



STUDENT SUSTAINABILITY COMMITTEE

Funding Application – Step II

Funding Criteria

A. General Rules

1. Students, faculty, and staff are encouraged to submit requests for funding. Student-led projects require a faculty or staff sponsor in order to have funds awarded.
2. Funding can only go to university-affiliated projects from students, faculty, staff, and departments.
3. All SSC projects must make a substantial impact on students. This may be a direct impact or an impact through education and engagement. All SSC funding is 100% from student green fees, so the projects funded by the students must benefit them.
4. SSC encourages innovation and new technologies – creative projects are encouraged to apply.
5. Unless a type of expense is specifically listed below as having restrictions, SSC can generally fund it. The items referenced below should not be taken as comprehensive list.

B. Things SSC Can Fund, On A Case-By-Case Basis

1. SSC can fund feasibility studies and design work; however, it must work toward ultimately addressing a sustainability need on campus.
2. SSC can fund staff positions that are related to improving campus sustainability. Strong preference will be given to proposals receiving matching funding from departments and/or plans for maintaining continuity of the position after the end of the initial grant.
3. SSC can fund outreach events with a central theme of sustainability, provided their primary audience is the general campus community.
4. SSC discourages funding requests for food and prizes but will consider proposals on a case by case basis that prove significant reasoning.
5. SSC can fund repairs and improvements to existing building systems as long as it works toward the goal of improving campus sustainability; however, a preference is shown to projects utilizing new or innovative ideas.
6. SSC can provide departments with loans for projects with a distinct payback on a case by case base. Loans will require a separate memorandum of understanding between SSC and departmental leadership pledging to repay the award in full and detailing the payback plan.

C. Things SSC Will Not Fund:

1. SSC will not fund projects with a primary end goal of generating revenue for non-University entities.
2. SSC will not fund personal lodging, food, beverage, and other travel expenses.
3. SSC will not fund any travel expenses.
4. SSC will not fund tuition or other forms of personal financial assistance for students beyond standard student employee wages.

Your Step 2 funding application should include this application, the supplemental budget form, and any letters of support.

Please submit this completed application and any relevant supporting documentation to Sustainability-Committee@illinois.edu. The Working Group Chairs will be in contact with you regarding any questions about the application. If you have any questions about the application process, please contact the Student Sustainability Committee at sustainability-committee@illinois.edu.

General & Contact Information

Project Name: South Farm Nitrate Monitoring Station

Total Amount Requested from SSC: 103,227.91

Project Topic Areas: Land & Water Education Energy
 Transportation Food & Waste

Applicant Name: Reid Christianson

Campus Affiliation (Unit/Department or RSO/Organization): Crop Sciences

Email Address: reiddc@illinois.edu

Check one:

- This project is solely my own **OR**
 This project is proposed on behalf of (name of student org., campus dept., etc.): iSEE/ SWATeam

Project Team Members

Name	Department	Email
Reid Christianson	Crop Sciences	reiddc@illinois.edu
Joseph Edwards	Ecology, Evolution, and Conservation Biology	Jedwa9@illinois.edu
Rabin Bhattarai	Agricultural and Biological Engineering	rbhatta2@illinois.edu
Arthur Schmidt	Civil and Environmental Engineering	aschmidt@illinois.edu

Student-Led Projects (Mandatory):

Name of Faculty or Staff Project Advisor:

Advisor's Email Address:

Financial Contact (Must be a full-time University of Illinois staff member)

Contact Name: Anna Tammen; Micah Kenfield

Unit/Department: Crop Sciences; iSEE Sustainability Programs Coordinator

Email Address: amtammen@illinois.edu; kenfield@illinois.edu

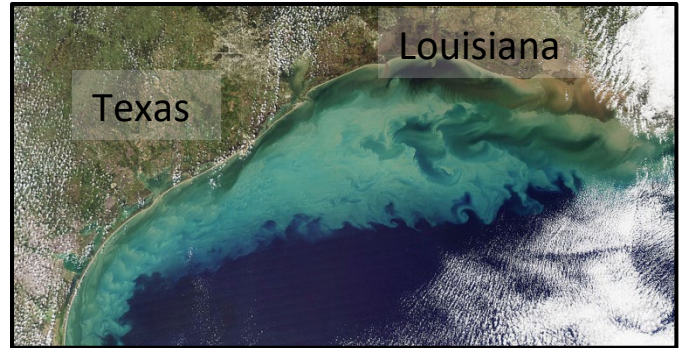
Project Information

Please review the proposal materials and online content carefully. It is highly recommended you visit a working group meeting sometime during the proposal submission process.

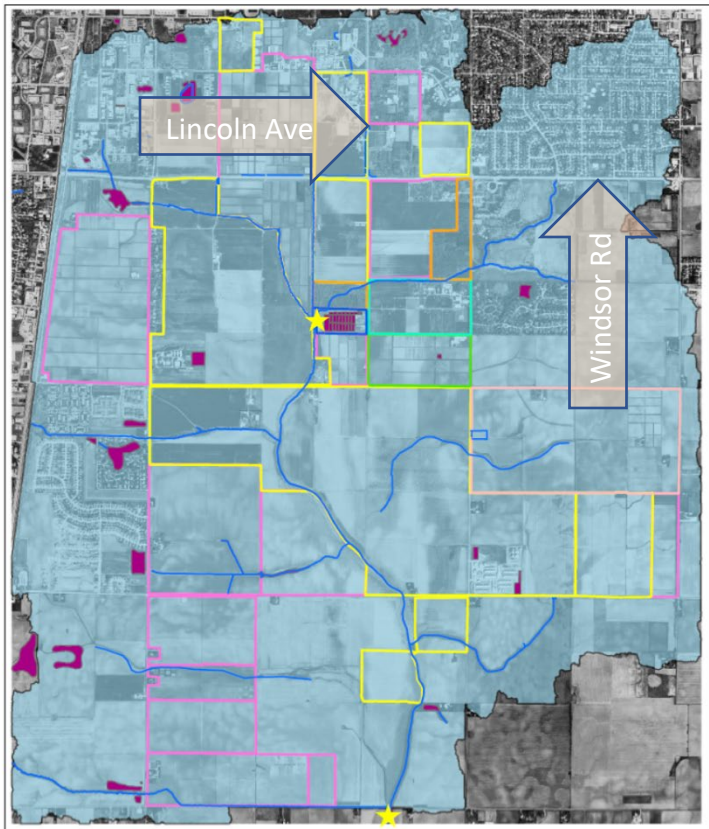
Please provide a brief background of the project, its goals, and the desired outcomes:

You may copy and paste your Step 1 application answer if nothing has changed.

Chemical fertilizers necessary to sustain the agricultural practices on campus are significant sources of waterway pollution downstream from UIUC. These pollutants, primarily in the form of nitrate, can contaminate drinking water, leading to health concerns such as blue-baby syndrome. Furthermore, nitrate pollution also promotes the growth of toxic algal blooms that reduce oxygen availability in the water, causing eutrophic “dead-zones” such as that in the Gulf of Mexico (pictured right).



Currently, the contribution of agricultural practices to this nitrate pollution from campus is unknown. **We are proposing building two “Nitrate Monitoring Stations” that will continuously monitor the flow of water and agricultural pollutants.** These stations will be able to transmit the data they collect remotely, allowing easy access to for UIUC students and community members. The first monitoring station will be located at the exit point for all water from the UIUC South Farm watershed (see the star at the bottom of the image below) and the second will be at the exit point for water flowing from the Animal Science Dairy Facility (a hot-spot for nitrate runoff). These locations were selected based on the need to represent the whole watershed, as well as collecting targeted information nitrate reduction potential (largest “bang for the buck”).



UIUC South Farm Land Use Strategies for Nitrogen Run-Off Determination and Mitigation

Legend

- ★ Proposed sample point
- Streams
- Ponds
- Energy Farm
- Aquaculture
- NRES Forest
- Veterinary Medicine
- Ag & Bio Engineering
- Animal Science
- Crop Science
- Watershed

Proposed N measurement point determined by finding closest stream point which all south farm land use drains to

Joseph Edwards
Eric Zamesky
NRES 454

To make land management at UIUC more sustainable, we need an accurate baseline for our current contribution to nitrate pollution. Right now, we have very poor (if any) data on how much nitrate is being lost from the South Farms and without building these monitoring stations it is unlikely we ever will. We must develop a better understanding of how our land management effects nitrate in the water so we can develop more efficient and sustainable land-use practices. These practices can be implemented in a real-world and accessible setting, which will facilitate direct interaction by students. Once we can develop these “Best Management Practices,” students will be able to take the short trip to the South Farms to see what sustainable agriculture looks like for themselves. Additionally, we plan to develop a system where we can send out the current flow and pollutant levels when there are spikes and lulls to students through various social media methods (such as a twitter-bot) to allow for the most exposure and student benefit possible.

These stations are a fleeting opportunity to catalyze a much broader change to agricultural management on the South Farms. As the College of Agriculture, Consumer and Environmental Sciences (ACES) develops plans to change land management practices; these monitoring stations represent a mechanism to hold these practices accountable for the nitrate they produce/reduce. Presenting decision makers with the actual stream nitrate load will make them much more likely to choose practices that mitigate these pollutants. By funding this project, SSC will be promoting a more conscious, data-driven, and accountable decision-making process on campus and setting an example for agricultural land-use management in Illinois and beyond.

Where will the project be located? Are special permissions required for this project site?

If special permission is required for this location, please explain and submit any relevant letters of support with the application.

The first monitoring station will be located under a bridge where County Road 1100 N intersects the Embarras River at approximately (40.039895 N, -88.216212 W). The second will be at the intersection of the Embarras and a drainage ditch leading away from the Animal Science dairy facility at approximately (40.073697, -88.223703). We have already begun talking with the proper authorities for each location (Champaign County for the first monitoring station and the College of ACES, Department of Crop Sciences for the second monitoring station). Neither station will disrupt currently designated uses/activities of these locations (e.g., no agricultural land will be taken out of production). Additionally, it is possible to move these stations in the future should it be decided that monitoring another location would be more useful.

Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments affiliated directly or indirectly by the project. This includes any entity providing funding (immediate, future, ongoing, matching, in-kind, etc.) and any entities that benefit from this project.

Please attach letters of commitment or support at the end of the application.

In addition to the project team, the entire campus and student body have a stake in this project by laying the foundation for accomplishing the iCAP goal of reducing nitrate from the South Farms. This is in direct alignment with the iCAP and was the impetus for proposing these activities.

No immediate, future, ongoing, matching, or in-kind funding has been secured. However, Dr. Christianson is a co-primary investigator on a recent \$1.1 million multi-state US Environmental Protection Agency grant proposal to implement better agricultural land management practices. The SSC project watershed will be the beneficiary of a portion of these funds. Further, as part of a recent recommendation by the Agriculture, Land Use, Food, and Sequestration Sustainability Working Advisory Team, the College of ACES is in the process of assembling a committee to evaluate and change agricultural land management policies. Being able to document these changes to meet the goals of the iCAP is incredibly important and will set an example for the student body that colleges on campus are serious about environmental stewardship.

How will this project involve and/or benefit students?

This includes both direct and indirect impact.

First and most important, the impact students will have on this project by funding it through the SSC is that they are setting an example for the type of responsibility that we should all feel for agricultural land

management and resulting pollution. This will provide a great deal of leverage in the future when working to make agricultural management of the South Farms more sustainable by essentially saying to campus-level decision makers “well, if students care about this topic you HAVE to care about it.” The same type of message could apply to agricultural commodity groups or other agricultural stakeholders by expressing the same sentiment; that younger generations care deeply about environmental stewardship and that management must head in the direction of sustainability.

The second way students can be involved with this project is through easy access to data generated by these monitoring stations. These stations can measure up to six different water quality variables every hour and make these data available on the internet in near real-time. These stations will provide a unique opportunity as educational material for many different classes in Crop Sciences, Natural Resources, Engineering, Geology, Environmental Sustainability, and Landscape Architecture to learn about these methods and practices first-hand. Additionally, we will work to publicize data generated by these stations through social media, university correspondence, and community involvement.

The third way students will be involved is through the inclusion of supervised undergraduate work/intern opportunities for managing the sites, collecting additional and supporting information (e.g., manually collected water samples for laboratory analysis), and initial quality control of collected data. These positions will provide direct hands-on experience with cutting-edge technology, sample collection methods, and laboratory procedures. These opportunities will be advertised through the Institute for Sustainability, Energy, and Environment (iSEE), the Sustainability Living Learning Community, and environmental RSOs.

Finally, the ultimate goal of these monitoring stations is to supply information to promote a change in land management activities to more sustainable practices here on campus. As these practices are implemented, students will be able to travel through the area and witness first hand what sustainable agriculture looks like in comparison to the conventional style they are likely accustomed to in central-Illinois. As students are exposed to these new ways of implementing agriculture, they will come to expect these when they leave campus, creating an increased demand for these practices beyond the extent of UIUC.

How will you bring awareness and publicize the project on campus? In addition to SSC, where will information about this project be reported?

We plan to create a website as a repository for data from these monitoring stations. This website will be available to the public and specifically targeted to students and campus community members. The website and information from it can be distributed through iSEE’s communications and the iCAP portal as well as by departments who use available information as part of their classes. We will also create social media profiles for these stations, which students can interact with using their personal accounts. For example, we could create a twitter-bot that shares nitrate loads and stream flows along with corny agriculture and sustainability-related jokes and memes to increase interactivity with users (get it... corny).

Financial Information

In addition to the below questions, please submit the supplemental budget spreadsheet available on the Student Sustainability Committee [website](#). Submission of both documents by the submission deadline is required for consideration of your project.

Have you applied for funding from SSC before? If so, for what project?

We have not previously applied for SSC funding.

If this project is implemented, will you require any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs?

Please note that SSC provides funding on a case by case basis annually and should not be considered as an ongoing source of funding.

A large portion of the requested funding is for initial site set-up, development of site characteristics and supporting data, and implementing quality control measures. Once running, these sites will require minimal ongoing maintenance. Dr. Christianson is willing to support the continuation of these activities through external funding or by combining this monitoring with ongoing monitoring efforts around the state.

Please include any other obtained sources of funding. Have you applied for funding elsewhere?

Please attach any relevant letters of support as needed in a separate document.

Dr. Christianson is a co-primary investigator on a recent \$1.1 million multi-state US Environmental Protection Agency grant proposal to implement better agricultural land management practices. The SSC project watershed will be the beneficiary of a portion of these funds, including individual field monitoring over the four-year duration of the project. Decisions surrounding this funding will likely be made in the early part of 2019. Monitoring efforts associated with this proposed work would seamlessly extend the requested SSC funding by at least three years.

Environmental, Economic, and Awareness Impacts

How will the project improve environmental sustainability at the Urbana-Champaign campus? If applicable, how does this project fit within any of the [Illinois Climate Action Plan \(iCAP\)](#) goals?

Stream nitrate reduction is specifically listed as a goal of the 2015 iCAP, Chapter 7, objective 6 “Reduce nitrates in agricultural runoff and subsurface drainage by 50% from the FY15 baseline by FY22.” However, there is no data for this baseline period, so we cannot quantify nitrate reduction without the proposed monitoring. With the monitoring in place, our current land management activities can then be assessed for deficiencies and adjusted to meet the 50% reduction initiative outlines by the iCAP. Additionally, as these monitoring stations are user-friendly, their ease of data collection will promote their continued use. The high quality of data collected will also serve as a check for direct evaluation of the impact that new sustainable land management practices have on achieving nitrate reduction goals.

How will you monitor and evaluate the project’s progress and environmental outcomes? What short-term and long-term environmental impacts do you expect?

Some examples include carbon emissions, water conservation, green behavior, and reduced landfill waste.

A unique aspect of this project is that the stations will, literally, be able to monitor themselves. These stations will measure flow and pollutant rates continuously and report these values remotely. Using these measurements, we will then be able to monitor the effectiveness of greater efforts to better utilize the land and agricultural practices on campus. Some ways of monitoring these broader goals will be to compare the baseline for nitrate pollution coming off of our agricultural land. The short-term goal for this project will be to establish a baseline for nitrate pollution in our streams. The long-goal will be to leverage this baseline to implement better management policies and practices for our land, ultimately leading to at least a 50% reduction in stream nitrate level, as mandated by the 2015 iCAP.

What are your specific outreach goals? How will this project inspire change at UIUC?

As soon as these stations are established, we plan on developing an accessible website where the information the stations are collecting can be made available to students and the general public. We will also connect this website to various social media profiles (Twitter, Facebook, Snapchat, etc.) to better disseminate the information gained from these stations to the public. We will use the University email infrastructure, like iSEE or departmental listserves, to distribute the websites and various social media profiles.

This project will increase awareness of the contribution our agricultural practices are making to nitrate pollution within the campus community. With this awareness, we can influence decision makers on campus and beyond to be more considerate of their contributions to nitrate pollution, and ultimately to develop and implement better practices for reducing these pollutants. By showing that students are taking ownership and responsibility over the environmental degradation caused by our campus agricultural practices, we can be an example to other growers to follow our lead and take responsibility for their nitrate pollution as well.

If applicable, how does this project impact environmental injustice or social injustice?

The most hard-hitting impacts of agricultural nitrate pollution are felt far downstream of where the crops are being grown. Many of these areas rely on the nitrate-contaminated water either for drinking or as a source of economic income through fishing or tourism. Drinking water with high nitrate levels can cause infants to suffocate due to poor oxygen uptake (known as “blue baby” syndrome) and has been linked to higher rates of diabetes and certain forms of cancer in adults. While it is possible to treat drinking water to lower nitrate levels, this solution is often cost-prohibitive in many communities with lower socioeconomic standing. These impacts are direct threats to the health of underprivileged communities that are forced to deal with this pollution.

Nitrate pollution is detrimental to the economies of downstream communities as well. When nitrate polluted water exits the stream into the Gulf of Mexico, the resultant algal blooms decrease oxygen availability for fish, plants, and other organisms in the environment. These low-oxygen conditions significantly reduce the community's ability to harvest resources from the water, such as shrimp or fish, putting an economic strain on the people suffering from this pollution. Furthermore, these algal blooms are aesthetically unappealing and potentially toxic, reducing the tourism revenue as well as cultural and recreational value these communities receive from the environment. These economic threats can exacerbate hardships for families in areas hit by nitrate pollution that are likely already facing other environmental threats such as increased storm damage and rising sea levels.

By installing these nitrate monitoring stations at the source of the pollution, we are taking ownership over the damage our actions are causing to communities downstream. These stations will serve as a mechanism to hold our agricultural practices accountable for their nitrate pollution and to help us develop and implement better, less environmentally detrimental practices in the future.