Name: Ida Weiss

Is this a project that you will work on alone, or will you collaborate with others? If you are collaborating with others, list their names, their Tufts affiliation, and their contact emails. Please indicate which member of your team will be the principle contact.

Angley Topper (langley.topper@tufts.edu): Tufts junior & Nolop contact; Aidan Demsky (aidan.demsky@tufts.edu): TMC Lodge Director & TMC contact; Alicia Bellido (current Garden Club President) alica.bellido@tufts.edu; Elyssa Annesar (current Eco Rep coordinator) elyssa.annesar@tufts.edu; Brandon Stafford (Nolop makerspace faculty supervisor)brandon.stafford@tufts.edu; Will Yorton (Bray Shop student worker) will.yorton@tufts.edu

Please provide a 300-350 word description of your project

We propose funding an outdoor compost bin for the Tufts Mountain Club Lodge in Lincoln, NH. Past composting efforts have been unsuccessful due to lack of funding and animal problems. Now, we have the motivation, organization, long term strategy, and funding to make this project a reality. Over 700 students, alumni, and Tufts guests enjoy the Lodge each year. The need for compost is apparent; guests generate about 6,600 gallons of waste annually, all of which goes to a NH landfill or incinerator. Our next step, in line with TMC and Tufts' mission of reducing waste and greenhouse gas emissions, is to provide on-site composting. The compost system will include a permanent 3x3x3.5 ft. outdoor wooden bin, indoor compost bucket, and educational material. The bin was designed following online blueprints, which we altered to keep out pests and resist bear activity. We plan to use a structurally sound bin design and proper compost management to minimize animal activity. Weekend caretakers will be responsible for monitoring, emptying, and logging compost amounts. A "Lodge Composting" guide that we write, print, and laminate will teach guests and caretakers on how to compost correctly. During Lodge work weekends, we'll make any needed bin repairs. At the end of each semester, we'll send out feedback surveys to the Lodge Community and make system adjustments as needed. We expect by spring 2021 to have decomposed compost ready to donate to the Tufts Garden Club. The project will be easily built into TMC and Lodge infrastructure, which will ensure its longevity and success. All Lodge Caretaker training sessions, from February 2020 onwards, will teach compost duties. Two positions within TMC executive board, the Lodge Director and Stewardship Director, will be responsible for the care and education of the composting system. We see this as a low-cost, 100% student-led project. Students who join the project team or volunteer can learn new skills (basic carpentry and composting) and work across student groups. Composting will reduce the Lodge's carbon footprint, expand the scope of Tufts sustainability, and be an empowering, fun project.

What is the problem that you are looking to solve?

With the Lodge composting system, we will solve the bear/pest problem that's impeded past compost projects and create a long term, sustainable composting system. We also

aim to reduce the Lodge's carbon footprint and limit solid waste deposited into the Lincoln waste station.

Has this been done before? Yes

When in the past was this project done? By whom?

TMC Lodge caretakers 10-15 years ago created a rough compost bin.

How is this project different than the ones done in the past?

Lodge composting had been attempted before. However, it was discontinued because of bear activity and pests. For these reasons and a lack of funding/focused efforts, the lodge has no functional compost system. In total more than 700 guests stay at the Lodge annually. This includes regular users, as well as six big weekends with around one hundred guests. During smaller weekends individual groups cook their own meals and during big weekends, caretakers cook big group dinners. On any given weekend, Lodge guests throw away vegetable scraps, fruit rinds, egg shells, tea bags, and coffee grounds. What's more, guests will frequently ask caretakers, "Where is the compost? Can this be composted?" showing that the need and will to compost is clearly present in the Lodge community. The biggest problem we will face is limiting pest and bear activity. Online resources have excellent suggestions on how to achieve this. We plan to keep pests and bears away with three main strategies: (1) delegating and teaching compost responsibilities, (2) bin design (ie. enclosing the bin in ½" hardwire fencing, anchoring the bin to the ground, and building a structurally sound container), and (3) proper and care management of the bin's contents. 1. Delegation: The previous attempt at Lodge composting did not focus enough on education and training. We recognize this as a key reason why the last compost bin was discontinued. Proper education, training, and behavior correcting will be a key part of this project. In our experience, students and Lodge guests are already excited and ready to compost, so we will simply provide them the steps to compost correctly. There will be a hierarchy of control for the Lodge compost. The compost, when completed, will be the responsibility of the Loj Director and Stewardship Director, both Tufts Mountain Club executive board positions. This ensures the compost's long term success. Weekly care of the compost will be delegated to the Lodge caretakers, two to three students who maintain the Lodge, make announcements, and coordinate cleaning tasks during weekends. All caretakers will be trained on compost care at the Lodge during the official Caretaker trainings. Lodge guests will be informed of proper compost use by caretaker announcements and clear signage inside and outside the Lodge. 2. Bin Design: First, the two-bin compost design is designed to be bear and pest proof. Estimated compost generated yearly at the Lodge is 580 gallons or 93 cubic ft. Considering compost decomposition rate, we propose building two 36 x 36 x 40" bins. Each bin can store 30 cubic ft, for a total capacity of 60 cubic ft. We used four different resources to design our compost bin, the primary one being a bear-proof compost bin designed and tested for Grizzly Bears in Slovakia. From this design we used the in-ground spike anchors, interior posts, thick cross-beams, and lid that falls flush with the top of the bin. The NYC Compost Program Manual and Jesse Hills at the Cobb Hill cohousing in Hartland, VT suggested using ½" wire mesh to keep

out pests. The lid, bottom, and three external sides of our compost bins will be covered in meshing. The lid will be latched and the door hinge on the second bin secure with four hook and eye latches. 3. Management: Our third strategy to keep out bears and pests is to limit the smell. The NYC Master Compost Program identified five important factors to consider: ingredients, moisture, oxygen, size of ingredients, and the size & shape of bin. The carbon-to-nitrogen ratio is achieved by adding two parts browns to one part greens. For browns, we will use dry leaves, woodchips, sawdust, or cardboard and newspaper. All of these materials are easily accessible in the Lincoln, NH area at low-cost prices and could be stored and kept dry in the TMC shed. The greens would be the organic vegetable products from the kitchen. All dairy, meat, and fish products will be kept out of the compost bin. Greens and browns will be measured and mixed in a separate bucket before adding to the compost pile. After each compost addition, the caretaker will add a cap of browns to further reduce odor. Our proposed compost bin size should self-regulate moisture, but if it's not damp to the touch, the caretaker will be responsible for adding water and stirring the bin to mix. Proper aeration will ensure the pile is composting aerobically. It is when oxygen levels fall below 5% (anaerobic) that compost bins begin to smell. We'll take extra steps to properly aerate our bin, such as mixing the greens and browns beforehand, turning the pile every two weeks, and adding bulk carbon- rich materials such as woodchips, pinecones, or corncobs that are non-condensing and create air space. Variations in "ingredient" size help the compost decompose quickly. Bins larger than 27 cubic ft. can maintain a consistent temperature, up to 140 F in the winter. Our bin is 30 cubic ft.

How will you measure success?

We'll measure success by keeping a compost log and sending out a compost feedback survey to the TMC elist (May '20, Dec. '20, and May 21'). If we successfully keep out pests and no bears come, we'll also consider that a success. Caretakers will fill out a weekly compost sheet log to keep track of amounts generated. Log fields will include: compost generated (gallons), brown material added (gallons), and compost smell (1-5). In late May 2020 we'll send out a compost survey to the Lodge community, asking for feedback about ease of use, their understanding of compost, and ways to improve the system. Caretakers will also be responsible for counting the number of trash and recycling bags generated at the Lodge each weekend. This will give us quantitative results to understand how much waste we successfully diverted.

How many people would this project impact? Please categorize them as students, faculty, staff, and other

The Lodge Compost bin project would foster collaboration between different student organizations: the Tufts Mountain Club, Tufts Garden Club, Nolop makerspace staff, the Eco Reps, Students for Environmental Awareness, Tufts Bikes, and Crafts Center. In the spring, we'll create a small project team to finalize details (5-8 students) and assemble another bigger group to build the bin. The project would create a long term partnership between the Tufts Garden Club (10-15 members and recipients of the compost) and the Tufts Mountain Club (330 members). In the spring semester of 2020, we will reach out to Tufts Bikes, SEA, the Eco Reps, SEA, and the Crafts Center for volunteers and student

expertise. We have already put together a project team of three dedicated TMC students and received pledges of support from students at the Nolop makerspace, Bray Engineering Lab, the Garden Club, and Eco Reps (see list for full project team). This is also an opportunity to connect students with the fantastic, new Nolop space, getting students familiarized with its resources and staff. Most importantly, this project would benefit the 700 annual guests that visit the Lodge: student clubs on retreat, sports teams, alumni, and Tufts students.

What is the environmental impact?

Composting at the Lodge will reduce greenhouse methane gas emission, conserve space in NH landfills, and regenerate soil for Tufts campus. We estimate that the Lodge generates 55 gallons of compost per month during the academic year and 25 gallons during summer months. This adds up to 577.5 gallons per year (97 cubic ft). Currently, this organic waste goes to the Lincoln NH Waste Station and then to a NH landfill or incineration center. In landfills, slow decomposition of organic waste generates methane, which according to the Environmental Defense Fund, is 26-38 times more potent than CO2. NH currently lacks enough space for its solid waste. This is partly due to two commercial landfills closing in MA (Chicopee and Southbridge), which caused a 500,000 ton loss in disposal capacity. Now, more waste is hauled long-distance to Pennsylvania and Ohio. By reducing our contribution of solid waste, we reduce our carbon footprint and extra greenhouse gas emissions from rail and truck transportation of solid waste. NH is also considering an Organic Waste Disposal Ban to achieve a Disposal Reduction Goal (proposed at 30% reduction from 2008 baseline by 2030 and 80% by 2050). Looking down the road, composting at the Lodge will align well with NH's solid waste reduction plan (Nork 2019). On campus, the Garden Club will use the decomposed compost for projects, such as the community garden. Nutrient-rich, organic compost will help regenerate and replenish soil. Nork, M. (2019). 2019 Biennial Solid Waste Report. 23.
https://www.des.nh.gov/organization/commissioner/pip/publications/documents/r-wmd-19-0 2.pdf

What are the educational impacts of this project?

The educational impacts of this project are many and varied. Our initial design challenge of building a bear and critter resistant requires that we think creatively and research thoroughly. We will take our current compost blueprint (see attached document) and receive input from Brandon Stafford before our final build in the spring. Anyone and everyone is welcome to join the project team in the spring. At our open compost-building sessions in Nolop, interested students can learn basic carpentry, under supervision from Nolop staff. We'll use the Campus Center community event as an example of the design process: how to compost in bear country. We hope going forward to share these ideas with the Appalachian Mountain Club (AMC) other college outdoor clubs who operate cabins in the New England area. Besides explaining our design process, challenges, and solutions, we'll also use this opportunity to explain the benefits of composting to the public. At the Lodge itself, guests will learn how to compost. This is significant because guests who may have no prior experience with

compost before will get to participate in the process and actually see the compost bin in action. Additionally, the twenty caretakers that are trained each year will have a deeper understanding of the composting and aerating process and can become compost leaders and advocates in their communities after graduating from Tufts.

What is the social impact (excluding educational aspects)? (e.g. alleviating climate injustice, community resiliency, culture change, equity, etc)

The entire project is student-planned, written, and carried-out. Besides technical advice from Head Staff of Nolop Brandon Stafford and other Bray/Nolop workers, we plan to research, buy, build, transport, install, and maintain the compost bin with 100% student action. Our core team of student volunteers (from different student organizations), will meet to buy materials, transport wood, and build the bin, among other tasks. This group project will bring students, freshmen to seniors, together through problem-solving and collaboration. Our community event, "The Lodge Now Composts!" at the Campus Center, will be an opportunity to share what a Tufts Green Fund project looks like and collaborate with the Eco Reps to educate students about composting. This project also contributes to the environmental ethos we are trying to build within the Tufts community. We want to engage TMC students to think about where their waste is going and how simple solutions can divert organic waste from ending up in landfills.

Will it help Tufts meet its sustainability goals? If so, how? (See Tufts sustainability goals here: https://sustainability.tufts.edu/sustainability-at-tufts/our-commitments/commitments/)

This project aligns with Tufts long-term sustainability goals in two areas: (1) reduction of waste, and (2) reduction of greenhouse gas emissions. The 2013 Sustainability Council Report's Waste Working Group set the goal to, "Reduce waste by 3 percent each year, on average, through source reduction, waste management strategies, and behavior change." We expect to divert between 7-10% of Lodge waste from landfills each year. Lodge composting also inspires behavior change and reinforces composting as a normal habit. We'll educate students on composting at our Campus Center event and continually teach and correct composting habits at the Lodge. Over 700 Tufts students, alumni, and guests will get to see the compost bin in action and participate in Lodge composting every year, which fulfills Objective 3 of the Waste Working group ("Increase participation in recycling and waste diversion through ongoing education and behavior change campaigns. Within five years, all members of the Tufts community will know how to divert and reduce waste, and active participation in waste diversion will increase by 50 percent"). Although Tufts currently composts on campus, most students and faculty never see the full cycle (from organic waste to pile to soil). Our project provides a neat opportunity for students to see (and participate in) this process first-hand. Composting will reduce the Lodge's carbon footprint by removing organic waste from landfills where it generates methane gas. Reducing greenhouse gas emissions is a main goal of the We Are Still in Coalition and the NE/Gov/Eastern Canadian Premiers Climate Action Plan. (Note: This Green Fund project could initiate closer collaboration

between Tufts Sustainability initiatives and Lodge activities (i.e. waste reduction, energy efficiency, carbon offsetting, etc)).

What are the life cycle cost savings or the immediate cost savings, if applicable?

This project does not have immediate cost savings nor do life cycle costs apply.

Provide us with a timeline of planning and implementation of the project. (This question is for optional additional information not included in the Gannt chart)

A Gannt chart is attached for months January - May 2020, when the most activity is taking place. For September 2020 - May 2021, please refer to the attached Google Doc. timeline.
https://docs.google.com/document/d/1f1shG9KImj9JOyYdgDApVaYmR9d0yhvGERzV1Tj6ycc/edit?usp=sharing

How much funding are you requesting from the Green Fund? Are you seeking funding from other places?

We are requesting $1,470 from Green Fund. We are not seeking outside funding.

i. Please provide more detail on the project components beyond infrastructure (i.e., management of the process and use of the final product.)

We answered the comments within the application itself, but will clarify briefly here. We will create a project team in the early spring and delegate tasks to this team. Main tasks will include contacting Boston repurposed wood stores, researching and writing the "Lodge Composting" Guide document, meeting with Brandon Stafford to finalize design, and working with TMC to modify Caretaker training to include compost duties. We'll use the TMC van to transport materials and will hold 2-3 work sessions to build the bin. We'll use the van to transport the bin up the Lodge. The composting process itself will be simple. Caretakers, at the beginning of the weekend, will point out the compost (an indoor plastic bucket) and explain how it works. Sunday morning caretakers will record compost amounts and bin odor in the Compost Log, mix sawdust into the bucket, dump the bucket into the bin, and add a cap of sawdust. We'll modify the compost protocol as needed. A member of the project team will meet with every caretaker between early April (bin installation) and the end of the semester to review compost protocol.

We will keep in contact with Tufts Garden Club and work to plan projects with them. In the spring of 2021, we will use heavy black trash bags to bag up and transport the compost to campus.

ii. How would you ensure that there are no pest issues?

Bin design and proper compost management, as well as long term compost care, provided by TMC and the caretakers.

iii. Have you reached out to the nearby farms?

We decided to donate the compost to Tufts Garden Club.