INTERNSHIP - SUMMER 2019

USING PLANTS TO CONTROL BUCKTHORN

Duties: We are hiring two UMN student interns to take key roles in a suite of ongoing field experiments in the Department of Forest Resources funded through the Minnesota Invasive Terrestrial Plants and Pests Center. The experiments, established in spring 2017 following large-scale buckthorn removals, ask how to use native plant species to suppress buckthorn re-invasion and improve restoration of buckthorn-invaded woodlands and forests. They also examine the roles of herbivory, fire, and herbicides in this process. Primary duties will be to re-locate experimental units; plant and monitor the growth of buckthorn; weed small plots; measure light availability multiple times through the season; measure plant species composition; maintain deer fences; remove fallen trees; and generally assist with experimental needs. The two interns will work as a team, supervised by two post-doctoral researchers.

Optional independent research opportunities: The post-docs are willing to mentor interns in independent research projects utilizing the existing experimental design, if the interns choose. Interns are also welcome to participate in lab meetings of the Forest Ecology research group on the St. Paul campus. Applicants interested in pursuing independent research should submit applications as soon as possible to allow the possibility of preparing a proposal for UROP funding which is due in February.

Dates: mid May – August 31, 2019, with some flexibility. Positions could start as early as April, depending on weather and intern availability. Similarly, extension through October may be possible depending on intern availability, because we will also recruit a team of two for September-October to re-survey buckthorn abundance in permanent transects and harvest buckthorn seedlings.

Pay Range: $12.00 - $15.00 per hour, depending on experience and duties

Hours: Approximately 40 hours per week

Required qualifications:
- Interest in field biology, ecology, forestry, restoration, plant propagation or environmental science
- Dependable, motivated, with integrity and a strong work ethic
- Strong skills in communicating and working with other team members across differences
- Flexible team structure: interns will work as a pair (or with one or both post-docs) for different tasks
- Attention to detail in repetitive work, and diligent adherence to standardized protocols
- Flexible work hours: adapt daily plans to weather; light readings need uniform sky conditions, and gray days are typically too few, so pre-sunrise or post-sunset readings will be needed on up to 21 days through the season; potentially a few long day-trips to a forest diversity experiment at Cloquet
- Willing to work with plants in a wide range of field conditions across the Twin Cities, including varied weather, steep terrain, and biting insects
- Strong organizational skills, and proficiency in Google Drive for data management
- Previous work experience

Preferred qualifications:
- Student status (6+ credits in Spring 2019 and intending a full class load in Fall 2019)
- Experience identifying herbaceous and woody plants in Twin Cities area woodlands
- Access to a reliable vehicle to reach the multiple field sites, up to 34 miles from the University of Minnesota St. Paul campus (mileage reimbursement available).

Contact: Questions and applications should be directed to Mike Schuster and Peter Wragg (Dept. of Forest Resources) via email (coveritup@umn.edu). To apply, please submit a cover letter and CV/Resume. In your cover letter, answer the following questions: 1) What are your desired start and end dates for summer? 2) What, if any, planned absences do you have over the summer? 3) Are you available for field work in the Spring and/or Fall semesters? If so, when? Review of applications will start February 1, 2019 and continue until the positions are filled.
Under which conditions do each forest herb (grass/wildflower/sedge) and woody species do best?
Perform more detailed species level vegetation surveys to relate the performance of the 33 species seeded in the big plot experiment to canopy & soil characteristics, to enable guidelines for more effective & efficient restoration of diverse and functional woodland understories. Or assess woody species by measuring growth rates of native shrubs and trees in the small plot experiment and comparing them with canopy & soil characteristics.

Do pre-seeding treatments (e.g. raking away leaf litter or woody debris) improve the effectiveness of seeding by increasing seed-to-soil contact?
Practitioners have different views. Test this using additional small subplots next to the seeding experiment.

Does fertilizing with nitrogen advantage buckthorn or herbaceous competitors?
Buckthorn might be expected to be advantaged over competitors given its fast growth rate in high nutrient conditions. Alternatively, fertilizing could help control buckthorn by promoting herbaceous plants, as has been observed with other woody species in grasslands. Test this using additional small subplots.

Does planting seeds of native species suppress other invasive species besides common buckthorn (glossy buckthorn, Tatarian & Morrow's honeysuckles, garlic mustard, etc.)?
Test this by planting seeds of other invasive species (under controlled conditions!) and assessing their performance in plots with and without native seeding.

How does buckthorn fruit production vary with plant size (do the top 20% largest individuals produce 80% of the seeds?) and light availability?
This could guide managers in which buckthorns to remove first to limit seed production. This project would be done in the fall, at sites where buckthorn has not yet been removed.

Does the supply of mycorrhizal hosts limit expansion of buckthorn into stands of other trees?
Mutualisms with soil microbiota are important components of many tree species’ niches, and may therefore play an important role in their dispersal into new habitats. Test this using inoculated soils in the lab.

Why do we see more buckthorn under oaks than in surrounding open areas?
Determine the role of shade, propagule pressure, herbaceous competition, and soil moisture on common buckthorn establishment under oaks in grasslands.