

UAF Master Planning Committee

Special Meeting Agenda

Friday, May 29, 2009; 9 a.m.

Chancellor's Conference Room; Signers' Hall Room 330

- 1) **Olson Application for Balsam Poplar Experiment in T-Field**

Summary of Proposed Work
Balsam Poplar Common Garden for Teaching and Research
Matthew Olson, P.I.

1. **Goals:** Describe your research goals and objectives. Why is the NCA the most appropriate location for this research?

We will be planting a common garden of balsam poplar genotypes that originate from throughout the range of the species (Across Canada and Alaska) for research and teaching purposes. The entire genome of poplar has been DNA sequenced and genomic DNA nucleotide variation for these genotypes has been characterized for 600+ genes. Studies of these genotypes are the focus of a long term collaborative study with scientists at the Canadian Department of Agriculture and Agri-Food. Research goals include understanding adaptation during climate change, identifying genes associated with timing of dormancy (an important trait for adaptation across latitudinal clines), understanding the influence of genetic diversity on ecosystem processes, cold adaptation of trees, and genetic variation of tolerance to herbivory. Research in this garden will complement an NSF-funded project on Cold Adaptation in Balsam Poplar being conducted by the Principle Investigator, Matt Olson. This garden will be available for use in Biology courses including Principles of Ecology, Principles of Genetics, and Principles of Evolution to provide hands-on exercises to estimate genetic diversity in natural populations of trees. We will be using this garden for a summer course in 2009.

2. **Timeline:** What is the timeline for your research?

Ongoing. We intend to grow the trees to maturity, so the site may remain a garden for 10+ years. If no research is being conducted in the garden for any 5 year period, its utility will be re-assessed and discussions will ensue regarding whether the site should be returned to a grassy field.

3. **Access:** Describe how you will access the site: by what means, how often, and in what seasons.

Access will be required during the spring, summer and fall, when snow is not on the ground. We will access the site by foot and, when required, by vehicle along the dirt road from the GI parking lot. Special access during the winter may be requested in the future for teaching purposes and will be by foot along currently defined hiking and snowshoe trails to the T-field.

4. **Location:** Provide GPS coordinates of your proposed site(s) together with a North Campus Area map (See below) that indicates the proposed site. The NCS Chair can provide a GPS unit if you do not have access to one. Specific research locations will not be divulged to the general public but will be used by the NCS strictly for management decisions. Photographs or digital images of the site are also helpful.

This will be provided by Luke Hopkins and Alan Tonne

5. **Size and dimensions of study area:** Give the size and dimensions of your proposed study area.

This will be provided by Luke Hopkins and Alan Tonne

6. **Site modifications:** One of the objectives of the North Campus Plan is to maintain the natural integrity of the NCA and ensure a quality research environment for the future. How will your research meet these objectives? Describe any required modifications to the location such as new trails, soil pits, boardwalks, tree removal, construction projects, or other infrastructure.

We will be installing a fence approximately 8 feet high with metal posts and mesh fencing that surrounds the garden. This is required for tree establishment to ensure the saplings are not eaten by Moose. After the trees are mature the fence can be removed if necessary.

7. **Utilities:** Indicate if your research requires power lines or connections.

No

8. **Potential hazards:** Describe any environmental hazards associated with your proposed NCA research, including use of harmful chemicals, radiation, or infrastructure that could harm the NCA and/or its users.

Roundup herbicide will be used to treat the site before planting. This herbicide has a short retention time in the soil (only days) and has minor long term environmental influences.

9. **Potential conflicts:** The NCS is committed to maintaining quality standards of multiple use in the NCA. Describe any potential conflicts with educational or recreational users.

None known. The garden will not impact the current locations of any ski trails. Minor changes can be made to accommodate any concerns of the trail users.

10. **Restoration:** The UAF North Campus Plan requires that all evidence of the research project be removed from the site within 90 days of project completion and restoration of the area. Describe how you will accomplish this.

This is a long term study, so it cannot currently be projected needs for this site in 10 – 25 years from now. Additional funding will have to be acquired at the time for site manipulation.

A Poplar Common Garden for Alaska's State Needs

Proposal: To develop a common garden of approximately 500 balsam poplar clones (*Populus balsamifera*), each replicated 5 times (2500 trees total), for permanent study on the UAF campus. This garden will be a replicate of a garden currently growing in Indian Head, Canada and will include 15 individuals from each of 32+ populations. These clones originate from sites throughout the range of balsam poplar (Figure 1). My vision is that this garden will be a long term research resource for all types of researchers (physiologists, chemists, geneticists, ecologists, foresters, etc.) interested in genetic variation in Alaskan vegetation. I anticipate that it will spawn many different research projects and can be the source of funded proposals for years to come. Carol Lewis, Dean of the School of Natural Resources and Agricultural Sciences, is very keen on the idea and has offered long term space in the Experimental Fields to plant the garden.

Rationale

Landscape Genetics: Poplar is the model tree species for genetics and physiology; an annotated genome is available, making the genetic resources necessary for population and functional genetic studies easily accessible. Balsam poplar is a foundation species for floodplain boreal forest. The degree and type of ecological importance of this species varies across the state and its range, depending on factors such as the presence of competitor tree species or alternative

sources for large and small herbivore browse; these factors will drive variation in local selection regimes and adaptation. Ongoing research in the Olson lab at UAF is addressing patterns of DNA sequence variation throughout the range in these same genotypes of balsam poplar. A common garden will allow studies of the patterns of functional genetic variation present across the Boreal forest and expressed in the Interior Alaskan environment. The presence of this common garden on the UAF campus will provide easy access for future students at all levels for studies of plant physiology, herbivory, disease resistance, yield and growth characteristics, and functional genetics. Moreover, comparative studies can be conducted utilizing the same genotypes growing in the replicate garden in Indian Head, Canada.

Teaching and outreach: Genotype and environment affects on plant phenology is one of two curriculum components being developed by EPSCoR outreach to secondary schools. This common garden will serve as a long term site where Fairbanks secondary school students can conduct studies on the effects of genotype and environment on morphological and physiological traits in plants. The garden also will serve as a field site for UAF university classes to conduct field studies of the influences of genotype and environment on plant growth, physiology and morphology.

State needs: Balsam poplar is the fastest growing tree species in Interior Alaska and is being considered for interior floodplain forest plantings. With future requirements for biofuels for heating, coal gasification, and other needs, reforestation with high yield genotypes is necessary. This garden will provide the first study of yield in the Interior for a range-wide collection of genotypes of an Alaskan hardwood species. It will provide information about which source population genotypes are best suited for growth in Interior Alaska. Dr. Carol Lewis, Dean of the School of Natural Resources and Agricultural Sciences at UAF, is enthusiastic about collaborating on the development of this garden and has suggested collaboration with the Alaska Department of Forestry to obtain future long term funding.

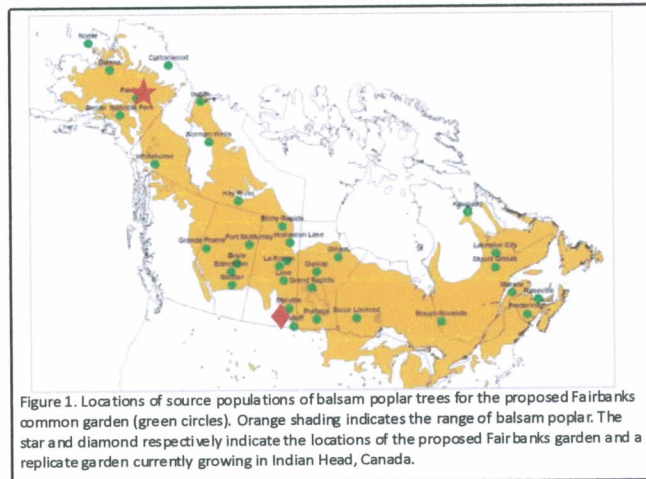


Figure 1. Locations of source populations of balsam poplar trees for the proposed Fairbanks common garden (green circles). Orange shading indicates the range of balsam poplar. The star and diamond respectively indicate the locations of the proposed Fairbanks garden and a replicate garden currently growing in Indian Head, Canada.



Exotic Tree Farm

500 ft

800 ft

Olson

BirdVetch Plot

Seefeldt

Iwata

Boyer Rd

Sawyer Rd

Hickory Rd

500 ft from Field Corner

**APPLICATION PERMIT FOR RESEARCH IN NORTH CAMPUS AREA
UNIVERSITY OF ALASKA FAIRBANKS (Updated Oct 2007)**

The North Campus Area (NCA) provides an excellent outdoor research laboratory for a variety of disciplines. Faculty, graduate and undergraduate students, and visiting scientists have used the NCA for research in ecology, plant science, soils, wildlife and wetlands biology, water chemistry, geophysical sciences, permafrost, agriculture, ornithology, art, photography, native studies, and more. Its value lies primarily in its accessibility on campus and diversity of ecological habitats.

UAF's North Campus Plan (www.uaf.edu/mastplan/northcampus) seeks to ensure that the NCA remains an outstanding campus laboratory for current and future research programs. The North Campus Subcommittee (NCS), created by the UAF Master Planning Committee, reviews and approves all NCA activities consistent with the North Campus Plan. Membership and the activities of the NCS are included at the web site listed above.

All NCA research requires a permit from the NCS; research in the Boreal Arboretum also requires approval from the UAF Arboretum Committee. Permits are valid for up to two years, with renewals possible upon further NCS review. Attached is a permit application that should be accompanied with a brief summary (3-page maximum) of your proposed work. The NCS will review your application and respond in writing, including a request for additional information (if required). The summary of proposed work should include the following:

1. **Goals:** Describe your research goals and objectives. Why is the NCA the most appropriate location for this research?
2. **Timeline:** What is the timeline for your research?
3. **Access:** Describe how you will access the site: by what means, how often, and in what seasons.
4. **Location:** Provide GPS coordinates of your proposed site(s) together with a North Campus Area map (See below) that indicates the proposed site. The NCS Chair can provide a GPS unit if you do not have access to one. Specific research locations will not be divulged to the general public but will be used by the NCS strictly for management decisions. Photographs or digital images of the site are also helpful.
5. **Size and dimensions of study area:** Give the size and dimensions of your proposed study area.
6. **Site modifications:** One of the objectives of the North Campus Plan is to maintain the natural integrity of the NCA and ensure a quality research environment for the future. How will your research meet these objectives? Describe any required modifications to the location such as new trails, soil pits, boardwalks, tree removal, construction projects, or other infrastructure.
7. **Utilities:** Indicate if your research requires power lines or connections.
8. **Potential hazards:** Describe any environmental hazards associated with your proposed NCA research, including use of harmful chemicals, radiation, or infrastructure that could harm the NCA and/or its users.
9. **Potential conflicts:** The NCS is committed to maintaining quality standards of multiple use in the NCA. Describe any potential conflicts with educational or recreational users.
10. **Restoration:** The UAF North Campus Plan requires that all evidence of the research project be removed from the site within 90 days of project completion and restoration of the area. Describe how you will accomplish this.

Contact the NCS Chair (contact information below) if you need any help with the application process. The NCS strives to expedite the permitting and approval process to make it as efficient as possible.

Regulations for Research in NCA

1. Motorized vehicles will only be allowed on designated services roads (exception, emergency vehicles)
2. Walking and use of wheeled vehicles will not be permitted on groomed ski trails in winter. The only exception will be emergency vehicle access and if a situation arises with the research project that requires access for maintenance, equipment installation, etc. and if a snowmachine will not suffice. Any researcher requiring access that includes possible damage to groomed winter trails or boggy summer trails **MUST** obtain permission from the NCS Chair prior to using the trails. When required, access that has negative impact on groomed ski trails or wet areas should be coordinated with the NCS Chair to ensure that any necessary corrective work is carried out. Use of a snowmachine, if needed, also should be coordinated through the NCS Chair.
3. Researchers and/or their departments will be responsible for funding repair to trails and roads caused by non-approved vehicle access.
4. Projects should be located at a sufficient distance off trails to avoid vandalism and reduce visual impact to other users.
5. Fencing for protection of research project sites is a last resort and requires NCS approval.
6. Trees and other living plant materials near the research site may not be used as signposts, supports for wires and equipment, or other uses that might cause permanent damage or provide entry points for disease or insect pests.
7. All structures, equipment, flagging, cables, and other research materials must be removed within 90 days of project completion. The researchers and/or department will be billed for anything not removed.
8. If modifications to the site have been made, it must be restored as mutually agreed upon in the permit application by the researcher, their department and the NCS. The researchers and/or department will be billed for any modifications not accomplished.

Permitting Process

Once the NCS Chair receives your completed application it will be distributed electronically to the full North Campus Subcommittee. They will respond to the NCS Chair within 5 working days. If there is no further discussion needed you will be notified by the NCS Chair. If further discussion is needed the NCS Chair will schedule a meeting to decide how the research will fit in with the values of the North Campus.

Please note that applications from students must be approved and signed by a faculty advisor or advisors. Faculty advisors and their departments or institutes will be responsible for removal of research materials and site cleanup after project completion.

Applications from researchers not affiliated with UAF require a sponsor from UAF faculty or staff.

If approved

Research sites need to be accessed in a means appropriate for the management regime of the trails/roads involved. Motorized vehicles will only be allowed on designated service roads (see map below). No walking or wheeled vehicles on designated ski trails in winter. No heavy, wheeled vehicles in wet areas. If needed, a snow machine is available for accessing research plots in winter (researchers can coordinate with the NCS Chair). As a last resort, access that damages ski trail grooming, or creates large ruts in a wet area needs to be coordinated with NCS Chair so that corrective dirt work or grooming can occur.

Research projects should be located away from existing trails and should be concealed to reduce vandalism and visual impact to other users. Fencing is a last resort for protecting research projects, and will require the approval of the NCS.

All equipment and artifacts from research projects must be removed within 90 days of the completion of the research project. This includes all structures, equipment, data loggers, and flagging. Responsibility and funding for removal must be identified as part of the approval process. All research projects need to fall under the responsibility of a UAF school or department that will take financial responsibility for post-project clean-up.

Continuation of research beyond the permitting period will require a permit renewal. Requests for renewal should be submitted to the NCS Chair.

If denied

Denial of permit applications by the NCS can be appealed to the Master Planning Committee. A written appeal should be forwarded to the MPC for immediate consideration by the Executive Committee. The MPC will be informed of the appeal and, if the complexity of the proposal merits, will be considered by the entire body. Final appeal can be made directly to the UAF Chancellor.

Contact for Further Information

Chair, North Campus Subcommittee
Peter Fix, Assistant Professor
School of Natural Resources & Ag Sciences
323 O'Neill Building
Phone: 907-474-6926
FAX: 907-474-6184
Email: ffpjf@uaf.edu

Additional Contact:

Luke Hopkins
North Campus Manager
Facilities Services
803 Alumni Dr.
UAF Campus
Fairbanks, 99775
Phone: 907-474-2648; Cell 347-0066
Fax: 907-474-5656
Email: lhopkins@fs.uaf.edu

Application for Research in North Campus Area

**University of Alaska, Fairbanks
PO Box 757520
Fairbanks, AK 99775**

Project Title Balsam Poplar Common Garden for Teaching and Research

Project start date 1 June 2009 Project end date unknown

Total project duration long term

Principal Investigator Matthew Olson

Work Address 311 Irving 1

Phone number x2766 Email mat.olson@uaf.edu

Co-Investigators, Faculty Advisor (s), or UAF Sponsor Carol Lewis, Alan Tonne

Work addresses 172 AHRB & Experimental Farm

Phone numbers x7083, x7627 Email ffcel@uaf.edu

Department head/director Brian Barnes Phone number: x7649

UAF address: 311A Irving 1 Email ffbmb@uaf.edu

Project's funding source(s): EPSCoR Biology, Global Change Graduate Student Grant

Budget number (to be used only if agreed-upon repairs/restoration have not been accomplished and only with notification of researcher, department head and/or director listed above) _____

Signatures (include date)

Principal Investigator: _____

Department Head or Institute Director: _____

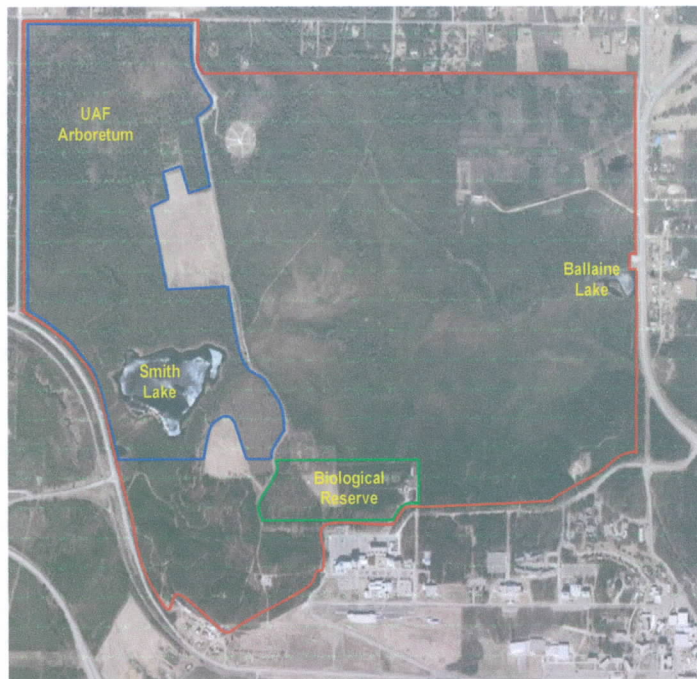
Faculty Advisor(s) if application is from a student _____

UAF sponsor if applicant is not affiliated with UAF: _____

Approved _____ Declined _____ by North Campus Subcommittee on _____

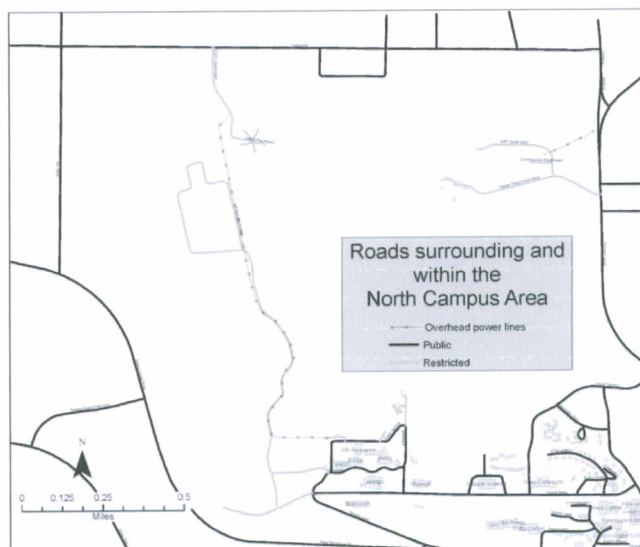
Chair, North Campus Subcommittee: _____

North Campus Area including the Boundaries of the Arboretum and the Biological Reserve

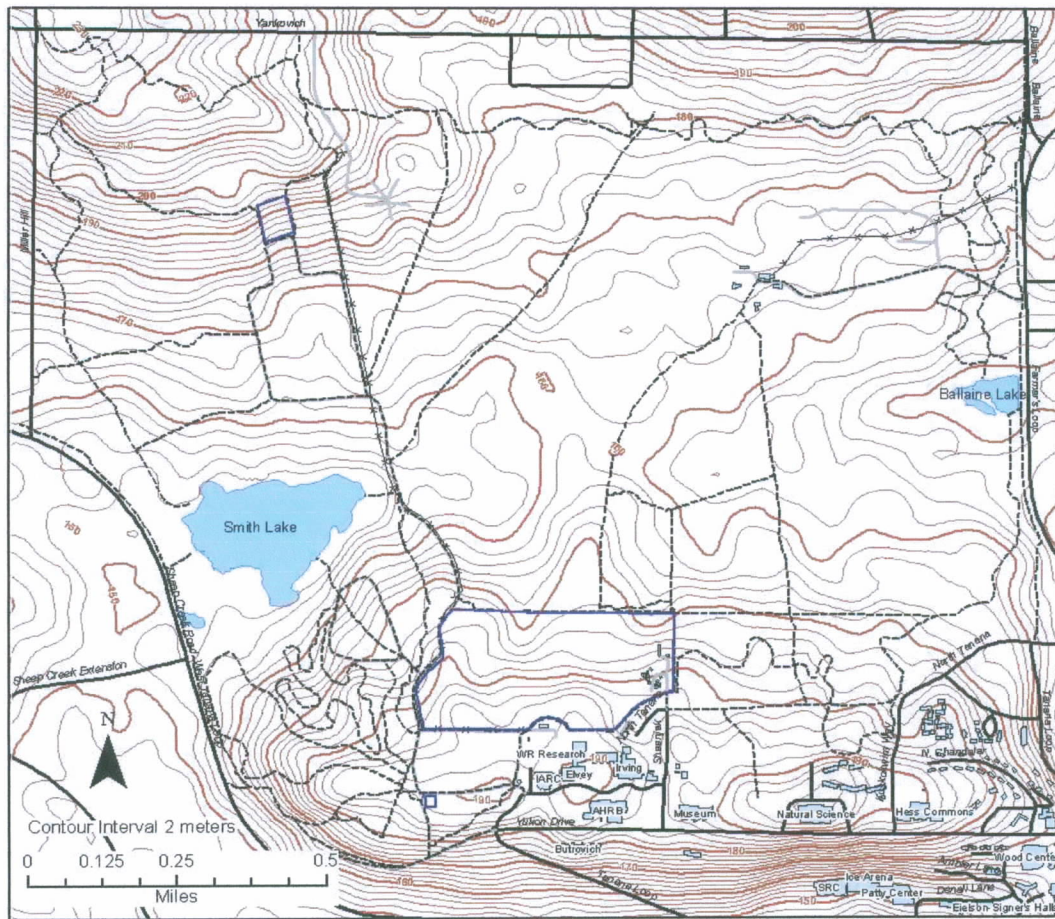


— = Approximate boundary of North Campus Area
— = Approximate boundary of Arboretum
— = Approximate boundary of Biological Reserve

Roads Within and Surrounding North Campus Area



Topographic Map of North Campus Area



- Fences
 - x— Power lines
 - - - Trails
- roads**
- Public
 - Restricted