Symposium Notes (recorder: Xanthe Walker)

2011 Bonanza Creek LTER Symposium: Alaska's Changing Fire Regime
Pikes Waterfront Lodge
Friday February 25th, 2011
7:30 – 8:00 Continental Breakfast

Introductions and Backdrop for Symposium
8:00 – 8:30 Roger Ruess, Michelle Mack and Jill Johnstone: Welcome and symposium overview

Roger Ruess: 2011-2017 BNZ LTER: Regional Consequences of Changing Climate-Disturbance Interactions for the Resilience of Alaska's Boreal Forest

Teresa Hollingsworth: goals of meeting: overview of proposal, integration of NSN, and outreach

Morning Session: Update and overview of current research tasks

8:30 – 9:00
Teresa Hollingsworth: Task C1
Establishing a New Site Network (NSN): Regionalization of Bonanza Creek LTER

- The long term sites on floodplains and accompanying uplands were not ideal to address resilience, needed to get a more regional view of what is happening in interior Alaska
- Need to keep the integrity of older sites as well
- BNZ creek has identified key feedbacks – need to re-evaluate traditional models
- Requires a more spatially extensive perspective; need to examine 3 boreal ecoregions
- Variables important to ecosystem structure and function is different between the ecoregions but black spruce dominated in all 3 ecoregions
- Two axes defining the matrix of regional site network: time since disturbance, and site drainage
- 12 sites in each of the 3 ecoregions; 4 age classes, and drainage gradients
- Use existing sites where stand age has been determined, use fire scar maps to fill in needed stand ages
- What do we want to accomplish in this meeting?
    - Describe current site locations and explore options for additional locations
    - Make decisions about site layout, monitoring protocols, and other logistics
    - Discuss how each PI can fit their research into the framework of the NSN
    - Keep the continuity from current LTER monitoring sites and NSN
    - Discuss challenges and future issues
- Sub-committees: NPP and trophic interaction, Climate, Site Locations, and Soils
- MAP server Website: http://www.lter.uaf.edu/NewSiteNetwork/google_map_new_sites_test.cfm
- Questions:
    - Soil group and Site location need to work together regarding site drainage gradients
    - NSN – keep the same sites? Or add more as they are disturbed? Maybe should not evenly sample the different age classes – bias your sampling to add in more of the older age classes, because they'll burn, but also younger sites will get older (succession)
    - Land Ownership

- Glaciated areas - Site drainage is linked to parent material
- Sites of particular characteristics different in 3 ecoregions – use Table of ecoregion characteristics to address some of those (above) issues
- Need to pick sites representative of ecoregion, age class, and site drainage.
- Will we be doing site reconstruction in the older sites, because they would have developed in a totally different climate than the current.
- Purpose – to encompass variability within potential range of black spruce successional trajectories – if you go to midage stands there is an issue of fire severity, and environmental gradients – but don't have enough replicates to deal with it - hopefully within each of the areas there will be more than one site on a similar trajectory (?)
- Also need to think about density of the stands.
- Need to also control for the purely local geographical differences – stand edge, wildlife populations
- What will be characterized at all 36 sites? What is the core data? Will be answered tomorrow
- Core sites to anchor and then people with specific questions can use those sites to answer the specifics, use ecoregions as three sets of modal regions

9:00 – 10:00 Overview of fire-related tasks

• Jill Johnstone: Brief introduction

• Task C5-Eric Kasischke: Variation in fire regime over space and time, and landscape sensitivity
- This task takes a very broad view of fire regime, integrates results from a lot of projects affiliated with LTER, not focused on any particular sites
- First workshop proposed for spring 2012
- Characteristics in fire regime in terms of interannual variability? Majority of burning occurs in large intense fire periods, how does this correlate to climate data? Look at patterns of burning within the year
- Use Landsat and HOTSPOT data
- Burning within different ecoregions; there are landscape temporal dynamics
- What type of data do they need to focus on? Working on developing new tools to understand the processes?
- Questions:
  - Shrub burned? Could be recovering forest, or shrub based upland area. Use LANDSAT data but needs to be 'truthed' in the field to confirm what exactly 'shrub' area is.
  - How far back in time can go with fire weather information? 1990 approximately.

• Task D1-Scott Rupp: Historic fire return intervals and feedbacks between fire and vegetation
- How the fire regime is changing and how it may change in the future, and understanding connection with vegetation dynamics.
- 30 years to burn 20 million acres across Alaska, the next 20 million acres were added int eh last 10 years – dramatic changes at the landscape level, need to look at large scales to see how these trends are changing – NSN
- Dramatic changes in fire return intervals and fire size

- ALFRESCO modelling – fire regime in future and changes in recent decades: Distribution of fire sizes within season; increased severity; variability is changing; has a big impact on stand age, stand age decreasing.
- Conifer to deciduous ratio will decrease (ALFRESCO Model)
- Severity is a huge influence on the system

• Task D2-Lee Taylor, Christa Mulder, and Knut Kielland: Interactions of fire with microbial communities, plants, pathogens, and herbivores

Taylor:

- Plot level and organismal scale to address issues of seedling recruitment and successional trajectories
- Have a variety of study sites would be nice to integrate into NSN
- Distinct fungal communities on four species returning after fire
- Relationship between growth and fungi; some fungi depress, others facilitate growth, differential between species of trees and fungi

Kielland:

- Primarily focused on moose
- Would like to look at moose browsing etc. in NSN
- Diverging patterns on stand regeneration based on herbivory; white spruce height, density, and vigour differs between browsing and exclosed
- Also look at hare browsing in relation to white spruce regeneration, potential work in new burns – put up new exclosures?
- More fire, more browsing, higher populations of hare

Mulder: No presentation

• Task D3-Jill Johnstone: Effects of altered fire regime on successional trajectory

- Focus on boreal black spruce, but hopefully be able to study different vegetation types
- Fire severity accounts for over 50% of variation in post fire seedling establishment, but stand age and soil moisture also very important.
- Assess mechanisms behind observed post-fire recovery
- Also look at vascular plant community as a whole – plant species traits for modeling recovery after fire
- Build initial response model and test against sites where they have longer term data

GENERAL QUESTIONS:

- Permafrost fire severity group – ice content and site moisture, are there plans to connect with that group? Ground vegetation scenarios need to relate to permafrost group, integrate data for probabilistic modelling.
- Scott have you looked at paleorecord for number of fires occurred at 200-250 time scale – maybe this type of fire regime has occurred in the past? Hard to pull that out but have identified distinct changes in fire regime over past 6000 years. But do have reconstructed temperature from 1800 and tackling climate from 1700, eventually build a 1000 year chronology, no sign of it. Paleo lake core sediments matches really well with tree rings as well.

10:00 – 10:10 Coffee Break

10:10 –11:00 Overview of fire-related tasks (continued)

• Task D4-Michelle Mack: Ecosystem and landscape consequences of an altered fire regime
- Determine the ecosystem and the landscape consequences of an altered fire regime
- Soil organic layer – source of resilience in bs forests
- Soil organic layer also drives fires in these systems
- Black spruce shift to deciduous = decrease below ground and increase above ground carbon accumulation – what is the NET?
- Shift to deciduous equals increase in NET accumulation at 50 years
- But at 100 years? Maybe soils will win?
- Experiments to test for relative importance of soil-microbial feedbacks

• Task D5-Vladimir Romanovsky: Fire, soil organic layer, and permafrost
- Diversity of ecosystems produce diversity in permafrost
- Diversity within ecosystem too, depends on soil moisture, and organic layer thickness, but by the end of the century all black spruce sites will be thawing
- Product: predict thawing of permafrost thawing and temperatures at different soil depths
- In all ecosystems modelled tussock is the only ecosystem where permafrost is not predicted to thaw
- Medium thickness of organic layer will thaw before very thick, similarly wet will thaw before dry (in black spruce)
- During this cycle of LTER funding (until 2017) will not see permafrost thaw
- Regardless of fire severity (in past) permafrost can recover, this will probably change in future
- KEY point: need scenarios from different researchers

• Task CS1-Dave McGuire: Changing fire regime and atmospheric feedbacks
- DoD SERDP – develop models that can forecast landscape change
- USF and WS – conceptual framework for integrating important components of an ecosystem model for Alaska

GENERAL QUESTIONS:
- Vladimir fire effects on permafrost – what factors determined impact of fire on permafrost? It is all included in the model – latent heat, water content etc. Major thing is the organic layer – permafrost in Alaska survives because of thick organic layer, thus fire important in modeling permafrost.
- Vladimir – can you see old fires in permafrost dynamics? Can definitely see 30 years ago fires and model them well, but going farther back (200 years) they have not done but may be possible.
- Vladimir – in looking at the recorded data it looks as though the peak of permafrost warming peaked in the mid 1990s. So it seems as though the next decade or two snow depth may be most important. How is that handled? Is there past data sets that reflect that? Yes, they do have past data. If snow cover increases than permafrost warming will increase. Also differences in south versus north facing slopes due to soil warming, initial snow fall, depth, and melting.

11:00 – 11:10 Break

11:10 – 12:00 Roger Ruess: Proposal reviews

• Summary of feedback (positive and negative)
• What do we need to do better?
• What ideas do we have?

Feb 1 2011 – BNZ LTER officially refunded
The reviews recently came out, please read. They are very informative and useful. There were 9 outside reviews and a panel summary. 12 sites went through review – 4 came through fine – BNZ LTER was one of those.
What is the program all about? The proposal contains 4 components.

1. Climate change on ecosystem structure and function
2. Climate and Disturbance interactions
3. Climate Feedbacks to Atmosphere
4. Social Ecological Dynamics

What did the panel think – what were the key scientific weaknesses?

- These are important in the site review

3 people to identify the weaknesses:

Dave McGuire:

- Lack of connection between conceptual framework and models
- Need to identify tipping points/threshold behaviour
- Use simpler models because the models used are as complicated as the ecosystems themselves, making it hard to understand
- Questions:
    - Fine for focusing on site behaviour, but is really a scaling question, need to incorporate all of the feedbacks when examining at the large scale.
    - One way to think address these concerns – link the empirical data to the modelling by asking people who are doing the empirical work to think about the modelling, ie. threshold changes etc.
    - Also make it clear that smaller models are used – various scales of models are used by different PIs. It is not just these two models.
    - Predictive oriented commentary –

Knut Kielland

- Snowshoe hare work started much before issues of current proposal
- Very high hare numbers for last 6 years straight
- Over last 3 years studied mortality rate
- Now have accurate survival estimates
- Metabolic rates has a bearing on how they will deal with environment; no data from high latitudes
- Predation by linx, small area captured all of them, how can they expand?
- Moose exclosures and regeneration on important tree species
- Moose survival and density with snow etc.
- Questions:
    - What were the reviewers saying? They said the mammal work kind of fell flat. It was an issue of what was presented in the proposal rather than what they actually did. Point being that need to communicate better

    - Reviewers said the linkage between mammal studies and vegetation not studied – need to look at herbivory more. Also need to look at populations and projections and incorporate it into herbivory – needed to be better articulated.

Dave Verbyla

- NDVI: index of photosynthetic activity
- Declining trend in NDVI since 1980s in boreal forest– ie.browning
- Use LANDSAT and MODIS
- Juday – pattern of browning is consistent with the tree ring data
- At BNZ creek significant decrease in NDVI since 1980s – ground truthing it and relating to tree rings
- Questions:
    - Debating the scale of GCB paper regarding browning vs. greening
    - Remote sensing technique has a problem detecting increasing growth where trees have been a minor component of past vegetation – it will take ground based techniques to justify

- 12:00 –1:20 Lunch

Friday February 25th, 2011 (cont.)

Afternoon session: Focus on Social Linkages and Outreach

1:20 – 1:40 Gary Kofinas: Social Science tasks related to disturbance

- Coupled Social-Ecological Dynamics for Interior Alaska
- All available species harvested at all times of year; what is the heterogeneity of usage, what are the implications of those changes in resources, and what is the vulnerability of those communities to change
- Document local knowledge and science; how changes may affect abundance, distribution and availability of resource, and the accessibility of the resource
- Discussion for adaptation strategies based on this knowledge
- Changes in economy relate to changes in communities demographics
- Make a database of LK across the LTER network
- Link changes (science) with Local knowledge; there is a geographical mismatch – LK from communities outside of ecoregions

1:40 – 2:00 Elena Sparrow: LTER Educational outreach – existing programs and opportunities

- Overview of outreach and then highlight two separate projects
- Education and Public Outreach = formal education, informal education, and public outreach
- GLOBE database – phenology measurements
- Mentoring – Summer Research Internships – need to do it better, how?

Jen Schmidt

- Snowshoe hare feeding trials with Woodriver Elementary school

Katie Villano Spellman

- Teaching Material in 5 different school districts – from JFSP
- Now imbedded in School District Curriculum; teacher workshops for training

2:00 – 2:20 Scott Rupp: Fire agency outreach and co-operation

- The Alaskan Fire Science Consortium
- 8 across the US, including one in Alaska
- Bridge together the science and management communities
- Contact Jennifer Northway regarding the Consortia and hoe projects can coordinate

GENERAL QUESTIONS:

- Opportunity; Liz O'Donald is developing a project regarding video media with research in Alaska – great opportunity to participate
- Alaska Research Needs List will be out next month or April, questions and topics include subjects the LTER is covering

2:20 – 2:45 Break

Afternoon working groups: Improving outreach and social linkages

2:45 – 3:00 Charge to working groups and discussion points
3:00 – 4:00 Working groups convene
4:00 – 4:30 Summary of working group discussions

Reporting Back

Group #4 –

- In general wove back and forth between social-ecological research and outreach – had difficulty keeping them distinct
- Need for us as a group to develop our own skills in public engagement communication, and leadership – increase the scientists ability to do this through some sort of training
- To tie science and social, emphasize the ecological and economic importance of research, fuel and food security – opportunities to use our research to make fact sheets about different types of wood vs. fossil fuels etc. educate people to make their own decisions
- Opportunities to engage with other organizations (e.g. federal subsistence board)
- Engage in outreach to rural area, Fairbanks, and the world – field videos, question and answer forum through the web, regular newspaper column in order to reach out to people in Fairbanks

Group #2

- Berries
- Fire directly to food – subsistence harvesting
- Human health – smoke, pollen
- Fuel – fossil fuel versus firewood
- Connecting with communities – NSN may be closer to villages
- Classroom protocols could be more widely distributed (web)
- Increase bioinformatics skills – moose populations/vegetation change
- High school internships
- Providing outreach through exhibits: Denali National Park, Museum at UAF

Group#1

- Fuel and food as key needs for communities
- Ecoregions: majority are lowland and bordering upland
- Research that supports planning tools
- Where our expertise meets needs of the community
- Need to think about how people fit into to the boreal ecosystem – recreation, wood harvesting
- Outreach ideas: exhibit at the museum, using Grad students to develop lessons for the classroom and village schools etc.
- Have monthly meetings to push the social ecological linkages

Group#3

- What we as individuals within our own research could do; not everyone had a clear pathway to do that:
    - Regeneration success in forest
    - Vegetation and Caribou herds
    - Post-disturbance succession – connection between ecological (type of fire) influence; what happens after versus peoples perception of what happens after fire
    - Carbon flux etc. – hard to connect with people; need to demystify the role of carbon
- Entire ecosystem services
- Need to discuss scale, can we talk about villages, regions, and international connections
- How do we know what people think they need to know; interact with people about what questions they have
- Invest greater effort into exploring societal implications of our work
- Find existing institutions that we can use to transfer our research rather than taking it on all by ourselves

Graduate student research

4:30 – 5:00 Graduate students present poster previews

- Rebecca Hewitt (Hollingsworth)
- Michaela Swanson (Ruess)
- M-C Leewis (Leigh)
- Dashiell Feierabend (Kielland)
- Russell Dennis (Doak/Wagner)
- Amber Churchill (McGuire/Turetsky)
- Mark Winterstein (Hollingsworth/Walker)
- Nicole McConnell (McGuire/Turetsky)
- Emily Schwing (Valentine)
- Kristofer Johnson (post-doc, McGuire)
- Xanthe Walker (Johnstone)
- F. M. Juan (McGuire)

5:00 – 6:00 Mixer and Poster setup

6:00 – 7:00 Dinner

7:00 – 8:00 Poster session3

Saturday February 27, 2010
8:00 – 8:30 Continental Breakfast
Morning session: Collaboration and synergy
8:30– 9:00 Tom Hanley: Updates from the Forest Service Division

- Bee Vanhorn introduction, new program manager for ecosystem structure and function
- Paul Brewster introduction, assistant director for program director
- FIA – working with BNZ creek experimental forest; ground work to compliment remote sensing
- NSF grant works on a 6 year funding cycle, recently renewed
- QUESTIONS:
    - What is the FIA monitoring?
        - Collect FIA protocol data, except including: Soil samples and more detailed description, greater moss and lichen cover
        - Not permanently marked sites, just coordinates
        - It is not state wide, but a good way to start the push into Interior Alaska
        - Aerial imagery = high intensity LiDAR, MODIS
        - Will be accessible for LTER researchers
        - FIA has a couple of constraints – need to fit into national protocol and only have a minimal amount of time on the ground
        - Need to have to good communication and awareness between LTER and FIA; contact person is Jamie Hollingsworth
        - 3 year effort

9:00– 10:10 Related research occurring through external funding
• Michelle Mack: Synergy with non-LTER funded research

- Wide range of projects will be covered today
- Many new projects

• Chip Miller: Carbon in Arctic Reservoir's Vulnerability Experiment (CARVE)

- Part of NASA's earth venture call
- Looking at interactions of climate and hydrologic cycle and how they drive the carbon cycle
- Looking for tipping points
- Estimating CO2 and CH4 fluxes
- Using Alaska to represent Arctic, logistically simpler
- Top-Down: complete integrative samples
- Bottom-Up: processed based, but not sure if you have them all or the right magnitude
- Putting together Top-down and Bottom-Up
- Twin Otter: Spectrometer in the near-IR, also the oxygenase band which has the capability of measuring photosynthetic activity (?), surface reflectivity, ISGA continuous for CO2 and CH4, and CO
- Fly three times per year – spring, summer, and fall
- They need flux measurements, soil moisture, and ecosystem productivity, energy balance from the ground – would like to collaborate
- Questions:
    - Will soil moisture be a profile?
        - The L-band sensor is only sensitive to surface soil moisture
        - Another mission (Air Moss) will be able to penetrate down many more cm

• Ted Schuur: SERDP project on boreal vulnerability
- Connections between LTER and SDERP
- understanding of boreal forest ecology and how it related to management
- management = social dimension
- what ecosystems are vulnerable to state change?
- develop models to predict landscape change?
- Tools: ALFRESCO, DOS-DVM-TEM, combined with information from field sites
- Assess other ecosystem types: white spruce, deciduous, shrublands, etc.
- Another project: Vulnerability of Permafrost Carbon Research Coordination Network (RCN)
    - Magnitude, timing, and form of carbon permafrost release?
    - Workshop June 1-3 2011
- Questions:
    - Time frame? Managing fire severity? Timing with respect with to century scale of thawing permafrost?
        - The end point will be a large thawing of permafrost regardless of management
        - Hope to model different managing scenarios

• Tom Douglas: SERDP project on climate, ecology and modeling
- 2 separate SERDP projects; Contact Michelle Walvoord regarding permafrost controls on hydrology in Interior Alaska by integration of Ground based Geophysical Characterization and Numerical Modeling
- Tom Douglas: addressing impacts of climate change on US army Alaska with decision support tools developed through field work and modeling
    - Primary focus on hydrology and how permafrost drives that; some areas may become drier, others may become wetter
    - Using repeat photography, find sites where changes have occurred and determine why they have changed
    - Couple geophysics with Lidar to understand thermal and hydrologic thresholds
    - Need to find sites near BNZ creek
    - Looking for future management options as DoD training program increases in Alaska
- Questions:
    - Military disturbance? Is there a component looking at what the military does and the interactions between natural disturbance, vegetation composition, and military disturbance.
        - There was no long term environmental monitoring
        - They will try to address some of that but it is fairly open ended as there are so many components involved

• Diane Wagner: Insect and pathogen research
- Summarize a number of ongoing studies
- Annual aerial detection surveys: fly over much of the state and record inset and pathogen damage
- Insect population surveys: through the LTER since 1975
- Also a number of studies regarding impact of single taxa
    - FHP projects: Alder canker, root and butt disease, spruce beetle
    - Roger Ruess: fungal stem canker
    - Christa Muler et al.: impacts of invasive Melilotus on pollination and berry production of Vaccinium

    - Glenn Juday: climate, insects and plant growth
    - Pat Doak and Diane Wagmer: Aspen Leaf Miner, Willow Leaf Blotch Miner
    - Wagner et al: LTER experiment – main impacts and interactions between insect and vertebrate herbivores
- Opportunities: scaling up, use aerial data, better coordination and integration, study the interactions between insects/pathogens and fire
- Questions:
    - Map from first aerial surveys – either being done along rivers or streams? Why? Sample along the rivers and streams (why?)

• Eric Kasischke: NASA vulnerability project update
- ABOVE: arctic boreal vulnerability Experiment
- Letter from the LTER supporting collaboration with ABOVE and CARVE
- Questions:
    - If decide to go through with it?
        - Science team will be put together and coordination
        - NSF would be interested in coordinating

• Jen Harden: Impact of permafrost degradation on carbon & water
- NSF grant, co-sponsered by NSGF
- Premise is that fire may help accelerate the thaw but the most important thing is water redistribution
- Interested in fate of terrestrial carbon and transport to ocean
- Relationship between C accumulation and stand age is nearly linear; but there is a lot of site variability
- Need to look at microscale heterogeneity; what is controlling what with regards to spatial variability?
- There is an opportunity to remeasure the archived samples
- Need to be on the lookout for more wetland sites
- National Soil Carbon Network – database including over 4000 organic layer points
- Also have soil moisture and permafrost maps; helpful for site selection
- Questions:
    - Is there any base map that shows all the study sites, not only the LTER but all the sites?
        - Would be a good idea to make a tool on the LTER site that individuals could include where they've studied and what data they've collected
        - Need a meta-database, but should also have a complete and quality checked system developed by specialists, need to put resources into it
        - Could use fluxnet system

10:10 – 10:30 Synergy Break: Opportunities for people to discuss collaborations

Morning working groups: Building better integration and synergy
10:30 – 10:40 Jill Johnstone: Charge to working groups and discussion points
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11:30 – 12:00 Summary of working group discussions

Soils

- Focused on problems with synergies
- Possible synergies: mapping of soil carbon along lake margins, use national soil carbon network, maps by Charles Tarnocai
- Need common protocols and open communication, without them missed opportunities arise
- Each PI adopt a site and make sure they know what everyone (other researchers) are doing at that site so that it can be communicated to the entire group
- Synergy could be enhanced if we all went out to field sites together, have summer site symposium

SDERP

- Discussed sites and access to them; permafrost tunnel
- NSN = SDERP sites hopefully
- Regional GIS/database is needed: LTER has a great database, need to expand this to all studies
- LTER provides database: scientists store data there

Insects and Pathogens

- How to integrate more insect pathogen data and research into the LTER without increasing the workload to much
- Incorporating insect damage into sampling protocol
- Make better use of aerial data
- Using elementary school children to collect basic data on insect damage

NASA

- 1 year project with remote sensing based project that could be handed to land managers
- CARVE mission and LTER synergy – how to use LTER data to calibrate CARVE sensor
- CARVE project: high frequency sampling of sites close to Fairbanks

12:00 – 1:20 Lunch

Afternoon session: The New Site Network

1:20 – 1:45 Jamie Hollingsworth: The old and new site networks: monitoring and logistics

- Climate monitoring: At least one level 3 station in each ecoregion and level 1 stations at all A sites (12)
- Vegetation Plots: scale back = how sampling will change in existing plots
- Tree inventory
- Tree Bands – species monitored in NSN will no longer be monitored in the historical sites; the old bands will not be removed just will no longer be monitored because they don't have the man power – but another group could take over reading them
- Litter Trays: remove from all the old sites that aren't part of the NSN because it is too much effort –
    - may be possible to maintain some sites,
    - perhaps should scale back in a similar pattern as to how the seed traps were scale backed
    - perhaps should also consider where we expect to see change and continue monitoring in those areas
    - need PIs to let them know where it is most beneficial to continue litter monitoring
- Seed Trays: add new seed trays to NSN in different design (since 2006) and maintain the seed trays at the old sites
- Active Layer: continue probing protocol and add all NSN that are underlain by permafrost

- Site Layout: consistent between sites, prime corner in SW corner
- Summer 2011: plan to establish all the plots and set them up across all ecoregions
    - Frost probing for active layer depth? Active layer may be constant through time through permafrost degradation? Need a benchmark and it needs to be very deep. Could use differential GPS and hope that you would get the signal in the repeated measures. Need to measure settlement (?) in order to really understand permafrost degradation
- Summer 2012: need to classify site by age and put in the age bands
    - Trees will tagged

1:45 – 2:15 Teresa Hollingsworth: Site selection for the new site network

- 9 sites already picked out for Ray Mountains ecoregion
    - 40 -100 year old sites: 1)east facing slope with lots of spruce regeneration, 2) south east facing slope low severity burn with less spruce regeneration, 3) south east aspen dominated
- 3 sites identified in Yukon-Tanana Uplands
    - Limited by the road system and whether it is worth developing sites 5 hours away from Fairbanks
- 4 sites identified in Tanana-Kuskokwim Lowlands
    - Large portion of lowlands is not accessible by road, needs to be discussed
- Need to make sure 36 sites encompass the range of variability, need to justify the sites chosen
- Need to get a list, perhaps via the webpage, of when PIs will be available to go out into the field, need to visit the sites together and make sure they will be of use
- Stream measurements? Density range?

Afternoon working groups: Making the most of the New Site Network

2:15 – 2:30 Teresa Hollingsworth: Charge to working groups and discussion points
2:30 – 2:45 Coffee Break
2:40 – 3:45 Working groups convene

Site Locations Group:

3:45 – 4:15 Summary of working group discussions

- Climate Group
    - Climate station (level 3) should be along the Taylor Hwy, as there is no climate station there, perhaps collaborate with the weather service
    - Need to have some level 1 stations at higher elevations to capture differences in precipitation and air temperature, will add soil temperature and relative humidity, could potentially put four level 1 sensors in each ecoregion
- Net Primary Production (NPP) Group
    - Discussed challenges in measuring interannual growth in black spruce (ie. tree bands are not likely adequate)
        - Could you just do short tree cores ever decade? Without affecting its growth?
        - Will you age every tree in every plot? Age cohorts? Size cohorts? How will you scale dendrometer data up to the stand scale?
    - Herbivory; wherever the NSN is implemented need to monitor current annual growth consumption on some key species

        - How? browse point diameter, percent browse, marked individuals, random individuals
    - Implementing game plan for tracking insect herbivory and pathogens; need to discuss what is doable etc.
    - Shrubs, mosses, grasses, graminoids, and forbs need to be considered; will they have to be monitored? Limited number of sites? Where and how still to be decided.
    - Reproduction also needs to be discussed.
    - How GPP is partitioned long term and interannually?
    - Need to discuss litterfall – are there any particular sites for any particular reasons at which they should continue monitoring litterfall.
        - But maybe the value is in monitoring litterfall long term, but unless specifically interested in that we can't necessarily commit to monitoring it
    - Non-vasculars; acknowledge that they are important, perhaps monitor at a subset of sites
- Soils Group
    - Sites are large to capture soil variability
    - Need to do full soil profile characterizations
    - Mark with permanent flags or rebar – soil pits in center of plots just outside of the vegetation plots
    - Need sampling protocols both for collecting and for archiving (microbial)
    - At least 10 organic profiling characterizations, total C, N etc.
    - Instrumentation: protocol that exists will most likely work
    - Site selection- need initial information on a lot of sites; soil drainage etc.
- Site Selection Group
    - See Jill's notes
    - Reality of logistics:
        - Taylor Hwy may not be sustainable (5 hour drive) creates issues for long term site management team
        - Sustainability is key – LONG term monitoring – many people, many years
        - Most intensive sampling will occur at easily accessible sites
    - Before commitment:
        - Quick surveys before finalization and investing of site set up
    - Resourcing of a more dispersed network, will more people be hired, Neon, what do we need to make this work if there will be extra demands
    - Sites within the ecoregions
        - Tanana Uplands have been most widely sampled
        - Perhaps not sample on the Taylor Hwy; can't access full range of age distributions
        - Specifics of other sites (ex. Murphy Dome)
        - Should continue to invest in Delta Junction sites
        - Need to sample sites that are more representative of the lowlands – in terms of logistics will be difficult
        - Nice clustering of young age sites in Ray Mountains, and sites classified as old are far from those, needs to be investigated
    - Underlying framework of sampling
        - Need to use these sites as an anchor, not sampling the full range, but use these sites as a baseline or a reference.
        - Dichotomy of permafrost underlain black spruce versus not

        - Hill slopes gradients as a fundamental organizing pattern on landscapes; cluster sites within an age class to have upper and lower hillslope – may be issues with size of the burn. Need to get rid of confounding factors that may arise if sampling same age class that are spatially separated
        - Stand density
        - Successional trajectories
        - Mesic areas particularly sensitive – room for fire severity, permafrost degradation to shift the system in one direction or another, perhaps focus on mesic range
        - Maybe can't get a fully balanced design across all of the ecoregions
    - What is the pathway forward?
        - Maybe need to actually go to some sites and discuss in situ to really make any finalizations
        - In each ecoregion we have core sites that we have identified and want to keep
        - Use the existing data that we have in order to ID new sites
        - Alaskan Carbon database – overlay of soil drainage map
        - Only thing agreed on: stands of different ages, everything else was debated
        - Need to anticipate where changes may happen and establish those sites so that when that change happens it has been captured; moving goal post future, but cannot design a site that captures all the variability of change
        - Have some plan B sites
        - Need to come up with the specific questions in order to select the sites
        - Go back to the proposal: stand age and site drainage are the key variables, need to go back to choosing sites based on the criteria laid out in the proposal
        - We need to figure out the details: block by burns? block by density?
        - Anchors: commit to intermediate age sites and mid-drainage sites and go from there

4:15 – 5:00 Meeting wrap-up and general discussion

5:00 – 6:00 Happy hour: drinks and further discussion