Vegetation Dynamics and Distribution

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A few later additions

Everyone is welcome

Writeup organization

- Good input from the group
- Six sections – Objectives, Fieldwork, Remote sensing, Modeling, Other group links, Gaps
- Each section

a. Synopsis paragraph/main issues
b. Table w/ details
c. One or more critical next steps/action items

1. Science Objectives – synopsis, detail

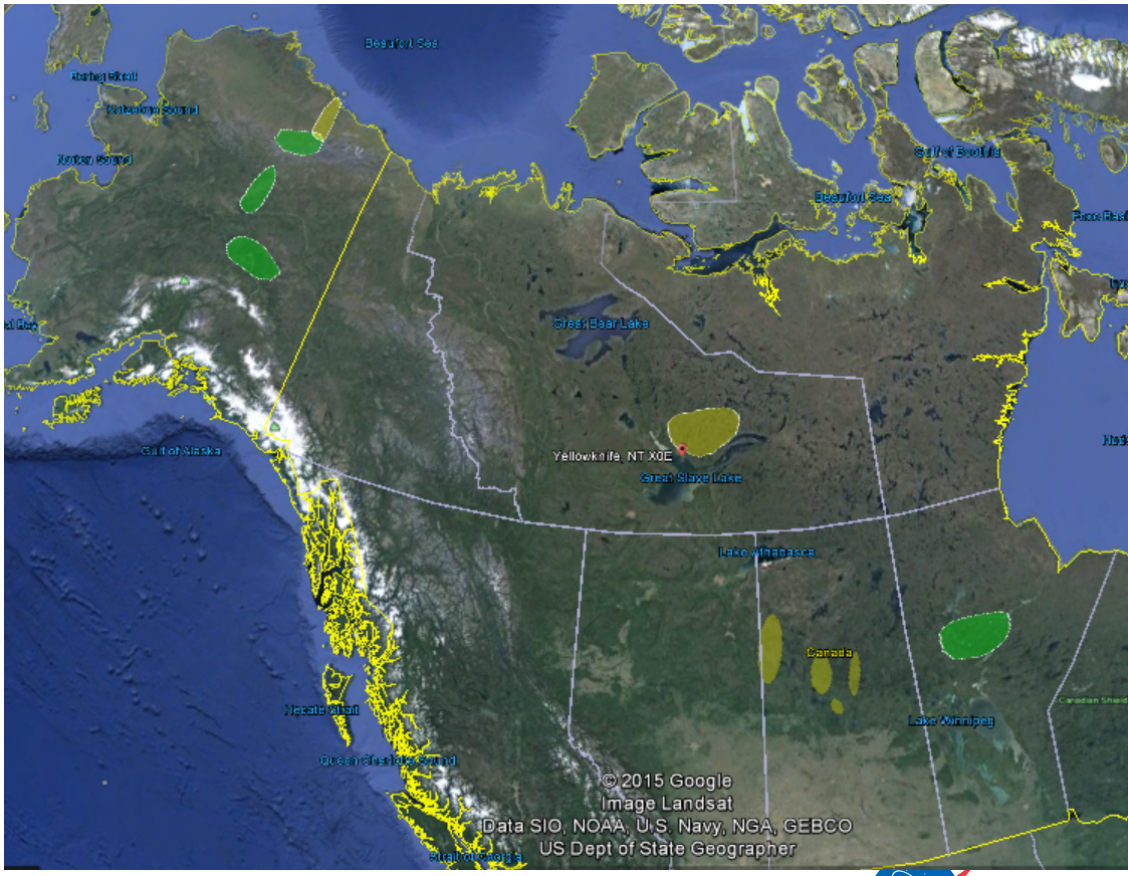
Table w/ addl columns for Groups and Tier 2 science objectives
Six common science themes

- Mechanistic controls on vegetation - plant or soil physiology and biogeochemistry, includes phenology, growing season length, stress, emerging remote sensing tools. Overlap w/ veg structure/function, hydrology, C dynamics
- Shifting patterns of tundra vegetation density, with emphasis on greening, shrub encroachment or expansion and treeline dynamics
- Shifting patterns of boreal forest vegetation density and extent, with emphasis on browning and die back
- Effects of disturbance frequency and/or intensity on recovery and vegetation type and structure. Overlap w/ fire disturbance group
- Patterns and dynamics of vegetation structure and ecotones, including emerging remote sensing tools. Overlap veg structure/function group
- Mapping patterns of vegetation distribution

2. Field Studies – synopsis, detail

Field efforts can be organized around three axes:
1) type of measurement
2) sampling design
3) expected location(s)

Yellow are tentative
Still uncertain
More details needed



2. Field Studies – action items

- Organize around types of measurements, sampling designs, study location(s)
- Identify, plan for core and common sites
- Mechanism to circulate protocols for frequently-used measurements
- Mechanism to circulate wish lists for additional measurements or sample collection
- Easy access to equipment to accurately locate all plots - expectation we will use it

3. Remote Sensing – synopsis, details

Themes include:

1. Detecting and scaling plant physiological signals
2. Understanding the dynamics of vegetation structure and function
3. Understanding radiometric variability unique to arctic and boreal regions (e.g. low sun angles)

Common remote sensing data and products:

1. Satellite (PGC/NGA, Landsat, MODIS, SAR)
2. Airborne(G-LiHT, Historical Aerial Photos, L-Band InSAR, LiDAR Hyperspectral)
3. Ground/Tower (automated spectra or narrowband, multi-angle imaging, multi-angle LIDAR)

3. Remote Sensing – action items

- Compile a list of best practices of satellite data product use
- Establish a common set of vegetation classifications
- Develop a strategy to leverage and further improve upon the PGC fine-scale DEM

3. Airborne Remote Sensing – action items

- The vegetation group enthusiastically endorses one or more airborne remote sensing campaign(s)
- Hope to contribute to a campaign that explicitly targets one or more specific science questions and is closely coordinated with any relevant field based observations.
- White paper "case study approach" promising – easy to see how something like an aircraft campaign targeting browning or greening could link w/ this and other groups
- We need to do our part by locking down our field plans and sites

4. Modeling

Projects include:

1. Micromet-ecophysiology to describe tree establishment at forest tundra ecotone
2. Retrieval of shrub biomass and LAI from LiDAR
3. Post-fire vegetation succession
4. Forest productivity, demography, range shifts

Next steps and planning:

1. Coordination between groups focused on modeling
2. Bidirectional coordination between modeling and observational groups.

5. Connections w/other WGs:

- Too many to list – suspect every group in ABoVE could join 3-4 WGs

6. Data and/or knowledge gaps:

- consistent vegetation type map for entire domain
- spatial history of non-fire (both biotic and abiotic) disturbances
- homogenizing historical and near-real time climate observations across space and time
- develop a strategy for opportunistic data collection.

- Next step for writeups – you tell us how we can help