Minutes
Region II-III Reforestation Science & Technical Committee (S&TC)
Meeting #3 – September 30, 2014

Bridgit/Teleconference sites: Fairbanks, Anchorage, Soldotna, Talkeetna, Saskatoon

S&TC Attendance

Roger Burnside	Teresa Hollingsworth	Amanda Robertson
Jim Durst, co-chair	Glenn Juday	John Winters
Marty Freeman, co-chair	Nick Lisuzzo	Trish Wurtz
Nancy Fresco	Tom Paragi	John Yarie
Doug Hanson	Will Putman	

Unable to attend: Mitch Michaud, Ben Seifert, Brian Young

Note: Handouts referenced in the minutes are available from either co-chair.

Agenda and minutes. The Committee approved the agenda and the draft minutes from the April 29, 2014 meeting without objection.

Public comments. Freeman noted that Cal Kerr sent an e-mail with questions and comments about reforestation at Tyonek and on the Kenai Peninsula, reforestation economics, and growth and yield in mixed forest stands. A copy of the comments and a response from the co-chairs was sent to the S&TC

PRESENTATIONS

The S&TC heard five presentations. A summary of key points from each presentation, and a link to a PDF of the presentation slides follows.

◆ **Tom Paragi and Julie Hagelin, ADF&G**
Wildlife-vegetation interactions in regeneration of Alaska boreal forest
A PDF of the PowerPoint for this presentation is available at:
http://forestry.alaska.gov/pdfs/2014_09_30_Paragi_Wildlife_vegetation_interactions_regen_AK_boreal_forest.pdf

Wildlife activities affecting forest vegetation: Seed predation, bark girdling roots and shoots, bud/shoot consumption, fungi inoculation

- Fungal dispersers include small mammals (more than flying squirrels), particularly really common creatures like red-backed voles and other microtines.
- Birds can positively impact forest health—some species of woodpecker (like 3-toed woodpecker) has shown an amazing ability to keep spruce beetle outbreaks in check. They also need the same patches of habitat, late seral stage trees, standing dead etc.

Effects on forest vegetation: Can change stocking levels and shift species composition in sapling stage. Examples: moose pressure on deciduous trees and possibly pine; hare pressure on coniferous regeneration.

Logging v. fire: A comparison of logging and fire activity in the Fairbanks area from 1963-2013 showed that

- Logging openings averaged 24 ac, total openings = 35,000 acres, total number = 1,488, and less legacy wood is left on site.
- Fire openings averaged 26,000 acres, total openings = 8,500,000 acres, total number = 326.
- Fire openings include larger areas with patchy burn intensity. The patches within large fires are similar in size to patch cuts.

Recommendations.

- When Forestry comes up with management objectives, ADF&G can provide input on how to best tailor management relative to wildlife considerations.
- Maintain fungal dispersers (e.g., flying squirrels) and herbivore predators to maintain forest resilience and adaptability. Keep large, old, dead wood. Keep islands within harvest areas.
- In areas with grass, clearcutting increases grass after harvesting and provides covers for small mammals that eat seed, seedlings, and girdle shoots. Keeping some mature trees increases avian predators which helps keep herbivore populations down during reforestation.
- When logging, create larger openings with uncut patches within them.
- Hare and other small populations are typically cyclic. When hare populations are high, consider focusing planting efforts on areas within large burns rather than small, logged patches.
- Develop a checklist of wildlife factors to consider when designing site-specific prescriptions.
- Ensure that reforestation standards have enough flexibility to adapt to specific conditions.
- Be cautious about translating Eurasian info to N. America.

◆ **Jill Johnstone, U. of Saskatchewan/UAF-Inst. of Arctic Biology**
Fire and succession in northern black spruce forests.
A PDF of the PowerPoint for this presentation is available at:
http://forestry.alaska.gov/pdfs/2014_09_30_Johnstone_Fire_&_Succession_in_Northern_Black_Spruce.pdf

Background:

- Black spruce dominates the boreal forest. It grows on cold soils, has slow growth rates that allow it to persist where nutrient turnover is slow, is flammable. And has serotinous cones.
- Post-fire recovery determines future forest composition.
- Fire severity affects seedbed quality and therefore patterns of post-fire recruitment.
- The intensity of organic soil burning varies widely even in stands where canopy consumption is severe.

Experimental effects of fire severity:

- Low severity burns leave organic mats intact. These have dark, porous surfaces and dry out quickly, resulting in poor seedbeds. Tree recruitment requires high seedfall which favors serotinous conifers (black spruce) that were on the site pre-fire. White spruce could establish on these sites if seed was available within 100m of the burned edge.
- High severity burns leave mineral soil exposed. This surface provides better seedbeds and opportunities for establishment of deciduous trees. Less seed is needed for successful establishment, and there is less advantage for serotinous species.

<u>Black spruce regeneration following 2004 fires in interior AK</u>:
- Studied 90 black spruce sites from 80-130 years old, at 0-1000 m elevation. Deciduous trees were not present on these sites pre-fire.
- Spruce seedling density significantly decreased with increasing elevation, and increased in response to the amount of black spruce on the site pre-fire, and to available moisture. Fire severity and stand age were less important factors.
- Deciduous seedling density significantly increased with increasing fire severity, and decreased at increasing elevations. Latitude, moisture, and distance to seed sources were less important factors.
- Black spruce recovery by low severity burns in older stands on wet sites. Fire severity is the main control on deciduous recruitment -- low intensity burns don't leave good seedbeds. Sites were more likely to return to black spruce dominance if the prior stand was greater than 60-70 year old; this may relate to seed availability increasing in older stands.
- High intensity burns that expose mineral soil seedbeds provide opportunities for deciduous-dominated stands to replace black spruce stands.

<u>Impact of fire frequency on stand reestablishment</u>:
- Research conducted at sites with overlapping fires in Yukon.
- Black spruce seed availability is reduced with short-interval fire returns – young trees don't produce much seed.
- Seedling establishment occurred at long-interval (80-year) burn sites; at unburned sites or sites with short-interval (15-year) burns, there was little recruitment.
- Black spruce probably won't overtake deciduous dominants for 150 years, and fire is likely to recur before then.
- Surveys of cone production in black spruce stands in AK and Yukon showed that stands need 50-80 years post-fire to support natural regeneration following a burn. Few trees younger than 50 years have viable cones.

<u>Possible patterns of stand establishment following fire</u>:
- Conifer re-establishment: Likely on sites with low-severity fires and a long fire-free interval.
- Deciduous establishment: Likely on sites with more severe fires that expose mineral seedbeds.
- Conversion to non-forested area: Likely on sites with higher frequency fires that don't allow sufficient time for development of black spruce seed crops.
- Changing climate may lead to more severe and more intense fires.

- Changing cover types affect carbon storage, energy and water transfer, wildlife and subsistence resources, and the risk of fire and insect disturbances.

Discussion:

- Does fire retard expansion of treeline? Johnstone: Seven of the 90 study sites were near treeline. At five of those sites, regeneration after fire was low and the stand reverted to shrub birch. Two severely burned sites transitioned from low density black spruce to aspen woodland for which the seed source was kilometers away.
- Do we know where we are in the process of converting black spruce to deciduous stands after recent big, intense fires? Johnstone: Dave Verbyla and Teresa Hollingsworth are working on quantifying that. Based on fire maps, about 6% of the area burned in the past 50 years would be in forests too young to regenerated, but fire polygons are not reliable. Under the more aggressive climate change projections, conversion could be an issue in the next 100 years. The record isn't long enough to definitively identify conversions at this time. Hollingsworth: We are looking at past fire scars and current vegetation and indices of burn severity. There were big fire years in the mid-1960s and 2004-5, but we don't know the severity of the individual fires. In general, it appears that even in high-severity burns, a lot of wetter, lowland landscapes return to black spruce, and a lot of the AK landscape is lowland black spruce. We are trying to determine how much of the landscape is vulnerable. Johnstone: We are searching the literature for pollen studies that indicate past deciduous eras. A Yukon Flats study indicates historic changes in pollen records. We may not know a transition has occurred until it has happened.
- How would regeneration in white spruce stands compare to the black spruce patterns? Johnstone: The sorting of black spruce and white spruce on the landscape is largely due to regeneration strategies with and without serotiny. White spruce has low potential for regeneration on organic soils, and favors warmer, drier sites. White spruce regeneration requires seed dispersal in unburned patches, so fire patchiness will be important for white spruce – the spatial patter of fire is important. Fire frequency may also affect the maturity of white spruce for seed production.

◆ **Nancy Fresco, UAF-SNAP and Amanda Robertson, USFWS-NW Boreal LCC**
Climate change interactions with reforestation in Regions Ii and III.
A PDF of the PowerPoint for this presentation is available at:
http://forestry.alaska.gov/pdfs/2014_09_30_Fresco_Regeneration_and_Climate_Change.pdf

Background: SNAP data is based on global climate models that are downscaled based on local data. Forecast planning predicts a single future within a predicted range. Scenarios planning projects multiple futures based on different combinations of parameters for uncertain factors.

Uncertainty: Sources of uncertainty include the small number of climate stations, highly variable inter-annual precipitation, complex modeling, tipping points, and the Pacific Decadal Oscillation. Uncertainty for precipitation is greater than that for temperature. Human behavior adds another layer of uncertainty.

SNAP projections

- Changes in fire cycles:
  - Interior AK will become warmer and drier over the next century.
  - Warming and drying will lead to increased fire risk.
  - Fire is likely to become an ecosystem driver in areas where it was previously rare.
  - SNAP uses ALFRESCO to model vegetative succession. It is a stochastic model based on five global climate models. Multiple runs are used to replicate actual data.
  - The model predicts a large decrease in the ratio of coniferous vs. deciduous trees occurring in the next few decades. The ratio then stabilizes due to decreased flammability of deciduous trees. The amount of tundra cover also decreases, and overall forest cover – and possibly shrub tundra cover – increases.
  - The fire return interval is projected to shorten from the 2010s to 2050s, then level off and lengthen again slightly, but not back to prior intervals. The proportion of early successional vegetation cover will increase.
  - Substantial burning in the next three decades is projected in Regions II and III, resulting in an increase in deciduous forest cover and younger forests.
  - The vegetation changes will affect forest structure and habitat, benefitting some species and adversely affecting others.
- Changes in permafrost and hydrology
  - Permafrost is thawing rapidly; models predict that Regions II and III would be thawed virtually regionwide by the 2050s except for small-scale pockets.
  - Only a few inches increase in rooting depth leads to big changes in species composition.
  - Permafrost thaw leads to frost heave, pits, gullies, differential tussock growth, localized drying and changes in shrub and moss species abundance, productivity, and mortality.
  - Climate change will contribute to the drying of wetlands, streams, and lakes.
  - Drying and draining soils will decrease available moisture for trees. Shallow permafrost supports poor tree growth. Too dry soils increase soil temperature and lead to drought stress. There's a tipping point from increased growth with warming to drought and decreased growth.
- Changes in climate
  - Models predict forests moving northward and upward, changing habitats, increasing invasive species encroachment, and increases in insect outbreaks.
  - The projected date of thaw recedes about 3 weeks in the spring and fall.
  - There are thresholds for phenomena such as tree growth, insect and disease outbreaks, fire regimes, and species shifts.
  - Climate shifts are shown by looking at shifts in biomes; the biomes incorporate temperature and precipitation regimes, including growing degree days, season length, snowfall, etc.
  - 18 climate-biome (cliome) clusters are identified for Alaska and Canada.
  - Models indicate that current biomes no longer match the climate in big areas. Vegetation may not be able to shift geographically as fast as the biome projections, but there will pressure for change in that direction.

    - Under the most likely climate change scenario, most of Alaska would have 2-3 shifts in cluster within the century.
    - Region III may look more like Region II by 2090 in terms of vegetation.
- Linking models
    - An integrated ecosystem model is under development for AK, Yukon, and NW British Columbia; it's due out in 2015.

<u>Strategies for managing risk</u>:
- Robust: Pursue options that would work out well in any scenario
- Bet the Farm: Make a bet on one future (e.g., if it is essential to achieve or prevent a particular outcome)
- Hedge Your Bets: Make several bets of equal size
- Core/Satellite: Place a major bet with other small bets as a hedge *(adapted from Global Business Network)*

<u>Discussion</u>:
- Fresco: The models show some increase in precipitation, but concurrent increases in temperature and permafrost thaw will increase dryness.
- Fresco: Modeling on sites that are already free of permafrost project a roughly zero sum on the combination increases in precipitation with increases in evapotranspiration. There are thresholds on the microsite level within landscapes – slight changes in landscape position and aspect affect the moisture balance.
- Robertson: Increasing temperatures increase dark respiration and increase metabolic costs. There is less variability in temperature between years than in precipitation. Temperature increases may have little effect in most summers, but in a dry summer there could be major impacts and die-off. Putman noted that warm summers also coincide with high volatility.
- Juday: There has been a pause in warming globally since 1998 following the El Niño peak. What has happened in AK? Fresco: The Pacific Decadal Oscillation can accentuate or mask underlying trends. Actual data is matching the projections of the more extreme climate change models. Stochastic models match the range and type of variation actually recorded, but not the year-to-year timing of specific variations.
- Robertson: The projected biome shifts don't mean that vegetation would actually change to the cover type for the projected biome, but that the predicted climate would match the climate associated with that biome. For example, the models show western Alaska shifting to climate conditions that match a Saskatchewan grassland biome.
- Durst: Hydrologic impacts are more related to timing and intensity of precipitation than to total precipitation. Fresco: That is the big issue for hydrologic planning in Southeast AK – for example, there is a big difference between precipitation that occurs as snowfall vs. winter rains. The models project changes in the balance of rain and snow in the shoulder seasons. Fresco can share that data.
- There are thresholds for beaver populations, too, and increased beaver populations can in turn cause rapid hydrologic changes.

◆ **Teresa Hollingsworth, UAF/USFS-Boreal Ecology CRU**
LTER research in interior Alaska: Key projects that link to reforestation.
A PDF of the PowerPoint for this presentation is available at:
http://forestry.alaska.gov/pdfs/2014_09_30_Hollingsworth_NSN_reforestation.pdf

Background: Research sites are in and adjacent to the Bonanza Creek Experimental Forest, and the in the Caribou-Poker Creeks Research Watershed. Researchers have been studying reforestation following flooding and fire since the 1960s. Visit the LTER website for more info: http://www.lter.uaf.edu/

Floodplain and upland succession

- LTER sites were set up to look at each of the floodplain primary succession stages.
- Data sets include vegetation, tree inventory, soils, climate, and other important environmental variables that give a strong understanding of Tanana River floodplain dynamics and small-scale upland fire dynamics.
- There is variability in how the sites have gone through the stages. The early stages (bare ground through alder establishment) happen linearly. After the alder stage many factors influence the trajectory, e.g., beavers, herbivores, reflooding.
- There is current debate on whether floodplain sites will eventually convert of black spruce in the prolonged absence of disturbance.
- These studies were synthesized in CJFR 2010:40(7)

New Site Network

- A new LTER plan was developed in2010 with an increased focus on the interaction of and disturbances, including fire, insects, and permafrost changes. This research is based on the "new site network."
- Research is analyzing post-fire dynamics spatially and temporally.
- The network includes both the core sites in and around Bonanza Creek and Caribou-Poker Creek, and other sites that have been used for LTER work. The focus for new sites is on sites that are currently mature black spruce or were black spruce prior to burning.
- New sites were selected to be locations that can be monitored long-term and that are representative of landscapes and fire scars across the interior AK ecoregions. Sites cover a range of elevations, canopy types, soil types, and water flux/soil moisture conditions. Soils include a variety of permafrost, parent material, and soil texture conditions.
- Sites were drawn from the Ray Mountains, Yukon-Tanana Uplands, and Tanana-Kuskokwim Lowlands ecoregions.
- Black spruce has wide phenotypic plasticity, exists in a large range of environmental conditions, is fire-adapted, and is the predominant interior tree. Black spruce re-entered AK about 8,000-10,000 years ago following the glacial retreat and increases in fires.
- Black spruce sites are distributed across upland-lowland and pH gradients. The pH reflects the soil parent material. Black spruce include treeline, acidic, and non-acidic groupings.

- Rapid assessment of middle-aged stands is underway. Mean age after burning is roughly 70-150 years.
- More information on the network and an interactive mapping tool is available at http://ltergis.iab.uaf.edu/nsn4web.html

Forest Inventory Analysis (FIA) contracting work

- FIA is getting started in interior AK using modified FIA protocols. Initial sampling will be done over four years. The Bonanza Creek Experimental Forest, Caribou-Poker Creek Research Watershed, and Tanana Valley State Forest are included in the sampling.
- There is little overlap with vertebrate sites in the Caribou-Poker Creek Research Watershed.
- Juday: Will it be possible to establish general reforestation standards or do we need more regional/site variability in the standards? Hollingsworth: It will be hard to have standards across the whole area. Something like ecoregions might be helpful.

◆ **Miho Morimoto, UAF**
Forest regeneration post-harvest in the forest area of Tanana Valley State Forest: Meeting emerging biomass energy demands. *(For a copy of this presentation, contact the author at mmorimoto@alaska.edu)*

Background

- The study includes areas harvested on state land from 1973-2012 in the Fairbanks area.
- Prior to 1983, most harvesting used partial cuts. Salvage harvesting after fire increased from 1983 to the mid-1990s. The rise of export markets to China increased clearcut harvesting in the 1990s. After export markets declined, harvesting reverted to a mix of selective cuts for either white spruce or birch and other partial cuts.
- The use of site preparation was and assisted reforestation was highest from the mid-1980s to about 2000.
- Harvesting activity is expected to increase due to expanding use of wood biomass for energy.
- 30 white spruce harvest units were sampled in 2013-14 including partial cuts and clearcuts, cuts with and without site preparation, and areas with planting and natural regeneration.

Results

- All units far exceeded the FRPA reforestation standards, but the proportion of subplots meeting the standard varied from 55-100%.
- Stem density increases for 20-25 years post-harvest. White spruce takes longer to grow than aspen or birch. At the time of the initial DOF regeneration surveys, six of 13 units didn't meet the reforestation standard, but all units exceeded the standard in 2013.
- White spruce regeneration dominated sites harvested in the mid-1970s to late 1980s. Birch regeneration dominated sites harvested more recently.
- Overall, stem density, quadratic mean diameter, and height of trees in clearcut units were greater than in partial cut units; greater in scarified units than non-scarified units; and greater in naturally regenerated units than planted units.

- Regeneration was most abundant in clearcut units that were scarified and regenerated naturally.
- In planted units, the planted white spruce seedlings were larger than the naturally regenerated white spruce seedlings.
- In planted units, naturally regenerated white spruce were smaller than those in naturally regenerated units – the planted seedlings appear to suppress growth of the natural seedlings.
- After 40 years, nearly 60 tons/ha of biomass was produced.
- Planting white spruce seedlings resulted in less total biomass. Partial cuts had more biomass due to residual stems.
- On scarified sites, grass increased, but trees regenerated successfully. The positive effects of site preparation in improving seedbeds overcame the negative effects of increased grass cover.
- Planting is beneficial when the goal is larger white spruce.
- Site preparation with natural regeneration is beneficial for maximizing biomass.

<u>Uncertainty</u>:
- Changes in silvicultural practices, periodic white spruce seed crops, and thick grass cover following birch harvest may introduce changes that would affect the results. In recent years, there has been less clearcutting, less site preparation, and less reforestation activity.
- This study included only harvesting in white spruce types. Study is needed on the effects of site preparation on birch sites.

<u>Discussion</u>
- Morimoto: Biomass measurements in this study included all tree species but not shrubs. The percent of white spruce biomass is low. Paragi: Some biomass users (e.g. the current pellet mill) prefer white spruce. Juday: biomass use is evolving. Preferences for species and stem size depend on the desired product.
- Juday: Some of the clearcut prescriptions still left some residuals for various reasons.
- Hanson: Partial cuts were typically diameter-limit cuts on white spruce in white spruce-dominated stands.
- Putman: Morimoto's data calls into question the FRPA 7-year time limit for regeneration.
- Wurtz: The FRPA standards allow harvesters to cut white spruce and then meet the regeneration standards with regrowth of aspen. However, Morimoto's data show that white spruce alone met the standards in most units over time.
- Winters: Would these results carry over to the Kenai Peninsula, especially in the coastal-boreal transition forests? Morimoto: Not confident of the extent of applicability beyond the Fairbanks area.
- Winters: It will help to address the idea of geographically subdividing the FRPA standards.

◆ **Andrew Allaby, UAF**
Rosie Creek regeneration – 28 years post-harvest

(For a copy of this presentation, contact the author at aallaby@gmail.com)

Experimental regeneration plots established in 1986 following 1983 fire:

- Slope and ridgetop sites, 3 blocks each, with 5 ground treatments and 6 planting treatments (180 units).
- Primarily installed to look at white spruce regeneration.

Current evaluation looked at transects in 140 units and censused 6 units:

- Measured stem numbers, species, diameters, heights.
- Transects were accurate estimators of census for the major specie; they were less accurate for alder and willow. Patchiness evident even within units, particularly for alder.
- A very large seed year in 1987 may have exaggerated the success of regeneration in the control plots. The plots were planted in 1986.
- Much of the study area was within the range of natural seedfall (Densmore, 1999).
- Robertson suggested that ridge and slope sites may need to be separated.

Patterns are emerging:

- All units examined exceeded current FRPA all-species regeneration standard.
- Ground-disturbance improved stem density and biomass production over control. There was no statistical difference among scarification methods.
- Some trade-off between stem density and biomass.
- White spruce biomass was greatest in units planted with white spruce in comparison with control and broadcast seeding units; white spruce stem density was greatest in broadcast seeding units.
- Planting white spruce increases white spruce biomass over 3 decades but doesn't increase white spruce stocking levels. Planting resulted in larger, well-positioned white spruce.
- White spruce broadcast seeding increased white spruce stocking. It also increased white spruce biomass, but to a smaller extent than planting.
- Will look at spot seeding treatments more closely, which were affected by rodents. Juday noted that rodents are effective at identifying and consuming spot-seeding sites.

Choice of post-harvest treatment, including whether to plant and what species to plant, is tied to long-term management goals for site.

◆ **Glenn Juday, UAF**
Lessons about reforestation from monitoring post-fire succession: 31 years since the Rosie Creek Fire
(For a copy of this presentation, contact the author at gpjuday@alaska.edu)

Background:

- White spruce seed crops are variable – there are periodic big years and some moderate years.

- Both seedfall and seed viability matter: hot, dry seasons initiate cone production; rainy summers in the following year are important to fill out a viable seed. This maximizes release of viable seed into an environment where fire has likely occurred.
- 1987 has high seedfall and high viability and swamped other seed crop years.
- The Rosie Creek Fire occurred in 1983

Research site: Research site was a reserve next to an unburned patch that was a seed source. Adjacent stands on other sides were salvage logged.

Results:

- Seed crops from 1983, 1987, and 1990 comprise 99% of the seedlings.
- White spruce and birch established more frequently than expected in patches dominated by *Equisetum* and less frequently in stands dominated by *Calamagrostis*.
- Most death of seedlings/saplings occurred due to snagfall, not self-thinning.
- Height growth and total height are greatest for the seedlings that establish earliest. It took 15-25 years for many seedlings to reach breast height where they are taller than most shrub and herb competition.
- White spruce height growth in inversely proportional to the number of degree-days after the summer solstice. Growth rates bounce back if reset by a big rain event.

Notes for white spruce reproduction:

- Enough white spruce seed to reaches up to provide a reasonable chance that the species will be part of the next forest canopy generally falls within 200 m of surviving source trees except in excellent crop years.
- Seedbeds are only receptive to new seed for about 10 years, which allows for two to four white spruce seedling cohorts, depending on the seed years.
- Seedlings arriving later may survive more often in areas not already filled by earlier seed crops.
- Moose browsing pushes the species mix toward conifers by reducing competition from browsed hardwoods. Moose prefer browsing in areas near the stand edge. These are also the areas where white spruce seedfall is most abundant. White spruce has its best chance of survival within 200 m of the edge of residual stands.
- Red squirrels clip spruce leaders, with more clipping occurring on the biggest trees. Clipping is highest in low seed crop years.
- There's a one-year lag in white spruce growth following a very wet or dry year. Moisture accumulated in the summer of 2014 could result in an extended growth period in 2015.
- Putman noted that the dry summer of 2013 induced cone production, and 2014 was wet, so the viability of the 2014 seed should be good.

BIBLIOGRAPHY UPDATE. An update of the draft bibliography has been posted on the Division of Forestry website:
http://forestry.alaska.gov/pdfs/stc_working_draft_bibliography2014sept29.pdf along with a cross-reference index. The index includes the geographic area, main topics, and tree species addressed in each paper. We continue to add papers identified by the S&TC and other scientists and land managers.

The next step will be to draft a 1-2 page introduction to each of the sections in the bibliography synthesizing the key information. Paragi will do the wildlife section. Freeman and Durst will contact S&TC members about the other sections.

NEXT MEETING AGENDA. Freeman will send out a Doodle poll to select the date – which is targeted for November. The next meeting will feature a second group of presentations:

- Invasive species and regeneration: Trish Wurtz and Nick Lisuzzo
- Insect and disease issues relevant to reforestation: Roger Burnside and Nick Lisuzzo
- Planting results with non-native trees in Regions II-III. TBA-Freeman will check with John Alden.
- Reforestation and site preparation results on state and Native land not covered in BAKLAP research. Include information on where treatments and experiments have been done.
    - Region II – Doug Hanson, Will Putman; also contact Dan Rees
    - Region III – John Winters, Mitch Michaud, Ben Seifert.

TO DO LIST:

Freeman and Durst

- Minutes
- letter to mail list
- date and agenda for next meeting
- organize subgroups regarding results on state and native land
- contact S&TC members about section summaries for bibliography

Paragi – summary of wildlife section in bibliography

Doug Hanson and Will Putman: Region III lessons learned from reforestation

John Winters and Mitch Michaud: Region II lessons learned from reforestation

<u>Other attendees</u>

John Alden, USFS retd.
Andrew Allaby, UAF-speaker
Libby Bella, USFWS-KNWR
Jessica Guritz, NRCS
Jill Johnstone, U Saskatchewan-speaker
Miho Morimoto, UAF-speaker
Beth Schulz, USFS
John Strasenburgh, citizen