Minutes
Region II-III Reforestation Science & Technical Committee (S&TC)
Meeting #6 – April 20, 2015

DNR Large Conference Room - Fairbanks

S&TC Attendance

Roger Burnside,	Doug Hanson	Tom Paragi
Jim Durst, co-chair	Glenn Juday	Will Putman
Marty Freeman, co-chair	Nick Lisuzzo	Amanda Robertson
Nancy Fresco	Mitch Michaud	John Yarie

Unable to attend: Teresa Hollingsworth, Trish Wurtz, John Winters, Brian Young

Note: Handouts referenced in the minutes are available from either co-chair.
To-do items are marked with ►

Agenda and minutes. The Committee approved the agenda and the minutes from the February 4, 2015 meeting.

Public comments.

- E-mail string between Cal Kerr, Will Putman, and Marty Freeman regarding reforestation economics *(see handout).*
- Eric Nichols commented at the March Board of Forestry meeting that the existing stocking standard of 450 seedlings/acre may mean that landowners will have to thin stands later. He also recognized that grass competition is a problem for Region II-III reforestation.
- Dick Bishop commented by e-mail that he appreciates getting the S&TC minutes.
- Theo DeLaca said that, as a professional tree planter in Alaska, he is concerned that the reduction in tree planting in Alaska in recent years may result in some harvested areas not being adequately stocked.

BIBLIOGRAPHY UPDATE. References added since the last meeting have been incorporated and the summaries are now part of the bibliography. Another update will be done and it will be reposted.

PRESENTATION

As preparation for review of existing reforestation standards, Marty Freeman gave a PowerPoint presentation providing background on the scale of harvesting in regions II and III, the acreage of harvested areas approved for exemption from the FRPA reforestation standards (mostly in response to insect infestations), and reminding the committee of some of the ideas discussed in previous meetings. A PDF of the PowerPoint for this presentation is available at http://forestry.alaska.gov/forestpractices.htm#reforestation. A summary of key points follows.

Scale of harvesting: Based on DPOs since 1991 and FLUPs since 1997, Kenai, Mat-Su, and Copper River areas have had some pulses of harvest over time. The largest of these are related to salvage from spruce bark beetle infestations. The Tok area had a smaller pulse, related to wildland fire salvage. Over the past 25 years, roughly 500 acres per year harvest on both state and non-state lands (exclusive of salvage) has been typical. Firewood harvest is a major driver for salvage at this time, rather than beetle kill. Acreage sold on state land has always been less than the calculated annual allowable cut in each area, with the exception of salvage sales in the Kenai area from Fy97-FY07, and typically much less.

Exemptions from reforestation: Requested exemptions from reforestation requirements are generally related to insect- or disease-killed stands or to conversions of timberlands to other land uses. Between 1995 and 2005, exemptions related to spruce bark beetles were common on the Kenai, with over70% of the acreage notified for harvest under exemption. In the Copper River Area, close to 30% of the notified acreage was exempted during the same period. The Division of Forestry has not requested any exemptions for harvests on state lands. Only two exemptions have been requested and granted in Region III, one for fire salvage on private land, and one for a wind farm installation.

Four Green Book principles: Four principles identified during the mid-1980s revision of FRPA have proved useful when considering changes to forest practices: fairness, no "big hit," enforceability, and professional management.

Discussion points: The S&TC discussions the past five meetings have coalesced around several topics, including

- Need for flexibility to deal with climate change and changes in markets, harvesting equipment, etc. Tom noted that adaptive management is important and it isn't just trial and error – adaptive management actions are designed to test specific hypotheses
- Ability to accommodate geographic variability, variability occurs at multiple scales
- Factors that affect time and density goals for natural regeneration, and
- Considerations for use of non-native species.
- S&TC recommendations can take different forms, including regulations, training needs, guidance for specific conditions, etc.

STANDARDS REVIEW

The committee began a review of the existing Region II-III reforestation standards in FRPA and its Regulations, as presented in a handout by topic. Marty reminded the group of what type and level activities are necessary before FRPA is applicable. The Committee discussed whether the 40-acre threshold for timber operations allowed for reforestation problems to accumulate over a significant area over time. Hanson noted that it's difficult evaluate the impacts when many operations are dispersed harvests for fuelwood. This generated discussion regarding harvests for biomass and firewood. It was noted that acreage or volume "harvested,"

"removed," and "sold" are all different numbers. "Board feet" is likely not a useful measure of harvest activities in regions II and III, where a majority of the trees harvested are not for sawlogs.

General Definitions - Mitch reminded members to be careful with language when discussing goals and objectives; for example, "wildlife" is a land use while "forest" is a land cover. There was discussion of the terms "commercial tree species" and "merchantable stand of timber" as they relate to current and anticipated non-sawtimber uses of forest lands such as firewood or biomass feedstock.

Stocking standards – The S&TC began by discussing how many trees are needed to fully occupy various sites, and how many are needed to meet various land use goals. Glenn said that 450 stems/ac at 5 years may be too low for regeneration to meet full occupancy later in the rotation based on measurements he has made on old growth white spruce stands (170-250 years), which contained about 405 total stems/ac 30-50 years after harvest. This reflects stands that are fully using available light on the best 5% of sites. Doug said that in his inventory work that trees >9" dbh in mature spruce stands were typically in the range of 110 stems/ac., the number of trees/acre > 9"dbh was lower in other stand types. Will said that natural stands are typically "suboptimally spaced." Mitch noted that ideal stocking and distribution depends on the goals for the site.

Confounding trends include continued recruitment (for up to 20 years?) and reduction of stems over time due to competition and mortality. Glenn said that Miho Morimoto found more than adequate stocking on state lands 40 years after harvest; stands of older birch and showed less natural regeneration – e.g, 270 stems/acre FRPA Reforestation surveys are done by 7 years post-harvest, and stocking continues to increase after that time. The study results showed that there were generally plenty of trees to develop full canopy cover at dominancy. He is not seeing an expansion of non-stocked areas at the landscape level. Mitch said that seedling mortality is as high as 20% in planted stands. John Y. noted that even open stands receive shading in Alaska due to low sun angles.

Doug noted that fuelwood harvesting along the road systems in the Interior has typically left advanced regeneration. Harvesting in remote villages is often by hand-felling and skidding with snowmachines rather than larger equipment, and can leave residual trees undamaged.

Glenn spoke about Andrew Allaby's research, which suggests using a decision tree for salvage and regeneration. Need to define management goal, desired future condition, and stand condition at harvest. For example, the goal might be to keep white spruce a dominant component of stands at all ages, essentially short-cutting stand phases with hardwood dominance. Southcentral and Copper River stands seem to have longer periods of white spruce recruitment from high seed years than do Interior stands.

Doug added that stem density can be deceiving; for example, dense stands of white spruce poletimber may be as old as, and never transition to, stands of white spruce sawtimber due to

density effects. Mixed spruce/hardwood stands are the typical precursors to white spruce sawlog stands. Glenn said that basal area is more consistent than stem density and less affected by patches of small stems. When gaps are created by disturbance, basal area can increase even without additional recruitment. While the S&TC did not disagree, John Y. noted that it can be difficult to remove confounding effects of dense stands of small stems, and Marty said basal area would be unworkable for assessing regeneration at the time of regeneration surveys when stems are still small. Glenn suggested that basal area may be a useful measurement for assessing stocking in residual stands. The S&TC noted that stocking standards may need to be evaluated multiple ways: time interval, management goal, and geographic location. On private lands, the goal is often to preserve the current options into the future; that is, you grow a forest if you harvest a forest, generally preserving the stand types. Perhaps the regeneration standard needs to focus on creating conditions that increase our confidence of success.

Glenn recommended not always requiring replanting. It artificializes the site and is expensive. However, white spruce stocking and height growth are greater in planted areas. If a white spruce component is needed for wood fuels such as pellets, we need to think about keeping it in the mix. If rotation age is shortened, it compounds the need for planting to keep a spruce component in the early successional stages.

Doug provided a table of information from the state timber inventories showing average stand age and number of trees per acre by area and size (attached). The average number of sawtimber trees/acre prior to harvest is lower than the minimum stocking standard for residual trees >9" dbh for stands to be exempt from reforestation standards. Total trees/acre generally exceed the minimum standards. Spruce stand ages are younger in the Kenai area due to extensive beetle mortality. Tok and Mat-Su stands are more all-aged than other areas. White spruce pole stands are the typically similar in age to white spruce sawtimber stands – they are just on poorer sites. The stocking standard may be high if natural stands are typically below this stocking level.

Detailed plan of operation – As part of the effort to increase success, the S&TC discussed adding details to the regeneration section of the existing DPO, particularly when the landowner is relying on natural regeneration. Potentially, there could be different checklists for vegetative vs. seed regeneration. Items to potentially include are:

- organic matter depth, seed bed type, and disturbance level
- seed or propagule source(s)
- status of white spruce seed crop
- species on site pre-harvest
- level of grass present
- information on insects, diseases, and herbivores

Time frames and extensions – When can we measure and say, yes you have enough forest? Can we develop a "likelihood index" for successful regeneration, with potential deductions for

issues with soils, grass, insects, seed source, and other factors? The S&TC discussed whether it is reasonable to allow a longer period (e.g., 12-15 years) for natural regeneration after harvesting, as long as indicators show that natural regeneration is likely to succeed over time, and there is an intermediate survey to check on progress. Glenn suggested that setting the time frame to encompass an average of two white spruce seed cohorts would be appropriate – that would be about 12 years.

Amanda noted that the seedling stage is when impacts of climate change may be most evident. Can we identify areas where a biome shift is likely to occur?

How would a longer period for natural regeneration affect public benefits of reforestation? Tom and Glenn said that there are some ecological benefits of a longer early succession period for wildlife habitat and plant diversity.

John Y. added that hardwoods shade white spruce recruits which eventually grow into the canopy. If hardwood regeneration is delayed it will take longer to get white spruce back. A 2-3 year time frame for natural regeneration would be better. Rotation ages would have to be adjusted to account for delayed regeneration, and that would increase the area needed to produce a given sustained yield. Glenn noted that harvests rates are not currently near the biological capacity. Tom said that "sustainability" depends on the definition. Harvesting could be sustainable at lower levels – is that too low? Will climate change further decrease sustained yield? Glenn said that passively lengthening the period for natural regeneration could be a disaster but if it is done with safeguards and checks it would be in line with how forests naturally regenerate. John Y. suggested considering a 5-year timeframe for natural regeneration of hardwoods and 10 years for white spruce because of its variable seed crops. Hardwoods regenerate more rapidly and have more frequent good seed years. The S&TC could also consider differences on public and private lands.

Nick and Roger noted that we have some information from spring surveys for insects and need tools in FRPA to allow deviations in unusual circumstances. Marty explained how the existing framework for variations from FRPA requirements works.

Mitch said that sites with heavy *Calamagrostis* cover develop a clubmoss ground layer after 10-15 years, and white spruce can germinate in the moss layer.

Browsing – How are repeatedly-browsed seedlings counted in regeneration surveys? Doug explained that the standards require "vigorous, undamaged" seedlings.

SUMMARY OF KEY POINTS

Draft Findings

- **F1.** The focus on sawtimber and board-foot measurements doesn't fully reflect the Region II-III forestry situation which includes a large proportion of harvesting for fuelwood and other biomass energy products. 30mbf threshold ~ 7 – 9 mcf.
- **F2.** The window for white spruce recruitment extends for up to 15 years on uplands in Region III, and longer in Region II and on floodplains in Region III.
- **F3.** See chart from Doug + info from Glenn on range of natural stocking levels.
- **F4.** Climate change has increased some insect populations. When major insect outbreaks occur, the use of the reforestation exemption is likely to increase. From 1991-2004, reforestation exemptions encompassed 73% of the acreage in DPOs on the Kenai Peninsula and 28% in the Copper River basin due to the spruce bark beetle infestation.

Definition questions:

- Do "merchantable stand of timber" and "commercial species" clearly encompass biomass?
- Clarify whether repeatedly browsed seedlings count toward regeneration thresholds. *Note: the regulations require "vigorous, undamaged" seedlings.*

Draft consensus recommendations

- **C1.** DPOs need more in-depth information where natural regeneration is the planned reforestation method.
- **C2.** The S&TC identified factors that increase/decrease the confidence that regeneration will successfully result in a forest that can produce a sustained yield of commercial species
    - What species are on-site prior to harvest and what species will be harvested (affects options for natural regeneration).
    - Seed bed conditions: depth of organic matter and amount and distribution of exposed mineral soil, mechanical disturbance of soil (disturbance is a positive factor for birch, and negative for aspen).
    - Availability of seed sources
        - For white spruce: proximity to seed trees, exposure to wind, time since last large mast crop
        - For birch: proximity to seed trees
    - Risk of vegetative competition
        - Negative: Presence of *Calamagrostis* (esp. on toeslope and other moist sites), deep feathermoss
        - Uncertain –check in literature: Fireweed *(See Lieffers & Stadt 1994; Graham & Wurtz 2003; Newton 1996; Collins, Becker, & Collins 2001a; Johnstone 2006; and Holsten, Werner, & DeVelice 1995)*;
        - Positive: Equisetum seems correlated with white spruce regeneration
    - Insect and disease conditions, such as presence of root rot or beetle activity in existing stands (a known risk for white spruce; uncertain effect on hardwood regeneration)
    - Herbivore populations that are risks for hardwood regen:
        - Peaks in hare cycles
        - Dense moose populations (risks for hardwoods)

        - Amount and distribution of regeneration on the landscape (e.g., patches of regeneration are more vulnerable to herbivory in areas where regeneration and browse are scarce)
    - Planned or completed site preparation or planting (scarification; planting immediately if have high grass)
- **C3.** Goals, Land use conversions, Harvest unit planning and design, and Material extraction and disposal sites – no recommendations at this time.

Continue discussion:

- Consider allowing a period of 12 years for natural regeneration in stands where the indicators show a high likelihood of regeneration success within that period. Require a regeneration report after 5 years to ensure that the stand is on a trajectory that is likely to be successful. If the indicators no longer support an extended period for natural regeneration, corrective measures may be required. White spruce seed crops are variable and large seed crops occur on average every __ to __ years; the 12-year period would typically encompass two strong seed crops.
- Do we need to change definitions or procedures to more completely capture activities in the non-sawtimber markets?
- Does the FRPA applicability threshold have the potential to mask regeneration difficulties (many small adjacent harvest areas vs. single large harvest area)?Where are biome shifts likely to occur in Regions II and III?

Research needs

- Are the applicability thresholds (e.g., 40 ac minimum size) appropriate in terms of reforestation where the affected area may accumulate over time?
- Are insect infestations affecting hardwood recruitment? Insect infestations in spruce can cause widespread mortality (e.g., spruce bark beetles). Infestations in hardwoods usually cause decay or decreased growth that decrease wood value rather than causing mortality.
- What has happened on harvested areas exempted from reforestation requirements? *(See reports by Jandreau, 2006 and Sanders, 2003)*

NEXT MEETING DATES AND AGENDA.

The next meeting will be May 6, 2015 in Fairbanks.

TO DO LIST

- **Freeman and Durst:**
    - Minutes and summary of draft consensus points
    - Letter to mail list
    - Agenda for next meeting
    - Post PowerPoint on history of harvest and reforestation exemptions.

Other attendees

Theo DeLaca, Future Forests
Todd Nichols, ADF&G

Attachments

Table of trees/acre on state land. Source: DOF timber inventories, Doug Hanson

Table of trees/acre on Native lands. Source: Tanana Chiefs Conference surveys, Will Putman

Decisions for harvest and reforestation. Source: Andrew Allaby thesis defense presentation

STATE LAND TREES/ACRE Source: DOF inventories, Doug Hanson

Area	Timber Type	Age	Saplings	Pole	Saw	Tot. trees
Fai-Delta	WS Saw	175	320	81	121	522
	BI Closed	96	580	269	49	898
	AS Closed	94	787	327	65	1,179
	WS-BI Pole	132	301	163	61	525
	WS-HW Repro	56	2,515	112	11	2,638
Tok	WS Saw	163	600	182	102	884
	BI Closed	112	75	190	29	294
	AS Closed	95	850	212	42	1,104
	WS-BI Pole	134	1,000	142	53	1,195
	WS-HW Repro	79	1,925	164	11	2,100
Copper River	WS Saw	149	873	130	87	1,090
	AS Closed	87	830	297	37	1,164
	WS-AS Pole	98	950	140	27	1,117
	WS-BS Repro	122	767	157	9	933
Mat-Su	BI Pole Closed	102	285	145	76	506
	Bi Saw Closed	123	68	57	92	217
	WS-BI Saw Closed	126	153	49	81	283
	WS-HW Repro	113	408	143	23	574
Kenai	WS-SS	103	424	68	46	538
	BIRCH	112	353	49	36	438
	WS-BI	111	338	95	34	467

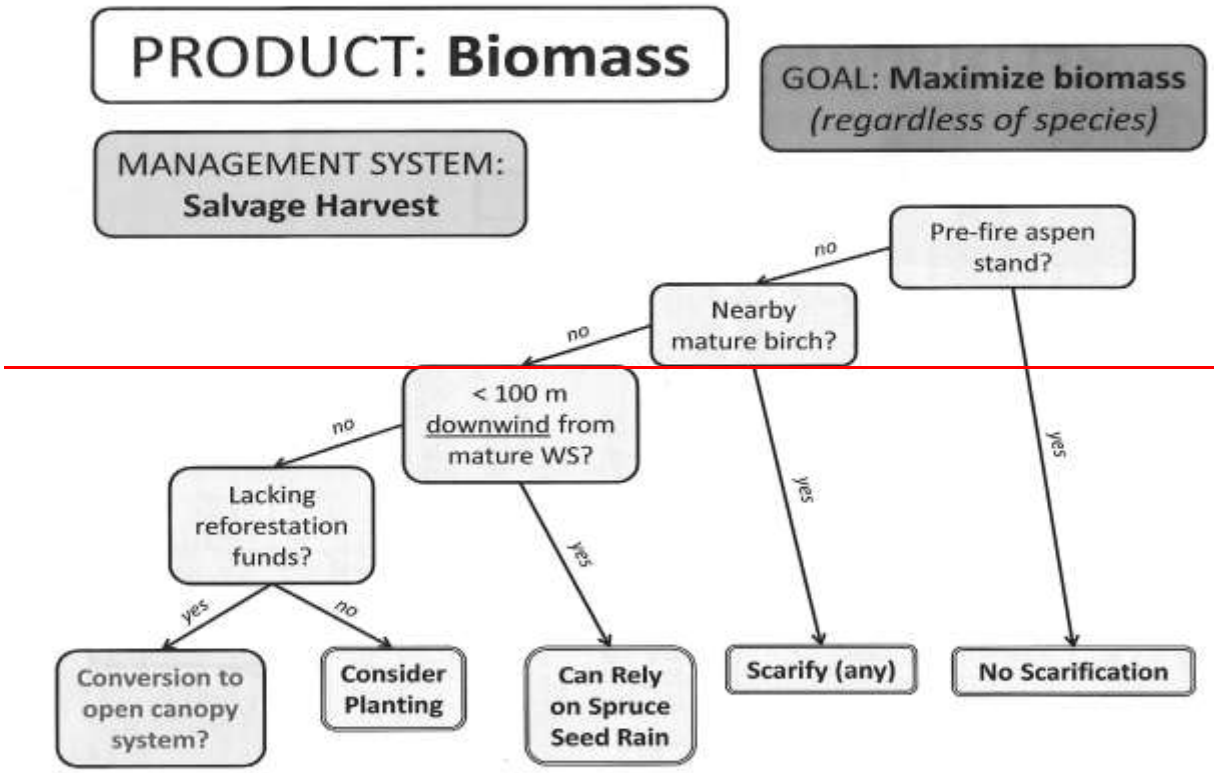
Tanana Chiefs Stocking Summaries by Strata

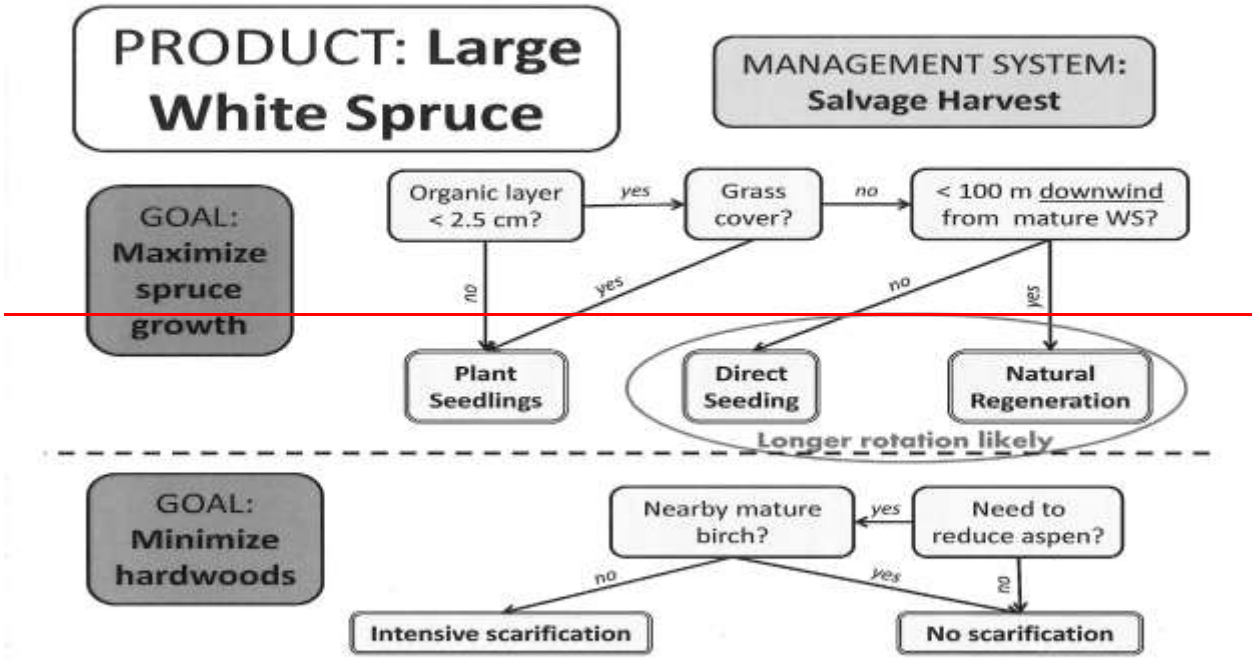
Source: Will Putman

Stratum Description	saplings stems per acre (1"-5" DBH)	poletimber stems per acre (5"-9" DBH)	sawtimber stems per acre (> 9" DBH)
Black spruce Poletimber	1,111	176	4
Black spruce - Hardwood Poletimber	709	172	5
Cottonwood Poletimber	382	191	39
Cottonwood Sawtimber	167	110	58
Hardwood Poletimber	602	232	24
Hardwood Sawtimber	0	62	73
White spruce Poletimber	286	238	47
White spruce Sawtimber	148	133	74
White spruce - Black spruce Poletimber	1,024	108	4
White spruce - Cottonwood Poletimber	354	182	38
White spruce - Cottonwood Sawtimber	635	104	50
White spruce - Hardwood Poletimber	305	199	35
White spruce - Hardwood Sawtimber	221	163	64
Average over all projects	398	192	42

Source: Andrew Allaby
thesis defense
April 2015

Decision Tree for Salvage Harvest


PRODUCT: Biomass
GOAL: Maximize biomass
(regardless of species)
MANAGEMENT SYSTEM:
Salvage Harvest
Pre-fire aspen stand?
no
Nearby mature birch?
no
< 100 m downwind from mature WS?
no
Lacking reforestation funds?
yes
no
Conversion to open canopy system?
Consider Planting
yes
Can Rely on Spruce Seed Rain
yes
Scarify (any)
yes
No Scarification


PRODUCT: Large White Spruce
MANAGEMENT SYSTEM: Salvage Harvest
GOAL: Maximize spruce growth
Organic layer < 2.5 cm?
yes
Grass cover?
no
< 100 m downwind from mature WS?
no
yes
no
yes
Plant Seedlings
Direct Seeding
Natural Regeneration
Longer rotation likely
GOAL: Minimize hardwoods
Nearby mature birch?
yes
Need to reduce aspen?
no
yes
no
Intensive scarification
No scarification