CHAPTER 4: IMPLEMENTATION

Upon signature by the Commissioner of the Alaska Department of Natural Resources (DNR), this plan will become policy for the management of state lands in the Tanana Valley State Forest. All DNR land use authorizations, timber sales, road building, mineral leases, and other actions on these state lands shall comply with the provisions of this plan.

This chapter describes additional actions that support the management intent detailed in previous chapters for this working state forest. Such actions include potential management agreements, priority research topics, additions to the state forest, and procedures for plan amendment. This plan remains effective until revised.

STATE LAND CLASSIFICATION

To implement the plan on state lands, ADNR must classify state lands to reflect the intent of land use designations made by this plan. State law requires that land classification precede most conveyance or leasing of state uplands or tidelands. According to state statute classification means the designation of lands according to their apparent best use. It identifies the primary use for which the land will be managed, but all other uses are initially presumed as compatible with the primary use. For this reason, all plan classifications are intended for multiple uses. In this plan most management units are assigned a single, principal designation.

In some instances, more than one designation is identified; these are termed co-designations and indicate that two or more uses are considered to be compatible within a specific management unit of state land. Compatibility of uses should be able to be achieved through distance separation, or siting and design techniques that should reduce or preclude the undesirable effects of a particular use.

Following is a list of land classifications, and their associated definitions in Alaska regulations (the Alaska Administrative Code – AAC), which will apply to state lands in the planning area as a result of plan adoption. DOF will manage state lands and resources consistent with these classifications and with the management directions given in Chapter 3 for specific management units of state land.

11 AAC 55.070. Forest Land. Land classified forest is land that is or has been forested and 16 is suited for forest management because of its physical, climatic, and vegetative conditions.

11 AAC 55.120. Material Land. Land classified material is land that is suitable for the 24 extraction of common varieties of sand, gravel, stone, peat, clay, and other similar materials.

11 AAC 55.160. Public Recreation Land. Land classified public recreation is land that is 31 suitable for recreation uses, waysides, parks, campsites, scenic overlooks, hunting, fishing or 32 boating access sites, trail corridors, or greenbelts along bodies of water or roadways.

11 AAC 55.170. Reserved Use Land. (a) Land classified reserved use is land that:

1. is reserved for transfer to another governmental or non-governmental agency that is performing a public service;
2. is reserved for transfer through land exchanges; or

3. has been designated for a public facility.

RELATIONSHIP OF LAND USE DESIGNATIONS IN THIS PLAN TO STATE LAND CLASSIFICATIONS

The classifications contain no specific land management directives; those directives are expressed through the use of land use designations in the plan and described in detail for individual Regions and management units included in Chapter 3. However, the designations used in the area plan must be converted into land classifications outlined in state regulation (11 AAC 55) that reflect the intent of the plan.

Since plan designations are central to the management of state land in this area plan, knowledge of the amount of area associated with particular designations is important, allowing a comparison between the designated uses. Table 4-1 identifies the acreage associated with the designations recommended in this plan. Descriptions of each of the following designations are also provided at the beginning of Chapter 3.

Acreages associated with plan classifications are given in Table 4.1

Table 4.1. Acreages Associated with Land Designations and Co-designations

Symbol	Designation	Acreage
F	Forestry	1,778,829
Ma, F	Materials and Forestry	1,246
Rp, F	Public Recreation – Public Use Site and Forestry	274
Rs, F	Reserved Use and Forestry	23,626

The conversion of land use designations used by this plan into state land classifications is indicated in the table below. These are intended to identify the allowable uses of a state upland area, consistent with the definitions described previously and with any management intent given in Chapter 3.

Table 4.2. Land designations – Conversion to Classifications

Symbol	Designation	Classification
F	Forestry	Forest Land
Ma	Materials	Material Land
Rp	Public Recreation – Public Use Site	Public Recreation Land
Rs	Reserved Use	Reserved Use Land

CLASSIFICATION ORDER

State land is classified under the authority of AS 38.04.005, AS 38.05.300, and 3 11 AAC 55.010 -.280 according to the management intent set forth in this area plan. Land classification orders, as used in area plans, convert the land use designation in the area plan to land use classifications, which are required under statute. Classifications are important to the determination of whether certain forms of activity can occur under portions of statute and they provide a general indication of how state land is to be managed. However, they do not provide the basis for

the management of state land. The plan designations, management intent, and management guidelines of an area plan perform that function.

Land Classification Order NC-24-002 classifies all state land within the Tanana Valley State Forest Management plan area. See Appendix B. This Land Classification Order supersedes and replaces all previous land classifications and classification orders affecting the planning area of the Tanana Valley State Forest Management Plan boundary. It does not replace or supersede Special Use Designations predating the approval of this revision.

The potential for the reclassification of state land in the future is authorized under 11 AAC 20 55.240, but this action will require the revision of LCO NC-24-002 and may require, in some cases, the revision of this management plan. An amendment to the plan is required under 11 AAC 55.030(f)(1)(B) if the proposed authorization would modify the basic management intent for one or more of the subunits or if the authorization would conflict with the plan's allowed or prohibited uses, policies, or guidelines.

The classifications described in this plan apply to state owned and selected lands within the plan boundary. In the case that the state acquires parcels of land within the TVSF boundary that have not been designated or classified through this revision of the TVSF MP, the following guidelines will apply: If the parcel adjoins or is surrounded by other state land, the designation of that area(s) applies. It is to be managed according to the management intent and guidelines applicable to the adjacent lands. If there are two different designations of the abutting parcels, the designation of the larger parcel shall apply. If this guidance is followed, a formal amendment or revision of the Land Classification Order is not required.

Table 4.3 provides estimates of the acreage by classification and co-classification for upland units of state land.

Table 4.3. Acreages Associated with land Classifications and Co-classifications

Classification	Acreage
Forest Land	1,736,596
Materials/Forest Land	1,246
Public Recreation/Forest Land	274
Reserved Use/Forest Land	20,891

SURVIVOR DESIGNATIONS AND CLASSIFICATIONS

This revision of the Tanana Valley State Forest Management Plan replaces and supersedes all previous plan designations and land classifications (termed 'survivor') that affected the TVSFMP planning area. It does not replace or supersede Special Use Designations predating the approval of this revision. Areas not reclassified in this plan remain subject to the requirements of 11 AAC 55.040(g).

AGENCY LAND MANAGEMENT RESPONSIBILITIES

The DNR Division of Forestry and Fire Protection (DOF) has overall land management authority within state forests. The DOF will coordinate multiple use planning in the State Forest and is responsible for timber management. The DNR Division of Mining, Land and Water will continue to be responsible for adjudicating land and water use applications and mineral permitting. Administrative procedures, such as cooperative agreements, may be used to establish the applicability of Division of Parks and Outdoor Recreation regulations to the

management of campgrounds, public use cabins, and other recreational facilities. The USDA Forest Service, Pacific Northwest Research Station, has management authority for the Bonanza Creek Experimental Forest (Subunit 5B). As outlined in the lease granted to the Forest Service by the DNR (Appendix D), the Forest Service must approve all activities in the Experimental Forest, including timber harvest, road construction, and mineral exploration and development.

CITIZENS' ADVISORY COMMITTEE FOR THE TANANA VALLEY STATE FOREST

A Citizens' Advisory Committee (CAC) for the TVSF and other forested land managed by the DNR in the Tanana River Basin was authorized and established by past versions of the TVSF Management Plan and has proven a valuable mechanism for achieving multiple uses of the forest without conflict. The Committee, in an advisory capacity, will provide recommendations to the DNR on forest management issues on these lands. The Committee does not conflict with the Board of Forestry established by AS 41.17.041. The Committee's purpose is to:

- Review and provide Committee recommendations to the DOF on updates and amendments to the TVSF Management Plan and Five-Year Schedules of Timber Sales (including reforestation and transportation schedules). Site specific Forest Land Use Plans (FLUPs) will be made available to each member for review, during the established review period, however, the Committee is not required to make recommendations on these documents.
- Provide a forum for gathering public opinion on management of state forested land, help to develop a regional consensus on forest management, and provide management recommendations to the Director, DOF. When consensus cannot be reached on a Committee recommendation, the Committee should forward the majority's recommendation and any different views not represented by the majority's recommendation to the Division.
- Review issues and activities on DNR-managed forested land and recommend management policies to the Director, DOF.
- Help disseminate information about the TVSF and other DNR-managed forested land to the public.

Each member should represent the full range of interests within his or her constituency. All CAC members should work to establish two-way communications with other groups and individuals within the interest they represent. Members are expected to bring their constituencies' interests and concerns to the CAC. However, when the Committee makes recommendations, all members should act in consideration of the whole community and the statewide public interest, not just the interest of their immediate constituency. The CAC consists of the following twelve members appointed by and serving at the pleasure of the Director, DOF. The term of office is three years. The Director, DOF will make committee appointments so that four expire each year on a revolving basis. The Director, DOF will review all applications received from individuals seeking appointment to the CAC without requiring recommendations from the current committee.

Table 4.4. Citizens' Advisory Committee Constituencies.

Seat	Constituency
Forest Industry	Represents businesses involved in harvesting and/or processing timber resources.
Value-added Processing	Represents businesses involved in the manufacture of finished wood products and minor forest products.
Environmental Interests	Represents environmental organizations and individuals with environmental interests.
Private Forest User	Represents the incidental forest user for both consumptive and non-consumptive activities including subsistence and personal use.
Forest Science	Represents the forest science community. Background should include training, experience and a current knowledge of multiple forestry specialties related to forest ecosystem management. Representatives should not be currently employed by a State agency other than the University of Alaska.
Alaska Native Community	Represents both individual Alaska Natives and Alaska Native organizations in the Tanana Basin who use the forest or will be directly impacted by forest management.
Recreation	Represents the non-commercial users who visit the forest and take advantage of both consumptive and non-consumptive benefits for pleasure and enrichment of life.
Tourism Industry	Represents the commercial operators who directly use forest lands as well as those whose customers are incidentally exposed.
Fish and Wildlife Interests	Represents the full range of interests in fish and wildlife, including sport and commercial users.
Mining Industry	Represents organizations and individuals involved in the mineral exploration, extraction, and processing industries.
Regional Representative - Upper Tanana Valley	Represents the public on a regional basis, including commercial, non-commercial, consumptive, and non-consumptive uses. This representative should reside in the eastern Tanana River Valley between Banner Creek and the Canadian border.
Regional Representative - Lower Tanana Valley	Represents the public on a regional basis, including commercial, non-commercial, consumptive, and non-consumptive uses. This representative should reside in the western Tanana River Valley west of the Fairbanks North Star Borough.

When appointing CAC members, the Director, DOF will seek region-wide geographic representation. The CAC will elect its own presiding officer. The CAC will adopt its own by-laws subject to approval by the Director, DOF.

PROCESS FOR REVIEWING APPLICATIONS FOR PERMITS, LEASES, DISPOSALS, AND EASEMENTS

For timber sales, the Forest Land Use Plans will identify proposed access routes and materials sites both within and outside the TVSF. Temporary routes will be authorized by the DOF through the FLUP process. Long-term routes will be authorized through a right-of-way easement. The DOF will identify the proposed ROW in the FLUP. Following FLUP review, DOF will submit the easement application to the Division of Mining, Land and Water (DMLW) to authorize and record the route on the status plats.

Other land management proposals may be initiated by other agencies or private individuals and may include requests for easements, commercial leases, material sales, or permits for mineral activity, trapping cabins, or grazing. The following process will be used to review these authorization or conveyance requests. All applications for use of State Forest land, including mining or prospecting, will be forwarded to the DOF. The DMLW will distribute applications for review by agencies, including the DOF. The DOF will review applications for consistency with this plan and other existing laws and policies. The DOF will then return applications to the DMLW with stipulations for processing. The DOF may also require additional review of applications after interagency or public comment. Although preliminary decisions or final findings will continue to be made by the DMLW, applications must be consistent with stipulations provided by the DOF. No permits, leases, easements, or disposals will be authorized for use of State Forest land that are not consistent with stipulations from the DOF.

For mining operations, temporary routes will be authorized by the DMLW through its Miscellaneous Land Use Permit (MLUP). For long-term routes, the DMLW will issue an easement.

PLAN MODIFICATION

The land use designations, policies, implementation actions, and management guidelines of this plan may be changed periodically as new data and new technologies become available and as changing economic, social, and environmental conditions place different demands on public lands.

Periodic Review

The plan will be reviewed at least every 5 years to determine if revisions are necessary. An interagency planning team chaired by the DOF will coordinate this periodic review at the request of the Department of Natural Resources Commissioner. The plan review will include meetings with interested groups and the general public.

Procedures for Plan Changes

Three kinds of changes are allowed by regulations in 11 AAC 55.030. “A revision to a land use plan is subject to the planning process requirements of AS 38.04.065. For the purposes of this section and AS 38.04.065, a ‘revision’ is an amendment or special exception to a land use plan as follows:

1. An ‘amendment’ permanently changes the land use plan by adding to or modifying the basic management intent for one or more of the plan's subunits or by changing its allowed or prohibited uses, policies, or guidelines.” A proposal to remove an area from the commercial timber base, to harvest the timber from an area where it is prohibited, or to close an area not identified in this plan to mineral entry are examples of changes requiring amendment. However, amending the Forest Practices Regulations, for example, and inserting those changes in this plan do not require an amendment of the plan. Amendments require public notice, public hearings, and approval by the Commissioner. Amendments may be proposed by agencies,

municipalities, or members of the public. Requests for amendments are submitted to the Northern Regional Office of the DOF. The Director of DOF determines what constitutes an amendment or just a minor change.

2. A ‘special exception’ does not permanently change the provisions of a land use plan and cannot be used as the basis for a reclassification of the subunit. Instead, it allows a one-time, limited-purpose variance of the plan's provisions, without changing the plan's general management intent or guidelines. For example, a special exception might be used to grant an eligible applicant a preference right under AS 38.05.035 to purchase land in a subunit designated for retention in public ownership. A special exception might be made if complying with the plan would be excessively burdensome or impractical or if compliance would be inequitable to a third party, and if the purposes and spirit of the plan can be achieved despite the exception.

3. A minor change to a land use plan is not considered a revision under AS 38.04.065. A `minor change' is a change that does not modify or add to the plan's basic intent, and that serves only to clarify the plan, make it consistent, facilitate its implementation, or make technical corrections. Authority: AS 38.04.065, AS 38.04.900, AS 38.05.020, AS 38.05.300.

FORESTWIDE IMPLEMENTATION ACTIVITIES

This section describes management activities necessary to implement this plan. Projects are designed to serve as reference material for agencies to develop elements of the Five-Year Schedule of Timber Sales or other public review process.

WILDLIFE HABITAT ENHANCEMENT

Pursuant to AS 41.17.400(e), ADF&G's Division of Wildlife Conservation, in cooperation with the DOF, may manipulate forest stands to increase available moose browse and begin staggered rotations of hardwood forest beneficial to ruffed grouse and other early- to mid-successional wildlife species. Among the techniques that may be used are: prescribed burning, silvicultural methods, tractor crushing of riparian willow and bulldozer shearblading or felling of hardwoods. Habitat enhancement projects will be discussed in the Five-Year Schedule of Timber Sales or by some other public process.

RECREATION FACILITIES

The following list contains recreation facilities in which the public has expressed interest. DOF is not funded or staffed to implement or develop these recommendations beyond review and participation in the adjudication process for applications for such projects. This list is included for the awareness of land managers and planners; it does not represent DOF's endorsement of any project.

Table 4.5. Recreation Developments of Public Interest.

Unit	Location and Description
1	Maintain trails in Unit 1A
4	Boat launch at end of Murphy Dome Extension on Chatanika River. Add gravel, toilets, possibly refuse containers, and make small improvements to launching area.
4	Upgrade of boat launch at end of Murphy Dome Extension on Chatanika River to campground.
4	Scenic turnout on Murphy Dome Extension
4	Trail construction and signing
5	Nenana Ridge interpretive site 1. Establish self-guiding interpretive trail 2. Construct picnic site with toilets and refuse containers
5	Trailhead providing recreational access from Cripple Creek neighborhood
5	Trail segments connecting existing forestry roads between Fairbanks and Nenana
6	Boat launch and parking area on the Chena River at the end of the Grange Hall Road
6	Trail construction and maintenance of Lyrad Creek system
12	Campground at Alaska Highway crossing of Robertson River

RESEARCH NATURAL AREAS

Appendix E describes each Research Natural Area's features and the rationale for designating the area as an RNA.

TIMBER AND ROAD DEVELOPMENT

Two types of monetary considerations affect the amount of timber that DOF can offer for sale: development costs and budget. Development costs are incurred for reforestation, road construction, and maintenance. Most development costs are assumed by the timber sale operator. Agency budget pays for timber sale preparation and administration. The locations, products, and volumes of timber offered and harvested will depend in part upon the amount of revenue the sale can generate to offset development costs. This will vary with the access, timber quality, volume, harvest costs, and current markets. Consequently, timber sale priority must not only meet forest management goals, but also must be economically feasible.

FIRE DISTURBANCE

Recognizing that the boreal forest is disturbance-driven is essential. Forest condition in the Interior is changing as a result of increased insect and disease activity, greater fire risk, and increased stress on trees caused by climatic change. Previous fire control efforts contribute to the shortage of young to intermediate aged stands, especially in upland forests. Some form of disturbance, natural or human-caused, is necessary to maintain the forest and its biological diversity. Maintenance of a rich landscape mosaic is needed to prevent biodiversity losses. In the Tanana Valley State Forest, fires will continue to be suppressed near settlements and where there are infrastructure investments. Current and proposed timber sales will receive fire protection commensurate with the values at risk. However, where feasible, wildland fires will be allowed to burn and suppression will be limited in other areas to decrease the long-term risk of damaging fires and to maintain natural diversity of forest stands, stand ages, and habitat types.

Where allowing wildland fire is not feasible, the DOF will use timber harvest, prescribed fire, or habitat enhancement techniques to disturb the forest and maintain a natural range of forest types and stand ages. Annual reviews of protection levels are an important aspect of the fire plan. Social, environmental, and economic conditions determine the need to review and change protection levels. Each Area Office is responsible for a periodic review of protection levels in their geographic area. Suggested changes will be coordinated with the regional office, neighboring landowners, and will follow the guidelines established by the Alaska Interagency Wildland Fire Management Plan (FMP). The FMP addresses the process for protection level changes on pages 38-40 in a section entitled: Wildland Fire Management Option Revisions. For additional information on fire management topics in the Tanana Valley State Forest, see the Interagency Fire Management Plan description in Chapter 1 and the Fire Management parts of the Scientific Resources and the Timber Management sections of Chapter 2. Any proposed changes of fire management options (protection levels) will be provided to affected land owners and managers and resource management agencies in accordance with the Alaska Interagency Wildland Fire Management Plan.

RECOMMENDATIONS FOR CHANGES TO THE TVSF LANDBASE

As public land continues to be surveyed and classified by the Alaska DNR Lands Section, DOF advocates for the inclusion of productive Forest classified lands in the State Forest System, bringing these parcels under active forest management.

The Eastern Tanana Area Plan (ETAP) and Yukon Tanana Area Plan (YTAP) each list units recommended for addition to the TVSF in their Chapter 2 descriptions of Forest classified lands. The list of parcels recommended for addition to the TVSF according to the ETAP and YTAP can be found below.

Lands Identified in the ETAP and YTAP for addition to the Tanana Valley State Forest

Table 4.6 DNR DMLW Recommended Additions to the Tanana Valley State Forest

Area Plan	Unit Number	Land Use Designation	Acreage
YTAP	T-41	Forest	34,361
YTAP	K-26	Forest	17,897
YTAP	K-31	Forest	2,547
YTAP	P-01	Forest	2,211
YTAP	P-03	Forest	4,838
YTAP	P-11	Forest	514
YTAP	P-30	Forest	4,300
YTAP	P-41	Forest	14,386
YTAP	P-48	Forest	18,813
YTAP Total			99,867
ETAP	F-04	Forest	24,104
ETAP	F-14	Forest	9,266
ETAP	F-21	Forest	2,603
ETAP	F-33	Forest	69,921
ETAP	F-34	Forest	62,723
ETAP	F-37	Forest	2,032
ETAP	F-38	Forest	3,840
ETAP	F-48	Forest	2,765
ETAP	F-64	Forest	14,373
ETAP	F-71	Forest	640
ETAP	F-99	Forest	1,938
ETAP	F-100	Forest	1,440
ETAP	F-111	Forest	824
ETAP	F-114	Forest	1,035
ETAP	F-133	Forest	320
ETAP	F-148	Forest	311
ETAP	D-08	Forest	33,209
ETAP	D-10	Forest	72,657
ETAP	D-12	Forest, Habitat	14,112
ETAP	D-17	Forest, Habitat	14,729
ETAP	D-18	Forest	12,019
ETAP	D-19	Forest, Habitat	11,204
ETAP	D-21	Forest, Habitat	61,565
ETAP	D-46	Forest, Habitat	40

Area Plan	Unit Number	Land Use Designation	Acreage
ETAP	D-48	Forest, Habitat	980
ETAP	D-49	Forest	227
ETAP	D-50	Forest, Habitat	2,560
ETAP	D-55	Forest, Habitat	10,769
ETAP	D-58	Forest, Habitat	14,175
ETAP	U-21	Forest, Habitat	13,141
ETAP	U-24	Forest	14,607
ETAP	U-34	Forest, Habitat	2,435
ETAP	U-65	Forest, Habitat	7,639
ETAP	U-66	Forest	10,530
ETAP Total			494,733
Total recommended additions to TVSF			**594,600**

In addition to those listed in ETAP and YTAP, DOF has identified a number of parcels desired for addition to the TVSF.

Additions and withdrawals of land from Alaska's State Forest system occur through legislative designation, following the procedural guidelines described in AS 38.04.005 and AS 38.04.060 - 38.04.070. The recommendations in Table 4.3 are based on the Forestry management guidelines described in the ETAP and YTAP as of 2024. The Division of Forestry may propose other parcels for addition to the TVSF not specifically noted in DMLW Area plans DOF and DMLW recommendations are subject to change. The specificity of Table 4.3 does not exclude future adaptation of the currently proposed changes to the TVSF land base. In addition, the Alaska Timber Jobs Task Force published recommendations in 2012, identifying over one million acres of forest classified land in the Tanana Basin recommended for addition to the TVSF. Any proposed changes in legislative designation for a parcel of land will be coordinated with the DMLW Resource Assessment and Development Section (RADS), as well as the DMLW Lands Office.

RESEARCH NEEDS

All research on the resources, features, uses, and economics of the State Forest will improve DNR's ability to manage the State Forest. A number of research projects have been done to help improve decision-making in the last 20 years. However, the environment continues to change which requires new and/or better knowledge of the boreal forest. The knowledge may allow DNR to increase the benefits available from the forest, and in some cases the knowledge is needed to validate plan recommendations. The following research projects are those most needed to improve the quality of planning decisions and increase TVSF benefits in the order of priority.

Silvicultural Research

1. **Compilation of on-going and completed research relevant to Alaska:** The compilation will help find existing information and know what research will further help with management decision making.
2. **Non-Native Species:** Potential advantages and disadvantages of reforestation with non-native, non-invasive tree species after timber harvest or natural mortality events are uncertain. How would naturalized species in Alaska like lodgepole pine or Siberian larch influence carbon sequestration, future timber supply, and fish and wildlife habitat in boreal forest? Prior to adopting forest regeneration at an operational scale that includes non-native trees, a Science and Technical Committee and an Implementation Committee could be convened to consider pros and cons to forest health, ecosystem services, the forest industry and provide guidance for implantation and monitoring.
3. **Remote sensing technologies:** Can we use remote sensing technology, including UAV, airplane, satellite, visible and hyperspectral images, and LiDAR, to obtain high-quality data at low cost? What types of applications, such as timber cruising, inventory, regeneration survey, fuel assessment, aerial direct seeding, and fire management are feasible?
4. **Assisted migration:** Monitoring of existing provenance and species trials will help assess the adaptability of seed sources and non-native species. Can we find optimal sites for local seeds under changing climate? Incorporate seeds from southern latitude and non-native species on selected sites for reforestation after timber harvest in a systematic way to assess adaptability, growth, and optimal spacing.
5. **Effects of harvest techniques:** What are the short-term patterns of regeneration on sites harvested with fellerbunchers?
6. **Landscape scale fire resilience and resource outcomes:** Can we pattern harvest of hardwood or mixed species stands to regenerate fuel types that reduce risk of fire spread into mid-aged white spruce (protect future sawlogs)? Can we use timber sale size and configuration to emulate fire disturbance patterns to maintain desired assemblages of wildlife species in managed forest? Can we use these timber harvest patterns to evaluate wildlife ecosystem services beneficial to forest regeneration and resilience to insect irruptions?
7. **Wildlife use of cutover areas:** Can we systematically evaluate existing timber sales for understanding habitat attributes predictive of the occurrence or abundance of wildlife species or species assemblages that may aid design of future timber sales for evaluating both timber and desired wildlife outcomes?
8. **Timber growth and yield:** The Interior Alaska FVS variant was recently released and needs to be validated using existing timber sales, Levels of Growing Stock sites, Cooperative Alaska Forest Inventory, and other available long-term research sites. Growth and yield model should also include non-native species, such as lodgepole pine and Siberian larch, to assess their economic feasibility.

9. **Seedling:** What are the capabilities of growing high-quality seedlings within the state? Should additional nursery infrastructure be established in-state? Are there BMPs to consider when collecting seed? What does a resilient seed storage bank look like on a statewide level?
10. **Mixed wood and hardwood silviculture:** What components of the silvicultural prescription should be considered when managing mixed species or hardwood stands? Guidelines of management practices, such as harvesting method, need of reforestation management, and timing of each practice will be beneficial for forest land managers.
11. **Tree mortality:** Is it possible to mitigate insect outbreaks, especially *Ips* and spruce beetle, using forest management techniques or spatial pattern of harvest? What are the best practices for managing forest health? What are the silviculture prescription components that need to be considered with regard to forest health?
12. **Silvicultural Treatments:** Partial cuts, seed tree cuts, selective cuts and other harvest systems need to be studied to determine the impact to soil warming, site productivity, and wildlife response.
13. **Grazing Sites:** What are best practices of livestock grazing and range management to mitigate invasive species or pathogens? How could we use livestock grazing as part of forest management?