DEPARTMENT OF NATURAL RESOURCES

Anoka Sand Plain

Subsection Forest Resource Management Plan

Fiscal Years 2013-2022

Mid-plan Monitoring Report

Minnesota Department of Natural Resources
Division of Forestry Planning Document
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This report and additional information about the DNR Subsection Forest Resources Management Planning process can be found on the DNR Forest Management Planning website.

This information is available in alternate formats upon request.

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Executive Summary

The Anoka Sand Plains Subsection Forest Resource Management (ASP SFRMP) plan covers an area that reaches from Brainerd along the Mississippi river east to the Northern Twin Cites Metro area. The Sand Dunes State Forest (SDSF) and the Carlos Averey Wildlife Management Area (WMA) are the two major management units within the ASP SFRMP. This monitoring report will cover the first 5 years of the ASP SFRMP, covering FY2013 to FY2017. During that time period stands selected for management were heavily weighted in and around the SDSF. This area also contained a high percentage of the red pine within the planinning area. During the first 5 years of the planning period two factors have had an effect on the goals described in the original ASP SFRMP plan and changed how mangers implement the plan at the stand level.

- In 2012 the Minnesota Department of Natural Resources (DNR) conducted a review of extended rotaion forest (ERF) policy. From that review it was determined that there was sufficient old forest across all ownerships and that managing DNR lands for ERF was currently not needed within the ASP SFRMP area. Due to the change of ERF policy, ERF goals will not be discussed in this monitoring report.

- In 2016 public concern about the management of the SDSF resulted in an update to the the SDSF Operational Plan, Which affected the management of the SDSF for FY2013 to FY2022. To provide time for public imput, management within the SDSF was suspended for the last two years of this monitoring period, FY2016 and FY2017.

Additionally, in 2018 the Sustainable Timber Harvest Analysis (STHA) was conducted on DNR lands State wide to develop a new 10 year sustainable harvest target. This process resulted in a new 10 year stand exam list within the ASP SFRMP area, as well as a change to the normal rotation ages that will be applied to forest types within the ecological section. The STHA direction occurred just after the end of this monitoring period and did not affect management decisions during FY2013 to FY2017. While the STHA decision did not directly affect this monitoring period (FY13 to FY17), it is important to recognize that it will affect management and plan goals during the second half of the planning period.

Summary of Plan Goals

The following are the goals remaning for management in the Anoka Sand Plain SFRMP. A summary of findings based on analysis in this report are listed under each goal.

Move toward a balanced age-class distribution for even-aged cover types, particularly aspen, oak, tamarack, and red pine

- Management efforts are moving aspen, birch, oak, and red pine towards a balanced age class by moving older forest to young forest condition.
- Tamarack is the only cover type that is not moving toward balanced age class distributions.

Maintain the amount of acres of young forest (0-30 years old) allowing for slight increases if needed

- During the first 5 years of the plan period, the overall amount of young forest has decreased across all cover types. Young forest is being created at a lower rate than the forest is aging into old forest. This trend is not consistent with plan goals.

Identify and maintain old forest (forest older than normal rotation age (NRA)), including designating old growth forest

- The amount of old forest on the landscape is increasing across all cover types. This trend is consistent with plan goals for all cover types except oak and jack pine. The majority of oak cover types will be visited in 2018 to 2022. Nearly half of the jack pine acres are over NRA, with no young forest acres.
- Designated old growth forest acres have increased within this planning period. This increase is mainly due to newly acquired lands and new designations. Ongoing polygon mapping of new additions is nearly complete.

Slight increase in timber productivity from previous planning periods, but overall less than plan goals

- On average, across all five years the volume offered was slightly lower than the plan average of 5,068 cords per year.
- For two of five years, timber productivity (volume offered and sold) was higher than the plan average, for the remaining years, volume offered was significantly less than the planned average.
- Appraisal rates during this 5 year period where higher than the average across all SFRMPs.

Increase and decrease specific cover types across the landscape, including decreasing aspen and jack pine while increasing oak, red pine, and white pine.

- In line with plan goals for some species, aspen has decreased and white pine has increased across the subsection.

Increase white pine as a component in existing pine, oak, and aspen stands

- In line with plan goals, increase in white pine was included as a common management objective code.

Native plant community (NPC) and NPC condition data are available to inform management decisions.

- Additional NPC classifications have been completed, and continue to be completed, on DNR lands.

Species of Greatest Conservation Need and Key habitats are Maintained or enhanced.

- The State Endangered, Threatened, and Special Concern Species of Greatest Conservation Need lists, which guide management activities, were updated since plan implementation resulting in an increase in the number of listed species in the Anoka Sand Plain Subsection.

- Significant habitat management work has been completed within the two Special Management Areas on Carlos Avery WMA. Funds have been secured for additional habitat work.

Summary of Recommendations

Based on results of analysis in this report, the monitoring team made recommendations to staff implementing the plan to continue to successfully address the goals of the ASP SFRMP during the second half of the plan:

- Good sell rates occurred in pine cover types over the last five years in the subsection, sale rates were lower for oak and other hardwoods. Look for opportunities to make less desireable species more marketable when not conflicting with conservation goals.
- Staff are doing well at entering objective codes, but the number entered could increase to capture additional valuable information. Enter as many objective codes as is appropriate for each stand.
- Properly assigning appraised, altered, and deferred classifications to acres visited is important to tracking efforts.
- Reasons for deferrals were not entered in all stands that where deferred. Entering specific definitions for deferral codes and consistently using them will help facilitate meaningful reporting and improvement.
- Consistent, accurate data entry is important to monitoring efforts. Data enrty in all systems should be derived and named consistently over time to facilitate long-term trend analysis and tracking.
- Apply appropriate silvicultural techniques to meet plan goals for oak age class distribution and contribution of oak to old forest on the landscape.
- Continue to apply management recommendations for state and federally listed species.
- Continue to map NPCs on DNR lands to inform management decisions and facilitate more detailed understanding and analysis of landscape patterns, including growth stage.
- Continue to monitor and treat invasive species as funds are available.
- Continue habitat work within Special Management Areas.

Introduction

The Anoka Sand Plain SFRMP recommends vegetation management for State fiscal years 2013-2022 (final plan documents are available on the Anoka Sand Plain SFRMP website). Assembling available monitoring information through FY2017 provides an approximate mid-point review of plan implementation.

The Monitoring Process

Following internal guidance developed for monitoring SFRMP implementation and effectiveness, the Anoka Sand Plain (ASP) SFRMP Core Team convened in 2019. The team reviewed and compared accomplishment data with the goals identified in the ASP SFRMP. A variety of policies have changed over the course of this monitoring cycle, which affect plan implementation. The extended plan will include this document as an appendix.

Team members who contributed to this monitoring report include:

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Wade Mapes, Central Region Fire, Timber and Enforcement Program Forester
Division of Ecological and Water Resources
Liz Harper, EWR Central Region Assistant Regional Manger
Division of Fish and Wildlife
Mike North, Region 1 and 3 Forest Wildlife Coordinator
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Planners
Katie Zlonis, Forest Resource Planner
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Information Sources, Data, and Data Analysis

The monitoring team used a variety of data sources (see list below) to assess trends and summarize data since plan implementation. These observations led to the recommended actions listed in this report. Detailed data used to develop these recommendations are available upon request.

Information Sources:

- Final ASP SFRMP
- Forest Inventory Module (FIM) implementation data from ASP SFRMP development
- FIM data from 2017
- Timber Sales Report System – reports of timber volumes sold FY13-FY17, and reports of stand accomlishments by FIM stand and cutting block.
- Silviculture and Roads Module (SRM) and Stand Exam Layer (SEL) data including planned and actual actions, site visits, and management objectives for FY13–FY17.

Changes to the Sand Dunes Operational Plan

During the 2016 legislative session, the legislature requested a report from the DNR on progress in collaborationg with citizens on management the SDSF, and also put a one year moratorium on most timber harvesting activities within the SDSF. In response the DNR launched a new public engagement process in the summer of 2016 to discuss management in the SDSF.

In May of 2017 the Minnesota legislature also passed 2017 Minn. Stat. Ch. 93, Sec 155 that affected how forest management was accomplished within the SDSF for a two-year period.

A new operational plan was developed for the SDSF to cover fiscal years 2013 to 2022. One of the purposes of the operational plan was to refine the goals of the Anoka Sand Plain Subsection Forest Resouce Plan. It is largly focused on planned activites for FY2018 to FY2022 rather than activities that were already completed between FY2013 and FY2017. To fully implement the law passed in 2017, and to develop the new operational plan, planned activites were put on hold in the SDSF durring FY 2016 and FY2017, the last two years of this monitoring period.

A Note Regarding Data Limitations

This monitoring effort used the best available data sources to assess SFRMP implementation and effectiveness. However, due to inherent limitations in these datasets and the short timeframe of the monitoring period, analysis results may not always reflect effects of management work completed on the ground. Results of these analyses should be interpreted with an understanding that it will take decades to assess effectiveness of plan implementation for some goals. Further, landscape changes reported from FIM comparisons may be influenced by factors outside of plan implementation, such as small changes in stands considered in or out of the SFRMP boundary, changes to land administration, and changes resulting from inventory updates.

Implementation Monitoring – Management Actions

Key Points

- The majority of stands selected to be visited in the first half of the planning period are located in the western half of the subsection, primarily in and around the SDSF.
- Stand covertypes visited during the first half of the planning period were mostly pine.
- Volume offered was close to plan estimates and sell rates were high.
- Appraisal rates are consistant with the State average, but varied by year.
- Overall, 69% of acres selected to be visited during this 5 year monitoring period were visited.
- Recorded management objectives indicate that staff are applying plan goals to management decisions, including conversion, silvicultural, habitat, and ecological goals.
- Development of the new SDSF Operational Plan put appraisals on hold in FY 16 and FY 17 affecting the amount of stands appraised and offered during those fiscal years.

Monitoring Question

Are management actions on DNR forest lands in the Anoka Sand Plain Subsection carried out in a manner consistent with the plan? Do metrics such as treatment levels, appraisal rates, management prescriptions, and management objectives reflect goals in the plan?

We compared implementation data, Timber Sales Module (TSM), Silviculture and Roads Module (SRM), and Stand Exam Layer (SEL) data to help answer these questions.

Results

Treatment Level: Volume Offered and Sold

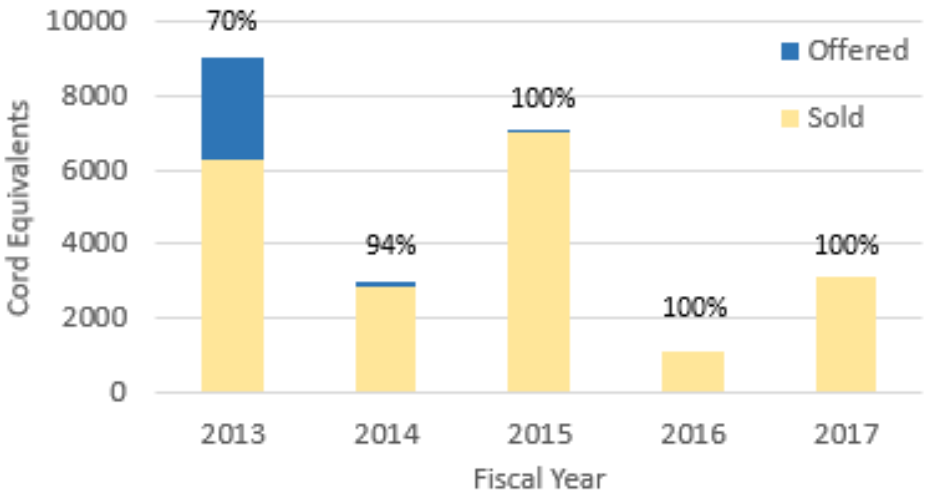
The recommended treatment level over the 10-year Anoka Sand Plain SFRMP was approximately 5,068 cords per year, compared to an estimated 3,790 cords per year during the decade preceding the planning period.

- Volume offered for sale was 92% of the estimated treatment level (23,327 cords compared to 25,340 estimated).
- Of cords offered, 20,423 were sold (88%) (**Figure 1**).
- Volume offered varied over years. More volume was offered in FY 2013 and FY2015 than in other years. Average volume offerd was 4,665 cords per year. The high variation of wood offered per fiscal year is likely due to multiple reasons.

- The number of acres planned to be visited varied greatly for each year fiscal year. High of 557 acres in FY2013 Low of 100 acres in FY2016
- Stands selected during the first half of this planning period where weighted to the western half of the subsection. These stand were located in and around the SDSF. Legislative direction put a hold on stand exams in the SDSF during fiscal years 2016 and 2017 in order to create a new SDSF Operational Plan.
- Staffing changes in the local forestry area left only one forester in the Zimmerman office during FY2014.

- Sell rates were high: 70% in 2013, and 94-100% in all other years.
- In 2013, the year the highest number of cords was offered, sell rates varied by species (**Appendix 1 Table I-1**). Species with relatively low sell rates that year include northern pin oak, paper birch, red maple, and quaking aspen.

Figure 1. Volume in cord-equivalents offered and sold by fiscal year, with percent of offered volume sold over bars. Total volume offered does not exclude reoffers.



Appraisal

Overall, 69% of acres seleceted to be visited during this 5-year monitoring period were visited. However, data for FY 2013-2014 may be inaccurate due to changes in data entry systems at that time. During FY 2015-2017, when we have greater confidence in our data, 88% of planned acres were visited.

Of acres visited, 61% were appraised, 9% were altered and 30% were deferred (**Table 1**). Appraisal rates met the 2014-2017 average across all SFRMPs in SEL (61% vs. 61% average); however, there was some variation among years, with no acres appraised in FY 2017.

The greatest single species by acreage appraised was red pine, with lower amounts of oak, northern hardwoods, ash, birch, and white spruce. (**Table 1**).

Appraisal rates varied by cover type and were highest in northern hardwoods, lowland hardwoods and ash, birch, and white spruce (**Table 1**).

Stands were deferred for silvicultural reasons 95% of the time in FY 2015-2017. The remaining 5% (10 acres of oak cover type) were deferred for habitat reasons.

The only annual plan addition (APA) acres during the monitoring period were 14 acres of oak in 2014 from the Sandstone Area. The sum of APA acres from FY2014-FY2017 was 5% of deferred acres during that time period, and APA acres were less than 1% of planned ASEL acres.

Treated Acres Defined

Appraised:	Acres that lie within a timber sale boundary, including small patches of leave trees
Deferred:	Acres visited, but treatment is deferred to a later date and stand is not appraised for timber. Examples of deferral reasons include the stand not being ready for harvest or delaying treatment for habitat or ecological reasons.
Altered:	Acres visited that are significantly different than the inventory data indicated and are not suitable for harvest. For example, the wrong cover type or stand age to meet harvest criteria.
Treatment Acres:	Appraised Acres + Deferred Acres + Altered Acres

Table 1. Planned compared to visited acres that were appraised, altered, or deferred by year and cover type, not including Annual Plan Additions. Percentages under appraised, altered, and deferred columns show the percent of acres visited.

Fiscal Year	Cover Type	Planned ASEL Acres	Planned Acres Visited	Percent Planned Acres Visited	Exam Acres Appraised	Exam Acres Appraised	Exam Acres Altered	Exam Acres Altered	Exam Acres Deferred	Exam Acres Deferred
2013	Aspen	27	30	111%	0	0%	0	0%	30	100%
	Northern hardwoods	13	7	54%	0	0%	0	0%	7	100%
	Oak	112	4	4%	4	100%	0	0%	0	0%
	Jack pine	11	9	82%	7	78%	0	0%	2	22%
	Red pine	260	200	77%	182	91%	0	0%	18	9%
	White pine	92	72	78%	68	94%	0	0%	4	6%
	Tamarack	42	42	100%	0	0%	42	100%	0	0%
2014	Aspen	139	18	13%	0	0%	4	22%	14	78%
	Birch	14	14	100%	10	71%	4	29%	0	0%
	Northern hardwoods	60	60	100%	0	0%	0	0%	60	100%
	Oak	34	5	15%	0	0%	0	0%	5	100%
	Jack pine	4	0	0%	0	0%	0	0%	0	0%
	Red pine	199	129	65%	129	100%	0	0%	0	0%
	White pine	17	0	0%	0	0%	0	0%	0	0%
2015	Aspen	24	24	100%	0	0%	0	0%	24	100%
	Birch	3	3	100%	0	0%	0	0%	3	100%
	Lowland hardwoods	16	10	64%	0	0%	0	0%	10	100%
	Northern hardwoods	10	10	100%	0	0%	0	0%	10	100%
	Oak	26	13	50%	13	100%	0	0%	0	0%
	Red pine	233	218	94%	179	82%	0	0%	39	18%
	White pine	37	37	100%	37	100%	0	0%	0	0%
	White spruce	23	18	78%	0	0%	18	100%	0	0%
2016	Birch	5	5	100%	0	0%	0	0%	5	100%
	Oak	11	11	100%	0	0%	0	0%	11	100%
	Jack pine	19	19	100%	0	0%	19	100%	0	0%
	Red pine	41	42	102%	42	100%	0	0%	0	0%
	White pine	24	24	100%	24	100%	0	0%	0	0%
2017	Northern hardwoods	9	9	100%	0	0%	0	0%	9	100%
	Oak	50	50	100%	0	0%	21	42%	29	58%
	Jack pine	28	0	0%	0	0%	0	0%	0	0%
	Red pine	62	62	100%	0	0%	0	0%	62	100%
	Tamarack	4	0	0%	0	0%	0	0%	0	0%
Totals	All Cover Types and Years	**1649**	**1145**	**69%**	**695**	**61%**	**108**	**9%**	**342**	**30%**

Table 2. Deferral reason by cover type (data not available in SEL for 2013 deferral records).

Fiscal Year	Cover Type	Acres	Deferral Reason Silviculture	Deferral Reason Ecology	Deferral Reason Habitat
2015	Aspen	24	24	0	0
	Birch	3	3	0	0
	Lowland hardwoods	10	10	0	0
	Northern hardwoods	10	10	0	0
	Red pine	39	39	0	0
2016	Birch	5	5	0	0
	Oak	11	11	0	0
2017	Northern hardwoods	9	9	0	0
	Red pine	62	62	0	0
	Oak	29	19	0	10

Planned vs. Final Prescriptions

Final prescriptions were generally similar to preliminary prescriptions, and adjustments are within expectations (**Appendix III Table III- 1**).

However, a number of stands had preliminary prescriptions for harvest or thinning, but had "no harvest" as a final prescription. Most of these were deferred and one spruce stand, noted below, was altered. Reasons for a "no harvest" prescription included:

- Acreage too small or too far from mill to be marketable
- Too many invasive species (wait until funding available to treat)
- Maintain stand for wildlife
- Recently harvested, defer 5 years and reassess
- Slowly phasing out pure spruce stand and recruiting other species for biodiversity per SDSF Operational Plan
- Maintain pine stand for multiple use and increase biodiversity in SDSF

Management Objectives

Recorded management objectives are our best tool to assess work toward many goals at this stage of plan progress (see Appendix IV for objectives by cover type).

- 91% of appraised and altered acres had management objectives assigned. Of stands with management objectives, 39% had more than one objective (**Table 3**).

- Management objectives were often aimed at increasing a particular species, especially oak and white pine, or increasing diversity of tree species in a stand.
    - The white spruce stand noted above is an example of a stand with objectives to increase diversity by increasing bur oak, northern pin oak, tamarack, and white pine.
    - In addition to increasing species within a cover type, 19 acres of jack pine had the objective to convert to white pine.
- The management objective for red pine stands was to maintain similar stand characteristics into the future.
- Some stands had objectives to address species, habitat, or native plant communites.
- Some objectives, including those aimed at maintaining or changing stand structure and composition, address multiple goals across ecological, wildlife, or silvicultural issues.

Table 3. Stands and acres with one or more objectives assigned.

Preliminary Number of Objectives	Preliminary Number of Stands	Preliminary Acres	Appraised Number of Objectives	Appraised Number of Stands	Appraised Acres	Altered Number of Objectives	Altered Number of Stands	Altered Acres
1	106	1515	1	14	400	1	3	50
2	15	486	3	6	60	4	1	18
3	9	141	4	4	16			
4	1	25	Blank	Blank	Blank	Blank	Blank	Blank
Totals:	**131**	**2167**		**24**	**476**		**4**	**68**

Recommended Actions to Implement Management Consistently with Plan Goals

- Many of the plan goals include increasing species diversity or managing for native plant communities. Make sure to capture the intent to carry out these goals through management actions in management objective codes and take credit for when this is done.
- Moving forward, planned volume offered will need to meet the decisions of STHA. Make sure to follow the decisions of STHA. However, refer to the *Sustainable Timber Harvest Analysis and Wildlife Management Areas* Frequently Asked Questions document for additional information on applying STHA decisions to wildlife management areas.
- Continue to enter management objectives. Entering more than one management objective, when appropriate, is encouraged.
- Data entered into SEL should match data entered in TSM.

Effectiveness Monitoring – Cover Type and Age

Key Points

- The new SDSF Operational Plan affected management within the SDSF.
- In May of 2017, the Minnesota legislature also passed 2017 Minn. Stat. Ch. 93, Sec 155 that affected how forest management was accomplished within the SDSF for a two-year period after its enactment.
- Changes in cover types appear to be generally moving in the direction of plan goals.
- The amount of young forest has decreased during this 5 year period.
- Age class distributions for all cover types with goals will move toward balanced age class distributions due to planned actions that have not yet been completed.
- Amount of older forest over rotation age aligns with plan goals for bur oak cover type, but exceeds plan goals for the aspen and red oak cover types.
- Number of rare species in the subsection has increased due to revisions of the statewide Endangered, Threatened, and Special Concern species and Species of Greatest Conservation Need lists since plan implementation. Species of note added to these lists that are pertinent to this SFRMP include butternut, lark sparrow, red-headed woodpecker, various fishes and bats, and rusty patched bumblebee.
- Native Plant Community has been classified on additional acres since plan implementation, and condition rank has been assigned to more NPC acres, increasing information available to inform management.
- Work within Special Management Areas has resulted in the creation of wildlife habitat. A 15-acre farm field was planted to hardwoods in the Victor Hill Forest Management Area SMA and a prescribed burn plan was developed in the Radio Dunes SMA to maintain a savanna. Additional work is planned within these SMAs.

Monitoring Question

Are management actions on DNR forest lands in the Anoka Sand Plain Subsection having the desired on-the-ground effect?

- Does the landscape composition of cover types, and age-class distributions within cover types, reflect a trend toward long-term goals?

We compared Forest Inventory Module (FIM) data from the implementation dataset used to develop the ASP SFRMP and FIM data from 2017 to help answer these questions.

Results

Change in Acres

The management boundary of the ASP SFRMP is different than the actual boundary of the subsection. A small portion of the the Carlos Avery WMA exists within the Western Superior Uplands Subsection and there is a small amount of land within the St. Paul Baldwin Plains Subsection that is also included within this plan.

Durring the first five years of the plan, acres of all covertypes decreased as compared to the ASP SFRMP implementation dataset. There was also a slight decrease in forested covertypes (**Table 4**). This small amount of difference is consistant with FIM being changed over time, with stand boundaries being verified and changed.

Table 4. Change in managed acres under ASP SFRMP from 2011 to 2017 FIM data.

Managed Acres	2011	2017	Change
All Covertypes	43,290	43,201	-.002%
Forested Covertypes	14,205	14,036	-.012%

Change in Young Forest

This plan defines young forest as the 0-30 year age classes for the aspen/balm of Gilead, oak, birch, and jack pine cover types. The goal for young forest in the Anoka Sand Plain Subsection is to maintain young forest (**Table 5**).

During the first five years of the plan, the proportion of aspen considered young forest decreased, which contrasts with the plan goal to maintain young forest (**Table 5,** also see Figs 2-4). Acres in 0-30 age classes decreased for all cover types, and for birch and jack pine there are no acres in some young age classes:

- There were no acres in the 0-30 age classes for birch in the implementation or current FIM dataset; however, the ASP SFRMP goal for birch was to move toward a balanced age class distribution, which would result in more acres in the 0-10 age class. Birch acres that have recently been harvested, or are planned for harvest, will help address this goal (**Figure 3**).
- In 2017, there are no longer any acres in the 0-10 age class for jack pine.

Table 5. Percent of forested managed acres that are young forest across all cover types and percent of acres in 0-30 age classes within each cover type.

Cover Type	FIM 2011	FIM Data 2017	Trend	Trend matches goal?
Aspen, Birch, Jack pine, and Oak	22%	18%	**Decrease**	No
*Aspen	49%	28%	**Decrease**	No
Birch	0%	0%	**NA**	No
Jack pine	39%	28%	**Decrease**	No
Oak	22%	18%	**Decrease**	No

**Current aspen percentage does not consider aspen under development.

Change in Older Forest

The Anoka Sand Plain SFRMP defines older forest as even-aged managed stands that are over normal rotation age (NRA) for their cover type. The plan goal is to maintain old forest with 37% of aspen and 38% of oak managed acres over NRA. The original plan NRA for aspen is 40 years old and the NRA for red and pin oak is 80 years old.

During the first half of the planning period, the proportion of older forest increased across all cover types (**Table 6**). Notes regarding older forest for specific cover types:

- Aspen acres over NRA increased and are above plan recommendation; however, some acres recently harvested or planned for harvest will help move toward this goal (**Figure 2**).
- Oak acres over NRA are double the plan recommendation; however, some acres recently harvested or planned for harvest will help move toward this goal (**Figure 4**).
- While there was no specific older forest goal for birch acres, we note that all birch acres are now over NRA. However, birch that is recently harvested or planned for harvest from the 61-80 year age classes will result in future acres under NRA (**Figure 3**).
- Nearly half of jack pine acres are over NRA.

Since implementation of the ASP SFRMP department policies surrounding old forest management have changed. Extended Rotation Forest (ERF) and Ecologically Important Lowland Conifer (EILC) have been rescinded and Lowland Conifer Old Growth (LCOG) candidates have been selected, but are not yet designated. The STH stand selection will also effect the amount of young forest and older forest within this subsection. Although data presented is relative to old forest goals in this monitoring report, it can still serve as a reference to the proportion of older forest over time in the subsection.

Table 6. Percent of even-aged cover types over normal rotation age (NRA) compared to DFCs 2011 to 2017.

Cover Type	NRA	2011 Total Acres	2011 Acres Over NRA	2011 Percent Over NRA	2017 Total Acres	2017 Acres Over NRA	2017 Percent Over NRA	Percent Change 2011-2017	10-year DFC %	Trend Matches Goal?
Aspen	40	1819	592	33	1788	885	69	36	37	No
Birch	40	149	1.5	1	162	162	100	99	None	
Red/Pin/Ox	80	5311	1858	35	5178	2703	52	17	38	No
White/Bur/Ox	120	947	23	2	987	32	3	1	5	Yes
Red pine	80	2402	6	<1	2310	5	<1	0	None	
Jack pine	30	223	143	64	156	116	74	10	None	None
Tamarack	100	728	46	6	708	164	23	17	None	
Ash/LLHW	80	568	118	21	560	85	15	-6	None	
NH/CH	80	1175	145	12	1167	336	29	17	None	
White Pine	100	692	30	4	870	48	6	2	None	

Old Growth

Designated old growth by old growth type in FIM has increased since plan implementation. This includes designated old growth stands and candidate old growth stands. Eightly-six acres of designated old growth located in Boot lake SNA are not recorded in FIM and there are an additional 174 acres of old growth and candidate old growth stands that have been approved by Regional FRIT to be designated, but that are not yet fully updated in FIM. The designation process for these stands started in 2017. These new acres are a result of new land acquisitions on Wildlife Management Areas and State Parks.

Table 7. Comparison of designated old growth and candidate old growth between acres reported in plan and current old growth FIM dataset by old growth type.

Old growth Type	1994 Acres Goal	2011 Designated Acres in FIM	2017 Designated Acres in FIM	2017 Changes to Old growth not in FIM
Lowland Hardwoods	80	149	149	0
Northern Hardwoods	115	26	26	0
Oak	40	64	64	0
White Pine	135	8	16	140
Candidate Oldgrowth	0	0	52	120
Total	**370**	**247**	**307**	**260**

Change in Managed Acres by Cover Type

The ASP plan recommended the following related to cover type distribution in the Subsection:

- increases in white pine, red pine, and oak cover types through conversions as appropriate for NPCs
- maintain tamarack, birch, and ash/lowland hardwood acres
- reduce acres of aspen, northern hardwoods, and jack pine
- manage lands consistent with NPC. This could mean increases in more open landscapes including oak savannas and open woodlands.

Current FIM data show the following trends in the Subsection (**Table 8**):

- increases in white pine and bur oak, but a slight decrease in red pine and red oak acres
- lowland hardwood acres have slightly decreased, tamarack acres have decreased slightly (8 acres), and birch acres have remained relatively constant (**Table 8**)
- acres of aspen, northern hardwoods, and jack pine align with plan goals
- upland brush has increased significantly in acres, but upland grass has decreased

To fully convert a forest from one cover type to another, may take much longer to accomplish and be recognized in FIM than this length of this monitoring period. In addition to changes in FIM data, recorded management objectives indicate the intent to accomplish conversion goals through increasing species, especially white pine and oak, or through converting cover types (see Management Objectives section above). Comments entered for stands planned for management further indicate the intent to restore 112 acres to oak savanna and 20 acres to other open habitat types (grass or brush).

Table 8. Change in total acres by cover type compared to plan goals. Note that cover type change may reflect succession, inventory, changes in stand boundaries, and changes in land administration in addition to effects of management. *Note: The percent change may be large for some cover types within the subsection that have very small acreages*

Cover Type	2011 FIM Acres	2017 FIM Acres	Percent Change from 2011	10-year DFC Acres	Percent Change from 2011	Trend Matches Goal?
Ash/Lowland Hardwoods	568	560	-2%	569	0%	Y
Aspen/Balm of Gilead	1819	1788	-2%	1796	-1%	Y
Northern Hardwoods /Central Hardwoods	1175	1167	-1%	1141	-1%	Y
Oak	5852	5720	-2%	5933	2%	Y
Offsite Oak	408	445	9%	344	-16%	N
White Pine	693	870	25%	752	9%	Y
Red Pine	2402	2310	-4%	2436	1%	Y
Jack Pine	223	156	-30%	187	-16%	Y
Scotch Pine	7	7	0%	0	-100%	N
White Spruce	87	75	-14%	69	-21%	Y
Upland Larch	30	29	-3%	9	-70%	Y
Tamarack	729	708	-3%	729	0%	Y
Red Cedar	25	0	-100%	5	-80%	Y
Upland Grass	3469	3463	-1%	3465	0%	Y
Upland Brush	38	85	124%	44	16%	Y
Lowland Brush	5472	5588	2%	5476	0%	Y
Marsh	14046	14061	-1%	14033	0%	Y
Hybrid Poplar	13	16	23%	0	-100%	N
Birch	149	162	9%	149	0%	N

*Trend was considered to match goal if the % change in 2011 was in the same direction as the 10-year DFC or, for cover types with a goal to maintain acres, if the % change was 5% or less.

Change in Age Class Distributions

The Anoka Sand Plain SFRMP includes long-term goals to move the aspen/balm of Gilead, birch, oak, red pine, and tamarack cover types toward balanced age class distributions.

Except for tamarack, all of these cover types have acres in older age classes that were recently harvested or are currently under development, which will move them toward more balanced age class distributions over time (**Figure 2. to 6**).

Figure 2. Aspen/balm of gilead age class distributions by acres from 2011 and 2017 FIM data, including acres under development.

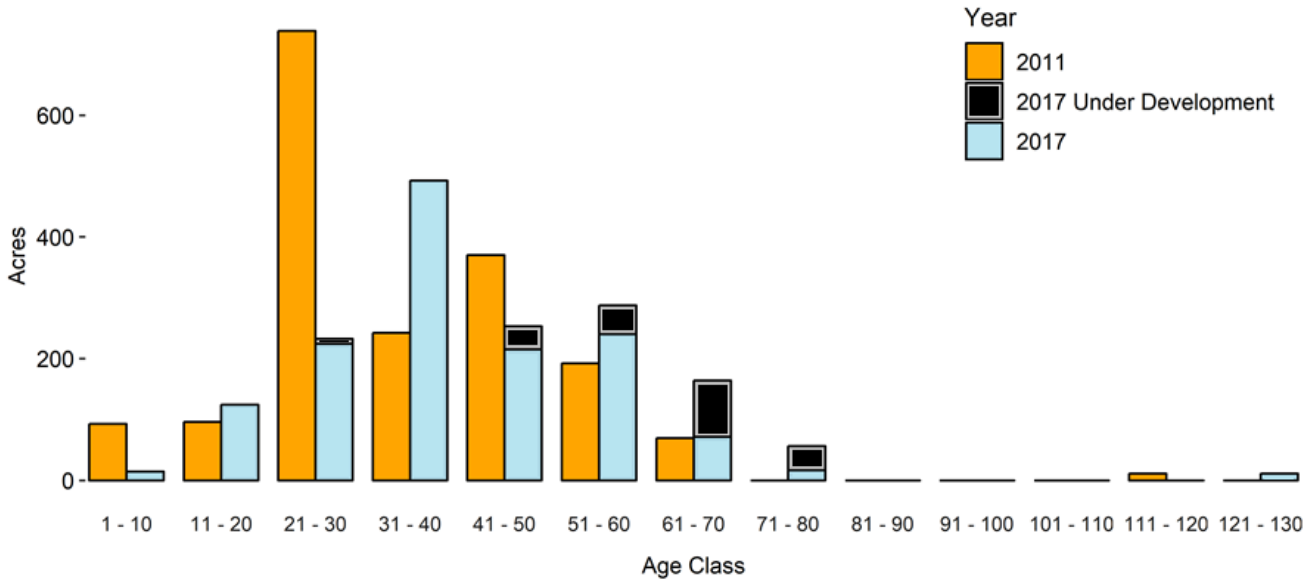


Figure 3. Birch age class distribution by acres from 2011 and 2017 FIM data.

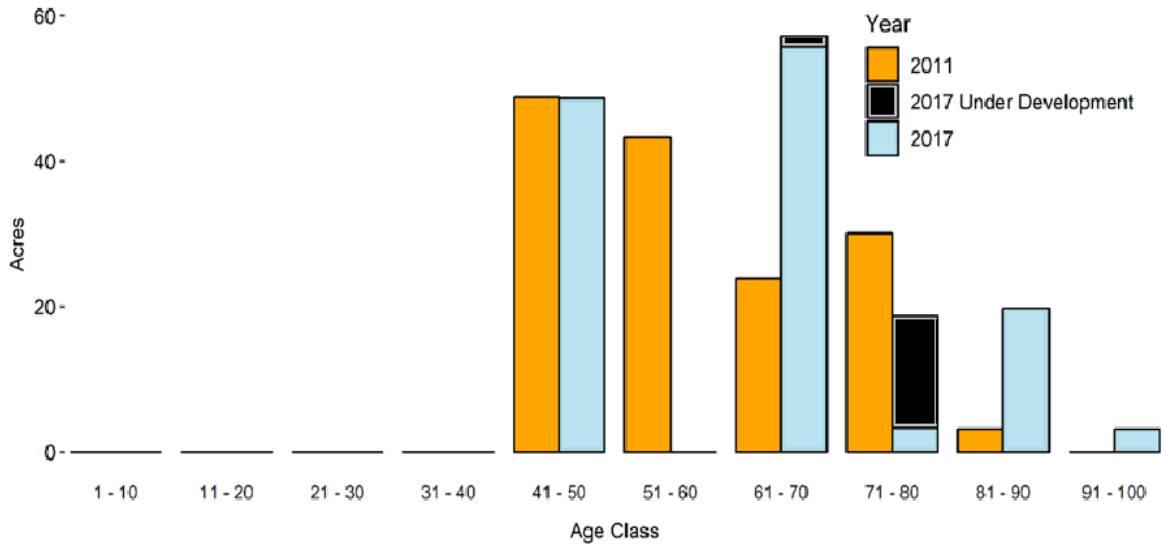


Figure 4. Oak age class distribution by acres from 2011 and 2017 FIM data.

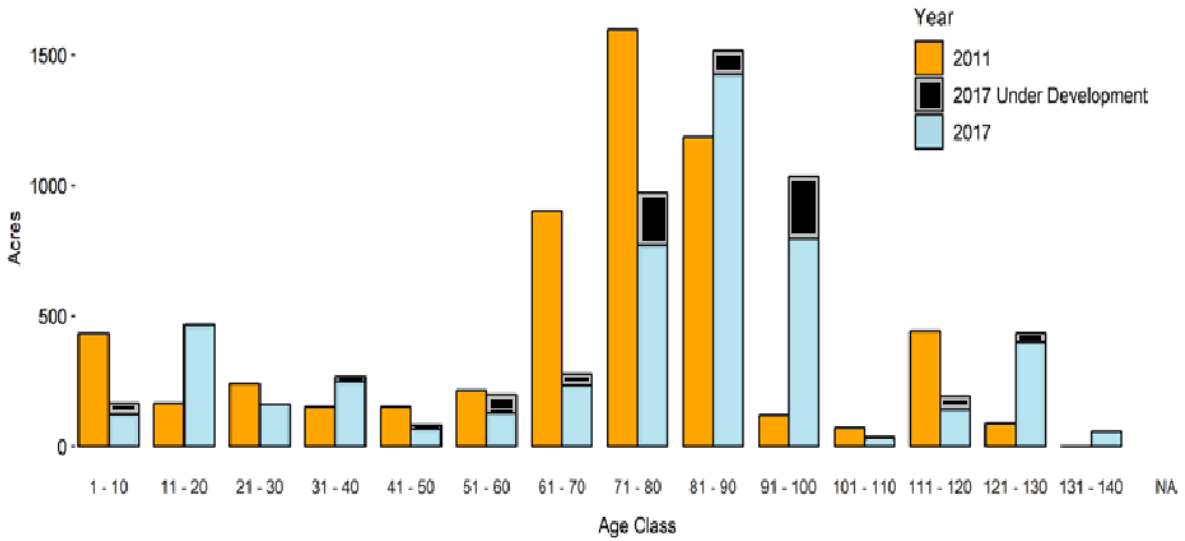


Figure 5. Red pine age class distribution by acres from 2011 and 2017 FIM data.

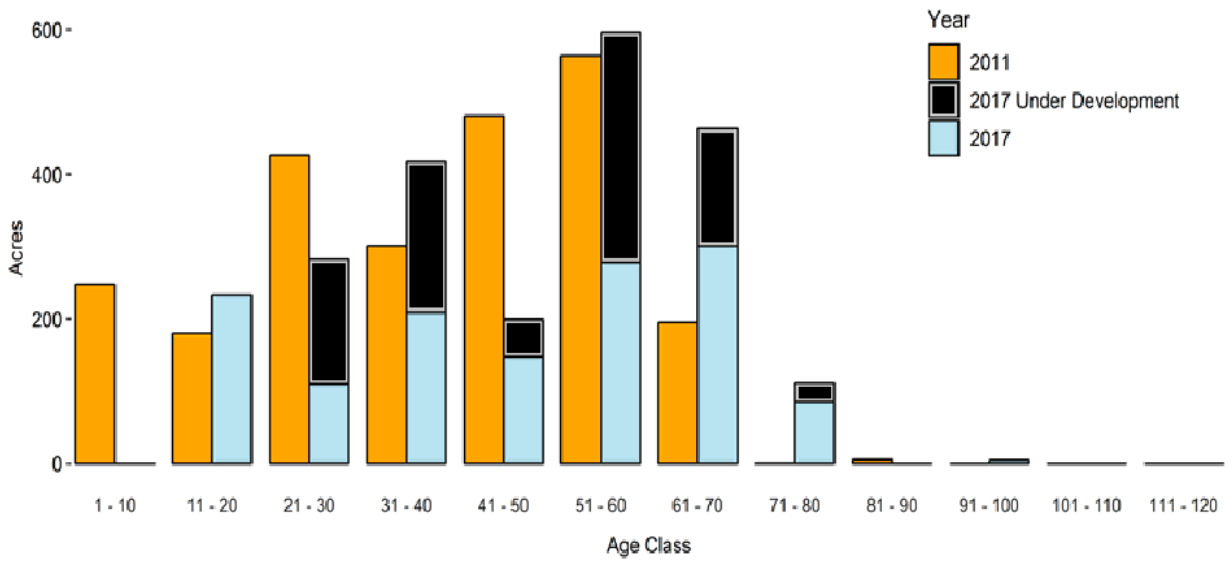
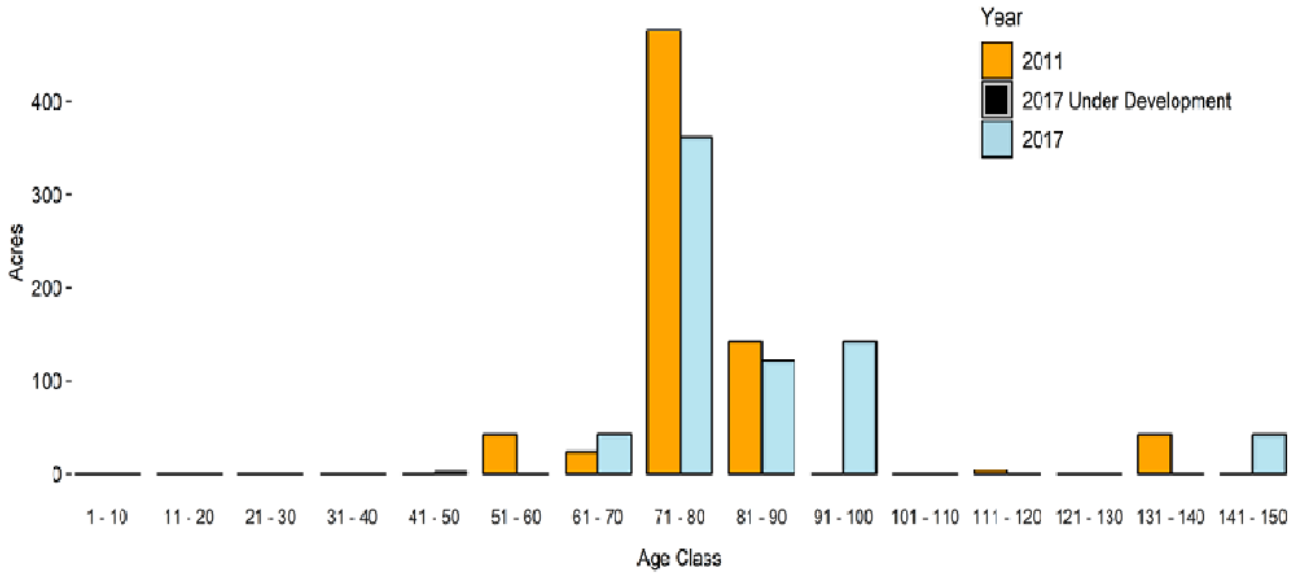


Figure 6. Tamarack age class distribution by acres from 2011 and 2017 FIM data.



Native Plant Communities and Sites of Biodiversity Significance

The ASP SFRMP lists classifying native plant communities (NPC) as a strategy for General Direction Statement (GDS) 1A. Since this plan was approved, these classifications now go through a rigorous certification process by experts from all three divisions. As of 2011, 18,726 acres (45%) in the Anoka Sand Plain Subsection had a NPC classification, this was across all NPC types. During this monitoring period an additional 302 acres were classified by NPC but are not yet certified. The majority of the certified NPC classified acres and additional clasifications were done outside of Wildlife Management Areas.

NPC has not been documented on any old growth acres, which are not included in managed acres (except a sliver of 7 acres of one old growth stand).

Some NPCs in the Anoka Sand Plain have Status Ranks that indicate they are imperiled (S1 or S2, **Table 9**; For more information on NPC Status Ranks, see *Conservation Status Ranks for Native Plant Community Types and Subtypes*). Strategies for GDS-3F in the Anoka Sand Plain SFRMP recommend managing these communities to maintain their ecological integrity by protecting, maintaining or enhancing them.

The Minesota Biological Survey identified 29 sites of either outstanding or high biodiversity that overlap managed acres (**Table 10**). Candidate HCVFs were proposed for designation on FSC-certified State forestry and wildlife administered lands by regional interdisciplinary HCVF teams in early 2013. Minnesota Biological Survey Sites of outstanding or high biodiversity were used as the basis for HCVF designation. The SDSF is the only designated HCVF site in the subsection and overlaps a number of MBS sites of high or outstanding biodiversity.

Table 9. Certified DNR NPC acres classified through 2011 with Status Ranks*. Rare or potentially rare NPCs are in bold.

Forested NPC	Status Rank	Managed Acres	Non-forested NPC	Status Rank	Acres
FDc23a2	**S1S2**	**16**	APn91a	S5	69
FDc25	None	23	MRn83	None	837
FDc25b	**S2**	**33**	MRn93		418
FDs37	None	2958	**MRn93b**	**S2**	**41**
FDs37a	S4	1642	OPn92		138
FDs37b	S3	296	OPn92a	S4	16
FFs59a	S3	109	OPn92b	S4	15
FFs68a	S3	953	UPs14		59
FPn73a	S5	535	**UPs14a2**	**S1S2**	**1158**
FPs63a	**S2S3**	**416**	**UPs14b**	**S1S2**	**32**
MHc36		49	WMn82		105
MHc47a	S3	319	WMn82a	S5	2854
MHs38c	S3	35	WMn82b	S4 or S5	3553
WFn55b	S3	1510	WMn82b2	S4	306
WFn64b	S4	117	WMs83a	S3	98
WFs55a	S4	15	None	None	None

*Status Ranks

S1S2 - Between Critically Imperiled and Imperiled
S2 - Imperiled
S2S3 - Between Imperiled and Vulnerable to Extirpation
S3 - Vulnerable to Extirpation
S4 - Apparently Secure; Uncommon but not Rare
S4 or S5 - Subtype S-Ranks are either S4 or S5
S5 - Secure, Common, Widespread, and Abundant

Table 10. Sites of outstanding and high biodiversity significance that overlap managed acres in the Anoka Sand Plain Subsection. Sites that overlap SDSF are in bold.

MBS Site Name	Biodiversity Significance	Acres
Carlos Avery Natural Area	Outstanding	21985
Orrock 17 Savanna	**Outstanding**	**40**
Orrock 25	**Outstanding**	**368**
Orrock 35 Southwest	**Outstanding**	**387**
Orrock 36 North	**Outstanding**	**583**
Sherburne Meadows	Outstanding	221
Silver Creek 03	Outstanding	19
Uncas Dunes	**Outstanding**	**265**
Burns 27	High	283
Conklin Savanna	High	286
East Clough 19	High	1490
East Rail Prairie 8	High	98
Jensen Slough	**High**	**496**
Kunkel Wma	High	2283
Linwood 5 Natural Area	High	2159
Livonia 30 Southwest	High	239
Mississippi River Island - Nettle Island	High	26
Neds Lake Natural Area	High	1590
Oak Grove 23	High	514
Orrock 16	**High**	**123**
Orrock 23 Northwest	**High**	**93**
Orrock 24	**High**	**47**
Orrock 29 Southwest	**High**	**6**
Reformatory Meadows	High	461
Sandhill Crane Meadow	High	314
Skunk Lake Wetlands	High	5185
Springvale 29	High	951
West Bellevue 29	High	185
Wyoming 8	High	667

Rare Species and Special Management Areas

Maintaining or enhancing the key habitats associated with Species of Greatest Conservation Need (SGCN), including sites of statewide biodiversity significance, is a goal within the Anoka Sand Plain SFRMP (GDS-3B and GDS- 3D).

Providing current data on SGCN and rare species to DNR staff that can be applied to management decisions is important to meeting this goal. The Stand Exam Layer (SEL) provides DNR staff the ability to

provide comments related to SGCN and rare species management that are planned on specific forest stands.

Since FY 2013, the following comments have been entered into SEL about SGCN and rare species:

- Avoiding harvest in spring or fall to prevent Blanding's turtle mortality was entered as a comment for 304 acres
- Other rare species, including red shouldered hawk, were addressed in comments for 136 additional acres

During this monitoring period additional information pertaining to SGCN and rare species was developed that pertains to management of forests within the ASP SFRMP area.

In 2013, the DNR officially updated the State list of endangered, threatened, and special concern species (ETS) for the first time since 1996. Minnesota's list of Species in Greatest Conservation Need (SGCN) was also updated in 2015 and is referenced in Minnesota's 2015-2025 Wildlife Action Plan.

During this time, the federal government also listed the northern long eared bat as threatened and instituted the final 4d rule in January of 2016.

Habitat management

When the ASP SFRMP was developed in 2012, three Special Management Areas (SMAs) were initialy identified to address special management needs of rare features, SGCNs and Key Habitats.

Two of the SMAs are on Carlos Avery WMA: Boot Lake and Radio Dunes. The third SMA, The Sand Dunes State Forest SMA, is within the SDSF and is addressed in the SDSF Operational Plan.

Boot Lake SMA is in the NW corner of Carlos Avery WMA adjacent to Boot Lake Scientific and Natural Area. Due to confusion between the names of Boot Lake SMA and SNA, this SMA has been expanded and is now referred to as the Victor Hill Forest Management Area (VHFMA). The area was expanded to 417 contiguous acres of WMA forest and includes two designated old growth stands.

The goal of the VHFMA is to provide a large contiguous diverse forest (patch) with less edge habitat. The adjacent SNA and Anoka County Park forests also increase the size of this contiguous forest. This contiguous forest will provide habitat for SGCNs like the very, ovenbird, and red-shouldered hawk as well as for popular game species like the gray squirrel and black bear.

In 2016 an Outdoor Heritage Fund grant was received in cooperation with the MN Deer Hunters Association. The focus of the grant project is to reforest areas that were formally agricultural fields and later used a wildlife food plots.

Highlights of the grant project:

2017 15 acres hardwood seedlings planted and a 20 acre deer exclosure fence was constructed.
2018 20 acres inside the fence were direct seeded with 8 species of hardwoods.
2019 Direct seeding area was sprayed and mowed high to release seedlings
2020 (proposed), a smaller deer exclosure fence will be constructed. Additional seedlings will be planted to diversify areas.

During the STH 10 –year stand selection, stands within the VHFMA were swapped out for stands elsewhere on the WMA. After the recently planted areas have become established, eligible stands will be considered for treatment.

Radio Dunes SMA is a 40 acre dry barrens oak savanna (G2/S2) on the west side of the Sunrise Unit of Carlos Avery WMA.

Habitat work done on the SMA:

2017 A 2 acre stand of young jack pine was cleared by DNR Wildlife Roving Habitat Crew.
2019 A prescribed burn plan was developed for the savanna. The burn plan includes special conditions to protect listed species.
2019 An Outdoor Heritage Fund grant has been received by the EWR Non-Game Program for further habitat work on the savanna and other areas of the Sunrise Unit.
2020 (proposed) A portion of the savanna is scheduled for a prescribed burn.

Recommended Actions to Increase the Effectiveness of Managment

- Apply appropriate silvicultural techniques to meet plan goals for oak age class distribution and contribution of oak to old forest on the landscape.
- When prescribing management, be aware of issues around maintaining or enhancing rare and high quality NPCs and HCVFs.
- Continue habitat work on the Special Management Areas to meet plan goals.
- Continue to map NPCs on DNR lands to facilitate more detailed understanding and analysis of landscape patterns, including growth stage.
- Apply management strategies that appropriately follow laws, policy, and ETS recommendations for both state and federal ETS listed species.
- Continue to monitor and treat invasive as funds are available.
- Plan for effective pre harvest and post harvest invasive species control.
    - Buckthorn and Siberian elm will become an increasing issue within this section over time.

Appendix I.

Table I-1. Cord equivalents offered and sold during first five fiscal years of Anoka Sand Plain SFRMP by species.

Species	2013 Offered	2013 Sold	2014 Offered	2014 Sold	2015 Offered	2015 Sold	2016 Offered	2016 Sold	2017 Offerd	2017 Sold	Total Offered	Total Sold
American Elm	37	27	8	6	17	17	0	0	0	0	62	50
Ash	13	13	0	0	25	25	0	0	0	0	38	38
Aspen Species	26	26	0	0	576	576	0	0	520	520	1,122	1,122
Basswood	27	24	3	3	53	53	0	0	0	0	83	80
Black Cherry	59	32	27	27	5	5	3	3	7	7	101	74
Black Locust	16	16	0	0	0	0	0	0	0	0	16	16
Boxelder	15	4	6	1	4	4	0	0	0	0	25	9
Bur Oak	644	644	0	0	86	86	0	0	0	0	730	730
Cottonwood	1	1	0	0	7	7	0	0	0	0	8	8
Eastern Red Cedar	20	14	4	2	21	21	5	5	0	0	50	42
Green Ash	2	0	1		5	5	0	0	0	0	8	5
Hackberry	1	1	0	0	0	0	0	0	0	0	1	1
Jack Pine	153	124	50	50	12	12	0	0	65	65	280	251
Largetooth Aspen	19	17	2	2	0	0	0	0	0	0	21	19
Miscellaneous	100	0	0	0	0	0	0	0	0	0	100	0
Mixed Conifers	1	1	0	0	0	0	0	0	0	0	1	1
Mixed Hardwoods	1	1	0	0	51	51	0	0	97	97	149	149
Northern Hardwoods	246	18	0	0	0	0	0	0	0	0	246	18
Northern Pin Oak	2,355	1,492	902	902	769	769	0	0	1	1	4,027	3,164
Red Pine	3,064	2,998	1,637	1,629	2,658	2,658	595	595	247	247	8,201	8,127
Oak Species	164	108	0	0	0	0	227	227	1,900	1,900	2,291	2,235
Paper Birch	165	10	24	15	15	15	0	0	0	0	204	40
Pine Species	0	0	10	10	1,706	1,706	0	0	135	135	1,851	1,851
Ponderosa Pine	1	1	0	0	0	0	0	0	0	0	1	1
Red Maple	203	85	93	68	40	40	0	0	0	0	336	193
Scotch Pine	100	92	35	31	651	651	35	35	4	4	825	813
Spruce-Balsam	0	0	0	0	0	0	0	0	1	1	1	1
Quaking Aspen	1,344	311	144	15	161	161	10	10	1	1	1,660	498

Species	2013 Offered	2013 Sold	2014 Offered	2014 Sold	2015 Offered	2015 Sold	2016 Offered	2016 Sold	2017 Offerd	2017 Sold	Total Offered	Total Sold
White Oak	4	4	0	0	0	0	0	0	0	0	4	4
White Pine	220	220	0	4	120	116	260	260	77	77	677	677
White Spruce	22	20	65	65	46	46	0	0	75	75	208	206
Totals	**9,023**	**6,304**	**3,011**	**2,830**	**7,028**	**7,024**	**1,135**	**1,135**	**3,130**	**3,130**	**23,327**	**20,423**

Appendix II.

Table II- 1. Planned compared to visited acres that were appraised, altered, or deferred by Division of Forestry Area.

Fiscal Year	Forestry Area	ASEL Acres	Appraised Acers	Percent Appraised	Altered Acers	Percent Altered	Deferred Acres	Percent Deferred	Visited Acres	Percent of Planned
2013	142	9	0	0%	0	0%	0	0%	0	0%
	312	376	107	100%	0	0%	0	0%	107	28%
	344	146	0	0%	0	0%	0	0%	0	0%
2014	312	214	129	100%	0	0%	0	0%	129	60%
	344	245	10	100%	0	0%	0	0%	10	4%
2015	312	306	229	80%	18	6%	39	14%	286	93%
	344	66	0	0%	0	0%	47	100%	47	71%
2016	312	60	42	0%	19	31%	0	0%	61	102%
	344	39	24	60%	0	0%	16	40%	40	103%
2017	312	94	0	0%	0	0%	62	100%	62	66%
	344	59	0	0%	21	36%	38	64%	59	100%

*Forestry Areas: 142 - Backus Area, 312 – Little Falls Area, 344 – Standstone Area

Appendix III.

Table III- 1. Preliminary compared to final prescriptions by cover type and appraisal status.

Cover Type	Preliminary Prescription	Final Prescription	Appraised Acres	Altered Acres	Deferred Acres
Asp_Bam SI<65	Clearcut- with Reserves	No harvest action	0	0	20
Asp_Bam SI>64	Even-Aged Regen Harvest	No harvest action	0	0	4
Birch	Clearcut- with Reserves	No harvest action	0	0	3
Birch	Clearcut- with Reserves	Clearcut- with Reserves	0	0	5
Birch	Clearcut- with Reserves	Clearcut-w/Reserves - Sprouting	10	0	0
Lowland Hardwoods & Ash	Clearcut	No harvest action	0	0	10
Northern Hardwoods	Even-Aged Regen Harvest	No harvest action	0	0	10
Northern Hardwoods	Clearcut	No harvest action	0	0	9
Oak	Clearcut	Clearcut- with Reserves	13	0	0
Oak	Clearcut- with Reserves	Clearcut- with Reserves	0	0	11
Oak	Clearcut- with Reserves	Regeneration Harvest General	0	21	19
Oak	Clearcut- with Reserves	No harvest action	0	0	10
Jack Pine	On-site Visit	None listed	0	19	0
Red Pine Natural	Commercial Thinning	None listed	38	0	0
Red Pine Plantation	Commercial Thinning	None listed	4	0	0
Red Pine Plantation	Commercial Thinning	Commercial Thinning	0	0	62
Red Pine Plantation	Commercial Thinning	Selective Thinning-Commercial	288	0	0
Red Pine Plantation	Commercial Thinning	None listed	20	0	0
Red Pine Plantation	Commercial Thinning	No harvest action	0	0	39
White Pine	Clearcut	Selective Thinning-Commercial	24	0	0
White Pine	Commercial Thinning	None listed	37	0	0
White Spruce	Commercial Thinning	No harvest action	0	18	0

Table V-2 continued.

Appendix IV.

Table IV- 1. Entered management objectives by cover type.

Cover Type	Appraised Acres	Objective	Cover Type	Altered Acres	Objective
Birch	34	Increase Bur Oak	Jack Pine	19	Convert cover type White Pine
Birch	18	Increase Northern Pin Oak	Red Pine	10	Increase WP
Birch	16	Increase White Oak	Oak	21	Maintain existing NPC composition and structure
Birch	34	Maintain similar stand	White Spruce	18	Increase Bur Oak
Birch	16	Special management consideration for species or habitat	White Spruce	18	Increase Northern Pin Oak
Red Pine	363	Maintain similar stand	White Spruce	18	Increase Tamarack
Oak	13	Change stand structure Multi-aged stand	White Spruce	18	Increase White Pine
Oak	42	Increase Bur Oak			
Oak	42	Maintain similar stand			
Oak	42	Special management consideration for species or habitat			
White Pine	24	Maintain similar stand			