PROJECTING EFFECTS OF TIMBER HARVEST SCENARIOS ON VEGETATION AND WILDLIFE HABITAT

Spray Lake Detailed Forest Management Plan

Prepared for

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1.0 INTRODUCTION

1.1 Background

Spray Lake Sawmills (1980) Ltd. (SLS) received a Forest Management Agreement (FMA) in September 2001. The FMA area encompasses approximately 2800 km^2 of the southern east slopes of Alberta and includes portions north and south of the Bow River. SLS is required to develop long range forest management plans under provisions of the FMA. Understanding the long-term effects of alternative timber harvest scenarios on vegetation cover and seral stage and wildlife habitat is one of the goals of the Detailed Forest Management Plan (DFMP).

URSUS Ecosystem Management Ltd. (URSUS) was retained by SLS to predict long-term changes in vegetation cover type/seral stage and wildlife habitat supply/fragmentation resulting from two timber harvest scenarios:

- Even Flow without Adjacency and Operational Harvest Sequencing; and
- Surge Cut with Adjacency and Operational Harvest Sequencing.

1.2 Objectives

Our overall objective was to assess the long-term effects of timber harvest on vegetation cover/seral stage and related wildlife habitat suitability, supply and fragmentation. Specific objectives were:

- to develop succession sequences for Wildlife Habitat Units (WHUs) to enable projection of forest cover/age class and wildlife habitat supply into the future;
- to project WHU status and supply into the future at prescribed intervals of 10, 20, 50, 100 and 200 years in the context of two spatially explicit timber harvest scenarios;
- to calculate, and compare the land areas of various forest cover type/age class combinations at the prescribed future intervals for the two timber harvest scenarios;
- to calculate, and compare the supply and distribution of high quality habitat for 18 wildlife indicator species at the prescribed future intervals for the two timber harvest scenarios;
- to calculate and compare changes in size and frequency of high quality habitat patches for seven fragmentation-sensitive wildlife species at the prescribed future intervals for the two timber harvest scenarios; and
- to discuss ecological supply issues arising from futures projections and offer recommendations for mitigation and monitoring.

2.0 METHODS

2.1 Vegetation/Habitat Succession Sequences

The projection of vegetation/habitat conditions was done at the level of the Wildlife Habitat Unit (WHU). WHUs were classified and mapped at a scale of 1:20,000 within both portions (North and South) of the FMA using information from Alberta Vegetation Inventory (AVI) and Digital Elevation Models (DEM). WHUs are recurring combinations of Natural Subregion (elevation), vegetation/land cover type, slope angle/aspect, canopy closure (North FMA only), age class, and moisture regime (North FMA only). Slightly different approaches to classification of WHUs currently apply for the North and South portions of the FMA. An example of a typical WHU in the North FMA is follows:

LF(f)-PLc-og(m)

LF = Lower Foothills Subregion
(f) = occurring on slopes <15%
PL = Lodgepole Pine forest
c = closed canopy (>30%)
og = old growth (>170 years)
(m) = mesic moisture regime

An example of a related WHU in the South is follows:

UFC 1/1-og

UFC = Upland Forest-Conifer
1 = Lodgepole Pine Forest
/1 = <15% slope and <1600 m elevation
og = old growth (>170 years)

Each currently classified and mapped WHU in the study area was projected into the future to the next most likely and older WHU type. For example, the above North FMA WHU [LF(f)-PLc-og(m)] was predicted to change to an old growth White Spruce forest stand - LF(f)-SWc-og(m). The Natural Subregion, slope angle/aspect, canopy closure, moisture regime and age class were projected to remain the same. We then assigned an age at which the change to the next likely WHU would most likely occur. For forested communities this was based on a review of the current age class distribution of the original and/or future WHUs. In the case of the example WHU we chose 211 years as the age at which Lodgepole Pine forest would succeed to a dominantly White Spruce forest. This age was chosen based on review of age class distribution of Lodgepole pine and White Spruce forests (on flat terrain in the Lower Foothills) in the region from Sunpine and Spray Lake AVI databases. For WHUs that occurred in both the SLS North FMA and the Sunpine FMA we adopted Sunpine succession sequences in order to form the basis for regional integration.

The projection of current WHUs to the next likely oldest WHU resulted in some cases in new WHUs that did not exist currently in the FMA. These new “Level 2” WHUs were then projected into the future leaving a proportion of resultant WHUs that were new or existing. This process continued for up to 6 Levels until no more “new” WHUs occurred.

A recent study of mature and old growth forests in the central Alberta Rockies (Morgantini and Kansas 2003) was reviewed to determine ages at which forests succeeded from Lodgepole Pine to White x Engelmann spruce at different elevations. Another study in Kananaskis Country by Oldershaw (2002) was used to determine the ages at which timber harvest clearcuts succeeded from graminoid-dominated to shrub dominated to tree-dominated. Some habitat types did not change status because they were in an edaphic (e.g. wetlands) or disturbance (e.g. rangeland clearing) climax condition.

A number of assumptions were made in the course of predicting future forest conditions (Appendix 1). These arose mainly from limitations in current knowledge of natural vegetation succession. Some of these assumptions may limit model accuracy. Future improvements to the model will be made based on refinement of knowledge particularly around assumptions.

Post-Harvest Trajectories

The succession model that was completed for the South FMA assumed that all harvested forest stands regenerated to lodgepole pine forests. Shrub and tree-dominated clearcuts in this model were assumed to support only lodgepole pine trees. This was primarily due to the relatively limited detail of the current land classification. The ecological land classification for the North FMA is more detailed and characterized shrub and treed-dominated clearcuts according to dominant and co-dominant tree species. For the North FMA we assumed that all forest stands converted back to their original tree species composition. The contrast in the two approaches to post-harvest trajectory allows for a comparison of the effect of mixedwood forest retention on long-term habitat supply.

2.2 Integration of Succession and Timber Harvest Scenarios

We projected wildlife habitat units (WHUs) into the future taking into account the effects of two different approaches to timber harvest. Each polygon was projected into the future with its characteristics at any given time dependent on its original age and characteristics and the timing of timber harvest. “Snapshots” of the characteristics of individual polygons were taken at five different time periods – 2011, 2021, 2051, 2101, and 2201. Modeling was conducted in ARC-info GIS and Microsoft-Excel spreadsheet analysis.

Descriptions of the two timber harvest scenarios (“runs”) applied follow:

RUN #2 FMA Even Flow **without** Adjacency and Operational Harvest Sequencing

The intent of this scenario was to determine the FMA sustainable harvest flow without adjacency or operational sequencing parameters. Using this run in conjunction with other model runs, allows for a comparative assessment of the effects of adjacency and operational harvest sequencing on the sustainability of timber and habitat supply.

RUN #4 FMA Surge Cut **with** Adjacency and Operational Harvest Sequencing

The intent of this run was to employ a surge cut on the entire FMA for the first 20 years of the planning horizon, followed by a harvest level that would be sustainable for 200 years (from a timber supply perspective). The SLS preferred management options of 20-year adjacency and 5-year regeneration delay were applied in this scenario.

2.3 Changes in Forest Cover Type and Age Class

We calculated changes in the supply of forest cover types of pre-designated age classes (seral stage) at each of the prescribed future intervals and each timber harvest scenario. Land areas of WHUs were used as the basis for calculating forest cover type and age class supply at future time periods. The following generalized forest cover types were delineated for the purpose of measuring changes in forest cover type and age class over time. Rules for assigning complex AVI tree percent compositions are outlined below each underlined generalized forest cover type.

Coniferous Forest Cover Types

>6% crown closure of trees

> or = 90% composition of Sw, Se, Sb (mesic/dry), Pl, Pj, Fb, or Fa

not recently (since 1950) clearcut or burned

Lodgepole Pine Forest

³90% Lodgepole Pine

³50% Lodgepole Pine w/ mixed conifer (wet)

³50% Lodgepole Pine w/ mixed conifer(mesic/dry)

³50% Lodgepole Pine and 20-50% Black Spruce

White x Engelmann Spruce Forest

³90% White Spruce

³50% White Spruce w/ mixed conifer (wet)

³50% White Spruce w/ mixed conifer (mesic/dry)

³50% White Spruce and 20-50% Balsam Fir

³50% White Spruce and 20-50% Black Spruce

³50% White Spruce and 20-50% Subalpine Fir

³90% Engelmann spruce

³50% Engelmann spruce w/ mixed conifer (wet)

³50% Engelmann spruce w/ mixed conifer (mesic/dry)

³50% Engelmann spruce and 20-50% Balsam Fir

³50% Engelmann spruce and 20-50% Black Spruce

³50% Engelmann spruce and 20-50% Subalpine Fir

Deciduous Forest Cover Types

>6% crown closure of trees
> or = 90% composition deciduous trees
> or = 50% composition of Aw, Pb or Bw
not recently (since 1950) clearcut or burned

Aspen Forest

>90% deciduous trees; and, ³50% aspen

Balsam Poplar Forest

>90% deciduous trees; and, ³50% balsam poplar

Coniferous-dominated Mixedwood Forest Cover Types

>6% crown closure of trees
> or = 50% and < or = 80% composition of coniferous tree species
50/50 coniferous-deciduous split classified as coniferous mixedwood
not recently (since 1950) clearcut or burned

Pine Mixedwood Forest

³50% Lodgepole Pine and 20-50% Aspen>Poplar
³50% Lodgepole Pine and 20-50% Poplar>Aspen

White x Engelmann Spruce Mixedwood Forest

³50% Eng. Spruce and 20-50% Aspen>Poplar
³50% Eng. Spruce and 20-50% Poplar>Aspen
³50% White Spruce and 20-50% Aspen>Poplar
³50% White Spruce and 20-50% Poplar>Aspen
³50% White Spruce and 20-50% White Birch
³50% Black Spruce and 20-50% Aspen>Poplar
³50% Black Spruce and 20-50% Poplar>Aspen
³50% Black Spruce and 20-50% Birch>Aspen

Deciduous-dominated Mixedwood Forest

>6% crown closure of trees
> or = 50% and < or = 80% composition of deciduous tree species
50/50 coniferous-deciduous split classified as coniferous mixedwood
not recently (since 1950) clearcut or burned

Aspen Mixedwood Forest

³50% Aspen>Poplar and 20-50% Black Spruce
³50% Aspen>Poplar and 20-50% Eng. Spruce
³50% Aspen>Poplar and 20-50% Lodgepole Pine
³50% Aspen>Poplar and 20-50% Subalpine Fir
³50% Aspen>Poplar and 20-50% White Spruce

Balsam Poplar Mixedwood Forest

³50% Poplar>Aspen and 20-50% Black Spruce

³50% Poplar>Aspen and 20-50% Eng. Spruce

³50% Poplar>Aspen and 20-50% Lodgepole Pine

³50% Poplar>Aspen and 20-50% White Spruce

Three seral stages (young seral, mature seral and old growth) were assigned to the forest cover types (e.g. lodgepole pine forest) within each broad cover grouping (e.g. coniferous forest). The following age classes were used to define seral stages:

For Coniferous forest cover types:

Young Seral	20 to 70 years
Mature Seral	71 to 170 years
Old Growth	>170 years

For Deciduous and Mixedwood forest cover types"

Young Seral	20 to 50 years
Mature Seral	51 to 110 years
Old Growth	>110 years

A recent study of mature and old growth forests in the central Alberta Rockies (Morgantini and Kansas 2003) was used to establish mature seral and old growth age thresholds. Age class distinctions for deciduous and mixedwood forests was based on analysis of stand age/tree composition relationships from the Sunpine and Spray Lake AVI databases.

Histograms were developed for each forest cover type/age class combination documenting changes in land area for the five prescribed future intervals and the two timber harvest scenarios. Current conditions were also included as a baseline for comparison.

2.4 Changes in Wildlife Habitat Suitability and Supply

We projected and compared changes in the supply of habitat suitability classes over time for the two timber harvest scenarios – Even Flow (w/o adjacency and operational harvest sequencing) and Surge Cut (w/ adjacency and operational harvest sequencing). This comparison was done for 18 wildlife indicator species in the North FMA and 16 species in the South FMA. Wildlife habitat suitability ratings of very low, low, moderate, high and very high were assigned to each current and projected WHU using the methods outlined in Chapter 2 (Appendices 5 and 6). These ratings were applied to the WHU maps for each of the prescribed future intervals and harvest scenarios. Three classes of habitat suitability low (Very-Low to Low ratings); Moderate (Moderate ratings); High (High to Very High ratings) were mapped and presented as histograms for each indicator species, time period and harvest scenario.

2.5 Changes in Habitat Fragmentation

We projected and compared changes in the size and frequency of patches of contiguous high suitability habitat for the prescribed future intervals and the two timber harvest scenarios. Patch size characteristics were calculated for seven fragmentation-sensitive wildlife species - Barred Owl, Great Gray Owl, Black-backed Woodpecker, Northern Goshawk, Northern Pygmy Owl, Pileated Woodpecker and Western Tanager. Adjacent polygons with high or very high suitability were merged into patches. The number and mean size of patches > 50-ha and >100-ha were mapped and presented as histograms for each fragmentation-sensitive species, prescribed future interval and harvest scenario.

3.0 RESULTS AND DISCUSSION

3.1 Changes in Forest Cover Type/Age Class Supply

Results are discussed separately for the North and South portions of the FMA primarily because of the differences in the manner in which post-cut succession trajectories were addressed. The two areas also differ with respect to baseline forest cover and age conditions. Histograms showing projected changes in forest cover type and age class over time for the two harvest scenarios are provided in Appendix 2 (South FMA) and Appendix 3 (North FMA). All projections and summaries were completed in the context of the gross land base.

3.1.1 South FMA

Deciduous and Mixedwood Forest Cover

Both timber harvest scenarios in the South FMA result in steady declines in deciduous forest cover types. Aspen forests comprise 9486-ha in the South FMA currently. In 20 years this amount is reduced to 8370-ha under even flow harvesting (Run 2) and 8128-ha under the surge cut (Run 4). This amount is further reduced to 4336-ha and 4425-ha in 50 years for Runs 2 and 4 respectively. Without post-cut deciduous retention or fire aspen forest stands in the South FMA will not occur in 100 years. A similar situation occurs for balsam poplar forest (Appendix 2). For both aspen and balsam poplar forests the even flow scenario resulted in significant declines in the supply of mid seral forest cover at year 2011 followed by rebounding to near baseline conditions in year 2021.

Deciduous and coniferous mixedwood forests showed a similar pattern of decline to pure deciduous forests (Appendix 2), with a slightly greater supply of pine and spruce mixedwood forests remaining by year 2101.

Coniferous Forest Cover

Lodgepole pine forest in the South FMA is currently dominated by stands in the mid seral age class (71 to 170 years). This status remains for both timber harvest scenarios until the year 2101 at which time a more even distribution of pine age classes occurs (Appendix 2). Total supply of lodgepole pine forest remains relatively constant for both harvest scenarios for at least 100 years. By 2201 there is a projected reduction of total lodgepole pine forest of 58.2% and 36.9% for the even flow and surge cut scenarios respectively. Old growth lodgepole pine forest (>171 years) increases steadily under both harvest scenarios, with a noticeable peak at 100 years.

Old growth (>170 years) White x Engelmann Spruce forest supply increases steadily and markedly for both timber harvest scenarios. The Surge Cut scenario with adjacency and operational harvest sequencing resulted in a 48.2% greater supply of spruce forest (all old growth) in 200 years. Mid seral spruce (71 to 170 years) decreases steadily and disappears for both scenarios by 2201 (Appendix 2). Young seral spruce forest supply is very low or nil for all time periods. This is primarily a result of the model assumption that placed all early seral harvest blocks through a lodgepole pine forest trajectory.

Harvested Areas

The supply of recently harvested lands increased steadily for both scenarios (Appendix 2). Total area of recently harvested lands increased from 7,417-ha currently to 42,362-ha for the Even Flow scenario and 46,345-ha for the Surge Cut scenario. Both scenarios showed significant increases in the relative amount of treed and shrub-sapling clearcut over time. Graminoid clearcut area increased initially and decreased in later time periods (Appendix 2).

3.1.2 North FMA

Deciduous and Mixedwood Forest Cover

Baseline conditions in the North FMA showed a dominance of the mature seral age class (51 to 110 years) for deciduous forest cover types (Appendix 3). Under both harvest scenarios the mature seral age class declined steadily in land area reaching a low in 2051. The old growth age class (>100 years) increased, reaching a peak in 2021 and declining to very low amounts by 2101. Deciduous and mixedwood forest supply in the North FMA remained at very low levels until 2201, unlike the South FMA which showed a disappearance of deciduous and mixedwood forest cover at this time period. This difference was a result of the contrast in early post-succession trajectories with the South FMA stands all being converted to pine forest and the North FMA stands being converted back to the original forest cover type. Differences in the age class distribution of deciduous and mixedwood forest stands resulting from timber harvest scenarios (i.e. even flow vs. surge cut) were very minor.

Coniferous Forest Cover

Lodgepole pine forest in the North FMA is currently dominated by stands in the mid seral age class (71 to 170 years). A steady decline in mature seral Lodgepole Pine forests was observed for both harvest scenarios (Appendix 3). By 2201 the land area of mature seral pine declined by approximately 90%. Old growth pine forest (>170 years) increased steadily from <1000-ha in 2001 to approximately 30,000-ha in 2101, followed by a sharp decline in 2201 (Appendix 3). Young seral lodgepole pine forests were very rare in 2001 and increased by an order of magnitude by 2201. The surge cit scenario (Run #2) resulted in relatively more old growth forest in 100 to 200 years than did the even flow cut.

Old growth (>170 years) White/Engelmann Spruce forest supply increases steadily and markedly (by an order of magnitude) for both timber harvest scenarios. The land area of mid seral (70 to 170 years) White/Engelmann Spruce forest cover remained relatively stable for the 200 year planning period. Young seral spruce forests were very rare until 2101 and 2201 when significant increases occurred (Appendix 3).

Harvested Areas

The supply of recently harvested lands increased for both scenarios (Appendix 3). Total area of recently harvested lands increased from approximately 15,000-ha currently to 73,000-ha for the Even Flow scenario and 58,000-ha for the Surge Cut scenario. The relative amount of treed clearcut increased significantly during later time periods for both scenarios (Appendix 3).

3.2 Changes in Wildlife Habitat Supply

3.2.1 South FMA

Changes in the land area supply of high and moderate suitability habitat for the 16 wildlife indicator species in the South FMA are presented as histograms in Appendix 6. Maps illustrating changes in the spatial distribution of habitat quality for each species, prescribed time period and timber harvest scenario are presented in Appendix 7.

Nine of the 16 species showed increases in high suitability habitat by the year 2201. These species prefer either old upland spruce forest (Black-backed Woodpecker, Northern Pygmy Owl, Northern Goshawk, Barred Owl, Long-Toed Salamander, Western Toad, Marten, Lynx) or young seral or treed clearcut forest (Lynx, Moose) for foraging or reproduction. Some of the species that showed increases in high suitability habitat in 200 years also showed minor declines in high quality habitat in the first 50 to 100 years. These included Black-backed Woodpecker, Northern Goshawk, and Marten. Four species exhibited losses in high quality habitat by the year 2201. These species prefer older deciduous and mixedwood forest (Western Tanager, Pileated Woodpecker, Great Gray Owl) or grasslands (Elk). Another group of species (Wandering Garter Snake, Red-sided Garter Snake, Cougar) appeared to be relatively unaffected with respect to alterations in habitat quality. The two snake species are not reliant on forest cover and cougar is a predator.

Differences in approach to timber harvest (i.e. Even Flow vs. Surge Cut) did not appear to significantly alter the supply of high quality habitat for any species for any of the prescribed future intervals assessed.

3.2.2 North FMA

Changes in the land area supply of high and moderate suitability habitat for the 18 wildlife indicator species in the North FMA are presented as histograms in Appendix 8. Maps illustrating changes in the spatial distribution of habitat quality for each species, prescribed time period and timber harvest scenario are presented in Appendix 9.

Species that showed increases in supply of high quality habitat over time were Northern Pygmy Owl, Barred Owl, Black Backed Woodpecker, Western Tanager, Canada Lynx, and Marten. Species that showed declines in the supply of high suitability habitat over time were Northern Goshawk, Great Gray Owl, Pileated Woodpecker, Cougar and Northern Bat. High suitability habitat supply for Western Toad, Garter Snake, Moose, Elk, Long-toed Salamander and Sandhill Crane remained relatively stable over time. Species with increases in high quality habitat supply generally were those that prefer old growth coniferous forest. Species with decreases in high quality habitat were those that rely on mixedwood and deciduous forest.

Differences in approach to timber harvest (i.e. Even Flow vs. Surge Cut) did not appear to significantly alter the supply of high quality habitat for any species for any of the prescribed future intervals assessed.

3.3 Changes in Habitat Fragmentation

Changes in high suitability habitat patch-size distribution were measured to investigate habitat fragmentation effects. This was done for seven wildlife species considered to be sensitive to the effects of habitat fragmentation. Appendices 10 and 11 show these changes for the five prescribed time periods and the two timber harvest scenarios.

3.3.1 South FMA

Northern Pygmy-Owl, Northern Goshawk, Barred Owl and Black-backed Woodpecker habitat patches increase both in number and mean size over the prescribed time intervals. Some decrease occurs during the first 50 years but it does not appear to be significant. Western Tanager, Great Gray Owl and Pileated Woodpecker habitat patches stay relatively constant in both number and size over the first fifty years of the assessment and then reduce to zero at the 100-year and 200-year time interval. This effect is likely due to the disappearance of deciduous and mixedwood components of the South FMA.

3.3.2 North FMA

Northern Pygmy-Owl, Western Tanager, Barred Owl and Black-backed Woodpecker habitat patches increase both in number and mean size over the prescribed time intervals. Northern Goshawk, Great Gray Owl and Pileated Woodpecker habitat patches stay relatively constant in both number and size over the first fifty years of the assessment and then show decreases at the 100-year and 200-year time interval. This effect is likely due to the disappearance of deciduous and mixedwood components of the North FMA.

4.0 CONCLUSIONS

- Old growth (>170 years) White x Engelmann Spruce forest supply increases steadily and markedly for both timber harvest scenarios (Runs 2 and 4). The Surge Cut scenario with adjacency and operational harvest sequencing resulted in a 48.2% greater supply of spruce forest (all old growth) in 200 years.

- Differences in approach to timber harvest (i.e. Even Flow-Run 2 vs. Surge Cut –Run 4) did not appear to significantly alter the supply of high quality habitat for wildlife indicator species at the various time periods assessed (Appendix 4).

- Both Run 2 and Run 4 resulted in a more evenly balanced age class distribution of Lodgepole Pine forest than the current status, which is dominated by mid-seral stands.

- The number of large (>100 ha) patches of high quality habitat for old growth forest wildlife indicator species increased in from 100 to 200 years.

- Timber harvest approach did not significantly affect high quality patch size frequency for wildlife indicator species – indicating a strong natural succession effect.

- Projection modeling shows that natural vegetation succession in the absence of fire will lead to a significant decline in deciduous and mixedwood forest cover types at from 50 to 100 years. High quality habitat supply for mixedwood dependent species also declines markedly at this time period.

- Even flow timber harvest without adjacency considerations leads to significant declines in aspen and mixedwood forest cover at 10 years.

5.0 LITERATURE CITED

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APPENDIX 1

ASSUMPTIONS PERTAINING TO THE WILDLIFE HABITAT UNIT SUCCESSION MODEL

Coniferous Forest WHUs

- All Lodgepole Pine forests succeed to White Spruce forests.
- Open canopy old growth White Spruce stands that were selectively logged become closed canopy White Spruce forest stands due to infilling of trees in understory;
- Open canopy Lodgepole Pine-mixed conifer WHUs (i.e. PL-Mx) will become closed canopy stands when aging from young seral to mid-seral because of infilling by understory spruce.
- White Spruce-mixed conifer (SW-Mx) WHUs will become pure SW stands when aging from mid-seral to old growth because of loss of Lodgepole Pine component;
- All White x Engelmann Spruce and Subalpine fir forests become older spruce and fir forests after they've reached old growth status (i.e. do not switch from spruce to fir or fir to spruce).
- Mixed White Spruce-Black Spruce stands succeed to pure White Spruce forest;

Deciduous Forest WHUs

- Old growth Aspen forest stands change to Aspen-Lodgepole Pine WHUs on SW-facing and dry (d) slopes and Aspen-White Spruce WHUs on NE-facing sites;
- Old growth Balsam Poplar forest succeeds to Balsam Poplar-White Spruce forest on all sites except open canopy SW-facing stands which succeed to Balsam Poplar-Lodgepole Pine;
- Riparian balsam poplar forest succeeds to White Spruce-Poplar mixedwood forest and then to riparian white spruce stands and will not be held in a disclimax state due to natural flooding or beaver activity;
- Upland Aspen forests become Aspen-Lodgepole Pine mixedwoods and then succeed to Lodgepole Pine forests on flat and SW-facing slopes and to White Spruce mixedwood and eventually pure White Spruce forests on NE-facing slopes.

Mixedwood Forest WHUs

- Open canopy Aspen-White Spruce (AW-SW) forest will become closed canopy when aging from mid-seral to old growth age class mixedwoods because of infilling by White Spruce;
- All mixedwood forest stands on upland sites will succeed to pure coniferous forests in the absence of fire;
- Open canopy mixedwood forests succeed to open canopy pure conifer forests on dry SW-facing slopes;

Clearcuts/Burns/Rangeland Clearings

- Regenerating clearcuts are considered to be young seral forest stands at 41 years for deciduous-dominated WHUs and 51 years for coniferous-dominated WHUs;
- Burned (BU) WHUs with trees change to young seral forest at 51 years for the Subalpine and Upper Foothills Subregions and 41 years for the Lower Foothills Subregion.

- Grassland dominated burns (BU-GR) succeed to White Spruce forest on NE-facing slopes and Lodgepole Pine forest on flat and SW-facing aspects in 80 years;
- Rangeland clearings with tree overstory become natural forested WHUs over time;
- Rangeland clearing WHUs with shrub (SC) and graminoid cover (GR) remain as such as a result of continued grazing (i.e. disclimax)
- Tall shrub clearcuts will change to Lodgepole Pine forest on SW-facing sites and White Spruce forest on NE-facing sites;
- Tall shrub clearcuts on flat sites will change to Lodgepole Pine forest in the Boreal Mixedwood, Lower Foothills and Upper Foothills Subregions and to White Spruce forest in the Subalpine Subregion;
- Clearcut WHUs will progress from graminoid to shrub to forested condition;

Anthropogenic

- All WHUs currently cleared for transportation or reclamation will remain cleared (i.e. disturbance climax);
- All WHUs currently classified as industrial or settlement will remain as such;
- All WHUs currently classified as CP or CPR (cultivated perennial) will stay as such;

Barren-Natural

- All WHUs currently classified as Barren Rock, Sand or Cutbank will remain as such (i.e. edaphic climax);

Natural Shrubland/Grassland

- Upland shrub on SW-facing slopes succeeds through Lodgepole Pine forest and then to White Spruce forest in all Subregions.
- Upland shrub on flat and NE-facing sites succeeds to spruce forest in all Subregions.

- Upland grasslands succeed to lodgepole pine forest on SW-facing and/or dry (d) sites in all Subregions in 80 years;
- Upland grasslands succeed to White Spruce forest on flat and NE-facing sites in the Upper Foothills and Subalpine Subregions in 80 years;

Wetlands/Waterbodies

- Waterbodies/wetlands (lakes, ponds, flooded areas, rivers and graminoid/forb cover types with wet or aquatic moisture regime) remain in the same state over time (i.e. edaphic climax).
- Mixed Tamarack and Spruce (Black or White) forests succeed to either Black Spruce or White Spruce stands because of shade intolerance of Tamarack;
- Other ecosystem processes such as insects, disease, windthrow, and mass wasting are not factored into this model.

APPENDIX 2

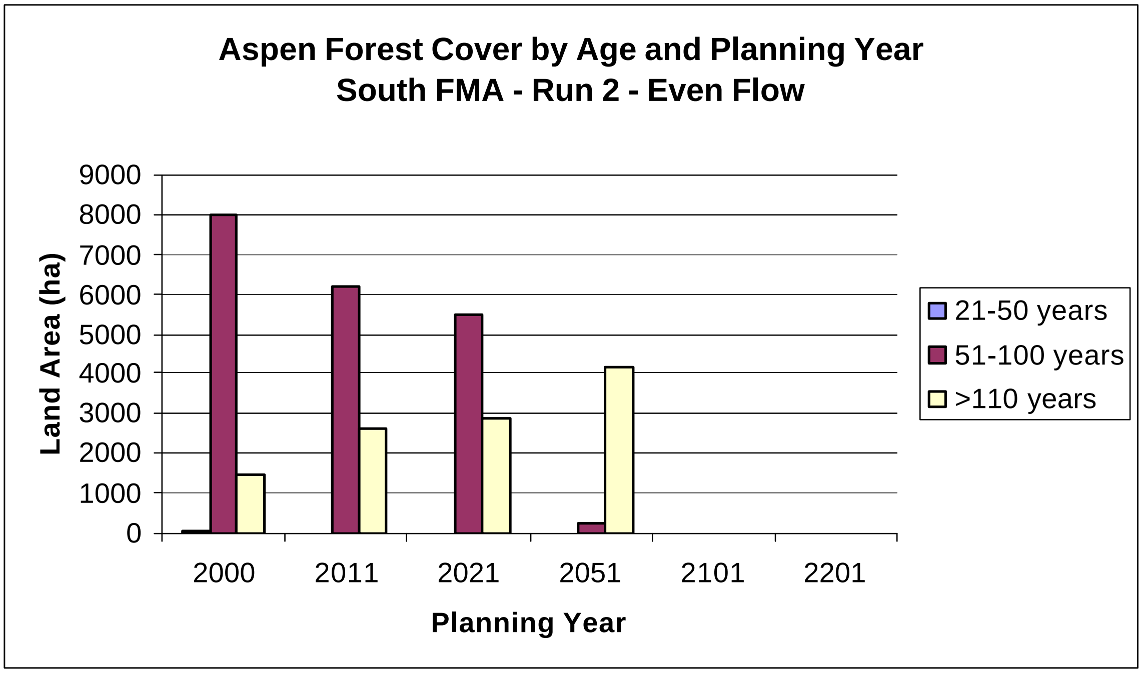
LAND AREAS OF FOREST COVER TYPES BY AGE CLASS
-SOUTH PORTIONS OF SPRAY LAKE FMA-

for

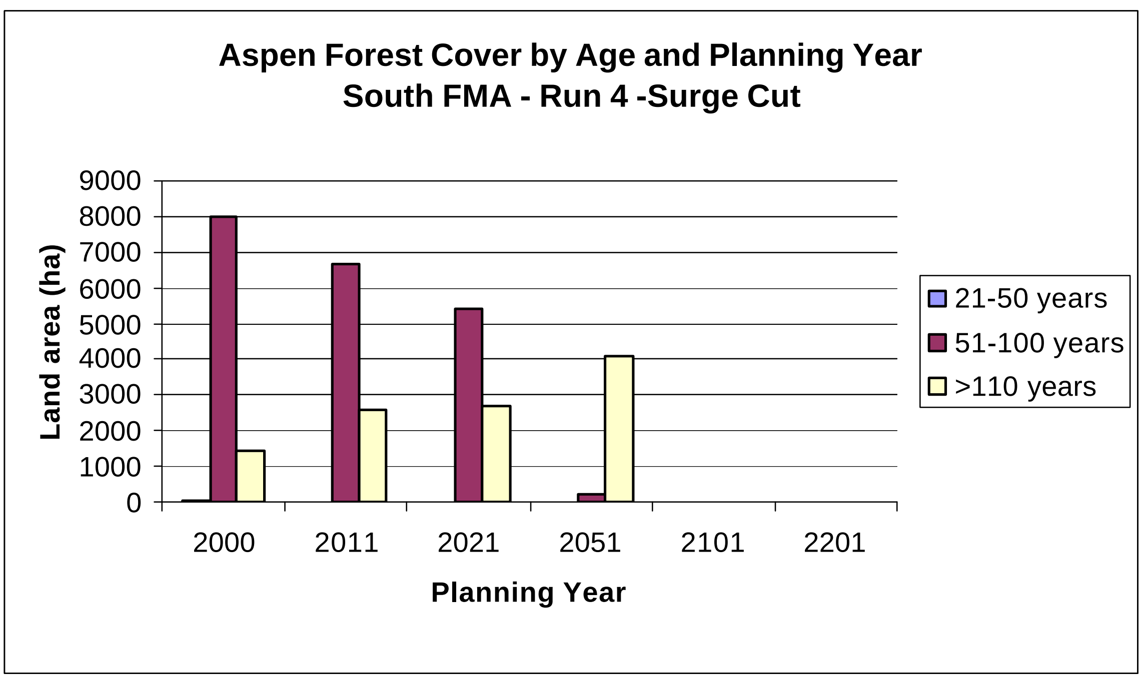
MODEL RUN #2 – EVEN FLOW WITHOUT ADJACENCY AND OPERATIONAL HARVEST SEQUENCING

and

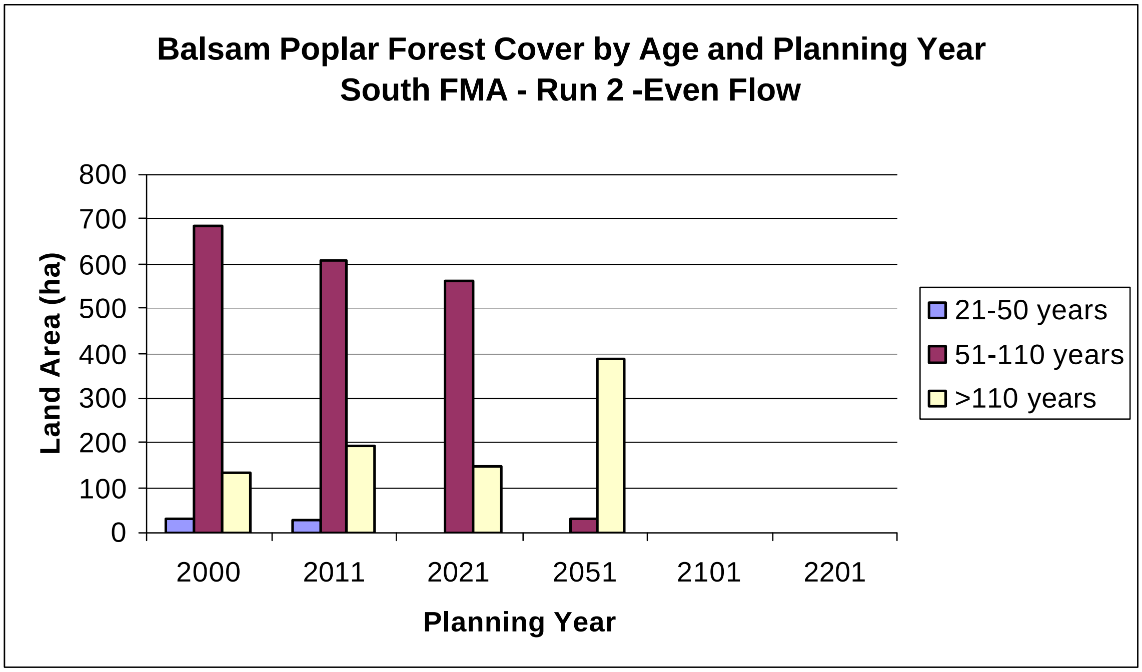
MODEL RUN #4 – SURGE CUT WITH ADJACENCY AND OPERATIONAL HARVEST SEQUENCING

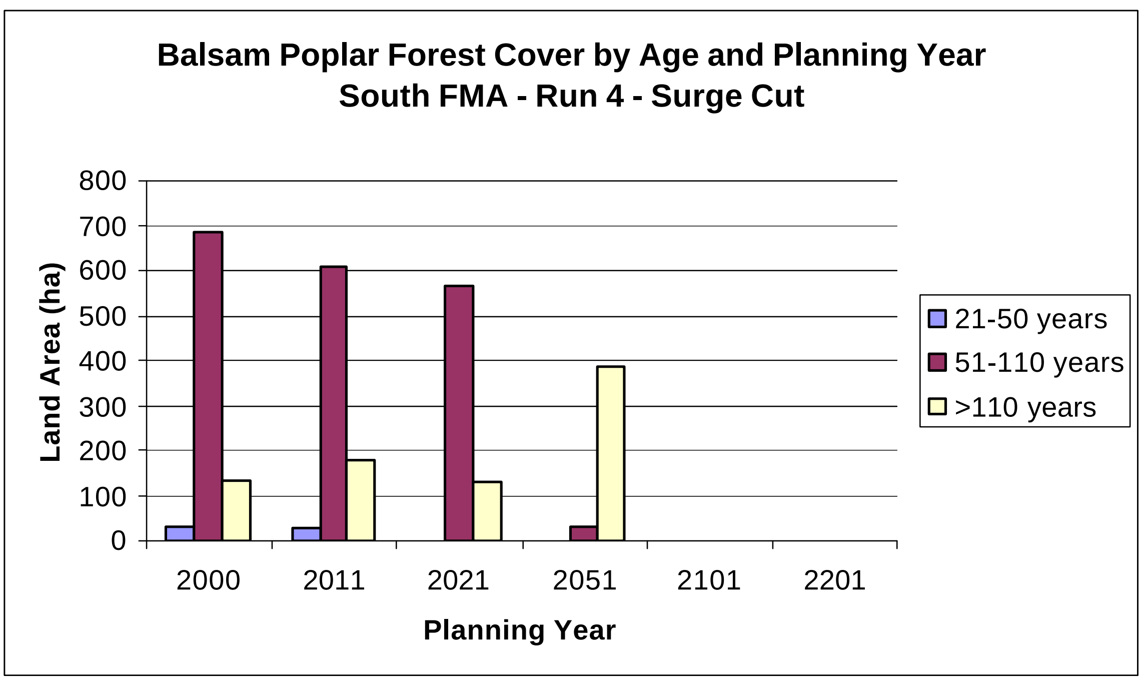


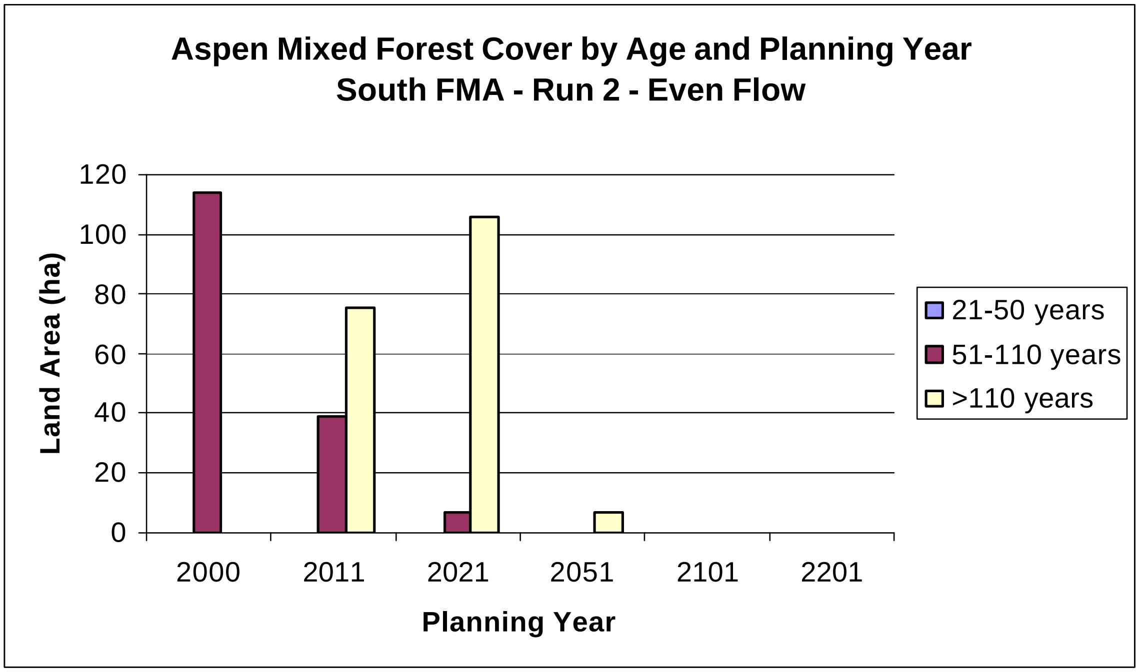
Aspen Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-100 years
>110 years

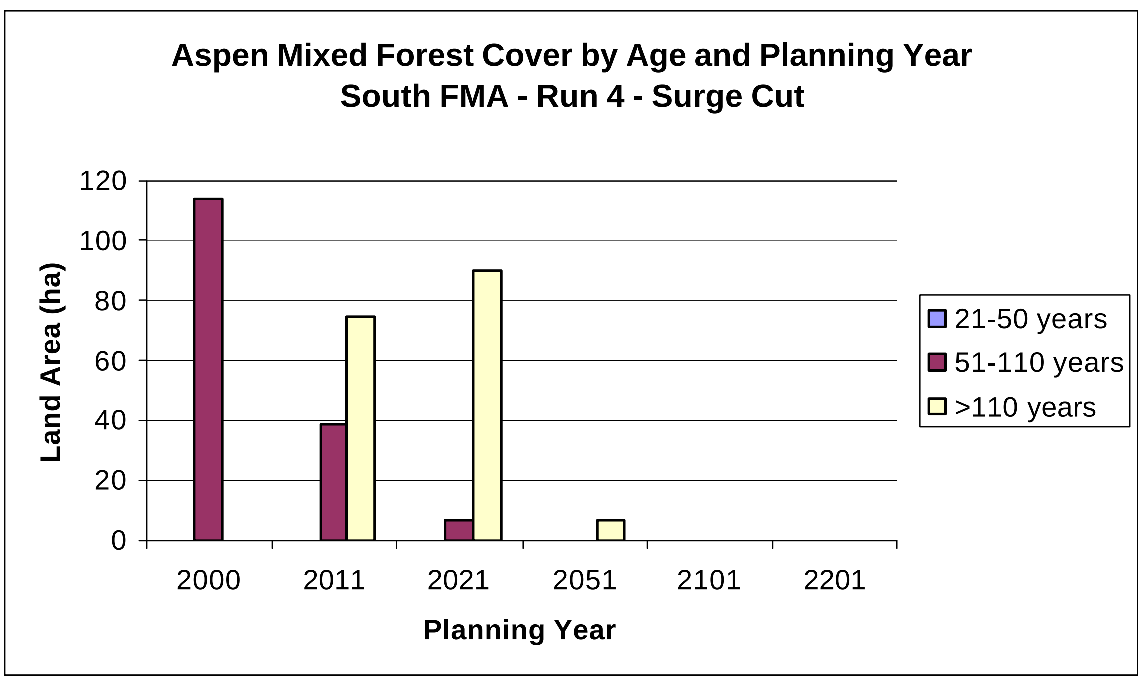


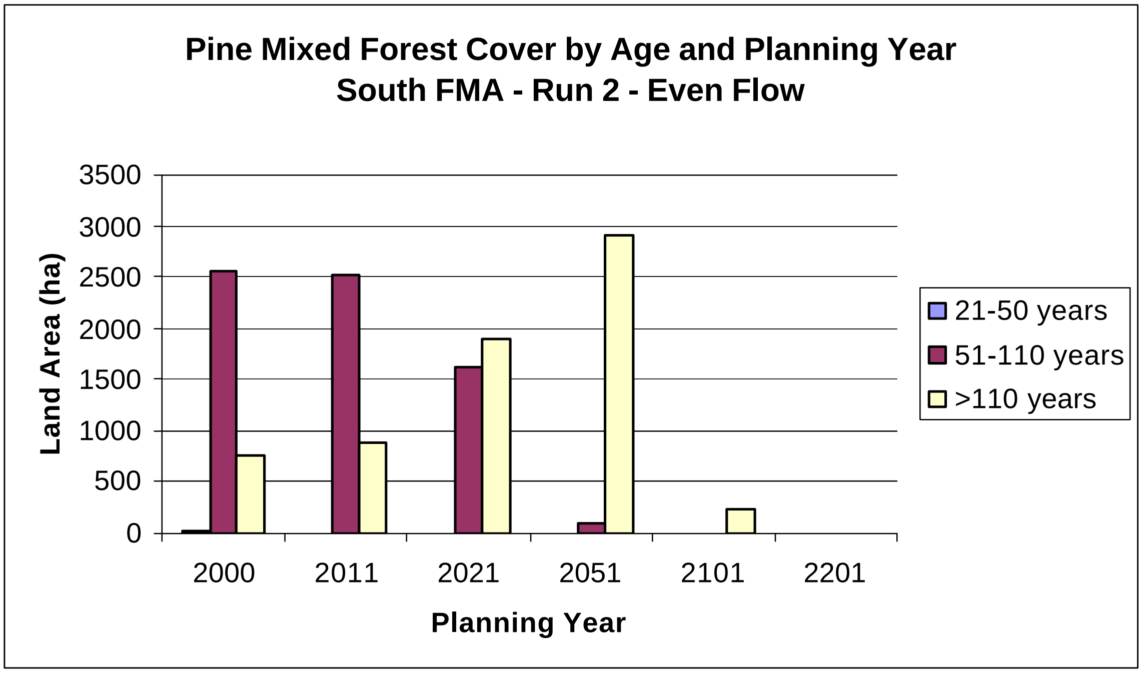
Aspen Forest Cover by Age and Planning Year
South FMA - Run 4 -Surge Cut
Land area (ha)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-100 years
>110 years

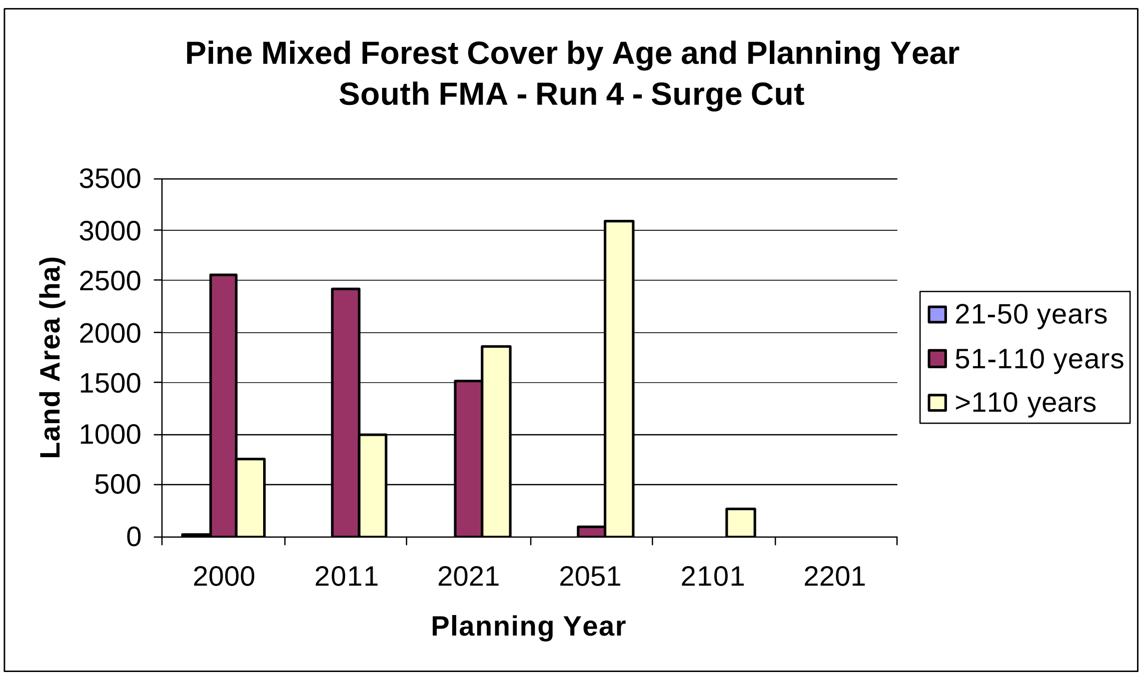

Balsam Poplar Forest Cover by Age and Planning Year
South FMA - Run 2 -Even Flow
Land Area (ha)
800
700
600
500
400
300
200
100
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

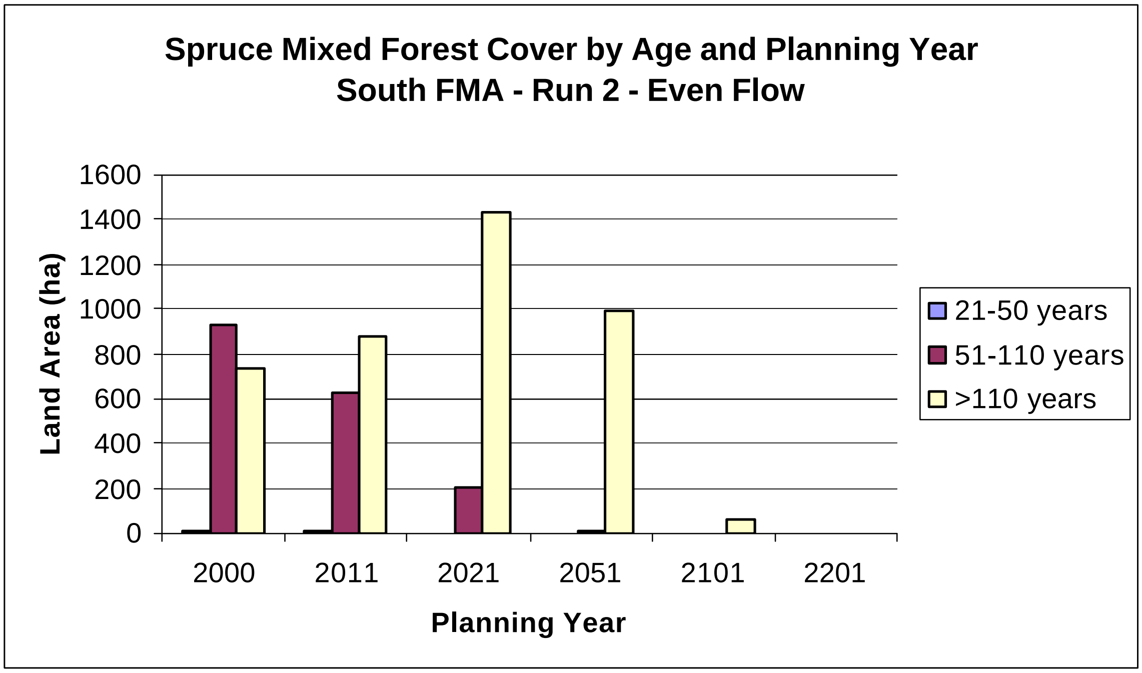

Balsam Poplar Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
800
700
600
500
400
300
200
100
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

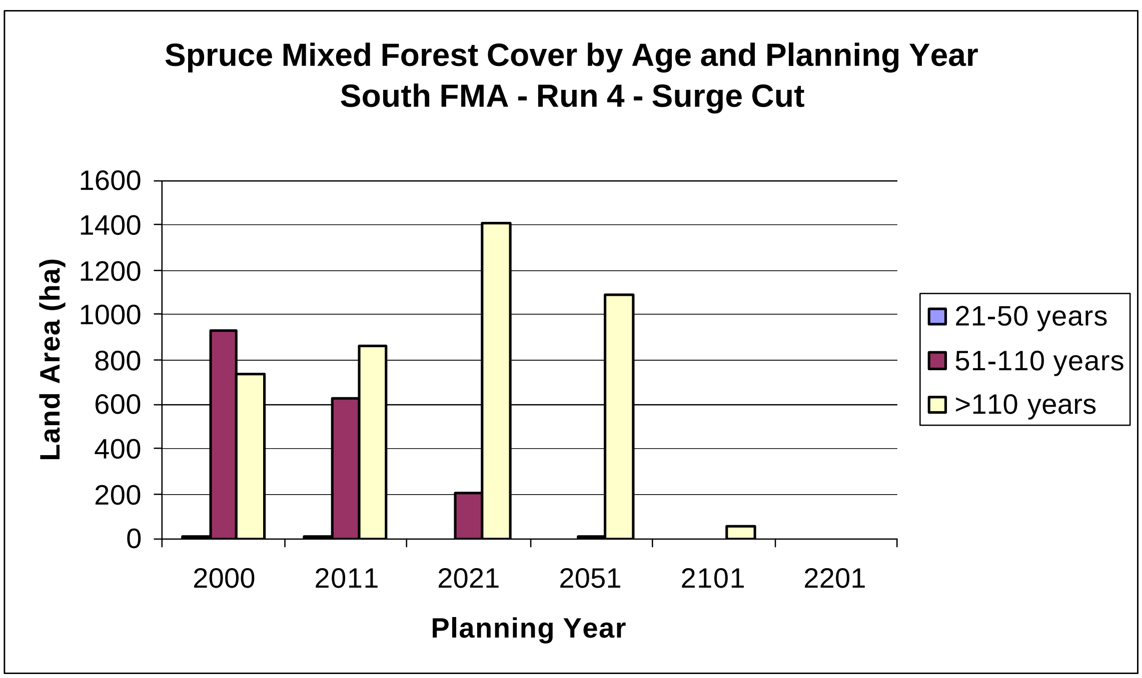

Aspen Mixed Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
120
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

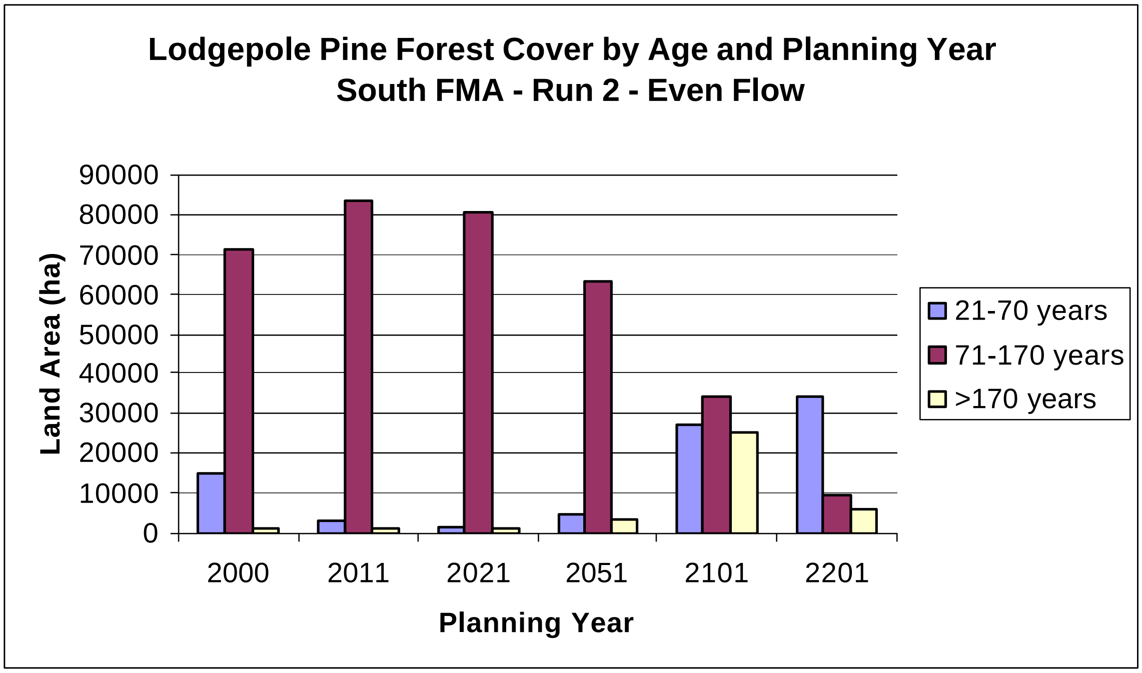

Aspen Mixed Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
120
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

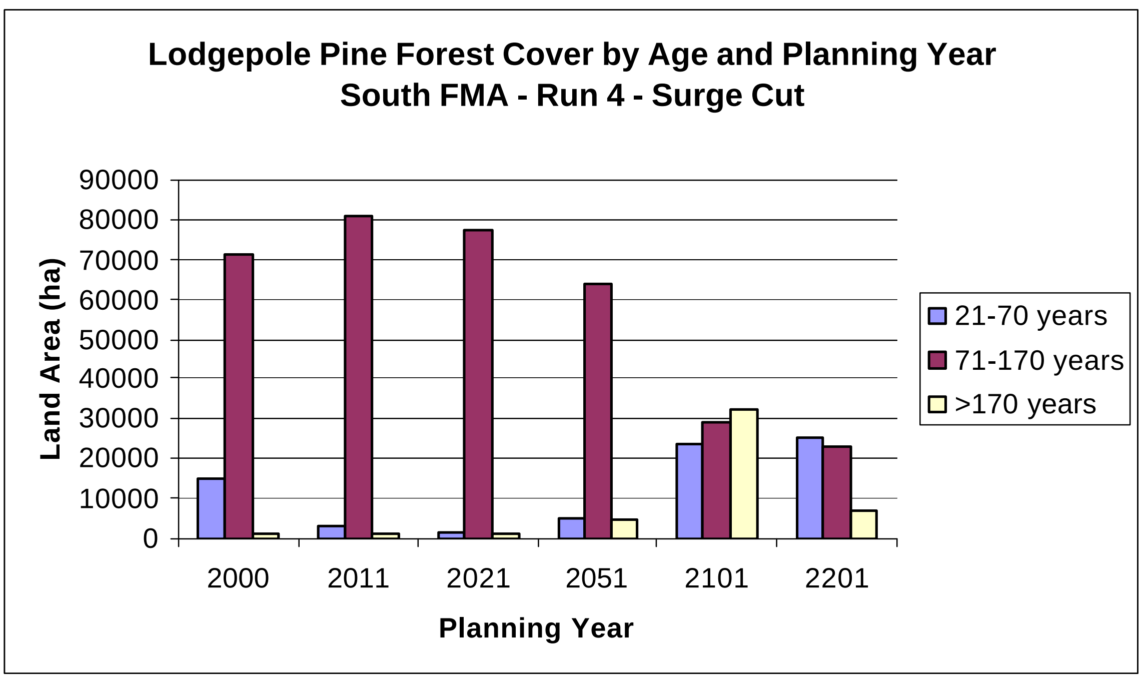

Pine Mixed Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

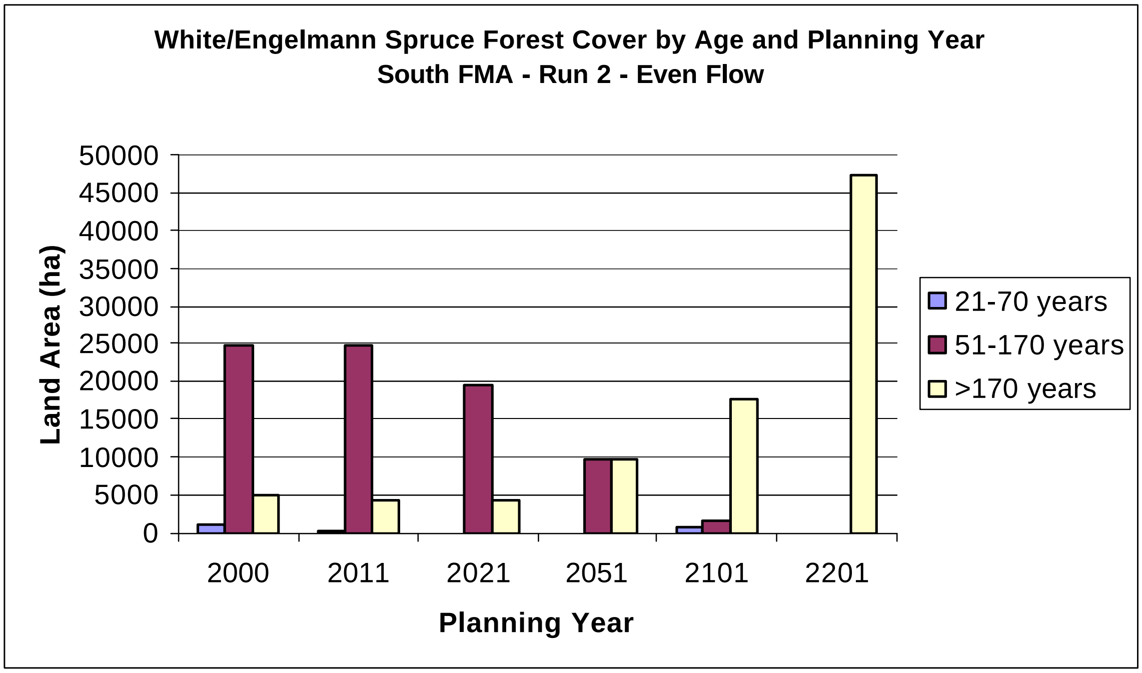

Pine Mixed Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

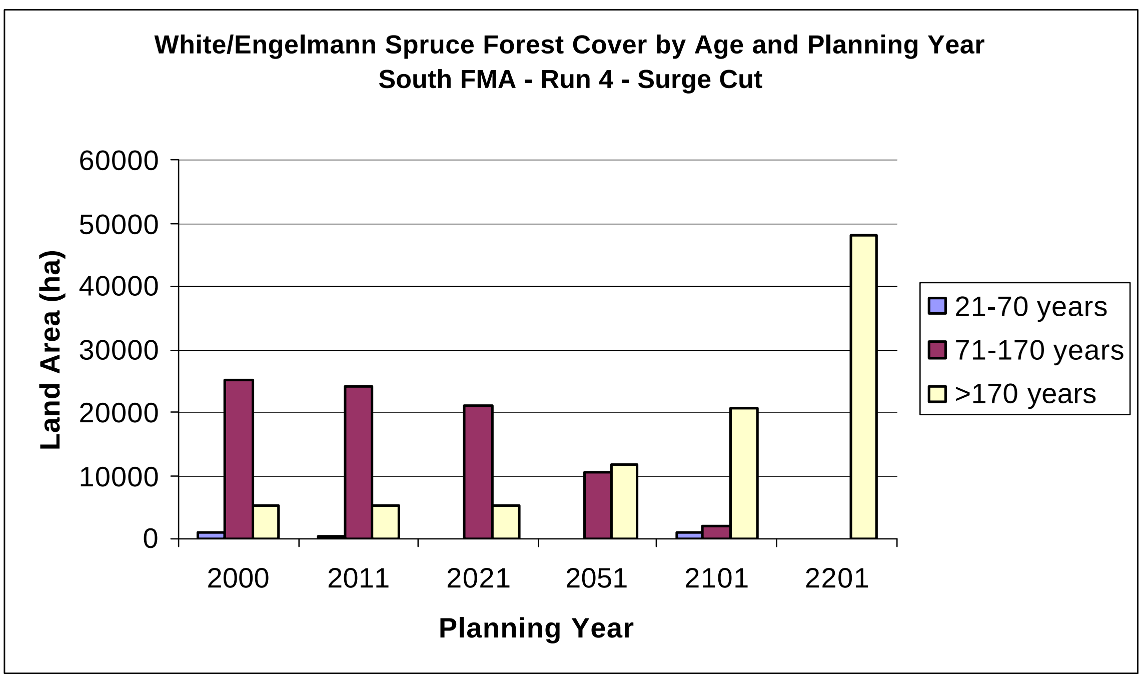

Spruce Mixed Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
1600
1400
1200
1000
800
600
400
200
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

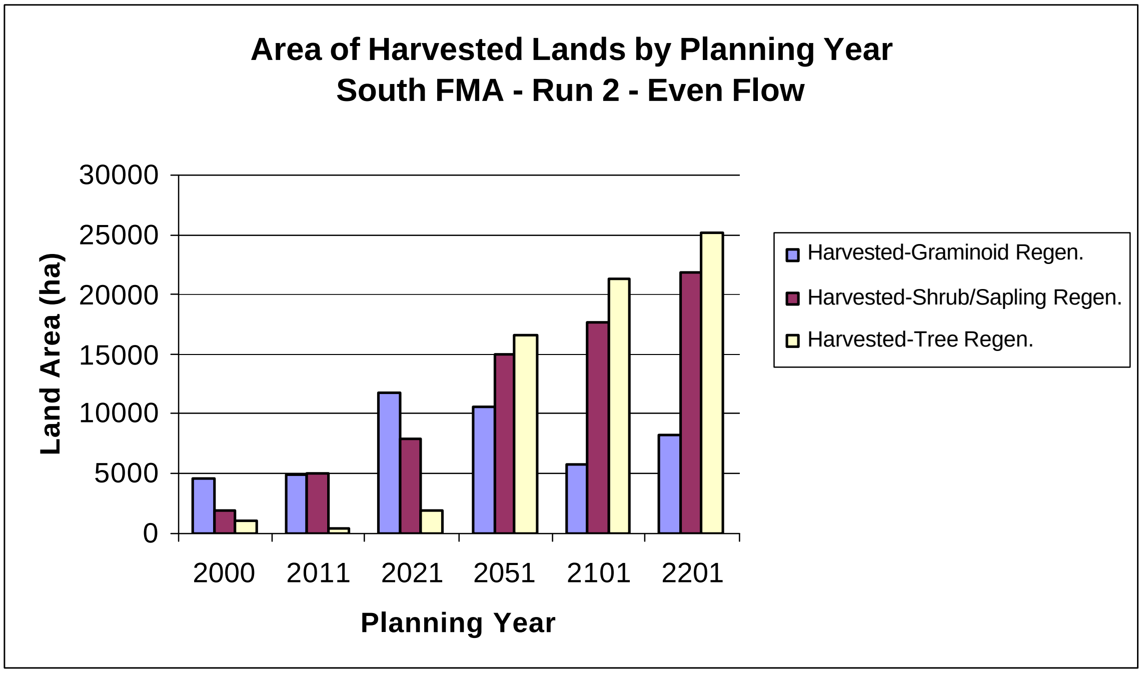

Spruce Mixed Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
1600
1400
1200
1000
800
600
400
200
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

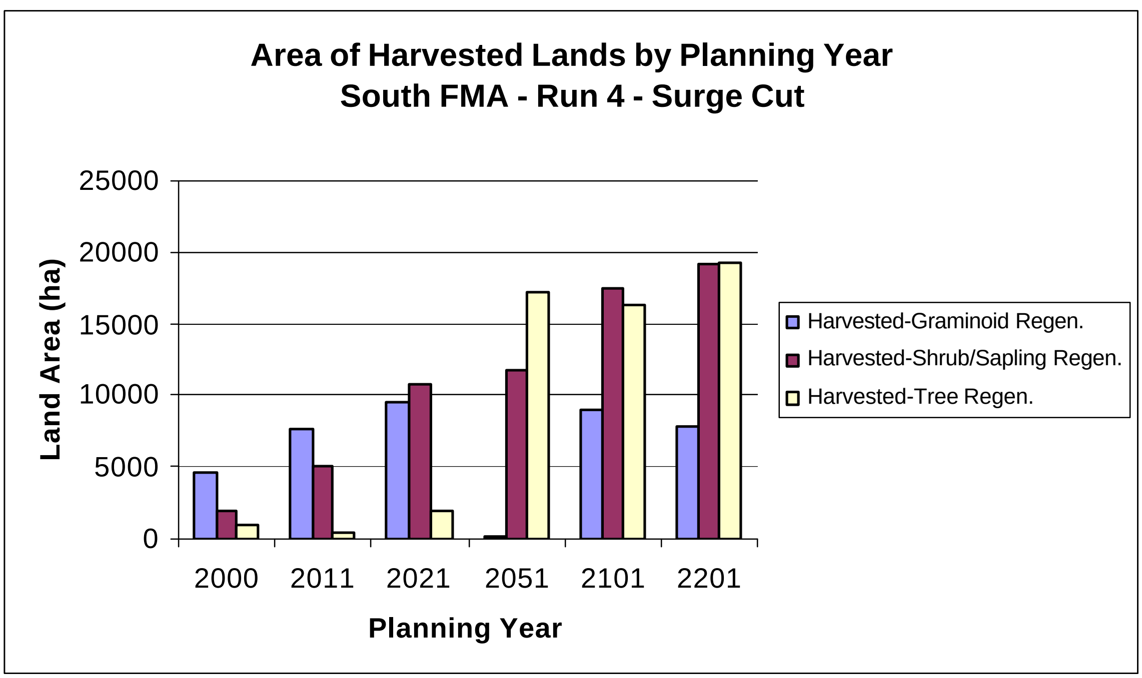

Lodgepole Pine Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


Lodgepole Pine Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


White/Engelmann Spruce Forest Cover by Age and Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
51-170 years
>170 years


White/Engelmann Spruce Forest Cover by Age and Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


Area of Harvested Lands by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
Harvested-Graminoid Regen.
Harvested-Shrub/Sapling Regen.
Harvested-Tree Regen.


Area of Harvested Lands by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
Harvested-Graminoid Regen.
Harvested-Shrub/Sapling Regen.
Harvested-Tree Regen.

APPENDIX 3

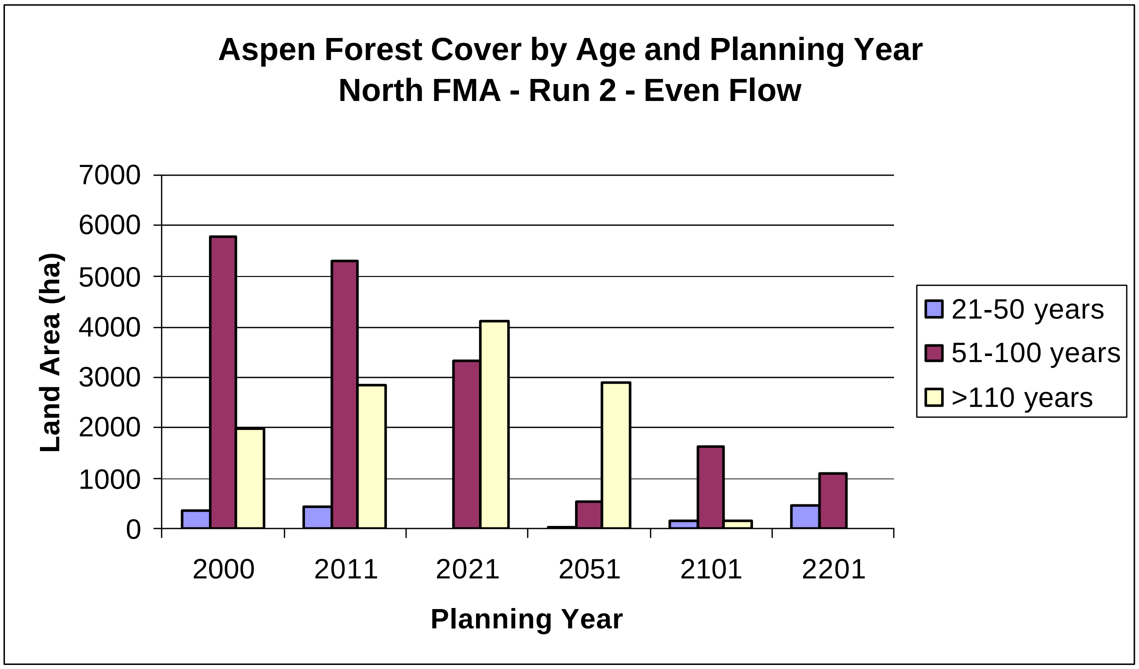
LAND AREAS OF FOREST COVER TYPES BY AGE CLASS
-NORTH PORTION OF SPRAY LAKE FMA-

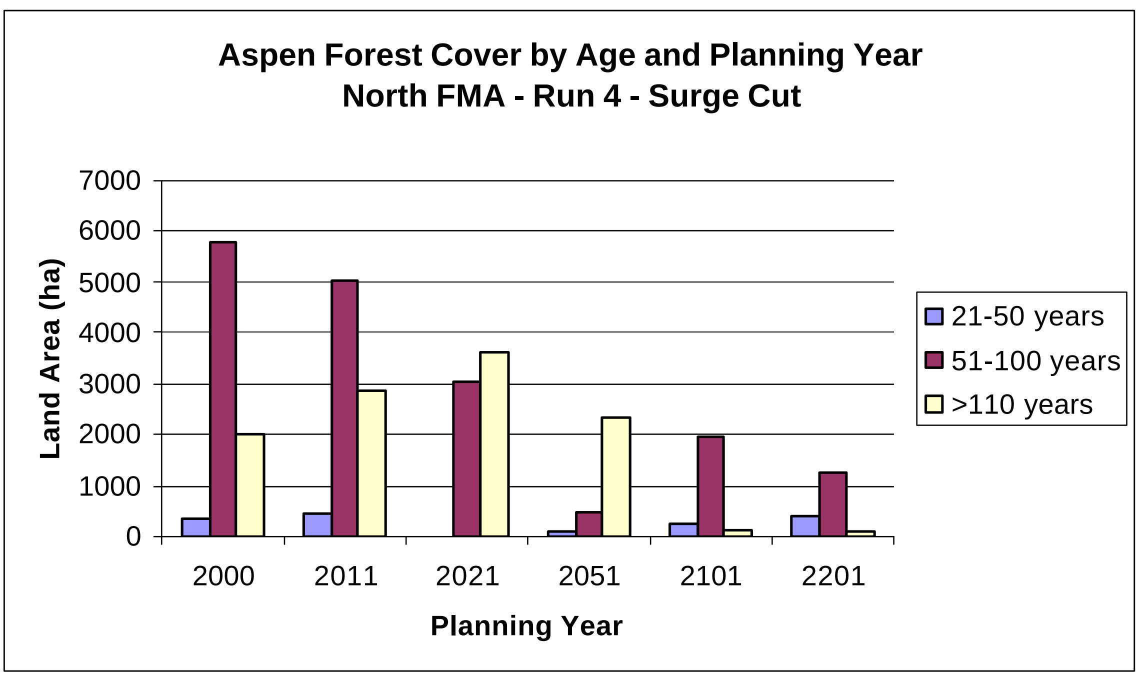
for

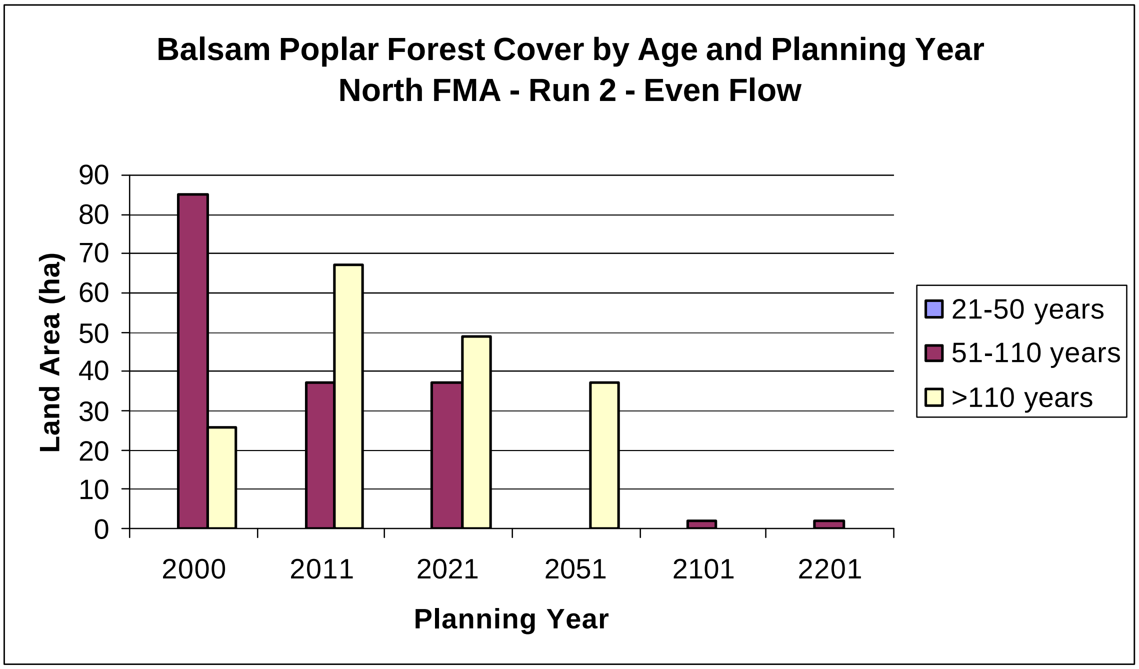
MODEL RUN #2 – EVEN FLOW WITHOUT ADJACENCY AND OPERATIONAL HARVEST SEQUENCING

and

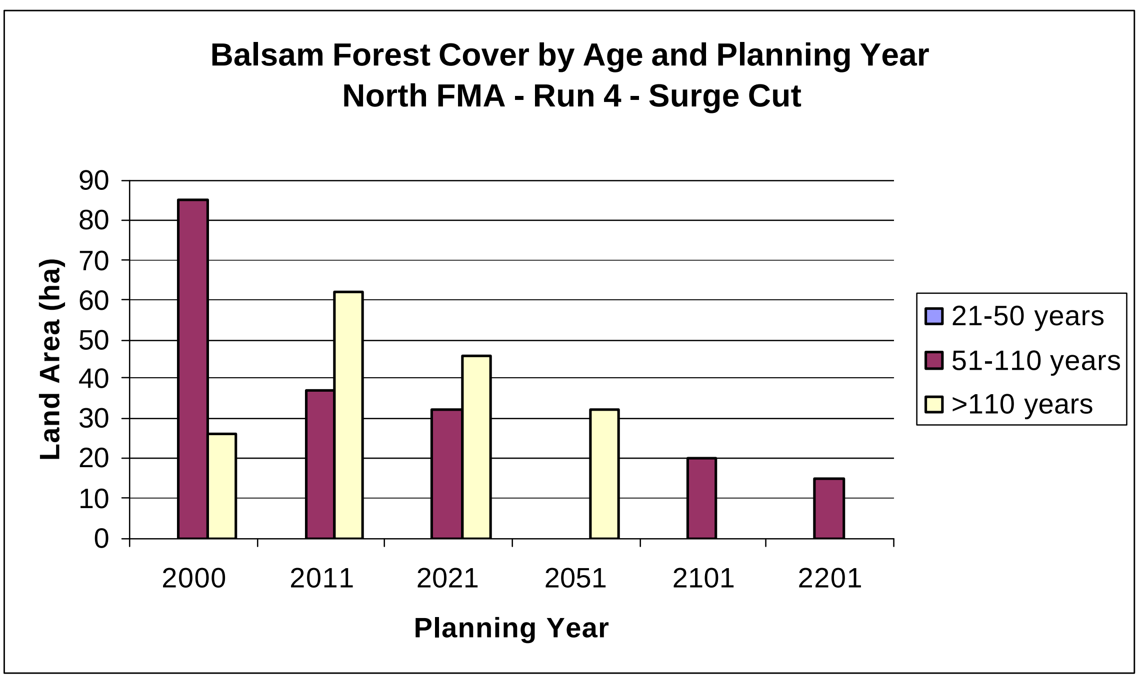
MODEL RUN #4 – SURGE CUT WITH ADJACENCY AND OPERATIONAL HARVEST SEQUENCING


Aspen Forest Cover by Age and Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-100 years
>110 years

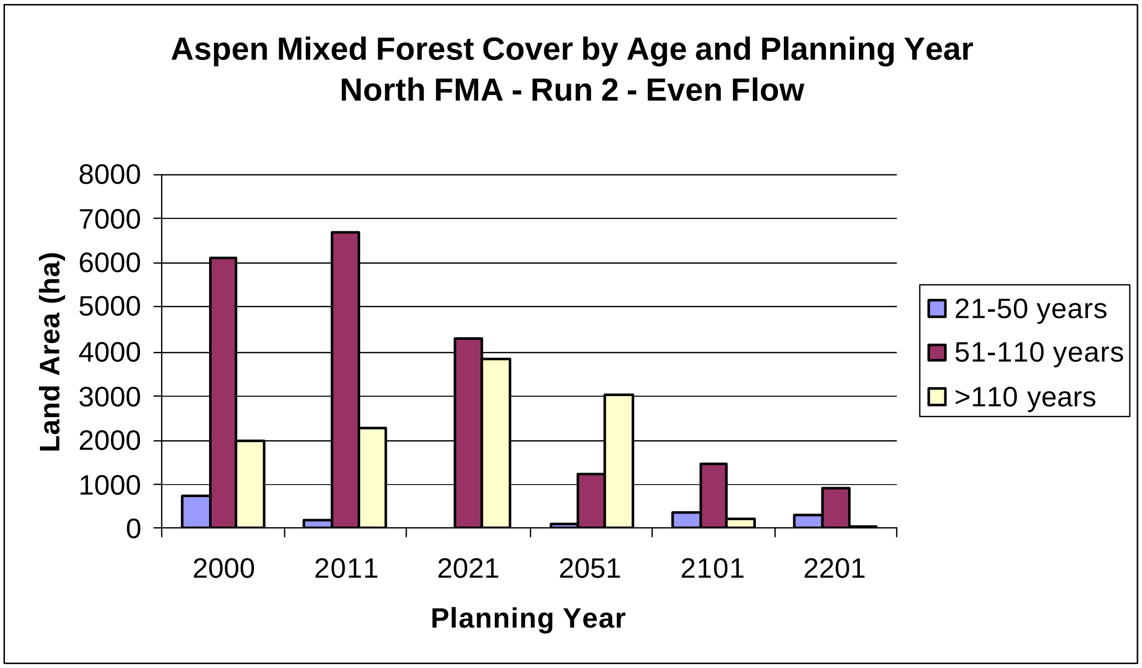

Aspen Forest Cover by Age and Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-100 years
>110 years

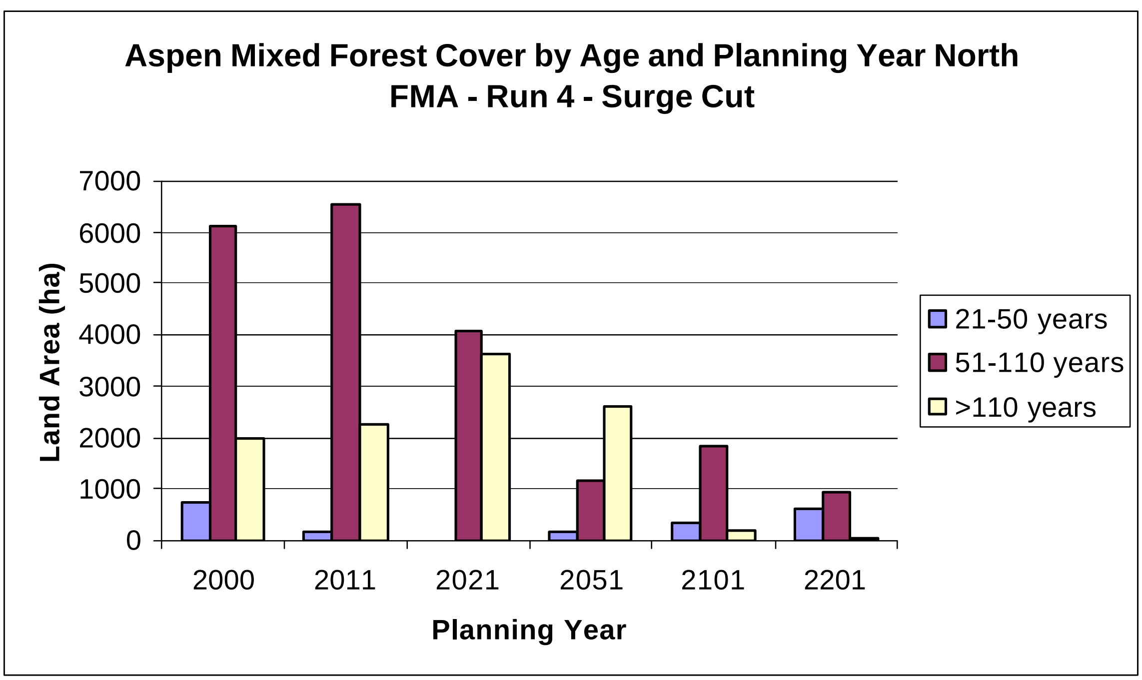


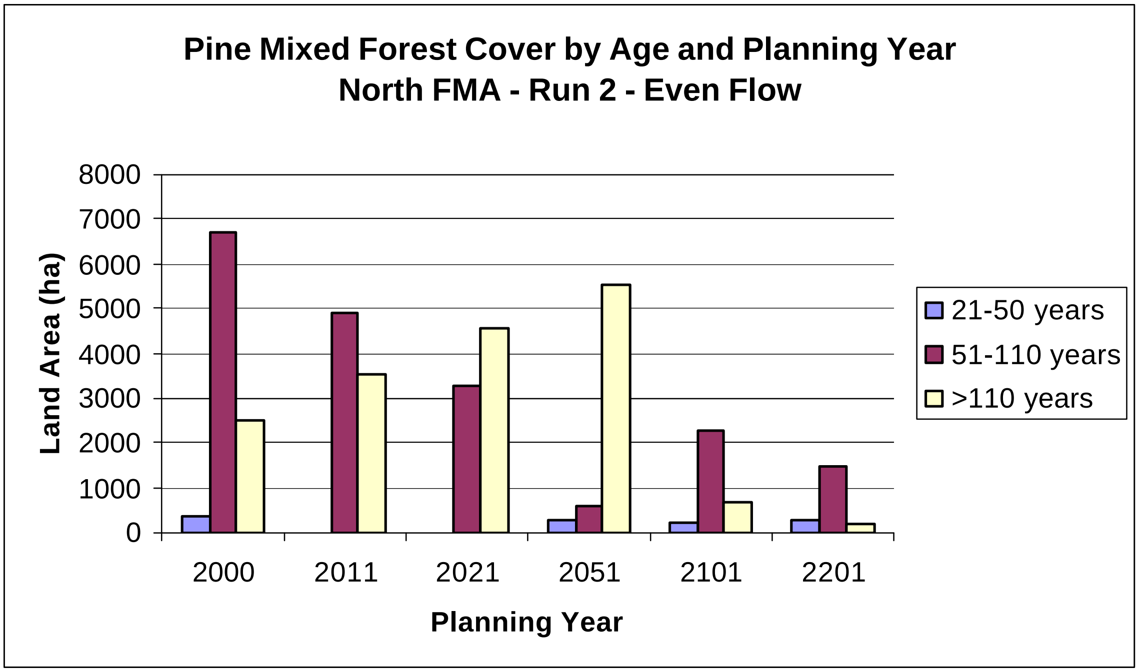
Balsam Poplar Forest Cover by Age and Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
0
10
20
30
40
50
60
70
80
90
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

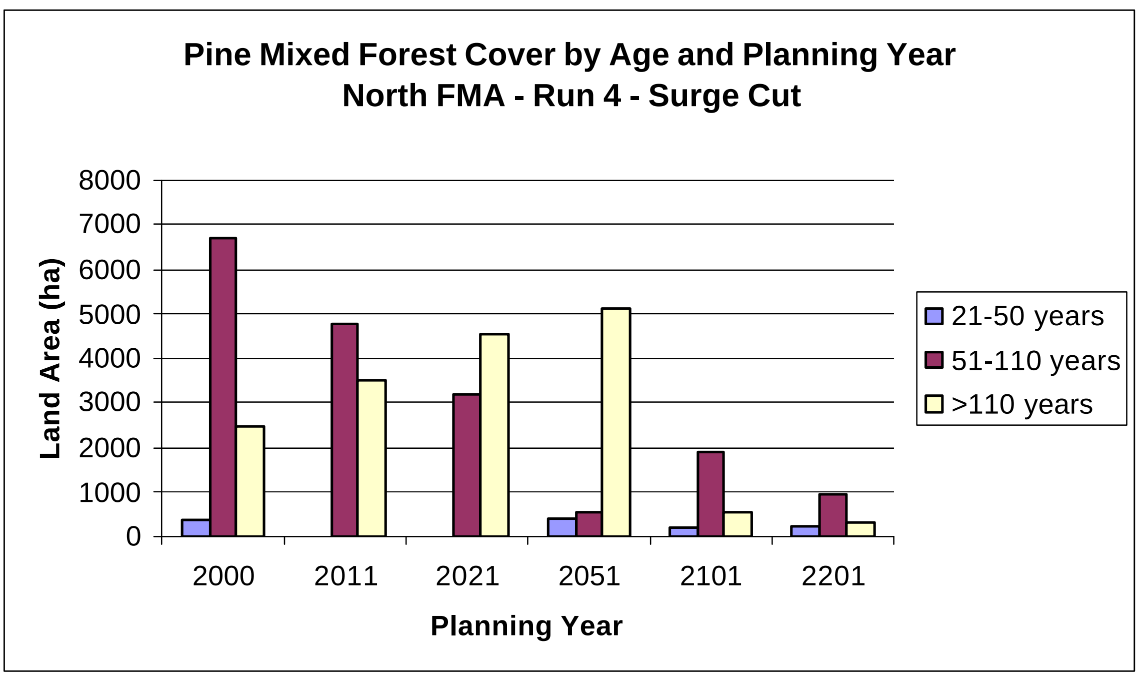


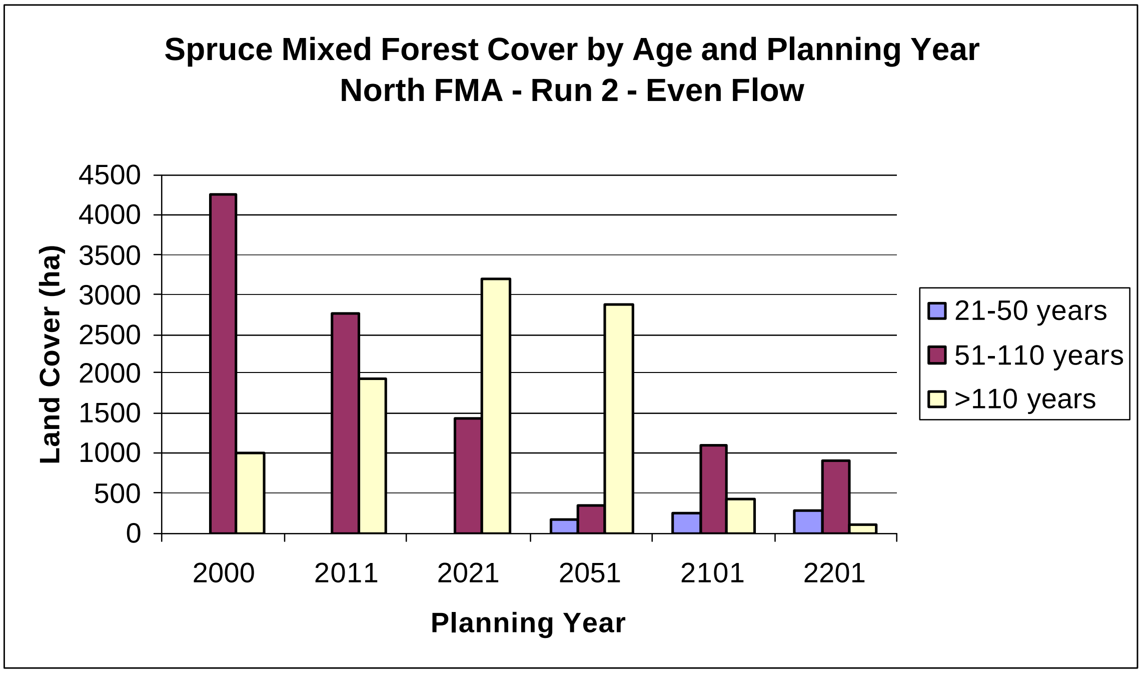
Balsam Forest Cover by Age and Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
0
10
20
30
40
50
60
70
80
90
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

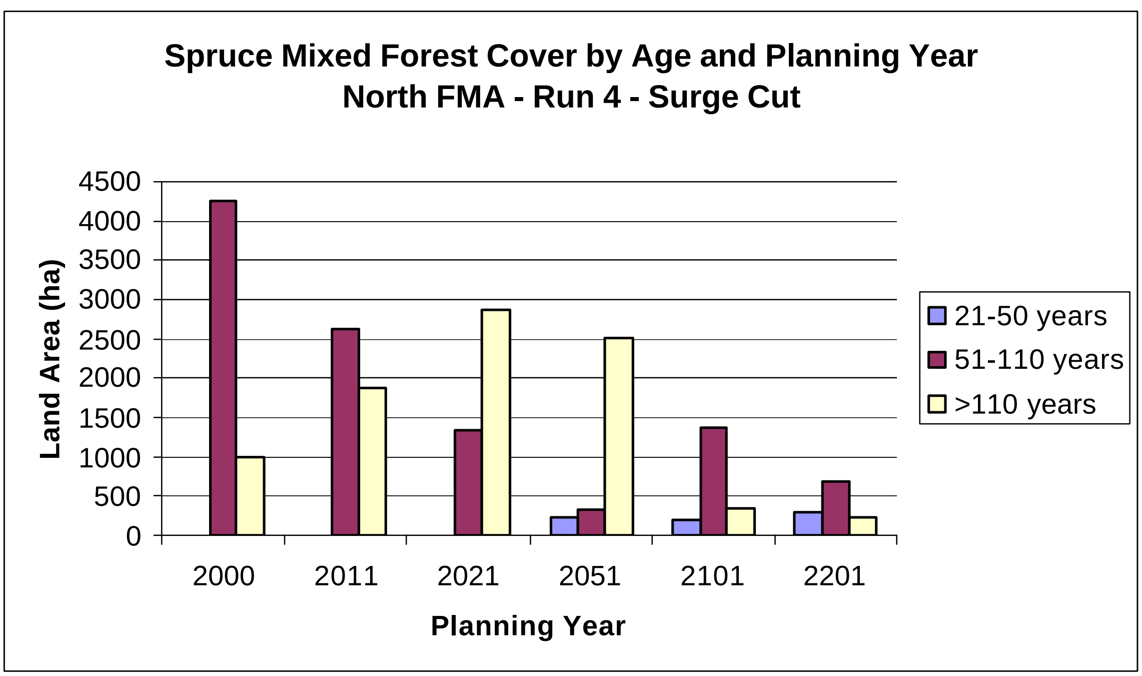

Aspen Mixed Forest Cover by Age and Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

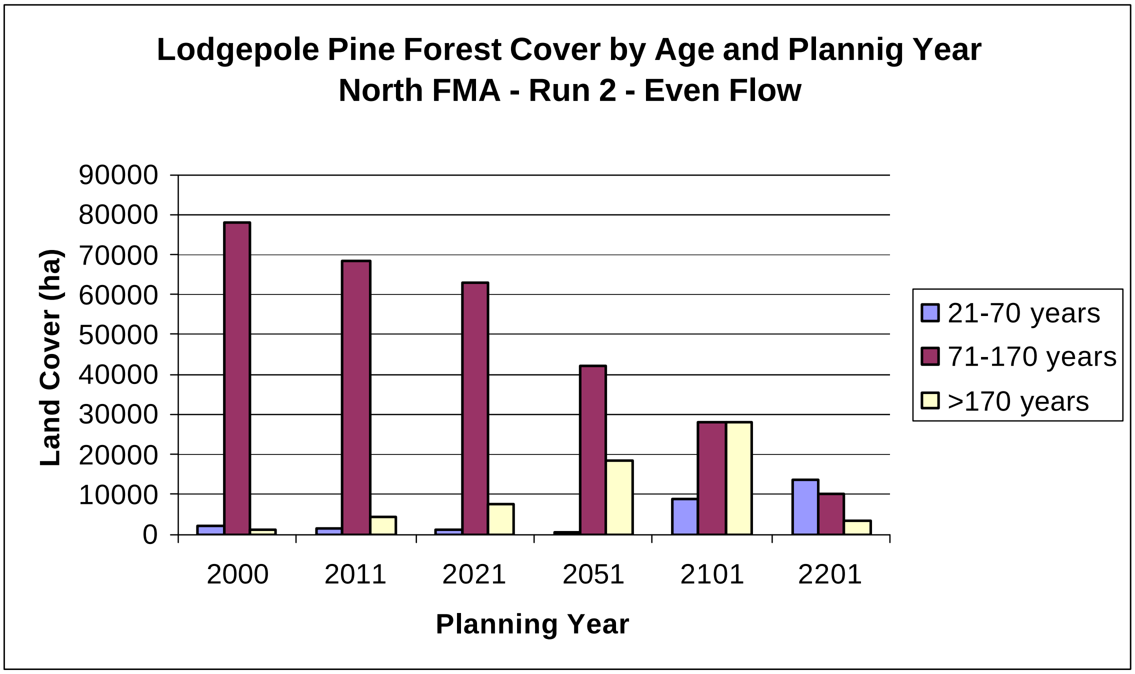

Aspen Mixed Forest Cover by Age and Planning Year North
FMA - Run 4 - Surge Cut
Land Area (ha)
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

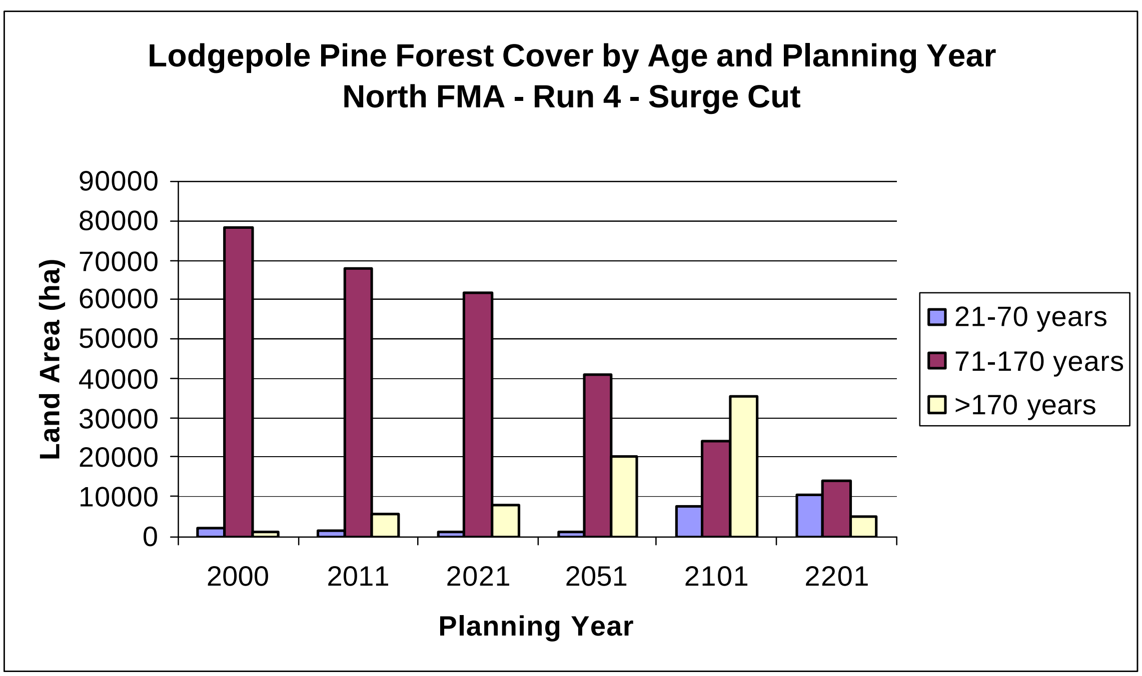

Pine Mixed Forest Cover by Age and Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

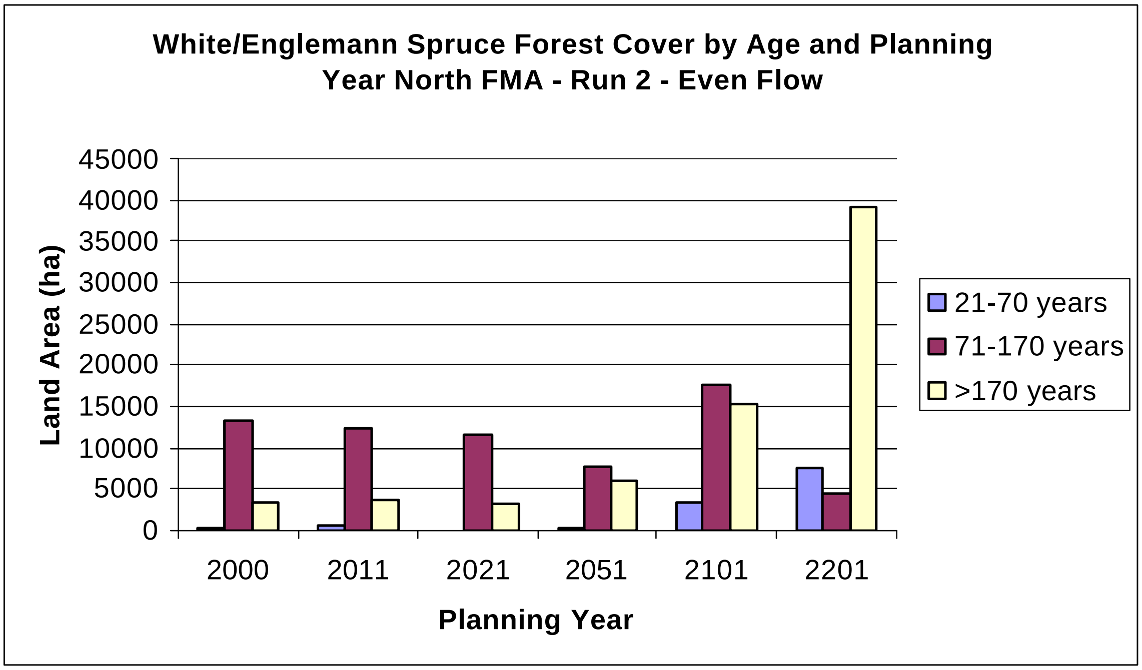

Pine Mixed Forest Cover by Age and Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

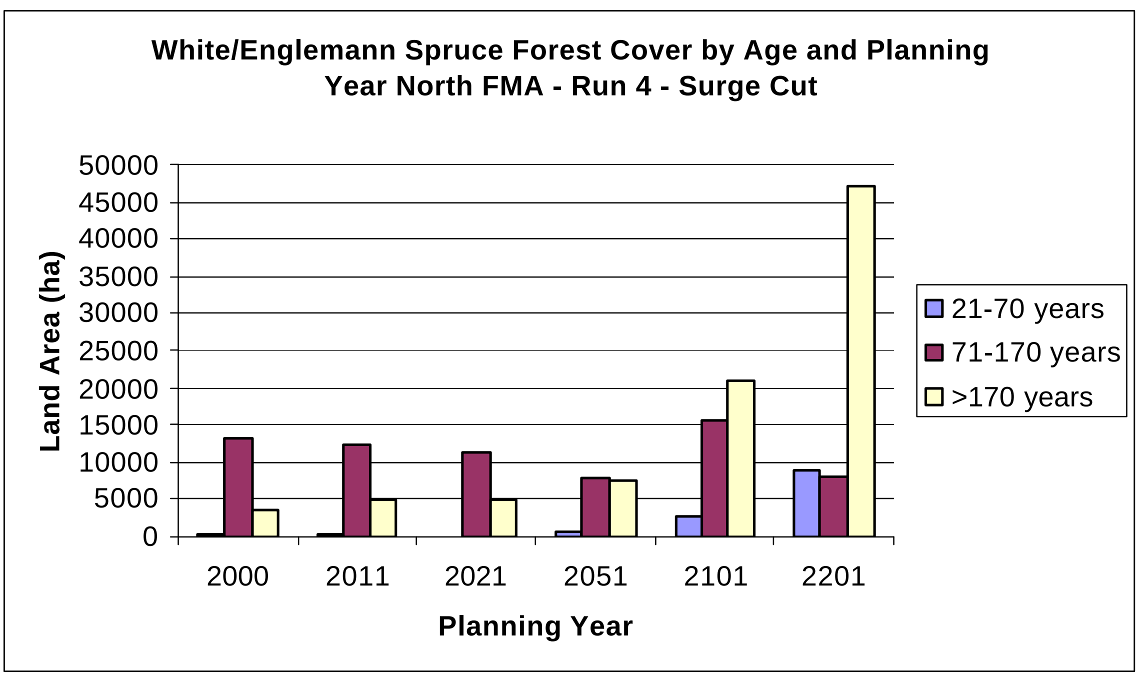

Spruce Mixed Forest Cover by Age and Planning Year
North FMA - Run 2 - Even Flow
Land Cover (ha)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

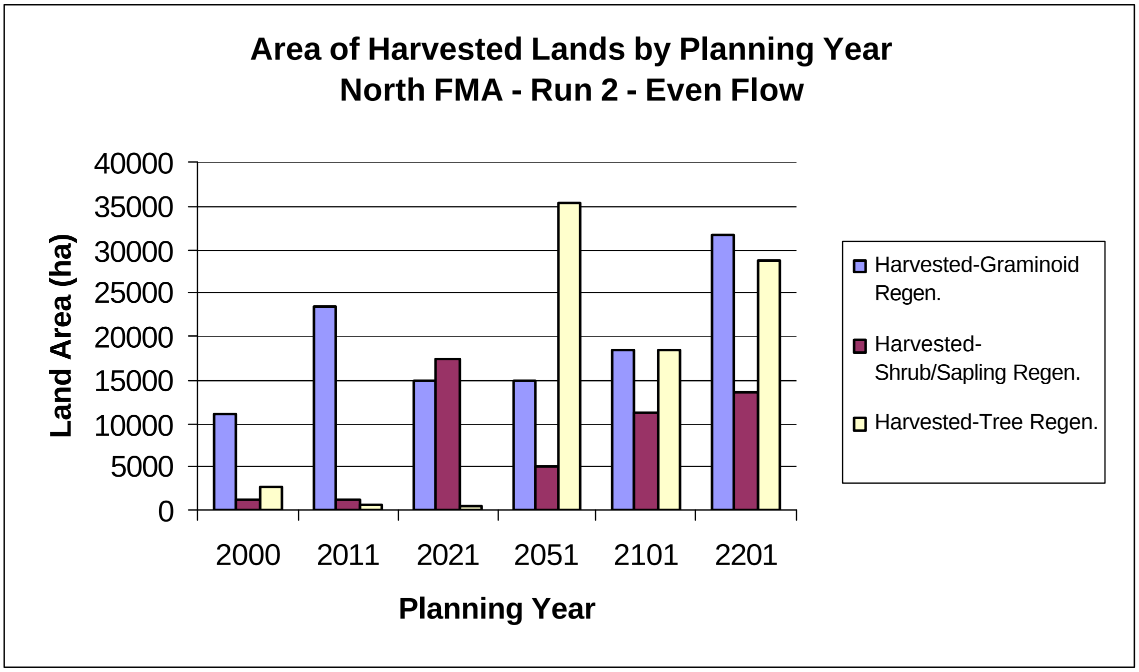

Spruce Mixed Forest Cover by Age and Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
21-50 years
51-110 years
>110 years

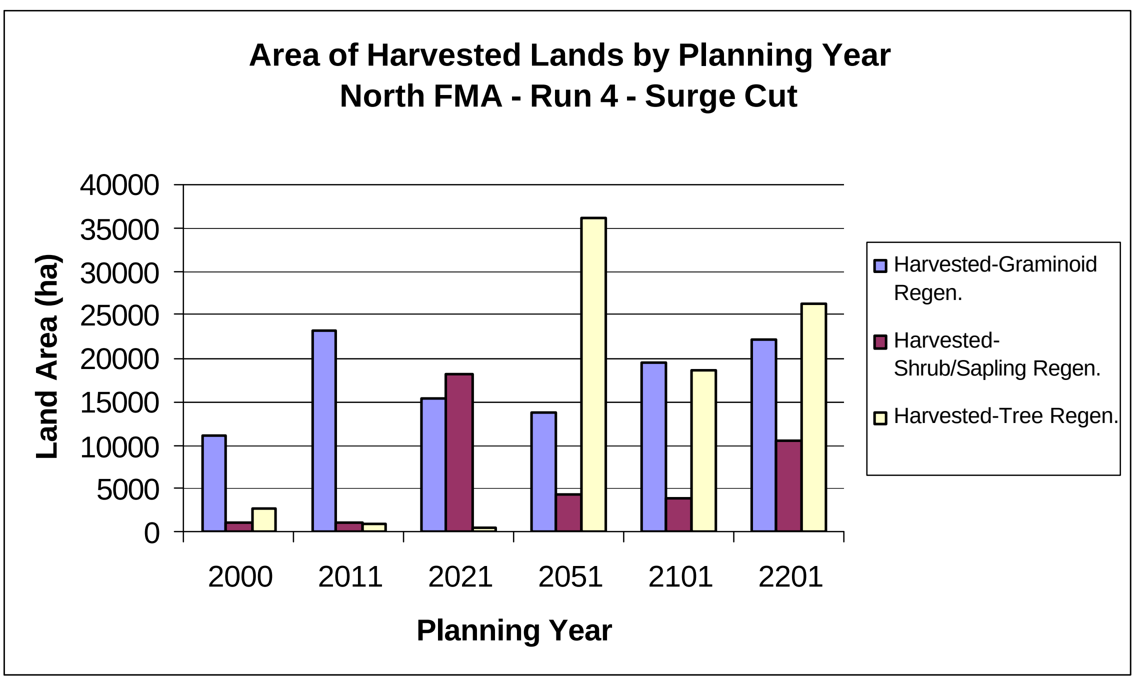

Lodgepole Pine Forest Cover by Age and Plannig Year
North FMA - Run 2 - Even Flow
Land Cover (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


Lodgepole Pine Forest Cover by Age and Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


White/Englemann Spruce Forest Cover by Age and Planning Year North FMA - Run 2 - Even Flow
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


White/Englemann Spruce Forest Cover by Age and Planning Year North FMA - Run 4 - Surge Cut
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
21-70 years
71-170 years
>170 years


Area of Harvested Lands by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
Harvested-Graminoid Regen.
Harvested-Shrub/Sapling Regen.
Harvested-Tree Regen.

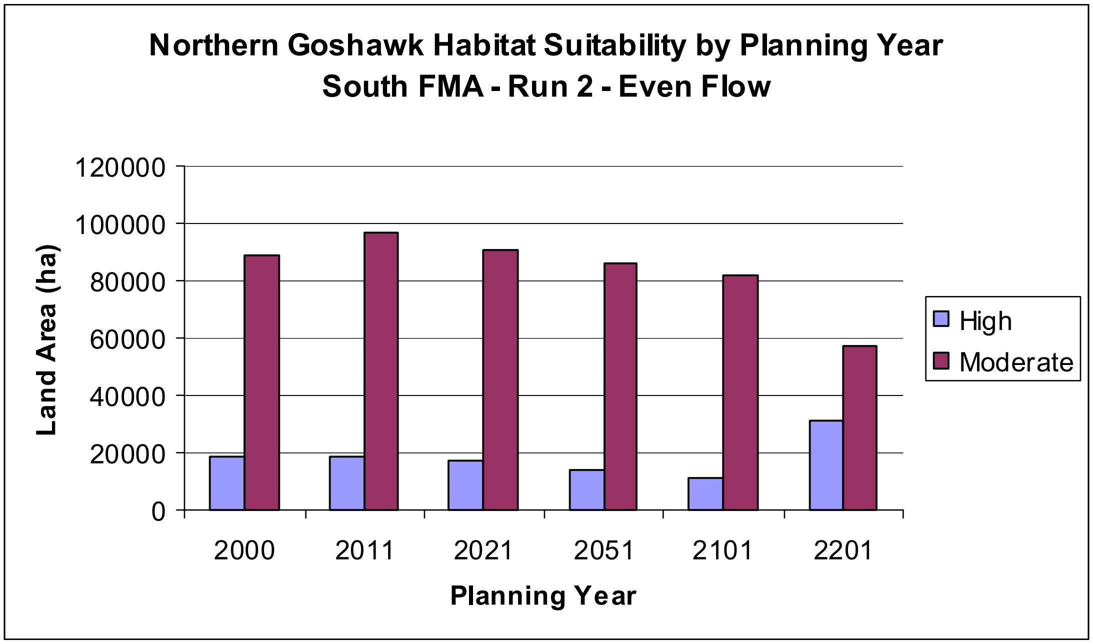

Area of Harvested Lands by Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
Harvested-Graminoid Regen.
Harvested-Shrub/Sapling Regen.
Harvested-Tree Regen.

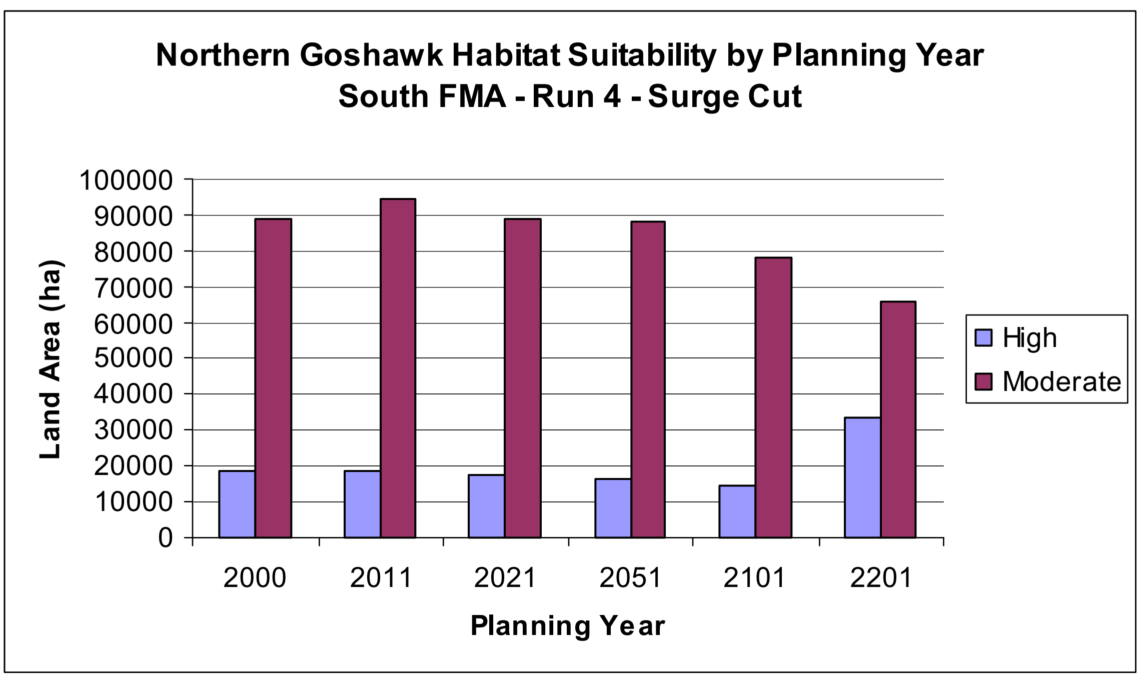
APPENDIX 4

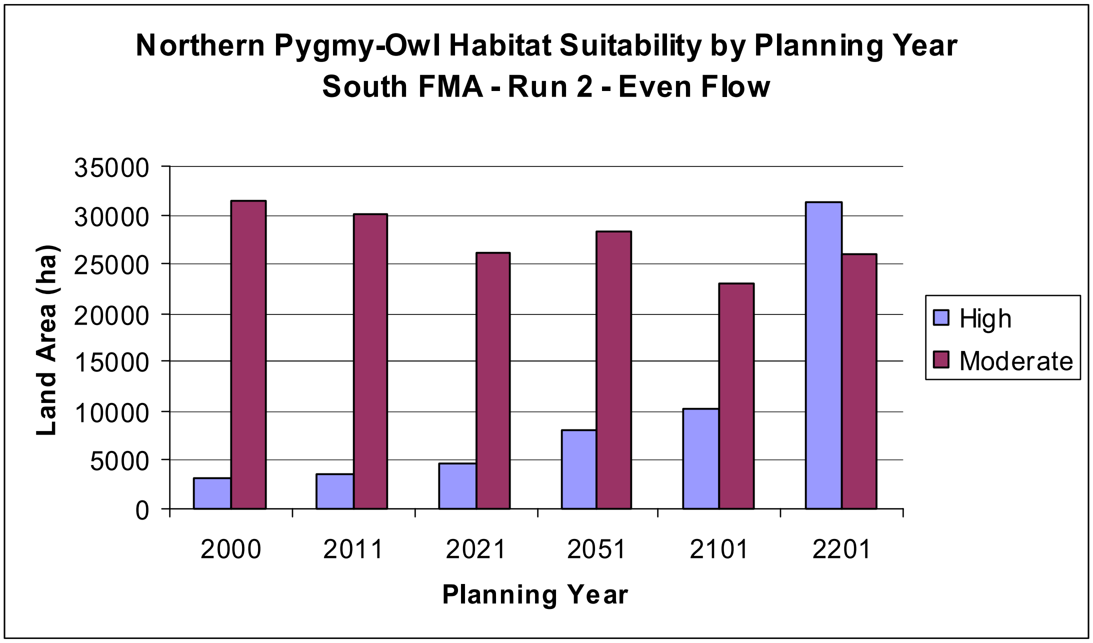
APPENDIX 5

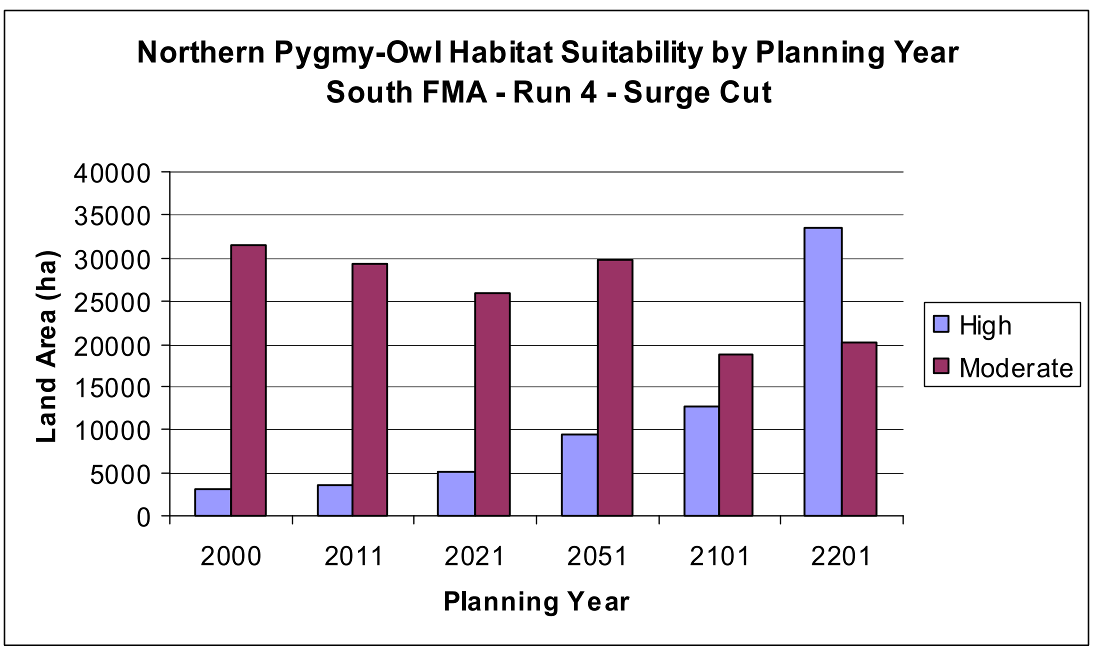
APPENDIX 6

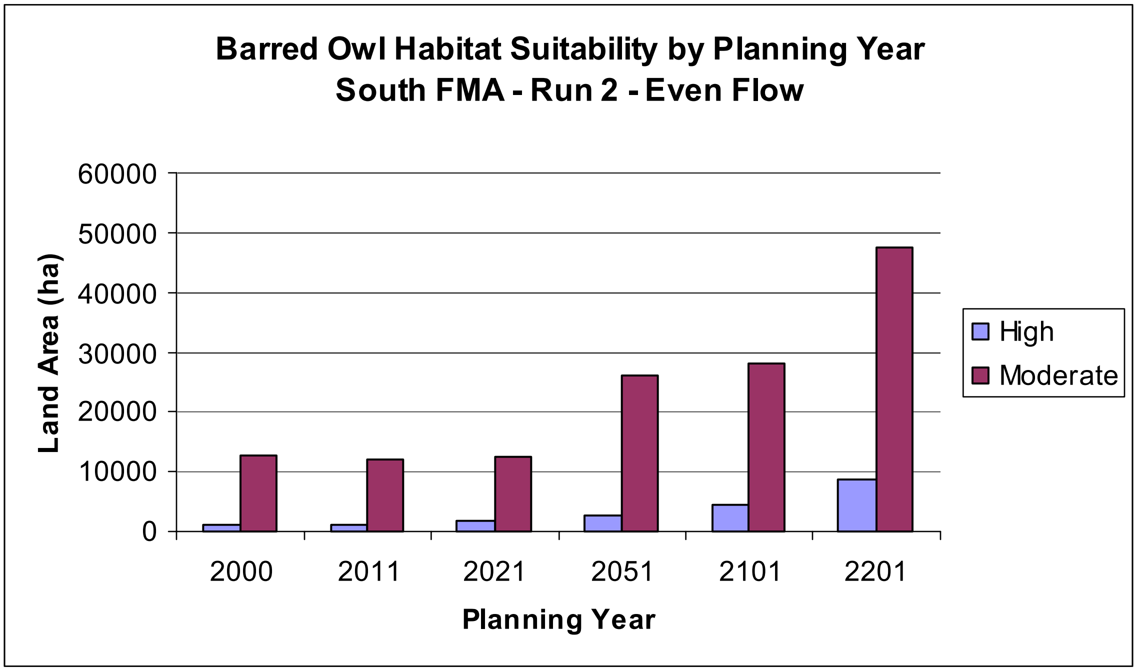
CHANGES IN WILDLIFE HABITAT SUITABILITY
FOR TWO TIMBER HARVEST SCENARIOS
-SOUTH PORTION OF SPRAY LAKE FMA-

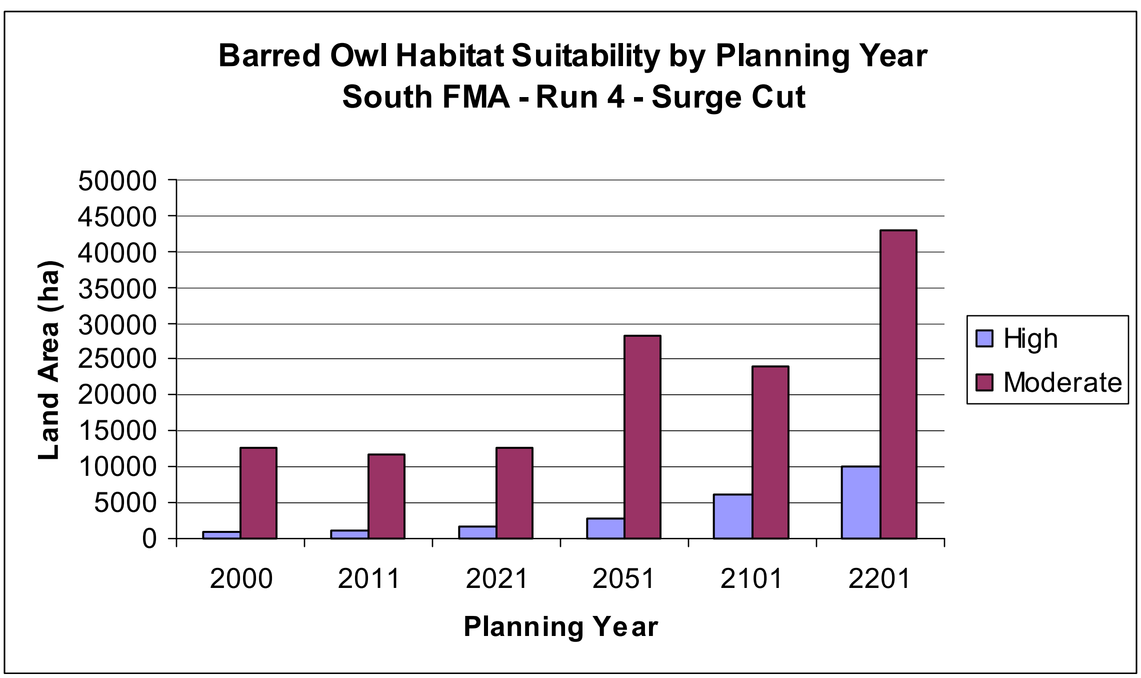

Northern Goshawk Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

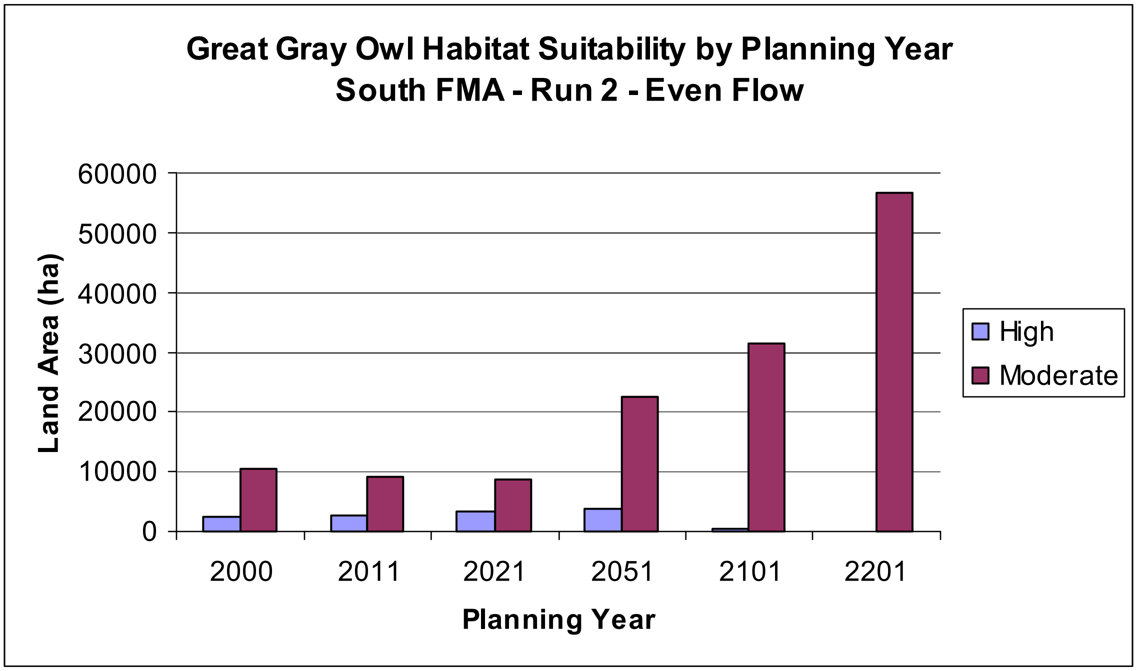

Northern Goshawk Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

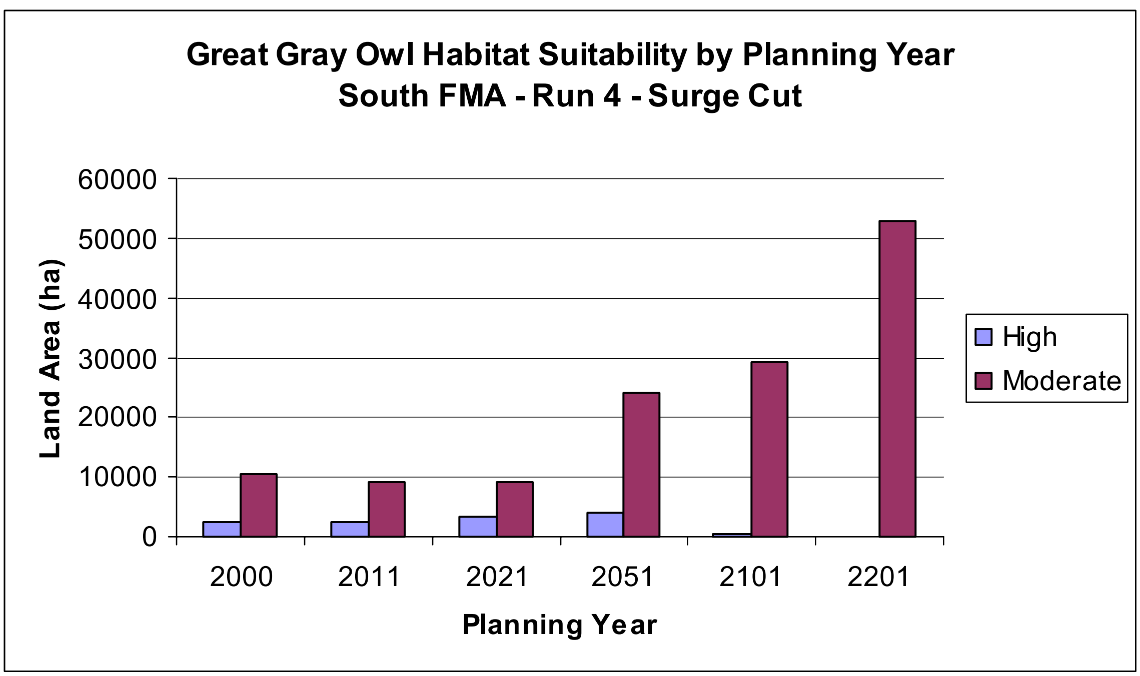

Northern Pygmy-Owl Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

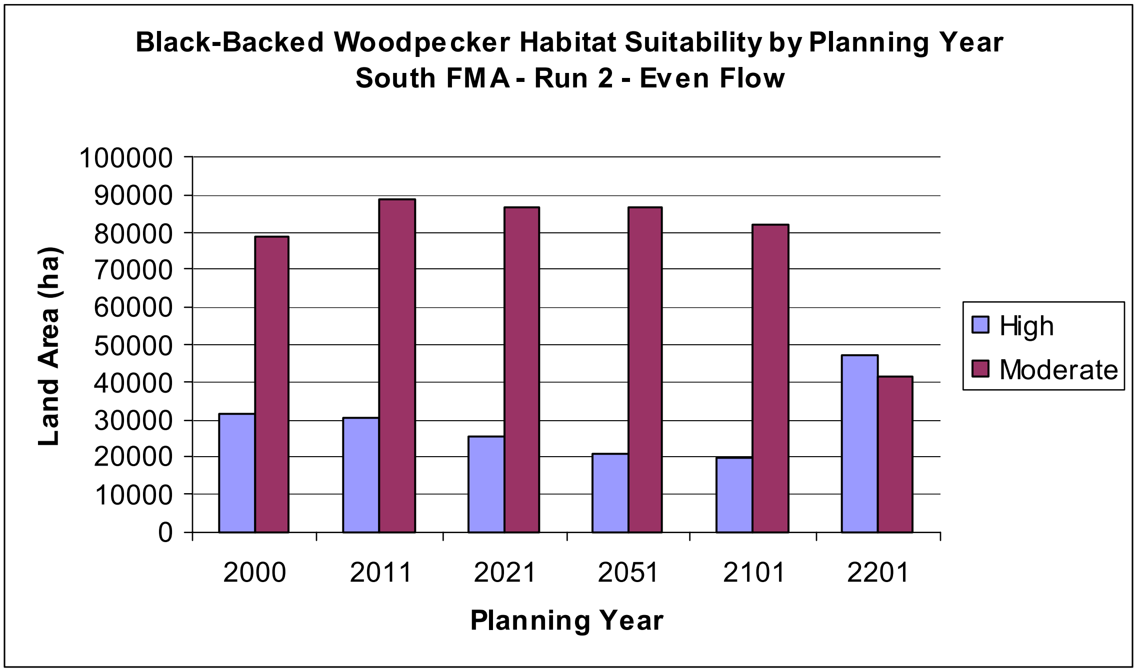

Northern Pygmy-Owl Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

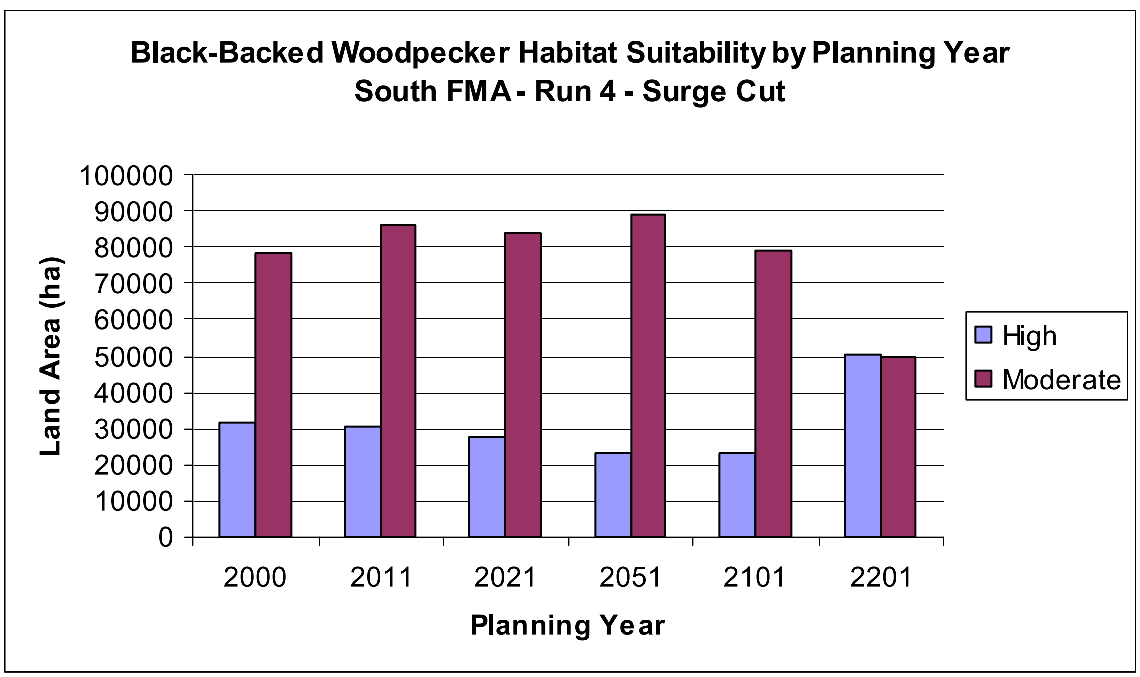

Barred Owl Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

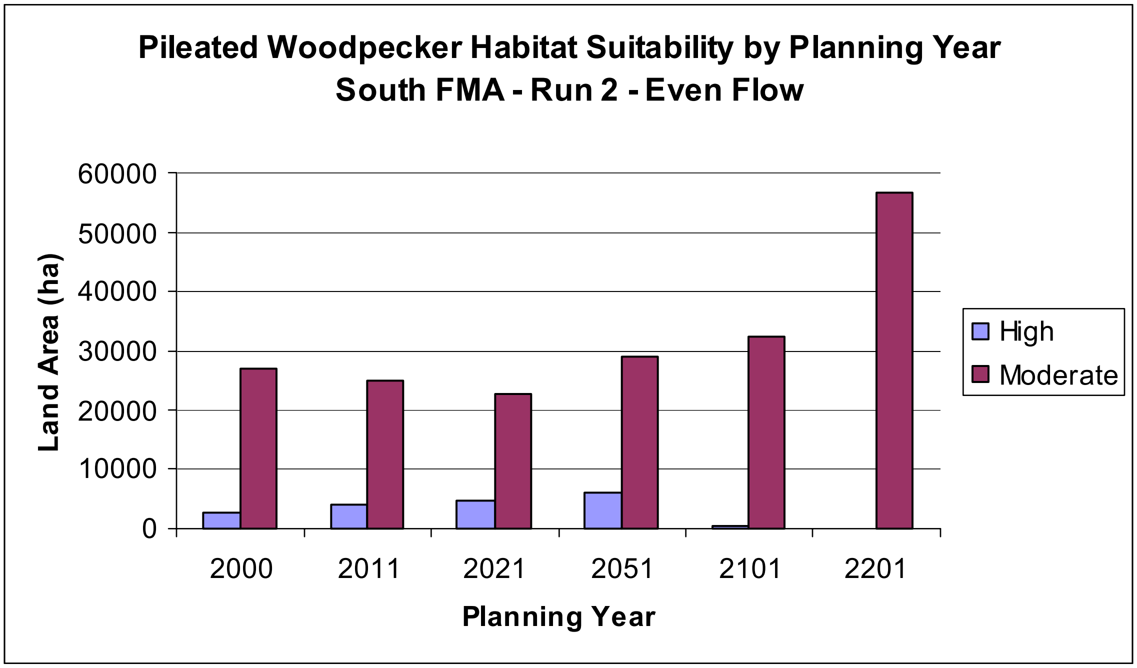

Barred Owl Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

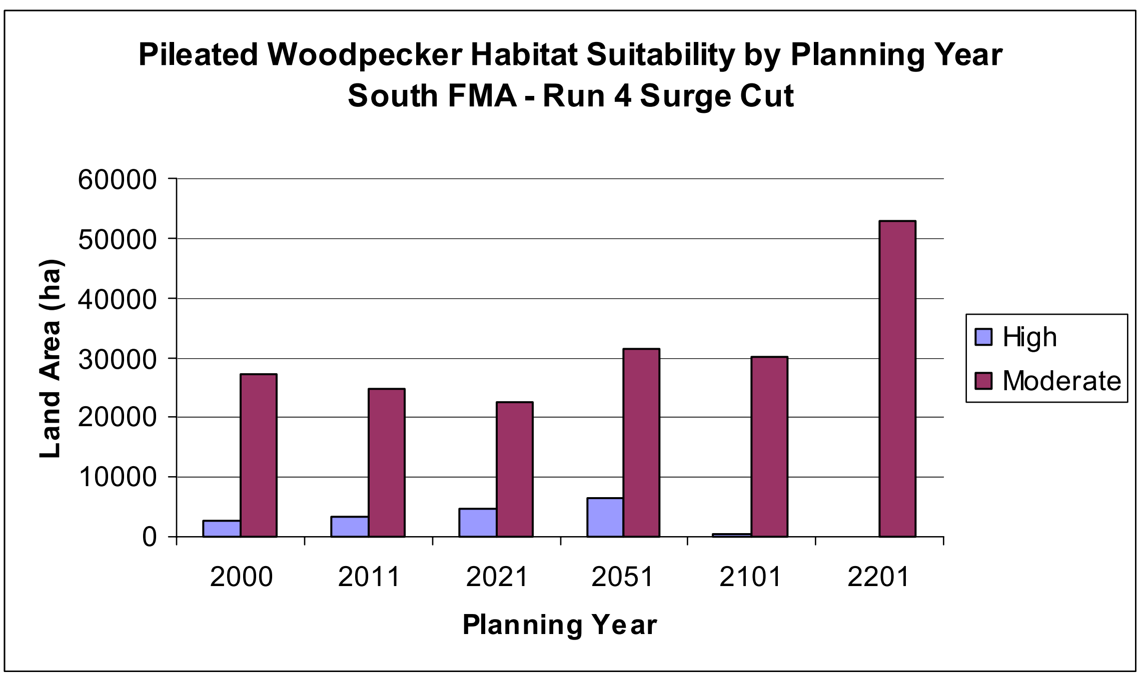

Great Gray Owl Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

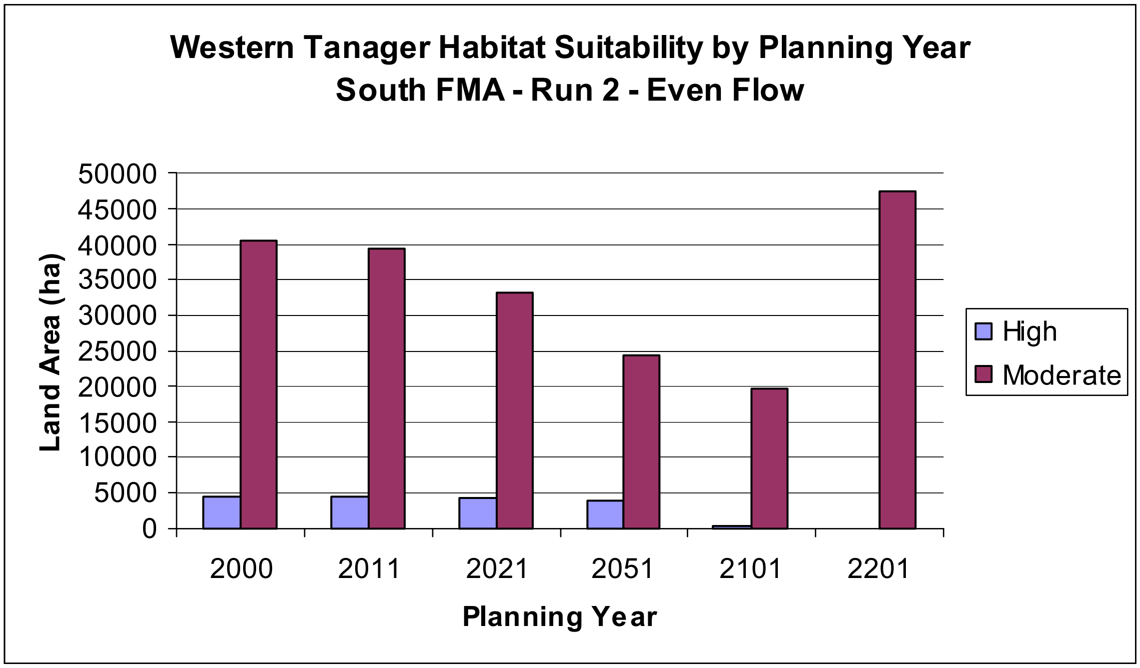

Great Gray Owl Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

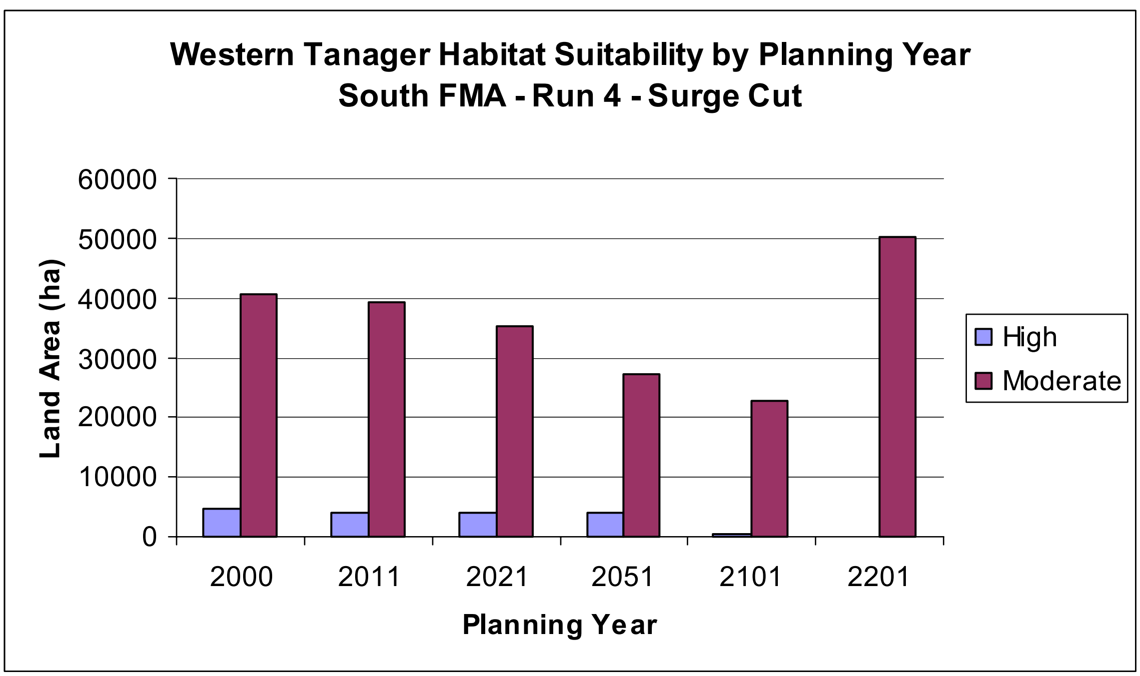

Black-Backed Woodpecker Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

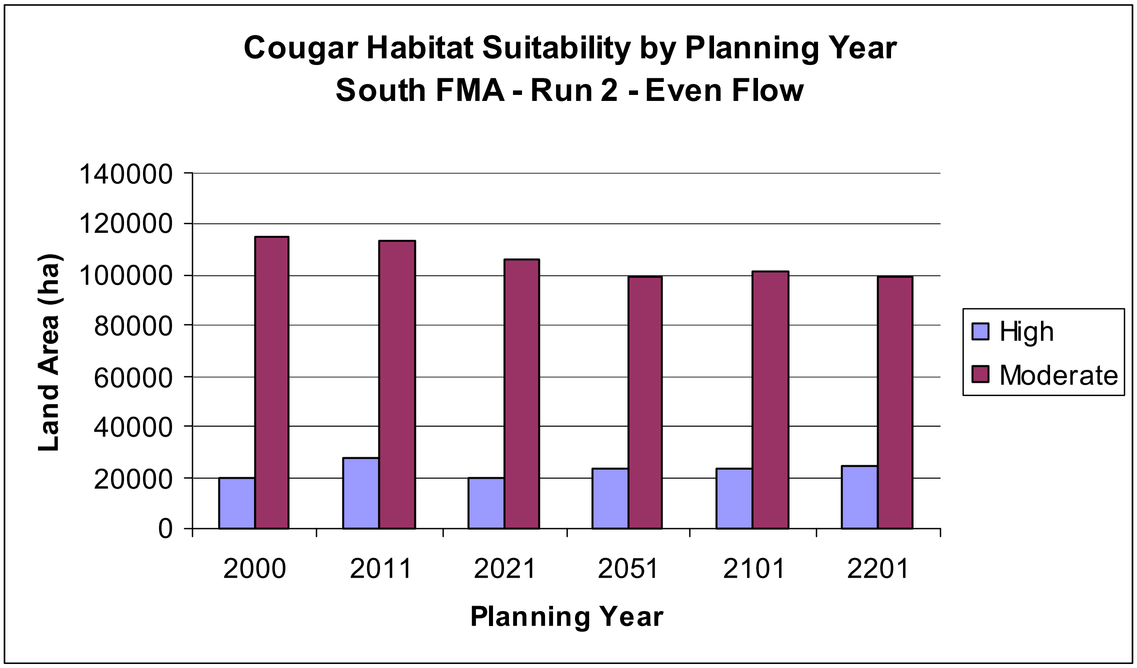

Black-Backed Woodpecker Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Pileated Woodpecker Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

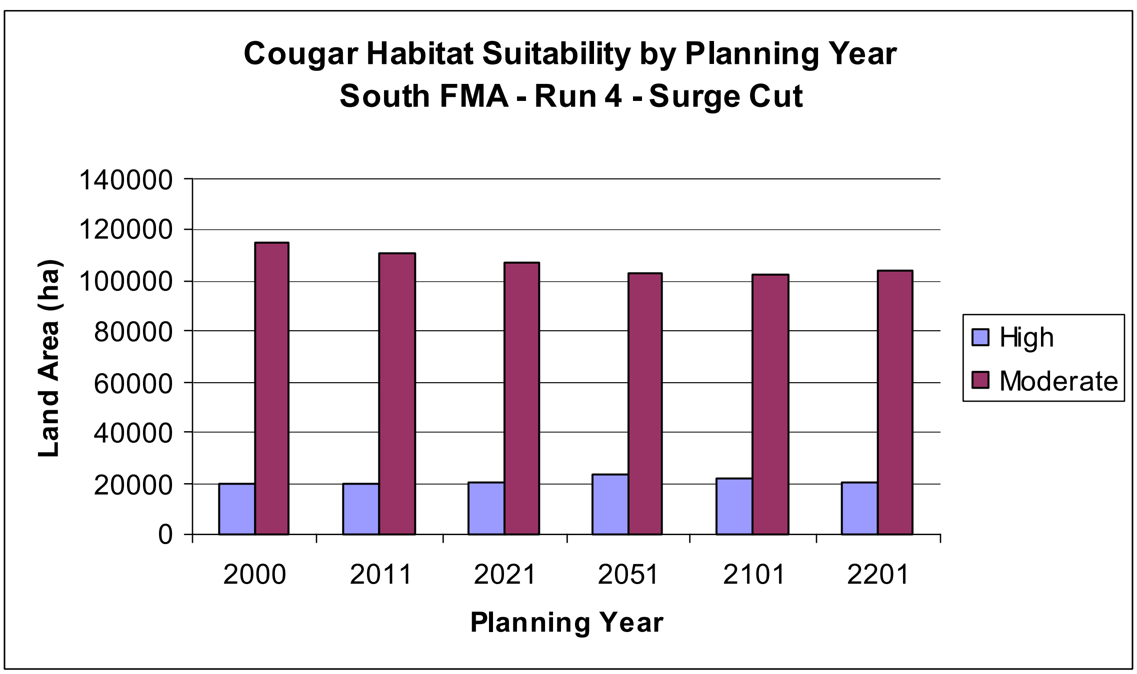

Pileated Woodpecker Habitat Suitability by Planning Year
South FMA - Run 4 Surge Cut
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Western Tanager Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

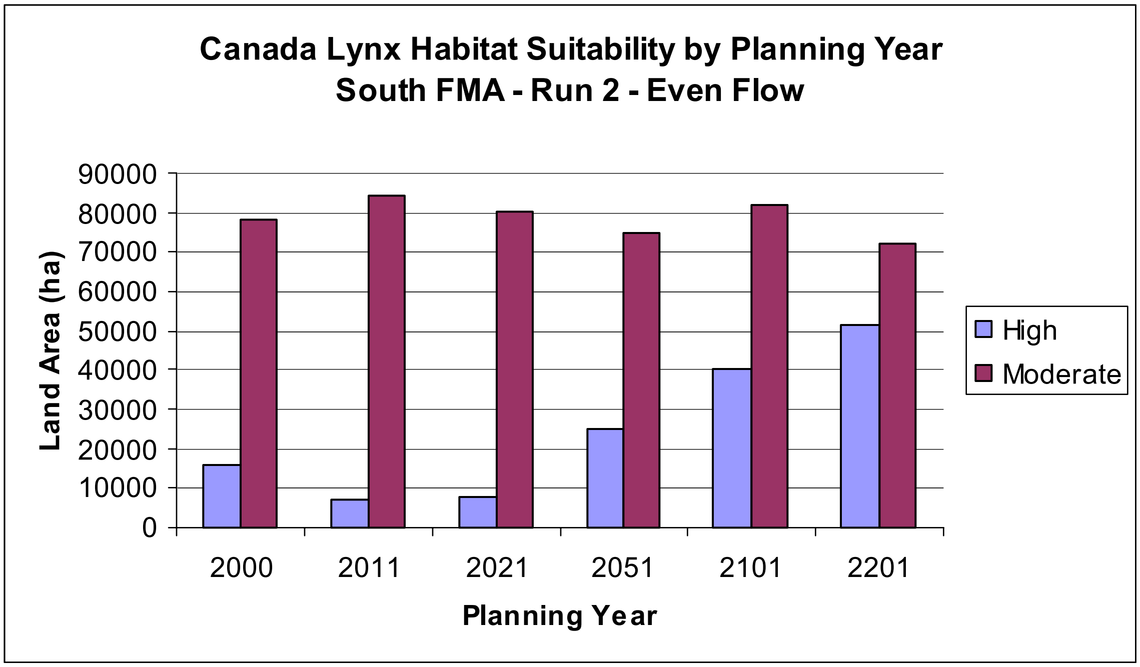

Western Tanager Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

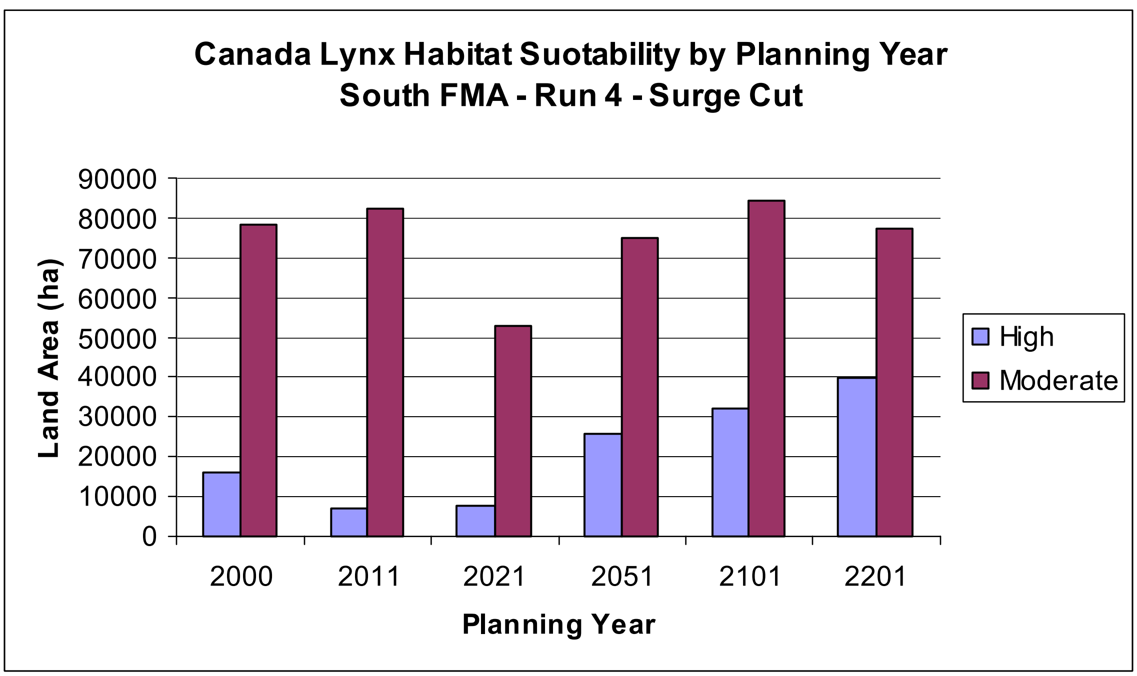


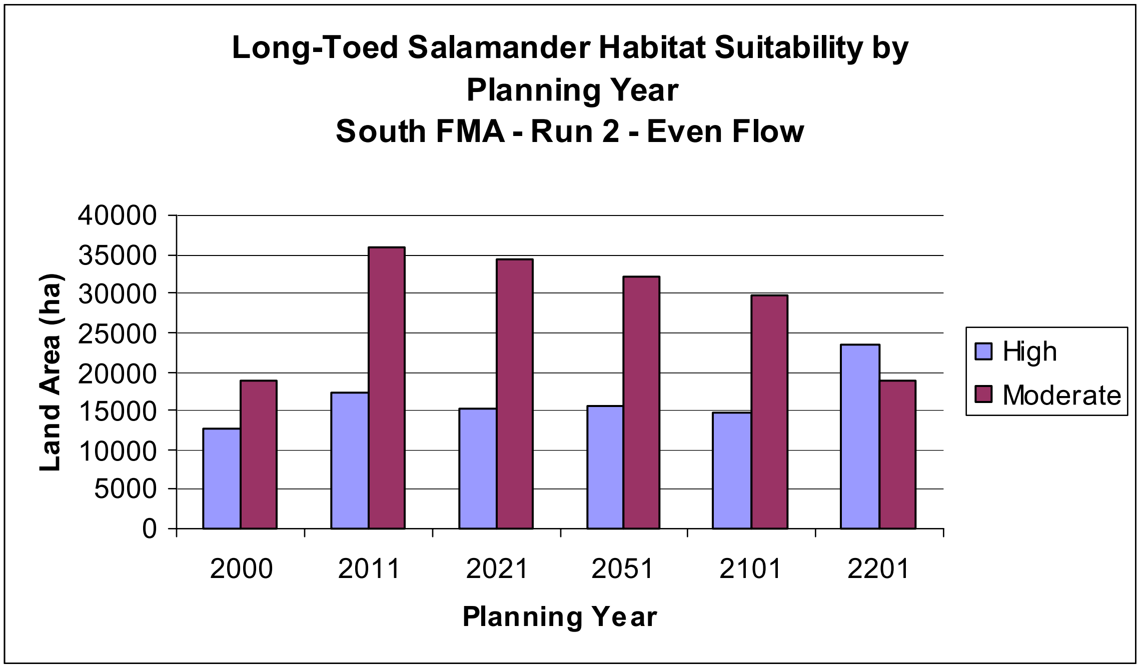
Cougar Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

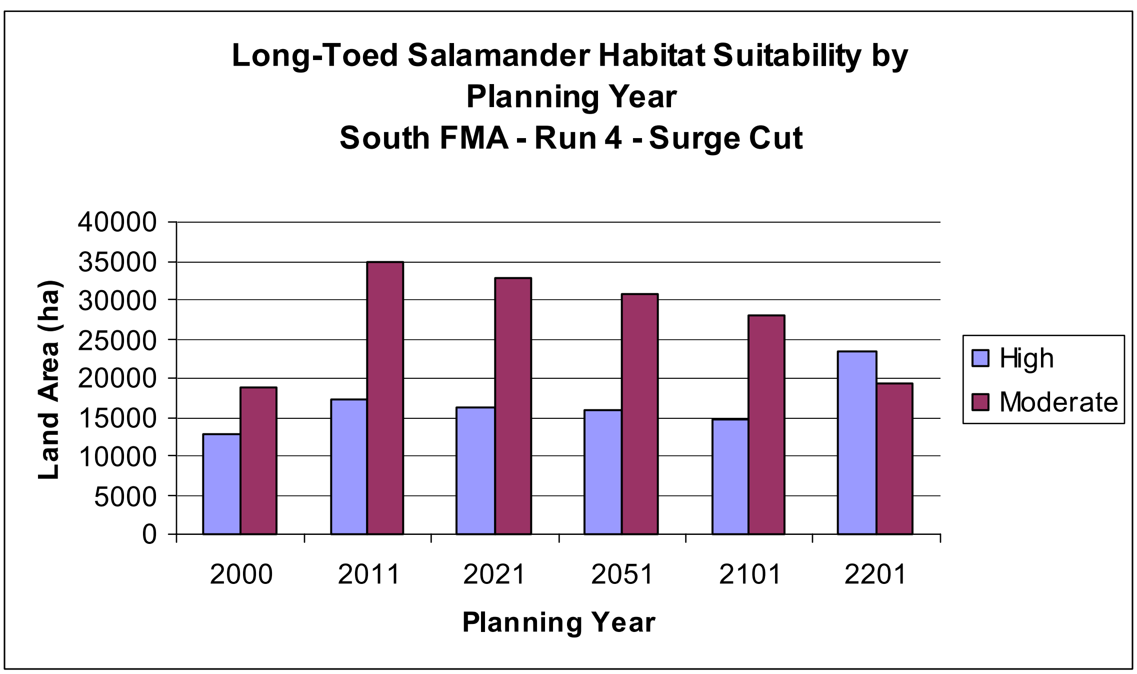


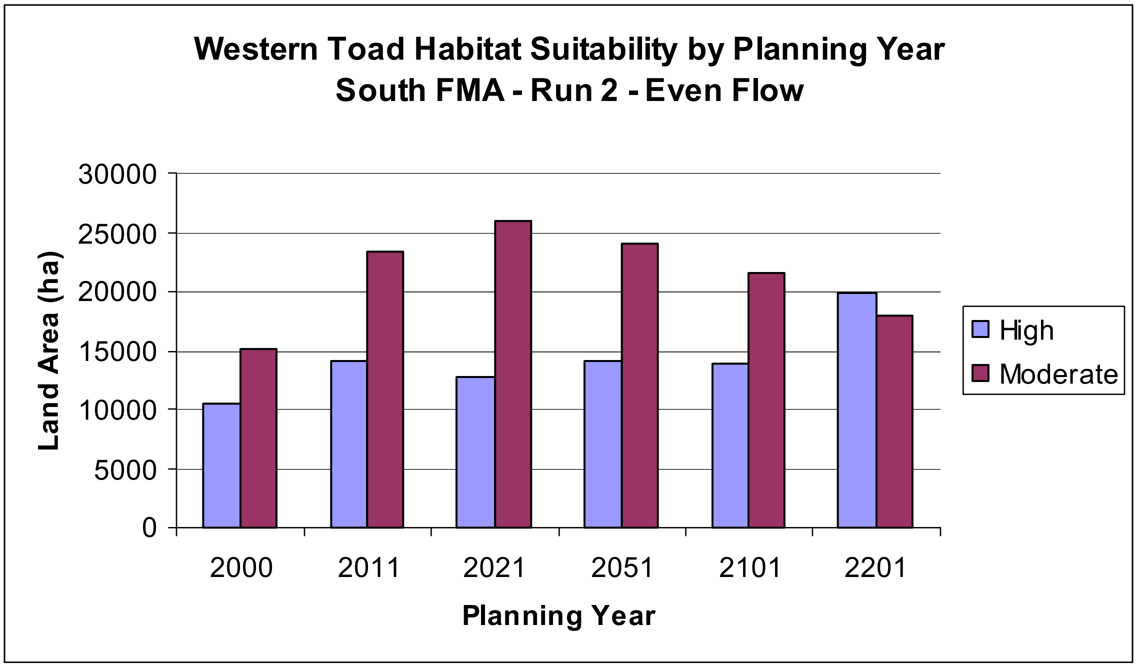
Cougar Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

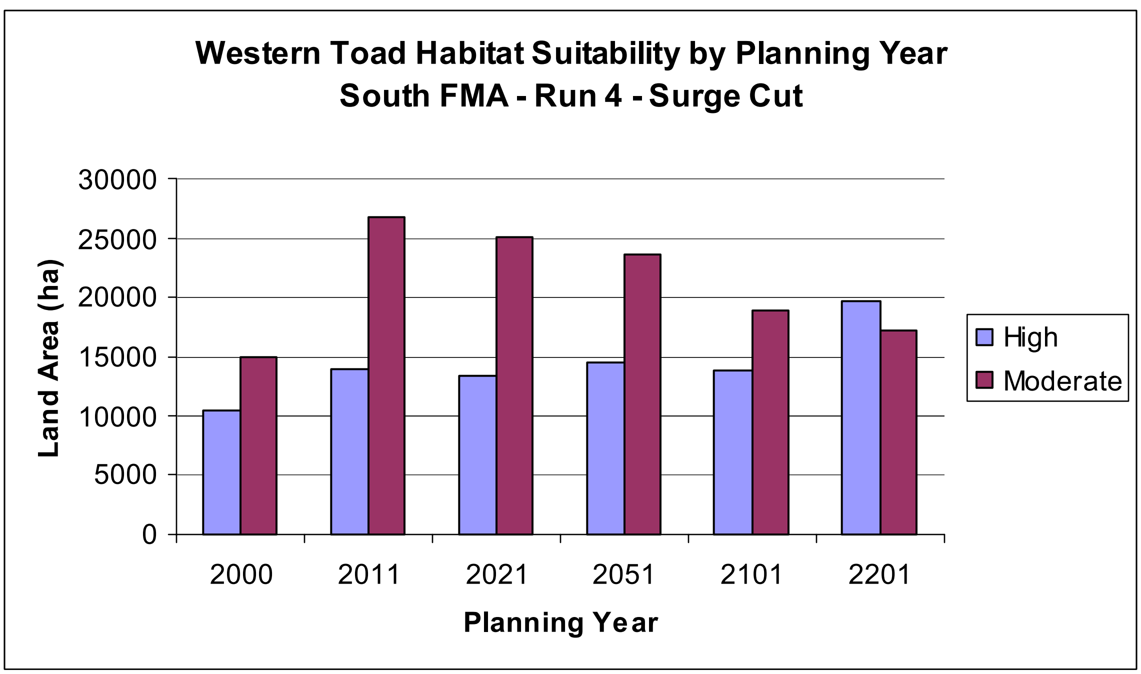

Canada Lynx Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

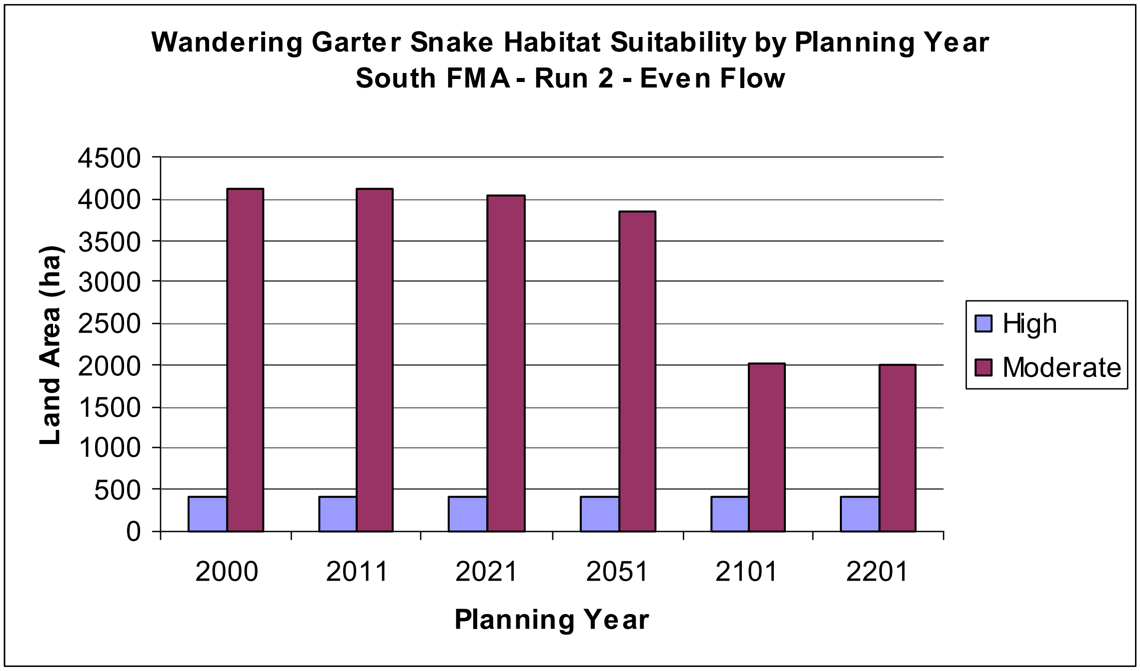

Canada Lynx Habitat Suotability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

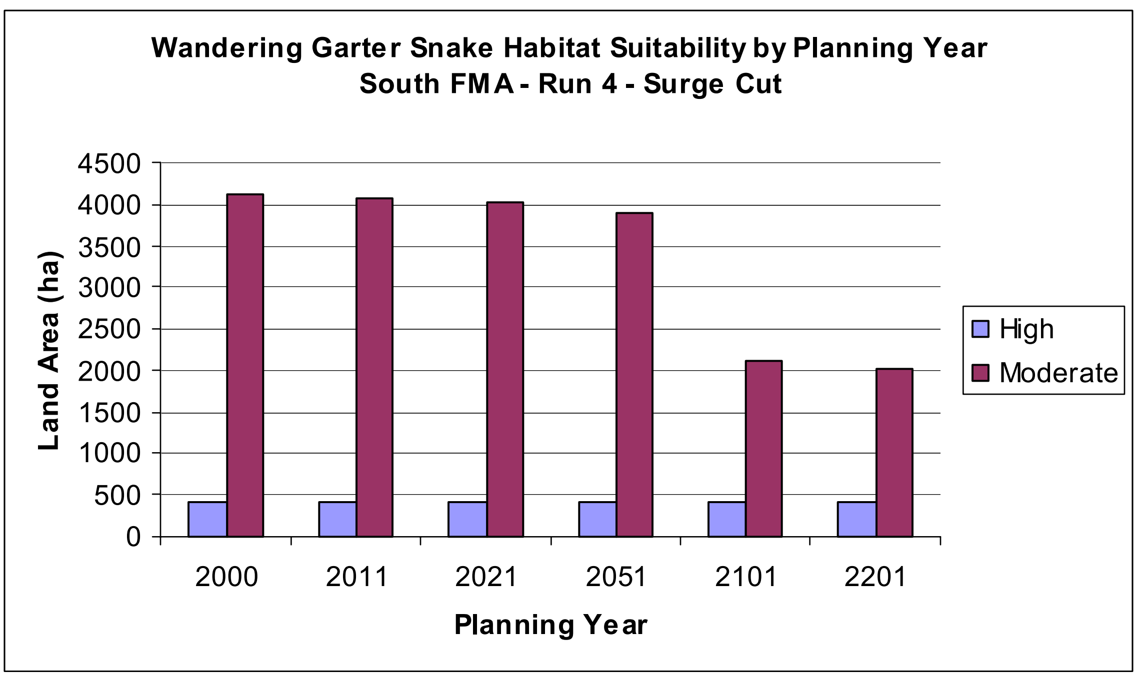

Long-Toed Salamander Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

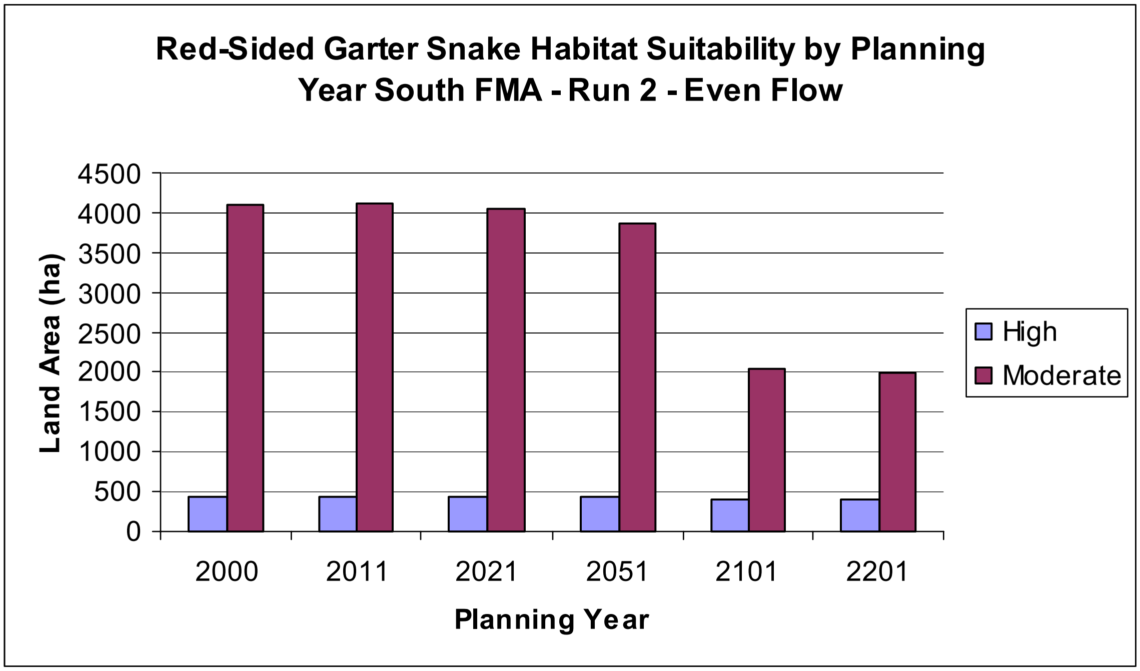

Long-Toed Salamander Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

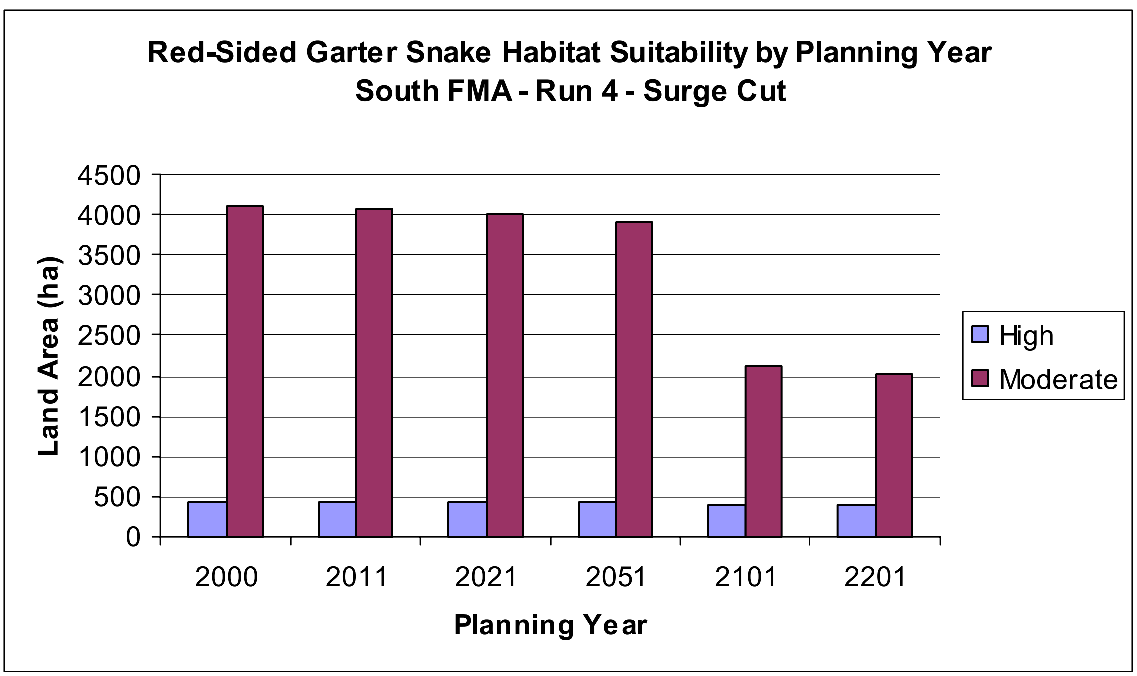

Western Toad Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

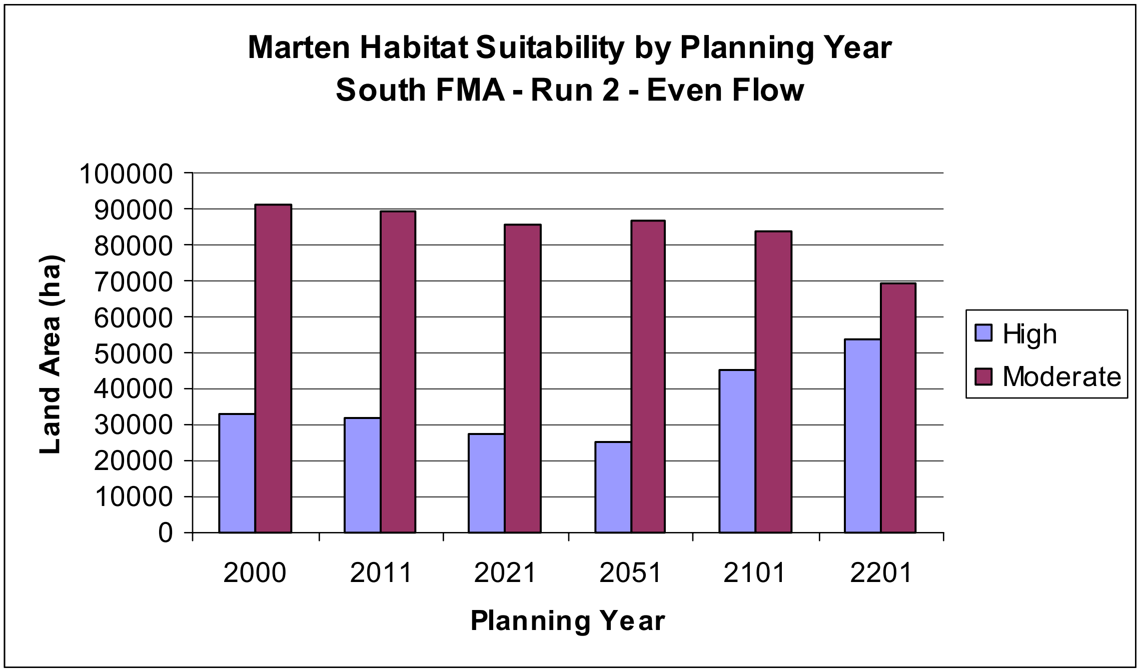

Western Toad Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

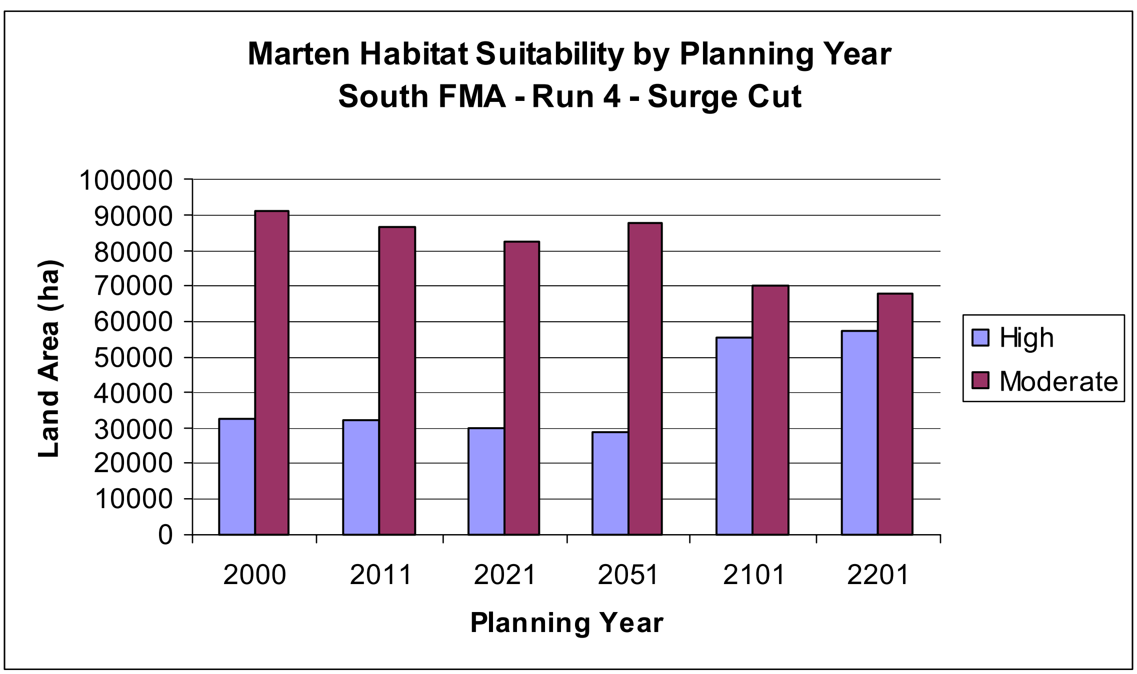

Wandering Garter Snake Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

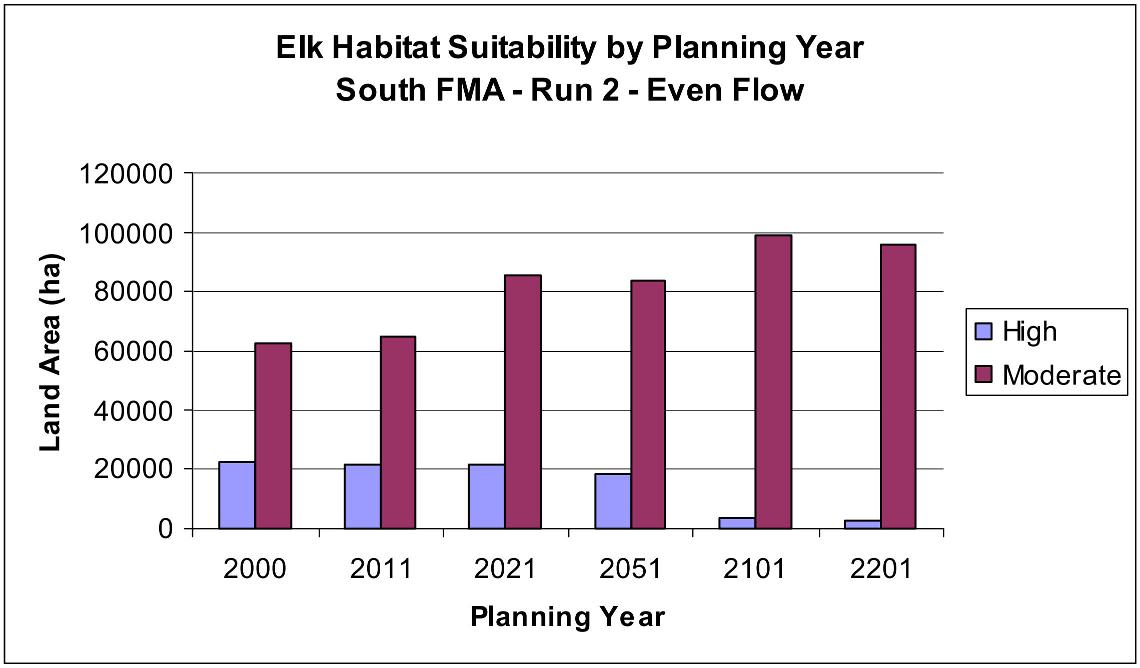

Wandering Garter Snake Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

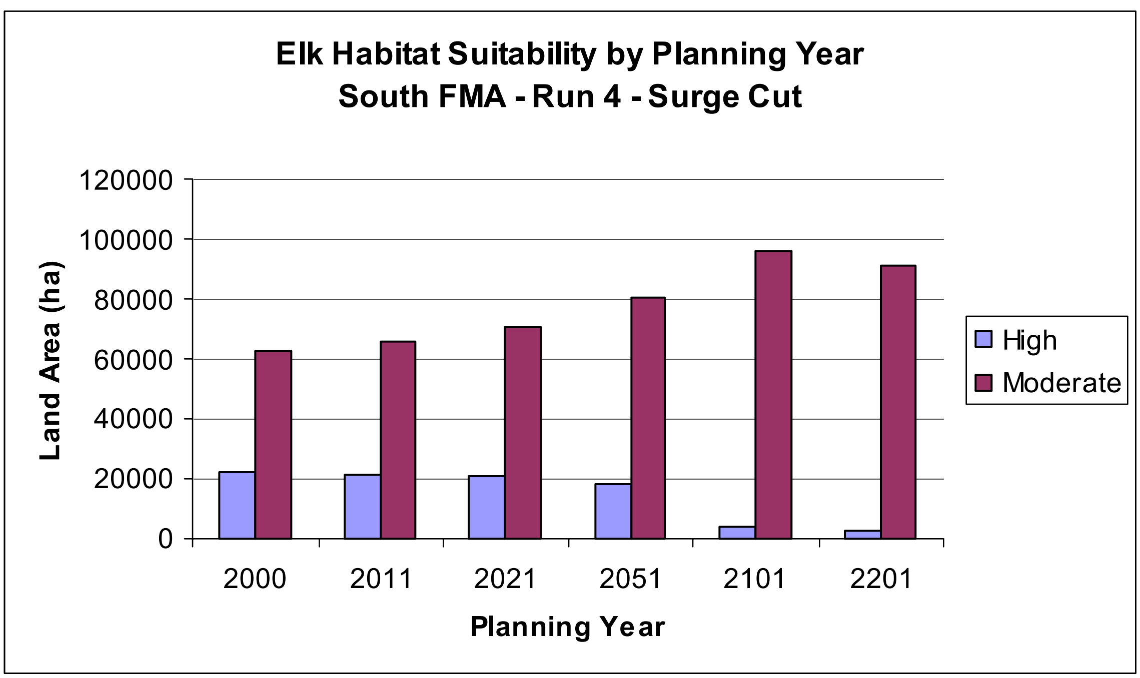

Red-Sided Garter Snake Habitat Suitability by Planning Year South FMA - Run 2 - Even Flow
Land Area (ha)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

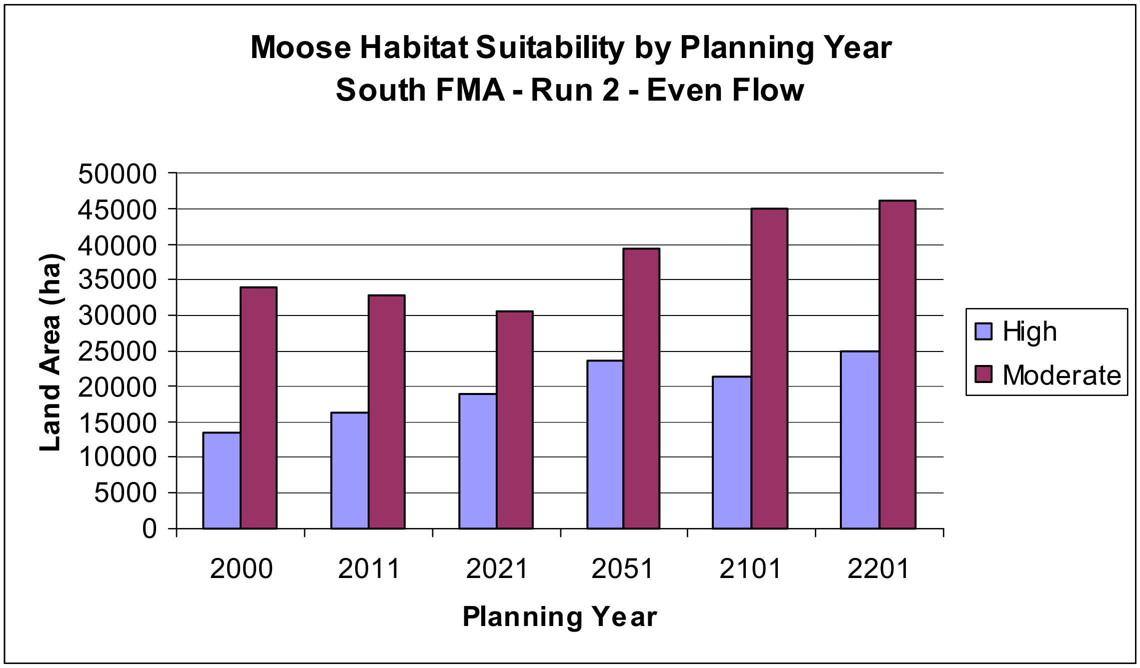

Red-Sided Garter Snake Habitat Suitability by Planning Year South FMA - Run 4 - Surge Cut
Land Area (ha)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

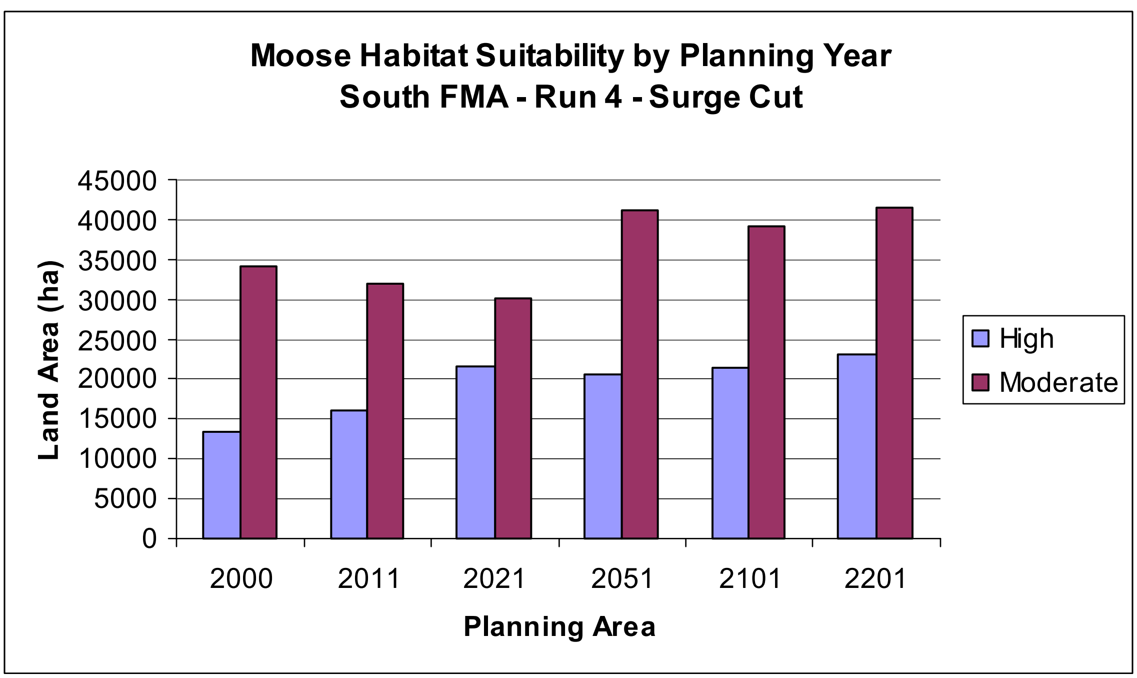

Marten Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Marten Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Elk Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Elk Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Moose Habitat Suitability by Planning Year
South FMA - Run 2 - Even Flow
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Moose Habitat Suitability by Planning Year
South FMA - Run 4 - Surge Cut
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Area
High
Moderate

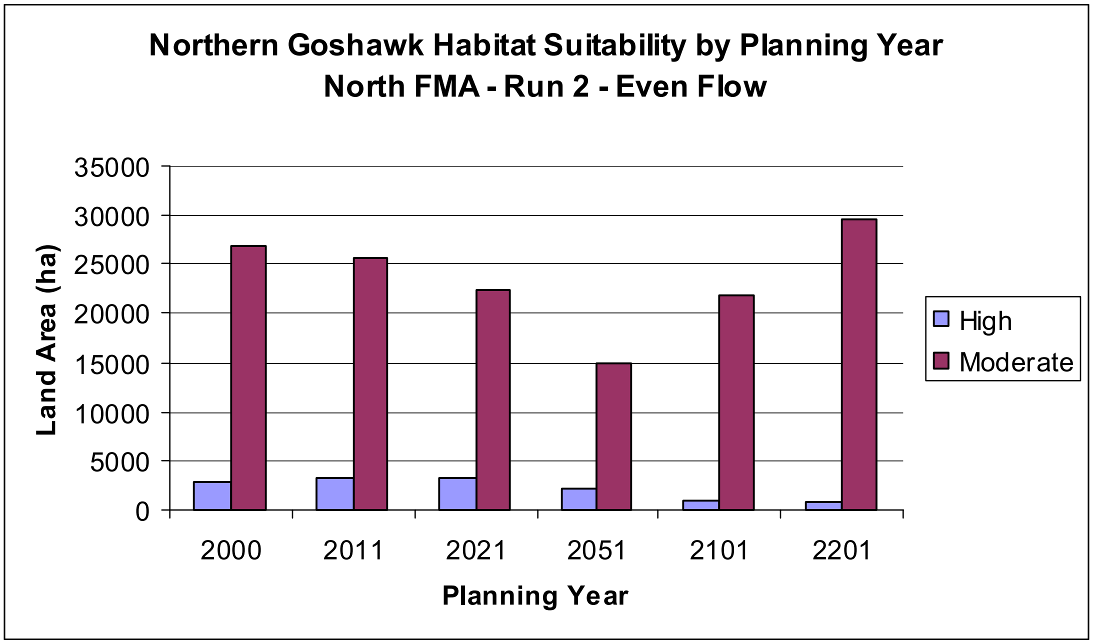
APPENDIX 7

CHANGES IN WILDLIFE HABITAT SUITABILITY FOR TWO TIMBER HARVEST SCENARIOS -SOUTH PORTION OF SPRAY LAKE FMA-

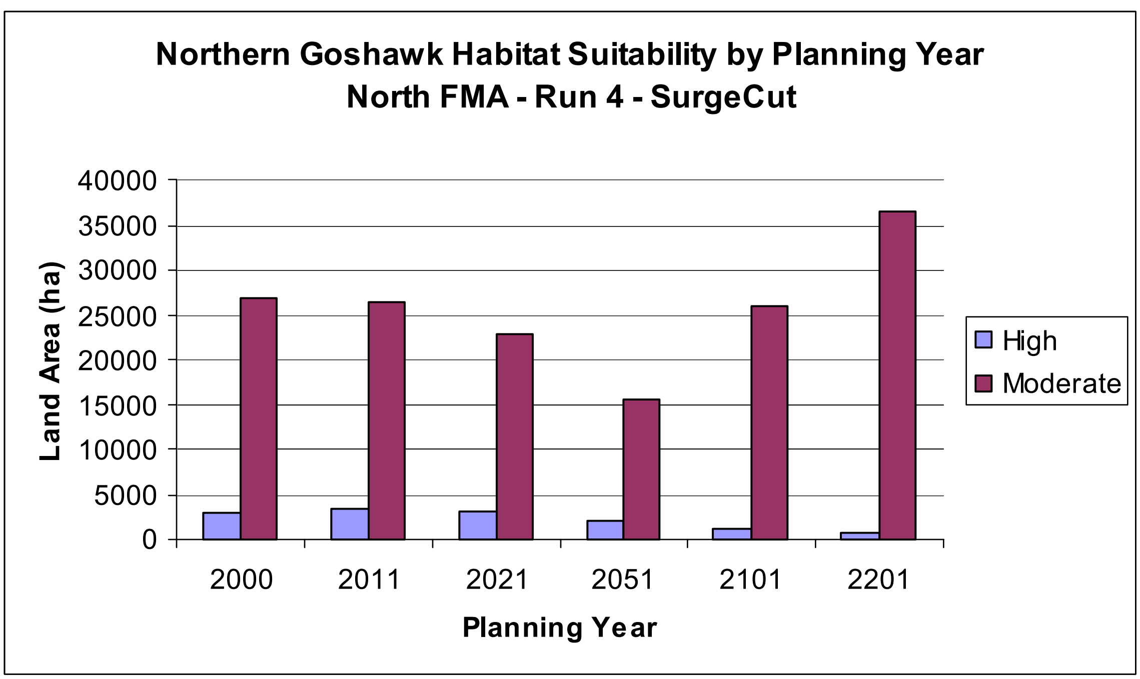
Maps Archived

Appendix 8

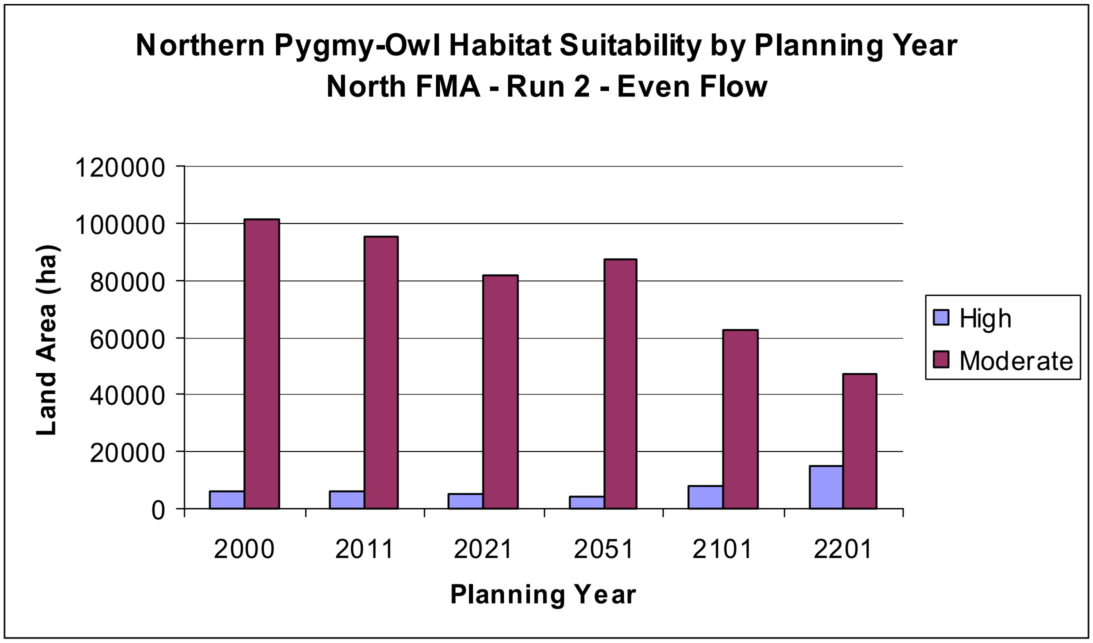
CHANGES IN WILDLIFE HABITAT SUITABILITY FOR TWO TIMBER HARVEST SCENARIOS -NORTH PORTION OF SPRAY LAKE FMA-

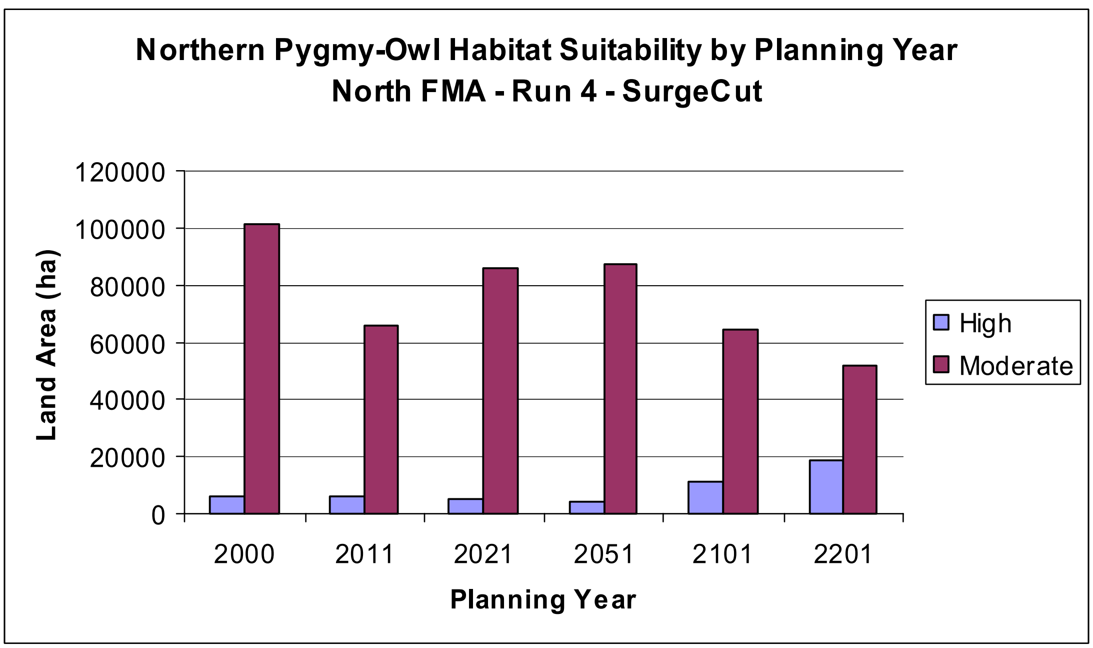


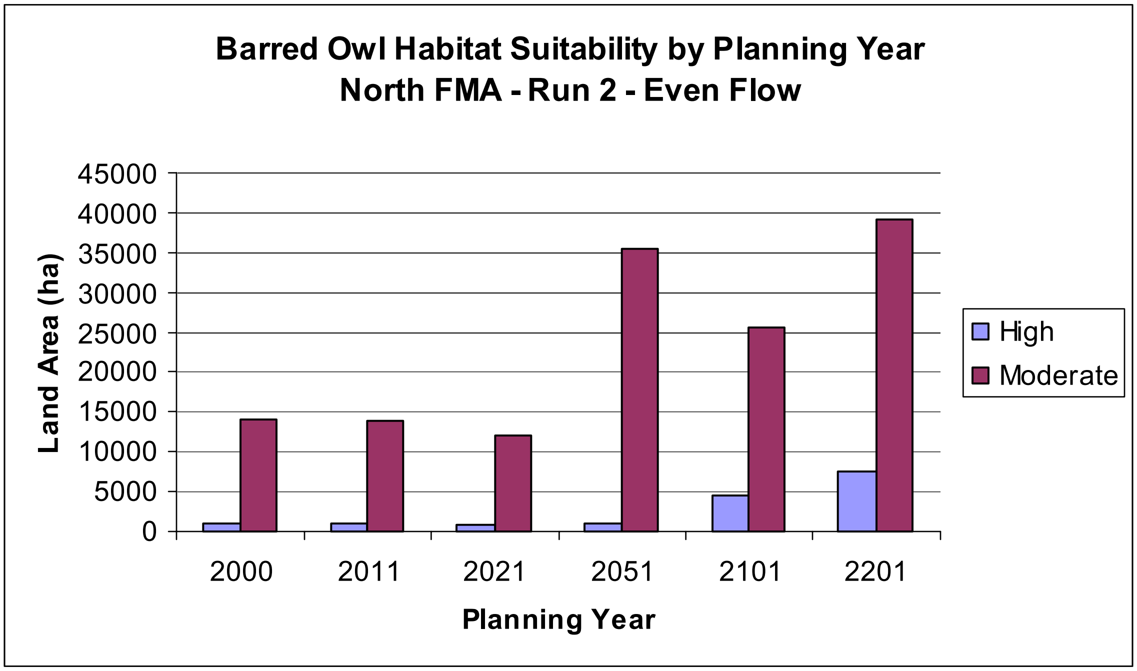
Northern Goshawk Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

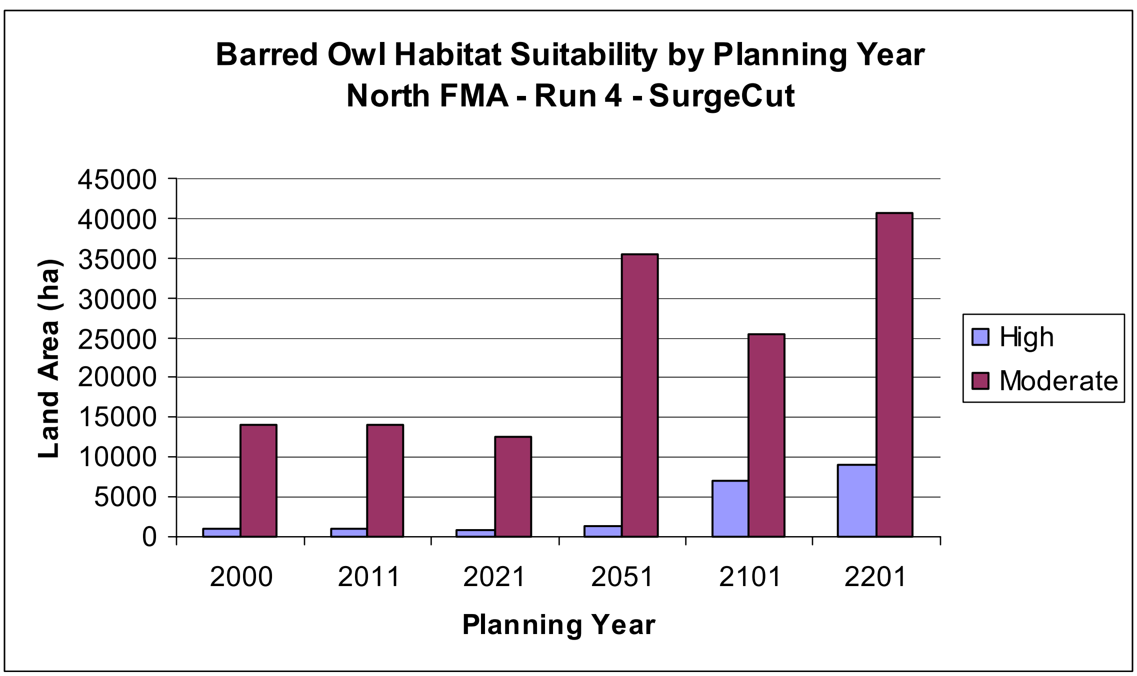


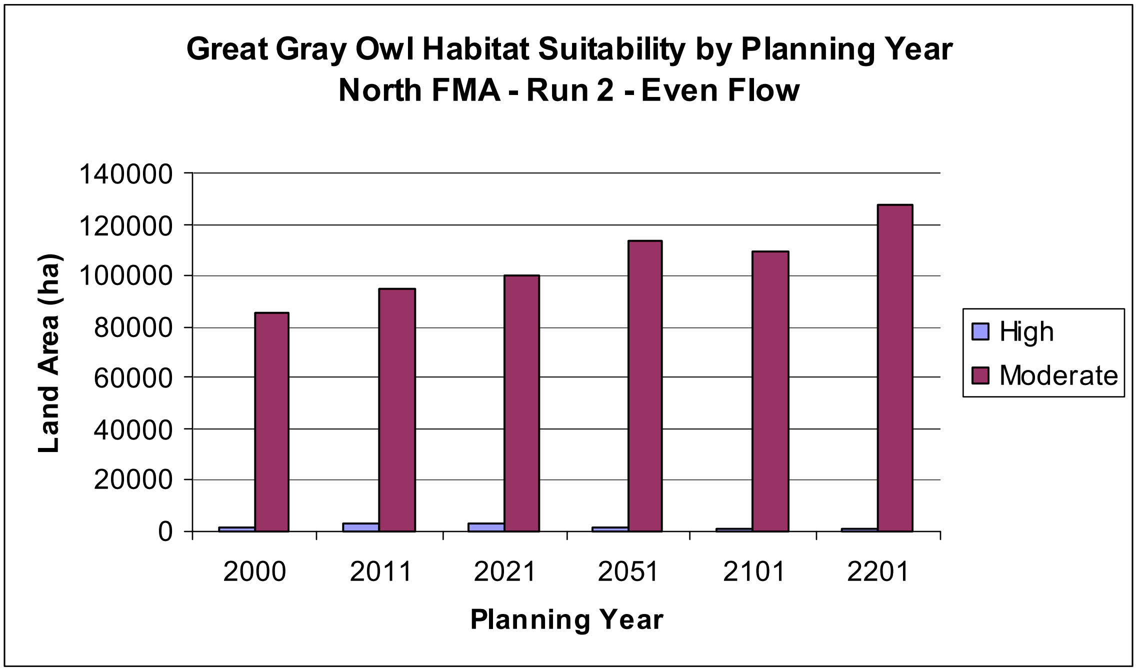
Northern Goshawk Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

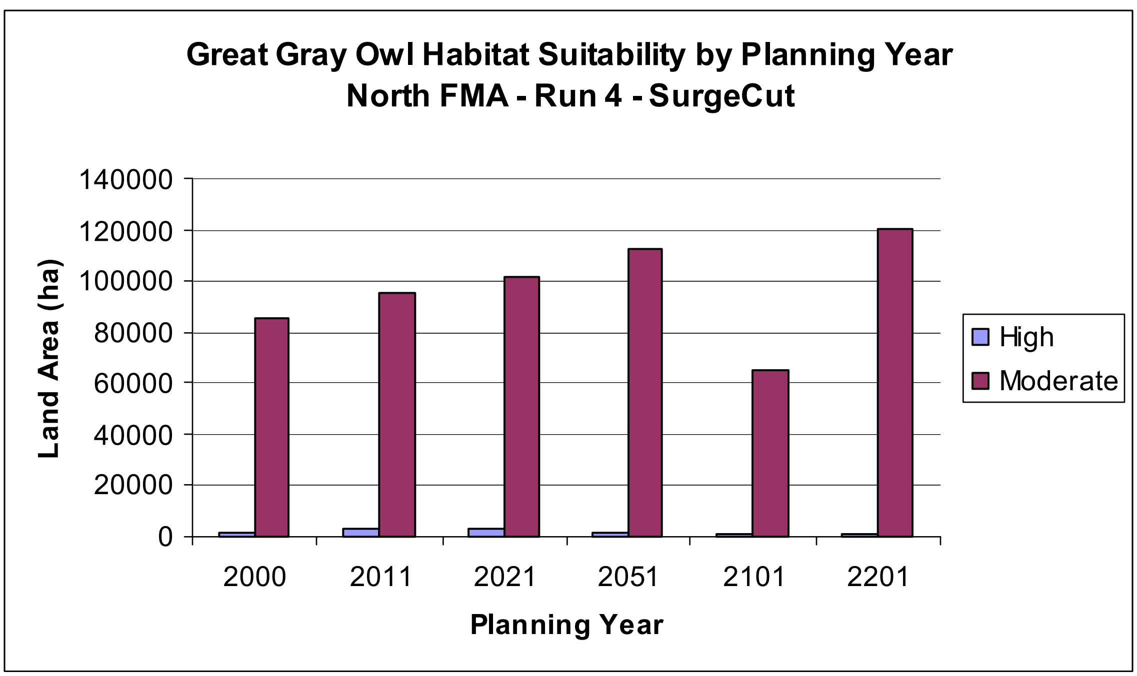

Northern Pygmy-Owl Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

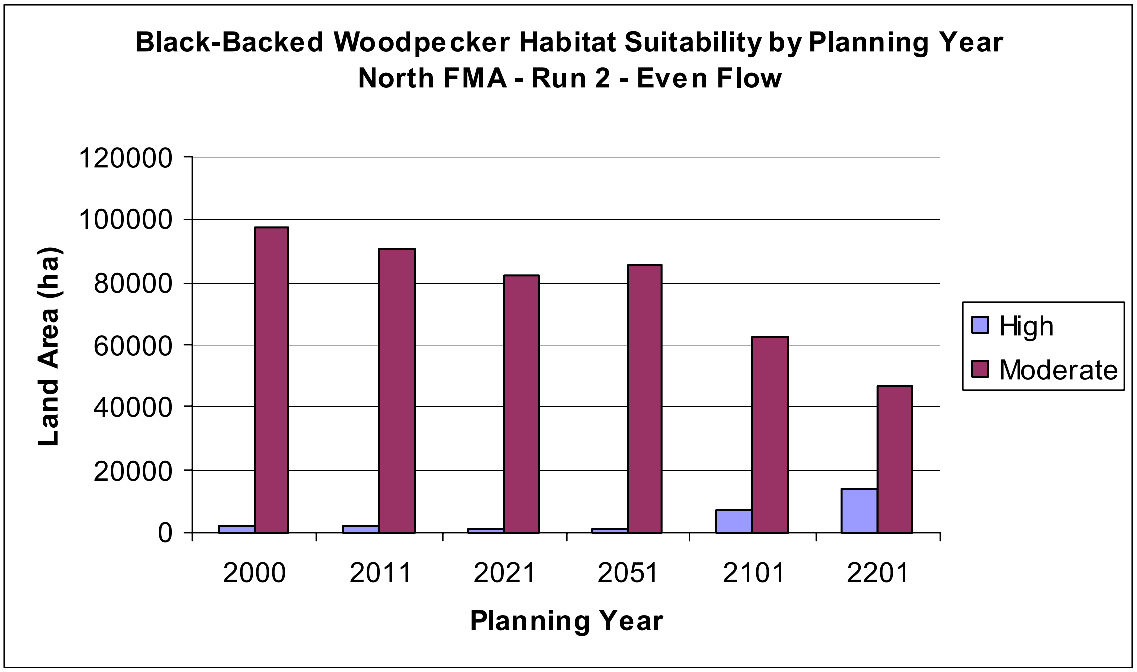

Northern Pygmy-Owl Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

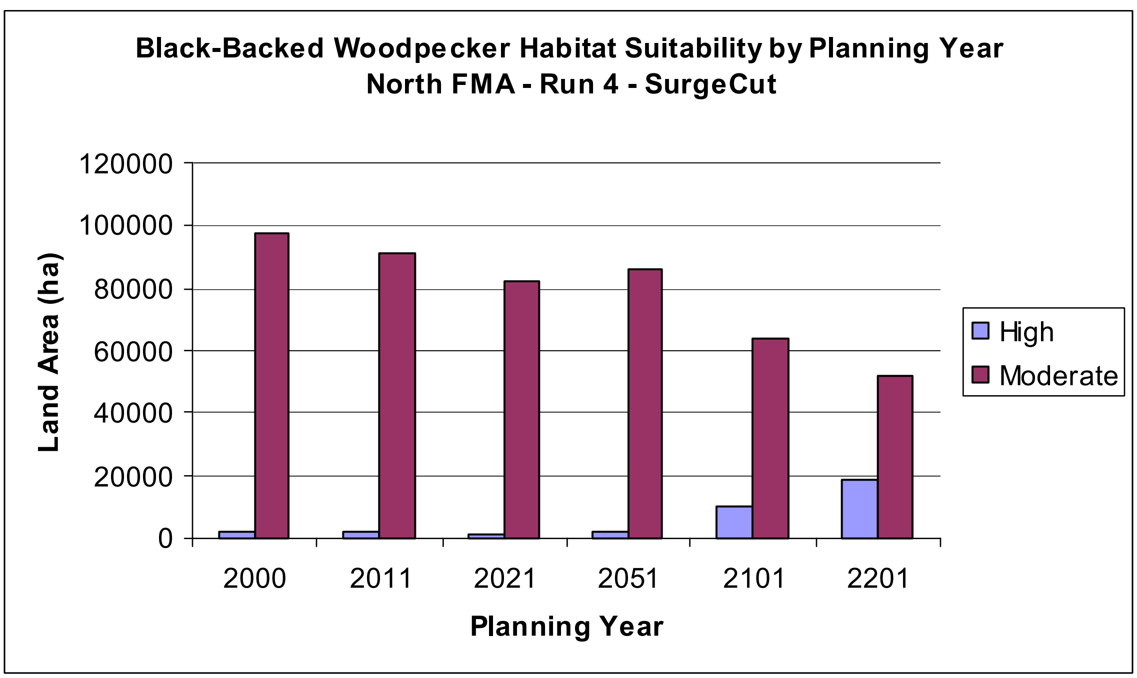

Barred Owl Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

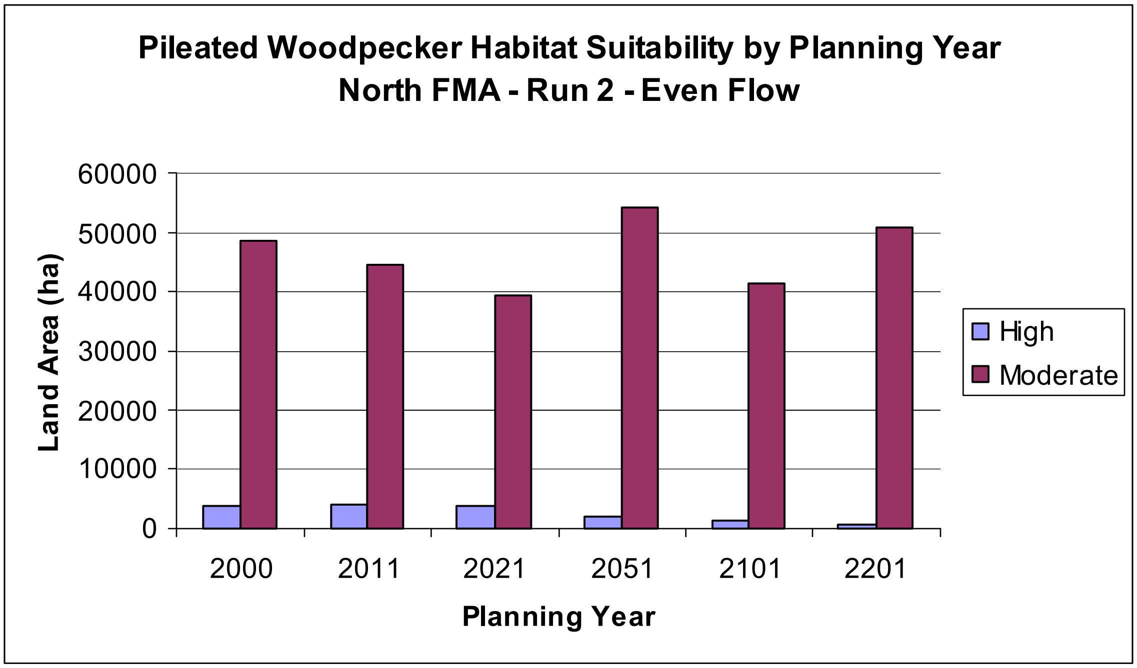

Barred Owl Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Great Gray Owl Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

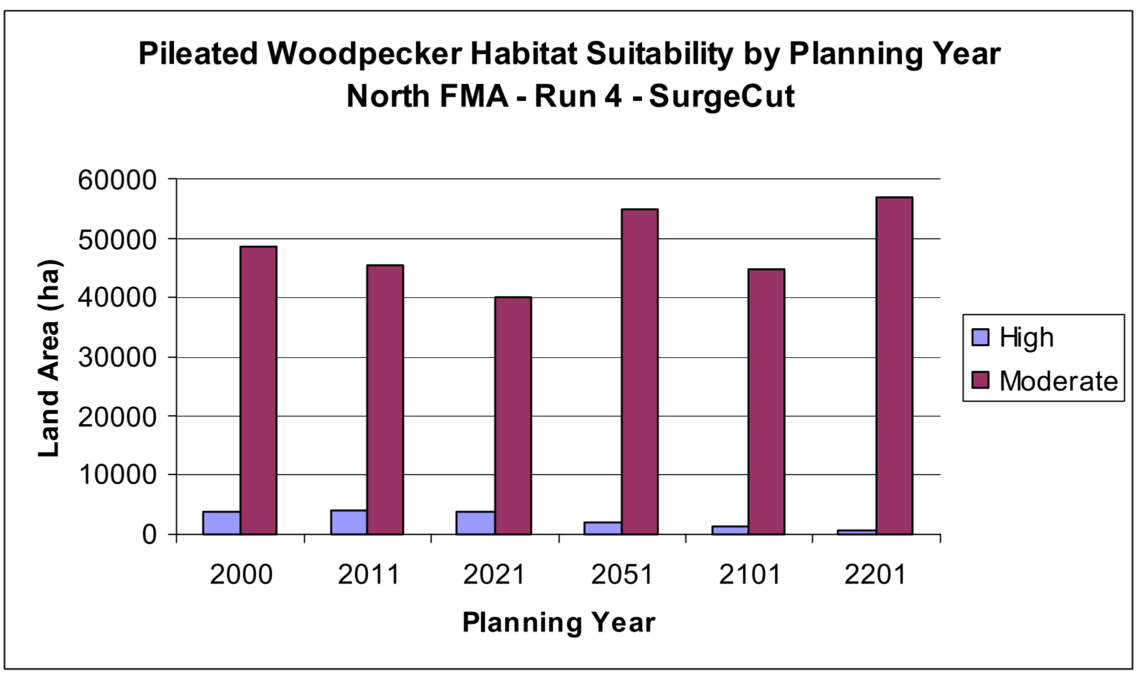

Great Gray Owl Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Black-Backed Woodpecker Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

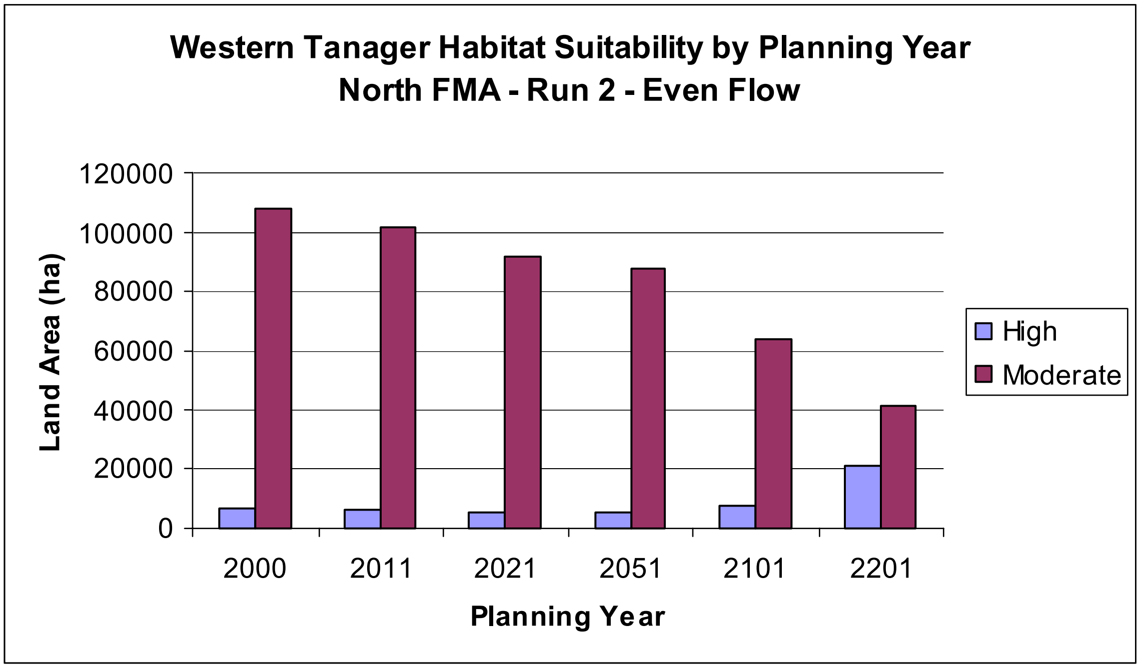

Black-Backed Woodpecker Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

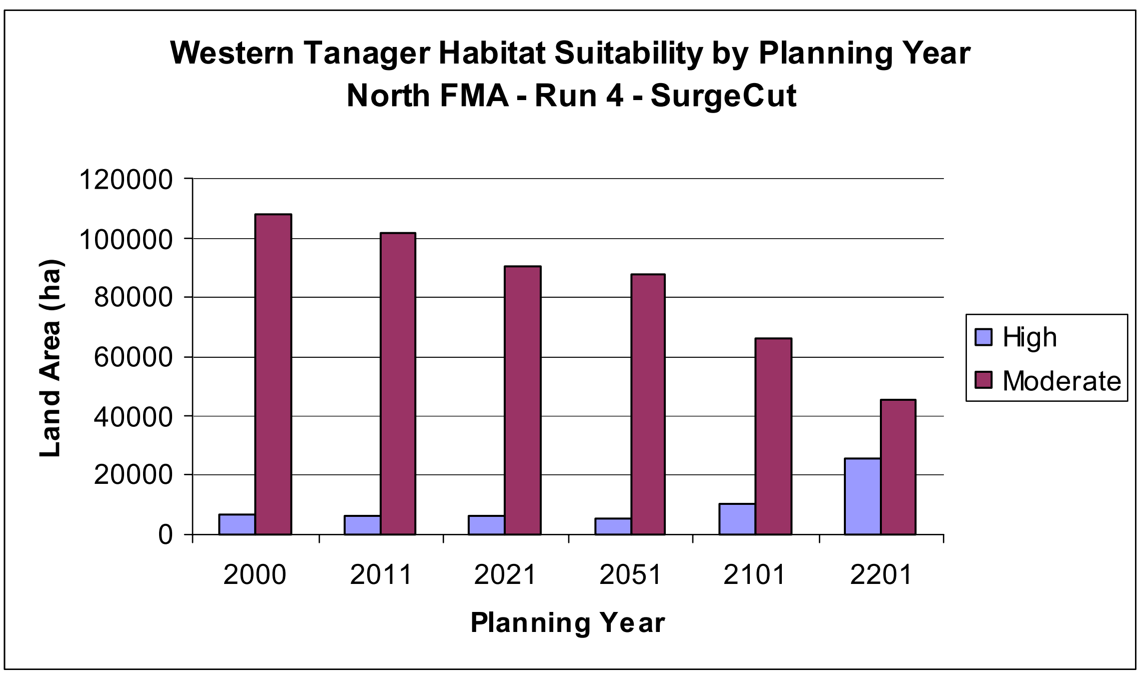


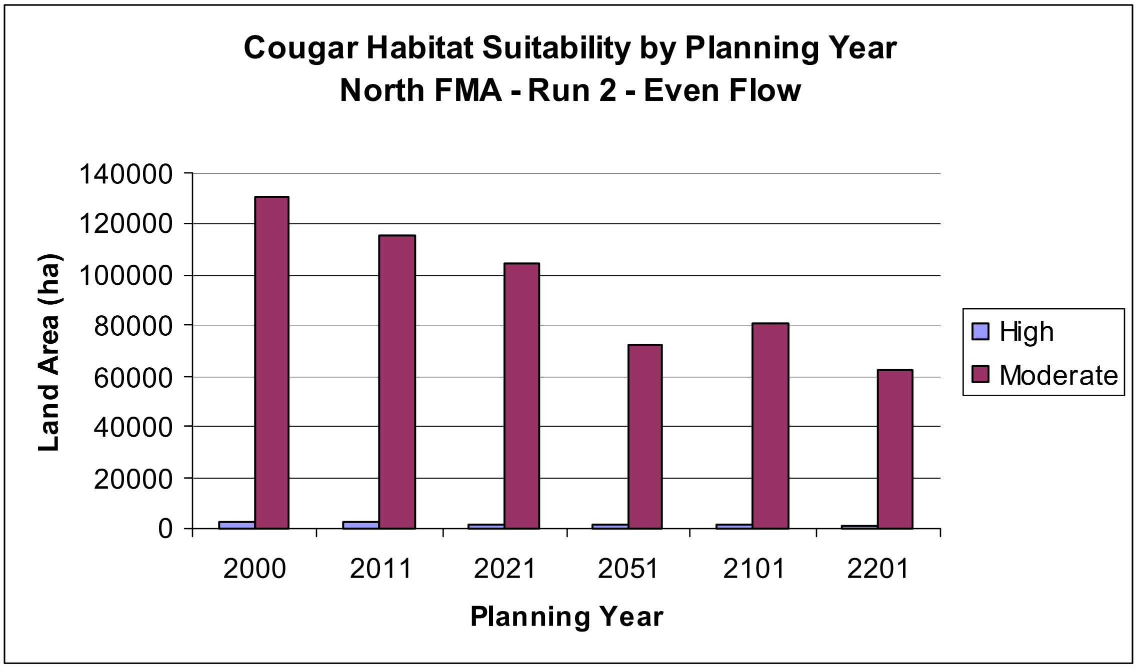
Pileated Woodpecker Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

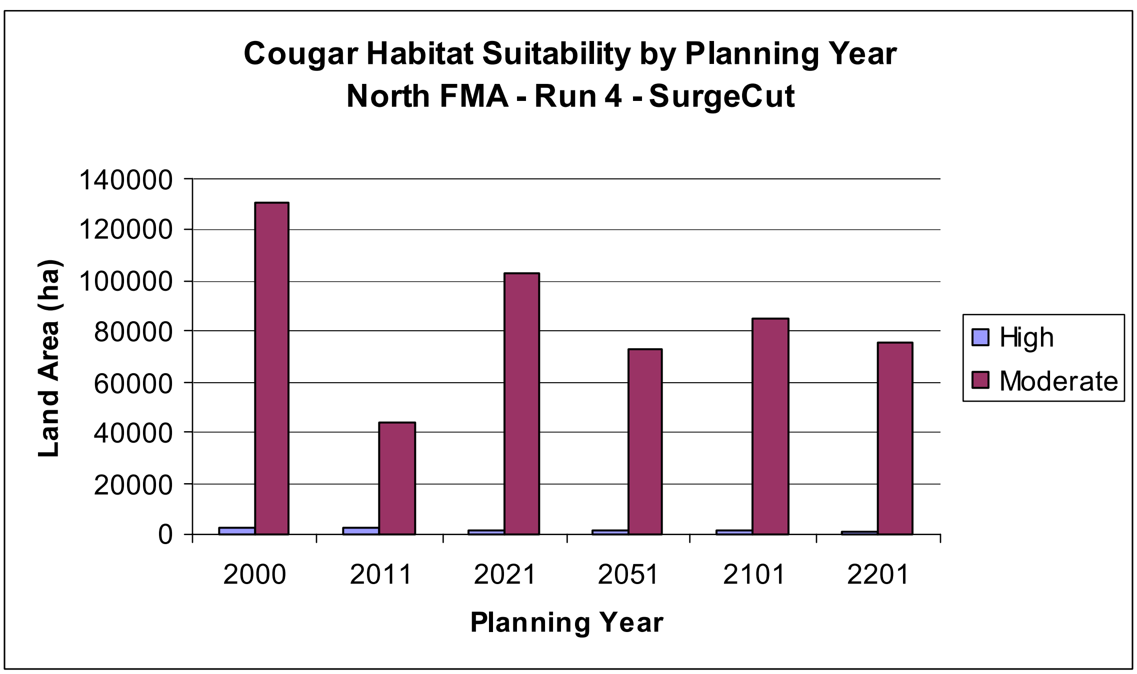


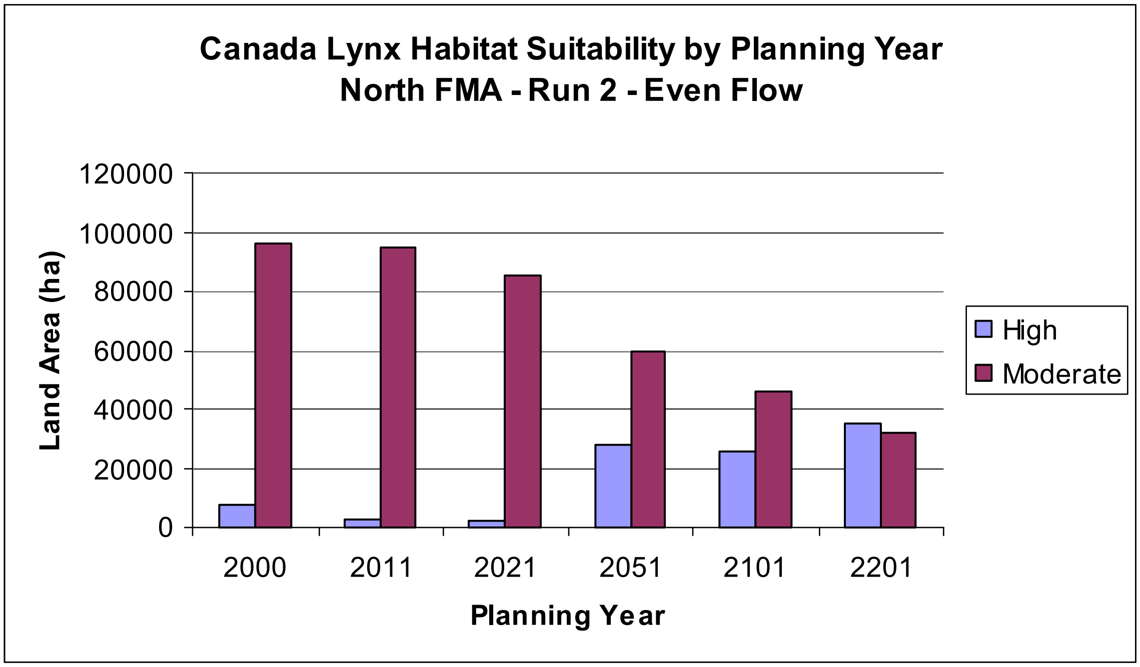
Pileated Woodpecker Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

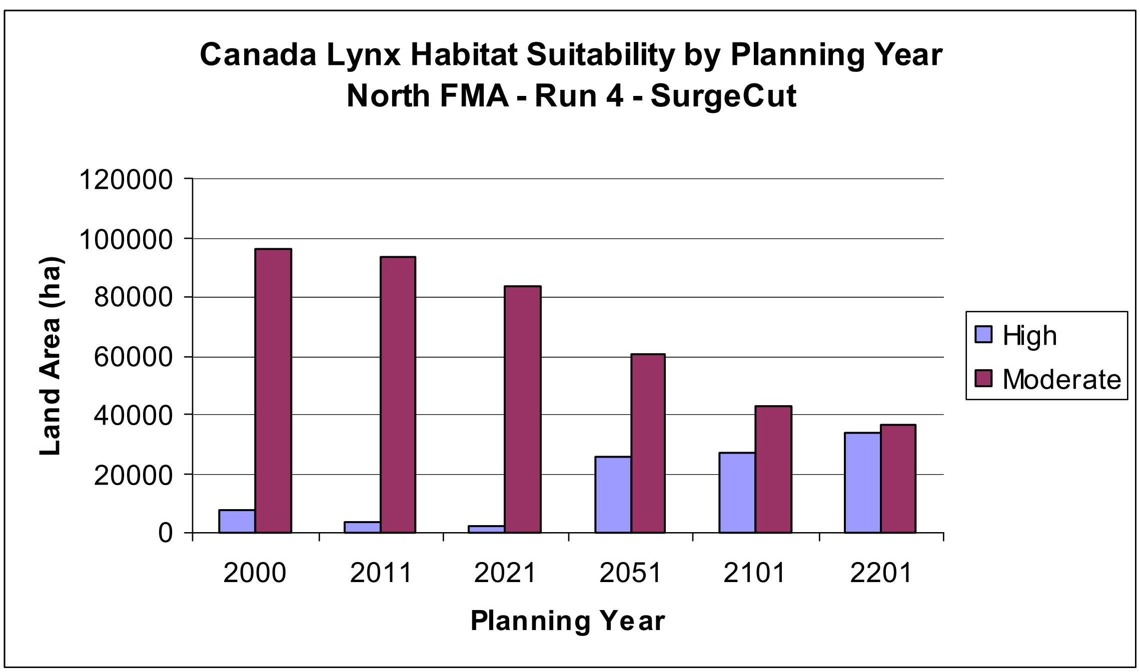

Western Tanager Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
120000
100000
80000
60000
40000
20000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

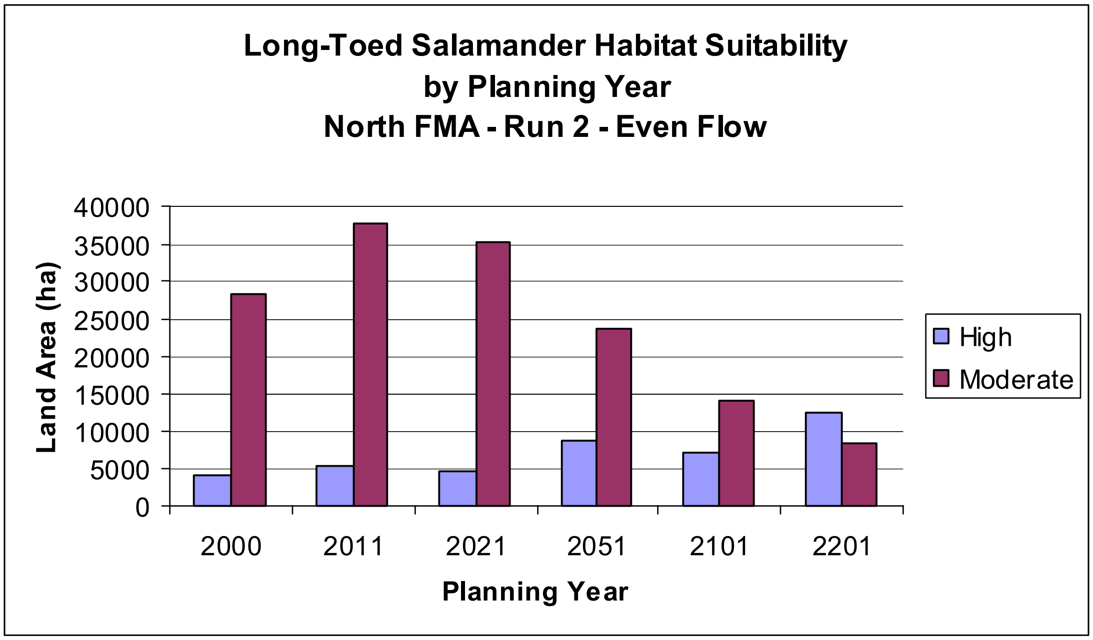

Western Tanager Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
120000
100000
80000
60000
40000
20000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

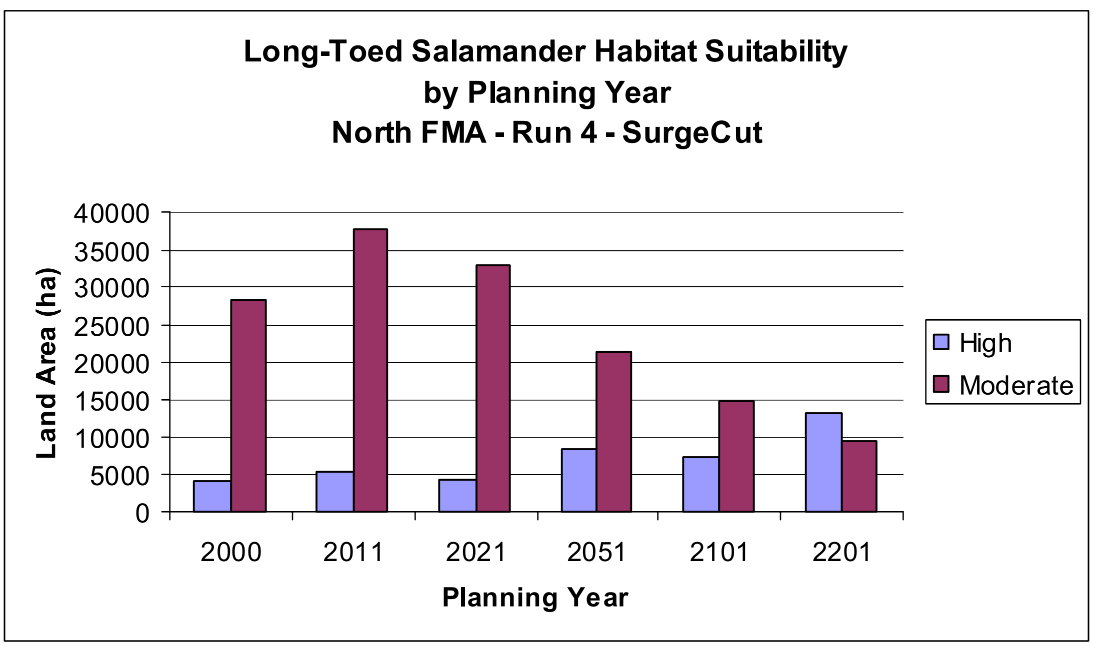

Cougar Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

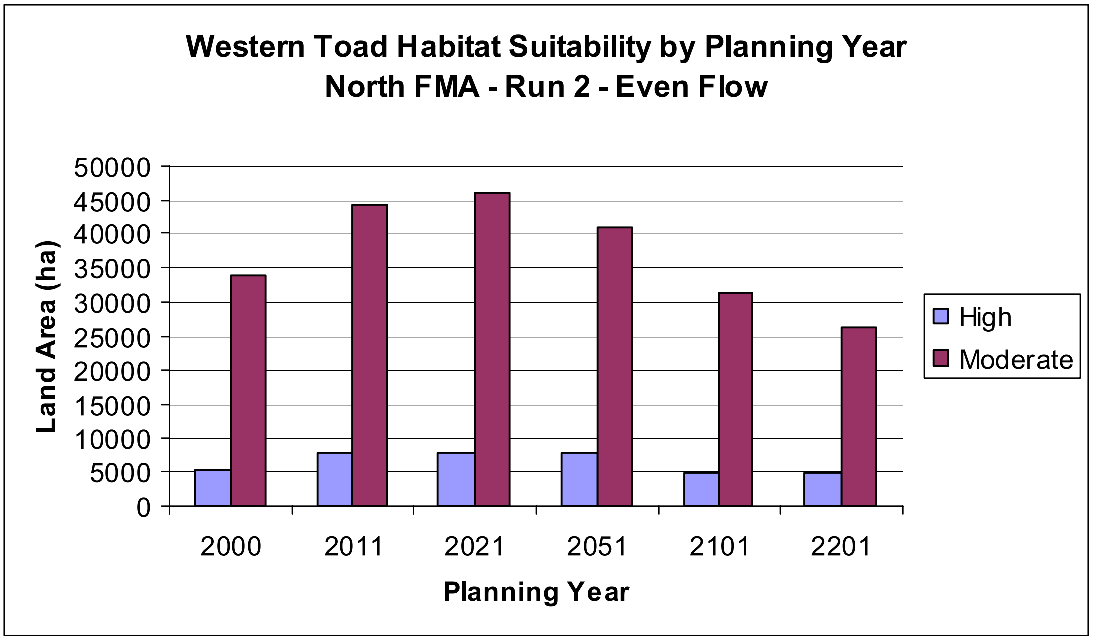

Cougar Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

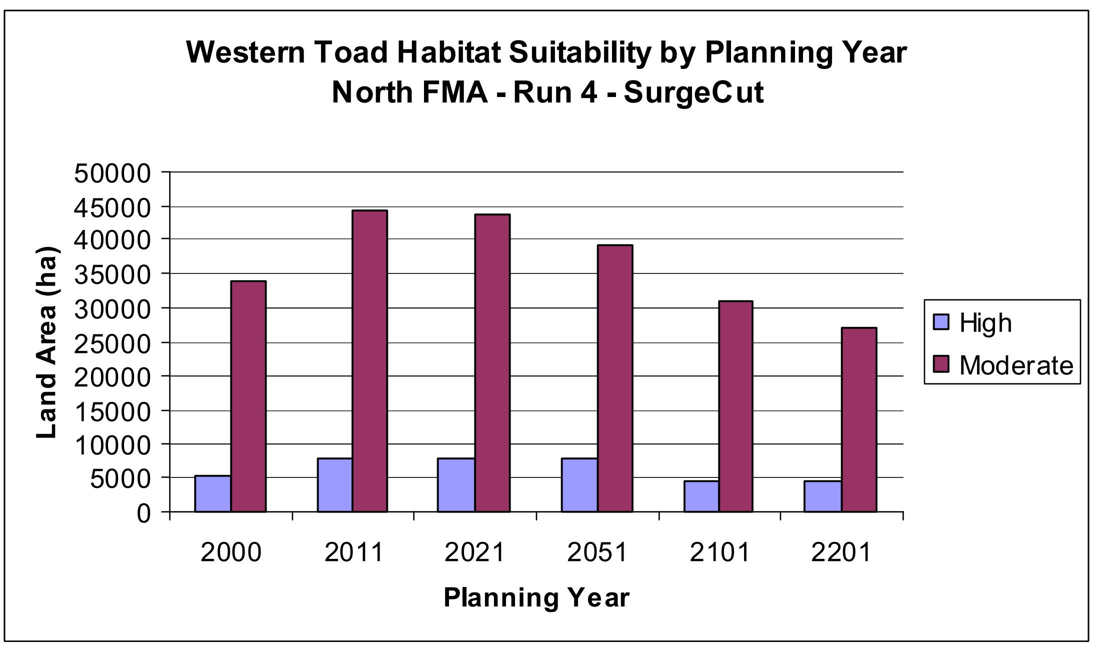

Canada Lynx Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

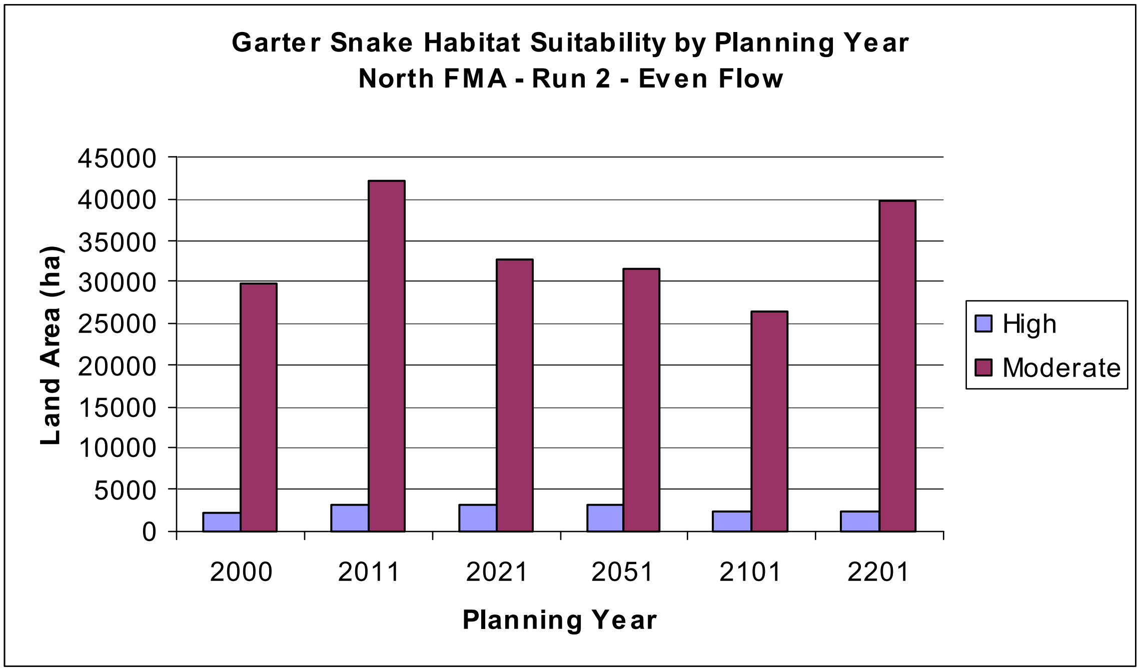

Canada Lynx Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

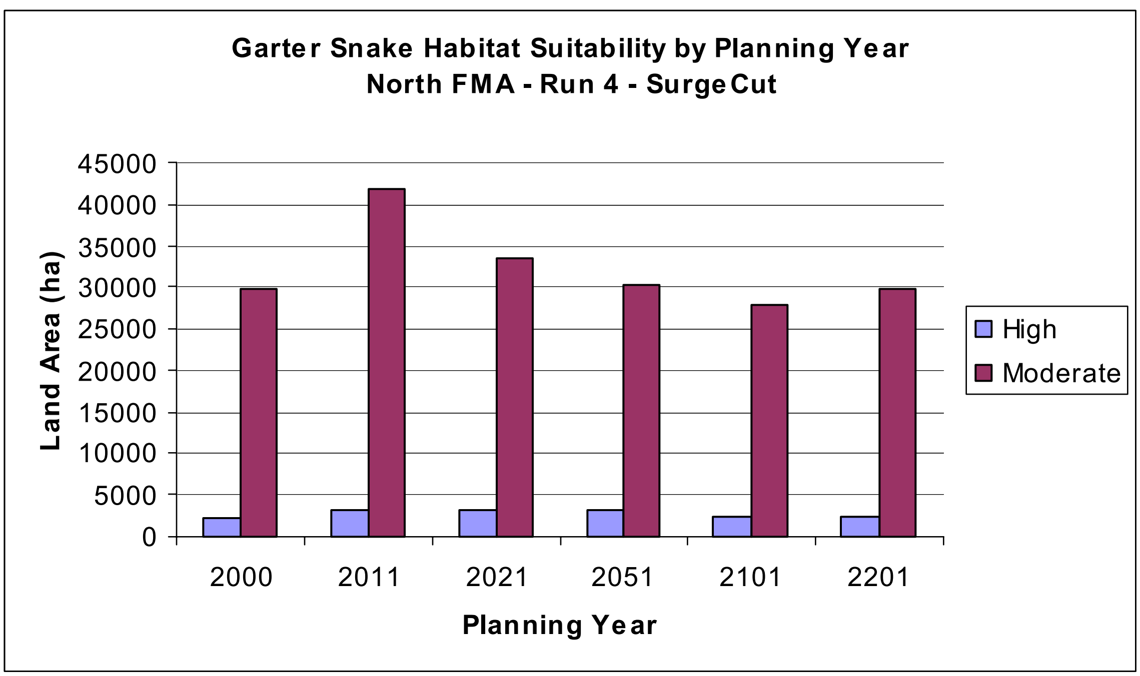

Long-Toed Salamander Habitat Suitability
by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

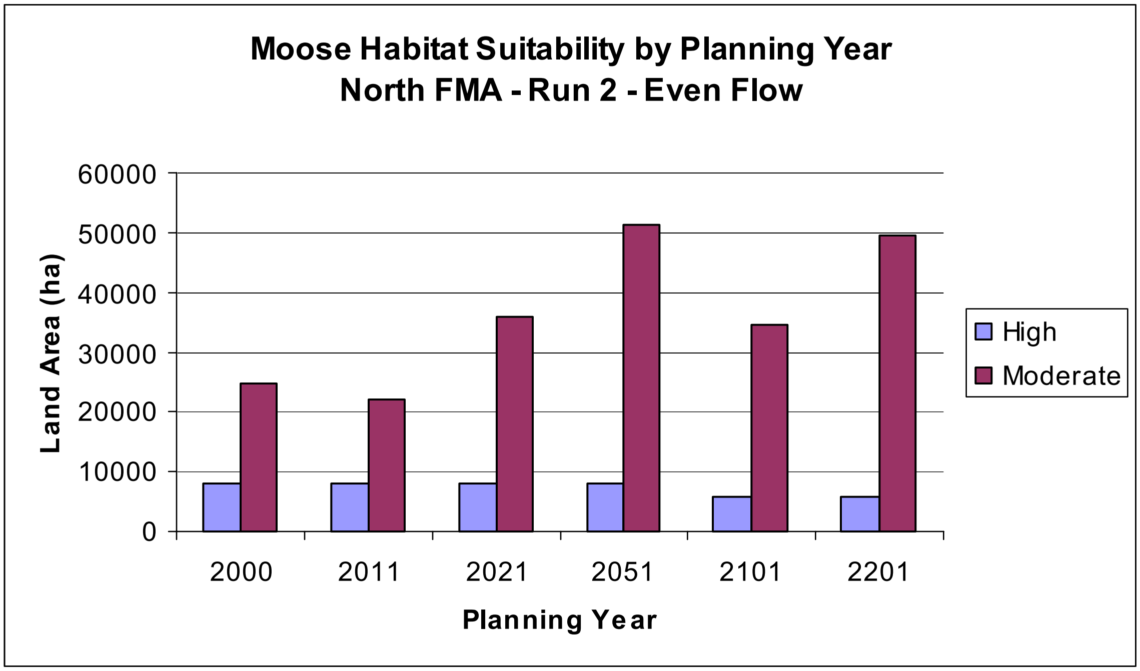

Long-Toed Salamander Habitat Suitability
by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

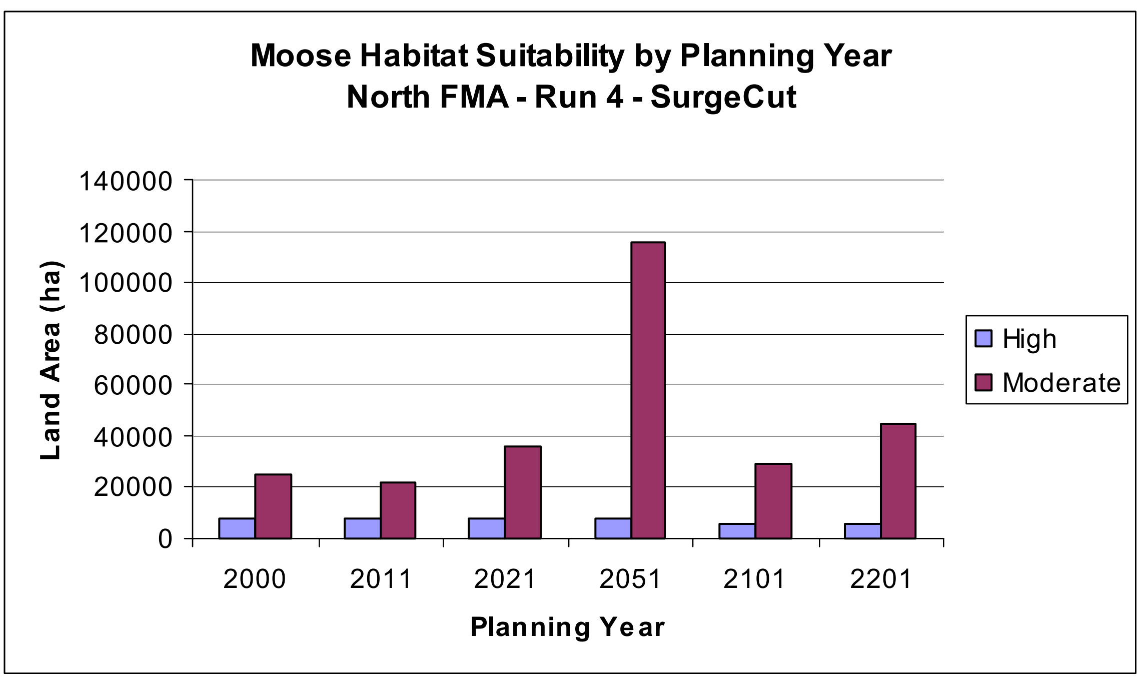

Western Toad Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

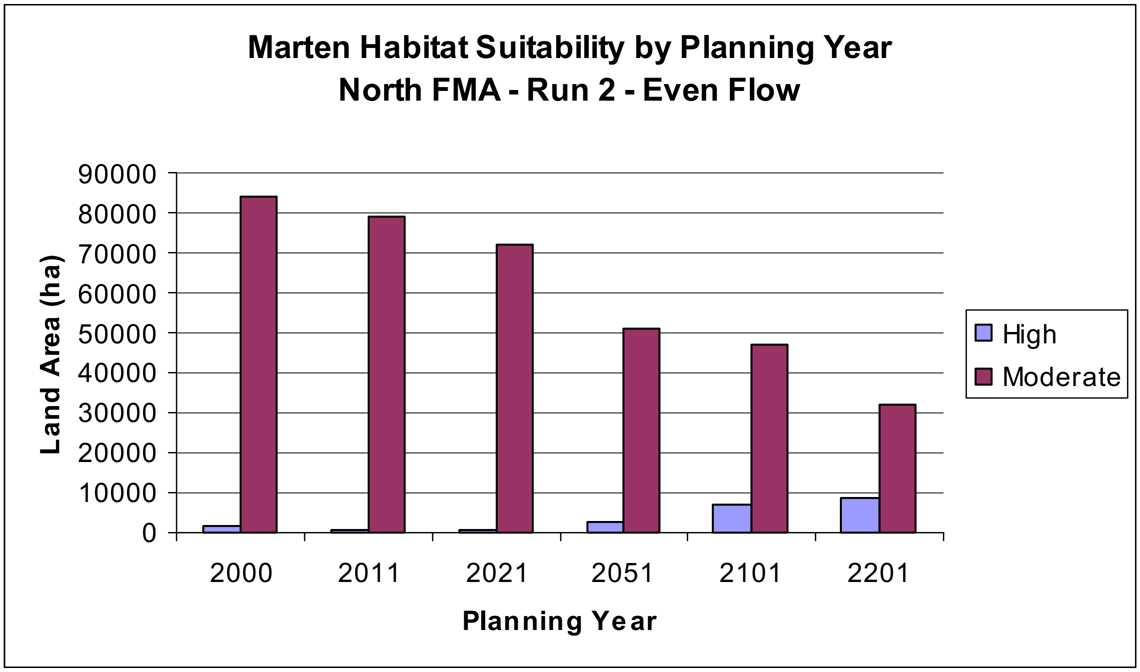

Western Toad Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

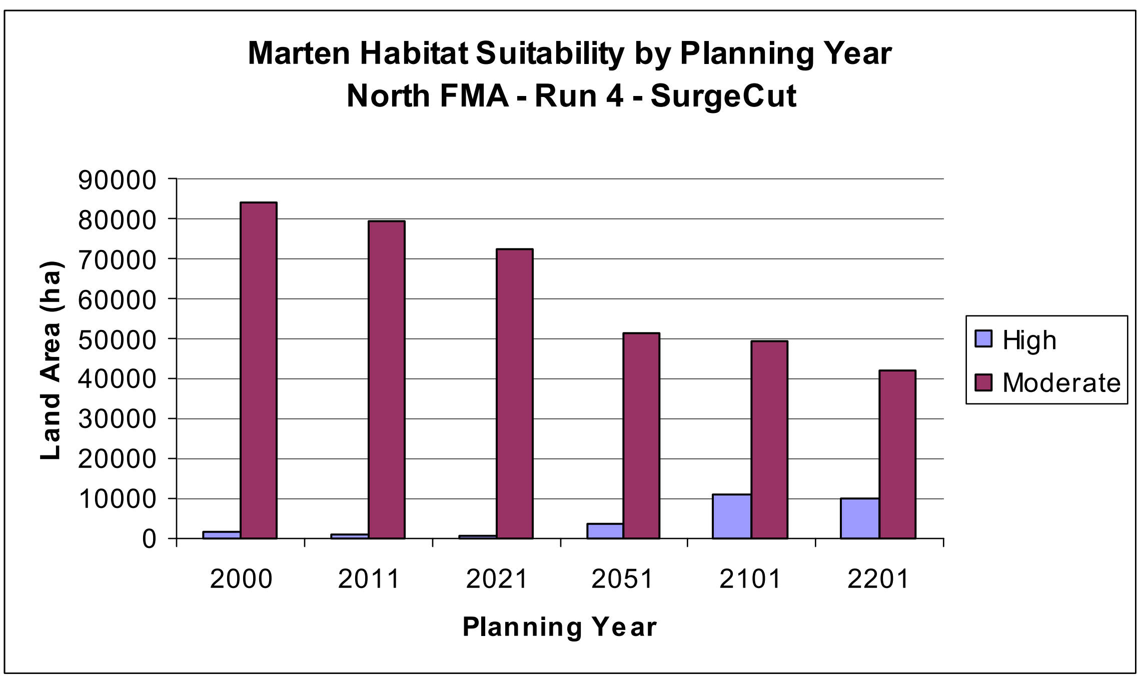

Garter Snake Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

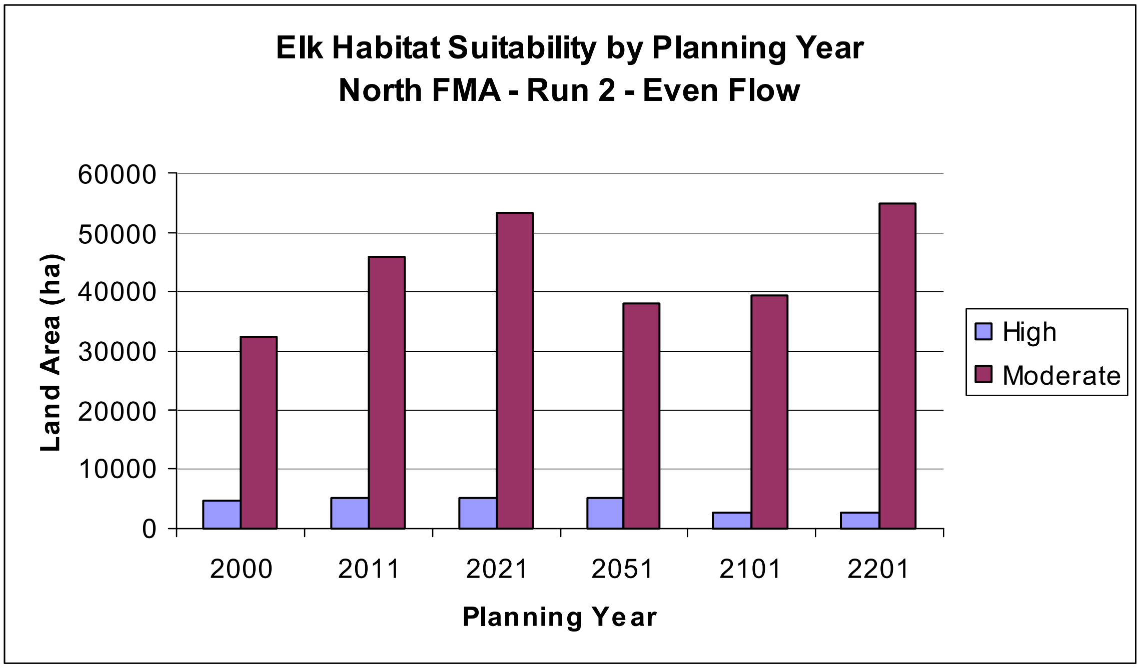

Garter Snake Habitat Suitability by Planning Year
North FMA - Run 4 - Surge Cut
Land Area (ha)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

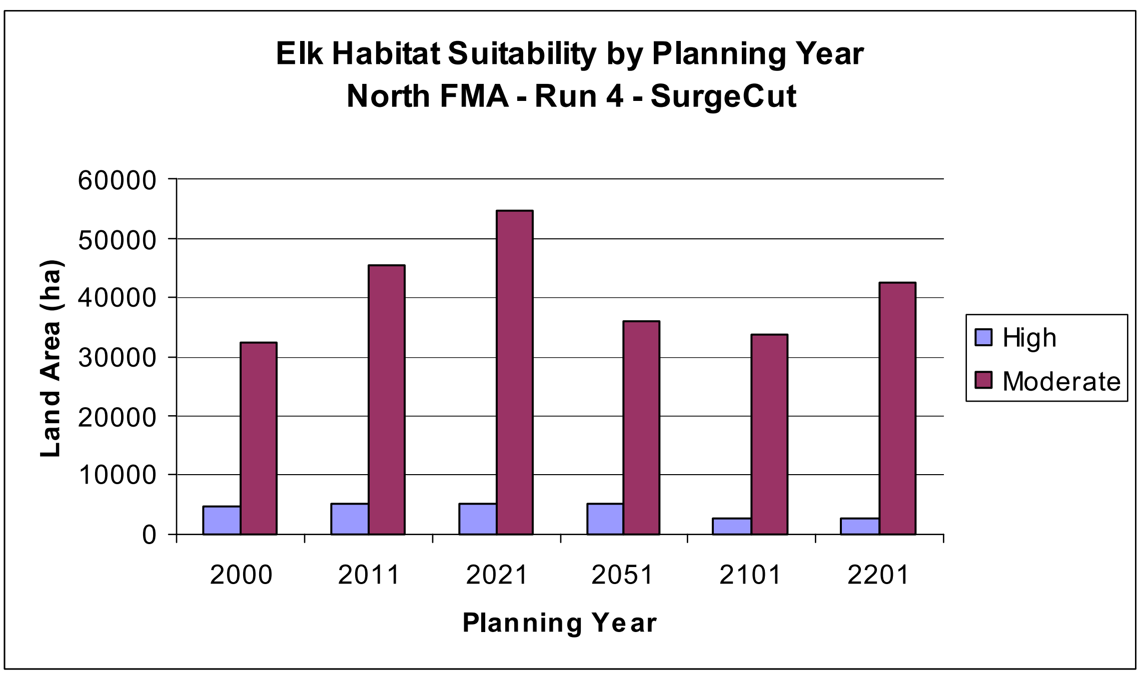

Moose Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

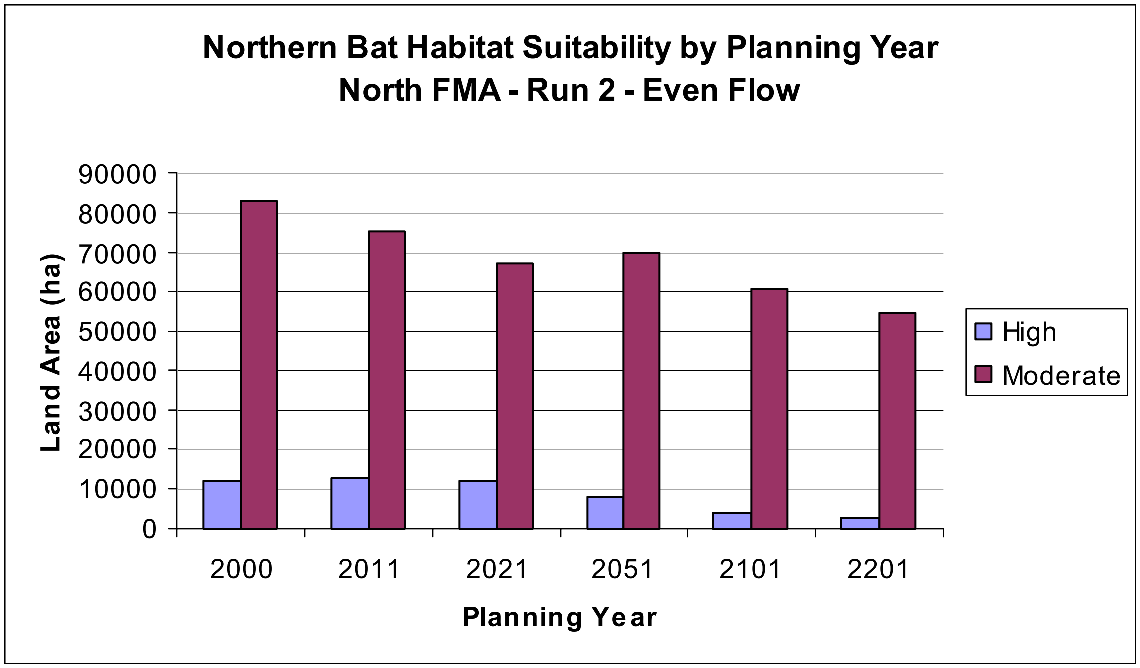

Moose Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
140000
120000
100000
80000
60000
40000
20000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

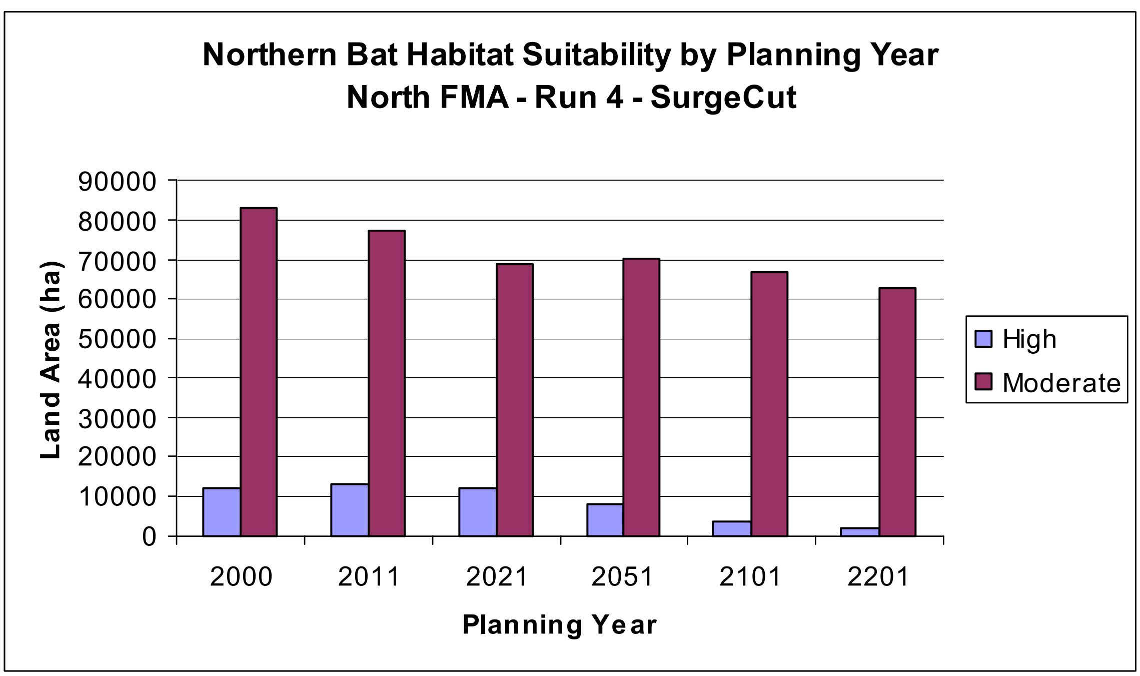

Marten Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

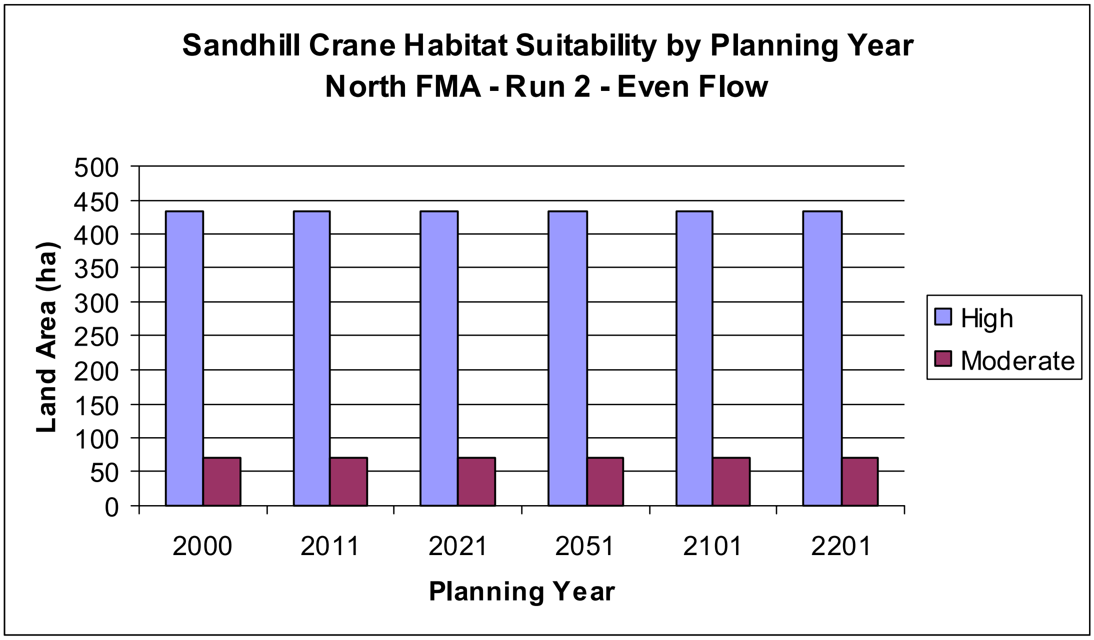

Marten Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

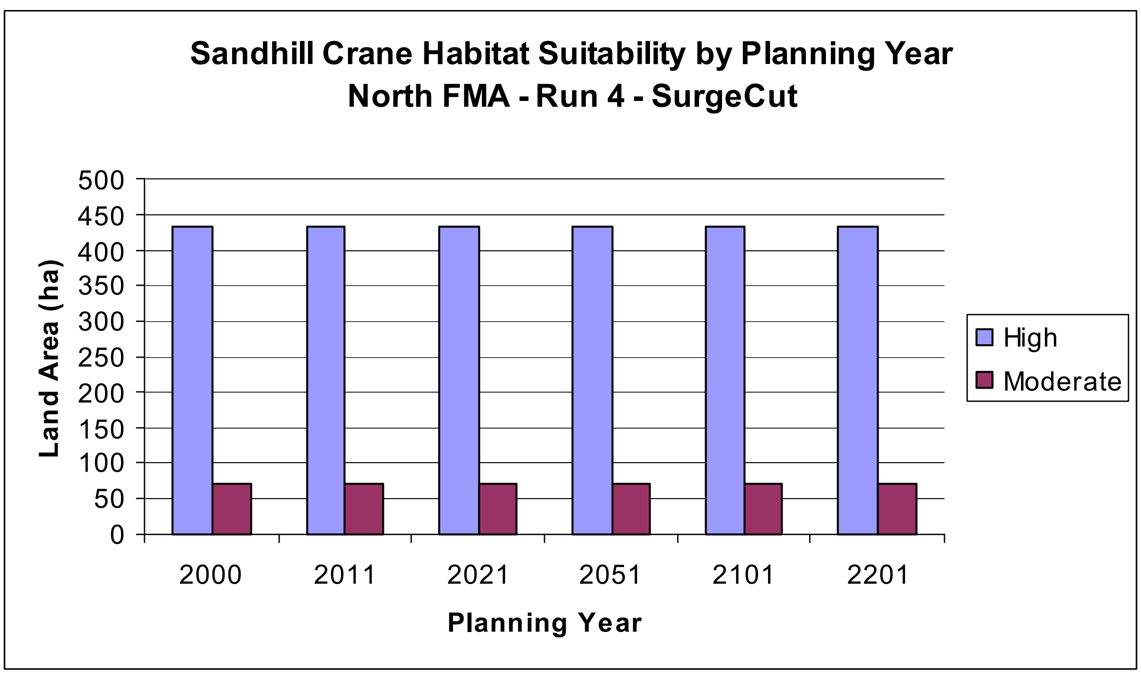

Elk Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Elk Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
60000
50000
40000
30000
20000
10000
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Northern Bat Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Northern Bat Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
Land Area (ha)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Sandhill Crane Habitat Suitability by Planning Year
North FMA - Run 2 - Even Flow
500
450
400
350
300
250
200
150
100
50
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate


Sandhill Crane Habitat Suitability by Planning Year
North FMA - Run 4 - SurgeCut
500
450
400
350
300
250
200
150
100
50
0
Land Area (ha)
2000
2011
2021
2051
2101
2201
Planning Year
High
Moderate

APPENDIX 9

CHANGES IN WILDLIFE HABITAT SUITABILITY FOR TWO TIMBER HARVEST SCENARIOS -NORTH PORTION OF SPRAY LAKE FMA-

Maps Archived

APPENDIX 10

South Portions of FMA - Run#2 Evenflow
High Suitability Habitat Patches

Western Tanager

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	15	91	4	177
2011	13	89	3	177
2021	15	78	2	148
2051	9	80	3	116
2101	0	0	0	0
2201	0	0	0	0

Black-backed Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	84	259	34	539
2011	96	212	40	415
2021	93	163	46	259
2051	65	174	31	290
2101	54	177	27	284
2201	82	466	49	732

Barred Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	2	142	1	208
2011	3	74	1	109
2021	3	70	0	0
2051	3	123	2	154
2101	11	89	1	283
2201	26	134	10	239

Great Gray Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	9	68	1	129
2011	8	87	2	155
2021	10	85	2	148
2051	9	66	3	116
2101	0	0	0	0
2201	0	0	0	0

Northern Goshawk

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	87	117	33	198
2011	89	114	33	194
2021	75	115	31	179
2051	53	103	16	172
2101	32	117	12	191
2201	77	287	42	469

Northern Pygmy-Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	12	112	5	182
2011	13	93	4	151
2021	18	89	4	159
2051	28	96	11	145
2101	27	114	10	182
2201	77	287	42	469

Pileated Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	10	82	3	112
2011	15	104	4	191
2021	20	103	6	184
2051	14	180	5	387
2101	0	0	0	0
2201	0	0	0	0

South Portions of FMA - Run#4 Surge Cut
High Suitability Habitat Patches

Western Tanager

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	15	91	4	177
2011	11	85	2	184
2021	13	68	0	0
2051	9	73	2	114
2101	0	0	0	0
2201	0	0	0	0

Black-backed Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	84	259	34	539
2011	94	216	38	434
2021	83	218	37	406
2051	66	204	30	370
2101	71	171	34	284
2201	82	501	49	784

Barred Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	2	142	1	208
2011	3	113	2	143
2021	3	95	1	160
2051	3	143	2	182
2101	16	98	3	236
2201	26	179	10	331

Great Gray Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	9	68	1	129
2011	6	80	1	147
2021	9	69	0	0
2051	9	73	2	114
2101	0	0	0	0
2201	0	0	0	0

Northern Goshawk

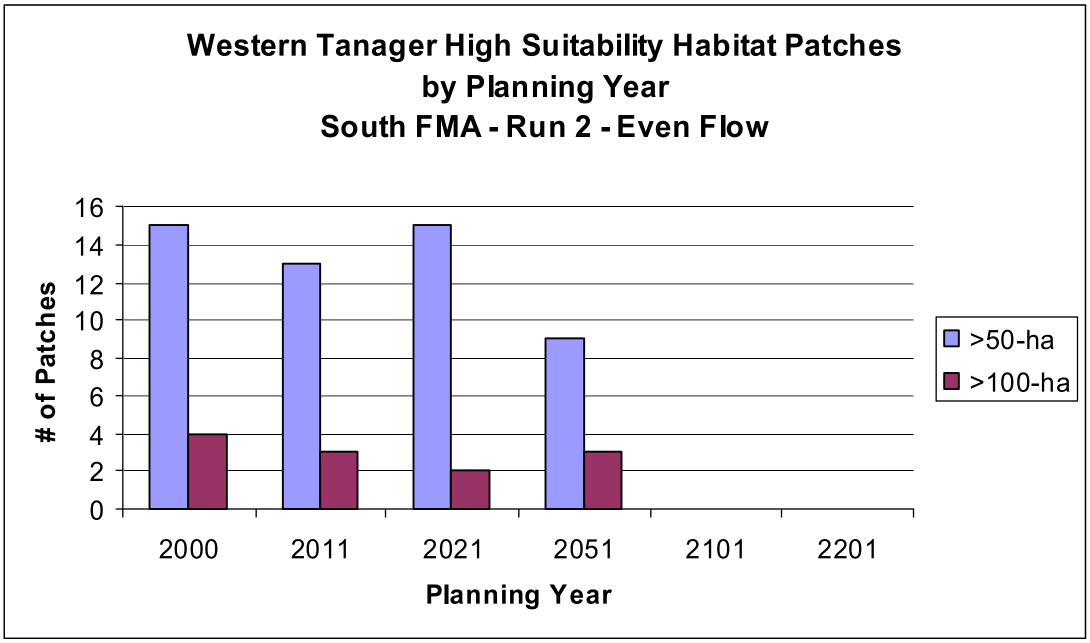
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	87	117	33	198
2011	86	112	31	191
2021	78	113	26	197
2051	60	107	23	173
2101	49	110	19	175
2201	77	319	42	514

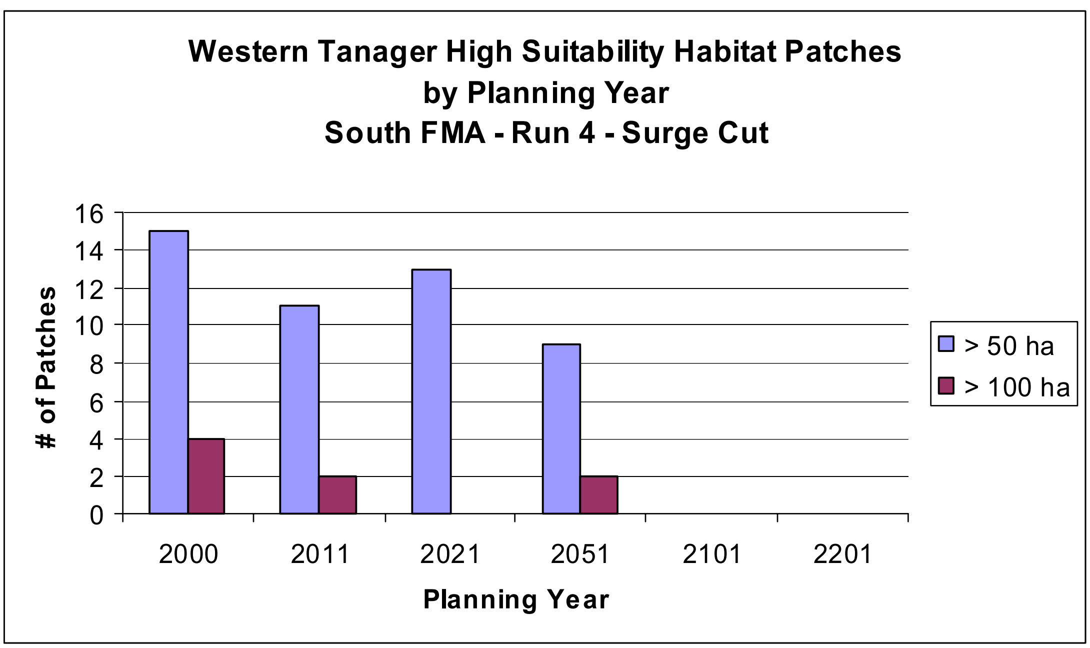
Northern Pygmy-Owl

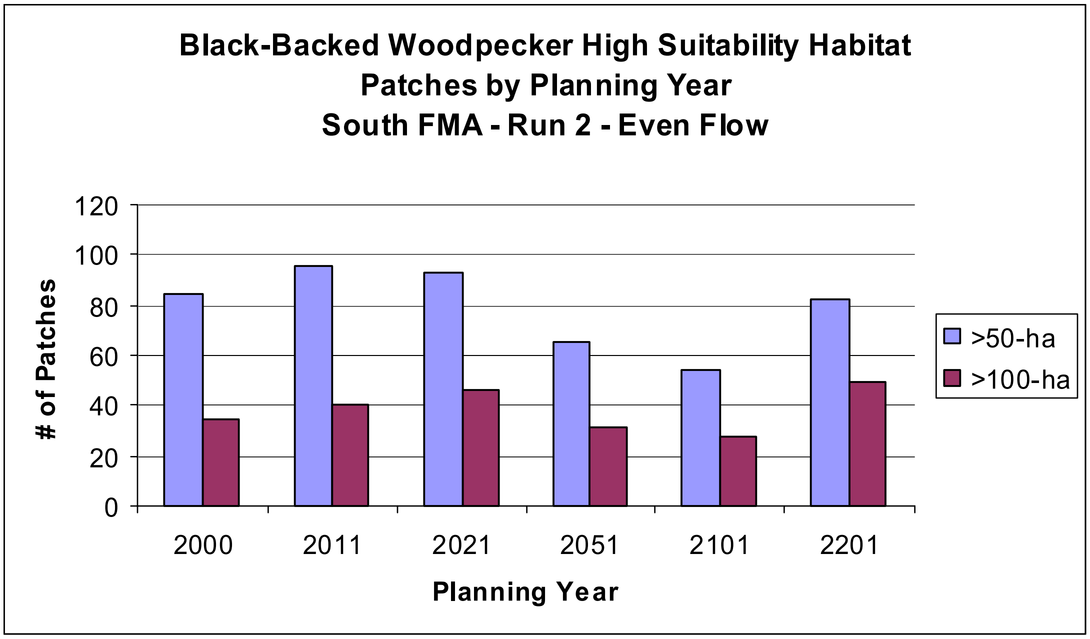
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	12	112	5	182
2011	12	110	5	166
2021	16	95	4	178
2051	33	96	11	160
2101	40	107	14	181
2201	77	319	42	514

Pileated Woodpecker

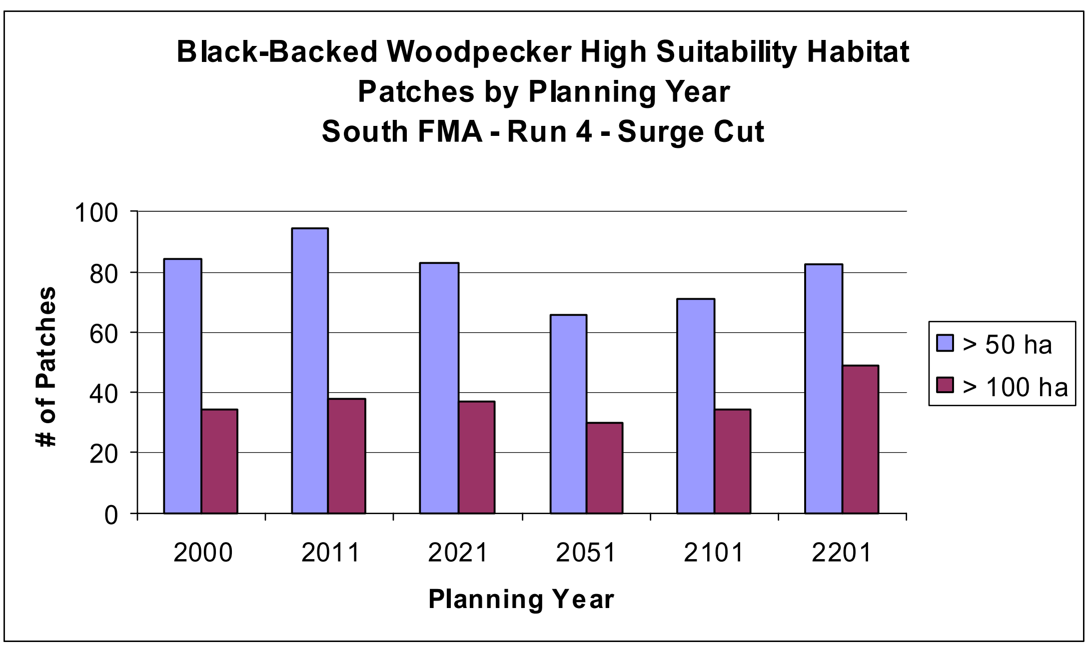
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	10	82	3	112
2011	14	93	2	232
2021	23	77	4	129
2051	14	160	4	391
2101	0	0	0	0
2201	0	0	0	0


Western Tanager High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
Planning Year
>50-ha
>100-ha
0
2
4
6
8
10
12
14
16
2000
2011
2021
2051
2101
2201

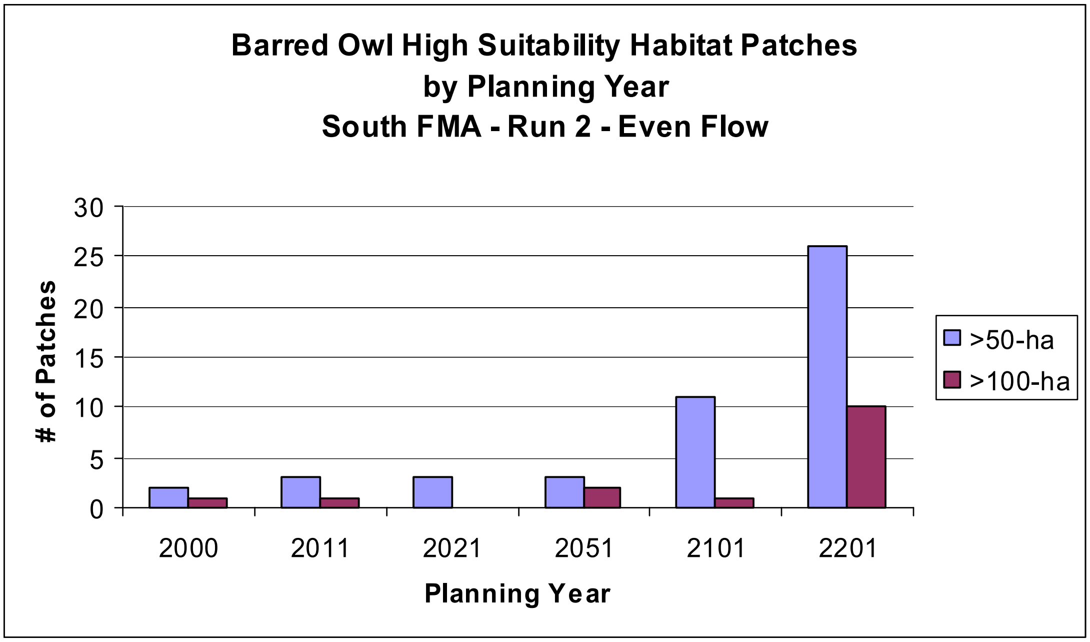

Western Tanager High Suitability Habitat Patches
by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
Planning Year
> 50 ha
> 100 ha
0
2
4
6
8
10
12
14
16
2000
2011
2021
2051
2101
2201

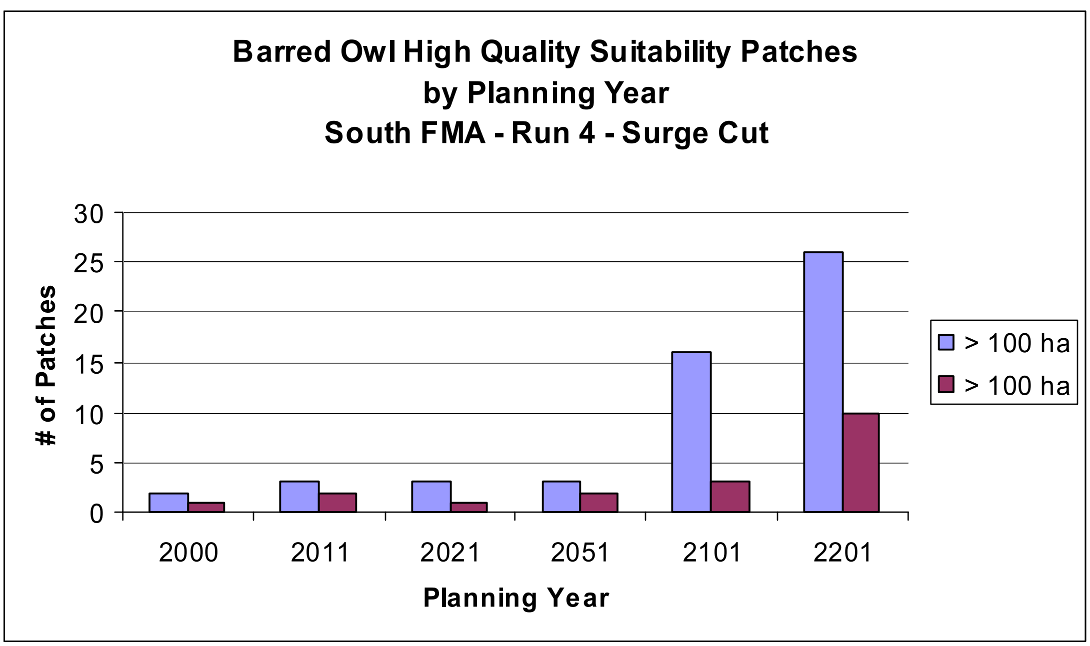


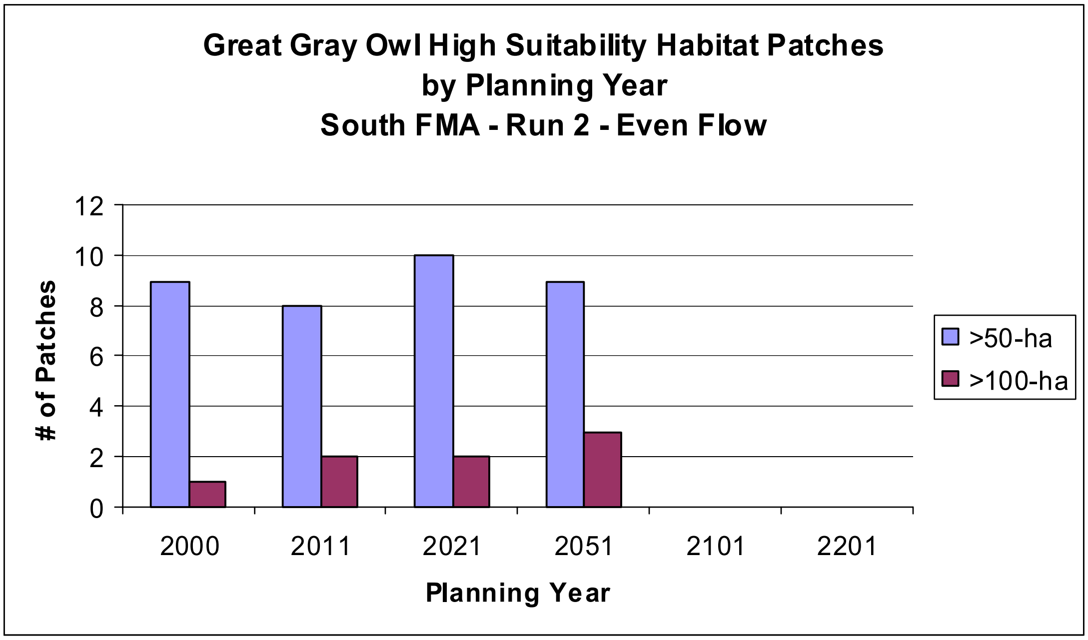
Black-Backed Woodpecker High Suitability Habitat
Patches by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
120
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

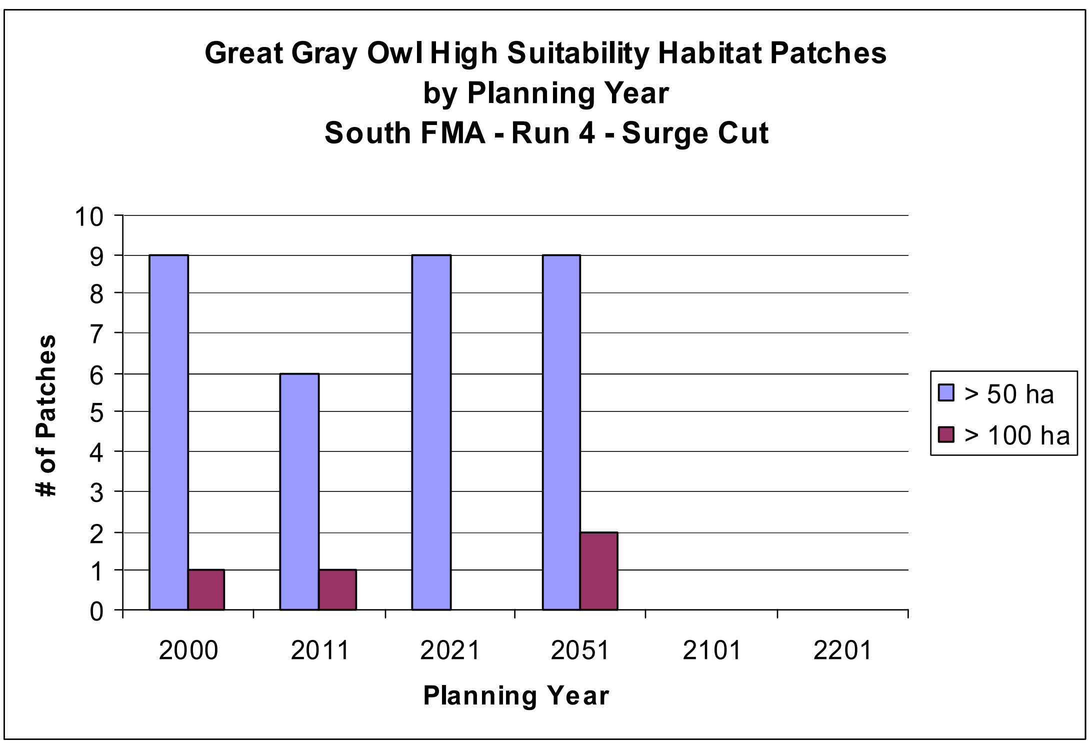


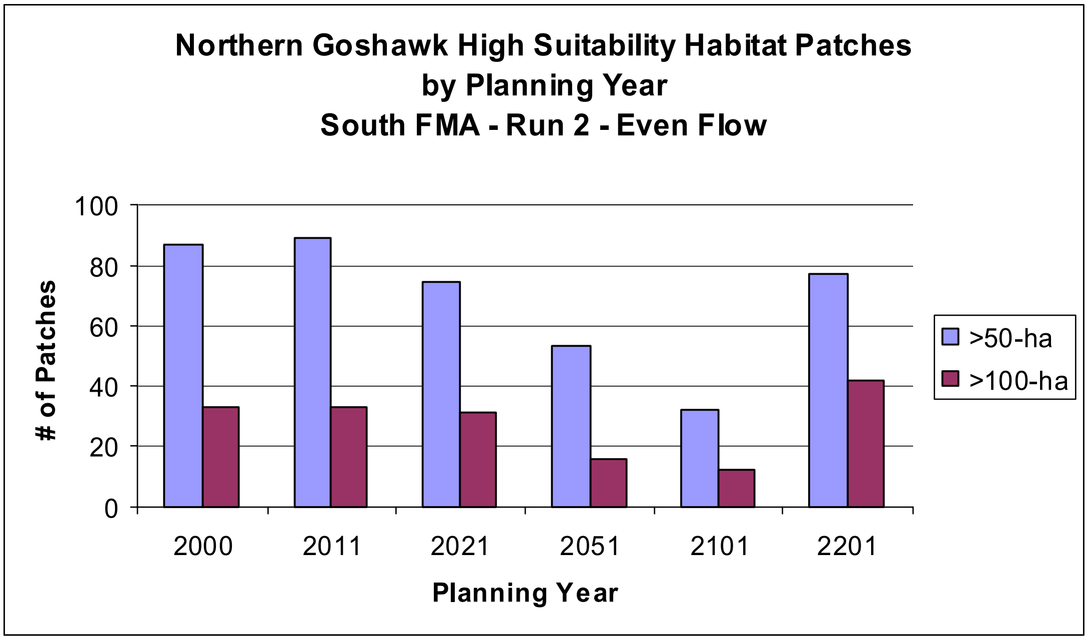
Black-Backed Woodpecker High Suitability Habitat
Patches by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Barred Owl High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
30
25
20
15
10
5
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

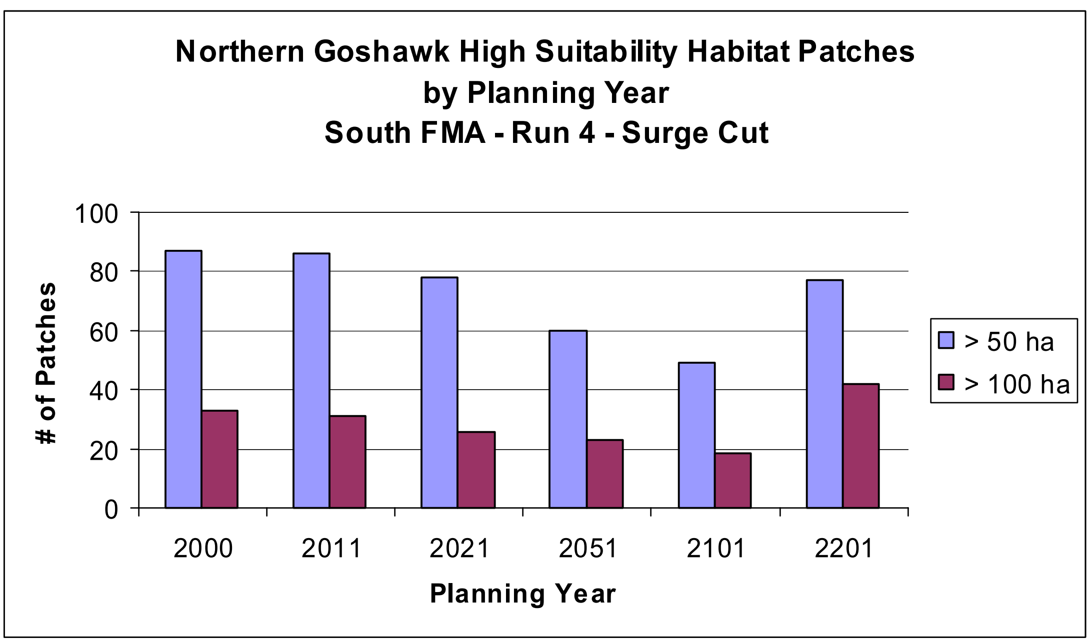

Barred Owl High Quality Suitability Patches
by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
30
25
20
15
10
5
0
2000
2011
2021
2051
2101
2201
Planning Year
> 100 ha
> 100 ha


Great Gray Owl High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
12
10
8
6
4
2
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

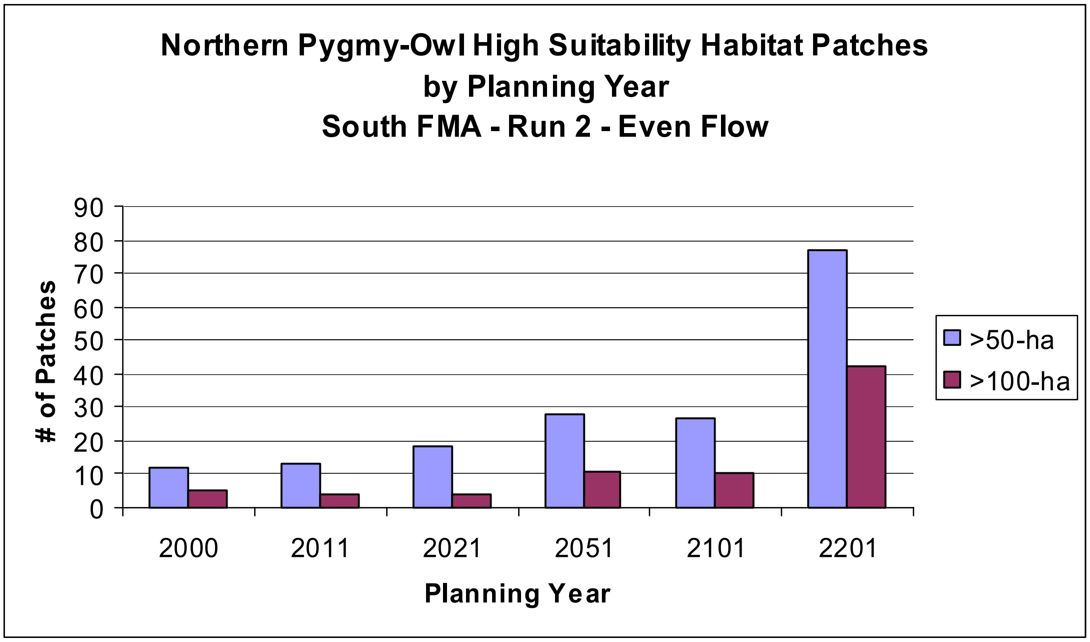

Great Gray Owl High Suitability Habitat Patches
by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
10
9
8
7
6
5
4
3
2
1
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha

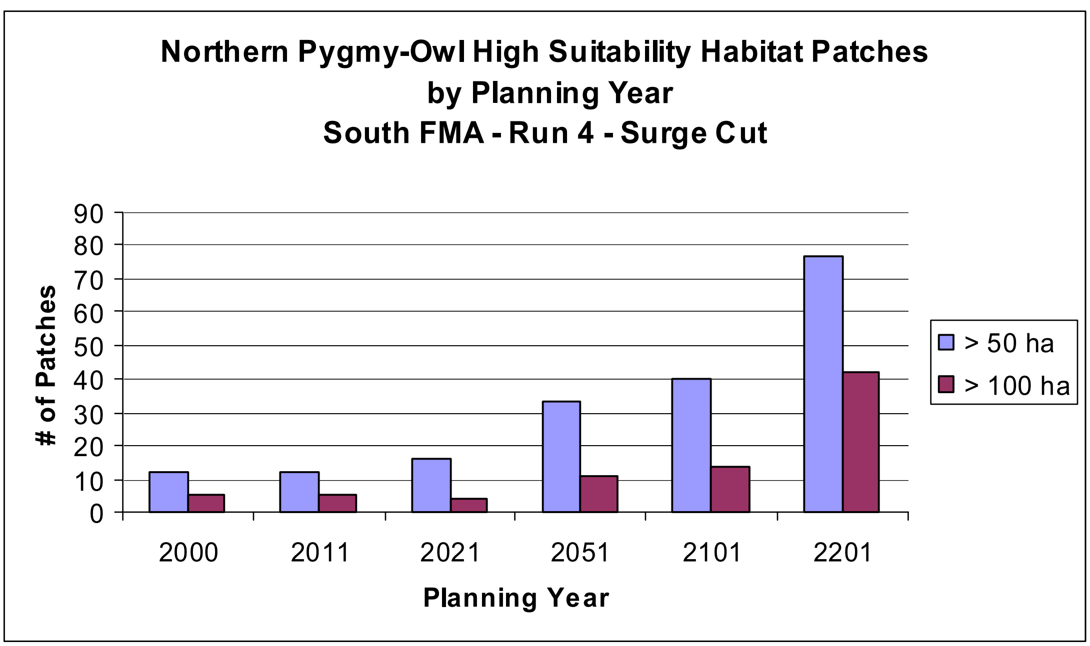


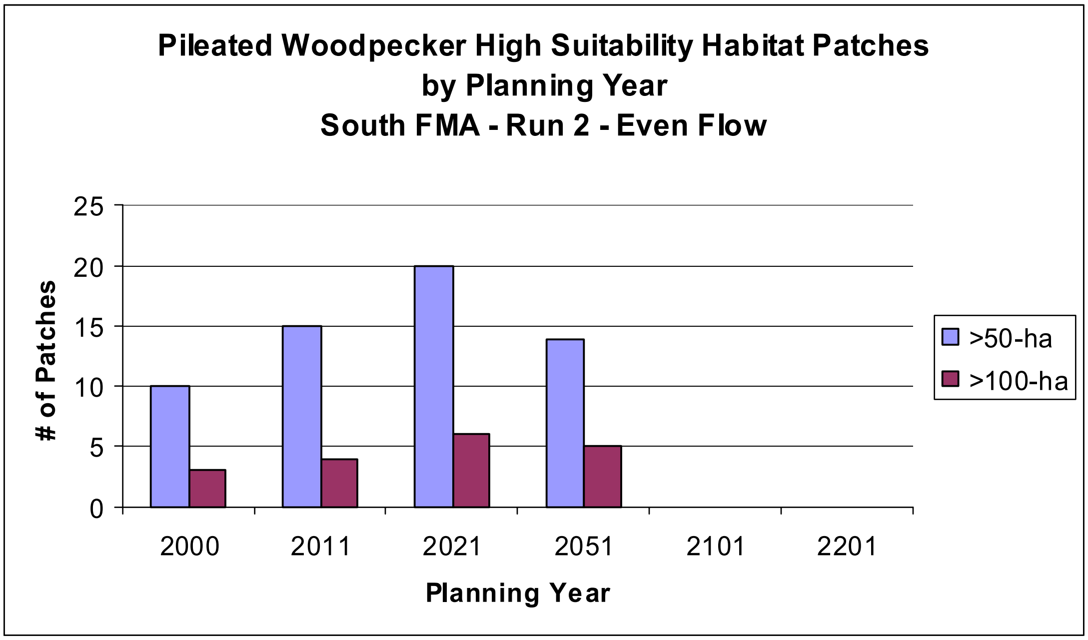
Northern Goshawk High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha



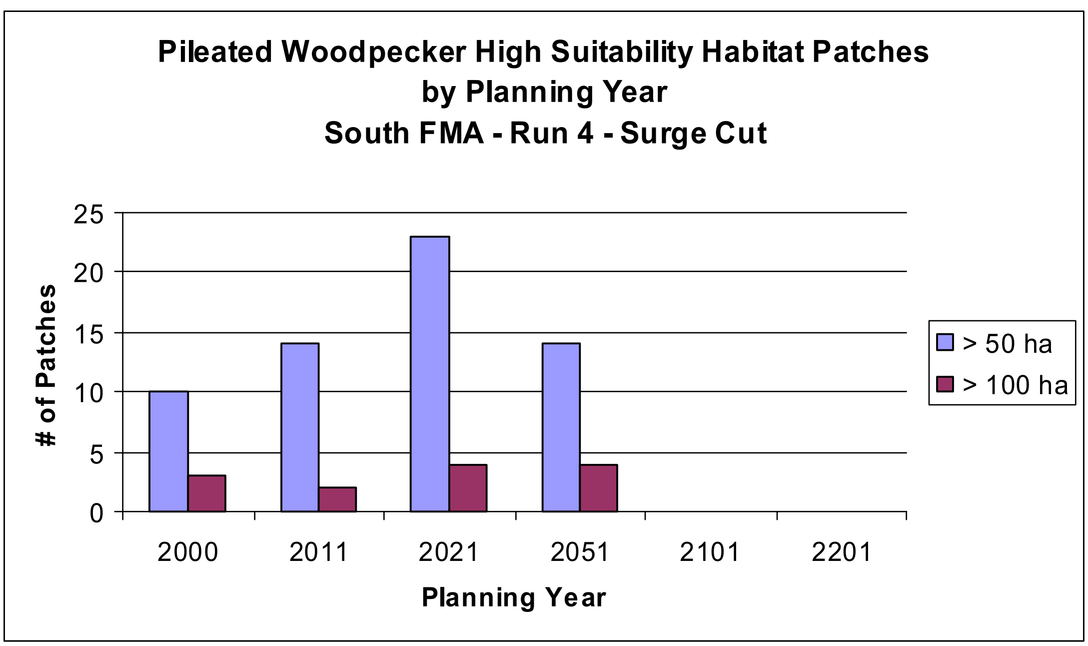
Northern Goshawk High Suitability Habitat Patches
by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Northern Pygmy-Owl High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
90
80
70
60
50
40
30
20
10
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha


Northern Pygmy-Owl High Suitability Habitat Patches
by Planning Year
South FMA - Run 4 - Surge Cut
90
80
70
60
50
40
30
20
10
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha



Pileated Woodpecker High Suitability Habitat Patches
by Planning Year
South FMA - Run 2 - Even Flow
# of Patches
0
5
10
15
20
25
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha



Pileated Woodpecker High Suitability Habitat Patches
by Planning Year
South FMA - Run 4 - Surge Cut
# of Patches
0
5
10
15
20
25
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha

APPENDIX 11

North Portions of FMA - Run#2 Evenflow
High Suitability Habitat Patches

Western Tanager

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	33	106	9	200
2011	27	106	8	203
2021	22	113	9	183
2051	20	128	7	239
2101	34	97	11	157
2201	66	232	35	378

Black-backed Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	9	130	2	353
2011	7	120	3	186
2021	7	102	3	135
2051	6	95	3	108
2101	30	94	9	154
2201	49	197	28	295

Barred Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	4	133	1	340
2011	4	98	2	128
2021	4	98	2	128
2051	4	93	2	107
2101	17	89	5	148
2201	29	166	16	250

Great Gray Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	6	98	3	119
2011	13	101	5	156
2021	12	108	6	151
2051	9	104	4	154
2101	3	109	1	193
2201	3	109	1	193

Northern Goshawk

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	11	102	4	158
2011	14	103	6	153
2021	12	110	6	154
2051	8	125	4	187
2101	3	109	1	193
2201	3	109	1	193

Northern Pygmy-Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	29	99	6	224
2011	30	109	11	180
2021	26	108	11	162
2051	19	104	7	160
2101	37	94	10	160
2201	51	196	30	288

Pileated Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	15	93	4	160
2011	20	99	7	157
2021	18	104	8	153
2051	11	110	5	161
2101	4	94	1	193
2201	3	109	1	193

North Portions of FMA - Run#4 Surge Cut
High Suitability Habitat Patches

Western Tanager

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	33	106	9	200
2011	31	104	10	183
2021	29	101	11	157
2051	22	120	7	235
2101	43	100	12	184
2201	87	202	42	344

Black-backed Woodpecker

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	9	130	2	353
2011	8	112	3	186
2021	8	97	3	134
2051	7	100	3	128
2101	45	96	11	181
2201	69	166	30	294

Barred Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	4	133	1	340
2011	5	90	2	127
2021	4	98	2	127
2051	5	103	3	121
2101	30	96	7	181
2201	33	161	16	261

Great Gray Owl

Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	6	98	3	119
2011	13	101	5	165
2021	13	98	5	157
2051	9	102	4	149
2101	2	137	1	192
2201	1	82	0	

Northern Goshawk

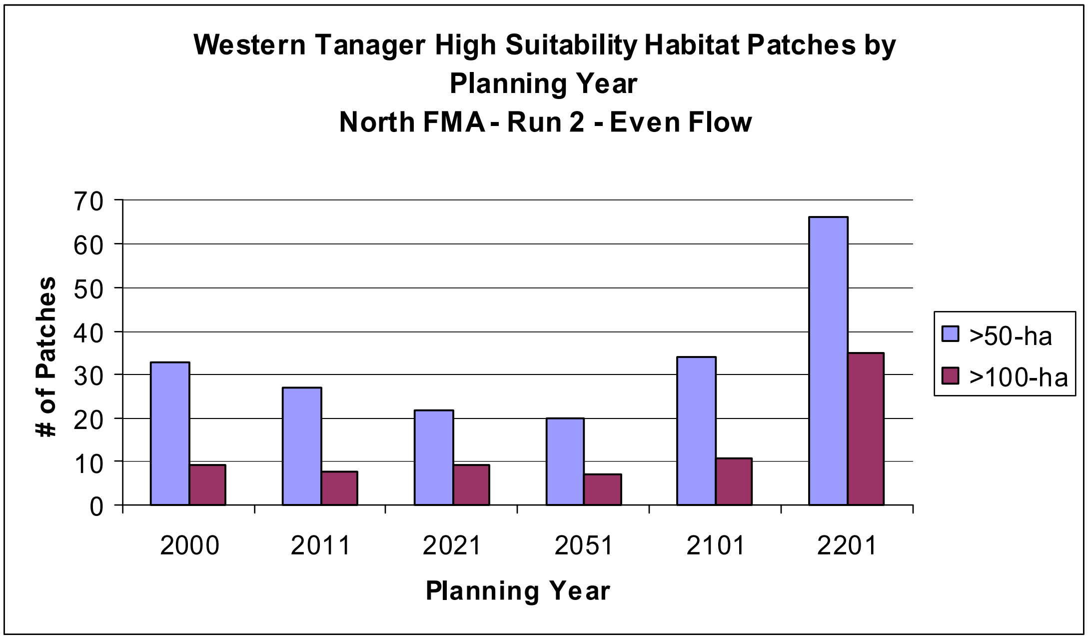
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	11	102	4	158
2011	14	103	6	152
2021	14	98	6	148
2051	8	122	4	182
2101	2	137	1	192
2201	1	82	0	

Northern Pygmy-Owl

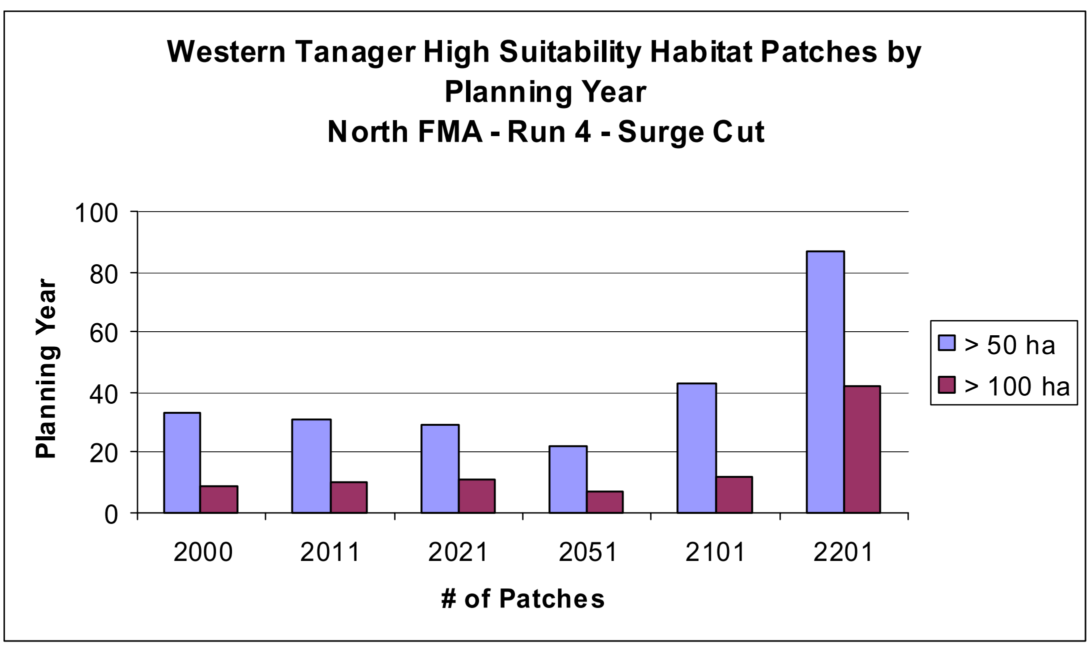
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	29	99	6	224
2011	30	107	11	182
2021	27	102	10	168
2051	20	104	8	156
2101	48	102	15	174
2201	70	167	31	291

Pileated Woodpecker

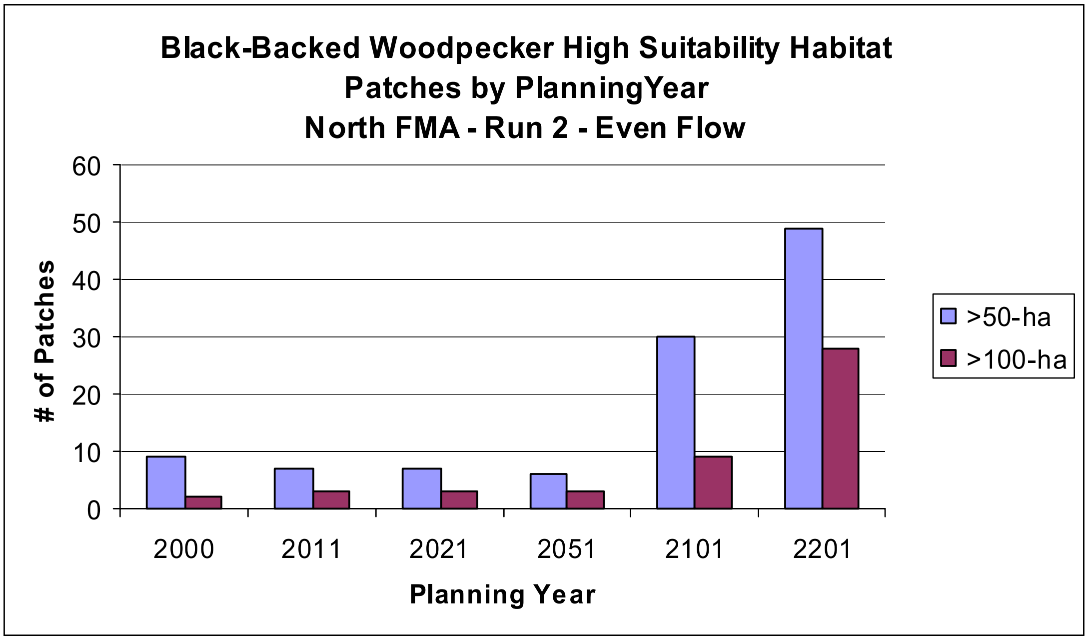
Time interval	>50-ha		>100-ha	
	Number	Mean ha	Number	Mean ha
2000	15	93	4	160
2011	20	99	7	157
2021	18	99	7	158
2051	11	107	5	157
2101	2	137	1	192
2201	1	82	0	



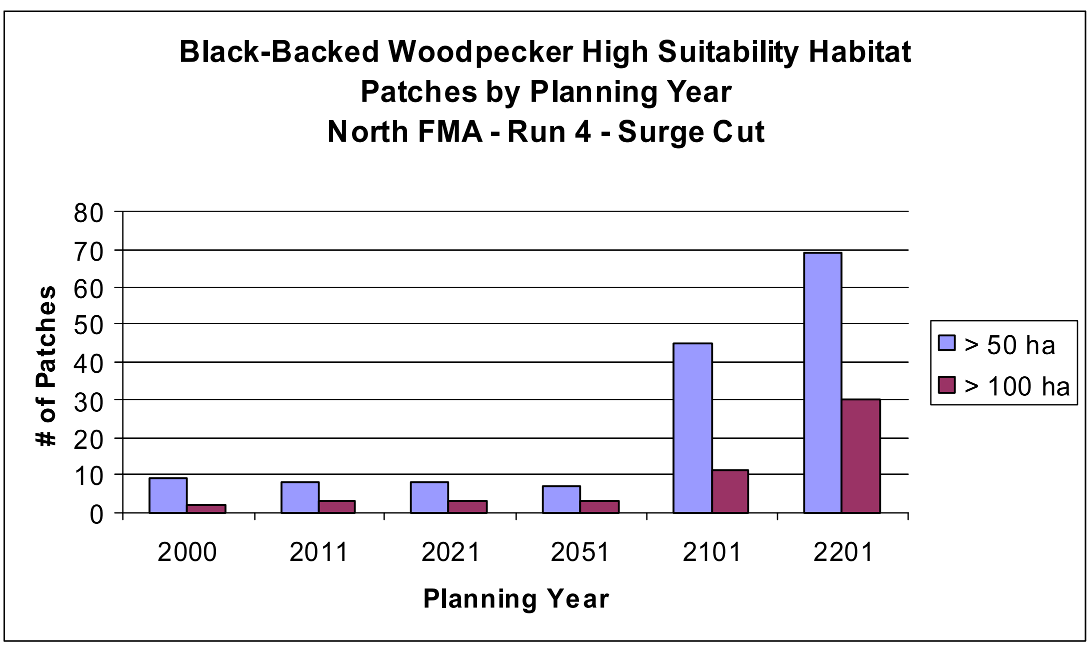
Western Tanager High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
# of Patches
70
60
50
40
30
20
10
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha



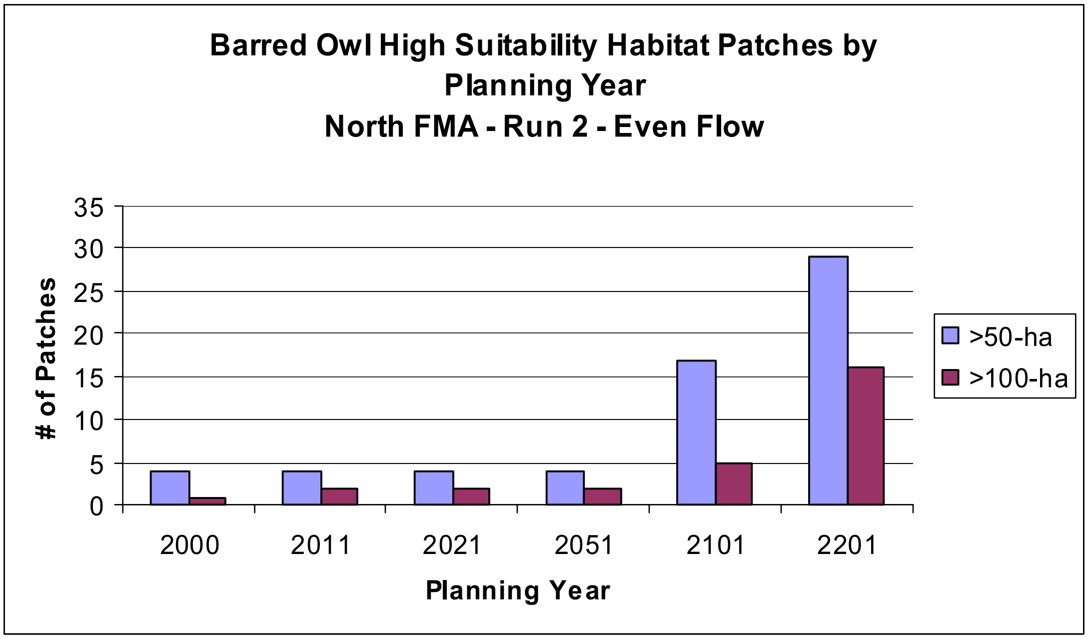
Western Tanager High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
Planning Year
100
80
60
40
20
0
2000
2011
2021
2051
2101
2201
# of Patches
> 50 ha
> 100 ha

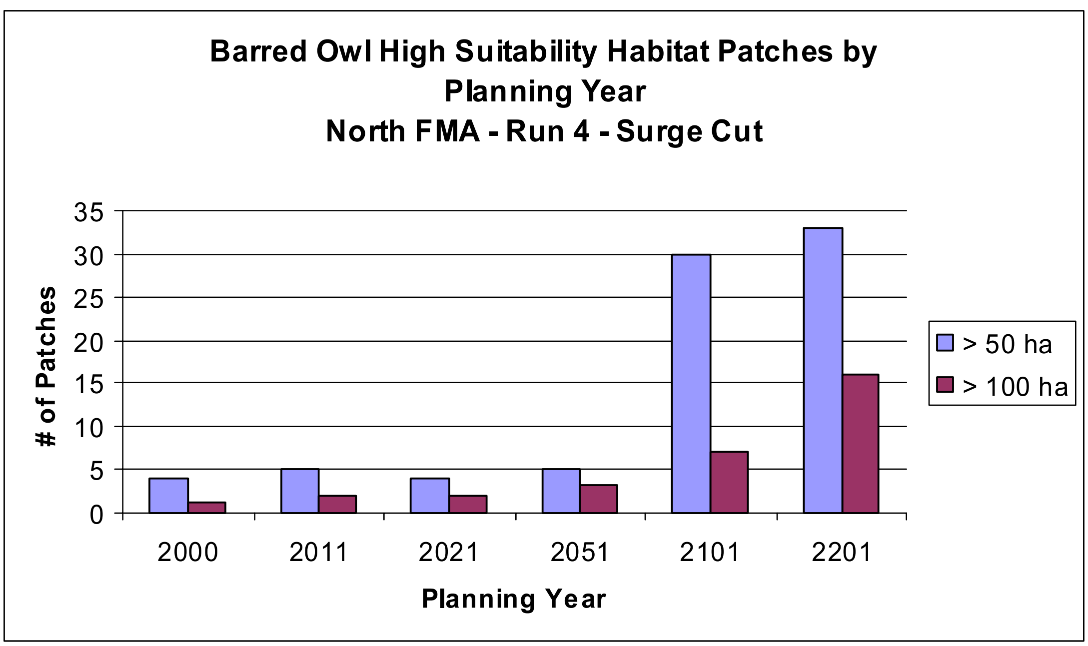


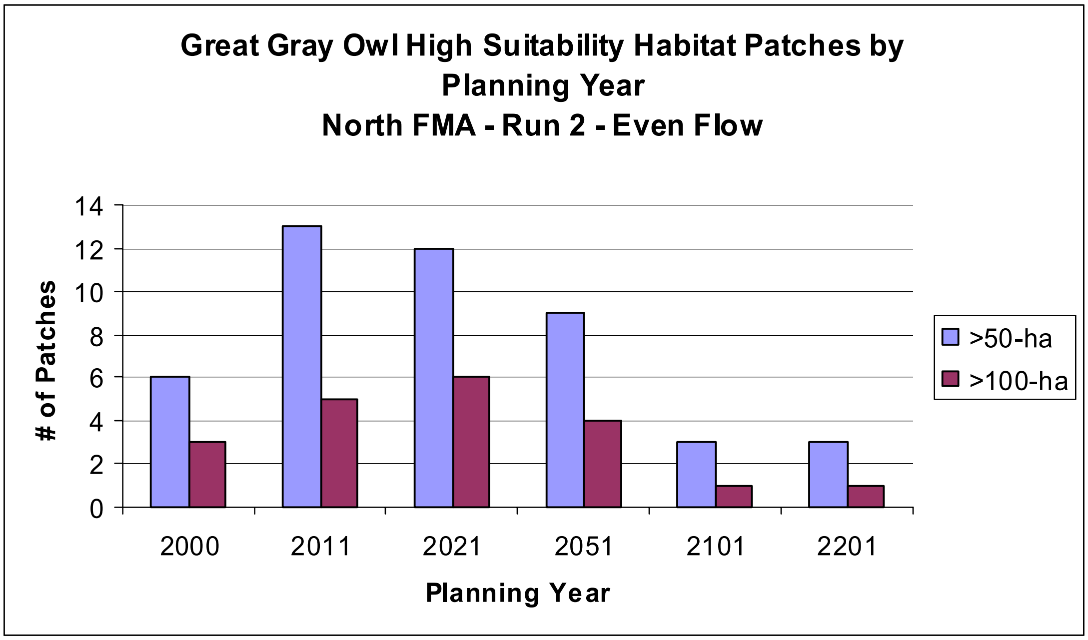
Black-Backed Woodpecker High Suitability Habitat
Patches by PlanningYear
North FMA - Run 2 - Even Flow
60
50
40
30
20
10
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

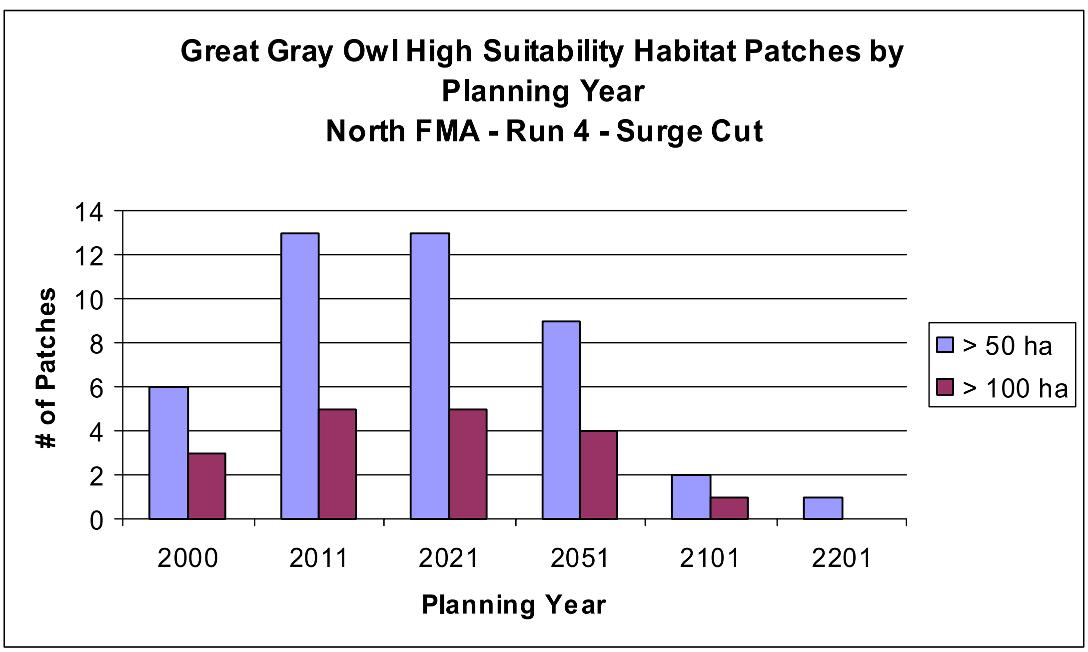


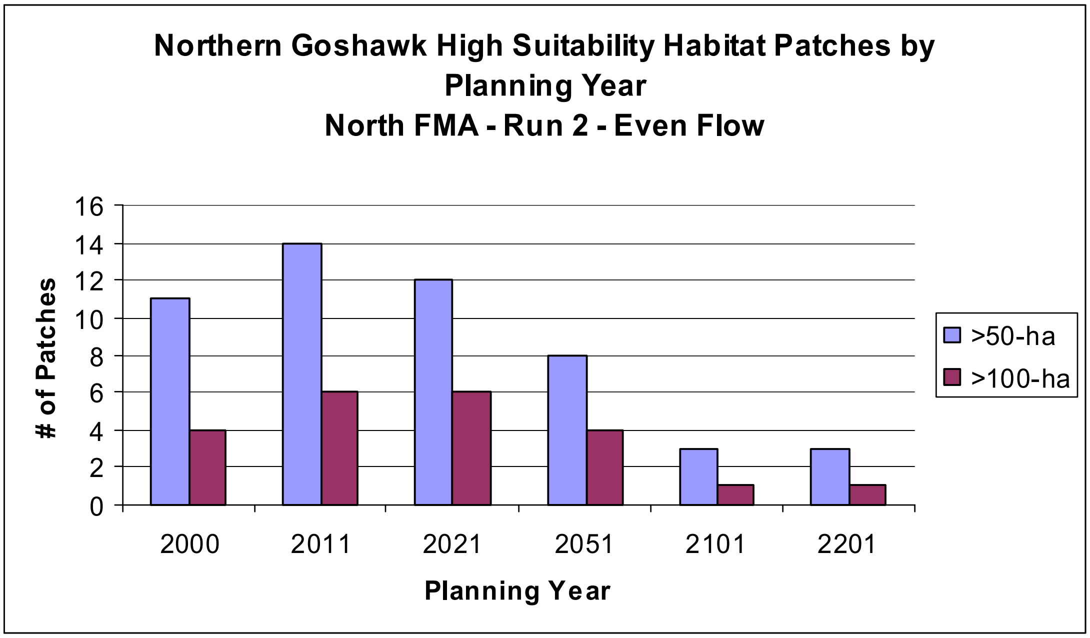
Black-Backed Woodpecker High Suitability Habitat
Patches by Planning Year
North FMA - Run 4 - Surge Cut
80
70
60
50
40
30
20
10
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Barred Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
35
30
25
20
15
10
5
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

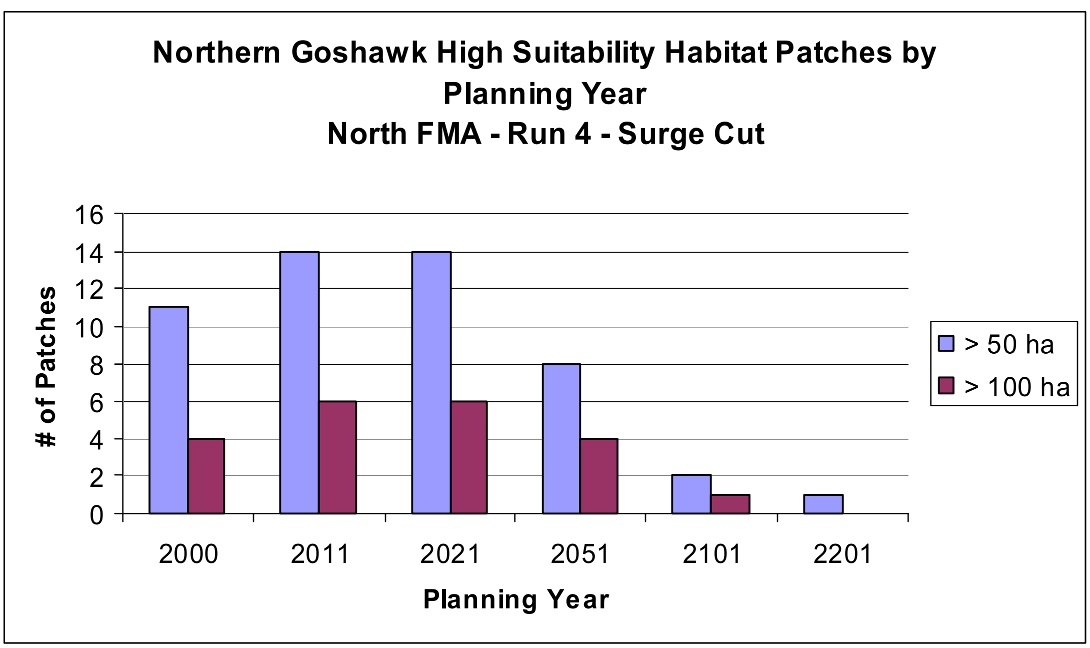

Barred Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
35
30
25
20
15
10
5
0
# of Patches
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Great Gray Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
# of Patches
14
12
10
8
6
4
2
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

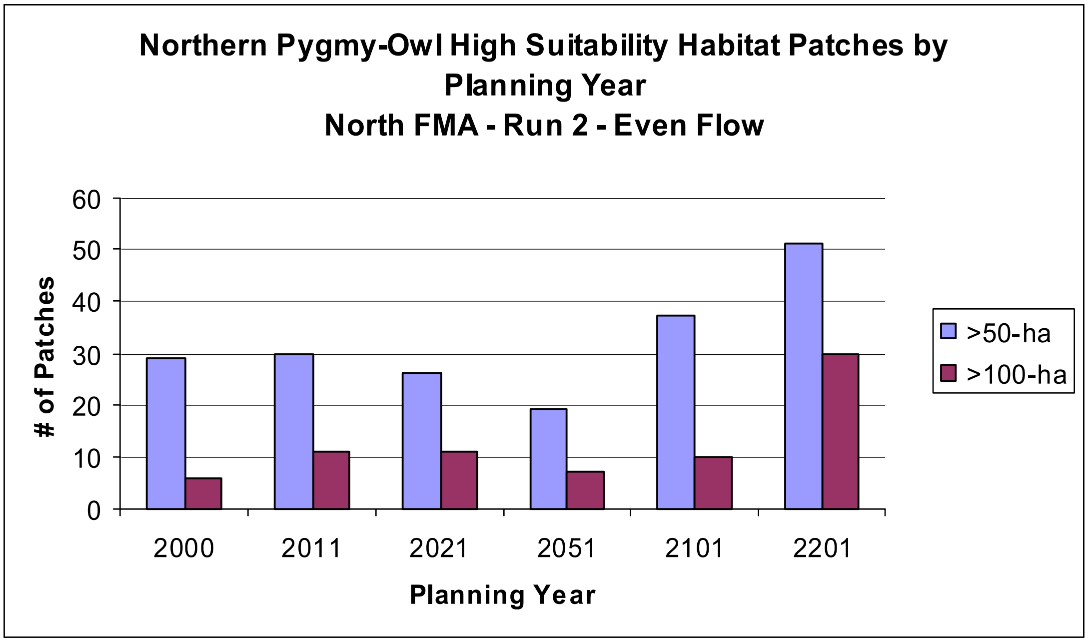

Great Gray Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
# of Patches
14
12
10
8
6
4
2
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha

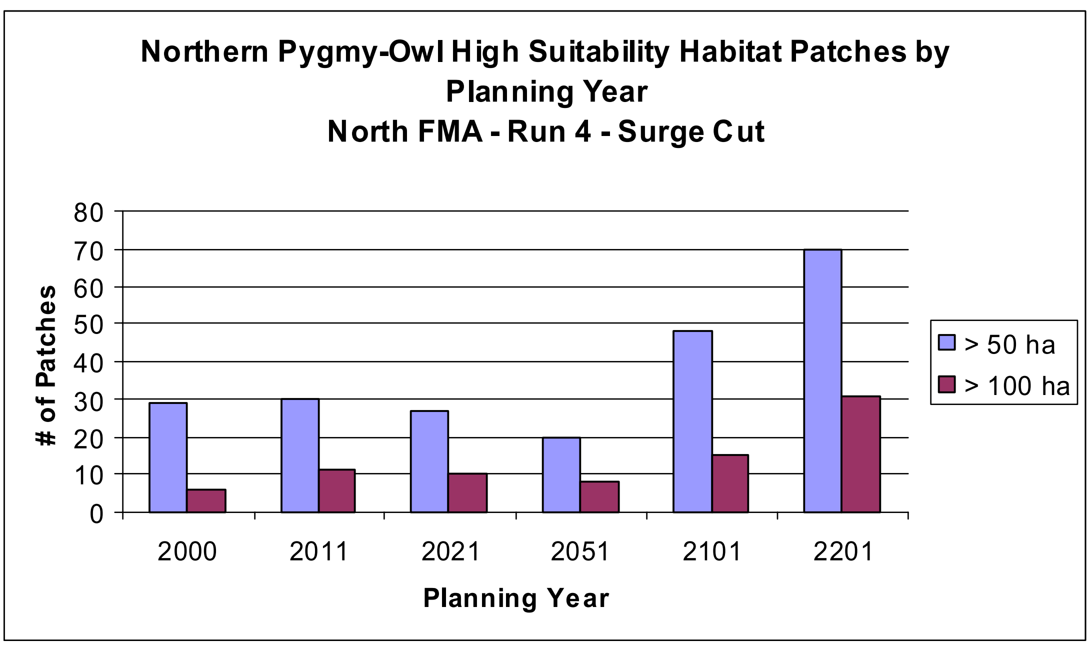


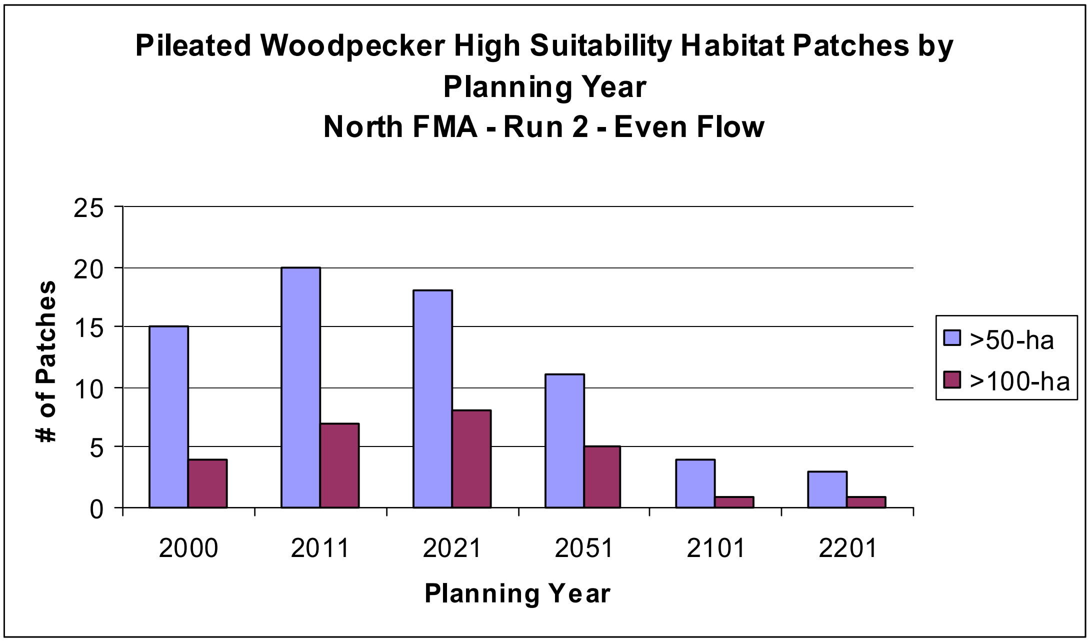
Northern Goshawk High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
# of Patches
16
14
12
10
8
6
4
2
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha

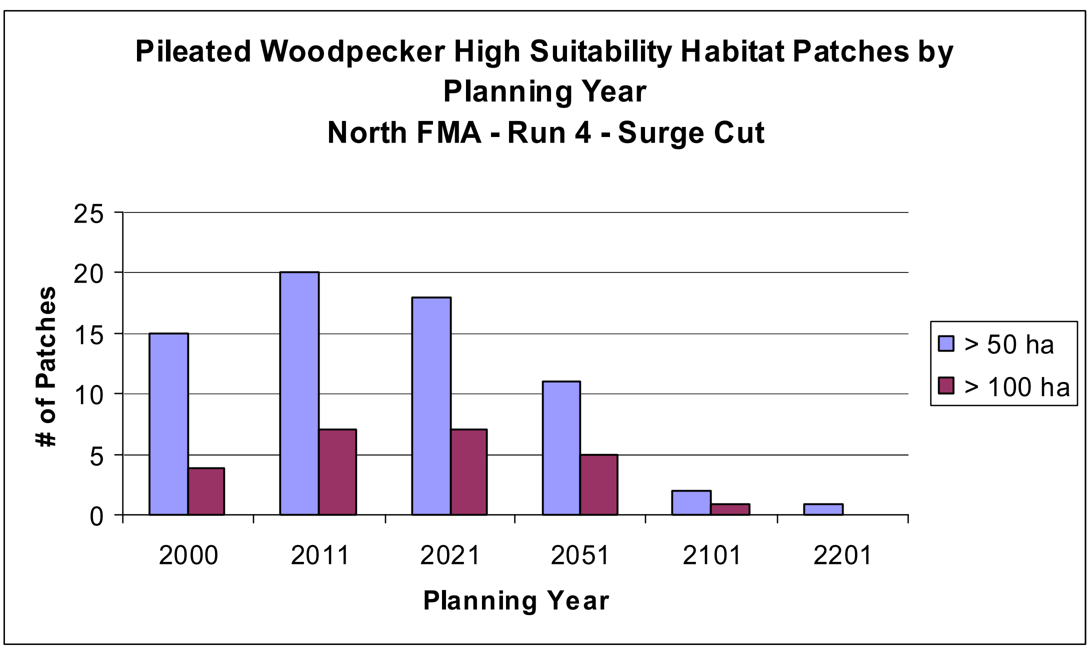


Northern Goshawk High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
# of Patches
16
14
12
10
8
6
4
2
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Northern Pygmy-Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
# of Patches
0
10
20
30
40
50
60
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha


Northern Pygmy-Owl High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
# of Patches
0
10
20
30
40
50
60
70
80
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha


Pileated Woodpecker High Suitability Habitat Patches by Planning Year
North FMA - Run 2 - Even Flow
# of Patches
25
20
15
10
5
0
2000
2011
2021
2051
2101
2201
Planning Year
>50-ha
>100-ha


Pileated Woodpecker High Suitability Habitat Patches by Planning Year
North FMA - Run 4 - Surge Cut
# of Patches
25
20
15
10
5
0
2000
2011
2021
2051
2101
2201
Planning Year
> 50 ha
> 100 ha