SPRAY LAKE SAWMILLS

Chapter 5 – Values, Objectives, Indicators, and Targets (VOITs)

2021 Forest Management Plan

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	Chapter	2	FMP Development
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1. Introduction

One of the first steps in the FMP development process is the assembly and verification of the Values, Objectives, Indicators and Targets (VOITs). This shapes how the Preferred Forest Management Strategy (PFMS) is developed, which effects how the landbase and TSA are completed. They also serve as a tool to measure the success of the execution of the FMP. The VOITs establish linkages between social, economic and ecological values identified for the FMP area and their application in forest management activities.

The Government of Alberta (GoA) provides a base set of VOITs required for forest management plans through the Alberta Forest Management Planning Standard version 4.1 (Planning Standard), which is revised on an ongoing basis to reflect policy updates. With government approval, FMA holders can modify or add to these VOITS, to address values and objectives specific to their operating area.

Spray Lake Sawmill (SLS) first incorporated VOITs into its planning process during the development of the 2007-2016 DFMP. The Plan Development Team (PDT) began the process of developing VOITs for the 2021 FMP by reviewing the provided government VOITs to ensure they aligned with SLS forest management strategies. Input from stakeholders and First Nation communities was also sought and incorporated. Note that plan commitments, including those derived from VOITs (e.g. strategies), are consolidated in *Chapter 7 – Plan Implementation and Monitoring*.

1.1 Development Approach

The approach to VOIT development was to review the base GoA VOITs internally as well as through the PDT. Following agreement within SLS and the PDT, VOITs were reviewed with the public and with First Nation communities. This approach provided a review from a broad range of stakeholders to ensure the FMP incorporated new government expectations, multiple perspectives, emerging science, and regional forest management priorities, as identified through consultation. Each VOIT underwent extensive review and discussion internally as well as at the PDT meetings and, if necessary, was amended to comply with new policies or directives, and/or ensure clarity and practicality of obligations, including monitoring and reporting requirements.

In spring of 2019, VOITs that had agreement from SLS, PDT as well as GoA were shared with stakeholders and First Nation communities through separate consultation processes that were initiated in March 2019. As described in greater detail in *Chapter 2 – FMP Development*, the draft VOITs were reviewed by SLS's Public Advisory Committee (PAC) and made available at open houses. First Nations consultation was conducted according to the requirements established by the Province's Aboriginal Consultation Office (ACO).

1.2 Agreement in Principle

Agreement In Principle (AIP) was granted on January 18th, 2019 for VOITs with the exception of VOITs 10, 14e, and 25. Conditions of the approval include:

- The AIP pertains only to the wording of the VOITs as written in the submission, it does not cover targets yet to be established;
- Wording may change based on input provided by the quota holders as well through the Public Participation Program and First Nations Consultation Program;
- The AIP does not preclude the addition of VOITs from input provided by quota holders, public and First Nation peoples;
- The AIP does not cover any yet to be submitted FMP content referred to in the VOITs; and
- VOIT approval will not occur until review of the final submission of the 2021 FMP is completed.

VOIT 10, 14e and 25 received AIP on March 28th, 2019.

1.3 VOIT Development Progress and Status Summary

This section summarizes the key interactions in the development and acceptance of VOITs. As noted, the VOITs were discussed at PDT meetings #2 through #15 (May 9, 2018 to April 22, 2020).

This section summarizes the key interactions in the VOIT development and acceptance process. Below is a brief summary of the dates in which meaningful events took place regarding VOIT development and acceptance:

May 9, 2018 – Reviewed VOITs 1 through 3 in the PDT meeting - John Stadt (GoA) provided guidance on what the GoA will be looking for in terms of targets for the first three VOITs.

August 1, 2018 – VOITs (1,2,4,5,6,9,14,15,16,25, and 28) were presented at the PDT for acceptance from the PDT members.

August 20, 2018 – Technical Team Meeting – reviewed all VOITs and identified VOITs that are ready for GoA review/AIP.

September 19, 2018 – Liana provided comments on VOITs #4,6,10,12,15,17,22,23,24,25,26,28,30,31,32.

September 26, 2018 – SLS reviewed and responded to comments. Comments have been added to individual VOITs.

October 16, 2018 – Technical Team Meeting – reviewed current status of the VOITs and prepared for PDT meeting #5.

October 17, 2018 – PDT meeting #5 – reviewed majority of VOITs and received agreement from PDT on all that was reviewed with agreed upon amendments to working (as noted in each VOIT in below sections) VOITs not reviewed: 1,2,3,10,14,15,16,25.

November 27, 2018 – PDT #6 – Discussed VOIT 14e – cold water fish, Paul was not available to discuss further. Whitebark/Limber Pine wording was reviewed for addition as VOIT 14f. Wild forest populations wording that was provided by GoA was reviewed and agreed upon.

November 29, 2018 – Comments from GoA on VOITS 1 & 3 from John Stadt (Provincial Forest Ecologist) & Comments on VOITS 15 & 16 from Deogratias Rweyongeza (Senior Geneticist). Comments recorded along with any changes to the VOITs in the section below the VOIT.

December 12, 2018 – VOITs were submitted for AIP on wording, except for outstanding VOITs (#10, 14 e & 25)

January 18, 2019 –AIP was granted on VOIT wording, except for outstanding VOITs (#10, 14 e & 25)

January 24, 2019 – PDT #7 - Discussed VOIT 14e, GoA and PDT agreement to drop VOIT 14e, which was relating to cold water fish, will be dealt with within FMP through a strategy rather than a VOIT.

March 21, 2019 – Remaining VOITs (10, 14e, 25) were submitted for AIP on wording

March 28, 2019 – AIP was granted on remaining VOIT (10, 14e, 25) wording

September 19, 2019 – GoA provided updated wording for VOIT 28

January 29, 2020 – PDT agreed on update to wording of VOIT 26 "Adherence to approved OGR buffer and/or approved OGR deviation".

May 27, 2020 – GoA provided recommendation for update to wording for VOIT 15 to remove reference to number of required genetic reserve areas as target is unavailable.

July 21, 2020 – Collaboration with City of Calgary during Milestone 3 of the public communication, two new VOITs (#33 &#34) added for water resources.

1.4 VOIT Terms and Definitions

Values: A DFA characteristic, component or quality considered by an interested party to be important in relation to the Canadian Standards Association (CSA) Sustainable Forest Management (SFM) element or other locally identified element.

Objectives: a broad statement describing a desired future state or condition of values.

Indicators: a variable that measures or describes the state of condition of a value.

Targets: a specific statement describing a desired future state of condition of an indicator. Targets should be clearly defined, time-limited, and quantified, if possible.

Means to identify target: the methodology employed to set the target(s).

Legal/policy requirements: regulatory or policy instruments.

Means of achieving objective and target: the tools and approaches that will be used in the implementation of the VOIT.

Monitoring and measurement: the methods by which implementation and success will be measured.

Reporting: how SLS intends to report on the VOIT.

Acceptable variance: the amount of variation from the stated target this is considered to have still meet the objective while not having precise met the dated target.

Responses: action to be taken when the variance from the stated target exceeds acceptable tolerances.

2. VOIT Summary Table

For reference purposes Table 2-1 provides a summary of the 2021 FMP VOITs. Additional detail for each VOIT is presented in Section 3.

Table 2-1. VOIT summary table

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
CCFM Criterion 1. Biological Diversity											
CSA SFM Element 1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)											
1	1.1.1 Landscape scale biodiversity	1.1.1.1 Maintain biodiversity by retaining the full range of cover types and seral stages	Area of old, mature, and young forest in the Defined Forest Area (DFA) by cover class. Reporting was completed using yield curve strata (HW, MIX, PL, SW).	Over the 200 year planning horizon: a) Gross landbase: greater than or equal to 36% old forest, greater than or equal to 42% mature plus old forest, less than or equal to 15% young forest; and b) Active forested landbase: greater than or equal to 15% old forest, greater than or equal to 22% mature plus old forest, less than or equal to 20% young forest. **Note:** Old forest retention shall include the full natural range of ages.	Targets and seral stage definitions shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class)	Planning Standard	Spatial Harvest Sequence (SHS).	Regular updates to inventory.	**FMP:** Tables of indicators (values and targets) at 0, 10, 50, 100 and 200 years. Maps of indicators at 0, 10 and 50 years **Performance:** 5 year - Stewardship Report (None). 10 year - Stewardship Report (Compare time 0 of previous FMP to Classified Landbase (CLB) of new FMP).	Area (ha) of old and mature forests in DFA by cover class shall be between 90% and 100% of target areas. Area of young forest in the DFA by cover class shall not exceed 110% of target area.	Adjust strategies in subsequent Forest Management Plan (FMP).
2	1.1.1 Landscape scale biodiversity	1.1.1.2 Maintain biodiversity by avoiding landscape fragmentation	Range of patch[2] sizes for forest that is 20 years of age and less for the DFA	A distribution of harvest area sizes that will result in a patch size pattern over the 200-year planning horizon that is increasing in patch size.	Targets shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class).	Planning Standard	Spatial and temporal harvest planning. Patch size distribution targets are set for forest patches less than 20 years old.	Regular updates to forest inventory.	**FMP:** Tables of area of forest in each patch size class for the DFA at 0, 10, and 50 years. Maps of patch size classes at 0, 10, and 50 years. **Performance:** 5 year - Stewardship Report (None). 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).	At the end of the 10- year FMP term the target distribution is achieved; or demonstrated progress to achieving target in one rotation where the pattern has deviated significantly from the target.	Adjust strategies in subsequent FMP.
3	1.1.1 Landscape scale biodiversity	1.1.1.2 Maintain biodiversity by avoiding landscape fragmentation	Area of old interior forest[3] in the DFA by cover class. Reporting was completed using yield curve strata (HW, MIX, PL, SW).	Area of old interior forest will not be less than 17% of HW stands, 17% of MIX stands, 21% of PL stands, and 22% of SW stands, over the next 200 years. **Note:** Target will be informed by the large amount of regional protected areas functioning within and adjacent to the DFA[4]	Targets shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class).	Planning Standard	Spatial and temporal harvest planning.	Regular updates to forest inventory.	**FMP:** Maps and tables of indicator at 0, 10, and 50 years. **Performance:** 5 year - Stewardship Report (None) 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).	Target is achieved for at least 80% of the planning period with variance not exceeding 20% below target.	Adjust strategies in subsequent FMP.
4	1.1.1 Landscape scale biodiversity	1.1.1.3 Maintain biodiversity by minimizing access	Open all-weather forestry road (DLO) density for the DFA.	Less than 0.038 km/km^2 at the time of the next FMP.	Targets shall be based on sound science, ecological considerations, harvest planning, wildlife zones, and social values.	Planning Standard	Develop a strategy that coordinates access with other resource users, spatial/temporal sequencing of harvest, road closures and decommissioning (SHS and long-term corridor access plan).	Regular updates to forest inventory and Digital Integrated Dispositions (DIDs).	**FMP**: Table of road density for the DFA at 0 and 10 years. Map of existing and proposed open and closed all weather forestry roads (DLO). Report forestry roads and total (all users) roads. **Performance**: Stewardship Reports - table and map of permanent all-weather open forestry road densities (km/km^2) for the DFA.	A variance not exceeding +/-20% must be achieved.	Adjust strategies in subsequent FMP.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
5	1.1.1 Landscape scale biodiversity	1.1.1.3 Maintain biodiversity by minimizing access	Open seasonal / temporary forestry road length by DFA. The GoA direction is to ignore gates when reporting for this item. Access management is not considered in the target.	Less than 330 km for the DFA at the time of the next FMP.	Targets shall be based on sound science, ecological considerations, harvest planning, wildlife zones, and social values.	Planning Standard	Road construction, maintenance and reclamation activities.	Road plan (Operating Ground Rule) OGR 11.2	**FMP:** Table and map of existing open seasonal/temporary forestry roads at time zero. **Performance:** Stewardship Reports - table of open seasonal / temporary forestry roads for each timber year for DFA.	A variance not exceeding +/- 20% must be achieved.	Adjust strategies in subsequent Annual Operating Plans (AOPs).
6	1.1.1 Landscape scale biodiversity	1.1.1.4 Maintain plant communities uncommon in DFA or province	Area or occurrence of each uncommon plant community within DFA.	Apply operational procedures to conserve uncommon plant communities for 100% of known and encountered occurrences.	Geographic Information System (GIS) analysis, Alberta Vegetation Inventory (AVI), ecosite phases, Alberta Conservation Information Management System (ACIMS) plant community classification and tracking list. Predict and identify occurrence of uncommon plant communities.	Planning Standard	Coordinating with other resource users, spatial planning of harvest and road construction, OGR.	Annual ACIMS database updates, regular updates to inventory.	**FMP:** Table with descriptive list and targets. Map(s) displaying known locations of uncommon plant communities. **Performance:** Stewardship Reports - summary of action taken, based on direction received from ACIMS, in the areas where uncommon plant communities have been identified.	At the end of the 10- year FMP term the target is achieved.	Adjust strategies in subsequent AOPs.
7	1.1.1 Landscape scale biodiversity	1.1.1.5 Maintain unique habitats provided by wildfire and blowdown events	Area of unsalvaged burned forest.	Live trees: Retain unburned trees in green islands and retain patches recognizing timber condition, access, non-timber needs according to the directive "Fire Salvage Planning and Operations - Directive No. 2007-01".	Targets based on "Fire Salvage Planning and Operations - Directive No. 2007-01" Ensure consistency with FireSmart objectives.	"Fire Salvage Planning and Operations - Directive No. 2007-01".	Salvage planning.	Organization reports, air photo interpretation, ground surveys, post-harvest assessments, Forest Harvest Plans (FHP).	**FMP:** Table and map of fire disturbances within the last 10 years - salvaged and unsalvaged, report on area in hectares (ha). **Performance:** Stewardship Reports - table and map of fire disturbance by DFA with percent salvaged.	At the end of the 10- year FMP term the target is achieved or exceeded.	Adjust strategies in subsequent AOPs.
8	1.1.1 Landscape scale biodiversity	1.1.1.5 Maintain unique habitats provided by wildfire and blowdown events	Area of unsalvaged blowdown.	In areas of significant blowdown (>= 100 ha) that is salvageable, a minimum of 10% will be left unsalvaged.	Targets are to be based on sound science, ecological considerations and disturbance regimes.	Planning Standard	Salvage planning.	Inventory updates, FHP.	**FMP:** None. **Performance:** Stewardship Reports - table of salvageable blowdown disturbance and the percent unsalvaged in the DFA.	At the end of the 10- year FMP term the target is achieved or exceeded.	Adjust strategies in subsequent AOPs.
9	1.1.1 Landscape scale biodiversity	1.1.1.6 Retain ecological values and functions associated with riparian zones	Compliance with OGR.	100% protection of watercourse buffers.	OGR	Federal Fisheries Act, Water Act.	Planning, Timber Supply Analysis (TSA), OGR.	Organization reports, existing compliance reporting systems	**FMP:** None **Performance:** Stewardship Reports - number and rationale of approved watercourse buffer variances as per the Timber Harvest Planning and OGRs	No variance	Immediate remedial action and / or administrativ e penalty
10	1.1.2 Local/stand scale biodiversity	1.1.2.1 Retain stand level structure	% area / volume of residual structure (both living and dead), within a harvest area, ~~as~~ outlined in the Company's structure retention document (to be provided to AAF) by DFA	3% by area to be internal to each harvest area and be representative of the pre-harvest stand composition. **Note**: A wide range in variability in harvest area level retention within the DFA is desired as long as the target level is achieved.	Implement SLS structure retention strategy and OGRs.	Occupational Health and Safety Act, Forest and Prairie Protection Act.	Implement residual structure retention strategies and OGRs.	Organization reports, cut-over photography, air photo interpretation, ground surveys, post-harvest assessments.	**FMP:** None. **Performance:** Stewardship Reports - Table of the percent of structure retention by year for the DFA.	At the end of the 10-year FMP term the target is achieved or exceeded.	Adjust strategies in subsequent FMP.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
11	1.1.2 Local/stand scale biodiversity	1.1.2.1 Retain stand level structure	Percentage of harvested area for the DFA with downed woody debris[5] equivalent to pre-harvest conditions.	75% of harvest areas having downed woody debris retained on site.	Recording utilization of downed woody debris post-harvest.	Planning Standard	Organization developed standards	Organization developed during FMP planning.	**FMP:** None **Performance:** Stewardship Reports - table showing number of harvest areas by year that received treatments that reduces downed woody debris (e.g. brush raking and prescribed burns)	None.	Adjust strategies in subsequent FMPs.
12	1.1.2 Local/stand scale biodiversity	1.1.2.2 Maintain integrity of sensitive sites	Sensitive sites (e.g. mineral licks, major game trails) as per the Operating Ground Rules that are protected in the DFA.	Strategies to maintain consistent with provincial guidelines / OGR.	Local knowledge, ACIMS, ABMI, FHPs, FWMIS.	Planning Standard	Organization developed standards for sensitive site protection, OGRs.	Organization reports, air photo interpretation, ground surveys.	**FMP:** None. **Performance:** Stewardship Reports - summary of identified sites.	None.	Adjust strategies in subsequent FHPs.
13	1.1.2 Local/stand scale biodiversity	1.1.2.3 Maintain aquatic biodiversity by minimizing impacts of water crossings	Forestry water crossings in compliance with Code of Practice for Water Course Crossings within the DFA.	Designs meet standards of the Code of Practice for Water Course Crossings and OGRs.	Code of Practice for Water Course Crossings: Sections 7, 9 and Schedule 2.	Code of Practice for Water Course Crossings.	Road construction, maintenance and reclamation activities.	Road plan OGR 11.2.	**FMP:** None. **Performance:** Stewardship Reports - number of crossings by type within standard in the DFA AOP - report number of crossings by type.	None.	Act immediately to eliminate problems and adjust strategies in subsequent AOPs.
CCFM Criterion 1. Biological Diversity											
CSA SFM Element 1.2 Species Diversity: Conserve species diversity by ensuring that habitats for the native species found in the DFA are maintained throughout time											
14	1.2.1 Viable populations of identified plant and animal species	1.2.1.1 Maintain habitat for identified high value species (i.e., economically valuable, socially valuable, species at risk, species of management concern)	**a)** Number of hectares of primary and secondary habitat from the fRI Research (fRI) Grizzly Bear model measured from May 1, 2021; **b)** Percent change in the Barred owl potential breeding pairs (habitat) and Resource Selection Function (RSF) value from May 1, 2021; **c)** Percent change in American marten habitat suitability index from May 1, 2021; **d)** Percent change in relative abundance value of three songbird species (Brown Creeper, Ovenbird, and Varied Thrush) from May 1, 2021; **e)** Maintain identified Whitebark and Limber Pine trees, saplings and seedlings.	**a)** Maintain or increase the number of hectares of primary and secondary habitat from the fRI Grizzly Bear model, as measured at time 0; **b)** Maximum 15% reduction in the breeding pairs indicator over the 200 year planning horizon and 15% reduction in the RSF indicators over the 200 year planning horizon; **c)** Maximum 15% reduction in the indicator over the 200 year planning horizon; **d)** Maximum 15% reduction in the indicator over the 200 year planning horizon; **e)** A minimum of 95% protection of all known Whitebark and Limber Pine trees, saplings and seedlings. 100% protection of GoA long term monitoring installations.	Habitat models (provided by the Government of Alberta (GoA)). Based on sound science, ecological considerations, wildlife zones, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list, provincially listed species, ABMI, ACIMS, Recovery plans, government priorities, public consultation, habitat suitability analysis, literature review, observation data, local and traditional knowledge. For Whitebark and Limber pine, use AVI in combination with company and GoA field data. GoA long term monitoring installation datasets.	Recovery plans for species at risk, Federal Species at Risk Act.	Harvesting plans, road construction, OGR, planning and implementation, adherence to provincial wildlife guidelines, adhere to SHS. For Whitebark and Limber pine, ensure protection of trees, saplings and seedlings through careful operational planning of roads and harvest areas.	Updates to vegetation inventory and habitat modelling.	**FMP:** **a)** Table and maps of current (time zero) and future (10 and 20 years) landscape condition for Core and Secondary habitat zones; **b)** Tables of breeding pairs (habitat) and RSF at 0, 10, 20, 50, 100 and 200 years and maps of RSF value and breeding pairs at 0, 10, 20 and 50 years; **c)** Tables of habitat suitability at 0, 10, 20, 50, 100 and 200 years and maps of habitat suitability at 0, 10, 20 and 50 years; **d)** Tables of relative abundance at 0, 10, 20, 50, 100 and 200 years and maps of relative abundance at 0, 10, 20 and 50 years; **e)** Variance requests impacting Whitebark and Limber pine trees, saplings and seedlings and how many individuals affected by each. **Performance:** 5 year - (a-d) Stewardship Report (None); 5 year - (e) Stewardship Report; 10 year - (a-d) Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP); and 10 year - (e) Stewardship Report (Cumulative impact of variance on Whitebark and Limber Pine trees, saplings and seedlings). Report on mitigation strategies.	At the end of the 10-year FMP term the target is achieved or exceeded.	Adjust strategies in subsequent FMP.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
CCFM Criterion 1. Biological Diversity											
CSA SFM Element 1.3 Genetic Diversity: Conserve genetic diversity by maintaining the variation of genes within species											
15	1.3.1 Genetic integrity of natural tree populations	1.3.1.1 Retain "wild[6] forest populations" for each native tree species in each seed zone through establishment of in-situ reserves by Alberta and timber disposition holders	Number and area (ha) of in-situ gene conservation areas.	Spray Lake Sawmills will coordinate work with the GoA to identify the number of required situ gene-conservation areas, some of which may not necessarily be within the DFA, with priority given to protected areas and the passive landbase.	-	Timber Management Regulation (TMR) 144.2(1). As directed by the Alberta Forest Genetic Resource Management and Conservation Standards (FGRMS).	Conservation areas are designated by a Protective or Consultative Notation (PNT, CNT).	AVI updates, ground or air checks to confirm status. FMP planning and Stewardship Reporting.	**FMP**: Table showing number of genetic conservation areas required in each seed zone and number provided in DFA. Map showing locations of genetic conservation areas. **Performance**: Stewardship Reports - report progress towards target.	At the end of the 10-year FMP term the target is achieved or exceeded.	Adjust strategies in subsequent FMP.
16	1.3.1 Genetic integrity of natural tree populations	1.3.1.2 Retain wild[6] forest genetic resources through *ex-situ* conservation	Number and composition of forest tree seed populations established in seedbanks, clone banks or trials that are satisfactory to GoA.	Active conservation program for all Controlled Parentage Program plan species and other species in cooperation with Alberta To be established by GoA based on adequate representation of native tree species in conservation efforts to genetic loss within and among seed zones.	GoA to approve legitimate sources of ex-situ seed and project targets of volume of seed required. Compare cumulative collection of ex-situ seed from various sources to projected targets from GoA, annually, for the tree species desired or determined to be at risk.	TMR 144.2(1). As directed by FGRMS.	FGRMS and GoA/Industry Genetics Cooperatives.	Conservation activities identified in FMP as per FGRMS.	**FMP**: Table and map showing number of provenances, genotypes and seedlots and their origin within the DFA. **Performance**: Stewardship Reports - not applicable until a controlled parentage program becomes active.	No variance from targets as set by GoA is anticipated. Adjustment to targets and objectives are allowable as more research and development bring new data and parameters forward.	GoA will direct any required amendments or adjustments to targets.
CCFM Criterion 1. Biological Diversity											
CSA SFM Element 1.4 Protected Areas: Respect protected areas identified through government processes											
17	1.4.1 Areas with minimal human disturbances within managed landscapes	1.4.1.1 Integrate trans boundary values and objectives into forest management	Consultation with relevant stakeholders.	Ongoing consultation with relevant protected area agencies.	Link to consultation objective in Planning Standard or other existing consultation processes.	Planning Standard.	Management and operational planning.	Documentation of consultation processes.	**FMP:** None. **Performance:** Stewardship Reports - summary of consultation with relevant protected area agencies.	None.	Adjust strategies in subsequent FMP.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
CCFM Criterion 2. Ecosystem Productivity											
CSA SFM Element 2.1 Ecosystem resilience											
18	2.1.1 Reforested harvest areas	2.1.1.1 Reforest all harvested areas	Annual % of openings that: **a)** meet or exceed the Reforestation Standard of Alberta (RSA) establishment survey minimum stocking and species composition standards for the declared regenerated yield stratum; **b)** meet or exceed the RSA establishment survey minimum stocking and species composition standards for an alternate regenerated yield stratum; and **c)** do not achieve the RSA establishment survey minimum stocking and/or species composition standards for any regenerated yield strata and are re-treated within one year. Indicators a, b and c are to be reported separately.	The sum of indicators a, b and c = 100% of openings.	Direction from GoA.	TMR 141.6(1) and 141.6(2); RSA	Implementation of silviculture strategies that ensure the target stocking and species composition is achieved for the opening.	RSA establishment survey protocols.	**FMP:** None. **Performance**: ARIS - updates to Alberta Regeneration Information System (ARIS) tables. Stewardship Reports - tables summarizing indicators a, b, and c.	None.	Adjust silviculture strategies.
19	2.1.1 Reforested harvest areas	2.1.1.2 Meet or exceed the C and D Mean Annual Increment (MAI) standard for the population of openings surveyed in a given quadrant	Summed difference between target and actual C and D MAIs for openings surveyed in a five-year quadrant, as reported to ARIS.	100% of target	Direction from GoA.	TMR 141.7(1) and 141.7(2); RSA	Implementation of silviculture strategies that ensure the target productivity is achieved for the population of openings.	RSA performance survey protocols.	**FMP:** None. **Performance**: ARIS - updates to ARIS tables. Stewardship Reports - summarize the difference between target and actual C and D MAIs for openings surveyed in a five-year quadrant, as reported to ARIS.	Meet or exceed the target C and D MAI for the DFA.	Adjust silviculture strategies.
20	2.1.2 Maintenance of forest landbase	2.1.2.1 Limit conversion of productive forest landbase to other uses	Amount of change in forest landbase.	Net change of the gross forested landbase area within the DFA.	Forest inventory and land use data.	Planning Standard	Maintain current forest cover inventory and land use updates. Promote the minimization of non-forested impacts to the landbase.	Inventory and land use systems.	**FMP:** None. **Performance**: Stewardship Reports - number of dispositions and area of disposition withdrawn from the landbase, number of dispositions returned, and area of dispositions returned to the landbase, net change to landbase area.	Report actual.	Adjust net landbase projections in next TSA.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
21	2.1.2 Maintenance of forest landbase	2.1.2.2 Recognize lands affected by insects, disease or natural calamities	Amount of area affected.	Area (ha) affected by significant forest disturbances such as insect infestations, fire, windthrow or other disturbance event.	Forest health surveys, inventory updates, fire reporting.	Planning Standard, Alberta Forest Health Strategy and Shared Roles and Responsibilities between GoA and the Forest Industry.	Maintain up-to-date information.	Annual forest health surveys.	**FMP:** None. **Performance**: Stewardship Reports - maps showing areas impacted by fire, insects, windthrow and other natural events.	Report actuals.	Event specific.
22	2.1.3 Control invasive species	2.1.3.1 Control invasive plants	Invasive plant program	Invasive plant program in place and implemented.	Weed Management in Forestry Operations Directive 2001-06.	Weed Management in Forestry Operations Directive 2001-06.	Co-operative programs.	Adherence to OGRs.	**FMP:** None. **Performance**: Stewardship Reports - summary of OGRs to prevent spread of invasive plants, and any changes to the OGRs related to invasive plants.	Report actuals.	Improve invasive plant program.
CCFM Criterion 3. Soil and water											
CSA SFM Element 3.1 Soil quantity and quality											
23	3.1.1 Soil productivity	3.1.1.1 Minimize impact of roading and bared areas in forest operations	Compliance with OGRs.	Less than 5%.	Direction from GoA.	OGRs and Soils Guidelines.	Effective planning and supervision of operations.	Field inspection reports and audits.	**FMP:** None. **Performance**: Stewardship Reports - number of approved FHP ground rule deviations related to road area variance requests.	As approved by GoA.	Immediate remedial action to correct.
24	3.1.1 Soil productivity	3.1.1.2 Minimize incidence of soil erosion and slumping	Incidence of soil erosion and slumping.	Complete compliance.	Direction from GoA.	OGRs and Soils Guidelines.	Effective planning and supervision of operations and adherence to relevant OGRs.	Field inspection reports and audits, Forest Operations Monitoring Program (FOMP).	**FMP:** None **Performance**: Stewardship Reports - reporting number of variances identified, nature of incident and corrective actions taken.	None.	Immediate remedial action to correct.
CCFM Criterion 3. Soil and water											
CSA SFM Element 3.2 Water quantity and quality											
25	3.2.1 Water quantity and quality	3.2.1.1 Limit impact of timber harvesting on water yield	Forecast impact of timber harvesting (over 200 years) on water yield.	a) Water yield = 15% (Equivalent ECA = <30%). b) Zero Water Act penalties, Complete compliance with FMP.	ECA and Water Yield Models, Water Strategy and local needs.	Water Act, Planning Standard.	Adherence to forecast harvest sequence and relevant OGRs.	SHS area variance as per OGRs.	**FMP:** Forecast ECA change by forest hydrology watershed. **Performance**: 5 year - Stewardship Report (None). 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).	< 20 percent SHS variance.	Adjust harvest pattern if problems arise.
26	3.2.2 Effective riparian habitats	3.2.2.1 Minimize impact of operations in riparian areas	Riparian buffers maintained as outlined in OGRs.	Adherence to approved OGR buffer and/or approved OGR deviation.	Direction from GoA.	OGRs.	Effective planning and supervision of operations and adherence to relevant OGRs.	Field inspection reports and GoA FOMP reporting.	**FMP:** None. **Performance**: Stewardship Reports - number and rationale of approved watercourse buffer variances as per the Timber Harvest Planning and OGRs.	None.	Immediate correction and / or administrative penalty.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
CCFM Criterion 5. Multiple Benefits to Society											
CSA SFM Element 5.1 Timber and non-timber benefits											
27	5.1.1 Sustainable timber supplies	5.1.1.1 Establish appropriate Annual Allowable Cut (AACs)	Process described in Annex 1 is followed and standards are met.	Complete compliance.	Consultation in planning process, Alberta Forest Management Planning Standard (April 2006).	Forests Act and TMR.	Effective implementation of planning process.	Multiple means: ARIS, AOPs, Stewardship Reports, field inspection, Forest Revenue Scaling and Tenure System (FOREST).	**FMP:** AAC. **Performance**: 5 year - Stewardship Reports (None). 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).	Issue specific.	Adjust AAC using most current and relevant information.
CCFM Criterion 5. Multiple Benefits to Society											
CSA SFM Element 5.2 Communities and Sustainability											
28	5.2.1 Risk to communities and landscape values from wildfire is low.	5.2.1.1 To assist the GoA in reducing wildfire threat potential by reducing fire behavior, fire occurrence, threats to values at risk and enhancing fire suppression capability	**a)** Percentage reduction in "Summer" Fire Behavior Potential area (ha) within the FireSmart Community Zone. **b)** Percentage reduction in "Summer" Fire Behavior Potential area (ha) across the DFA now and over the planning horizon.	**a)** Reduce the area (ha) in the high, very high and extreme "Summer" Fire Behavior Potential rating within the parts of FireSmart Community Zones that overlap the DFA. Targets are 17% in Bow Corridor Kananaskis Morley MD31, 25% in Bragg Creek MD 31, 22% in Coal Camp, 6% in Red Deer River, 11% in Rocky Corridor and 1% in Eden Valley IR. **b)** Reduce the area (ha) in the high, very high and extreme "Summer" Fire Behavior Potential rating across the DFA by 16% over 20 years.	Fire Behaviour Potential and Fuel Grid Assessment (Annex 3 Report Provided to Forest Management Agreement (FMA) Holder). FMA Holder assessment of the SHS developed using recommendations from Annex 3 Report.	Planning Standard.	SHS, thinning, partial harvest techniques, FireSmart Treatments.	AOPs, Compartment Assessments.	**FMP**: Maps of Fire Behaviour Potential, Fuel Grid, Historical Wildfires and Natural Subregions (Generated by the GoA). **Performance**: Stewardship Reports - report on actual harvested area a) and b).	Issue specific.	Adjust approach in future FMPs.
29	5.2.2 Provide opportunities to derive benefits and participate in use and management	5.2.2.1 Integrate other uses and timber management activities	**a)** Extent of various uses. **b)** Recreational trail integration. **c)** Forest aesthetics.	**a)** Annual opportunity for public input on harvest plans. **b)** Integrate recreational trails as indicated in the Timber Harvest Planning and Operating Ground Rules. **c)** Integrate forest aesthetics as indicated in the Timber Harvest Planning and Operating Ground Rules and Visual Quality Strategy.	Consultation and co-operation.	Legislation and policy.	Effective implementation of plans.	Consultation Tracking.	**FMP:** None. **Performance**: Stewardship Reports - summary of opportunities, by year, for public input on harvest plans.	Issue specific.	Adjust activities.
30	5.2.3 Forest Productivity	5.2.3.1 Maintain Long Run Sustained Yield Average (LRSYA)	Regenerated stand yield compared to natural stand yield.	No net decrease from the natural stand productivity.	FMP TSA.	Planning Standard.	Effective implementation of plans.	Future FMP RSA (MAI).	**FMP:** Table of comparison of natural versus managed MAI. **Performance**: TSA 5 year - Stewardship Report (none) 10 year - Stewardship Report (compare time 0 of previous FMP to CLB of new FMP)	Report actual.	Adjust AAC in next FMP using most current and relevant information.

ID	Value	Objective	Indicator	Target	Means to Identify Target	Legal / Policy Requirements	Means of Achieving Objective and Target[1]	Monitoring and Measurement	Reporting	Acceptable Variance	Response
CCFM Criterion 6. Accepting society's responsibility for sustainable development											
CSA SFM Element 6.1 Indigenous and treaty rights and Indigenous forest values											
31	6.1.1 Compliance with government regulations and policies	6.1.1.1 Implement Indigenous Consultation Plan	Meet Alberta's current expectations for Indigenous consultation.	Consult at the community level with designated representatives of affected Indigenous communities.	The GoA Indigenous Consultation and Policy Guidelines.	GoA guidelines on consultation with Indigenous communities on Land and Natural Resource Management.	Effective implementation of Indigenous Consultation Plan.	Indigenous Relations/Alberta Agriculture and Forestry consultation adequacy letter.	**FMP:** Results of consultation, and how it has been incorporated in the plan. **Performance**: Stewardship Reports.	None.	Adjust activities - issue specific.
CCFM Criterion 6. Accepting society's responsibility for sustainable development											
CSA SFM Element 6.2 Public participation and information for decision-making											
32	6.2.1 Meaningful public participation is achieved	6.2.1.1 Implement Public Participation Process	Meet expectations of Section 5 of CSA Z809-02.	Implementation of Spray Lake Sawmills' (SLS) Public Participation Program.	SLS public participation program.	Planning Standard.	Effective implementation of Public Participation Process.	SLS public communication database.	**FMP:** Summary of the Public Participation Program for FMP development. **Performance**: Stewardship Reports.	None.	Adjust activities.
Criterion 7. Water Resources – Additional VOITs											
33	7.1.1 Water quantity for provision of drinking water (natural organic matter)	7.1.1.1 Minimize impact of operations on the treatability of drinking water	Contributions of nutrients and NOM (natural organic matter).	No significant increase in nutrients and NOM.	SSRP, City of Calgary long term monitoring data and SWPP.	SSRP, Water for Life Strategy.	Water quality monitoring in collaboration with City of Calgary, GOA and researchers.	SHS area variance as per OGRs.	**FMP:** None. **Performance:** Stewardship reports - area of burned forest (fire size > 1 ha) within the Calgary source water area (where forestry activities are permitted) Future FMP - to be determined with City of Calgary.	Issue specific.	Issue specific adjustments.
34	7.1.2 Water quality for provision of drinking water (fire risk)	7.2.1.1 Reduce the potential for catastrophic wildfire which may impair drinking water treatment	3.2.4 Water quality for provision of drinking water	To be determined collaboratively with GOA and other stakeholders (i.e. municipalities).	GoA fire risk mapping and City of Calgary wildfire taskforce, 2021 FMP SHS.	Water for Life Strategy.	Harvesting activity in high risk areas.	Documentation of activities.	**FMP:** Updated wildfire risk mapping by GOA. **Performance:** Stewardship reports and next FMP - Reduction in fire hazard, from forest harvesting, within the Calgary source water area.	Any reduction of fire risk to drinking water supplies is acceptable.	Adjust harvesting plans as needed.

Footnotes:
[1] Items noted under the "Means to Identify Target" and "Means of Achieving Objective and Target" are intended as suggestions and not meant to limit potential approaches. The list is not comprehensive or mandatory.
[2] Patch: a stand of forest in the same seral stage, and not split by a linear feature greater than 8m wide. Linear features in this definition includes roads, pipelines, powerlines, and rivers, but does not include seismic lines.
[3] Old Interior Forest: Old interior forest patches are defined as any patch greater than 120 ha that is composed of stands greater than 120 years old, using a 8m adjacency distance.
[4] Protected Area Representation GAP Analysis - Spray Lake Sawmills FMA/B9 Areas - July, 2013
[5] Downed Woody Debris: wood lying at an angle of less than 45 degrees from the ground and having a diameter greater than 7.5 cm.
[6] Wild: genetic materials of native species originating from natural regeneration (FGRMS).

3. Detailed VOITs

The following section provides more detailed information regarding each of the VOITs in the 2021 FMP than the VOIT table summary in Section 2. It also provides expanded indicator definitions and context on the past history of each VOIT from the previous 2007 DFMP.

The VOITs are presented in the same order as in the VOIT table provided in Section 2 of this chapter and can be quickly referenced using the information in heading level 2:

- VOIT index number;
- GoA VOIT hierarchy numbering; and
- A short descriptive name.

3.1 Biological Diversity

3.1.1 VOIT 1 (1.1.1.1) – Seral Stages

3.1.1.1 CCFM Criterion:	1 Biological Diversity
3.1.1.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.1.3 Value:	1.1.1 Landscape scale biodiversity
3.1.1.4 Objective:	1.1.1.1 Maintain biodiversity by retaining the full range of cover types and seral stages

3.1.1.5 Indicator

Area of old, mature, immature, and young forest in the DFA by cover class. Reporting was completed using yield curve strata (HW, MIX, PL, SW).

3.1.1.6 Target

Over the 200-year planning horizon:

a) Gross landbase: greater than or equal to 36% old forest, greater than or equal to 42% mature plus old forest, less than or equal to 15% young forest; and
b) Active forested landbase: greater than or equal to 15% old forest, greater than or equal to 22% mature plus old forest, less than or equal to 20% young forest.

Note: Old forest retention shall include the full natural range of ages.

Refer to Section 4.1.1 (Table 4-3, Table 4-4) for more information.

3.1.1.7 Means to Identify Target

Targets and seral stage definitions shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class).

3.1.1.8 Legal/Policy Requirements

Planning Standard.

3.1.1.9 Means of Achieving Objective and Target

Spatial Harvest Sequence (SHS).

3.1.1.10 Target Monitoring and Measurement

Regular updates to inventory.

3.1.1.11 Reporting

FMP: Tables of indicators (values and targets) at 0, 10, 50, 100 and 200 years. Maps of indicators at 0, 10 and 50 years.

Performance:

- 5 year - Stewardship Report (None);
- 10 year - Stewardship Report [Compare time 0 of previous FMP to Classified Landbase (CLB) of new FMP].

Refer to Section 4.1.1 and tables and maps within for reporting outputs.

3.1.1.12 Acceptable Variance

Area (ha) of old and mature forests in each DFA subunit by cover class shall be between 90% and 100% of target areas. Area of young forest in each DFA subunit by cover class shall not exceed 110% of target area.

3.1.1.13 Response

Adjust strategies in subsequent Forest Management Plan (FMP).

3.1.1.14 Definitions

Seral Stages: A stage in forest succession. Spray Lake Sawmills 2021-2031 FMP uses the GoA directed seral stage classes shown in Table 3-1.

Table 3-1. Seral stage definitions used for reporting

Stratum	Young	Immature	Mature	Old	Very Old
FD	1 - 19	20 - 79	80 - 119	120 - 179	180+
HW	1 - 19	20 - 79	80 - 119	120 - 179	180+
HWPL	1 - 19	20 - 79	80 - 119	120 - 179	180+
HWSX	1 - 19	20 - 79	80 - 119	120 - 179	180+
PL	1 - 19	20 - 79	80 - 119	120 - 179	180+
PLHW	1 - 19	20 - 79	80 - 119	120 - 179	180+
SB	1 - 19	20 - 79	80 - 119	120 - 179	180+
SW	1 - 19	20 - 79	80 - 119	120 - 179	180+
SWHW	1 - 19	20 - 79	80 - 119	120 - 179	180+

Yield Curve Strata:

The yield curve strata are HW (hardwood), MIX (mixedwood, includes MIXPL and MIXSW), PL (lodgepole pine), SW (white spruce).

3.1.1.15 History

VOIT similar to the Issue/Value #4 – *Biodiversity and Wildlife*, objective 4.1.2 - *Maintain the natural vegetation range of variability across the landscape at key points in time* in the 2007 FMP, the 2021 FMP VOIT adds additional statement about spatial distribution of patches.

3.1.2 VOIT 2 (1.1.1.2a) – Patch Sizes

3.1.2.1 CCFM Criterion:	1 Biological Diversity
3.1.2.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.2.3 Value:	1.1.1 Landscape scale biodiversity
3.1.2.4 Objective:	1.1.1.2a Maintain biodiversity by avoiding landscape fragmentation

3.1.2.5 Indicator

Range of patch sizes for forest that is 20 years of age and less for the DFA.

3.1.2.6 Target

A distribution of harvest area sizes that will result in a patch size pattern over the 200-year planning horizon that is increasing in patch size. Targets for the year 2031 are found in Section 4.1.2 (Table 4-5).

3.1.2.7 Means to Identify Target

Targets shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class).

3.1.2.8 Legal/Policy Requirements

Planning Standard.

3.1.2.9 Means of Achieving Objective and Target

Spatial and temporal harvest planning. Patch size distribution targets are set for forest patches less than 20 years old.

3.1.2.10 Target Monitoring and Measurement

Regular updates to forest inventory.

3.1.2.11 Reporting

FMP: Tables of area of forest in each patch size class for the DFA at 0, 10, and 50 years. Maps of patch size classes at 0, 10, and 50 years

Performance:

- 5 year - Stewardship Report (None);
- 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).

3.1.2.12 Acceptable Variance

At the end of the 10- year FMP term the target distribution is achieved; or demonstrated progress to achieving target in one rotation where the pattern has deviated significantly from the target.

3.1.2.13 Response

Adjust strategies in subsequent FMP.

3.1.2.14 Definitions

Patch: a stand of forest in the same seral stage, and not split by a linear feature greater than 8m wide. Linear features in this definition includes roads, pipelines, powerlines, and rivers, but does not include seismic lines.

3.1.2.15 History

VOIT similar to the Issue/Value #4 – *Biodiversity and Wildlife*, objective 4.1.2 - *Maintain the natural vegetation range of variability across the landscape at key points in time* in the 2007 FMP, the 2021 FMP VOIT adds additional statement about spatial distribution of patches.

3.1.3 VOIT 3 (1.1.1.2b) – Old Interior Forest

3.1.3.1 CCFM Criterion:	1 Biological Diversity
3.1.3.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.3.3 Value:	1.1.1 Landscape scale biodiversity
3.1.3.4 Objective:	1.1.1.2b Maintain biodiversity by avoiding landscape fragmentation

3.1.3.5 Indicator

Area of old interior forest of each cover class for the DFA. Reporting was completed using yield curve strata (HW, MIX, PL, SW).

3.1.3.6 Target

Area of old interior forest will not be less than 17% of HW stands, 17% of MIX stands, 21% of PL stands, and 22% of SW stands, over the next 200 years.

Refer to Section 4.1.3 (Table 4-6, Table 4-7) for more information.

Note: Target will be informed by the large amount of regional protected areas functioning within and adjacent to the DFA (Protected Area Representation GAP Analysis - Spray Lake Sawmills FMA/B9 Areas - July 2013).

3.1.3.7 Means to Identify Target

Targets shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes. Target shall ensure representation of natural range of ecosystem attributes (e.g. productivity class).

3.1.3.8 Legal/Policy Requirements

Planning Standard.

3.1.3.9 Means of Achieving Objective and Target

Spatial and temporal harvest planning.

3.1.3.10 Target Monitoring and Measurement

Regular updates to forest inventory.

3.1.3.11 Reporting

FMP: Maps and tables of indicator at 0, 10, and 50 years.

Performance:

- 5 year - Stewardship Report (None);

- 10 year - Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP).

3.1.3.12 Acceptable Variance

Target is achieved for at least 80% of the planning period with variance not exceeding 20% below target.

3.1.3.13 Response

Adjust strategies in subsequent FMP.

3.1.3.14 Definitions

Old Interior Forest: Old interior forest patches are defined as any patch greater than 120 ha that is composed of stands greater than 120 years old, using an 8m adjacency distance.

3.1.3.15 History

VOIT similar to the Issue/Value #4 – *Biodiversity and Wildlife*, objective 4.1.2 - *Maintain the natural vegetation range of variability across the landscape at key points in time* in the 2007 FMP, the 2021 FMP VOIT adds additional statement about spatial distribution of patches & old interior forest.

3.1.4 VOIT 4 (1.1.1.3a) – All-Weather Permanent Forestry Roads

3.1.4.1 CCFM Criterion:	1 Biological Diversity
3.1.4.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.4.3 Value:	1.1.1 Landscape scale biodiversity
3.1.4.4 Objective:	1.1.1.3a Maintain biodiversity by minimizing access

3.1.4.5 Indicator

Open all-weather forestry road (DLO) density for the DFA.

3.1.4.6 Target

Less than 0.038 km/km^2 at the time of the next FMP.

3.1.4.7 Means to Identify Target

Targets shall be based on sound science, ecological considerations, harvest planning, wildlife zones, and social values.

3.1.4.8 Legal/Policy Requirements

Planning Standard.

3.1.4.9 Means of Achieving Objective and Target

Develop a strategy that coordinates access with other resource users, spatial/temporal sequencing of harvest, road closures and decommissioning (SHS and long-term corridor access plan). See *Chapter 7 – Plan Implementation and Monitoring* Section 3.

3.1.4.10 Target Monitoring and Measurement

Regular updates to forest inventory and Digital Integrated Dispositions (DIDs).

3.1.4.11 Reporting

FMP: Table of road density for the DFA at 0 and 10 years. Map of existing and proposed open and closed all weather forestry roads (DLO). Report forestry roads and total (all users) roads.

Performance:

- Stewardship Reports - table and map of permanent all-weather open forestry road densities (km/km^2) for the DFA

3.1.4.12 Acceptable Variance

A variance not exceeding +/-20% must be achieved.

3.1.4.13 Response

Adjust strategies in subsequent FMP.

3.1.4.14 History

VOIT similar to the Issue/Value #1 – *Access Management*, objective 1 - . *Minimize the impact of access development on the environment and other land uses* in the 2007 FMP.

3.1.5 VOIT 5 (1.1.1.3b) – Open Seasonal/Temporary Forestry Roads

3.1.5.1 CCFM Criterion:	1 Biological Diversity
3.1.5.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.5.3 Value:	1.1.1 Landscape scale biodiversity
3.1.5.4 Objective:	1.1.1.3b Maintain biodiversity by minimizing access

3.1.5.5 Indicator

Open seasonal / temporary forestry road length by DFA. The GoA direction is to ignore gates when reporting for this item. Access management is not considered in the target.

3.1.5.6 Target

Less than 330 km for the DFA.

3.1.5.7 Means to Identify Target

Targets shall be based on sound science, ecological considerations, harvest planning, wildlife zones, and social values.

3.1.5.8 Legal/Policy Requirements

Planning Standard.

3.1.5.9 Means of Achieving Objective and Target

Road construction, maintenance and reclamation activities.

3.1.5.10 Target Monitoring and Measurement

Road plan (Operating Ground Rule) OGR 11.2.

3.1.5.11 Reporting

FMP: Table and map of existing open seasonal / temporary forestry roads at time zero.

Performance:

- Stewardship Reports - table of open seasonal / temporary forestry roads for each timber year for DFA.

3.1.5.12 Acceptable Variance

A variance not exceeding +/- 20% must be achieved.

3.1.5.13 Response

Adjust strategies in subsequent Annual Operating Plans (AOPs).

3.1.5.14 History

VOIT similar to the Issue/Value #1 – *Access Management*, objective 1 - . *Minimize the impact of access development on the environment and other land uses* in the 2007 FMP.

3.1.6 VOIT 6 (1.1.1.4) – Uncommon Plant Community

3.1.6.1 CCFM Criterion:	1 Biological Diversity
3.1.6.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.6.3 Value:	1.1.1 Landscape scale biodiversity
3.1.6.4 Objective:	1.1.1.4 Maintain plant communities uncommon in DFA or province

3.1.6.5 Indicator

Area or occurrence of each uncommon plant community within DFA.

3.1.6.6 Target

Apply operational procedures to conserve uncommon plant communities for 100% of known and encountered occurrences. See *Chapter 7 – Plan Implementation and Monitoring* Section 8.1.5 for details.

3.1.6.7 Means to Identify Target

Geographic Information System (GIS) analysis, Alberta Vegetation Inventory (AVI), ecosite phases, Alberta Conservation Information Management System (ACIMS) plant community classification and tracking list. Predict and identify occurrence of uncommon plant communities.

3.1.6.8 Legal/Policy Requirements

Planning Standard.

3.1.6.9 Means of Achieving Objective and Target

Coordinating with other resource users, spatial planning of harvest and road construction, OGR.

3.1.6.10 Target Monitoring and Measurement

Annual ACIMS database updates, regular updates to inventory.

3.1.6.11 Reporting

FMP: Table with descriptive list and targets. Map(s) displaying known locations of uncommon plant communities.

Performance:

- Stewardship Reports - summary of action taken, based on direction received from ACIMS, in the areas where uncommon plant communities have been identified.

3.1.6.12 Acceptable Variance

At the end of the 10- year FMP term the target is achieved.

3.1.6.13 Response

Adjust strategies in subsequent AOPs.

3.1.6.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.1 - *Gain an understanding of the vegetative diversity across the FMA* in the 2007 FMP.

3.1.7 VOIT 7 (1.1.1.5a) – Unsalvaged Burned Forest

3.1.7.1 CCFM Criterion:	1 Biological Diversity
3.1.7.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.7.3 Value:	1.1.1 Landscape scale biodiversity
3.1.7.4 Objective:	1.1.1.5a Maintain unique habitats provided by wildfire and blowdown events

3.1.7.5 Indicator

Area of unsalvaged burned forest.

3.1.7.6 Target

Live trees: Retain unburned trees in green islands and retain patches recognizing timber condition, access, non-timber needs according to the directive "Fire Salvage Planning and Operations - Directive No. 2007-01".

3.1.7.7 Means to Identify Target

Targets based on "Fire Salvage Planning and Operations - Directive No. 2007-01" Ensure consistency with FireSmart objectives.

3.1.7.8 Legal/Policy Requirements

"Fire Salvage Planning and Operations - Directive No. 2007-01".

3.1.7.9 Means of Achieving Objective and Target

Salvage planning.

3.1.7.10 Target Monitoring and Measurement

Organization reports, air photo interpretation, ground surveys, post-harvest assessments, Forest Harvest Plans (FHP).

3.1.7.11 Reporting

FMP: Table and map of fire disturbance within the last 10 years - salvaged and unsalvaged, report on area in hectares (ha).

Performance:

- Stewardship Reports - table and map of fire disturbance by DFA with percent salvaged.

3.1.7.12 Acceptable Variance

At the end of the 10-year FMP term the target is achieved or exceeded.

3.1.7.13 Response

Adjust strategies in subsequent AOPs.

3.1.7.14 History

Not previously addressed through 2007 DFMP Values.

3.1.8 VOIT 8 (1.1.1.5b) – Unsalvaged Blowdown

3.1.8.1 CCFM Criterion:	1 Biological Diversity
3.1.8.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.8.3 Value:	1.1.1 Landscape scale biodiversity
3.1.8.4 Objective:	1.1.1.5b Maintain unique habitats provided by wildfire and blowdown events

3.1.8.5 Indicator

Area of unsalvaged blowdown.

3.1.8.6 Target

In areas of significant salvageable blowdown (>= 100 ha) a minimum of 10% will be left unsalvaged.

3.1.8.7 Means to Identify Target

Targets are to be based on sound science, ecological considerations and disturbance regimes.

3.1.8.8 Legal/Policy Requirements

Planning Standard.

3.1.8.9 Means of Achieving Objective and Target

Salvage planning.

3.1.8.10 Target Monitoring and Measurement

Inventory updates, FHP.

3.1.8.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - table of salvageable blowdown disturbance and % unsalvaged in the DFA.

3.1.8.12 Acceptable Variance

At the end of the 10-year FMP term the target is achieved or exceeded.

3.1.8.13 Response

Adjust strategies in subsequent AOPs.

3.1.8.14 History

Not previously addressed through 2007 DFMP Values.

3.1.9 VOIT 9 (1.1.1.6) – OGR Compliance

3.1.9.1 CCFM Criterion:	1 Biological Diversity
3.1.9.2 CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.9.3 Value:	1.1.1 Landscape scale biodiversity
3.1.9.4 Objective:	1.1.1.6 Retain ecological values and functions associated with riparian zones

3.1.9.5 Indicator

Compliance with OGR.

3.1.9.6 Target

100% protection of watercourse buffers.

3.1.9.7 Means to Identify Target

OGR.

3.1.9.8 Legal/Policy Requirements

Federal Fisheries Act, Water Act.

3.1.9.9 Means of Achieving Objective and Target

Planning, Timber Supply Analysis (TSA), OGR.

3.1.9.10 Target Monitoring and Measurement

Organization reports, existing compliance reporting systems.

3.1.9.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - number and rationale of approved watercourse buffer variances as per the Timber Harvest Planning and OGRs

3.1.9.12 Acceptable Variance

No variance.

3.1.9.13 Response

Immediate remedial action and / or administrative penalty.

3.1.9.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.4 - *Retain structural attributes within harvested areas and fire salvage areas* in the 2007 FMP.

3.1.10 VOIT 10 (1.1.2.1a) – Structure Retention

3.1.10.1	CCFM Criterion:	1 Biological Diversity
3.1.10.2	CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.10.3	Value:	1.1.2 Local/stand scale biodiversity
3.1.10.4	Objective:	1.1.2.1a Retain stand level structure

3.1.10.5 Indicator

% area / volume of residual structure (both living and dead), within a harvest area, as outlined in the Company's structure retention document (to be provided to AAF) by DFA.

3.1.10.6 Target

3% by area to be internal to each harvest area and be representative of the pre-harvest stand composition. See *Chapter 7 – Plan Implementation and Monitoring* Appendix I – Structure Retention Strategy for further details.

Note: A wide range in variability in harvest area level retention within the DFA is desired as long as the target level is achieved.

3.1.10.7 Means to Identify Target

Implement SLS structure retention strategy and OGRs.

3.1.10.8 Legal/Policy Requirements

Occupational Health and Safety Act, Forest and Prairie Protection Act.

3.1.10.9 Means of Achieving Objective and Target

Implement residual structure retention strategies and OGRs.

3.1.10.10 Target Monitoring and Measurement

Organization reports, cut-over photography, air photo interpretation, ground surveys, post harvest assessments.

3.1.10.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - table of the percent of structure retention by year for the DFA.

3.1.10.12 Acceptable Variance

At the end of the 10-year FMP term the target is achieved or exceeded.

3.1.10.13 Response

Adjust strategies in subsequent FMP.

3.1.10.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.4 - *Retain structural attributes within harvested areas and fire salvage areas* in the 2007 FMP.

3.1.11 VOIT 11 (1.1.2.1b) – Downed Woody Debris

3.1.11.1	CCFM Criterion:	1 Biological Diversity
3.1.11.2	CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.11.3	Value:	1.1.2 Local/stand scale biodiversity
3.1.11.4	Objective:	1.1.2.1b Retain stand level structure

3.1.11.5 Indicator

Percentage of harvested area for the DFA with downed woody debris equivalent to pre-harvest conditions.

3.1.11.6 Target

75% of harvest areas having downed woody debris retained on site.

3.1.11.7 Means to Identify Target

Recording utilization of downed woody debris post-harvest.

3.1.11.8 Legal/Policy Requirements

Planning Standard.

3.1.11.9 Means of Achieving Objective and Target

Organization developed standards.

3.1.11.10 Target Monitoring and Measurement

Organization developed during FMP planning.

3.1.11.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - table showing number of harvest areas by year that received treatments that reduces downed woody debris (e.g. brush raking and prescribed burns).

3.1.11.12 Acceptable Variance

None.

3.1.11.13 Response

Adjust strategies in subsequent FMPs.

3.1.11.14 Definitions

Downed Woody Debris: wood lying at an angle of less than 45 degrees from the ground and having a diameter greater than 7.5 cm.

3.1.11.15 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.4 - *Retain structural attributes within harvested areas and fire salvage areas* in the 2007 FMP.

3.1.12 VOIT 12 (1.1.2.2) – Sensitive Sites

3.1.12.1	CCFM Criterion:	1 Biological Diversity
3.1.12.2	CSA SFM Element:	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.12.3	Value:	1.1.2 Local/stand scale biodiversity
3.1.12.4	Objective:	1.1.2.2 Maintain integrity of sensitive sites

3.1.12.5 Indicator

Sensitive sites (e.g. mineral licks, major game trails) as per the Operating Ground Rules that are protected in the DFA.

3.1.12.6 Target

Strategies to maintain consistency with provincial guidelines / OGR.

3.1.12.7 Means to Identify Target

Local knowledge, ACIMS, ABMI, FHPs, FWMIS.

3.1.12.8 Legal/Policy Requirements

Planning Standard.

3.1.12.9 Means of Achieving Objective and Target

Organization developed standards for sensitive site protection, OGRs.

3.1.12.10 Target Monitoring and Measurement

Organization reports, air photo interpretation, ground surveys.

3.1.12.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - summary of identified sites.

3.1.12.12 Acceptable Variance

None.

3.1.12.13 Response

Adjust strategies in subsequent FHPs.

3.1.12.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.2.3 - *Incorporate wildlife habitat needs in operational planning* in the 2007 FMP.

3.1.13 VOIT 13 (1.1.2.3) – Water Crossings

3.1.13.1 Criterion:	CCFM	1 Biological Diversity
3.1.13.2 Element:	CSA SFM	1.1 Ecosystem Diversity: Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that occur naturally in the Defined Forest Area (DFA)
3.1.13.3	Value:	1.1.2 Local/stand scale biodiversity
3.1.13.4	Objective:	1.1.2.3 Maintain aquatic biodiversity by minimizing impacts of water crossings

3.1.13.5 Indicator

Forestry water crossings in compliance with Code of Practice for Water Course Crossings within the DFA.

3.1.13.6 Target

Designs meet standards of the Code of Practice for Water Course Crossings and OGRs.

3.1.13.7 Means to Identify Target

Code of Practice for Water Course Crossings: Sections 7, 9 and Schedule 2.

3.1.13.8 Legal/Policy Requirements

Code of Practice for Water Course Crossings.

3.1.13.9 Means of Achieving Objective and Target

Road construction, maintenance and reclamation activities.

3.1.13.10 Target Monitoring and Measurement

Road plan OGR 11.2

3.1.13.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - number of crossings by type within standard in the DFA
- AOP - report number of crossings by type.

3.1.13.12 Acceptable Variance

None.

3.1.13.13 Response

Act immediately to eliminate problems and adjust strategies in subsequent AOPs.

3.1.13.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.2.4 - *Minimize the impacts of SLS activities on riparian areas* in the 2007 FMP.

3.1.14 VOIT 14 (1.2.1.1) – Species at Risk

3.1.14.1	CCFM Criterion:	1 Biological Diversity
3.1.14.2	CSA SFM Element:	1.2 Species Diversity: Conserve species diversity by ensuring that habitats for the native species found in the DFA are maintained throughout time
3.1.14.3	Value:	1.2.1 Viable populations of identified plant and animal species
3.1.14.4	Objective:	1.2.1.1 Maintain habitat for identified high value species (i.e., economically valuable, socially valuable, species at risk, species of management concern)

3.1.14.5 Indicator

a) Number of hectares of primary and secondary habitat from the fRI Research (fRI) Grizzly Bear model, measured from May 1, 2021;
b) Percent change in the Barred owl potential breeding pairs (habitat) and Resource Selection Function (RSF) value from May 1, 2021;
c) Percent change in American marten habitat suitability index from May 1, 2021;
d) Percent change in relative abundance value of three songbird species (Brown Creeper, Ovenbird, and Varied Thrush) from May 1, 2021;
e) Maintain identified Whitebark and Limber Pine trees, saplings and seedlings.

3.1.14.6 Target

a) Maintain or increase the number of hectares of primary and secondary habitat from the fRI Grizzly Bear model, as measured at time 0;
b) Maximum 15% reduction in the breeding pairs indicator over the 200-year planning horizon and 15% reduction in the RSF indicators over the 200-year planning horizon;
c) Maximum 15% reduction in the indicator over the 200-year planning horizon;
d) Maximum 15% reduction in the indicator over the 200-year planning horizon;
e) A minimum of 95% protection of all known Whitebark and Limber Pine trees, saplings and seedlings.

100% protection of GoA long term monitoring installations.

3.1.14.7 Means to Identify Target

Habitat models (provided by the Government of Alberta (GoA)).

Based on sound science, ecological considerations, wildlife zones, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list, provincially listed species, ABMI, ACIMS, Recovery plans, government priorities, public consultation, habitat suitability analysis, literature review, observation data, local and traditional knowledge.

For Whitebark and Limber pine, use AVI in combination with company and GoA field data.

GoA long term monitoring installation datasets.

3.1.14.8 Legal/Policy Requirements

Recovery plans for species at risk, Federal Species at Risk Act.

3.1.14.9 Means of Achieving Objective and Target

Harvesting plans, road construction, OGR, planning and implementation, adherence to provincial wildlife guidelines, adhere to SHS.

For Whitebark and Limber pine, ensure protection of trees, saplings and seedlings through careful operational planning of roads and harvest areas.

3.1.14.10 Target Monitoring and Measurement

Updates to vegetation inventory and habitat modelling.

3.1.14.11 Reporting

FMP:

a) Table and maps of current (time zero) and future (10 and 20 years) landscape condition for Core and Secondary habitat zones;

b) Tables of breeding pairs (habitat) and RSF at 0, 10, 20, 50, 100 and 200 years and maps of RSF value and breeding pairs at 0, 10, 20 and 50 years;

c) Tables of habitat suitability at 0, 10, 20, 50, 100 and 200 years and maps of habitat suitability at 0, 10, 20 and 50 years;

d) Tables of relative abundance at 0, 10, 20, 50, 100 and 200 years and maps of relative abundance at 0, 10, 20 and 50 years;

e) Variance requests impacting Whitebark and Limber pine trees, saplings and seedlings and how many individuals affected by each.

Performance:

- 5 year - (a-d) Stewardship Report (None);
- 5 year - (e) Stewardship Report;
- 10 year - (a-d) Stewardship Report (Compare time 0 of previous FMP to CLB of new FMP); and
- 10 year - (e) Stewardship Report (Cumulative impact of variance on Whitebark and Limber Pine trees, saplings and seedlings). Report on mitigation strategies.

3.1.14.12 Acceptable Variance

At the end of the 10-year FMP term the target is achieved or exceeded.

3.1.14.13 Response

Adjust strategies in subsequent FMP.

3.1.14.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.2.2 - *Maintain habitat for key species over time at the landscape level* in the 2007 FMP.

3.1.15 VOIT 15 (1.3.1.1) – Wild Forest Populations

3.1.15.1	CCFM Criterion:	1 Biological Diversity
3.1.15.2	CSA SFM Element:	1.3 Genetic Diversity: Conserve genetic diversity by maintaining the variation of genes within species
3.1.15.3	Value:	1.3.1 Genetic integrity of natural tree populations
3.1.15.4	Objective:	1.3.1.1 Retain "wild forest populations" for each native tree species in each seed zone through establishment of in-situ reserves by Alberta and timber disposition holders

3.1.15.5 Indicator

Number and area (ha) of in-situ gene conservation areas.

3.1.15.6 Target

Spray Lake Sawmills will coordinate work with the GoA to identify the number of required situ gene conservation areas, some of which may not necessarily be within the DFA, with priority given to protected areas and the passive landbase.

3.1.15.7 Means to Identify Target

-

3.1.15.8 Legal/Policy Requirements

Timber Management Regulation (TMR) 144.2(1). As directed by the Alberta Forest Genetic Resource Management and Conservation Standards (FGRMS).

3.1.15.9 Means of Achieving Objective and Target

Conservation areas are designated by a Protective or Consultative Notation (PNT, CNT).

3.1.15.10 Target Monitoring and Measurement

AVI updates, ground or air checks to confirm status. FMP planning and Stewardship Reporting.

3.1.15.11 Reporting

FMP: Table showing number of genetic conservation areas required in each seed zone and number provided in DFA. Map showing locations of genetic conservation areas.

Performance:

- Stewardship Reports - report progress towards target.

3.1.15.12 Acceptable Variance

At the end of the 10-year FMP term the target is achieved or exceeded.

3.1.15.13 Response

Adjust strategies in subsequent FMP.

3.1.15.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.5 - *Retain tree species genetic diversity across the landscape* in the 2007 FMP.

3.1.16 VOIT 16 (1.3.1.2) – Wild Forest Populations Ex-situ

3.1.16.1	CCFM Criterion:	1 Biological Diversity
3.1.16.2	CSA SFM Element:	1.3 Genetic Diversity: Conserve genetic diversity by maintaining the variation of genes within species
3.1.16.3	Value:	1.3.1 Genetic integrity of natural tree populations
3.1.16.4	Objective:	1.3.1.2 Retain wild forest genetic resources through ex-situ conservation

3.1.16.5 Indicator

Number and composition of forest tree seed populations established in seedbanks, clone banks or trials that are satisfactory to GoA.

3.1.16.6 Target

Active conservation program for all Controlled Parentage Program plan species and other species in cooperation with Alberta.

To be established by GoA based on adequate representation of native tree species in conservation efforts to genetic loss within and among seed zones.

3.1.16.7 Means to Identify Target

GoA to approve legitimate sources of ex-situ seed and project targets of volume of seed required. Compare cumulative collection of ex-situ seed from various sources to projected targets from GoA, annually, for the tree species desired or determined to be at risk.

3.1.16.8 Legal/Policy Requirements

TMR 144.2(1). As directed by FGRMS.

3.1.16.9 Means of Achieving Objective and Target

FGRMS and GoA/Industry Genetics Cooperatives.

3.1.16.10 Target Monitoring and Measurement

Conservation activities identified in FMP as per FGRMS.

3.1.16.11 Reporting

FMP: Table and map showing number of provenances, genotypes and seedlots and their origin within the DFA.

Performance:

- Stewardship Reports - not applicable until a controlled parentage program becomes active.

3.1.16.12 Acceptable Variance

No variance from targets as set by GoA is anticipated. Adjustment to targets and objectives are allowable as more research and development bring new data and parameters forward.

3.1.16.13 Response

GoA will direct any required amendments or adjustments to targets

3.1.16.14 History

VOIT similar to the Issue/Value #4 – Biodiversity and Wildlife, objective 4.1.5 - *Retain tree species genetic diversity across the landscape* in the 2007 FMP.

3.1.17 VOIT 17 (1.4.1.1) – Trans Boundary Values (stakeholder consultations)

3.1.17.1	CCFM Criterion:	1 Biological Diversity
3.1.17.2	CSA SFM Element:	1.4 Protected Areas: Respect protected areas identified through government processes
3.1.17.3	Value:	1.4.1 Areas with minimal human disturbances within managed landscapes
3.1.17.4	Objective:	1.4.1.1 Integrate trans boundary values and objectives into forest management

3.1.17.5 Indicator

Consultation with relevant stakeholders.

3.1.17.6 Target

Ongoing consultation with relevant protected area agencies.

3.1.17.7 Means to Identify Target

Link to consultation objective in Planning Standard or other existing consultation processes.

3.1.17.8 Legal/Policy Requirements

Planning Standard.

3.1.17.9 Means of Achieving Objective and Target

Management and operational planning.

3.1.17.10 Target Monitoring and Measurement

Documentation of consultation processes.

3.1.17.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - summary of consultation with relevant protected area agencies.

3.1.17.12 Acceptable Variance

None.

3.1.17.13 Response

Adjust strategies in subsequent FMP.

3.1.17.14 History

VOIT similar to the Issue/Value #13 – Protected Areas, objective 13.1 - *This was a historical issue dealt with in the establishment of the FMA* in the 2007 FMP.

3.2 Ecosystem Productivity

3.2.1 VOIT 18 (2.1.1.1) – Reforestation

3.2.1.1 CCFM Criterion:	2 Ecosystem Productivity
3.2.1.2 CSA SFM Element:	2.1 Ecosystem resilience
3.2.1.3 Value:	2.1.1 Reforested harvest areas
3.2.1.4 Objective:	2.1.1.1 Reforest all harvested areas

3.2.1.5 Indicator

Annual % of openings that:

a) meet or exceed the Reforestation Standard of Alberta (RSA) establishment survey minimum stocking and species composition standards for the declared regenerated yield stratum;
b) meet or exceed the RSA establishment survey minimum stocking and species composition standards for an alternate regenerated yield stratum; and
c) do not achieve the RSA establishment survey minimum stocking and/or species composition standards for any regenerated yield strata and are re-treated within one year.

Indicators a, b and c are to be reported separately.

3.2.1.6 Target

The sum of indicators a, b and c = 100% of openings.

3.2.1.7 Means to Identify Target

Direction from GoA.

3.2.1.8 Legal/Policy Requirements

TMR 141.6(1) and 141.6(2); RSA.

3.2.1.9 Means of Achieving Objective and Target

Implementation of silviculture strategies that ensure the target stocking and species composition is achieved for the opening.

3.2.1.10 Target Monitoring and Measurement

RSA establishment survey protocols.

3.2.1.11 Reporting

FMP: None.

Performance:

- ARIS - updates to Alberta Regeneration Information System (ARIS) tables.
- Stewardship Reports - tables summarizing indicators a, b, and c.

3.2.1.12 Acceptable Variance

None.

3.2.1.13 Response

Adjust silviculture strategies.

3.2.1.14 History

VOIT similar to the Issue/Value #16 – Reforestation, objective 16.1 - *Meet our obligations in reforesting all harvested areas* in the 2007 FMP, the 2021 FMP VOIT adds additional statement regarding reforestation target (*i.e*. MAI).

3.2.2 VOIT 19 (2.1.1.2) – Mean Annual Increment

3.2.2.1 CCFM Criterion:	2 Ecosystem Productivity
3.2.2.2 CSA SFM Element:	2.1 Ecosystem resilience
3.2.2.3 Value:	2.1.1 Reforested harvest areas
3.2.2.4 Objective:	2.1.1.2 Meet or exceed the C and D Mean Annual Increment (MAI) standard for the population of openings surveyed in a given quadrant

3.2.2.5 Indicator

Summed difference between target and actual C and D MAIs for openings surveyed in a five-year quadrant, as reported to ARIS.

3.2.2.6 Target

100% of target.

3.2.2.7 Means to Identify Target

Direction from GoA.

3.2.2.8 Legal/Policy Requirements

TMR 141.7(1) and 141.7(2); RSA.

3.2.2.9 Means of Achieving Objective and Target

Implementation of silviculture strategies that ensure the target productivity is achieved for the population of openings.

3.2.2.10 Target Monitoring and Measurement

RSA performance survey protocols.

3.2.2.11 Reporting

FMP: None.

Performance:

- ARIS - updates to ARIS tables.
- Stewardship Reports - summarize the difference between target and actual C and D MAIs for openings surveyed in a five-year quadrant, as reported to ARIS.

3.2.2.12 Acceptable Variance

Meet or exceed the target C and D MAI for the DFA.

3.2.2.13 Response

Adjust silviculture strategies.

3.2.2.14 History

VOIT similar to the Issue/Value #16 – Reforestation, objective 16.1 - *Meet our obligations in reforesting all harvested areas* in the 2007 FMP, the 2021 FMP VOIT adds additional statement regarding reforestation target (*i.e*. MAI).

3.2.3 VOIT 20 (2.1.2.1) – Limit Forest Landbase Conversion

3.2.3.1 CCFM Criterion:	2 Ecosystem Productivity
3.2.3.2 CSA SFM Element:	2.1 Ecosystem resilience
3.2.3.3 Value:	2.1.2 Maintenance of forest landbase
3.2.3.4 Objective:	2.1.2.1 Limit conversion of productive forest landbase to other uses

3.2.3.5 Indicator

Amount of change in forest landbase.

3.2.3.6 Target

Net change of the gross forested landbase area within the DFA.

3.2.3.7 Means to Identify Target

Forest inventory and land use data.

3.2.3.8 Legal/Policy Requirements

Planning Standard.

3.2.3.9 Means of Achieving Objective and Target

Maintain current forest cover inventory and land use updates. Promote the minimization of non-forested impacts to the landbase.

3.2.3.10 Target Monitoring and Measurement

Inventory and land use systems.

3.2.3.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - number of dispositions and area of disposition withdrawn from the landbase, number of dispositions returned, and area of dispositions returned to the landbase, net change to landbase area.

3.2.3.12 Acceptable Variance

Report actual.

3.2.3.13 Response

Adjust net landbase projections in next TSA.

3.2.3.14 History

VOIT similar to the Issue/Value #8 – Forest Landbase, objective 8.2 - *Minimize the loss of productive forest land base* in the 2007 FMP.

3.2.4 VOIT 21 (2.1.2.2) – Forest Health Program

3.2.4.1 CCFM Criterion:	2 Ecosystem Productivity
3.2.4.2 CSA SFM Element:	2.1 Ecosystem resilience
3.2.4.3 Value:	2.1.2 Maintenance of forest landbase
3.2.4.4 Objective:	2.1.2.2 Recognize lands affected by insects, disease or natural calamities

3.2.4.5 Indicator

Amount of area affected.

3.2.4.6 Target

Area (ha) affected by significant forest disturbances such as insect infestations, fire, windthrow or other disturbance event.

3.2.4.7 Means to Identify Target

Forest health surveys, inventory updates, fire reporting.

3.2.4.8 Legal/Policy Requirements

Planning Standard, Alberta Forest Health Strategy and Shared Roles and Responsibilities between GoA and the Forest Industry.

3.2.4.9 Means of Achieving Objective and Target

Maintain up-to-date information.

3.2.4.10 Target Monitoring and Measurement

Annual forest health surveys.

3.2.4.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - maps showing areas impacted by fire, insects, windthrow and other natural events.

3.2.4.12 Acceptable Variance

Report actuals.

3.2.4.13 Response

Event specific.

3.2.4.14 History

VOIT similar to the Issue/Value #7 – Forest Health (forest pest management), objective 7.1 - *Assist Sustainable Resource Development (SRD) in assessing the status and control of insect and disease concerns. As examples, concerns identified are Dwarf Mistletoe and Mountain Pine Beetle (MPB)* in the 2007 FMP.

3.2.5 VOIT 22 (2.1.3.1) – Invasive Plants Program

3.2.5.1 CCFM Criterion:	2 Ecosystem Productivity
3.2.5.2 CSA SFM Element:	2.1 Ecosystem resilience
3.2.5.3 Value:	2.1.3 Control invasive species
3.2.5.4 Objective:	2.1.3.1 Control invasive plants

3.2.5.5 Indicator

Invasive plant program.

3.2.5.6 Target

Invasive plant program in place and implemented.

3.2.5.7 Means to Identify Target

Weed Management in Forestry Operations Directive 2001-06.

3.2.5.8 Legal/Policy Requirements

Weed Management in Forestry Operations Directive 2001-06.

3.2.5.9 Means of Achieving Objective and Target

Co-operative programs.

3.2.5.10 Target Monitoring and Measurement

Adherence to OGRs.

3.2.5.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - summary of OGRs to prevent spread of invasive plants, and any changes to the OGRs related to invasive plants.

3.2.5.12 Acceptable Variance

Report actuals.

3.2.5.13 Response

Improve invasive plant program.

3.2.5.14 History

VOIT similar to the Issue/Value #7 – Forest Health (forest pest management), objective 7.5 - *Assist in the prevention, detection and control of restricted and noxious, invasive plants* in the 2007 FMP.

3.3 Soil and Water Resources

3.3.1 VOIT 23 (3.1.1.1) – Roading and Bared Areas

3.3.1.1 CCFM Criterion:	3 Soil and water
3.3.1.2 CSA SFM Element:	3.1 Soil quantity and quality
3.3.1.3 Value:	3.1.1 Soil productivity
3.3.1.4 Objective:	3.1.1.1 Minimize impact of roading and bared areas in forest operations

3.3.1.5 Indicator

Compliance with OGRs.

3.3.1.6 Target

Less than 5%.

3.3.1.7 Means to Identify Target

Direction from GoA.

3.3.1.8 Legal/Policy Requirements

OGRs and Soils Guidelines.

3.3.1.9 Means of Achieving Objective and Target

Effective planning and supervision of operations.

3.3.1.10 Target Monitoring and Measurement

Field inspection reports and audits.

3.3.1.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - number of approved FHP ground rule deviations related to road area variance requests.

3.3.1.12 Acceptable Variance

As approved by GoA.

3.3.1.13 Response

Immediate remedial action to correct.

3.3.1.14 History

VOIT similar to the Issue/Value #6 – Soil Conservation, objective 6.1 - *Minimize the impact of our activities on soil productivity* in the 2007 FMP.

3.3.2 VOIT 24 (3.1.1.2) – Soil Erosion and Slumping

3.3.2.1 CCFM Criterion:	3 Soil and water
3.3.2.2 CSA SFM Element:	3.1 Soil quantity and quality
3.3.2.3 Value:	3.1.1 Soil productivity
3.3.2.4 Objective:	3.1.1.2 Minimize incidence of soil erosion and slumping

3.3.2.5 Indicator

Incidence of soil erosion and slumping.

3.3.2.6 Target

Complete compliance.

3.3.2.7 Means to Identify Target

Direction from GoA.

3.3.2.8 Legal/Policy Requirements

OGRs and Soils Guidelines.

3.3.2.9 Means of Achieving Objective and Target

Effective planning and supervision of operations and adherence to relevant OGRs.

3.3.2.10 Target Monitoring and Measurement

Field inspection reports and audits, Forest Operations Monitoring Program (FOMP).

3.3.2.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - reporting number of variances identified, nature of incident and corrective actions taken.

3.3.2.12 Acceptable Variance

None.

3.3.2.13 Response

Immediate remedial action to correct.

3.3.2.14 History

VOIT similar to the Issue/Value #6 – Soil Conservation, objective 6.2 - *Minimize soil erosion from our operations* in the 2007 FMP.

3.3.3 VOIT 25 (3.2.1.1) – Water Yield Impacts (forecasted)

3.3.3.1 CCFM Criterion:	3 Soil and water
3.3.3.2 CSA SFM Element:	3.2 Water quantity and quality
3.3.3.3 Value:	3.2.1 Water quantity
3.3.3.4 Objective:	3.2.1.1 Limit impact of timber harvesting on water yield

3.3.3.5 Indicator

Forecast impact of timber harvesting (over 200 years) on water yield.

3.3.3.6 Target

a) Water yield = 15% (Equivalent ECA = <30%).
b) Zero Water Act penalties, Complete compliance with FMP.

3.3.3.7 Means to Identify Target

ECA and Water Yield Models, Water Strategy and local needs.

3.3.3.8 Legal/Policy Requirements

Water Act, Planning Standard.

3.3.3.9 Means of Achieving Objective and Target

Adherence to forecast harvest sequence and relevant OGRs.

3.3.3.10 Target Monitoring and Measurement

SHS area variance as per OGRs.

3.3.3.11 Reporting

FMP: Forecast ECA change by forest hydrology watershed.

Performance:

- 5 year - Stewardship Report (none).
- 10 year - Stewardship Report (compare time 0 of previous FMP to CLB of new FMP).

3.3.3.12 Acceptable Variance

< 20 percent SHS variance.

3.3.3.13 Response

Adjust harvest pattern if problems arise.

3.3.3.14 History

VOIT similar to the Issue/Value #18 – Water Quality and Quantity and Fisheries Resources, objective 18.1 - *Maintain water quality and quantity by minimizing the effects of SLS activities on watercourses* in the 2007 FMP.

3.3.4 VOIT 26 (3.2.1.1) – Riparian Buffers

3.3.4.1 CCFM Criterion:	3 Soil and water
3.3.4.2 CSA SFM Element:	3.2 Water quantity and quality
3.3.4.3 Value:	3.2.2 Effective riparian habitats
3.3.4.4 Objective:	3.2.2.1 Minimize impact of operations in riparian areas

3.3.4.5 Indicator

Riparian buffers maintained as outlined in OGRs.

3.3.4.6 Target

Adherence to approved OGR buffer and/or approved OGR deviation.

3.3.4.7 Means to Identify Target

Direction from GoA.

3.3.4.8 Legal/Policy Requirements

OGRs.

3.3.4.9 Means of Achieving Objective and Target

Effective planning and supervision of operations and adherence to relevant OGRs.

3.3.4.10 Target Monitoring and Measurement

Field inspection reports and GoA FOMP reporting.

3.3.4.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - number and rationale of approved watercourse buffer variances as per the Timber Harvest Planning and OGRs.

3.3.4.12 Acceptable Variance

None.

3.3.4.13 Response

Immediate correction and / or administrative penalty.

3.3.4.14 History

VOIT similar to the Issue/Value #18 – Water Quality and Quantity and Fisheries Resources, objective 18.2 - *Protect fish and fish habitat between designated protected areas, designated recreation areas, private lands and the FMA* in the 2007 FMP.

3.4 Multiple Benefits to Society

3.4.1 VOIT 27 (5.1.1.1) – Establish Appropriate Annual Allowable Cut (AAC)

3.4.1.1 CCFM Criterion:	5 Multiple Benefits to Society
3.4.1.2 CSA SFM Element:	5.1 Timber and non-timber benefits
3.4.1.3 Value:	5.1.1 Sustainable timber supplies
3.4.1.4 Objective:	5.1.1.1 Establish appropriate Annual Allowable Cut (AACs)

3.4.1.5 Indicator

Process described in Annex 1 is followed and standards are met.

3.4.1.6 Target

Complete compliance.

3.4.1.7 Means to Identify Target

Consultation in planning process, Alberta Forest Management Planning Standard (April 2006).

3.4.1.8 Legal/Policy Requirements

Forests Act and TMR.

3.4.1.9 Means of Achieving Objective and Target

Effective implementation of planning process.

3.4.1.10 Target Monitoring and Measurement

Multiple means: ARIS, AOPs, Stewardship Reports, field inspection, Forest Revenue Scaling and Tenure System (FOREST).

3.4.1.11 Reporting

FMP: Determine AAC.

Performance:

- 5 year - Stewardship Report (none).
- 10 year - Stewardship Report (compare time 0 of previous FMP to CLB of new FMP).

3.4.1.12 Acceptable Variance

Issue specific.

3.4.1.13 Response

Adjust AAC using most current and relevant information.

3.4.1.14 History

VOIT similar to the Issue/Value #17 – Sustainable Timber Supply, objective 17.2 - *Manage the forest land base within the FMA on a sustained yield basis based on a balance of ecological, economic and social values* in the 2007 FMP.

3.4.2 VOIT 28 (5.2.1.1) – Fire Behaviour Potential

3.4.2.1 CCFM Criterion:	5 Multiple Benefits to Society
3.4.2.2 CSA SFM Element:	5.2 Communities and Sustainability
3.4.2.3 Value:	5.2.1 Risk to communities and landscape values from wildfire is low.
3.4.2.4 Objective:	5.2.1.1 To assist the GoA in reducing wildfire threat potential by reducing fire behaviour, fire occurrence, threats to values at risk and enhancing fire suppression capability

3.4.2.5 Indicator

a) Percentage reduction in “Summer” Fire Behaviour Potential area (ha) within the FireSmart Community Zone
b) Percentage reduction in “Summer” Fire Behaviour Potential area (ha) across the DFA now and over the planning horizon

3.4.2.6 Target

a) Reduce the area (ha) in the high, very high and extreme "Summer" Fire Behavior Potential rating within the parts of FireSmart Community Zones that overlap the DFA. Targets are 17% in Bow Corridor Kananaskis Morley MD31, 25% in Bragg Creek MD 31, 22% in Coal Camp, 6% in Red Deer River, 11% in Rocky Corridor and 1% in Eden Valley IR.
b) Reduce the area (ha) in the high, very high and extreme "Summer" Fire Behavior Potential rating across the DFA by 16% over 20 years.

Refer to Section 4.3.2 (Table 4-20, Table 4-21) for more information.

3.4.2.7 Means to Identify Target

Fire Behaviour Potential and Fuel Grid Assessment (Annex 3 Report Provided to Forest Management Agreement (FMA) Holder).

FMA Holder assessment of the SHS developed using recommendations from Annex 3 Report.

3.4.2.8 Legal/Policy Requirements

Planning Standard.

3.4.2.9 Means of Achieving Objective and Target

SHS, thinning, partial harvest techniques, FireSmart Treatments.

3.4.2.10 Target Monitoring and Measurement

AOPs, Compartment Assessments.

3.4.2.11 Reporting

FMP: Maps of Fire Behaviour Potential, Fuel Grid, Historical Wildfires and Natural Subregions (Generated by the GoA).

Performance:

- Stewardship Reports - report on actual harvested area a) and b).

3.4.2.12 Acceptable Variance

Issue specific.

3.4.2.13 Response

Adjust approach in future FMPs.

3.4.2.14 History

VOIT similar to the Issue/Value #9 – Forest Protection (fire), objective 9.1 - *Support the Government of Alberta's forest fire protection activities* in the 2007 FMP, the 2021 FMP VOIT includes reducing wildfire threat potential in the FMA and FireSmart community zones.

3.4.3 VOIT 29 (5.2.2.1) – Other Uses and Timber Management Activities

3.4.3.1 CCFM Criterion:	5 Multiple Benefits to Society
3.4.3.2 CSA SFM Element:	5.2 Communities and Sustainability
3.4.3.3 Value:	5.2.2 Provide opportunities to derive benefits and participate in use and management
3.4.3.4 Objective:	5.2.2.1 Integrate other uses and timber management activities

3.4.3.5 Indicator

a) Extent of various uses;
b) Recreational trail integration; and
c) Forest aesthetics.

3.4.3.6 Target

a) Annual opportunity for public input on harvest plans;
b) Integrate recreational trails as indicated in the Timber Harvest Planning and Operating Ground Rules; and
c) Integrate forest aesthetics as indicated in the Timber Harvest Planning and Operating Ground Rules and Visual Quality Strategy.

3.4.3.7 Means to Identify Target

Consultation and co-operation.

3.4.3.8 Legal/Policy Requirements

Legislation and policy.

3.4.3.9 Means of Achieving Objective and Target

Effective implementation of plans.

3.4.3.10 Target Monitoring and Measurement

Consultation Tracking.

3.4.3.11 Reporting

FMP: None.

Performance:

- Stewardship Reports - summary of opportunities, by year, for public input on harvest plans.

3.4.3.12 Acceptable Variance

Issue specific.

3.4.3.13 Response

Adjust activities.

3.4.3.14 History

VOIT similar to the Issue/Value #12 – Integration with Other Commercial Users, objective 12.2 - *Work with other commercial users to minimize the impact of activities on each other's interests* in the 2007 FMP.

3.4.4 VOIT 30 (5.2.3.1) – Long Run Sustained Yield Average (LRSYA)

3.4.4.1 CCFM Criterion:	5 Multiple Benefits to Society
3.4.4.2 CSA SFM Element:	5.2 Communities and Sustainability
3.4.4.3 Value:	5.2.3 Forest Productivity
3.4.4.4 Objective:	5.2.3.1 Maintain Long Run Sustained Yield Average (LRSYA))

3.4.4.5 Indicator

Regenerated stand yield compared to natural stand yield.

3.4.4.6 Target

No net decrease from the natural stand productivity.

3.4.4.7 Means to Identify Target

FMP TSA.

3.4.4.8 Legal/Policy Requirements

Planning Standard.

3.4.4.9 Means of Achieving Objective and Target

Effective implementation of plans.

3.4.4.10 Target Monitoring and Measurement

Future FMP RSA (MAI).

3.4.4.11 Reporting

FMP: Table of comparison of natural versus managed MAI.

Performance:

- TSA.
- 5 year - Stewardship Report (none).
- 10 year - Stewardship Report (compare time 0 of previous FMP to CLB of new FMP).

3.4.4.12 Acceptable Variance

Report actual.

3.4.4.13 Response

Adjust AAC in next FMP using most current and relevant information.

3.4.4.14 History

VOIT similar to the Issue/Value #17 – Sustainable Timber Supply, objective 17.1 - *Provide a continuous supply of timber to our mill site* in the 2007 FMP.

3.5 Accepting Society's Responsibility for Sustainable Development

3.5.1 VOIT 31 (6.1.1.1) – First Nations Consultation Plan

3.5.1.1 CCFM Criterion:	6 Accepting society's responsibility for sustainable development
3.5.1.2 CSA SFM Element:	6.1 First Nation and treaty rights and First Nation forest values
3.5.1.3 Value:	6.1.1 Compliance with government regulations and policies
3.5.1.4 Objective:	6.1.1.1 Implement First Nations Consultation Plan

3.5.1.5 Indicator

Meet Alberta's current expectations for First Nations consultation.

3.5.1.6 Target

Consult at the community level with designated representatives of affected First Nation communities.

3.5.1.7 Means to Identify Target

The GoA First Nations Consultation and Policy Guidelines.

3.5.1.8 Legal/Policy Requirements

GoA guidelines on consultation with First Nation communities on Land and Natural Resource Management.

3.5.1.9 Means of Achieving Objective and Target

Effective implementation of First Nations Consultation Plan.

3.5.1.10 Target Monitoring and Measurement

First Nations Relations/Alberta Agriculture and Forestry consultation adequacy letter.

3.5.1.11 Reporting

FMP: Results of consultation, and how it has been incorporated in the plan.

Performance:

- Stewardship Reports.

3.5.1.12 Acceptable Variance

None.

3.5.1.13 Response

Adjust activities - issue specific.

3.5.1.14 History

Not previously addressed through 2007 DFMP Values.

3.5.2 VOIT 32 (6.2.1.1) – Public Participation Process

3.5.2.1 CCFM Criterion:	6 Multiple Benefits to Society
3.5.2.2 CSA SFM Element:	6.2 Public participation and information for decision-making
3.5.2.3 Value:	6.2.1 Meaningful public participation is achieved
3.5.2.4 Objective:	6.2.1.1 Implement Public Participation Process

3.5.2.5 Indicator

Meet expectations of Section 5 of CSA Z809-02.

3.5.2.6 Target

Implementation of Spray Lake Sawmills' (SLS) Public Participation Program.

3.5.2.7 Means to Identify Target

SLS public participation program.

3.5.2.8 Legal/Policy Requirements

Planning Standard.

3.5.2.9 Means of Achieving Objective and Target

Effective implementation of Public Participation Process.

3.5.2.10 Target Monitoring and Measurement

SLS public communication database.

3.5.2.11 Reporting

FMP: Summary of the Public Participation Program for FMP development.

Performance:

- Stewardship Reports.

3.5.2.12 Acceptable Variance

None.

3.5.2.13 Response

Adjust activities.

3.5.2.14 History

VOIT similar to the Issue/Value #14 – Public Involvement, objective 14.1 - *Continue to provide for public involvement in the development of company plans* in the 2007 FMP.

3.6 Water Resources – Additional VOITs

3.6.1 VOIT 33 (6.1.1.1) – Water Quality for Drinking Water Provision (NOM)

3.6.1.1 CCFM Criterion:	7 N/A
3.6.1.2 CSA SFM Element:	7.1 N/A
3.6.1.3 Value:	7.1.1 Water quantity for provision of drinking water (natural organic matter)
3.6.1.4 Objective:	7.1.1.1 Minimize impact of operations on the treatability of drinking water

3.6.1.5 Indicator

Contributions of nutrients and NOM (natural organic matter).

3.6.1.6 Target

No significant increase in nutrients and NOM.

3.6.1.7 Means to Identify Target

SSRP, City of Calgary long term monitoring data and SWPP.

3.6.1.8 Legal/Policy Requirements

SSRP, Water for Life Strategy.

3.6.1.9 Means of Achieving Objective and Target

Water quality monitoring in collaboration with City of Calgary, GOA and researchers.

3.6.1.10 Target Monitoring and Measurement

SHS area variance as per OGRs.

3.6.1.11 Reporting

FMP: None.

Performance:

- Stewardship Reports.
  - Area of burned forest (fire size > 1 ha) within the Calgary source water area (where forestry activities are permitted).
- Future FMP – to be determined with City of Calgary.

3.6.1.12 Acceptable Variance

Issue specific.

3.6.1.13 Response

Issue specific adjustments.

3.6.1.14 History

VOIT added for 2021 FMP after consultation with the City of Calgary.

3.6.2 VOIT 34 (6.1.1.1) – Water Quality for Drinking Water Provision (firerisk)

3.6.2.1 CCFM Criterion:	7 N/A
3.6.2.2 CSA SFM Element:	7.1 N/A
3.6.2.3 Value:	7.1.2 Water quality for provision of drinking water (fire risk)
3.6.2.4 Objective:	7.1.2.1 Reduce the potential for catastrophic wildfire which may impair drinking water treatment

3.6.2.5 Indicator

Water quality for provision of drinking water.

3.6.2.6 Target

To be determined collaboratively with GOA and other stakeholders (i.e. municipalities).

3.6.2.7 Means to Identify Target

GoA fire risk mapping and City of Calgary wildfire taskforce, 2021 FMP SHS.

3.6.2.8 Legal/Policy Requirements

Water for Life Strategy.

3.6.2.9 Means of Achieving Objective and Target

Harvesting activity in high risk areas.

3.6.2.10 Target Monitoring and Measurement

Documentation of activities.

3.6.2.11 Reporting

FMP: Updated wildfire risk mapping by GOA.

Performance:

- Stewardship Reports and Future FMP – Reduction in fire hazard, from forest harvesting, within the Calgary source water area.

3.6.2.12 Acceptable Variance

Any reduction of fire risk to drinking water supplies is acceptable.

3.6.2.13 Response

Adjust harvesting plans as needed.

3.6.2.14 History

VOIT added for 2021 FMP after consultation with the City of Calgary. Related to VOIT 28 (5.2.1.1) – Fire Behaviour Potential.

4. FMP VOIT Reporting (2021)

4.1 Biological Diversity

4.1.1 VOIT 1 (1.1.1.1) – Seral Stages

Reporting Requirement:

- Tables of indicators (values and targets) at 0, 10, 50, 100 and 200 years.
- Maps of indicators at 0, 10 and 50 years.

Reporting is completed by yield curve strata. Note that while there are no yield curves used for SB (Black Spruce) and FD (Douglas Fir) and they are not harvested, they are included in the gross landbase by yield curve strata summary (Table 4-3) as an additional category (SBFD) for completeness.

Table 4-1. Gross landbase: area by seral stage

Year	Young		Immature		Mature		Old		Total	
	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
2021	25,447	8	29,582	10	124,580	41	124,697	41	304,306	100
2031	37,290	12	39,400	13	93,753	31	133,864	44	304,306	100
2071	43,568	14	106,007	35	14,323	5	140,409	46	304,306	100
2121	40,670	13	131,060	43	21,978	7	110,599	36	304,306	100
2221	42,774	14	121,885	40	28,208	9	111,439	37	304,306	100

Table 4-2. Active landbase: area by seral stage

Year	Young		Immature		Mature		Old		Total	
	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
2021	25,181	11	27,122	12	83,602	37	89,933	40	225,838	100
2031	37,039	16	37,310	17	60,022	27	91,467	41	225,838	100
2071	43,458	19	105,007	46	12,678	6	64,694	29	225,838	100
2121	40,433	18	129,630	57	21,325	9	34,450	15	225,838	100
2221	38,211	17	115,620	51	27,782	12	44,225	20	225,838	100

Table 4-3. Gross landbase: area by seral stage and yield curve strata

		HW		MIX		PL		SW		SBFD		Total	
	Year	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
Young	2021	366	1	1,113	4	20,651	81	3,299	13	17	0	25,447	100
	2031	307	1	1,540	4	25,230	68	10,209	27	4	0	37,290	100
	2071	4	0	1,948	4	29,237	67	12,344	28	35	0	43,568	100
	2121	38	0	662	2	27,964	69	12,000	30	5	0	40,670	100
	2221	229	1	979	2	29,278	69	11,971	28	317	1	42,774	100
Immature	2021	1,911	6	3,895	13	19,899	67	3,781	13	96	0	29,582	100
	2031	1,469	4	4,435	11	28,839	73	4,576	12	81	0	39,400	100
	2071	746	1	5,536	5	75,500	71	24,197	23	28	0	106,007	100
	2121	50	0	9,030	7	85,530	65	36,356	28	94	0	131,060	100
	2221	142	0	5,430	4	77,737	64	38,174	31	404	0	121,885	100
Mature	2021	12,961	11	10,094	8	79,605	65	19,627	16	2,293	2	124,580	100
	2031	9,472	10	6,106	7	62,178	67	14,653	16	1,345	1	93,753	100
	2071	1,068	7	1,767	12	9,253	65	2,176	15	58	0	14,323	100
	2121	476	2	2,211	10	12,305	56	6,968	32	17	0	21,978	100
	2221	15	0	562	2	19,926	71	7,701	27	5	0	28,208	100
Old	2021	3,800	3	4,489	4	58,081	48	55,643	46	2,683	2	124,697	100
	2031	7,791	6	7,512	6	61,989	48	52,914	41	3,658	3	133,864	100
	2071	17,219	13	10,342	8	64,245	47	43,634	32	4,968	4	140,409	100
	2121	18,474	17	7,689	7	52,437	50	27,027	26	4,973	4	110,599	100
	2221	18,653	17	12,621	12	51,296	48	24,506	23	4,364	4	111,439	100

Table 4-4. Active landbase: area by seral stage and yield curve strata

		HW		MIX		PL		SW		Total	
	Year	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
Young	2021	359	1	1,106	4	20,458	81	3,259	13	25,181	100
	2031	299	1	1,533	4	25,104	68	10,103	27	37,039	100
	2071	4	0	1,948	4	29,224	67	12,282	28	43,458	100
	2121	38	0	662	2	27,893	69	11,839	29	40,433	100
	2221	220	1	927	2	28,170	74	8,895	23	38,211	100
Immature	2021	1,508	6	3,590	13	19,043	70	2,980	11	27,122	100
	2031	1,229	3	4,177	11	28,033	75	3,870	10	37,310	100
	2071	714	1	5,507	5	75,226	72	23,560	22	105,007	100
	2121	50	0	9,030	7	85,410	66	35,140	27	129,630	100
	2221	142	0	5,428	5	76,514	66	33,537	29	115,620	100
Mature	2021	10,348	12	7,482	9	54,916	66	10,856	13	83,602	100
	2031	7,283	12	4,229	7	41,070	68	7,440	12	60,022	100
	2071	854	7	1,530	12	8,594	68	1,700	13	12,678	100
	2121	468	2	2,203	10	12,109	57	6,545	31	21,325	100
	2221	15	0	562	2	19,803	71	7,403	27	27,782	100
Old	2021	3,401	4	3,839	4	44,752	50	37,941	42	89,933	100
	2031	6,804	7	6,078	7	44,962	49	33,623	37	91,467	100
	2071	14,044	22	7,032	11	26,125	40	17,494	27	64,694	100
	2121	15,059	44	4,121	12	13,757	40	1,512	4	34,450	100
	2221	15,240	34	9,100	21	14,682	33	5,202	12	44,225	100

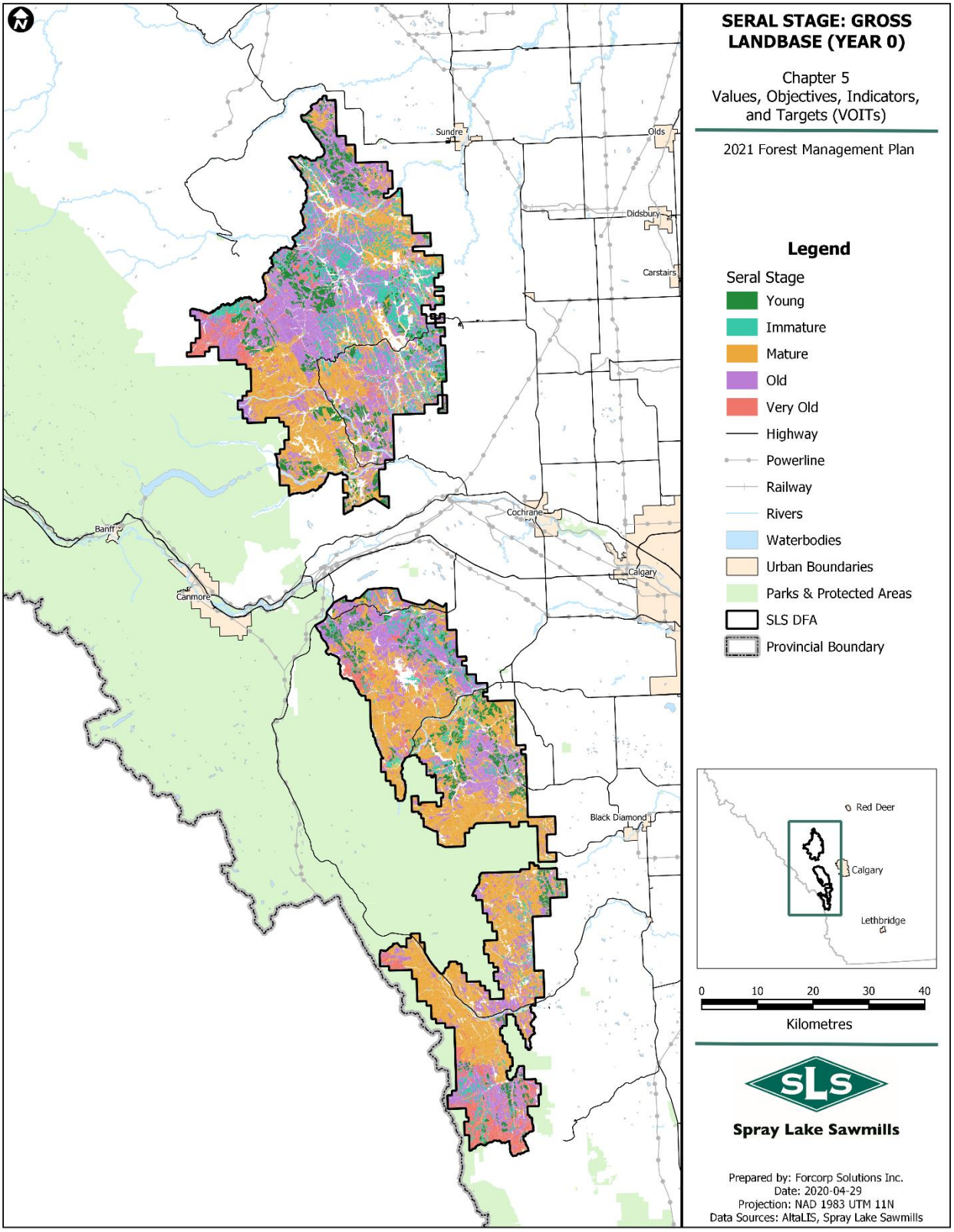

Figure 4-1. Seral stages on the gross landbase in 2021

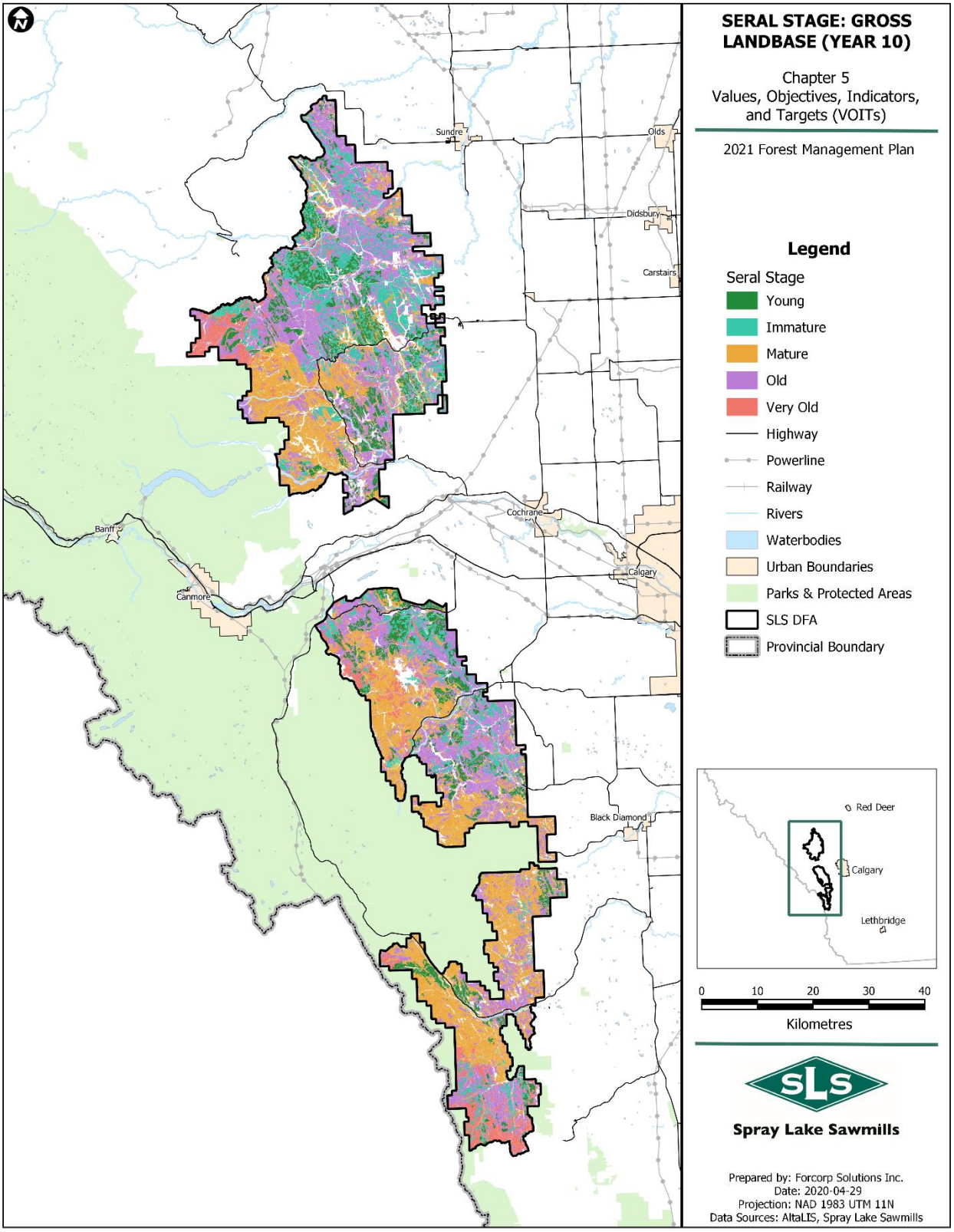

Figure 4-2. Seral stages on the gross landbase in 2031

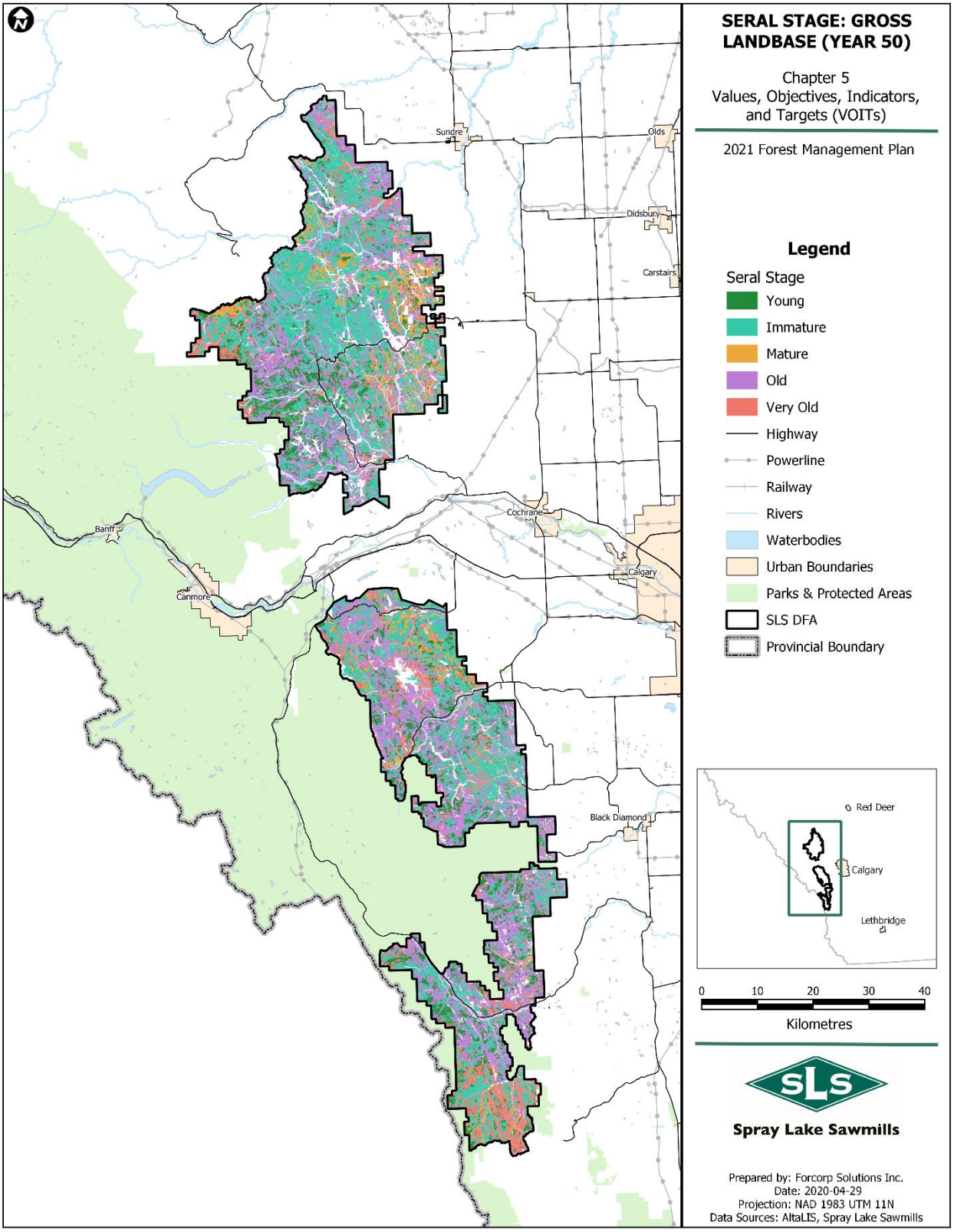

Figure 4-3. Seral stages on the gross landbase in 2071

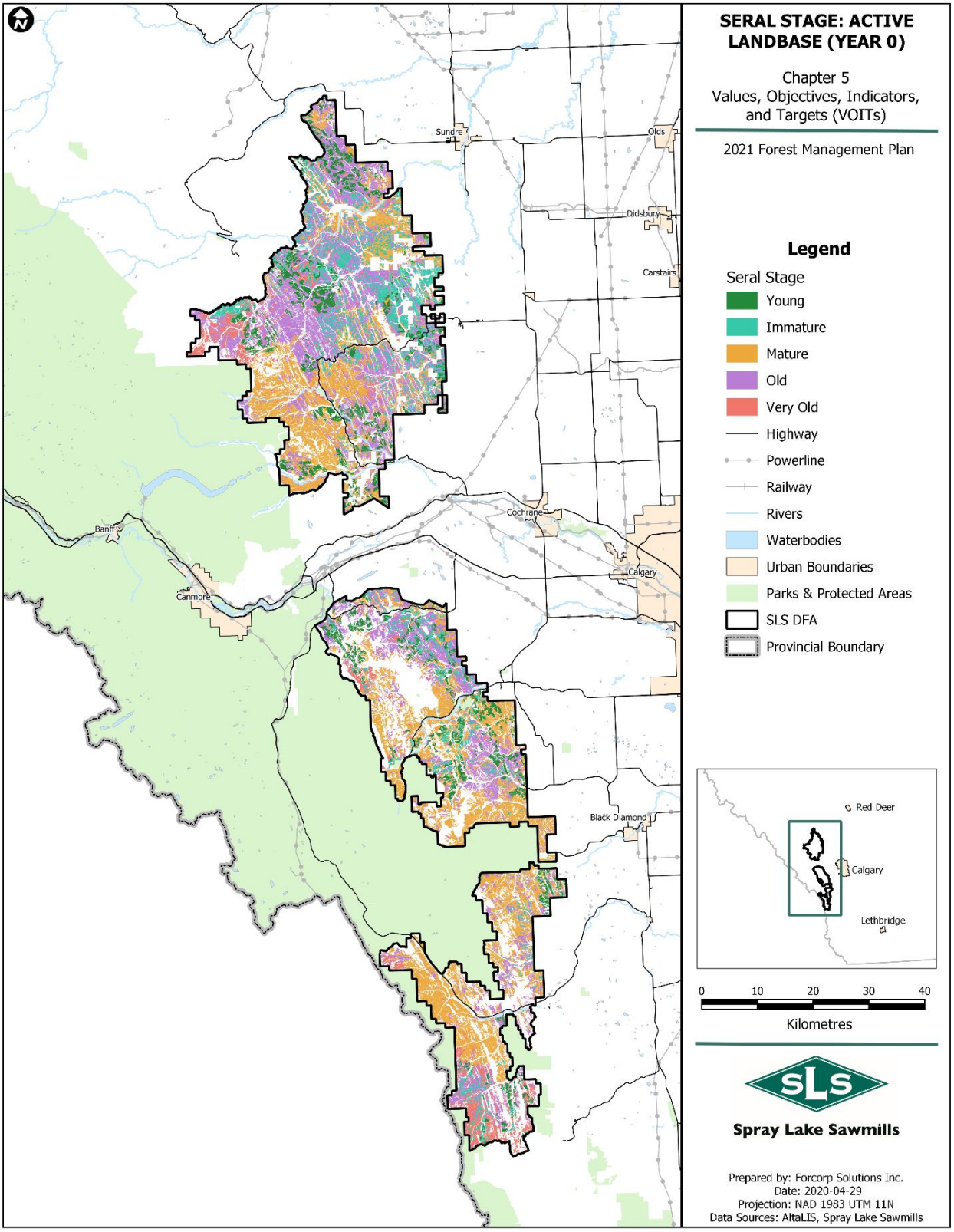

Figure 4-4. Seral stages on the active landbase in 2021

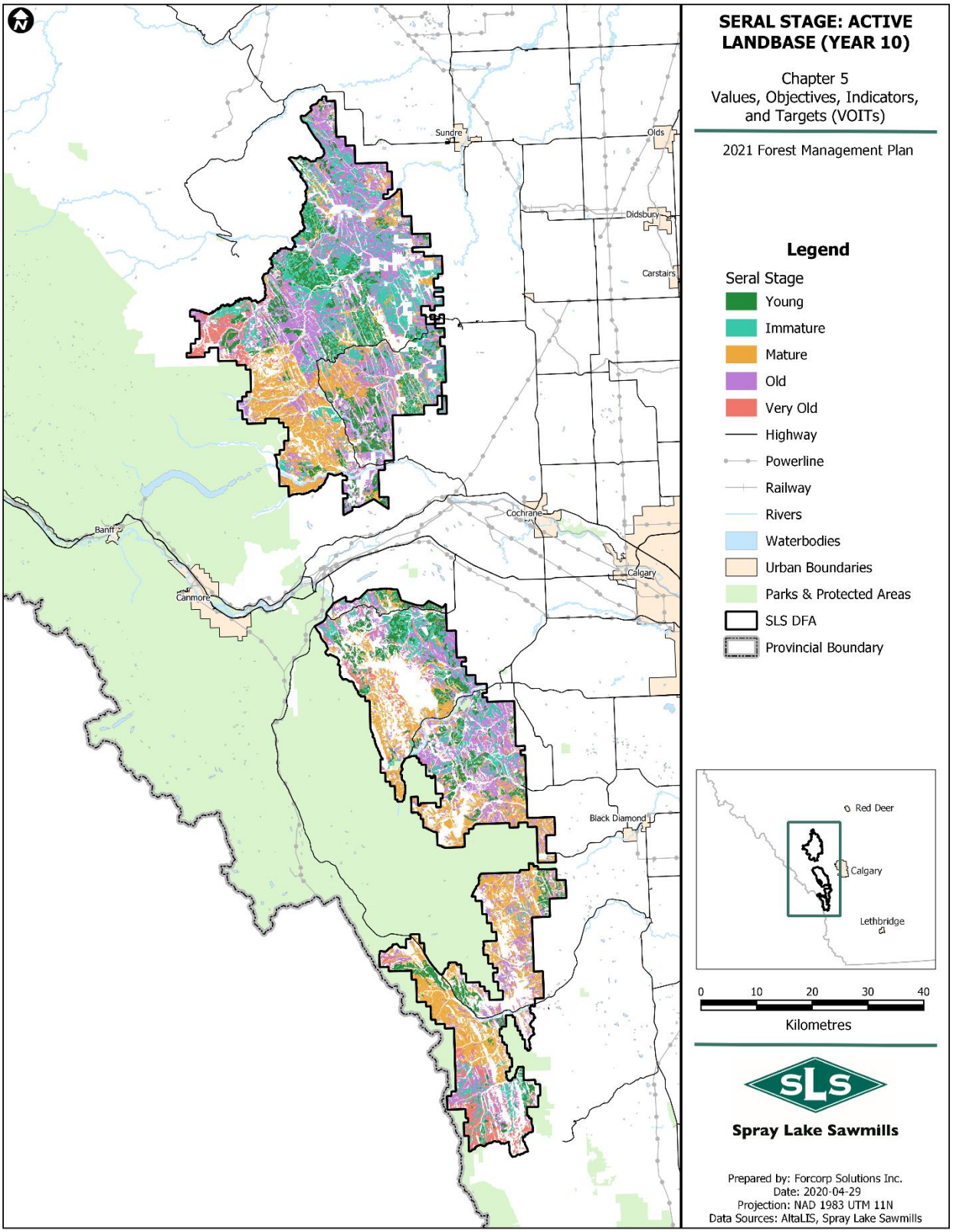

Figure 4-5. Seral stages on the active landbase in 2031

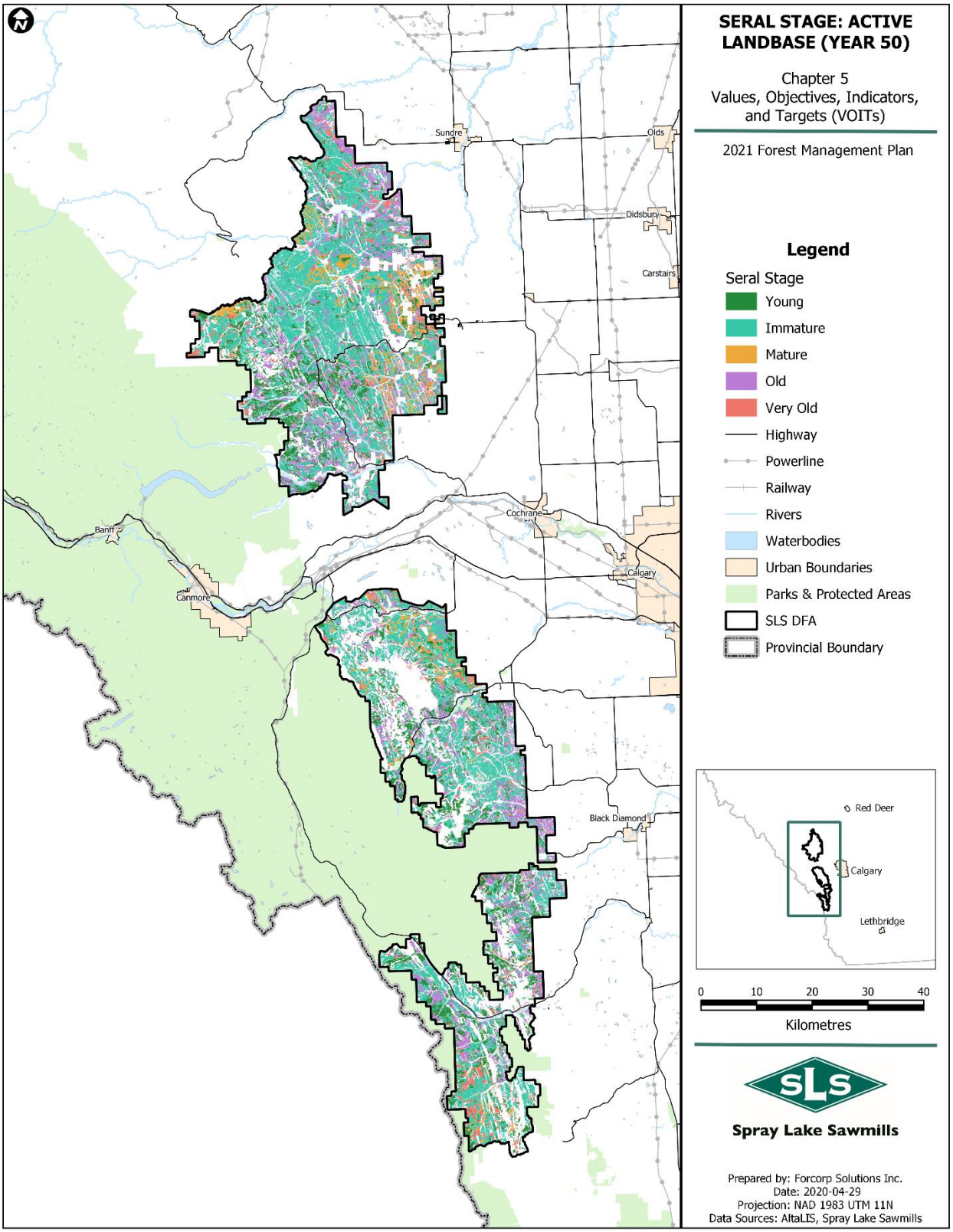

Figure 4-6. Seral stages on the active landbase in 2071

4.1.2 VOIT 2 (1.1.1.2a) – Patch Sizes

Reporting Requirement:

- Tables of area of forest in each patch size class for the DFA at 0, 10, and 50 years.
- Maps of patch size classes at 0, 10, and 50 years size.

The patch size pattern over the 200-year planning horizon is one of increasing patch size (Table 4-5).

Table 4-5. Area by patch size class

Patch Size	2021			2031			2071		
	Area (ha)	%	Avg. Size (ha)	Area (ha)	%	Avg. Size (ha)	Area (ha)	%	Avg. Size (ha)
< 20 ha	3,706	15	11	3,820	10	9	10,488	24	9
20 to 100 ha	10,739	43	52	9,175	25	54	14,417	33	49
100 to 250 ha	7,419	29	147	6,323	17	157	9,985	23	160
250+ ha	3,317	13	326	17,721	48	821	8,569	20	456
Total	25,181	100	97	37,039	100	401	43,458	100	117

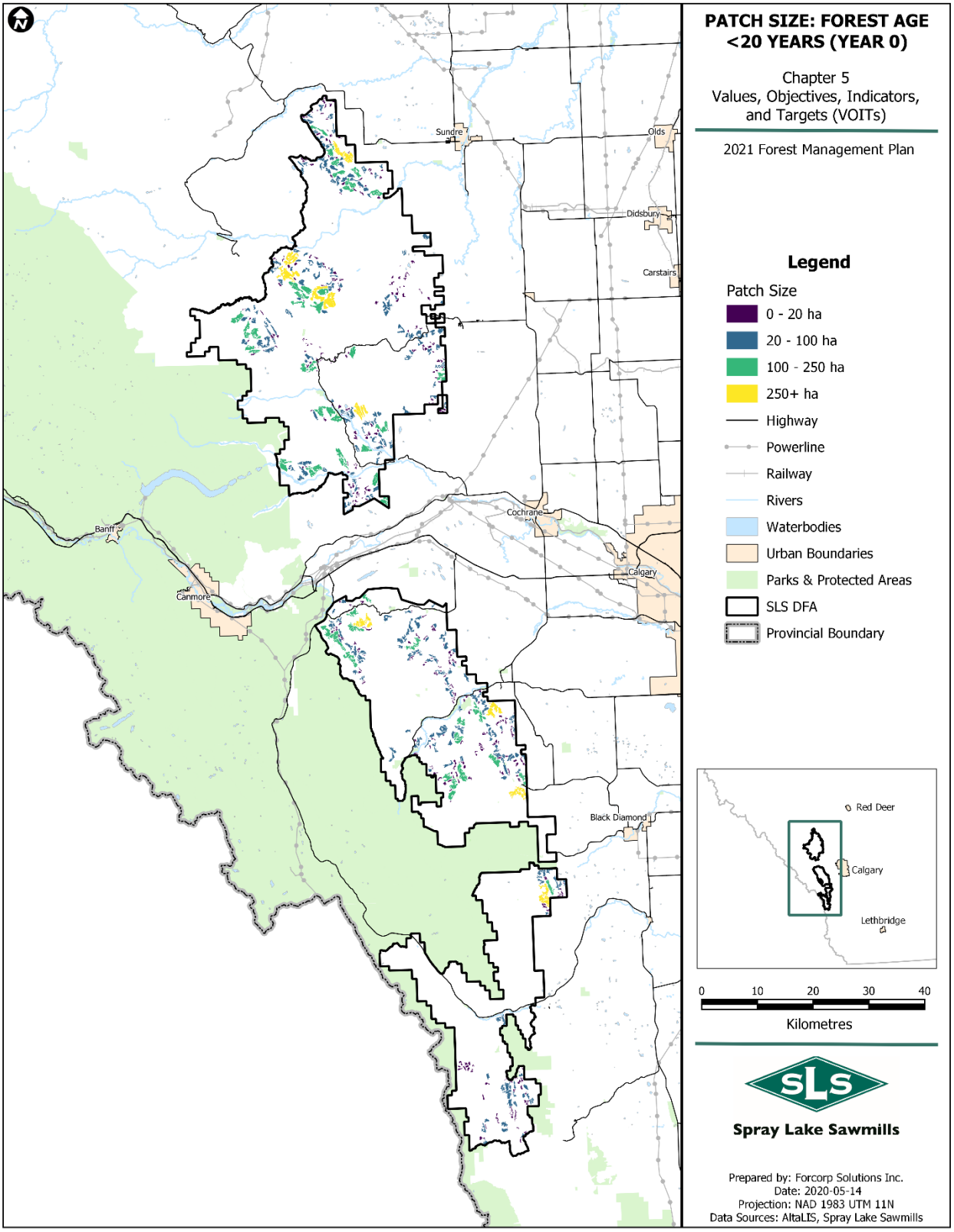

Figure 4-7. Patch size distribution for forest less than 20 years old in 2021

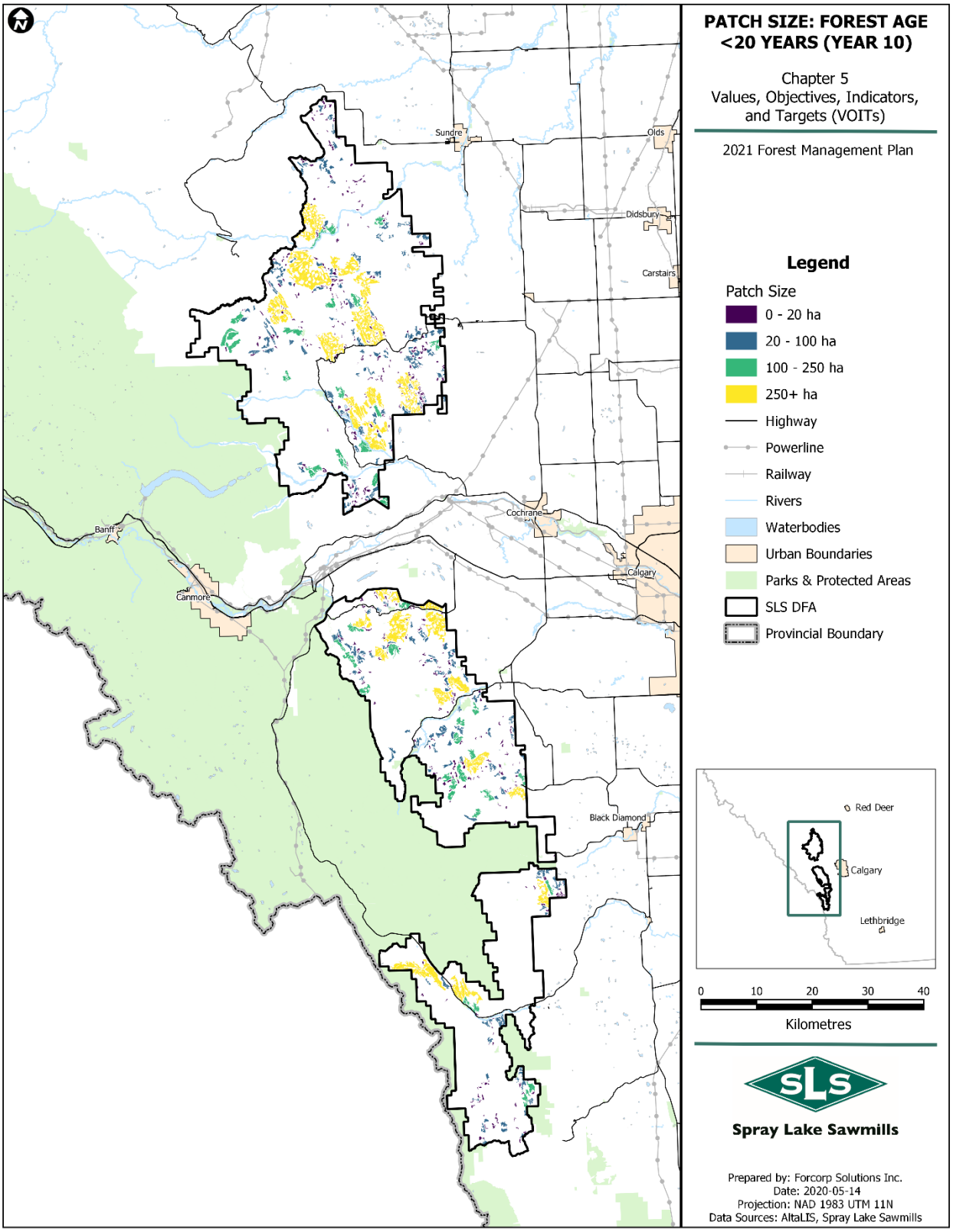

Figure 4-8. Patch size distribution for forest less than 20 years old in 2031

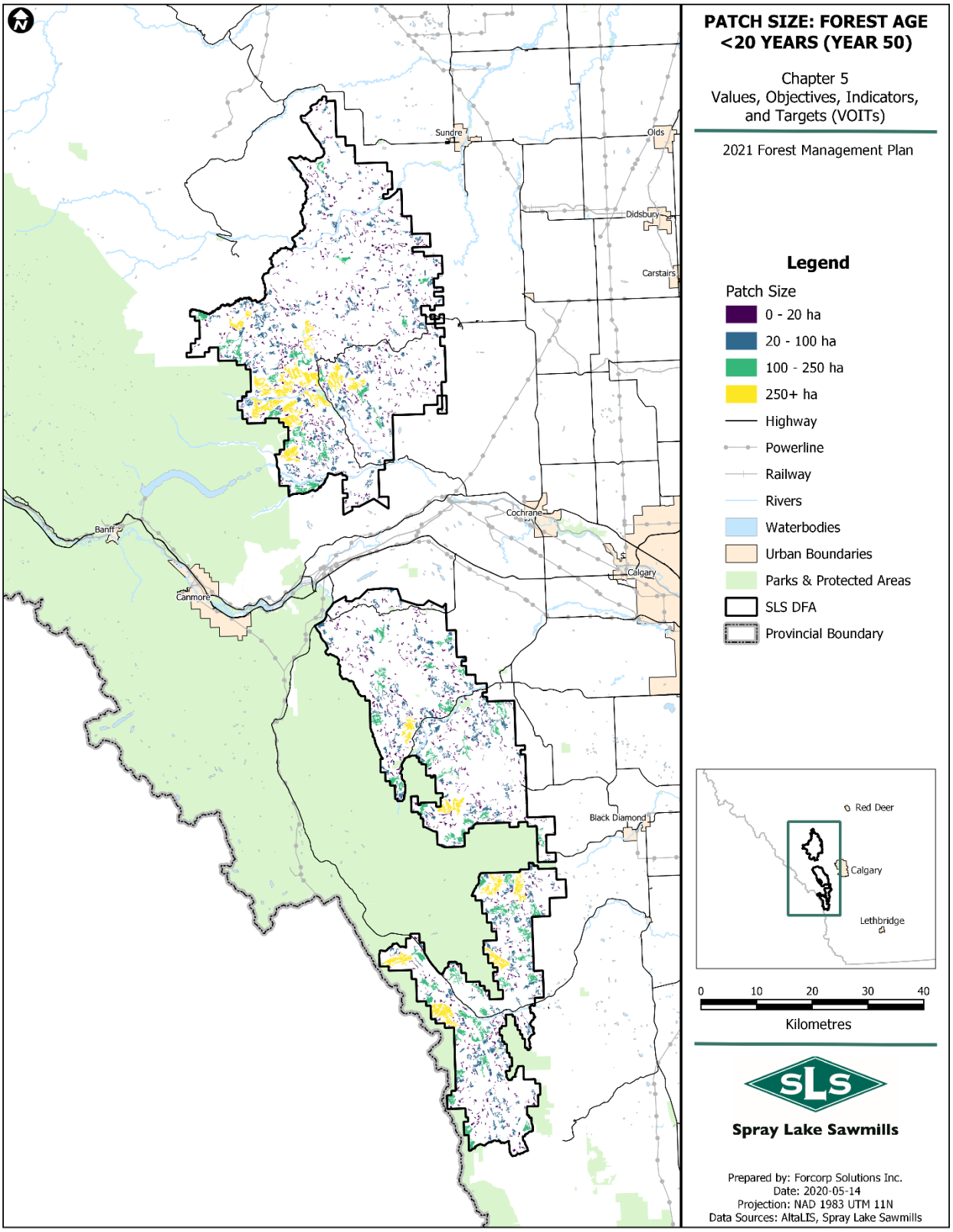

Figure 4-9. Patch size distribution for forest less than 20 years old in 2071

4.1.3 VOIT 3 (1.1.1.2b) – Old Interior Forest

Reporting Requirement:

- Tables of indicators (values and targets) at 0, 10 and 50 years.
- Maps of indicators at 0, 10 and 50 years.

Reporting is completed overall (Table 4-7) and by yield curve strata (Table 4-7). Note that while there are no yield curves used for SB (Black Spruce) and FD (Douglas Fir), they are included in the yield curve strata summary as an additional category (SBFD) for completeness. There are 5,089 ha in the SBFD category, and these are not harvested. Over time they age to become part of the old seral stage and interior core.

Table 4-6. Summary of old and of old interior forest

Year	Forest > 120 Years Old		Forest > 120 Years Old in Patches > 120 Ha	
	Area (ha)	% Change	Area (ha)	% Change
2021	124,697	-	108,052	-
2031	133,864	+ 7	118,722	+ 10
2071	140,409	+ 13	124,594	+ 15

Table 4-7. Area of old interior forest by yield curve strata

	HW		MIX		PL		SW		SBFD		Total	
Year	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
2021	3,509	18	3,755	19	51,431	29	47,181	57	2,176	43	108,052	36
2031	7,061	37	6,790	35	55,690	31	46,048	56	3,133	62	118,722	39
2071	14,739	77	8,953	46	57,681	32	39,169	48	4,052	80	124,594	41

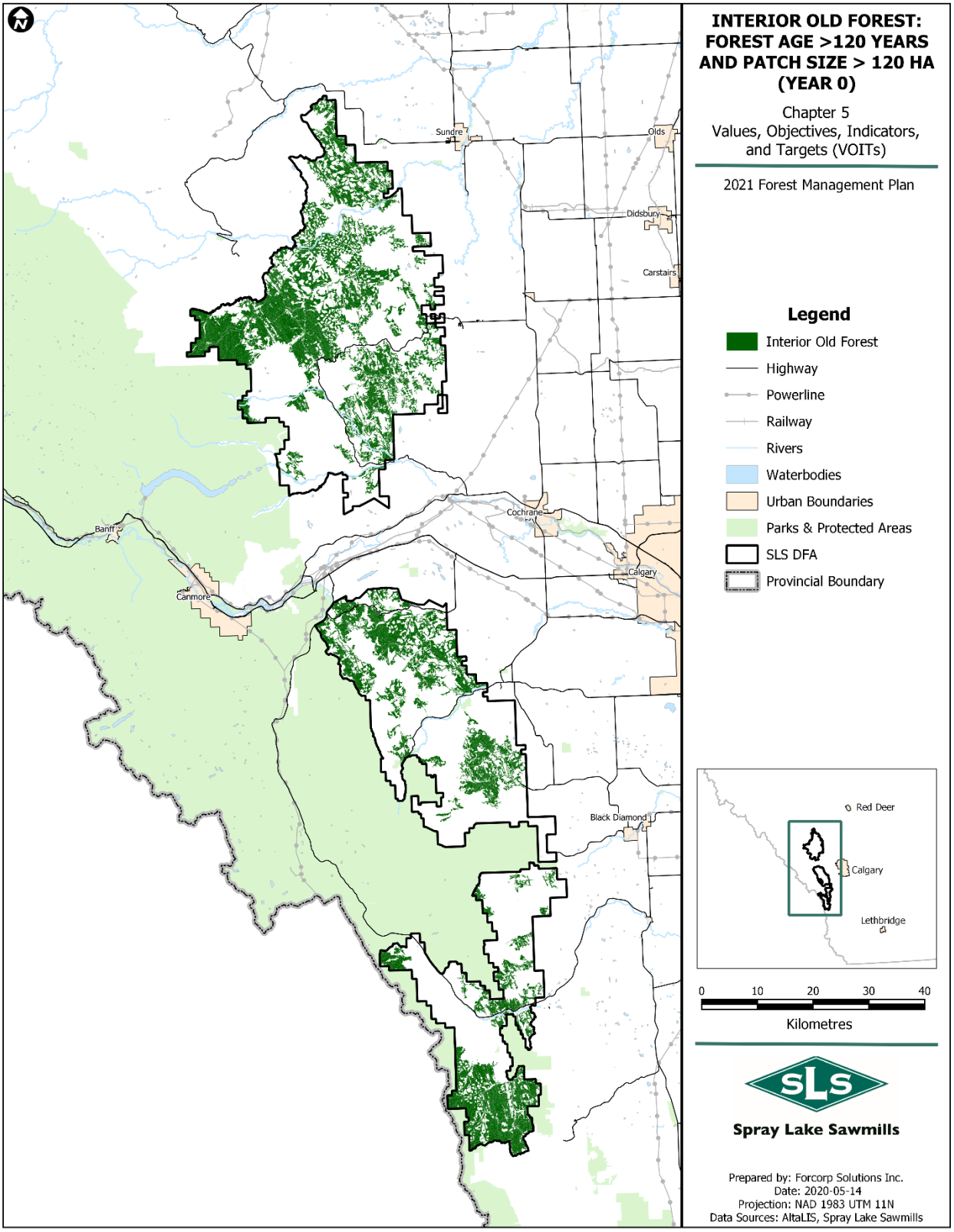

Figure 4-10. Interior old forest (forest greater than 120 years old in patches greater than 120 ha) distribution in 2021

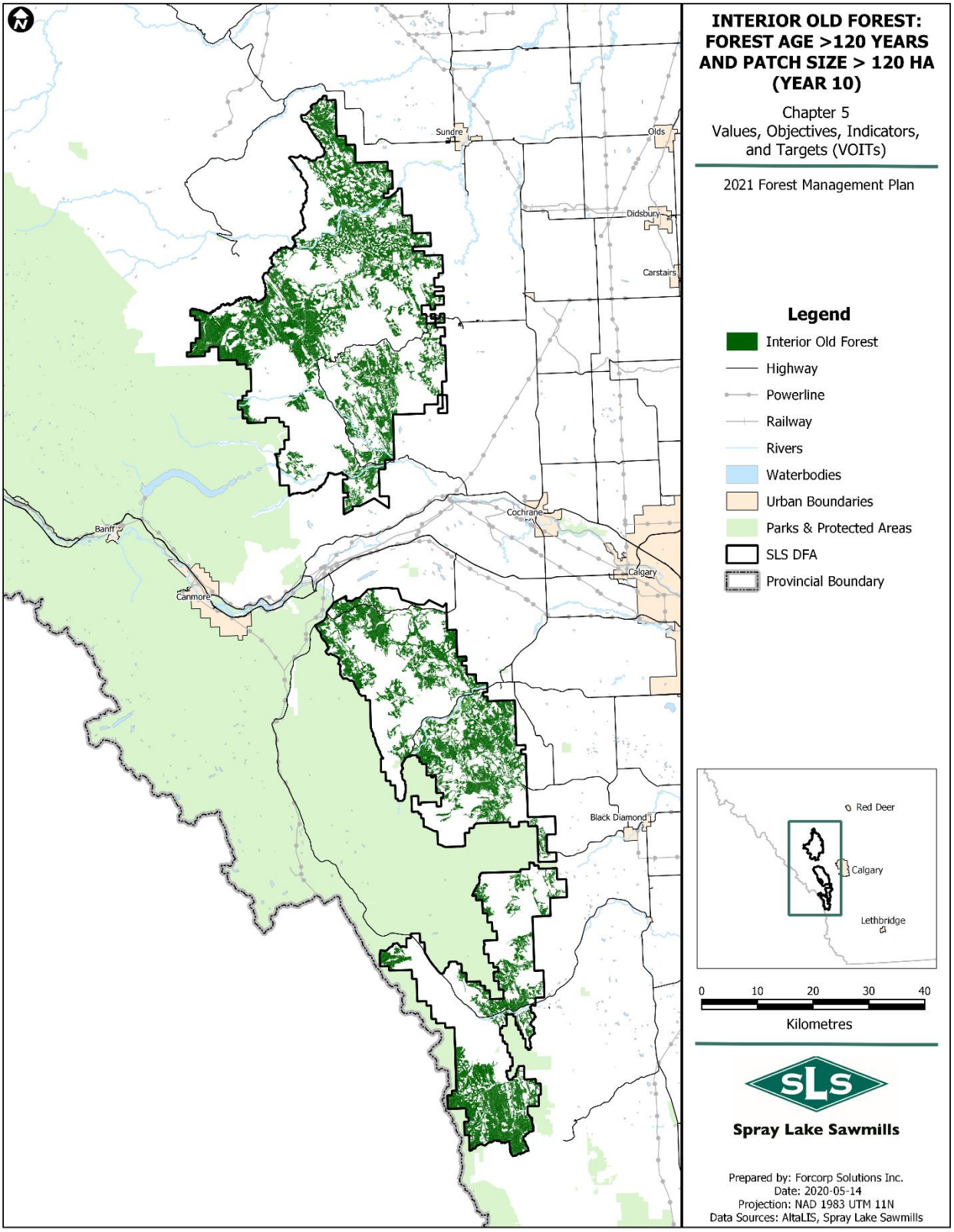

Figure 4-11. Interior old forest (forest greater than 120 years old in patches greater than 120 ha) distribution in 2031

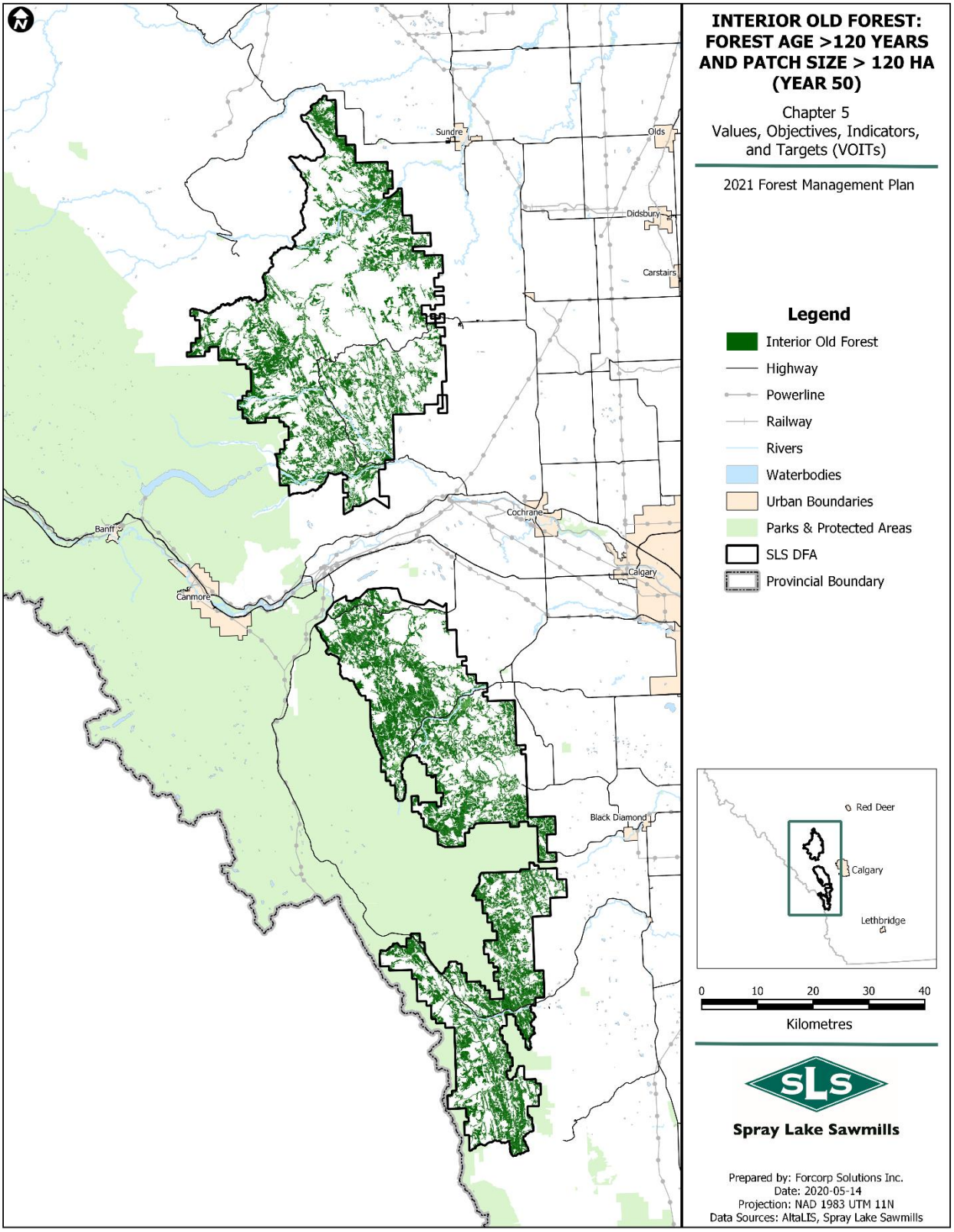

Figure 4-12. Interior old forest (forest greater than 120 years old in patches greater than 120 ha) distribution in 2071

4.1.4 VOIT 4 (1.1.1.3a) – All-Weather Permanent Forestry Roads

Reporting Requirement:

- Table of road density for the DFA at 0 and 10 years.
- Map of existing and proposed open and closed all weather forestry roads (DLO).
- Report forestry roads and total (all users) roads.

Road density for all-weather permanent forestry roads was calculated using the Digital Integrated Dispositions (DIDs) system using the following steps:

- Select DIDs entries from the DIDs layer extracted for the purposes of landbase construction (see *Annex V – Net Landbase Development* Section 2.3.18) that have a disposition type of 'DLO'.
- Select only those DLO entries assigned to company 'SPRAY LAKE SAWMILLS (1980) LTD.', or 'SUNDRE FOREST PRODUCTS INC.'. Other DLOs in the area are not forestry roads.
- Calculate centerlines for the selected DLOs. This is required because DIDs is polygon-based and does not contain information about road length. The process was carried out using the PostGIS function *ST_ApproximateMedialAxis.*
- Finally, road density was calculated from the resulting centerlines, by summing the total length (km) of DLO and dividing by the area of the DFA (km^2)

The estimated length and density of roads classified as DLO, split by whether they are forestry or non-forestry roads, is provided in Table 4-8. In addition, forestry roads are classified as open or gated, based on SLS current status. Forestry DLOs are shown spatially in Figure 4-13. No additional DLO roads are proposed at this stage but may be required in the future. For additional reporting on total all-user road densities see *Chapter 4 – Summary of Previous DFMP* Section 3.3.1.

Table 4-8. The DLO length and density for forestry and non-forestry DLOs on the DFA

Type	Status	Year 0		Currently Proposed (Year 10)*	
		Road Length (km)	Density (km/km^2)	Road Length (km)	Density (km/km^2)
DLO (Forestry)	Open	16	0.005	-	-
	Gated	45	0.014	-	-
	Total	61	0.018	61	0.018
DLO (Non-Forestry)		81	0.024	-	-
Total		142	0.042	-	-

* No new all-weather permanent forestry roads are proposed and SLS does not currently envision a need to build additional all-weather permanent roads in the next 10 years. Nevertheless, SLS has identified a target of 0.038 km/km^2 to allow for the possibility of limited road construction if circumstances change.

Total all-user road length and density is provided in Table 4-9. See *Chapter 3 – Landscape Assessment* Section 5.7 for additional details.

Table 4-9. Total all-user road length and density in the DFA

Type	All Roads		Open Roads	
	Road Length (km)	Density (km/km^2)	Road Length (km)	Density (km/km^2)
North	549	0.37	356	0.24
South	621	0.34	327	0.18
Total	1,170	0.35	683	0.21

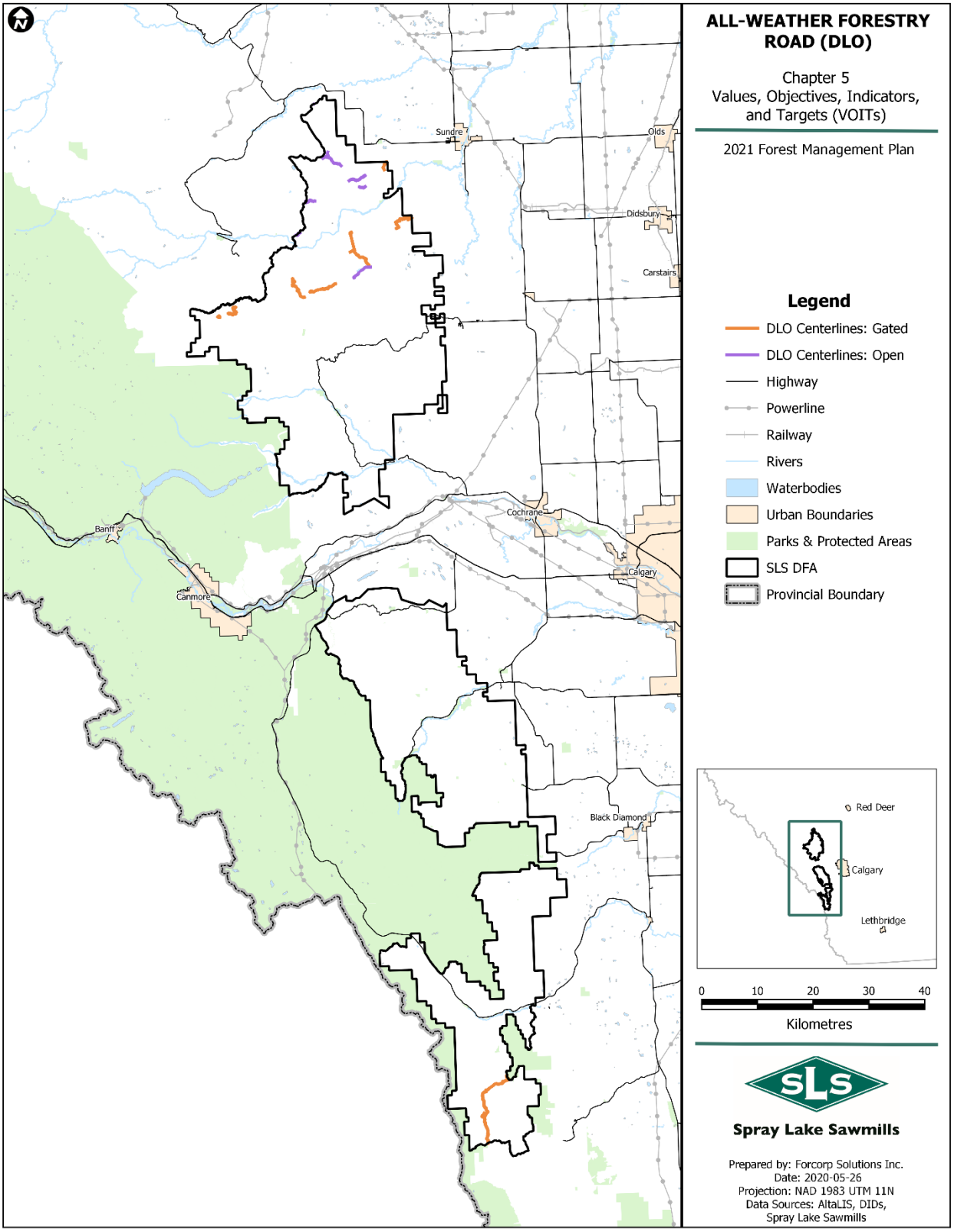

Figure 4-13. All-weather forestry road (DLO) on the DFA

4.1.5 VOIT 5 (1.1.1.3b) – Open Seasonal/Temporary Forestry Roads

Reporting Requirement:

- Table of existing open seasonal/temporary forestry roads at time zero.
- Map of existing open seasonal/temporary forestry roads at time zero.

There are currently 203 km of open seasonal/temporary forest roads in the DFA, of which a majority are gated access (Table 4-10, Figure 4-14).

Table 4-10. The length of temporary forest roads on the DFA

Type	Status	Road Length (km)
Temporary Forest Road	Open	87
	Gated	116
	Total	203

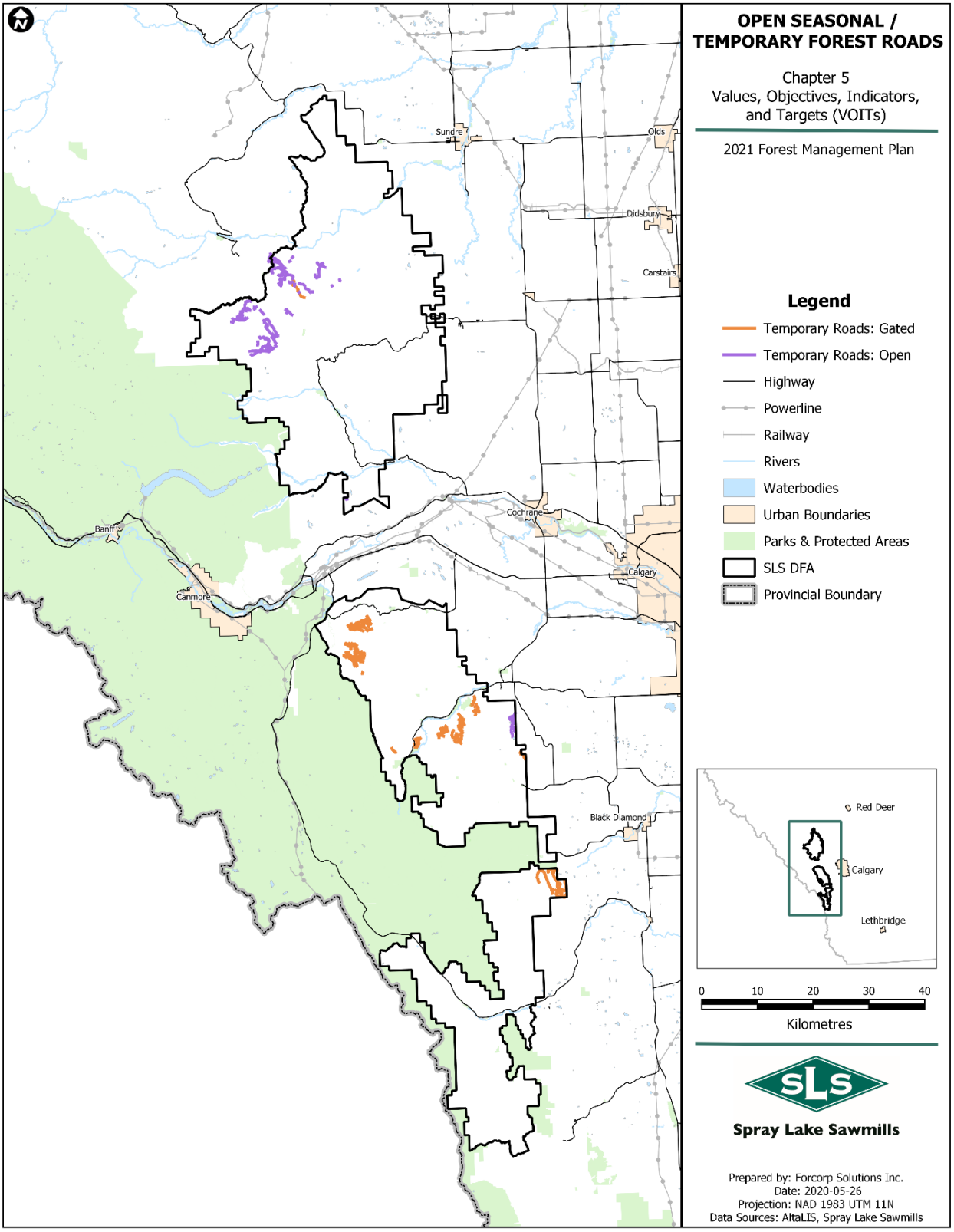

Figure 4-14. Open seasonal / temporary forest roads on the DFA

4.1.6 VOIT 6 (1.1.1.4) – Uncommon Plant Community

Reporting Requirement:

- Table with descriptive list and targets.
- Map(s) displaying known locations of uncommon plant communities.

Table 4-11. ACIMS non-sensitive occurrences within the DFA

Latin Name	Common Name	Species Rank	Number of Occurrences
Agoseris lackschewitzii	Pink false dandelion	S3	1
Amblyodon dealbatus	Short-tooth hump moss	S3	2
Anaptychia crinalis	Fringe lichen	S2	1
Anastrophyllum michauxii	Liverwort	SU	1
Antennaria aromatica	Scented pussytoes	S3	1
Antennaria corymbosa	Corymbose everlasting	S2	1
Arnica longifolia	Long-leaved arnica	S2	1
Aulacomnium androgynum	Little groove moss	S2S3	1
Bacidia hegetschweileri	Dot lichen	S1	1
Boechera lemmonii	Lemmon's rockcress	S3	1
Boloria astarte	Astarte Fritillary	S3	2
Brachythecium frigidum	Moss	S1S2	1
Braya humilis ssp. maccallae	Leafy braya	S2	1
Bryonora castanea	Lichen	SU	1
Buellia badia	Button lichen	S1	1
Calicium trabinellum	Yellow collar stubble lichen	S2	2
Callophrys spinetorum	Thicket Hairstreak	S1S2	1
Cetrariella commixta	Intermingled camouflage lichen	S1S2	1
Chaenotheca chrysocephala	Stubble lichen	S2	1
Chaenotheca stemonea	Stubble lichen	S1	1
Chaenotheca trichialis	Stubble lichen	S2	1
Chaenotheca xyloxena	Stubble lichen	S1	1
Cladonia humilis	Cladonia lichen	S1?	1
Cladonia ramulosa	Cladonia lichen	S2	1
Collema subparvum	Jelly lichen	S1	1
Collema undulatum var. granulosum	Jelly flakes lichen	S2S3	1
Coscinodon cribrosus	Sieve-toothed moss	S1	2
Cyphelium inquinans	Cupped soot lichen	S2	1
Dermatocarpon intestiniforme	Leather lichen	S3	2
Dichelyma falcatum	Moss	S2S3	1
Dicranella crispa	Curl-leaved fork moss	S2S3	1
Dicranella subulata	Awl-leaved fork moss	S2S3	2
Dicranum tauricum	Broken-leaf moss	S1S3	2
Didymodon fallax	Fallacious screw moss	S2S3	1
Didymodon subandreaeoides	Moss	S2S3	1
Draba porsildii	Porsild's draba	S3	1

Latin Name	Common Name	Species Rank	Number of Occurrences
Draba ventosa	Wind River draba	S2	1
Drepanocladus brevifolius	Brown moss	SU	1
Elymus scribneri	Scribner's wheat grass	S2	3
Encalypta spathulata	Candle-snuffer moss	S2S3	1
Ephebe lanata	Lichen	S1S2	1
Erigeron radicatus	Dwarf fleabane	S3	1
Grimmia alpestris	Alpine grimmia moss	SU	1
Grimmia donniana	Donian grimmia moss	S1S2	2
Hippuris montana	Mountain mare's-tail	S1	1
Homalothecium nevadense	Moss	S1S2	6
Hygroamblystegium tenax	Moss	S1S2	1
Imbribryum muehlenbeckii	Moss	S2S3	1
Jaffueliobryum raui	Moss	S2	1
Juncus parryi	Parry's rush	S2	1
Jungermannia atrovirens	Liverwort	SU	1
Lecanora saligna	Rim-lichen	S1	1
Lecidella anomaloides	Disk lichen	S1	1
Lepraria incana	Dust lichen	S3	1
Leptogium hirsutum	Jellyskin lichen	SU	1
Leptogium pseudofurfuraceum	Dimpled jellyskin lichen	S2S3	1
Leptogium tenuissimum	Lilliput jellyskin lichen	S2S3	1
Lewisia pygmaea	Alpine lewisia	S2	1
Limprichtia cossonii	Moss	SU	7
Lopadium pezizoideum	Urn-disk lichen	S2	1
Lophozia badensis	Liverwort	SU	1
Lycaena phlaeas	Little Copper	S2	6
Melanohalea subelegantula	Camouflage lichen	S3	1
Micarea assimilata	Assimilative dot lichen	S2	1
Moerckia hibernica	Liverwort	SU	1
Mycocalicium subtile	Lichen	S2S4	1
Neottia convallarioides	Broad-lipped twayblade	S2	1
Ochrolechia frigida	Arctic saucer lichen	SU	1
Orthotrichum pylaisii	Moss	S2	1
Packera contermina	Arctic butterweed	S2	2
Pellaea gastonyi	Gaston's cliff brake	S2	4
Pellaea glabella ssp. simplex	Smooth cliff brake	S2	1
Pellia neesiana	Liverwort	SU	1
Phaeophyscia nigricans	Shadow lichen	S2S3	1
Phaeophyscia sciastra	Dark shadow lichen	S3	1
Philonotis marchica	Moss	S2S3	2
Physaria arctica	Arctic bladderpod	S3	1
Pinus albicaulis	Whitebark pine	S3	4
Pinus flexilis	Limber pine	S3	10
Pinus flexilis Scree Woodland	Limber pine scree woodland	S1S2	1

Latin Name	Common Name	Species Rank	Number of Occurrences
Potentilla hookeriana	Hooker's cinquefoil	SU	1
Potentilla macounii	Macoun's cinquefoil	S1	2
Potentilla villosa	Hairy cinquefoil	SU	1
Primula egaliksensis	Greenland primrose	S2	2
Psora nipponica	Butterfly scale	S2S3	1
Psora tuckermanii	Brown-eyed scale	S2S3	1
Ptychostomum calophyllum	Matted bryum	S2	1
Ptychostomum turbinatum	Moss	S2S3	2
Ramalina intermedia	Rock ramalina	S3	1
Ranunculus glaberrimus	Early buttercup	S3	2
Rhizocarpon concentricum	Lichen	S1	1
Rhodobryum ontariense	Ontario Rhodobryum moss	S1S2	2
Riccardia chamedryfolia	Liverwort	SU	1
Sedum divergens	Spreading stonecrop	S2	1
Seligeria donniana	Donian beardless moss	S2S3	1
Splachnum vasculosum	Large-fruited splachnum moss	S1S2	1
Tayloria acuminata	Point-leaf small-kettle moss	S2	1
Tetraplodon urceolatus	Alpine lemming moss	S2S3	1
Thrombium epigaeum	Epigeal clot lichen	S2	2
Tortula leucostoma	Moss	S2S3	1
Tortula systylia	Moss	S2S3	1
Umbilicaria americana	American rock tripe lichen	S2S3	3
Verrucaria hydrela	Speck lichen	S1	1
Vulpicida canadensis	Brown-eyed sunshine lichen	S2S3	1
Xylographa parallela	Black woodscript lichen	S2S4	2
Total			**157**

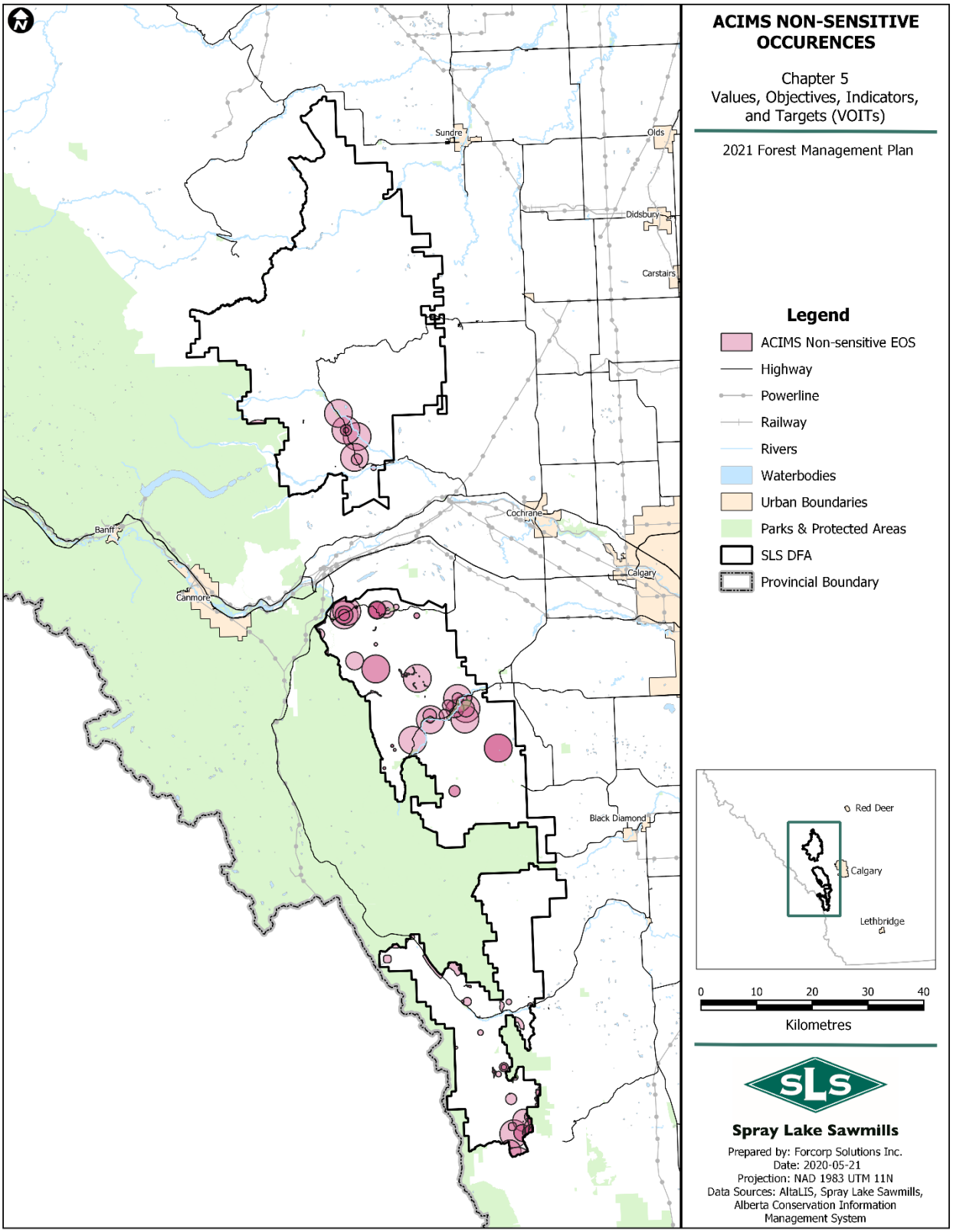

Figure 4-15. Alberta Conservation Information Management System (ACIMS) non-sensitive occurrences in the DFA

4.1.7 VOIT 7 (1.1.1.5a) – Unsalvaged Burned Forest

Reporting Requirement:

- Table of fire disturbances (salvaged and unsalvaged) within the last 10 years.
- Map of fire disturbances (salvaged and unsalvaged) within the last 10 years.
- Report on area in hectares (ha).

See *Chapter 3 – Landscape Assessment* Section 5.5. Less than 200 hectares were burned from 2010-2019 (Table 4-12) and none of this area was salvage logged.

Table 4-12. Number and size of wildfires within the DFA

Year	Total Wildfire Starts	Number of Wildfires (Spatial)	Total Wildfire Area (ha)	Within the DFA			
				Area Burned (ha)	Average Wildfire Size (ha)	Maximum Wildfire Size (ha)	Wildfire in DFA (%)
2007	95	1	28	28	28	28	100
2008	76	0					
2009	92	2	9	9	5	5	100
2010	144	0					
2011	107	1	6	6	6	6	100
2012	221	3	18	18	6	15	100
2013	166	0					
2014	146	0					
2015	85	2	73	39	20	37	54
2016	98	5	40	40	8	17	100
2017	140	1	4	4	4	4	100
2018	72	1	30	30	30	30	100
2019[1]		1	3	3	3	3	100
Total	**1,442**	**17**	**211**	**177**	**10**	**37**	**84**

[1] Total number of wildfire starts for 2019 was not available at the time of this report.

4.1.8 VOIT 14 (1.2.1.1) – Species at Risk

Reporting Requirement:

- Table and maps of current (time zero) and future (10 and 20 years) landscape condition for Core and Secondary habitat zones for grizzly bear.
- Tables of breeding pairs (habitat) and RSF at 0, 10, 20, 50, 100 and 200 years and maps of RSF value and breeding pairs at 0, 10, 20 and 50 years for barred owl.
- Tables of habitat suitability at 0, 10, 20, 50, 100 and 200 years and maps of habitat suitability at 0, 10, 20 and 50 years for marten.
- Tables of relative abundance at 0, 10, 20, 50, 100 and 200 years and maps of relative abundance at 0, 10, 20 and 50 years for varied thrush, ovenbird, and brown creeper.
- Variance requests impacting Whitebark and Limber pine trees, saplings and seedlings and how many individuals affected by each.

4.1.8.1 Grizzly Bear

The Grizzly Bear (*Ursus arctos horribilis*) was officially classified as Threatened in Alberta in 2010. The main sources of mortality for Grizzly Bears are poaching, accidental collisions with highway vehicles or trains, self-defence kills, and mistaken identity kills from black bear hunters (Government of Alberta, 2016).

In response to declining populations in Alberta, a 5-year recovery plan was developed (Alberta Sustainable Resource Development, Fish and Wildlife Division, 2008), followed by an updated plan in 2016 (Alberta Environment and Parks, 2016). This plan builds on the previous one by creating clearly defined grizzly bear management zones and by setting road density thresholds. Within these zones, the density of open routes is to be maintained below 0.6 km/km^2 in core areas, and below 0.75 km/km^2 in secondary areas (Government of Alberta, 2019). Open routes are defined in the Recovery Plan as "roads and trails (including seismic lines) on which motorized travel is possible and permissible."

fRI Research has provided the 2018 GBTools model package, which includes several different tools to help assess the potential impact of the planned harvest outlined in the FMP on Grizzly Bear habitat metrics. For reporting we used the *Habitat States* tool (fRI Research Grizzly Bear Program, 2019). The *Habitat States* tool combines a Resource Selection Function (RSF) model, which is used to represent habitat quality, and a mortality risk model, which is used to represent habitat security (or more specifically risk of human-caused mortality). Habitat quality is classified as non-critical, secondary, or primary habitat. However, if mortality risk is high, primary and secondary habitat are classified as primary or secondary sink (i.e. good quality but high risk, Figure 4-16).

There are some model limitations to consider when reviewing the model outputs:

- Outside of the Natural Region of Upper Foothills, which makes up 23% of the DFA, the fRI model may result in unrealistic outputs (Government of Alberta, 2019).
- The mortality risk model relies upon a 'proximity to roads and trails' dataset. We were unable to adjust this dataset and it contains some open roads and trails that are closed or have been removed from the landscape. These inconsistencies may affect model outputs for habitat state.

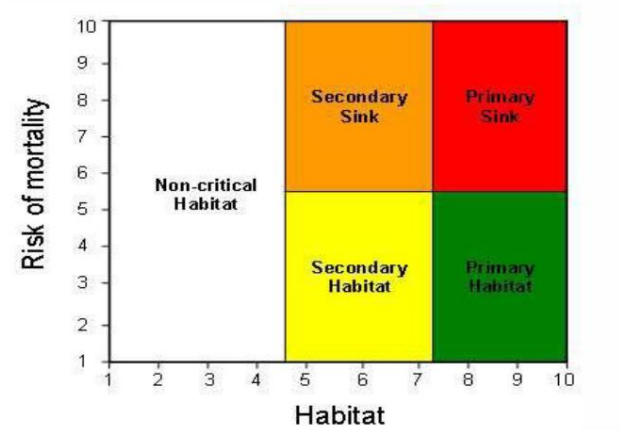

Figure 4-16. The possible classifications of habitat in the *Habitat States* model, depending on the values for mortality risk and habitat quality **(fRI Research Grizzly Bear Program, 2019)**.

Road Density

Road density calculations were based on a composite road layer, which combined AltaLIS base features with designated and non-designated trails, as well as operations roads from SLS (*see Annex VI – Timber Supply Analysis: Appendix I*). Roads considered impassable to vehicle traffic because of reclamation or gates were classified as closed. Total road densities, including closed and temporary operational roads, in the portions of the grizzly bear population units overlapping the DFA, were between 0.285 and 0.412 km/km^2. Many of these roads are closed, and when considering only the open roads the densities are well under half the 0.6 km/km^2 open road threshold identified in the recovery plan. (Table 4-13).

Note that initial reporting used the *Current Road Density* tool from the 2018 GBTools model package (fRI Research Grizzly Bear Program, 2019). However, it was identified that this tool was underestimating road density (Clearwater Core: 0.216 km/km^2, Clearwater Secondary: 0.186 km/km^2, Livingstone Core: 0.125 km/km^2) because the tool did not clip watershed boundaries (used as processing units) to the project area boundary (the DFA). It therefore included areas outside of the DFA in density calculations, where road data was unavailable. Therefore, we re-calculated the metrics to avoid this issue.

Table 4-13. Current road density in the parts of the DFA overlapping with the Clearwater and Livingstone grizzly bear population units

Population Unit	Habitat Zone	Total (Includes Closed Roads)		Open	
		Road Length (km)	Density (km/km^2)	Road Length (km)	Density (km/km^2)
Clearwater	Core	113	0.412	76	0.275
	Secondary	437	0.355	268	0.218
Livingstone	Core	410	0.285	221	0.154

Habitat State

Of the seven bear management areas, two overlap the SLS DFA: Clearwater and Livingstone. The total size of the Clearwater population unit is 974,792 ha (Core: 592,857 ha and Secondary: 381,935 ha), of which 150,469 ha or 15.4% (Core: 27,450 ha and Secondary 123,019 ha) falls within the DFA. The total size of the Livingstone population unit is 493,575 ha (Core: 472,708 ha, Secondary: 20,867), of which 143,744 ha or 29.1% (Core: 143,744 ha and Secondary: 0 ha) falls within the DFA. Summaries of the output from the *Habitat States* model are presented in Table 4-14 and Table 4-15.

Table 4-14. Grizzly bear *Habitat States* model summary for the Clearwater management zone

Habitat Zone	Habitat Type	2021	2031			2041		
		Area (ha)	Area (ha)	Difference from Year 0 (ha)	Change from Year 0 (%)	Area (ha)	Difference from Year 0 (ha)	Change from Year 0 (%)
Core	Primary	4,371	5,302	932	21	5,930	1,560	36
	Secondary	3,903	3,612	-291	-7	2,777	-1,125	-29
	Non-Critical	3,840	2,876	-965	-25	2,031	-1,810	-47
	Secondary Sink	3,992	3,805	-188	-5	3,768	-225	-6
	Primary Sink	11,344	11,855	511	5	12,944	1,600	14
Secondary	Primary	21,413	24,148	2,735	13	26,245	4,831	23
	Secondary	16,627	15,508	-1,119	-7	14,376	-2,251	-14
	Non-Critical	27,775	23,521	-4,254	-15	20,780	-6,995	-25
	Secondary Sink	17,732	18,048	316	2	18,031	299	2
	Primary Sink	39,472	41,794	2,321	6	43,586	4,114	10

Table 4-15. Grizzly bear *Habitat States* model summary for the Livingstone management zone

Habitat Zone	Habitat Type	2021	2031			2041		
		Area (ha)	Area (ha)	Difference from Year 0 (ha)	Change from Year 0 (%)	Area (ha)	Difference from Year 0 (ha)	Change from Year 0 (%)
Core	Primary	75,634	72,204	-3,430	-5	69,028	-6,606	-9
	Secondary	17,872	16,363	-1,508	-8	14,979	-2,892	-16
	Non-Critical	24,561	30,175	5,614	23	34,958	10,397	42
	Secondary Sink	6,889	6,500	-389	-6	6,432	-457	-7
	Primary Sink	18,788	18,501	-287	-2	18,347	-442	-2

In the Clearwater population the *Habitat States* model predicted an increase in primary habitat, a decrease in secondary habitat, and an increase in primary sink in both the core and secondary zones over the 20 years analyzed. This is primarily due the conversion of non-critical habitat to either primary habitat or primary sink, depending on mortality risk. Overall, the PFMS resulted in increases to habitat quality in most locations (Figure 4-17) but mixed responses in mortality risk, with risk increasing in some areas but decreasing in others (Figure 4-18). The consistent increases in habitat quality combined with the mixed changes in mortality risk explain the increases in both primary habitat and primary sink. However, given that SLS plans to use strictly controlled temporary access only, this should mean that mortality risk in new harvest areas is much reduced (Lamb, CT, Mowat, G, Reid, A, et al., 2018). If human access is minimized, human-caused mortality should also be minimized. See *Chapter 7 – Plan Implementation and Monitoring* Section 8.2.1 for further details on the SLS Grizzly Bear management strategy.

In the Livingstone population the *Habitat States* model predicted a loss of primary and secondary habitat, and small reductions in sink habitat. This is primarily due to the conversion of primary and secondary habitat to non-critical habitat. In contrast to the Clearwater RSF model, the Livingstone RSF model predicts that the PFMS will decrease habitat quality (Figure 4-19). This effect is surprising and requires validation, given that the opposite effect is seen in the Clearwater population and in other populations in the province. Early stage regenerating forests tend to be associated with increased food resources and increased selection by grizzly bears (Kearney, S., Coops, N., Stenhouse, G et al., 2019) and references within. Based on the projected changes in modelled habitat, the PFMS risk to Grizzly Bears is considered low.

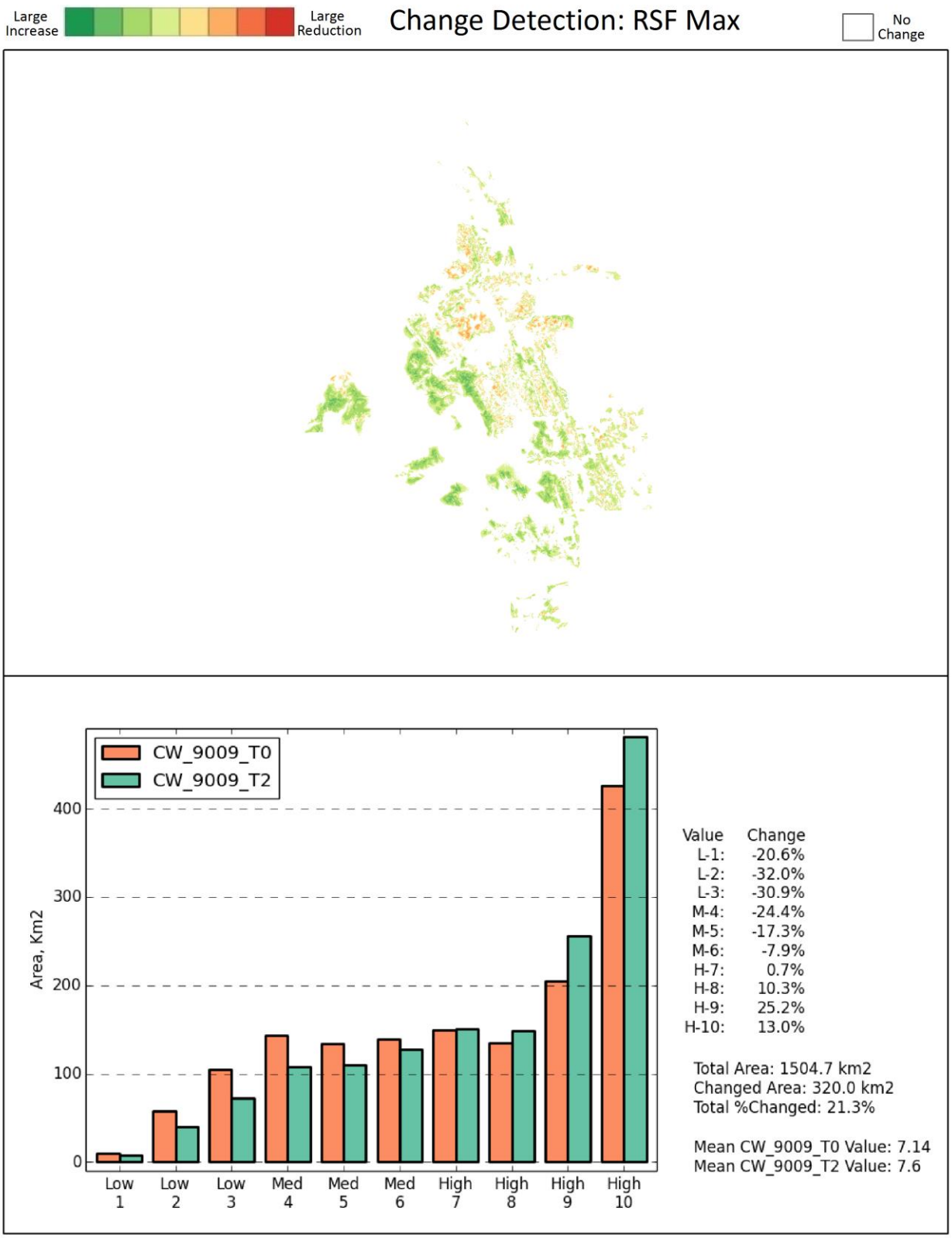

Figure 4-17. The change in forecasted RSF Max for the Clearwater population between 2021 and 2041 as a result of the PFMS

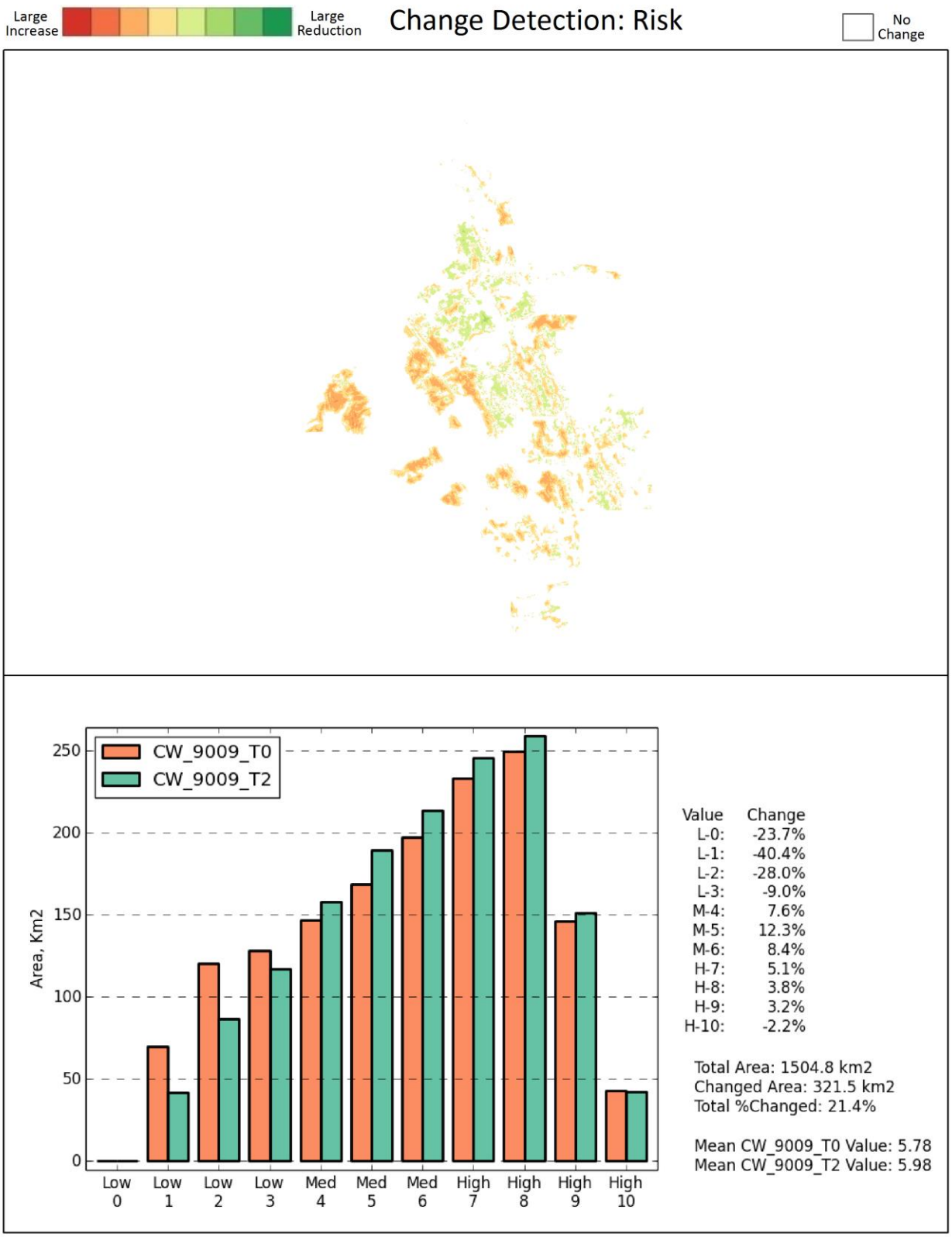

Figure 4-18. The change in forecasted Mortality Risk for the Clearwater population between 2021 and 2041 as a result of the PFMS.

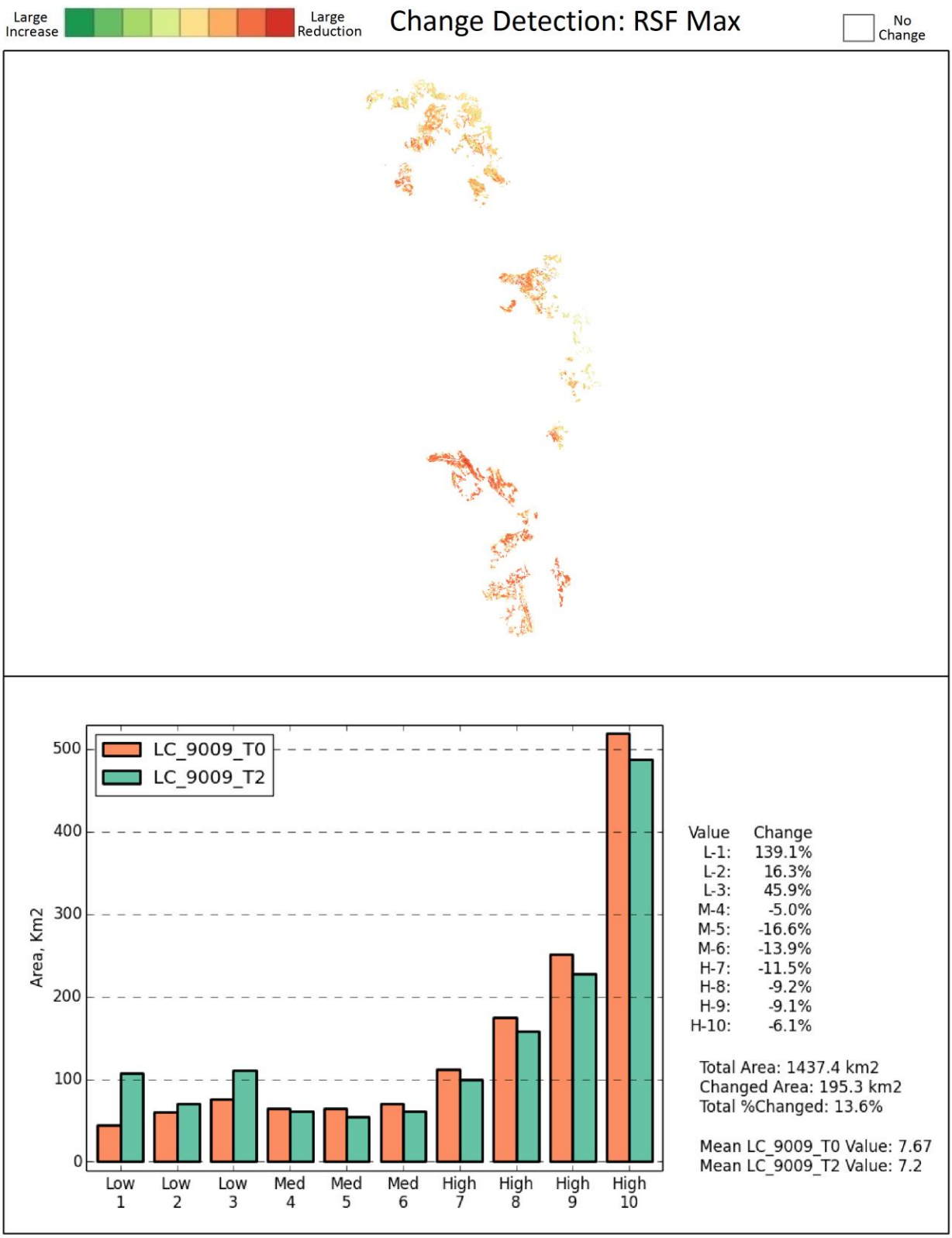

Figure 4-19. The change in forecasted RSF Max for the Livingstone population between 2021 and 2041 as a result of the PFMS

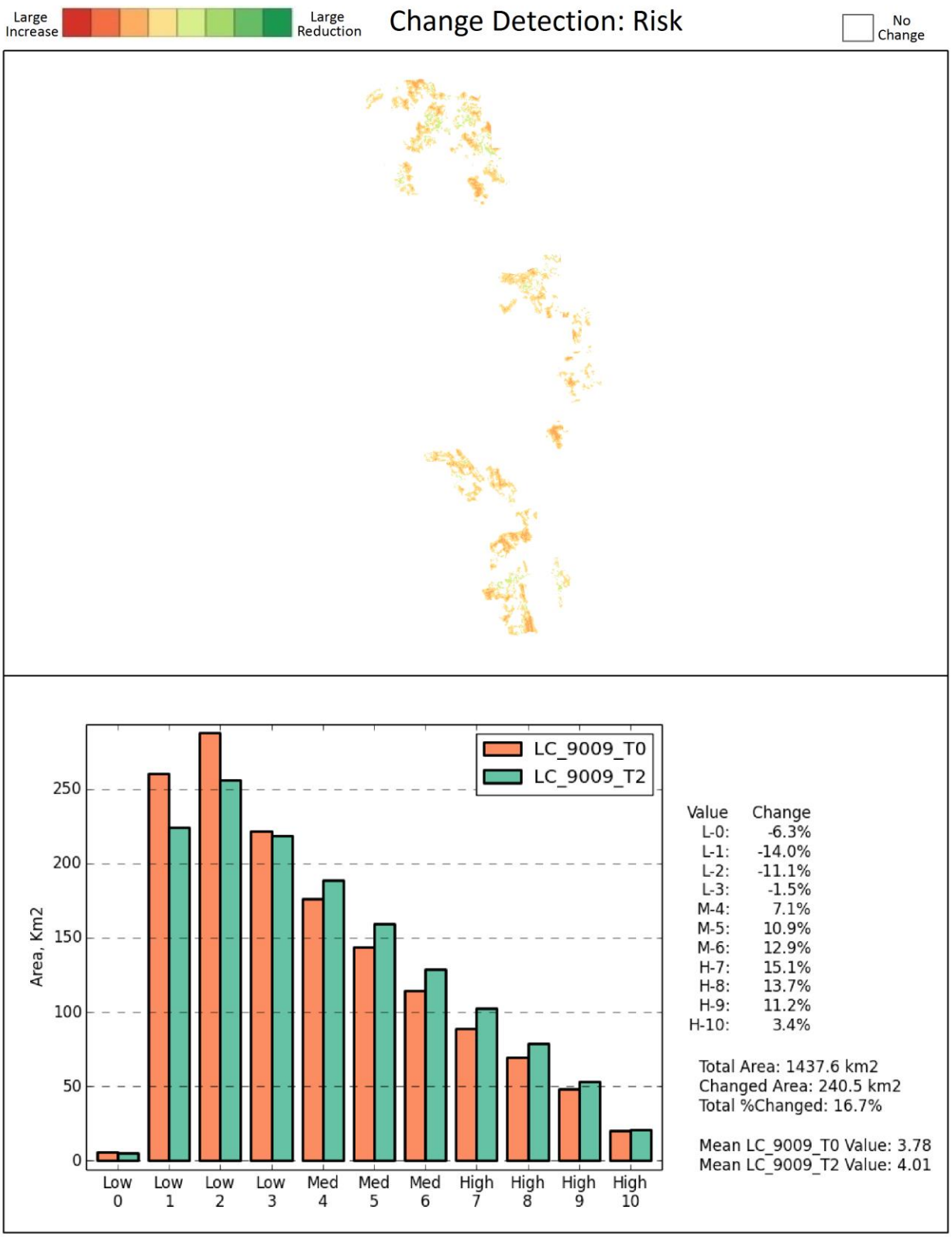

Figure 4-20. The change in forecasted Mortality Risk for the Livingstone population between 2021 and 2041 as a result of the PFMS

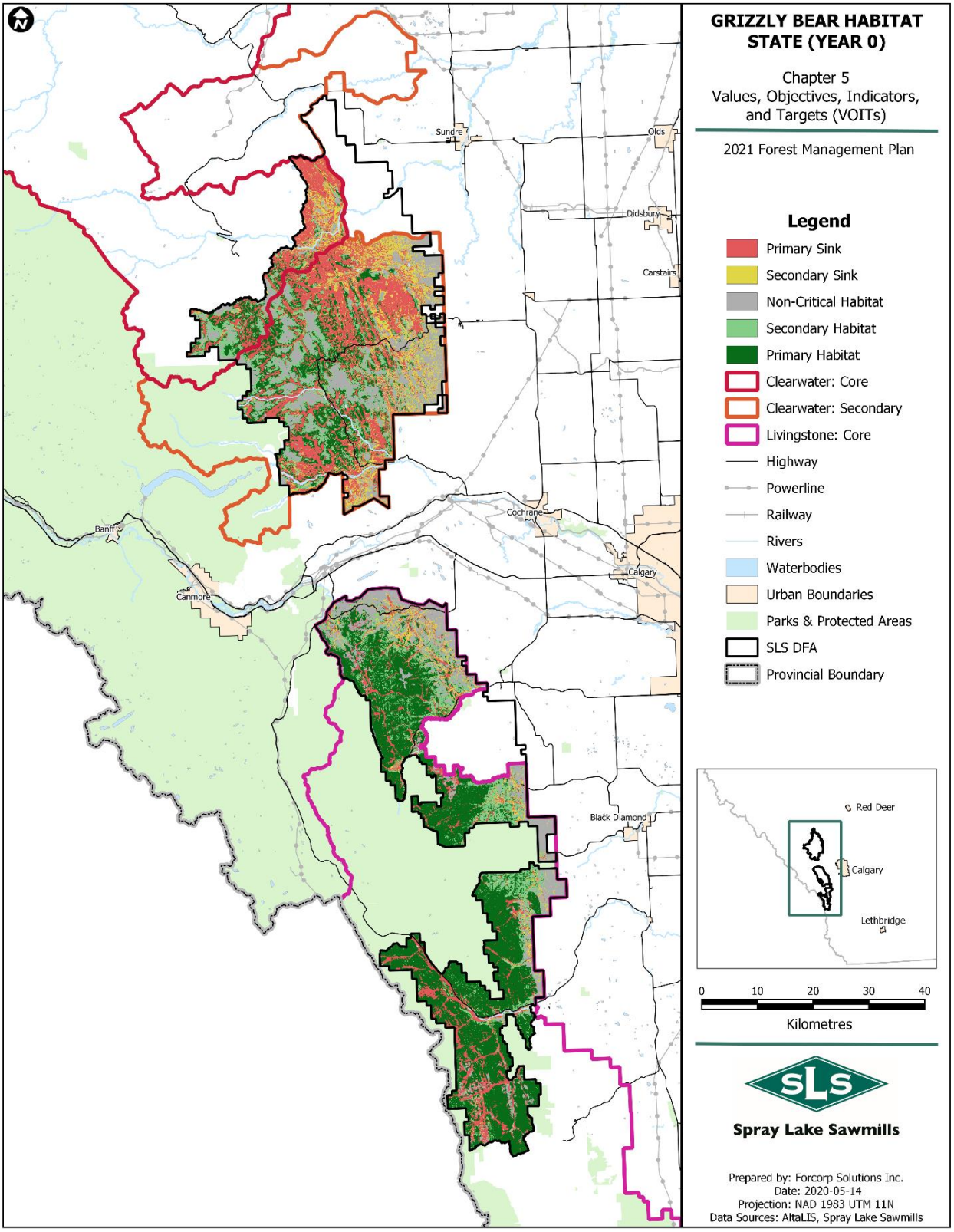

Figure 4-21. Grizzly Bear habitat state in 2021

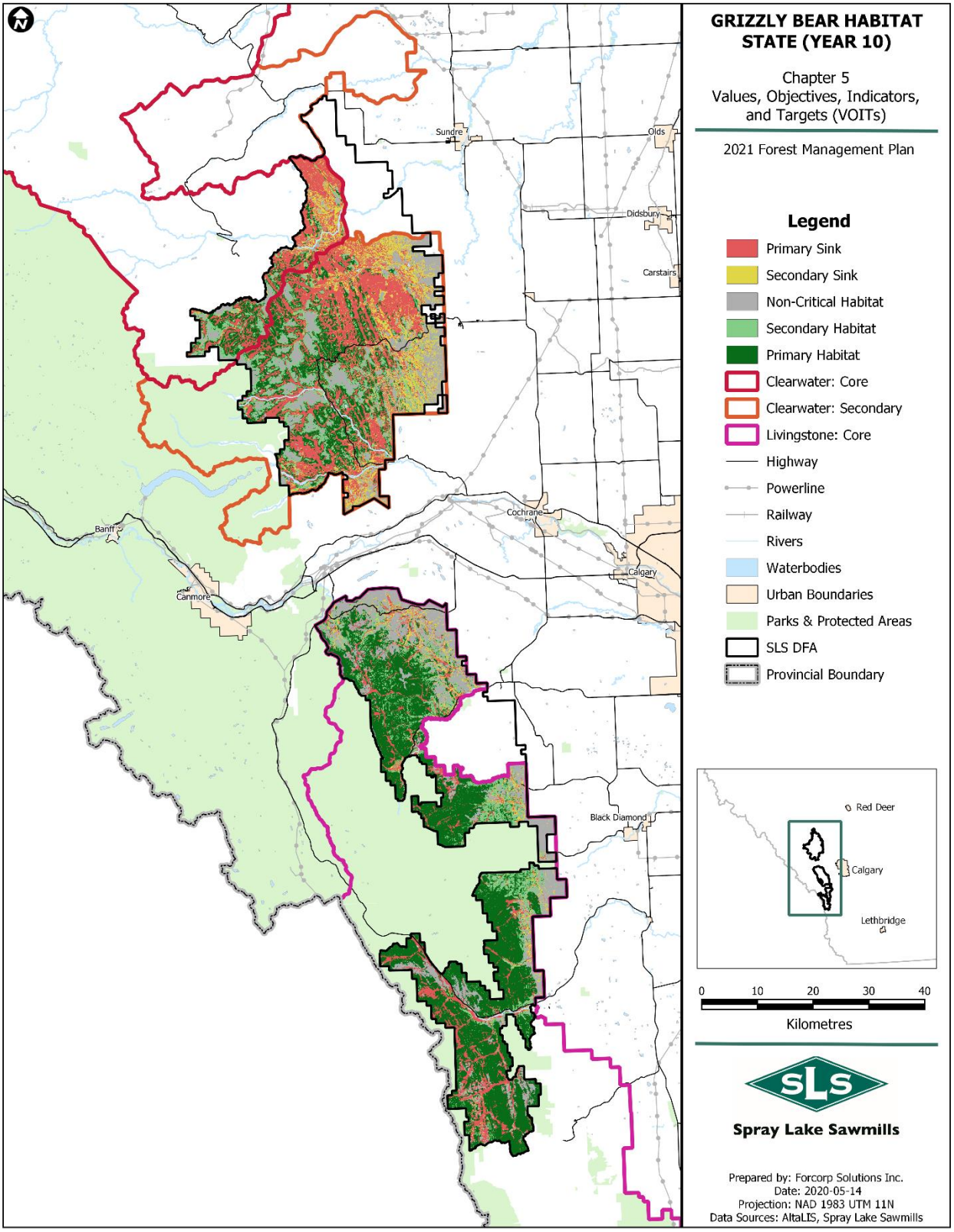

Figure 4-22. Grizzly Bear habitat state in 2031

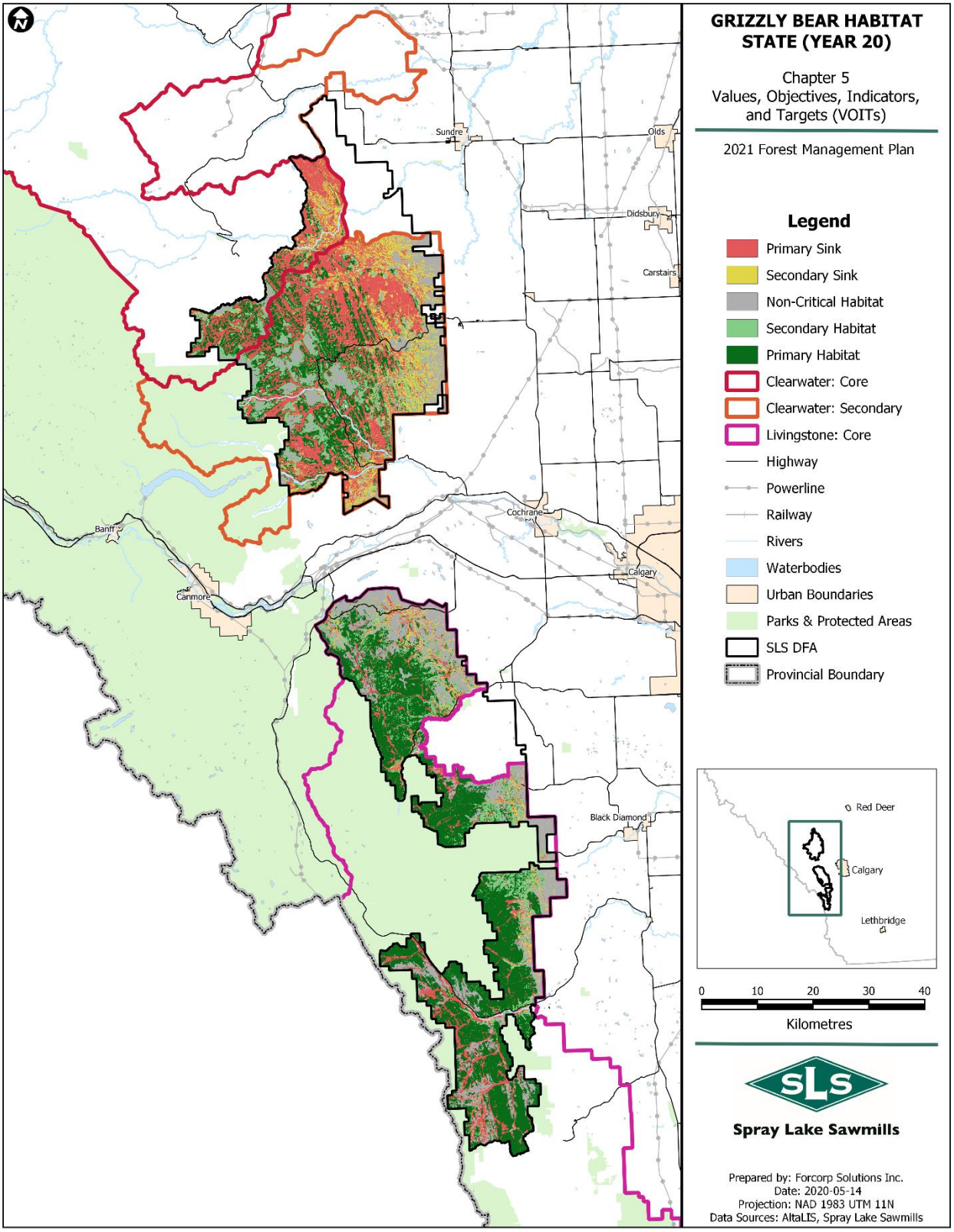

Figure 4-23. Grizzly Bear habitat state in 2041

4.1.8.2 Barred Owl

The Barred Owl (*Strix varia*) has been listed as a *Species of Special Concern* in Alberta and a conservation management plan is available for the species. Barred Owls prefer old forests with a mix of large deciduous trees and snags, and old conifer forest. They nest in natural cavities of large balsam poplar and trembling aspen. The Barred Owl's large territories make it an indicator or focal species for the wider assemblage of species that rely on old mixedwood forests (Alberta Environment and Parks, 2016).

The GoA provided models for assessing habitat value (using an RSF) and predicting the potential number of breeding pairs as the landscape changes. Results are displayed in Table 4-16.

To determine the number of breeding pairs, the following post-processing calculation was carried out:

Using the "BREEDPAIR" raster, take the number under "Count" for Value 1 (e.g. 4,793,719), multiple it by the raster grid size (15m by 15m = 225 m^2) and then divide by 10,000 to get the number in hectares.

e.g. (4,793,719 x 225)/10,000 = 107,858.7

Then divide this number by 562 ha (Russel, 2008).

e.g. 107,858.7/562 = 191.9

Round the number, and this gives you the number of breeding pairs.

e.g. 192

The time 10, 20, 50, 100 and 200 outputs of the model were post-processed from the Patchworks model output for the preferred forest management scenario (PFMS) and time period. All time periods were run on the gross landbase, which was aged for each time period processed.

Table 4-16. Results from the Barred Owl habitat model for Breeding Pairs and RSF

	Metric	Year 0	Year 10	Year 20	Year 50	Year 100	Year 200
Breeding Pairs	Raster Value Total	1,609,699	1,981,168	1,839,656	1,609,699	1,521,254	1,521,254
	Potential No. Breeding Pairs	64	79	74	64	61	61
	% Change from Time 0	0	23.4	15.6	0	-4.7	-4.7
RSF	Mean	0.06	0.063	0.06	0.058	0.056	0.056
	Standard Deviation	0.091	0.098	0.094	0.092	0.09	0.09
	% Change from Time 0	0	5.6	0.9	-3.4	-5.8	-5.8

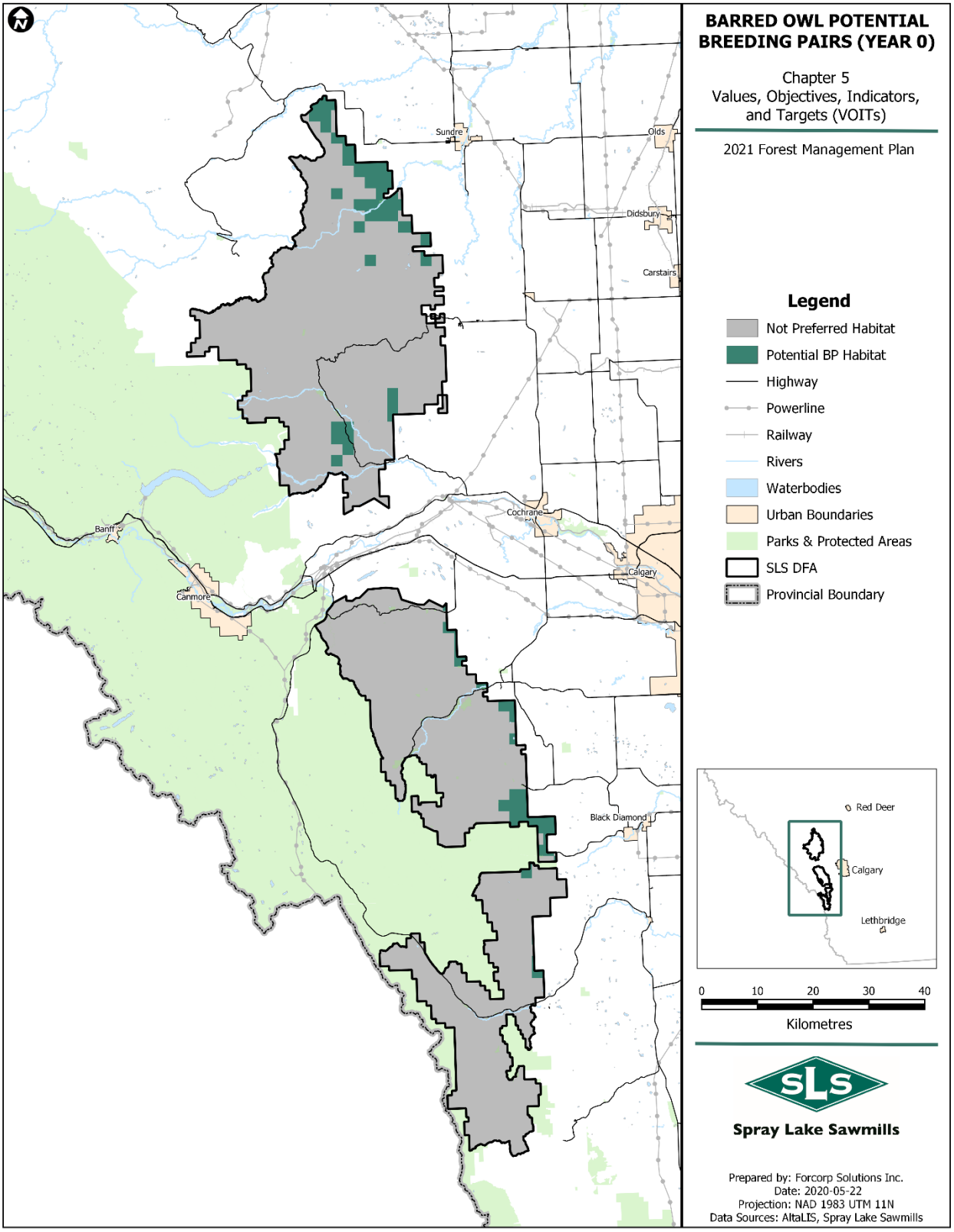

Figure 4-24. Barred Owl potential breeding pairs in 2021

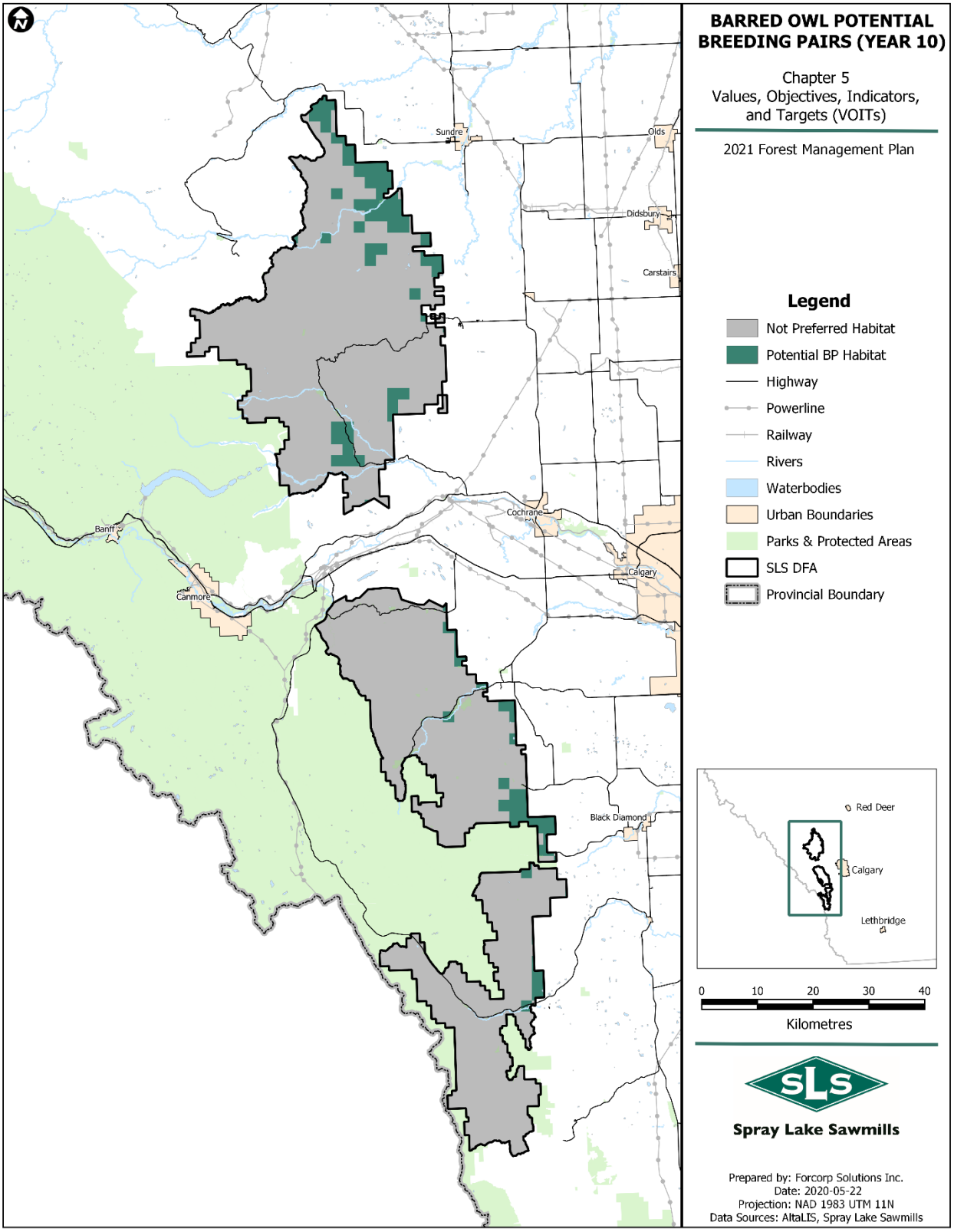

Figure 4-25. Barred Owl potential breeding pairs in 2031

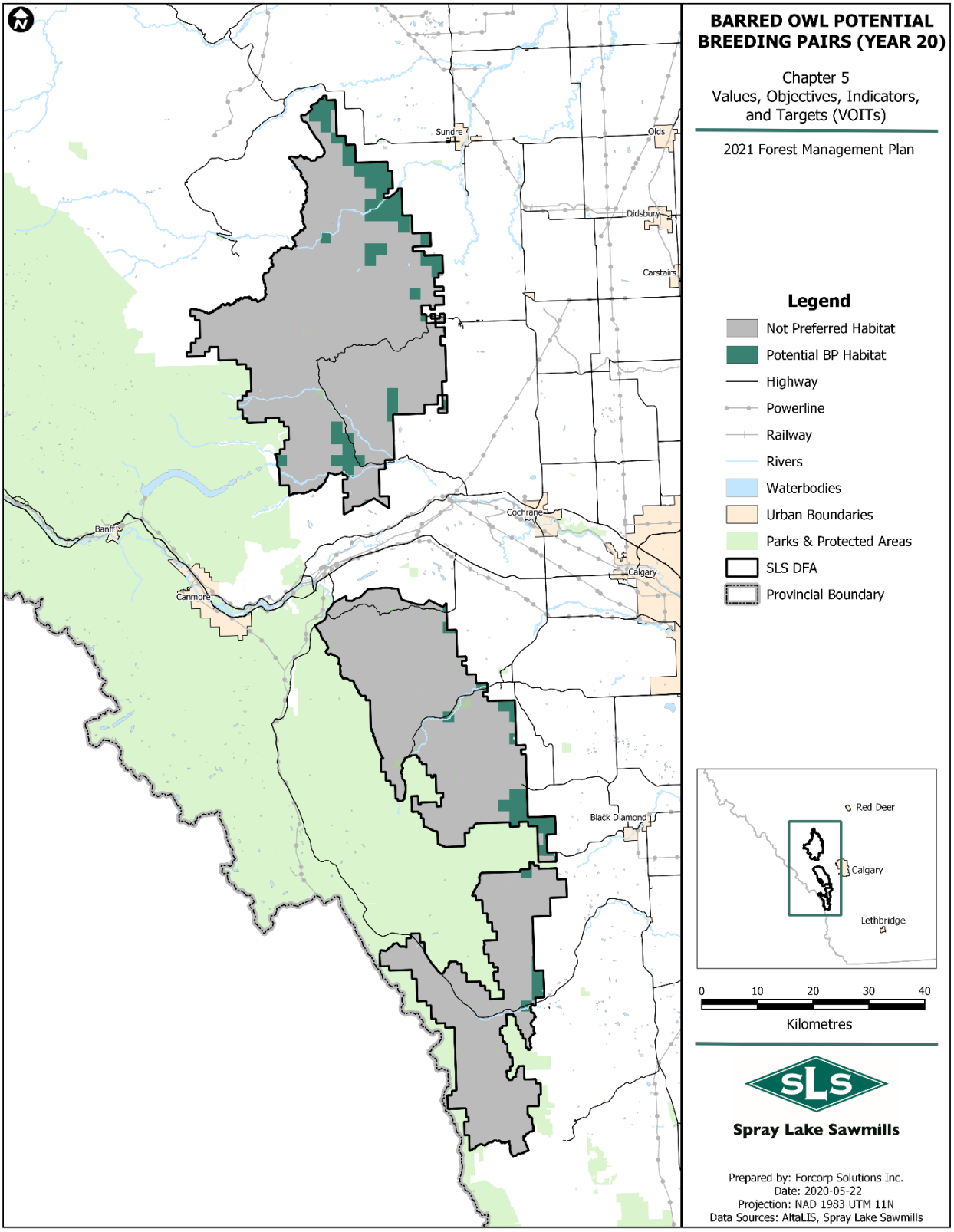

Figure 4-26. Barred Owl potential breeding pairs in 2041

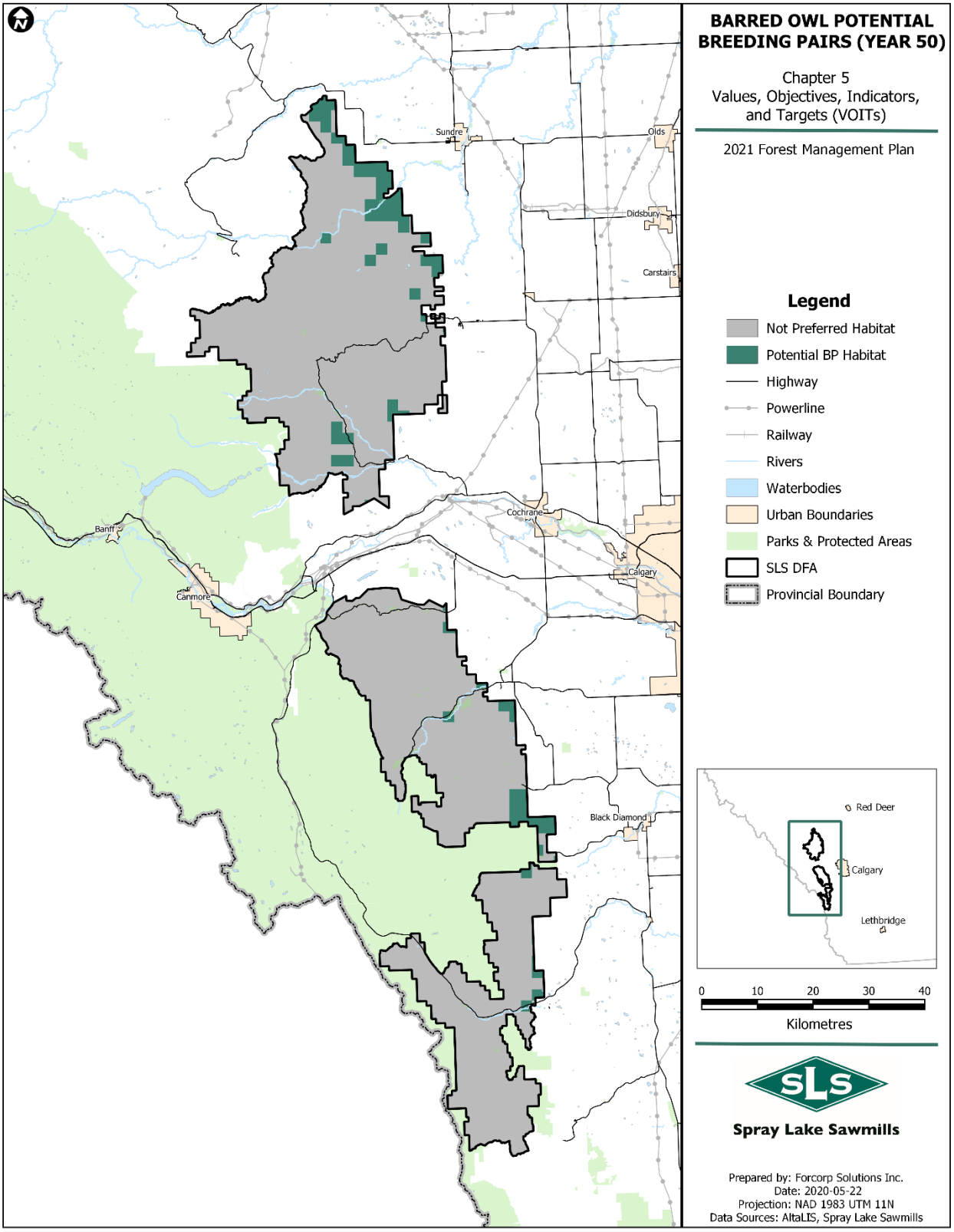

Figure 4-27. Barred Owl potential breeding pairs in 2071

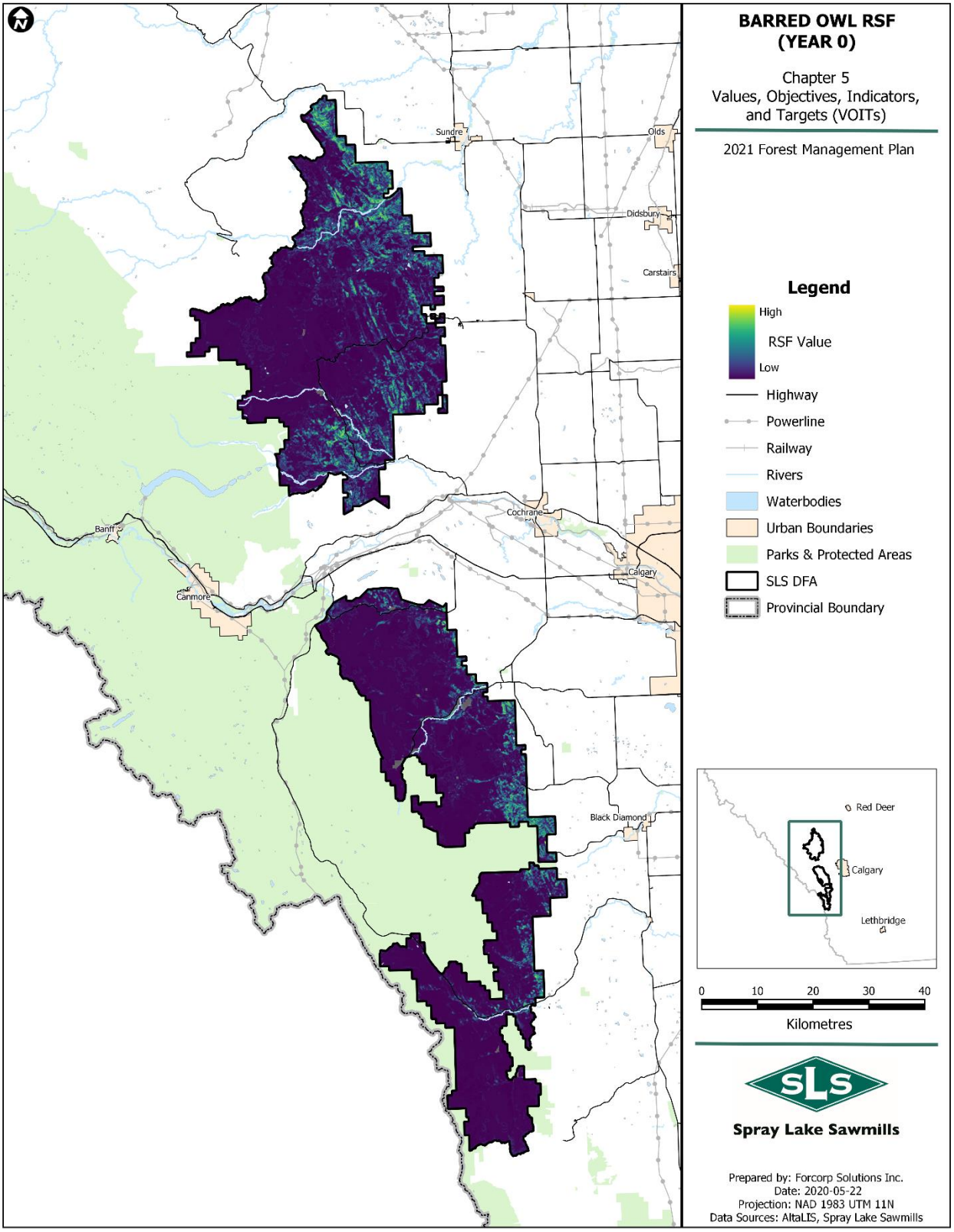

Figure 4-28. Barred Owl RSF values in 2021

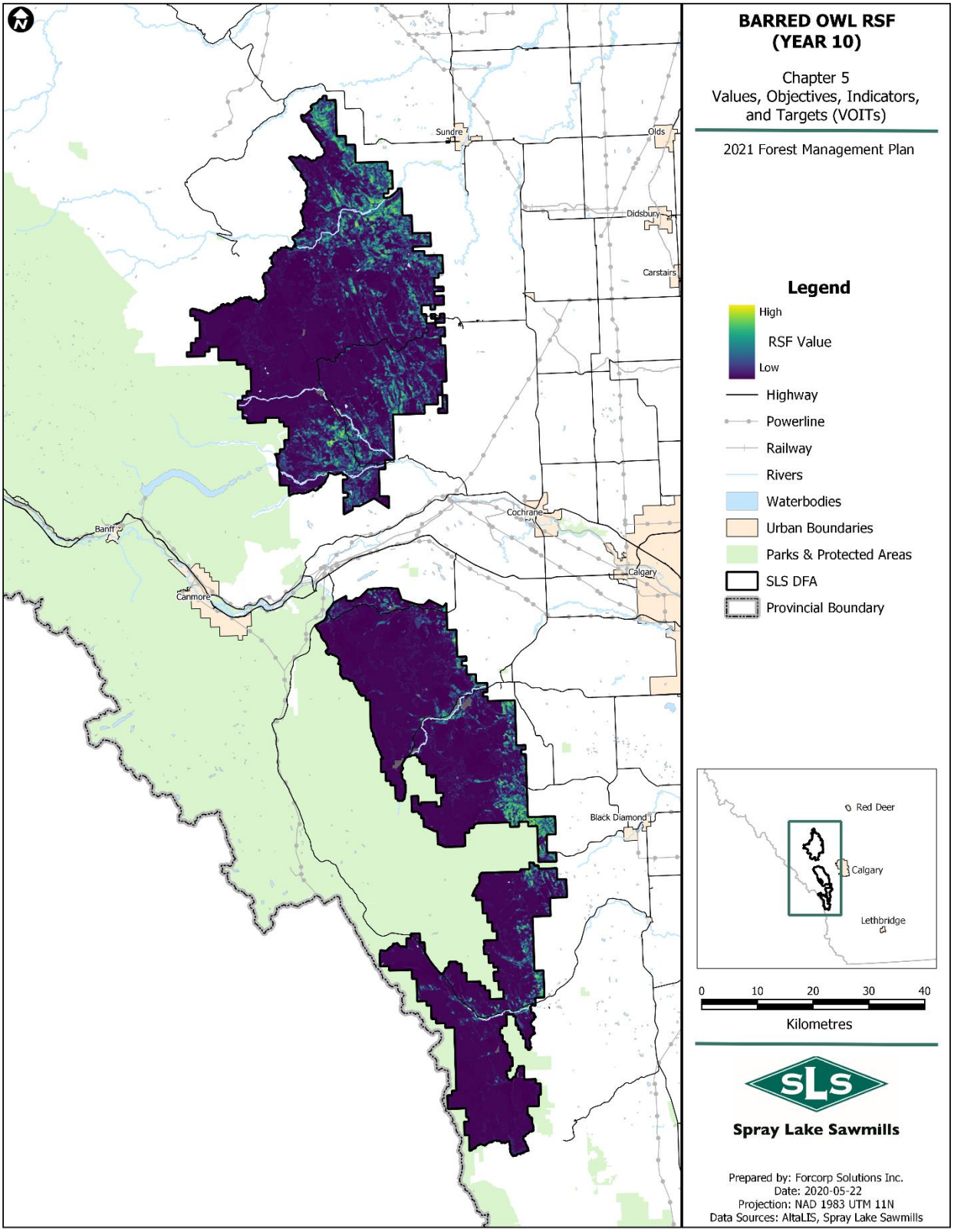

Figure 4-29. Barred Owl RSF values in 2031

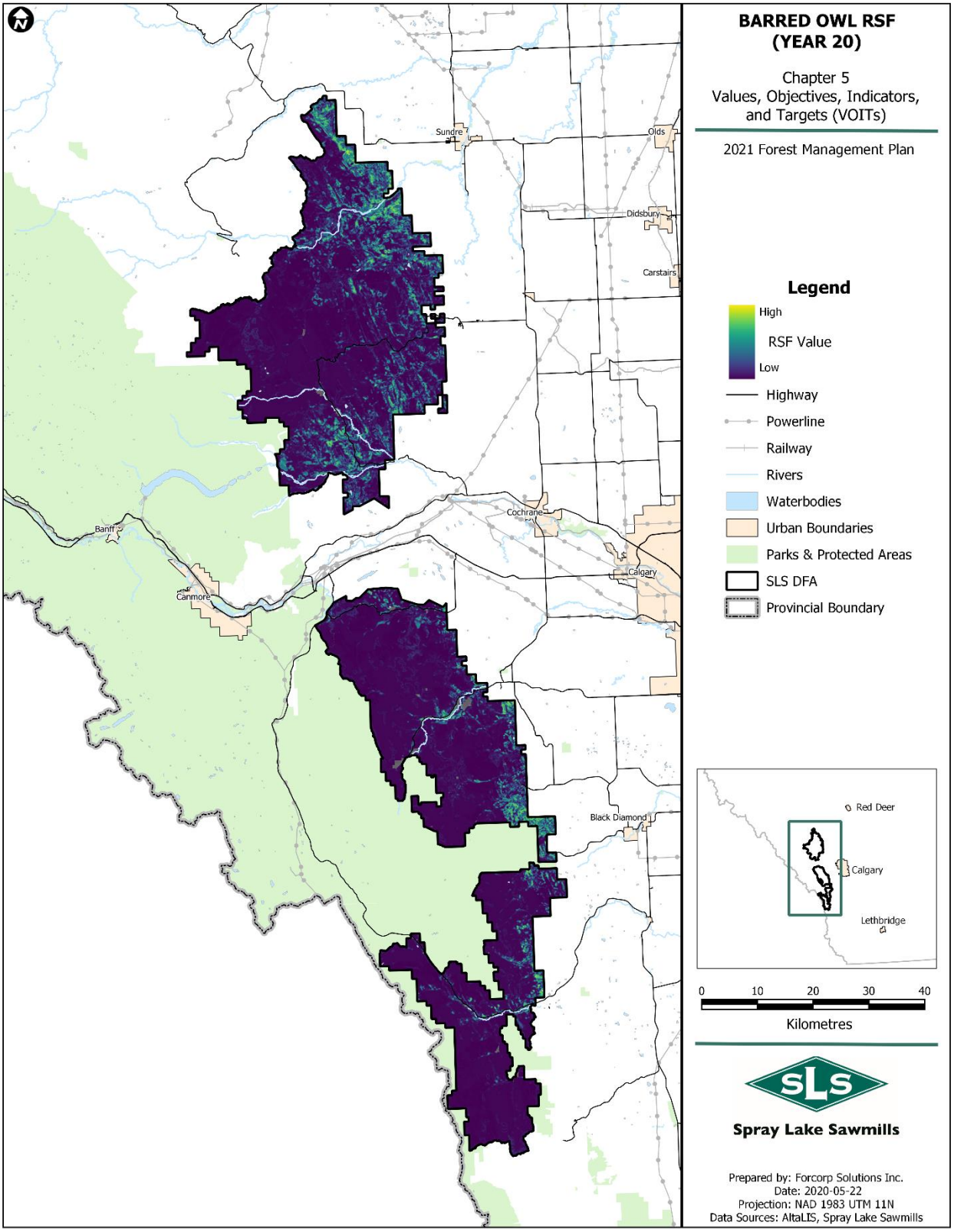

Figure 4-30. Barred Owl RSF values in 2041

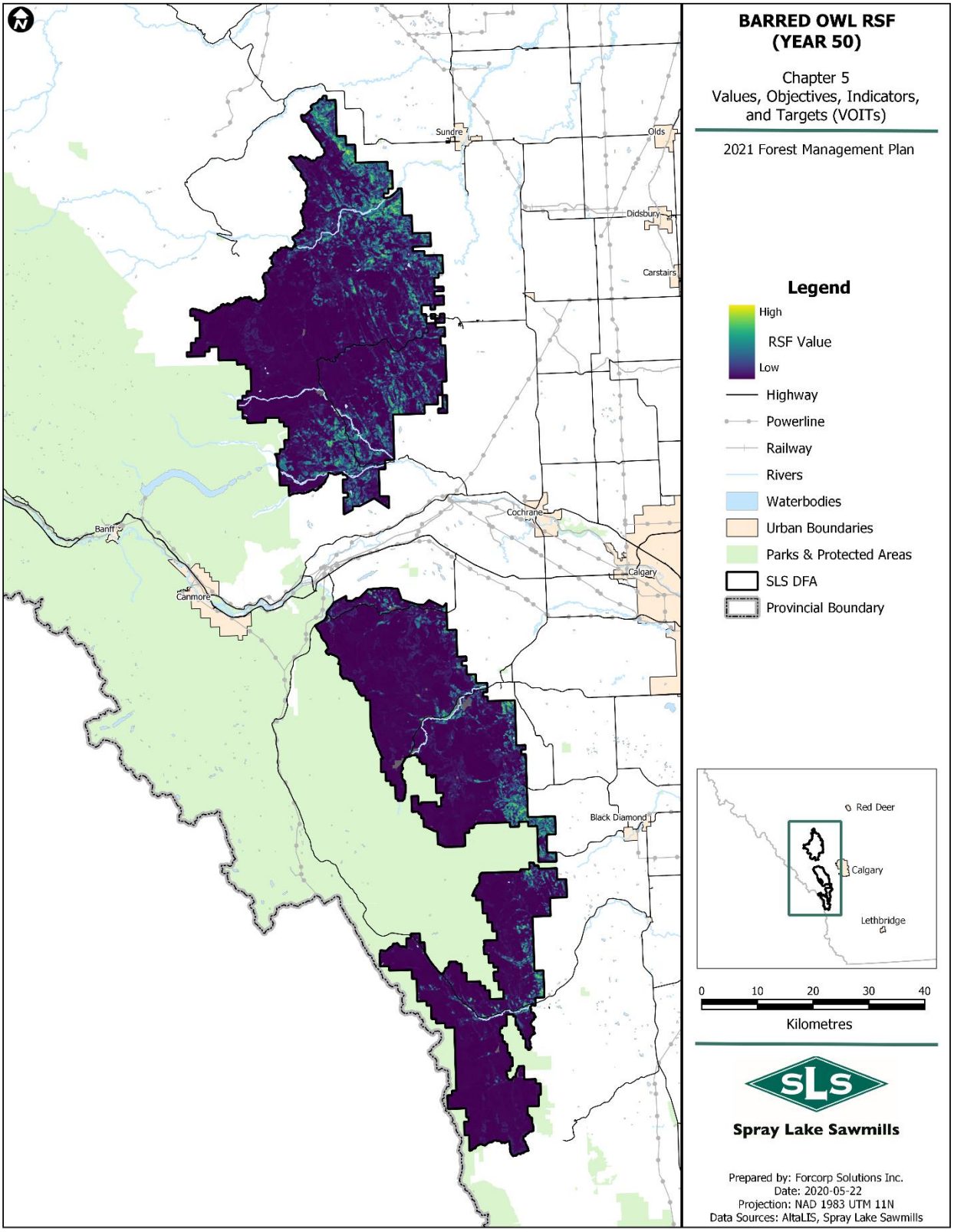

Figure 4-31. Barred Owl RSF values in 2071

4.1.8.4 Marten

- Tables of habitat suitability at 0, 10, 20, 50, 100 and 200 years and maps of habitat suitability at 0, 10, 20 and 50 years for marten.

The American Marten (*Martes americana*) is listed as *secure* in Alberta (Government of Alberta, 2017). Marten require forests that are structurally capable of providing cover, protective thermal microenvironments, and protection from predators. Although Marten are sometimes found in young forests with these characteristics, typically they are found in late-successional coniferous forests. These mature forests also provide habitat for many other species mammalian and avian species (Government of Alberta, 2019).

To forecast future Marten habitat, Habitat Suitability Index (HSI)-age curves are incorporated directly into timber supply modeling. First, height-age curves were developed using the GYPSY model's species-specific top height-age equations. Curves are delineated by species group and timber productivity rating and split into two density classes. These height-age curves were then converted to HSI-age curves by calculating HSI at each age as a function of height. Variables in the calculation include tree canopy closure, tree canopy height, and percent of different species in the canopy. Similar curves were grouped together to reduce the number of inputs for timber supply modeling.

Modeling results are presented in Table 4-17 and Figure 4-32. The green shading represents a change of +/- less than 15% from current levels (low risk); the yellow indicates a -15 to 30% change (moderate risk); and red shows a greater than -30% change (high risk). All time periods were run on the gross landbase, which was aged for each time period processed.

Table 4-17. Habitat Suitability Index values for Marten

Metric	Year 0	Year 10	Year 20	Year 50	Year 100	Year 200
Mean Habitat Suitability Index	121,468	113,837	105,305	92,204	90,984	91,159
% Change	-	-6.3	-13.3	-24.1	-25.1	-25.0

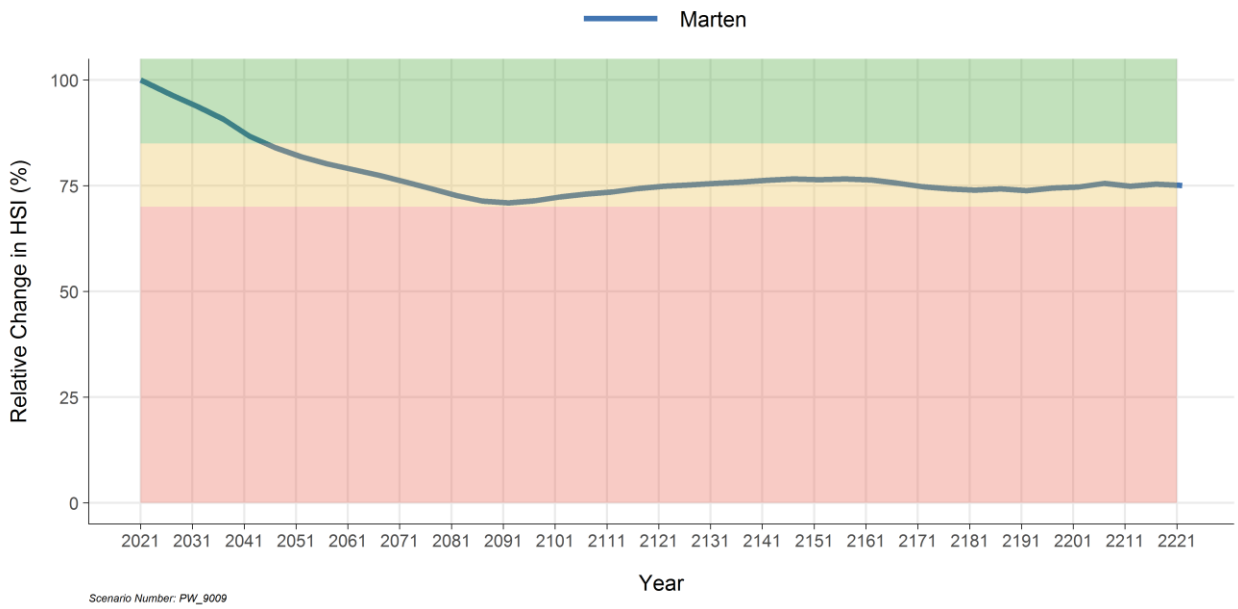

Figure 4-32. Marten Habitat Suitability Index (HSI) over 200 years.

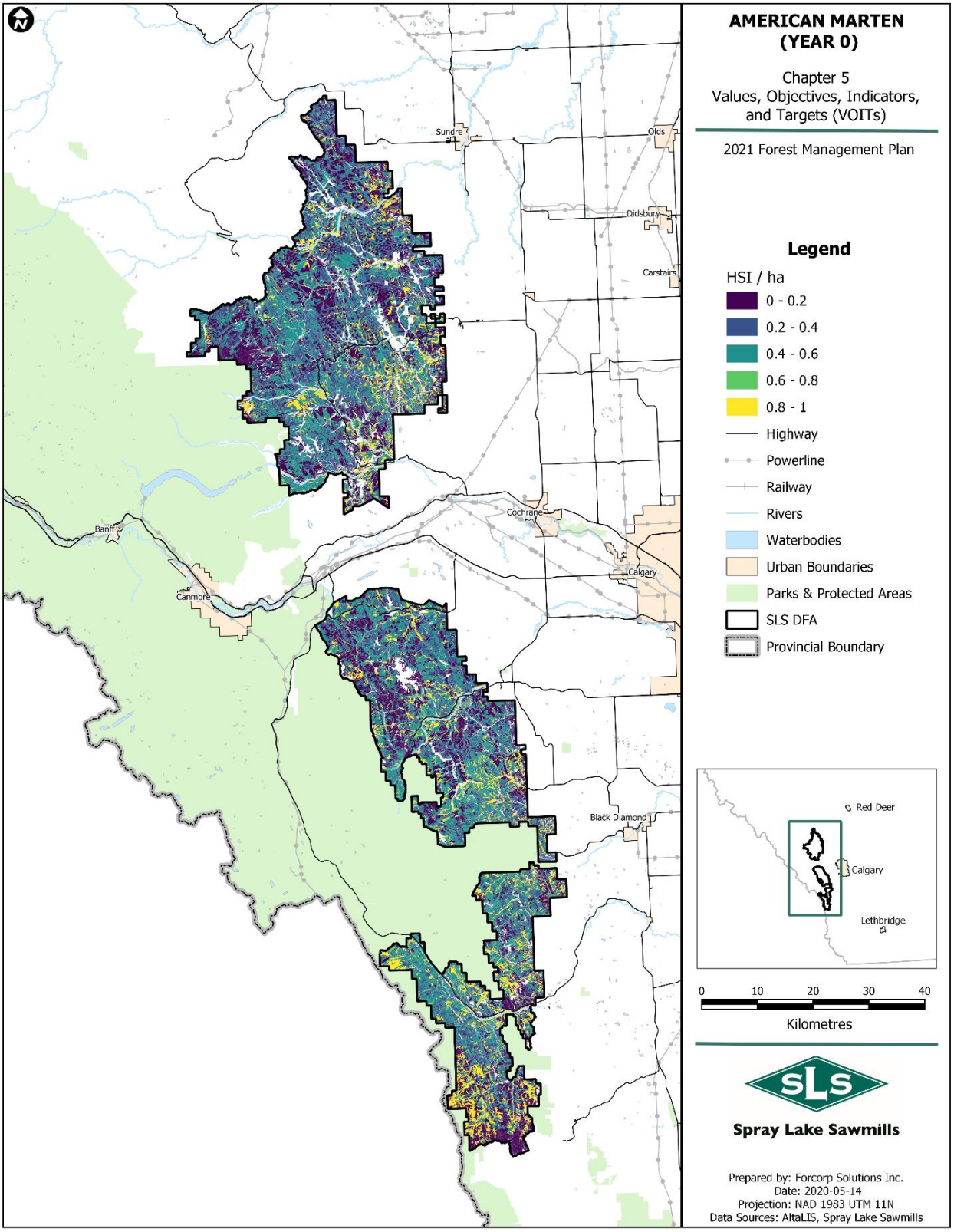

Figure 4-33. Marten Habitat Suitability Index values in 2021

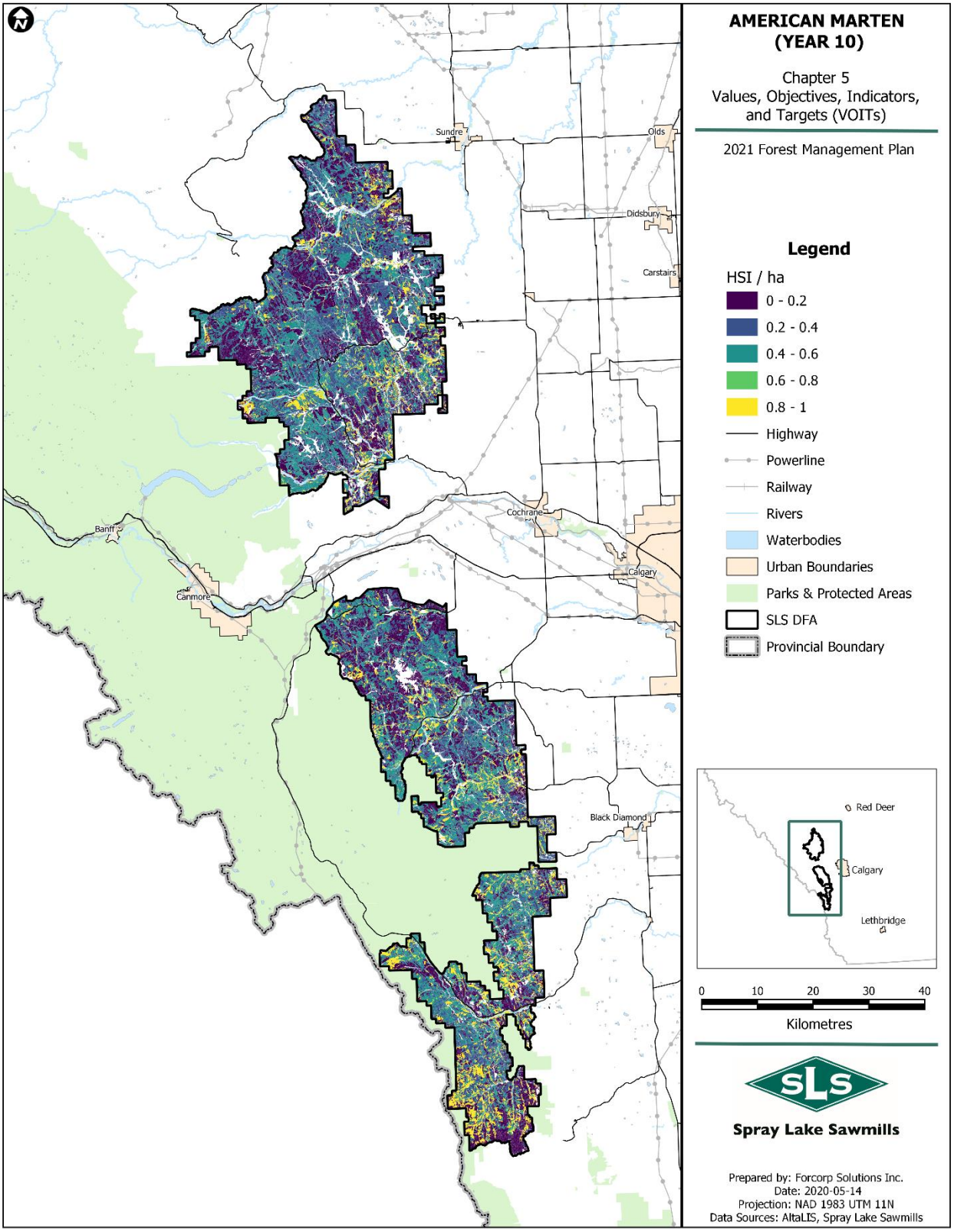

Figure 4-34. Marten Habitat Suitability Index values in 2031

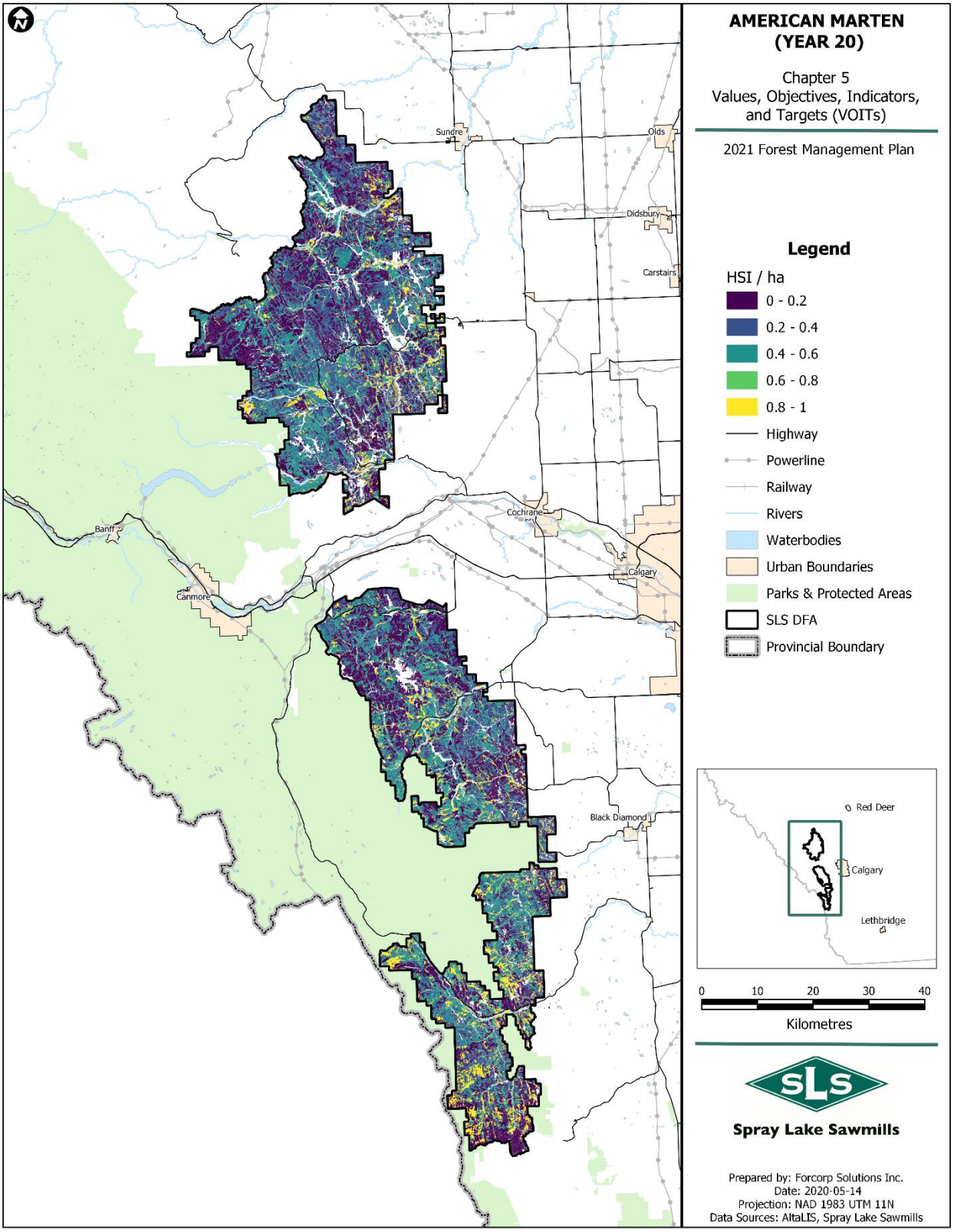

Figure 4-35. Marten Habitat Suitability Index values in 2041

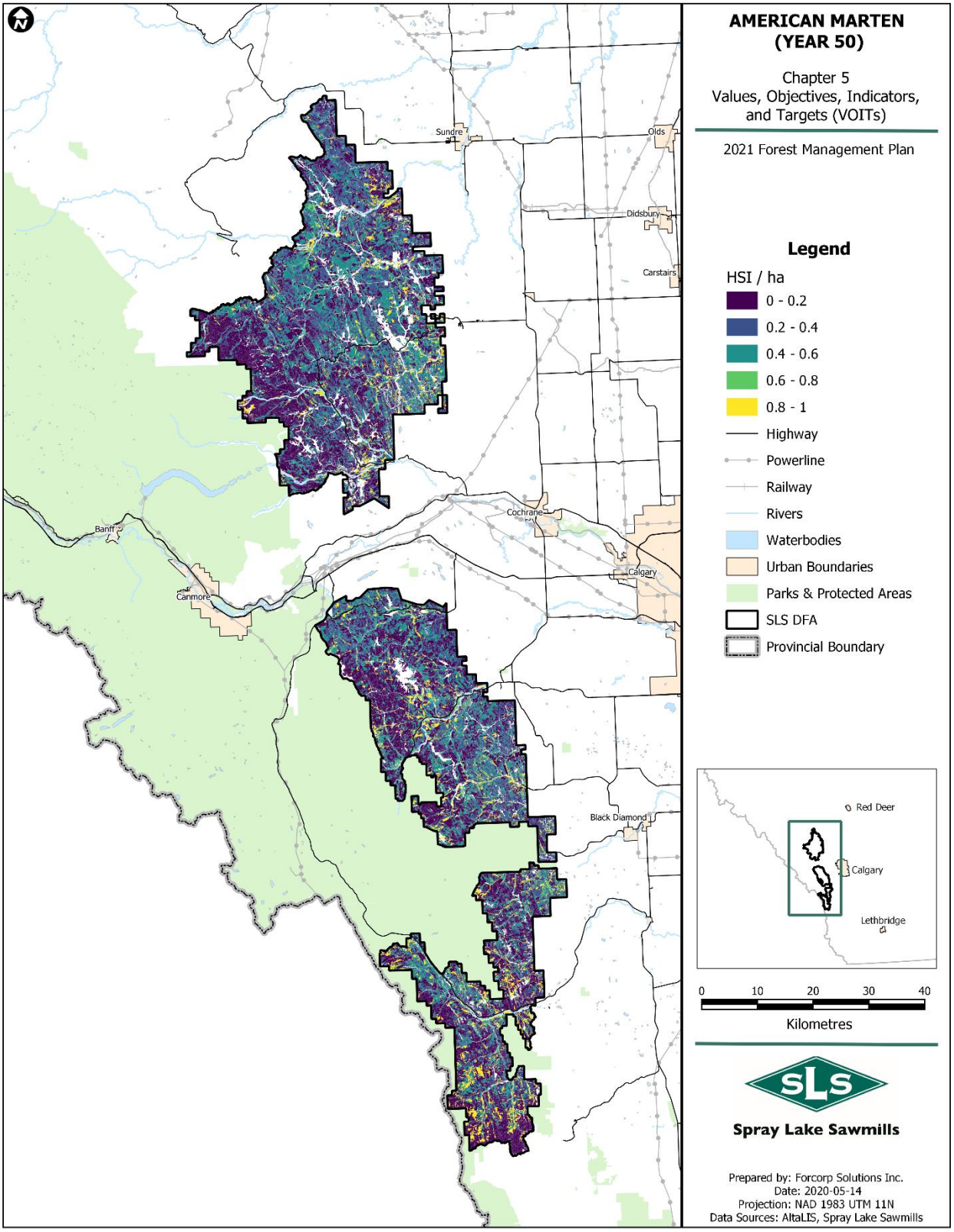

Figure 4-36. Marten Habitat Suitability Index values in 2071

4.1.8.5 Songbirds

- Tables of relative abundance at 0, 10, 20, 50, 100 and 200 years and maps of relative abundance at 0, 10, 20 and 50 years for varied thrush, ovenbird, and brown creeper.

Three species were selected by the PDT to be modeled – the Varied Thrush (*Ixoreus naevius*), the Ovenbird (*Seiurus aurocapilla*), and the Brown Creeper (*Certhia americana*). Both the Varied Thrush and the Ovenbird are listed as *secure* in Alberta, while the Brown Creeper is listed as *Sensitive* (Government of Alberta, 2017). Each of the identified species was incorporated into the PFMS model based on coefficients provided by the GoA. All time periods were run on the gross landbase, which was aged for each time period processed. Results, measured as Relative Abundance (RA) are provided in Table 4-18.

Table 4-18. Relative abundance values for selected songbirds

Species	Metric	Year 0	Year 10	Year 20	Year 50	Year 100	Year 200
Varied Thrush	Relative Abundance	7,173	6,838	6,468	5,299	5,142	5,052
	% Change	-4.7	-9.8	-26.1	-28.3	-29.6	-4.7
Ovenbird	Relative Abundance	40,436	40,133	40,289	42,113	43,893	43,848
	% Change	-0.7	-0.4	4.1	8.5	8.4	-0.7
Brown Creeper	Relative Abundance	460	488	501	542	514	496
	% Change		6.1	9.0	18.0	11.8	7.9

The Varied Thrush is associated with mature conifer forests and is found in highest abundance in mature pine and mature white spruce. Abundance is higher in harvested pine and white spruce stands compared to similarly aged, naturally disturbed stands of the same type in the forested region. It prefers large, continuous stands over small patches (Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project, 2019). Trends over the 200-year forecasting period are displayed in Figure 4-37 and shown spatially for selected timepoints below.

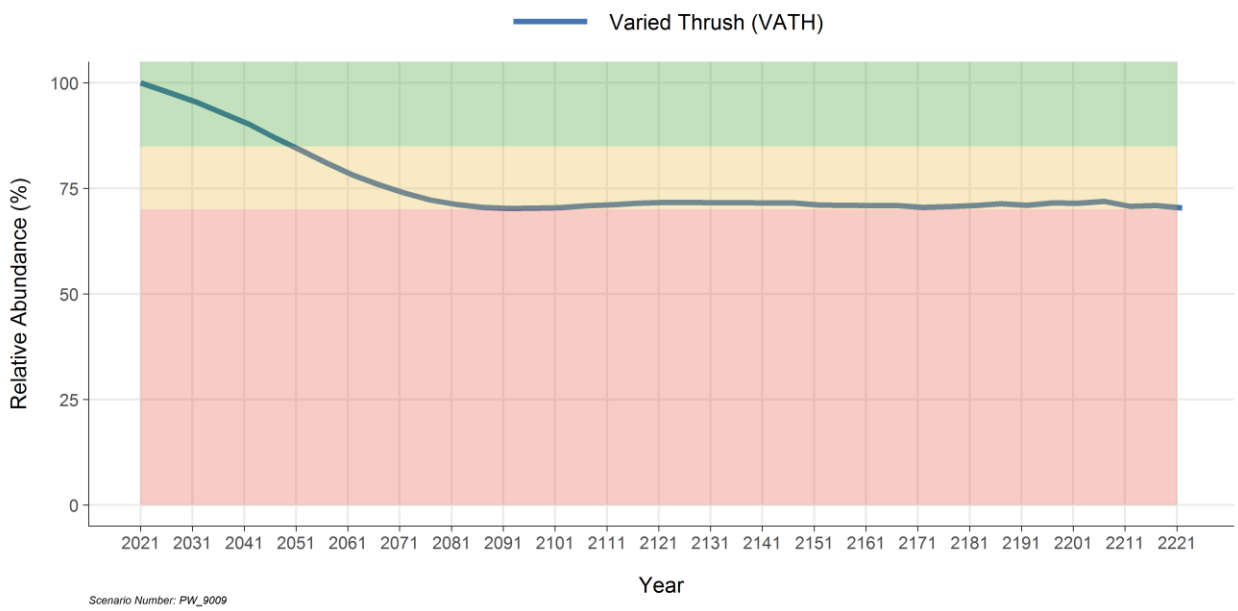

Figure 4-37. Varied Thrush Relative Abundance (RA) over 200 years.

The Ovenbird is primarily associated with large mature/old deciduous or mixedwood forests but is also found in white spruce stands and to a lesser extent in other forest types. It prefers large areas of contiguous forest for breeding but is relatively insensitive to linear footprint density. (Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project, 2019). Trends over the 200-year forecasting period are displayed in Figure 4-38 and shown spatially for selected timepoints below.

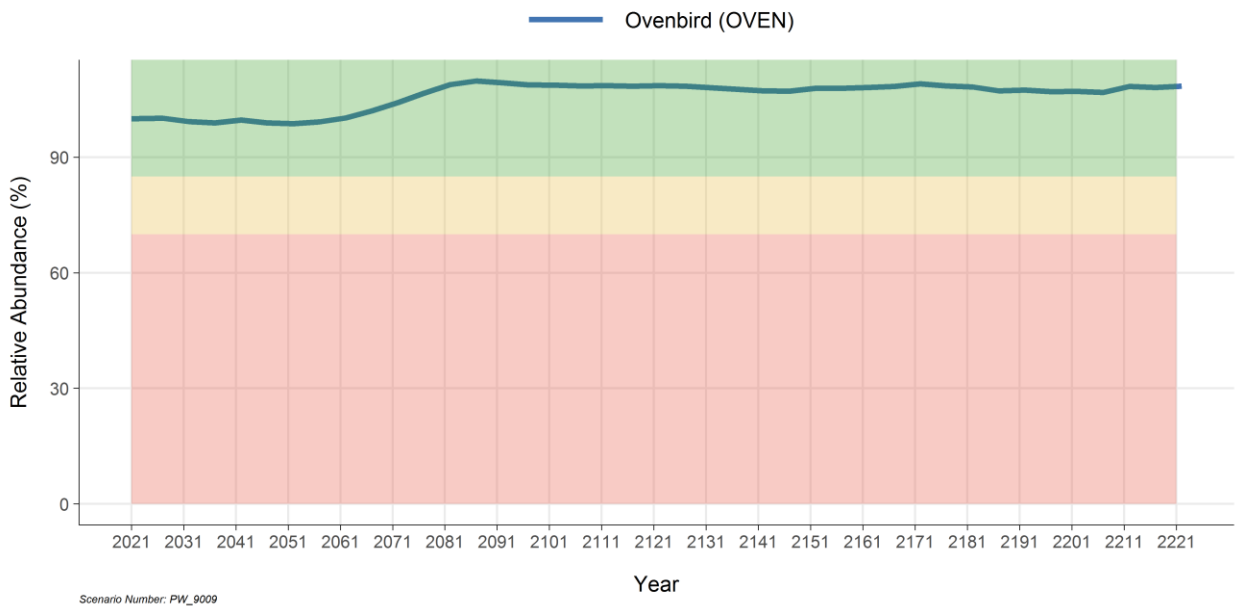

Figure 4-38. Ovenbird Relative Abundance (RA) over 200 years.

The Brown Creeper is an old forest and forest interior specialist, preferring the largest available trees and snags for nesting and foraging. However, it will also live in deciduous or marshy forests, if suitable nesting habitat is available. It nests under the peeling bark of dead and dying trees, or wherever it can find a sheltered overhang. Abundance increases with stand age in all forest types (Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project, 2019). Trends over the 200-year forecasting period are displayed in Figure 4-39 and shown spatially for selected timepoints below.

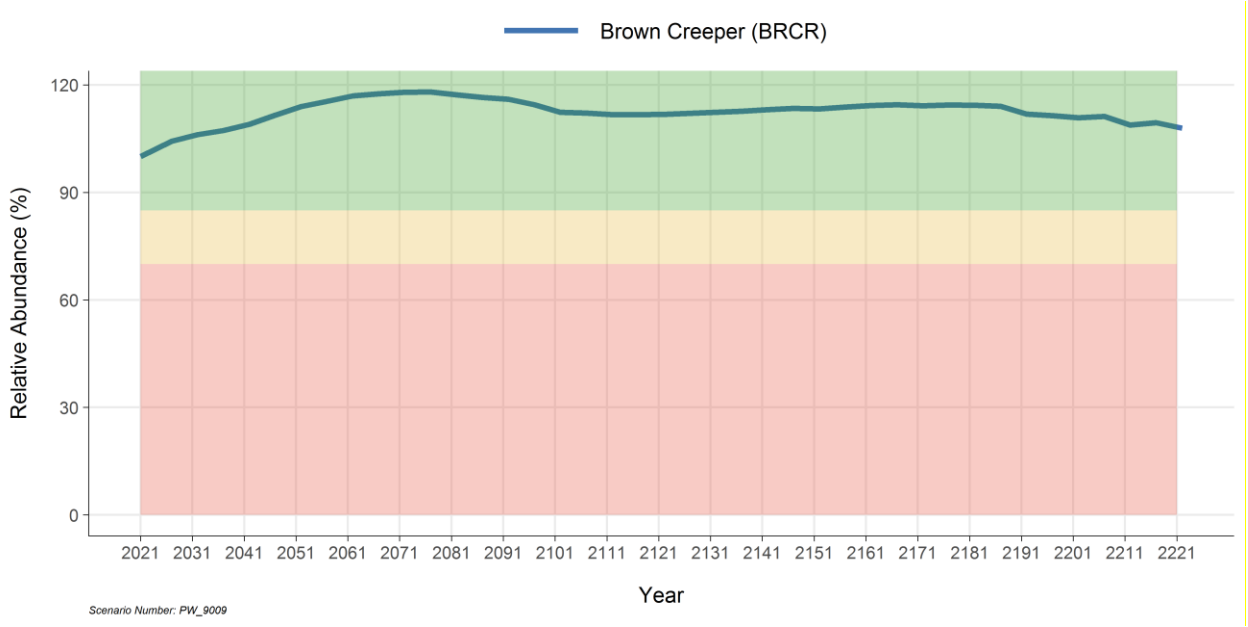

Figure 4-39. Brown Creeper Relative Abundance (RA) over 200 years.

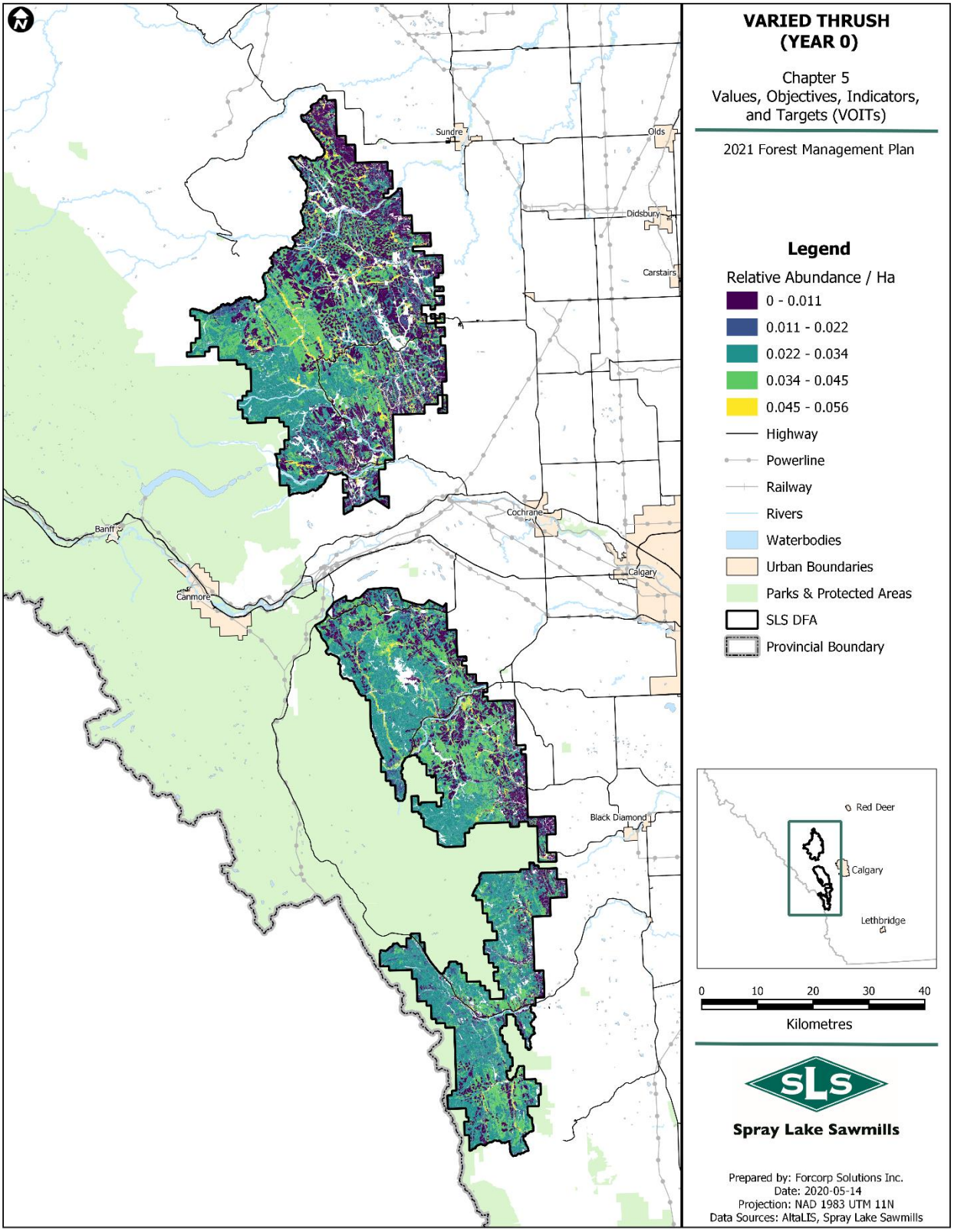

Figure 4-40. Varied Thrush Relative Abundance (RA) values in 2021

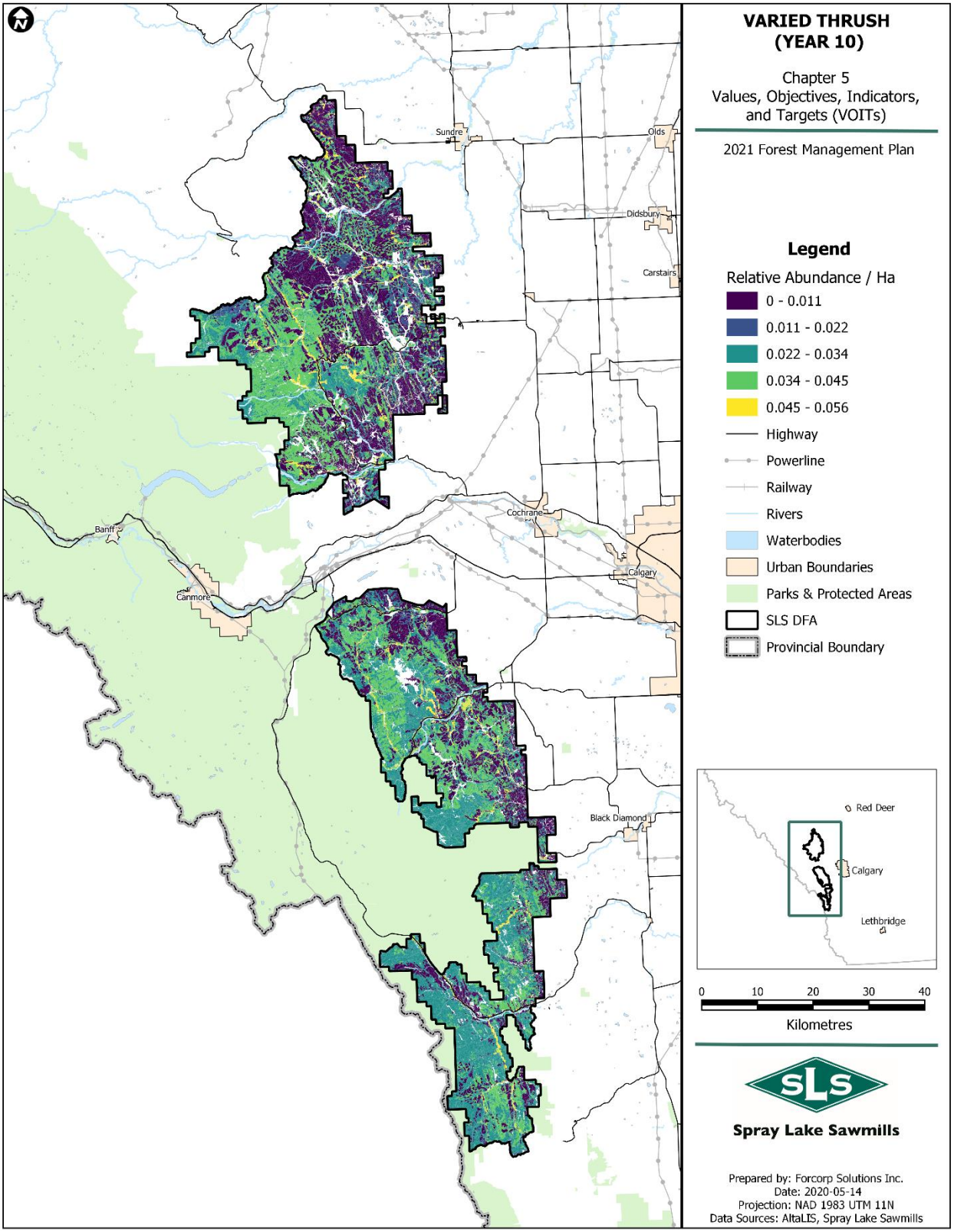

Figure 4-41. Varied Thrush Relative Abundance (RA) values in 2031

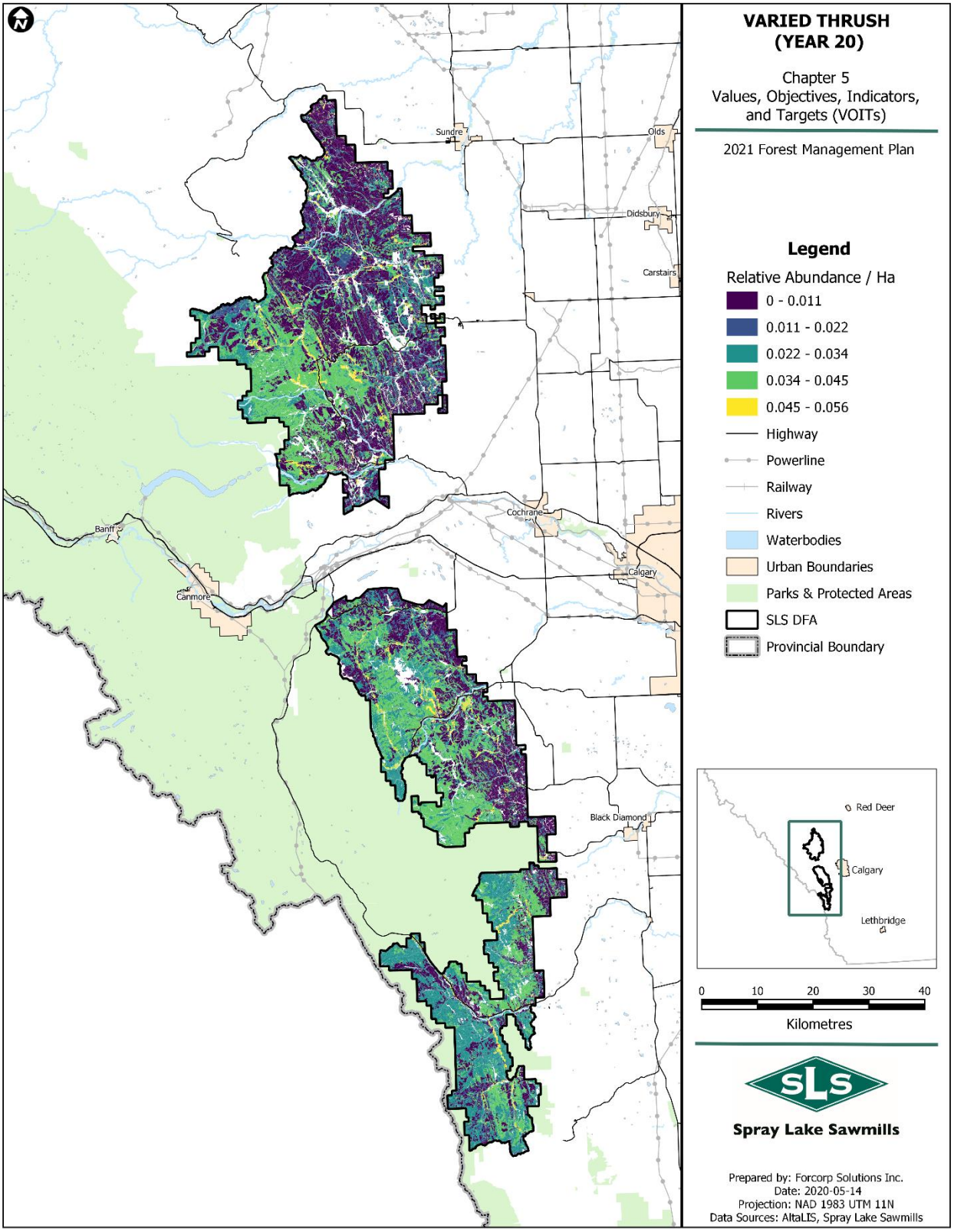

Figure 4-42. Varied Thrush Relative Abundance (RA) values in 2041

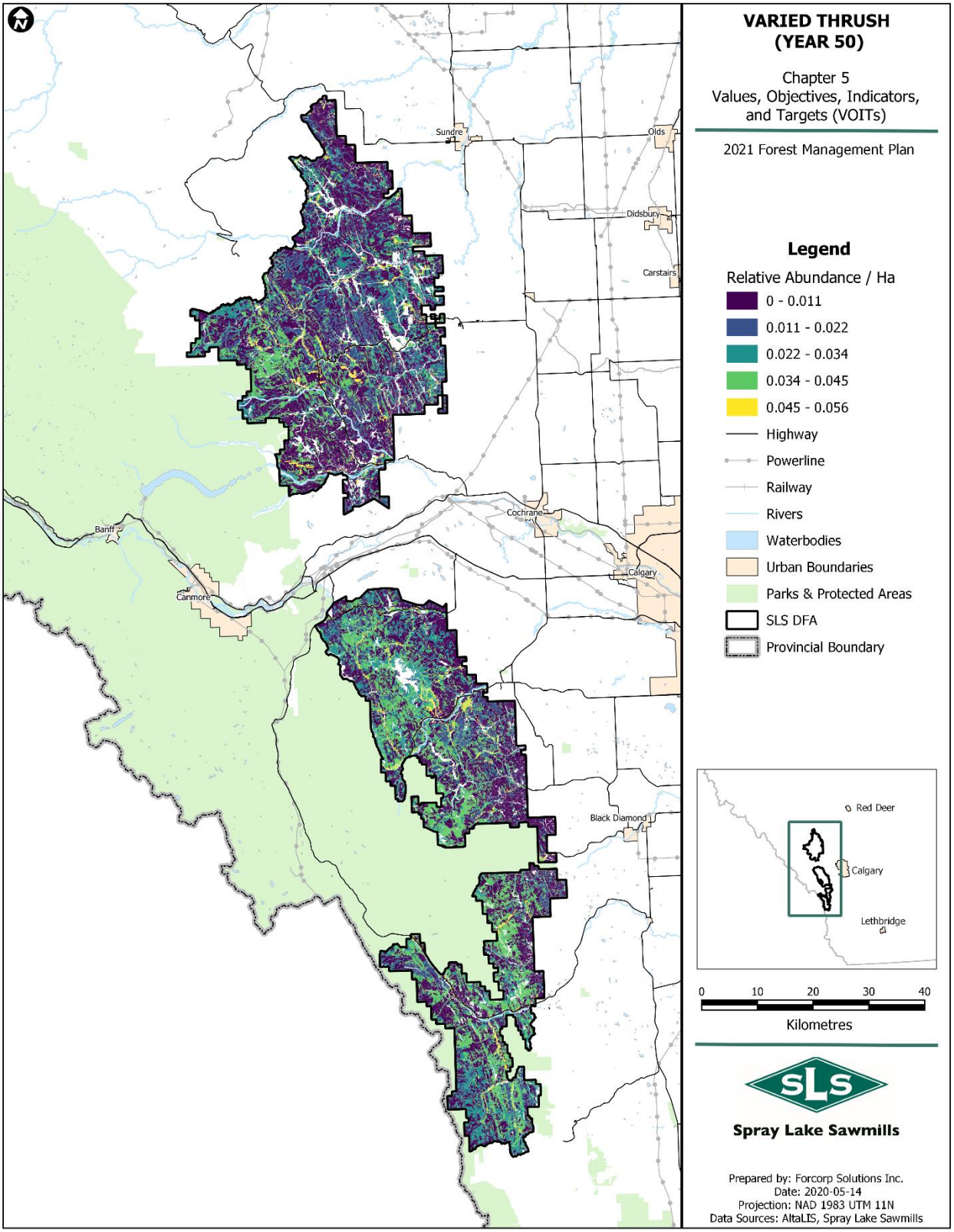

Figure 4-43. Varied Thrush Relative Abundance (RA) values in 2071

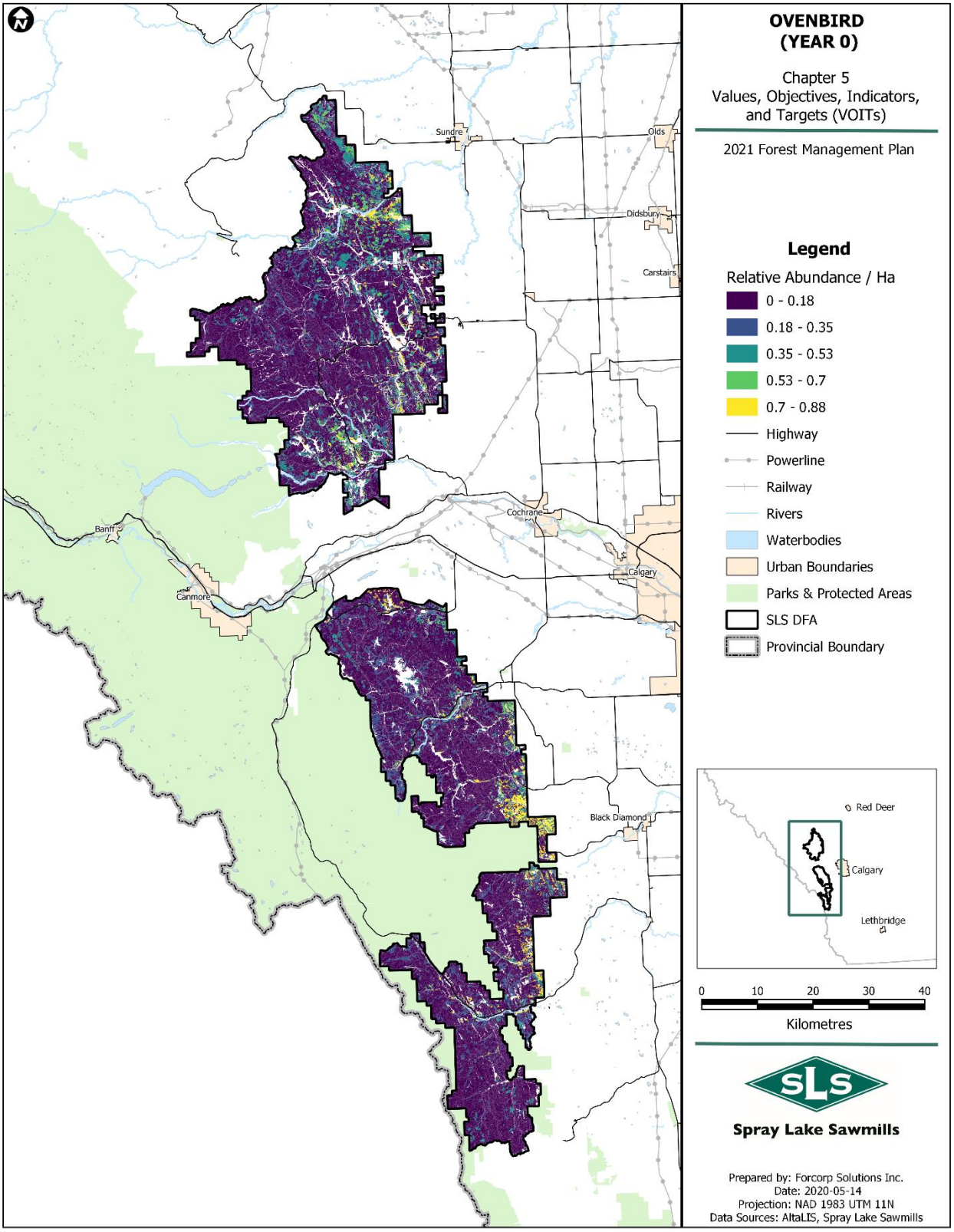

Figure 4-44. Ovenbird Relative Abundance (RA) values in 2021

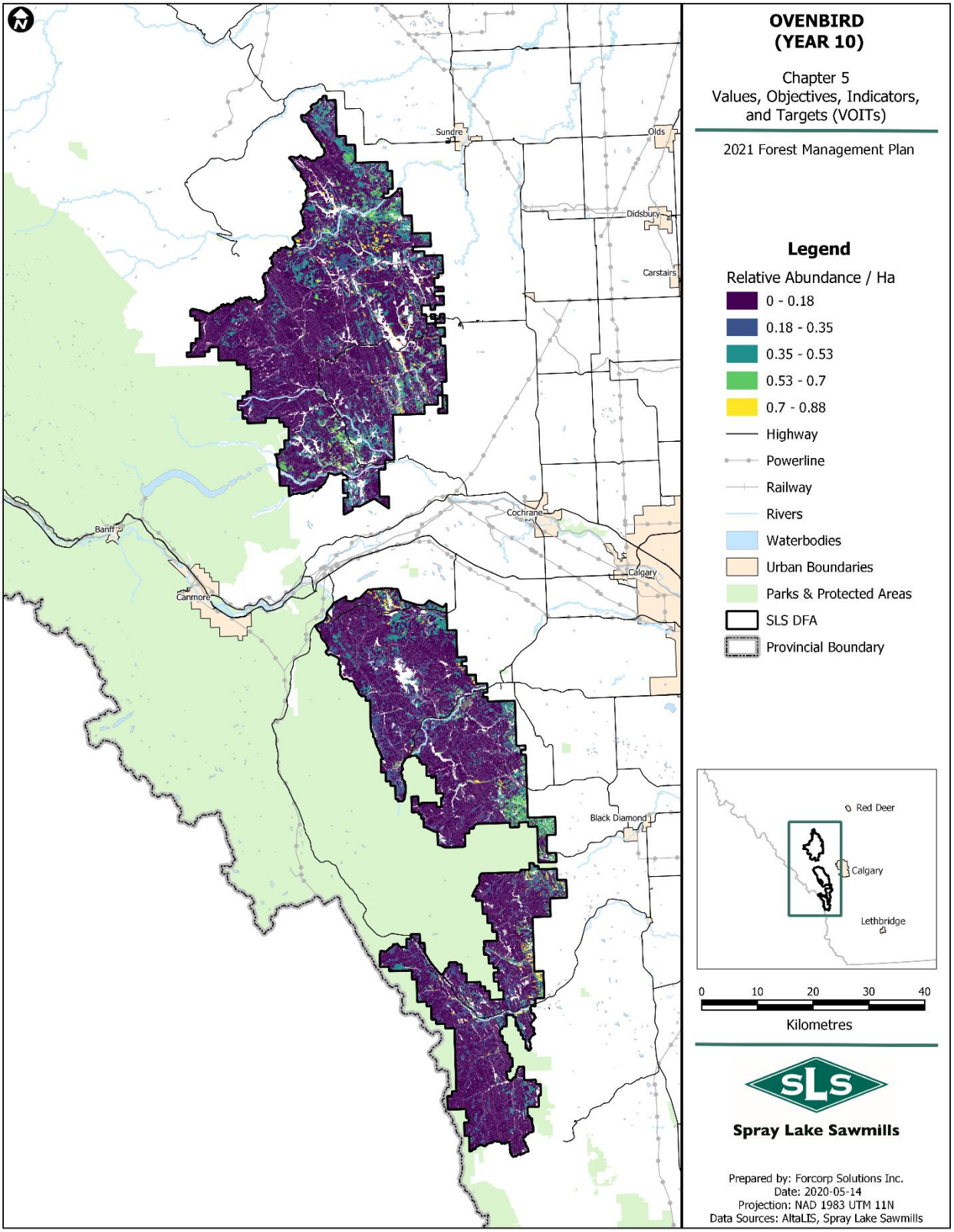

Figure 4-45. Ovenbird Relative Abundance (RA) values in 2031

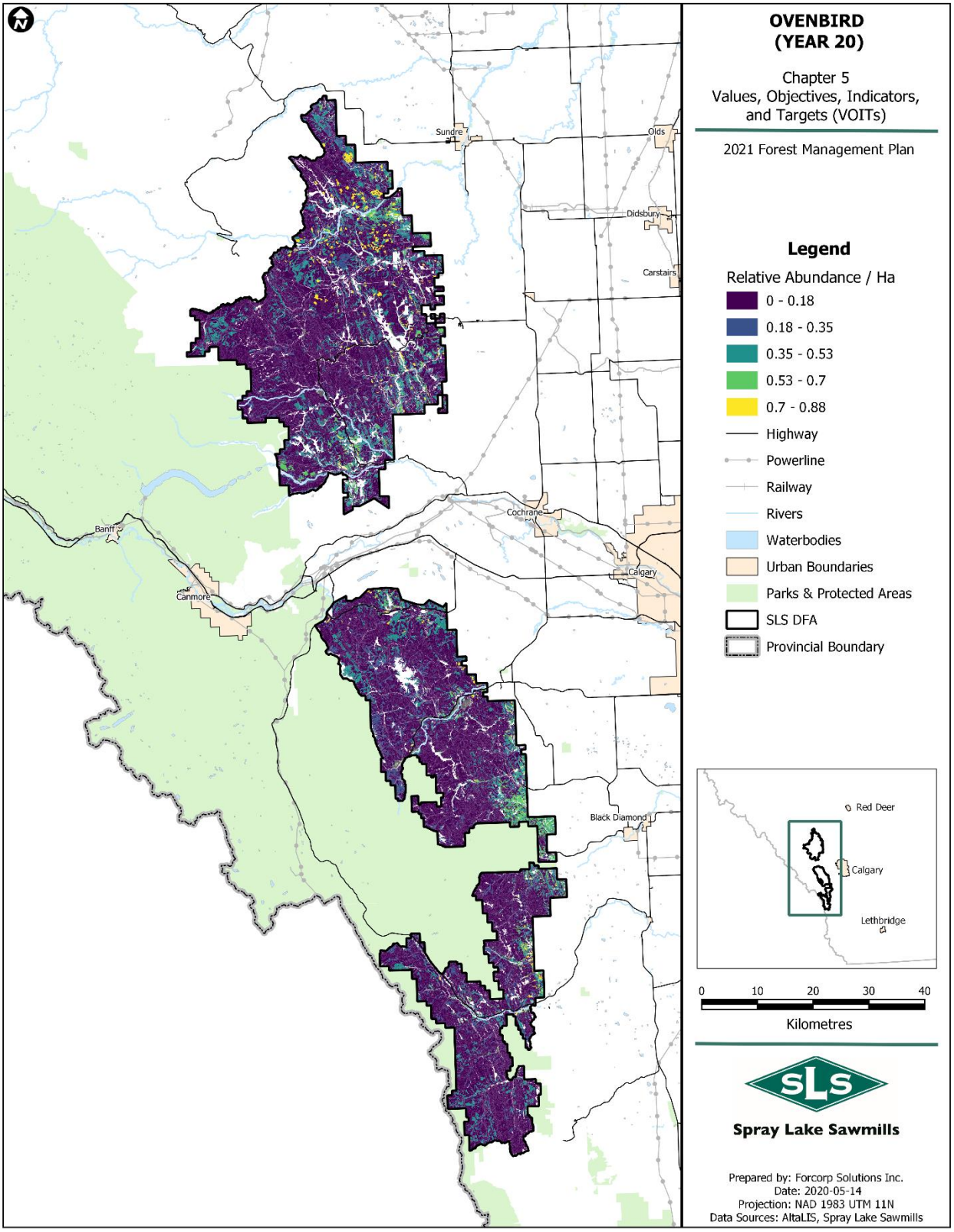

Figure 4-46. Ovenbird Relative Abundance (RA) values in 2041

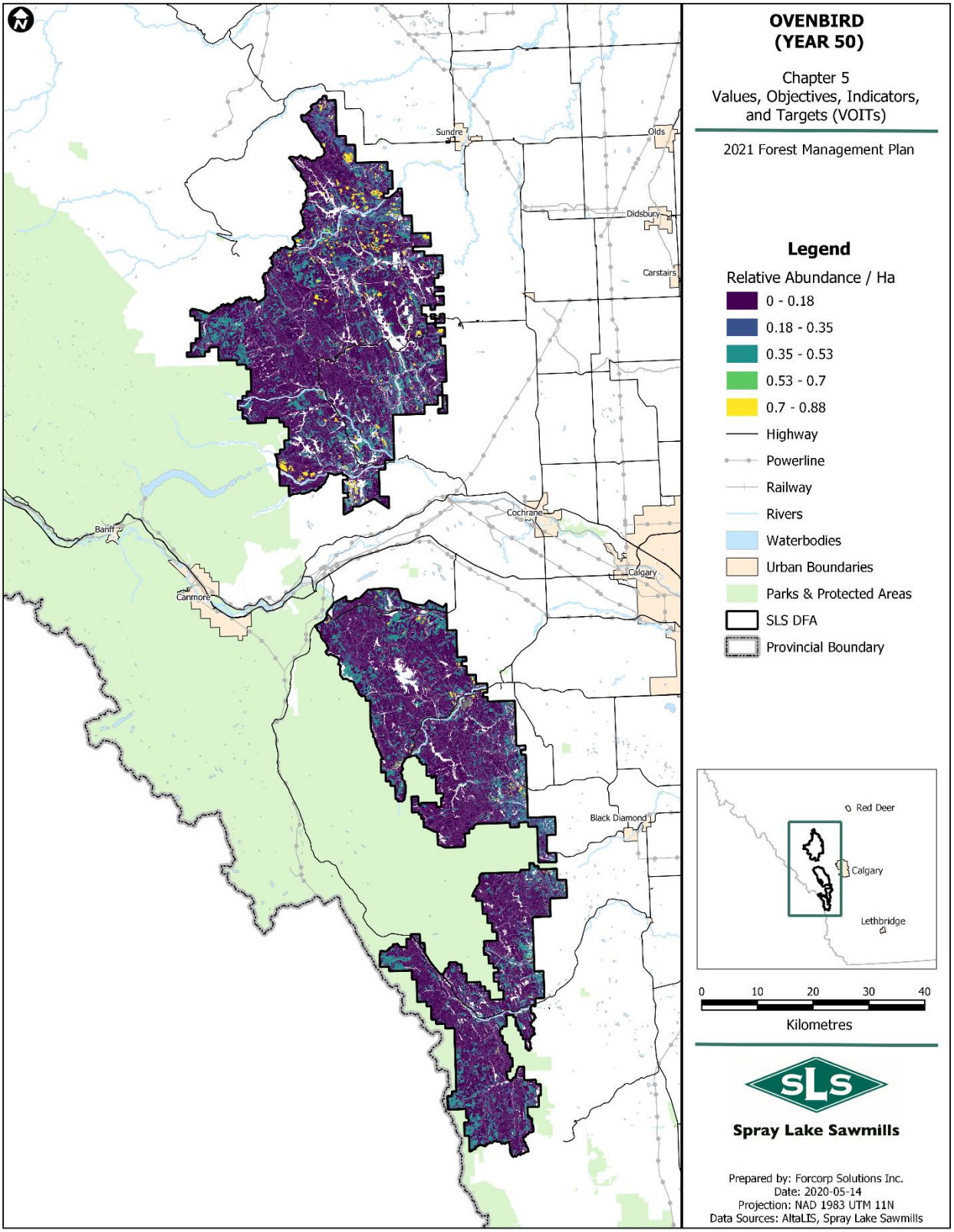

Figure 4-47. Ovenbird Relative Abundance (RA) values in 2071

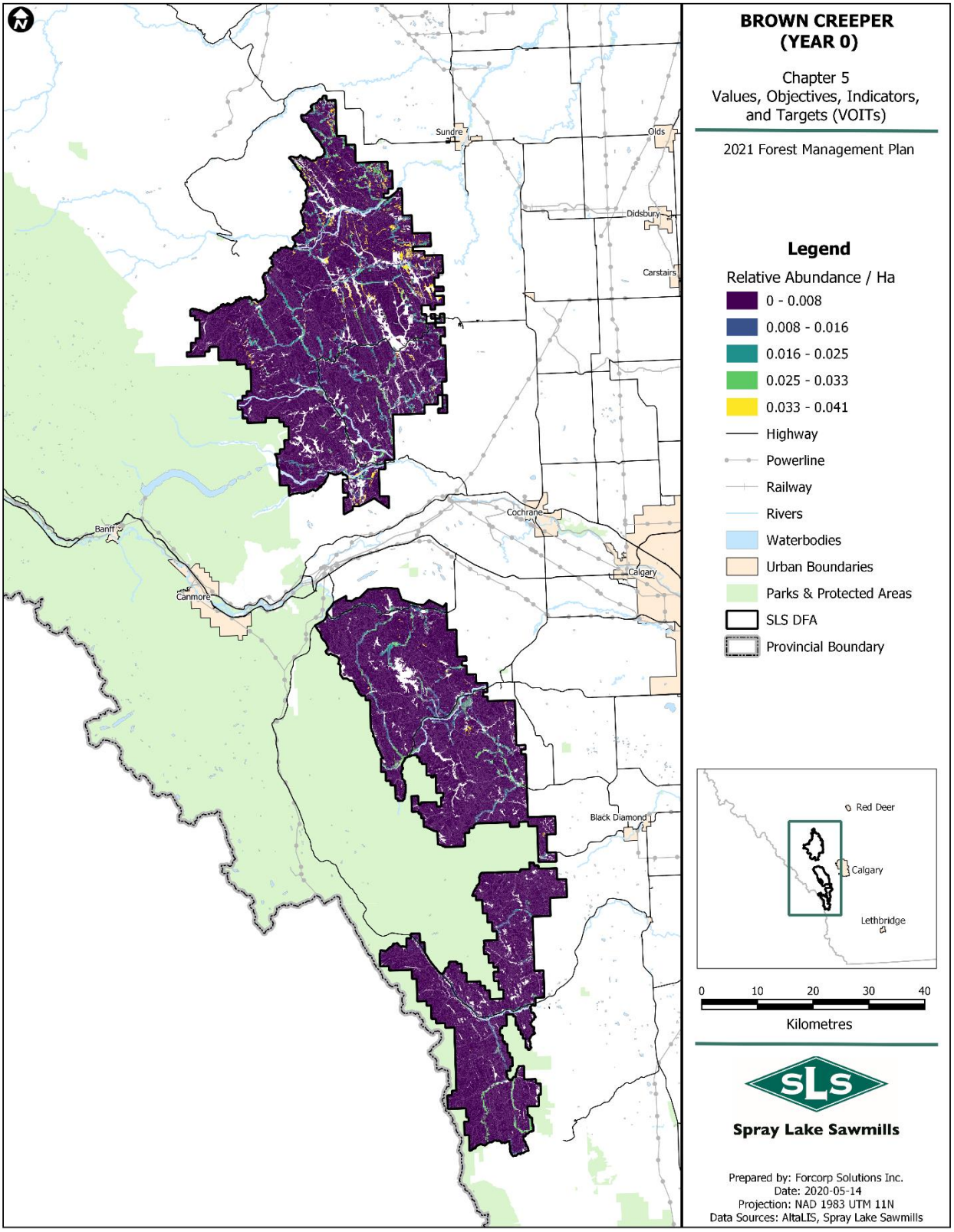

Figure 4-48. Brown Creeper Relative Abundance (RA) values in 2021

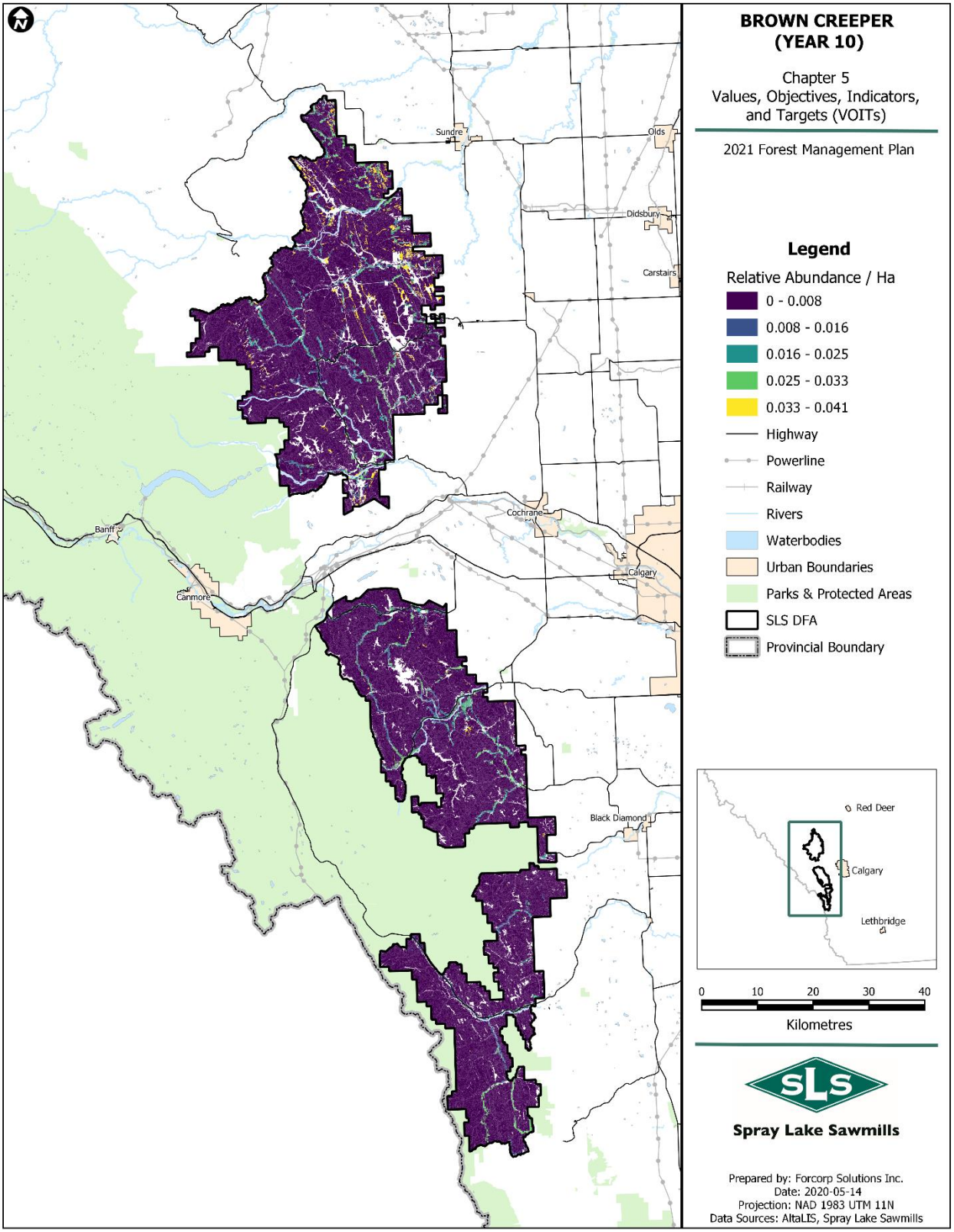

Figure 4-49. Brown Creeper Relative Abundance (RA) values in 2031

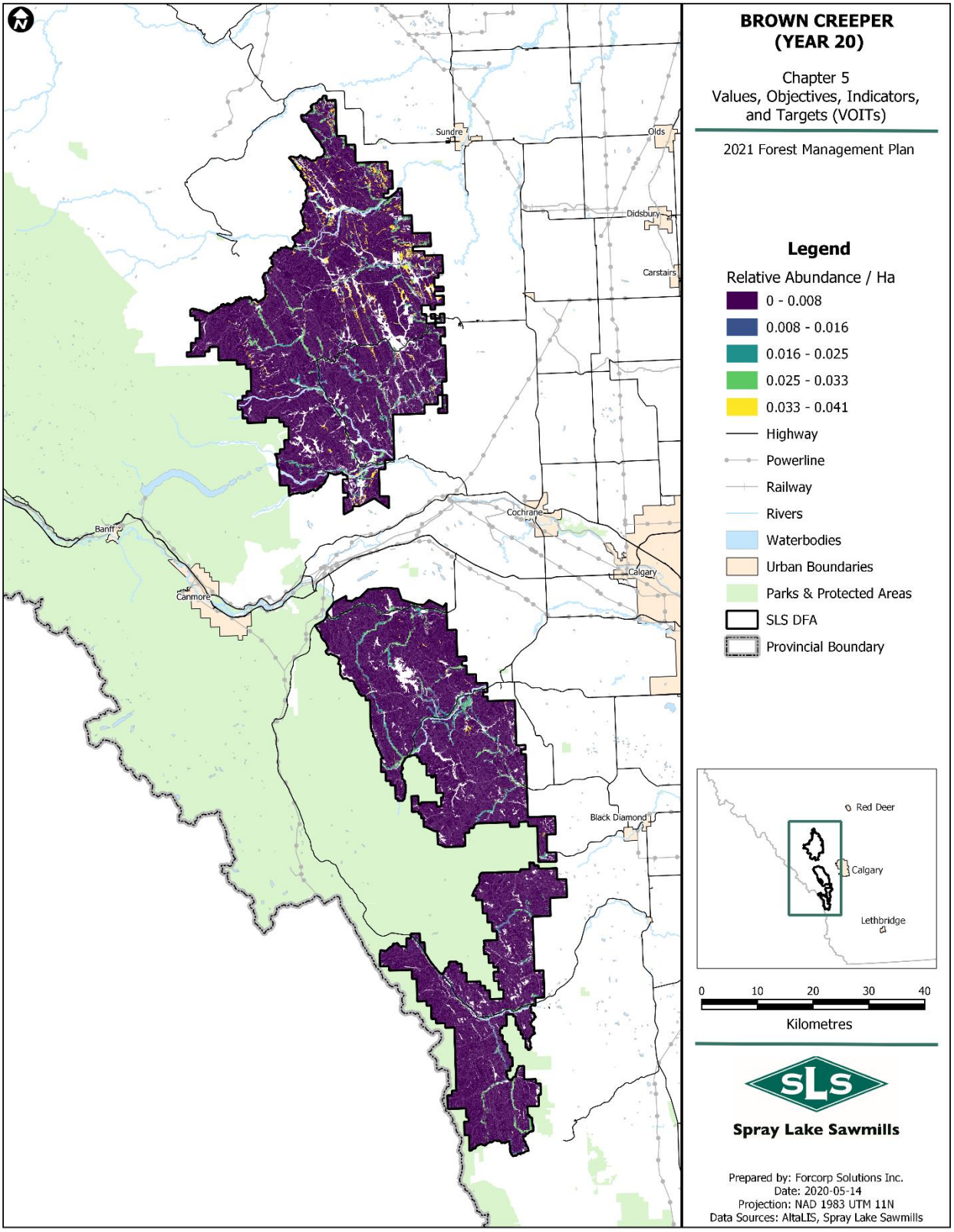

Figure 4-50. Brown Creeper Relative Abundance (RA) values in 2041

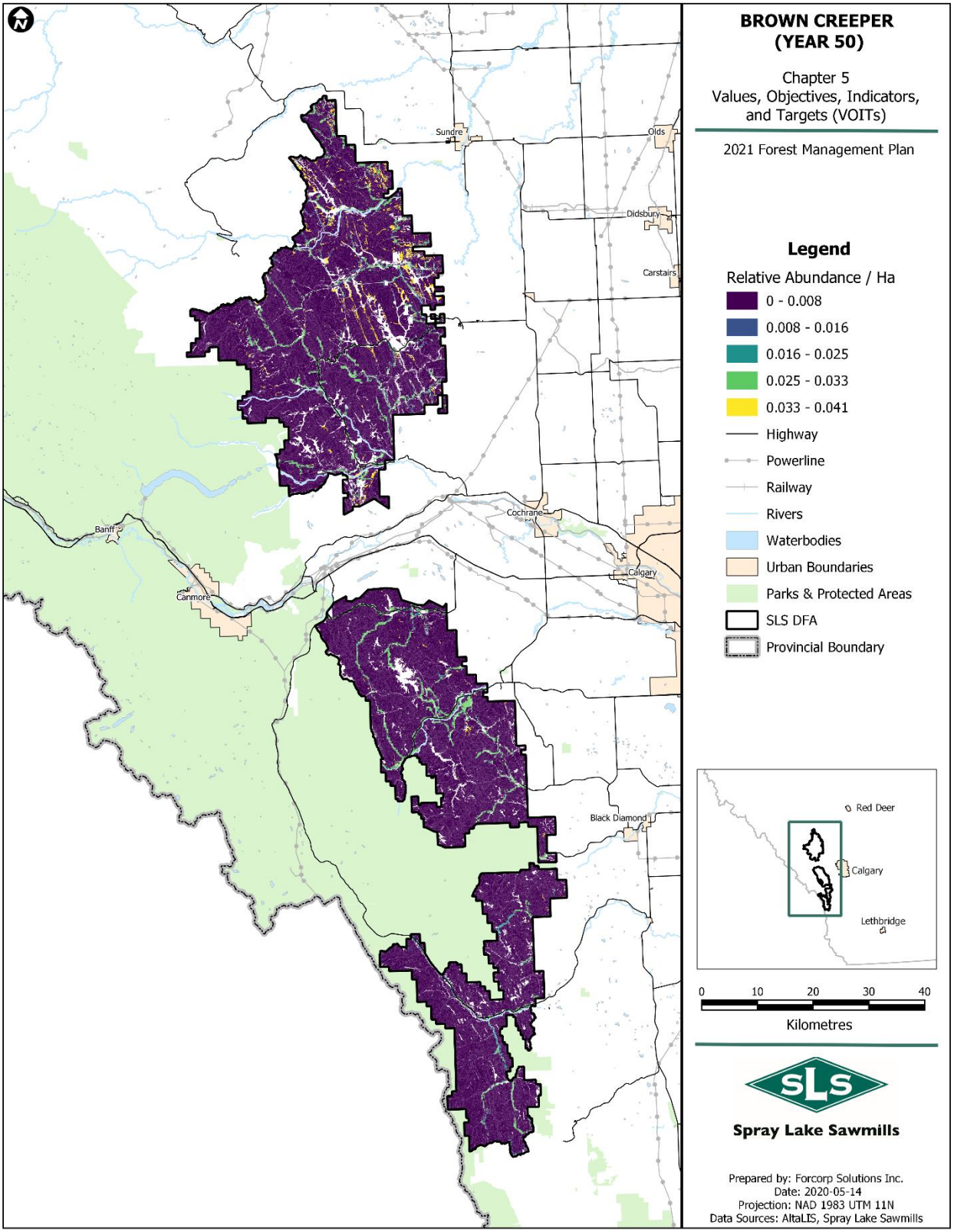

Figure 4-51. Brown Creeper Relative Abundance (RA) values in 2071

4.1.8.6 Whitebark and Limber Pine

No variance requests have been made to date in the DFA.

4.1.9 VOIT 15 (1.3.1.1) – Wild Forest Populations

Reporting Requirement:

- Table showing number of genetic conservation areas required in each seed zone and number provided in DFA.
- Map showing locations of genetic conservation areas.

At this time Spray Lake does not have an ongoing tree breeding program. If one is established, it will be reported on in Stewardship Reports.

4.1.10 VOIT 16 (1.3.1.2) – Wild Forest Populations Ex-situ

Reporting Requirement:

- Table showing number of provenances, genotypes and seedlots and their origin within the DFA
- Map showing provenances, genotypes and seedlots and their origin within the DFA

At this time SLS does not have an ongoing tree breeding program. If one is established, it will be reported on in Stewardship Reports.

4.2 Soil and Water Resources

4.2.1 VOIT 25 (3.2.1.1) – Water Yield Impacts (forecasted)

Reporting Requirement:

- Forecast ECA change by forest hydrology watershed.

The run-off from watersheds was evaluated using the Equivalent Clearcut Area (ECA) methodology. See *Chapter 6 – Preferred Forest Management Strategy* Section 4.11 for modeling methodology. Only watersheds with a minimum of 500ha within the DFA were included in the analysis. The forecasted overall changes in average ECA % over the 200-year time period are summarized in Figure 4-52 and displayed for selected timepoints in Figure 4-53 through Figure 4-56. The ECA % of each watershed (for the area of that watershed that is within the DFA) is provided in Table 4-19. The colouring is based on the following thresholds:

- **Green:** Less than 30%;
- **Yellow:** Equal or greater than 30% and less than 50%; or
- **Red:** Equal or greater than 50%.

The primary focus was to minimize impacts to watersheds in the first 20 years. While there are occasional red forecasted watersheds beyond 20 years, it is not expected that these impacts will actually occur because a new FMP will be developed every 10 years, at which point controls will be applied over the first 20 years to ensure impacts are minimized. Further details on mitigation strategies for yellow medium risk watersheds are described in *Chapter 7 – Plan Implementation and Monitoring* Section 7.2.

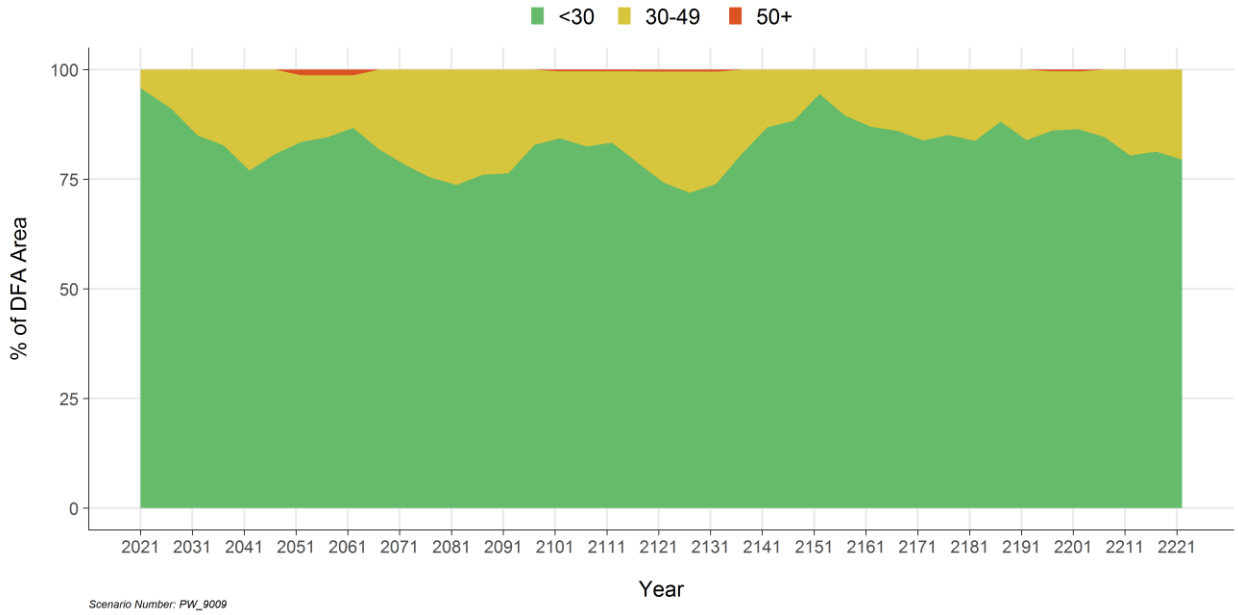

Figure 4-52. Area-weighted watershed ECA value over 200 years

Table 4-19. The ECA %s for each watershed and key time period

		ECA %					
Watershed ID	Area in DFA (ha)	Year 0	Year 10	Year 20	Year 50	Year 100	Year 200
23	5,000	10	8	5	16	16	20
24	3,916	11	9	17	25	22	27
25	3,449	13	9	20	28	33	28
31	2,625	15	13	14	20	26	25
32	5,626	12	7	9	12	20	14
33	6,123	15	32	32	17	33	27
34	4,537	22	15	10	12	28	16
35	7,028	20	35	40	19	41	32
36	2,858	20	20	17	25	27	31
37	3,849	0	0	1	24	6	10
38	7,469	12	14	17	33	23	25
40	4,327	4	19	20	26	24	27
42	4,897	9	9	7	27	14	16
47	551	22	18	14	30	18	33
48	3,389	18	16	14	13	22	27
50	4,421	9	40	36	16	35	39
52	3,272	13	12	22	31	20	25
55	6,473	14	23	20	22	27	21
56	6,057	1	1	0	24	6	12
60	4,159	7	6	4	22	9	20
61	673	0	0	0	25	4	23
62	3,721	21	19	13	20	24	24
64	1,709	0	0	0	27	3	7
65	2,421	0	0	0	40	10	23
66	3,767	13	13	18	25	17	17
68	2,715	1	1	0	41	7	20
69	2,669	6	4	2	32	13	13
70	2,541	1	0	10	32	5	16
71	904	0	8	7	28	13	12
72	1,434	0	46	44	20	50	48
73	2,235	5	8	8	13	9	15
74	3,948	0	14	23	41	19	25
75	6,590	0	15	14	30	15	16
76	1,935	0	3	21	35	16	23
77	5,610	6	5	10	28	18	21
78	1,864	14	10	33	36	23	27
79	6,573	36	44	46	19	45	42
80	2,005	3	44	42	29	38	41
81	4,321	2	11	37	40	31	36
82	5,359	13	27	30	15	31	26
84	3,429	2	2	2	32	8	17
85	908	5	5	4	29	11	15
86	2,363	5	10	28	26	24	25
87	6,186	16	24	24	23	25	25
90	6,238	18	18	23	17	19	20
93	4,514	8	21	26	14	29	28

94	5,528	2	3	3	14	1	13
95	1,247	0	0	0	28	6	9
96	1,658	0	0	0	31	4	8
98	1,685	0	0	0	24	8	9
100	5,333	18	17	24	14	27	20
104	2,308	13	10	31	22	31	28
106	5,837	22	36	37	14	41	32
107	2,213	12	33	28	10	32	32
108	2,244	12	20	21	17	21	19
110	2,198	23	29	31	9	41	31
114	2,467	19	20	24	12	25	20
128	723	1	1	13	17	10	7
129	1,969	25	21	30	12	30	24
130	2,572	34	28	41	12	39	32
131	1,228	9	7	20	15	14	8
132	4,775	18	14	23	21	23	25
136	2,860	10	36	32	17	36	23
138	2,568	20	19	35	21	34	31
139	2,046	7	4	16	20	26	26
322	2,686	16	15	19	10	18	16
323	2,691	24	21	18	16	33	27
325	1,005	9	4	2	26	9	17
326	1,357	18	10	6	16	24	13
328	1,386	1	0	12	29	30	29
329	1,907	0	0	0	40	11	20
330	2,058	0	0	0	43	6	25
332	3,235	18	16	11	23	23	23
333	5,073	5	4	7	45	9	13
336	1,754	6	19	19	16	19	18
338	973	25	25	31	26	32	28
364	802	2	2	3	24	6	5
370	1,249	0	0	0	38	12	21
372	4,176	18	16	16	28	21	23
374	1,421	19	18	15	17	23	18
376	1,470	0	0	9	18	5	8
377	6,274	1	8	17	29	13	18
378	744	0	2	16	20	12	14
416	1,202	0	5	5	20	12	9
463	504	0	2	6	33	5	18
464	6,152	19	21	40	21	29	30
465	727	29	31	34	18	27	21
466	906	35	39	39	16	33	32
468	1,002	0	0	0	21	6	7
489	3,860	0	0	0	13	4	4
490	1,818	18	15	40	37	33	34
491	3,308	18	30	29	16	32	31
526	1,247	38	35	30	9	47	32
535	4,851	17	28	40	22	33	36
557	3,950	22	20	16	31	22	23
558	1,618	1	34	31	32	28	24

559	1,619	0	5	42	28	40	48
737	2,247	20	18	13	15	26	24
738	3,541	14	43	38	19	39	30
766	558	0	0	0	48	12	16
993	2,664	31	27	19	15	26	19
1389	669	27	22	15	35	27	19
1410	1,905	4	4	8	17	7	8
1430	1,805	0	0	0	39	6	14
1440	3,099	9	4	2	19	16	11
1443	1,620	15	14	21	13	21	22
1445	5,895	10	22	26	15	29	21
1449	5,192	0	4	8	45	9	11

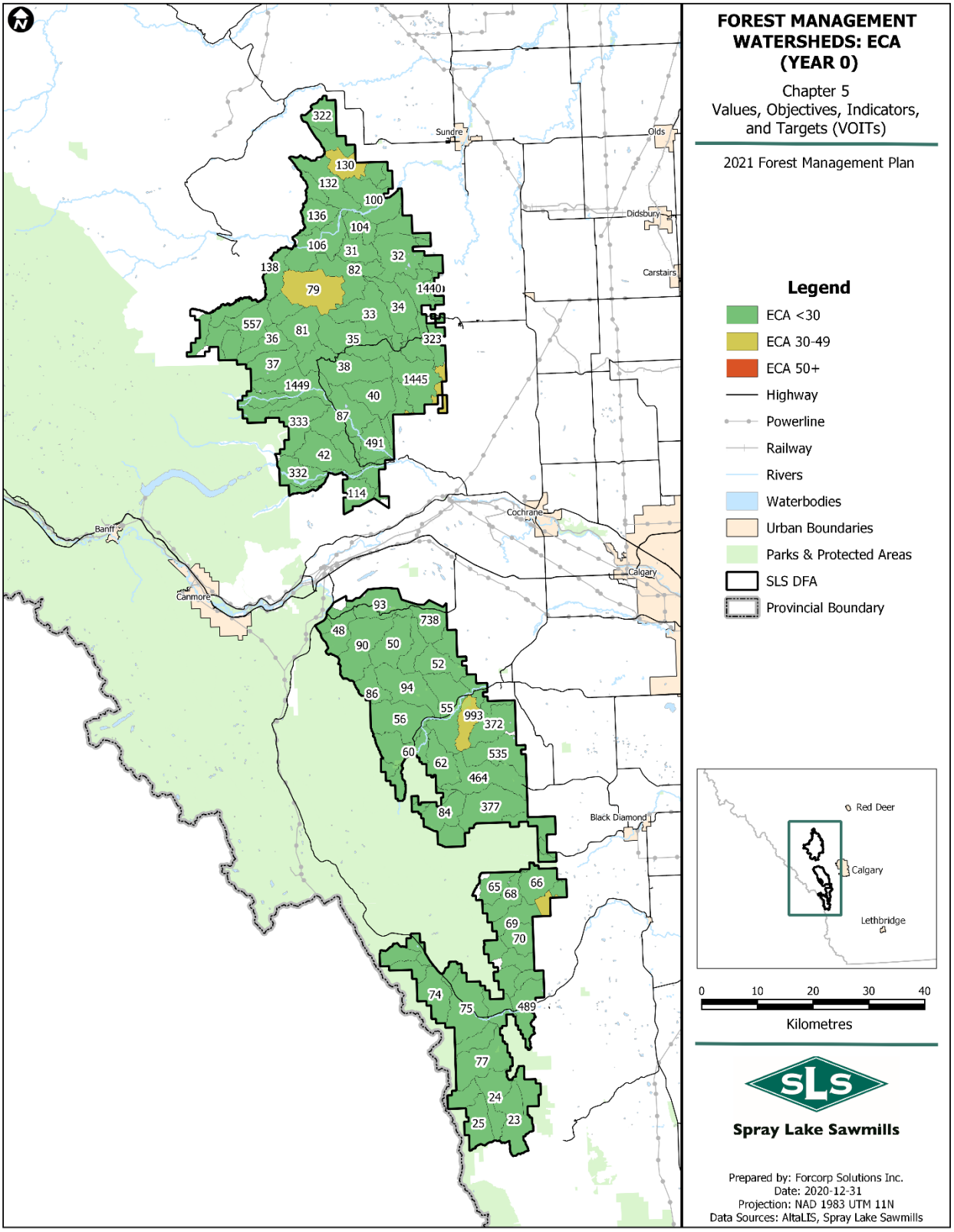

Figure 4-53. Forest Management Watersheds displayed by ECA classification in 2021

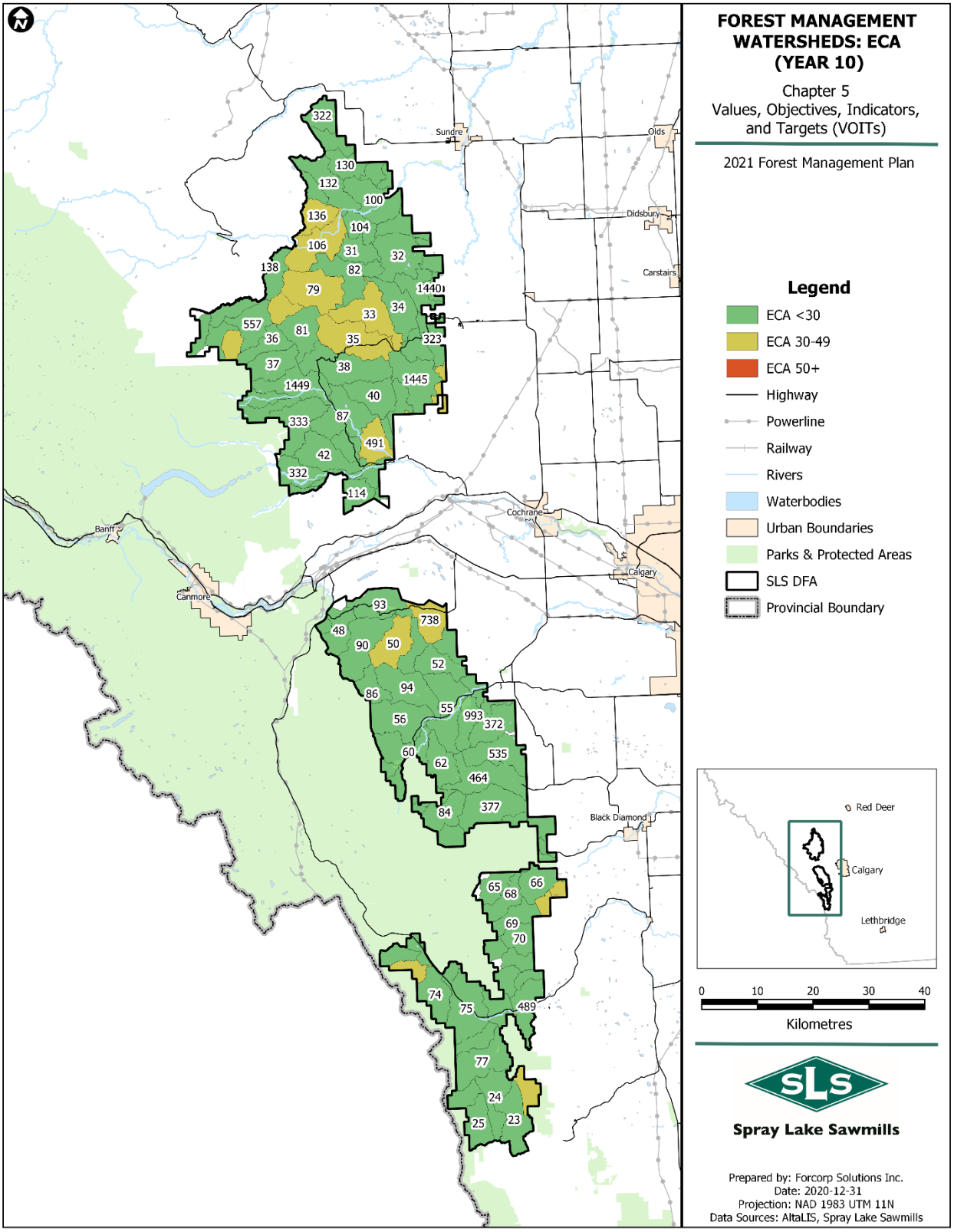

Figure 4-54. Forest Management Watersheds displayed by ECA classification in 2031

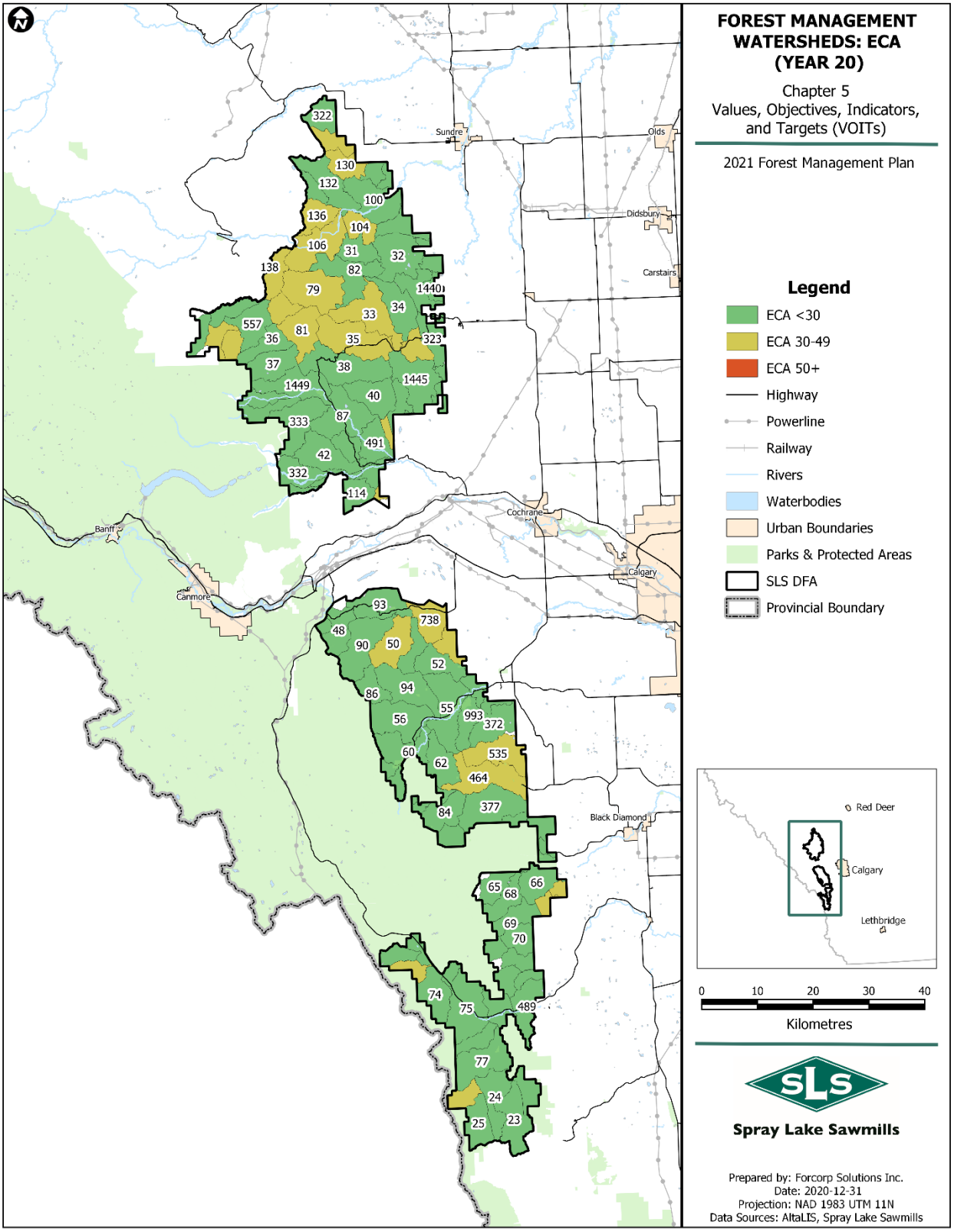

Figure 4-55. Forest Management Watersheds displayed by ECA classification in 2041

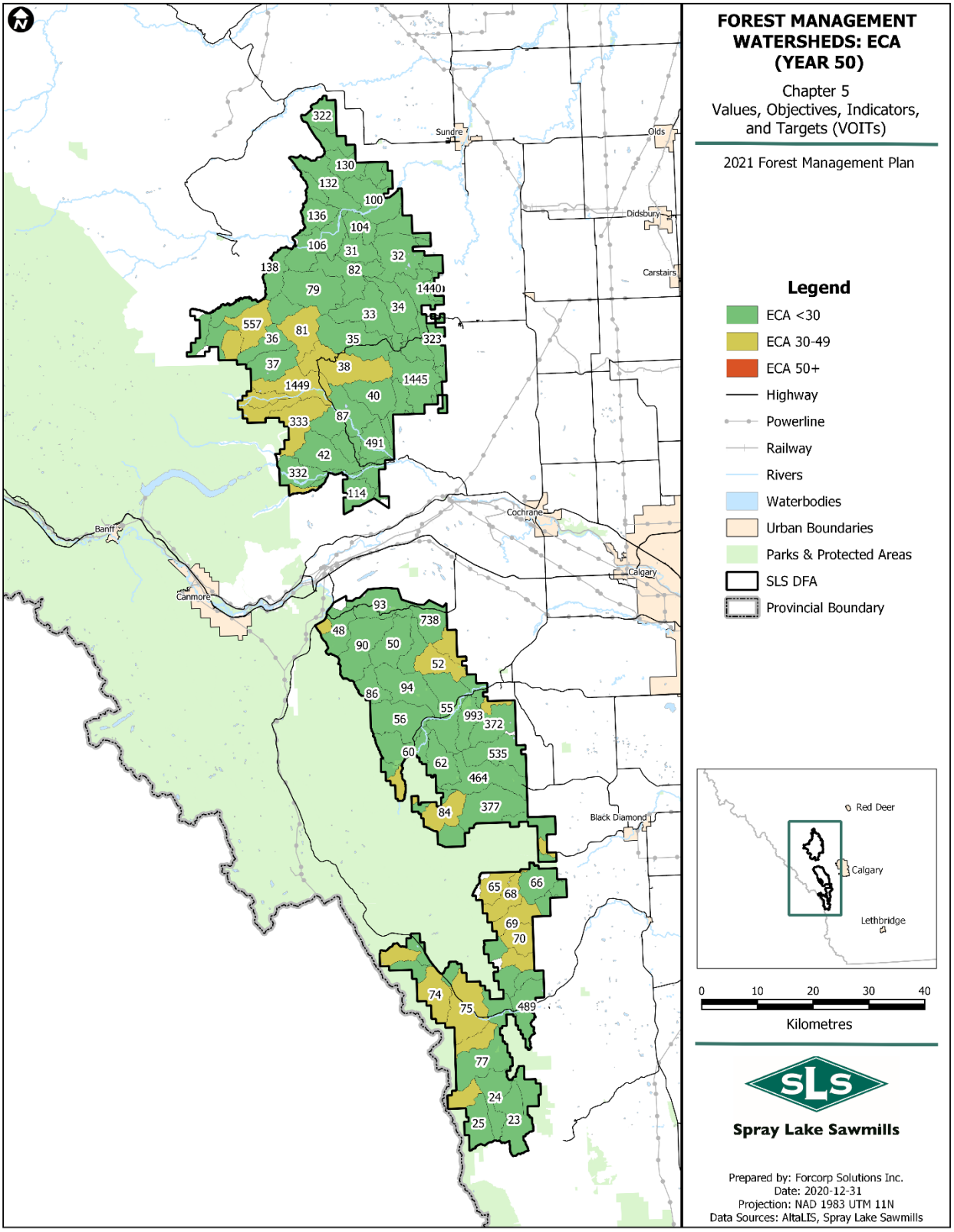

Figure 4-56. Forest Management Watersheds displayed by ECA classification in 2071

4.3 Multiple Benefits to Society

4.3.1 VOIT 27 (5.1.1.1) – Establish Appropriate Annual Allowable Cut (AAC)

Reporting Requirement:

- Determine AAC.

The SLS proposed AAC is described in *Chapter 6 – Preferred Forest Management Strategy* Appendix I.

4.3.2 VOIT 28 (5.2.1.1) – Fire Behaviour Potential

Reporting Requirement:

- Maps of Fire Behaviour Potential, Fuel Grid, Historical Wildfires and Natural Subregions (Generated by the GoA).

Details, including maps, on fire behaviour potential, historical wildfires, and natural subregions can be found in *Chapter 3 – Landscape Assessment* (Section 5.5 for wildfire history, including fire behaviour potential and Section 2.7 for natural subregions).

The predicted reductions for each fire behaviour potential risk category based on the 20-year SHS are provided in Table 4-20 for the whole DFA. Predicted reductions for the parts of FireSmart Community Zones that overlap the DFA are provided in Table 4-21.

Table 4-20. Area harvested in the SHS, classified by summer fire behavior potential risk category

Risk Category	Area (ha)	%	Decade 1 Harvest		Decade 2 Harvest	
			Area (ha)	% of Initial	Area (ha)	% of Initial
Extreme	65,214	20	3,531	5	4,593	7
Very High	66,982	20	4,628	7	4,951	7
High	55,387	17	5,859	11	5,668	10
Moderate	60,207	18	7,347	12	7,949	13
Low	78,523	23	1,110	1	1,601	2
Non-Fuel / No Value	7,933	2	-	-	-	-

Table 4-21. Area harvested in the SHS for parts of FireSmart Community Zones that overlap the DFA, classified by summer fire behavior potential risk category

FireSmart Community Zone*	Risk Category	Area (ha)	Decade 1 Harvest		Decade 2 Harvest	
			Area (ha)	% of Initial	Area (ha)	% of Initial
Bow Corridor Kananaskis Morley MD31 (14% in DFA)	Extreme	2,505	155	6	232	9
	Very High	5,062	278	5	431	9
	High	7,143	621	9	807	11
	Moderate	9,646	827	9	865	9
	Low	9,881	138	1	311	3
	Non-Fuel	354	1	0	4	1
Red Deer River (8% in DFA)	Extreme	40	-	-	0	-
	Very High	1,169	-	-	60	5
	High	593	-	-	45	8
	Moderate	545	-	-	44	8
	Low	755	-	-	7	1
	Non-Fuel	27	-	-	-	-
Bragg Creek MD 31 (97% in DFA)	Extreme	4,845	350	7	761	16
	Very High	4,876	428	9	629	13
	High	10,917	1,086	10	1,810	17
	Moderate	5,183	572	11	549	11
	Low	8,448	76	1	283	3
	Non-Fuel	360	-	0	13	4
Coal Camp (68% in DFA)	Extreme	750	110	15	134	18
	Very High	6,547	585	9	913	14
	High	3,641	319	9	336	9
	Moderate	8,998	964	11	1,723	19
	Low	11,594	284	2	232	2
	Non-Fuel	142	8	6	4	3
Eden Valley IR (25% in DFA)	Extreme	1,474	-	0	-	0
	Very High	923	-	0	0	0
	High	465	-	0	27	6
	Moderate	197	-	0	-	0
	Low	2,258	-	0	4	0
	Non-Fuel	41	-	0	-	0
Rocky Corridor (1% in DFA)	Extreme	345	12	3	1	0
	Very High	1,303	79	6	18	1
	High	1,597	159	10	93	6
	Moderate	2,862	198	7	177	6
	Low	2,242	17	1	23	1
	Non-Fuel	52	-	-	-	-

*Note: The FireSmart Community Zones often overlap, meaning that the same harvest areas are often contributing to reductions in multiple zones.

Additional information on the forecasted impacts of the PFMS on fire behaviour potential and the SLS Fire Protection Strategy is provided in *Chapter 7 – Plan Implementation and Monitoring* Section 6.1.

4.3.3 VOIT 30 (5.2.3.1) – Long Run Sustained Yield Average (LRSYA)

Reporting Requirement:

- Table of comparison of natural versus managed MAI.

The LRSYA results are described in *Chapter 6 – Preferred Forest Management Strategy* Section 3.3.

4.4 Accepting Society's Responsibility for Sustainable Development

4.4.1 VOIT 31 (6.1.1.1) – First Nations Consultation Plan

Reporting Requirement:

- Results of consultation, and how it has been incorporated in the plan.

The First Nations Consultation Plan, its results, and details of incorporation into the plan is described in detail in *Chapter 2 – FMP Development.*

4.4.2 VOIT 32 (6.2.1.1) – Public Participation Process

Reporting Requirement:

- Summary of the Public Participation Program for FMP development.

The Public Participation Program is described in detail in *Chapter 2 – FMP Development.*

4.5 Water Resources – Additional VOITs

4.5.1 VOIT 34 (6.1.1.1) – Water Quality for Drinking Water Provision (firerisk)

Details, including a map of fire behaviour potential can be found in *Chapter 3 – Landscape Assessment* Section 5.5.2. Additional information on strategies is available in *Chapter 7 – Plan Implementation and Monitoring* (Section 6.1).

5. References

Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project. (2019). *Brown Creeper (Certhia americana).* ABMI Website: abmi.ca/home/data-analytics/biobrowser-home/species-profile?tsn=99002654.

Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project. (2019). *Ovenbird (Seiurus aurocapilla).* ABMI Website: abmi.ca/home/data-analytics/biobrowser-home/species-profile?tsn=726205.

Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project. (2019). *Varied Thrush (Ixoreus naevius).* ABMI Website: abmi.ca/home/data-analytics/biobrowser-home/species-profile?tsn=179773.

Alberta Environment and Parks. (2016). *Alberta Grizzly Bear (Ursus arctos) Recovery Plan.* Edmonton, AB: Alberta Species at Risk Reocvery Plan No. 38.

Alberta Environment and Parks. (2016). *Barred Owl Conservation Management Plan 2016-2021.* Edmonton, AB: Species at Risk Conservation Management Plan No. 14.

Alberta Sustainable Resource Development, Fish and Wildlife Division. (2008). *Alberta Grizzly Bear Recovery Plan 2008-2013.* Edmonton, AB: Alberta Species at Risk Recovery Plan No. 15.

fRI Research Grizzly Bear Program. (2019). *2018 GBTools User Guide.* fRI Research.

Government of Alberta. (2016). *Grizzly Bear Recovery Planning Factsheet.*

Government of Alberta. (2017). *Alberta Wild Species General Status Listing - 2015.*

Government of Alberta. (2019). *Non-Timber Assessments in Forest Management Planning.*

Kearney, S., Coops, N., Stenhouse, G et al. (2019). Grizzly bear selection of recently harvested forests is dependent on forest recovery rate and landscape composition. *For. Ecol. Manage*, 499, 117459.

Lamb, CT, Mowat, G, Reid, A, et al. (2018). Effects of habitat quality and access management on the density of a recovering grizzly bear population. *J Appl Ecol.*, 55: 1406– 1417.

Russel, M. (2008). *Habitat selection of barred owls (Strix varial) across multiple spatial scales in a boreal agricultural landscape in north-central Alberta.* University of Alberta, AB: M.Sc. Thesis.

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