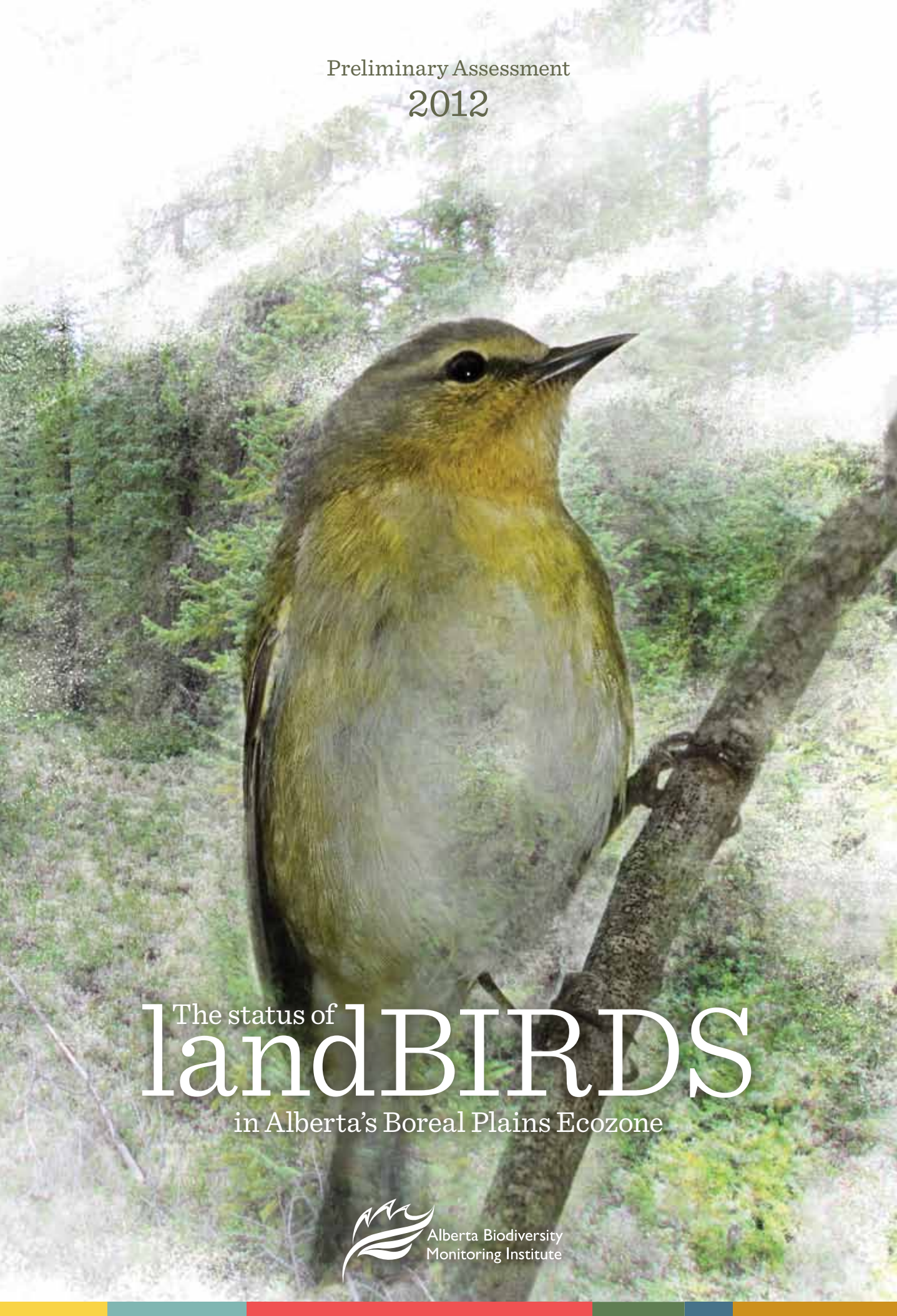
Preliminary Assessment
2012



The status of landBIRDS in Alberta's Boreal Plains Ecozone

Alberta Biodiversity Monitoring Institute

THIS REPORT DESCRIBES THE STATUS OF LANDBIRDS, HUMAN FOOTPRINT, AND HABITAT IN ALBERTA'S PORTION OF THE BOREAL PLAINS ECOZONE (BPE).

THE BOREAL PLAINS ECOZONE (BPE) COVERS A VAST AREA IN CANADA, INCLUDING PARTS OF BRITISH COLUMBIA, ALBERTA, THE NORTHWEST TERRITORIES, MANITOBA, AND SASKATCHEWAN. FIGURE 01

CONTENTS

REPORT SUMMARY

The Alberta Biodiversity Monitoring Institute (ABMI) measures and reports on the state of biodiversity, habitat, and human footprint across the province using scientifically credible indicators of environmental health. This report describes the status of landbirds, human footprint, and habitat in Alberta's portion of the Boreal Plains Ecozone (BPE).

The BPE represents 58% of Alberta's total land area. It also encompasses approximately 90% of Alberta's oil sands region as defined in the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring (JCA oil sands region).[1] Millions of landbirds breed in the BPE each year and they are an important component of ecological health for the region.

As of 2010, 21% of Alberta's BPE has been directly altered by human activity. The total human footprint includes: 12% cultivation; 6% forest harvesting; 3% residential, commercial, and energy infrastructure; and 1% transportation infrastructure.

The ABMI assessed the status of 74 landbird species in Alberta's BPE and found them to be 80% intact.[2] In general, the intactness is lowest for species that are positively associated with human-modified landscapes, such as the Barn Swallow and House Wren. These species are between four and six times more common than would be expected if the region had no human footprint. Species that are associated with old-forest habitat were found to be less abundant than expected and include the Brown Creeper, Golden-crowned Kinglet, and Black-throated Green Warbler.

The ABMI found that 11.3% of Alberta's BPE is managed as protected areas. Protected areas are not evenly distributed across different ecoregions but are concentrated in the Slave River Lowland, which largely overlaps with Wood Buffalo National Park.

The ABMI found large trees and snags were 73% intact in Alberta's BPE. All categories of trees and snags were below what we expected to find under intact reference conditions.

The JCA oil sands region largely overlaps with the eastern half of the BPE in Alberta. As of 2010, the total human footprint of the JCA oil sands region is 12%. The ABMI assessed the status of 74 common landbirds in the oil sands region and found them to be, on average, 85% intact. The average intactness values for each of the six landbird guilds were all slightly higher in the JCA oil sands region than for the BPE as a whole.

In an effort to better understand the detailed status of individual bird species in Alberta, we conducted supplemental analysis using data from the ABMI, the Boreal Avian Modelling Project, and the Breeding Bird Survey. As an example, we assessed the Olive-sided Flycatcher and its relationships with human footprint and habitat. Olive-sided Flycatcher abundance peaked in landscapes with intermediate levels of forestry footprint, and was lower in landscapes with agriculture and urban-industrial footprint.

The information in this report provides regional ecological baseline conditions for landbirds, which can be used as a foundation for evaluating future outcomes of resource management in the region.

1. Report available at http://environment.alberta.ca/03902.html.

2. The ABMI's Intactness Index is used to report on ecological health within regions of Alberta. The index ranges from 100% intact to 0% intact—an area with little evidence of human impact is nearly 100% intact; a parking lot surrounded by big-box stores is nearly 0% intact. The Intactness Index is a measure of how much more or less common a species is relative to its respective reference conditions.

HOW DOES THE ABMI MEASURE ECOLOGICAL HEALTH?

Albertans are familiar with a range of well-accepted indicators—ones that describe the condition of our economy and others that measure the state of our own health. There are no such broadly accepted indicators to describe the condition of the province's lands, waters, and living resources.

Alberta is the only jurisdiction in Canada, and one of the few in the world, to set up an integrated program to measure and report on the state of land, water, and living resources.

The ABMI monitoring program is a comprehensive system that:

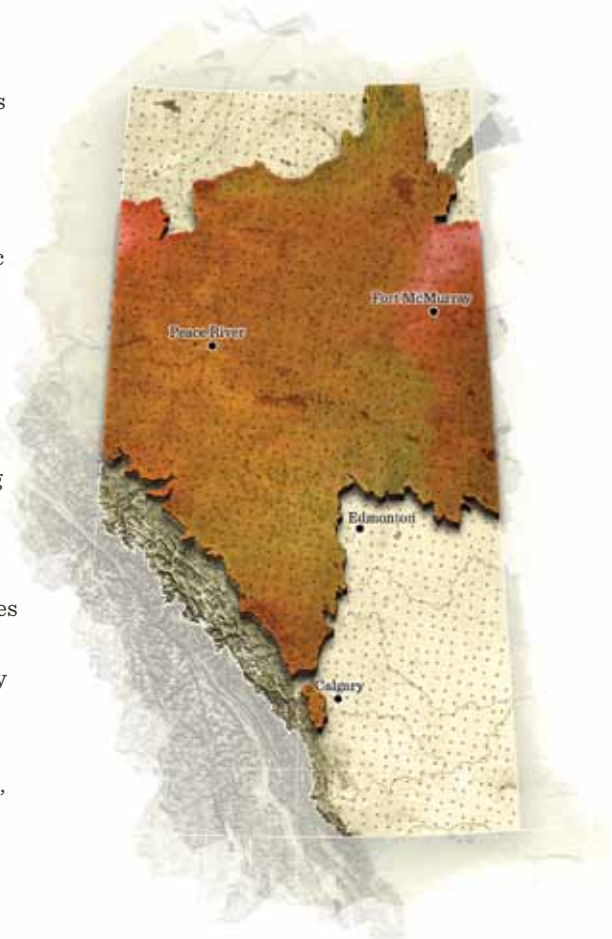
- Tracks over 2,000 species and habitats across the province
- Generates value-neutral, independent, publicly accessible data
- Informs government, industry, and the public about the state of the environment so we can plan for a future that includes biodiversity, clean air, water, and land

The ABMI provides comprehensive indicators that act as a common yardstick for establishing clear management goals and tracking performance against those goals.

The ABMI is not a management agency and does not make management recommendations. The goal of the ABMI is to present scientifically sound knowledge in a value-neutral format. Where possible, the ABMI will identify relationships between human land use, habitat, and species to help inform environmental stewardship policy, planning, and regulation.

Measuring the Ecological Health of Landbirds

Landbirds are one component of biodiversity that is assessed by the ABMI. Landbirds are abundant during the spring breeding season in the boreal forest. They are also very conspicuous as they sing to attract mates and defend territories. These characteristics make landbirds one component of biodiversity that is relatively easy to monitor.



THE BOREAL PLAINS ECOZONE (BPE) REPRESENTS 58% OF ALBERTA'S TOTAL LAND AREA. FIGURE 02
950 ABMI SITES ARE LOCATED IN ALBERTA'S BPE (OUT OF A TOTAL OF 1656 SITES).

BIODIVERSITY INDICATORS IN THIS REPORT

The ABMI measures many indicators to support the management of biodiversity, wildlife, and the environment. In this report, we profile the status of landbirds, human footprint, and habitat in the Boreal Plains Ecozone (BPE).

The ABMI assesses the status of human footprint for Alberta's portion of the BPE using the institute's inventory of human footprint for the province of Alberta.

THE ABMI DEFINES HUMAN FOOTPRINT AS "THE VISIBLE CONVERSION OF NATIVE ECOSYSTEMS BY HUMANS TO SUPPORT TEMPORARY OR PERMANENT RESIDENTIAL, RECREATIONAL, OR INDUSTRIAL USES." THE ABMI'S HUMAN FOOTPRINT INVENTORY COMPILES EXISTING INFORMATION ON PROVINCIAL HUMAN FOOTPRINT SUPPLEMENTED WITH ABMI DATA, WHICH ARE SUBJECT TO RIGOROUS QUALITY CONTROL PROCEDURES.

Landbirds are those species which rely on terrestrial habitat throughout their life cycle. We assess the status of landbirds using ABMI point-count survey data. Results are summarized for all landbirds and six landbird guilds, including:

- Neotropical migrants
- Old-forest specialists
- Forest interior specialists
- Winter residents
- Species at risk
- Human-associated species

We assess the status of habitat and habitat elements focusing on attributes that are considered important to the ecology of many species of landbirds, such as the percentage of the landbase that is protected, and large-diameter trees and snags.

This report also examines the status of human footprint and landbirds in Alberta's oil sands region as defined in the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring Report (JCA oil sands region). This spotlight on the JCA oil sands region can be found on page 30 of this report.

It is important to note that the findings of this report are averages that apply to Alberta's portion of the BPE or to broad regions within the BPE. As with most landscapes in Alberta, specific sites within the ecozone are nearly 0% intact (e.g., active industrial sites and cultivated fields) and other sites are nearly 100% intact (e.g., undeveloped forest and wetland habitat).

Finally, we analyzed data sets from the ABMI, the Boreal Avian Modelling Project, and the Breeding Bird Survey to assess habitat associations and relationships to human footprint for the Olive-sided Flycatcher. This evaluation can be found on page 32 of this report.

Next Steps

The analyses in this report are preliminary, as not all ABMI sites in the BPE have been sampled. As the ABMI's data and analytical methods continue to grow and mature, we will expand our reporting to include trends in landbirds throughout Alberta's portion of the BPE. Similarly, the ABMI will report on more species and habitats as monitoring information for the BPE continues to build.

HOW DOES THE ABMI REPORT ON THE STATUS OF BIODIVERSITY?

The ABMI Species and Habitat Intactness Index

The ABMI uses tools called the Species Index and the Habitat Index to report on how intact species and habitats are in a region. Here's how they work:

- The indices range from 100% intact to 0% intact.
- An area with no evidence of human impact is 100% intact.
- An urban parking lot surrounded by big-box stores is close to 0% intact.
- If the abundance of a species is equal to the number we expect to find in an area of no human disturbance, that species is considered to be 100% intact.
- If the amount of habitat is the amount we expect to find in an area of no human disturbance, that habitat is considered to be 100% intact.

The indices decline from 100% toward 0% under the following circumstances:

- Common native species or habitats become rare or disappear.
- Common native species or habitats become exceptionally abundant.
- Weeds or invasive species become very common.

For example, we consider a species to be 50% intact if our data shows its population to be either half or double the number that we would expect to find if the region had no human footprint.

100% INTACT

AN UNDEVELOPED AREA WITH NO EVIDENCE OF HUMAN IMPACT

0% INTACT

AN URBAN PARKING LOT SURROUNDED BY DEVELOPMENT

THE ABMI SPECIES AND HABITAT INTACTNESS INDEX FIGURE 03

The Human Footprint Index

The ABMI reports on the extent of human footprint by determining the area of land directly altered by human activities. It works like this:

- 0% means there is no visible human footprint.
- 100% means the landscape has been completely modified by human footprint.

In general, cities and cultivated fields have high human footprint, while protected and unmanaged areas have low human footprint. Values presented in this report are complete inventories circa 2007 and 2010.

See the BPE Landbird Data Supplement (available at www.abmi.ca) for details.

Ecological Risk

As the intactness of a region declines toward zero, the ecological risks we face increase.

These risks are initially small and may be mostly unnoticeable. However, the less intact the region becomes, the more likely we are to change air and water quality and the recreational opportunities we enjoy.

If there are too many of a species or group of species, they may:

- Affect biodiversity by crowding out other species or drive other changes in the environment
- Indicate that the environment is already changing and specific species are taking advantage of those changes

If the numbers of a species or group of species are lower than we expect:

- The risk of losing that species increases.
- The ecosystem could be affected as a result of losing that species.

Determining Implications and Priorities

Deciding if and how to respond to changes in species or habitat intactness requires consideration of the following:

- Current intactness value
- Degree of confidence in the intactness value
- Magnitude and immediacy of ecological risk
- Tolerance for ecological risk

The highest priority for attention will most likely be given to species and habitats that present significant and immediate ecological risk.

HOW DOES THE ABMI MONITOR LANDBIRDS IN THE FIELD?

Every summer, ABMI's field monitoring staff take on the large task of monitoring Alberta's bird populations at each of our sites. Collecting, producing, and ensuring high-quality scientific data is not as straightforward as it might seem—bird monitoring is full of unexpected challenges, interesting obstacles, and even pleasant surprises.

Bird recordings are made early in the morning during the spring, when birds are most active. At each ABMI site, we use digital recorders to record birds singing or calling for 10 minutes at each of 9 point-count stations for a total of 90 minutes of recordings per site. Field staff make observations about ecosystems, habitats, and natural and human footprint at each station while making bird recordings. We send the digital sound files to expert ornithologists who painstakingly identify the amazing array of calls or vocalizations. The sound files allow experts to isolate specific high and low frequencies that may not be audible to the human ear.

THE ABMI RECORDS MORE THAN 200 HOURS OF BIRD SONGS EACH YEAR.

INTERVIEW WITH AN ABMI FIELD SUPERVISOR

GREG BROOKE
is an experienced field supervisor and technician and has been with the ABMI for over seven years. Brooke has monitored birds in Alberta in practically every terrain and situation. Through the years he has developed a wealth of knowledge and a great love for landbirds.

Q: How does the ABMI ensure the quality of data and bird recordings?

We do everything possible to make the recordings consistent: all recorders are calibrated to function in the same way; they pick up sound at the same distance of 100-150 m, at the same frequencies, and are set up to consistently to face north. Also, the recording levels are locked so they cannot be accidentally adjusted.

We get feedback from expert ornithologists who work with us to improve the quality of recordings. We are always trying to improve and be more consistent. We also keep all recordings on file so we can go back if we need to.

Q: What are your biggest challenges in bird monitoring?

Our biggest challenge is rain and getting to the monitoring sites. Some of our crews get dropped off in a bog and it's hard to guarantee that the machine will not get wet. If the wind gets to be more than 15km per hour, we cannot record, because all you hear is wind. Same with rain; if there is too much, it sounds like beating drums.

The bird recorders aren't that portable either: the recorders (approximately 45 pounds) need to be dragged over all kinds of terrain and this increases the chances of condensation and getting the recorders wet. Field crews have six hours to complete the recordings beginning a half hour before sunrise. This might sound like a lot but that 300 metres (between the point-counts) could be very long: it could mean going up and down terrain with burned cutblocks, creeks, cliffs, bullpens or a farmer's dog in your way.

Q: What can you tell about a bird by its song?

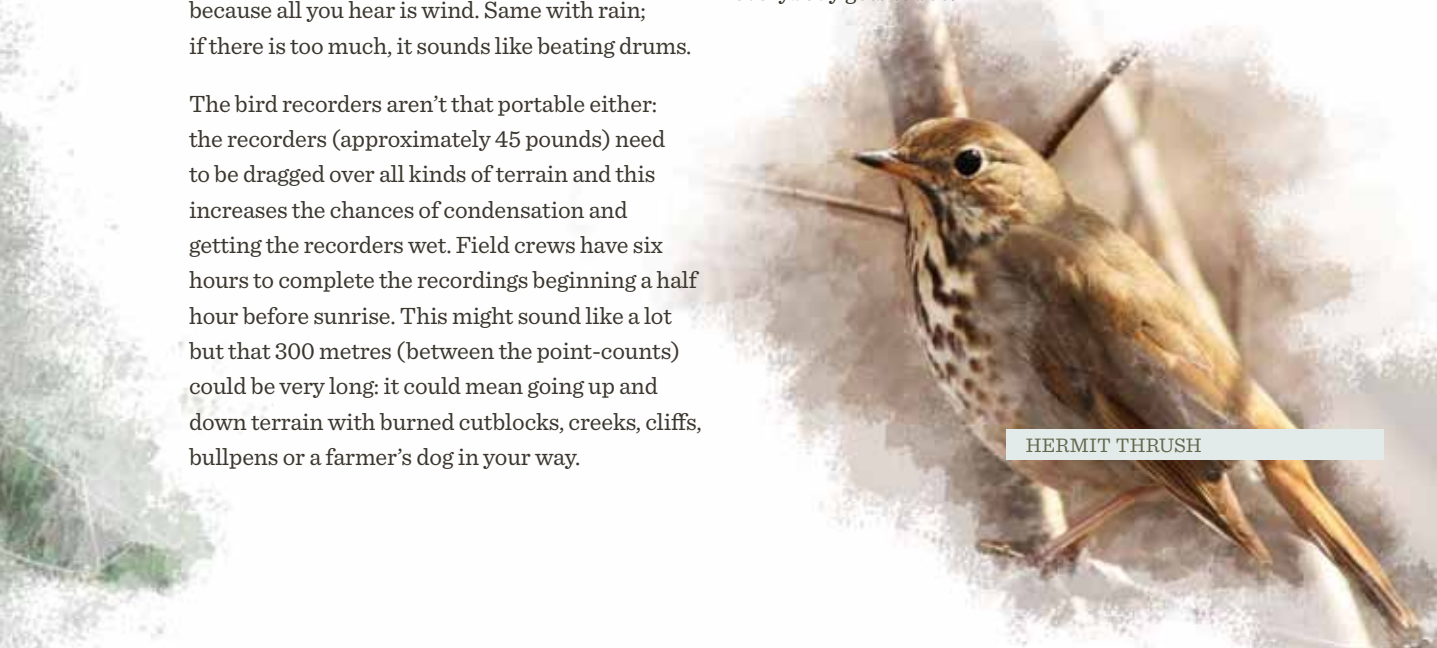
Generally only males call. The long repetitive calls that you hear usually mean "you are in my territory," or "I'm here and I'm willing."
The shorter calls, such as those from chickadees, are warning the flock that a predator is near.

Q: What is your favourite songbird call and why?

Hermit Thrush; it was the first bird that I could identify by ear and I love the song. It is a great bird to listen to.

Q: How did you get involved in monitoring?

I liked being outside and I wanted to get paid for it... and I still love being outside.
The ABMI takes people to places where you can pretty much guarantee no one's ever stood before... so it's interesting to see things that not everybody gets to see.



HERMIT THRUSH

THE ABMI REPORTS ON

THE STATUS OF LANDBIRDS IN ALBERTA'S BOREAL PLAINS ECOZONE

The Boreal Plains Ecozone extends as a wide band from northeastern British Columbia, across northern and central portions of Alberta. It continues through central Saskatchewan, to the eastern shores of Lake Winnipeg in Manitoba and up to the southern part of the Northwest Territories.

The BPE includes:

- 8% of Canada—an area larger than the Yukon
- Approximately 381,000 km^2 or 58% of Alberta's land and water resources
- 10 ecoregions, 8 of which partially or completely occur in Alberta
- A major portion of Bird Conservation Region 6 (BCR6)[1]
- Many globally and nationally significant Important Bird Areas,[2] 11 of which occur in Alberta
- The Peace-Athabasca Delta, which is designated as a Ramsar Wetland of International Importance[3]

The landscape of the BPE has been shaped by disturbance. Multiple ice ages have created a flattened and rolling landscape dotted with numerous shallow lakes and wetlands connected by meandering streams. This predominantly forested ecozone experiences frequent wide-spread natural disturbance like fire and insect outbreaks, and supports a diversity of ecosystems, habitats, and wildlife species, including more than 200 species of landbirds.

CONSIDERED THE "BIRD NURSERY" OF NORTH AMERICA, THE MOSAIC OF FOREST AND WETLAND HABITAT IN THE BOREAL FOREST SERVES AS THE BREEDING GROUNDS FOR MILLIONS OF BIRDS EACH YEAR.

Millions more pass through the ecozone during their spring and fall migrations.

For landbirds, the BPE is important for a number of reasons:

- Landbirds are by far the most numerous bird group that breeds in the boreal forest.
- Many landbirds, such as warblers, are almost entirely reliant on the boreal forest during the breeding season.
- Several landbirds are categorized as species at risk.

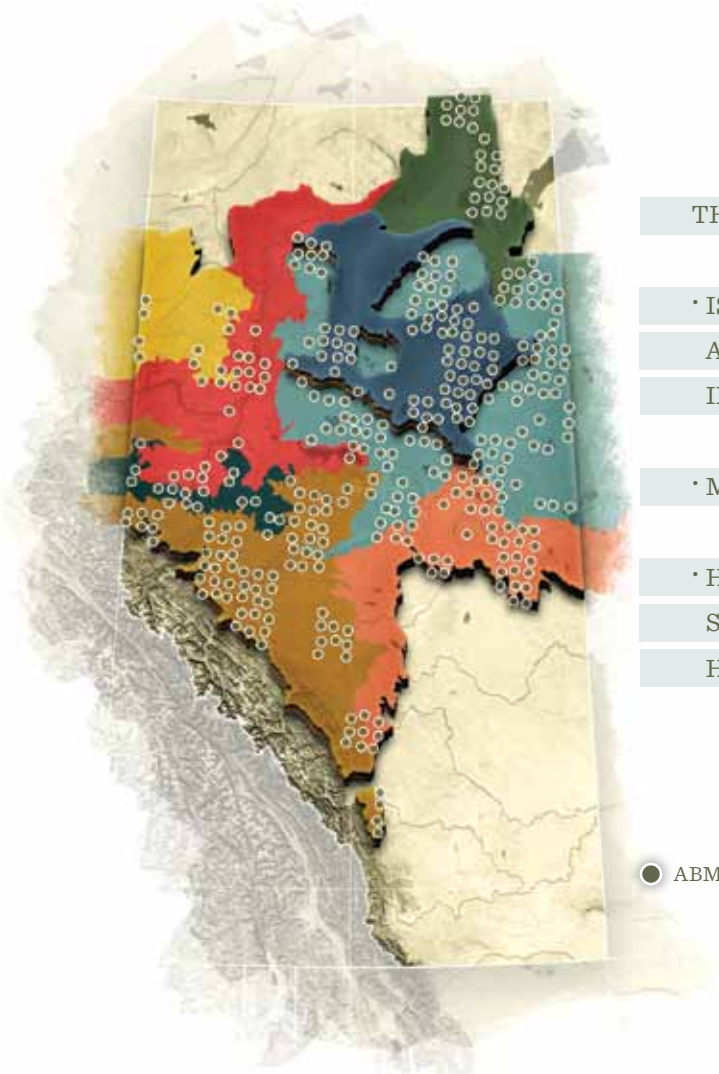
FOR MORE INFORMATION:

1. www.bsc-eoc.org/international/bcrcanada.html
2. www.ibacanada.ca
3. www.ramsar.org

PEACE RIVER

TABLE 01 BOREAL PLAINS ECOREGIONS THAT OCCUR IN ALBERTA, INCLUDING PERCENT AREA SUMMARY AND A SUMMARY OF ABMI MONITORING ACTIVITY

	Total Area Located in AB (%)	Area of AB (%)	Total Number of ABMI Sites	Total Number of Sites Sampled
Boreal Transition	43	7	108	37
Clear Hills Upland	52	4	60	10
Mid-Boreal Uplands	43	13	215	106
Peace Lowland	86	9	144	23
Slave River Lowland	68	5	85	26
Wabasca Lowland	100	8	134	56
Western Alberta Upland	90	10	177	76
Western Boreal	97	2	27	13
Alberta's Boreal Plains Ecozone	54	58	950	347



THE WABASCA LOWLAND:

- IS LOCATED ENTIRELY IN ALBERTA AND IS FOUND NOWHERE ELSE IN CANADA
- MAKES UP 8% OF ALBERTA
- HAS 134 PERMANENT ABMI SAMPLE SITES, 56 OF WHICH HAVE BEEN SURVEYED TO DATE

ABMI SITES SURVEYED BETWEEN 2003 AND 2011 (347)

FIGURE 04 ECOREGIONS CONTAINED IN ALBERTA'S BOREAL PLAINS ECOZONE AND THE DISTRIBUTION OF THE ABMI SAMPLE SITES SURVEYED TO DATE

ECONOMIC AND SOCIAL CONTEXT

Alberta's BPE is a working landscape, rich in renewable and non-renewable resources, including agricultural resources, timber, oil and gas. Industries that develop these resources are the primary economic drivers in Alberta.

Taken as a whole, the BPE is Canada's second largest contributor of agricultural land by area. Agriculture has driven human settlement in the BPE since the late 1800s and continues to expand in some areas of the Boreal Plains, such as the Peace River region.

Complementing agricultural production is a robust forest industry. As the BPE in Alberta is predominantly forested, much of the ecozone's land base is managed for timber production.

Alberta's oil sands area, one of the largest deposits of hydrocarbons in the world, is centrally located in the BPE in Alberta. Oil sands development has been the focal point for the economy in the boreal region and continues to grow. To locate, extract, and deliver oil and gas resources, a vast network of roads, pipelines, and seismic lines overlays the BPE, providing access to previously remote areas.

Today, about 350,000 people live in Alberta's BPE. Much of our population remains in small communities located throughout the ecozone despite recent and rapid urban development in areas such as Fort McMurray. There are numerous Aboriginal communities located throughout Alberta's BPE. They are strongly tied to traditional practices of hunting, trapping, and fishing, but are also actively involved in the resource-based industries within the ecozone. This diversified region plays a critical role in maintaining Alberta's economic sustainability.

Much of our future economic success in the BPE also relies on services generated from the region's ecosystems and biodiversity, including those services provided by landbirds such as pest control, seed dispersal, and pollination. In Canada's boreal forest, birds are estimated to provide pest control services valued at over $5 billion each year.[2]

Alberta's BPE, rich in both natural resources and ecological value, requires effective monitoring of landbirds as part of a balanced approach to ensure environmentally sustainable economic growth in this region.

THE TENNESSEE WARBLER IS A SPRUCE BUDWORM SPECIALIST AND CAN EXHIBIT UP TO A 10-FOLD INCREASE IN ABUNDANCE DURING BUDWORM OUTBREAKS.[1] THE ABMI FOUND THE TENNESSEE WARBLER TO BE 98% INTACT.

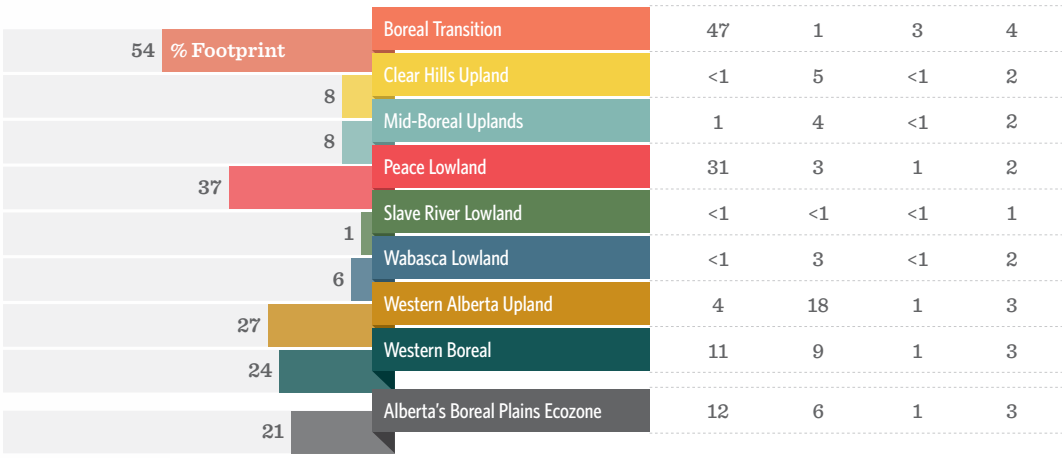
HUMAN FOOTPRINT

The ABMI defines human footprint as the visible conversion of native ecosystems to temporary or permanent residential, recreational, or industrial landscapes. This includes land conversion activities that support the agriculture and energy industries, residential settlement, and transportation infrastructure.

As of 2010, the total human footprint across Alberta's BPE was 21% and included 12% agricultural cultivation as the largest total human footprint (Table 02). The total human footprint increased by 1% between 2007 and 2010 in the BPE.

The type and amount of human footprint in the BPE provides context for interpreting the status of landbird species and habitats.

TABLE 02 THE PERCENTAGE OF HUMAN FOOTPRINT IN ALBERTA'S BOREAL PLAINS ECOZONE AND IN ITS EIGHT FEDERAL ECOREGIONS (NOTE: DETAIL MAY NOT SUM TO TOTALS BECAUSE OF ROUNDING.)



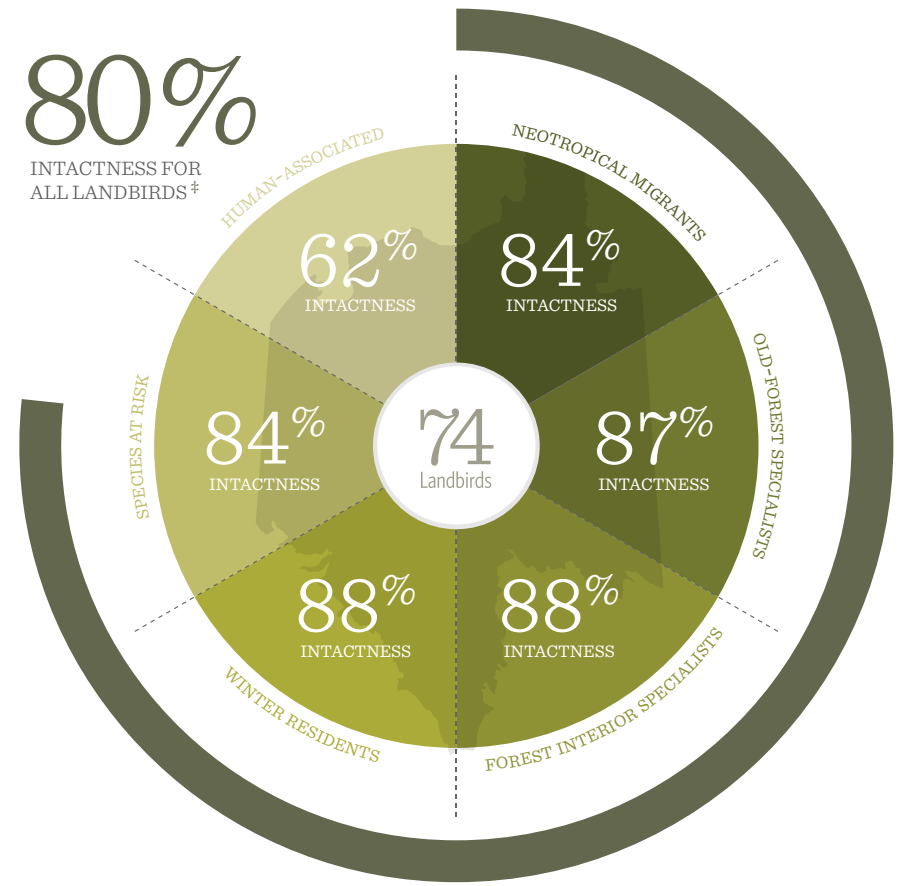
	Cultivation (%)	Forest Harvesting (%)	Transportation Infrastructure (%)	Residential, Commercial, and Energy Infrastructure (%)
Boreal Transition	47	1	3	4
Clear Hills Upland	<1	5	<1	2
Mid-Boreal Uplands	1	4	<1	2
Peace Lowland	31	3	1	2
Slave River Lowland	<1	<1	<1	1
Wabasca Lowland	<1	3	<1	2
Western Alberta Upland	4	18	1	3
Western Boreal	11	9	1	3
Alberta's Boreal Plains Ecozone	12	6	1	3

INTACTNESS OF LANDBIRDS

Thousands of native animal and plant species live in the BPE. Landbirds represent a small but conspicuous subset of these species and are an important component of ecological health in the region. The ABMI assessed the status of 74 common landbirds in Alberta's BPE and found them to be, on average, 80% intact (Figure 05).

We profile six landbird guilds, including landbird species at risk in Alberta's BPE. Comprehensive detail on all species is available in the supplemental material associated with this report, available at www.abmi.ca.

At present, our assessment of native landbirds is only available for relatively common species. The ABMI has an ongoing monitoring program operating in Alberta's BPE and we anticipate that more landbirds will be included in upcoming reports for this region.



‡ Intactness for all landbirds is calculated as the average intactness of all 74 common landbirds as opposed to the average of the above landbird guilds.

FIGURE 05 INTACTNESS FOR LANDBIRDS IN ALBERTA'S BOREAL PLAINS ECOZONE

PREDICTED INTACTNESS OF LANDBIRDS

The ABMI builds statistical models that describe the relationship between land use, habitat, and the relative abundance of individual species. These statistical models are developed and maintained for hundreds of species across Alberta. One of the uses of these statistical models is to predict the intactness of each landbird species in every quarter section of land in Alberta's BPE. Using the ABMI's Inventory of Human Footprint (circa 2010), it is possible to project the average intactness for 74 landbird species in Alberta's BPE (Figure 06). Predictive mapping of species abundance is an example of a tool that can be used to enhance certainty in policy and management activities in Alberta's BPE.

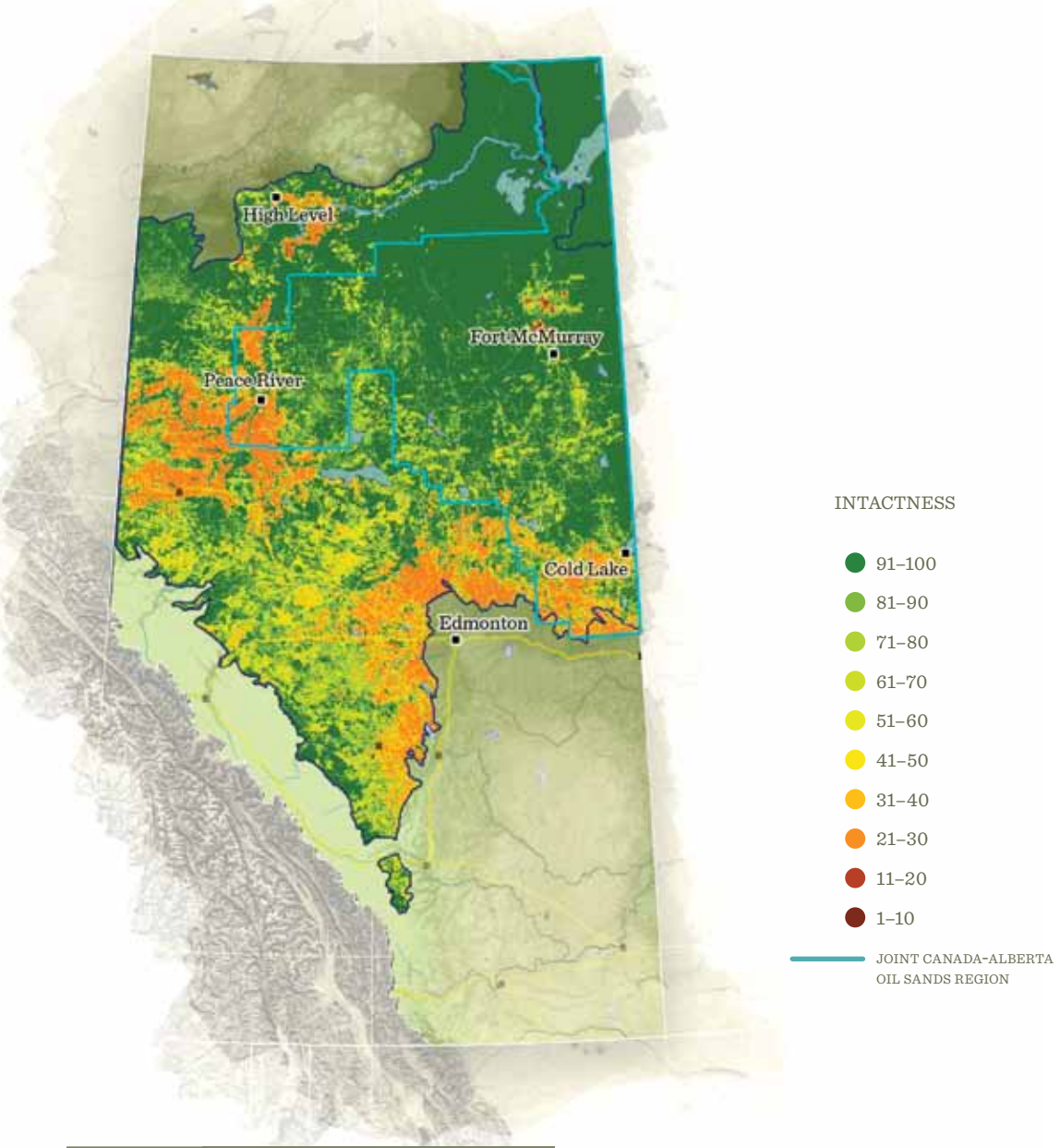


FIGURE 06 AVERAGE PREDICTED INTACTNESS FOR 74 LANDBIRD SPECIES IN THE BOREAL PLAINS ECOZONE OF ALBERTA. DARK RED IDENTIFIES THE QUARTER-SECTIONS PREDICTED TO HAVE THE LOWEST AVERAGE LANDBIRD INTACTNESS VALUES.

NEO-TROPICAL MIGRANTS

The majority of North America's landbirds migrate in the spring from Central and South America to Canada's boreal forest so they can take advantage of the abundant food resources and diversity of habitats available during their breeding season. These species are so successful that populations approximately double by the end of the breeding season with the influx of juveniles. Migrating landbirds are important ecological links to ecosystems thousands of kilometres away.

THE ABMI ASSESSED THE STATUS OF 31 NEO-TROPICAL MIGRANTS IN ALBERTA'S BPE AND FOUND THEM TO BE, ON AVERAGE, 84% INTACT.

The six most common neo-tropical migrant species occurred at more than 50% of ABMI sites. These species are: Swainson's Thrush, Tennessee Warbler, Ovenbird, Red-eyed Vireo, Least Flycatcher, and Magnolia Warbler. Five of these common species were over 90% intact with Ovenbird being 85% intact (15% less abundant than would be expected if there was no human footprint in the BPE; Table 03.)

Of the species assessed by the ABMI, the Barn Swallow, House Wren, Clay-colored Sparrow, and Yellow Warbler differed the most from what we expected to find under intact conditions; these species were all more abundant than expected if there was no human footprint. The Barn Swallow was six times more abundant than expected if there were no human footprint in the region, while the House Wren was approximately two times more abundant. Both the Barn Swallow and House Wren become more common as agriculture and other resource industries expand.

At 45% intact, the Clay-colored Sparrow was approximately two times more common than expected. This species is most often associated with open grassland landscapes and nests in shrubby habitats.[3] Finally, the Yellow Warbler was 1.4 times more abundant than expected and is often associated with forest edges, young forests, and habitats near water.[4]

YELLOW-BELLIED FLYCATCHER

TABLE 03 THE INTACTNESS OF 31 NEO-TROPICAL BIRDS IN BPE. SPECIES ARE RANKED FROM HIGH TO LOW INTACTNESS.

Arrows indicate if the abundance of the species was above ^ or below v intact reference conditions.

	Mourning Warbler	*Oporornis philadelphia*	ESRD - Secure ‡ 100% Intactness
	Least Flycatcher	*Empidonax minimus*	ESRD - Sensitive 100
	Canada Warbler	*Wilsonia canadensis*	ESRD - Secure 100
^	Yellow-bellied Flycatcher	*Empidonax flaviventris*	ESRD - Undetermined 99
v	American Redstart	*Setophaga ruticilla*	ESRD - Secure 99
^	Magnolia Warbler	*Dendroica magnolia*	ESRD - Secure 98
v	Wilson's Warbler	*Wilsonia pusilla*	ESRD - Secure 97
^	Tree Swallow	*Tachycineta bicolor*	ESRD - Secure 96
v	Tennessee Warbler	*Oreothlypis peregrina*	ESRD - Secure 95
^	Red-eyed Vireo	*Vireo olivaceus*	ESRD - Secure 95
v	Northern Waterthrush	*Parkesia noveboracensis*	ESRD - Secure 95
v	Black and White Warbler	*Mniotilta varia*	ESRD - Secure 94
v	Western Tanager	*Piranga ludoviciana*	ESRD - Sensitive 93
v	Swainson's Thrush	*Catharus ustulatus*	ESRD - Secure 93
v	Cape May Warbler	*Dendroica tigrina*	ESRD - Sensitive | AB ESCC 2010 - In Process 92
v	Olive-sided Flycatcher	*Contopus cooperi*	ESRD - May Be At Risk | COSEWIC - Threatened | SARA - Threatened 91
v	Bay-breasted Warbler	*Dendroica castanea*	ESRD - Sensitive | AB ESCC 2010 - In Process 89
v	Ovenbird	*Seiurus aurocapilla*	ESRD - Secure 85
^	Warbling Vireo	*Vireo gilvus*	ESRD - Secure 84
v	Connecticut Warbler	*Oporornis agilis*	ESRD - Secure 83
^	Western Wood Pewee	*Contopus sordidulus*	ESRD - Sensitive 83
v	Blackpoll Warbler	*Dendroica striata*	ESRD - Secure 82
v	Black-throated Green Warbler	*Dendroica virens*	ESRD - Sensitive | AB ESCC 2010 - Species of Special Concern 81
v	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	ESRD - Secure 79
^	Alder Flycatcher	*Empidonax alnorum*	ESRD - Secure 78
v	Palm Warbler	*Dendroica palmarum*	ESRD - Secure 70
^	Yellow Warbler	*Dendroica petechia*	ESRD - Secure 66
^	Bank Swallow	*Riparia riparia*	ESRD - Secure 54
^	House Wren	*Troglodytes aedon*	ESRD - Secure 51
^	Clay-colored Sparrow	*Spizella pallida*	ESRD - Secure 45
^	Barn Swallow	*Hirundo rustica*	ESRD - Sensitive 21 % Intactness

‡ Threat categories for neo-tropical migrants as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and sub-species identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed under Canada's Species At Risk Act (SARA), recognized by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD), and/or identified by Alberta's Endangered Species Conservation Committee (AB ESCC 2010).

SPECIES

OLD-FOREST AND FOREST INTERIOR SPECIALISTS

Old forests are often caught at the interface between economic and ecological sustainability. Timber from these forests provides the raw materials needed for manufacturing. At the same time, they provide habitat for many landbirds in Alberta. There are a number of landbirds that depend on old forests to meet their requirements for nesting and foraging. These old-forest specialists respond to changes in the amount and configuration of old forest in the landscape. Within a forest stand, they respond to changes in forest age, composition, and habitat structure. For this reason, old-forest specialists are often highlighted as tracking ecological sustainability for this forest type.

Similar to old-forest specialists, several landbird species assessed in this report can also be categorized as forest interior specialists. These species prefer large, contiguous tracts of mature to old forests to meet their breeding and foraging requirements. Habitat quality for forest interior specialists is determined by a number of characteristics of the forest stand, such as its size, amount of forest edge, and amount of forest in the surrounding landscape. Forest fragmentation, the process of subdividing contiguous tracts of forest into smaller, more isolated patches, impacts forest interior specialists directly through the loss of habitat. There may also be indirect effects to their populations, such as reduced reproductive success or increased predation risk. Forest fragmentation is an important management issue in the BPE where the combined activities of the agriculture, forestry, and energy sectors are subdividing previously contiguous boreal forest.

Several old-forest specialists are also considered forest interior specialists, including three species listed as Sensitive by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD): Black-throated Green Warbler, Brown Creeper, and Western Tanager.

THE ABMI ASSESSED THE STATUS OF 13 OLD-FOREST LANDBIRDS IN ALBERTA'S BPE AND FOUND THEM TO BE 87% INTACT.

Old-forest landbirds were each less abundant than would be expected if there were no human footprint—ranging from 99% to 74% intact (Table 04).

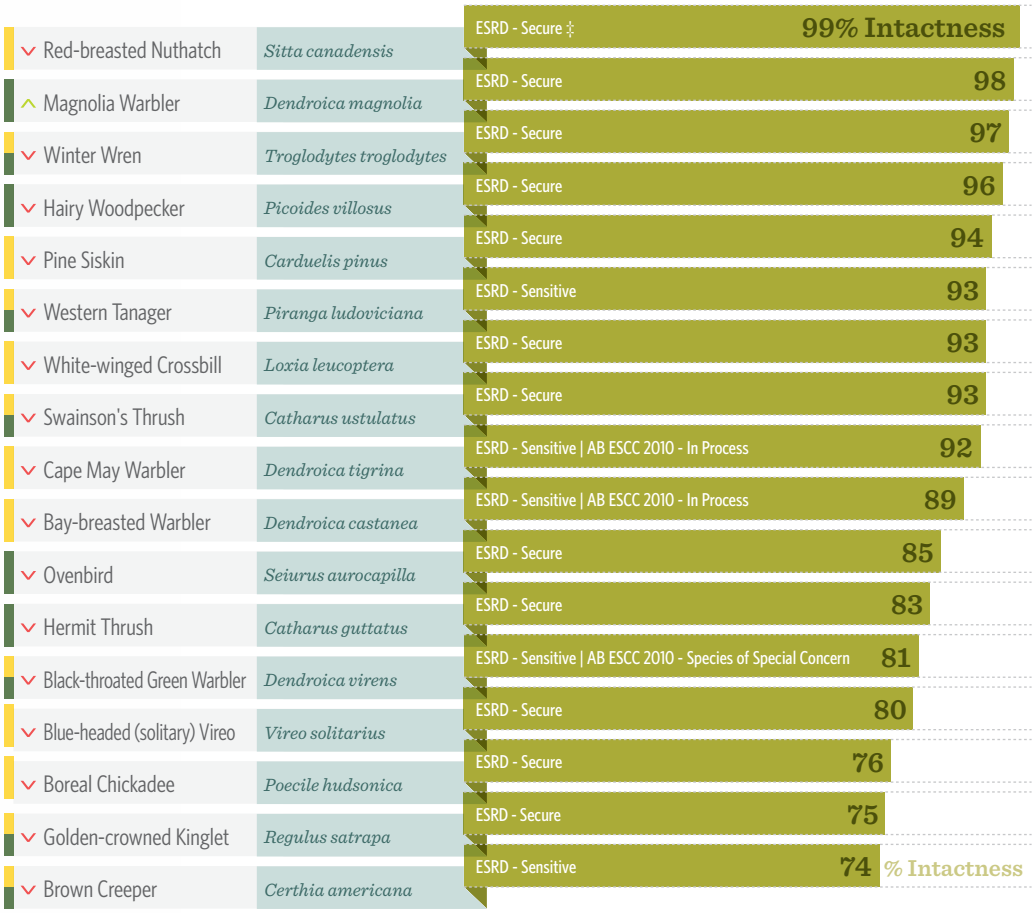
THE ABMI ASSESSED THE STATUS OF 10 FOREST INTERIOR LANDBIRDS IN ALBERTA'S BPE AND FOUND THEM TO BE 88% INTACT.

At 98% intactnesss, the Magnolia Warbler was the only species that was more abundant than would be expected if there was no human footprint. The remaining forest interior landbirds were all less abundant than expected—ranging from 97% to 74% intact (Table 04).

TABLE 04 THE INTACTNESS OF 17 OLD-FOREST AND/OR FOREST INTERIOR SPECIALISTS IN THE BPE. SPECIES ARE RANKED FROM HIGH TO LOW INTACTNESS.

Arrows indicate if the abundance of the species was above ^ or below v intact reference conditions.

Old-forest Specialist ● Forest Interior Specialist ●



‡ Threat categories for old-forest and forest interior specialists as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and sub-species identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed under Canada's Species at Risk Act (SARA), recognized by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD), and/or identified by Alberta's Endangered Species Conservation Committee (AB ESCC 2010).

OF THE OLD-FOREST AND FOREST INTERIOR SPECIALISTS, THE BROWN CREEPER, AT 74% INTACT, DIFFERED MOST FROM WHAT WE EXPECTED TO FIND UNDER INTACT CONDITIONS. THE BROWN CREEPER NESTS UNDER THE PEELING BARK OF DEAD AND DYING TREES AND PREFERS TO FORAGE ON LARGE DIAMETER CONIFER TREES.[5]

SPECIES

WINTER RESIDENTS

Winter resident landbirds make their home in the boreal forest year-round (as opposed to migrating south for the winter). While these species are broadly distributed across the boreal forest, the severe winter weather in the BPE makes life challenging and results in lower overall population densities relative to migratory species. Due to harsh winter conditions, these species may be even more selective about where they live in the winter than at other times of the year. Many winter residents are reliant on older forests for roosting (availability of suitable cavity trees), foraging (dead and decaying wood), and thermal cover.

The availability of these important resources may be critical factors determining their overwinter survival. Winter residents may be particularly sensitive to landscape changes because of their lower abundance and winter habitat requirements.[6]

The ABMI surveys winter residents during the spring breeding season; we are not directly monitoring these birds during the winter season.

THE ABMI ASSESSED THE STATUS OF 12 WINTER RESIDENT LANDBIRDS IN ALBERTA'S BPE AND FOUND THEM TO BE 89% INTACT.

The three species that deviated most from what we expected to find were the Boreal Chickadee (76% intact), Brown Creeper (74% intact), and Ruffed Grouse (72% intact); these species were all less abundant than expected (Table 05).

BOREAL CHICKADEE

TABLE 05 THE INTACTNESS OF 12 WINTER RESIDENT LANDBIRDS IN ALBERTA'S BPE. SPECIES ARE RANKED FROM HIGH TO LOW INTACTNESS.

Arrows indicate if the abundance of the species was above ^ or below v intact reference conditions.

	Blue Jay	*Cyanocitta cristata*	ESRD - Secure ‡ 100% Intactness
^	Pileated Woodpecker	*Dryocopus pileatus*	ESRD - Secure 99
v	Red-breasted Nuthatch	*Sitta canadensis*	ESRD - Secure 99
^	Black-capped Chickadee	*Poecile atricapillus*	ESRD - Secure 99
^	Common Raven	*Corvus corax*	ESRD - Secure 98
v	Hairy Woodpecker	*Picoides villosus*	ESRD - Secure 96
v	White-winged Crossbill	*Loxia leucoptera*	ESRD - Secure 93
v	Gray Jay	*Perisoreus canadensis*	ESRD - Secure 84
v	Evening Grosbeak	*Coccothraustes vespertinus*	ESRD - Secure 81
v	Boreal Chickadee	*Poecile hudsonica*	ESRD - Secure 76
v	Brown Creeper	*Certhia americana*	ESRD - Secure 74
v	Ruffed Grouse	*Bonasa umbellus*	ESRD - Secure 72 % Intactness

‡ Threat categories for winter residents as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and sub-species identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed under Canada's Species at Risk Act (SARA), recognized by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD), and/or identified by Alberta's Endangered Species Conservation Committee (AB ESCC 2010).

SPECIES AT RISK

The health of biodiversity in a region includes an assessment of species that are naturally rare or that have demonstrated a significant decline in abundance. These rare species are generally referred to as "species at risk" because future declines in abundance may result in the loss of the species from a region.

THE ABMI ASSESSED THE STATUS OF 14 LANDBIRD SPECIES CONSIDERED AT RISK IN ALBERTA'S BPE AND FOUND THEM TO BE, ON AVERAGE, 84% INTACT.

Of the species assessed by the ABMI, the Barn Swallow, at 21% intact, differed the most from what we expected to find under intact reference conditions (Table 06). It was six times more abundant than we expected to find if there was no human footprint in the BPE. The Barn Swallow has experienced declines across parts of Canada over the past 30 years and was listed as Threatened by COSEWIC in 2011.[7] Causes of the declines are unknown.

The Barn Swallow is considered a habitat generalist. It nests in or on artificial structures like barns, bridges, and road culverts. This species takes advantage of foraging opportunities in open, human-modified landscapes.[7] In the BPE, barn swallows were more abundant in areas with agriculture and urban/residential development and they were virtually absent in areas without any human footprint. Human footprint in the BPE may be creating suitable habitat for the Barn Swallow.

The majority of landbird species at risk are migratory, including both short-distance and long-distance migrants. ABMI data can be used to inform management of these species at risk on their breeding grounds, and help to distinguish between management effects on their breeding grounds as opposed to their wintering grounds.

TABLE 06 THE INTACTNESS OF 14 LANDBIRD SPECIES AT RISK IN ALBERTA'S BPE. SPECIES ARE RANKED FROM HIGH TO LOW INTACTNESS.

Arrows indicate if the abundance of the species was above ^ or below v intact reference conditions.

	Least Flycatcher	*Empidonax minimus*	ESRD - Sensitive ‡ 100% Intactness
	Canada Warbler	*Wilsonia canadensis*	ESRD - Sensitive | COSEWIC - Threatened | SARA - Threatened 100
^	Yellow-bellied Flycatcher	*Empidonax flaviventris*	ESRD - Undetermined 99
^	Pileated Woodpecker	*Dryocopus pileatus*	ESRD - Sensitive 99
^	Common Yellowthroat	*Geothlypis trichas*	ESRD - Sensitive 95
v	Western Tanager	*Piranga ludoviciana*	ESRD - Sensitive 93
v	Cape May Warbler	*Dendroica tigrina*	ESRD - Sensitive | AB ESCC 2010 - In Process 92
v	Olive-sided Flycatcher	*Contopus cooperi*	ESRD - May Be at Risk | COSEWIC - Threatened | SARA - Threatened 91
v	Bay-breasted Warbler	*Dendroica castanea*	ESRD - Sensitive | AB ESCC 2010 - In Process 89
^	Western Wood Pewee	*Contopus sordidulus*	ESRD - Sensitive 83
v	Black-throated Green Warbler	*Dendroica virens*	ESRD - Sensitive | AB ESCC 2010 - Species of Special Concern 81
v	Brown Creeper	*Certhia americana*	ESRD - Sensitive 74
v	Rusty Blackbird	*Euphagus carolinus*	ESRD - Sensitive | COSEWIC & SARA - Special Concern 61
^	Barn Swallow	*Hirundo rustica*	ESRD - Sensitive 21 % Intactness

‡ Threat categories for species at risk as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and sub-species identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed under Canada's Species at Risk Act (SARA), recognized by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD), and/or identified by Alberta's Endangered Species Conservation Committee (AB ESCC 2010).

THE BARN SWALLOW, AT 21% INTACT, DIFFERED THE MOST FROM WHAT WE EXPECTED TO FIND UNDER INTACT REFERENCE CONDITIONS. IT WAS SIX TIMES MORE ABUNDANT THAN WE EXPECTED TO FIND IF THERE WAS NO HUMAN FOOTPRINT IN ALBERTA'S BPE.

HUMAN-ASSOCIATED SPECIES

Human activities modify natural environments, impacting many species including landbirds. How a species responds to these changes depends on its ability to adapt to new environmental conditions. Human-associated landbirds are those species that are not only adapted to humans but also may benefit from our land use activities. These species do well in landscapes where there is widespread human activity, such as agriculture, forestry, and urbanization. Knowledge of the status and trends in human-associated landbirds enables us to understand and predict the impact of human activities on native birds in the BPE's changing landscape.

THE ABMI ASSESSED THE STATUS OF 18 HUMAN-ASSOCIATED LANDBIRDS IN ALBERTA'S BPE AND FOUND THEM TO BE, ON AVERAGE, 62% INTACT.

Of these species, two were 100% intact (Table 07). The remaining species were more abundant than expected. Five species were at least two times more abundant than expected: American Crow, Barn Swallow, Black-billed Magpie, Savannah Sparrow, and Song Sparrow.

BLUE JAY

TABLE 07 THE INTACTNESS OF 17 HUMAN-ASSOCIATED LANDBIRD SPECIES IN ALBERTA'S BPE. SPECIES ARE RANKED FROM HIGH TO LOW INTACTNESS.

Arrows indicate if the abundance of the species was above ^ or below v intact reference conditions.

	Blue Jay	*Cyanocitta cristata*	ESRD - Secure ‡ 100% Intactness
	Cedar Waxwing	*Bombycilla cedrorum*	ESRD - Secure 100
^	Brewer's Blackbird	*Euphagus cyanocephalus*	ESRD - Secure 99
^	Black-capped Chickadee	*Poecile atricapillus*	ESRD - Secure 99
^	Tree Swallow	*Tachycineta bicolor*	ESRD - Secure 96
^	Brown-headed Cowbird	*Molothrus ater*	ESRD - Secure 91
^	Warbling Vireo	*Vireo gilvus*	ESRD - Secure 84
^	American Robin	*Turdus migratorius*	ESRD - Secure 71
^	Yellow Warbler	*Dendroica petechia*	ESRD - Secure 66
^	European Starling	*Sturnus vulgaris*	ESRD - Secure 65
^	Bank Swallow	*Riparia riparia*	ESRD - Secure 54
^	Red-winged Blackbird	*Agelaius phoeniceus*	ESRD - Secure 53
^	House Wren	*Troglodytes aedon*	ESRD - Secure 51
^	American Crow	*Corvus brachyrhynchos*	ESRD - Secure 26
^	Barn Swallow	*Hirundo rustica*	ESRD - Sensitive | COSEWIC - Threatened 21
^	Black-billed Magpie	*Pica hudsonia*	ESRD - Secure 18
^	Savannah Sparrow	*Passerculus sandwichensis*	ESRD - Secure 14
^	Song Sparrow	*Melospiza melodia*	ESRD - Secure 14 % Intactness

‡ Threat categories for human-associated landbirds as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and sub-species identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed under Canada's Species at Risk Act (SARA), recognized by Alberta's Ministry of Environment and Sustainable Resource Development (ESRD), and/or identified by Alberta's Endangered Species Conservation Committee (AB ESCC 2010).

PROTECTED AREAS

Habitat is fundamental to maintaining healthy ecosystems and is also the component of biodiversity where most industrial planning and management occurs—humans most often manage habitat. Representation of different habitat types in an undeveloped state (e.g., protected areas) is a commonly used "coarse filter" tool for managing regional biodiversity. Protected areas help to maintain the thousands of species that are too poorly known to manage on an individual basis, and they provide a safeguard against mistakes in maintaining better-known species in the managed land base. The ABMI used geographic information system (GIS) analyses to summarize the percentage of ecoregions in Alberta's BPE that are managed as protected areas.

Overall, 11.3% of the BPE in Alberta is managed as protected areas (Table 08; Figure 07). That percentage is not evenly distributed across ecoregions. Of the 11.3% managed as protected areas, approximately two-thirds (63%) is located in the Slave River Lowland Ecoregion. The Slave River Lowland Ecoregion largely overlaps Wood Buffalo National Park, one of the world's largest national parks (44,807 km^2), and a UNESCO world heritage site.

Alberta holds greater than 90% of the responsibility for three ecoregions: Wabasca Lowland, Western Boreal, and Western Alberta Upland. Respectively, 6%, 0.3%, and 1% of these ecoregions are managed as protected areas.

The ABMI's definition of protected areas in the BPE includes Alberta's parks and protected areas network, national parks, and National Wildlife Areas. This protected areas analysis includes the Birch River Conservation Area which is classified as a Public Land-use Conservation Area within the Lower Athabasca Regional Plan 2012–22. Unlike other protected areas, resource management plans for the Birch River Conservation Area may allow for forest harvesting.

OVERALL, 11.3% OF THE BPE IN ALBERTA IS MANAGED AS PROTECTED AREAS.

TABLE 08 AMOUNT AND DISTRIBUTION OF PROTECTED AREAS IN ALBERTA'S PORTION OF THE BPE ECOREGIONS.

	Provincial Responsibility (Percentage of Entire Ecoregion Located in Alberta's Portion of the BPE)	Percentage of Ecoregion Managed as a Protected Area	Total Human Footprint by Ecoregion (%)
Boreal Transition	43	1	54
Clear Hills Upland	52	3	7
Mid-Boreal Uplands	43	12	7
Peace Lowland	86	2	37
Slave River Lowland	68	78	1
Wabasca Lowland	100	6	5
Western Alberta Upland	90	1	47
Western Boreal	97	0.3	23
Alberta's Boreal Plains Ecozone	54	11.3	21

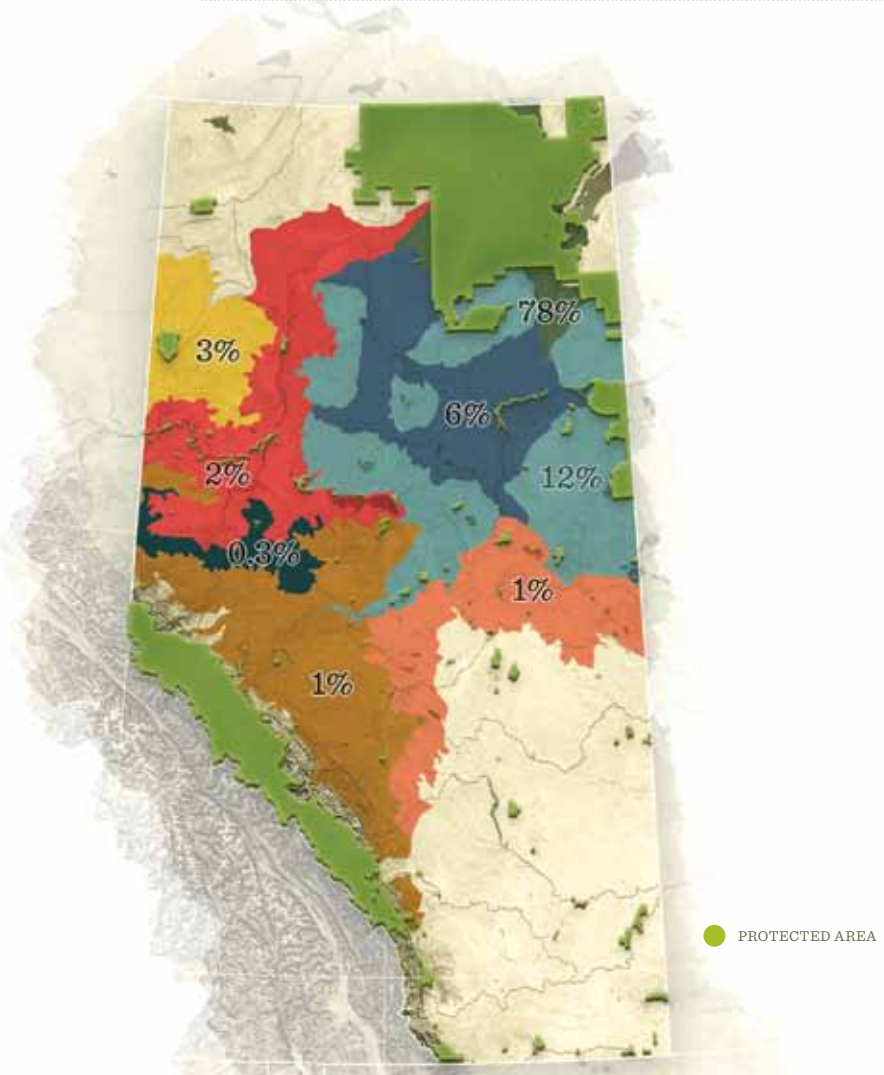


FIGURE 07 PERCENTAGE OF ECOREGION MANAGED AS A PROTECTED AREA.

HABITAT ELEMENTS

Resource managers do not often manage for individual species but instead manage habitat. There are several key habitat elements that are important to many landbird species, including large trees, snags, and downed woody material. These habitat elements are generally more abundant in older forests, providing nesting, roosting, and foraging sites for landbirds.

Several landbirds we assessed show positive relationships to high densities of large trees and snags and are known to be sensitive to a reduction in these habitat elements (e.g., Brown Creeper, Pileated Woodpecker).[5, 8] These elements can be challenging to maintain in landscapes managed for the production of fibre, energy, or agricultural commodities.

THROUGH THE USE OF GROUND-BASED SAMPLING, THE ABMI ASSESSED THE STATUS OF LIVING TREES AND SNAGS IN ALBERTA'S BPE AND FOUND THEM TO BE 73% INTACT.

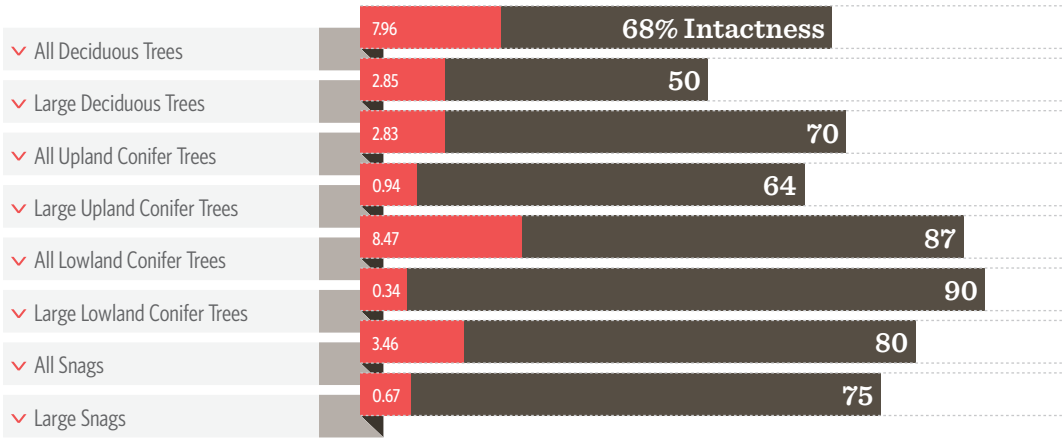
All categories of living trees and snags were below what we expected to find under intact reference conditions (Table 09). Across the BPE in Alberta, large deciduous and large upland conifer trees differed the most from what we expected; they were 50% less abundant and 36% less abundant than expected, respectively.

HAIRY WOODPECKER

TABLE 09 THE INTACTNESS AND BASAL AREA OF TREES AND SNAGS IN ALBERTA'S BOREAL PLAINS ECOZONE.

Arrows indicate if the abundance of the attribute was above ^ or below v intact reference conditions.

● The red portion of the bar shows the average basal area (m^2/ha)



Natural disturbances such as fire and wind create a continual supply of fallen trees. Some landbirds, particularly woodpeckers, forage for insects on downed woody material.[9] A few landbirds may also use fallen trees as display or lookout posts. For example, the Ruffed Grouse uses downed wood as part of their mating ritual as males drum from logs to attract females.[10]

THROUGH THE USE OF GROUND-BASED SAMPLING, THE ABMI ASSESSED THE STATUS OF DOWNED WOODY MATERIAL IN ALBERTA'S BPE AND FOUND IT TO BE 93% INTACT (FIGURE 08).

FIGURE 08 THE INTACTNESS AND VOLUME OF DOWNED WOODY MATERIAL IN ALBERTA'S BOREAL PLAINS ECOZONE.

v ALL DOWNED WOODY MATERIAL
Average of 42.1 m^3/ha

^ LARGE DOWNED WOODY MATERIAL
Average of 11.8 m^3/ha

SPOTLIGHT

OIL SANDS REGION

The BPE encompasses approximately 90% of Alberta's oil sands region as defined in the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring (JCA oil sands region; Figure 09). The JCA oil sands region largely overlaps the eastern half of the ecozone in Alberta, and covering an area of 149,000 km^2, is considered one of the largest hydrocarbon deposits in the world. Oil sands development has been the focal point of the economy in the boreal region and continues to grow.

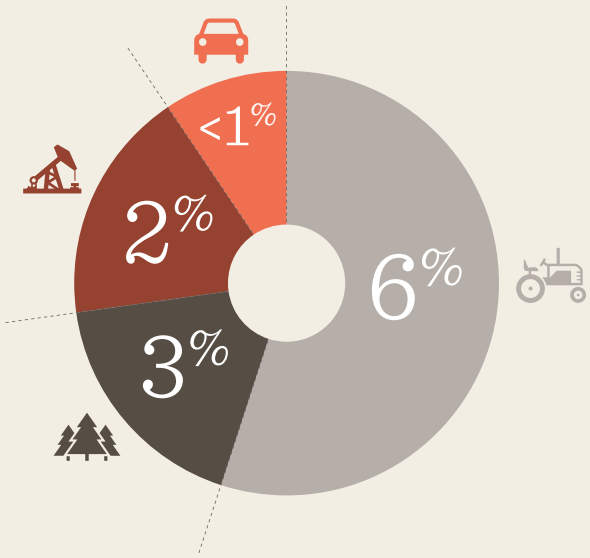
The ABMI monitors the status of human footprint, species, and habitat in the oil sands region. This information is important to support the sustainable development of this economically and socially important region.

FIGURE 09 ALBERTA'S OIL SANDS REGION AS DEFINED IN THE JOINT CANADA-ALBERTA IMPLEMENTATION PLAN FOR OIL SANDS MONITORING

Human Footprint

The total human footprint of the JCA oil sands region is 12% and is composed of: 6% cultivation; 3% forest harvesting; 2% residential, commercial, and energy infrastructure; and <1% transportation infrastructure (Figure 10).

FIGURE 10 THE PERCENTAGE OF HUMAN FOOTPRINT IN THE JCA OIL SANDS REGION



Landbird Intactness

THE ABMI ASSESSED THE STATUS OF 74 COMMON LANDBIRDS IN THE JCA OIL SANDS REGION AND FOUND THEM TO BE, ON AVERAGE, 85% INTACT.

The average intactness values for each of the six landbird guilds were all slightly higher in the oil sands region than for Alberta's BPE as a whole (Table 10).

TABLE 10 THE INTACTNESS OF ALL LANDBIRDS AND SIX LANDBIRD GUILDS IN THE OIL SANDS AREA AND ALBERTA'S BPE

	Number of Species	
Neotropical Migrants	31	84% Intactness in BPE 88% Intactness in Oil Sands
Old-forest Specialists	13	87 92
Forest interior Specialists	10	88 92
Winter Residents	12	89 94
Species at Risk	14	84 89
Human-associated	18	62 69
All Landbirds‡	74	80% Average Intactness in BPE 85% Average Intactness in Oil Sands

‡ Intactness for all landbirds is calculated as the average intactness of all 74 landbirds assessed as opposed to the average of landbird guilds. The ABMI defines "human footprint" as "the visible conversion of native ecosystems by humans to support temporary or permanent residential, recreational, or industrial land use."

SPOTLIGHT

OLIVE-SIDED FLYCATCHER

IN AN EFFORT TO BETTER UNDERSTAND THE DETAILED STATUS OF THE OLIVE-SIDED FLYCATCHER AND OTHER INDIVIDUAL BIRD SPECIES IN ALBERTA, THE ABMI HAS PARTNERED WITH THE BOREAL AVIAN MODELLING (BAM) PROJECT, AND THE NORTH AMERICAN BREEDING BIRD SURVEY (BBS). THROUGH THIS PARTNERSHIP, WE AIM TO DEVELOP A DEEPER UNDERSTANDING OF HOW THE MANAGEMENT OF WILDLIFE HABITAT AND HUMAN FOOTPRINT AFFECT BIRDS IN THE BOREAL FORESTS OF ALBERTA.

The BAM Project was created to collate existing point-count data from across boreal North America and develop the best predictive bird-habitat models. These models are designed to inform boreal bird habitat associations, the status of boreal bird populations, and causal mechanisms behind bird population changes across North America's boreal forest. At the heart of this program is a boreal-wide dataset compiled from academia, government, non-government organizations, and the private sector. The BAM Project seeks to provide the most current and comprehensive understanding possible about boreal birds to proactively support biodiversity management and conservation in the boreal forest (www.borealbirds.ca).

The BBS, established in 1966, is a volunteer-based avian survey designed to monitor long-term changes in breeding bird populations throughout North America. The BBS is cooperatively led by the US Geological Survey and Environment Canada. All data are freely available from the BBS website (https://www.pwrc.usgs.gov/BBS/) and are used in a variety of ways to support bird conservation.

Combined, the ABMI, BAM, and BBS form an impressive dataset, which included 19,659 point-count locations in Alberta at the time of our analysis. This supplemental analysis focuses on our results for the Olive-sided Flycatcher. Similar assessments are being done for the other landbirds identified in this report.

OLIVE-SIDED FLYCATCHER

The Olive-sided Flycatcher is a neotropical migrant provincially listed as May Be at Risk by Alberta ESRD, and federally listed as Threatened under Schedule 1 of Canada's Species at Risk Act. The Olive-sided Flycatcher's preferred breeding habitat is generally viewed to be coniferous forest edges close to natural openings such as rivers, wetlands, and young burns. In the boreal forest, wooded riparian areas are thought to be used for breeding. The Olive-sided Flycatcher can be found at the edges of young post-harvest stands, especially if there are residual trees and snags remaining. As the Olive-sided Flycatcher feeds almost exclusively on flying insects, nesting territories are characterized by trees and snags, which provide perching and singing posts.

THE COMPILED DATA SETS OF THE ABMI, BAM, AND BBS INCLUDED 19,659 POINT-COUNT LOCATIONS. THE OLIVE-SIDED FLYCATCHER WAS DETECTED AT 541 OR 2.8% OF SURVEYED LOCATIONS.

Habitat Associations

General habitat associations of the Olive-sided Flycatcher in Alberta corresponded well with existing knowledge of the species' natural history. Olive-sided Flycatcher relative abundance (now referred to as abundance) was highest in shrubby habitats and along the margins of wetlands and open water (Figure 11).

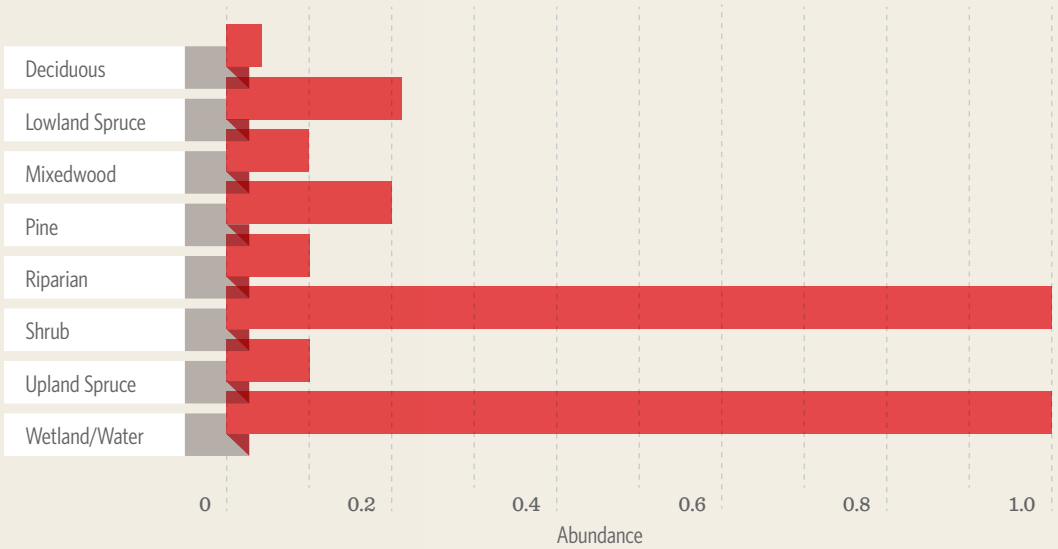


FIGURE 11 ABUNDANCE OF OLIVE-SIDED FLYCATCHER IN EIGHT MAJOR HABITAT TYPES. ABUNDANCE WAS MEASURED AS NUMBER OF INDIVIDUALS PER HECTARE STANDARDIZED TO A SCALE OF 0 TO 1. DATA SOURCE: ABMI, BAM, BBS, ALBERTA VEGETATION INVENTORY, GRASSLAND VEGETATION INVENTORY, AND ABMI'S PROVINCIAL HUMAN FOOTPRINT INVENTORY VERSION 2007

OLIVE-SIDED FLYCATCHER

(CONTINUED)

Olive-sided Flycatcher abundance was highest in young pine and upland spruce forest, followed by young mixedwood and deciduous stands; abundance generally declined with forest age (Figure 12). Olive-sided Flycatcher abundance was consistently low in lowland spruce forests, regardless of stand age.

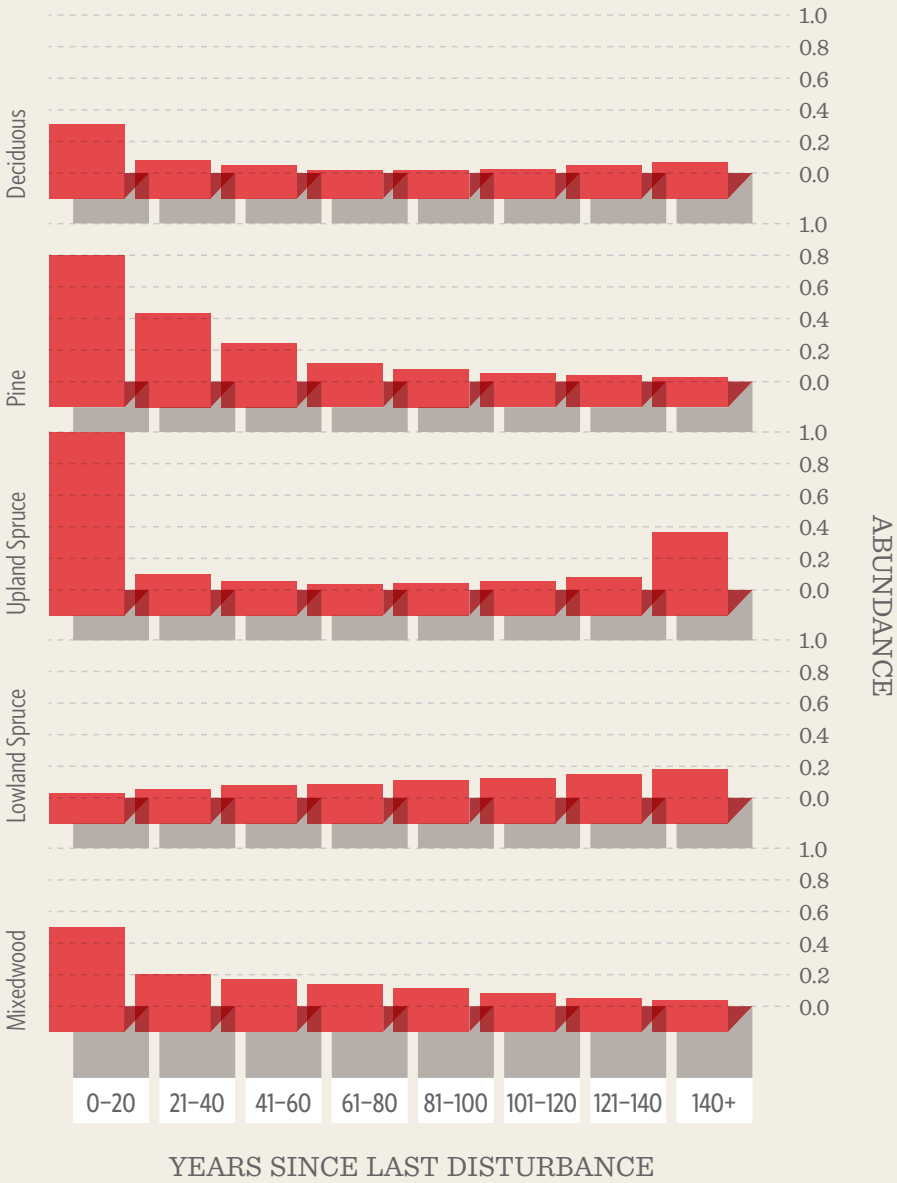


FIGURE 12 ABUNDANCE OF OLIVE-SIDED FLYCATCHER BY FOREST TYPE AND AGE. ABUNDANCE WAS MEASURED AS NUMBER OF INDIVIDUALS PER HECTARE STANDARDIZED TO A SCALE OF 0 TO 1. DATA SOURCE: ABMI, BAM, BBS, ALBERTA VEGETATION INVENTORY, GRASSLAND VEGETATION INVENTORY, AND ABMI'S PROVINCIAL HUMAN FOOTPRINT INVENTORY VERSION 2007

Relationship to Human Footprint

Abundance of Olive-sided Flycatcher decreased with increasing amount of agricultural cultivation (annual crop and tame pasture) and with increasing urban and industrial footprint. Olive-sided Flycatcher abundance peaked in landscapes with intermediate levels of forestry footprint (Figure 13).

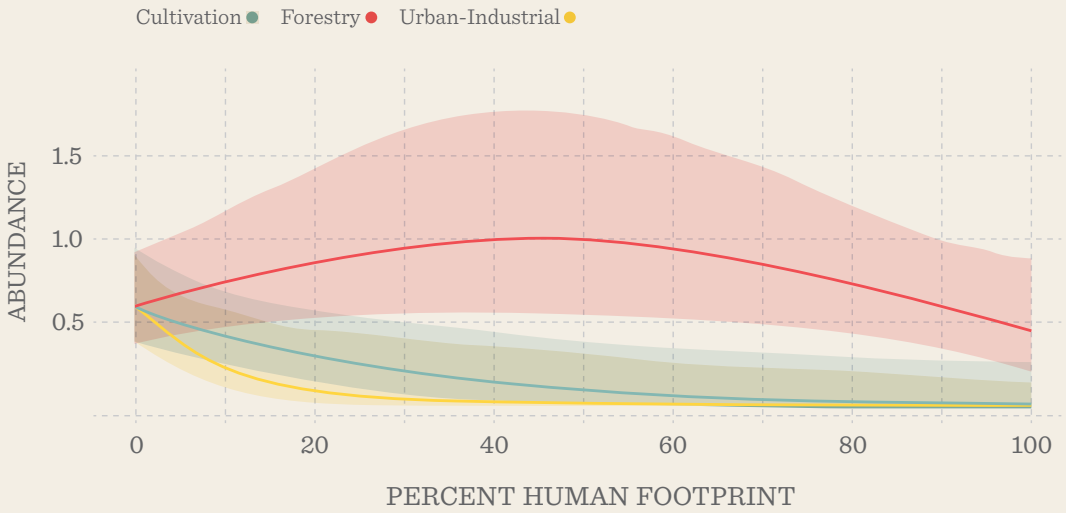
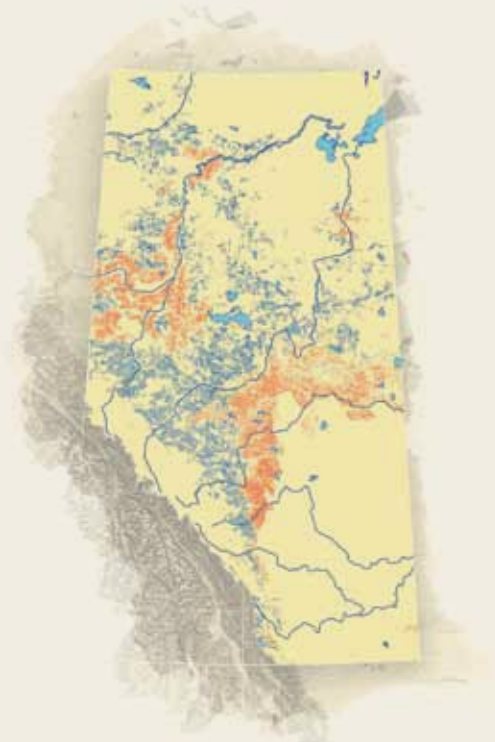


FIGURE 13 ABUNDANCE OF OLIVE-SIDED FLYCATCHER AS A FUNCTION OF PERCENT HUMAN FOOTPRINT. ABUNDANCE WAS MEASURED AS NUMBER OF INDIVIDUALS PER HECTARE STANDARDIZED TO A SCALE OF 0 TO 1. SHADED AREAS REPRESENT 90% CONFIDENCE INTERVALS. DATA SOURCE: ABMI, ABMI'S PROVINCIAL HUMAN FOOTPRINT/HABITAT INVENTORY VERSION (2007) CLIPPED TO 150 M RADIUS CIRCLES AROUND EACH POINT-COUNT.



Mapping Habitat Suitability of Olive-sided Flycatcher

Using the above statistical relationships between human footprint, habitat, and Olive-sided Flycatchers, it is possible to create maps that empirically predict the habitat suitability of this species in every quarter section of the province (Figure 14). Provincially, Olive-sided Flycatcher habitat suitability was predicted to be lowest in regions where agriculture, urbanization, and energy-related footprint are highest. Higher habitat suitability was predicted in areas with intermediate levels of forestry footprint.

INCREASE

NO CHANGE

DECREASE

FIGURE 14 DIFFERENCE BETWEEN REFERENCE CONDITIONS AND CURRENT HABITAT SUITABILITY FOR OLIVE-SIDED FLYCATCHER IN ALBERTA (CIRCA 2007). DATA SOURCE: ABMI FIELD DATA AND ABMI'S PROVINCIAL HUMAN FOOTPRINT/HABITAT INVENTORY VERSION (2007). THE MAP IS MADE TO A SCALE OF PROVINCIAL QUARTER SECTIONS (ALBERTA TOWNSHIP SYSTEM).

GENERAL TERMS

Limitations

The ABMI is designed primarily as a proactive tool used to identify the status, trends, and correlative relationships among common species, habitats, and human footprint. The status and trends in rare and endangered species and habitats are not yet directly evaluated by the ABMI monitoring program. There are many existing provincial and national systems specifically designed to measure rare and endangered species and habitats.

The ABMI indices are based on the establishment of current, intact reference conditions that are statistical predictions designed to account for human footprint. These reference conditions and subsequent ABMI analyses and reporting do not account for historical changes in a species' overall abundance (i.e., the ABMI cannot account for any change in a species that occurred before 2003).

ABMI reference conditions have statistical uncertainty for individual species. This uncertainty will decrease as the ABMI surveys more sites in Alberta's BPE.

Looking Forward

The ABMI has made considerable strides in supporting biodiversity management in Alberta; however, we are just beginning. The ABMI continues to build momentum and is committed to:

1. Ensuring the effective delivery of relevant, timely, and scientifically rigorous biodiversity information
2. Improving biodiversity management by contributing critical knowledge to decision-making systems
3. Supporting governments and industries in meeting their domestic and international reporting obligations
4. Eliminating duplication and redundancy in provincial biodiversity monitoring
5. Facilitating the seamless transfer of information to government, industry, the research community, and the public

The legacy created through the development of the ABMI is truly enormous. We are committed to continued excellence in biodiversity monitoring.

Scientific Integrity

The ABMI is committed to the responsible analysis and interpretation of data. The ABMI holds itself to the highest ethical standards, including operational transparency, honesty, conscientiousness, and integrity. The ABMI strongly encourages the responsible and ethical evaluation and interpretation of the knowledge contained in this report. For a complete discussion of the ethical behaviour endorsed by the ABMI, please see Honor in Science, published by Sigma Xi (1997), available at http://www.sigmaxi.org/programs/ethics/Honor-in-Science.pdf. A broader discussion about the use of ABMI data and information can be found in Scope and Application of the ABMI's Data and Information (00048), Version 2008-01-04, Alberta Biodiversity Monitoring Institute, Alberta, Canada.

This report is also available at www.abmi.ca under "Reports/Core Reports."

Disclosure

Data used in the preparation of this report is available on the ABMI's website and includes species, habitat, and remotely sensed data collected between 2003 and 2011.

The scientific methods used in analyses of data for this report are described in the following documents:

1. Alberta Biodiversity Monitoring Institute. 2011. Manual for Estimating Species and Habitat Structure Intactness (20029), Version 2011-07-07. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at www.abmi.ca under "Reports/Intactness Analyses."

2. Alberta Biodiversity Monitoring Institute. 2012. Manual for Reporting Human Footprint (20030), Version 2012-03-26. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at www.abmi.ca under "Reports/Standards and Protocols/Landscape Mapping Protocols."

Principal authors of this report included Katherine Maxcy, Jim Herbers, and Sonya Poller. Joan Fang, David Huggard, Daiyuan Pan, and Péter Sólymos analysed and helped to interpret the data. Jim Schieck and Erin Bayne provided technical and editorial insight. Special thanks to the Boreal Avian Modelling Project, the North American Breeding Bird Survey, and Greg Brooke.

GENERAL TERMS
(CONTINUED)

Terms and Conditions of Report Preparation

The ABMI is responsible for initiating and resourcing the creation of this report. The following terms were applied as a condition of the ABMI preparing this report:

1. The ABMI reports on a standardized list of biodiversity indicators that are relevant to regional planning, policy, and management. Developed by the ABMI, these indicators will be consistently applied.
2. The ABMI maintains full control over all language and messaging in this report.
3. This landbird status report encompasses Alberta's portion of the BPE and cannot be localized to smaller landscapes within the BPE unless already specified in this report.
4. This biodiversity status report uses data collected between 2003 and 2011.
5. The report was released publicly in a timely manner.

Image Credits

Norman Bateman/Chris Kolaczan/Wayne Lynch/ Martha Marks/Royal Alberta Museum

The Alberta Biodiversity Monitoring Institute 2012. The Status of Landbirds in Alberta's Boreal Plains Ecozone: Preliminary Assessment. Version 2011-12. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at www.abmi.ca. Published in September 2012.

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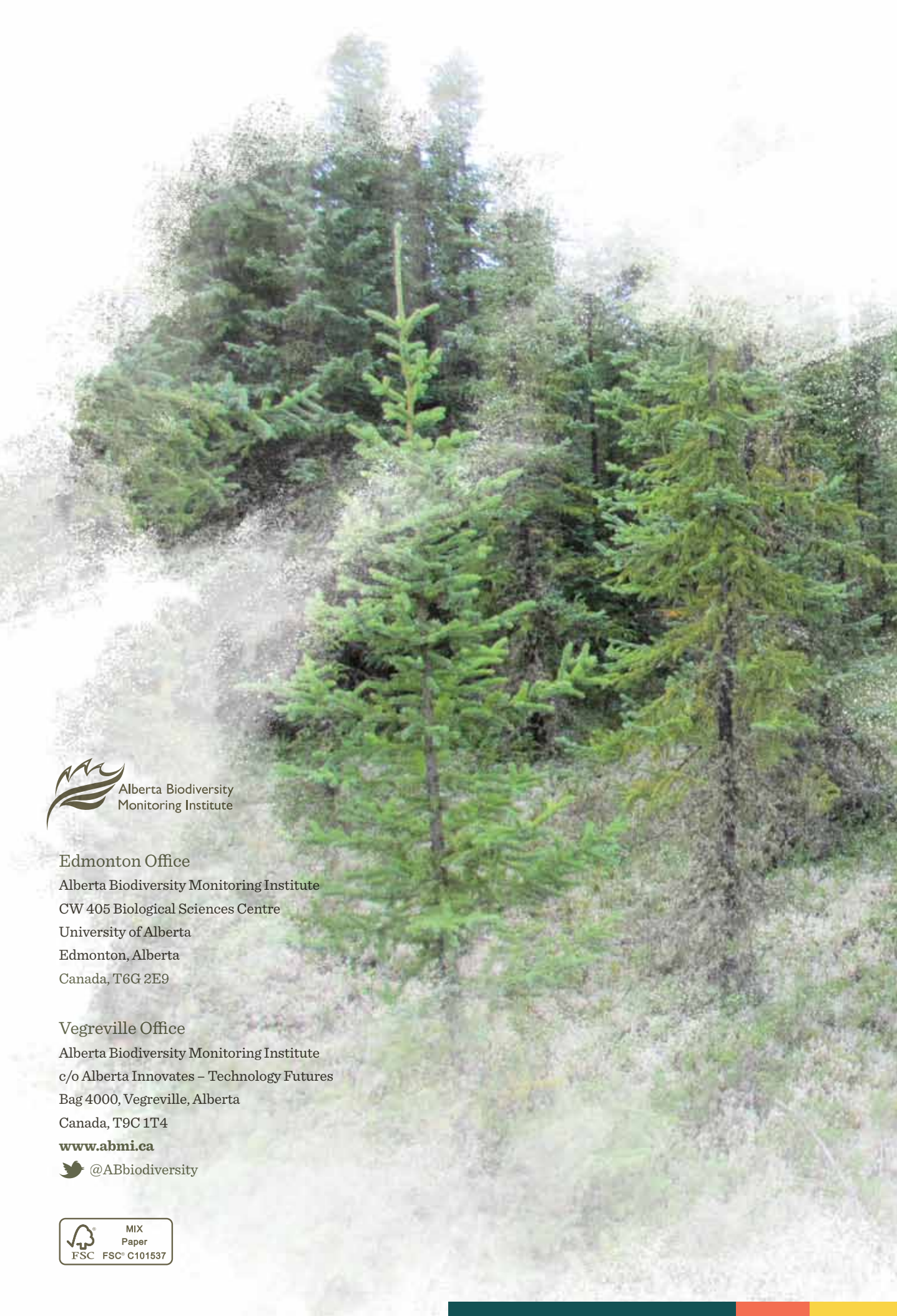
In 2012, the ABMI logged over 1450 bird recordings (10 minute point-counts).



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