Amendment to the final Recovery Strategy for the Sprague's Pipit (*Anthus spragueii*) in Canada

RE: Partial identification of critical habitat in Alberta and Saskatchewan and Action Planning

[PROPOSED]

2011

INTRODUCTION

The Recovery Strategy for the Sprague's Pipit (*Anthus spragueii*) in Canada (Environment Canada 2008) was posted on the Species at Risk Public Registry in May 2008.

Under Section 45 of the *Species at Risk Act* (SARA), the Minister of the Environment may amend a recovery strategy at any time.

This amendment to the Recovery Strategy for the Sprague's Pipit (*Anthus spragueii*) in Canada is for the purpose of:

- Identifying Sprague's Pipit critical habitat. Research and analysis of information gathered regarding critical habitat for Sprague's Pipit have advanced since the posting of the final Recovery Strategy for this species in 2008, allowing partial identification of critical habitat.

- Revising the Schedule of Studies to identify critical habitat as a number of studies are still required before critical habitat identification can be completed.

- Revising Environment Canada's timelines of the action planning for the Sprague's Pipit.

This amendment is being posted on the Species at Risk Public Registry for a 60-day comment period. At the time of final posting, the following text will replace sections 2.7 and 2.11 of the complete recovery strategy as well as adding Appendices 2-5 to section 5 and revising the Acknowledgments and Literature Cited sections.

2.7 CRITICAL HABITAT

Critical habitat is defined in the *Species at Risk Act* section 2(1) as "the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species".

Ideally, critical habitat would be identified based on a range-wide analysis of the amount, locations, and attributes of habitat required to meet the population and distribution objectives for the species. The identification of critical habitat for Sprague's Pipit is complicated due to 1) the species' broad distribution within Prairie Canada, 2) the paucity of information regarding occurrence and abundance of the species, and 3) the annual variation in the species' occurrence and abundance.

At this time, based on the best available information, critical habitat is partially identified for Sprague's Pipit in south-eastern Alberta and southern Saskatchewan.

The following approaches were used to partially identify critical habitat for Sprague's Pipit in Canada.

2.7.1 Approaches to Identifying Critical Habitat

The original recovery strategy outlined a number of steps and studies that needed to be undertaken before critical habitat could be identified (Environment Canada 2008). Progress has since been made on five of the items: 1) establishing a database with the abundance and location of Sprague's Pipits across Prairie Canada (Davis unpubl. data), 2) developing a protocol to identify sites as potential critical habitat, 3) developing and refining predictive models of pipit occurrence using existing data (Dale unpubl. data, Davis unpubl. data), 4) determining how response to patch size and landscape factors varies temporally and spatially (Davis unpubl. data, Fisher and Davis unpubl. data), and 5) identifying factors influencing use and reproductive success in non-native habitats (Dohms 2009, Fisher and Davis *in press*, Davis unpubl. data). Results from these studies have contributed to the identification of the three sites herein identified as containing critical habitat for Sprague's Pipit.

Sprague's Pipit occurrence and abundance data was compiled from a number of sources across Prairie Canada including government and non-government biologists, academics, and provincial data repositories (Saskatchewan and Manitoba Conservation Data Centre, Alberta Fish and Wildlife Information Management System, and Alberta Conservation Information Management System). The following criteria and approaches were used to identify sites containing critical habitat:

Approach 1: Where detailed occupancy and demographic information exists, sites (e.g., quarter-sections), or portions of sites, known to be important to pipits were identified based on persistence (singing males recorded in at least two of the past five years), density (≥ 5 singing males/100 ha), and confirmation of breeding (nests or fledged young recorded) in the past five years. While this is the preferred approach for identifying Sprague's Pipit critical habitat, data meeting these criteria were only available for two sites (see Section 2.7.2 below).

Approach 2: In the absence of detailed occupancy and demographic information, identification of critical habitat was guided by spatially explicit predictive models where sufficient and current data existed for a given area. Because the species has undergone substantial population declines and distribution shifts, only data collected within the past 10 years was used to avoid erroneously identifying historic breeding sites that are no longer suitable for Sprague's Pipits. Reliance on predictive models was necessary because surveys and observations of pipits are widely scattered and tend to sample only a small proportion of a given area. Use of predictive models is a precautionary approach that allows one to determine the potential suitability of sites which were not sampled but can reasonably be expected to be inhabited by pipits. Models were validated to ensure reasonable usefulness for identifying critical habitat. This approach was used to identify Sprague's Pipit critical habitat for one site where suitable data was available (see Section 2.7.2 below).

2.7.2 Site Selection

Information was sufficient to identify Sprague's Pipit critical habitat using approach 1 in portions of Last Mountain Lake National Wildlife Area (NWA), the adjacent Agriculture and Agri-Food Canada (AAFC) Nokomis Community Pasture, and Grasslands National Park (GNP), Saskatchewan, while approach 2 was used to identify critical habitat in Canadian Forces Base (CFB) Suffield NWA, Alberta. Further analyses and models are required to identify additional sites throughout the species range (see Table 5: Schedule of Studies to Identify Critical Habitat).

SOUTHERN SASKATCHEWAN

Last Mountain Lake NWA and AAFC Nokomis Community Pasture (Site 1)

Sprague's Pipit occurrence and abundance have been quantified at Last Mountain Lake NWA for 9 years from 1980-1997 (Dale 1983, Sutter 1994, Dale et al. 1997). More recent monitoring (2004-2009) has focused on quantifying pipit reproductive success on a number of sites at both the NWA and the adjacent Nokomis Community Pasture (Davis and Fisher 2009, Dohms 2009, Dohms and Davis 2009, Brewster 2009, Davis unpubl. data). Sprague's Pipit surveys conducted in 2007 (Strauss 2007) along the eastern and western portions of the NWA indicated that pipits were much less common than in the 1980s and 1990s. Changes in abundance and distribution appeared to be due to substantial changes in vegetation in the NWA. Therefore, locations of all territorial males and nests from 2004-2009 were plotted in a Geo-referenced Information System(GIS) to identify areas known to be used by Sprague's Pipits on the NWA and the adjacent community pasture. Portions of quarter- sections (Appendix 3) known to be used by pipits and containing suitable biophysical attributes (see Section 2.7.3 below) are identified as critical habitat.

Grasslands National Park (Site 2)

Sprague's Pipit abundance and reproductive success has been quantified within the East Block of Grassland National Park since 2007 (Lusk 2009). Surveyors recorded the locations of all singing males and nests in six study plots. These locations were plotted in a GIS to identify areas known to be used by breeding Sprague's Pipits. Portions of quarter-sections containing these locations were identified (Appendix 4) and portions containing suitable biophysical attributes (see Section 2.7.3 below) are identified as critical habitat.

ALBERTA

Canadian Forces Base Suffield NWA (Site 3)

Canadian Forces Base Suffield National Wildlife Area (CFB Suffield NWA) is a protected area under the *Canada Wildlife Act* managed by the Department of National Defense; military exercises do not occur within the NWA. Grassland bird surveys were conducted at the NWA for 12 years during the period 1994-2009 (Dale et al. 1999, Wiens et al. 2008, Dale unpubl. data). Results from these surveys indicate that Sprague's Pipits occur in the area annually and over a large portion of the NWA. However, because of the presence of anthropogenic features (e.g.

roads and natural gas infrastructure) and unsuitable habitat (e.g., shrubs, wetlands, open sand dunes) the entire area is not comprised of suitable habitat for Sprague's Pipit. Intensive surveys conducted in the area over multiple years permitted an area-specific habitat model to be developed for the Suffield NWA to facilitate the identification of areas within the NWA that are suitable for this species. The model was developed and tested using 5 years of data (2000-2004) collected from the southern block of the NWA (Appendix 2). The data were collected within a broad range of precipitation conditions (from severe drought to above normal precipitation). Two additional years of data (2005 and 2006) collected in both the southern block and northern block of the NWA (Appendix 2) were used to validate the model. The model is adapted from the methodology outlined in Wiens et al. (2008). The model was not developed for portions of CFB Suffield outside of the NWA or for other land located near the NWA at this time due to the lack of data available for model development and validation, and because land-use and habitat features in those areas are substantially different than those found in the NWA.

Results from the Suffield NWA habitat model and the extensive coverage of known locations of territorial males indicate that most areas of the south block are used by Sprague's Pipits (CWS unpubl. data). Furthermore, the model indicates that many areas within the north block also contain critical habitat. Although all habitat suitability classes (relative probabilities 0.1-1.0) were used by Sprague's Pipits in at least one of the five years, habitat suitability classes ≥0.6 had over 50% use overall suggesting that these areas are particularly important for pipits (CWS unpubl. data); this threshold (0.6) was thus used for identifying critical habitat for Sprague's Pipit in CFB Suffield NWA.

2.7.3 Location of Critical Habitat and Habitat Attributes

Critical habitat for Sprague's Pipit was partially identified to the extent possible based on best available information in 767 quarter-sections[1] at Suffield NWA in Alberta, 8 quarter-sections within Last Mountain Lake NWA, 5 quarter-sections in Nokomis Community Pasture, and 43 quarter-sections in Grassland National Park (GNP) in Saskatchewan. Quarter-sections that contain critical habitat are listed in Appendix 5 for each site.

Within the identified quarter-sections, the following biophysical attributes comprise critical habitat of Sprague's Pipit (Dale 1983, Dale et al. 1997, Davis 2004, 2005; Davis and Duncan 1999, Davis et al. 1999, 2006, unpubl. data, Dieni and Jones 2003, Madden 1996, Sutter and Brigham 1998, Sutter et al. 2000, Koper et al. 2009):

- open areas of upland native prairie ≥ 65 ha
- native prairie management units in fair to excellent range condition (Abouguendia 1990)
- limited woody vegetation
- limited invasion by exotic grasses
- flat to gently rolling topography

[1] The Dominion Land Survey system (McKercher and Wolfe 1986) is the grid system used in the Prairie Provinces to describe land locations. One unit of this system, the quarter-section (65 ha), is particularly useful for mapping critical habitat as it is used for ownership and management purposes. The quarter section level is used in this document to aid in describing the location of Sprague's Pipit critical habitat.

It is not currently possible to provide the specific amounts or levels of all of these critical habitat attributes required by Sprague's Pipits. Work to develop an understanding of such levels and thresholds in quantifiable terms is included in a schedule of studies.

Critical habitat for Sprague's Pipit excludes unsuitable habitat (e.g., dense patches of woody vegetation, open sand dunes, coulees, riparian areas, water bodies, planted non-native grassland, eroded slopes, badlands), existing infrastructure (e.g., roads, gas and oil wells, buildings, pipelines, fence lines, and watering sites) and perennial watering and salting sites for livestock.

The critical habitat identified in this document is necessary for Sprague's Pipit survival and recovery in Canada. However, further work is required to identify additional critical habitat necessary to support the population and distribution objectives for recovery of the species. Studies to identify additional critical habitat are outlined in Section 2.7.5. Additional critical habitat will be identified in one or more action plans as new information becomes available.

2.7.4 Examples of Activities Likely to Result in Destruction of Critical Habitat

Land management and stewardship activities of various agencies and local residents have conserved native grassland habitat suitable for this species. For example, many range management practices for the production of livestock on native prairie are compatible with Sprague's Pipit breeding habitat. Practices which maintain moderate amounts of residual cover with a patchy distribution and do not result in large increases in the amount of bare ground, shrub or non-native plants, or cause rangelands to degrade to poor range condition, are compatible with Sprague's Pipits. However, there are other human activities which may result in the destruction of critical habitat.

Destruction is determined on a case by case basis. Destruction would result if part of the critical habitat were degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. Destruction may result from single or multiple activities at one point in time or from the cumulative effects of one or more activities over time.

For example, Sprague's Pipit critical habitat may be destroyed by anthropogenic activities that have the following effects (see Dale 1983, Davis et al. 1999, Davis and Duncan 1999, Davis 2005, Linnen 2008, Dale et al. 2009):

- loss of native vegetation or disturbance of soil substrate
- degradation of native prairie to poor range condition
- excessive increase in bare ground
- intentional planting of woody vegetation
- introduction of exotic plant species (e.g., crested wheatgrass (*Agropyron cristatum*, brome grass (*Bromus* spp.), alfalfa (*Medicago* spp.), sweet clover (*Melilotus* spp.), and leafy spurge (*Euphorbia esula*))
- covering of critical habitat with new anthropogenic structures

Examples of activities on critical habitat that will result in destruction of critical habitat include, but are not limited to:

- **Removal, cultivation and/or conversion of native prairie to annual cropland or non-native grassland.**
  Sprague's Pipits require native grassland habitat. The species is not found breeding in any type of annual cropland and is less abundant in non-native compared to native grasslands (Robbins and Dale 1997, Davis et al. 1999, Davis and Duncan 1999, Madden et al. 2000). Pipit abundance has been shown to decrease on native pastures with increasing amounts of non-native grassland in the landscape (Dale unpubl. data, Davis et al. unpubl. data). Furthermore, reproductive success and juvenile survival have been found to be lower in non-native than native grassland habitat (Davis unpubl. data, Fisher and Davis *in press*).
- **Construction of roads.**
  Roads (paved, gravel or dirt surfaces of > 2 m width with ditches or raised road bed) destroy and fragment native grassland habitat, facilitate invasion of native grassland by exotic plant species, concentrate activities of certain predators and increase the chance of pipits colliding with vehicles. As a possible consequence of these effects, abundance of pipits has been found to be lower along roads than along trails (Sutter et al. 2000).
- **Intentional flooding of upland habitat.**
  Water impoundment and creation of wetlands in upland native prairie cause the terrestrial vegetation to be unavailable to pipits for nesting and foraging. Pipit abundance has been found to increase with increasing distance from wetlands (Koper et al. 2009) suggesting the presence of wetlands negatively affects habitat suitability beyond the wetland itself.
- **Prolonged/chronic over-grazing.**
  Livestock grazing may reduce habitat quality if intensity, frequency, and duration of grazing are excessively high. Prolonged over-grazing may degrade habitat to a point where the vegetation structure and community is no longer compatible with the habitat requirements of the species. Rangeland classified as "Poor" range condition (Abouguendia 1990) is not suitable for pipits (Davis et al. unpubl. data) and is likely difficult to recover without substantial resources and time (Abouguendia 1990).
- **Construction of new infrastructure (e.g., buildings, oil and gas wells, pipelines, waste and water storage facilities)**
  Anthropogenic structures placed on native grassland exclude pipits from using the habitat directly associated with the structure. Occurrence of pipits is negatively affected by the density of wells in the landscape (Dale et. al.2009) and individual wells are avoided by pipits, with exclusion zones extending up to 60 m from natural gas wells (Bogard and Davis unpubl. data).

Activities required to manage, inspect, or maintain existing facilities and infrastructure, which are not critical habitat but whose footprints may be within or adjacent to the identified critical habitat, are not examples of activities likely to result in the destruction of critical habitat. In addition, construction or repair of anthropogenic structures required to improve or maintain the condition of critical habitat (e.g., pasture fences, dug-outs and other livestock watering systems, or salt blocks) are not considered destruction of critical habitat.

Some human activities in or adjacent to critical habitat will require assessment for possible cumulative effects on critical habitat and the potential for destruction. Environment Canada will work with provincial regulatory authorities, academia, and land users to develop a better understanding of cumulative effects of both energy development and agricultural activities and associated infrastructure, as well as thresholds of destruction (Table 5), and mitigation guidelines (such as restrictions on activities in certain areas and over certain time periods).

2.7.5 Schedule of Studies to Identify Critical Habitat

Although much progress has been made since the original Sprague's Pipit recovery strategy, there are a number of studies/steps that are required before additional critical habitat can be identified across the species' Canadian breeding range (Table 5).

Table 5. Schedule of Studies

Description of Activity and Question	Anticipated Outcome/Rationale	Timeline
Develop and refine predictive models of occurrence and abundance to help identify potential critical habitat areas.	Geographic information system (GIS) maps will be developed delineating regions of high probability of occurrence and abundance will be used to identify candidate landscapes potentially containing critical habitat.	October 2011-March 2013
Conduct field surveys to verify predictive models and collect pipit location and abundance data.	Additional critical habitat is identified in various regions of the prairies, including southwestern Saskatchewan	April 2011-March 2014
Determine thresholds of tolerance for exotic species, woody vegetation, wetlands, and disturbances associated with agriculture and energy development.	Additional critical habitat is identified and cumulative effects and factors causing destruction are better understood.	March 2014
Refine ability to derive population estimates.	Understand how much critical habitat is required to meet population and distribution objectives .	March 2013

2.11 STATEMENT ON ACTION PLAN

The completion of Action Plans has been delayed pending identification of critical habitat and finalization of this amendment to the Final Recovery Strategy for the Sprague's Pipit. There is a potential for a multispecies Action Plan that could benefit multiple species at risk inhabiting southwestern Saskatchewan, which would incorporate an important part of the Sprague's Pipit's range in Canada. Action Plan (s) to cover other parts of the range of the Sprague's Pipit also need to be developed. Action plans for Sprague's Pipit will be completed by 2014.

3. REFERENCES

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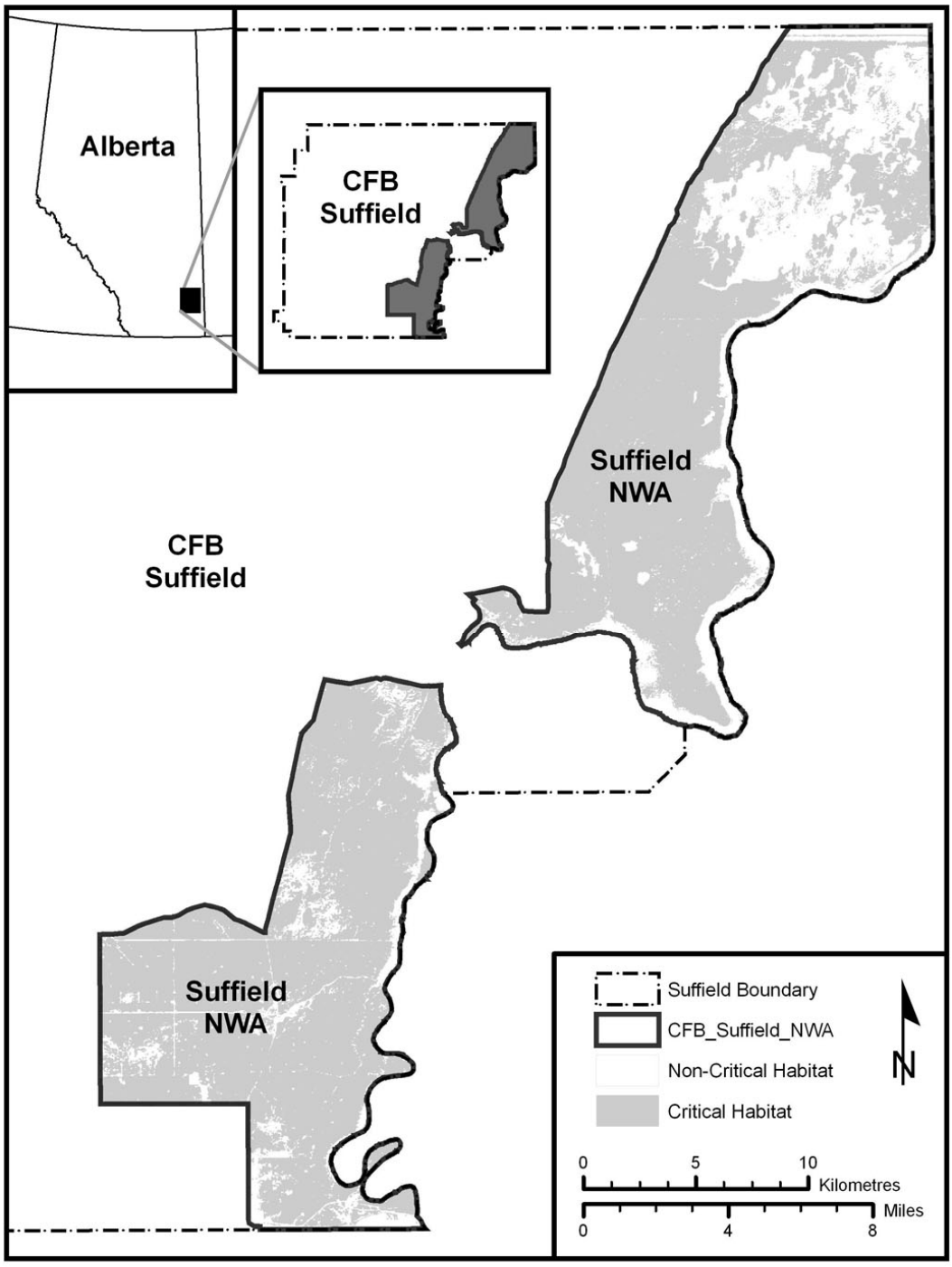
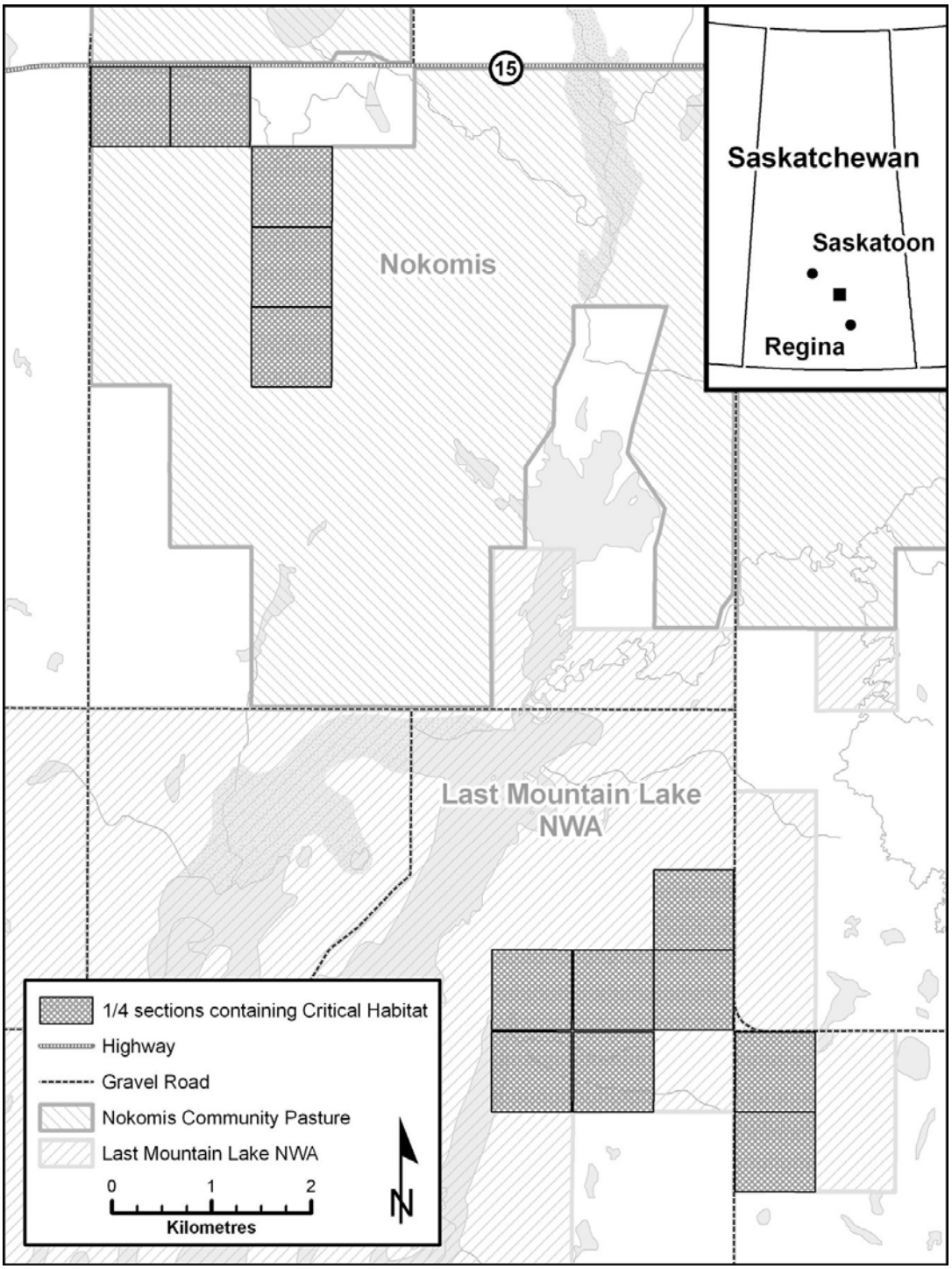
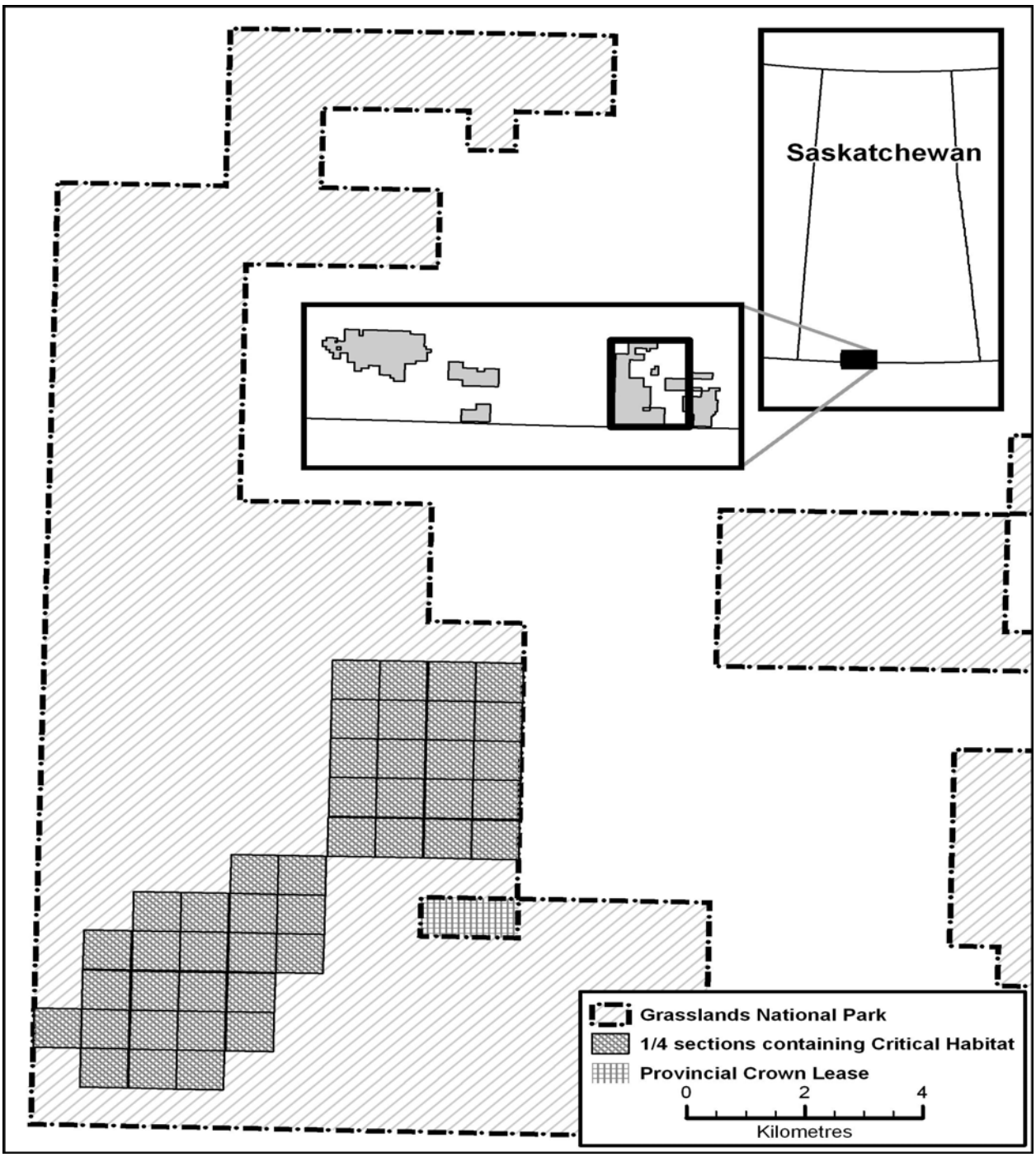
APPENDIX 2. **Location of Sprague's Pipit critical habitat in the south and north block of CFB Suffield National Wildlife Area in south-eastern Alberta.**



APPENDIX 3. Location of Sprague's Pipit critical habitat in Last Mountain Lake National Wildlife Area and adjacent Nokomis community pasture in south-central Saskatchewan. Only those portions of the outlined quarter-sections containing suitable biophysical attributes are considered critical habitat.



APPENDIX 4. Location of quarter-sections containing critical habitat in the East Block of Grasslands National Park (GNP), Saskatchewan. Only those portions of the outlined quarter-sections containing suitable biophysical attributes are considered critical habitat.



APPENDIX 5. Legal land descriptions of quarter sections containing critical habitat [2]

LAST MOUNTAIN LAKE NWA, SASKATCHEWAN				
Quarter section	**Section**	**Township**	**Range**	**Meridian**
NE	21	28	23	2
NW	22	28	23	2
NW, SW	23	28	23	2
NE, SE, SW	27	28	23	2
SE	28	28	23	2

AAFC NOKOMIS COMMUNITY PASTURE, SASKATCHEWAN				
Quarter section	**Section**	**Township**	**Range**	**Meridian**
NW, SW	17	29	23	2
NE, NW	19	29	23	2
SW	20	29	23	2

GRASSLANDS NATIONAL PARK, SASKATCHEWAN				
Quarter section	**Section**	**Township**	**Range**	**Meridian**
NE, NW	6	1	6	3
NE, NW, SE, SW	7	1	6	3
NW, SW	8	1	6	3
NE, NW, SE, SW	17	1	6	3
NE, NW, SE, SW	18	1	6	3
SE, SW	20	1	6	3
NE, NW	21	1	6	3
NE, NW	22	1	6	3
NE, NW, SE, SW	27	1	6	3
NE, NW, SE, SW	28	1	6	3
NE, NW, SE, SW	33	1	6	3
NE, NW, SE, SW	34	1	6	3
NE	1	1	7	3
NE, SE, SW	12	1	7	3
SE	13	1	7	3

[2] Within these quarter-sections, Sprague's Pipit critical habitat consists only of those areas of land with biophysical attributes as described in the Section 2.2.

CFB SUFFIELD NWA, ALBERTA				
Quarter section	**Section**	**Township**	**Range**	**Meridian**
NE, NW, SE, SW	3	15	5	4
NE, NW, SE, SW	4	15	5	4
NE, NW, SE, SW	5	15	5	4
NE, NW, SE, SW	6	15	5	4
NE, NW, SE, SW	7	15	5	4
NW, SE, SW	8	15	5	4
NE, NW, SW	9	15	5	4
SE, SW	10	15	5	4
SW	15	15	5	4
NW, SE, SW	16	15	5	4
NE, NW, SE, SW	17	15	5	4
NE, NW, SE, SW	18	15	5	4
NE, NW, SE, SW	19	15	5	4
NE, NW, SE, SW	20	15	5	4
NW, SW	21	15	5	4
NE, NW, SE, SW	27	15	5	4
NE, NW, SE, SW	28	15	5	4
NE, NW, SE, SW	29	15	5	4
NE, NW, SE, SW	30	15	5	4
NE, NW, SE, SW	31	15	5	4
NE, NW, SE, SW	32	15	5	4
NE, NW, SE, SW	33	15	5	4
NE, NW, SE, SW	1	15	6	4
NE, SE	12	15	6	4
NE, NW, SE, SW	13	15	6	4
NE, NW	20	15	6	4
NE, NW	21	15	6	4
NW	22	15	6	4
NE, NW	23	15	6	4
NE, NW, SE, SW	24	15	6	4
NE, NW, SE, SW	25	15	6	4
NE, NW, SE, SW	26	15	6	4
NE, NW	27	15	6	4
NE, NW, SE, SW	28	15	6	4
NE, NW, SE, SW	29	15	6	4
NE, NW, SE, SW	32	15	6	4
NE, NW, SE, SW	33	15	6	4
NE, NW, SE, SW	34	15	6	4
NE, NW, SE, SW	35	15	6	4
NE, NW, SE, SW	36	15	6	4

Quarter section	Section	Township	Range	Meridian
NE, NW, SE, SW	4	16	5	4
NE, NW, SE, SW	5	16	5	4
NE, NW, SE, SW	6	16	5	4
NE, NW, SE, SW	7	16	5	4
NE, NW, SE, SW	8	16	5	4
NE, NW, SE, SW	9	16	5	4
NW, SW	10	16	5	4
NW, SW	15	16	5	4
NE, NW, SE, SW	16	16	5	4
NE, NW, SE, SW	17	16	5	4
NE, NW, SE, SW	18	16	5	4
NE, NW, SE, SW	19	16	5	4
NE, NW, SE, SW	20	16	5	4
NE, NW, SE, SW	21	16	5	4
NE, NW, SE, SW	22	16	5	4
NW	23	16	5	4
SW	26	16	5	4
NE, NW, SE, SW	27	16	5	4
NE, NW, SE, SW	28	16	5	4
NE, NW, SE, SW	29	16	5	4
NE, NW, SE, SW	30	16	5	4
NE, NW, SE, SW	31	16	5	4
NE, NW, SE, SW	32	16	5	4
NE, NW, SE, SW	33	16	5	4
NE, NW, SE, SW	34	16	5	4
NE, NW, SE, SW	1	16	6	4
NE, NW, SE, SW	2	16	6	4
NE, NW, SE, SW	3	16	6	4
NE, NW, SE, SW	4	16	6	4
NE, NW, SE, SW	5	16	6	4
NE, NW, SE, SW	8	16	6	4
NE, NW, SE, SW	9	16	6	4
NE, NW, SE, SW	10	16	6	4
NE, NW, SE, SW	11	16	6	4
NE, NW, SE, SW	12	16	6	4
NE, SE, SW	13	16	6	4
NE, NW, SE, SW	14	16	6	4
NE, NW, SE, SW	15	16	6	4
NE, NW, SE, SW	16	16	6	4
SE, SW	17	16	6	4
NE, SE	24	16	6	4

Quarter section	Section	Township	Range	Meridian
SE	25	16	6	4
NE, NW	7	17	3	4
SE, SW	18	17	3	4
NE, NW, SE, SW	31	17	3	4
NW, SW	32	17	3	4
NE	12	17	4	4
NE, NW, SE, SW	13	17	4	4
NE, NW, SE	14	17	4	4
NE, SE	15	17	4	4
NE, NW	19	17	4	4
NE, SE	22	17	4	4
NE, NW, SE, SW	23	17	4	4
NE, NW, SE, SW	24	17	4	4
NE, NW, SE, SW	25	17	4	4
NE, NW, SE, SW	26	17	4	4
NE, NW, SE, SW	27	17	4	4
NE, NW, SE, SW	28	17	4	4
NE, NW, SE, SW	29	17	4	4
NE, NW, SE, SW	30	17	4	4
NW, SE, SW	31	17	4	4
NE, NW, SE, SW	32	17	4	4
NE, NW, SE, SW	33	17	4	4
NE, NW, SE, SW	34	17	4	4
NE, NW, SE, SW	35	17	4	4
NE, NW, SE, SW	36	17	4	4
NW	2	17	5	4
NE, NW, SE, SW	3	17	5	4
NE, NW, SE, SW	4	17	5	4
NE, NW, SE, SW	5	17	5	4
NE, NW, SE, SW	6	17	5	4
NW, SE, SW	7	17	5	4
NE, NW, SE, SW	8	17	5	4
NE, NW, SE, SW	9	17	5	4
NE, NW, SE, SW	10	17	5	4
NE, NW, SE, SW	11	17	5	4
NW, SW	14	17	5	4
NE, NW, SE, SW	15	17	5	4
NE, NW, SE, SW	16	17	5	4
NE, NW, SE, SW	17	17	5	4
SE	18	17	5	4
SE, SW	20	17	5	4

Quarter section	Section	Township	Range	Meridian
SW	21	17	5	4
NE, NW, SE, SW	25	17	5	4
SE	26	17	5	4
NE, NW, SE, SW	36	17	5	4
NW, SW	5	18	3	4
NE, NW, SE, SW	6	18	3	4
NE, NW	7	18	3	4
NE, NW	18	18	3	4
NW, SW	19	18	3	4
NW, SW	30	18	3	4
NW, SW	31	18	3	4
NE, NW, SE, SW	1	18	4	4
NE, NW, SE, SW	2	18	4	4
NE, NW, SE, SW	3	18	4	4
NE, NW, SE, SW	4	18	4	4
NE, NW, SE, SW	5	18	4	4
NE, NW, SE, SW	8	18	4	4
NE, NW, SE, SW	9	18	4	4
NE, NW, SE, SW	10	18	4	4
NE, NW, SE, SW	11	18	4	4
NE, NW, SE, SW	12	18	4	4
NE, NW, SE, SW	13	18	4	4
NE, NW, SE, SW	14	18	4	4
NE, NW, SE, SW	15	18	4	4
NE, NW, SE, SW	16	18	4	4
NE, NW, SE, SW	17	18	4	4
NE, SE	20	18	4	4
NE, NW, SE, SW	21	18	4	4
NE, NW, SE, SW	22	18	4	4
NE, NW, SE, SW	23	18	4	4
NE, NW, SE, SW	24	18	4	4
NE, NW, SE, SW	25	18	4	4
NE, NW, SE, SW	26	18	4	4
NE, NW, SE, SW	27	18	4	4
NE, NW, SE, SW	28	18	4	4
NE, NW, SE, SW	33	18	4	4
NE, SE	34	18	4	4
NE, NW, SE, SW	35	18	4	4
NE, NW, SE, SW	36	18	4	4
NW	5	19	3	4

Quarter section	Section	Township	Range	Meridian
NE, NW, SW	6	19	3	4
NE, NW, SE, SW	7	19	3	4
NE, NW, SE, SW	8	19	3	4
NE, NW	9	19	3	4
NE, NW	10	19	3	4
NE, NW, SE, SW	11	19	3	4
NE, NW, SW	13	19	3	4
NE, NW, SE, SW	14	19	3	4
NE, NW, SE, SW	15	19	3	4
NE, NW, SE, SW	16	19	3	4
SE, SW	17	19	3	4
NE, NW, SE, SW	18	19	3	4
NE, NW, SE, SW	19	19	3	4
NE, NW, SE, SW	20	19	3	4
NE, NW, SE, SW	21	19	3	4
NE, NW, SE, SW	22	19	3	4
NE, NW, SE, SW	23	19	3	4
NE, NW, SE, SW	24	19	3	4
NE, NW, SE, SW	25	19	3	4
NE, NW, SE, SW	26	19	3	4
NE, NW, SE, SW	27	19	3	4
NE, NW, SE, SW	28	19	3	4
NE, SE, SW	29	19	3	4
NE, NW, SE, SW	30	19	3	4
NE, NW, SE, SW	31	19	3	4
NE, NW, SE, SW	32	19	3	4
NE, NW, SE, SW	33	19	3	4
NE, NW, SE, SW	34	19	3	4
NE, NW, SE, SW	35	19	3	4
NE, NW, SE, SW	36	19	3	4
NE, NW, SE, SW	1	19	4	4
NE, NW, SE, SW	2	19	4	4
NE, NW, SE, SW	3	19	4	4
NE, SE	10	19	4	4
NE, NW, SE, SW	11	19	4	4
NE, NW, SE, SW	12	19	4	4
NE, NW, SE, SW	13	19	4	4
NE, NW, SE, SW	14	19	4	4
NE, SE	23	19	4	4
NE, NW, SE, SW	24	19	4	4
NE, NW, SE, SW	25	19	4	4

Quarter section	Section	Township	Range	Meridian
NE, SE	36	19	4	4
NE, NW, SE, SW	1	20	3	4
NE, NW, SE, SW	2	20	3	4
NE, NW, SE, SW	3	20	3	4
NE, NW, SE, SW	4	20	3	4
NE, NW, SE, SW	5	20	3	4
NE, SE, SW	6	20	3	4
SE	7	20	3	4
NE, NW, SE, SW	8	20	3	4
NE, NW, SE, SW	9	20	3	4
NE, NW, SE, SW	10	20	3	4
NE, NW, SE, SW	11	20	3	4
NE, NW, SE	12	20	3	4
NE, NW, SE, SW	13	20	3	4
NE, NW, SE, SW	14	20	3	4
NE, NW, SE, SW	15	20	3	4
NE, NW, SE, SW	16	20	3	4
NE, SE, SW	17	20	3	4