

# Action Plan for the Forked Three-awned Grass (*Aristida basiramea*) in Ontario

## Forked Three-awned Grass



2014

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For copies of the action plan, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, recovery strategies, and other related recovery documents, please visit the [SAR Public Registry](#)<sup>1</sup>.

**Cover illustration:** Judith Jones

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[Proposition] »

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<sup>1</sup> [www.registrelep.gc.ca/default\\_e.cfm](http://www.registrelep.gc.ca/default_e.cfm)

## PREFACE

The federal, provincial, and territorial government signatories under the [Accord for the Protection of Species at Risk \(1996\)](#)<sup>2</sup> agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of action plans for species listed as Extirpated, Endangered, and Threatened for which recovery has been deemed feasible. They are also required to report on progress within five years after the publication of the final document on the Species at Risk Public Registry.

Under SARA, one or more action plan(s) provide the detailed recovery planning that supports the strategic direction set out in the recovery strategy for the species. This plan outlines what needs to be done in Ontario to achieve the population and distribution objectives (previously referred to as the recovery goal) identified in the recovery strategy, including the measures to be taken to address the threats and monitor the recovery of the species, as well as the proposed measures to protect the critical habitat that has been identified for the species. This action plan also includes an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation. This action plan is considered one in a series of documents that are linked and should be taken into consideration together. Those being the COSEWIC status report, the recovery strategy, and other action plans for this species.

The Minister of the Environment and the Minister responsible for the Parks Canada Agency are the competent ministers for the recovery of Forked Three-awned Grass and have prepared this action plan to implement the recovery strategy, as per section 47 of SARA. To the extent possible, it has been prepared in cooperation with the Ontario Ministry of Natural Resources as per section 48(1) of SARA. A second action plan will be prepared by the competent Ministers for the Cazaville and Très-Saint-Sacrement populations in the Province of Quebec.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this action plan and will not be achieved by Environment Canada and the Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the Forked Three-awned Grass, and Canadian society as a whole.

Implementation of this action plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

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<sup>2</sup> [www.ec.gc.ca/media\\_archive/press/2001/010919\\_b\\_e.htm](http://www.ec.gc.ca/media_archive/press/2001/010919_b_e.htm)

## **ACKNOWLEDGMENTS**

This action plan was initially prepared by Judith Jones, Winter Spider Eco-Consulting, for Environment Canada, Canadian Wildlife Service – Ontario (EC, CWS-ON). Andrew Promaine (Parks Canada Agency) provided information to complete action planning for the Beausoleil Island (Georgian Bay Islands National Park). Ken Tuininga (EC, CWS-ON) coordinated the development of this document with the assistance of Marie-Claude Archambault, Angela Darwin, Krista Holmes, and Rachel deCatanzaro (EC, CWS-ON). Madeline Austen, Lesley Dunn, and Sue Humphrey (EC, CWS-ON) provided additional guidance and direction. Vincent Carignan and Karine Picard (Environment Canada, Canadian Wildlife Service – Quebec) provided comments to aid in harmonizing this document with the action plan being developed for Quebec populations. Ewen Eberhardt and Paul Johanson (CWS-NCR) also provided valuable input and advice. Valuable review comments were also provided by Ontario Ministry of Natural Resources and Parks Canada Agency staff.

## EXECUTIVE SUMMARY

This action plan complements the Recovery Strategy for the Forked Three-awned Grass (*Aristida basiramea*) in Canada, published in 2007 and that was also adopted with an addendum by the Province of Ontario (Jones 2011). The proposed recovery measures seek to implement the broad strategies and approaches to recovery set out in the recovery strategy for populations in Ontario: Anten Mills, Beausoleil Island, Cedar Point Road, Champlain Road, Christian Island, Golf Link Road, Huronia Airport, La Fontaine Road, Macavalley Road, Macy Lake/Methodist Point, and Thunder Beach. A separate action plan will be prepared for populations in Quebec.

This action plan addresses all four recovery objectives as they pertain to the Ontario populations. Recovery actions outlined in this document fall under five broad strategies: 1) outreach and communication, 2) conservation and management, 3) threat mitigation, 4) research, and 5) surveys and monitoring.

Critical habitat for Forked Three-awned Grass is fully identified in this action plan for the Ontario populations. It corresponds to natural and semi-naturalized open habitats on sandy soils where the species has been found in Ontario. These critical habitat areas require minor habitat disturbances for the long-term persistence of the species. Smaller populations are more likely to be impacted by disturbances that otherwise would not harm a larger population, and some activities may have a threshold level at which they become harmful even to large populations. While most of the Ontario populations are found in semi-naturalized habitat and likely benefit from some human-made or influenced disturbance, the population on Beausoleil Island occurs in a natural habitat setting having its own natural disturbance regime. Therefore, activities likely to result in destruction of critical habitat vary under different circumstances.

The critical habitat identified in this action plan is located on both federal and non-federal lands. Proposed measures to protect critical habitat are presented in section 1.4.

A socio-economic cost-benefit evaluation for implementing this action plan is presented. Protection of critical habitat and implementation of recovery measures outlined in this action plan are expected to have some significant benefits, including contributing to the recovery of Forked Three-awned Grass and other species that share its habitat. Protection of critical habitat may also lead to socio-economic costs for some landowners, the likelihood or extent of which is expected to be low.

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# 1. RECOVERY ACTIONS

## 1.1 Context and Scope of the Action Plan

Forked Three-awned Grass is listed as Endangered under Schedule 1 of the federal *Species at Risk Act*. It is a slender, wiry plant that grows to 30-60 cm in height and has very narrow leaves (1mm wide). The plant branches from the base, giving it a tufted appearance. It often has a coppery colour when mature. The reproductive parts (flowers; fruits) are borne at the top of the stems.

This action plan should be considered along with the Recovery Strategy for the Forked Three-awned Grass (*Aristida basiramea*) in Canada (Jones 2007). The recovery strategy provides more details on the strategic direction and approaches for recovery of Forked Three-awned Grass, and background information on the species and its threats. The context for recovery of this species has changed since the posting of the recovery strategy in 2007. Recent field searches in potential habitat, following the schedule of studies laid out in the recovery strategy, led to the discovery of seven additional populations in Ontario (Jones 2006). This increased the size of the total known Canadian population from approximately 120 000 plants to more than 3 million plants. Currently, there are 19 populations of Forked Three-awned Grass known in Canada (Jones 2011). Eight are in Quebec<sup>3</sup> (around the village of Cazaville, more than 10 000 plants, and the municipality of Très-Saint-Sacrement, around 400 plants), and 11 are in Ontario (all in Simcoe County and on islands in adjacent Georgian Bay; Figure 1; Table 1). Abundance information was updated for seven Ontario populations in September 2010 (Jones 2010).

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<sup>3</sup> The federal recovery strategy treated these as one population based on the treatment in COSEWIC (2002). Barbeau and Brisson (2004) treated the Cazaville plants as 6 separate populations or occurrences.

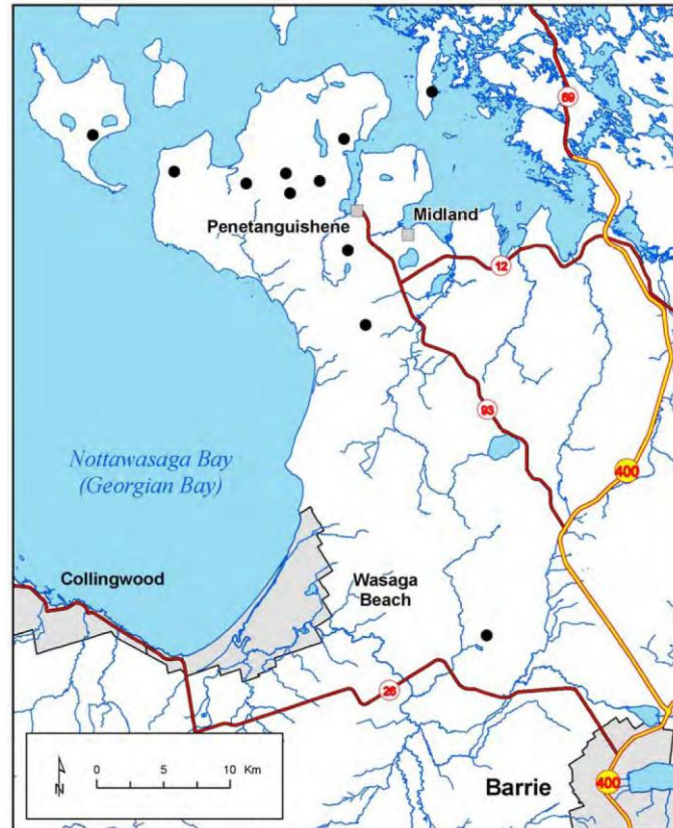


Figure 1. Extant populations of Forked Three-awned Grass in Ontario (from Jones 2011).

Table 1. Ontario populations of Forked Three-awned Grass with land tenure and most recent abundance estimate. Source: field work (Jones 2010) unless otherwise noted.

Population	Described in recovery strategy?	Land Tenure	Estimated Size of Occupied Habitat	Estimated Total Number of Plants (2010 unless indicated)
Anten Mills*	Yes	Non-federal	~ 10m <sup>2</sup> in 2 small patches	70 plants in marginal habitat
Beausoleil Island (Georgian Bay Islands NP)	Yes	Federal (Protected Area)	~1 ha	11 000 to 18 000 in 2009 (Promaine and Sutherland 2010)
Cedar Point Road	No	Non-federal	3 ha	Present in 2010; abundance unknown
Champlain Road	No	Non-federal	>1 ha	~10 000
Christian Island	Yes	Federal	~5 ha	~150 000 in several patches
Golf Link Road	No	Non-federal	~2.5 ha	Millions (Jones 2006)
Huronina Airport	No	Non-federal	60 ha	~800 000 plants
La Fontaine Road	No	Non-federal	<1/2 ha	~100 plants
Macavalley Road	No	Non-federal	unknown	>100 plants (Jones 2006); (most of site not surveyed)
Macey Lake-Methodist Pt. Rd.	Yes	Non-federal	>3 ha	>200 000 in several subpopulations
Thunder Beach	No	Non-federal	>2 ha	Densely covering at least 2 ha; >1 million plants
11 populations			>78 ha	At least 3 million plants

\* No plants were found for one of the three Anten Mills subpopulations in the most recent survey (Jones 2010).



In Canada, the primary threats to Forked Three-awned Grass identified in the federal recovery strategy include limited habitat, sand extraction, succession and absence of ecological processes, development, planting of conifers, invasive species, ATV use, agricultural practices, and garbage dumping (Jones 2007). In addition, mowing, road maintenance, and trampling are identified as threats in the Province of Ontario addendum to the federal recovery strategy (Jones 2011).

This action plan addresses all Ontario populations of Forked Three-awned Grass and outlines measures in Ontario that are based on the approaches to meet the recovery objectives in the recovery strategy (Jones 2007).

The recovery goal for Forked Three-awned Grass identified in the recovery strategy (Jones 2007) is to maintain self-sustaining populations of *Aristida basiramea* at all the sites where the species is of native origin<sup>4</sup> in Canada. The recovery goal in the province of Ontario's Government Response Statement<sup>5</sup> is: to maintain self-sustaining populations of Forked Three-awned Grass at all currently occupied sites within the species' native distribution in Ontario (Ministry of Natural Resources 2011). In the context of this action plan the population and distribution objective would be identical to the recovery goal as stated in the federal recovery strategy (Jones 2007), however, as mentioned above the scope of this action plan includes only the Ontario populations.

The recovery objectives from the federal recovery strategy (Jones 2007) are:

1. Forked Three-awned Grass persists in its natural habitat at the five known sites<sup>6</sup> where the species is thought to be of natural origin, with population sizes remaining viable for the next 10 years and beyond.
2. Measures necessary to avoid and mitigate threats to the species and its habitat are identified and mitigation has begun by 2007. These would include a range of tools for consideration.
3. Research and monitoring of a high scientific standard to document and assess habitat requirements, population trends and viability have started in at least two populations by 2007.
4. Educational material necessary to foster good stewardship of the species and its habitat are prepared and distributed to target audience(s) by 2007.

This action plan addresses all four recovery objectives as they pertain to the Ontario populations. The objectives and broad approaches from the recovery strategy are applicable to the seven new populations as well. The term "sites" in the first recovery objective refers to entire populations. However, for clarity, in the action plan "sites" refers to subpopulations.

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<sup>4</sup> For clarity, sites where Forked Three-awned Grass is of "native origin" described in the recovery strategy refers to areas where the species occurs naturally. This may include some sites where its origin is not certain and could possibly have resulted from ancient introductions by native people.

<sup>5</sup> The response statement is the Ontario government's policy response to the scientific advice provided in the recovery strategy.

<sup>6</sup> At the time that the recovery strategy was prepared, five populations were known in Canada. This included four populations in Ontario and one in Quebec.

## 1.2 Measures to be Taken and Implementation Schedule

The measures to be taken and implementation schedule to meet the population and distribution objectives are presented in Table 2. Environment Canada and Parks Canada Agency will endeavour to support implementation of this plan, given available resources and various species at risk conservation priorities.

### 1.2.1 Measures completed or underway

The recovery strategy listed several studies that were needed to identify critical habitat for the Forked Three-awned Grass populations in Ontario. The following studies have been completed to date:

- Study and characterize habitat and vegetation community type on Beausoleil Island. Survey newly discovered part of site (see Promaine and Sutherland 2010).
- Identify and map suitable / potential habitat around Macey Lake (see Jones 2010).
- Analyze previously mapped relict shorelines in Simcoe County, Ontario to locate areas where additional populations and potential habitat could exist (see Jones 2006).
- Survey areas identified from analyses to see if other populations (including seed banks) and/or suitable habitat are present (see Jones 2006).

In addition, the following activities have been completed:

- Since the posting of the recovery strategy, surveys have been conducted to update abundance information for many populations (see Table 1).
- Wilderness zoning has been applied (2009) at the Beausoleil Island location to enhance protection for Forked Three-awned Grass habitat.
- Monitoring has been set up for the Beausoleil Island and Christian Island populations of Forked Three-awned Grass (Jones 2008; Promaine and Sutherland 2010), although the protocols have not been standardized between the locations being monitored. At Beausoleil Island, the park-specific program monitors the area of occupancy, density distribution, and habitat quality. On Christian Island, three permanent transects were established to observe population size and fluctuation and the effects of any active threats.
- A Forked Three-awned Grass Recovery Action Plan has been drafted (2009) by Beausoleil First Nation. The First Nation has also undertaken outreach activities within the community (signage, workshops) to raise awareness of Forked Three-awned Grass and other species at risk, and has interviewed band members to gather traditional ecological knowledge. The First Nation will also be initiating habitat management for the species to remove invasive and competing species and open up soil for colonization.

### **1.2.2 Measures to be taken and implementation schedule**

The measures identified fall into five broad strategies: outreach and communication, conservation and management, threat mitigation, research, and surveys and monitoring. They are described in Table 2, together with the implementation schedule for their completion.

Monitoring is required in order to know whether the population and distribution objectives are being met (although the size at which populations remain viable has not yet been determined), and will also allow threats to be tracked so that intervention can occur as required. Monitoring at all sites is a planned action. It is recommended that a standardized protocol for all sites include GPS track logs for the boundaries of occupied polygons, standardized methodology to determine population estimates, and brief threat assessments. Monitoring data may help determine what size constitutes a viable population (action 5.2 in Table 2). Given that Forked Three-awned Grass is an annual species whose presence and population size fluctuates from year to year, annual population estimates may not be as meaningful as the overall long-term trend.

**Table 2. Implementation Schedule**

#	Recovery Measures	Priority <sup>7</sup>	Threats or objectives addressed <sup>8</sup>	Timeline
<b>Broad Strategy 1: Outreach and Communication (includes broad approaches 4, 15 and 18 of the recovery strategy<sup>9</sup>)</b>				
1.1	Coordinate contact with private landowners among interested jurisdictions to reduce confusion by only contacting landowners with critical habitat once.	High	All threats	2014-17
1.2	Engage municipal planners regarding critical habitat, landuse planning, and surveys.	High	Habitat loss due to development, road maintenance, mowing, trampling and ATV use	2014-16
1.3	Encourage the transfer of knowledge (including Traditional Ecological Knowledge); Develop and provide information to private landowners <sup>10</sup> , municipalities, utility companies, First Nations communities, and national park users describing species needs, acceptable activities within critical habitat, history of species locations, and encouraging stewardship.	High	All threats	2014-17
<b>Broad Strategy 2: Conservation and Management (includes broad approaches 5, 7, 15, 18 and 21 of the recovery strategy)</b>				
2.1	Encourage restoration of habitat at Anten Mills through mechanical removal of surrounding vegetation, raking, and opening up of new ground to allow the species to recolonize formerly occupied patches.	High	Habitat loss due to succession	2014-17
2.2	Investigate and support the use of best management practices (e.g., controlled burning, other habitat management activities) for Forked Three-awned Grass on Christian Island by Beausoleil First Nation, and incorporate Traditional Ecological Knowledge where available.	Medium	Habitat loss due to succession	2014-18
2.3	Work with utility companies to determine how habitat may be maintained in corridors by regular maintenance activities.	Medium	Mowing; road maintenance	2014-15

<sup>7</sup> “Priority” reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the recovery objective for species. Medium priority measures may have a less immediate or less direct influence on reaching the recovery population and distribution objectives, but are still important for recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the recovery objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

<sup>8</sup> Threats identified for Ontario populations in the federal recovery strategy include: Limited habitat, succession and absence of ecological processes, development, planting of conifers, invasive species, ATV use, and garbage dumping. In addition, mowing, road maintenance, and trampling are identified as threats in the Province of Ontario addendum to the federal recovery strategy (Jones 2011).

<sup>9</sup> Not all of the recovery strategy's broad approaches are included in this document because some have already been carried out (e.g., complete studies to determine critical habitat, apply protective park zoning to Beausoleil Island site) or are specific to the Quebec populations.

<sup>10</sup> Landowners with backyards that are immediately adjacent to sites meeting the Site Occupancy Criterion and adjacent to continuous habitats, though not currently identified as critical habitat (see 1.3.4), should be targeted in addition to those landowners with critical habitat currently identified on their property.

#	Recovery Measures	Priority <sup>7</sup>	Threats or objectives addressed <sup>8</sup>	Timeline
<b>Broad Strategy 3: Threat Mitigation (includes broad approaches 6 and 11 of the recovery strategy)</b>				
3.1	In cooperation with Beausoleil First Nation, promote removal of garbage from Forked Three-awned Grass habitat on Christian Island.	Medium	Dumping of garbage	2014-16
3.2	Develop and promote best management practices to help mitigate the threat of invasive species from some sites to improve habitat and expose new ground for Forked Three-awned Grass (e.g., mechanical removal of Mouse-ear Hawkweed and Spotted Knapweed).	Medium	Invasive species	2014-16
3.3	Encourage and work with private landowners with critical habitat to help initiate measures to prevent ATV use by trespassers (e.g., erecting signage and barriers).	Medium	Trampling and ATV use	2014-16
<b>Broad Strategy 4: Surveying and Monitoring (includes broad approaches 1, 2 and 22 of the recovery strategy)</b>				
4.1	Standardize monitoring protocols to be used at all sites, including those with existing monitoring programs, to examine population trends and the status of threats to the populations; Implement monitoring programs at all sites not currently monitored, to monitor the success of recovery and threat mitigation.	High	All threats	2014-16
4.2	Continue regular monitoring (e.g., every three years) of the Beausoleil Island population and its critical habitat to assess the impacts of succession and determine the need for management actions.	High	Habitat loss due to succession	2014-16
<b>Broad Strategy 5: Research (includes broad approaches 21 and 23 of the recovery strategy)</b>				
5.1	Study the effectiveness of best management practices as a habitat improvement tool at Christian Island, and their effect on other (non-target) species.	Medium	Habitat loss due to succession	2014-18
5.2	Conduct research on the length of time seeds remain viable in the seed bank (to determine whether historical habitats require protection), natural processes that maintain habitat, and whether conifer removal or other measures leading to opening of ground would be beneficial to the recovery of the species. Explore opportunities for determining the minimum viable population size for the species.	Low	All threats	2015-18

## 1.3 Critical Habitat

### 1.3.1 Identification of the species' critical habitat

Critical habitat is fully identified in this action plan for all known Forked Three-awned Grass populations in Ontario, and this identification is deemed to be the extent necessary to meet the population and distribution objectives as they relate to the 11 populations in Ontario that are of natural origin. Critical habitat is identified in detail at a site-level for one population (Beausoleil Island) occurring in natural habitat. For the remaining 10 populations occurring in semi-naturalized habitat, available information suggests there are a number of locations within the populations that are undocumented; that is, locations where detailed geo-spatial information is not currently available to Environment Canada. Recent species inventories provide a geographic reference (using cadastral lot boundaries<sup>11</sup>) for all of these locations, from which to base the current approach to critical habitat identification for these 10 populations (as outlined in the following sections). The cadastral lot boundaries provide a bounding area in which to identify the areas in which critical habitat occurs.

The identification of critical habitat for Forked Three-awned Grass is based on two criteria: habitat suitability and site occupancy. More precise boundaries may be mapped, and additional critical habitat may be added in the future, if additional surveys or other work support the inclusion of areas beyond those currently identified. A primary consideration in the identification of critical habitat is the amount, quality and location of habitat needed to achieve the population and distribution objectives.

### 1.3.2 Suitable habitat

Most Ontario populations of Forked Three-awned Grass occur in areas that were formerly cultivated fields but have recovered to semi-natural barrens or grassland vegetation. The vegetation community of these old fields is quite different from the species composition and disturbance regime of a natural sand barren (an exceedingly rare vegetation type in Ontario, ranked S1<sup>12</sup>), although neither is it completely human-made or influenced (Jones 2005, 2006). Therefore, for most sites (with the exception of Beausoleil Island which occurs in a natural habitat setting), Ecological Land Classification (ELC) type (Lee et al. 1998) is not a useful guide to indicate the suitable habitat of Forked Three-awned Grass in Ontario<sup>13</sup>. On Beausoleil Island, however, the ELC is appropriate and suitable habitat is considered to be the:

- Open Sand Barren (SBO1) ecosite (Promaine 2009).

Not all disturbed ground is suitable for Forked Three-awned Grass. There are distinct types of recent disturbance or stages of recovery from older disturbance that make habitat suitable (Jones 2006). Thus, not all inactive agricultural fields, vacant lots, old sand pits, or roadsides are

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<sup>11</sup> A land subdivision of the Province of Ontario. For the purposes of this document, administrative lot boundaries are referring to a surveyed area of land or cadastre captured digitally by the Ontario Ministry of Natural Resources through the Ontario Base Mapping Program. Part of a hierarchy of administrative boundaries, a lot is a portion of a concession within a specific geographic township of Ontario.

<sup>12</sup> The provincial ranking of rarity based on NHIC (2010): S1 is critically imperiled, S2 is imperiled, S3 is vulnerable, S4 is apparently secure, and S5 is secure in the province of Ontario.

<sup>13</sup> ELC in Ontario is currently being revised to further distinguish between different types of cultural habitats (e.g., Poverty Grass Open Sand Barren ecotype) in addition to various native open habitat ecotypes (H. Lee pers. comm. 2012) and may be useful to define habitat suitability for Forked Three-awned Grass in the future.

suitable habitat. In addition, areas of suitable habitat may shift and change with further disturbance(s) (e.g. fires, tree harvesting, land use practises) and/or stages of recovery from older disturbances. Forked Three-awned Grass is capable of colonizing newly formed optimal habitats from year to year as these habitats become available. Suitable habitat in semi-naturalized habitats is defined as open areas on sandy soil where tree and shrub canopy is absent and at least some grassy or bare ground patches are present, which may include any of the following:

- Dry, open, unshaded sandy areas with patches of bare ground (of any size) exposed;
- Semi-natural (unimproved<sup>14</sup>) grassy ground dominated by Poverty Grass or Sand Dropseed; or by Canada Bluegrass if patches of bare ground (of any size) are exposed;
- Open Sand Barren or Open Sand Dune vegetation on relict shorelines from post-glacial lake/sea levels;
- Sandy disturbed areas dominated by non-native plant species with patches of bare ground (of any size) exposed;
- Sandy fallow fields or edges of fields and abandoned sand pits;
- Sandy trails through well-vegetated grassy areas;
- Sandy roadside embankments.

Open areas are considered suitable habitat to provide additional habitat for dispersal and because the species may be present in the seed bank in these areas. As well, sand may blow or may shift, so inclusion of unoccupied areas that are adjacent to the occupied habitat may accommodate the natural movement of sandy substrates and Forked Three-awned Grass colonies over time (Jones 2007).

### 1.3.3 Site occupancy

Site Occupancy Criterion: The site occupancy criterion defines an occupied site as locations where Forked Three-awned Grass has been observed for any single year since 2005 with the exception of sites of sandy roadside embankments for which Forked Three-awned grass must have persisted for more than one year<sup>15</sup>. The critical habitat site boundary is defined by the area occupied by individual plants or patches of plants plus the outer extent of continuous suitable habitat.

Recent surveys, since 2005 (e.g., Jones 2006, 2010), have been completed for the Ontario populations and this information provides the most accurate and up-to-date representation of the extent of occupied areas within these populations. Information from these recent surveys was used for the determination of site occupancy. These surveys have discovered new populations as well as additional occupied sites within populations suggesting the species is more widespread than originally thought. In addition, these surveys indicate nearby areas, where detailed surveys were not possible, also contain suitable habitat and, in several instances, the presence of Forked Three-awned Grass was noted from the road-side. Although detailed geospatial information was not collected at these locations nonetheless, a geographic reference (lot boundaries) was noted.

<sup>14</sup> Not tilled, built on, or otherwise developed or prepared for human use.

<sup>15</sup> Roadside embankments are primarily temporary habitat for Forked Three-awned Grass as they may be spots where one or more plants happened to establish in one year but would be immediately extirpated the following year (e.g. at the bottom of an embankment where it will be washed out by next year's meltwater). Persisting for more than one year indicates a relatively stable environment where the species can persist.

It is therefore likely that additional surveys would confirm more occupied suitable habitat which could contribute to the overall recovery of the species.

#### **1.3.4 Application of Forked Three-awned Grass critical habitat criteria**

Critical habitat for Forked Three-awned Grass is identified as the extent of continuous suitable habitat (Section 1.3.2) for sites meeting the site occupancy criterion (Section 1.3.3), with the exception of sites with occurrences in backyards (see below). Critical habitat extends around the occupied area for as far as the suitable habitat remains continuous (e.g., connected areas). Patches separated by human-made features such as paved and gravel roads, airport runways, and planted lawns are not considered continuous. Patches separated by natural breaks such as stands of trees, wetlands, shrubby areas or areas of tall grass where there are no bare ground patches are also not considered continuous.

Recent species inventories assessed locations where Forked Three-awned Grass is known to occur. For the 10 populations where Forked Three-awned Grass occurs in semi-naturalized habitats, inventories involved roadside survey techniques and locations were geo-referenced to cadastral lot boundaries. For six of these populations, the inventories identified additional locations not previously known to support Forked Three-awned Grass. Although these surveys do not provide detailed geospatial data on the individual plant locations nor the extent of suitable habitat, the information is considered adequate to assess the site occupancy criterion (Section 1.3.3) and to confirm the presence of suitable habitat (1.3.2). In addition, aerial photos were used to confirm the current possible extent of suitable habitat. Therefore, in the absence of any detailed geospatial occurrence or habitat information, critical habitat for the 10 populations where Forked Three-awned Grass occurs in semi-naturalized habitats is identified based on the cadastral lot boundary in which they occur<sup>16</sup>. Where Forked Three-awned Grass occurs in adjacent lots, or where continuous suitable habitat extends past a lot boundary, adjacent lot boundaries were merged together to create a single bounding “box” around the approximated critical habitat site(s).

Critical habitat for Forked Three-awned Grass in Ontario is identified as the areas within the cadastral lot bounding “boxes” that have the ecological attributes described as suitable habitat (Section 1.3.2) and meet the site occupancy criterion (Section 1.3.3).

As Forked Three-awned Grass is an annual plant species living in a dynamic environment, the extent and shape of precise critical habitat is subject to annual variation. The species likely does not occupy the same openings continually but instead will colonize openings newly formed by a variety of disturbances (e.g. fires, tree harvesting, and land use practices). As most of the Ontario Forked Three-awned Grass populations occur in semi-natural habitat (10 of the known 11 populations), maintaining some minor human disturbance may be required for long-term persistence of the species.

The bounding “boxes” identifying critical habitat in adjacent lots with suitable habitat will incorporate dynamic areas even as precise critical habitat shifts and changes within a location from year to year. Cadastral lot boundaries are considered an appropriate bounding area within which to identify critical habitat for these 10 populations, as the lots account for the extent of

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<sup>16</sup> Lot sizes vary, but are approximately 600m x 1400m, although village lots on Christian Island are much smaller



suitable habitat adjacent to occupied suitable habitat as well as the current local land management regime(s) influencing species colonization and long-term persistence.

Where critical habitat occurs in a natural habitat setting (one population on Beausoleil Island) the ELC framework captures the uniform ecosystem where suitable habitat for Forked Three-awned Grass occurs. The ELC ecosite includes an area of consistent environmental factors and vegetation characteristics including, suitable soil texture and moisture regime and drainage, physiography and vegetation species composition thus, capturing the extent of area currently occupied by the species as well as the additional adjacent suitable habitat areas that could be colonized by the species.

Critical habitat is not identified for occurrences in backyards because individual plants found there are restricted by a very limited area of suitable habitat, and are unlikely to contribute to the long-term natural persistence of the species. Moreover, sites with these occurrences are considered marginal habitats for regeneration. If further monitoring determines that occupied backyards are immediately adjacent to sites meeting the site occupancy criterion (1.3.3) and adjacent to continuous suitable habitats, some backyard sites could be important for dispersal between suitable habitat and may be considered for future critical habitat identification. In addition, for further clarification, within the bounding “boxes”, any feature that is not suitable habitat (e.g. road, house, agricultural building) is not critical habitat.

Forked Three-awned Grass occurs in some places on roadside shoulders, which are human-made habitats with very active use and a high level of disturbance. Roadside shoulders are considered temporary habitat where the species is not likely to persist for the long term and, therefore, these sites are not identified as critical habitat. For example, the population present on a roadside shoulder in the Rainy River District in 2001 (Jones 2007) has not reoccurred in subsequent years despite several searches (Oldham pers. comm. 2010). Note that there is a distinction between a shoulder (part of the road surface where vehicles travel, and not identified here as critical habitat) and an embankment (part of the ditch or slope adjacent to the road surface and not normally travelled by vehicles).

Application of the critical habitat criteria to available information led to the identification of 15 sites for the 11 populations of Forked Three-awned Grass in Ontario. The critical habitat identified is considered sufficient to meet the population and distribution objectives for populations in Ontario. In order to respect protocols for provincial species at risk data use and related agreements, these site locations are presented in this document at the level of the 1km x 1km Universal Transverse Mercator (UTM) grid squares within which the critical habitat occurs. It is important to note that the coordinates presented in Appendix A are a cartographic representation of the sites containing critical habitat and not the extent or boundaries of the critical habitat itself. As additional information becomes available, the critical habitat identification approach may be refined, sites currently identified as critical habitat may be refined or more sites meeting the critical habitat criteria may be added.

### **1.3.5 Examples of activities likely to result in destruction of critical habitat**

Understanding what constitutes destruction of critical habitat is necessary for the protection and management of critical habitat. Destruction of critical habitat is determined on a case by case

basis. Destruction would result if part of the critical habitat was degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. In the case of Forked Three-awned Grass, a species whose habitat requires some disturbance to maintain open conditions, activities that result in temporary disturbance within critical habitat are not in all cases considered to be destruction. Destruction may result from a single activity or multiple activities at one point in time or from the cumulative effects of one or more activities over time (Government of Canada 2009).

Disturbance that may initially harm habitat for Forked Three-awned Grass also often creates excellent new habitat when the disturbance subsides (Barbeau and Brisson 2004; Jones 2006). As an annual plant, the local distribution of Forked Three-awned Grass changes somewhat from year to year as plants colonize newly opened bare patches within their habitat. As a result, some disturbance to Forked Three-awned Grass habitat may be beneficial to the species, opening up suitable bare ground within a given site. By nature of their size, smaller populations are more likely to be impacted by disturbances that otherwise would not harm a larger population. In addition, some activities may have a threshold level at which they become harmful even to large populations rather than beneficial. While most of the Ontario populations are found in semi-naturalized habitat and likely to benefit from some human-made or influenced disturbance, the population on Beausoleil Island occurs in a natural habitat setting having its own natural disturbance regime. For these reasons this section has been divided into three subsections that list different examples of activities likely to result in destruction of critical habitat in different circumstances.

#### **1.3.5.1 Examples of activities likely to result in destruction of critical habitat at all sites**

- Activities that result in the loss or prolonged covering up of suitable habitat, thus preventing growth and establishment of Forked Three-awned Grass. These activities include but are not limited to: building permanent structures; paving ground; bringing in and placing fill, dirt, gravel or sod on the ground; seeding of lawns, that can result in potentially introducing invasive species that compete with Forked Three-awned Grass; or planting of trees or shrubs that will grow larger than 3m tall, resulting in shading of the ground and build up of needles, thatch or debris.
- Activities such as extensive vehicle use, ploughing and extracting sand that disturb the ground resulting in the ground becoming overly loose and unsuitable for the growth and establishment of Forked Three-awned Grass.

Forked Three-awned Grass requires minor disturbance in its habitat. Therefore, to adequately protect the species, some activities currently underway in semi-natural habitats with limited disturbance levels should be able to continue within and adjacent to critical habitat without constituting destruction. In some cases, disturbed ground may become suitable habitat if left unworked for a year or more, but this would need to be assessed on a case-by-case basis. For more information on examples of activities likely to result in destruction of critical habitat in semi-natural habitats see sections 1.4.1 and 1.4.2 below.

### **1.3.5.2 Examples of activities likely to result in destruction of critical habitat on Beausoleil Island only, in addition to 1.3.5.1**

On Beausoleil Island, the habitat of Forked Three-awned Grass was recognized in the recovery strategy (Jones 2007) as being in a more natural setting (i.e., Open Sand Barren) than the other occurrences of Forked Three-awned Grass in Canada. In addition, the Beausoleil Island habitat occurs above and below a slight slope. The lower level area has loose sand which is little-vegetated, so this location cannot sustain the same degree of human-made or influenced disturbance that may be helpful at other large sites. Therefore, activities likely to result in the destruction of critical habitat on Beausoleil Island include but are not limited to:

- Activities that cause physical disturbance to the soil substrate where Forked Three-awned Grass occurs, resulting in loosening of the ground, creating conditions unsuitable for the establishment and growth of Forked Three-awned Grass. These activities include but are not limited to: sand extraction and any level of off-road vehicle use.
- Infrastructure development that results in visitor foot traffic that disrupts soil supporting Forked Three-awned Grass plants, such as picnic shelter construction.

## **1.4 Proposed Measures to Protect Critical Habitat**

*The information below outlines the potential protection measures known to Environment Canada, at the time of publication, for critical habitat of Forked Three-awned Grass in Ontario. This action plan does not make a determination of whether these measures constitute effective protection under SARA.*

Critical habitat protection may be facilitated through various mechanisms including, but not limited to: federal and provincial legislation, stewardship activities, permitting, education of landowners and land users, and municipal bylaws and management plans.

### **1.4.1 Federal lands**

The critical habitat of Forked Three-awned Grass on Beausoleil Island is within Georgian Bay Islands National Park and as such will be legally protected by the process outlined in subsection 58(2) of SARA as well as by the *Canada National Parks Act*.

In addition, the park will manage activities to prevent destruction of critical habitat through the use of management tools including park zoning, posting notices, and notifications to visitors. The Beausoleil Island critical habitat is within a Zone 2 – Wilderness designation (Parks Canada Agency 2009) area of the park.

The critical habitat on Christian Island is on Beausoleil First Nation reserve lands, and will be protected by the process outlined in section 58 of SARA. Environment Canada will work with the Beausoleil Island First Nation on this protection. The Beausoleil First Nation has undertaken outreach activities (signage, workshops, website link) to raise awareness of Forked Three-awned Grass on Christian Island and contribute to its protection and that of other species at risk.

Questions on examples of activities likely to result in destruction of critical habitat on federal lands other than on Beausoleil Island (1.3.5.2) should be directed to Environment Canada, Canadian Wildlife Service - Ontario.

#### **1.4.2 Non-federal lands**

In Ontario, Forked Three-awned Grass is listed as Endangered under the *Endangered Species Act, 2007* (ESA), and the general habitat provisions of that law will automatically apply to this species as of June 30, 2013. An Ontario addendum to the federal recovery strategy has been posted (Jones 2011), and a regulation to describe the habitat of Forked Three-awned Grass under the Ontario ESA may be prepared. Environment Canada will work with the province of Ontario to assess protection on non-federal lands.

In addition, Forked Three-awned Grass habitat may also receive policy-level protection on municipal and private lands under the Provincial Policy Statement of the Ontario *Planning Act*. The Provincial Policy Statement does not permit the development or site alteration of the significant habitat of endangered and threatened species, and may therefore contribute to protection of critical habitat for Forked Three-awned Grass.

At Anten Mills, a portion of the Forked Three-awned Grass population is on land that is under a conservation easement held by the Nottawasaga Valley Conservation Authority. The easement is expected to contribute to protection of Forked Three-awned Grass critical habitat.

Questions on whether an activity is likely to result in destruction of habitat under the ESA (on non-federal lands) should be directed to the local Ontario Ministry of Natural Resources district office.

## **2. EVALUATION OF SOCIO-ECONOMIC COSTS AND OF BENEFITS**

The *Species at Risk Act* (SARA) requires that an action plan include an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation (SARA 49(1)(e)). This evaluation addresses only the incremental socio-economic costs of implementing this action plan from a national perspective as well as the social and environmental benefits that would occur if the action plan were implemented in its entirety, recognizing that not all aspects of its implementation are under the jurisdiction of the federal government. It does not address cumulative costs of species recovery in general nor does it attempt a cost-benefit analysis. Its intent is to inform the public and to guide decision making on implementation of the action plan by partners.

The protection and recovery of species at risk can result in both benefits and costs. The Act recognizes that “*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons*” (SARA 2003). Self-sustaining and healthy ecosystems with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians. A review of the literature confirms that Canadians value

the preservation and conservation of species in and of themselves. Actions taken to preserve a species, such as habitat protection and restoration, are also valued. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White 1996; Fisheries and Oceans Canada 2008). Furthermore, the conservation of species at risk is an important component of the Government of Canada's commitment to conserving biological diversity under the *International Convention on Biological Diversity*. The Government of Canada has also made a commitment to protect and recover species at risk through the *Accord for the Protection of Species at Risk*. The specific costs and benefits associated with this action plan are described below.

Given that this action plan affects only a limited geographic area in Ontario, it is anticipated that most costs will be felt locally, and are expected to be minimal at the regional, provincial or national scale. Significant benefits are also anticipated, as this action plan is expected to contribute to the recovery of Forked Three-awned Grass in Ontario and have potential benefits to the protection of species at risk in general.

### **Socio-economic Costs of Implementing this Action Plan**

This action plan is expected to have some limited costs to the local economy. In particular, changes in extent or timing of activities at commercial enterprises may result in some economic cost. Where critical habitat occurs in agricultural fields, there may be potential for restriction on cultivation to occur given that activities such as ploughing may result in the destruction of critical habitat; however, this would need to be determined on a case by case basis (see 1.3.5.2). Should it be determined that restriction on cultivation of land is required, this may reduce the annual economic yield a farmer may obtain from the land. A number of properties on which Forked Three-awned Grass occurs are Christmas tree farms. Allowing planted trees to grow up to a maximum height of approximately 3 m within critical habitat should allow both persistence of suitable habitat for Forked Three-awned Grass and the successful continuation of these enterprises. As well, adjacent to the Huronia Airport, Forked Three-awned Grass occurs on properties owned by private aviation enterprises. While parking planes does not necessarily constitute destruction of critical habitat, destruction could occur if the ground is disturbed to the extent that it is no longer suitable for Forked Three-awned Grass (see 1.3.5.2), and businesses may need to make alternate arrangements in some instances.

Given this species has a small geographic range in Ontario, and the number of sites identified as critical habitat in this plan is small, the resulting costs are expected to be low at the regional and national scale.

Additional costs of implementing this action plan may include salary and other operating costs associated with undertaking recovery measures, which will be supported to the extent possible by participating agencies and organizations. It will also require agency staff to spend some time to coordinate activities among federal, provincial, and local jurisdictions and organizations involved in recovery efforts.

Other potential socio-economic costs associated with the recovery actions described in this action plan are also expected to be low.

## Benefits of Implementing this Action Plan

Many of the benefits derived from biodiversity conservation, including the protection of species at risk, are non-market commodities that are difficult to quantify. Wildlife, in all its forms, has value in and of itself, and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological, and scientific reasons. This is supported by a survey that showed Ontario Residents spent approximately \$4.3 billion in 1996 on nature-related activities in Canada (Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians 2000).

The conservation of wildlife at risk is an important component of the Government of Canada's commitment to upholding international commitments made under the Convention on Biological Diversity. For Ontario, biodiversity is important to its current and future economy and natural wealth. A self-sustaining healthy ecosystem with its various elements in place, including species at risk, contributes positively to landowner and public livelihoods.

The protection of critical habitat and the recovery measures outlined in this action plan are expected to have a highly beneficial impact for the recovery of Forked Three-awned Grass, including reducing the rate of habitat loss, reducing the intensity of threats to the species and its habitat, and increasing population size of the species. Protection of habitat for Forked Three-awned Grass may also benefit other species that use open habitat, and contribute to protection of the critically imperilled sand barrens vegetation community type in Ontario.

Through communication with Beausoleil First Nation, recovery activities for Forked Three-awned Grass could be integrated into Beausoleil First Nations' tourism and conservation education strategy, thus benefiting the community and the species.

The possibility that ancestral movements of Native peoples may have played a role in the current distribution of Forked Three-awned Grass (Jones 2008) suggests that its distribution may be a piece of living history. This interesting story could be used as part of interpretive materials for visitors to Georgian Bay Islands National Park.

## 3. MEASURING PROGRESS

The performance indicators presented in the associated recovery strategy (section 2.7 Evaluation) provide a way to define and measure progress toward achieving the population and distribution objectives (formerly referred to as the recovery goal).

Reporting on *implementation* of the action plan (under s. 55 of SARA) will be done by assessing progress towards implementing the broad strategies.

Reporting on the ecological and socio-economic impacts of the action plan (under s. 55 of SARA) will be done by assessing the results of monitoring the recovery of the species and its long term viability, and by assessing the implementation of the action plan.

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## APPENDIX A: SITES IDENTIFIED AS CRITICAL HABITAT FOR FORKED THREE-AWNED GRASS

**Table 3. Sites identified as containing critical habitat for Forked Three-awned Grass (*Aristida basiramea*) in Ontario. Critical habitat for Forked Three-awned Grass occurs within these 1 km UTM grid squares where the criteria described in Section 1.3 are met.**

Population	Grid Number	Easting <sup>17</sup>	Northing <sup>17</sup>	# of critical habitat site centroids within the grid <sup>18</sup>	Total site area (ha) within the grid that contains critical habitat <sup>19</sup>	County	Land Tenure <sup>20</sup>
Anten Mills	1	594000	4926000	0	3	Simcoe	Non-Federal
	2	593000	4925000	1	55	Simcoe	
	3	594000	4925000	0	31	Simcoe	
	4	593000	4924000	0	4	Simcoe	
Beausoleil Island (Georgian Bay Islands National Park)	1	589000	4966000	1	4	Muskoka	Federal
Cedar Point Road	1	569000	4961000	0	8	Simcoe	Non-Federal
	2	570000	4961000	0	34	Simcoe	
	3	569000	4960000	0	1	Simcoe	
	4	570000	4960000	1	51	Simcoe	
	5	571000	4960000	0	1	Simcoe	
Champlain Road	1	582000	4963000	0	3	Simcoe	Non-Federal
	2	583000	4963000	0	12	Simcoe	
	3	582000	4962000	0	4	Simcoe	
	4	583000	4962000	1	33	Simcoe	
Christian Island	1	562000	4964000	0	1	Simcoe	Federal
	2	562000	4963000	1	35	Simcoe	
	3	562000	4962000	0	5	Simcoe	
	4	563000	4964000	0	1	Simcoe	
	5	563000	4963000	0	39	Simcoe	
	6	563000	4962000	0	11	Simcoe	
	7	564000	4962000	0	2	Simcoe	
	8	564000	4964000	1	41	Simcoe	
	9	564000	4963000	2	47	Simcoe	
	10	565000	4963000	1	2	Simcoe	

Golf Link Road	1	582000	4954000	0	1	Simcoe	Non-Federal
	2	583000	4954000	1	40	Simcoe	
Huronia Airport	3	583000	4948000	0	26	Simcoe	Non-Federal
	4	584000	4948000	1	99	Simcoe	
	5	585000	4948000	0	21	Simcoe	
	6	584000	4947000	0	17	Simcoe	
	7	585000	4947000	0	64	Simcoe	
	8	583000	4949000	0	4	Simcoe	
	9	584000	4949000	0	30	Simcoe	
La Fontaine Road	10	585000	4946000	0	2	Simcoe	Non-Federal
	1	579000	4957000	0	10	Simcoe	
	2	578000	4958000	0	11	Simcoe	
	3	579000	4958000	1	62	Simcoe	
Macavalley Road	4	579000	4959000	0	72	Simcoe	Non-Federal
	1	581000	4960000	0	20	Simcoe	
	2	581000	4959000	1	55	Simcoe	
	3	582000	4959000	0	1	Simcoe	
	4	580000	4960000	0	6	Simcoe	
Methodist Point Road - Macey Lake	5	580000	4959000	0	8	Simcoe	Non-Federal
	1	576000	4964000	0	6	Simcoe	
	2	577000	4964000	0	26	Simcoe	
	3	576000	4963000	0	40	Simcoe	
	4	577000	4963000	0	97	Simcoe	
	5	578000	4963000	0	58	Simcoe	
	6	579000	4963000	0	5	Simcoe	
	7	576000	4962000	0	1	Simcoe	
	8	577000	4962000	0	80	Simcoe	
	9	578000	4962000	0	100	Simcoe	
	10	579000	4962000	0	57	Simcoe	
	11	577000	4961000	0	20	Simcoe	
	12	578000	4961000	1	99	Simcoe	
	13	579000	4961000	0	90	Simcoe	
	14	580000	4961000	0	3	Simcoe	
	15	577000	4960000	0	1	Simcoe	
	16	578000	4960000	0	71	Simcoe	
	17	579000	4960000	0	86	Simcoe	
18	578000	4959000	0	68	Simcoe		
Thunder Beach Road	1	575000	4960000	0	7	Simcoe	Non-Federal
	2	575000	4959000	1	58	Simcoe	
	3	576000	4959000	0	16	Simcoe	

	4	575000	4958000	0	6	Simcoe
	5	576000	4958000	0	4	Simcoe
	<b>Total:</b>			<b>15</b>	<b>1976 Ha</b>	

<sup>17</sup> The listed coordinates are a cartographic representation of critical habitat presented as the southwest corner of the 1 km Universal Transverse Mercator (UTM) Military Grid Reference System square containing the critical habitat site (see [http://maps.nrcan.gc.ca/topo101/mil\\_ref\\_e.php](http://maps.nrcan.gc.ca/topo101/mil_ref_e.php) for more information on the reference system). The coordinates may not fall within critical habitat and are provided as a general location only.

<sup>18</sup> A value of "0" means the grid square contains a portion of (a) critical habitat site(s) but not the site centroid.

<sup>19</sup> The area presented is of the site boundary (rounded up to the nearest 1 ha) containing areas of critical habitat; therefore, the actual area of critical habitat within this boundary may be significantly less. Field verification is required to determine the precise area of critical habitat. Refer to Section 1.3 for a description of how critical habitat within these areas is defined.

<sup>20</sup> Land Tenure is provided as an approximation of land ownership of the site containing critical habitat and should be used for guidance purposes only. Accurate land tenure will require cross referencing critical habitat boundaries with surveyed land parcel information.

## APPENDIX B: EFFECTS ON THE ENVIRONMENT AND OTHER SPECIES

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the [Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals](#). The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or achievement of any of the [Federal Sustainable Development Strategy](#)'s<sup>21</sup> (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of action plans may inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts on non-target species or habitats. The results of the SEA are incorporated directly into the action plan itself, but are also summarized below in this statement.

Measures for the recovery of Forked Three-awned Grass are not expected to have significant negative impacts on other species. The primary measures for this species are education and outreach steps that don't involve habitat modification. As well, at most sites the habitat is a semi-disturbed area that contains species adapted to disturbance. Thus, actions to maintain disturbance patterns, where conducive to the persistence of the species, should have no new effect on the habitat or the species present.

For example, the most common native plant species associated with Forked Three-awned Grass are Poverty Grass, Sand Dropseed, and Canada Bluegrass, and most other associates are common Eurasian species of disturbed and marginal habitats. Recovery efforts for Forked Three-awned Grass are expected to benefit native associates because these species have similar habitat requirements that include disturbance.

Burning to improve the habitat of Forked Three-awned Grass could potentially have adverse effects if conducted in areas where there are species sensitive to fire. Fire may potentially damage or destroy non-target species, especially invertebrates, and their habitat. Therefore, research to determine the other species present in the burn area is a proposed action to make certain that non-target species are not adversely affected. Follow-up monitoring is recommended after any burning is done to enhance Forked Three-awned Grass habitat.

Burning may temporarily reduce the number of individuals of associate plant species present, but as these are common species, the effect is not expected to be significant or permanent. The numbers of these individuals will eventually rebound as the process of succession begins again. As well, the most common species in the habitat are likely to occur in adjacent fields that would not be burned.

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<sup>21</sup> [www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1](http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1)

This action plan directly contributes to the goals and targets of the Federal Sustainability Development Strategy for Canada. Specifically, it contributes to Goal 5: Wildlife Conservation – Maintain or restore populations of wildlife to healthy levels, and to Goal 6: Ecosystem/Habitat Conservation and Protection: Maintain productive and resilient ecosystems with the capacity to recover and adapt.