Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population)

Ontario Government Response Statement

Protecting and Recovering Species at Risk in Ontario

Species at risk recovery is a key part of protecting Ontario's biodiversity. The *Endangered Species Act, 2007* (ESA) is the Government of Ontario's legislative commitment to protecting and recovering species at risk and their habitats.

Under the ESA, the Government of Ontario must ensure that a recovery strategy is prepared for each species that is listed as endangered or threatened. A recovery strategy provides science-based advice to government on what is required to achieve recovery of a species.

Within nine months after a recovery strategy is prepared, the ESA requires the Ontario government to publish a statement summarizing the government's intended actions and priorities in response to the recovery strategy. The response statement is the government's policy response to the scientific advice provided in the recovery strategy. In addition to the strategy, the government response statement considered (where available) input from Indigenous communities and organizations, stakeholders, other jurisdictions, and members of the public. It reflects the best available local and scientific knowledge, including Traditional Ecological Knowledge where it has been shared by communities and Knowledge Holders, as appropriate and may be adapted if new information becomes available. In implementing the actions in the response statement, the ESA allows the government to determine what is feasible, taking into account social, cultural and economic factors.

The Recovery Strategy for the Jefferson Salamander (*Ambystoma jeffersonianum*) and Unisexual Ambystoma (Jefferson Salamander dependent population) (*Ambystoma laterale – (2) jeffersonianum*) in Ontario was completed on May 30, 2018. Given the similar distribution and threats, the recovery efforts for Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) are addressed collectively in a single government response statement. The government response statement for Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) builds on and replaces the existing government response statement for Jefferson Salamander (2010).

In 2010, the Government of Ontario developed a government response statement in response to the *Recovery Strategy for the Jefferson Salamander in Ontario* (2010). Since that time, progress has been made toward all government-led actions and several of the government-supported actions outlined in the GRS. Through the Species at Risk Stewardship Fund, the Ontario government has supported a total of 40 projects designed to contribute to the protection and recovery of Jefferson Salamander. Three of these projects focused exclusively on the species, while the other 37 projects focused on multiple species at risk, including Jefferson Salamander. For a complete summary of the progress that has been made toward the protection and recovery of Jefferson Salamander in Ontario please see the 2015 Five-Year Review of Progress.

Jefferson Salamander is a relatively large, uniformly grey to brownish-grey mole salamander with variable amounts of grey-blue speckling along the sides of the body and tail. The Unisexual Ambystoma (Jefferson Salamander dependent population), which co-exist with Jefferson Salamanders, are morphologically similar but genetically distinct. In Canada, the two species' have only been found in Southern Ontario, mainly along the Niagara Escarpment.

Protecting and Recovering Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population)

Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) (also referred to hereafter as Jefferson dependent unisexuals) are listed as endangered species under the ESA, which protects both the salamanders and their habitat. The ESA prohibits harm or harassment of the species and damage or destruction of their habitat without authorization. Such authorization would require that conditions established by the Ontario government be met. In addition to protection under the ESA, Jefferson Salamander is also listed under Schedule 10 of the *Fish and Wildlife Conservation* Act (FWCA) as a Specially Protected Amphibian.

The global distribution of the Jefferson Salamander is restricted to eastern North America. In Canada, they are only known to occur in southern Ontario, which represents the northern extent of the species' range. Jefferson dependent unisexuals are found in association with Jefferson Salamander populations throughout the Jefferson Salamander range. In Ontario, Jefferson Salamander and Jefferson dependent unisexuals generally occur in the eastern portion of the Carolinian zone and along the Niagara Escarpment. There are also geographically isolated populations

dispersed throughout the range. Present knowledge indicates that the current isolated sub-populations of these species are remnants of what was once a more extensive, continuous range throughout southern Ontario. Recent estimates for Jefferson Salamander suggest a decline of more than 90 percent over the last three generations (33 years) of this species in Ontario. Within their distribution in Ontario, both salamanders co-occur and are only differentiated from each other through genetic analysis.

Jefferson Salamander and Jefferson dependent unisexuals are members of the Mole Salamander family (*Ambystomatidae*), a family name that refers to spending the majority of their time underground or beneath cover except when breeding.

All Unisexual Ambystoma (Jefferson Salamander dependent population) salamanders are females and have a unique reproductive strategy whereby the sperm from male Jefferson Salamanders is needed to initiate egg development. Their offspring are unique in that they are also all females. While the sperm may or may not be incorporated into the Jefferson dependent unisexual egg, the species does not appear to be able to reproduce in the absence of a Jefferson Salamander. Therefore, the persistence of the Unisexual species is dependent on the presence of Jefferson Salamander.

Jefferson Salamander and Jefferson dependent unisexuals are the earliest of the mole salamanders to arrive at breeding ponds in the spring. They typically migrate to breeding ponds during the first rainy nights of the spring when temperatures are above freezing. Jefferson dependent unisexuals appear to exhibit the same behaviours as Jefferson Salamanders throughout their life cycle. Breeding commences when groups of adults gather in scattered locations in a breeding pond and males deposit their spermatophores on pond substrates. Within a day or two, females deposit egg masses on twigs or emergent vegetation. In Ontario, transformation from the aquatic (larval) to terrestrial body form normally occurs in July and August. After transformation the salamanders move out of the pond and seek shelter in forested areas, where they spend most of their time underground. Jefferson Salamanders, especially females, do not breed every year and breeding success varies depending on spring weather and water-levels.

Adult Jefferson Salamanders and Jefferson dependent unisexuals are found within deciduous or mixed upland forests containing, or adjacent to, suitable breeding ponds. Breeding ponds are typically ephemeral, or vernal, woodland pools that dry in late

summer. Terrestrial habitat is in mature woodlands that have small mammal burrows or rock fissures that enable adults to overwinter underground below the frost line.

In Ontario, the Jefferson Salamander and Jefferson dependent unisexuals are limited by availability of suitable habitat. The vast majority of suitable habitat in Ontario has been cleared, initially for agriculture and subsequently for urban development and there remains high development pressure on the limited remaining habitat. Key knowledge gaps include the effectiveness of mitigation measures to address threats, information on the species' movements including dispersal patterns, timing and distances, and habitat use, particularly the location and characteristics of overwintering habitat.

The primary threats to the two species include habitat loss, degradation, and fragmentation of woodlands and breeding ponds, road-related threats (e.g., vehicles and pollutants) and changes in pond hydrology. Other threats may include forestry activities, recreational activities, unauthorized collection, invasive and introduced species, agricultural land uses and climate change.

Currently there is insufficient science to support whether or not created features (e.g., artificial breeding ponds) can be successfully colonized. Given this, efforts to recover Jefferson Salamander and Jefferson dependent unisexuals will be focused on promoting the conservation and protection of existing populations and habitat, rather than creating new habitat. Priority will be given to reducing primary threats (i.e., road mortality, habitat degradation) and curtailing further loss or degradation of known habitat or potentially suitable habitat in areas where the species occurs or where their range is likely to naturally expand. Improving habitat connectivity will help enable the species' to naturally recolonize areas where they formerly occurred or where there is suitable habitat adjacent to occupied sites. Approaches to recovery will include continued inventory and monitoring, reducing threats to Jefferson Salamander and Jefferson dependent unisexuals and their habitat, filling knowledge gaps and increasing levels of engagement and awareness.

Government's Recovery Goal

The government's goal for the recovery of the Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) is to ensure long-term viability and persistence of the extant distribution, and to support the expansion of the species' range to include historically-occupied areas in Ontario.
This will be achieved through approaches such as removing or sufficiently mitigating high priority threats, enhancing or restoring habitat and improving habitat connectivity.

Actions

Protecting and recovering species at risk is a shared responsibility. No single agency or organization has the knowledge, authority or financial resources to protect and recover all of Ontario's species at risk. Successful recovery requires inter-governmental co-operation and the involvement of many individuals, organizations and communities. In developing the government response statement, the government considered what actions are feasible for the government to lead directly and what actions are feasible for the government to support its conservation partners to undertake.

Government-led Actions

To help protect and recover Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population), the government will directly undertake the following actions:

- Continue to protect Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) and their habitat through the ESA. Amend the 2010 habitat regulation for Jefferson Salamander to include the Unisexual Ambystoma (Jefferson Salamander dependent population) and expand the geographic scope to areas where the species' have been newly discovered. Continue to implement, promote compliance with and enforce habitat protections using the species-specific habitat regulation.

- Ensure appropriate timing windows as well as additional avoidance and/or mitigation measures are considered in the application of the ESA for activities undertaken in and around Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) habitat.

- Continue monitoring, restoration and awareness efforts in areas where Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) have been found in protected areas.

- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.

- Encourage the submission of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) data to Ontario's central repository through the citizen science projects that they receive data from (e.g., iNaturalist) and directly through the Natural Heritage Information Centre.

- Undertake communications and outreach to increase public awareness of species at risk in Ontario.

- Support conservation, agency, municipal and industry partners, and Indigenous communities and organizations to undertake activities to protect and recover Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population). Support will be provided where appropriate through funding, agreements, permits (including conditions) and/or advisory services.

- Encourage collaboration, and establish and communicate annual priority actions for government support in order to reduce duplication of efforts.

Government-supported Actions

The government endorses the following actions as being necessary for the protection and recovery of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population). Actions identified as “high” will be given priority consideration for funding under the Species at Risk Stewardship Program. Where reasonable, the government will also consider the priority assigned to these actions when reviewing and issuing authorizations under the ESA. Other organizations are encouraged to consider these priorities when developing projects or mitigation plans related to species at risk. The government will focus its support on these high-priority actions over the next five years.

Focus Area: Research, Monitoring and Population Management

Objective: Increase knowledge of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) distribution, biology, habitat requirements, threats, and limiting factors.

Although progress has been made toward the development of a standardized survey protocol, further action is required to implement the protocol to fill knowledge gaps around the species’ current distribution and range in Ontario, particularly in portions of the Oak Ridges Moraine and Greenbelt Plan areas. Knowledge gaps also exist around the species’ spatial ecology, including dispersal patterns, timing and distances. Confirming where the species’ are present and the habitat requirements for all life stages will help determine where recovery efforts are best focused. Implementation of a standardized long-term monitoring program will aid in understanding the status of both species, the effectiveness of recovery efforts, and determine whether habitat management actions may be required. Monitoring the proportion of Jefferson Salamander and Jefferson dependent unisexuals within sample populations will help fill

knowledge gaps in trends in these data over time. Jefferson Salamander and Jefferson dependent unisexuals are limited by the amount of suitable habitat. Understanding mitigation strategies to protect breeding pond hydrology will assist in ensuring suitable habitat is available for the full duration of the breeding period.

Actions:

1. **(High)** Implement a standardized survey protocol (i.e., presence/absence) to verify historic populations and document potential new populations of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population).
2. **(High)** Continue to research the species' movements and habitat use to inform habitat protection, including investigation of habitat needs for all life-stages and life processes.
3. Develop a standardized long-term monitoring protocol and monitoring schedule to be implemented at subpopulations throughout the species' range. Monitoring activities could include assessment of:
    - species presence/absence;
    - population viability, recruitment and distribution;
    - site-specific threats;
    - trends in habitat condition and use; and,
    - changes in proportional abundance of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population).
4. Investigate and test the effectiveness of mitigation approaches to reduce or avoid impacts to breeding and suitable breeding pond hydrology. Actions may include:
    - mitigation strategies (e.g., water management systems) to ensure sufficient quantity and duration of water present in breeding ponds adjacent to industry activities and,
    - addressing or mitigating the potential impacts of climate change on pond hydrology.

5. Investigate the effects and severity of additional known and potential threats to Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population), including:
    - the potential effects of introduced or invasive species; and,
    - the potential effects of environmental contaminants, disease and parasites.
6. Investigate the ecological relationship between Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) to assess potential demographic constraints to species' recovery (e.g., related to reproductive output, recruitment, and survival in the larval and adult life stages).
7. Investigate the potential need for, feasibility of and likely success of recruitment techniques at existing sites to support the recovery goal for Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population). If found to be feasible and necessary, implement, evaluate, adapt and improve recruitment techniques with consideration for Jefferson Salamander ecology and the Unisexual Ambystoma (Jefferson Salamander dependent population) as a whole. An example of a priority recruitment technique is:
    - exploring the potential benefits and need for a cost effective head-starting protocol/program (e.g., reproductive monitoring, artificial incubation of eggs, and release of juveniles).

Focus Area:	**Habitat and Threat Management**
Objective:	Maintain or improve habitat quality and reduce threats to Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population).

Habitat loss, fragmentation and degradation are considered the greatest threats to Jefferson Salamander and Jefferson dependent unisexuals across their global range, including Ontario. Developing, implementing and evaluating practical actions that municipalities, developers, academics, conservation partners and the public can undertake to address high priority threats, such as road mortality, will help support the

protection and recovery of these species. Promoting beneficial actions that stakeholders, land managers and Indigenous communities and organizations can take proactively to enhance and restore habitat and improve habitat connectivity are also encouraged.

Actions:

8. **(High)** Collaborate with municipalities, developers, local organizations and members of the public to mitigate the effects of roads. Actions may include:
    - developing, implementing and evaluating the effectiveness of best management practices and techniques to reduce road mortality (e.g., ecopassages, barrier fencing, traffic calming measures, seasonal closures) particularly in areas of high mortality;
    - installing permanent control measures to prevent sediment and pollution from roads from entering breeding ponds; and,
    - developing programs or campaigns to reduce road mortality, which may include installing signs and publicizing the need for cautious driving, particularly in areas of high mortality.
9. Collaborate with local groups and land managers to assess current, historic and presently unoccupied areas with suitable habitat and identify candidate areas for habitat enhancement and restoration, prioritizing currently occupied habitat. This may involve identifying site-specific restoration needs and goals and developing restoration plans. Actions could include:
    - targeting removal of fish or invasive species from breeding ponds using appropriate and approved methods;
    - creating a mosaic of suitable habitat with a focus on increasing connectivity between suitable habitat patches; and,
    - applying techniques to ensure sufficient water levels and quality in breeding ponds during the breeding season. This may include buffering for the potential effects of

climate change on water levels in the future and exploring opportunities to support hydrology at a watershed scale (e.g., restoring riparian habitat).

10. Develop, implement and evaluate best management practices and techniques to mitigate impacts of additional threats (e.g., industry activities, recreational use) on Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) individuals and their habitat.

Focus Area:	**Awareness**
Objective:	Increase public awareness and promote protection of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) and their habitats in Ontario.

Increasing awareness amongst local land managers, municipalities and developers and promoting integration with other relevant planning processes are critical to addressing key threats such as habitat loss and road mortality. Raising awareness amongst the public, local land owners and organizations of Jefferson Salamander and Jefferson dependent unisexuals, as well as how to reduce threats to the species' and how to enhance their habitat will help promote and encourage protection of the species' and their habitat in Ontario.

Actions:

11. **(High)** Support the development of tools and approaches for municipalities, planning authorities, industries, property managers and other stakeholders to ensure habitat mapping and protection requirements under the ESA are integrated into official plans and other relevant planning processes.

12. Identify communication needs and develop products that will provide information and resources to landowners, property managers, the aggregate industry, local stewardship councils, local conservation authorities and other stakeholders to assist in recovery efforts and promote land stewardship.

Implementing Actions

Financial support for the implementation of actions may be available through the Species at Risk Stewardship Program. Conservation partners are encouraged to discuss project proposals related to the actions in this response statement with program

staff. The Ontario government can also advise if any authorizations under the ESA or other legislation may be required to undertake the project.

Implementation of the actions may be subject to changing priorities across the multitude of species at risk, available resources and the capacity of partners to undertake recovery activities. Where appropriate, the implementation of actions for multiple species will be co-ordinated across government response statements.

Reviewing Progress

The ESA requires the Ontario government to conduct a review of progress towards protecting and recovering a species not later than five years from the publication of this response statement. The review will help identify if adjustments are needed to achieve the protection and recovery of Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population).

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Jefferson Salamander (Ambystoma jeffersonianum) and Unisexual Ambystoma (Jefferson Salamander dependent population) (Ambystoma laterale – (2) jeffersonianum) in Ontario for their dedication to protecting and recovering species at risk.

For Additional Information:

Visit the species at risk website at ontario.ca/speciesatrisk
Contact the Natural Resources Information Centre
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