

## **Project: Science for Monarch Butterfly and Pollinator Conservation**

### **1. Two-year budget: C\$520,000**

### **2. Short statement on the need identified (including current status), the project objective and the outcomes (achievable by June 2019) to address it:**

Monarch populations have declined significantly, triggering an unprecedented international effort to conserve this flagship species. The monarch butterfly represents a broad group of pollinators critical to our food security (including other butterflies and moths, honey bees, other bees and some wasps, and certain beetles) and as well, the flowering grassland habitat these pollinators need in order to thrive. Policy makers are engaged in pollinator conservation at all levels—federal, state, provincial and local. Filling priority science gaps will inform policy-making and targeted conservation actions, while enhancing public knowledge and support for conservation. Significant gaps in scientific knowledge on monarchs include a full understanding of their migration, demography, use of and need for nectar resources, and the impact of changing conditions on the population. Because of the monarch's charismatic nature, monarch scientific work receives high levels of interest from the media and the public. Monarchs are also featured in many educational programs in classrooms and other formal and informal learning environments (e.g., botanical gardens, zoos). In this respect, they are a gateway to learning about science, biodiversity, insect life cycles and conservation.

Ten years ago, a project with the Commission for Environmental Cooperation (CEC) led to the publication of the *North American Monarch Conservation Plan*, and more recent CEC projects have supported trilateral collaboration for monarch conservation in the areas of habitat and outreach/education. This recent work has laid a strong foundation for continental conservation of the species, by setting up processes for trilateral work, identifying trilateral priorities and initiating the coordination of communications and on the ground actions across the three countries. Building on this work, the current project focuses on one of the identified priorities, the need to implement cohesive coordination of monitoring and research that will contribute to adaptive conservation actions for monarchs, by leveraging the Trilateral Monarch Conservation Science Partnership (T-MCSP) to give it a lasting impact.

The project will focus on: 1) coordination (e.g., working groups and work plan for the trilateral science partnership); 2) implementation of a trilateral monitoring strategy with shared protocols and integrated data; 3) research to address shared priorities (i.e., overwintering density, natal origins, nectar resources, and climate change) and dissemination of results to assist planning, management and actions (e.g., geospatial habitat mapping). Project results will support broader knowledge and action for pollinator conservation, particularly to better understand nectar resources and climate impacts, since monarchs and pollinators depend on the same habitat and nectar resources. Through this work, national agencies and conservation organizations will be able to prioritize their actions for more effective science-based conservation results.

**3. Explain how the project can achieve more impact by working trinationally, and why the CEC is the most effective vehicle to undertake this work:**

The monarch's unique migratory nature makes working trinationally an imperative, the necessity to coordinate and leverage national efforts to help ensure that national investments are protected and result in more effective monarch conservation. The CEC's experience in facilitating coordinated action across the three countries makes it the most effective vehicle to help accomplish this. This project provides a unique and timely opportunity to highlight and empower a new and innovative model for international scientific collaboration in order to conserve a shared migratory species. The CEC has created forums to enhance these types of collaborations in the past, providing a value-added support structure to enhance such an effort that will continue on after this project is completed.

**4. Describe how the project may capitalize on, or advance, the relationship between ecosystems, job creation, gender impacts, and income generation:**

Pollinators are vital to food security because most fruit, vegetable, and seed crops are pollinated by animals. Numerous species of North American pollinators are in decline, including managed honey bees. In addition to the economic value of pollinators' contribution to our food supply, animal pollination provides essential functions for a wide range of other natural communities in North America. The monarch butterfly serves as a flagship for the flowering grassland habitat these pollinators need to thrive. Investing in science and conservation in the monarch's migratory route and overwintering grounds provides multiple economic benefits, including job opportunities, e.g., reforestation and monitoring efforts. For example, monitoring efforts in Mexico involve 42 protected areas and dozens of employees and volunteers. The Monarch Butterfly Biosphere Reserve (MBBR) in central Mexico provides a protected winter home for the monarchs, as well as a means for local communities to generate revenue from tourism. More than 150,000 tourists visit the overwintering colonies every year. Investing in enhanced science, which includes monitoring, will support adaptive management of the MBBR and other key resources across the monarch's range that will also directly inform broader pollinator research and conservation.

**5. Describe how the project complements or avoids duplication with other national or international work:**

This project focuses on value-added integration of ongoing efforts in Canada, Mexico, and the United States. Collaborative efforts are coordinated through the Trilateral Committee for Wildlife and Ecosystem Conservation and Management (Trilateral Committee), under the leadership of the US Fish and Wildlife Service, Environment and Climate Change Canada, and Mexico's National Commission of Protected Natural Areas. The CEC has played a critical role in serving as a launching pad for implementation, convergence, and expansion of previous and similar ongoing efforts. This project fills a critical gap in achieving trilateral objectives under the 2008 North American Monarch Conservation Plan, which the CEC published, in the area of applied science needed to drive conservation action and decision-making. The Trilateral Committee endorsed the Trilateral Monarch Conservation Science Partnership (T-MCSP) in 2016. The Trilateral Committee continues to serve as a forum for monitoring T-MCSP progress and avoiding duplication with other international work, while linking coordinated and focused science and research with action and implementation.

**6. Describe opportunities for inclusion of traditional ecological knowledge (TEK), if applicable, and how these opportunities are incorporated into the project:**

Past CEC efforts included a study to identify TEK related to monarch conservation in Canada, Mexico and the United States. The report, based on a review of publicly available literature, found very little monarch-specific TEK throughout the migratory corridor. However, recent work has highlighted an interest from local and Indigenous communities in monarch and pollinator habitat creation and conservation, as one way to build on or renew with a traditional role as stewards of nature. The project will consider local and traditional knowledge under its monitoring work along the migration route; local and Indigenous communities from the areas around monitoring sites will be invited to the workshops and to citizen science monitoring efforts.

**7. Describe opportunities for youth engagement, if applicable, and how these opportunities are incorporated into the project:**

Monitoring for monarch conservation relies heavily on citizen-science programs in all three countries, which provides incredible opportunities to engage young people. Participating partners in the T-MCSP work with university students and community members (including kids and families) to recruit, train, and deploy volunteer citizen-scientists to collect important data on monarch butterflies, milkweed, and nectar plants to engage thousands of young people. The integrated monitoring strategy called for in this proposal will support those programs. Additionally, the monitoring work involves different land-cover types while engaging those sector-specific stakeholders, including rights-of-ways, and urban, agricultural, and protected areas.

**8. List significant involvement of other levels of government, Indigenous groups, local communities, experts, private sector, civil society and others, as applicable:**

This effort encompasses broad trilateral collaboration of government agencies, academic institutions, and nongovernmental organizations. It builds upon their existing work and capacities, including research sponsored by both government and universities. The T-MCSP brings together the leading experts on monarch science in all three countries, acting as a “think tank” for monarch conservation, and this project would benefit directly from that expertise. The leading targeted partners for this project include:

- Government - US Fish and Wildlife Service, US Geological Survey, and Natural Resources Conservation Service (US Department of Agriculture) from the US; Environment and Climate Change Canada, Canadian Wildlife Service, and Parks Canada from Canada; and *Comisión Nacional de Áreas Naturales Protegidas* (Conanp), *Comisión Nacional para el Conocimiento y Uso de la Biodiversidad* (Conabio), and the *Instituto Nacional de Ecología y Cambio Climático* (INECC) from Mexico.
- Academia - University of Guelph, University of Western Ontario, University of Ottawa, and University of Calgary from Canada; University of Minnesota, University of Kansas, and University of Arizona from the US; *Instituto de Biología*, *Universidad Nacional Autónoma de México* (UNAM) from Mexico.
- Nongovernment - *Insectarium de Montréal* from Canada; Monarch Joint Venture (a partnership of over 54 organizations in the United States, including Xerces Society for Invertebrate Conservation and Monarch Watch) from the United States;

World Wildlife Fund-Mexico, *Fondo Mexicano para la Conservación de la Naturaleza, Ecosistémica and Pronatura México* from Mexico.

By working together with such diverse and engaged partners, this project will make the most effective and efficient use of resources for better informed decision-making. The project also engages local communities, Indigenous groups, and local civil society groups in the monarch’s migratory route by leveraging them as citizen scientists and collaborators on monitoring and research projects.

**9. Identify relevant committee members and their federal agencies in each country committed to developing this project, and implementing it, if approved:**

Canada: **Gregory Mitchell** (Environment and Climate Change Canada), [gregory.mitchell@canada.ca](mailto:gregory.mitchell@canada.ca)

Mexico: **Ignacio March Misfut** (*Comisión Nacional de Áreas Naturales Protegidas*), [ignacio.march@conanp.gob.mx](mailto:ignacio.march@conanp.gob.mx)

United States: **Ryan Drum** (US Fish and Wildlife Service), [ryan\\_drum@fws.gov](mailto:ryan_drum@fws.gov)

In collaboration with: **Víctor Sánchez-Cordero** (*Instituto de Biología, UNAM*), [victor@ib.unam.mx](mailto:victor@ib.unam.mx); **Michael Gale** (US Fish and Wildlife Service), [Michael\\_gale@fws.gov](mailto:Michael_gale@fws.gov); **Holly Holt** (Monarch Joint Venture), [hholt@umn.edu](mailto:hholt@umn.edu); **Keith Hobson** (Environment and Climate Change Canada), [khobson6@uwo.ca](mailto:khobson6@uwo.ca); **Maxim Larrivee** (*Insectarium de Montréal*), [maxim.larrivee@ville.montreal.qc.ca](mailto:maxim.larrivee@ville.montreal.qc.ca); and other members of the T-MCSP.

**10. List the objectives and activities to be conducted to achieve measurable results:**

Objectives	Main activities to achieve objectives	Measurable results
By June 2019, the current status of monarch science in the three countries is known and cohesive trinational coordination of monarch science has been achieved through the Trinational Monarch Conservation Science Partnership (T-MCSP)	<b>Activity 1</b> Coordinate monarch science based on trinationally-agreed priority areas	Trinational monarch science efforts are coordinated across the three countries  Monarch experts, policy-makers, NGOs, and the public are informed on the status of the science
By June 2019, a trinational monitoring strategy is in place that integrates biological monitoring protocols and databases across the three countries to support monarch conservation efforts	<b>Activity 2</b> Development of trinational monitoring strategy	A trinational monitoring strategy that integrates biological monitoring protocols and databases across the three countries is implemented

<b>Objectives</b>	<b>Main activities to achieve objectives</b>	<b>Measurable results</b>
Pilot studies contribute to addressing knowledge gaps in four priority areas for research (overwintering density, natal origins, nectar resources for monarchs and pollinators, and climate change)	<b>Activity 3</b> Produce original research and demonstrations focused on knowledge gaps in four priority areas	Reports and demonstration studies on the four research priorities are completed and made available to monarch experts