Nature-based Solutions to Address Flooding in Coastal Cities

1. **Project duration:** from November 2021 to November 2025 (48 months)
   The implementation periods of the activities might differ from what is described in this document

2. **Budget (C$):** 560,000

3. **Short statement of the issue(s) under this topic, need/gap identified; the project objective(s) and activities to address the issue; and expected outcomes and benefits/beneficiaries:**
   Many North Americans live in coastal cities that produce a high value of goods and services but are vulnerable to flooding. The risks associated with coastal flood hazards are escalating due to land-use changes, ecosystem loss or transformation, population growth in coastal zones, sea-level rise, changes in the frequency and severity of storms, and ageing flood protection infrastructure. Tide- and storm-driven flooding is increasingly damaging homes and infrastructure, and generally disrupting coastal communities and their economies.

   Natural areas adjacent to cities provide ecosystem benefits and services that support climate change adaptation for communities. Inspired by these systems, nature-based solutions (NBS) reduce flood and erosion risk through the protection, restoration, and sustainable management of natural coastal environments, and the construction of new features that mimic or work with ecological processes. NBS contribute to increased resilience in coastal areas, helping to manage risks with cost-effective, holistic, and innovative approaches, while also delivering co-benefits, such as habitat, recreation, and water quality. As countries look to finance infrastructure work in the context of a COVID-19 economic recovery, NBS represent one promising way to combine development, climate, disaster risk reduction and conservation objectives.

   Despite growing interest in these solutions, there are many gaps and barriers currently preventing broader implementation of NBS in North America. These include a lack of data and authoritative design guidance, difficulty quantifying co-benefits and creating business cases, and uncertainty concerning efficacy and performance in extreme conditions, different environments, and changing climate conditions. Collaboration and interdisciplinary approaches that consider future climate conditions are needed to overcome these challenges.

   Building on past collaborative experiences advancing knowledge on blue carbon, coastal adaptation, and extreme events, the CEC is uniquely placed to build capacity for coastal communities to manage flood risk in a changing climate through NBS that maximize co-benefits to human and natural communities. In particular, the project provides a first opportunity for NBS practitioners, working across North America in a broad range of disciplines, to lay the foundation for a North American community of practice that can offer an interdisciplinary approach to implementing NBS. It also addresses barriers to using NBS by filling knowledge gaps on co-benefits, retrofitting and monitoring, and by training practitioners and educating community members on the use of NBS.

4. **Select the strategic pillar(s) from the 2021-2025 Strategic Plan that the project addresses:**
    ☐ Clean Air, Land and Water
    ☐ Preventing and Reducing Pollution in the Marine Environment
    ☐ Circular Economy and Sustainable Materials Management
    ☒ Shared Ecosystems and Species
    ☒ Resilient Economies and Communities
    ☐ Effective Enforcement of Environmental Laws

5. **Describe how the project uses strategic cross-cutting approaches in its implementation: Innovative and Effective Solutions and/or Diverse and Inclusive Stakeholder Engagement and Public Participation (including gender and diversity effects and opportunities, and youth):**
    The project's first objective is to seed new intersectoral, international collaboration through diverse and inclusive engagement to help fill knowledge gaps and implementation challenges that currently limit the use of NBS. As such, it will promote the use of underutilized innovative and effective solutions to address flooding in coastal cities. Effective NBS deliver on coastal flooding management and prevention while adding several co-benefits not offered by traditional infrastructure, namely carbon sequestration, habitat creation and other conservation objectives that will translate into ecosystem services of high value to fisheries and tourism, among other sectors.

6. **Explain how the project can achieve more impact through trinational cooperation:**
    While there is expertise and experience applied to develop NBS to address flooding in coastal cities in each of the three countries, there is very little collaboration and knowledge-sharing across countries, approaches, and fields of expertise. The CEC offers a unique forum to foster the development of integrated flood risk management approaches across North America, integrating sector-specific knowledge and expertise from the three countries to lay the foundation for the creation of a North American NBS community of practice and leverage existing knowledge.

7. **Describe how the project complements, or avoids duplication with, other national or international work:**
    While each country has developed expertise and experience applying NBS to coastal flooding, there is no international multidisciplinary community of practice focused on this. The project committee has identified and shared the main relevant initiatives and sources of information available in each country and internationally and will begin the project with an intersectoral scoping workshop to discuss most recent developments, opportunities, and specific priorities to advance within the project in the context of ongoing national and international work.

8. **Describe how the project engages traditional ecological knowledge (TEK) experts or Tribal/First Nations/Indigenous communities, if applicable:**

   The project will engage Indigenous and local communities as it develops its community of practice, and as participants in webinars, trainings, and site visits, as applicable.

9. **Describe how the project engages new audiences or partners, if applicable:**

   The project targets coastal city decision-makers, planners and managers, project funders and evaluators, infrastructure engineers, coastal engineers, risk reduction practitioners, conservation and restoration ecologists and researchers in several disciplines, most of whom have not engaged with the CEC in the past.

10. **Identify the designated partner agencies or organizations committed to implementing this project, as well as other organizations that could be involved, or benefit from it, including through outreach efforts, collaborations or partnerships (e.g., federal agencies, other levels of government, academia, NGOs, the private sector, civil society, and youth):**

Lead agencies or organizations	Country
Infrastructure Canada, Natural Resources Canada, National Research Council of Canada,	Canada
Semarnat, Conabio, Conagua, Profepa, INECC	Mexico
NOAA, USACE, USGS, FEMA, EPA	United States
Other organizations/individuals	**Country**
Department of Fisheries and Oceans Canada	Canada
Conanp, Mexican Chamber of Construction Industry	Mexico
International Joint Commission (IJC)	Canada-United States
NGOs (WWF, others TBD)	Canada, Mexico, United States
Provincial and State agencies	Canada, Mexico, United States
Local/ municipal/ regional authorities	Canada, Mexico, United States
Academic experts	Canada, Mexico, United States

11. **In the following table, describe: the project objective(s) and the activities and subtasks planned to achieve the objective(s); the corresponding outputs, expected results and how they will be measured (performance measures); baselines (if known), and targets by end of the project; and the timeline and budget:**

OBJECTIVE 1	**Produce knowledge informed by multidisciplinary expertise to support the use of NBS by coastal communities vulnerable to flooding.**
Activity 1 Budget C$40,000	Establish trinational intersectoral collaboration to support the use of NBS to address coastal flooding in cities.
Output(s)	- A workshop report identifying specific opportunities and priority areas for trinational work - A North American multidisciplinary core group of practitioners (ad hoc community of practice) sharing experience on integrated coastal flood risk management in urban areas
Expected results, performance measures	Members of the ad hoc multidisciplinary community of practice can collaborate on common priorities to support the implementation of NBS for coastal flood risk management (measures TBD).
Baseline (current status), if known	- Opportunities and priority areas for intersectoral trinational work have not been identified. - There is no North American multidisciplinary core group of NBS practitioners.
Target (by project end)	- Opportunities and priority areas for intersectoral trinational work are identified. - The ad hoc community of practice includes members from each country for most sectors identified.
Subtask 1.1	Host an intersectoral scoping workshop series with participants covering a range of NBS-relevant disciplines and agencies (e.g., NBS application, disaster risk reduction, climate change adaptation, municipal flood management, conservation practitioners, scientists, engineers, contractors, planners, policy makers, municipal representatives, project funders and evaluators), to identify specific opportunities to fill gaps and leverage existing efforts.	early2022
Activity 2 Budget C$400,000	Provide knowledge and tools for communities to support NBS implementation.
Output(s)	- A socio-economic analysis of NBS co-benefits - A practical synthesis of existing knowledge on retrofitting existing infrastructure while enhancing co-benefits - A practical synthesis of existing knowledge on monitoring the efficacy of NBS under current and future conditions - A high-level guidance document on methodology and indicators to monitor the efficacy of NBS - A collection of selected case studies highlighting best practices of implementing NBS in coastal cities - Communications material on NBS co-benefits

Expected results, performance measures	Outputs are used to inform the development of webinars and other engagement actions under Objective 2.	
Baseline (current status), if known	- Limited socio-economic analysis of NBS co-benefits - Limited practical synthesis of existing knowledge on retrofitting existing infrastructure while enhancing co-benefits - Limited practical synthesis of existing knowledge on monitoring the efficacy of NBS under current and future conditions - Limited guidance on methodology and indicators to monitor the efficacy of NBS - Case studies highlighting best practices of implementing NBS in coastal cities exist but they do not account for co-benefits and future conditions. - Limited communications material on NBS co-benefits	
Target (by project end)	A minimum of 10 information products are made available.	
Subtask 2.1	Produce a socio-economic analysis of NBS co-benefits (job creation, resilience to climate change and other stressors, environmental quality, carbon sequestration, biodiversity conservation, access to nature, human health, equity and inclusion).	mid 2022–late 2023
Subtask 2.2	Produce a practical synthesis of existing knowledge on retrofitting existing infrastructure while enhancing co-benefits.	mid 2022–late 2022
Subtask 2.3	Produce a series of case studies highlighting best practices of implementing NBS in coastal cities (how communities achieve this under existing conditions, contrast with usual way of doing thing).	mid 2022–early 2023
Subtask 2.4	Produce a synthesis of existing knowledge on monitoring the efficacy of NBS under current and future conditions with proposed methodology and indicators to monitor the efficacy of NBS.	early 2022–late 2023
Subtask 2.5	Produce information products based on the results of the analyses on co-benefits and on retrofitting.	early - late 2023
OBJECTIVE 2	**Strengthen local capacity to implement NBS by exchanging knowledge across disciplines and the three countries.**	
Activity 3 Budget C$120,000	Share practical experience on implementing NBS.	

Output(s)	- Online training for professionals and municipal and federal staff on good practices for planning, implementing, and monitoring NBS for coastal communities in a changing climate - Webinars for practitioners sharing their experience implementing and evaluating the performance of NBS projects - Site exchanges on different types of coastal assets	
Expected results, performance measures	Professionals and staff can apply good practices for planning, implementing and monitoring NBS for coastal communities.	
Baseline (current status), if known	- There are online trainings on some aspects of NBS but they are not designed for a wide North American audience	
Target (by project end)	- Webinars on implementation and evaluation of NBS projects - Three site exchanges (focused on different types of coastal assets)	
Subtask 3.1	Deliver trainings on the implementation and monitoring of NBS for local communities	mid–late 2023
Subtask 3.2	Create a series of webinars for practitioners to share their experience implementing and evaluating the performance of NBS projects	early–mid 2023
Subtask 3.3	Host workshops on barriers and opportunities for NBS	early-mid 2023

12. Describe <u>post-project</u> expected impacts:

Expected impact (by when: month, year)	SMART performance measure(s)
By December 2025, a North American community of practice that can offer an interdisciplinary approach to implementing NBS will have been formally established	A community of practice will have established the leadership and financial capacity to support engagement in NBS across North America
By December 2025, decision-makers in coastal cities will be using information developed by the project to support the use of NBS over that of traditional infrastructure when applicable	Evidence based on surveys that communities are planning to use NBS in infrastructure to address flooding based on information provided by the project
By December 2030, coastal cities will be using NBS in retrofitting or newly-developed infrastructure to address coastal flooding in a changing climate	Evidence based on surveys that communities are implementing NBS in infrastructure to address flooding based on information provided by the project