Survey on the Adoption of Natural Infrastructure in the Water Sector

Canadian Water & Wastewater Association
Utility Leadership Committee
Carl Bodimeade, Chair
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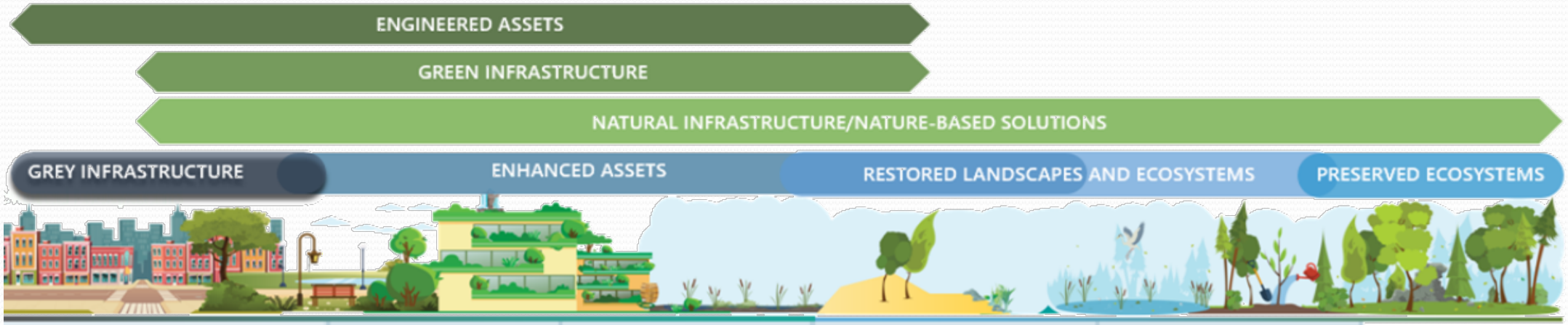
What is “Natural Infrastructure”?

- Wide range of interpretations (confirmed by survey responses)
- CCME Best Practices document, 2018 & Framework document, 2021
- *“The Canadian Council of Ministers of the Environment (CCME) has defined Natural Infrastructure as the use of preserved, restored or enhanced elements or combinations of vegetation and associated biology, land, water and naturally occurring ecological processes to meet targeted infrastructure outcomes (CCME 2018).”*
- For purposes of survey, the term Natural Infrastructure (NI) was used as a general term to encompass Green Infrastructure, Low Impact Development, and other similar nature-based approaches.

Typology of Infrastructure Types



CLIMATE-RELATED CHALLENGES

Grey infrastructure refers to engineered assets made exclusively of materials such as concrete and steel.

While considerable expertise has accrued on best practices for their design, they are not typically highly resilient to the impacts of climate change.

Nature-based solutions can be used in place of grey infrastructure, or in tandem to create a hybrid approach, to enhance resilience of the infrastructure asset, and provide many other co-benefits.

EXAMPLES OF NATURE-BASED SOLUTIONS

STORMWATER	EXTREME HEAT	COASTAL HAZARDS	RIVERINE FLOODS	
Low-Impact Development E.g. Absorbent landscaping, rain gardens, permeable pavement, green roofs, vegetated swales	**Urban Trees and Greening Projects** E.g. Urban parks, woodlands, tree planting, green roofs and walls	**Hybrid Infrastructure** E.g. Integrating hard defenses and soft armouring, vegetated dikes, beach nourishment, rock placement to complement sea walls, dune restoration, eelgrass beds	**Restoration Projects** E.g. Restored and working landscapes; protecting and enhancing riparian areas, shorelines, forests, grasslands, wetlands, ponds and streams	**Preserved ecosystems** can serve important infrastructure functions, similar to restored landscapes, but offer added ecosystem benefits given their intact state.

CCME, 2021

Survey Objectives

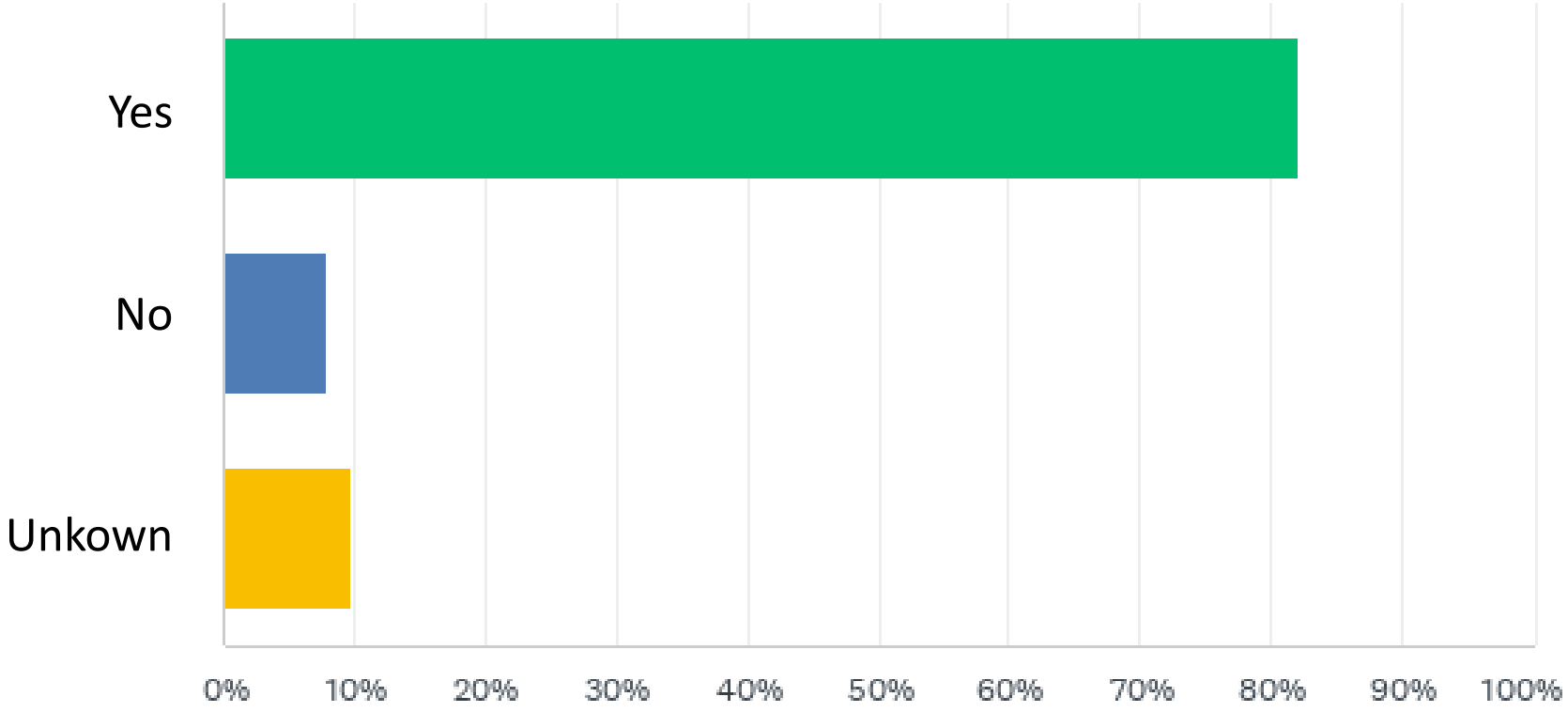
- Assess level of knowledge and adoption of Natural Infrastructure (NI) in the water sector
- Gauge priorities and needs of CWWA membership on this subject
- Determine next steps for CWWA
  - Knowledge sharing
  - Position Statement
  - Communications with government
  - Identify partnerships with other organizations
- Undertaken in collaboration with CWWA's Climate Change Committee

Format and Response

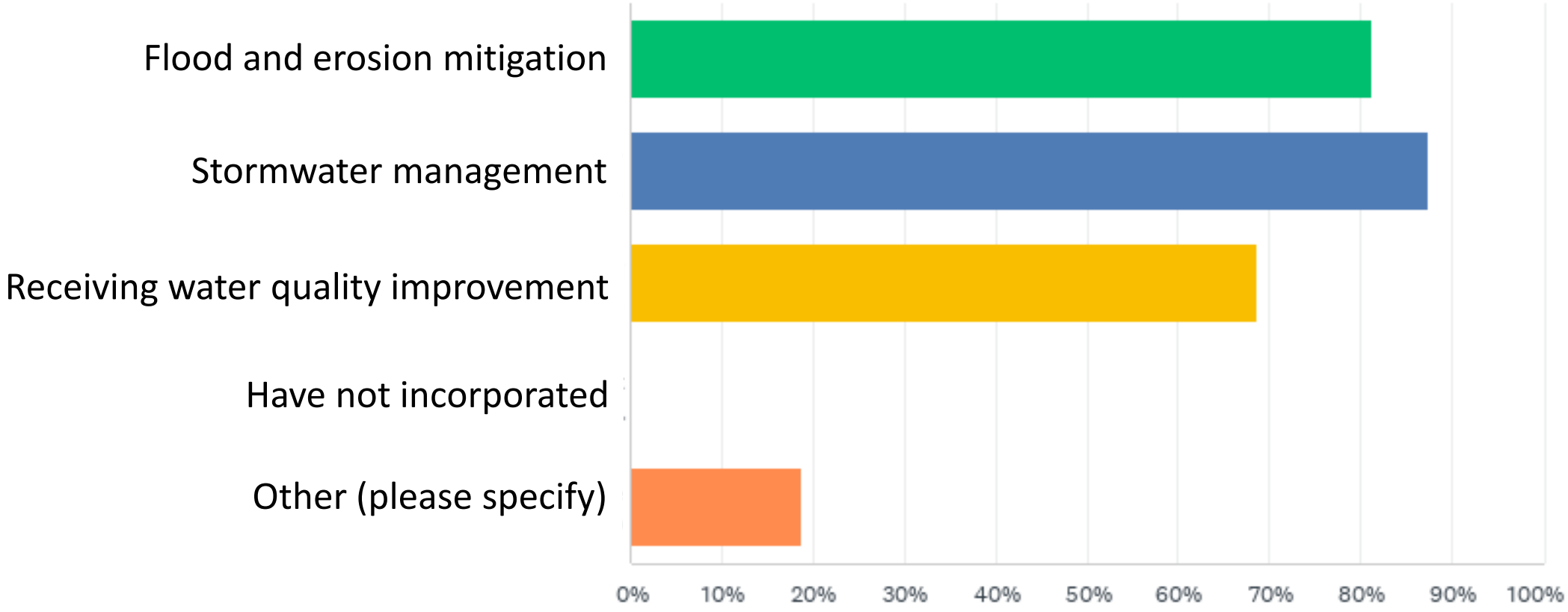
- **Five sections to survey**
  - Respondent & Organization Information
  - Organizational Knowledge & Capabilities
  - Experience & Examples
  - Planning & Funding
  - Closing Questions & Comments

- **Response** – Thank you to all participants!
  - Open Jan 24, 2023 to Feb 28, 2023
  - 129 responses
  - Largely municipalities, but also utilities, consultants, suppliers and government
  - Large (>1M) to small (5,000) population served
  - 34 examples provided

Q11 Does your organization consider NI to be a possible solution to some of its infrastructure challenges?



Q13 For what purpose has your organization incorporated NI into projects?



Examples

- 34 examples received from 17 contributors
- Largely municipalities, but 1 each from consultant, NGO, industry association and university
- 3 BC, 1 AB, 1 MN, 9 ON, 1 QC, 2 NS
- Types:
  - General NI Asset Programming Improvements
  - Preservation/Restoration of Natural Ecosystem
  - New NI Construction/Installation
  - Green Roof/Wall
- Purposes (selected) – watershed or stormwater management, wildfire suppression, natural ecosystem restoration, GHG reduction, **combinations**
- Majority ongoing to 10 years old, 3 over 50 years old!

Key Points

1. Majority of responses largely received from organisations serving a larger population with larger capacity systems. This likely reflects that larger organisations have greater capacity to both implement Natural Infrastructure projects and to respond to surveys such as this.

2. **No universal definition of NI**
   - It appears that multiple terms and definitions are used to describe Natural Infrastructure across the country.
   - Multiple respondents referred to CCME's definition.
   - Still a need for universally accepted terminology and definition.

Key Points (cont.)

3. Vast majority of respondents recognized NI as a possible solution to their infrastructure challenges.

4. Majority of responses indicated that **objectives for implementing NI programs and projects** were for
   - watershed protection
   - flood and erosion management
   - stormwater management
   - receiving water quality improvement
   - many projects fulfil several of those purposes.
   - other purposes included: reducing overflow to rivers, erosion risk management, restoration and resource management, research and enhancing wetlands for wildlife.

Key Points (cont.)

5. **Wide range of groups may participate in NI programs and projects**, such as:
   - Public works
   - Transportation
   - Parks & recreation
   - Facilities
   - Engineering
   - Planning
   - Development
   - As well as watershed planning and protection organisations, and local, non-governmental watershed groups.

Key Points (cont.)

6. **Asset Management**
   - Majority (about two-thirds) of respondents indicated their organisation had a formal asset management program, 15% of the respondents were unsure if they did, and another 22% indicated that they did not.
   - Third of organisations responding either do not have an asset management program or their staff are unsure if they have one
   - There is still a need to increase awareness and funding for asset management;
   - Likely applies to all aspects of the organization and not just NI.

Key Points (cont.)

7. **Barriers to greater implementation of NI initiatives.**
   - Most common was a lack of "knowledge"; defined in several ways, including:
     - Lack of understanding of the benefits and performance of NI;
     - Lack of expertise/knowledge to properly plan, design, and maintain NI; and
     - Lack of standards for adoption of NI.

   - Many respondents also indicated that lack of funding was also a barrier.

CWWA

Key Points (cont.)

8. **Current needs**
   - Generally in response to the knowledge gaps identified previously.
     - tools to help evaluate the benefits of NI (including cost benefits);
     - standards and specifications for the design of NI; and
     - better guidance/information on where, when and what type of NI should be incorporated to maximize benefits.
   - Additional provincial/federal funding programs specifically focused on promoting implementation of NI programs and projects would also help advance its uptake.

Key Points (cont.)

9. Respondents viewed **CWWA's role** as both an *information provider* and *facilitator*.
   - As an *information provider*, CWWA could curate existing knowledge and best practices for the adoption of NI and make those resources available to stakeholders.
   - As a *facilitator*, CWWA could promote the benefits, successes, and best practices of NI both to adopters and to potential funding providers. In addition, CWWA could leverage its relationships with government and other stakeholders, as well as its membership's expertise, to ensure effective standards for NI are developed.

Next Steps

- Publish survey report – Q1, 2024
- Develop CWWA Position Statement on NI
- Ongoing advocacy and collaboration with relevant federal government agencies

Questions & Panel Discussion