



## CLIMATE CHANGE ADAPTATION PLANNING FOR MARINAS AND BOAT HARBOURS

### PROPOSED TECHNICAL WORKING GROUP

#### TERMS OF REFERENCE

### 1. Historical Background Definition of the problem

Recreational navigation and nautical tourism infrastructure will be adversely affected by climate change. In addition to playing their role in carbon management and decarbonisation (i.e. moving to 'net zero' greenhouse gas emissions), designers, owners and operators of such infrastructure need to take action to strengthen resilience and adapt to climate change. This includes planning for gradual changes in parameters such as temperature and sea level, and to the expected increase in the frequency and severity of extreme events.

Climate change represents a significant risk to facilities and operations of recreational navigation infrastructure, marina businesses and the multiple economic activities that they enable and support. Conversely, a positive, proactive response can both reduce these risks and bring business opportunities.

PIANC has recently developed important guidance on climate change including:

- PTGCC Technical Note No.1-2022: Managing Climate Change Uncertainties in Selecting, Designing and Evaluating Options for Resilient Navigation Infrastructure
- EnviCom 178: Climate Change Adaptation Planning for Ports and Inland Waterways (2020)
- EnviCom 188: Carbon Management for Port and Navigation Infrastructure (2019)

While these documents provide excellent background information on climate change and its relevance to the waterborne transport sector as a whole, their focus tends to be on larger transport facilities such as ports and inland commercial shipping infrastructure. Different challenges and opportunities are faced by recreational navigation and nautical tourism infrastructure, and some smaller multi-purpose transport facilities.

Sustainability and continued growth of recreational boating and nautical tourism will require resilient infrastructure and the ability to go boating in a safe environment. Both will likely be impacted by climate change. Marinas and small craft boat harbours are often in locations that are vulnerable to the impact of climate change, so increased risks for physical impacts are a primary concern. Additionally, changes in climate patterns may also change visitation preference and usage of waterways and boating destinations.

The business consequences of climate change will be significant and may include: increased risks of physical impacts, increased maintenance and operations costs, higher insurance premiums, higher risks of business interruption, new information requirements of investors and lenders, and transitional risks (regulatory and business risks unrelated to physical impacts).



# PIANC

The World Association for Waterborne  
Transport Infrastructure

Infrastructure improvements, long-term planning and short-term action are required by marinas, independently of their organization and ownership structure. While some marinas are small business (SMEs) that have a concession that may not require direct action, the infrastructure owner must plan for adaptation. Public entities, either if they operate the facility or not, and the increasing number of marinas worldwide are private enterprises, need to understand the needs and opportunities for facilities adaptation to climate change.

The adaptation planning approach is required both for existing facilities and for new projects. New facilities must be built with an embedded adaptation strategy. Some existing facilities that have other market drivers to redevelop or new recreational facilities that are part of a redeveloped waterfront, must account for climate change to be more resilient. Some other existing marina facilities may need to adapt only because of climate change risks or opportunities.

## 2. Objectives

PIANC's objective under its Declaration of Climate Change is to seek to continue to support ports, harbours, marinas and inland waterways by facilitating knowledge sharing and preparing practical technical guidance to help them manage the climate change challenge through effective risk management.

This working group report will target specific conditions of marinas and recreational navigation infrastructure, to develop guidance for climate change planning and adaptation. It will provide practical guidance for implementation of best practices for incorporating resilience and adaptation measures in the redevelopment of existing infrastructure and development of new marinas.

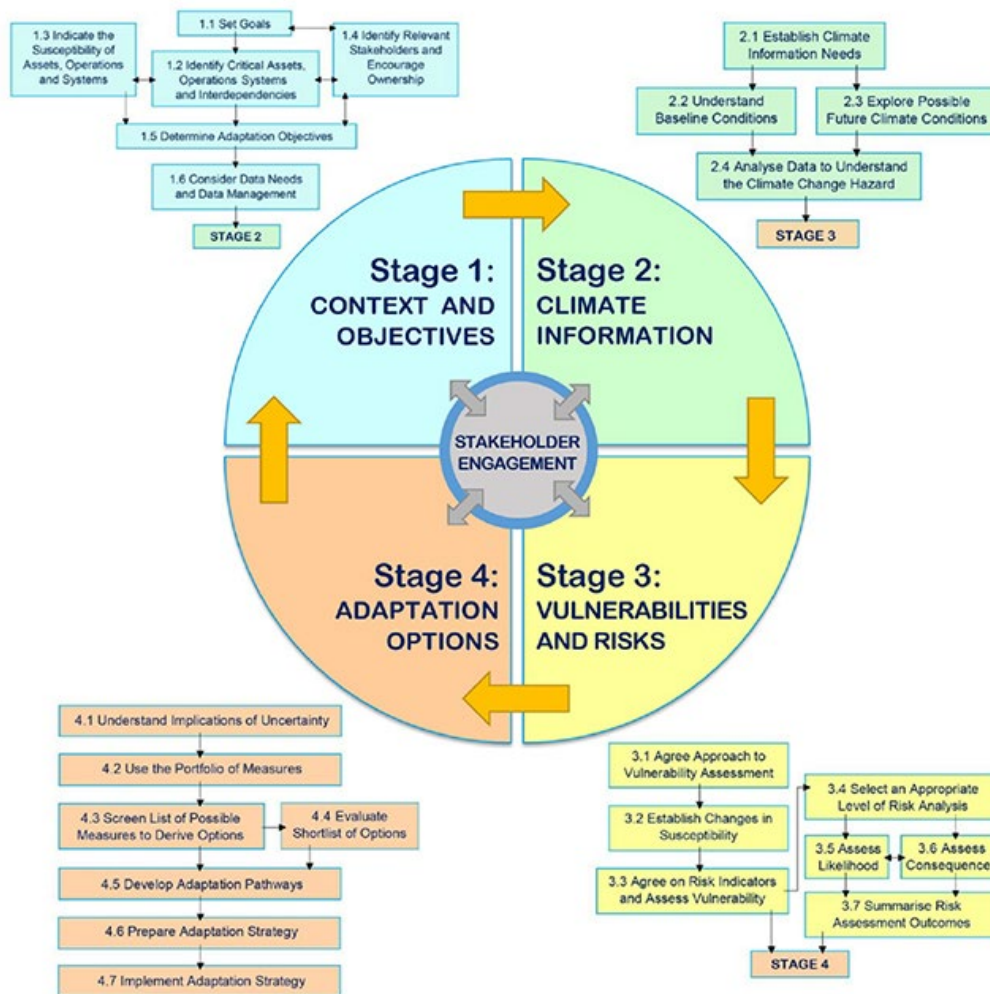
By developing guidance for climate adaptation of marinas and recreational boating infrastructure, this report should help owners manage climate physical risks, encourage proactive investment in resilient infrastructure, and promote transparency in climate risk disclosure to improve investment and regulatory conditions, ultimately sustaining marina businesses.

## 3. Earlier reports to be reviewed

The existing PIANC report on climate planning and adaptation, WG 178, introduces the potential consequences of climate change and some of the challenges to be addressed if ports and inland waterway authorities are to adapt effectively. It then introduces a four-stage methodological framework to help port and waterway owners and operators plan for improved resilience.

This framework must be revised so that, while maintaining its essence, it can be applied to the practical needs of marinas. Specifically, it must be distilled for its practicality and applicability to smaller projects, streamlined planning processes, and smaller organizations.

In addition to the review and incorporation of relevant guidance from this document, the proposed guidance will also draw from collection of best practices, industry interviews, grey literature by other organisations and other sources.



## 4. Scope of work

The proposed scope of works is to:

- Review existing PIANC literature and external sources of information related to climate change resilience and adaptation , with emphasis on applications for marinas and recreational navigation infrastructure
- Engage with RecCom members, sister associations and other recreational boating industry organisations to identify challenges/opportunities, emerging trends, and best practices of adaptation in the marina and recreational boating industry
- Collect case studies of marina industry practices that achieve resilience
- Develop guidance for the assessment and implementation of climate adaptation measures that are relevant and specific to infrastructure of marinas, small craft harbours and nautical tourism



# PIANC

The World Association for Waterborne  
Transport Infrastructure

- Identify key drivers of change, financial evaluation considerations and feasibility
- Recommend marina design and planning innovative approaches for the evaluation and design of new and renovation projects, to achieve climate resilience and effectively include climate adaptation measures in marina design

## 5. Intended product

The objective of the guidance would be to provide information and recommendations on best practice.

## 6. Working Group membership

Membership proposed to include:

- Marina design and engineering professionals
- Marina and boat harbour owners and operators
- Investors, lenders and insurance professionals involved in marina development
- Resilience, sustainability, and environmental specialist involved in marina development
- PTGCC representative, to ensure consistency with other related PIANC documents and initiatives
- RecCom WG 148 representative, to enhance synergies between adaptation solutions proposed and WwN recommendations

## 7. Target audience

The type of readers the proposed WG guidance is intended to help would be:

- Marina and boat harbour owners and operators
- Marina design and engineering professionals
- Climate change mitigation specialists, including policy makers and regulators
- Utility authorities and other entities that provide power, water and other services
- Environment and sustainability specialists and regulators involved in marina projects
- Legal, financial and economic professionals involved in marina projects
- Insurers, investors, lenders, and funding/investment organisations involved in marina projects

## 8. Relevance

### 8.1. Relevance to countries in transition

The proposed guidance should provide practical tools to implement climate adaptation of recreational and tourism boating infrastructure in countries in transition.

Additional benefits may be obtained if these guidelines are used by international agencies involved in funding or grants to assess best practices in a practical manner.



# PIANC

The World Association for Waterborne  
Transport Infrastructure

## 8.2. Climate Change

The guide will help to promote more resilient and adaptive infrastructure facilities and to implement PIANC's Climate Declaration in the marina industry.

## 8.3. Working with Nature

Adaptation solutions discussed shall include natural and nature-based solutions, be compatible with PIANC's Working with Nature philosophy and build upon WG 148.

## 8.4. UN Sustainable Development Goals

This proposed guidance is intended to directly contribute to the following SDG's:

- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 13: Climate Action
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

## 8.5. Relevance to UN Small Island Development States (SIDS)

SIDS are especially vulnerable to climate risks and any practical guidance to support increased in resilience will be beneficial.

## 9. References

- PTGCC Technical Note No.1-2022: Managing Climate Change Uncertainties in Selecting, Designing and Evaluating Options for Resilient Navigation Infrastructure
- EnviCom 178: Climate Change Adaptation Planning for Ports and Inland Waterways (2020)
- RecCom 148 (unpublished)