CLIMATE CHANGE ADAPTATION AND NATURE-BASED SOLUTIONS IN THE ISLANDS TRUST REGION

A RESILIENT COASTS FOR SALMON REPORT

Prepared by: Jerlyn Brutas, Kyla Sheehan

Editors: Maria Catanzaro, Nicole Christiansen, Isobel Pearsall, Oscar Beardmore-Gray, Taylor Gardiner

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RESILIENT COASTS FOR SALMON

PACIFIC SALMON FOUNDATION

STEWARDSHIP CENTRE FOR BRITISH COLUMBIA

EXECUTIVE SUMMARY

The impacts of coastal climate change, such as sea level rise and erosion, are a direct threat to coastal communities and ecosystems. Utilizing Nature-based Solutions (NbS) for shoreline protection is one method that local governments and their communities can use to effectively adapt to coastal climate change. However, because NbS are a relatively new concept compared to their hard-engineered alternatives (e.g., seawalls, riprap, etc.), the ability of local governments to implement policies and projects that support these NbS are greatly dependent on government capacity and extent of knowledge on the subject. In this report, we first summarize recommendations from reputable guidance documents on the implementation of effective coastal climate change adaptations in local governments. We then review the policies, bylaws, and incentives utilized by the Islands Trust Area (ITA) for coastal climate change, highlighting special projects by Local Trust Areas (LTA) of the ITA that support coastal adaptations and NbS. We then discuss the challenges and barriers faced by local communities within the ITA to further coastal climate adaptations, as told by Islands Trust Staff through interviews. Finally, we discuss the differences between the recommendations for coastal climate change in guidance documents, and what is actually being implemented by Islands Trust. The identification of knowledge gaps in this last section is important to inform the Pacific Salmon Foundation what information or tools the Foundation may provide to communities to move past barriers.

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This report was written on the traditional territories of the Coast Salish peoples, including, the Sḵwx̱wú7mesh Úxwumixw (Squamish), xʷməθkʷəy̓əm (Musqueam), and səlilwətaʔɬ (Tsleil-Waututh) First Nations (Vancouver, BC), and the W̱SÁNEĆ Peoples (Saanich, BC): the BOḰEĆEN (Pauquachin), MÁLEXEŁ (Malahat), SȾÁUTW̱ (Tsawout), T'Sou-ke, WJOŁEŁP (Tsartlip), and W̱SIKEM (Tseycum) First Nations, and lək̓ʷəŋən (Lekwungen) Peoples: the Songhees and Esquimalt First Nations (Victoria, BC). We gratefully acknowledge that we live and work on these traditional territories, and we recognize the connection and care for these lands and waters by Indigenous Peoples since time immemorial.

This report is part of the Resilient Coasts for Salmon project, which is funded in part by the Government of Canada (Environment and Climate Change Canada) through the Climate Action and Awareness Fund (2021 – 2026), and we are grateful for this funding to reach our goals of raising awareness of the impacts of coastal modification, climate change, and how we can better adapt to sea level rise using nature-based solutions.

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ABBREVIATIONS

ITA – Islands Trust Area; refers to the entirety of the area under the jurisdiction of Islands Trust

LTA – Local Trust Area; refers to a localized group of major islands within the Islands Trust Area. Each Local Trust Area is named after one main island, and typically includes multiple associated islands.

LTC – Local Trust Committee; refers to the three-person representative committee of a Local Trust Area. Each Local Trust Committee consists of two community-elected trustees and one chair or vice-chair from the Islands Trust Executive Committee

LUB – Land Use Bylaw; document that addresses matters of land use

OCP – Official Community Plan; document that addresses long-term goals of communities

See Appendix 1 for the full glossary.

INTRODUCTION

As the threat of climate change continues to intensify, coastal communities and their respective governments have the immense task of altering their behaviours and practices to maintain community safety and protect shoreline habitat and culturally important places. The default approach for coastal protection and **sea level rise** adaptation has been hard-armouring coastlines with seawalls, bulkheads, and other coastal modifications. While these methods are commonly believed to work against flooding and erosion in some capacity, more recent studies (Gittman et al. 2016; Judd 2021; Gittman and Scyphers 2017) have found that hard armour alters the natural functions of shorelines, making it more difficult for coastal environments to adapt to these processes that will inevitably worsen with climate change. **Hard armour** (e.g., sea walls, rip rap) is also detrimental to biodiversity and disrupts the natural connectivity between land and water. Alternatively, **Nature-based Solutions (NbS)** focus on restoration and protection of natural coastlines, ultimately addressing cultural, economic, and societal needs through conservation and care for biodiversity and the environment.

By reviewing adaptation strategies at the local government level, and identifying common barriers to nature-based adaptation, we can support adaptive management and identify effective strategies that can be shared with other communities, for the betterment and protection of coastal habitats. With this report, we hope to support informed decision making across local governments on the east coast of Vancouver Island to improve coastal ecosystems for the benefit of people and salmon.

COASTAL NATURE-BASED SOLUTIONS

Common coastal NbS include beach nourishment, native plantings on beach and riparian areas, and the addition of large woody debris to beaches. These methods are used to stabilize shorelines and provide natural habitats to support coastal biodiversity. NbS such as rain gardens and green roofs can also be used to manage runoff that would otherwise allow contaminants to enter coastal waters.

Natural shorelines are dynamic and able to shift with changing conditions. When we impose hard structures such as a seawall, we impede the shoreline's resilient nature. Shoreline NbS, on the other hand, work with nature, supporting natural processes like sediment transport that help beaches remain adaptive. The dynamic and constantly adapting nature of NbS is a key reason why they can create more resilient habitats; ecosystems are most resilient when they can function naturally.

REGION OF FOCUS

The lands referred to as the **Islands Trust Area (ITA)** in this report lie within the Traditional Territories of many Indigenous communities that have lived and stewarded the land since time immemorial. These communities include, but are not limited to, the Sḵwx̱wú7mesh Úxwumixw (Squamish) Semiahmoo, sc̓əwaθən məsteyəxʷ (Tsawwassen), Hulqiminum K'omoks, Tla'amin, Qualicum, Snuneymuxw First Nations; the W̱SÁNEĆ Peoples: the BOḰEĆEN (Pauquachin), MÁLEXEŁ (Malahat), SȾÁUTW̱ (Tsawout), T'Sou-ke, WJOŁEŁP (Tsartlip), W̱SIKEM (Tseycum); the Hul'qumi'num Treaty Group, which represents these five communities: Quw'utsun (Cowichan Tribes), Halalt First Nation, Lyackson First Nation, Ts'uubaa-asatx (Lake Cowichan) First Nation, and Spune'luxutth (Penelakut Tribes), and many other Coast Salish Peoples.

Established in 1974, Islands Trust is a special administration that acts as the regional governing body for over 450 islands in the Salish Sea (Islands Trust, 2024a). The Islands Trust Area is separated into 13 **Local Trust Areas (LTA)**, each represented by a Local Trust Committee (LTC) made up of two community-elected trustees and a chairperson from the Islands Trust Council (Figure 1). LTCs are responsible for land–use planning and decision–making for their respective LTA (Islands Trust, 2024b). The only exception to this is Bowen Island, which is the only municipality within the Islands Trust. All policies and decisions are made in accordance with the Islands Trust mandate which, in full, is to *"preserve and protect the Trust Area and its unique amenities and environment for the benefit of the residents of the trust area and British Columbia in cooperation with municipalities, regional districts, improvement districts, First Nations, other persons and organizations and the government of British Columbia"* (Islands Trust, 2024c)

To aid in carrying out this mandate, the Islands Trust Conservancy (hereby referred to as the Conservancy) was created as a distinct arm of the Islands Trust Area. Run by the Islands Trust Conservancy Board, the Conservancy works with landowners, environmental organizations, charities, several forms of government, and other conservation allies to safeguard land within the Islands Trust Area through the creation of nature reserves and conservation covenants (Islands Trust, 2024d).

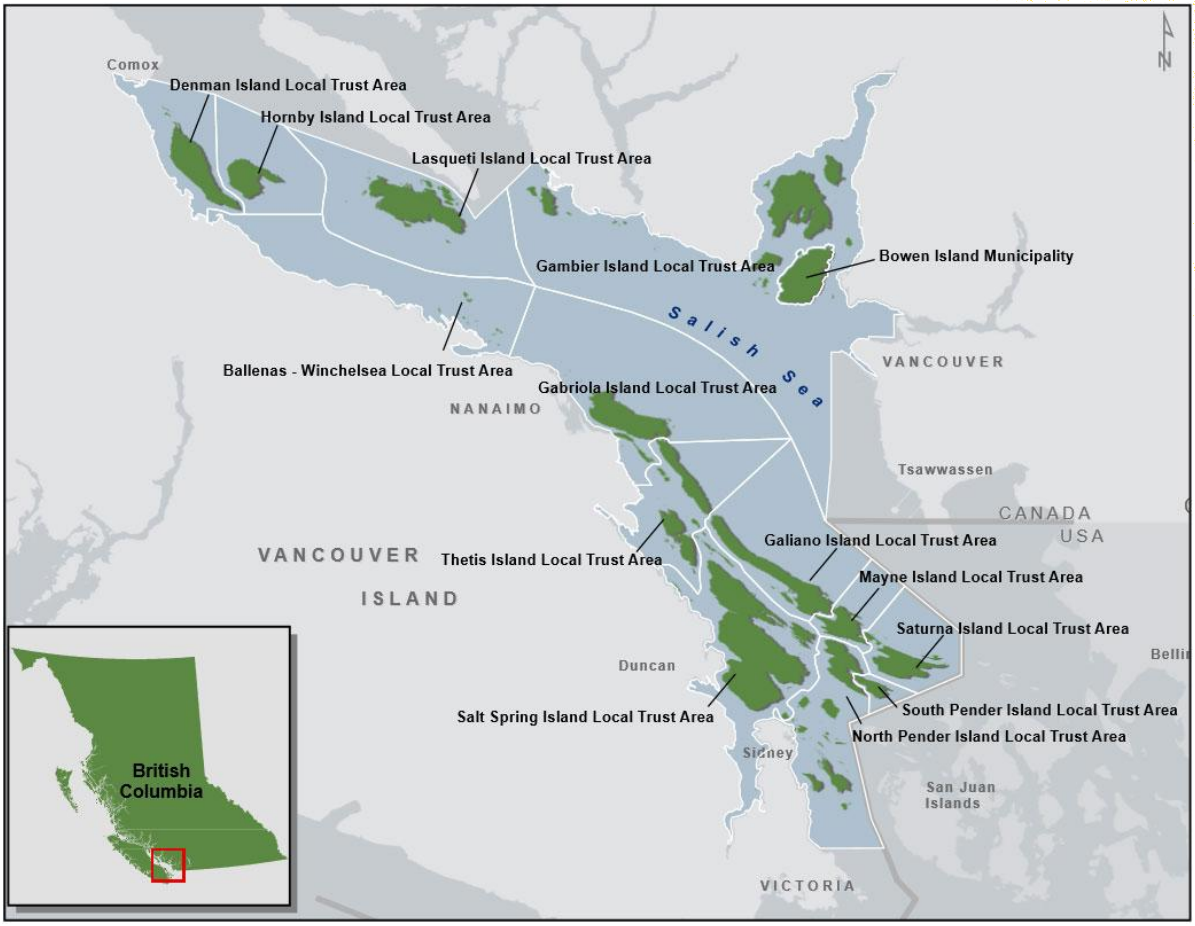

Figure 1 - Map of the Islands Trust Area. The 13 Local Trust Areas are highlighted in green (source: Islands Trust, 2024e).

The ITA faces many challenges unique to island communities and ecosystems. Many regions contain high biodiversity and include hundreds of species that are at risk (Islands Trust, 2024e). The protection of such sensitive ecosystems is fundamental for the survival of many of these species. Island shorelines especially are of great ecological value as they provide marine life with food and shelter, including spawning areas for forage fish – a vital part of Pacific salmon diets. These shorelines are also culturally important, as they allow Coastal First Nations communities to continue traditions and maricultural methods, such as clam gardens, that have been passed down for millennia (Islands Trust, 2024f). However, increasing populations and major development in and surrounding the Islands Trust Area can cause pressure for these at-risk ecosystems. Tourism and outdoor recreation can also impact the welfare of these ecosystems. The Trust Area is also inherently at risk of oil spills and marine shipping issues that could greatly damage its coastal environments and communities.

OBJECTIVES

This report has **three primary goals:**

1. **To identify the differences and knowledge gaps** between what is recommended for climate adaptation and NbS, and what has been actually implemented by local governments.
2. **To determine barriers to effective climate change adaptations** that are hindering coastal communities from addressing challenging issues such as sea level rise, flooding, and coastal erosion.
3. **To determine what information or tools are needed by local governments to move past these barriers**, so that the Pacific Salmon Foundation may provide help and resources where possible.

First, we provide an overview of recommendations from current climate adaptation guidance documents for local governments (Figure 2), including both general climate adaptation guidance and that specific to coastal environments. Next, we provide a summary of policies, bylaws, projects, and incentive programs specific to coastal climate change adaptations that are being used by local governments on the east coast of Vancouver Island in British Columbia. This report will be focused on the Islands Trust Region (Figure 1) and will be supplemented with information gathered from interviews with Islands Trust staff on climate change adaptation strategies within their jurisdiction.

By learning common barriers and providing resources or opportunities for collaboration, the Pacific Salmon Foundation hopes to assist local governments in facilitating conversations and actions on best practices towards shoreline and coastal management in hopes to better protect the future of Pacific salmon.

Note: While we acknowledge that stormwater and runoff management is related to coastal water and habitat protection, we have chosen to omit regulatory practices and policies related to these topics in our review.

REPORT STRUCTURE

This report is divided into two main sections. The first section focuses on guidance for local governments on adapting to coastal climate change. Figure 2 shows some examples of the documents that were reviewed for this section. The second section provides an overview of coastal management practices by the Islands Trust, as well as barriers to further coastal climate adaptations based on a review of available materials and interviews with Islands Trust regional and municipal staff. This report then highlights key recommendations for coastal adaptations and closes with a discussion on the Islands Trust's climate adaptation strategies in comparison to recommendations from guidance documents. For more details on approaches used to create this report including the full list of guidance documents that were reviewed, see Appendix II. For a list of questions used in the interviews, see Appendix III.

Figure 2 – Cover photos of four of the main guidance documents reviewed. Top left: International Union for the Conservation of Nature (IUCN). Top right: West Coast Environmental Law (WCEL). Bottom left: Climate Caucus. Bottom left: Managing Natural Assets Initiative.

1: GUIDANCE DOCUMENT SUMMARY

Successfully implementing NbS for climate adaptation requires multidisciplinary effort and thoughtful consideration of the environment and surrounding communities (Vouk et al., 2021; West Coast Environmental Law [WCEL], 2012). It also requires high levels of collaboration among parties such as municipal and regional government staff, Indigenous leaders, ecologists, biologists, engineers, and more, and should be done with the intention to strengthen environmental stewardship within communities. As such, it can be difficult for local governments to know where and how to begin the process. Several conservation-focused organizations, including West Coast Environmental Law (WCEL), and Nature Canada, have created guidance documents to support climate change adaptations and best practices for implementing NbS at the community level (Figure 2). This section aims to summarize the recommendations of these guidance documents, including general suggestions for implementing nature-based climate adaptation strategies into local government plans, as well as specific adaptations recommended for coastal communities. The full list of documents used in this review can be found in our methods document (Appendix II).

1.1: IMPLEMENTING NATURE-BASED SOLUTIONS AND CLIMATE ADAPTATIONS INTO LOCAL GOVERNMENTS

While the exact framework of NbS implementation differs between each guidance document that was reviewed, one key recommended activity typically remains the same: local governments must first assess the ways in which climate change will most likely impact its community at a broad scale to identify what goals and actions must be made a priority (Managing Natural Assets Initiative [MNAI], 2021; Vouk et al., 2021; WCEL, 2012). Coastal communities, for example, may choose to prioritize adaptations against flooding, shoreline erosion, sea level rise, and other processes impacting marine ecosystem health such as stormwater runoff. Such an assessment should be made by obtaining and reviewing current climate data and other relevant information for the region and can often be the impetus for governments to invest in further climate modeling for their communities (WCEL, 2012). Alongside climate modelling, governments are also recommended to fund research for other climate-relevant data, such as infrastructure vulnerability and water quality sampling, as well as public engagement meetings to address concerns. After using this information to identify where communities may be most vulnerable, local governments can begin the process of adapting current laws, policies, and government plans to account for climate change stressors while also supporting social and economic objectives.

1.1.1 Engagement, buy-in, and inclusivity considerations

NbS require contributions and collaboration from a wide array of stakeholders, representatives, and decision makers from many disciplines. It compels a **whole systems approach** that aims to provide a

more holistic, forward-thinking perspective to conservation, including shared goals among governments and members of the community, rather than being limited to particular jurisdictions or regulatory boundaries (Vouk et al., 2021). Taking this into consideration, projects regarding NbS climate change adaptations should:

- Involve and engage a multi-faceted team of representatives in relative fields (e.g., coastal biologists and geomorphologists, climate scientists, engineers, city planners, etc.) (MNAI, 2021; WCEL, 2012)
- Consider public consultation and outreach to clarify project goals, address potential concerns, grasp community needs, and develop community buy-in – a large factor in driving ongoing support for climate adaptation (WCEL, 2012)
    - Such public consultation can be supplemented with education and outreach to ensure understanding of NbS and clarify misconceptions
- Seek out early and continual engagement with affected parties to encourage active participation at each step of development (Vouk et al., 2021)

Engagement and inclusivity considerations are an important factor not only in the process of developing nature-based climate adaptations, but also ensuring public expectations are met. Local governments should strive to make both project and public consultation as inclusive as possible to help drive consensus and community buy-in.

1.1.2 Building capacity through integrating climate adaptation into community planning

It is important to consider that not all communities and their respective governments have the capacity to continuously adapt to climate change needs. Capacity can be influenced by factors such as funding restraints, staff numbers, and varying knowledge levels on NbS and climate change adaptation (WCEL, 2012). Local governments can manage adaptation needs by addressing climate impacts and environmental vulnerabilities in every government process of planning and decision-making. Documents such as **Regional Growth Strategies** and **Official Community Plans (OCPs)** can play a significant role in integrating NbS as they outline overarching plans for communities under their jurisdiction and can set the foundation for current and future regulations regarding land use. These documents can be used to:

- Highlight specific climate change goals or risks and reframe policies to account for them.

- Address the amount of capacity needed for certain policies or projects to be implemented.
- Give local governments a better understanding of how resources should be allocated to meet specific goals.
- Uphold regional/municipal/community standards for climate adaptation strategies.
    - Regional governments should develop a clear and streamlined standard for climate adaptation strategies that must be upheld by all municipalities within its jurisdiction. Municipalities can then choose to build on these standard as permitted by their abilities and local priorities (International Union for Conservation of Nature [IUCN], 2020; Vouk et al., 2021; WCEL,2012).

To help bridge the gap between climate-related activities, and non-climate related activities, climate issues can be mainstreamed into all government strategies and activities. By integrating considerations of the changing climate into community planning, local governments may better understand their priorities and work towards them (Nature Canada, 2022; WCEL, 2012).

1.1.3 Incentives

Incentive programs can be used to encourage stewardship and engage broad audiences on the principles of NbS (Vouk et al., 2021). While these approaches often require monetary investment from local governments, the long-term benefits outweigh the initial cost. Incentives can be offered in a variety of ways:

- Smaller scale resident or community initiatives
    - **Example:** The City of Toronto provides grants of up to $100,000 for residents and property owners to build green roofs (City of Toronto, 2024; Sun, 2020).
- Larger funding programs for non-profit societies, grassroots organizations, and other smaller scale initiatives
    - **Example:** The Grant in Aid program offered by many municipalities within B.C. provides funds for non-profit organizations that benefit the community. Beneficiaries can range from tourism, arts and culture, environmental services, and more.
- **Development Cost Charges (DCCs)** can be lowered to incentivize specific types of development like green infrastructure or other minimal impact developments

    - **Example:** In 2010, The City of Penticton lowered DCCs by 50% for all development projects confirmed to be sustainable (WCEL, 2012). This can be a driving force for companies to invest in climate-resilient infrastructure.

- Tax exemption programs
    - **Example:** The Natural Area Protection Tax Exemption Program (NAPTEP) run by the Islands Trust Conservancy entails that private property owners that willingly donate their ecologically significant land to an Island's Trust conservation covenant, should be exempt from 65% of municipal property taxes (Islands Trust, 2024g).

1.2: NATURE-BASED CLIMATE ADAPTATION RECOMMENDATIONS FOR COASTAL COMMUNITIES

While it is essential for communities to adapt to every aspect of climate change, the focus of this report is to find nature-based climate adaptations applicable to coastal and shoreline communities throughout different regions of Vancouver Island. This section still accounts for the recommended procedures mentioned in the previous section, but further summarizes specific adaptation recommendations for coastal communities.

1.2.1 Softening shorelines

Hard armouring, such as seawalls and other coastal modifications, was not traditionally built with a comprehensive understanding of the long-term effects of climate change. As a result, coastal environments and communities can be severely negatively affected by a lack of resilience to heightened coastal hazards (e.g. SLR, erosion) (Bridges et al., 2021; Lamont et al., 2014; National Oceanic and Atmospheric Administration [NOAA], 2015). Recommendations are moving towards "softening" shorelines by replacing conventional hard infrastructure with NbS, either through maintenance or restoration of fully natural coastal ecosystems, or through hybrid options that blend green infrastructure and hard engineering (Lamont et al., 2014; Hilke et al., 2020). However, there is no definite framework for the full or partial removal and replacement of hard armour with soft alternatives. This can cause barriers concerning permitting, design, and lack of interest and awareness from the public (Hilke et al., 2020). To address these barriers:

- Local governments can follow mainstreaming procedures by outlining goals and objectives for coastal protection in an OCP or other similar community planning document and use these objectives to streamline a process for soft shoreline initiatives *and* their long-term maintenance.

- New policies, bylaws, permits, and DCCs can also be enforced to restrict or prevent the development of new hard armour (Hilke et al., 2020).
- Governments should also engage with the community through public hearings and educational events and bulletins, as construction or changes to publicly accessible shorelines (e.g., parks, walkways, roads) can affect a community's daily interactions with these spaces (NOAA, 2015).
    - Engagement should be done with private landowners to ensure that they are equipped with sufficient knowledge on coastal NbS and have a proper understanding of the policies, procedures, and recommendations in place when making decisions on how to protect shorelines on their properties (NOAA, 2015; Hilke at al., 2020).
- Reputable organizations such as NOAA and Nature Canada can provide guidance on the design, development, and maintenance of nature-based shoreline projects, but local governments should use their regulatory authority to create recommendations and rules specific to the regions under their jurisdiction.
    - A comprehensive and multidisciplinary team should be appointed for this to ensure that knowledge moving from government bodies to citizens will accurately reflect the ecology and needs of the region (NOAA, 2015).

Softening shorelines is a direct action that communities can take in response to current and future impacts of coastal climate change, both to the benefit of the environment and communities. Whenever possible, local governments should strive to use this as an option for coastal climate adaptation to promote healthy shorelines, habitat connectivity, and community resilience.

1.2.2 Natural Asset Inventory

Despite providing many services to communities, **natural assets,** such as coastal beaches, wetlands, and other natural ecosystems, are often overlooked in terms of their value as community assets. The development of a **natural asset inventory** can be beneficial in providing an economic value to natural resources, such that their services - and how they can be impacted by climate change - are considered in land-use decisions in the same way that **hard assets** are.

- Knowledge of coastal natural assets and their processes can help inform planning and actions needed to strengthen coastal resilience and contribute to habitat and biodiversity protection (MNAI, 2021).

- Natural assets may gain value over time, while engineered assets generally do the opposite. Having a complete natural asset inventory can help inform their unique management and valuation (Asset Management BC [AMBC], 2019; MNAI, 2021).

To develop a coastal natural asset inventory, a diverse team composed of representatives across many disciplines and levels of government must be assembled to assess existing ecosystem services and any issues in relation to them. Once all of the natural assets are considered, plans for their management can be made. For example, natural assets such as dunes, beaches, and shoreline vegetation can become a great baseline for the implementation of coastal NbS, like dune preservation, beach nourishment, and shoreline plantings. Canada's Municipal Natural Asset Initiative (MNAI) provides a detailed guidance document on natural asset methodology, as well as a toolkit for coastal asset management and modelling.

1.2.3 Adaptive management

Nature-based solutions and certain green infrastructure approaches often come with uncertainties because living components – such as vegetation that may take time to establish – are not predictable in the same way that traditional hard infrastructure may be (IUCN, 2020; Vouk et al., 2021). As such, it is essential that NbS are developed under the framework of adaptive management – an approach where adjustments can be made along the way as new information becomes available.

- Adaptive management is especially important when it comes to nature-based solutions, as restoration sites will be exposed to volatile elements such as storms, extreme wind, and other weather events and interactions with the environment.
- As with any kind of project, long-term monitoring plans are recommended for all projects that may undergo changes over time to ensure that they function as intended.
    - Developing a framework for long-term monitoring plans is recommended for consistency across projects. This can include details such as the timeline and frequency of monitoring, and the funding required for monitoring to occur (Vouk et al., 2021).

2: COASTAL ADAPTATION STRATEGIES IN THE ISLANDS TRUST AREA

2.1 COASTAL ADAPTATION STRATEGIES IN THE ISLANDS TRUST AREA

2.1.1 Coastal Regulation Bylaws & Policy

Islands Trust and the associated Islands Trust Council and Islands Trust Conservancy have a critical role to play in climate adaptation decision-making and planning. To play their part, Islands Trust uses documents such as Official Community Plans (OCP) and other regulatory bylaws to plan their objectives and goals regarding coastal and marine protection. This aligns with recommendations from several guidance documents that advise mainstreaming climate and environmental issues and goals through OCPs.

As a requirement under British Columbia's Islands Trust Act, the Islands Trust Council adopted a Policy Statement used to guide land use planning and maintain the "preserve and protect" mandate (Government of British Columbia, 2024a). The Islands Trust Policy Statement is being updated as of 2024 through the Islands Trust Policy Statement Amendment Project (also known as Islands 2050) after recognizing the need to update this statement to address more relevant current and future issues regarding reconciliation, climate change, and more (Islands Trust, 2024h). In sections regarding coastal and marine ecosystems, the current Policy Statement expresses that:

- The protection of and planning for coastal and marine ecosystems must be addressed in each LTA's Official Community Plan (OCP) and regulatory bylaws (Islands Trust Council, 2003, p. 10).
- *"...development, activity, buildings, or structures should not result in a loss of significant marine or coastal habitat or interfere with natural coastal processes"* (Islands Trust Council, 2003. P. 15).

As this Statement guides the entire ITA, these policies can be found echoed in the OCPs and Land Use Bylaws (LUB) of each LTA and Bowen Island Municipality. For example, one of the marine and coastal resources policies adopted by the Thetis Local Trust Area OCP states that the shoreline and foreshore may be maintained by discouraging uses that would disrupt natural shoreline processes, retaining and supporting natural vegetation and features, discouraging the removal of seabed materials, and more (Thetis Island Local Trust Committee, 2023a, p. 31). As another example, the Ballenas-Winchelsea Local Trust Area OCP states that "The [Local Trust Committee] should not permit hardening of the shoreline." (Islands Trust Executive Committee, 2016). Land Use Bylaws typically reiterate these policies and include guidance for how the land in certain areas may be used.

In 2021, Islands Trust performed a review of each Official Community Plan and Land Use Bylaw regarding foreshore and nearshore policies to assess their relevance and compliance with the Islands Trust Policy Statement and further develop OCP and bylaw models to protect the shoreline. This project and its associated report outline recommendations and mandates for shoreline protection across the region. Table 1 is produced from the Shoreline Protection Model Bylaw Report summarizing relevant shoreline regulations in the Islands Trust Area. A list of regional and provincial initiatives and requirements for shoreline protection, and guidelines on mitigation and adaptation to sea level rise are also included in the report (Islands Trust, 2021). This project shows the commitment of Islands Trust to continually uphold its "preserve and protect" mandate and ensure that shoreline policies are as consistent and up to date as possible throughout the Trust Area.

Table 1 - Summary of Local Trust Committee shoreline policies and regulations within the Islands Trust Area (recreated from Islands Trust, 2021).

Local Trust Area	Private Docks permitted (zone specific)	Setback from Natural Boundary of the Sea	Permits Structures in Setback from NB	Exemptions to Setback from NB	Shoreline (or Marine) Development Permit Area
Ballenas-Winchelsea	✓	15 m	-	✓	✓
Bowyer and Passage Islands (Gambier LTA)	✓	15 m	Property specific min. Setbacks based on historical buildings and structures	✓	-
Denman	✓	15 m	✓	-	-
Gabriola	✓	15 m**	✓	-	✓
Galiano	✓	15 m	✓	-	✓
Gambier	✓	15 m	✓	✓	✓
Gambier Associated Islands	✓	15 m	✓	-	-
Hornby	-	15 m	-	✓	-
Lasqueti	✓*	15 m**	✓	-	-
Mayne	✓	15 m	✓	✓	-
North Pender	✓	15 m	✓	✓	✓
North Pender Associated Islands	✓	15 m	-	-	✓
Salt Spring	✓	15 m**	✓	✓ (zone specific)	✓
Saturna	✓	15 m	✓	-	-

South Pender	✓	15 m	✓	✓	-
Thetis	✓	15 m	✓	✓	-
Thetis Associated Islands	✓	15 m	✓	-	-

*Docks permitted on specific lots only. Rezoning required for additional docks

**May be reduced with engineering certification

Other coastal Islands Trust policies include:

- A required minimum setback regulation for building on the waterfront. This distance varies between islands but is typically either 7.5 m or 15.0 m from the natural boundary of the sea (Table 1) (Islands Trust, 2021).
    - These setback distances are highlighted in each Local Trust Area's LUB.
- Encouraged use of community or shared docks rather than private docks (Youmans, 2023).
    - Information regarding the construction and usage of docks can be found in LUBs.
    - There are currently further proposed policies on docks drafted under the Islands 2050 project (Islands Trust, n.d.).
- Development Permit Areas (DPAs) for shoreline and marine zones that institute stricter development rules for protection of the natural environment.
    - **Example:** Galiano Island's Shoreline DPA includes detailed development guidelines specifically for shoreline areas, and a requirement for all development plans to address sea level rise, storm surge, and other anticipated impacts of climate change (Galiano Island Local Trust Committee, 2024, p. 51).
    - LTAs with shoreline or marine DPAs can be found in Table 2.
- Some LTAs have additional rules or objectives outlined in their OCP, such as Gabriola Island's Marine Resource Objectives (Figure 3).

Marine Resources Objectives

1. *To manage coastal marine resources in keeping with the Islands Trust preserve and protect mandate;*
2. *To preserve and protect unique, rare, or representative marine plant and animal communities in their natural habitats;*
3. *To protect the natural and scenic values of the coastline which provide the Island with its rural marine character;*
4. *To provide opportunities for the commercial uses of the foreshore and coastal waters provided that such uses do not detract from the marine waters' environmental integrity;*
5. *To recognize the importance of the existing log storage areas in the foreshore of the planning area as important to the forest industry, but to discourage a further expansion of major log storage or booming areas;*
6. *To promote the recreational and commercial use of the area's aquaculture resources, provided such use does not detract from the use or enjoyment of the shoreline by the public or upland property owners; and*
7. *To encourage the sharing of docks and wharves.*

Figure 3 - Marine Resource Objectives highlighted in the Gabriola Island Official Community Plan (source: Gabriola Island Trust Committee, 2022).

2.1.2 Marine Shorelines Program

The Marine Shorelines program is one of many Islands Trust's efforts to preserve the ecological and cultural values of the Trust Area's ecosystems. Islands Trust Staff work together with homeowners to provide options for natural shoreline protection methods, including redirecting homeowners to resources from the Stewardship Centre for British Columbia's Green Shores Program (Islands Trust, 2024f). Other resources provided to the community include:

- Sharing our Shorelines Booklet – North Pender Local Trust Committee
- Shorelines Matter brochure (2014)
- Your Marine Waterfront: A guide to protecting your property while promoting healthy shorelines (2016) (Figure 4)

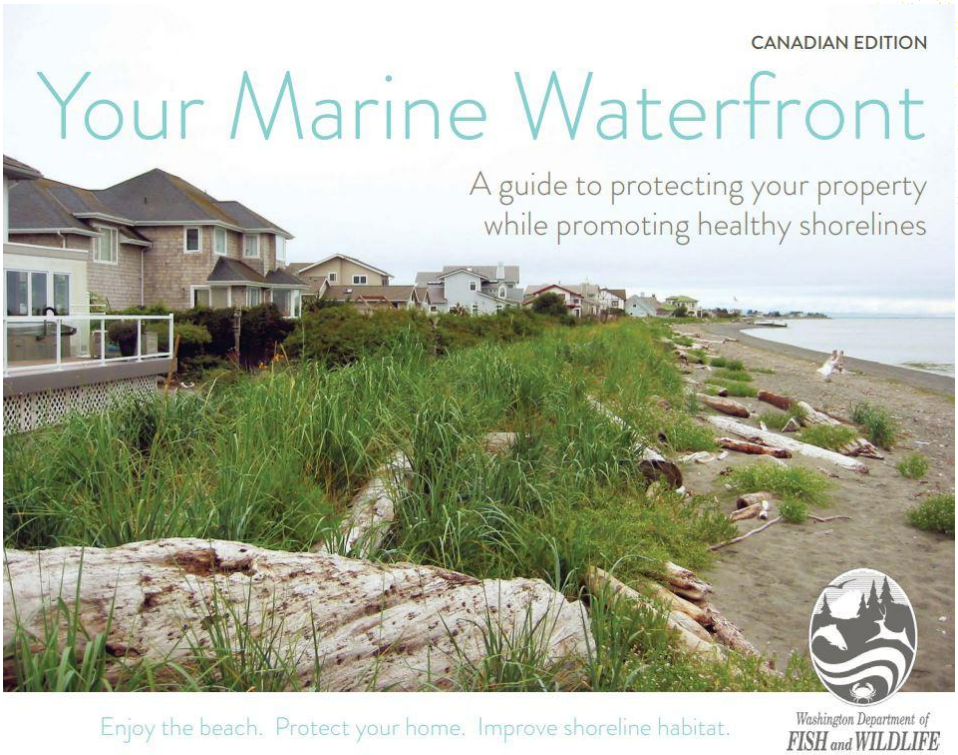

Figure 4 - Cover of Your Marine Waterfront, an educational booklet produced by the Washington Department of Fish and Wildlife (2016) that is shared through the IT Marine Shorelines program.

A planner for Islands Trust mentioned in an interview that while Islands Trust provides resources for natural shoreline protection and many islands have setback regulations that restrict hard-armour seawalls; property owners would still build structures along the shoreline to protect their properties from erosion, especially in high-erosion areas. The planner also mentioned that this topic – protection of private shorelines - is one area in which education and outreach regarding natural shorelines may help change and influence public opinion and choice.

Islands Trust Shoreline Mapping project

One significant initiative from the Marine Shorelines program is the Islands Trust Shoreline Mapping project (ISTMP) developed in 2011. Through this project, three shoreline map types were created for every island:

1. Distribution of Shoreline Types
2. Energy & Sediment Movement
3. Shoreline Values & Vulnerability

The purpose of these maps is to communicate vital information on shoreline features and types to island communities, planners, and politicians, and to broaden appreciation for the Islands Trust Areas' natural features (Islands Trust, 2011).

The Marine Shorelines program has also developed ecosystem maps and inventories for eelgrass, bull kelp, forage fish spawning habitat (Figure 5), and other sensitive ecosystems for all applicable Local Trust Areas and the Bowen Island Ecosystem. These maps are available as PDFs on the Islands Trust website alongside information on Islands Trust properties, parks, and more. These projects are a huge undertaking that strive to benefit and support islands' biodiversity and the health of Pacific salmon (Islands Trust, 2024f; Islands Trust, 2024i). Islands Trust's investment of time and resources into various mapping and inventory projects aligns with recommendations from guidance documents and showcases commitment to forward-thinking shoreline management and ecosystem protection.

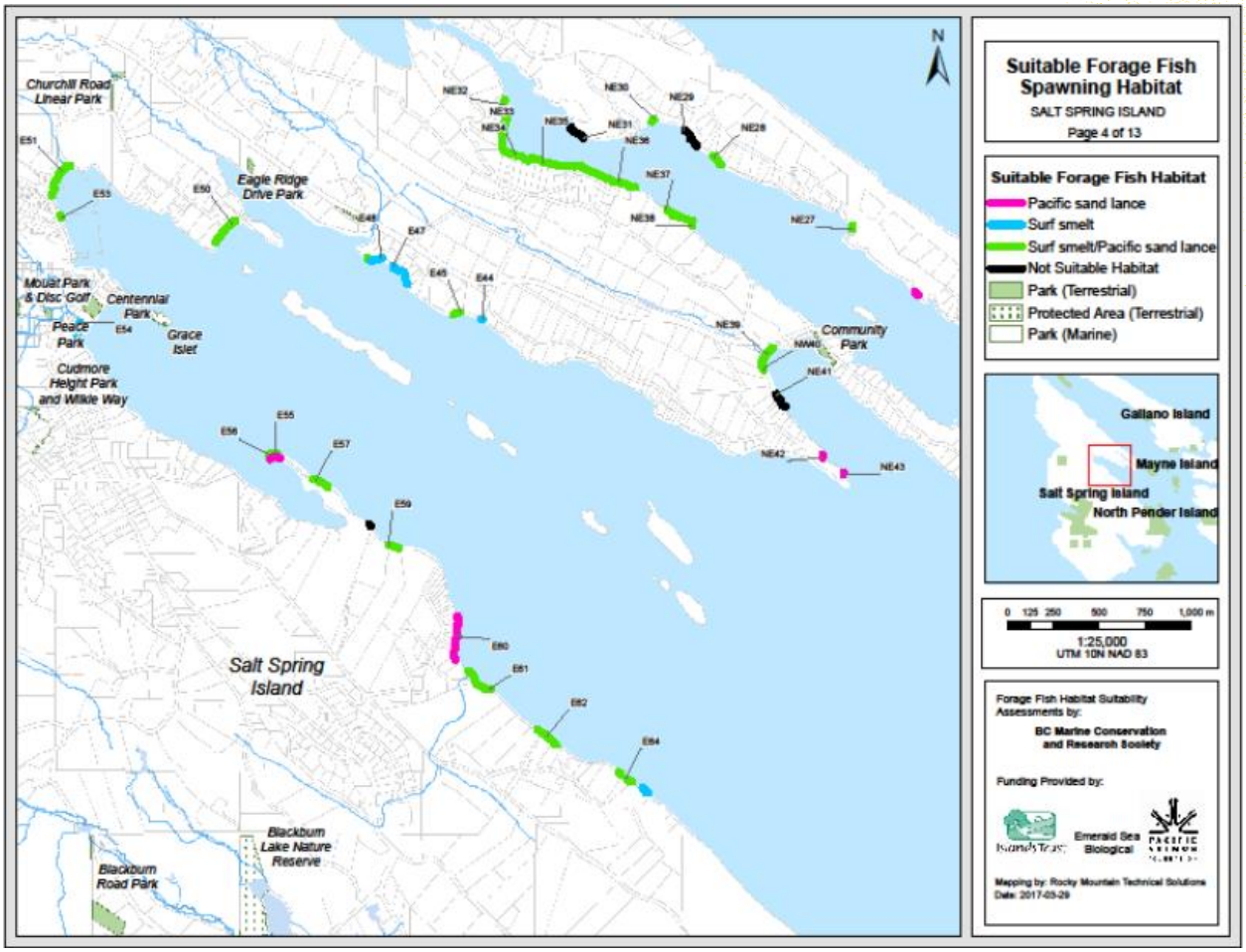

Figure 5 - Map of suitable forage fish spawning habitat on Salt Spring Island (source: de Graff, 2017).

2.1.3 The Islands Trust Conservancy

The Conservancy is a branch of Islands Trust that focuses on land acquisition within the Trust Area. This work is guided by the Regional Conservation Plan 2018-2027, which states goals and actions to work with island communities, conserve natural areas, and enhance ecological integrity (Islands Trust Conservancy, 2018). Through the Conservancy, island landowners can donate their ecologically important land, including coastal and shoreline areas, in two ways:

1. As a **nature reserve** – donated land will be monitored and managed for conservation by the Islands Trust Conservancy through a detailed management plan (Islands Trust, 2024j).
2. As a **conservation covenant** - this allows landowners to continue to live on their property on the basis that they promise to protect the land in certain ways and allow the Conservancy to regularly monitor the property for conservation purposes (Islands Trust, 2024k).

To incentivize landowners to participate in these initiatives, the Conservancy developed the **Natural Area Protection Tax Exemption Program (NAPTEP)**, which allows those who form a conservation covenant agreement to receive an annual property tax exemption of 65%. NAPTEP focuses on land acquisition in areas with sensitive ecosystems, such as coastal bluffs and wetlands, and includes critical habitats for native, rare, and at-risk species (Islands Trust, 2024g). Those that donate ecologically significant land as a nature reserve may also be eligible for tax exemptions through the Federal government's Ecological Gifts Program (Government of Canada, 2024).

With the help of the Conservancy, non-profit organizations, and federal, provincial, and regional governments within B.C., almost 20% (15,700 ha) of land in the Islands Trust Area is protected (Islands Trust, 2024l, Figure 6). This includes 34 nature reserves and 79 conservation covenants (Islands Trust, 2024l). These protected places can be explored through an interactive map on the Islands Trust Website, where you can click on each nature point on the map to learn more about that particular nature reserve or covenant.

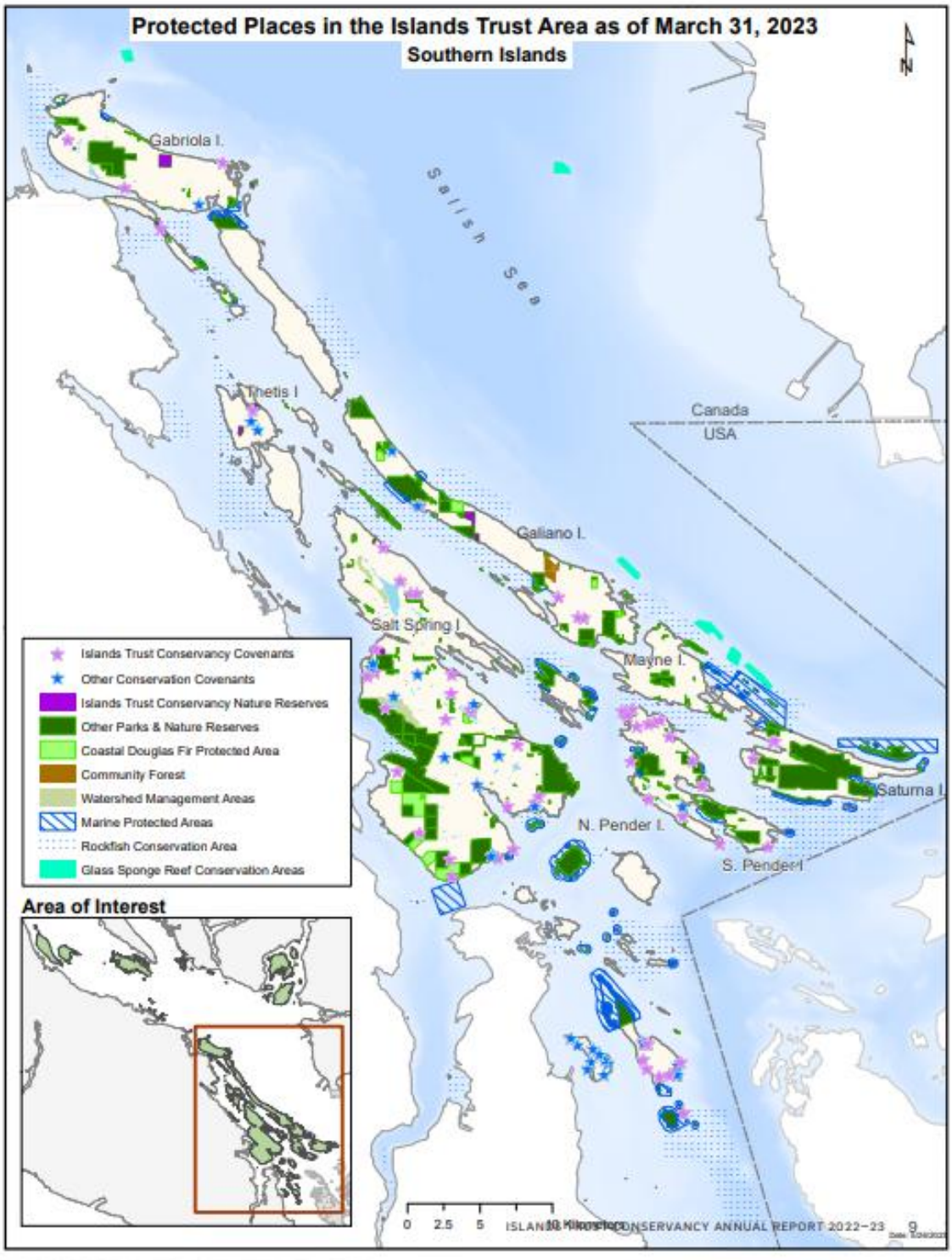

Figure 6 - A detailed map of Protected Places in the Islands Trust Southern Islands (left) as of March 31, 2023 (source: Islands Trust Conservancy, 2022).

2.1.4 Other coastal adaptation strategies

Islands Trust has many other tools and programs that support coastal climate adaptation:

- Conservation Status reports for each Local Trust Areas that includes information on species at risk, parks and protected areas, and graphics and statistics relevant to the islands' conservation (Figure 7).
- A Climate Projections report (2020) for the Islands Trust Area. This report describes sea level rise as an indicator of climate change and presents data on future projections between North Saanich and Vancouver using a 2015 study from Natural Resources Canada (Pinna Sustainability, 2020).
- A Species at Risk Program that runs under the Conservancy. With the help of Canada Nature Fund's Priority Places grants from Environment and Climate Change Canada, this program pilots various initiatives that help to protect and conserve ecological communities, e.g., a Garry oak meadow restoration project on Saltspring Island (Islands Trust, 2024m).
- A Freshwater Sustainability Program that addresses best practices to preserve freshwater. This includes information on topics such as drought preparation, rainwater harvesting, and groundwater sustainability. There are currently three groundwater projects in the Islands Trust area: the Islands Trust Area Aquifer Conceptualization project, the Islands Trust Area Groundwater Recharge Mapping Project, and the Southern Gulf Islands Groundwater Availability Assessment project (Islands Trust, 2024n).

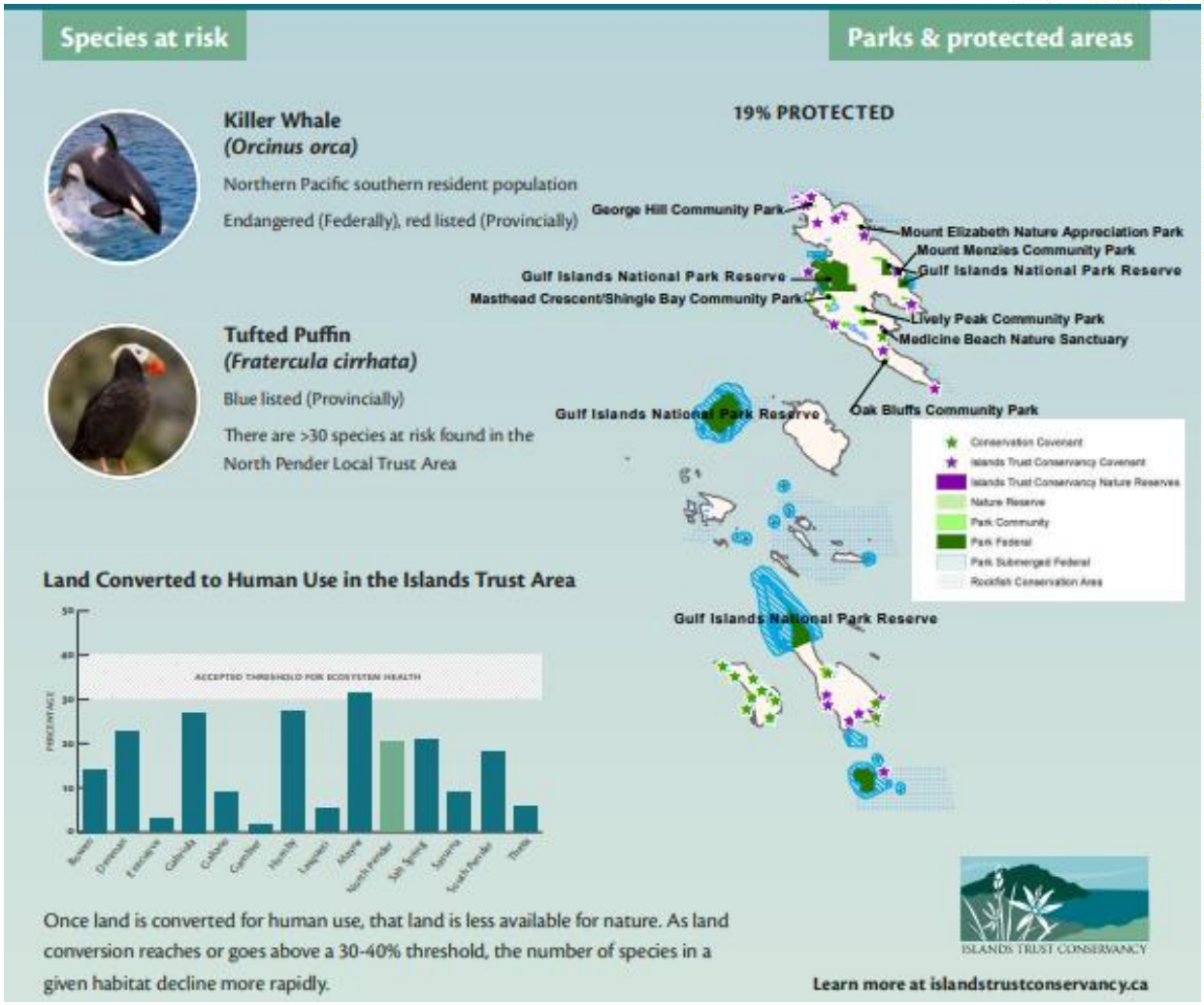

Figure 7 - Example of data available in the North Pender Island Local Trust Area conservation status report (Source: Islands Trust, 2019).

2.2 SPECIAL PROJECTS BY LOCAL TRUST AREAS AND BOWEN ISLAND MUNICIPALITY

2.2.1 Gambier Local Trust Area:

Gambier Island OCP and LUB Targeted Review Project

As of July 2024, the Gambier Island Official Community Plan and Land Use Bylaw (LUB) are under review for amendments regarding topics such as:

- Protection of archaeological and cultural sites
- Protection of forest ecosystems, including Douglas fir and associated ecosystems
- Shoreline protection, marine designations, and public docks
- First Nations perspectives

One of the main goals of this project is to update the island's policy to reflect better approaches to shoreline and forest ecosystem conservation and use. Phase 1 and Phase 2, which included data and mapping analysis and engagement with the public and First Nations, are now complete. The project is currently in Phase 3: bylaw development and drafting of OCP and LUB amendments. As of April 2024, Gambier Island has invested $30,500 into this project (Gambier Island Local Trust Committee, 2024).

Keats Island Shoreline Protection Project

Keats Island is one of 35 associated islands included in the Gambier Island Trust Area and is the only other individual island in this LTA with its own Official Community Plan and regulation bylaws. Due to concerns regarding dock development and shoreline hardening, the Keats Island Shoreline Protection project was initiated with the objective of amending the Keats Island community's OCP and LUB for better protection of the shoreline and marine areas (Islands Trust, 2023a). After community consultation and establishing a community Working Group, the project is currently drafting amendments to bylaws. The following two bylaws are proposed:

- Proposed Bylaw No. 153 – amendments to the Keats Island OCP that would include the creation of a Shoreline Development Permit Area to increase restrictions against certain types of new development on the shoreline.
- Proposed Bylaw No. 154 – amendments to the Keats Island Land Use Bylaw, which would introduce an increased development setback (from 7.5 m to 15 m) from the natural boundary

of the sea in certain zones, a minimum 10 metre distance between docks, and guidelines for the Shoreline DPA proposed in bylaw No.153. (Islands Trust, 2023b).

2.2.2 Thetis Local Trust Area

OCP/LUB Marine Areas Review Project

This project was initiated to review the OCP and LUB policies regarding the unzoned and undesignated Marine Zones of Thetis Island's Associated Islands. Proposed Bylaws No. 113 and 114 seek to change these undesignated areas into areas applicable to the OCP and LUB (Thetis Island Local Trust Committee, 2023a; 2023c). This will ensure that the Thetis Island Associated Island's Marine Zones are being regulated consistently with the "preserve and protect mandate." (Thetis Island Local Trust Committee, 2023d).

2.2.3 Bowen Island Municipality

Mannion Bay Revitalization Project

The Mannion Bay Revitalization project was initiated by Bowen Island Municipality to restore the environmental features and community wellbeing of the area. Initiatives within this project include:

- A community rack for small self-propelled watercrafts, such as kayaks and canoes, is being used to identify which vessels are actively being used for recreation, as opposed to being stored at the bay.
- The creation of the Use of Public Beaches and Water Areas Bylaw (Bylaw No. 418). This bylaw guides proper and respectful uses of Bowen Island's shoreline and beaches, including the prohibition of damaging activities, as well as regulations for storage and removal of vessels such as boats and other watercrafts (Bowen Island Municipality, 2016)
- The Municipality of Bowen Island has been granted a 30-year License of Occupation for Mannion Bay from the Ministry of Forests, Lands, and Natural Resource Operations. This license will be used to continuously restore the socioecological integrity of Mannion Bay (Bowen Island Municipality, 2022).
- A voluntary **No Anchor Zone** within Mannion Bay to protect eelgrass habitats from damage by boat anchors and chains. In 2020, eelgrass was also re-planted in these areas for salmon and other aquatic species. This initiative was done in partnership with SeaChange Marine Conservation Society. (Bowen Island Municipality, 2022, Figure 8).

Figure 8 – A diagram indicating buoy placement within Mannion Bay's No Anchor Zone. Buoys are placed outside of eelgrass depth (Source: Bowen Island Municipality, 2022).

2.2.4 Other projects:

Several other Local Trust Areas are also undertaking OCP and LUB reviews as of July 2024. Goals for these reviews generally range from topics such as:

- Increased housing options, affordability, and equity
- Climate change resiliency
- First Nations relations and involvement
- Community land use planning
- Ecosystem protection

2.3 CHALLENGES AND BARRIERS TO COASTAL ADAPTATION WITHIN ISLANDS TRUST

As part of this review project, interviews and surveys were conducted with staff from Islands Trust and Bowen Island Municipality to determine barriers and challenges to further climate adaptations. Barriers mentioned in staff communication include:

- Availability of funding
- Budgeting restraints
- Unclear land/shoreline jurisdiction
- Information needed regarding the cost of Nature-based Solutions vs. Engineered options
- Lack of relevant local climate data
- Lack of staff capacity
- Lack of education and training for staff
- Lack of education for homeowners on alternative shoreline protection options
- Difficulty sourcing information on high-value ecosystems such as salmon-bearing streams (for the Islands Trust Conservancy)

One of the most prominent barriers stated from interviews with staff was lack of staff capacity, availability of funding, and budget restraints. Carla Skuce, Manager of Environment and Parks Planning for Bowen Island Municipality, mentioned her department's awareness on the abundance of available resources for shoreline protection and coastal adaptation but noted that lack of staff and capacity has prevented them from analyzing and utilizing such resources for projects (C. Skuce, personal communication, June 24, 2024). A similar sentiment is echoed by Kathryn Martell, Ecosystem Protection Specialist for the Islands Trust Conservancy. In a survey, Martell stated that each regional district overlapping with the Islands Trust Area has different sets of data that could be relevant to conservancy work, but staff have not had the time or capacity to source, cross-reference, and synthesize these data for it to be relevant to the ITA (K. Martell, survey, 2024). Regarding funding, Skuce also mentioned a beach restoration project on Bowen Island that considered implementing a Green Shores design, but the municipality did not have sufficient funding to go through with it (C. Skuce, personal communication, June 24, 2024). When staff were asked about the kinds of projects they would undertake if funding and capacity were not an issue, responses included:

- Development of a natural asset inventory (Bowen Island)

- Development of a biodiversity inventory (Bowen Island)
- Green Shores for Shoreline Development along the perimeter of the island (Bowen Island)
- Assessment of critical infrastructure that may be at risk due to SLR
- Greater connections between First Nations Reconciliation and coastal adaptation
- Greater development of partnerships between environmental groups and Islands Trust
- Greater synthesis of relevant resources and tools for educational purposes or project use
- Mapping of SLR and storm surge impacts within the Islands Trust Area
- Heat maps of the influence of shoreline vegetation on forage fish, eelgrass, and kelp, as well as educational materials about those habitats

Another notable challenge in shoreline protection is the lack of knowledge and understanding of property owners on nature-based solutions when deciding how to protect their shorelines. According to a Planner for Islands Trust, when homeowners build hard-engineered structures without any prior consultation, it can cause legal issues regarding construction on the shoreline and irreversible damage to the shoreline morphology. Improved shoreline protection can be partly addressed through greater outreach efforts to educate homeowners on soft shoreline options such as beach nourishment and re-vegetation of the shoreline. It would also be greatly beneficial for all coastal planners and Qualified Environmental Professionals (QEPs) to receive training specific to shoreline environments and planning so that they can direct property owners to resources and options that would help uphold the integrity of both the property and the shoreline. Clear guidelines for property owners that highlight options for certain issues or other development plans along the shoreline, who to contact, and what permits or permissions are needed would streamline the process for property owners and result in increased protections for shorelines (personal communication, April 16, 2024).

When asked what other specific data or training may be helpful to move past educational barriers, the planner mentioned that receiving Green Shores Level 1 and Level 2 training greatly helped them change their approach and perspective to coastal planning (personal communication, June 19, 2024). The planner also mentioned that more resources and information are needed on the costs of NbS in comparison to traditional hard-armouring, as it can vary greatly between properties and is a prominent factor in which option property owners choose (personal communication, June 19, 2024).

2.4 DISCUSSION: ISLANDS TRUST STRATEGIES COMPARED TO THE GUIDANCE DOCUMENTS

The coastal adaptations and shoreline protection strategies developed by Islands Trust thus far seem to be appropriate and progressive. As found in the guidance document review, mainstreaming issues regarding climate change and affected environments is an important step in building capacity, as it creates room to prioritize action and potentially set aside budgets to handle such challenges. Islands Trust does this through the Islands Trust Act and Policy Statement, which outlines a consistent and streamlined model in which it is mandatory for Local Trust Areas (LTA) and their designated representatives to address the protection of marine and shoreline ecosystems (Islands Trust, 2021). This includes a minimum setback distance in each LTA, which not only protects shorelines from harmful development but safeguards future structures from erosion, sea level rise, flooding, and other coastal climate change risks. As such, minimum setback distances should be updated (i.e., increased) as new research or information about sea level rise is found. In line with this, Islands Trust has policies that allow Local Trust Committees (LTC) to amend regulations in their OCPs and LUBs as they see fit (Islands Trust, 2021). We can see this reflected in the various OCP and LUB amendment projects discussed in the "Special Projects" section. However, as with all policies, proper enforcement of setbacks is required to be beneficial to both the community and the environment. The "preserve and protect" mandate that is used to drive the Islands Trust Policy Statement is a beneficial reminder to staff to drive policy towards better care for island ecosystems and their communities.

It is standard practice, thanks to the *Local Government Act*, that the community is notified and given the opportunity to provide feedback regarding any proposed Official Community Plan bylaw amendments (Government of British Columbia, 2024b). Some project charters, such as the Keats Island Shoreline Protection project, mention community involvement or the development of a community working group. This is important, as the involvement of community members in the development of climate adaptation projects could potentially heighten overall public awareness of issues regarding coastal ecosystems, leading them to make better informed decisions on topics such as shoreline management and public beach usage.

Islands Trust has invested plenty of time and resources into projects such as the Shoreline Mapping initiative, ecosystem inventories for forage fish habitat, bull kelp, and eelgrass, and the Shoreline Protection Model Bylaw report, which are all valuable resources for informing future planning efforts, and research. The NAPTEP initiative through the Conservancy is also an advantageous incentive that allows the organization to protect important ecosystems and preserve the biodiversity in them, by setting aside land for protection. In discussion with Islands Trust staff, it seems that staff have many goals and desires for coastal adaptation work but are limited by time and resources to achieve them. Despite this, Islands Trust clearly cares greatly for its shorelines and is committed to

protecting them. There will likely be much more coastal adaptation work to look forward to in years to come.

2.4.1 – Key Take-Aways

- Islands Trust has prioritized data-informed planning and has invested time and efforts into building resources such as the Shoreline Mapping Initiative and ecosystem inventories.
- Islands Trust has an opportunity to update development setbacks that are informed by current sea level rise projections and to build policies to enforce those setbacks.
- Further, meaningful action is restrained by the availability of funding for project implementation, as well as staff capacity and challenges with jurisdiction.

3: HOW THE PACIFIC SALMON FOUNDATION CAN SUPPORT COASTAL ADAPTATION IN YOUR COMMUNITY

The Pacific Salmon Foundation (PSF) is dedicated to supporting local communities with coastal climate change adaptation. Following is a list of resources that can support coastal adaptation:

- The Marine Data Centre's Marine Ecosystem Map is an interactive map platform that provides over 450 layers of geospatial data for ecological and human use. PSF collates and receives marine data from multiple databases and sources including researchers, stewardship groups, and Fisheries and Oceans Canada (DFO). The Marine Ecosystem map is a platform where users can visualize spatial coastal data to assess what is occurring in their community. These data can help inform planning decisions, including identifying areas for restoration.
    - The Pacific Salmon Foundation's Resilient Coasts for Salmon project spent five years mapping the entire coastline of eastern Vancouver Island to determine where the shoreline is natural and where it has been modified by structures like seawalls, and overwater structures like docks. They are also tracking the extent of log accumulation on shorelines in this area. The data collected will ultimately provide key insights about nearshore salmon habitat and SLR. With the Resilient Coasts data in the Marine Ecosystem Map, you will be able to visualize the extent of hard armour and other coastal modifications at local scales, and how this intersects with other data layers such as vulnerability to SLR, predicted pacific sand lance habitat, and countless other factors. The datasets will be available for download, or you can play around with the layers on the Marine Ecosystem Map itself to analyze whatever is of interest to your

community. These data will be publicly available in 2025, and local community reports of the findings will be released in 2025 and 2026.

- **What data/modeling would help your community plan for the future and keep shorelines intact for the benefit of people and salmon? Could PSF help with collecting/finding existing data?** Reach out to Resilient Coasts for Salmon project manager Kyla Sheehan (ksheehan@psf.ca) for more information.
- The Pacific Salmon Foundation has written several articles that provide practical tips for reducing our impact on local waters by choosing green cleaning products, being an eco-friendly boater, and much more. The Resilient Coasts for Salmon project's Tool Kit and educational page are excellent resources for Islands Trust residents, as well as staff looking to become familiar with nature-based solutions.

REFERENCES

Asset Management BC (AMBC). 2019. *Integrating Natural Assets into Asset Management.* AMBC. https://www.assetmanagementbc.ca/wp-content/uploads/Integrating-Natural-Assets-into-Asset-Management.pdf

Bowen Island Municipality. (2016). *Bylaw No. 418 Use of Public Beaches and Water Areas Bylaw.* https://bowenisland.civicweb.net/document/106394/BIM%20Bylaw%20No.418,%202016(E).pdf?handle=2A3C01DF18EC491B85FBB9BC459AD5CD

Bowen Island Municipality. (2022, August 25). *Mannion Bay Revitalization*. Bowen Island Municipality. https://bowenislandmunicipality.ca/parks-recreation-culture/environment/mannion-bay/

Bridges, T.S., King, J.K., Simm, D., Beck, M.W., Collins, G. Lodder, and Mohan, R.K. 2021. *International Guidelines on Natural and Nature-Based Features for Flood Risk Management.* U.S. Army Engineer Research and Development Center.

City of Toronto. 2024. Eco-Roof Incentive Program. Toronto, Ont. https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives/green-your-roof/

de Graaf, R.C. (2017). Salt Spring Island and Wallace Island Surf Smelt and Pacific sand lance Spawning Habitat Suitability Assessments September 2015-September 2016. *Islands Trust.* https://islandstrust.bc.ca/document/salt-spring-and-wallace-forage-fish-report-2023/

Gabriola Island Official Local Trust Committee. (2022). *Gabriola Island Official Community Plan: Bylaw No. 166.* Islands Trust. https://islandstrust.bc.ca/document/gabriola-island-ocp-bylaw-no-2023/

Galiano Island Local Trust Committee. (2024). *Galiano Island Local Trust Committee: Official Community Plan Bylaw No. 108.* Islands Trust. https://islandstrust.bc.ca/document/galiano-ltc-ocp-bylaw-no-108/

Gambier Island Local Trust Committee. (2024, April 29). *Gambier Island OCP and LUB Targeted Review Project Charter v.2.1*. Islands Trust. https://webfiles.islandstrust.bc.ca/islands/local-trust-areas/gambier/current-projects/Gambier%20Island%20Official%20Community%20Plan%20Review/1.%20About%20the%20Project/2024-04-29%20Project%20Charter.pdf

Gittman R., Scyphers S., Smith C., Neylan I., and Grabowski, J. 2016. Ecological Consequences of Shoreline Hardening: a Meta-analysis. BioScience 66(9): 763–73.

Gittman, R.K., and S.B. Scyphers. 2017. The cost of coastal protection: A comparison of shore stabilization approaches. Shore and Beach 85(4): 19–24.

Government of British Columbia. (2024a). *Islands Trust Act.* *https://www2.gov.bc.ca/gov/content/home*

Government of British Columbia. (2024b). *Local Government Act, Part 14 – Planning and Land Use Management [RSBC 2015].* BC Laws. Retrieved from BC Legislative Assembly website: *https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/r15001_14#part14*

Government of Canada. (2024). *Ecological Gifts Program: overview.* *https://www.canada.ca/en/environment-climate-change/services/environmental-funding/ecological-gifts-program/overview.html*

Hilke, C., Ritter, J., Ryan-Henry, J., Powell, E., Fuller, B., Stein, B., and Watson, B. 2020. *Softening Our Shorelines: Policy and Practice for Living Shorelines Along the Gulf and Atlantic Coasts.* National Wildlife Federation. https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2020/Softening-Our-Shorelines.pdf

IUCN. 2020. *Guidance for using the IUCN Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of Nature-based Solutions. First edition.* https://portals.iucn.org/library/sites/library/files/documents/2020-021-En.pdf

Islands Trust. (n.d.). *Islands 2050 – Fact Sheet.* https://islandstrust.bc.ca/document/islands-2050-docks-seawalls-desalination-fact-sheet/

Islands Trust. (2011). *Islands Trust Shoreline Mapping Project Methodology.* https://islandstrust.bc.ca/document/islands-trust-shoreline-methodology-report-2023/

Islands Trust. (2019). *Conservation status of North Pender Island Local Trust Area.* https://islandstrust.bc.ca/document/north-pender-island-lta-profile-2/

Islands Trust. (2021). *Shoreline Protection Model Bylaw Report.* https://islandstrust.bc.ca/document/shoreline-protection-model-bylaw-report-march-2021/

Islands Trust. (2023a) *Memorandum: Keats Island Shoreline Protection Project.* https://webfiles.islandstrust.bc.ca/islands/local-trust-areas/gambier/current-projects/Keats%20Island%20Shoreline%20Protection/2.%20Staff%20Reports/2023-06-20%20Keats%20Shoreline%20memo%20and%20Madrone%20Report.pdf

Islands Trust. (2023b). *Keats Shoreline Protection Project*. https://islandstrust.bc.ca/keatshorelineproject/

Islands Trust. (2024a). *Overview of Islands Trust.* https://islandstrust.bc.ca/about-us/overview-of-islands-trust/

Islands Trust. (2024b). *Local Trust Committees.* https://islandstrust.bc.ca/about-us/governance/local-trust-committees/

Islands Trust. (2024c). *Islands Trust Act—About Us.* https://islandstrust.bc.ca/about-us/islands-trust-act/

Islands Trust. (2024d). *Governance.* https://islandstrust.bc.ca/about-us/governance/

Islands Trust. (2024e). *Interesting Facts.* https://islandstrust.bc.ca/mapping-resources/interesting-facts/

Islands Trust. (2024f). *Marine Shorelines.* https://islandstrust.bc.ca/programs/marine-shorelines/

Islands Trust. (2024g). *NAPTEP: Natural Area Protection Tax Exemption* https://islandstrust.bc.ca/programs/natural-area-protection-tax-exemption-program/

Islands Trust. (2024h). *Islands 2050—Programs* https://islandstrust.bc.ca/programs/islands-2050/

Islands Trust. (2024i). *Ecosystem Inventories.* https://islandstrust.bc.ca/programs/ecosystem-inventories/

Islands Trust. (2024j). *Create a Nature Reserve.* https://islandstrust.bc.ca/conservancy/protect-nature/create-a-nature-reserve/

Islands Trust. (2024k). *Conservation Covenants.* https://islandstrust.bc.ca/conservancy/protect-nature/conservation-covenants/

Islands Trust. (2024l). *Protected Places.* https://islandstrust.bc.ca/conservancy/protected-places/

Islands Trust. (2024m). *Species at Risk Program.* https://islandstrust.bc.ca/conservancy/species-at-risk/

Islands Trust. (2024n). *Freshwater Sustainability.* https://islandstrust.bc.ca/programs/freshwater-sustainability/

Islands Trust Conservancy. (2018, January 30). *Regional Conservation Plan 2018 – 2027.* Islands Trust. https://islandstrust.bc.ca/document/itc-regional-conservation-plan-2018-2027-2023/

Islands Trust Conservancy. (2022). *Islands Trust Conservancy Annual Report 2021- 2022.* Islands Trust. https://islandstrust.bc.ca/document/islands-trust-annual-report-2021-2022

Islands Trust Conservancy. (2023). *Islands Trust Conservancy Annual Report 2022- 2023.* Islands Trust. https://islandstrust.bc.ca/document/islands-trust-conservancy-annual-report-2022-2023/

Islands Trust Council. (2003). *Islands Trust Policy Statement.* Islands Trust. https://islandstrust.bc.ca/document/islands-trust-policy-statement-consolidated-2023/

Islands Trust Executive Committee. (2016). *Ballenas-Winchelsea Islands Official Community Plan: Bylaw No. 27.* Islands Trust. https://islandstrust.bc.ca/document/ballenas-winchelsea-ocp-bylaw-no-2023/

Judd, A. 2021. Damage and Repairs Could Make B.C. Floods Canada's Most Expensive Natural Disaster. Global News – November 19, 2021. https://globalnews.ca/news/8388250/bc-floods-damage-cost-repairs-insurance-most-expensive-natural-disaster-canadian-history/

Lamont, G., Readshaw J., Robinson, C., and St-Germain, P. 2014. *Greening Shorelines to Enhance Resilience, An Evaluation of Approaches for Adaptation to Sea Level Rise.* SNC-Lavalin Inc. https://www.stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/Greening_Shorelines_to_Enhance_Resilience.pdf

MNAI. 2021. *Managing Natural Assets to Increase Coastal Resilience: Guidance Document for Municipalities.* https://mnai.ca/media/2021/11/MNAI-Coastal-Asset-Guidance-Doc-cover-101-combined.pdf

Nature Canada. 2022. *Top 10 Municipal Actions to advance nature-based climate solutions.* https://www.naturalinfrastructurenb.ca/wp-content/uploads/2022/12/NBCS-Top-10-Municipal-Actions.pdf

National Oceanic and Atmospheric Administration (NOAA). 2015. *Guidance for Considering the Use of Living Shorelines.* https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf

Pinna Sustainability. (2020). *Climate Projections for the Islands Trust Area.* Islands Trust. https://islandstrust.bc.ca/document/climate-projections-for-islands-trust-area-report-2020/

Sun, V. 2021. *Climate Caucus Councillor's Handbook: Nature-Based Solutions Executive Summary.* Climate Caucus. https://sustain.ubc.ca/sites/default/files/2020-083_Councillors%27%20Handbook%20of%20Nature%20Based%20Solutions_Sun.pdf

Thetis Island Local Trust Committee. (2023a). *Thetis Island Official Community Plan*. Islands Trust. https://islandstrust.bc.ca/document/thetis-island-island-ocp-bylaw-no-2023/

Thetis Island Local Trust Committee. (2023c). *Thetis Island Local Trust Committee Bylaw No. 114: Bylaw to Amend Thetis Associated Islands Land Use Bylaw, 2014.* Islands Trust. https://webfiles.islandstrust.bc.ca/islands/local-trust-areas/thetis/current-projects/OCP-LUB%20Marine%20Areas%20Review%20Project/3.%20Proposed%20Bylaws/Proposed%20Bylaw%20No.%20114%20Land%20Use%20Bylaw%20-%202nd%20Reading.pdf

Thetis Island Local Trust Committee. (2023d). *OCP/LUB Marine Areas Review Project – Charter v 1.0. Islands Trust.* https://webfiles.islandstrust.bc.ca/islands/local-trust-areas/thetis/current-projects/OCP-LUB%20Marine%20Areas%20Review%20Project/1.%20About%20the%20Project/Project%20Charter.pdf

Vouk, I., Pilechi, V., Provan, M., Murphy., Enda, 2021. *Nature-Based Solutions for Coastal and Riverine Flood and Erosion Risk Management.* https://www.csagroup.org/wp-content/uploads/CSA-Group-Research-Nature-Based-Solutions-for-Coastal-and-Riverine-Flood-and-Erosion-Risk-Management.pdf

West Coast Environmental Law (WCEL). 2012. *Preparing for Climate Change: An Implementation Guide for Local Governments in British Columbia.* https://www.wcel.org/sites/default/files/publications/WCEL_climate_change_FINAL.pdf

Youmans, J. (2023). *Community and Shared Docks: Case Studies from the B.C. Coast.* Islands Trust. https://islandstrust.bc.ca/document/community-dock-case-studies-2023/

APPENDIX I - GLOSSARY

Conservation Covenant – an agreement between the Conservancy and the land owner, whereby the land owner continues to live on their property on the basis that they promise to protect the land in certain ways and allow the Conservancy to regularly monitor the property for conservation purposes.

Development Cost Charges (DCCs): feed collected and regulated by local governments that are put on new development to help fund growth-related infrastructure.

Hard armour: traditional approaches towards shoreline protection. Includes manmade structures such as seawalls, bulkheads, dikes, etc.

Hard assets: Tangible or physical resources with value, such as buildings, roads, sewage systems, etc.

Islands Trust Area (ITA): refers to the entirety of the area under the jurisdiction of Islands Trust.

Local Trust Area (LTA): a localized group of major islands within the Islands Trust Area. Each Local Trust Area is named after one main island, and typically includes multiple associated islands.

Local Trust Committee (LTC): the three-person representative committee of a Local Trust Area. Each Local Trust Committee consists of two community-elected trustees and one chair or vice-chair from the Islands Trust Executive Committee.

Land Use Bylaw (LUB): document that addresses matters of land use.

Natural Assets: Natural resources or ecosystems, such as lakes, forests, and beaches, that provide services to humans and are managed or could be managed by the government.

Nature-based Solutions (NbS): actions and management methods for conservation that integrate the use of nature and natural ecosystem processes.

Nature Reserve – land that has been donated by the land owner, with the intention of it being managed and monitored for conservation by the Conservancy.

No Anchor Zone: areas where boats are either prohibited from, or encouraged to avoid, dropping anchor. The intention of these areas is to protect benthic habitats including eelgrass beds, which can be scoured by anchors and chains. These areas are typically marked by 'No Anchor Zone' buoys.

Official Community Plan (OCP): a local government plan that outlines the long-term visions of communities

Regional Growth Strategy (RGS): a comprehensive plan created by governments that provide an overarching framework, as well as objectives, goals, and actions for the long-term growth of a region.

Sea Level Rise: the increase in the water level of the world's oceans.

Whole Systems Approach: a strategy for conservation, where topics like nature-based solutions (NbS) are integrated throughout the community rather than being limited to a particular jurisdiction or regulatory boundary. This is a holistic, forward-thinking approach that involves all rightsholders and stakeholders, and strives to achieve shared goals among governments and members of the community.

APPENDIX II – METHODS

GOAL

The purpose of this report is to be an educational piece for the Resilient Coasts for Salmon project that will be included in community mapping reports. This report represents a review of bylaws, policies and incentive programs that have been implemented in some east coast Vancouver Island (ECVI) communities to support the uptake of nature-based approaches to climate adaptation. The websites of select ECVI communities will be reviewed for bylaws, policies, funding and incentive programs that support the uptake of nature-based solutions, and address climate adaptation related to concerns with sea level rise, storm surge and coastal flooding. The reviewer is seeking any bylaw, policy, incentive/rebate program or otherwise that supports

1. the implementation of nature-based solutions;
2. proactive planning for Sea Level Rise (SLR); and
3. the removal of hard armour, or prevention of new armouring being constructed.

This report highlights strategies implemented by ECVI local governments to address coastal climate change impacts, as well as identify common barriers to implementation of nature-based adaptation strategies.

Note: this is not a systematic review. There may be some inherent biases in documents that were chosen and reviewed.

PROCEDURES FOR SECTION 1: GUIDANCE DOCUMENTS

1. Document collection

Guidance documents were found through Google search or by recommendation of colleagues and were chosen for review by relevancy to coastal climate change adaptation and NbS. No strict set of search terms were used to find these guidance documents, but included terms such as coastal climate change guidance, sea level rise guidance, coastal management, green infrastructure guidance, and more. Each guidance document was reviewed briefly (through examination of abstract, overview, and/or table of contents) to ensure relevancy of content to report topic. Most of the guidance documents used were specific to Canada, with a few resources from the USA and International organizations (table 1).

The following is a full list of the guidance documents chosen and used for the reports:

Table 2 - List documents used for the Guidance Document Review (section 1 of report).

Title	Published by	Year published
Climate Caucus Councillor's Handbook: Nature-Based Solutions	Climate Caucus	2021
Greening Shorelines to Enhance Resilience: An Evaluation of Approaches for adaptation to Sea Level Rise	Stewardship Centre for British Columbia	2014
Guidance for Considering the Use of Living Shorelines	National Oceanic and Atmospheric Association (NOAA)	2021
Guidance for using the IUCN Global Standards for Nature-based solutions: a user-friendly framework for the verification, design and scaling up of Nature-based Solutions	International Union for Conservation of Nature (IUCN)	2020
International Guidelines on Natural and Nature-Based Features for Flood Risk Management	Engineering with Nature	2021
Managing Natural Assets to Increase Coastal Resilience: Guidance for Municipalities	Managing Natural Assets Initiative (MNAI)	2021
Nature-Based Solutions for Coastal and Riverine Flood and Erosion Risk Management	Canadian Standards Association (CSA)	2021
Preparing for Climate Change: An implementation guide for local governments in British Columbia	West Coast Environmental Law (WCEL)	2012
Softening our Shorelines: Policy and Practice for Living Shorelines Along the Gulf and Atlantic Coasts	National Wildlife Federation	2020
Top 10 Municipal Actions to advance nature-based solutions	Nature Canada	2022

2. Document review

Each guidance document was thoroughly reviewed for relevant information to coastal climate change and NbS. Comprehensive notes were taken on each guidance document in preparation for writing the report.

PROCEDURES FOR SECTION 2:

Regional and municipal government documents (policies, bylaws, incentive programs, projects, etc.)

1. Document collection methods

Documents from this section were collected from the Islands Trust website and the Bowen Island Municipality website. Webpages on both websites were thoroughly reviewed for information and documents relevant to coastal climate change and NbS. For example, the Islands Trust Programs page was checked for coastal and shoreline initiatives, the Mapping & Resources page was checked for relevant shoreline maps, and so on. The Island Planning webpages of each Islands Trust Local Trust Area (LTA) were also checked for locally relevant projects, as well as Official Community Plans (OCP) and Land Use Bylaws (LUB). All documents collected were then put in an excel spreadsheet to be kept track of.

Note: while stormwater and runoff management are relevant to coastal resource and habitat protection, we have chosen to omit regulatory practices and policies related to these topics in our review.

2. Document review

Documents compiled into the excel spreadsheet were filtered for relevancy to coastal climate change adaptation and NbS. Comprehensive notes were then taken on each document in preparation for writing the report.

3. Staff interviews

A list of staff from Islands Trust and Bowen Island Municipality were collected from their respective government's websites and contacted for interviews with the report author. These interviews were

intended to gain further insight into their local government's coastal management methods and learn about barriers to coastal adaptation. Staff contacted were based on their roles within their respective government, the relevancy of their department to coastal and climate issues. This includes planners, engineers, staff in climate action, sustainability, and parks departments, and more. Staff may also have been contacted due to already-established partnerships with the Pacific Salmon Foundation, or by recommendation by other government staff.

Staff were also given the option to write a survey rather than participate in an interview.

A total of three staff members from Islands Trust and Bowen Island Municipality were interviewed, and one survey was recorded. Interviews were booked through Doodle, conducted over Zoom, and ranged from 15-45 minutes long. The interviewer also recorded notes during the interview.

For the full list of interview questions asked, see Appendix III.

APPENDIX III - INTERVIEW AND SURVEY QUESTIONS

INTERVIEW QUESTIONS:

What protections are currently in place for coastal and shoreline habitats?

What kind of projects or resources do you have that address coastal climate change adaptations or shoreline development? (e.g. restoration, removal of coastal hard armour, climate data/modeling, sea level rise planning, educational materials)

What are some barriers that you have experienced when dealing with climate change and adaptation related issues? What information or resources are needed to move past these barriers and support further climate adaptation and implementation of nature-based solutions?

If funding was not an issue, what projects or initiatives would you undertake? What is your vision for coastal climate adaptation?

Are community members involved or consulted in climate adaptation work? Do you have a sense of what the community wants in terms of coastal adaptation and shoreline management?

If community members were to contact you with concerns or guidance on sea level rise, do you feel that you/your department have enough training/knowledge on coastal resilience to answer their questions?

Are there any incentives or initiatives that are currently offered within your community to residents to promote nature-based climate adaptations or the removal or prevention of hard armouring?

Note: Follow up questions and specific questions on area-specific projects, documents, or policies may have been asked when applicable.

SURVEY QUESTIONS (ADAPTED FROM INTERVIEW QUESTIONS):

1. What is your full name?
2. What is your job title? (please include which Local Trust Areas or regions of Islands Trust you are involved in if applicable)
3. What are the most prominent barriers that you have experienced when dealing with coastal climate change and adaptation related issues?
4. What information or resources are needed to move past these barriers? (multiple choice)
   - ☐ Green Shores training
   - ☐ Educational materials for staff
   - ☐ Educational materials for the public

- ☐ Coastal mapping data
- ☐ Expertise from contracted professionals (e.g. geo-coastal morphologists)

5. Are there any other specific data or training opportunities not mentioned above that would be helpful to move past these barriers?
6. If funding or resources was not an issue, what projects or initiatives would you undertake?
7. Are community members involved or consulted in climate adaptation work? Do you have a sense of what the community wants in terms of coastal adaptation and shoreline protection?
8. If community members were to contact you with concerns or guidance on sea level rise, do you feel that you/your department have enough training/knowledge on coastal resilience to answer their questions?

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