



**Emerging Hazards, Challenges and Opportunities Facing Island County
related to Climate Change**
Submitted by the Island County Marine Resources Committee (MRC)
Date – Fall 2023
REVISION 11/06/2023

Introduction

Following extreme tides over the Winter of 2022-2023 that inundated shoreline structures across Island County (IC), each of the County Commissioners raised concerns about emerging hazards related to Climate Change (CC) and Sea Level Rise (SLR). This white paper has been developed by MRC members and technical experts in response to the Commissioners and suggests the need for ongoing dialogue as IC joins other coastal communities worldwide in seeking to address changes in climate and sea level. This paper provides an overview of existing and emerging conditions, issues of importance to health, safety and resilience, and response opportunities. References are provided at the end of the paper.

While CC is a global issue, this white paper focuses on ramifications specific to IC:

1. Emerging climate trends and the need to focus on extreme events;
2. Myriad legal and illegal shoreline uses that challenge governmental services and interventions;
3. Policy opportunities to address CC and SLR in combination with priorities for health, equity, and habitat;
4. Strategies to attract and maintain public engagement; and
5. Next steps for the Commissioners' consideration.

Conditions – Existing and Emerging Trends

1) Trends in Climate, Sea Level Conditions and the unique need to focus on Extreme Events

Global and local patterns of new extremes in heat, precipitation, storm intensity, height of storm surges and tidal events are defying historic patterns. While many reports focus on the average of these trends, extreme events are the most hazardous and destructive to human and ecological life. These extremes are occurring more frequently – very often setting new records.

Health and Climate Policy Recommendation: Basing regulations on past averages of rainfall, temperature, and sea level ignores the increasingly frequent extremes in these parameters. Predictive models should be essential tools in the development of planning policy and regulations (e.g., Comprehensive Plan (CP), Shoreline Master Plan (SMP) and Hazard Mitigation Plan (HMP)) to ensure homes, businesses, and infrastructure (e.g., public works projects) are located and constructed in areas that will remain viable for the expected asset lifetime and not release pollutants during extreme events.

Three pressing trends are impacting Island County

1a) A Trend toward hotter and dryer summers with associated extremes:

The Pacific Northwest has experienced less rain and higher temperatures overall. Human, marine, animal, and plant life suffer in these conditions and there is an increased probability of fire.

Groundwater recharge: IC depends upon wells for drinking water for Camano, South Whidbey and much of North Whidbey. Rainfall filters through the soil to replenish underground reservoirs, called aquifers from which drinking water is drawn. If more water is drawn from the aquifer than can be recharged, the aquifer risks depletion. As development takes place in IC, impervious surface area increases in opposition to an increased demand for drinking water, irrigation, and other uses. This balance of recharge/use is challenged further by the trend toward hotter temperatures resulting in dryer conditions in the summer and fall seasons which then increase water demand for lawns and gardens or fire suppression. While the average rainfall over the course of a year may not vary, if rainfall is not received in a gradual manner, but instead in a series of deluges, the rain does not permeate to the aquifer and runs off instead. These generalized concepts must be interpreted for specific locations over specific aquifers within IC and take into consideration the extent of impervious surface as well as the projected demand. SLR will also increase the risk of saltwater intrusion into wells in shoreline areas without access to the deeper aquifer.

IC has an information gap regarding how changing conditions impact the capacity and reliability of IC's aquifers. Understanding WA Dept of Ecology (DOE) and IC policies is the first step to closing this gap by performing a water balance which is aquifer specific.

Health and Climate Policy Recommendation: Work with state, local, and federal agencies such as NOAA and USGS, WA Ecology, and County staff to explore all data sources to estimate water flowing into and out of specific aquifers to inform decisions about State level and County specific policies that should be updated to ensure adequate groundwater supply.

Direct Marine Life impacts: Extreme heat waves affect shellfish and other intertidal life directly, causing massive die-offs which then cause a nutrient load on Puget Sound. Summer heat waves can coincide with low tides during daylight hours, exposing marine life to direct heating without the buffering capacity of cooler waters. Recreational shellfish harvesting can be affected, but so can the ecological systems that operate in the waters around IC. Continuous water temperature monitoring is important to capture extreme heat events.

Policy Recommendation: Support data collection to monitor effects on marine resources such as shellfish, forage fish, kelp, eel grass, and salmon.

1b) A trend toward higher storm surges and extreme high tides

This trend places at risk properties, septic drain fields, roads, utility lines and water systems from marine flooding. Utility maintenance, repair, and replacement costs due to saltwater corrosion will continue to increase and intensify. Exposure of septic drain fields in the intertidal zone presents an especially significant public health risk. Remediating this situation county-wide presents a valuable public health opportunity. The appropriate allocation of funding between public sources vs private homeowners is an important issue, particularly as the public health risk involves not just the homeowner but others who might be impacted by water borne diseases.

Policy recommendation specific to septic: WA DOH has proposed a rule revision¹ to require Health Licensing Offices in Puget Sound counties to identify areas where SLR may impact horizontal setbacks to septic systems resulting in an increased risk to public health. IC should be ready to implement this requirement as soon as finalized. **Policy recommendation:** Ensure that shoreline homeowners have access to adequate information about the trends that will affect their property and options for adaptation or mitigation. Shore Friendly can provide education and match experts with property owners to assist them. Incentivize community wide solutions which provide economies of scale.

Recommendation for interdepartmental coordination: Ensure that emergency plans are developed with projections for extreme weather events.

1c) An anticipated trend toward wetter winters with more intense rainfall extremes

Patterns of extremes for rainfall are variable and complex. Storms which have more intense patterns of rain and wind challenge long-held assumptions regarding bluff stability, change erosion patterns, raise the potential for flooding risks from inland sources and expand areas that are "flood prone", emphasizing the importance of stormwater management.

Health and Climate Recommendation: Using Low Impact Development (LID) techniques such as pervious pavement, swales, bioretention areas, green roofs, and curb and gutter elimination can help to direct stormwater runoff to areas not contributing to bluff collapse, while allowing important aquifer recharge. Ensure that all LID projects include an understanding of the need for long-term maintenance and periodic monitoring to ensure that the benefits accrue in perpetuity.

2) Myriad legal and illegal uses complicate governmental services and interventions

2a) Mixed Built Environment

Structures, setbacks, drainage, septic, and placement of utilities in flood prone and erosion impacted areas throughout IC reflect the evolution of uses of the island, regulatory codes, building technologies, understanding of shoreline processes and ecology, and public cooperation over the past 150 years.

Policy recommendation: To prevent misunderstanding, clearly delineate the legal responsibilities of private owners from the responsibilities of government in addressing the consequences of increased flooding and erosion.

¹ <https://doh.wa.gov/sites/default/files/2023-09/RuleRevision-OSS-KeyChanges.pdf?uid=6508f8312762b>

2b) Mixture of public and private infrastructure in flood prone areas

Easements in flood prone areas used by the County or other providers for utilities, drainage and other services are often interwoven with private infrastructure creating a maze of legal and physical challenges to improving existing systems and to complying with legal mandates for “fish friendly” accommodations to meet treaty obligations.

Health, equity, and climate recommendation: Track emerging flood prone areas to identify overlaps between expanding flood-prone areas with wetlands of importance for salmon recovery and sites important for treaty compliance suggesting some economies of scale for protective measures.

2c) Septic Drain fields in flood-prone areas

Septic drain fields in flood prone areas present threats to human and ecosystem welfare. Technological advances in small, independent individual or community septic systems may present new options to address this hazard but cost to decommission and remove a drain field and install a new system is significant.

Health and Equity Recommendation:

Every effort should be made to incentivize and defray costs to remove existing drain fields (whether functioning or failed) in the SMP domain and waterward. Develop additional requirements for new and retrofit septic systems within projected flood areas. Requiring watertight septic tank lids could reduce exposure to the community and first responders during response to flood events.

2d) Unpermitted existing structures

Despite IC’s best efforts at educating people about the proper permits and building requirements, there are inevitably structures that are either built prior to regulation development or despite existing regulations. These non-conforming structures are at greater risk of climate related impacts.

Policy Recommendation for Health, Equity and Climate: Ensure that unpermitted existing structures are not the recipient of any governmental grants or loans to enhance or rebuild.

2e) Rushed “panic” shoreline building

After a flooding or storm surge event, there is often a rush to armor shorelines or place temporary or semi-permanent barriers to divert water from inhabited dwellings without considering alternatives.

Recommendation: Planning is the key to preventing future problems and ensuring that costs are justified by the longevity of the structure in the face of CC and SLR. Resist pressure to make rushed decisions in favor of long-lasting decisions beyond what may be temporarily required to alleviate emergency situations. Nature based solutions are often better at reducing SLR and storm surge impacts, are frequently more economically viable, are often easier to maintain and adapt to changing conditions and may be incentivized through Shore Friendly type initiatives. Hard armoring destroys habitat, increases erosion, reduces biodiversity, and creates habitat for invasive species.

3) Policy Opportunities to Address CC, SLR in combination with Priorities for Health, Equity and Climate

The County’s vision, policies and regulations related to shoreline, bluff, wetland, and adjacent properties are spelled out in two bodies of regulatory code: the Comprehensive Plan (CP) and the Shoreline Management Plan (SMP); and one emergency plan: the Hazard Mitigation Plan (HMP). All are routinely updated, ideally should be coordinated with each other and present opportunities for policy and emergency planning to anticipate considerations for CC and SLR.

Policy Recommendation for Health, Equity and Climate: To facilitate coordination of updates and revisions, create a regulatory **CROSSWALK** between the CP and SMP, and with the HMP using predictive models that account for the increased prevalence of extreme events.

3a) IC Comprehensive Plan (CP)

The CP addresses the vision and priorities for IC’s future development within which the SMP must fit. The CP forecasts for a 20-year period, and is required to be updated every 10 years. IC is working on the 2025 Periodic update which can incorporate CC and SLR considerations and include updated predictions for extreme events.

Policy Resource: Use “Sound Choices” checklist as a starting point for aligning the CP, SMP, and HMP with Puget Sound recovery strategies. <https://pspwa.app.box.com/v/SoundChoicesChecklist2023>

3b) IC Shoreline Management Program (SMP)

The SMP and its specifics must fit within the vision and priorities articulated by the CP. It is the county's regulatory code for the entire shoreline and all locations 200 feet landward from the mean high tide (MHD). The SMP is scheduled for update every 8 years and is subject to review by the WA Dept of Ecology.

The effective IC SMP was approved in 2016. A 2020 update is awaiting County acceptance of a revised version received December 17, 2021, from the Dept of Ecology. The next update cycle will begin in 2026 for the 2028 update or 8 years following approval of the 2020 version. Should the County wish to modify portions of the SMP prior to the scheduled next update, there is an option to open the entire existing code for revision but not to revise only specific sections.

Policy Recommendation: SLR will present opportunities to use the requirement for "no net loss of shoreline ecological functions" to strengthen provisions to protect critical areas of habitat and to provide mitigation measures to address unanticipated impacts to the shoreline.

Equity Recommendation: Anticipating changes to the shoreline from SLR, explore opportunities to increase public access especially for those who do not own shoreline property.

3c) IC Multi-Jurisdiction Hazard Mitigation Plan (HMP) also addresses this suite of issues.

The HMP was last updated and approved on September 3, 2020. The HMP is updated on a 5-year cycle with the next update commencing at the beginning of 2024. It is reviewed and approved by the Washington State Emergency Management Division and the Federal Emergency Management Agency. As part of the most recent update, CC was addressed within the hazard profiles of each identified hazard to assist the county in considering CC issues when identifying future mitigation actions for the planning area.

4) Strategies to attract and maintain public engagement

Increase opportunities for engaging individuals and communities in discussions about shared goals, new information, issues and concerns, options, solutions, and incentives for dealing with the new realities of ongoing CC and SLR. Discussion should include emergency planning for extreme events.

4a) Prioritizing targeted discussions with shoreline property owners is essential since they will be the first to be impacted by extreme tidal events and higher storm surges. The Shore Friendly program can be extremely useful in that regard. However, everyone in IC will be impacted by hotter and drier summers and wetter winters with increased rainfall intensity and should be part of the overall outreach plan. Shared aquifers and intertwined infrastructure require discussion by the entire community to identify consensus solutions.

4b) Building a vision in dialogue with the public includes developing a rationale for roles and responsibilities of government versus personal responsibility. Stakeholder participation helps to ensure that all are treated equitably and that costs are distributed fairly. Ensuring that stakeholders are involved consistently, across IC departments, without redundancy will be challenging.

4c) Use an Adaptive Management Approach with the understanding that CC and SLR are areas of active research. Take common sense steps toward desired outcomes, while reserving opportunities to employ adaptive management techniques as dynamic conditions warrant. Providing many opportunities for public engagement can demonstrate progress while maintaining openness to new ideas, updated climate science, and solutions.

4d) Strategic use of Enforcement Compliance assistance can be useful to ensure that regulations are understood. However, carefully applied enforcement can be used to highlight the intent of policies and to discourage flagrant disregard of policies.

5) Next Steps for Commissioners' Consideration

5a) Create a regulatory CROSSWALK between the CP and SMP. The HMP does incorporate coastal erosion and CC data, and the crosswalk should include where these are referenced in the HMP for consistency and clarity.

5b) Close Information Gaps

- Inventory septic drain fields in intertidal zone
- Gather available data on the water balance (use versus replenishment) within aquifers to ensure adequate aquifer capacity for projected water usage

5c) Open public dialogue on issues of CC and SLR

5d) Assemble resources to assist in planning for better stormwater management

Abbreviated Resource List:

(Note: the MRC has begun to assemble a list of readily available information sources to help IC understand CC and SLR trends. This list is not exhaustive, but should be viewed as a starting point for an on-going assembly of materials.)

Emerging Trends and Extreme Events

- <https://www.nationalacademies.org/news/2021/10/climate-change-and-a-new-normal-of-extremes>
- <https://www.ncei.noaa.gov/access/billions/climatology/NWCR>

Hotter and Drier Summers

- <https://wsg.washington.edu/impacts-from-the-summer-2021-heatwave-on-washington-shellfish/>
- <https://cig.uw.edu/projects/in-the-hot-seat-saving-lives-from-extreme-heat-in-washington-state/>
- <https://www.timescolonist.com/local-news/gulf-islands-water-woes-a-warning-sign-for-the-rest-of-drought-prone-bc-7491954>

Wetter Winters and More Intense Rainfall

- <https://cig.uw.edu/projects/annual-assessment-of-water-year-impacts-in-the-pacific-northwest/>

Higher Storm Surges and Extreme High Tides

- <https://cig.uw.edu/projects/washington-coastal-resilience-project/>
- https://cig.uw.edu/wp-content/uploads/sites/2/2019/10/ExtremeWL_Final_15Oct19_midres.pdf
- <https://www.king5.com/article/tech/science/environment/higher-king-tides-sea-levels-rising-climate-change/281-8b7fc495-e3af-4010-af8a-8e449c308a4e>
- <https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html>
- <https://tidesandcurrents.noaa.gov/sltrends/sltrends.html>
- <https://coastnerd.blogspot.com/2023/01/anatomy-of-coastal-storm-december-27th.html>

Strategies to Engage the Public

- <https://nap.nationalacademies.org/catalog/12434/public-participation-in-environmental-assessment-anddecision-making>
- <https://www.epa.gov/international-cooperation/public-participation-guide-selecting-right-level-public-participation>
- <https://toolkit.climate.gov/>

“Sound Choices Checklist” for CP update

- <https://pspwa.app.box.com/v/SoundChoicesChecklist2023>

Climate change impact to invasive species/ threatened or endangered species

- <https://cig.uw.edu/wp-content/uploads/sites/2/2020/12/snoveretalsok2013sec8.pdf>
- <https://wdfw.wa.gov/species-habitats/habitat-recovery/climate-change>
- http://depts.washington.edu/paigle/workshops/vegetation/0940_Peterson_Kerns_Invasive_Plants_7Nov11.pdf
- <https://www.invasivespeciesinfo.gov/subject/climate-change>

Materials management and waste contribution to CC and local government responses

- <https://www.epa.gov/smm/example-local-government-climate-action-plans-address-materials-management-and-waste>

Shore Friendly Program

- <https://www.islandcountywa.gov/365/Shore-Friendly-Program>

Shore Stewards

- <https://extension.wsu.edu/island/nrs/shore-stewards/>