

Supplementary Information C:

Planning Language Examples for Climate Resiliency

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## Introduction

The **Planning for Climate Change on the North Olympic Peninsula** project has collaboratively explored climate change impacts, vulnerabilities, and adaptation opportunities for the North Olympic Peninsula, to better inform the comprehensive and strategic planning processes of the cities, counties, tribes, Public Utility Districts and ports within the region. In the course of developing targeted adaptation strategies during the participatory spring workshops, a number of prioritized adaptation strategies were related to language in land use planning and ordinances. This document, part of the suite of final products of the project, summarizes references and examples for high level planning language as well as regulatory language to best mitigate the effects of climate change on the North Olympic Peninsula. The references and examples are organized by five key areas for adaptation for the region (collaboratively identified by over 150 stakeholders): **sea level rise, stormwater management, flooding, water supplies, and fire**. Note that the subheadings labeled “Comprehensive Planning Examples” could be utilized not only in Comprehensive Plans but also in strategic plans and other high level planning documents, and “Ordinance Examples” could also apply to lower level planning documents.

This document provides model language from other planning processes for North Olympic Peninsula jurisdictions to consider including in local planning efforts. The examples provided here will require tailoring to meet specific local needs and concerns. It is hoped that the strategies below stimulate discussion among decision-makers and planners in how to best prepare the region for the expected impacts, as outlined in the Planning for Climate Change Preparedness Plan for the North Olympic Peninsula report.

The project team recognizes there are considerable costs associated with the implementation of some of the strategies recommended here, for local governments, businesses and homeowners. These preventative expenses will need to be balanced against the potentially much greater cost of climate change impacts if no action is taken.

## 1. Sea Level Rise

During the course of the project, sea level rise was identified as a key climate impact for the North Olympic Peninsula. The Climate Change Preparedness Plan for the North Olympic Peninsula includes detailed sea level rise projections for the area. Four prioritized adaptation strategies and their relevant key action steps from the Preparedness Plan were specifically related to sea level rise and planning and regulatory documents (note: see Appendix A: Comprehensive List of Adaptation Strategies of the Climate Change Preparedness Plan for the North Olympic Peninsula for the full set of strategies and key action steps):

- **CI-3: Update planning documents for sea level rise and flooding where needed.**  
Key Action Steps:
  - Create a sea level risk district for inclusion in Comprehensive Plan and promulgate new codes and code changes associated with managing for sea level risk.
  - Incorporate climate change and coastal hazard considerations into building codes by increasing freeboard requirements to two feet (three feet for critical projects) above the current 100-yr flood plain as buildings are redeveloped, developed, or renovated.
- **CI-6: Create critical area flood mapping beyond FEMA’s historical flood data.**

**Key Action Steps:**

- Cities and Counties should establish a climate change flood overlay as part of the critical area designations specific to their future flood concerns and use it to in addition to the FEMA flood maps which are constrained by only using historical data.

- **CI-17: Encourage relocation of infrastructure outside of coastal flood zone**

**Key Action Steps:**

- Create redevelopment restrictions, incentives for retreat, and building code changes with enhanced enforcement to move infrastructure from vulnerable locations.

A report prepared by the Land Use Law Center at Pace University School of Law for the Nature Conservancy titled [“Local Land Use Response to Sea Level Rise”](#) (PACE) does an excellent job at summarizing both high level planning examples and lower level regulatory language related to sea level rise, as well as other related areas including stormwater management, building regulations, and flooding. As stated in that report “This report summarizes selected local land use ordinances and regulations that include specific mention of sea level rise or that incorporate appropriate policy responses that may be used to address sea level rise.” The 119 page report is a wonderful resource. Key excerpts from the report related to the adaptation strategies above are included below.

The report references the national framework for supporting preserving and protecting coastal resources, including the Coastal Zone Management Act, FEMA, the Disaster Mitigation Act, and the National Flood Insurance Program. It also references the state-level work done as part of The Coastal States Organization, [The Role of Coastal Zone Management Programs in Adaptation to Climate Change: Final Report of the CSO Climate Change Work Group \(September 2007\)](#). And for Washington State it notes:

**Washington:** Under Washington’s Shoreline Management Act, which implements the CZMA, local governments must establish shoreline management programs to protect shoreline. Legislation on Climate Change—Mitigating Impacts adopted in 2007 identifies sea level rise as one of the threats to Washington’s economy, environment, and communities. Executive Order 07-02 outlines strategies for addressing the impacts of climate change, focusing on greenhouse gases and energy issues.

Section VI of the document describes the processes local governments can use to incorporate consideration of sea level rise into land use planning, including Resolutions, Policy Statements, or Executive Orders, and Regional Land Use Plans. In VI.3 it covers how sea level rise can be incorporated into Comprehensive Plans, in VI.4 Shoreline Management Plans, and in VI.5 Hazard Mitigation Plans. For all options, it provides examples, including a few from Washington State, such as:

**“City of Bainbridge Island, Washington: Environment Element**

The City of Bainbridge Island, to the west of Seattle in Puget Sound, has explicitly addressed the potential for sea level rise in the Environment element of its comprehensive plan. Adopted in 2004, the plan recognizes that Bainbridge Island is potentially subject to flooding, erosion, landslides, seismic events, and soil subsidence. The overall goal of the Environment element is to avoid adverse impacts where possible; to minimize, reduce, or eliminate impacts over time; and to compensate for unavoidable impacts. The plan outlines protections for critical areas including transfer of and purchase of development rights; provides for the use of the City’s

Shoreline Management Master Program to address and protect marine fish and marine shoreline habitat; mandates no net loss of the city's remaining regulated aquatic resources; requires the maintenance of vegetated buffers between proposed development and aquatic resources; calls for the preservation of stream courses; and the protection or restoration of natural functions of riparian habitat.<sup>142</sup> "

Section VI.6 discusses types of land use regulations and best management practices for adaptation for sea level rise, including rolling easements, special area ordinances, habitat preservation, overlay zoning. As an example of overlay zoning, the document notes that in Tillamook, OR:

"Beachfront protective structures—"riprap and other revetments"—are permitted only in Developed Beachfront Areas and Fore-dune Management Areas of the BD Zone [Beach and Dune Overlay] where development existed on January 1, 1977 or under exceptions to Goal 18. Proposals must demonstrate that there is the threat of ocean erosion or flooding; the development cannot be adequately protected by non-structural means; the protective structure will be placed as far landward as possible and will be angled into the bank to prevent flank erosion; that existing public access is preserved; and that specified construction standards are met."

It also includes an example of a Coastal Zone Management from Collier County, Florida:

"The Resource Protection chapter of Collier County's Land Development Code includes specific requirements for Coastal Zone Management.<sup>265</sup> Among these is a mandatory sea-level-rise impact analysis for all shoreline development, including infrastructure. The analysis must show that the development will remain fully functional for its intended use after a six-inch rise in sea level.<sup>266</sup>"

Other types of land use regulations and best management practices for adaptation for sea level rise included in section VI.6 are: non-conformities; site capacity/performance standards; coastal wetland regulations; density restrictions/growth management; transfer of development rights; regulatory agreements; building standards, site plans and subdivision infrastructure; and floodplain management. An example of a tidal floodplain overlay from the town of Southampton, NY:

"Southampton's Tidal Floodplain Overlay District establishes subdivision requirements for lot layout on the barrier beach to minimize damage from coastal storms. Setbacks are established for ocean beach water frontages in accordance with the town's Coastal Erosion Hazards ordinance. Structures on other water frontages must be set back at least 75 feet from the upper edge of the tidal wetland."

Part 2 of the document is "Local Planning and Regulatory Strategies for New York Municipalities." While focused on New York, it provides a summary of the overall phases a local government can use to move forward on sea-level rise planning, including policies, studies, citizen participation, moratorium, planning, and regulations and inter-municipal cooperation. Note that the studies aspect includes "The municipality may hire consultants to gather available data at the regional and local level ". Much of this effort has been completed as part of the Planning for Climate Change on the North Olympic Peninsula project, see the Climate Change Preparedness Plan for the North Olympic Peninsula for sea level rise projections and other specifics.

Part 2 Section V is titled “Sea Level Rise and Storm Hazard Mitigation Regulatory Approaches”. Subsections of that chapter include: Create a New Zoning District(s) or Overlay District(s); Techniques and Standards that can be Included in New Districts; Subdivision Regulations and Site Plan Approvals; Adopt Local SEQRA Regulations; Avoid Regulatory Takings Challenges; Project Review Local Planning Board; Transfer of Development Rights; Establish Moratoria following future storm events (Post disaster moratoria); Intergovernmental Approaches.

For example, the section on “Techniques and Standards that can be included in New Districts”, has subsections that include: “no-build zone provision”, “establish very limited build zones”, and “permit conditions and standards”. An example under “permit conditions and standards” is:

“Prohibit rebuilding in areas subject to a storm event unless certain standards are met: See Section VI.5 Town of Nags Head, North Carolina: General Use Standards for Redevelopment in Ocean Hazard Areas. Destroyed structures, major damaged structures, and minor damaged structures may not be reconstructed without an on-site inspection of the lot by zoning administrator, a septic improvements permit, and certain setbacks dependent on the extent of damage. For destroyed or major damaged structures town water must be restorable at street frontage of the lot, electrical service must be restorable to building site, and there must be direct, uninterrupted approved vehicular access to the lot.” (Pages 89-90.)

Another valuable reference for sea level rise planning is [“Addressing Sea Level Rise and Cumulative Ecological Impacts in San Juan County, Washington.”](#) It provides a nice summary of financial and tax incentives a jurisdiction could use to protect shorelines, including: conservation easements; preferential taxation; and public infrastructure (pages 54-55).

The Washington Department of Ecology has published a [“Shoreline Master Programs Handbook”](#) whose Chapter 15 covers “Shoreline Stabilization”. This document discusses at length: the legal framework for shoreline management; the impacts of stabilization efforts; sea level rise; guidance for addressing stabilization in planning; demonstration of the need for stabilization and associated requirements; and soft shoreline stabilization techniques.

The Handbook provides specific thoughts on approaching the climate change driven threat of Sea Level Rise in shoreline stabilization efforts. On page 19 the report states:

“The prospect of higher sea levels in future decades has ramifications for stabilization policy. Increased sea level will generally lead to higher rates of erosion and greater damage from coastal storms, which is anticipated to increase pressure to armor the coastline. At the same time, many of the existing impacts of armoring, such as loss of marsh and beach habitat, are expected to be exacerbated by higher sea levels.”

“The potential for sea level rise has implications for shoreline stabilization policies: • New development and redevelopment should be located and designed to reduce vulnerability and avoid the need for future stabilization measures. • Pressure to stabilize shorelines will be high, particularly following damaging storms. Communities may identify in advance those areas where armoring is an appropriate option and those where it is not. • Storm damage and failure of stabilization structures will be opportunities to relocate at-risk development and to adopt softer, more resilient stabilization. Communities will need to anticipate pressure to rebuild

existing development in increasingly vulnerable areas and should adopt strategies that enhance resilience to future coastal hazards. • Higher seawalls and stronger dikes require space and will impact existing waterfront development. Reserve space for future stabilization and drainage infrastructure along shorelines where engineering solutions are appropriate.”

In instances where a shoreline is already experiencing erosion processes, the Department of Ecology recommends:

*“Where erosion impacts a developed site, carefully assess the need for stabilization and whether there are more effective means of reducing the risk without recourse to conventional erosion control structures.*

- Evaluate rates and mechanisms of erosion, and understand its causes, before selecting a stabilization method. Avoid short-term solutions that facilitate development of sites without addressing underlying hazards related to large landslides, channel migration, or sea level rise.”

Cove Point, Massachusetts recognized in their [“Community Flood Mitigation Plan”](#) of 2014 that their historical flood planning zone depended on the historical 100 year floodplain with established base flood elevations of 4ft. Considering climate change, the community saw a need to integrate best and worst case sea level rise scenarios into their recommendations for increased freeboard on community structures.

The Maryland Department of Natural Resources Chesapeake and NOAA completed their own investigation into the feasibility of a Sea-level Rise Overlay Zone in a report titled; [“A Model Sea-level Rise Overlay Zone for Maryland Local Governments”](#) in 2011. The final outcomes of this process are described below:

“The final deliverables include a model ordinance (Appendix A), a background report analyzing legal and policy considerations for implementing the ordinance, and roadmap for how the ordinance could be implemented in two Maryland jurisdictions, Anne Arundel County and the City of Annapolis (Appendix B). The model ordinance proposes revisions to existing floodplain ordinances: (1) to extend the floodplain boundaries to regulate in areas that will become at increasing risk of flooding as sea levels rise, and (2) to create different subdistricts within the floodplain district to allow local governments to tailor regulations based upon two adaption goals: accommodation (allow for continued development but require that it be more resilient to impacts), and retreat (gradually move development away from vulnerable areas to preserve valuable coastal resources). Each subdistrict employs different land-use tools to effectuate the goals of that district. In the accommodation district, the model requires increased setbacks, resilient design of structures and septic systems, and increased building elevations. In the conservation district (or retreat zone), the model uses downzoning, increased setbacks, and rebuilding restrictions. “

## 2. Stormwater

In the Planning for Climate Change project, three prioritized adaptation strategies and their relevant key action steps were specifically related to stormwater and planning documents:

- **CI-8: Improve on-site stormwater management practices**

**Key Action Steps:**

- Create monetary & non-monetary incentives for Stormwater Management or re-use, including within Low Impact Development (LID) projects. Applies to residential, industry, agriculture, and forestry sectors.

- **CI-10: Enhance stormwater retention in upstream areas**

**Key Action Steps:**

- Review other community policies aimed at stormwater retention.
- Draft and pass policy that uses conservation of natural ecosystems, enhance riparian buffers and land management to increase stormwater retention.

A great resource for Stormwater Management planning is the [Washington State Department of Ecology 2012 Stormwater Management Manual for Western Washington, amended in December 2014](#).

## Comprehensive Planning Examples

An example from [City of Olympia Comprehensive Plan](#), Environment Element (PN) and Utilities Element (PU):

- PN1.2 Coordinate critical areas ordinances and storm water management requirements regionally based on the best scientific information available
- PN1.6 Establish regulations and design standards for new developments that will minimize impacts to stormwater runoff, environmentally sensitive areas, wildlife habitat, and trees.
- PN1.9 Foster City partnerships with public, private, and non-profit agencies and groups and encourage them to help identify and evaluate new low impact development and green building approaches.
- PN1.10 Increase the use of low impact and green building development methods through education, technical assistance, incentives, regulations, and grants.
- PN 5.1 Reduce the rate of expansion of impervious surface in the community.
- PN5.2 Increase the use of permeable materials and environmentally-beneficial vegetation in construction projects.
- PN5.3 Retrofit existing infrastructure for stormwater treatment in areas with little or no treatment.
- PN5.4 Require prevention and treatment practices for businesses and land uses that have the potential to contaminate stormwater.
- PN5.5 Improve programs and management strategies designed to prevent and reduce contamination of street runoff and other sources of stormwater
- PU1.2 Require new developments to construct drinking water, wastewater and stormwater utilities in ways that meet the community development, environmental protection, and resource protection goals of this Plan, and that are consistent with adopted utility plans and extension policies.
- PU8.7 Separate combined wastewater/stormwater pipes in conjunction with stormwater and road improvements or residential repairs, when economically feasible.
- PU10.1 Improve stormwater systems in areas that are vulnerable to flooding.
- PU10.3 Evaluate the structural integrity of aging stormwater pipes and repair as needed.



- PU10.4 Inspect private and public stormwater systems to identify required maintenance and repairs.
- PU10.5 Inventory and inspect City-owned culverts and ditches and perform maintenance if needed.
- PU10.6 Ensure that private pipe and pond systems are maintained.

The PACE document described above also highlights some good examples for stormwater management, including the following:

**“City of St. Pete, Florida: Coastal and Conservation Element (page 36)**

The City of St. Pete is a barrier island community located on Florida’s Treasure Coast, entirely within the Coastal High Hazard Area and the 100-year floodplain. The Coastal and Conservation element of the city’s comprehensive plan establishes requirements for new development within the floodplain, including onsite retention of stormwater runoff, the minimization of impervious surfaces, and the cultivation of at least 25% native vegetation onsite. Policies to conserve wetlands and native vegetation encourage the removal of exotic invasive species, establish a preference for the use of native marine species in conservation and stabilization efforts, and require the adoption of land use regulations that protect environmental systems and habitat. Any project that produces changes in tidal circulation patterns requires hydrological analysis of the project’s net environmental impact before approval. Intermunicipal cooperation is required to protect environmental functions of estuaries and other resources “on a system-wide basis regardless of political boundaries.”

Other Stormwater examples can be found in the report from Keene NH: [Adapting to Climate Change: Planning a Climate Resilient Community](#).

## Ordinance Examples

An example from [Whatcom County 2000-390](#):

“20.80.633 Large Development stormwater controls.

An engineered Stormwater Design Report must be submitted to the county engineer for any use covering more than 5,000 square feet with impervious surfacing...”

The Maryland Department of Natural Resources and NOAA explored the use of Critical Area Jurisdictions to implement climate change resilient stormwater strategies such as green infrastructure and on-site stormwater treatment. The report is titled, “A Local Framework for Coastal Resilience Strategies for Critical Area Jurisdictions” and was published in 2015. (Note: the report is not available on-line, but a presentation about it is available [here](#).) The report specifically outlines recommended ordinance amendments, which may be instructive to proposing changes on the North Olympic Peninsula:

“4.2 Ordinance Amendments

- Forest Program Alternatives and Developed Woodland Program Alternatives – [COMAR 27.01.02.04 C](#) (3) lays out the regulations for both forest and developed woodlands clearing and mitigation requirements in the section covering Limited Development Areas. The same



standards apply for Resource Conservation Areas. Suggested changes for forest and developed woodlands would be located in a community's section on standards for LDA and RCA.

- Buffer Program Alternatives - [COMAR 27.01.09.01-2](#) provides details for mitigation and planting standards for approved Buffer activities, while [COMAR 27.01.09.01-5](#) discusses FIL [Fee in Lieu] of Buffer mitigation. To make the transition from mitigation to FIL that would be used for green infrastructure, a community would amend their Buffer regulations to incorporate the suggested conversions.
- Modified Buffer Area (MBA) Program Alternatives – Generic regulations and guidelines for Modified Buffer Areas are discussed in [COMAR 27.01.09.01-8](#). Each jurisdiction has a section in their Critical Area ordinance that details the regulations for their MBA in the IDA, LDA and RCA. This section is where the suggested amendments for defined planted buffer strips for specified activities and amounts of disturbance or lot coverage would be located and developed.
- Stormwater Program Alternatives – Critical Area policy for stormwater is described in the Maryland Chesapeake and Atlantic Coastal Bays' Critical Area 10% Rule Guidance Manual – “Developments that disturb less than 250 square feet of land are exempt, but those that disturb between 250 square feet and 5,000 square feet must comply with the 10% Rule. Those that disturb over 5,000 square feet must comply with both the 10% rule and the MDA Manual” (Section 7.0 (25) on page 7-9). In order to achieve the goal of treating small development projects that disturb less than 5,000 square feet, the town would amend their local Critical Area ordinance in the section for development standards in LDAs and RCAs to reflect the suggested changes, which entails using a chart to select a practice based on the amount of disturbance or development. No changes are necessary for IDA regulations because most new lot coverage or disturbance requires a 10% reduction in stormwater pollutants (COMAR 27.01.02 D (3)).”

### 3. Flooding

In the Planning for Climate Change project, two prioritized adaptation strategies and their relevant key action steps were specifically related to flooding and planning documents:

- **CI-6: Create critical area flood mapping beyond FEMA's historical flood data.**  
Key Action Steps:
  - Cities and Counties should establish a climate change flood overlay as part of the critical area designations specific to their future flood concerns and use it to in addition to the FEMA flood maps which are constrained by only using historical data.
- **CI-8: Improve on-site stormwater management practices**  
Key Action Steps:
  - Create monetary & non-monetary incentives for Stormwater Management or re-use, including within Low Impact Development (LID) projects. Applies to residential, industry, agriculture, and forestry sectors.

### Comprehensive Planning Examples

An example from Bainbridge Island - Comprehensive Plan Environment Element  
<http://www.ci.bainbridge-isl.wa.us/DocumentCenter/View/1627>:

- GOAL 1 - Protect the natural functions of frequently flooded areas.
  - Discussion: Frequently Flooded Areas are described in the Critical Areas Ordinance as those lands and floodplains adjacent to streams, lakes, coastal areas and wetlands with a 1% or greater chance of flooding in any given year (i.e. the 100-year floodplain), as determined by the Federal Emergency Management Agency (FEMA).
  - FL 1.1: Minimize public and private losses due to flood conditions by limiting development in frequently flooded areas as shown on the Flood Insurance Rate Maps.
  - FL 1.2: Limit the alteration of natural floodplains, stream channels, and natural protective barriers which help accommodate, dissipate, or channel floodwaters.
  - FL 1.3: Emphasize nonstructural methods, such as setbacks and vegetation, to prevent or minimize flood damage.
  - FL 1.4: Public facilities such as sewer and water lines should be located outside of frequently flooded areas, in order to minimize damage to both the public facility and the natural environment. Public facilities may be located within frequently flooded areas only if no environmentally preferable alternative exists to mitigate existing environmental concerns and additional development is not encouraged in frequently flooded areas

For more information on Green Streets, see the EPA document "[Managing Wet Weather with Green Infrastructure - Municipal Handbook Green Streets.](#)"

## Ordinance Examples

An example from the [City of Baltimore Codes](#):

### 2-1. Establishment of district.

(a) City to establish. The City must establish a Floodplain District and an official floodplain map to include all areas subject to inundation by floodwaters.

### (b) Bases.

(1) The bases of this delineation must be, at a minimum, the data contained in the most recent Flood Insurance Study for Baltimore City, and illustrated in the Flood Insurance Rate Map. The Flood Insurance Rate Map illustrates both the Special Flood Hazard Areas and that part of the tidal floodplain designated as "areas of 0.2% annual chance flood".

(2) The base-flood elevation, as determined in the Flood Insurance Study, is graphically delineated on the official floodplain map.

(3) Where field-surveyed topography or digital topography indicates that ground elevations are above the base-flood elevation in a Special Flood Hazard Area, then the area is considered in the Special Flood Hazard Area until FEMA issues a Letter of Map Change.

(4) Where field-surveyed topography or digital topography indicates that ground elevations are below the closest applicable design-flood elevation, even in areas not delineated on the FIRM as a Regulated Flood Hazard Area, the area is considered to be a Regulated Flood Hazard Area.

(c) District as overlay to zoning.

The Floodplain District is an overlay on any zoning district, as provided in the Zoning Code of Baltimore City.

## § 2-2. Subdistricts.

### § 3-1. In general.

(a) New construction and substantial improvements.

(1) In order to prevent excessive damage to structures, all new construction and substantial improvements to existing structures in the Floodplain District must comply with:

(i) the regulations and restrictions of this subtitle; and

(ii) except as otherwise provided in this Division I, the design and construction standards of:

(A) ASCE 24 {"Flood Resistant Design and Construction"}; and

(B) ASCE 7 {"Minimum Design Loads for Buildings and Other Structures"}, Chapter 5 {"Flood Loads"}.

(2) Where base-flood elevation data are used, the applicant must provide to the Planning Department:

(i) floodproofing elevations for all new construction and all substantial improvements to an existing structure; and

(ii) corresponding elevation certificates

Baltimore's Department of Planning has also initiated a unique planning approach that combines three previously separate planning processes and allows for ongoing alterations to required All Hazard Mitigation Plan updates. This effort is called the [Disaster Preparedness and Planning Project \(DP3\)](#) and is described by its creators as:

"Baltimore's Disaster Preparedness and Planning Project (DP3) was created by the Department of Planning as an effort to address existing hazards while simultaneously preparing for predicted hazards due to climate change. This project develops a program that integrates hazards mitigation planning, floodplain mapping, and climate adaptation planning. DP3 links research, outreach, and actions to create a comprehensive and new risk-preparedness system for addressing existing and future impacts.

Every five years the Federal Emergency Management Agency (FEMA) requires local governments to update their All Hazards Mitigation Plan (AHMP). In an effort to plan for existing hazards and prepare for predicted hazards due to climate change, the Office of Sustainability will develop and implement an integrated project to provide the City with a comprehensive

system for addressing existing and future impacts. The DP3 will assure that adaptation recommendations are included in future capital and operating budget decision making and prioritized within planning processes.”

The PACE document noted above, pages 54-55, also provide an example of a Conservancy District Overlay that is used for areas subject to flooding:

#### **Chatham, Massachusetts: Conservancy Districts Overlay**

“The Town of Chatham’s Conservancy Districts Overlay is intended to preserve groundwater, coastal waters, and habitat, and to “protect persons and property from the hazards of flood and tidal waters which may result from unsuitable development in or near swamps, ponds, bogs and marshes, along water courses or in areas subject to flooding, extreme high tides and the rising sea level.” The Districts encompass “all the submerged lands along the coast of Town, and 55 areas subject to flooding,” including the FEMA-designated 100-year floodplain. Permitted activities include beach nourishment except in salt marsh areas or shellfish tidal flats; dune nourishment; non-structural bank and dune stabilization; and approved coastal engineering structures. The construction of residential dwelling units is prohibited in the district and no building may be constructed in FEMA-designated V and V1-30 Zones. Pre-existing structures and uses are subject to the zoning ordinance’s non-conforming use provisions.”

## **4. Building Standards**

In the Planning for Climate Change project, four prioritized adaptation strategies and their relevant key action steps were specifically related to building standards and planning documents (note that these are also referenced above in the Sea Level Rise section):

- **CI-3: Update planning documents for sea level rise and flooding where needed.**  
Key Action Steps:
  - Create a sea level risk district for inclusion in Comprehensive Plan and promulgate new codes and code changes associated with managing for sea level risk.
  - Incorporate climate change and coastal hazard considerations into building codes by increasing freeboard requirements to two feet (three feet for critical projects) above the current 100-yr flood plain as buildings are redeveloped, developed, or renovated.
- **CI-17: Encourage relocation of infrastructure outside of coastal flood zone**  
Key Action Steps:
  - Create redevelopment restrictions, incentives for retreat, and building code changes with enhanced enforcement to move infrastructure from vulnerable locations.

## **Comprehensive Planning Examples**

An example from the [Escambia County Florida Comprehensive Plan](#):

“OBJ COA 1.1 General Hazard Mitigation: Reduce the exposure of people and property to natural hazards. POLICIES COA 1.1.1 Building Code. Escambia County will, through adoption of the Florida Building Code, regulate the construction, alteration, use, maintenance and

other aspects of buildings and structures to minimize the exposure to wind, flood, fire and other hazards.”

“OBJ COA 1.1.3 Flood Elevation: Escambia County will, as supported by federal emergency management regulations (Title 44, Code of Federal Regulations (CFR) 60.1) and the County’s experience of significant flood hazard events, require additional height above the base flood elevation to more effectively reduce the exposure of people and property to losses from flood hazards.”

## Ordinance Examples

An example from the City of Malibu, CA Coastal Zone Shoreline and Bluff Ordinance and; Local Coastal Program Local Implementation Plan (page 73-74 of PACE document):

“Development standards expressly require the consideration of sea level rise and mandate setbacks of a sufficient distance landward and elevations to a sufficient finished floor height, which will “eliminate or minimize to the maximum extent feasible hazards associated with anticipated sea level rise over the expected 100 year economic life of the structure.”<sup>255</sup>”

See also the Sea Level Rise section above which includes coastal zoning examples, and see the example code from City of Baltimore in the Flooding section above, which includes Building Standards aspects.

An executive order by the Governor of Maryland in 2012 directed the Maryland Department of Natural Resources to provide “Coast Smart” construction guidance, including recommendations for the siting and design of State structures, as well as other infrastructure-based projects. The result was a report entitled [“Climate Change and Coast Smart Construction infrastructure Siting and Design Guidelines”](#) published in 2014. The report found that in light of changing environmental conditions influenced by climate change:

[“...the State should employ Coast Smart practices when constructing all new State structures, reconstructing or rehabilitating substantially damaged State structures, or making other major infrastructure improvements in Maryland’s coastal zone, such as roads, bridges, sewer and water systems, drainage systems and essential public utilities. Similar measures should be applied to non-State structure or infrastructure projects if partially or fully funded by State agencies; and, to non-State projects located on State-owned lands. State agencies should take the necessary steps to incorporate the recommended Coast Smart practices into all appropriate architecture, engineering, construction and design manuals, State planning programs, regulatory programs, permitting and review processes, disaster planning and response, capital budgeting, and State grant and loan programs.”](#)

These recommendations are outlined in detail within the report.

## 5. Water Supplies

In the Planning for Climate Change project, sixteen prioritized adaptation strategies and their relevant key action steps were specifically related to water supplies and planning documents:

- **WS-2: Adopt new regulations requiring water-efficient appliances.**

Key Action Steps:

- Work with state legislators to revise regulations.

- **WS-3: Promote and incentivize smart irrigation technologies for agriculture.** Key Action Steps:

- **WS-7: Encourage forestry practices promoting water retention within the watershed**

Key Action Step:

- Consider integrating water retention into forestry practices permits.

- **WS-11: Create an outreach, education, and incentive program for private well users.**

Key Action Steps:

- Develop general awareness / educational materials related to water use issues including what aquifer the wells pull from, appropriate conservation techniques for the region, relevant incentive programs.

- **WS-12: Develop or increase incentives for low-water use landscaping**

Key Action Steps:

- Develop outdoor planting incentives (rebates or grants) for native, drought tolerant plants, and rainwater-capturing landscapes.

- **WS-13: Adjust rate structure for water use to incentivize conservation where needed**

Key Action Steps:

- Create inverted block rate structure for water use, or support those rate structures already in place.
- Consider developing time of use pricing.
- Price water on a sliding scale thereby allowing differential charging for certain uses.

- **WS-14: Develop code and infrastructure for a municipal reclaimed water system**

Key Action Steps:

- Collaborate with WA Department of Ecology on their reclaimed water rules (accepting comments on new rule promoting reclaimed water in fall 2015).
- Research codes used by other communities.
- Draft code and develop infrastructure for municipal reclaimed water systems in the area.

- **WS-15: Enhance residential water conservation through incentives and outreach.**

Key Action Steps:

- Extend incentives (rebates or grants) to use of drip irrigation, rain barrels and cisterns, and other residential conservation methods.

- **WS-16: Encourage the State to lift restrictions or permit grey water reuse**

Key Action Steps:

- Investigate existing recommendations for grey water use by WA State Department of Health: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/337-016.pdf>
- Lobby government to make necessary changes (potentially revising building codes).
- Create an outreach and incentive program encouraging grey water systems within a property.

- **WS-23: Research regulatory framework on water hauling/delivery.**

Key Action Steps:

- Research examples from other communities. One example is Chimacum, where they are already receiving water delivered to the area with no regulations in existence.
- Identify the best practices and gauge how they would apply to the North Olympic Peninsula.

- **WS-25: Manage/enhance upstream watersheds** Key Action Steps:

- Consider increasing buffers and using bioswales so that it recharges into the soil.
- Identify, protect, and restore natural recharge areas including floodplains and wetlands.
- Minimize runoff through: Low Impact Development (LID), forest and vegetation management, floodplain management; and reestablishment of natural surface water off-stream retention ponds and storage areas. Retention ponds could be used for storing water for agriculture while also restoring important waterfowl habitat and increasing groundwater recharge.
- Create new wetlands or wetland banks for water storage and filtration purposes. Utilize historical ditches where appropriate. In the Dungeness area it was found that when some ditches were tight-lined (solid pipes were used to channel the water), the wells went dry, indicating the ditches were good sources for recharging the aquifer. Roadside ditches could be rerouted and widened to promote infiltration.

## Comprehensive Planning Examples

An example from the [City of Olympia Comprehensive Plan](#):

- “Environment Element: GN 5 - Ground and surface waters are protected from land uses and activities that harm water quality and quantity.
  - PN5.6 Limit or prohibit uses that pose a risk to water supplies in Drinking Water (Wellhead) protection areas based on the best scientific information available and the level of risk. Require restoration of any such areas that have been degraded.
- Utility Element: GU4 - Use Olympia’s water resources efficiently to meet the needs of the community, reduce demand on facilities, and protect the natural environment.
  - PU4.1 Encourage and allow re-use techniques, including rainwater collection, greywater systems, and use of Class A reclaimed water as alternatives to use of potable water, in order to enhance stream flows or recharge aquifers, while also protecting water quality.
  - PU4.2 Develop specific targets for reducing potable water use.
  - PU4.3 Raise community awareness about why and how to conserve water.
  - PU4.4 Reduce water system leakage as much as possible, at a minimum below the Washington State limit of 10 percent of total water production.
  - PU4.5 Model best practices in our City operations and the Olympia Municipal Code.
  - PU4.6 Advance the use of reclaimed water as defined in Council-adopted policies.
- Utility Element: GU5 - Adequate supplies of clean drinking water are available for current and future generations and instream flows and aquifer capacity are protected.
  - PU5.1 Reserve water supply rights for at least 50 years in advance of need, so that supplies can be protected from contamination and they are not committed to lower priority uses.



- PU5.2 Develop and maintain multiple, geographically-dispersed sources of water supply to increase the reliability of the system.
- PU5.3 Monitor water levels in aquifers and maintain numerical groundwater models.
- PU5.4 Coordinate with Lacey, Tumwater, Thurston County and Public Utility District #1 to assure adequate water supplies throughout the City's Water Service Area, following the provisions of the Growth Management Act, Public Water System Coordination Act, and the Municipal Water Law.
- PU5.5 When practical, develop regionally consistent Critical Areas Ordinance regulations, Drainage Manual requirements, and other policies to ensure we are protecting groundwater quantity and quality across jurisdictional boundaries."

From Keene NH – [Adapting to Climate Change: Planning a Climate Resilient Community](#):

"Opportunity: Wetlands and Sub-surface Waters Protection and Management

- Goal A: Increase the protection of existing and future wetlands to maintain the ability of these systems to naturally recharge aquifers and decrease stormwater run-off.
  - Target A: Develop a wetlands management strategy by 2010 that includes the identification of and recommendation to preserve key wetland areas in the City that will reduce the impact of a flooding event.
  - Target B: Develop a City-wide hydrologic study identifying the hydrologic areas, particularly those most susceptible to changes in climate and develop management plans, by 2010.
  - Target C: Incorporate wetland and sub-surface waters protection into the comprehensive master plan.
  - Target D: Update all relevant City standards to consistently support the protection of wetlands and sub-surface waters, whether during plan review, construction, or during operations."

An example from the [Escambia County Florida Comprehensive plan](#):

"Area of Water Resource Concern: CP 10:7:

INF 4.1.12 Area of Water Resource Concern. An area of water resources concern may be established by the Northwest Florida Water Management District (NFWFMD) to protect the areas water resources from depletion, salt water intrusion, or contamination or from any other activity that may substantially affect the quality or quantity of the area's water resources. Within such area, the NFWFMD may establish lower permit thresholds, maximum and minimum levels, and stipulate any limiting conditions as necessary to monitor, manage, and control the use of water. Escambia County will cooperate with the NFWFMD in its enforcement of regulations if an area of water resources concern is established within Escambia County.

GOAL INF 5 AQUIFER RECHARGE PROTECTION

Escambia County will protect and provide for the rainfall recharge of the sand and gravel aquifer, the principal source of the County's potable water.

OBJ INF 5.1 Aquifer Protection Utilize LDC provisions, state funding, aquifer modeling, and other tools and resources to safeguard the long-term integrity of the sand and gravel aquifer.

OBJ CON 1.8 Water and Energy Conservation. The County will promote water and energy conservation strategies to support the protection of the County's natural resources."

## Ordinance Examples

An example of a city adopting a water conservation goal: [RESOLUTION NO. 2008-02 A RESOLUTION OF THE CITY OF ISSAQUAH ADOPTING A WATER CONSERVATION GOAL](#)

"1. The water conservation goal for the City of Issaquah is as follows: The City of Issaquah water utility shall develop conservation programs, capital investments and other strategies in order to achieve a water use savings of 51,000 gallons of water a day on an average annual basis and during the peak season 67,000 gallons of water a day by 2013.

2. The City of Issaquah, as a part of its Water System Plan update in 2008, shall assess its overall water conservation savings, water supply characteristics and demand projections in order to provide recommendations in order to update its water conservation goal."

An example of a city establishing a Water Efficiency Goal, from the [City of Bremerton, WA, Resolution 3019](#):

"1. Maintain water use per single family household to below 195 gallons per day on a three year average.

2. Keep maximum day demand less than twice the average day demand on a three year average."

An example of a reclaimed water ordinance from the [City of Yelm, Ordinance No. 684](#):

- Section 2: "It is the policy of the City of Yelm to reclaim 100% of the wastewater generated by the City and that reclaimed water shall be used within the jurisdiction wherever its use is economically justified, financialy and technically feasilble, and is consistent with legal requirements of RCW 90.46, for the preservation of public health, safety and welfare, and the protection of the environment."
- From Section 4: "Uses of Reclaimed Water: The Facilities Plan identified any use that meets the Standards for Class A Reclaimed Water as a planned or potential use of reclaimed water within the City's service area. Reclaimed water uses may include, but are not limited to, the irrigation of food and nonfood crops, landscape irrigation, impoundments, fish hatchery basins, decorative fountains, flushing of sanitary sewers, street cleaning, dust control, fire fighting and proteciton, toilet and urinal flushing, washing aggregate and concrete production, industrial cooling and industrial processes...."

## 6. Fire

In the Planning for Climate Change project, one prioritized adaptation strategy and its relevant key action steps were specifically related to fire and planning documents:

- **E-4: Update municipal codes to account for enhanced fire risk at forest/residential interface where needed**

Key Action Steps:

- Use education, incentives, and building codes to minimize fire risk, particularly in forest/residential interface.
- Enforce setbacks on building permits in forested areas.
- Update existing hazard analyses that incorporate historical climate variables (such as the Clallam County Community Wildfire Protection Program, 2009) with temperature and precipitation projections for a chosen climate change scenario.
- Review existing hazard analyses (such as the Clallam County Community Wildfire Protection Program, 2009) for strategies to mitigate the wildfire risk, and assess their continued viability with increased wildfire risk.

A good resource for planning language related to fire is: <http://www.firewise.org/wildfire-preparedness/regulations-and-plans.aspx>. Some of the publications it lists include:

[Managing Fire in the Urban Wildland Interface](#), by Kenneth Blonski, Cheryl Miller and Carol Rice, \$85.

[Planning for Wildfires](#) (PAS 529/530) By Jim Schwab, Stuart Meck, and Jamie Simone:

“Wildfires are both dangerous and costly, yet people continue to build in wildfire-prone areas. This poses challenges for governments and planners, who must decide whether to permit development in such areas and how best to design developments that are allowed. This report explores both issues, outlining how knowledge of wildfire risks can be incorporated into comprehensive planning and identifying best practices for development in at-risk areas.” \$15.

## Comprehensive Planning Examples

From [King County WA Comprehensive Plan](#):

R-625 Structures within the FPD [Forest Production District] should be sited to maintain the productivity of the district. Site plan requirements should limit impervious surface, provide for fire control, protect domestic water supply and prevent conflicts with forest management.

R-637 King County should encourage community fire planning so that residents are aware of the dangers of forest fires and take steps to make their properties less vulnerable. King County should support neighborhood-based efforts to manage forests to improve forest health and reduce the risk of wildfire.

R-641 King County should consider climate change impacts and take steps to improve forest health and resilience to climate change impacts through its technical assistance to forest land owners, management of county-owned forest lands, and support of neighborhood-based efforts to reduce risks from wildfires.

## Ordinance Examples

Section 4.2 of the [Wildfire Planning Strategies For Community Design: A Guide For Southeastern Developers And Planners](#) includes descriptions of model wildfire code ordinances. For example, it includes:

“Communities are increasingly adopting or strengthening wildland fire ordinances to minimize wildfire damage. The majority of community wildland codes address 1) vegetative fuel clearance around structures, 2) vegetative maintenance, and 3) vehicular access requirements.” (p. 5)

## 7. Other Resources

A few other planning resources related to climate change are:

- [Washington State Department of Ecology Website on Climate Change](#): The site includes links to climate impact and adaptation reports for the state, as well as links to other relevant adaptation reports and planning resources.
- [Municipal Research and Services Center](#): A Washington State non-profit “dedicated to proactively supporting the success of local governments state-wide by providing collaborative consultation and immediate access to a vast research and knowledge base.” It has a great search tool that can be used to find example comprehensive plan and ordinance language on a variety of topics.
- [Georgetown Climate Center’s Adaptation Clearinghouse](#): this national clearinghouse is “a resource database and online community that seeks to assist state policymakers, resource managers, academics, and others who are working to help communities adapt to climate change.”
- [Climate Adaptation Knowledge Exchange](#): this site is a “shared knowledge base for managing natural and built systems in the face of rapid climate change”, and includes examples from throughout the world.
- [American Planning Association](#): a not-for-profit educational organization that provides resources for community planning. Note that their [Washington State chapter](#) has identified Climate Change as one of their 10 Big Ideas for Washington’s Future, and there are working groups associated with each of the 10 ideas that will be working on related work products in 2015.
- [Washington State Department of Commerce Climate Change and Energy](#) website: this includes subpages on [Climate Change Adaptation](#), which references other Adaptation resources, as well as a subpage on [Climate Change Mitigation](#), with resources related to reducing greenhouse gases.
- [Washington State Community Trade and Economic Development 2008 report on Planning for Climate Change: Addressing Climate Change through Comprehensive Planning under the Growth Management Act](#): this report discusses “how land use and transportation planning processes can be used to reduce greenhouse gas emissions.” (Exec Summary, p. 4)