

Appendix B: Adaptation Strategy Matrix

A document prepared as part of the North Olympic Peninsula Resource Conservation and Development Council's project: *Planning for Climate Change on the North Olympic Peninsula*

ID #	Strategy	Focus Area	Type of Strategy	Score	Lead Group(s)	Timeframe for Implementation <small>Immediate, Near-term (0-3 years), Medium-term (3-10 years), Long-term (>10 years)</small>	Opportunities or Concerns
E-1	Enhance efforts to encourage breeding and planting of drought tolerant, resilient plant species	Ecosystems	Awareness	20	Agricultural/Forestry Sectors, Educational Organizations	Near-term	Highly adaptive, feasible, in line with political and social goals
E-2	Incorporate climate change more explicitly into comprehensive plans and Shoreline Master Programs (SMP)	Ecosystems	Planning	19	City and County Governments	Near-term	Timing depends on where the jurisdictions are in their update cycle for the SMP.
E-3	Enhance promotion of agricultural best management practices to include future climate conditions	Ecosystems	Awareness	19	Agricultural Sector, Educational Organizations	Immediate	Highly adaptive, feasible, in line with political and social goals
E-4	Update municipal codes to account for enhanced fire risk at forest/residential interface where needed	Ecosystems	Policy	19	Local Governments	Near-term	Highly adaptive, feasible, in line with political and social goals
E-5	Increase regional capacity for water storage (preferable with natural systems)	Ecosystems	Planning	18	Multi-Stakeholder	Long-term	High need for additional capacity but facing numerous political barriers
E-6	Encourage FEMA to incorporate climate change in rate maps and guidance	Ecosystems	Planning	18	State and County Governments	Long-term	A way to incentivize adaptive measures taken by homeowners in the face of climate change, though FEMA's processes for updates are lengthy and slow
E-7	Develop graphic tool to illustrate climate impacts	Ecosystems	Planning	17.5	Multi-Stakeholder	Near-term	Complexity will depend on the approach and type of impact modeled
E-8	Update financing policies for development in high risk areas	Ecosystems	Policy	17	Banks and Insurance Groups	Medium-term	This action would remedy an inappropriate incentive to build in high-risk areas, though political support would be difficult.
E-9	Enhance efforts to incentivize use of native plants landscaping in residential, commercial, industrial settings	Ecosystems	Awareness	17	Local Governments and Private Sector	Near-term	Very feasible, low cost
E-10	Utilize low cost citizen science monitoring and analysis approaches and technologies	Ecosystems	Awareness	17	Research Institutions, Non-profit Education Centers, Citizen Scientists	Near-term	Highly adaptive, feasible, and in line with political and social goals
E-11	Increased funding for harmful algae bloom monitoring	Ecosystems	Awareness	16.5	Public Health Departments and Research Institutions	Near-term	Highly adaptive and flexible
E-12	Complete survey of sensitive submerged habitats and the species that utilize them	Ecosystems	Awareness	16.5	Research Institutions and Citizen Scientists	Medium-term	Low social/political feasibility, would address the ecosystem wide impacts
E-13	Enhance efforts to restore and develop wildlife corridors	Ecosystems	Planning	16.5	Multi-Stakeholder	Medium-term	Technically feasible, but with unknown cost and political support
E-14	Strengthen enforcement on illegal shoreline uses	Ecosystems	Policy	16	City and County Governments	Near-term	This is an action that is already legally required, need is to analyze of existing enforcement failures, and staffing limitations
E-15	Restructure rural water and sewer systems where needed	Ecosystems	Planning	16	Local Governments and Community Groups	Medium-term	Politically difficult to accomplish.
E-16	Develop community climate action plans (if not already in place)	Ecosystems	Planning	15.5	Local Governments and Community Groups	Near-term	Highly adaptable, some political barriers
E-17	Add climate impact overlays to existing "Critical Areas"	Ecosystems	Planning	15.5	City and County Governments	Medium-term	Difficult to devise and implement, but would attempt to synthesize a range of climate variables, staffing may be a limitation
E-18	Support and enhance watershed and nearshore habitat restoration	Ecosystems	Policy	15.5	Multi-Stakeholder	Near-term	Adaptable and technically feasible with moderate political support and community co-benefits
E-19	Monitor and analyze climate change impacts at salmon stream restoration sites	Ecosystems	Awareness	15	Research Institutions, Citizen Scientists, Salmon Recovery Organizations	Near-term	Highly adaptive, feasible, and potentially facing barriers with political and social goals
E-20	Decrease non-climate ecosystem stressors	Ecosystems	Awareness	15	Multi-Stakeholder	Near-term	Immediate management strategy, difficult to implement
E-21	Transition away from use of biosolids/industrial fertilizer on agriculture and forestry lands	Ecosystems	Awareness	14.5	Agricultural and Forestry Sectors	Medium-term	Unknown cost, facing political barriers
E-22	Designate and prioritize funding for additional land designated for agriculture	Ecosystems	Planning	14.5	Multi-Stakeholder	Medium-term	N/A
E-23	Develop a funding program appropriate for acquisition of high-risk structures in coastal or riverine flood zones	Ecosystems	Policy	14	Multi-Stakeholder	Long-term	High cost benefit opportunities, difficult social and political barriers
E-24	Create funding mechanism for conservation projects in Clallam County	Ecosystems	Policy	14	Multi-Stakeholder	Medium-term	Unknown overall cost and potentially low political feasibility
E-25	Provide guidance on right "timeline" for erosion buffers period (50, 75, 150 years) and setback distances (50ft to 200ft) that account for changing climate conditions	Ecosystems	Planning	13	Local Governments and Community Groups	Medium-term	Difficult to implement and enforce socially and politically
E-26	Integrate climate change projections into salmon hatchery planning	Ecosystems	Planning	12.5	Salmon Hatchery Managers	Medium-term	Unknown technical feasibility and overall ability to adapt to climate change
E-27	Identify and monetize environmental services inventory and then prioritize shoreline and watershed areas appropriate for defense and retreat	Ecosystems	Awareness	12	Research Institutions and Local Government	Medium-term	Technically feasible and politically challenging
E-28	Re-energize efforts to reduce stressors to salmon stream habitats	Ecosystems	Planning	11	Research Institutions and Local Government	Medium-term	Politically and socially difficult
E-29	Re-energize efforts to reduce stressors to salmon stream habitats	Ecosystems	Awareness	Not Scored	Multi-Stakeholder	Near-term	Existing attention and structure for salmon restoration. Many current stressors to address.
E-30	Incentivize agricultural water conservation	Ecosystems	Policy	Not Scored	Multi-Stakeholder	Near-term	N/A
E-31	Reduce local land-based pollutants that enhance acidification in marine waters	Ecosystems	Awareness	Not Scored	Multi-Stakeholder	Medium-term	Staffing limitations for monitoring
E-32	Integrate climate change projections into shellfish hatchery planning	Ecosystems	Planning	Not Scored	Shellfish Hatchery Managers	Medium-term	N/A
E-33	Utilize climate sensitive tree species in riparian buffers	Ecosystems	Policy	Not Scored	Forestry and Conservation Groups	Medium-term	N/A
E-34	Replace under-sized culverts to anticipate climate influenced run-off events	Ecosystems	Policy	Not Scored	Operations and Maintenance Departments	Medium-term	State is required to replace culverts that impede salmon passage, has an ongoing effort. State does not always have funding for partnering.
WS-1	Enhance education on drought and water supplies issues for the peninsula	Water Supplies	Awareness	20	Multi-Stakeholder	Immediate	Highly adaptive, feasible, in line with political and social goals, low cost
WS-2	Adopt new regulations requiring water-efficient appliances	Water Supplies	Policy	20	State Government	Medium-term	Technically and politically feasible, but potentially limited ability to influence state regulations
WS-3	Promote and incentivize smart irrigation technologies for agriculture	Water Supplies	Awareness	20	Agriculture Sector	Medium-term	High cost, technical and political feasibility
WS-4	Identify monitoring needs and enhance water supply monitoring	Water Supplies	Awareness	19	Multi-Stakeholder	Near-term	Highly adaptive, feasible, in line with political and social goals, low cost
WS-5	Enhance efforts to educate home and business owners on the value of on-site water conservation, retention, and catchment	Water Supplies	Awareness	18	Multi-Stakeholder	Immediate	Highly adaptive, feasible, in line with community goals, low cost
WS-6	Continue to study ways to enhance water storage and groundwater recharge	Water Supplies	Planning	18	Water Utilities and Local Governments	Near-term	Highly adaptive, feasible, in line with political and social goals, low cost
WS-7	Encourage forestry practices promoting water retention within the watershed	Water Supplies	Awareness	18	Forestry Sector	Medium-term	N/A
WS-8	Research or develop model to assess sea level rise and saltwater intrusion to groundwater	Water Supplies	Planning	18	Local Government, PUDs	Medium-term	N/A
WS-9	Improve forecasting for future water supply and demand	Water Supplies	Planning	18	Water Utility Managers	Medium-term	Politically feasible but technically difficult
WS-10	Map water retention values for ecosystems	Water Supplies	Planning	18	Multi-Stakeholder	Near-term	Technically and politically feasible
WS-11	Create an outreach, education, and incentive program for private well users	Water Supplies	Awareness	17	Multi-stakeholder	Near-term	Technically and politically feasible, unknown funding resources
WS-12	Develop or increase incentives for low-water use landscaping	Water Supplies	Awareness	17	Multi-stakeholder	Near-term	Highly adaptable, low cost, potentially facing political barriers
WS-13	Adjust rate structure for water use to incentivize conservation where needed	Water Supplies	Policy	16	Local Governments	Medium-term	Somewhat adaptable to climate change impacts, marginally politically and socially feasible
WS-14	Develop code and infrastructure for a municipal reclaimed water system	Water Supplies	Planning	15	Local Governments	Long-term	High cost for new infrastructure, somewhat technically and politically feasible
WS-15	Enhance residential water conservation through incentives and outreach	Water Supplies	Awareness	15	Multi-stakeholder	Near-term	Highly adaptable, low cost, potentially facing political barriers
WS-16	Encourage the state to lift restrictions or permit grey water reuse	Water Supplies	Policy	13.5	Local Governments and Community Groups	Medium-term	Low cost, marginally politically and socially feasible
WS-17	Create a smart grid water use system and share data with consumers to increase conservation	Water Supplies	Policy	12	Water Utility Managers	Medium-term	High cost, lacking political feasibility
WS-18	Pilot programs for sub-basin management within water rights laws	Water Supplies	Policy	12	State and County Governments	Medium-term	High cost, political barriers
WS-19	Streamline the administrative process for adjusting water rights	Water Supplies	Policy	11	Local Governments, Community Groups, Department of Ecology	Medium-term	Low cost, minimal political feasibility
WS-20	Direct wastewater reuse between municipalities and industries	Water Supplies	Policy	11	Water Utilities and Local Government	Long-term	Technically and politically feasible

WS-21	Explore opportunities for artificial recharge of groundwater aquifers	Water Supplies	Planning	11	Multi-Stakeholder	Long-term	Minimally adaptable, high cost, facing technical and political barriers
WS-22	Research the development and construction of a desalinization plant	Water Supplies	Planning	9	Local Governments	Long-term	High cost, subject to significant political and social barriers
WS-23	Research regulatory framework on water hauling/delivery	Water Supplies	Planning	Not Scored	Multi-Stakeholder	Near-term	N/A
WS-24	Enhance management of septic water quality issues	Water Supplies	Policy	Not Scored	Local Governments	Medium-term	N/A
WS-25	Manage/enhance upstream watersheds	Water Supplies	Policy	Not Scored	Multi-Stakeholder	Medium-term	Highly adaptable, technically and politically feasible
CI-1	Update Emergency management and response planning to include climate change where needed	Critical Infrastructure	Planning	20	Emergency Managers	Near-term	Highly adaptive with very good political support
CI-2	Reduce inflow and infiltration to wastewater systems	Critical Infrastructure	Policy	19.5	Operations and Maintenance Dept.	Immediate	Current issue with high levels of political/social support but also higher costs
CI-3	Update planning documents for sea level rise and flooding where needed	Critical Infrastructure	Planning	19	Multi-Stakeholder	Near-term	Medium and long-term issue where current planning can help reduce future costs
CI-4	Do outreach and education on climate adaptation to build community support	Critical Infrastructure	Awareness	19	Multi-Stakeholder	Immediate	Low cost but only moderate political support
CI-5	Develop and utilize decision making tools related to climate change risks	Critical Infrastructure	Planning	18	Local Governments	Medium-term	Highly adaptable until tools are developed then hard to change. These tools receive moderate/low political support
CI-6	Create critical area flood mapping beyond FEMA's historical flood data	Critical Infrastructure	Planning	17	Multi-Stakeholder	Near-term	Low cost with moderate political feasibility
CI-7	Encourage soft defenses for Shoreline Infrastructure	Critical Infrastructure	Policy	16	Local Governments and Private Sector	Near-term	High cost with moderate political support. Rated highly for environmental benefits.
CI-8	Improve on-site stormwater management practices	Critical Infrastructure	Policy	16	Multi-Stakeholder	Near-term	Adaptable, high cost, and moderately political and social feasibility
CI-9	Participate in FEMA's Community Rating System (CRS)	Critical Infrastructure	Planning	16	Multi-Stakeholder	Medium-term	Less adaptable, low cost, and with moderate political support
CI-10	Enhance stormwater retention in upstream areas	Critical Infrastructure	Policy	16	Multi-Stakeholder	Medium-term	Marginally adaptable, high cost, and marginally politically feasible
CI-11	Install tide gates, "duckbill" valves for stormwater outfall infrastructure where needed	Critical Infrastructure	Policy	15.5	Operations and Maintenance Departments	Near-term	Less adaptive, moderate cost, and good political feasibility
CI-12	Retrofit infrastructure for coastal flooding and sea level rise	Critical Infrastructure	Policy	15.5	Local Governments and Private Sector	Long-term	Moderate cost, with good political support
CI-13	Require Education/Training/Monitoring for homeowners with septic systems	Critical Infrastructure	Awareness	15	Local Governments	Near-term	Highly adaptive, low cost, low political support
CI-14	Consider hard shoreline protection in certain situations	Critical Infrastructure	Policy	14	Local Governments and Private Sector	Medium-term	Less adaptable, high cost, and with moderate political support. Ranked very low on environmental benefit due to negative impacts on nearshore habitat.
CI-15	Develop inverted block rate structure for water and sewer	Critical Infrastructure	Policy	13	Utility Managers	Medium-term	Somewhat adaptable, moderate cost, and very little political support
CI-16	Use homeowner outreach to encourage relocation outside floodplains	Critical Infrastructure	Awareness	10.5	Multi-Stakeholder	Medium-term	Less adaptable, extremely low political support
CI-17	Encourage relocation of infrastructure outside of coastal flood zone	Critical Infrastructure	Policy	9	Local Governments and Private Sector	Long-term	High cost, and very difficult to achieve politically
CI-18	Relocate Port Townsend municipal wastewater treatment plant long-term	Critical Infrastructure	Policy	9	City of Port Townsend	Long-term	High cost, and moderately politically feasible
CI-19	Adopt new flood risk management standards and guidelines	Critical Infrastructure	Planning	Not Scored	Multi-Stakeholder	Medium-term	Mirrors current guidance to federal agencies
CI-20	Install pumps for stormwater outfalls subject to sea level rise	Critical Infrastructure	Policy	Not Scored	Operations and Maintenance Depts.	Medium-term	N/A
CI-21	Renovate Clallam Bay/Seki wastewater treatment plant	Critical Infrastructure	Policy	Not Scored	Local Government	Long-term	N/A
CI-22	Renovate Elwha lowlands vacuum sewer system	Critical Infrastructure	Policy	Not Scored	Tribal Government	Long-term	Location in lowlands means moving system uphill is probably the central option since the Tribe has upland properties that may be suitable.