

# Section 309 Assessment and Strategy

**DRAFT**

**FY 2021-2025**

Hawaii Coastal Zone Management Program  
Office of Planning  
Department of Business, Economic Development & Tourism  
State of Hawaii

February 2020



## TABLE OF CONTENTS

|  |     |
|--|-----|
| ACRONYM LIST .....                                 | i   |
| INTRODUCTION .....                                 | 1   |
| SUMMARY OF ACHIEVEMENTS .....                      | 2   |
| ASSESSMENT: PHASE I .....                          | 4   |
| <i>Wetlands</i> .....                              | 4   |
| <i>Coastal Hazards</i> .....                       | 8   |
| <i>Public Access</i> .....                         | 19  |
| <i>Marine Debris</i> .....                         | 31  |
| <i>Cumulative and Secondary Impacts</i> .....      | 36  |
| <i>Special Area Management Planning</i> .....      | 44  |
| <i>Ocean and Great Lakes Resources</i> .....       | 49  |
| <i>Energy and Government Facility Siting</i> ..... | 60  |
| <i>Aquaculture</i> .....                           | 72  |
| ASSESSMENT: PHASE II .....                         | 76  |
| <i>Coastal Hazards</i> .....                       | 76  |
| <i>Ocean and Great Lakes Resources</i> .....       | 89  |
| STRATEGY .....                                     | 96  |
| <i>Coastal Hazards</i> .....                       | 96  |
| <i>Ocean Resources Management Planning</i> .....   | 105 |
| <i>5-Year Budget Summary by Strategy</i> .....     | 111 |
| SUMMARY OF STAKEHOLDER AND PUBLIC COMMENT .....    | 112 |
| REFERENCES .....                                   | 114 |
| APPENDICES .....                                   | 116 |
| <i>Appendix A. Coastal Hazards Successes</i> ..... | 116 |
| <i>Appendix B. Ocean Resources Successes</i> ..... | 118 |
| <i>Appendix C. Public Comment Themes</i> .....     | 120 |

**ACRONYM LIST**

|          |  |
|----------|--|
| AAL      | Average Annualized Loss  |
| ACT      | Action Team  |
| ASCE     | American Society of Civil Engineers  |
| BOEM     | Bureau of Energy Management  |
| BWS      | Board of Water Supply  |
| CDD      | Community Development District   |
| CMPs     | Coastal Management Programs  |
| CZMA     | Coastal Zone Management Act  |
| DAR      | Department of Land and Natural Resources, Division of Aquatic Resources            |
| DBEDT    | Department of Business, Economic Development and Tourism                           |
| DLNR     | Department of Land and Natural Resources   |
| DOBOR    | Department of Land and Natural Resources, Division of Boating and Ocean Recreation |
| DOD      | Hawaii Department of Defense   |
| DOE      | U.S. Department of Energy  |
| DOFAW    | Department of Land and Natural Resources, Division of Forestry and Wildlife        |
| DOT      | Department of Transportation   |
| ENSO     | El Nino Southern Oscillation   |
| FEMA     | Federal Emergency Management Agency  |
| FIRMs    | Flood Insurance Rate Maps  |
| HAR      | Hawaii Administrative Rules  |
| HAZUS-MH | Hazards United States Multi-Hazard   |
| HCDA     | Hawaii Community Development Authority   |
| HCEI     | Hawaii Clean Energy Initiative   |
| HCRS     | Hawaii Coral Reef Strategy   |
| HCZMP    | Hawaii Coastal Zone Management Program   |
| HDOA     | Hawaii Department of Agriculture   |
| HI-EMA   | Hawaii Emergency Management Agency   |
| HI-MDAP  | Hawaii Marine Debris Action Plan   |
| HRS      | Hawaii Revised Statutes  |
| HSCD     | Hawaii State Civil Defense   |
| HTA      | Hawaii Tourism Authority   |
| IBC      | International Building Code  |
| ICAC     | Interagency Climate Adaptation Committee   |
| ICAP     | Center for Island Climate Adaptation and Policy                                    |
| JTMP     | Japanese Tsunami Marine Debris   |
| MLCD     | Marine Life Conservation District  |
| MOU      | Memorandum of Understanding  |
| NARS     | Natural Area Reserves  |
| NELHA    | Natural Energy Laboratory of Hawaii Authority                                      |
| NERRS    | National Estuarine Research Reserve System   |
| NFIP     | National Flood Insurance Program   |
| NOV      | Notice of Violation  |
| NPS      | National Park Service  |
| OP       | Office of Planning   |
| ORMP     | Ocean Resources Management Plan  |

|        |  |
|--------|--|
| OTEC   | Ocean Thermal Energy Conversion              |
| SAMP   | Special Area Management Plan                 |
| SBCC   | State Building Code Council                  |
| SCORP  | State Comprehensive Outdoor Recreation Plan  |
| SHMHMP | State of Hawaii Multi-Hazard Mitigation Plan |
| SLR    | Sea Level Rise                               |
| TLESC  | Tsunami Loads and Effects Subcommittee       |
| TOD    | Transit Oriented Development                 |
| TSS    | Total Suspended Solid                        |
| USACE  | U.S. Army Corps of Engineers                 |
| USEPA  | U.S. Environmental Protection Agency         |
| USFWS  | U.S. Fish and Wildlife Service               |
| USGS   | U.S. Geological Survey                       |

## INTRODUCTION

The Coastal Zone Enhancement Program encourages state and territorial coastal management programs to strengthen and improve their federally approved coastal management programs in one or more of nine areas. These “enhancement areas” include wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management plans, ocean and Great Lakes resources, energy and government facility siting, and aquaculture. The enhancement program was established in 1990 under Section 309 of the Coastal Zone Management Act (CZMA), as amended.

Every five years, states and territories are encouraged to conduct self-assessments of their coastal management programs to determine enhancement opportunities within each of the nine enhancement areas—and to assess the effectiveness of existing management efforts.

All State and Territory Coastal Management Programs (CMPs) must complete an approved Assessment and Strategy (A&S) to be eligible for Section 309 funding in FY 2016-2020. This A&S has been prepared in order that the Hawaii Coastal Zone Management Program (HCZMP) may be eligible for Section 309 funding in FY 2021-2025. The A&S report was developed based on research and input from resource stakeholders and the public.

The CZMA places a strong emphasis on public participation and encourages the participation, coordination, and cooperation with and among appropriate local, state, federal and regional groups to help carry out the goals of the CZMA. In keeping with the intent of the CZMA, the A&S is a public document.

During the A&S development process, the CZM Program solicited input from key stakeholders and provided opportunities for the public to provide input via Statewide information sharing sessions and an online survey. The stakeholders provided feedback on what they felt are the high priority enhancement areas, the critical problems related to those priority areas and the greatest opportunities for the HCZMP to strengthen and enhance them. This ensured that the priorities and needs proposed in the assessment and strategy reflect more than just the HCZMP staff opinions. General public participation in the A&S process was also conducted via Statewide information sessions held on Kauai, Oahu (Kapolei and Honolulu), Molokai, Lanai Maui, and Hawaii Island (Kona and Hilo) and an online survey. A total of 141 people attended one of our in-person meetings and 156 people participated through our online survey. During the timeframe concurrent with NOAA review of the draft A&S, the HCZMP is soliciting public participation by posting the draft A&S document on its public website. The public is being provided the opportunity to review the draft document and submit comments through the website.

In addition, past and present HCZMP directions and initiatives, HCZMP staff capabilities, and HCZMP expertise and core functions were significant factors in the development of the Strategies.

*Please note: For purposes of clarity when reading this document, we have used color to delineate the difference between the NOAA-provided a template for coastal management programs and HCZMP responses. **Template text is printed as black font** and **HCZMP responses are printed in blue font.***

## SUMMARY OF ACHIEVEMENTS

### **Ocean Resources Management Plan (ORMP) Implementation Projects and 2020 Plan Update**

The 309 Strategy for FY 2021-2025 for the Ocean Resources enhancement area continues to prioritize the management of Hawaii's marine and coastal resources because of its economic, environmental, and cultural significance to the State. Continuing initiatives will build upon several significant achievements from the FY 2016-2020 309 Strategy.

During the last strategic period the 2013 ORMP initiated several projects supportive of the Plan's Management Priorities. These projects were selected by the Plan's Action Teams and managed by HICZMP staff. In Years 1-2, the ORMP supported the discussions to create a Community Based Subsistence Fishing Area (CBSFA) by providing facilitation for a series of public meetings (2016). Support of the CBSFA program was included as a goal in the 2013 Plan's Management Priority #10, 'Community and Place-Based Ocean Management Projects'. The 2013 Plan spurred the creation of the reports *Spawning Seasons: Nearshore Fisheries Monitoring Training, Data Collection, and Data Analysis* (2017) and *Using MARXAN to Set Conservation Targets and Priority Areas for Coral Bleaching Recovery Implementation* (2017), both of which were supportive of the Plan's Management Priorities, 'Marine Resources', #4, and 'Coral Reef', #5. These reports were prioritized by the 'Coral Reef' Action Team, a group led by the Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR).

In Years 3-4, the ORMP Action Team 'Appropriate Coastal Development and Management of Coastal Hazards', in which lead efforts that fall under Management Priorities #1 and #2, led an effort to explore the planning concept of managed retreat in Hawaii. The effort included a series of reports and a symposium to share knowledge and gather subject-matter experts to discuss issues relevant to retreat, including financing, social justice, and environmental considerations. The project culminated in the final report, *Assessing the Feasibility and Implications of Managed Retreat Strategies for Vulnerable Coastal Areas in Hawai'i* (2019). In 2018, an update process was initiated to reexamine Hawaii's evolving landscape of coastal resource needs and promote action for the next ORMP planning horizon, 2020-2030. Between 2018-2020 the HCZMP utilized the ORMP network's partnerships to analyze content for the update of the 2013 ORMP and hosted a series of Coordinated Working Group and Council on Ocean Resources meetings to discuss proposed Plan changes. Eight statewide public meetings and an online survey gathered input from approximately 300 constituents regarding place-based coastal issues and observations. This input was evaluated and shared with agency stakeholders during a series of one-on-one meetings. These consultations were used to identify agency priorities and solicit further input into the update of the ORMP. The 2020 ORMP is anticipated to be completed by April 1, 2020.

### **Coastal Hazards**

The 309 Strategy for FY 2016-2020 for this enhancement area focused on increasing Hawaii's resiliency to withstand effects from coastal hazards because of the state's vulnerability to coastal storms, including tsunamis. Specifically, the strategy focused on modeling and mapping probabilistic Tsunami Design Zone maps. The mapping products will be used to codify tsunami design standards in the Hawaii State Building Code and the City and County of Honolulu Building Code to mitigate tsunami risk in coastal zone developments. The Tsunami Design Zone maps will identify coastal zones where structures of greater importance and critical infrastructure would need to be designed for tsunami resistance.

In Year 2 of the 309 Strategy, the Hawaii Coastal Zone Management Program (HCZMP) obtained consulting services to model and map probabilistic Tsunami Design Zone maps for the island of Oahu in accordance with the International Building Code (IBC) 2018 and the American Society of Civil Engineers (ASCE) 7-16 tsunami loads and effects design standards. The contract was executed October 2018 and was completed September 2019. The modeling and mapping for the island of Oahu included the developing tsunami sources, verifying bathymetric and topographic Digital Elevation Model (DEM), performing high resolution inundation modeling, convening technical and informational meetings and conducting independent technical reviews. The deliverables included completed high-resolution probabilistic Tsunami Design Zone maps for the island of Oahu. Year 3 activities were also initiated and will result in the probabilistic Tsunami Design Zone maps for a portion of the island of Maui.

**ASSESSMENT: PHASE I****Wetlands**

**Section 309 Enhancement Objective:** Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands. §309(a)(1)

*Note: For the purposes of the Wetlands Assessment, wetlands are “those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” [33 CFR 328.3(b)]. See also pg. 174 of the CZMA Performance Measurement Guidance<sup>1</sup> for a more in-depth discussion of what should be considered a wetland.*

**Phase I (High-Level) Assessment:** (Must be completed by all states.)

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

- Using provided reports from NOAA’s Land Cover Atlas,<sup>2</sup> the following table provides the extent, status, and trends of wetlands in the Hawai’i’s coastal counties. Note that the data available for the Hawaiian Islands is only available for 1992, 2001, 2005, and 2010/2011.

Current state of wetlands in 2010/11 (acres): 120,836

**Coastal Wetlands Status and Trends**

| Change in Wetlands  | from 1992-2010/11* | from 2005-2011/11* |
|---|--------------------|--------------------|
| Percent net change in total wetlands (% gained or lost)                   | 0.40%              | 0.17%              |
| Percent net change in freshwater (palustrine wetlands) (% gained or lost) | -0.20%             | 0.15%              |
| Percent net change in saltwater (estuarine) wetlands (% gained or lost)   | 28.69%             | 1.35%              |

\* Hawaiian Islands data is only available for 1992, 2001, 2005, and 2010/11. 2018/19 data will not be released until early 2020.

<sup>1</sup> <https://coast.noaa.gov/czm/media/czmapmsguide2018.pdf>

<sup>2</sup> <https://coast.noaa.gov/digitalcoast/tools/lca.html>. Note that the 2016 data will not be available for all states until later Summer 2019. NOAA OCM will be providing summary reports compiling each state’s coastal county data. The reports will be available after all of the 2016 data is available.

**How Wetlands Are Changing**

| <b>Land Cover Type</b> | <b>Area of Wetlands Transformed to Another Type of Land Cover between 1992-2010/11* (Sq. Miles)</b> | <b>Area of Wetlands Transformed to Another Type of Land Cover between 2005-2010/11* (Sq. Miles)</b> |
|------------------------|---|---|
| Development            | 0.05  | 0.05  |
| Agriculture            | 0.14  | 0.13  |
| Barren Land            | 0.28  | 0.14  |
| Water                  | 0.18  | 0.16  |

\* Note: Hawaiian Islands data is only available for 1992, 2001, 2005, and 2010/11. 2018/19 data will not be released until early 2020.

The tables above were completed using NOAA high-resolution CCAP data for each county and aggregated into a statewide summary using desktop GIS.

2. The following is a summarized list of current reports/plans providing additional data on the status and trends of Hawai'i's coastal wetlands since the last assessment to augment the national data sets.
  - (1) *Threat Rankings for Coastal Wetland Habitats and Strategy Development to Address Priority Issues* (Pacific Birds, 2017) identification and prioritization of conservation needs of Hawai'i's coastal wetlands and waterbirds for integration into an updated version of the Pacific Birds *Strategic Plan for Wetland Conservation in Hawai'i*. <https://pacificbirds.org/wp-content/uploads/2017/05/Pacific-Birds-Threat-Ranking-and-Strategy-Development-May-2017.pdf>
  - (2) *Hawai'i's State Wildlife Action Plan (SWAP)* (DLNR, 2015) details the strategy and plans of the State DLNR and its partners to address the conservation needs of over 10,000 species native to Hawai'i. This is an update of the *Comprehensive Wildlife Conservation Strategy (CWCS)* 2005 plan <https://dlnr.hawaii.gov/wildlife/files/2016/12/HI-SWAP-2015.pdf>
  - (3) *State Comprehensive Outdoor Recreation Plan (SCORP)* (DLNR, 2015) is aimed at implementing the goals, objectives, and policies of the Hawai'i State Plan, State Recreational Functional Plan, and County General Plans by representing a balanced program of acquiring, developing, conserving, using, and managing Hawai'i's recreational resources. Includes the State Wetlands Resource Plans <https://dlnr.hawaii.gov/dsp/files/2015/08/2015-SCORP-with-Appendices.pdf>
  - (4) *Water Resource Protection Plan (WRPP)* (CWRM, 2008) a comprehensive study of statewide ground- and surface-water resources, watersheds, and natural stream environments which includes discussion on occurrence, sustainability, conservation, augmentation, and other resource management measures. [http://files.hawaii.gov/dlnr/cwrm/planning/wrpp2008update/FINAL\\_WRPP\\_20080828.pdf](http://files.hawaii.gov/dlnr/cwrm/planning/wrpp2008update/FINAL_WRPP_20080828.pdf)
  - (5) *Hawaiian Islands Climate and Vulnerability and Adaptation Synthesis* (EcoAdapt, 2018) synthesizes the results of climate impacts assessment, vulnerability assessment, and adaptation planning- and provides an inter-island analysis of the findings <https://uhh.maps.arcgis.com/apps/Cascade/index.html?appid=860687eb697a4d2c81db5028c414fc1e>

- (6) *Wetland Loss in Hawai'i Since Human Settlement* (Van Rees & Reed, 2014) – relying on advanced GIS data believe that loss in wetland in Hawai'i is greater than originally reported <https://ase.tufts.edu/biology/labs/reed/documents/pub2014WetlandlossinHI.pdf>

**Management Characterization:**

- 1. Indicate if there have been any significant changes at the state or territory level (positive or negative) that could impact the future protection, restoration, enhancement, or creation of coastal wetlands since the last assessment.

**Significant Changes in Wetland Management**

| Management Category  | Significant Changes Since Last Assessment<br>(Y or N) |
|--|---|
| Statutes, regulations, policies, or case law interpreting these            | N   |
| Wetlands programs (e.g., regulatory, mitigation, restoration, acquisition) | N   |

- 2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
  - a. Describe the significance of the changes;
  - b. Specify if they were 309 or other CZM-driven changes; and
  - c. Characterize the outcomes or likely future outcomes of the changes.

Although there have not be any significant changes in statute, regulations, policies or case law since the last 309 Assessment the following is a summary of the activities that have occurred:

Office of Planning coordinated the selection and nomination of a site to become a National Estuarine Research Reserve (NERR) in Hawai'i. On January 19, 2017, He'eia was designated as the 29<sup>th</sup> research reserve in the NERR System (NERRS). The He'eia NERR is managed in partnership with the State of Hawai'i through the University of Hawai'i, Hawai'i Institute of Marine Biology (UH-HIMB). The 1,385-acre He'eia National Estuarine Research Reserve encompasses upland forest and grasslands, wetlands, reefs and seagrass beds, as well as the largest sheltered body of water in the Hawaiian Island chain. It is located within the Kāne'ohē Bay estuary on the windward side of O'ahu and includes significant historic and cultural resources. <http://www.himb.hawaii.edu/2017/02/08/himb-to-manage-new-he%CA%BBeia-national-estuarine-research-reserve/>

On August 26, 2016, President Barack Obama signed a proclamation expanding Papahānaumokuākea Marine National Monument (PMNM) to 582,578 square miles (1,508,870 square kilometers), nearly the size of the Gulf of Mexico, making it the biggest terrestrial or marine protected area on the planet. The PMNM is administered jointly by four co-trustees – the Department of Commerce (NOAA), the Department of Interior (FWS), the State of Hawai'i (DLNR), and the Office of Hawaiian Affairs. The coral islands, seamounts, banks and shoals supports a diversity of coral, fish, birds, marine mammals and other flora and fauna, many of which are unique to the Hawaiian Island chain. Many of the islands and shallow water environments are important

habitats for rare species such as the threatened green turtle and the endangered Hawaiian monk seal, as well as the 14 million seabirds representing 22 species that breed and nest there. Land areas also provide a home for four species of bird found nowhere else in the world, including the world's most endangered duck, the Laysan duck.

Although there have not been any significant changes since the last 309 Assessment, at risk species such as the endangered Kaua'i 'akikiki (*Oreomystis bairdi*) and 'akeke'e (*Loxops caeruleirostris*), and O'ahu tree snails have had captive propagation programs begun or expanded and the Nihoa millerbird (*Acrocephalus familiaris kingi*) and Laysan duck (*Anas laysanensis*) have been translocated to create populations on other islands in the Northwest Hawaiian Island. A project to relocate nēnē (*Branta sandvicensis*) from a hazardous location near the Kaua'i Airport to safe locations on other islands is in progress and reducing risk to both the flying public and the birds. Predator proof fences to protect populations of seabirds, nēnē and O'ahu tree snails have been built and operated. Increased survey and monitoring of status and threats to seabirds, forest birds and native invertebrates are ongoing and being expanded. Conservation initiatives such as the Plant Extinction Prevention Program, Snail Extinction Prevention Program, Kaua'i Endangered Seabird Recovery Program, and community-based marine managed areas, have begun.

**Enhancement Area Prioritization:**

- 1. What level of priority is the enhancement area for the coastal management program?

|               |               |
|---------------|---------------|
| <b>High</b>   | <u>      </u> |
| <b>Medium</b> | <u>      </u> |
| <b>Low</b>    | <u>  X  </u>  |

- 2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The Hawai'i CZM Program defers actions related to wetlands acquisition, management and restoration to those agencies with direct authority and resources to address this enhancement area. The acquisition, management and restoration of wetlands fall under the jurisdiction of DLNR. Although there is no state wetland plan, DLNR is has a State Wildlife Action Plan, which includes actions related to waterbirds and their wetland habitats. The DLNR has also been managing a master plan for Kawainui-Hamakua Marsh Complex on O'ahu. Through the existing plans and actions of the DLNR to facilitate effective protection and use of this resource, this is a low priority area.

\*\*\*\*\*

## Coastal Hazards

**Section 309 Enhancement Objective:** Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise and Great Lakes level change. §309(a)(2)

*Note: For purposes of the Hazards Assessment, coastal hazards include the following traditional hazards and those identified in the CZMA: flooding; coastal storms (including associated storm surge); geological hazards (e.g., tsunamis, earthquakes); shoreline erosion (including bluff and dune erosion); sea level rise; Great Lake level change; land subsidence; and saltwater intrusion.*

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. In the table below, indicate the general level of risk in the coastal zone for each of the coastal hazards. The following resources may help assess the level of risk for each hazard. Your state may also have other state-specific resources and tools to consult. Additional information and links to these resources can be found in the “Resources” section at the end of the Coastal Hazards Phase I Assessment Template:
  - a. The state’s multi-hazard mitigation plan.
  - b. Coastal County Snapshots: Flood Exposure
  - c. Coastal Flood Exposure Mapper
  - d. Sea Level Rise Viewer/Great Lakes Lake Level Change Viewer
  - e. National Climate Assessment

**General Level of Hazard Risk in the Coastal Zone**

| Type of Hazard  | General Level of Risk <sup>3</sup> (H, M, L) |
|---|--|
| Flooding (riverine, stormwater) <sup>4</sup>                  | H  |
| Coastal storms (including storm surge) <sup>4</sup>           | H  |
| Geological hazards (e.g., tsunamis, earthquakes) <sup>4</sup> | H  |
| Shoreline erosion <sup>4,6</sup>                              | H  |
| Sea level rise <sup>5,6</sup>                                 | H  |
| Great Lakes level change <sup>6</sup>                         | N/A  |
| Land subsidence <sup>7</sup>                                  | M  |
| Saltwater intrusion <sup>4</sup>                              | H  |
| Other (please specify)  | N/A  |

2. If available, briefly list and summarize the results of any additional data or reports on the level of risk and vulnerability to coastal hazards within your state since the last assessment. The state's multi-hazard mitigation plan or climate change risk assessment or plan may be a good resource to help respond to this question.

**National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands**

The University of Hawaii Coastal Geology Group, in conjunction with the USGS, recently completed an analysis of historical shoreline change along the beaches of Kauai, Oahu, and Maui islands as part of the USGS National Assessment of Shoreline Change Project (Fletcher *et al.*, 2012). Trends in long-term (early 1900s – present) and short term (mid-1940s – present) shoreline change were calculated at regular intervals (20 m) along the shore using weighted linear regression (see summary table below).

According to the study, erosion is the dominant trend of shoreline change in Hawaii. Seventy percent (70%) of the beaches studied on the islands of Kauai, Oahu, and Maui are chronically eroding and more than 21 km or nine percent (9%) of the total length of the beaches studied has been completely lost to erosion during the past century.

Chronic beach erosion causes beach loss, threatens coastal development, and endangers critical habitat. These problems will likely worsen with accelerating sea level rise in the coming decades and therefore pose a high level of risk to Hawaii's coastal zone.

| Shoreline Change Trends for Kauai, Oahu, and Maui |                  |     |                 |               |                |    |                    |           |    |             |
|---|------------------|-----|-----------------|---------------|----------------|----|--------------------|-----------|----|-------------|
| Region  | No. of Transects |     | Beach Loss (km) |               | Beach Loss (%) |    | Average Rate (m/y) | % Eroding |    | % Accreting |
|   | LT               | ST  | LT              | ST            | LT             | ST |                    | LT        | ST |             |
| <b>Kauai</b>                                      |                  |     |                 |               |                |    |                    |           |    |             |
| North   | 1104             | 1.7 | 8               | - 0.11 ± 0.02 | - 0.06 ± 0.02  | 76 | 60                 | 23        | 38 |             |
| East  | 867              | 1.0 | 6               | - 0.15 ± 0.02 | - 0.06 ± 0.02  | 78 | 63                 | 19        | 33 |             |

<sup>3</sup> Risk is defined as "the estimated impact that a hazard would have on people, services, facilities and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage." *Understanding Your Risks: Identifying Hazards and Estimating Losses. FEMA 386-2. August 2001*

<sup>4</sup> See <https://nca2018.globalchange.gov/chapter/27/>.

<sup>5</sup> See [https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report\\_Dec2017.pdf](https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf).

<sup>6</sup> See <https://coast.noaa.gov/slr/>.

|                                     |              |             |           |                          |                          |           |           |           |           |
|-------------------------------------|--------------|-------------|-----------|--------------------------|--------------------------|-----------|-----------|-----------|-----------|
| South                               | 790          | 1.9         | 14        | - 0.01 ±<br>0.02         | 0.05 ±<br>0.04           | 63        | 57        | 34        | 39        |
| West                                | 962          | 1.5         | 7         | - 0.13 ±<br>0.04         | 0.16 ±<br>0.08           | 64        | 48        | 33        | 49        |
| <b>Total</b>                        | <b>3723</b>  | <b>6.0</b>  | <b>8</b>  | <b>- 0.11 ±<br/>0.01</b> | <b>0.02 ±<br/>0.02</b>   | <b>71</b> | <b>57</b> | <b>27</b> | <b>40</b> |
| <b>Oahu</b>                         |              |             |           |                          |                          |           |           |           |           |
| North                               | 1287         | 0.2         | 1         | - 0.11 ±<br>0.01         | - 0.07 ±<br>0.01         | 73        | 68        | 25        | 30        |
| East                                | 2108         | 5.5         | 13        | 0.01 ±<br>0.01           | - 0.01 ±<br>0.01         | 50        | 54        | 47        | 44        |
| South                               | 1319         | 3.0         | 11        | - 0.04 ±<br>0.01         | - 0.03 ±<br>0.02         | 50        | 47        | 48        | 50        |
| West                                | 628          | 0.0         | 0         | - 0.25 ±<br>0.01         | - 0.13 ±<br>0.02         | 83        | 71        | 16        | 27        |
| <b>Total</b>                        | <b>5342</b>  | <b>8.7</b>  | <b>8</b>  | <b>- 0.06 ±<br/>0.01</b> | <b>- 0.15 ±<br/>0.01</b> | <b>60</b> | <b>58</b> | <b>38</b> | <b>40</b> |
| <b>Maui</b>                         |              |             |           |                          |                          |           |           |           |           |
| North                               | 903          | 0.9         | 6         | - 0.26 ±<br>0.02         | - 0.22 ±<br>0.03         | 87        | 74        | 12        | 16        |
| Kihei                               | 1011         | 2.1         | 11        | - 0.13 ±<br>0.01         | - 0.12 ±<br>0.02         | 83        | 77        | 16        | 20        |
| West                                | 1519         | 3.8         | 14        | - 0.15 ±<br>0.01         | - 0.13 ±<br>0.01         | 85        | 77        | 14        | 18        |
| <b>Total</b>                        | <b>3433</b>  | <b>6.8</b>  | <b>11</b> | <b>- 0.17 ±<br/>0.01</b> | <b>- 0.15 ±<br/>0.01</b> | <b>85</b> | <b>76</b> | <b>14</b> | <b>18</b> |
| <b>Hawaii (all beaches studied)</b> |              |             |           |                          |                          |           |           |           |           |
| <b>Total</b>                        | <b>12498</b> | <b>21.5</b> | <b>9</b>  | <b>- 0.11 ±<br/>0.01</b> | <b>- 0.06 ±<br/>0.01</b> | <b>70</b> | <b>63</b> | <b>28</b> | <b>34</b> |

Source: Adapted from Fletcher *et al.*, 2012. p. 22.

### State of Hawaii Multi-Hazard Mitigation Plan, 2018

The State of Hawaii has updated its Hazard Mitigation Plan (SHMHMP) in 2018.<sup>7</sup> The 2018 SHMHMP includes supplemental information on climate change and its relation to sea level rise. The islands of Hawaii have been experiencing region-specific challenges. For example, the temperatures on the island of Oahu have been changing at a higher rate than the global mean compared to other islands. Climate change, in addition to sea-level rise, can have repercussions on the natural and cultural resources of the State. The relative rate of sea-level rise also varies among the Hawaiian Islands. This could be because of subsidence-based and oceanic variability. For example, the rate of subsidence on the Island of Hawaii is higher than the Islands of Kauai because the Island of Hawaii has a rate of subsidence compared to the Islands of Kauai and Oahu.

The SHMHMP also includes results from sea-level rise modeling for potential future exposure to coastal hazards. The modeling was based on the worst-case scenario (3.2 feet by the year 2100) as outlined in by the International Panel of Climate Change (IPCC). Based on the modeling exercise, the SHMHMP outlines estimated square miles of potential land loss for each County. The total loss in the State totals to an estimated 0.5 percent of the total land area. This makes up most of the developed and valued land of the State which lies on low-lying coastal plains, risking most of the population (displacing about

<sup>7</sup> <https://dod.hawaii.gov/hiema/files/2018/06/Draft-Section-4.2-Climate-Change.pdf>.

20,000 people statewide), infrastructure and economic sectors in the State. Trends for sea-level rise over the last century in the State range from 0.6 inches for Oahu and Kauai to 1.3 inches on the island of Hawaii per decade.

The SHMHMP includes projections of climate change impacts on environmental resources. Some of the foreseen climate change challenges for the State include sea-level rise, ocean and atmospheric warming, increased flooding, ocean acidification, changing distributions of animal life, and changing intensity and frequency of storms.

| County                      | Area                      |  |                              |
|-----------------------------|---------------------------|--|------------------------------|
|                             | Total Area (square miles) | SLR-XA-3.2 <sup>8</sup> (square miles) | SLR-XA-3.2 (% of Total Area) |
| County of Kauai             | 630.3                     | 8.8                                    | 1.4%                         |
| City and County of Honolulu | 600.2                     | 13.0                                   | 2.2%                         |
| County of Maui              | 1,174.6                   | 7.8                                    | 0.7%                         |
| County of Hawaii            | 4,027.8                   | 4.3                                    | 0.1%                         |
| <b>Total</b>                | <b>6,432.9</b>            | <b>33.9</b>                            | <b>0.5%</b>                  |

Source: State of Hawaii Hazard Mitigation Plan, 2018

Data Source: State of Hawaii GIS layers, State of Hawaii GIS Program Geospatial Data Portal; Draft Hawaii Sea Level Rise Vulnerability and Adaptation Report, 2017.

### Great Aleutian Tsunamis Research

A systematic analysis of giant earthquake sources (Mw  $\geq$  9.25) along the Aleutian-Alaska arc was conducted for Hawaii Emergency Management Agency (HI-EMA) (formerly known as State Civil Defense (SCD)) in order to verify the adequacy of current tsunami evacuation maps (Butler, 2014). This analysis modeled earthquakes with the extremes of fault area, mean fault slip, and slip nearest the trench that characterized the largest megathrust earthquakes of the last century: 2004 Mw 9.3 Sumatra-Andaman, 1960 Mw 9.5 Chile, and 2011 Mw 9.1 Tohoku, respectively. The analysis concluded that a great Mw 9+ Aleutian earthquake could generate a tsunami in Hawaii larger than historically observed, exceeding current tsunami inundation maps. In response to these and subsequent findings, the City & County of Honolulu, in conjunction with state, federal, and non-government stakeholders, has developed a new set of Extreme Tsunami Evacuation Zone maps, refuge areas, and evacuation routes to complement the current tsunami evacuation maps for the island of Oahu. Draft Extreme Tsunami Evacuation Maps are available at: <http://www.honolulu.gov/dem/default.html>.

### Risk and Vulnerability Assessment of Sea Level Risk Impact in Honolulu, Hawaii

A mapping and modelling effort was conducted to assess the risk and vulnerability of the urban corridor of the City and County of Honolulu on the island of Oahu (i.e., Diamond Head to Pearl Harbor) to coastal inundation hazards such as hurricanes and tsunamis under higher sea level projections (UH Sea Grant, 2014). This project demonstrates that SLR will significantly increase the impacts of coastal hazards in Honolulu's urban corridor, the most populated and economically active area in the state of Hawaii. The analysis indicates that 80% of the study area's economy, nearly half of the population, and much of the infrastructure and land are at risk of inundation.

### Management Characterization:

<sup>8</sup> SLR-XA-3.2 refers to Sea Level Rise Exposure Area with 3.2 feet of sea level rise.

1. In the tables below, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred that could impact the CMP's ability to prevent or significantly reduce coastal hazards risk since the last assessment.

#### Significant Changes in Hazards Statutes, Regulations, Policies, or Case Law

| Topic Addressed  | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|--|---|--|--|
| Elimination of development/redevelopment in high-hazard areas <sup>9</sup>   | Y                                       | Y  | N  |
| Management of development/redevelopment in other hazard areas                | Y                                       | Y  | N  |
| Climate change impacts, including sea level rise or Great Lakes level change | Y                                       | N  | N  |

#### Significant Changes in Hazards Planning Programs or Initiatives

| Topic Addressed  | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|--|---|--|--|
| Hazard mitigation  | Y                                       | Y  | Y  |
| Climate change impacts, including sea level rise or Great Lakes level change | Y                                       | Y  | N  |

#### Significant Changes in Hazards Mapping or Modeling Programs or Initiatives

| Topic Addressed                            | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|--|---|--|--|
| Sea level rise or Great Lakes level change | Y                                       | Y  | Y  |
| Other hazards                              | Y                                       | N  | N  |

2. Briefly state how “high-hazard areas” are defined in your coastal zone.

The State of Hawaii employs the Federal Emergency Management Agency (FEMA), National Flood Insurance Program (NFIP), definition of coastal high hazard area:

*An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The coastal high hazard area is identified as Zone V on Flood Insurance Rate Maps (FIRMs). Special floodplain management requirements apply in V Zones including the requirement that all buildings be elevated on piles or columns (FEMA, 2015).*

<sup>9</sup> Use state's definition of high-hazard areas.

"Coastal high hazard area" means a special flood hazard area subject to high velocity wave action from storms or seismic sources and designated on a flood insurance rate map (FIRM) as zone [V1-V30,] VE [,] or V.

<https://www.mauicounty.gov/DocumentCenter/View/10389/Ord-3687?bidId=>

"Coastal high hazard area" means a special flood hazard area subject to high velocity wave action from storms or seismic sources and designated on the flood insurance rate map as zone VE or V.

[https://www.honolulu.gov/rep/site/ocs/roh/ROH\\_Chapter\\_21A\\_.pdf](https://www.honolulu.gov/rep/site/ocs/roh/ROH_Chapter_21A_.pdf)

3. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
  - a. Describe the significance of the changes;
  - b. Specify if they were 309 or other CZM-driven changes; and
  - c. Characterize the outcomes or likely future outcomes of the changes.

#### **Act 286, Session Laws of Hawaii 2012**

a. Act 286, Session Laws of Hawaii 2012, amends the Hawaii State Planning Act by adding climate change adaptation priority guidelines to Part III (HRS §226-109).

Specifically HRS Chapter 226, is amended to read as follows:

"§ 226-109 Climate change adaptation priority guidelines.

Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:

- i. Ensure that Hawaii's people are educated, informed, and aware of the impacts of climate change may have on their communities;
- ii. Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;
- iii. Invest in continued monitoring and research of Hawaii's climate and the impacts of climate change on the State;
- iv. Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;
- v. Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;
- vi. Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;
- vii. Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;
- viii. Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other non-governmental entities, including nonprofit entities;

ix. Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and

x. Encourage planning and management of the natural and built environments that effectively integrate climate change policy.”

b. The HCZMP was instrumental in developing the climate change adaptation priority guidelines. On August 22-23, 2011, the State of Hawaii Coastal Zone Management Program, the National Oceanic and Atmospheric Administration, and U.S. Army Corps of Engineer’s Honolulu District’s (USACE) Silver Jackets initiative sponsored a workshop to facilitate the development of the foundation for a statewide climate change policy. Sixty participants engaged in the unique workshop, which combined a futures approach with appreciative inquiry to think “outside the box” and develop a common vision for moving forward. The results of the workshop, along with input from the broader community, laid the foundation for Act 286, Climate Change Adaptation Priority Guidelines, which was signed into law by Governor Neil Abercrombie on July 9, 2012.

c. Priority guidelines focus state and county resources on major areas of statewide concern that merit priority attention to improve the quality of life for Hawaii’s present and future population through the pursuit of desirable course of action. The climate change adaptation priority guidelines are intended to serve as a guiding policy for adapting to the expected impacts of climate change through existing implementation provisions of the Hawaii State Planning Act, which include guiding all major state and county activities, programs, budgetary, land use, and other decision-making processes, and county general plans and development plans, pursuant to Part II of the Hawaii State Planning Act.

#### **Hawaii Ocean Resources Management Plan 2013 Update**

a. The 2013 update to the Hawaii Ocean Resources Management Plan includes two management priorities directly related to climate change adaptation: (1) Management Priority #1 – Appropriate Coastal Development; and (2) Management Priority #2 – Management of Coastal Hazards (State of Hawaii, 2013).

b. The 2013 update to the Hawaii Ocean Resources Management Plan was a 309 driven effort included in the Hawaii CZM Program’s approved FY 2011–2015 309 A&S.

c. In November 2013, the Council on Ocean Resources established an action team tasked with implementing ORMP Management Priorities #1 and #2. The Action Team (ACT) for Appropriate Coastal Development & Management of Coastal Hazards is comprised of representatives from several state and county agencies, as well as federal and academic partners. The ACT has met regularly since its inaugural meeting in April 2014 and is in the process of developing an action plan for implementation.

#### **Act 83, Session Laws of Hawaii 2014**

a. The Hawaii Climate Adaptation Initiative Act (Act 83, Session Laws of Hawaii 2014), addresses climate change adaptation by (1) establishing an interagency climate adaptation committee (ICAC), attached administratively to the Department of Land and Natural Resources, to develop a sea level rise vulnerability and adaptation report for Hawaii through the year 2050 (HRS Chapter 225P); (2) authorizing the Office of Planning (OP) to coordinate the development of a statewide climate adaptation plan and to use the sea level rise vulnerability and adaptation report as a framework for addressing other climate threats and climate adaptation priorities identified in Act 286, Session Laws of Hawaii 2012 (HRS §225M-2(9)); and (3) allocating funds and creating positions to carry out these purposes.

b. While Act 83, Session Laws of Hawaii 2014, was not a 309 or CZM-driven effort, the HCZMP assisted in the development of the draft legislation and monitored and testified in support of this initiative as it passed through the legislature.

c. The ICAC, with support from the DLNR, is tasked with developing a Sea Level Rise Vulnerability and Adaptation Report that shall be completed by no later than December 31, 2017, and include the following: (1) identification of the major areas of sea level rise impacts affecting the State and counties through 2050; (2) identification of expected impacts of sea level rise based on the latest scientific research for each area through 2050; (3) identification of the economic ramifications of sea level rise; (4) identification of applicable federal laws, policies, or programs that impact affected areas; and (5) recommendations for planning, management, and adaptation for hazards associated with increasing sea level rise.

Additionally, the Office of Planning is tasked with conducting climate adaptation planning as follows: (1) develop, monitor, and evaluate strategic climate adaptation plans and actionable policy recommendations for the State and counties addressing expected statewide climate change impacts through the year 2050; (2) provide planning and policy guidance and assistance to state and county agencies regarding climate change; and (3) publish findings, recommendations, and progress reports on actions taken no later than December 31, 2017, and in its annual report to the Governor and the legislature thereafter.

#### **Act 32, Session Laws of Hawaii 2017**

a. Following the establishment of Act 83, Session Laws of Hawaii 2014, Act 32, Session Laws of Hawaii 2017 was established to strengthen Act 83. The ICAC was modified to create the Hawaii Climate Mitigation and Adaptation Initiative (Act 32, Session Laws of Hawaii 2017) provides a framework to address climate threats. The commission that was established because of Act 83 was expanded from the Interagency Climate Adaptation Committee to the Hawaii Climate Change Mitigation and Adaptation Commission (Hawaii Climate Commission). Act 32 establishes tasks for the Hawaii Climate Commission related to climate change mitigation and adaptation. The first output led by the Climate Commission focused on sea level rise, which led to the Hawaii Sea Level Rise Vulnerability and Adaptation Report. In addition to the report, a sea level rise tool was established to disseminate information on sea level rise and help professionals use the tool in their efforts to mitigate sea level rise.

#### **ORMP current updates by March 2020**

##### **Enhancement Area Prioritization:**

1. What level of priority is the enhancement area for the coastal management program?

|               |               |
|---------------|---------------|
| <b>High</b>   | <u>  X  </u>  |
| <b>Medium</b> | <u>      </u> |
| <b>Low</b>    | <u>      </u> |

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Of the nine enhancement areas, coastal hazards has been identified as the highest priority for both the HCZMP and surveyed stakeholders. The State of Hawaii is highly vulnerable to all types of coastal hazards, including tropical cyclones, tsunamis, earthquakes, flooding, erosion, etc., and future risk to coastal life and property is only expected to increase with climate change and sea level rise. It is therefore both timely and prudent for the HCZMP to conduct a Phase II Assessment to further explore specific problems, opportunities for improvement, and priority needs to inform the development of a Section 309 Strategy for this enhancement area.

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing coastal hazards strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

#### **Climate.gov**

NOAA's Climate.gov provides science and information for a climate-smart nation. The "Supporting Decisions" is a clearinghouse of reports, resources, and decision-support tools for planners and policy leaders who want authoritative climate science information to help them understand and manage climate-related risks and opportunities.

*Geographic Scope:* Various by resource

*Website:* [www.climate.gov](http://www.climate.gov)

#### **CZMA Performance Measurement System Data**

Annual CZMA performance measurement data for government coordination and habitat measures. The online database can be used to synthesize existing state and territory data reported during the assessment period. Note: Only CMP staff with permission to enter performance measurement data are able to access the database through their assigned account.

*Geographic Scope:* All coastal states and territories

*Website:* [www.coast.noaa.gov/czmpm/Login.aspx?ReturnUrl=%2fczmpm%2f](http://www.coast.noaa.gov/czmpm/Login.aspx?ReturnUrl=%2fczmpm%2f)

#### **National Climate Assessment Web Tool**

The U.S. Global Change Research Program provides an interactive web tool to quickly view key findings from the Fourth National Climate Assessment. Data are summarized by region and national topics (including coastal effects which includes a summary of key coastal effects, by region).

*Geographic Scope:* Entire United States (including territories)

*Website:* [www.nca2018.globalchange.gov](http://www.nca2018.globalchange.gov)

#### **NOAA C-CAP Coastal Land Atlas**

Online data viewer provides user-friendly access to regional land cover and land cover change information developed through NOAA's Coastal Change Analysis Program (C-CAP). The tool summarizes wetland change trends and can highlight specific changes of interest (salt marsh losses to open water, for instance). Users can investigate how land cover changed between 1996, 2001, 2006, 2011, and 2016.

Although data are provided by county, NOAA staff members are able to help states and territories easily aggregate county data into a statewide summary.

*Geographic Scope:* Contiguous United States and Hawaii

*Website:* [www.coast.noaa.gov/digitalcoast/tools/lca.html](http://www.coast.noaa.gov/digitalcoast/tools/lca.html)

### **NOAA Coastal County Snapshots: Flood Exposure**

Assesses a county's exposure and resilience to flooding. Analyzes a county's dependence on the ocean or Great Lakes for a healthy economy. Examines the benefits a county receives from its wetlands. Compares counties to each other or for regional analysis. Allows users to download a PDF report for the snapshot of their choice.

*Geographic Scope:* Coastal states only. Currently not available for territories.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/snapshots.html](http://www.coast.noaa.gov/digitalcoast/tools/snapshots.html)

### **NOAA Coastal Flood Exposer Mapper**

The online visualization tool supports communities that are assessing their coastal hazard risks and vulnerabilities. The tool creates a collection of user-defined maps that show the people, places, and natural resources exposed to coastal flooding. The maps can be saved, downloaded, or shared to communicate flood exposure and potential impacts. In addition, the tool provides guidance for using these maps to engage community members and stakeholders.

*Geographic Scope:* East Coast, Gulf of Mexico, and islands in the Pacific and Caribbean.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/flood-exposure.html](http://www.coast.noaa.gov/digitalcoast/tools/flood-exposure.html)

### **NOAA Sea Level Rise and Great Lakes Level Change Viewers**

The Sea Level Rise Viewer displays potential future sea levels and provides simulations of sea level rise at local landmarks, including modeling potential marsh migration due to sea level rise. The viewer overlays social and economic data onto potential sea level rise and visualizes how tidal flooding will become more frequent with sea level rise. The Great Lakes Level Change Viewer creates visuals that capture lake level changes that range from six feet above to six feet below historical long-term average water levels in the Great Lakes. Potential shoreline and coastal impacts are also provided.

*Geographic Scope:* All coastal states and territories except for Alaska.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/slr.html](http://www.coast.noaa.gov/digitalcoast/tools/slr.html) (Sea Level Rise Viewer) or

[www.coast.noaa.gov/llv/](http://www.coast.noaa.gov/llv/) (Great Lakes Level Change Viewer)

### **U.S. Climate Resilience Toolkit**

The toolkit provides information and tools to help people understand and assess their climate risk. The toolkit includes a framework to discover and document climate hazards and then develop workable solutions to lower climate-related risks and case studies to see how others are reducing their climate risk. A visualization tool generates interactive graphs and maps showing climate projections and observations for any county in the contiguous U.S. and allows users to explore historical temperature and precipitation observations at hundreds of climate stations as well as view observed and projected days of high-tide flooding at more than 80 coastal tide gauge stations.

*Geographic Scope:* National

*Website:* [toolkit.climate.gov/](http://toolkit.climate.gov/)

**References**

Hawaii Climate Commission, 2017: Hawaii Sea Level Rise Vulnerability and Adaptation Report. Hawaii Climate Change Mitigation and Adaptation Commission, Honolulu, HI, Accessed 18 July 2019, [https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report\\_Dec2017.pdf](https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf).

National Climate Assessment Web Tool (2018) Chapter 27: Hawaii and U.S.-Affiliated Pacific Islands. Accessed 18 July 2019, <https://nca2018.globalchange.gov/chapter/27/>.

NOAA Sea Level Rise Viewer Accessed 18 July 2019, <https://coast.noaa.gov/slr/>.

State of Hawaii 2018 Hazard Mitigation Plan Section 4. Risk Assessment. Accessed 18 July 2019, <https://dod.hawaii.gov/hiema/files/2018/06/Draft-Section-4.2-Climate-Change.pdf>.

### Public Access

**Section 309 Enhancement Objective:** Attain increased opportunities for public access, taking into account current and future public access needs, to coastal areas of recreational, historical, aesthetic, ecological, or cultural value. §309(a)(3)

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. Use the table below to provide data on public access availability within the coastal zone.

**Public Access Status and Trends**

| Type of Access                            | Current number <sup>10</sup>   | Changes or Trends Since Last Assessment <sup>11</sup><br>(↑,↓,-unkwn) | Cite data source   |
|---|--|---|--|
| Beach access sites                        | Unknown<br><br>Each county continues applying subdivision ordinances and special management area rules and shoreline setback rules to create, maintain and improve the beach access sites through project permit requirements. | Unknown   | A comprehensive statewide beach/shoreline access database does not exist for Hawaii. |
| Shoreline (other than beach) access sites | Unknown  | Unknown   | A comprehensive statewide beach/shoreline access database does not exist for Hawaii. |

<sup>10</sup> Be as specific as possible. For example, if you have data on many access sites but know it is not an exhaustive list, note “more than” before the number. If information is unknown, note that and use the narrative section below to provide a brief qualitative description based on the best information available.

<sup>11</sup> If you know specific numbers, please provide. However, if specific numbers are unknown but you know that the general trend was increasing or decreasing or relatively stable or unchanged since the last assessment, note that with a ↑ (increased), ↓ (decreased), – (unchanged). If the trend is completely unknown, simply put “unkwn.”

| Type of Access   | Current number <sup>10</sup>   | Changes or Trends Since Last Assessment <sup>11</sup><br>(↑,↓,-unkwn)  | Cite data source   |
|--|--|--|--|
| Recreational boat (power or nonmotorized) access sites | 63 boating facilities, including Division of Boating and Ocean Recreation (DOBOR) Boating Facilities (46), county facilities (7), restricted facilities (2), and private facilities (8)  | ↑ Total boating facilities including DOBOR, county, restricted, and private boating facilities.  | State Department of Land and Natural Resources (DLNR), DOBOR website at <a href="https://dlnr.hawaii.gov/dobor/dobor-facilities/">https://dlnr.hawaii.gov/dobor/dobor-facilities/</a> 8/28/2019  |
| Number of designated scenic vistas or overlook points  | More than: 28 parks with hiking trails for scenic lookouts   | Unknown<br><br>Around the islands of Hawaii, Kauai, Lanai, Maui, Molokai and Oahu, stunning views, panoramic landscapes, and signs lead to scenic overlooks around every turn. From lookout points accessible simply by pulling off the highway to overlooks that require a bit of hiking, there are 13 breathtaking scenic overlooks on the list. | DLNR Division of State Parks<br><a href="https://dlnr.hawaii.gov/dsp/parks/">https://dlnr.hawaii.gov/dsp/parks/</a><br><br><a href="https://www.onlyinyourstate.com/hawaii/breathtaking-scenic-overlooks-hi/">https://www.onlyinyourstate.com/hawaii/breathtaking-scenic-overlooks-hi/</a> 8/28/2019 |
| Number of fishing access points (i.e. piers, jetties)  | Fishing, including charter fishing and shore fishing, is a deeply rooted part of local culture in Hawaii. Most shoreline areas in Hawaii are open to fishing, unless prohibited or restricted and regulated by areas and seasons, indicated by signs, e.g., Regulated Fishing Areas; Marine Life Conservation Districts. | Unknown – only accounted for select DOBOR facilities.<br><br>46 DOBOR recreation boating facilities.   | DOBOR website at <a href="https://dlnr.hawaii.gov/dobor/dobor-facilities/">https://dlnr.hawaii.gov/dobor/dobor-facilities/</a> 8/28/2019   |

| Type of Access  | Current number <sup>10</sup>  | Changes or Trends Since Last Assessment <sup>11</sup><br>(↑,↓,-unkwn)  | Cite data source  |
|---|---|--|---|
| Coastal trails/<br>boardwalks<br><i>(Please indicate<br/>number of<br/>trails/boardwalks<br/>and mileage)</i> | <u>No. of Trails/ boardwalks</u><br>More than:<br>1. 115 Na Ala Hele Trails & Access Roads in Kauai, Oahu, Molokai, Lanai, Maui and Hawaii*.<br><br>*Does not include 1 closed trail on Oahu, and 4 closed trails on Hawaii Island.<br><br>2. 28 Other State Park Hiking Trails*.<br><br>*Does not include 2 closed state park trails on Kauai. | a. ↑ 16 trails; ↓ 46.24 miles due to 5 closed trails and roads, including 32 miles Mauna Kea Summit Road due to Thirty Meter Telescope (TMT)<br><br>b. ↑ 15 state park hiking trails; ↑ 59.13 miles. | a. Division of Forestry & Wildlife website <a href="https://hawaii.trails.hawaii.gov/trails/#/8/28/2019">https://hawaii.trails.hawaii.gov/trails/#/8/28/2019</a><br><br>b. Division of State Parks website at <a href="https://dlnr.hawaii.gov/dsp/hiking/8/28/2019">https://dlnr.hawaii.gov/dsp/hiking/8/28/2019</a> |
|   | <u>Miles of Trails/boardwalks</u><br>More than:<br>1. 399.26 miles of open Na Ala Hele Trails & Access Roads, and 44.4 miles of closed Na Ala Hele Trails and Roads; and<br><br>2. 88.83 miles of Other State Park Hiking Trails in Kauai, Oahu, Hawaii and Maui.   |  |   |

| Type of Access  | Current number <sup>10</sup>                                       | Changes or Trends Since Last Assessment <sup>11</sup><br>(↑,↓,-unkwn) | Cite data source   |
|---|--|---|--|
| <p>Number of acres parkland/open space</p>  | <p><u>Total sites</u></p>  |   |  |
|   | <p>More than:</p>  | <p>1. ↓ 5,294.67 acres</p>  |  |
|   | <p>1. National Wildlife Refuges (10 sites; 294,943 acres);</p>     | <p>2. ↓ 41 acres</p>  | <p>1. U.S. Fish &amp; Wildlife Service<br/><a href="https://www.fws.gov/refuges/profiles/bystate.html#hi">https://www.fws.gov/refuges/profiles/bystate.html#hi</a><br/>8/28/2019</p> <p>2. DBEDT, 2017.<br/><a href="http://dbedt.hawaii.gov/economic/databook/db2017/">http://dbedt.hawaii.gov/economic/databook/db2017/</a></p> <p>3. Ibid.</p> <p>4. <a href="http://dbedt.hawaii.gov/economic/databook/2017-individual/">http://dbedt.hawaii.gov/economic/databook/2017-individual/</a></p> <p>5. Ibid.</p> <p>6. DBEDT, 2017.<br/><a href="http://dbedt.hawaii.gov/economic/databook/db2017/">http://dbedt.hawaii.gov/economic/databook/db2017/</a></p> <p>7. Ibid.</p> <p>8. Ibid.</p> |
|   | <p>2. National Parks (7 sites; 369,161 acres);</p>                 | <p>3. ↓ 6 areas ↓ 55 acres</p>  |  |
|   | <p>3. State Parks and Historic Sites (63 sites; 33,467 acres);</p> | <p>4. ↑ 11,121 acres</p>  |  |
|   | <p>4. State Forest Reserve Lands (N/A sites; 657,841 acres);</p>   | <p>5. ↑ 1 area; ↑ 378 acres</p>                                       |  |
|   | <p>5. State Natural Area Reserves (21 sites; 123,810 acres);</p>   | <p>6. ↑ 63 areas; ↑1,666 acres</p>                                    |  |
|   | <p>6. State Public Hunting Areas (122 sites; 939,100 acres);</p>   | <p>7. ↓ 7 areas; ↓ 12,900 acres</p>                                   |  |
| <p>7. State Managed Sanctuaries, Refuges, and Preserves (50 sites; 40,000 acres);</p> | <p>8. ↑ 5 parks; ↑ 2,004 acres</p>                                 |   |  |
| <p>8. County Parks (730 sites; 11,166 acres).</p>                                     |  |   |  |

| Type of Access  | Current number <sup>10</sup>   | Changes or Trends Since Last Assessment <sup>11</sup><br>(↑,↓,-unkwn) | Cite data source |
|---|--|---|------------------|
| Access sites that are Americans with Disabilities Act (ADA) compliant <sup>12</sup> | The State of Hawaii Department of Land and Natural Resources and the four counties submitted a report entitled “Improve Public Beach Access for Persons with Disabilities in Hawaii” to the Legislature Session of 2017. Hawaii Outdoor Developed Areas Accessibility Guidelines, available from the State of Hawaii Department of Health’s website at <a href="http://health.hawaii.gov/dca">http://health.hawaii.gov/dca</a> take effect on January 2, 2017. | Unknown   |                  |
| Other<br>(please specify)   |  |   |                  |

- Briefly characterize the demand for coastal public access and the process for periodically assessing demand. Include a statement on the projected population increase for your coastal counties. There are several additional sources of statewide information that may help inform this response, such as the Statewide Comprehensive Outdoor Recreation Plan,<sup>13</sup> the National Survey on Fishing, Hunting, and Wildlife Associated Recreation,<sup>14</sup> and your state’s tourism office.

The entire State of Hawaii is in the coastal zone management area. Demand for coastal public access remains high in Hawaii and will increase as the State’s resident and visitor populations continue to grow. According to the “Population and Economic Projections for the State of Hawaii to 2045” from the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT), the resident population of Hawaii is projected to increase from 1.43 million in 2016 to 1.65 million in 2045, an average growth rate of 0.5 percent per year over the project period. Based on the most recent estimates released by the US Census (April 18, 2019), it is estimated that the 2019 population of Hawaii is at 1.42 million. This represents a 5.2% increase from the 1.36 million recorded during the 2010 Census.

<sup>12</sup> For more information on ADA see [www.ada.gov](http://www.ada.gov).

<sup>13</sup> Most states routinely develop “Statewide Comprehensive Outdoor Recreation Plans”, or SCROPs, that include an assessment of demand for public recreational opportunities. Although not focused on coastal public access, SCROPs could be useful to get some sense of public outdoor recreation preferences and demand. Download state SCROPs at [www.recpro.org/scorp-library](http://www.recpro.org/scorp-library).

<sup>14</sup> The National Survey on Fishing, Hunting, and Wildlife Associated Recreation produces state-specific reports on fishing, hunting, and wildlife associated recreational use for each state. While not focused on coastal areas, the reports do include information on saltwater and Great Lakes fishing, and some coastal wildlife viewing that may be informative and compares 2016 data to 2011, 2006 and 2001 information to understand how usage has changed. See [www.wsfprprograms.fws.gov/subpages/nationalsurvey/national\\_survey.htm](http://www.wsfprprograms.fws.gov/subpages/nationalsurvey/national_survey.htm)

The tourism industry plays an extremely significant role in Hawaii's economy. The Hawaii Tourism Authority (HTA) reported in its 2017 Annual Visitor Research Report that Hawaii's tourism industry achieved new records in total visitor spending and visitor arrivals in 2017, making the sixth consecutive year of record growth in both categories. A total of 9,404,346 visitors came to the state, an increase of 5.3 percent from the previous record of 8,934,277 visitors in 2016. According to Hawaii Visitor Statistics released for 2018 from HTA (January 31, 2019), a total 9,954,548 visitors came to Hawaii in 2018, an increase of 5.9 percent from 9,404,346 visitors in 2017. On average, there were 242,629 visitors in the Hawaiian Islands on any given day in 2018, up 5.3 percent from 2017. In other words, the annual visitors to Hawaii in 2018 has already reached to nearly 10 million, which was forecasted to happen in 2040 by *Population and Economic Projections for the State of Hawaii to 2040* (DBEDT 2012).

Growth of both resident and visitor populations may result in increased demand for shoreline access and associated pressures. Additionally, several relevant federal and state agency studies conducted since the last assessment reveal high demand for outdoor recreation and need for additional recreational facilities. A review of these reports is provided below.

### **2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation**

The U.S. Fish & Wildlife Service National Survey of Fishing, Hunting, and Wildlife-Associated Recreation is conducted every five years (approximately) and is considered one of the most important sources of information on fish and wildlife recreation in the United States.

The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation found that 465,000 Hawaii residents and nonresidents 16 years old and older fished, hunted, or wildlife watched in Hawaii. Of the total number of participants, 157,000 fished; 23,000 hunted; and 358,000 participated in wildlife-watching activities, including observing, feeding, and photographing wildlife. In 2011, state residents and nonresidents spent \$993 million on wildlife recreation in Hawaii. Of that total, trip-related expenditures accounted for \$752 million, while equipment expenditures totaled \$212 million. The remaining \$28 million was spent on licenses, contributions, land ownership and leasing, and other items.

In contrast to the 2011 National Survey, the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation did not collect data at the state level so there are no state-level reports. However, according to 2016 50-State Survey of Fishing, Hunting, and Wildlife-Related Recreation conducted by the Rockville Institute for State Fish and Wildlife Agencies under the aegis of the Association of Fish and Wildlife Agencies, 1,125,000 Hawaii residents and nonresidents 16 years and older participated wildlife-related recreations. Of the number of participants, 387,000 sportspersons, and 937,000 wildlife watching activities. Among 552,000 Hawaii residents 16 years and older participated wildlife-related recreations, 268,000 fished and/or hunted, 28,000 fished and hunted, and 235,000 fished only. The expenditures from 196,000 Hawaii resident participants in fishing were estimated at \$409,215,000, and the expenditures from 223,000 resident participants in wildlife watching were estimated at \$373,363,000.

### **State Comprehensive Outdoor Recreation Plan 2015**

To remain eligible for National Park Service Land & Water Conservation Fund grants, every State must prepare and regularly update (i.e., every 5 years) a statewide comprehensive outdoor recreation plan (SCORP). The State of Hawaii Department of Land and Natural Resources is delegated the responsibility for preparing and implementing the SCORP and has completed the 2015 Update.

Hawaii's recreational environment is divided into mauka (mountain or toward the mountains) and makai (seaward). Mauka recreation, often in forest settings, tends to include land and nature-based activities such as hiking, wilderness camping, picnicking, and hunting. Makai recreation along the shoreline and in the ocean includes surfing, swimming, snorkeling, diving, fishing, boating, beach activities, camping, and picnicking.

The 2015 SCORP Update identifies key issues related to the demand and quality of outdoor recreation, determines priority needs in response to these issues, and develops strategies to accomplish these priorities. Notable trends and needs are summarized below.

#### Trends & Needs for Outdoor Recreation:

- There is an increasing demand on outdoor recreational facilities due to growing resident, military, and visitor populations.
- Need for better physical fitness among Hawaii's population.
- Need to reduce barriers that prevent people from participating in outdoor recreation and to promote opportunities for all people to get outdoors, irrespective of age and ability.
- County leaders are refocusing on parks maintenance.
- Public-private partnerships are becoming increasingly important to providers.
- Visiting the beach is the most popular activity of both Hawaii's visitor and resident population, and investments in beach access and facilities will be an on-going need.
- Balancing demand for ocean and beach activities with caring for natural and cultural resources, protecting the public's safety, and avoidance of user conflicts is a challenge.
- There is a need for more and safer walking paths, trails, bike paths and sidewalks.
- For Hawaii's resident population, cultural practices and outdoor recreation are deeply intertwined. There is an on-going demand for access to nature in general and cultural sites specifically.
- Sports fields remain in high demand. An increasing population, combined with new sports, and year-round seasons are stressing multi-purpose fields.

#### Issues & Challenges

- **Issue #1: Quality and Condition of Facilities.** SCORP public survey respondents and provider respondents both identify, "Operating and maintaining existing infrastructure and facilities" as the number one priority for investment in outdoor recreation.
- **Issue #2: Hiking Trail Demand and Use.** The demand for more trails or access to mauka lands and the need for trail facilities and maintenance are two issues that go hand-in-hand.
- **Issue #3: User Conflicts.** Nearly half (44.6 percent) of the respondents reported that they are limited or prevented from participating in an outdoor activity due to conflict with another activity that shares facilities or resources with their activity.

- **Issue #4: Uncertain & Inadequate Financial Support.** Limited and/or decreasing funding are the most serious challenge to recreation providers in managing or providing outdoor recreation facilities.
  - **Issue #5: Liability Concerns.** A history of costly tort claims in Hawaii now weighs heavily into planning and management decisions. Liability concerns both on private and public land have limited use of or closed popular mauka recreational activities and sites.
  - **Issue #6: Enforcement.** The need for additional enforcement to protect both the public's wellbeing and the health of Hawaii's natural and cultural resources was a strongly expressed demand by both recreation providers as well as public survey respondents.
  - **Issue #7: Accessibility.** Responding to various shifts in demographics in Hawaii is essential to protecting the outdoor recreation experience and to providing support for appropriate activities. Safety and accessibility measures will be increasingly necessary in the future to allow aging and disabled individuals to engage in outdoor recreation activities.
  - **Issue #8: Physical Fitness.** The prevalence of obesity (body mass index (BMI) >30) continues to be a health concern for adults, children, and adolescents in the U.S.
  - **Issue #9: Communication.** Improving communication between recreation providers and participants is critical to providing a respectful and responsible atmosphere that keeps recreationists safe and the environment health.
  - **Issue #10: Fragility of the Natural Environment.** In Hawaii, outdoor recreation is dependent on a healthy natural environment, but outdoor recreation activities can have unintended ecological impacts.
3. If available, briefly list and summarize the results of any additional data or reports on the status or trends for coastal public access since the last assessment.

In response to House Concurrent Resolution No. 141, as adopted by the Twenty-Eighth Legislature of the State of Hawaii, Regular Session of 2015 that recognized the importance for providing access to Hawaii's beaches for everyone, including persons with disabilities, the State of Hawaii Department of Land and Natural Resources and the four counties submitted a report entitled "Improve Public Beach Access for Persons with Disabilities in Hawaii" to the Legislature Session of 2017. As required, the report discusses the status of public beach access to the shoreline for persons with disabilities at public beaches that have a public restroom facility or are in an ocean recreation management area. Through analysis of the Department's beach access matrix, six locations statewide were identified and mapped where improving beach access is feasible, safe, and sustainable for everyone. These locations are Kee Beach at Hāena State Park on the Island of Kauai, Mālaekahana State Recreation Area was selected on the north shore of the Island of Oahu, Sand Island State Recreation Area was selected on the south shore of the Island of Oahu, Makena State Park was selected on the Island of Maui, Hāpuna Beach State Recreation Area was selected on the Kona coast of the Island of Hawaii.

Hawaii Outdoor Developed Areas Accessibility Guidelines (Guidelines), available from the State of Hawaii Department of Health's website at <http://health.hawaii.gov/dcab> took effect on January 2, 2017. The document sets guidelines for accessibility to camping areas, picnic areas, trails and viewing areas by persons with disabilities at designated facilities of the State of Hawaii and its political subdivisions. According to the Guidelines, beach access routes shall coincide with or be

located in the same area as pedestrian access points to the beach, where “beach access route” is defined as a continuous, unobstructed path that crosses the surface of the beach that allows pedestrians to participate in beach related activities.

### Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could impact the future provision of public access to coastal areas of recreational, historical, aesthetic, ecological, or cultural value.

#### Significant Changes in Public Access Management

| Management Category   | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|---|---|--|--|
| Statutes, regulations, policies, or case law interpreting these | Y                                       | N  | N  |
| Operation/maintenance of existing facilities                    | Y                                       | N  | N  |
| Acquisition/enhancement programs                                | Y                                       | N  | N  |

The Hawaii Supreme Court on August 25, 2017 rejected a request by Waikiki apartment and condominium owners to order the State of Hawaii to pay for repairs to a damaged seawall, or for the owners’ attorney fees after 10 years of litigation. The decision by the Hawaii Supreme Court on August 25, 2017 ends the case.

Almost a century ago, unknown private parties built a seawall on the makai boundary of private property fronting Diamond Head of Oahu to protect their property from high waves and erosion. Since then, the seawall has been all but abandoned by the property owners, used by the public as a path to access the beach, shoreline and ocean along the Waikiki coastline, and infrequently repaired by the State.

The case, *Gold Coast Neighborhood Association v. State of Hawaii*, was initiated in 2007 by private individuals owning property situated on what is known as the “Gold Coast” on Oahu.

According to the decision of the Hawaii Supreme Court, the seawall can only be dedicated to the State by fulfilling the requirements of HRS § 264-1(c)(1). In this case, there is nothing in the record to indicate that there was a deed of conveyance naming the State as a grantee for the disputed portions of the seawall. Therefore, the seawall was not dedicated to the State under the requirements of HRS § 264-1(c)(1). According to the Hawaii Supreme Court, the “Gold Coast” seawall continues to serve the original purpose of protecting the private property from high waves and erosion, rather than the “preservation of access to Hawaii’s shoreline.” This “Gold Coast” case law closes the door for other private property owners to receive repairs and maintenance from the

State for the miles of seawalls built to protect private oceanfront development. The State will repair seawalls if and only money to do so is appropriated by the state legislature and allocated by the governor.

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
  - a. Describe the significance of the changes;
  - b. Specify if they were 309 or other CZM-driven changes; and
  - c. Characterize the outcomes or likely future outcomes of the changes.
  - a. Hawaii Supreme Court SCWC-14-0000472, 25-Aug-2017- *Gold Coast Neighborhood Association v. State of Hawaii*, closes the door for other private property owners to receive free services from the State for the miles of seawalls built to protect private oceanfront development.
  - b. The case law was neither 309, nor CZM-driven change.
  - c. End the situation that other private property owners may request for repairs and maintenance from the State for private-owned seawalls that are required to provide public access to beach, shoreline and ocean.
3. Indicate if your state or territory has a publically available public access guide. How current is the publication and how frequently it is updated?<sup>15</sup>

#### Publically Available Access Guide

| Public Access Guide                 | Printed | Online | Mobile App |
|-------------------------------------|---------|--------|------------|
| State or territory has?<br>(Y or N) | N       | N      | N          |
| Web address<br>(if applicable)      | N/A     | N/A    | N/A        |
| Date of last update                 | N/A     | N/A    | N/A        |
| Frequency of update                 | N/A     | N/A    | N/A        |

There is no publicly available public access guide for the State of Hawaii; however, individual state and county agencies with responsibilities related to public access, as well as non-government organizations, have produced or are in the process of developing public access guides and/or websites.

The following represents a non-exhaustive list of the most current references:

#### DLNR – Division of State Parks

- a. Website: [www.hawaiistateparks.org](http://www.hawaiistateparks.org)

<sup>15</sup> Note some states may have regional or local guides in addition to state public access guides. Unless you want to list all local guides as well, there is no need to list additional guides beyond the state access guide. You may choose to note that the local guides do exist and may provide additional information that expands upon the state guides.

- b. Hawaii State Parks: A Visitor’s Guide to Park Resources and Recreational Opportunities – Available at  
<https://dlnr.hawaii.gov/dsp/files/2019/04/2017-Parks-Brochure.pdf>

**DLNR** – Division of Forestry and Wildlife, Na Ala Hele Hawaii Trail and Access System

1. Website: <https://hawaiitrails.hawaii.gov/trails/#/>

#### County of Hawaii

- a. Shoreline Public Access Ways – Available at  
<http://www.hawaiicounty.gov/pl-shoreline-access-big-island>

#### County of Maui

- a. Shoreline Access Inventory – Available at (not available at this time, currently in final production)
- b. West Maui Beach Access Project – Available at  
<http://westmauibeachaccess.org/>

#### County of Kauai

3. Kauai Beaches – Available at  
<http://www.kauai.com/beaches>

#### City and County of Honolulu

1. Shoreline and Beach Access Points – Available at  
<http://cchnl.maps.arcgis.com/apps/OnePane/gpx/index.html?appid=0389a0d1ba8642af8f82832d0d25fdc0&webmap=bb2692cf44564637b072fcac2a1bf095>

#### University of Hawaii Sea Grant College Program

- a. Coastal Access Website: <http://seagrant.soest.hawaii.edu/coastal-access-in-hawaii/>

#### Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

|               |                                     |
|---------------|-------------------------------------|
| <b>High</b>   | <input type="checkbox"/>            |
| <b>Medium</b> | <input checked="" type="checkbox"/> |
| <b>Low</b>    | <input type="checkbox"/>            |

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Both the Phase I Assessment and stakeholder survey responses suggest that Public Access is a medium priority. In a prior A&S Cycle, the Hawaii CZM Program has completed and published the study to adopt alternative financing mechanisms for the acquisition, improvement, and

maintenance of shoreline public access. Each county has their individual mechanism to address site-specific beach access. For example, the Honolulu City Council has approved Resolution 18-263 to initiate a condemnation action to acquire an easement for a long-discussed public beach right of way to the ocean in East Honolulu's upscale Portlock Road area.

Consequently, the HCZMP has decided to rank the Public Access enhancement area as a "Medium" priority and will not be conducting a Phase II Assessment or developing a strategy for Public Access at this time.

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing public access strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

#### **CZMA Performance Measurement System Data**

Annual CZMA performance measurement data for public access. The online database can be used to synthesize existing state or territory data reported during the assessment period.

*Geographic Scope:* All coastal states and territories

*Website:* [www.coast.noaa.gov/czmppm/Login.aspx?ReturnUrl=%2fczmppm%2f](http://www.coast.noaa.gov/czmppm/Login.aspx?ReturnUrl=%2fczmppm%2f)

#### **National Survey on Fishing, Hunting, and Wildlife Associated Recreation**

The U.S. Census partners with the U.S. Fish and Wildlife Service to present information on individuals involved in fishing, hunting, and other wildlife-associated recreation, such as wildlife observation, photography, and feeding. Data include states in which these activities occurred; number of trips taken; days of participation; and expenditures for food, lodging, transportation, and equipment. While not focused on coastal areas, the reports do include information on saltwater and Great Lakes fishing and some coastal wildlife viewing. The 2016 reports compare 2016 data to 2011, 2006 and 2001 survey results to inform understanding of how usage has changed.

*Geographic Scope:* All states (territories not included)

*Website:* [www.wsfprprograms.fws.gov/subpages/nationalsurvey/national\\_survey.htm](http://www.wsfprprograms.fws.gov/subpages/nationalsurvey/national_survey.htm)

#### **Statewide Comprehensive Outdoor Recreation Plans**

Most states regularly develop Statewide Comprehensive Outdoor Recreation Plans (SCORPs). While each SCORP varies by state, at a minimum, the plan must (1) identify outdoor recreation issues of statewide importance; (2) evaluate demand, i.e., public outdoor recreation preferences; and (3) evaluate the supply of outdoor recreation resources and facilities.

*Geographic Scope:* All states (territories not included)

*Website:* [www.recpro.org/scorp-library](http://www.recpro.org/scorp-library)

## Marine Debris

**Section 309 Enhancement Objective:** Reducing marine debris entering the Nation’s coastal and ocean environment by managing uses and activities that contribute to the entry of such debris. §309(a)(4)

**Phase I (High-level) Assessment:** *(Must be completed by all states.)*

*Purpose: To quickly determine whether or not marine debris is a priority enhancement objective for the CMP that warrants a more in-depth assessment to understand key problems and opportunities that exist for program enhancement as well as the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. In the table below, characterize the existing status and trends of marine debris in the state’s coastal zone based on the best available data.

| Source of Marine Debris                                      | Existing Status and Trends of Marine Debris in Coastal Zone |   |   |
|--|---|---|---|
|  | Significance of Source<br>(H, M, L, unknwn)                 | Type of Impact <sup>16</sup><br>(aesthetic, resource damage, user conflicts, other) | Change Since Last Assessment<br>(↑, ↓, -, unknwn) |
| <i>Land-based</i>  |   |   |   |
| Beach/shore litter   | M   | aesthetic, resource damage, other   | -   |
| Dumping  | M   | aesthetic, resource damage, other   | -   |
| Storm drains and runoff                                      | M   | aesthetic, resource damage, other   | -   |
| Fishing (e.g., fishing line, gear)                           | H   | aesthetic, resource damage, user conflicts  | -   |
| Other (please specify)<br>Plastics marine debris             | H   | aesthetic, resource damage  | -   |
| <i>Ocean-based</i>   |   |   |   |
| Fishing (e.g., derelict fishing gear)                        | H   | resource damage, user conflicts, other  | -   |
| Derelict vessels   | H   | resource damage, other  | -   |
| Vessel-based (e.g., cruise ship, cargo ship, general vessel) | M   | aesthetic, resource damage  | -   |
| Hurricane/Storm  | M   | aesthetic, resource damage, other   | -   |
| Tsunami  | M   | aesthetic, resource damage, other   | Y   |
| Other (please specify)                                       | N/A   | N/A   |   |

Source: NOAA Marine Debris Program, Pacific Islands Marine Debris Regional Coordinator

2. If available, briefly list and summarize the results of any additional state or territory-specific data or reports on the status and trends or potential impacts from marine debris in the coastal zone since

<sup>16</sup> You can select more than one, if applicable.

the last assessment.

**Hawaii Marine Debris Action Plan 2018-2020**

The 2018 Hawaii Marine Debris Action Plan (HI-MDAP) establishes a comprehensive framework for strategic action to reduce the ecological, health and safety, and economic impacts of marine debris in Hawaii by 2020. The HI-MDAP was built on the significant ongoing and past efforts of Hawaii’s marine debris community. The National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program (MDP) and the U.S. Environmental Protection Agency (EPA) facilitated the development of the HI-MDAP with active participation and input from Hawaii’s marine debris community, from government agencies, nongovernmental organizations, academic institutions, and private entities.

Action plans for the HI-MDAP are updated every two years focusing on activities continue or establish new actions for the Hawaii Marine Debris community to accomplish. The 2018-2020 HI-MDAP continues with planned activity focused on the mainstays of the NOAA Marine Debris Program which are the reduction of sources through prevention; support and sustain marine debris removal; increase the capacity of prevention and removal of derelict ocean vessels; and carry out high quality research.

**Honolulu Strategy**

The Honolulu Strategy began in March of 2011 as the representatives of the marine debris community were brought together for the Fifth International Marine Debris Conference. One of the major outcomes was the formation of the “Honolulu Strategy.” The Honolulu Strategy was, and continues to be, a global framework for prevention and management of marine debris that was developed with scientists, practitioners, managers, and private sectors on a global scale. Rather than superseding any state or local management actions towards addressing marine debris, the Honolulu Strategy “provides a focal point for improved collaboration and coordination amount the multitude of stakeholders across the globe concerned with marine debris.” It emphasizes the need for participation and support on multiple levels for successful implementation of the strategy. The 2018-2020 HI-MDAP goals and strategies continue to align with the Honolulu Strategy in order to allow for a simpler planning and progress tracking process.

The goals of the Honolulu Strategy continue to be pursued during this reporting period. These goals include: 1) the reduction of land-based sources of marine debris introduced into the sea; 2) reduced the amount and impact of sea-based sources of marine debris; and 3) reduced amount and impact of accumulated debris on shorelines, benthic habitats, and pelagic waters.

**Management Characterization:**

1. Indicate if the approach is employed by the state or territory if there have been any significant state or territory-level management changes (positive or negative) for how marine debris is managed in the coastal zone.

| Management Category | Employed by State/Territory<br>(Y or N) | CMP Provides Assistance to Locals that Employ<br>(Y or N) | Significant Changes Since Last Assessment<br>(Y or N) |
|---------------------|---|---|---|
|---------------------|---|---|---|

|   |   |   |   |
|---|---|---|---|
| Marine debris statutes, regulations, policies, or case law interpreting these | Y | N | Y |
| Marine debris removal programs  | Y | N | N |

2. For any management categories with significant changes briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
- Describe the significance of the change;
  - Specify if it was a 309 or other CZM-driven change; and
  - Characterize the outcomes and/or likely future outcomes of the change(s).

Hawaii does not have a state-level marine debris removal program. Rather, agencies work to reduce the amount of marine debris based on their respective functional areas. Removal actions are often coordinated with community groups who share common goals of beach clean-up and restoration priorities. Goals and current actions aimed at reducing marine debris in Hawaiian waters, as listed in the HI-MDAP, are described below.

#### **Abandoned and Derelict Vessels**

- In an ongoing effort by the Department of Land and Natural Resources – Division of Boating and Ocean Recreation (DLNR-DOBOR), one of its chief goals is to increase capacity to address abandoned and derelict vessels in State water. HI-MDAP 2018 Report presented three ongoing strategies on this: 1) Preventing and identification of abandoned and derelict vessels (ADVs). DLNR-DOBOR is working on draft legislation to apply mandatory insurance to all ocean vessels required to register with the State or documented by the U.S. Coast Guard. 2) Effectively respond to ADVS. DLNR-DOBOR is seeking methods to make disposal options for ADVs publicly available. Additionally, as specified in the HI-MDAP, interagency coordination for addressing ADVs should be strengthened, and to maintain an ADV inventory for difficult to access coastlines. 3) Develop sustainable funding mechanisms and resources for vessel removal and disposal. DLNR-DOBOR is evaluating a rule/amendment to charge a disposal fee for boats at the time of vessel transfer or first-time registration to establish a response fund to remove ADVs.
- This was not a 309 or CZM-driven change.
- The preventative measures and enforcement methods are expected to reduce the amount of abandoned and derelict vessels. Scientific inquiry will assist with monitoring and gauging the effectiveness of marine debris removal activities.

#### **Conducting Research to Better Understand Marine Debris and its Impact**

- The strategies aimed at research of marine debris enumerated in the HI-MDAP include: 1) research on physical and chemical traits, transport, quantity, impacts and accumulation rates. Actions intended to fulfill this strategy include identify research priorities through collaborative workshops, assessing research capacity, and explore funding opportunities for marine debris research. 2) Development and standardization of laboratory methods. 3) Assessment on the impacts of marine debris on the environment. 4) research on the economic impacts of marine debris. 5) Evaluating the effectiveness of mitigation, outreach, and removal efforts. 6) Support communication and collaboration, compiling of data, and data sharing of scientific findings.

- 2. This was not a 309 or CZM-driven change.
- 3. Scientific inquiry and research methodology will aide in the monitoring of marine debris and its movement throughout the pacific region, and research will help agencies gauge the effectiveness of marine debris removal activities.

**Creation and enforcement of laws reducing local sources of Marine Debris.**

- a. **Ban on one time use plastics.** Since July 1, 2015, all four of the counties that make up the State of Hawaii adopted plastic bag ordinances that reduce and/or ban the use of single-use checkout bags in retail outlets. Exceptions were made for restaurants, and grocery produce where viable options were limited.

Plastic bags that are thicker and more durable, or paper bags made of recycled material, were exempted from the one time use ban, as they could be reused. Retailers were permitted to distribute them by charging users a fee. These actions have reduced the amount of waste that find their way into the marine environment and into municipal landfills.

On July 1, 2019, Act 254, SLH 2019 Legislature, was enacted. This Act creates a plastic source reduction working group that will be composed of 14 members who will make recommendations on how to best phase out single-use plastics (drinking straws, beverage containers, utensils, and polystyrene foam containers), promote reuse, and find sustainable alternatives for packaging.

- b. These were not 309 or CZM-driven changes.
- c. The move to ban one-time use plastics and packaging is expected to reduce the amount of plastics released into the environment that contribute to marine debris, reduce the stress on municipal landfills, and the reduction of plastics may limit injuries and the deaths of marine life and birds from harmful marine debris.

**Enhancement Area Prioritization:**

- 1. What level of priority is the enhancement area for the coastal management program?

|               |              |
|---------------|--------------|
| <b>High</b>   | _____        |
| <b>Medium</b> | _____        |
| <b>Low</b>    | <u>  X  </u> |

- 2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

NOAA Marine Debris Program is the lead agency for the coordination of multi-agency partners to provide support for marine debris related projects, activities, and actions in the Pacific Island Region. The agency works with state, federal, and non-profits to coordinate activities within the State to reduce the amount of marine debris from both land-based and marine sources.

The CMP defers actions related to marine debris to those agencies with direct authority and resources to address this enhancement area and continues to partner through supporting roles and participation in MDAP planning and strategic activities. Marine debris is also addressed as a part of the State’s Ocean Resources Management Plan (ORMP).

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment and/or developing marine debris strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

### **CZMA Performance Measures**

Annual CZMA performance measurement data is used to evaluate progress in meeting national goals. Annual performance goals cover five categories: coastal habitat, coastal hazards, coastal community development, public access, and coordination and public involvement. Marine debris removal actions fall under the Coastal Habitats.

*Geographic Scope:* All coastal states and territories.

*Weblink:* <https://coast.noaa.gov/czm/performance/>

### **NOAA Marine Debris Program**

The NOAA Marine Debris Program supports national and international efforts to research, prevent, and reduce the impacts of marine debris. The program coordinates and supports marine debris activities within NOAA and with other federal agencies and uses partnerships to support projects carried out by state and local agencies, tribes, non-governmental organizations, academia, and industry. The program provide also provides funding opportunities for projects that address marine debris.

*Geographic Coverage:* National and international

*Weblink:* <http://marinedebris.noaa.gov/>

### **Australia’s Commonwealth Scientific and Industrial Research Organization (CSIRO)**

This project summary details the results of a rigorous analysis of the NOAA Marine Debris Program’s Marine Debris Monitoring and Assessment Project (MDMAP) dataset and the Ocean Conservancy’s International Coastal Cleanup dataset. This study was funded by the NOAA Marine Debris Program and led by the Ocean Conservancy (OC) and the Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia. This project used a statistical model to identify geographic patterns and trends in marine debris distribution, assess marine debris management actions, and produce recommendations to improve marine debris monitoring protocols in the US. From this in-depth analysis. Analysis of NOAA’s data indicated that container deposit legislation for plastic bottles in Hawaii, Oregon, and California was effective in reducing the number of plastic bottles found on the shorelines of those states. Links to baseline estimates of US marine debris data can be found on the NOAA Marine Debris Program website.

*Geographic Coverage:*

*Weblink:* <https://marinedebris.noaa.gov/reports/analysis-marine-debris-us>

### **West Coast Governors Alliance on Ocean Health - Marine Debris Database**

The West Coast Marine Debris Database provides comprehensive access to information on West Coast marine debris including beach cleanups and derelict gear removal.

*Geographic Coverage:* Washington, Oregon, and California

*Weblink:* <http://debris.westcoastoceans.org/>

## ***Cumulative and Secondary Impacts***

**Section 309 Enhancement Objective:** Development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources. §309(a)(5)

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

- Using National Ocean Economics Program Data on population and housing,<sup>17</sup> please indicate the change in population and housing units in the state’s coastal counties between 2012 and 2017. You may wish to add additional trend comparisons to look at longer time horizons as well (data available back to 1970), but at a minimum, please show change over the most recent five-year period data is available (2012-2017) to approximate current assessment period.

**Trends in Coastal Population and Housing Units**

|                         | 2012      | 2017      | Percent Change<br>(2012-2017) |
|-------------------------|-----------|-----------|-------------------------------|
| Number of people        | 1,394,905 | 1,424,203 | 2.10%                         |
| Number of housing units | 525,678   | 542,853   | 3.27%                         |

- Using provided reports from NOAA’s Land Cover Atlas,<sup>18</sup> please indicate the status and trends for various land uses in the state’s coastal counties between 1996 and 2016. You may use other information and include graphs and figures, as appropriate, to help illustrate the information. Note that the data available for the islands may be for a different time frame than the time periods reflected below. In that case, please specify the time period that the data represent. Also note that Puerto Rico currently only has data for one time point so will not be able to report trend data. Instead, Puerto Rico should just report current land use cover for developed areas and impervious surfaces.

<sup>17</sup>[www.oceaneconomics.org/Demographics/PHresults.aspx](http://www.oceaneconomics.org/Demographics/PHresults.aspx). Enter “Population and Housing” section and select “Data Search” (near the top of the left sidebar). From the drop-down boxes, select your state, and “all counties.” Select the year (2012) and the year to compare it to (2017). Then select “coastal zone counties.”

<sup>18</sup>[www.coast.noaa.gov/digitalcoast/tools/lca.html](http://www.coast.noaa.gov/digitalcoast/tools/lca.html). Note that the 2016 data will not be available for all states until later Summer 2019. NOAA OCM will be providing summary reports compiling each state’s coastal county data. The reports will be available after all of the 2016 data is available.

**Distribution of Land Cover Types in Coastal Counties**

| Land Cover Type           | Land Area Coverage in <b>2016-2011</b><br>(Acres) | Gain/Loss Since <b>1996-2005</b><br>(Acres) |
|---------------------------|---|---|
| Developed, High Intensity | Not available                                     |   |
| Developed, Low Intensity  | Not available                                     |   |
| Developed, Open Space     | 73,292.8  | 3,641.6                                     |
| Grassland                 | 373,753.6   | 18,720.0                                    |
| Scrub/Shrub               | 848,921.6   | -5,228.8                                    |
| Barren Land               | 697,632.0   | 1,606.4                                     |
| Open Water                | 137,939.2   | -992.0                                      |
| Agriculture               | 574,905.6   | -20,537.6                                   |
| Forested                  | 1,284,972.8                                       | -4,326.4                                    |
| Woody Wetland             | 113,081.6   | 12.8  |
| Emergent Wetland          | 7,955.2   | 192.0                                       |

Coastal counties: Islands of Hawaii, Kauai, Maui, Oahu, Molokai, Lanai and Niihau; No new data available from 1996 to 2016.

3. Using provided reports from NOAA's Land Cover Atlas,<sup>19</sup> please indicate the status and trends for developed areas in the state's coastal counties between 1996 and 2016 in the two tables below. You may use other information and include graphs and figures, as appropriate, to help illustrate the information. Note that the data available for the islands may be for a different time frame than the time periods reflected below. In that case, please specify the time period the data represents. Also note that Puerto Rico currently only has data for one time point so will not be able to report trend data. Unless Puerto Rico has similar trend data to report on changes in land use type, it should just report current land use cover for developed areas and impervious surfaces.

**Development Status and Trends for Coastal Counties**

|                                 | <b>1996-2005</b> | <b>2016-2011</b> | <b>Percent Net Change</b> |
|---------------------------------|------------------|------------------|---------------------------|
| Percent land area developed     | 4.06%            | 4.31%            | 0.25%                     |
| Percent impervious surface area | 2.59%            | 2.77%            | 0.17%                     |

\* Note: Islands likely have data for another time period and may only have one time interval to report. If so, only report the change in development and impervious surface area for the time period for which data are available. Puerto Rico does not need to report trend data.

Coastal counties: Islands of Hawaii, Kauai, Maui, Oahu, Molokai, Lanai and Niihau; No new data available from 1996 to 2016.

<sup>19</sup>[www.coast.noaa.gov/digitalcoast/tools/lca.html](http://www.coast.noaa.gov/digitalcoast/tools/lca.html). Note that the 2016 data will not be available for all states until later Summer 2019. NOAA OCM will be providing summary reports compiling each state's coastal county data. The reports will be available after all of the 2016 data is available.

### How Land Use Is Changing in Coastal Counties

| Land Cover Type  | Areas Lost to Development Between <del>1996-2016</del> 2005-2011 (Acres) |
|------------------|--|
| Barren Land      | 2,937.6  |
| Emergent Wetland | 19.2   |
| Woody Wetland    | 6.4  |
| Open Water       | 19.2   |
| Agriculture      | 1,721.6  |
| Scrub/Shrub      | 2,547.2  |
| Grassland        | 2,764.8  |
| Forested         | 3,078.4  |

*\* Note: Islands likely have data for another time period and may only have one time interval to report. If so, only report the change in land use for the time period for which high-resolution C-CAP data are available. Puerto Rico and the Northern Mariana Islands do not report.*

*Coastal counties: Islands of Hawaii, Kauai, Maui, Oahu, Molokai, Lanai and Niihau; No new data available from 1996 to 2016.*

- Briefly characterize how the coastal shoreline has changed in the past five years due to development, including potential changes to shoreline structures such as groins, bulkheads and other shoreline stabilization structures, and docks and piers. If available, include quantitative data that may be available from permitting databases or other resources about changes in shoreline structures.

As the result of chronic and episodic erosion, on Oahu, 27 percent (29 km) of the shoreline has been armored to stabilize the shoreline. On Maui, 15.6 of 56 miles of Maui's shoreline surveyed in 2003 (County of Maui Department of Planning 2003) were identified as hardened. To protect the shoreline and reduce the risk of coastal hazards, the County of Kauai has increased the requirements of shoreline setbacks for various lot depths from a minimum of 40 feet to a minimum of 60 feet by amending the county shoreline rules. Within the shoreline area, structures are prohibited without a variance. According to the semi-annual reports submitted to the HCZMP by the counties, during the period of 2014 to 2018, only 12 shoreline setback variances were granted in total in the state. Among them, one setback variance was granted by the County of Kauai, 6 variances by the City and County of Honolulu, and 5 variances by the County of Maui.

To encourage the alternatives to shoreline hardening, the state and counties are working on natural-based alternatives such beach nourishment to mitigate coastal erosion impacts. Iroquios Point on Oahu, which was a successful beach restoration project with shoreline stabilization structures (nine T-groins), was completed in 2013. The county of Maui is proposing and working the Kahana Bay Erosion Mitigation Project which aims to devise a regional beach nourishment and restoration approach to provide erosion mitigation at the Bay. In the meantime, the State Department of Land and Natural Resources proposes to reauthorize and extend the small-scale beach nourishment program to streamline permitting requirements for beach restoration projects across the state.

- Briefly summarize the results of any additional state- or territory-specific data or reports on the cumulative and secondary impacts of coastal growth and development, such as water quality, shoreline hardening, and habitat fragmentation, since the last assessment.

There are approximately 88,000 cesspools in the State, with nearly 50,000 located on the Big Island, almost 14,000 on Kauai, over 12,000 on Maui, over 11,000 on Oahu and over 1,400 on Molokai. In 2017, the Hawaii Legislature amended HRS Chapter 342D to require cesspool elimination by 2050. Prior to January 1, 2050, every cesspool in the state, excluding cesspools granted exemptions by the director of health, shall be upgraded or converted to a septic system or aerobic treatment unit system, or connected to a sewerage system. The state offers income tax credits up to \$10,000 for qualified cesspools in designated sensitive areas, such as within 500 feet of a shoreline, perennial stream or wetland, or a source water assessment program area. The State Department of Health (DOH) prepared and submitted a report to 2018 Legislature titled, *Relating to Cesspools and Prioritization for Replacement*. The report identifies 14 areas in the state where an evaluation of data indicates the greatest need for action. The State DOH's top priority areas are upcountry Maui and Oahu's Kahaluu area, where cesspools pose a triple threat: significant risk to human health as well as concerns about drinking water contaminations and draining into sensitive waters.

The State and counties pay increasing attention to the cumulative impacts that may result from developments in the special management area (SMA) designated by the counties under HRS Chapter 205A. The counties deny or revoke piece-by-piece SMA permit applications that attempt to avoid the procedures and requirements of a SMA Major Permit. For example, the City and County of Honolulu revoked three SMA minor permits for each of three subdivided parcels on the North Shore of Oahu. These three SMA minor permits were originally granted in sequence for the same unified project that did not address the issues of potential cumulative impacts from each SMA minor permit application.

In the past five years, all four counties have restricted and limited shoreline hardening structures to protect beach processes. The HCZMP continues providing review and guidance to shoreline hardening projects per the request from the county planning departments. Given that increasing the number and scope of shoreline armoring structures in a region will adversely affect beach processes, and public views to, from, and along the shoreline, it is required to assess the adverse impacts of any proposed shoreline hardening projects on the shoreline areas that are in front of and adjacent to the project area.

**Management Characterization:**

1. Indicate if the approach is employed by the state or territory and if there have been any significant state-level changes (positive or negative) in the development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources, since the last assessment.

**Significant Changes in Management of Cumulative and Secondary Impacts of Development**

| <b>Management Category</b>                                      | <b>Employed by State or Territory<br/>(Y or N)</b> | <b>CMP Provides Assistance to Locals that Employ<br/>(Y or N)</b> | <b>Significant Changes Since Last Assessment<br/>(Y or N)</b> |
|---|--|---|---|
| Statutes, regulations, policies, or case law interpreting these | Y  | Y (SMA)   | N   |
| Guidance documents  | Y  | Y   | Y   |
| Management plans (including SAMPs)                              | Y  | Y (SMA)   | N   |

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;

The State Department of Health updated their implementation plan for polluted runoff control, Hawaii’s Nonpoint Source Management Plan 2015-2020. This updated nonpoint source (NPS) management plan guides the state’s NPS management efforts by establishing goals, objectives, strategies and milestones directed at preventing and reducing NPS pollution and improving water quality. The NPS management plan also advances the state’s efforts to obtain full approval of Hawaii’s Coastal Nonpoint Pollution Control Program (CNPCP). This updated plan sets forth a more coordinated approach among federal, state, and local water quality agencies to implement NPS projects and target pollutants and their sources effectively. Specifically, this plan focuses on establishing partnerships to align goals and leverage resources in three priority watersheds, such as Hanalei Bay, He’eia, and West Maui, to maximize water quality benefits.

b. Specify if they were 309 or other CZM-driven changes; and

The amendment to the Maui stormwater ordinance was a FY 2011-2015, section 309 strategy.

Development of a guidance document and training was a FY2006-2010, Section 309 strategy.

c. Characterize the outcomes or likely future outcomes of the changes.

In collaboration with the HCZMP, the Hawaii Polluted Runoff Control Program administered by the State Department of Health Clean Water Branch, met the conditions for two management measures and an administrative element for the CNPCP. With the guidance from the updated NPS management plan, the State of Hawaii anticipates the following major milestones:

- Implementation of at least 10 Clean Water Act Section 319-funded polluted runoff control projects, including a minimum of three projects implemented through partnerships;
- Approval and implementation of the CNPCP;
- Measurable water quality improvements in at least four NPS-impaired watersheds;
- Prioritization of watersheds to focus the State’s water quality improvement efforts;
- Water quality monitoring and assessment for three new inland waters;
- The State’s first Total Maximum Daily Load implementation (TMDL+) plan;
- Three new watershed-based plans;
- New statewide strategies that address water quality protection and runoff from cesspools, agriculture, and urban areas; and
- Increased coordination among federal, state, and local agencies to control polluted runoff.

The next update of Hawai’i’s NPS Management Plan is scheduled for 2020 and will provide an assessment of this plan’s implementation as well as new objectives, strategies, and milestones for 2020-2025.

**Enhancement Area Prioritization:**

1. What level of priority is the enhancement area for the coastal management program?

|               |   |
|---------------|---|
| <b>High</b>   |   |
| <b>Medium</b> | X |
| <b>Low</b>    |   |

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

As a result of section 309 Assessment and Strategy (2006-2010), the HCZMP has prepared and provided a guidance *Stormwater Impact Assessments: Connecting primary, secondary and cumulative impacts to Hawaii’s Environmental Review Process*. While cumulative and secondary (CSI) impacts continue to be important within the HCZMP, the enhancement area is identified mid-level priority for this strategy period. Results from the stakeholder survey also support this prioritization as it ranked in the middle of the nine enhancement areas.

\*\*\*\*\*

**Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing strategies for cumulative and secondary impacts of development. States likely have other state-specific resources, tools, and data that would be useful as well.*

### NOAA C-CAP Coastal Land Atlas

The online data viewer provides user-friendly access to regional land cover and land cover change information developed through NOAA's Coastal Change Analysis Program (C-CAP). The tool summarizes land use change trends. Users can investigate how land cover changed between 1996, 2001, 2006, 2011, and 2016. Although data are provided by county, NOAA staff members are able to help states easily aggregate county data into statewide summary.

*Geographic Scope:* Contiguous United States and Hawaii

*Website:* [www.coast.noaa.gov/digitalcoast/tools/lca.html](http://www.coast.noaa.gov/digitalcoast/tools/lca.html)

### NOAA Environmental Sensitivity Index Maps

Environmental Sensitivity Index (ESI) maps are designed to provide a concise summary of coastal resources at risk in case of an oil spill or other disaster. They characterize the type of shoreline (armored, vegetated, beach, etc.) and may be useful for resource characterization and assessment. ESI maps are periodically updated on a state-by-state basis, and are generally available in multiple formats (pdf maps, GIS layers, etc.)

*Geographic Scope:* All coastal states and territories

*Website:* [www.response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html](http://www.response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html)

### NOAA Impervious Surface Analysis Tool

The Impervious Surface Analysis Tool (ISAT), a custom suite of easy-to-use scripts for ArcGIS, is used to calculate the percentage of impervious surface area within user-selected geographic areas, such as watersheds, municipalities, and subdivisions. ISAT uses imperviousness values to categorize areas as having good, fair, or poor water quality. A correlation between an increase in impervious surfaces and a decrease in water quality has been well established, and ISAT users may find the information derived from ISAT helpful in predicting how different management scenarios might impact local water quality. The tool **calculates** the percent impervious area and total impervious surface area of each selected polygon, **categorizes** polygons to represent conditions of good, fair, and poor water quality based on calculated imperviousness, and **incorporates** land cover change scenarios to examine how changes influence impervious surfaces. Although it requires desktop GIS and some GIS technical skills, NOAA staff members are able to help states analyze data to support wetlands assessment.

*Geographic Scope:* Appropriate geographic scope should be based upon the resolution and complexity of the data. The tool is built on Esri's ArcGIS, so it will only run as fast as allowed within that software.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/isat.html](http://www.coast.noaa.gov/digitalcoast/tools/isat.html)

### NOAA OpenNSPECT Data

OpenNSPECT is the open-source version of the Nonpoint Source Pollution and Erosion Comparison Tool to investigate potential water quality impacts from development, other land uses, and climate change. OpenNSPECT was designed to be broadly applicable. When applied to coastal and noncoastal areas alike, the tool simulates erosion, pollution, and their accumulation from overland flow. The tool **provides** estimates and maps of surface water runoff volumes, pollutant loads, pollutant concentrations, and total sediment loads, **helps** users identify areas that might benefit from changes to proposed development strategies, and **provides** a means to analyze "what if" land use change scenarios. Although

it requires desktop GIS and some GIS technical skills, NOAA staff members are available to provide technical assistance.

*Geographic Scope:* Appropriate geographic scope should be based upon the resolution and complexity of the data. The tool is a plugin for open-source MapWindow GIS.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/openspect.html](http://www.coast.noaa.gov/digitalcoast/tools/openspect.html)

#### **CZMA Performance Measurement System Data**

Annual CZMA performance measurement data for coastal community development. The online database can be used to synthesize existing state and territory data reported during the assessment period.

*Geographic Scope:* All coastal states and territories

*Website:* [www.coast.noaa.gov/czmpm/Login.aspx?ReturnUrl=%2fczmpm%2f](http://www.coast.noaa.gov/czmpm/Login.aspx?ReturnUrl=%2fczmpm%2f)

## ***Special Area Management Planning***

**Section 309 Enhancement Objective:** Preparing and implementing special area management plans for important coastal areas. §309(a)(6)

The Coastal Zone Management Act defines a special area management plan (SAMP) as “a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone. In addition, SAMPs provide for increased specificity in protecting natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making.”

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states and territories.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a SAMP. This can include areas that are already covered by a SAMP but where new issues or conflicts have emerged that are not addressed through the current SAMP.

The Hawaii CZM Program has designated the following areas for Special Area Management Planning: Community Development Districts; Natural Area Reserves; Marine Life Conservation Districts; National Estuarine Research Reserves (NERR); Wildlife Sanctuaries; and Shoreline Setback Areas.

| <b>Geographic Area</b> | <b>Opportunities for New or Updated Special Area Management Plans</b><br>Major conflicts/issues |
|------------------------|---|
| Heeia, Oahu            | Heeia NERR Management Plan finalized December 2016  |
| Heeia, Oahu            | Heeia NERR designated January 19, 2017  |

2. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of SAMPs since the last assessment.

#### Community Development Districts

Community Development Districts (CDD) are areas designated by the Hawaii state legislature that need the support of alternative methods for managing and financing development actions required to support the overall community development. The Hawaii Community Development Authority (HCDA) develops plans for community development and manages the CDDs. CDDs are designated by Hawaii Revised Statutes (HRS) Chapter 206E. Presently there are three CDDs: Kakaako, Kalaeloa, and Heeia, all on Oahu.

<http://dbedt.hawaii.gov/hcda/>

#### Natural Area Reserves

Hawaii possesses unique natural resources, such as geological and volcanological features and distinctive marine and terrestrial plants and animals, many of which occur nowhere else in the world, and are highly vulnerable to loss by the growth of population and technology. Therefore, the Hawaii state legislature established the statewide Natural Area Reserves System (NARS) to preserve in perpetuity specific land and water areas which support communities, as relatively unmodified as possible, of the natural flora and fauna, as well as geological sites, of Hawaii. (HRS Chapter 195) The Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife, manages the 21 reserves on five islands, encompassing 123,810 acres of the State's most unique ecosystems. Since the last Section 309 assessment, the Kaluanui Natural Area Reserve (378 acres) on Maui was added to the NARS in 2014.

<https://dlnr.hawaii.gov/ecosystems/nars/>

#### Marine Life Conservation Districts

Marine Life Conservation Districts (MLCD) are designed to conserve and replenish marine resources. One of Hawaii's natural treasures is the wide variety of marine fishes that occur in the nearshore waters. Over 400 species of inshore and reef fishes inhabit Hawaii's coastal waters, which feature a number of different habitats, each with its own characteristic marine life. MLCDs allow only limited fishing and other consumptive uses, or prohibit these uses entirely. They provide fish and other aquatic life with a protected area in which to grow and reproduce. MLCDs are established by the DLNR, as authorized by HRS Chapter 190. Currently, there are 11 MLCDs, located on four islands.

<https://dlnr.hawaii.gov/dar/marine-managed-areas/hawaii-marine-life-conservation-districts/>

#### Wildlife Sanctuaries

The DLNR establishes wildlife sanctuaries, under the authority of HRS Chapter 183D and Chapter 195D, for the purpose of conservation, management, and protection of indigenous wildlife and their habitats. The DLNR Division of Forestry and Wildlife manages the State Wildlife Sanctuaries. A list of all the wildlife sanctuaries in Hawaii is contained in the administrative rules:

<http://files.hawaii.gov/dlnr/dofaw/rules/Chap126.pdf>

### Shoreline Setback Areas

The shoreline setback area is an area established by HRS Chapter 205A Coastal Zone Management to be not less than twenty feet and not more than forty feet inland from the shoreline to ensure the protection of shoreline areas and shoreline processes. HRS Chapter 205A also allows the counties to require shoreline setbacks greater than the distance established by the statute.

All four counties, Hawaii, Kauai, Maui and Oahu, have or are currently considering progressing from the original static shoreline setback of 40-feet that was established by HRS Chapter 205A and adopting erosion-based shoreline setbacks. In December 2014 the County of Kauai amended its Shoreline Setback Area regulations to incorporate erosion rate-based setbacks. The County of Kauai joins the County of Maui in progressing to erosion-based setbacks.

### Estuarine Reserves

The Heeia NERR on Oahu, was designated by NOAA as an estuarine reserve on January 19, 2017, becoming the 29<sup>th</sup> and newest reserve. The National Estuarine Research Reserve System (NERRS) is a network of 29 reserves, with Hawaii being the sole representative of the Pacific biogeographic region in the network. Established by the Coastal Zone Management Act of 1972, the NERRS is a partnership between the National Oceanic and Atmospheric Administration and coastal states. In 2012 the Governor of Hawaii initiated the process of establishing an estuarine research reserve in the state by designating the Office of Planning's Coastal Zone Management Program as the lead for the site selection process in the state. In December 2016 the Hawaii CZM Program finalized the Heeia NERR Management Plan 2016 - 2021. The NERRS site proposal process is documented on the Hawaii CZM Program web site: <https://planning.hawaii.gov/czm/initiatives/nerrs-site-proposal-process/>

### **Management Characterization:**

1. Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could help prepare and implement SAMPs in the coastal zone.

### **Significant Changes in Special Area Management Planning**

| <b>Management Category</b>                    | <b>Employed by State or Territory<br/>(Y or N)</b> | <b>CMP Provides Assistance to Locals that Employ<br/>(Y or N)</b> | <b>Significant Changes Since Last Assessment<br/>(Y or N)</b> |
|---|--|---|---|
| SAMP policies, or case law interpreting these | Y  | N   | N   |
| SAMP plans                                    | Y  | N   | Y   |

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
  - a. Describe the significance of the changes;
  - b. Specify if they were 309 or other CZM-driven changes; and
  - c. Characterize the outcomes or likely future outcomes of the changes.

Kaluanui Natural Area Reserve

- a. In 2014, the Natural Area Reserves System added the 378-acre Kaluanui Natural Area Reserve on Oahu, which brings the number of reserves to 21, encompassing 123,810 acres of the State's most unique ecosystems.
- b. This initiative is driven by non-CZM efforts.

National Estuarine Research Reserve System - Heeia

- a. The Office of Planning, Hawaii CZM Program coordinated the nomination and designation of the Heeia National Estuarine Research Reserve. The Office of Planning developed and finalized in December 2016 the Heeia NERR Management Plan 2016 - 2021. The Heeia NERR was designated by NOAA as an estuarine reserve on January 19, 2017, becoming the 29<sup>th</sup> and newest reserve.
- b. This initiative is CZM-driven and will serve as living laboratory for those who study coastal ecosystems.
- c. The Heeia NERR is the sole representative of the Pacific biogeographic region in the NERRS network and will enable researchers to better understand the effects of climate change and improve coastal management issues within this area.

Shoreline Setback Area - Kauai Erosion Rate-Based Setbacks

In December 2014 the County of Kauai amended its Shoreline Setback Area regulations to incorporate erosion rate-based setbacks. The County of Kauai joins the County of Maui in progressing to erosion-based setbacks from the original static setback of 40-feet that was established by HRS Chapter 205A Coastal Zone Management.

**Enhancement Area Prioritization:**

1. What level of priority is the enhancement area for the coastal management program?

|               |              |
|---------------|--------------|
| <b>High</b>   | _____        |
| <b>Medium</b> | _____        |
| <b>Low</b>    | <u>  X  </u> |

- 2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

There are government planning and management efforts and activities that are currently ongoing to address the SAMP areas. Significant SAMP planning efforts have been completed, such as the Heeia NERR Management Plan in December 2016.

\*\*\*\*\*

**Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing SAMP strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

Davis, Braxton. 2004. "Regional Planning in the U.S. Coastal Zone: A Comparative Analysis of 15 Special Area Plans." *Ocean and Coastal Management*. Volume 47, Pages 79 to 94.

*Geographic Scope:* National

*Website:* [www.sciencedirect.com/science/article/pii/S0964569104000225](http://www.sciencedirect.com/science/article/pii/S0964569104000225)

## Ocean and Great Lakes Resources

**Section 309 Enhancement Objective:** Planning for the use of ocean [and Great Lakes] resources.  
§309(a)(7)

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states and territories.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW),<sup>20</sup> indicate the status of the ocean and Great Lakes economy as of 2015 (the most recent data) in the tables below. Include graphs and figures, as appropriate, to help illustrate the information. Note ENOW data are not available for the territories. The territories can provide alternative data, if available, or a general narrative, to capture the value of their ocean economy.

**Status of Ocean and Great Lakes Economy for Coastal Counties (2015)**

|                                      | All Ocean Sectors  | Living Resources | Marine Construction | Ship & Boat Building | Marine Transportation | Offshore Mineral Extraction | Tourism & Recreation |
|--------------------------------------|--------------------|------------------|---------------------|----------------------|-----------------------|-----------------------------|----------------------|
| Employment (# of Jobs)               | 116,742            | 2,219            | 1,160               | 5,570                | 4,146                 | 132                         | 103,512              |
| Establishments (# of Establishments) | 4,184              | 123              | 28                  | 23                   | 107                   | 10                          | 3,893                |
| Wages (Millions of Dollars)          | \$4,200,000,000.00 | \$35,900,000.00  | \$117,400,000.00    | \$479,900,000.00     | \$289,400,000.00      | \$13,000,000.00             | \$3,200,000,000.00   |
| GDP (Millions of Dollars)            | \$8,200,000,000.00 | \$89,400,000.00  | \$233,600,000.00    | \$72,800,000.00      | \$649,800,000.00      | \$58,500,000.00             | \$7,000,000,000.00   |

<sup>20</sup>[www.coast.noaa.gov/digitalcoast/tools/enow.html](http://www.coast.noaa.gov/digitalcoast/tools/enow.html). If you select any coastal county for your state, you are directed to various data displays for that county. In the upper left of the screen, click the "State" box, to the left of the county box so that the state name will be highlighted. Now the data will reflect statewide data for all of the state's coastal counties. Make sure "2015" is selected for the year (top right corner). You can then click through the sector types by selecting the icons along the top and the type of economic data (employment, wages, GDP, etc), by clicking through the icons on the left.

**Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2015)<sup>21</sup>**

|                                      | All Ocean Sectors  | Living Resources | Marine Construction | Ship & Boat Building | Marine Transportation | Offshore Mineral Extraction | Tourism & Recreation |
|--------------------------------------|--------------------|------------------|---------------------|----------------------|-----------------------|-----------------------------|----------------------|
| Employment 11(# of Jobs)             | 8,652              | 129              | 629                 | 903                  | -1321                 | -31                         | 8,348                |
| Establishments (# of Establishments) | 425                | -37              | 2                   | 1                    | -2                    | -9                          | 458                  |
| Wages (Millions of Dollars)          | \$1,300,000,000.00 | \$11,600,000.00  | \$83,400,000.00     | \$136,000,000.00     | \$50,000,000.00       | \$1,400,000.00              | \$900,000,000.00     |
| GDP (Millions of Dollars)            | \$2,100,000,000.00 | \$34,400,000.00  | \$162,400,000.00    | \$39,900,000.00      | \$170,600,000.00      | \$39,700,000.00             | \$1,600,000,000.00   |

2. Understanding existing uses within ocean and Great Lakes waters can help reduce use conflicts and minimize threats when planning for ocean and Great Lakes resources. Using Ocean Reports<sup>22</sup>, indicate the number of uses within ocean or Great Lakes waters off of your state. For energy uses (including pipelines and cables, see the “Energy and Government Facility Siting” template following). Add additional lines, as needed, to include additional uses that are important to highlight for your state. Note: The Ocean Reports tool does not include data for the Great Lakes states. Great Lakes states should fill in the table as best they can using other data sources.

| Type of Use                                | Number of Sites |
|--|-----------------|
| Federal sand and gravel leases (Completed) | N/A             |
| Federal sand and gravel leases (Active)    | N/A             |

<sup>21</sup> The trend data is available at the bottom of the page for each sector and type of economic data. Mouse over the data points for 2005 and 2015 to obtain the actual values and determine the change by subtracting 2005 data from 2015.

<sup>22</sup> [www.coast.noaa.gov/digitalcoast/tools/ort.html](http://www.coast.noaa.gov/digitalcoast/tools/ort.html). Go to “Quick Reports” and select the “state waters” option for your state or territory. Some larger states may have the “Quick Reports” for their state waters broken into several different reports. Use the icons on the left hand side to select different categories: general information, energy and minerals, natural resources and conservation, oceanographic and biophysical, transportation and infrastructure, and economics and commerce. Then scroll through each category to find the data to complete the table.

|   |  |
|---|--|
| Federal sand and gravel leases<br><i>(Expired)</i>                                    | N/A  |
| Federal sand and gravel leases<br><i>(Proposed)</i>                                   | N/A  |
| Beach Nourishment Projects  | 10   |
| Ocean Disposal Sites  | 18   |
| Principle Ports<br><i>(Number and Total Tonnage)</i>                                  | 2, Barbers Point Oahu (10,225,588) & Kahului, Maui (3,858,176) |
| Coastal Maintained Channels   | 19   |
| Designated Anchorage Areas  | 28   |
| Danger Zones and Restricted Areas   | 5  |
| Other (please specify)<br><br>Endangered Species Act<br>Critical Habitat Designations | 55.40% Coverage  |

**Uses within Ocean or Great Lakes Waters**

3. In the table below, characterize how the threats to and use conflicts over ocean and Great Lakes resources in the state’s or territory’s coastal zone have changed since the last assessment.

**Significant Changes to Ocean and Great Lakes Resources and Uses**

| Resource/Use   | Change in the Threat to the Resource or Use Conflict Since Last Assessment (↑,↓,-,unkwn) |
|--|--|
| Benthic habitat (including coral reefs)                                | ↑  |
| Living marine resources (fish, shellfish, marine mammals, birds, etc.) | ↑  |
| Sand/gravel  | ↑  |
| Cultural/historic  | -  |
| Other (please specify)   | -  |
| Transportation/navigation  | -  |
| Offshore development <sup>23</sup>                                     | -  |
| Energy production  | -  |
| Fishing (commercial and recreational)                                  | -  |
| Recreation/tourism   | ↑  |
| Sand/gravel extraction   | Unknown  |
| Dredge disposal  | -  |
| Aquaculture  | -  |
| Other (please specify)   |  |

4. For the ocean and Great Lakes resources and uses in the table above that had an increase in threat to the resource or increased use conflict in the state’s or territory’s coastal zone since the last assessment, characterize the major contributors to that increase. Place an “X” in the column if the use or phenomenon is a major contributor to the increase.

**Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources**

|  | Land-based development | Offshore development | Polluted runoff | Invasive species | Fishing (Comm and Rec) | Aquaculture | Recreation | Marine Transportation | Dredging | Sand/Mineral Extraction | Ocean Acidification | Other (Specify)  |
|--|------------------------|----------------------|-----------------|------------------|------------------------|-------------|------------|-----------------------|----------|-------------------------|---------------------|--|
| <i>Example: Living marine resources</i>                                |                        | X                    | X               | X                | X                      | X           |            | X                     | X        |                         |                     |  |
| Benthic habitat (including coral reefs)                                | X                      |                      | X               | X                | X                      |             | X          |                       | X        |                         | X                   |  |
| Living marine resources (fish, shellfish, marine mammals, birds, etc.) | X                      |                      | X               | X                | X                      |             | X          | X                     | X        | X                       | X                   |  |
| Sand/gravel  | X                      |                      |                 |                  |                        |             | X          |                       |          | X                       |                     | Erosion, SLR   |
| Recreation/tourism   |                        |                      |                 |                  |                        |             | X          |                       |          |                         |                     | Natural resource health                                  |
| Sand/gravel extraction   | X                      |                      |                 |                  |                        |             |            |                       |          |                         |                     | Cultural and natural resources, moratorium on extraction |

<sup>23</sup> Offshore development includes underwater cables and pipelines, although any infrastructure specifically associated with the energy industry should be captured under the “energy production” category.

5. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of ocean and Great Lakes resources or threats to those resources since the last assessment to augment the national data sets.

#### Benthic Habitat (including coral reefs)

The 2010 Hawaii Coral Reef Strategy (HCRS) remains the guiding coral reef management document for the State with support from the NOAA Coral Reef Conservation Program. It was updated in 2010 and includes the goals and priority objectives for 2010-2020. The HCRS focuses its strategy on two priority sites in the State in West Maui and in South Kohala, Hawaii. In 2016, the priorities of the document were updated to include:

Objective #1: Reduce key anthropogenic threats to two priority near- shore reef areas by 2015 and five by 2020 using ahupua'a based management 1. Implement pollution control activities

Objective #2: Prevent new AIS introductions and minimize the spread of established AIS populations by 2020

Objective #3: Increase the abundance and average size of ten targeted coral reef fisheries species critical to reef health and ecological function by 2020

Objective #4: Designate a sufficient area of marine waters under effective conservation by 2020 to ensure sustainable and resilient coral reef ecosystems

Objective #5: Reduce anchor damage and trampling of coral reefs through the implementation of no-anchor zones, utilization of day-use mooring buoys and other methods by 2020

Following the 2014-2015 global coral bleaching event, the Coral Bleaching Recovery Plan (2017) was created to, "to identify management interventions most likely to promote coral recovery following the mass bleaching event in Hawai'i, specifically by synthesizing published information and expert opinions relevant to future policy and rulemaking by the Department of Land and Natural Resources (DLNR)". The plan recommends establishing a network of permanent no-take Marine Protected Areas (MPAs) and establishing a network of Herbivore Fishery Management Areas (HFMA) to promote recovery.

#### Living marine resources (fish, shellfish, marine mammals, birds, etc)

##### Reef Fish

Stock Assessment of the Coral Reef Fishes of Hawaii, 2016 (National Oceanic and Atmospheric Administration) states: "Of the 27 assessed species, 11 had median Spawning potential ratios (SPR) values below the minimum 0.30, which is the recommended limit we used as the default metric for overfishing in the current report (Restrepo et al., 1998). By this metric, SPR values lower than 0.30 indicate a stock may be experiencing overfishing (and due to the equilibrium assumption, may also be overfished). Two species had median SPR values close to this limit (< 0.35; Table 5). Surgeonfishes had the most species with low SPR values, while goatfishes generally had higher SPR values. Typically, species with low SPRs were the ones with long lifespan (i.e., surgeonfishes, large parrotfishes, *A. virescens*) or highly targeted (i.e., jacks). Species with shorter lifespans (i.e., goatfishes) fared generally better." The report also indicated that it is "highly likely that segments of fish stocks located around

more heavily populated islands (i.e., Oahu, Maui) face considerably higher fishing pressure than more isolated parts of the Main Hawaiian Islands (MHI). However, it is not entirely clear to what level reef fish populations are connected between islands, in terms of larval exchange and/or adult movement.”

### Shellfish

According to NOAA Fisheries Data, in 2015, commercial fishermen harvested more than 36 million pounds of finfish and shellfish in the Pacific Islands. Shellfish in the Pacific region face threats from harvest, ocean acidification, and habitat loss. Shellfish are cultural, economically, and biologically important to the Pacific region.

### Marine Mammals

The U.S. Pacific Marine Mammal Stock Assessments (2018, Carretta, et al.) provides stock assessments of marine mammals in Hawaii Stock:

ROUGH-TOOTHED DOLPHIN (Not considered strategic under the 1994 amendments to the Marine Mammal Protection Act (MMPA). The status of rough-toothed dolphins in Hawaiian waters relative to optimum sustainable population (OSP) is unknown, and there are insufficient data to evaluate trends in abundance.)

RISSE'S DOLPHIN (Not considered strategic under the 1994 amendments to the MMPA. The status of Risso's dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

COMMON BOTTLENOSE DOLPHIN (Stock of bottlenose dolphins is not considered strategic under the 1994 amendments to the MMPA. The status of bottlenose dolphins in the 4-islands waters stock relative to OSP is unknown, and there are insufficient data to evaluate abundance trends.)

PANTROPICAL SPOTTED DOLPHIN (Not considered strategic under the 1994 amendments to the MMPA. The status of spotted dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

SPINNER DOLPHIN (The Oahu/4-Islands stock of spinner dolphins is not considered a strategic stock under the MMPA. The status of Oahu/4-Islands spinner dolphins relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities on spinner dolphins around the main Hawaiian Islands. All Hawaiian spinner dolphin stocks are potentially exposed to high levels of Navy sonar and frequent detonations during training exercises.)

STRIPED DOLPHIN (The Hawaii stock of striped dolphins is not considered strategic under the 1994 amendments to the MMPA. The status of striped dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

FRASER'S DOLPHIN (The Hawaii stock of Fraser's dolphins is not considered strategic under the 1994 amendments to the MMPA. The status of Fraser's dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

MELON-HEADED WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

PYGMY KILLER WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

FALSE KILLER WHALE (The status of MHI insular stock false killer whales relative to OSP is unknown, although this stock appears to have declined during the past two decades insular false killer whales are listed as “endangered” under the Endangered Species Act.)

KILLER WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

SHORT-FINNED PILOT WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

BLAINVILLE'S BEAKED WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

LONGMAN'S BEAKED WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

CUVIER'S BEAKED WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

PYGMY SPERM WHALE (Not considered strategic under the 1994 amendments to the MMPA. The status of this stock relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance.)

SPERM WHALE (The status of sperm whales in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. Sperm whales are formally listed as "endangered" under the Endangered Species Act (ESA), and consequently the Hawaiian stock is automatically considered as a "depleted" and "strategic" stock under the MMPA.)

#### Sand/Sand Extraction

The Coastal Erosion Management Plan, 1999, states, “At visits to selected sites and through the review of beach erosion reports, beach loss or narrowing leading to recreational impacts have been found equaling 15 miles of actual or imminent losses on the other main Hawaiian Islands. Beach loss seriously impacts the visitor economy in Hawaii which in 1997 provided 171,900 jobs in the state, accounted for \$13 billion in tourism expenditures and supported a payroll of \$3.5 billion. Beach narrowing and loss, and shoreline hardening, also severely restrict public access to state conservation lands and natural resources. Public access to beaches and the ocean is a right that is preserved by the State of Hawaii constitution. Beach loss and narrowing, and coastal dune grading that accompanies coastal development causes environmental and ecological damage to natural resources and habitats. Coastal hardening can also produce coastal water quality impacts through increased turbulence and turbidity, and the direct flow of domestic sewage products into coastal waters because of the prevalence of sewage soil filtration (septic and cesspool systems) on shoreline plots. In heavily armored sectors, sand impoundment mauka of walls can lead to general sand volume decreases causing or exacerbating sector-wide erosion trends.” The Hawaii Revised Statutes, § 205A-44 (a) (2013) prohibits “the mining or taking of sand, dead coral or coral rubble, rocks, soil, or other beach or marine deposits from the shoreline area” with some exceptions.

Recreation/Tourism

According to the Hawaii Tourism Authority 2017 Annual Visitor Research Report, 9,404,346 visitors came by air service or by cruise ships to the state in 2017. Tourism is a vital component of Hawaii’s economy, but also contributes to the degradation of the natural environment and declining resident satisfaction with the balance between visitor benefits and drawbacks. The Hawaii Tourism Authority Resident Sentiment Survey, 2017, indicated 63 percent of residents are in agreement that “Tourism has brought more benefits than problems.

**Management Characterization:**

1. Indicate if the approach is employed by the state or territory and if any significant state- or territory-level changes (positive or negative) in the management of ocean and Great Lakes resources have occurred since the last assessment?

**Significant Changes to Management of Ocean and Great Lakes Resources**

| Management Category   | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|---|---|--|--|
| Statutes, regulations, policies, or case law interpreting these | Y                                       | N  | N  |
| Regional comprehensive ocean/Great Lakes management plans       | Y                                       | N  | N  |
| State comprehensive ocean/Great Lakes management plans          | Y                                       | Y  | Y  |
| Single-sector management plans                                  | Y                                       | N  | N  |

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

State comprehensive ocean/Great Lakes management plans

- a. Describe the significance of the changes;

An update of the 2013 Hawaii Ocean Resources Management Plan is currently underway. The plan provides a framework for coordinated efforts with the state, county, federal agencies, and non-profit organizations to manage coastal and marine resources. The 2020 plan update will incorporate community and stakeholder input in establishing several focus areas for the next 5-year planning horizon. The update is also working to enhance the acknowledgement of Traditional Ecological Knowledge within the document and improve utility through narrative and graphic enhancements.

- b. Specify if they were 309 or other CZM-driven changes; and

Yes, this was a CZM-driven change. CZM is currently leading the update, coordination, and implementation of the plan.

- c. Characterize the outcomes or likely future outcomes of the changes.  
Continued implementation of plan metrics and creation of new Hawaii Ocean Resources Management Plan demonstration actions and projects.

3. Indicate if your state or territory has a comprehensive ocean or Great Lakes management plan.

| Comprehensive Ocean/Great Lakes Management Plan       | State Plan  | Regional Plan   |
|---|---|---|
| Completed plan (Y/N) (If yes, specify year completed) | Y,<br>Hawaii Ocean Resources Management Plan (July, 2013)                               | Y,<br>The Pacific Regional Ocean Partnership Action Plan 2014-2016 (May 29, 2014)   |
| Under development (Y/N)                               | Y, 2020 Update in Development   | N   |
| Web address (if available)                            | <a href="http://planning.hawaii.gov/czm/ormp/">http://planning.hawaii.gov/czm/ormp/</a> | <a href="http://www.pacificprop.org/prop/images/content/PROP%20ActionPlan-final-052814.pdf">http://www.pacificprop.org/prop/images/content/PROP%20ActionPlan-final-052814.pdf</a> |
| Area covered by plan                                  | State coastal zone  | Hawaii, American Samoa, Guam, Commonwealth of the Northern Mariana Islands  |

**Enhancement Area Prioritization:**

1. What level of priority is the enhancement area for the coastal management program?

**High**        X    
**Medium**            
**Low**              

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Ocean resources remain a high priority in the HCZMP and are critical to the sustainability of the state of Hawaii. The state’s economic social/cultural and natural vitality depend on ocean resources, and that dependence has risen by almost every measure between 2005 and 2015. Prioritizing uses and reducing conflict between ocean uses remains a critical priority, particularly as environmental degradation as a result of all uses has made itself evident. Recent public outreach (August 2019) included federal, state, and county representatives as well as community members efforts across

the state. Participants expressed particular concern over land-based runoff pressures (sediment, sewage, pollution) and their impacts on coastal resources. The outreach also yielded concerns regarding dependence on ocean shipping, airports, and other coastal infrastructure, and general reliance on outside sources to sustain the needs of the state. Additionally, participants expressed concerns over the number of tourists visiting the state, particularly resulting in damage to facilities and an overall decline in the health of natural resources. Restoration of natural coastal areas was expressed a desire. Reduction in access as a result of coastal erosion and privatization of the coastline is a local concern both for recreation and the practice of cultural heritage. The impact of climate change on all of these factors was also discussed extensively.

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing strategies for ocean and Great Lakes Resources. States likely have other state-specific resources, tools, and data that would be useful as well.*

#### **MarineCadastre.gov Viewer**

This data viewer provides the baseline information needed for ocean planning efforts, particularly those that involve finding the best location for renewable energy projects. Users pick the ocean geography of their choosing and quickly see the applicable jurisdictional boundaries, restricted areas, laws, critical habitat locations, and other important features. With the national viewer, potential conflicts can be identified and avoided early in the planning process, and users can visually analyze and explore geospatial data for marine spatial planning activities and find direct access to authoritative marine cadastral data from federal and state sources.

*Geographic Scope:* National

*Website:* [www.coast.noaa.gov/digitalcoast/tools/mmc.html](http://www.coast.noaa.gov/digitalcoast/tools/mmc.html)

#### **NOAA Coastal County Snapshots: Ocean Jobs**

Provides a snapshot of the economic value of ocean and Great Lakes jobs within a coastal county.

*Geographic Scope:* Coastal states only. Currently not available for territories.

*Website:* [www.coast.noaa.gov/digitalcoast/tools/snapshots.html](http://www.coast.noaa.gov/digitalcoast/tools/snapshots.html)

#### **NOAA Economics: National Ocean Watch Data (ENOW)**

The effective management of coastal resources requires an understanding of the ocean and Great Lakes economy. This tool allows users to interact with ENOW data, which describe six economic sectors that depend on the oceans and Great Lakes: living resources; marine construction; marine transportation; offshore mineral resources; ship and boat building; and tourism and recreation. Users can discover which sectors are the largest in various parts of the county, which sectors are growing and declining, and which account for the most jobs, wages, and gross domestic product. They can view up to four counties, states, or regions to compare trends or the makeup of their ocean and Great Lakes economies. The ENOW Explorer's interface is designed to allow users who are familiar with economic data to interact with and view data and trends. The tool provides the highest level of interaction with ENOW data short of downloading the full data set.

*Geographic Scope:* National and regional

Website: [www.coast.noaa.gov/digitalcoast/tools/enow.html](http://www.coast.noaa.gov/digitalcoast/tools/enow.html)

### **NOAA Essential Fish Habitat Mapper**

The Essential Fish Habitat Mapper is an online tool that displays essential fish habitat, and habitat areas of particular concern, established under provisions in the Magnuson-Stevens Fishery Conservation and Management Act. The tool also includes areas where steps have been taken to minimize the impact that fisheries have on essential fish habitat, including anchoring restrictions, required fishing gear modifications, and bans on certain types of gear. Users can query information from multiple fishery management plans at once to view habitat maps and lists of species for a specific location. The tool displays habitat maps and species lists for specific locations, **queries** spatial information from multiple fishery management plans at once, and **provides** links to text descriptions and data inventories, including related fishery management plans, federal regulations, and data and metadata download.

*Geographic Scope:* National and regional

Website: [www.coast.noaa.gov/digitalcoast/tools/efhmapper.html](http://www.coast.noaa.gov/digitalcoast/tools/efhmapper.html)

### **NOAA Ocean Reports**

Allows users to draw or select an area and get in-depth quick reports of coastal and marine areas for ocean-facing coastal states and territories. The tool includes the following types of information: energy and minerals, natural resources and conservation, transportation and infrastructure, economics and commerce, and others.

*Geographic Scope:* Ocean-facing coastal states and territories (not Great Lakes)

Website: [www.coast.noaa.gov/digitalcoast/tools/ort.html](http://www.coast.noaa.gov/digitalcoast/tools/ort.html)

### **OceanData.gov**

The National Ocean Council's portal for data, information, and decision tools to support people engaged in regional marine planning for the future use of the ocean, coasts, and Great Lakes.

*Geographic Scope:* National and regional

Website: [www.data.gov/ocean/community/ocean](http://www.data.gov/ocean/community/ocean)

### **U.S. Marine Protected Areas Mapping Tool**

The U.S. Marine Protected Areas (MPAs) mapping tool is an online application designed to help users visualize MPA boundaries and provide access to MPA Inventory data. This mapping tool provides data on over 1,600 MPAs nationwide, offering easy access to spatial boundaries, conservation-based classification data, and site management information. Managers, scientists, and the public will find a detailed picture of the type, abundance, and distribution of MPAs throughout the United States, gaining an increased understanding and technical capacity for ocean resource protection, management, and stewardship. The tool **visualizes** patterns and characteristics of MPAs throughout the United States and filters the MPA Inventory in various ways to show only certain MPAs with specific attributes.

*Geographic Scope:* National and regional

Website: [www.coast.noaa.gov/digitalcoast/tools/mpaviewer.html](http://www.coast.noaa.gov/digitalcoast/tools/mpaviewer.html)

## Energy and Government Facility Siting

**Section 309 Enhancement Objective:** Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance. §309(a)(8)24

**Phase I (High-level) Assessment:** *(Must be completed by all states and territories.)*

*Purpose: To quickly determine whether or not energy and Government facilities is a priority enhancement objective for the CMP that warrants a more in-depth assessment. The in-depth assessment would enable CMPs to understand key problems and opportunities that exist for program enhancement as well as the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

- a. In the table below, characterize the status and trends of different types of energy facilities and activities in the state or territory's coastal zone based on best available data. If available, identify the approximate number of facilities by type. The MarineCadastre.gov may be helpful in locating many types of energy facilities in the coastal zone.

| Status and Trends in Energy Facilities and Activities in the Coastal Zone |              |  |                |  |
|---|--------------|--|----------------|--|
| Type of Energy Facility/Activity  | Exists in CZ |  | Proposed in CZ |  |
|   | (# or Y/N)   | Change Since Last Assessment<br>(↑, ↓, -, unkwn) | (# or Y/N)     | Change Since Last Assessment<br>(↑, ↓, -, unkwn) |
| <i>Energy Transport</i>   |              |  |                |  |
| Pipelines <sup>25</sup>   | Y            | -  | N              | -  |
| Electrical grid<br>(transmission cables)                                  | Y            | ↑  | Y              | ↑  |
| Ports   | Y            | -  | N              | -  |
| LNG <sup>26</sup>   | N            | -  | N              | -  |
| Other (please specify)  |              |  |                |  |
| <i>Energy Facilities</i>  |              |  |                |  |
| Oil and gas   | Y            | -  | N              | -  |
| Coal  | Y            | -  | N              | -  |
| Nuclear <sup>27</sup>   | N            | -  | N              | -  |
| Wind  | Y            | ↑  | Y              | ↑  |
| Wave <sup>28</sup>  | Y            | ↑  | Y              | ↑  |
| Tidal <sup>49</sup>   | N            | -  | N              | -  |

<sup>24</sup> CZMA § 309(a)(8) is derived from program approval requirements in CZMA § 306(d)(8), which states:

"The management program provides for adequate consideration of the national interest involved in planning for, and managing the coastal zone, including the siting of facilities such as energy facilities which are of greater than local significance. In the case of energy facilities, the Secretary shall find that the State has given consideration to any applicable national or interstate energy plan or program."

NOAA regulations at 15 C.F.R. § 923.52 further describe what states need to do regarding national interest and consideration of interests that are greater than local interests.

<sup>25</sup> For approved pipelines (1997-present): <http://www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp>

<sup>26</sup> For approved FERC jurisdictional LNG import/export terminals: <http://www.ferc.gov/industries/gas/indus-act/lng/exist-term.asp>

<sup>27</sup> The Nuclear Regulatory Commission provides a coarse national map of where nuclear power reactors are located as well as a list that reflects there general locations: <http://www.nrc.gov/reactors/operating/map-power-reactors.html>

<sup>28</sup> For FERC hydrokinetic projects: <http://www.ferc.gov/industries/hydropower/gen-info/licensing/hydrokinetics.asp>

| <b>Status and Trends in Energy Facilities and Activities in the Coastal Zone</b> |                     |  |                       |  |
|--|---------------------|--|-----------------------|--|
| <b>Type of Energy Facility/Activity</b>  | <b>Exists in CZ</b> |  | <b>Proposed in CZ</b> |  |
|  | <b>(# or Y/N)</b>   | <b>Change Since Last Assessment<br/>(↑, ↓, -, unkwn)</b> | <b>(# or Y/N)</b>     | <b>Change Since Last Assessment<br/>(↑, ↓, -, unkwn)</b> |
| Current (ocean, lake, river) <sup>49</sup>                                       | N                   | -  | N                     | -  |
| Hydropower   | Y                   | -  | N                     | -  |
| OTEC   | Y                   | -  | Y                     | ↑  |
| Solar  | Y                   | ↑  | Y                     | ↑  |
| Biomass  | Y                   | ↑  | Y                     | ↑  |
| Other (please specify):<br>Geothermal  | Y                   | ↑  | Y                     | ↑  |

b. If available, briefly list and summarize the results of any additional state or territory-specific information, data, or reports on the status and trends for energy facilities and activities of greater than local significance in the coastal zone since the last assessment.

Hawaii Revised Statutes (HRS) § 205A-1 defines the coastal zone management (CZM) area as “all lands of the State and the area extending seaward from the shoreline to the limit of the State’s police power and management authority, including the U.S. territorial sea.” Listed below are energy activities/policies of greater than local significance in the coastal zone since the last assessment.

#### Renewable Energy Resources

Pursuant to State of Hawaii Energy policies that potentially affect the coastal zone, Act 97 went into law in 2015, Hawaii became the first state in the nation to enact a renewable portfolio standards (RPS) mandate to generate 100 percent of electricity sales from renewable sources by 2045. Act 97 also set interim RPS targets for 2020 (30 percent), 2030 (40 percent), and 2040 (70 percent). Hawaii has exceeded its 2015 interim RPS of 15 percent by more than 8 percent and is on track to reach its 2020 interim target of 30 percent. To achieve this goal, the State works with county agencies, energy stakeholders, and local communities, as well as energy producers, businesses and organizations interested in renewable energy, and policy makers.

In order to encourage the exploration and development of clean energy resources, the State has developed siting resources that can be applied to energy production facilities that are located within the coastal zone. These include:

#### Renewable Energy Projects Directory

[energy.ehawaii.gov/epd/public/energy-projects-map.html](http://energy.ehawaii.gov/epd/public/energy-projects-map.html)

The Renewable Energy Projects Directory is the only interactive online map managed by the State of Hawaii that identifies all large-scale renewable energy projects and innovative energy projects in Hawaii and distinguishes them by development status: either existing/operational or proposed/under development.

#### Developer & Investor Center and Self-Help Energy Suite

[energy.hawaii.gov/developer-investor](http://energy.hawaii.gov/developer-investor)

The interactive Developer & Investor Center and Self-Help Energy Suite provide comprehensive information on the siting, permitting, and development of renewable energy facilities in Hawaii,

which can be used by project proponents, regulatory agencies, interested communities, and other stakeholders.

#### **Renewable EnerGIS**

[energy.hawaii.gov/resources/renewable-energis-map](http://energy.hawaii.gov/resources/renewable-energis-map)

Renewable EnerGIS provides geographic information system (GIS) data related to the renewable energy resource potential and siting of renewable energy projects at specific sites selected by the user. Developed in partnership with the Hawaii Office of Planning's Statewide GIS Program, EnerGIS supports efficient and low-cost initial project due diligence, which enables more appropriate renewable energy project siting and informed project planning and permitting; thereby decreasing project development timelines, costs, and impacts. By identifying site-specific attributes, EnerGIS informs regulatory agencies and other stakeholders of potential project impacts and permits. Originally built in 2012, HSEO released an upgraded version of EnerGIS on January 8, 2018, including new features, data, and graphics.

#### **Renewable Energy Permitting Wizard**

[wizard.hawaii-cleanenergyinitiative.org/](http://wizard.hawaii-cleanenergyinitiative.org/)

The Renewable Energy Permitting Wizard helps all stakeholders (developers, regulatory agencies, landowners, communities, etc.) understand the county, state, and federal permits that may be required for individual renewable energy projects in Hawaii, including procedures and prerequisites that dictate the sequence of approvals.

#### **e-Permitting Portal (Hawaii Department of Health)**

[eha-cloud.doh.hawaii.gov/epermit/](http://eha-cloud.doh.hawaii.gov/epermit/)

The e-Permitting Portal provides online access to environmental permits administered by the Hawaii Department of Health's Environmental Health Administration (EHA), including land, air, and water permits required for renewable energy and other projects. e-Permitting provides access to environmental permit applications, related instructions and information, and allows for online application compilation and submission, online application fee payment and online submission tracking.

#### **Electronic Permitting and Asset Management (Hawaii Department of Land and Natural Resources)**

[inforps-dp.hawaii.gov/DLNRInvPermitting/#/login](http://inforps-dp.hawaii.gov/DLNRInvPermitting/#/login)

In partnership with the Department of Land and Natural Resources (DLNR), HSEO provided funding support for the development of electronic permitting and asset management systems for three DLNR programs involved in the permitting of renewable energy projects and the management of Hawaii's renewable energy resources: Dams Safety, Geothermal, and Native Invertebrates. These tools are designed to enable DLNR to electronically receive, process, and catalog permits for these programs, as well as electronically inventory and manage assets under their supervision.

#### **Hawaii Climate Change Mitigation and Adaptation Commission**

Act 32 Session Laws of Hawaii (SLH), 2017, amended Hawaii Revised Statutes (HRS) Chapter 225P by renaming the Interagency Climate Adaptation Committee to the "Hawaii Climate Change Mitigation and Adaptation Commission." The State Climate Commission provides direction and facilitation on issues related to climate change mitigation, adaptation strategies to offset impacts from sea level rise (SLR), and provides coordination of SLR related planning amongst federal, state, and county agencies. It also advises governmental and non-governmental entities on issues related to water and agricultural security, and natural resource conservation.

This policy relates indirectly to energy facility siting, as Hawaii shorelines and coastal areas are experiencing a growing vulnerability to shoreline erosion, climate change related storms and natural hazards. Adaptation measures may be necessary to safeguard nearshore energy facilities such as undersea energy cables that connect to energy facilities (e.g., windfarms) located on neighbor island or offshore. SLR impacts affect the placement and repositioning of undersea cables when they make landfall, as well as protecting the nearshore bunkers/connecting relay stations within inundation zones.

c. Briefly characterize the existing status and trends for Government facilities and activities of greater than local significance<sup>29</sup> in the state’s coastal zone since the last assessment.

On June 24, 2016, the Bureau of Ocean Energy Management (BOEM) published a “Call for Information and Nominations” (Call) that sought additional nominations from companies interested in commercial wind energy leases within the Call area offshore of the Hawaiian Islands (specifically the south and northwest coastal areas of Oahu). BOEM also sought public input on the potential for wind development in the Call Area, including comments on site conditions, resources, and existing uses of the area that would be relevant to BOEM’s wind energy development authorization process. Since 2016, there have not been any new developments on this issue.

According to a BOEM publication related to offshore energy development for Oahu titled, “Selected BOEM-Funded Research Informing Renewable Energy Offshore Hawaii, July 2018,” BOEM completed a number of studies during this reporting period on the Hawaii region. These studies examined the Hawaii region’s infrastructure and energy needs, and evaluated topics related to the siting of ocean-based renewable energy facilities. These BOEM sponsored studies included:

Information Synthesis & Socioeconomic Studies

**Determining the Infrastructure Needs to Support Offshore Floating Wind and Marine Hydrokinetic Facilities on the Pacific West Coast and Hawaii (Completed 2016)**

This study by ICF International evaluated the current infrastructure and vessel requirements and capabilities existing on the Pacific West Coast of the U.S. and the Hawaiian Islands of Oahu, Maui, and Kauai to support the burgeoning offshore renewable energy industry. Understanding the infrastructure needs of the offshore renewable industry will help to identify the port-related requirements for offshore floating wind development and marine hydrokinetic industries and assess the utilization of the available marine equipment and facilities along the U.S. West Coast.

Report (BOEM 2016-011): <https://www.boem.gov/ESPIS/5/5503.pdf>

**Floating Offshore Wind in Hawaii: Potential for Jobs and Economic Impacts from Two Future Scenarios (Completed 2016)**

This study by the U.S. Department of Energy/National Renewable Energy Laboratory conducted an analysis of the employment and economic potential for floating offshore wind in Hawaii. The study examined two scenarios: 400 MW of offshore wind installed by 2050 and 800 MW of offshore wind installed by 2050. The results of this analysis can be used to better understand the general scales of economic opportunities that could result from offshore wind development.

---

<sup>29</sup> The CMP should make its own assessment of what Government facilities may be considered “greater than local significance” in their coastal zone but could include military installations or significant federal government complex. An individual federal building may not rise to a level worthy of discussion here beyond a very cursory (if at all) mention).

*Report (BOEM 2016-032): <https://www.boem.gov/2016-032/>*

**Marine Biogeographic Assessment of the Main Hawaiian Islands (Completed 2016)**

This study by the National Oceanic and Atmospheric Administration, working with Hawaiian partners, assembled and synthesized information about physical and biological resources offshore the main Hawaiian Islands, including physical oceanography, bathymetry, marine mammals, seabirds, sea turtles, fish, and corals. The assessment will help to characterize the distribution and abundance of marine resources in state and federal waters, identify knowledge gaps, support spatial planning for development of offshore renewable energy, and contribute to ecosystem-based management of marine resources.

*Project Details: <https://coastalscience.noaa.gov/projects/detail?key=163>*

*Data Products: <https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:155189>*

*Report (BOEM 2016-035): <https://www.boem.gov/ESPIS/5/5555.pdf>*

**Synopsis of Research Programs that can Provide Baseline and Monitoring Information for Offshore Energy Activities in the Pacific Region (Completed 2018)**

This study by the U.S. Geological Survey is identifying ongoing or completed research programs that have produced databases containing information on species and habitats sensitive to offshore energy activities in the Pacific Region. It is evaluating the capability of these programs to provide baseline and monitoring data to understand and mitigate potential impacts of conventional energy development offshore southern California and renewable energy development offshore southern California, Oregon, Washington, and Hawaii.

*Study Profile: <https://www.boem.gov/pr-14-dmi/>*

**Environmental Sensitivity and Associated Risk to Habitats and Species on the Pacific West Coast and Hawaii with Offshore Floating Wind Technologies (Completed 2018)**

This study by ICF International is identifying and characterizing potential impact-causing factors to the marine environment related to offshore floating wind energy development. The study will develop an environmental sensitivity and relative risk model to assess impacts on biological and habitat resources from offshore floating wind technology.

*Study Profile: <https://www.boem.gov/pc-14-05/>*

Cultural & Archaeological Studies

**Maritime Cultural Resources Site Assessment in the Main Hawaiian Islands (Completed 2017)**

This study assessed maritime cultural resources in Hawaii and was a collaborative effort between BOEM, the National Oceanic and Atmospheric Administration, a Native Hawaiian project facilitator, and an inter-island consultative working group made up of representatives from the main Hawaiian Islands. The study developed an inventory of submerged cultural resources on the Hawaii OCS, an inventory of terrestrial historic properties on the eight main Hawaiian Islands that could be within view of offshore renewable energy sites, and a best-practices tool for characterizing Native Hawaiian cultural landscapes. The overarching goal of this effort was to help facilitate federal decision-making processes in support of offshore renewable energy development.

*Study Fact Sheet: <https://www.boem.gov/PC-13-01-Fact-Sheet/>*

*First Report (BOEM 2017-021): <https://www.boem.gov/BOEM-2017-021/>*

*Second Report (BOEM 2017-022): <https://www.boem.gov/BOEM-2017-022/>*

*Third Report (BOEM 2017-023): <https://www.boem.gov/BOEM-2017-023/>*

## Biological Studies

### **Habitat Affinities and At-sea Ranging Behaviors among Main Hawaiian Island Seabirds (Completed 2018)**

This study by the U.S. Geological Survey conducted field studies of at-sea habitat utilization and ranging behaviors for seabirds breeding within the main Hawaiian Islands. It also compiled and analyzed remotely sensed and modeled habitat data to examine habitat relationships to predict species' distributions and improve spatial vulnerability maps. Results will be used by BOEM to assess potential effects of offshore renewable energy development to main Hawaiian Island seabirds.

*Study Profile:* <https://www.boem.gov/pc-13-03/>

*Project News & Maps:* <http://www.werc.usgs.gov/Project.aspx?ProjectID=254>

### **Visual Simulation of Whales and Renewable Energy Moorings and Cables (Completed 2018)**

This study by the U.S. Department of Energy/Pacific Northwest National Laboratory will compile information about whale movements (e.g., dive depths and swimming speed) and create a three-dimensional video animation of how whales may move through a hypothetical offshore floating wind farm. This visual simulation will help characterize the risk of whale encounters with mooring lines and electrical cables used in offshore floating wind projects.

*Study Profile:* <https://www.boem.gov/pr-17-whl/>

### **Pacific Marine Assessment Partnership for Protected Species (Ongoing, to be completed by 2020)**

This study is a partnership between BOEM, the National Marine Fisheries Service, and the U.S. Navy to conduct shipboard surveys of marine mammals, seabirds, and sea turtles in the Pacific. The data collected will help BOEM evaluate potential effects of proposed energy activities on protected species in an ecosystem-level context, including in areas of interest for renewable energy development (California, Oregon, and Hawaii) and for conventional energy decommissioning (California). Surveys of the Hawaiian Islands were conducted in 2017 and surveys of the California Current Ecosystem (Baja California, California, Oregon, and Washington) are scheduled for 2018.

*Study Profile:* <https://www.boem.gov/pc-17-04/>

### **Atlas of Main Hawaiian Island Seabird Colonies (Ongoing, to be completed by 2021)**

This study by the U.S. Geological Survey is developing a comprehensive up-to-date atlas of Hawaiian seabird colonies. It will be used to evaluate threats to colonies and adjacent high-use offshore waters, provide a reference to measure population trends, and best inform place-based conservation and restoration actions.

*Study Profile:* <https://www.boem.gov/pc-17-03/>

## Physical Oceanography & Geology Studies

### **Predicting the Consequences of Wave Energy Absorption from Marine Renewable Energy Facilities on Nearshore Ecosystems (Completed 2018)**

This study by the U.S. Geological Survey (USGS) is developing a statistical model that describes how wave energy may structure nearshore communities. Using 30 years of subtidal survey data from USGS, the National Park Service, and others, this study seeks ecosystem connections between nearshore communities and wave energy dynamics. The model will be used to predict nearshore ecosystem perturbations if wave energy conversion cause changes in modeled hydrodynamics.

*Study Profile:* <https://www.boem.gov/pc-13-05/>

**Management Characterization:**

- a. Indicate if the approach is employed by the state or territory and if significant state or territory-level changes (positive or negative) that could facilitate or impede energy and Government facility siting and activities have occurred since the last assessment.

| Management Category   | Employed by State or Territory<br>(Y or N) | CMP Provides Assistance to Locals that Employ<br>(Y or N) | Significant Changes Since Last Assessment<br>(Y or N) |
|---|--|---|---|
| Statutes, regulations, policies, or case law interpreting these | Y  | Y   | Y   |
| State Comprehensive Siting Plans/Procedures                     | N  | N   | N   |

- b. For any management categories with significant changes briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

Clean Energy policies that were enacted during this Section 309 cycle, and involved the coastal zone include:

SLH 2016

- a. **Act 173 - Permits hydroelectric facilities that are considered small hydropower facilities by the United States Department of Energy on agricultural district lands.** Authorizes construction of small hydropower facilities in a manner that combines clean energy infrastructure and irrigation for agricultural lands.
- b. **Act 176 - Requires the State establish a goal of becoming net-zero with respect to energy use by January 1, 2035.** As one of the largest consumer of electricity, state agencies have the potential to materially impact on implementation of our clean energy goals. Additionally, many schools are also used as emergency shelters. Firming electricity capabilities at our schools provides greater emergency preparedness.
- c. **Act 202 - Establishes a 5-year renewable fuels production tax credit.** It encourages the production of renewable fuels as a diversified fuel mix to achieve the State’s renewable energy goals. Renewable fuels are cleaner, lower cost alternative fuels for residential, commercial, and industrial customers. Renewable fuels are the most efficient source of heat energy and is cleaner burning, making it useful for Hawaii’s clean energy future.
- d. **Act 220 - Revises statutory provisions relating to the regulation of geothermal and mineral resources.** It provides geothermal developers the same opportunities already afforded to other renewable energy producers regarding leases on public lands.

## SLH 2017

- e. **Act 32 - Requires the State to expand strategies and mechanisms to reduce greenhouse gas emissions statewide** in alignment with the principles and goals adopted in the Paris Agreement. Hawaii has a tradition of environmental leadership, having prioritized policies regarding conservation, reduction in greenhouse gas emissions, and development and use of alternative renewable energy.
- f. **Act 205 - Repeals regulatory structure for transmission cable relating to the interisland transmission system.** This Act amend Act 165, SLH 2002 by repealing the provisions relating to interisland transmission system under public utilities commission, revises repeals gross income of electric utility companies from cable surcharge.

The remaining State of Hawaii legislative and policy changes on energy did not involve siting during this reporting period. Rather State energy policy focused on green energy, cost-effective/energy efficiency measures, promoting tax credits to encourage green energy growth and usage, as well as measures to endorse and advocate for resiliency amongst the green energy sector.

- c) Specify if it was a 309 or other CZM-driven change; these policies and legislative driven statutes were not driven by CZM.

The energy policy and associated plans for the siting of energy facilities listed above were driven by legislative and administrative priorities, and not that of CZM considerations.

- d) Characterize the outcomes and/or likely future outcomes of the changes(s).  
These statutory and policy changes are expected to transform Hawaii and its residents into a green energy producer and consumer.

The following legislative and administrative policy changes that occurred during this reporting period that are expected to transform Hawaii into a green energy producer, and its residents as green energy consumers are as follows:

## SLH 2018

- g. **Act 121 - Creates a revolving line of credit sub-fund within the Hawaii Green Infrastructure Special Fund for a state agency to finance cost-effective energy-efficiency measures.** Gives state agencies the opportunity to deploy cost-effective energy efficiency measures to reduce consumption in support of our energy efficiency portfolio standards, reduce utility bill expenses, and reinvest net savings in other programs and priorities.
- h. **Act 143 - Expands the renewable fuel tax credit cap by lowering the production threshold and expanding the types of renewable fuel eligible for the credit.** This Act expands the availability of the renewable fuels production tax credit by lowering

the production threshold and expanding the types of renewable fuel eligible for the credit. Locally produced biofuels have the potential to advance Hawaii’s clean energy goals and create job growth in Hawaii’s energy, farming, and manufacturing industries. Production costs have limited the advancement of biofuel production, this Act will advance this resource by promoting the investment in biofuel technology can lead to increases in its efficiency, profitability, and sustainability as a renewable energy source.

- i. **Act 200 - Directs the Public Utilities Commission to establish a microgrid services tariff to encourage and facilitate the development and use of energy resilient microgrids.** This act begins the process to standardize and streamline the related interconnection processes for microgrid projects in a manner that benefits utility customers. It also aims to prevent defection from the grid that would leave those connected vulnerable to rising costs of an energy system to be paid for by fewer customers.

**SLH 2019**

- j. **Act 122 - Establishes the Hawaii State Energy Office and Chief Energy Officer position in Department of Business, Economic Development, and Tourism (DBEDT).** The Act establishes the Hawaii State Energy Office as an attached agency. Provides funding to study whether a carbon pricing policy should be implemented for Hawaii.
- k. **Act 141 - Requires the Department of Business, Economic Development, and Tourism to adopt state appliance efficiency standards.** Among other aspects, this Act promotes the reduction of air pollutants and greenhouse gas emissions by promoting more energy efficient in government facilities, which can result in public health benefits and help the State meet its clean energy and climate change mitigation targets.
- l. **Act 144 - Allows agencies to enter performance contracts to undertake or implement energy conservation or alternate energy measures for vehicles.** This Act has the potential to serve as an energy savings tool for agencies when transitioning State petroleum burning vehicles to electric vehicles, thus reducing carbon emissions.

**Enhancement Area Prioritization:**

- a. What level of priority is the enhancement area for the coastal management program?

|               |               |
|---------------|---------------|
| <b>High</b>   | _____         |
| <b>Medium</b> | _____ X _____ |
| <b>Low</b>    | _____         |

- b. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

On the federal level, offshore energy development and siting of offshore energy facilities falls under the authority of BOEM. Stakeholder engagement was conducted by BOEM during the summer of 2016 through a series of public scoping meetings for offshore wind development for Oahu. These public scoping meetings were held early in the offshore wind development process.

As in 2016, BOEM is still in the process of identifying areas for environmental analysis and consideration for leasing, while addressing disparities and concerns with other agencies in the placement of offshore wind-turbine energy development. Because Oahu is where the demand is greatest for renewable energy sources, the focus is determining an appropriate area where wind and wave energy is steady and reliable, is within proximity to on land support infrastructure, and poses the least risk to commercial, recreational, and military ocean users.

During this reporting period, BOEM is evaluating two areas one to the north and another southeast of Oahu as the most practical. Stakeholders involved in the public scoping meeting of 2016 including recreational ocean users, native practitioners, commercial interests, and government agencies (specifically the U.S. Navy).

Development and management of State of Hawaii energy policy falls under the authority of the DBEDT, Hawaii State Energy Office. During this reporting period, the focus of the State Energy Office has been, and continues to be, reducing the State's dependency on fossil fuels, while encouraging clean energy for future economic growth.

Offshore energy siting is one of the many energy sources that the State Energy Office studied in its assessment to diversify Hawaii's clean energy portfolio (solar, wind, hydro, bioenergy, geothermal, and the promotion of energy efficiency). Outreach by the State Energy Office to promote clean energy use was directed at energy producers, as well as consumers (both individuals, private entities, commercial interests, and governmental agencies). The Hawaii State Energy Office policies are less directed at the siting of facilities and are more focused on facilitating clean energy development expansion and its efficient use by consumers.

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment and/or developing energy and Government facilities strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

### **Hawaii State Energy Office**

The Hawaii State Energy Office's (HSEO) mission is to maximize Hawaii's energy self-sufficiency and security by developing and utilizing local energy resources in a balanced way. In doing so, HSEO will guide our state toward the Hawaii Clean Energy Initiative goals to achieve 100 percent renewable energy in the electricity sector by 2045, reduce electricity consumption by 4,300 gigawatt-hours by 2030, and reduce petroleum use in transportation. To this end, HSEO works toward the deployment of clean energy infrastructure and serves as a catalyst for energy innovation. By achieving these goals, the State will meet its clean energy sector objectives and transform Hawaii's economy.

*Geographic Scope:* Statewide

*Weblink:* <http://energy.hawaii.gov/resources>

**Hawaii Clean Energy Initiative**

The Hawaii Clean Energy Initiative (HCEI) is a partnership between the State of Hawaii and the U.S. Department of Energy that launched in 2008. The mainstays of HCEI's policy agenda are its renewable energy portfolio and energy efficiency targets, which have been codified into law. Other policies that have grown out of HCEI cover areas such as regulatory reform, tax policy and clean energy financing. Together these policies and practices serve as the guideposts that maintains Hawaii's energy transformation.

*Geographic Scope:* Statewide

*Weblink:* <http://www.hawaiicleanenergyinitiative.org/policy/>

**BOEM Environmental Studies Program**

The Bureau of Ocean and Energy Management's (BOEM) Environmental Studies Program develops, conducts and oversees world-class scientific research specifically to inform policy decisions regarding development of Outer Continental Shelf energy and mineral resources. Research covers physical oceanography, atmospheric sciences, biology, protected species, social sciences and economics, submerged cultural resources and environmental fates and effects.

*Geographic Scope:* Specific to each study

*Weblink:* <http://www.boem.gov/Studies/>

**U.S. Energy Information Administration**

*The U.S. Energy Information Administration collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. The site includes a wealth of information on energy demand, use, and production (nationally, by region, and by energy sector).*

*Geographic Scope:* National and regional

*Weblink:* <http://www.eia.gov/>

**FERC Projects**

The Federal Energy and Regulatory Commission (FERC) has authority over electricity, natural gas (including LNG), and hydropower/hydrokinetic projects. The site has information on current and pending projects as well as market demands.

*Geographic scope:* National

*Weblink:* <http://www.ferc.gov/for-citizens/projectsearch/SearchProjects.aspx>

**GSA Lists of Federally Owned and Leased Facilities**

The Government Services Agency (GSA) maintains a national list of all federally owned and leased facilities in each state.

*Geographic scope:* National

*Weblink:* <http://www.iolp.gsa.gov/iolp/NationalMap.asp>.

**MarineCadastre.gov Viewer**

This data viewer provides the baseline information needed for ocean planning efforts, particularly those that involve finding the best location for renewable energy projects. Users pick the ocean geography of their choosing and quickly see the applicable jurisdictional boundaries, restricted areas, laws, critical habitat locations, and other important features. With the national viewer, potential conflicts can be identified and avoided early in the planning process and users can visually analyze and explore

geospatial data for marine spatial planning activities and provides direct access to authoritative marine cadastral data from federal and state sources.

*Geographic Scope:* National

*Weblink:* <http://www.csc.noaa.gov/digitalcoast/tools/mmc>

#### **NOAA Economics: National Ocean Watch Data (ENOW)**

The effective management of coastal resources requires an understanding of the ocean and Great Lakes economy. This tool allows users to interact with ENOW data which describe six economic sectors that depend on the oceans and Great Lakes: living resources; marine construction; marine transportation; offshore mineral resources; ship and boat building; and tourism and recreation. Users can discover which sectors are the largest in various parts of the county, which sectors are growing and declining, and which account for the most jobs, wages, and gross domestic product. They can view up to four counties, states, or regions to compare trends or the makeup of their ocean and Great Lakes economies. The ENOW Explorer's interface is designed to allow users who are familiar with economic data to interact with and view data and trends. The tool provides the highest level of interaction with ENOW data short of downloading the full data set.

*Geographic Scope:* National and regional

*Weblink:* <http://www.csc.noaa.gov/digitalcoast/tools/enow>

## ***Aquaculture***

**Section 309 Enhancement Objective:** Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable states to formulate, administer, and implement strategic plans for marine aquaculture. §309(a)(9)

**PHASE I (HIGH-LEVEL) ASSESSMENT:** *(Must be completed by all states and territories.)*

*Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.*

**Resource Characterization:**

1. In the table below, characterize the existing status and trends of aquaculture facilities in the state's coastal zone based on the best-available data. Your state Sea Grant Program may have information to help with this assessment.<sup>30</sup>

**Status and Trends of Aquaculture Facilities and Activities**

| Type of Facility/Activity | Number of Facilities <sup>31</sup> | Approximate Economic Value | Change Since Last Assessment<br>(↑, ↓, -, unkwn) |
|---------------------------|------------------------------------|----------------------------|--|
| Food Fish                 | 23                                 | (D)                        | Data is same from 2013                           |
| Sport Fish                | 0                                  | 0                          | Data is same from 2013                           |
| Baitfish                  | 0                                  | 0                          | Data is same from 2013                           |
| Ornamental Fish           | 14                                 | (D)                        | Data is same from 2013                           |
| Crustaceans               | 12                                 | \$15,876                   | Data is same from 2013                           |
| Mollusks                  | 3                                  | (D)                        | Data is same from 2013                           |
| Misc.                     | 6                                  | \$29,123                   | Data is same from 2013                           |

(D) – Withheld to avoid disclosing data for individual farms.

2. If available, briefly list and summarize the results of any additional state or territory-specific data or reports on the status and trends or potential impacts from aquaculture activities in the coastal zone since the last assessment.

The value associated with algae production increased from \$33,086 in 2014 to \$35,190 in 2017. However, the total value for all types of aquaculture production decreased from \$78,241 in 2014 to 76,367 in 2017. (Hawaii Aquaculture Annual Release, October 5, 2018, Hawaii Department of Agriculture). In 2019 the State of Hawaii launched a new aquaculture initiative with the Hawaii-

<sup>30</sup> While focused on statewide aquaculture data rather than just within the coastal zone, the *Census of Aquaculture* ([www.aqcensus.usda.gov/Publications/Census\\_of\\_Aquaculture/](http://www.aqcensus.usda.gov/Publications/Census_of_Aquaculture/)) may help in developing your aquaculture assessment. The census is conducted every 10 years and the last report was released in 2013. The report provides a variety of state-specific aquaculture data to understand current status and recent trends. .

<sup>31</sup> Be as specific as possible. For example, if you have specific information of the number of each type of facility or activity, note that. If you only have approximate figures, note “more than” or “approximately” before the number. If information is unknown, note that and use the narrative section below to provide a brief qualitative description based on the best information available.

Based Aquaculture Accelerator and Fund for startup aquaculture innovators at the Hawaii Ocean Science and Technology Park located in Kona, Hawaii. This initiative is intended to grow the aquaculture technology industry in Hawaii. The accelerator will initially be fully funded for three years and is expected to nurture three cohorts of 10 to 12 globally relevant aquaculture technology startups per year. (Governor David Y. Ige press release, April 17, 2019)

**Management Characterization:**

1. Indicate if the approach is employed by the state or territory and if there have been any state- or territory-level changes (positive or negative) that could facilitate or impede the siting of public or private aquaculture facilities in the coastal zone.

**Significant Changes in Aquaculture Management**

| Management Category   | Employed by State or Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Changes Since Last Assessment (Y or N) |
|---|---|--|--|
| Aquaculture comprehensive siting plans or procedures                              | Y                                       | N  | N  |
| Other aquaculture statutes, regulations, policies, or case law interpreting these | Y                                       | N  | N  |

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
  - a. Describe the significance of the changes;
  - b. Specify if they were 309 or other CZM-driven changes; and
  - c. Characterize the outcomes or likely future outcomes of the changes.

Not applicable.

**Enhancement Area Prioritization:**

1. What level of priority is the enhancement area for the coastal management program?

**High**      \_\_\_\_\_  
**Medium**    \_\_\_\_\_  
**Low**          X  

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

This enhancement area is a low priority for the HCZMP because the Hawaii Department of Agriculture (HDOA), Aquaculture and Livestock Support Services Branch is the State’s lead agency to

advance commercial aquaculture. The State’s aquaculture industry remains largely unchanged since the previous assessment, however the HCZMP does continue to explore opportunities to partner and support this Branch and the development of the aquaculture industry through the ORMP as part of the “ocean economy” management priority, with targets to work towards development suitable aquaculture standards to support the goal of increased local food production.

\*\*\*\*\*

### **Resources and Tools:**

*Below are a few national resources and tools that may be useful in conducting your assessment or developing aquaculture strategies. States likely have other state-specific resources, tools, and data that would be useful as well.*

#### **Coastal Aquaculture Planning Portal**

The Coastal Aquaculture Planning Portal is a toolbox of coastal planning tools designed to assist managers, planners, and industry with sustainable aquaculture development.

*Geographic Scope:* National

*Website:* [www.coastalscience.noaa.gov/research/marine-spatial-ecology/coastal-aquaculture-planning-portal-capp/#](http://www.coastalscience.noaa.gov/research/marine-spatial-ecology/coastal-aquaculture-planning-portal-capp/#)

#### **MarineCadastre.gov Viewer**

This data viewer provides the baseline information needed for ocean planning efforts, particularly those that involve finding the best location for renewable energy projects. Users choose an ocean geography and quickly see the applicable jurisdictional boundaries, restricted areas, laws, critical habitat locations, and other important features. With the national viewer, potential conflicts can be identified and avoided early in the planning process, and users can visually analyze and explore geospatial data for marine spatial planning activities and find direct access to authoritative marine cadastral data from federal and state sources.

*Geographic Scope:* National

*Website:* [www.coast.noaa.gov/digitalcoast/tools/mmc](http://www.coast.noaa.gov/digitalcoast/tools/mmc)

#### **NOAA Office of Aquaculture**

The Office of Aquaculture fosters sustainable aquaculture that will create employment and business opportunities in coastal communities; provide safe, sustainable seafood; and complement NOAA’s comprehensive strategy for maintaining healthy and productive marine populations, species, and ecosystems and vibrant coastal communities.

*Geographic Coverage:* National and regional

*Website:* [www.nmfs.noaa.gov/aquaculture/index.htm](http://www.nmfs.noaa.gov/aquaculture/index.htm)

#### **USDA Census of Aquaculture**

The U.S. Department of Agriculture publishes the Census of Aquaculture. The census provides a variety of state-specific aquaculture data to understand current status and recent trends. The last census was released in 2013.

*Geographic Coverage:* National

*Website:* [www.aqcensus.usda.gov/Publications/Census\\_of\\_Aquaculture/](http://www.aqcensus.usda.gov/Publications/Census_of_Aquaculture/)

**ASSESSMENT: PHASE II****Coastal Hazards****In-Depth Resource Characterization:**

*Purpose: To determine key problems and opportunities to improve the CMP's ability to prevent or significantly reduce coastal hazard risks by eliminating development and redevelopment in high-hazard areas and managing the effects of potential sea level rise and Great Lakes level change.*

1. Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards<sup>32</sup> within your coastal zone? Also indicate the geographic scope of the hazard, i.e., is it prevalent throughout the coastal zone, or are there specific areas most at risk?

|          | Type of Hazard     | Geographic Scope<br>(throughout coastal zone or specific areas most threatened) |
|----------|--------------------|---|
| Hazard 1 | Coastal Storms     | Throughout coastal zone   |
| Hazard 2 | Geological Hazards | Throughout coastal zone   |
| Hazard 3 | Flooding           | Throughout coastal zone   |

2. Briefly explain why these are currently the most significant coastal hazards within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

In order to prioritize hazard mitigation measures, the 2013 Hawaii State Hazard Mitigation Plan Update provides estimates of the Average Annualized Loss (AAL) for each of the significant natural hazards affecting the State of Hawaii. AAL is an objective measure of future losses averaged on an annual. AALs for each of the significant natural hazards affecting the State of Hawaii are listed in Table 3.0 and serve as the primary justification for the ranking of coastal hazards provided in response to Question 2 above. Additional descriptions of each of the most significant coastal hazards in Hawaii's Coastal Zone are also provided below.

**Table 3.0. State of Hawaii Estimated Average Annual Loss**

| Hazard                   | AAL                       |
|--------------------------|---------------------------|
| Tropical Cyclone         | \$390 Million/Year        |
| Tsunami                  | \$168 Million/Year        |
| Earthquake               | \$106 Million/Year        |
| Lava Flow                | \$24 Million/Year         |
| Flood                    | \$16 Million/Year         |
| Coastal Erosion          | \$10 to \$11 Million/Year |
| Debris Flow and Rockfall | \$3 to \$7 Million/Year   |

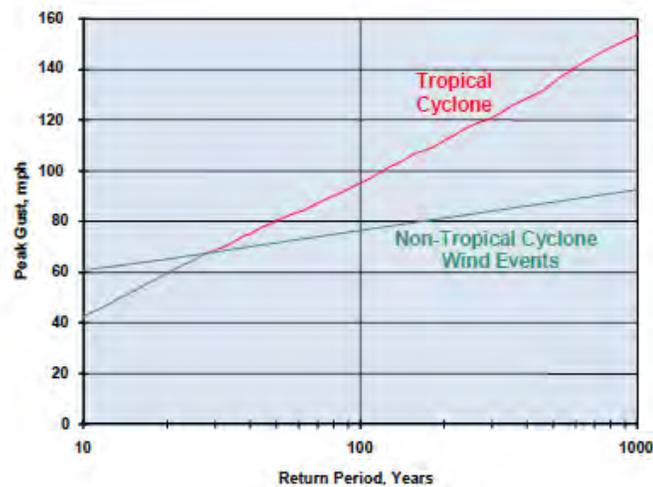
*Note: All descriptions of the most significant coastal hazards within Hawaii's coastal zone provided below are adapted from the State of Hawaii Multi-Hazard Mitigation Plan 2013 Update. (no updated data found).*

<sup>32</sup> See list of coastal hazards on pg. 24 of this assessment template.

### Coastal Storms – High Wind Storms

High trade and Kona wind events, distinct from tropical cyclones, affect Hawaii on a relatively regular basis. The *State of Hawaii Multi-Hazard Mitigation Plan 2013 Update* (SHMHMP) includes a comprehensive list of 140 high wind events recorded for over a century (1871-2013). The 2018 updated SHMHMP identifies 8 high major wind storm events between 2012 and 2017. Wind Hazard curves for the Hawaiian Islands (Figure 3.1) show that relatively low wind speeds that occur more frequently are more likely to be from Trade and Kona winds, while relatively high but less frequent wind speeds are more likely to be caused by tropical cyclones. Winds of 68 mph or less, which can still be very damaging, are more likely to occur due to non-cyclonic winds. Greater wind speeds are more likely to be experienced during a tropical cyclone (tropical depression, storm, or hurricane), which are more damaging; however, these events are less frequent.

**Figure 3.1 Wind Hazard Curves for the Hawaiian Islands for Hurricane and Non-Hurricane Winds**



Source: HI-EMA, 2013. p. 4-19. (no updated data available)

For example, at the lower wind speeds, a 60 mph or greater trade wind or Kona wind event is expected to occur once every 10 years, while the 60 mph or greater tropical cyclone is expected to occur once every 20 years. At the higher wind speeds, a 90 mph or greater tropical cyclone is expected to occur once every 80 years, while a 90 mph or greater trade or Kona storm is expected to be extremely rare and occur only once every 700-800 years. Therefore, major structural damage due to the high winds is more likely to be caused by tropical cyclones in the form of hurricanes. However, damage associated with storms with lower wind speeds such as minor structural damage for non-conforming structures, non-structural water damage due to windblown rain, flooding associated with wind storms, or damage to non-conforming power distribution systems is more likely to be caused by trade or Kona wind storms.

### Coastal Storms – Tropical Cyclones

Due to the dependence of tropical storm activity on ocean water temperature, tropical storm activity in the Pacific is mostly prevalent over the summer months. Most hurricanes in the Central Pacific occur in July through September, reducing in frequency and strength in October through December. An average hurricane season in Hawaii has about four to five tropical cyclones. In the past five years, the Central Pacific has experienced below-average activity due to neutral, or absent, El Niño Southern Oscillation (ENSO) conditions. Eight of the past ten years have been below average. A summary of significant

Hawaiian hurricanes over the last century along with the estimated damage from each hurricane is summarized in the table below.

| Significant Hawaiian Hurricanes of the 20 <sup>th</sup> Century |                |                       |         |
|---|----------------|-----------------------|---------|
| Name  | Date           | Damage (1990 Dollars) | Deaths  |
| Mokapu Cyclone  | Aug. 19, 1938  | Unknown               | Unknown |
| Hiki  | Aug. 15, 1950  | Unknown               | Unknown |
| Nina  | Dec. 2, 1957   | \$900,000             | 4       |
| Dot   | Aug. 6, 1959   | \$28,000,000          | 0       |
| 'Iwa  | Nov. 23, 1982  | \$394,000,000         | 1       |
| Iniki   | Sept. 11, 1992 | \$2,800,000,000       | 4       |

Source: Adapted from HI-EMA, 2013. p. 5-11. (no updated data found).

A list of the hurricanes and tropical storms that are recorded to have had some effect on the islands since 1871 is provided in the table below.

| Historical Tropical Cyclones Affecting the Hawaiian Islands |  |
|---|--|
| August 9, 1871  | Kohala Cyclone, gale winds                             |
| July 31, 1925   | Ramage Cyclone   |
| August 18-19, 1938  | Mokapu Cyclone   |
| January 23-26, 1948   | High Winds   |
| August 15, 1950   | Hurricane Hiki   |
| November 30-31, 1957  | Hurricane Nina, gusts to 92 mph                        |
| August 6-9, 1958  | Tropical Storm   |
| August 4-7, 1958  | Hurricane Dot, strong winds                            |
| September 12-19, 1963                                       | Tropical Storm Irah, strong winds                      |
| August 8-10, 1967   | Tropical Storm   |
| January 8-18, 1971  | Tropical Storm Sarah                                   |
| July 21-22, 1982  | Tropical Storm Daniel                                  |
| August 1, 1982  | Tropical Storm Gilma                                   |
| November 23, 1982   | Hurricane 'Iwa   |
| October 15-20, 1983   | Hurricane/Tropical Depression Raymond                  |
| July 22-23, 1986  | Hurricane Estelle, rain and high surf                  |
| July 18-20, 1989  | Tropical Storm Dalilia                                 |
| September 11, 1992  | Hurricane Iniki, heavy rain, high wings, and high surf |
| July 16, 1993   | Hurricane Fernanda, rain and high surf                 |
| July 14, 1994   | Tropical Storm Daniel, moderate surf                   |
| July 24, 1994   | Tropical Storm Fabio, heavy rainfall                   |
| August 15, 1999   | Hurricane Dora, mild rain                              |
| September 1, 2003   | Hurricane/Tropical Storm Jimena, 4 to 8-foot swell     |
| August 3, 2004  | Hurricane Darby, heavy rain and 4 to 8-foot swell      |
| September 22, 2005  | Hurricane/Tropical Storm Jova, 8 to 12-foot swell      |
| September 30, 2005  | Hurricane/Tropical Storm Kenneth, 8 to 10-foot swell   |
| August 13, 2007   | Hurricane Flossie, rain                                |
| August 10, 2009   | Hurricane/Tropical Storm Felicia, rain                 |
| July 26-30, 2013  | Tropical Storm Flossie                                 |
| August 4-21, 2014   | Tropical Storm Iselle                                  |
| October 13-19, 2014   | Hurricane Ana  |
| July 31-August 5, 2015                                      | Tropical Storm Guillermo                               |
| August 20-24, 2015  | Hurricane Hilo   |

|                       |                      |
|-----------------------|----------------------|
| August 26-Sep 4, 2015 | Hurricane Ignacio    |
| September 2-9, 2015   | Hurricane Jimena     |
| September 22, 2015    | Tropical Storm Niala |
| October 2-5, 2015     | Tropical Storm Oho   |
| October 20-23, 2015   | Hurricane Olaf       |

Source: Adapted from HI-EMA, 2013. p. 5-12. 2018 additions adapted from HI-EMA, 2018. p. 4-230, 4-231.

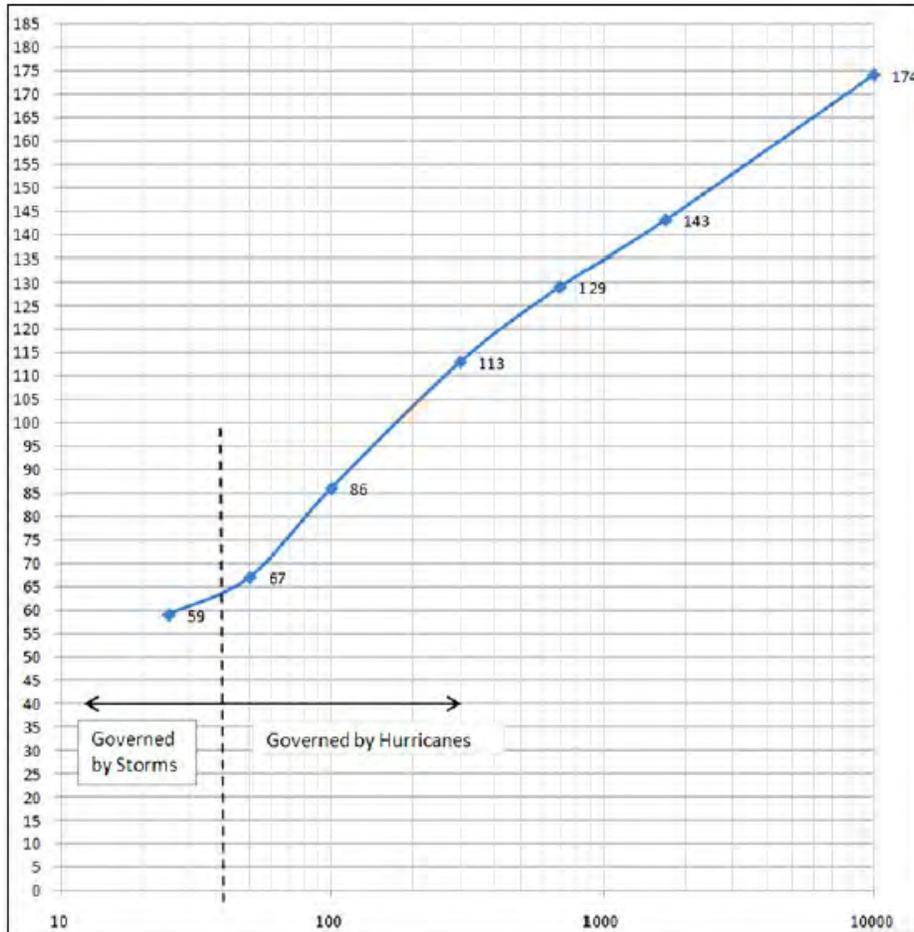
All of the Main Hawaiian Islands are at approximately the same risk of a direct hit by a hurricane. Recent studies have been used to estimate the average return period for different category hurricanes in the State of Hawaii and the island of Oahu, as shown in the table below.

| Hurricane Annual Odds of Occurrence by Saffir Simpson Category Incorporating NASA and HHRF<br>Sponsored Research and ASCE 7-10 |                     |                     |                    |           |
|--|---------------------|---------------------|--------------------|-----------|
| Hurricane Category   | Sustained Wind      | 3-sec. Peak Gust    | NASA/HHRF          |           |
|  |                     |                     | Anywhere in Hawaii | Oahu Only |
| 1  | 74 to 94 mph        | 90 to 116 mph       | 1 in 25            | 1 in 80   |
| 2  | 94 to 110 mph       | 117 to 134 mph      | 1 in 50            | 1 in 320  |
| 3 or 4   | 111 to 156 mph      | 135 to 189 mph      | 1 in 75            | 1 in 400  |
| Any Hurricane  | Greater than 74 mph | Greater than 90 mph | 1 in 15            | 1 in 55   |

Source: Adapted from HI-EMA, 2013. p. 5-16. (no updated data found).

In addition, the most recent windspeed hazard curve developed for Hawaii is the 2010 Edition of ASCE 7-10 is shown below. This hazard curve generally reflects a similar return period to those described in Table 3.3, except for hurricanes of Category 3 or greater which are predicted to be less frequent by the ASCE 7-10 hazard curve with a return period of around 750 years.

Windspeed Recurrence Intervals for Hawaii based on the 2010 Edition of ASCE-7



Source: HI-EMA, 2013. p. 5-17. (no updated data found).

Based on an AAL analysis using Hazards United States Multi-Hazard (HAZUS-MH) Software, tropical cyclone AAL for the State of Hawaii is estimated at \$390 Million / Year as referenced above in Table 3.0.

### Geological Hazards – Tsunamis

The Hawaiian Islands have a long history of destruction due to tsunamis and are particularly vulnerable to tsunamis originating from Alaska and Chile. Twenty-eight (28) tsunamis with flood elevations greater than 3.3 feet (1 meter) have made landfall in the Hawaiian Islands during recorded history and 4 have had significant damaging effects. A list of tsunami destruction is provided in the table below.

| Tsunami Destruction in Hawaii |                                    |        |  |                 |   |
|-------------------------------|------------------------------------|--------|--|-----------------|---|
| Date                          | Source                             | Deaths | Where  | Run-up          | Remarks   |
| 1837                          | Earthquake in Chile                | 16     | Hawaiian Islands   | 6 m/19.6 ft     | 14 deaths on the Big Island and 2 on Maui.  |
| 1868                          | Earthquake off the Big Island      | 47     | Big Island   | 13.7 m/45 ft    | The earthquake also caused a landslide in Pahala that killed 37 bringing total deaths to 79.            |
| 1877                          | Earthquake in Chile                | 5      | Hilo   | 4.8 m/16 ft     | Also 17 injured in Hilo.  |
| 1923                          | Kamchatka Earthquake               | 1      | Hilo   | 6.1 m/20 ft     | Others may have been killed (up to 12 others) and extensive damaged occurred in Hilo and Kahului.       |
| 1933                          | Earthquake in Japan                | 1600   | Japan  | 3.3 m/10.8 ft   | No deaths in Hawaii but 17 feet waves were reported at Napoopoo.  |
| 1946                          | Earthquake in the Aleutian Islands | 159    | Mostly in Hilo (96), but also Kauai (15), Maui (14), & Oahu (9). | 16.4 m/53.8 ft  | The largest natural disaster recorded to have occurred in Hawaii.                                       |
| 1952                          | Kamchatka Earthquake               | 0      | Hawaiian Islands   | 9.1 m/29.9 ft   | Damage occurred on Kauai, Maui, Oahu, and in Hilo.  |
| 1957                          | Earthquake in the Aleutian Islands | 0      | Hawaiian Islands   | 16.12 m/52.8 ft | Caused extensive damage on Kauai.   |
| 1960                          | Earthquake in Chile                | 61     | Hawaiian Islands   | 10.7 m/35.1 ft  | Over 1,000 people died in Chile, Japan, The Phillippines, and Hawaii.                                   |
| 1964                          | Earthquake in Alaska               | 0      | Hawaiian Islands   | 4.9 m/16.1 ft   | 106 people died in Alaska and 16 died on the North American coast. Damage occurred in Hilo and Kahului. |
| 1975                          | Earthquake off the Big Island      | 2      | Halape   | 14.3 m/47 ft    | 19 others were injured.   |

Source: Adapted from HI-EMA, 2013. p. 6-11. (no updated data available).

Currently, the State of Hawaii is working on producing tsunami probabilistic design maps for its islands. The first phase, which included the maps for the entire coastline of Oahu has been completed. There are, however, no tsunami probabilistic hazard maps for inundation or evacuation of the islands for distant and near source tsunamis; however, despite the historical frequency of tsunamis with 3.3 feet (1 meter) of run-up is about 1 in 15 years.

Tsunami AAL is estimated at \$168 Million / Year, as referenced above in Table 3.0. The annualized loss estimate is generally greater than losses from earthquakes, while being less than anticipated hurricane losses. Hawaii's direct exposure to tsunami hazard is quantified in the table below.

| Direct Exposure of the Five Western States to Tsunami Hazard |   |  |
|--|---|--|
| State  | Population at Direct Risk<br>(Lower-bound estimates based on present evacuation zones)  | Profile of Economic Assets and Critical Infrastructure   |
| California   | 275,000 residents plus another 400,000 to 2,000,000 tourists; 840 miles of coastline  | > \$200 Billion plus 3 major airports (SFO, OAK, SAN) and 1 military port, 5 very large ports, 1 large port, 5 medium ports  |
|  | Total resident population of area at immediate risk to post-tsunami impacts: 1,950,000  |  |
| Oregon   | 25,000 residents plus another 55,000 tourists; 300 miles of coastline   | \$8.5 Billion plus essential facilities, 2 medium ports, 1 fuel depot hub  |
|  | Total resident population of area at immediate risk to post-tsunami impacts: 100,000  |  |
| Washington   | 45,000 residents plus another 20,000 tourists; 160 miles of coastline   | \$4.5 Billion plus essential facilities, 1 military port, 2 very large ports, 1 large port, 3 medium ports   |
|  | Total resident population of area at immediate risk to post-tsunami impacts: 900,000  |  |
| Hawaii   | >200,000 residents plus another 175,000 or more tourists and approximately 1,000 buildings directly relating to the tourism industry; 750 miles of coast line | \$40 Billion plus 3 international airports, and 1 military port, 1 medium port, 4 other container ports, and 1 fuel refinery intake port, 3 regional power plants; 100 government buildings. |
|  | Total resident population of area at immediate risk to post-tsunami impacts: 400,000  |  |
| Alaska   | 105,000 residents plus highly seasonal visitor count; 6,600 miles of coastline  | >\$10 Billion plus International Airport's fuel depot, 3 medium ports plus 9 other container ports; 55 ports total.  |
|  | Total resident population of area at immediate risk to post-tsunami impacts: 125,000  |  |

Source: Adapted from HI-EMA, 2013. p. 6-30. (no updated data found).

### Geological Hazards – Earthquakes

Naturally occurring earthquakes in Hawaii can be either of tectonic or volcanic nature. Tectonic, or lithospheric, earthquakes in Hawaii occur at or near the shield volcanoes that form the islands. Twenty-six (26) earthquakes with magnitude 6.0 or greater have occurred in the Hawaiian Islands since the mid-1800s, as shown in the table below.

Earthquake AAL is estimated at \$106 Million / Year, as referenced in response to Question 3 above.

| History of Earthquakes in Hawaii, Magnitude 6.0 and Greater, 1868 - Present |              |                   |                                     |
|---|--------------|-------------------|-------------------------------------|
| Year  | Date         | Richter Magnitude | Source/Epicenter                    |
| 1868  | March 28     | 6.5 – 7.0         | Mauna Loa south flank               |
| 1868  | April 2      | 7.5 – 8.1         | Mauna Loa south flank               |
| 1871  | February 19  | 7.0               | South of Lanai Island               |
| 1908  | September 20 | 6.7               | Kilauea South Flank                 |
| 1918  | November 2   | 6.2               | Kaoiki, between Mauan Loa & Kilauea |
| 1919  | September 14 | 6.1               | District, Mauna Loa south flank     |
| 1926  | March 19     | >6.0              | NW of Hawaii Island                 |
| 1927  | March 20     | 6.0               | NE of Hawaii Island                 |
| 1929  | September 25 | 6.1               | Hualalai                            |
| 1938  | January 22   | 6.9               | North of Maui Island                |
| 1940  | June 16      | 6.0               | North of Hawaii Island              |
| 1941  | September 25 | 6.0               | Kaoiki                              |
| 1948  | June 28      | 4.6               | South of Oahu Island                |
| 1950  | May 29       | 6.4               | Kona                                |
| 1951  | April 22     | 6.3               | Lithospheric                        |
| 1951  | August 21    | 6.9               | Lithospheric                        |
| 1952  | May 23       | 6.0               | Kona                                |
| 1954  | March 30     | 6.5               | Kilauea South flank                 |
| 1955  | August 14    | 6.0               | Lithospheric                        |
| 1962  | June 27      | 6.1               | Kaoiki                              |
| 1973  | April 26     | 6.3               | Lithospheric                        |
| 1975  | November 29  | 7.2               | Kilauea south flank                 |
| 1983  | November 16  | 6.6               | Kaoiki                              |
| 1989  | June 25      | 6.1               | Kilauea south flank                 |
| 2006  | October 15   | 6.7               | Kiholo Bay, Hawaii Island           |
| 2006  | October 15   | 6.0               | Mahukona, Hawaii Island             |
| 2018  | May-June     | 0.5-6.9           | Kilauea eruption                    |

Source: Adapted from HI-EMA, 2013. p.7-21. 2018 addition adapted from HI-EMA, 2018. p. 4-131.

### Flooding

Major flooding events in Hawaii are caused by rainfall from storms and hurricanes, storm surge, tsunamis, dam failures, and high surf.

Flooding in the State of Hawaii occurs frequently and affects every county. The State of Hawaii experienced 170 flooding events, including flash floods and floods, between 2012 and 2017 (HI-EMA, 2018, p. 4-156). Over time, property damages have been large and many lives have been lost. Increasing development along the scenic coastal areas and shorelines has increased exposure to the risk

of flooding and storm surges. The table below shows the estimated building stock and potential damage costs due to coastal flooding.

Flooding AAL is estimated at \$16 Million/Year, as referenced above in Table 3.0.

| Estimated General Building Stock Loss (Structure and Contents) to the 1% CZF-3.2* |                               |                   |
|---|-------------------------------|-------------------|
| County  | Number of Structures Impacted | Potential Damages |
| County of Kauai   | 5,360                         | \$5,700,000,000   |
| City and County of Honolulu   | 17,100                        | \$120,000,000,000 |
| County of Maui  | 2,830                         | \$7,880,000       |
| County of Hawaii  | 470                           | \$110,000,000     |
| Total   | 26,360                        | \$125,817,880,000 |

Source: Adapted from HI-EMA, 2018. p.4-49.

\*1% CZF-3.2 refers to the 1 percent annual coastal flood zone (V zones only) with 3.2 feet of sea level rise.

- Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

| Emerging Issue                  | Information Needed   |
|---------------------------------|--|
| Sea Level Rise / Climate Change | Assessment of impacts to existing hazards; in-depth Hawaii-specific analysis of solutions. |

#### In-Depth Management Characterization:

*Purpose: To determine the effectiveness of management efforts to address identified problems related to the coastal hazards enhancement objective.*

- For each coastal hazard management category below, indicate if the approach is employed by the state or territory and if there has been a significant change since the last assessment.

#### Significant Changes in Coastal Hazards Statutes, Regulations, and Policies

| Management Category   | Employed by State/Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Change Since the Last Assessment (Y or N) |
|---|--------------------------------------|--|---|
| Shorefront setbacks/no build areas  | Y                                    | Y  | Y   |
| Rolling easements   | N                                    | N  | N   |
| Repair/rebuilding restrictions  | Y                                    | N  | N   |
| Hard shoreline protection structure restrictions  | Y                                    | Y  | N   |
| Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure) | Y                                    | N  | N   |
| Repair/replacement of shore protection structure restrictions   | N                                    | N  | N   |
| Inlet management  | N                                    | N  | N   |

| Management Category   | Employed by State/Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Change Since the Last Assessment (Y or N) |
|---|--------------------------------------|--|---|
| Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas) <sup>33</sup> | Y                                    | Y  | Y   |
| Repetitive flood loss policies (e.g., relocation, buyouts)  | N                                    | N  | N   |
| Freeboard requirements  | N                                    | N  | N   |
| Real estate sales disclosure requirements   | Y                                    | N  | N   |
| Restrictions on publicly funded infrastructure  | N                                    | N  | N   |
| Infrastructure protection (e.g., considering hazards in siting and design)  | N                                    | N  | N   |
| Other (please specify)  | N/A                                  | N/A  | N/A   |

#### Significant Changes to Coastal Hazard Management Planning Programs or Initiatives

| Management Category   | Employed by State/Territory (Y or N) | CMP Provides Assistance to Locals that Employ (Y or N) | Significant Change Since the Last Assessment (Y or N) |
|---|--------------------------------------|--|---|
| Hazard mitigation plans   | Y                                    | N  | N   |
| Sea level rise/Great Lake level change or climate change adaptation plans | Y                                    | Y  | Y   |
| Statewide requirement for local post-disaster recovery planning           | N                                    | N  | N   |
| Sediment management plans   | Y                                    | N  | Y   |
| Beach nourishment plans   | N                                    | N  | N   |
| Special Area Management Plans (that address hazards issues)               | N                                    | N  | N   |
| Managed retreat plans   | N                                    | N  | N   |
| Other (please specify)  | N/A                                  | N/A  | N/A   |

<sup>33</sup> NERR and CELCP projects

**Significant Changes to Coastal Hazard Research, Mapping, and  
Education Programs or Initiatives**

| <b>Management Category</b>   | <b>Employed by<br/>State/Territory<br/>(Y or N)</b> | <b>CMP Provides<br/>Assistance to<br/>Locals that<br/>Employ<br/>(Y or N)</b> | <b>Significant Change Since<br/>the Last Assessment<br/>(Y or N)</b> |
|--|---|---|--|
| General hazards mapping or modeling <sup>34</sup>  | Y   | Y   | Y  |
| Sea level rise mapping or modeling <sup>35</sup>   | Y   | Y   | N  |
| Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks) <sup>3</sup> | Y   | Y   | N  |
| Hazards education and outreach <sup>36</sup>   | Y   | N   | N  |
| Other (please specify)   | N/A   | N/A   | N/A  |

- Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's management efforts in addressing coastal hazards since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state's management efforts?

An evaluation to determine the effectiveness of Hawaii's management efforts in addressing coastal hazards has not been conducted to date. Any and all information relevant to measuring the impact (i.e., qualitative or quantitative) of all management efforts would facilitate future evaluation efforts. The updated 2018 *State of Hawaii Multi-Hazard Mitigation Plan (SHMHMP)*, however, assesses its performance of mitigation efforts since the previous plan in 2013. The following is a summary of the progress:

- 14 actions (13% of total actions) were completed
- 44 actions (40% of total actions) were initiated, but were not completed
- 40 actions (36% of total actions) were determined to be ongoing activities that were incorporated into the capability assessment
- 12 actions (11% of total actions) were not initiated or had no reported progress
- 52 actions were reviewed and revised for inclusion in the 2018 HMP Update mitigation strategy either by revising the 2013 HMP mitigation action or by incorporating the intent of the action into newly submitted mitigation action worksheets developed as part of the 2018 HMP Update process.

Source: HI-EMA, 2018. p. 6-3.

**Identification of Priorities:**

- Considering changes in coastal hazard risk and coastal hazard management since the last assessment and stakeholder input, identify and briefly describe the top one to three management

<sup>34</sup> <http://planning.hawaii.gov/czm/probabilistic-tsunami-design-zone-maps-for-0%CA%BBahu/>

<sup>35</sup> <https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/>

<sup>36</sup> <https://dod.hawaii.gov/hiema/resources/hharp/>

priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively address the most significant hazard risks. *(Approximately 1-3 sentences per management priority.)*

*Management Priority 1: Climate Change Adaptation*

*Description:* Climate change and sea level rise are expected to exacerbate coastal hazard risk in Hawaii. As a result, the State of Hawaii must develop planning and policy options to address existing threatened development and ensure that new development is properly sited outside of vulnerable areas, or designed to mitigate future impacts.

*Management Priority 2: Implementation of the 2013 2018 State of Hawaii Multi-Hazard Mitigation Plan*

*Description:* In an effort to reduce duplicative efforts, the HCZMP finds it a priority to support advancement of the high-priority mitigation actions proposed in the State Disaster Resilience Strategy of the 2018 SHMHMP. The hazard mitigation actions included in the 2013 SHMHMP have been evaluated and prioritized by a group of over 60 stakeholders from state and federal agencies, military, county government, utilities, private nonprofit organizations, financial institutions, private sector, academia, and representatives of the State Hazard Mitigation Forum and Hawaii State Earthquake Advisory Committee. The top strategic priority actions include: (1) Update and adopt codes and design standards for tsunami, hurricane, and severe storms; and (2) Produce needed to create probabilistic design maps for tsunami for application towards mitigation for critical facilities, major buildings, bridges, and key infrastructure such as power plants and ports.

2. Identify and briefly explain priority needs and information gaps the CMP has for addressing the management priorities identified above. The needs and gaps identified here should not be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

| Priority Needs       | Need?<br>(Y or N) | Brief Explanation of Need/Gap  |
|----------------------|-------------------|--|
| Research             | Y                 | <ul style="list-style-type: none"> <li>• Additional Hawaii-specific research on expected climate impacts;</li> <li>• In-depth cost-benefit analysis of potential planning and regulatory solutions is needed to prioritize adaptation efforts;</li> <li>• Multi-hazard risk assessments of public and private critical infrastructure.</li> </ul>  |
| Mapping/GIS/modeling | Y                 | <ul style="list-style-type: none"> <li>• Update existing historical erosion rate maps for the islands of Kauai, Oahu, and Maui;</li> <li>• Develop historical erosion rate maps for the islands of Niihau, Molokai, Lanai, Kahoolawe, and Hawaii;</li> <li>• Forecast and map coastal erosion and shoreline inundation hazard areas, accounting for projections of sea level rise;</li> <li>• Forecast and map riverine flooding, hurricane, and tsunami hazards, accounting for projections of sea level rise;</li> </ul> |

| Priority Needs                  | Need?<br>(Y or N) | Brief Explanation of Need/Gap   |
|---------------------------------|-------------------|---|
|                                 |                   | <ul style="list-style-type: none"> <li>Continue developing probabilistic tsunami design maps for upcoming use with the International Building Code (IBC) / American Society of Civil Engineers (ASCE) 7-16 Standard.</li> </ul>   |
| Data and information management | Y                 | <ul style="list-style-type: none"> <li>Dedicated funding for regular data collection;</li> <li>Guaranteed state and county access to best-available data on climate change and associated coastal impacts;</li> <li>Consistent use of data in decision-making.</li> </ul> |
| Training/Capacity building      | Y                 | <ul style="list-style-type: none"> <li>Guidance for integrating climate change adaptation into existing planning and regulatory frameworks.</li> </ul>  |
| Decision-support tools          | Y                 | <ul style="list-style-type: none"> <li>Coastal Hazards Assessment tool for use in Special Management Area permitting process.</li> </ul>  |
| Communication and outreach      | Y                 | <ul style="list-style-type: none"> <li>Public outreach on coastal hazard impacts and alternative response (e.g., soft vs. hard erosion control).</li> </ul>   |
| Other (specify)                 | N                 | No additional needs have been identified at this time.  |

**Enhancement Area Strategy Development:**

1. Will the CMP develop one or more strategies for this enhancement area?

Yes        X    
 No              

Briefly explain why a strategy will or will not be developed for this enhancement area.

Managing coastal hazards remains a concern for the State of Hawaii. In particular, climate change adaptation has been identified as a high management priority in need of significant investment towards quantifying impacts and implementing reasonable planning and regulatory solutions; however, the HCZMP has decided to defer developing a coastal hazards strategy to advance climate change adaptation until the Interagency Climate Adaptation Committee completes the sea level rise vulnerability and adaptation report for the State of Hawaii in an effort to reduce duplicative, and possibly conflicting, efforts. Instead, the HCZMP proposes to develop a strategy in order to advance implementation of the top two priority actions of the 2013 SHMHMP. The HCZMP contends that the proposed strategy will address Hawaii’s high exposure to tsunami risk and constitutes a program change achievable within the five-year funding cycle.

## ***Ocean and Great Lakes Resources***

### **In-Depth Resource Characterization:**

*Purpose: To determine key problems and opportunities to enhance the ability of state CMP to better address ocean and Great Lakes resources.*

4. What are the three most significant existing or emerging stressors or threats to ocean and Great Lakes resources within your coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone, or are specific areas most threatened? Stressors can be land-based development; offshore development (including pipelines, cables); offshore energy production; polluted runoff; invasive species; fishing (commercial and/or recreational); aquaculture; recreation; marine transportation; dredging; sand or mineral extraction; ocean acidification; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.

|            | <b>Stressor/Threat</b>          | <b>Geographic Scope</b><br>(throughout coastal zone or specific areas most threatened)   |
|------------|---------------------------------|--|
| Stressor 1 | Development and Coastal Hazards | Throughout Coastal Zone of Main Hawaiian Islands, Development on Maui and Oahu are most imminently threatened by coastal hazards |
| Stressor 2 | Land-Based Pollution            | Throughout Coastal Zone of Main Hawaiian Islands   |
| Stressor 3 | Threats to Marine Resources     | Throughout Coastal Zone of Main Hawaiian Islands   |

5. Briefly explain why these are currently the most significant stressors or threats to ocean and Great Lakes resources within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

Eight (8) information Sharing Sessions were held between August 19th and 30th, 2019 to support the update of the Hawai'i Ocean Resources Management Plan (ORMP) and to serve as a component of the stakeholder and public engagement for the development of the Section 309 Assessment and Strategy for FY2021-2025. Two meetings were held on each of the islands of O'ahu and Hawai'i, and one meeting was held on each of the islands of Kaua'i, Maui, Moloka'i, and Lāna'i. In total, 141 people attended the Information Sharing Sessions. Concurrently, an on-line survey was available to those who could not attend an in-person meeting. Survey questions mirrored the topics discussed at the Information Sharing Sessions. An additional 156 people remotely provided input via the online survey.

Development and coastal hazards, land-based pollution, and threats to marine resources were identified as persistent stressors on Hawaii's ocean resources and were identified as priority concerns to be addressed by the Coastal Zone Management Program in the coming years.

#### Development and Coastal Hazards

Building practices which have clustered development along the shoreline have endangered the perpetuation of Hawaii's economy, including tourism and industry, environmental wellbeing, and human safety. Global climate change is likely to intensify the challenges of historically unsustainable development, with increasing heat, drought, and intensifying storms projected in Hawaii's future. Coastal development also threatens public access to the shoreline, particularly in the face of sea

level rise. The public has a right of access to, and transit along, the area seaward of the shoreline, which is defined as a beach transit corridor by Hawaii Revised Statutes §115-5(a). The desire to protect coastal development from the ocean has compounded public access issues by increasing the demand for shoreline hardening to protect property. The effects of tourism, including private seaside resorts, a lack of public parking, and marine-related recreation and attractions in public beach parks and culturally sacred spaces can result in resource use-conflicts in public access areas. Limitations to shoreline access can impact traditional and customary rights, such as fishing and the gathering of seaweed and algae.

During statewide public outreach, concerns over appropriate coastal development and public access to the shoreline were paramount, with over 500 individual comments pertaining to this subject. Common themes heard from the public were concern for the sustainability of public infrastructure located near the shoreline (i.e. Honolulu International Airport and coastal highways), the impact of coastal development on public shoreline access, the impact of coastal development on the practice of Native Hawaiian culture, and the balance of resident needs with the economic importance of the tourism industry.

Interrelatedly, the issue of hazards impacting coastal development is long-standing concern for the Hawaiian Islands that has evolved and grown in the face of global climate change. Because of Hawaii's isolation from the continental United States, it is crucial that local planning efforts focus on self-sufficiency and preparedness. Hawaii's coast was developed without consideration of chronic beach erosion and rising sea levels. Thus, many structures are already becoming threatened by shifting sands and rising waters. Hawaii has historically not been a 'hotspot' for landfalling hurricanes, however, recent hurricane seasons have demonstrated that the risk of catastrophic hurricane damage is a danger to the island chain. The warmer waters caused by global climate change may lead to increased frequency and strength of hurricanes and other extreme weather events. Additionally, tsunami hazards threaten the integrity of coastal development and human security. Nearly 400 individual public comments were noted as concerns regarding coastal hazard risks in Hawaii. Of primary concern was evacuation on vulnerable coastal roads and the possibility of communities being 'cut off' in areas of minimal access, an inadequate number of safe shelters for residents to seek protection for themselves and their families during an emergency, and confusion over recovery planning roles. During statewide public outreach, concerns over coastal hazards and shoreline vulnerability were common, with nearly 400 individual comments concerning these subjects.

Shoreline vulnerability remains an active concern and has been explored through the ORMP framework since the 2013 creation of the 'Appropriate Coastal Development and Management of Coastal Hazards Action Team', which will continue to invest in finding solutions to the ever-evolving development and hazard issues faced in Hawaii's coastal zone.

#### Land-Based Pollution

Land-based pollution in Hawaii comes in many forms and can originate from many sources. High in the upper watershed, invasive flora and fauna degrade watershed health. Feral ungulates such as pigs and deer can overgraze and trample native vegetation, leading to soil erosion. Similarly, shallow-rooted alien tree species and fire-prone grasses can lead to the sedimentation of waterways, which discharge into nearshore habitats. Agricultural areas are further sources of sedimentation, pesticides, and herbicides. Since the end of industrial pineapple and sugarcane agriculture many sites have sat fallow for periods from years to decades. Fallow agricultural sites

without appropriate cover crops and maintenance practices have been observed to be major contributors of sediments and pollutants into waterbodies. Hawaii's urban development, including dense downtown areas, suburban communities, roadways, and industrial areas can contribute household chemicals, roadway oil and heavy metals, and other debris through stormwater runoff. Hawaii does not have a combined sewer and stormwater system. Rain and floodwaters are collected and discharged into waterbodies without treatment.

In addition to non-point sources of pollution, wastewater can place additional pressures on the ecosystem. When wastewater systems fail or are improperly maintained, polluted runoff can enter streams, groundwater, and the ocean. In Hawaii, about 40% of Hawaiian residents are served by an Individual Wastewater System, a decentralized system serving one residence or a cluster of homes. Individual Wastewater Systems vary in complexity, and include cesspools, seepage pits, and septic tanks. Cesspools deposit untreated human waste into large, cylindrical holes the ground. These excavated areas retain solids and rely on the process of percolation to dispose of fluids. For those served by centralized wastewater treatment, the disposal of treated wastewater can still act as a vector for the introduction of pharmaceuticals, microscopic plastic fibers, and nutrients (i.e. nitrogen and phosphorous), which can survive treatment processes, and negatively impact the environment when treated water is discharged. The effect of injection well systems as a means of disposal for treated wastewater has been observed to degrade coral and other nearshore species. The presence of fecal bacteria can impact human and economic health. In recreational waters, accidental ingestion of bacteria can lead to gastrointestinal distress and hepatitis A. With a highly tourism-dependent economy, 'brown water' advisories, visibly degraded water quality, and sickness may impact tourism revenues. Out of 108 marine water bodies assessed statewide, 88 do not attain water quality standards for at least one or more conventional pollutants (Hawaii State Department of Health, 2018).

During public outreach, over 400 individual comments were received regarding water quality and quantity issues. The primary public concerns were noted as cesspool pollution (wastewater discharges) and the varied impacts of sedimentation and chemical/nutrient pollution (stormwater runoff) on coastal resources.

#### Threats to Marine Resources

Threats to marine resources in the nearshore and ocean areas of Hawaii are numerous. Several issues that are negatively modifying marine habitats at present are: tourism impacts, water quality (discussed above in land-based pollutants), aquatic invasive species, marine debris, and global climate change, including ocean warming and acidification.

Though often unintentional, ocean-users may impact marine species through illegal or harmful practices, such as trampling coral and harassing marine life. Feeding of or following turtles, manta rays, sharks, and dolphins may promote increased reliance on human interactions or change species behavior. Commercial and recreational ocean activities can cause overcrowding and site congestion, reducing the effectiveness of designations such as Marine Protected Areas and tourist satisfaction. In 2018, Hawai'i hosted over 9.9 million visitors. Tourist arrivals are expected to grow, with a forecasted 10.8 million people projected to visit the islands in 2022.

Aquatic invasive species have been introduced to Hawai'i through intentional stocking, accidental releases, and 'hitchhiking' on vessels and marine debris. Aquatic invasive species can often outcompete native and endemic species, which vie for the same resources. These invaders are

usually successful due to the lack of natural predators, their ability to rapidly reproduce and take over habitat areas, and their ability fight off diseases. Alien species may also undergo dispersal through natural vectors, such as currents, tides, and storms.

The impact of marine debris on wildlife is unprecedented and severe. Entanglement, ingestion, and suffocation are common threats to many bird, fish, and marine mammal species. Discarded fishing nets, known as ghost nets, can settle on and destroy coral reefs. Alien species transport, vessel damage, navigational hazards, bycatch, aesthetic degradation of shorelines, and habitat damage are among the economic repercussions of marine debris. Hawaii’s geographic position makes it vulnerable to the impacts of plastic consumption and use around the Pacific Rim. Recent studies suggest that the Main Hawaiian Islands receive an abundance of marine debris from non-local sources, particularly on the windward sides of the islands.

Carbon emissions from anthropogenic sources are responsible for global climate change, which has caused warming and acidification of the world’s oceans. Global climate change is expected to increase coral reef damage by diminishing the health of reef species and reducing their capacity to recover between significant events, including bleaching and intensifying storms, both fueled by warming waters. In Hawai’i, culturally significant carbonate species such as ‘opihi, limpets, (*Cellana sp.*) and oysters are at risk of acidification and are already experiencing population decline from fishing pressure and habitat modifications. Degraded water quality with high nutrient levels can elevate the local impacts of acidification.

During public outreach, approximately 300 individual comments were received regarding concerns about the health of marine resources and the long-term sustainability of current practices in the face of global climate change.

6. Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

| Emerging Issue                     | Information Needed   |
|------------------------------------|--|
| Impacts of Tourism Industry        | Enforcement data, costs of comprehensive management, hot spots of damage, illegal activity data, education campaigns in multiple languages, funding allocated to mitigative activities and ecosystem restoration |
| Managed Retreat from the Coastline | Public versus private responsibilities, funding mechanisms, assessment of cultural impacts, equity analysis, legal factors, insurance implications   |

**In-Depth Management Characterization:**

*Purpose: To determine the effectiveness of management efforts to address identified problems related to the ocean and Great Lakes resources enhancement objective.*

2. For each of the additional ocean and Great Lakes resources management categories below that were not already discussed as part of the Phase I assessment, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred since the last assessment.

**Significant Changes in Management of Ocean and Great Lakes Resources**

| <b>Management Category</b>  | <b>Employed by State or Territory</b><br>(Y or N) | <b>CMP Provides Assistance to Locals that Employ</b><br>(Y or N) | <b>Significant Changes Since Last Assessment</b><br>(Y or N) |
|---|---|--|--|
| Ocean and Great Lakes research, assessment, monitoring              | Y   | N  | N  |
| Ocean and Great Lakes GIS mapping/database                          | Y   | Y  | N  |
| Ocean and Great Lakes technical assistance, education, and outreach | Y   | Y  | N  |
| Other (please specify)  |   |  |  |

3. For management categories with significant changes since the last assessment, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information.
  - c. Describe significant changes since the last assessment;
  - d. Specify if they were 309 or other CZM-driven changes; and
  - e. Characterize the outcomes or likely future outcomes of the changes.

Not applicable.

4. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state’s or territory’s management efforts in planning for the use of ocean and Great Lakes resources since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state’s or territory’s management efforts?

Please see Phase I Ocean and Great Lakes Resources.

**Identification of Priorities:**

2. Considering changes in threats to ocean and Great Lakes resources and management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to effectively plan for the use of ocean and Great Lakes resources. *(Approximately 1-3 sentences per management priority.)*

*Management Priority 1: Development and Coastal Hazards*

*Description:* Hawaii’s development is largely concentrated around the shoreline. Dense oceanfront construction has reduced accessibility for cultural practices and recreational uses. The built environment’s proximity to the ocean has increased the state’s vulnerability to coastal hazards, including sea level rise, storms, and chronic coastal erosion. As existing development considers mitigation and adaptation actions, the Hawaii Coastal Zone Management Program has the opportunity to convene experts, develop plans, and promote progressive policy options to minimize disruption to Hawaii’s economic, social, and environmental well-being.

*Management Priority 2: Watershed Management to Minimize Land-Based Pollution*

*Description:* Land-based sources of pollution from conservation, agricultural, and urban areas threaten the integrity of terrestrial and nearshore ecosystems. While public comments clearly demonstrated an observable impact from land-based sources of sediment on nearshore resources such as coral reefs and Native Hawaiian fishponds, other pollutants that are not visible to the naked eye are just as pervasive and potentially damaging. Agricultural and household chemicals, nutrients, plastic fibers from clothing, and medicine are all present in Hawaii's storm and wastewater. As an island state, all waters ultimately, treated or not, end up in waterways that lead to the ocean. The Hawaii Coastal Zone Management Program is poised to make an impact in this issue area because of its statewide resonance. Both State and County partners of the Hawaii Coastal Zone Management Program are interested in working on the issue of land-based sediment and pollutants in order to reduce the pressures on nearshore ecosystems.

*Management Priority 3: Marine Resource Health*

*Description:* Multiple stressors threaten the health of Hawaii's nearshore and ocean ecosystems, which provide invaluable ecosystem functions, including sediment collection, shoreline protection, water quality filtration, nursery habitat, and food web support. These areas provide habitat, support fisheries, provision recreational spaces, and attract tourism. As an island state, it is critical to Hawaii's economic, environmental, and social well-being that threats to the health of marine resources are mitigated to the extent possible. The Hawaii Coastal Zone Management Program and stakeholders of the ORMP are interested in addressing the many stressors facing marine resources, with an emphasis on the long-term health and sustainability of coral reefs and managing the unknown implications of global climate change on future ecosystem functionality.

3. Identify and briefly explain priority needs and information gaps the CMP has to help it address the management priorities identified above. The needs and gaps identified here do not need to be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

| Priority Needs                  | Need?<br>(Y or N) | Brief Explanation of Need/Gap   |
|---------------------------------|-------------------|---|
| Research                        | Y                 | Sources of sediment pollution hotspots and how do sources differ statewide, most best management practices and policies to control erosion/sedimentation/nutrient/pollutants analysis of place-based effectiveness in Hawaii, innovative coastal protection mechanisms (both hard and soft infrastructure) to protect coastal development, policy options to control aquatic invasive species, ocean acidification, and the impacts of tourism. |
| Mapping/GIS                     | N                 |   |
| Data and information management | N                 |   |
| Training/Capacity building      | N                 |   |
| Decision-support tools          | Y                 | Development of statewide guidance on controlling land-based pollutants  |
| Communication and outreach      | Y                 | Communication/outreach with State legislators to inform them of the Hawaii Ocean Resources Management Plan and the need to support coordinated efforts among agencies to implement the Plan. Development of communication tools to mitigate the impacts of tourism on marine resources.   |
| Other (specify)                 |                   |   |

**Enhancement Area Strategy Development:**

d. Will the CMP develop one or more strategies for this enhancement area?

Yes          X    
 No               

e. Briefly explain why a strategy will or will not be developed for this enhancement area.

Yes, a strategy will be developed for this enhancement area to continue the implementation of the ORMP, the HCZMP’s primary vehicle to coordinate State and County activities related to coastal and marine resource management. The ORMP is undergoing a concurrent update with the HCZMP Assessment & Strategy. The ORMP will primarily focus on the implementation of the priority areas listed above.

## STRATEGY

### Coastal Hazards

#### I. Issue Area(s)

The proposed strategy or implementation activities will support the following high-priority enhancement areas (*check all that apply*):

- |  |   |
|--|---|
| <input type="checkbox"/> Aquaculture                         | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting | <input type="checkbox"/> Wetlands                         |
| <input checked="" type="checkbox"/> Coastal Hazards          | <input type="checkbox"/> Marine Debris                    |
| <input type="checkbox"/> Ocean/Great Lakes Resources         | <input type="checkbox"/> Public Access                    |
| <input type="checkbox"/> Special Area Management Planning    |   |

#### II. Strategy Description

A. The proposed strategy will lead to, or implement, the following types of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

B. **Strategy Goal:** Improve and strengthen the management of development along the coastline through addressing episodic and chronic coastal hazards.

State the goal of the strategy for the five-year assessment period. The goal should be the specific program change to be achieved or be a statement describing the results of the project with the expectation that achieving the goal would eventually lead to a program change. For strategies that implement an existing program change, the goal should be a specific implementation milestone. For example, work with three communities to develop revised draft comprehensive plans that consider future sea level rise or, based on research and policy analysis, present proposed legislation on wetland buffers to state legislature or consideration. Rather than a lofty statement, the goal should be achievable within the time frame of the strategy.

The Coastal Hazards Strategy for the 2021-2025 has two goals. The first two years of the proposed Strategy focus on continuing the development and adoption of high-resolution probabilistic Tsunami Design Zone (TDZ) maps for the State of Hawaii. The subsequent three years of the proposed Strategy address the coastline adaptation strategies, which would strengthen the State of Hawaii's preparedness to addressing shoreline erosion and sea-level rise.

**Goal 1. Probabilistic Tsunami Design Zone Maps**

The first two years focus on continuing the development and adoption of comprehensive high-resolution probabilistic Tsunami Design Zone (TDZ) maps for the State of Hawaii for upcoming use with the International Building Code (IBC) 2021 / American Society of Civil Engineers (ASCE) 7-2022 Standard that will include tsunami loads and effects. The TDZ maps will be developed for the islands of Maui, Kauai and Hawaii.

**Goal 2. Coastline Adaptation Strategies**

The subsequent years address chronic coastal hazards, particularly strengthening coastal shoreline adaptation strategies through interagency cooperation. The HCZMP's Ocean Resources Management Plan identifies "Development and Coastal Hazards" as a Focus Area to prioritize Section 309 funding and staff capacity. To better manage development in the areas prone to coastal hazards, the HCZMP will develop an analysis of existing shoreline research in the State of Hawaii to identify future direction on how to protect the beaches in the State of Hawaii in addressing adaptation to sea-level rise and mitigation to shoreline erosion.

- C. Describe the proposed strategy and how the strategy will lead to and/or implement the program changes selected above. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)

**1. Probabilistic Tsunami Design Zone Maps**

The FY2016-2020 HCZMP Coastal Hazards Strategy focused primarily on developing 10 meter high-resolution 2,500-year probabilistic Tsunami Design Zone (TDZ) maps for the State of Hawaii. The HCZMP has since successfully completed developing probabilistic TDZ maps for the Island of Oahu. The maps are being presented to the American Society of Civil Engineers (ASCE) 7 Tsunami Loads and Effects Subcommittee (TLESC) for inclusion in the 2016 edition of the ASCE 7-16, Chapter 6 Tsunami Loads and Effects. The chapter was the first national, consensus-based standard for tsunami resilience. The design provisions to withstand tsunami loads and effects will also be adopted locally in the State of Hawaii Building Code and the City and County of Honolulu Building Code.

To continue developing probabilistic TDZ maps for State of Hawaii, the first goal of the of this Section 309 Strategy is to develop high-resolution TDZ maps for the islands of Maui, Kauai and Hawaii under Years 1 and 2. The HCZMP is procuring services to start modeling and mapping the maps for portions of the Island of Maui and will continue developing TDZ maps for remaining throughout the upcoming fiscal years. Subsequently, the tsunami provisions for the islands will be adopted in the State of Hawaii Building Code and the respective counties' Building Codes.

The development of the probabilistic TDZ maps will apply to tsunami provisions for Risk Category III and IV buildings and structures, which are primarily composed of critical infrastructure and high occupancy buildings. These provisions will provide a basis for more informed decision making for siting of future critical infrastructure by identifying areas that are at engineering risk from tsunami hazards. Developing high-resolution, refined TDZ maps and requiring their application in engineering practice is important in Hawaii because most critical infrastructure is located, and will likely continue to be, along the coast. Consequently, developing high-resolution TDZ maps allows

for improved coastal management for statewide coastal development of significant critical infrastructure.

## **2. Coastline Adaptation Strategies**

The second goal of this Section 309 Strategy addresses chronic coastal hazards. The Ocean Resources Management Plan identified “Development and Coastal Hazards” as a Focus Area. (Refer to the Ocean Resources Management Strategy for a description of the other Focus Areas.) The HCZMP aims to mitigate threats to development by developing policies and programs that limit shoreline hardening and managing development and redevelopment in hazard-prone areas, in addition to proactively addressing the effects of sea-level rise through interagency collaboration. Consequently, this goal of the proposed strategy will result in better delineation of the roles of state and county agencies that manage coastal development.

### **III. Needs and Gaps Addressed**

Identify what priority needs and gaps the strategy addresses and explain why the proposed program change or implementation activities are the most appropriate means to address the priority needs and gaps. This discussion should reference the key findings of the assessment and explain how the strategy addresses those findings.

#### **1. Probabilistic Tsunami Design Zone Maps**

Act 82, Session Laws of Hawaii 2007, established the State Building Code Council (SBCC) and a state building code, applicable to all construction in the State of Hawaii. Pursuant to Hawaii Revised Statutes (HRS) Chapter 107 Part II, the state building code shall include tsunami design provisions based on a nationally published standard; however, this statutory requirement has not been fulfilled to date. The HCZMP’s proposed strategy will directly address this gap by supporting community risk reduction through the adoption of structural design provisions to address tsunami loads and effects. In particular, the proposed strategy will fulfill the mapping need identified in the assessment to develop high-resolution probabilistic tsunami design zone maps for the State of Hawaii for use with the IBC 2021 / ASCE 7-22 Standard.

#### **2. Coastline Adaptation Strategies**

Development in coastal areas is an issue for all of Hawaii’s counties, where coastal developments face an imminent threat from sea-level rise. At least 19 percent of the beaches have been permanently lost (Summers et al., 2018)<sup>37</sup>. Loss of beaches and development in the coastal areas has been an issue since the 1990’s. The HCZMP has commissioned and supported various studies to learn about the challenges since. The State, however, continues to face challenges related to coastal development and coastal erosion. Many gaps in management remain and need to be addressed. Despite the best efforts of several state and county agencies responsible for managing coastal development, several management gaps have been identified. Although shoreline hardening accelerates shoreline erosion, standards and policy implementations are inconsistent. Further, there is no statewide policy that addresses this issue. This ambiguity creates confusion among state and county planners, developers and permit applicants. It also deters opportunities for a stronger policy stance on addressing coastal hardening. Consequently, private landowners and public goods are at risk to chronic coastal erosion and sea-level rise.

---

<sup>37</sup> Summers et al. (2018). Failure to protect beaches under slowly rising sea level. *Climate Change*, 151: 427–443.

The proposed strategy fills the gap between existing research on coastal erosion and sea-level rise, by identifying and implementing coastline adaptation strategies through developing and enhancing policies and programs that control development. The HCZMP will analyze the various studies cumulatively and collaborate with state and county agencies that manage coastline development to develop a range of coastline adaptation strategies suitable for the State of Hawaii. The proposed strategy allows the HCZMP to facilitate interagency collaboration to protect threatened developments and beaches from chronic coastal erosion.

#### **IV. Benefits to Coastal Management**

Discuss the anticipated effect of the strategy, including the scope and value of the strategy, in advancing improvements in the CMP and coastal management, in general.

##### **1. Probabilistic Tsunami Design Zone Maps**

The proposed strategy falls squarely within the federal and state coastal management objective of reducing the risks to life and property from coastal hazards, including geological hazards such as tsunamis (16 U.S.C. § 1452-2(B); HRS § 205A-2(b)(6)(A)). In particular, the new tsunami design zone maps will define the coastal zones where structures of greater importance would be designed for tsunami resistance and community resilience, ultimately leading to better consideration of siting and design of critical facilities and infrastructure.

##### **2. Coastline Adaptation Strategies**

The proposed strategy conforms to the state coastal management objectives of providing opportunities to the public for coastal recreational resources, managing development in the coastal zone and protecting beaches (HRS § 205A-2(b)(1)(A), HRS § 205A-2(b)(7)(A), HRS § 205A-2(b)(9)(A)). Prioritizing adaptation strategies for the coastlines in Hawaii mitigates future threats from coastal erosion, flooding and sea-level rise, and protects Hawaii's beaches, allowing residents and visitors continuous access to the beach.

##### **3. Likelihood of Success**

Discuss the likelihood of attaining the strategy goal and program change (if not part of the strategy goal) during the five-year assessment cycle or at a later date. Address the nature and degree of support for pursuing the strategy and the proposed program change and the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.

There is a very high likelihood of attaining the proposed strategy goal and program change during the five-year assessment cycle based on the details for each goal below.

##### **1. Probabilistic Tsunami Design Zone Maps**

- The importance of the proposed strategy goal and program change has been recognized by the State Legislature. Upon enacting Act 82, Session Laws of Hawaii 2007, the Hawaii State Legislature found that “the health and safety considerations related to [building codes] are of statewide interest, especially relating to emergency disaster preparedness.”
- The proposed strategy goal and program change is an unfulfilled statutory requirement. Act 82, Session Laws of Hawaii 2007, established the State Building Code Council (SBCC) and a state building code, applicable to all construction in the State of Hawaii. Pursuant to

HRS, Chapter 107 Part II, the state building code shall include tsunami design provisions based on a nationally published standard.

- The authority and duties of the SBCC and individual county governing bodies set forth in HRS Chapter 107 Part II will ensure local adoption of the tsunami design provisions. In particular, building officials appointed by the mayor of each of the four counties must serve on the State Building Code Council subcommittee responsible for recommending any necessary or desirable state amendments to the model codes pursuant to HRS Chapter 107 Part II. Any recommended state amendments shall require the unanimous agreement of the subcommittee. Furthermore, the governing body of each county shall amend the state building code as it applies within its respective jurisdiction without approval for the SBCC. Each county shall use the model codes and standards set forth in HRS Chapter 107 Part II as the referenced model building codes and standards for its respective county building code ordinance, no later than two years after the adoption of the state building code. If a county does not amend the statewide model code within the two-year time frame, the state building code shall become applicable as an interim county building code until the county adopts the amendments. As a result, once the probabilistic tsunami design zone maps and tsunami design provisions are adopted at the state level as administrative rules, they will become the minimum performance objectives acceptable throughout the State of Hawaii.
- The proposed strategy fulfills the strategic priority called for in the 2018 State of Hawaii Hazard Mitigation Plan. The Plan lists the development of probabilistic Tsunami Design Zone maps as an action item as part of the Plan's mitigation strategy.
- The HCZMP has been successful at obtaining similar program changes in recent history, namely the development and adoption of customized wind speed maps and local building code amendments for all four of Hawaii's counties (See Appendix A – *Success Story: Completion of the Hawaii-specific Wind Design Standards and Building Code Project Applicable to All New Construction in the State of Hawaii*).
- The preceding phases of the modeling/mapping project for the island of Oahu have already been successfully completed. Procurement for the Maui, Phase I portion of is in-progress.
- The greatest known impediment at this time is the political process involved with the adoption of building codes that is beyond the control of the HCZMP and greater hazard mitigation community; however, the recent Administration transition at the State level coupled with the multitude of recent coastal hazard related disasters worldwide and widespread support for this project should provide a more favorable climate for the adoption of the new tsunami design provisions than in previous years. Additionally, the HCZMP requested formal letters of support from relevant state and county agencies and committees in order to demonstrate the widespread endorsement of this project.

## **2. Coastline Adaptation Strategies**

- The HCZMP has commissioned various studies on shoreline adaptation strategies since the 1990s, including the Oahu Shoreline Management Plan (1991), Hawaii Coastal Erosion Management Plan (1998), Shoreline Hardening Policy and Environmental Assessment Guidelines (1998), Beach Management Plan for Maui (2008), A Framework for Addressing Climate Change Adaptation in Hawaii (2009), Hawaii Sea-level Rise

Vulnerability and Adaptation Report (2017) and the Ocean Resources Management Plan Action Team for Appropriate Coastal Development Management of Coastal Hazards (2013-2018).

- There have also been other studies in the State regarding shoreline adaptation including Climate Change and Regulatory Takings in Coastal Hawaii (2011), Integrated Shoreline Policy (n.d.) and Waikiki Beach Management Plan (2018).
- The 2018 State of Hawaii Hazard Mitigation Plan identifies chronic coastal flooding as one the challenges in the State. The chronic flooding, if not addressed, can become permanent flooding. Chronic flooding is exacerbated through coastal erosion, leading to permanent beach loss and threatening development.
- The 2017 Sea Level Rise and Vulnerability Report includes an analysis on erosion models and all the islands' coastal assets. The Report is accompanied by a sea-level rise viewer that demarcates areas threatened. This viewer is currently being adopted by the islands of Maui and Kauai.

#### 4. Strategy Work Plan

Using the template below, provide a general work plan that includes the major steps that will lead toward or achieve a program change or implement a previously achieved program change. If the state intends to fund implementation activities for the proposed program change, describe those in the plan as well. The plan should identify a schedule for completing the strategy and include major projected milestones (key products, deliverables, activities, and decisions) and budget estimates. If an activity will span two or more years, it can be combined into one entry (i.e., Years 2-3 rather than Year 2 and then Year 3). While the annual milestones are a useful guide to ensure the strategy remains on track, OCRM recognizes that they may change somewhat over the course of the five-year strategy unforeseen circumstances. The same holds true for the annual budget estimates. Further detailing and adjustment of annual activities, milestones, and budgets will be determined through the annual cooperative agreement negotiation process.

**Strategy Goal:** The HCZMP seeks to support the development and subsequent adoption of comprehensive high-resolution probabilistic tsunami design zone maps for the State of Hawaii for upcoming use with the International Building Code 2021 / American Society of Civil Engineers 7-2022 Standard that will include tsunami loads and effects.

**Total Years:** Five (5) Years

**Total Budget:** \$364,000

#### Year 1

- **Description of activities – Probabilistic Tsunami Design Zone Maps for State of Hawaii:**
  - Model/map Tsunami Design Zone maps for the island of Maui, Phase I for Kahului and from Makena to Kihei;

- Obtain contractual services to complete the island of Maui, Phase II for Maalaea to Kapalua and for the island of Kauai from Hanalei, Anahole to North of Lihue, and Poipu to Polihale.
  - **Major Milestone(s):**
    - Executed contract to complete the island of Maui, Phase I;
    - Completion of probabilistic Tsunami Design Zone maps for the island of Maui, Phase I. Deliverables associated with this milestone include:
      - Probabilistic Tsunami Design Zone maps that depict inundation depth, extent of flooding, location of tsunami bores;
      - Project geodatabase;
      - User-friendly file format (e.g., Keyhole Markup Language Zipped (KMZ) file) for convenient viewing and editing (e.g., for use with Google Earth and/or Google Maps).
    - Project workplan for the island of Maui, Phase II.
  - **Budget: \$151,000**
    - \$122,346 (Modeling/Mapping)
    - \$28,654 (Principal Investigator)
- 

## Year 2

- **Description of activities – Probabilistic Tsunami Design Zone Maps for State of Hawaii:**
  - Model/map Tsunami Design Zone maps for the island of Maui, Phase II from Maalaea to Kapalua and for the island of Kauai for Hanalei, Anahole to North of Lihue, and Poipu to Polihale;
  - Obtain contractual services and model/map Tsunami Design Zone maps for the island of Hawaii.
- **Major Milestone(s):**
  - Completion of probabilistic Tsunami Design Zone maps for the island of Maui, Phase II. Deliverables associated with this milestone include:
    - Probabilistic Tsunami Design Zone maps that depict inundation depth, extent of flooding, location of tsunami bores;
    - Project geodatabase;
    - User-friendly file format (e.g., Keyhole Markup Language Zipped (KMZ) file) for convenient viewing and editing (e.g., for use with Google Earth and/or Google Maps).
  - Completion of Tsunami Design Zone maps for the island of Hawaii. Deliverables associated with this milestone include:
    - Probabilistic Tsunami Design Zone maps that depict inundation depth and extent of flooding;
    - Project geodatabase;

- User-friendly file format (e.g., Keyhole Markup Language Zipped (KMZ) file) for convenient viewing and editing (e.g., for use with Google Earth and/or Google Maps).
  - **Budget: \$60,000**
    - \$50,000 (Modeling/Mapping)
    - \$10,000 (Principal Investigator)
- 

### Year 3

- **Description of activities:**
    - Initiate developing policies and programs that limit shoreline hardening and managing development and redevelopment in hazard-prone areas and areas with chronic coastal erosion.
      - Lead stakeholder discussions that would lead to interagency collaboration with county departments, Office of Conservation and Coastal Lands and the University of Hawaii School of Ocean & Earth Science & Technology.
    - Develop or enhance programs that eliminate development and redevelopment in hazard-prone areas and areas with chronic coastal erosion.
      - Expand on existing buy-out research commissioned by the HCZMP to establish relocation assistance.
    - Develop or enhance policies to minimize shoreline hardening and protect beaches from degradation.
    - Develop climate change adaptation plans that include conducting vulnerability assessments and identifying actions to minimize risks or incorporate adaptation into other plans, such as hazard mitigation and natural resource protection plans.
  - **Major Milestone(s):**
    - Policy recommendations to mitigate coastal erosion, avoid threat of property loss and protect beaches.
    - Statewide vulnerability assessment of climate change impacts on social and cultural resources.
  - **Budget: \$51,000**
- 

### Years 4 and 5

- **Description of activities:**
  - Establish a technical assistance program to support local risk reduction efforts.
  - Procure services through sister state agencies such as the Office of Conservation of Coastal Lands and county departments agencies to implement shoreline protection strategies.

- Adopt statewide managed retreat plans or policies for areas with chronic coastal erosion.
  - **Major Milestone(s):**
    - Policies at the state and county levels that control development on the shoreline.
    - Statewide policies and programs that avoid shoreline hardening to protect beaches from erosion.
    - Managed retreat policies or plans.
  - **Budget: \$102,000**
    - \$51,000 (Year 4)
    - \$51,000 (Year 5)
- 

## 5. Fiscal and Technical Needs

**A. Fiscal Needs:** If 309 funding is not sufficient to carry out the proposed strategy, identify additional funding needs. Provide a brief description of what efforts the CMP has made, if any, to secure additional state funds from the legislature and/or from other sources to support this strategy.

It is likely that 309 funds will not be sufficient to carry out the proposed strategy. Should additional funds be necessary, the HCZMP will seek partnership opportunities with sister State agencies such as HI-EMA and OCCL in order to leverage 309 funds awarded to the HCZMP under this strategy for the purposes of carrying-out outstanding tasks.

**B. Technical Needs:** If the state does not possess the technical knowledge, skills, or equipment to carry out all or part of the proposed strategy, identify these needs. Provide a brief description of what efforts the CMP has made, if any, to obtain the trained personnel or equipment needed (for example, through agreements with other state agencies).

Private engineering, scientific, and research capabilities are necessary to accomplish the probabilistic tsunami design zone maps and building code amendments for the State of Hawaii. These services will be procured in compliance with the Hawaii Public Procurement Code.

## 6. Projects of Special Merit (Optional)

If desired, briefly state what projects of special merit the CMP may wish to pursue to augment this strategy. Any activities that are necessary to achieve the program change or that the state intends to support with baseline funding should be included in the strategy above. The information in this section will not be used to evaluate or rank projects of special merit and is simply meant to give CMPs the option to provide additional information if they choose. Project descriptions should be kept very brief (e.g., undertake benthic mapping to provide additional data for ocean management planning). Do not provide detailed project descriptions that would be needed for the funding competition.

The HCZMP proposes to pursue projects of special merit to procure technical expertise needed to carry out the proposed strategy. It is likely that the costs will exceed the budget for the proposed strategy.

## ***Ocean Resources Management Planning***

- **Issue Area(s)**

The proposed strategy or implementation activities will support the following high-priority enhancement areas (*check all that apply*):

- |   |   |
|---|---|
| <input type="checkbox"/> Aquaculture                            | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting    | <input type="checkbox"/> Wetlands                         |
| <input type="checkbox"/> Coastal Hazards                        | <input type="checkbox"/> Marine Debris                    |
| <input checked="" type="checkbox"/> Ocean/Great Lakes Resources | <input type="checkbox"/> Public Access                    |
| <input type="checkbox"/> Special Area Management Planning       |   |

- **Strategy Description**

- The proposed strategy will lead to, or implement, the following types of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

- **Strategy Goal:** *State the goal of the strategy for the five-year assessment period. The goal should be the specific program change to be achieved or be a statement describing the results of the project with the expectation that achieving the goal would eventually lead to a program change. For strategies that implement an existing program change, the goal should be a specific implementation milestone. For example, work with three communities to develop revised draft comprehensive plans that consider future sea level rise or, based on research and policy analysis, present proposed legislation on wetland buffers to state legislature or consideration. Rather than a lofty statement, the goal should be achievable within the time frame of the strategy.*

The goal of the strategy for this enhancement area is to implement the priority actions of the 2020 Ocean Resources Management Plan. The primary mechanisms for the effectuation of this goal include several benchmarks for the HCZMP to work towards, including: 1) The endorsement of the 2020 Ocean Resources Management Plan by the Council on Ocean Resources, 2) Creation of guidelines to increase the utilization of green infrastructure in Hawaii's urban zone, and 3) The strengthening of Hawaii's enforceable policies in Marine Managed Areas in collaboration with the Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR).

The endorsement of the 2020 Ocean Resources Management Plan and creation of green infrastructure guidelines represent Program Changes through administrative decisions. The provision of assistance to partner agencies in amending the boundaries of or creating new Marine Managed Areas in Hawaii's nearshore areas will generate or amend enforceable policies, resulting in a Program Change through new or revised special area management plans.

- *Describe the proposed strategy and how the strategy will lead to and/or implement the program changes selected above. If the strategy will only involve implementation activities, briefly describe the program change that has already been adopted, and how the proposed activities will further that program change. (Note that implementation strategies are not to exceed two years.)*

The proposed strategy will pursue both administrative decisions and special area management plan designations through the work of the 2020 Ocean Resources Management Plan. The adoption of the updated Ocean Resources Management Plan by the Council on Ocean Resources, which is composed of the directors and managers of state and federal agencies, constitutes a commitment to the plan's proposed initiatives. This endorsement of the Plan's statewide policy direction constitutes an administrative decision. Once endorsed, the Plan's Focus Areas will be used to promote further strategic accomplishments and accompanying Program Changes.

The 2020 Ocean Resources Management Plan includes three Focus Areas, determined by extensive public and agency outreach:

- Development and Coastal Hazards (See Coastal Hazards Strategy for details on proposed Program Changes associated with Focus Area #1)
- Land-Based Pollution
- Marine Ecosystems

Focus Area #2, Land-Based Pollution, will pursue a Program Change through the creation of guidelines to reduce the negative impacts of runoff from land to sea. The guidelines will promote the utilization of green infrastructure in developed zones statewide. Focus Area #3, Marine Ecosystems, will emphasize efforts to strengthen Hawaii's enforceable policies in Marine Managed Areas. This effort will create new or revised special area management plans with the DLNR DAR, in support of the statewide Marine 30x30 Initiative, a component of the Sustainable Hawai'i Initiative, which seeks to effectively manage 30% of Hawai'i's nearshore marine environment by 2030.

During the FY 2020-2025 cycle, HCZMP will continue to coordinate the implementation of the 2020 Ocean Resources Management Plan to mitigate coastal issues and enhance the efforts of coastal zone management partner agencies. In addition to the three Focus Areas, the Plan's Management Priorities include metrics which are tracked by partner agencies. The metrics indicate progress in improving comprehensive coastal zone management strategies. As implementation activities are undertaken, the need for new or amended policies may be identified that may result in enacting and achieving a Program Change.

Initiatives likely to result in Program Changes during the FY 2020-2025 cycle include:

- Endorsement of 2020 Ocean Resources Management Plan by Council on Ocean Resources
- Guidance for the utilization of low impact development for the improvement coastal and stream water quality
- Support of Sustainable Hawai'i Marine 30x30 Initiative, including:

- Research, monitoring, sampling, collection of biological information, impact assessments, etc. to inform new and revised rules for coastal and coral reef conservation and the sustainable use of marine resources
  - Outreach, education, and public meeting needs
  - Policy analysis and recommendations
- **Needs and Gaps Addressed**

*Identify what priority needs and gaps the strategy addresses and explain why the proposed program change or implementation activities are the most appropriate means to address the priority needs and gaps. This discussion should reference the key findings of the assessment and explain how the strategy addresses those findings.*

The ORMP update process was designed to identify management gaps and improve coastal management processes. Many gaps were documented, as evidenced through HCZMP research and voiced by community members and agency partners in public meetings and individual interviews. An analysis of the numerous comments received yielded several critical needs among the State's ocean resources. The most pressing issues were determined by considering the sheer number of comments received as well as the urgency of each issue as expressed by agency stakeholders and subject-matter experts. The priority issues articulated by stakeholders were concerns about water quality and the health of the nearshore marine environment, declines in both of which are direct responses to land-based human pressures. Agency stakeholders and subject-matter experts expressed similar concerns about these issues and validated their ongoing importance to coastal health and resiliency.

#### Focus Area #2

During public outreach, over 400 individual comments were received regarding water quality and quantity issues. The primary public concerns were noted as wastewater discharges (including cesspool pollution) and the varied impacts of sedimentation and chemical/nutrient pollution (non-point stormwater runoff) on coastal resources. Notably, in Hawaii positive mitigative activities are currently occurring in the upper watershed, led by the DLNR-Division of Forestry and Wildlife and their partners, to control sources of erosion and sedimentation (such as feral ungulates and invasive flora). Lower in the watershed, many stakeholders have rallied around the issues of marine debris and coastal erosion, which also impact coastal water quality. A discernable gap in management was identified in the middle of the watershed, where waters flow through densely developed zones, gathering pollutants and sediment on their way toward the coast. As a result, a Focus Area #2's focus on land-based pollution will target the urban-zoned area of Hawaii's watersheds with a goal of improving coastal water quality by mitigating the quantity and improving the quality of non-point stormwater runoff, with a focus on guiding interventions in the middle of the watershed. This focus will evaluate a spectrum of low-impact development options and provide suggestions within the developed zone to improve both land and coastal water quality. This collaborative Focus Area will acknowledge and build upon efforts at the county level, as well as commendable but fragmentary initiatives promoted by local non-profit entities.

#### Focus Area #3

Approximately 300 individual comments were received regarding concerns about the overall health of marine resources and the long-term sustainability of our current practices in the face of global

climate change. Several issues that are negatively modifying marine habitats at present are: tourism impacts, overfishing, water quality (as discussed above), aquatic invasive species, marine debris, and global climate change, including ocean warming and acidification. While some of these issues are global in nature, many are influenced or exacerbated by local conditions and societal practices. Efforts in Focus Area #3 will serve to support the DLNR-Division of Aquatic Resources in their efforts to establish and expand Marine Managed Areas to improve Hawaii's coastal resiliency. Focus Area #3 will support the strengthening of Hawaii's enforceable policies in Marine Managed Areas. These efforts may require support in research, meeting facilitation, public outreach, policy analysis and other project components. The ultimate outcome of this support will result in the creation of new or revised special area management plans with the DLNR-DAR, in support of the statewide Marine 30x30 Initiative, a component of the Sustainable Hawai'i Initiative, which seeks to effectively manage 30% of Hawai'i's nearshore marine environment by 2030.

- **Benefits to Coastal Management**

*Discuss the anticipated effect of the strategy, including the scope and value of the strategy, in advancing improvements in the CMP and coastal management, in general.*

The endorsement of the 2020 Ocean Resources Management Plan and ensuing work to reduce land-based pollution and enhance marine ecosystem resiliency will improve the wellbeing of Hawaii's residents and visitors alike. These efforts are complementary in that the improvement of stormwater runoff quality and reduction of runoff quantity will help to improve nearshore habitat health by mitigating a chronic source of land-based stress on marine ecosystems. While these strategies are statewide in nature, they are anticipated to require tailored local mechanisms and positive localized effects upon their implementation. Because the benefits are comingled, the benefits of both Focus Areas are anticipated to grow over time, particularly in the case of the establishment of Marine Managed Areas. The value of both conservation efforts and low impact development also extends to public education and reinforcement of positive human behaviors, which instill positive feedback loops for environmental health and wellbeing.

- **Likelihood of Success**

*Discuss the likelihood of attaining the strategy goal and program change (if not part of the strategy goal) during the five-year assessment cycle or at a later date. Address the nature and degree of support for pursuing the strategy and the proposed program change and the specific actions the state or territory will undertake to maintain or build future support for achieving and implementing the program change, including education and outreach activities.*

The likelihood for success for this strategy is high. These efforts will capitalize on existing work and strong partnerships between state, federal, county agencies, and the Marine and Coastal Zone Advisory Council. Agencies are committed to implementation of the ORMP through the Hawaii Ocean Partnership, which was adopted in 2013. This commitment is a strong indicator for the dedication of staff resources to participate in the ORMP process on a consistent basis, therefore, it is highly likely that this strategy will meet with success.

- **Strategy Work Plan**

*Using the template below, provide a general work plan that includes the major steps that will lead toward or achieve a program change or implement a previously achieved program change. If the state intends to fund implementation activities for the proposed program change, describe those in*

*the plan as well. The plan should identify a schedule for completing the strategy and include major projected milestones (key products, deliverables, activities, and decisions) and budget estimates. If an activity will span two or more years, it can be combined into one entry (i.e., Years 2-3 rather than Year 2 and then Year 3). While the annual milestones are a useful guide to ensure the strategy remains on track, OCRM recognizes that they may change somewhat over the course of the five-year strategy unforeseen circumstances. The same holds true for the annual budget estimates. Further detailing and adjustment of annual activities, milestones, and budgets will be determined through the annual cooperative agreement negotiation process.*

**Strategy Goal:** The goal of the strategy for this enhancement area is to implement the priority actions of the 2020 Ocean Resources Management Plan, including:

- 1) The endorsement of the 2020 Ocean Resources Management Plan by the Council on Ocean Resources,
- 2) Adoption of guidelines to increase the utilization of green infrastructure in Hawaii's urban zone, and
- 3) The strengthening of Hawaii's enforceable policies in Marine Managed Areas in collaboration with the Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR).

**Total Years:** 5

**Total Budget:** \$391,000

**Year(s): 1**

**Description of activities:** Endorsement of 2020 Ocean Resources Management Plan by the Council on Ocean Resources. Analysis of existing landscape of Hawaii's State and County laws, rules, regulations, and ordinances related to water quality, stormwater runoff, low-impact development, and flood control issues. Identification of major stakeholders working on water quality, stormwater runoff, and flood control issues. Research and interviews with relevant personnel. Identification of barriers to implementation of best management practices (Focus Area #2).

**Major milestone(s):** Completion of project research and scoping phase.

**Budget:** 0

**Year(s): 2**

**Description of activities:** Obtain specialist services and commence initiative to create guidance on the utilization of green infrastructure in Hawaii's urban zone (Focus Area #2). Support DLNR-DAR research needs (Focus Area #3).

**Major Milestone(s):** Obtain consultant services and commence green infrastructure guidance project, fund marine ecosystems research needs.

**Budget:** \$60,000

**Year(s): 3**

**Description of activities:** Finalize and distribute guidance output statewide (Focus Area #2). Support DLNR-DAR public outreach and education efforts for Sustainable Hawaii Marine 30x30 Initiative (Focus Area #3).

**Major Milestone(s):** Completion of guidance.

**Budget:** \$51,000

**Year(s): 4**

**Description of activities:** Provide training or education/outreach as needed for utilization of guidance product (Focus Area #2). Continue to support DLNR-DAR public outreach and education efforts for Sustainable Hawaii Marine 30x30 Initiative (Focus Area #3).

**Major milestone(s):** Public outreach and educational efforts to promote utilization of guidance product.

**Budget:** \$51,000

**Year(s):** 5

**Description of activities:** Assess utilization of product by county officials and stakeholders. Identify next steps for mitigating sources of land-based pollution in the urban zone, remaining management gaps (Focus Area #2).

**Major milestone(s):** Examine product efficacy. Determine next steps in initiating project to mitigate land-based pollution in developed zones, i.e. shifting from urban to agricultural sediment and nutrients in stormwater runoff.

**Budget:** \$51,000

- **Fiscal and Technical Needs**

- **Fiscal Needs:** *If 309 funding is not sufficient to carry out the proposed strategy, identify additional funding needs. Provide a brief description of what efforts the CMP has made, if any, to secure additional state funds from the legislature and/or from other sources to support this strategy.*

It is anticipated that Section 309 funding will be sufficient to carry out the proposed strategy for this enhancement area.

- **Technical Needs:** *If the state does not possess the technical knowledge, skills, or equipment to carry out all or part of the proposed strategy, identify these needs. Provide a brief description of what efforts the CMP has made, if any, to obtain the trained personnel or equipment needed (for example, through agreements with other state agencies).*

The State possesses the technical knowledge and skills to carry out the proposed strategy. If needed, the State will contract with subject matter experts to provide specialty services.

- **Projects of Special Merit (Optional)**

If desired, briefly state what projects of special merit the CMP may wish to pursue to augment this strategy. Any activities that are necessary to achieve the program change or that the state intends to support with baseline funding should be included in the strategy above. The information in this section will not be used to evaluate or rank projects of special merit and is simply meant to give CMPs the option to provide additional information if they choose. Project descriptions should be kept very brief (e.g., undertake benthic mapping to provide additional data for ocean management planning). Do not provide detailed project descriptions that would be needed for the funding competition.

Ocean Resources Management Plan Action Teams for Focus Areas #2 and #3 may develop Action Plans which identify additional projects, the implementation of which are likely to exceed available 309 funding. Applications for Projects of Special Merit are anticipated to be submitted to cover the cost of additional implementation as directed by the subject-matter expertise of the Action Teams.

### **5-Year Budget Summary by Strategy**

At the end of the strategy section, please include the following budget table summarizing your anticipated Section 309 expenses by strategy for each year.

| <b>Strategy Title</b>   | <b>Year 1 Funding</b> | <b>Year 2 Funding</b> | <b>Year 3 Funding</b> | <b>Year 4 Funding</b> | <b>Year 5 Funding</b> | <b>Total Funding</b> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| <i>Probabilistic Tsunami Design Zone Maps for the State of Hawaii</i> | 151,000               | 60,000                | 51,000                | 51,000                | 51,000                | 364,000              |
| <i>Ocean Resources Management Planning</i>                            | 0                     | 91,000                | 100,000               | 100,000               | 100,000               | 391,000              |
| <b>Total Funding</b>  | <b>151,000</b>        | <b>151,000</b>        | <b>151,000</b>        | <b>151,000</b>        | <b>151,000</b>        | <b>755,000</b>       |

## SUMMARY OF STAKEHOLDER AND PUBLIC COMMENT

### Stakeholder Comment

The HCZMP solicited input for the Section 309 Enhancement Program Assessment from its network of representatives from state agencies, county planning agencies, federal agencies and non-profit agencies that frequently work with the program. The HCZMP reached out to the following stakeholder agencies for input:

- Department of Agriculture
- Department of Business, Economic Development & Tourism
- Department of Hawaiian Home Lands
- Department of Health
- Department of Land and Natural Resources (DLNR)
- DLNR Commission on Water Resource Management
- Department of Transportation
- Hawaii Emergency Management Agency
- Office of Hawaiian Affairs
- University of Hawaii Sea Grant College Program
- City & County of Honolulu Department of Planning & Permitting
- City & County of Honolulu Board of Water Supply
- County of Hawaii Planning Department
- County of Kauai Planning Department
- County of Maui Planning Department
- Marine and Coastal Zone Advocacy Council
- Pacific Islands Ocean Observing System

The stakeholders provided feedback on what they felt are the high priority enhancement areas, the critical problems related to those priority areas and the greatest opportunities for the HCZMP to strengthen and enhance them. This ensured that the priorities and needs proposed in the assessment and strategy reflect more than just the HCZMP staff opinions.

The Marine and Coastal Zone Advocacy Council (MACZAC) is the public advisory body of the HCZMP that was established in the Hawaii CZM statute, HRS Chapter 205A. MACZAC is an important HCZMP stakeholder group that is comprised of twelve public advisory members from the islands of Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii, with diverse backgrounds in business, environment native Hawaiian practices, terrestrial and marine commerce, recreation, research, and tourism. MACZAC members were notified of the 309 Assessment & Strategy update process at the May 10, 2019 MACZAC meeting. The CZM Program requested that two members of MACZAC serve as stakeholders to review and provide input on the Draft Assessment & Strategy. The Oahu and West Hawaii Representatives volunteered to serve in that capacity and will be provided with the draft assessment and strategy concurrently with the stakeholder/NOAA review period. Additionally, MACZAC members participated in the eight statewide public listening sessions which served to fulfill public input for the development of the strategy.

### Public Comment

The National CZMA places a strong emphasis on public participation and encourages the participation, coordination, and cooperation with and among appropriate local, state, federal and regional groups to

help carry out the goals of the CZMA. In keeping with the intent of the CZMA, the A&S is a public document. During the A&S development process, the HCZMP provided opportunities for the public to provide input via Statewide information sharing sessions and an online survey. General public participation in the A&S process was also conducted via Statewide information sessions held on Kauai, Oahu (Kapolei and Honolulu), Molokai, Lanai Maui, and Hawaii Island (Kona and Hilo) and an online survey. A total of 141 people attended one of our in-person meetings and 156 people participated through our online survey.

During the timeframe concurrent with NOAA review of the draft A&S, the HCZMP initiated the 30-day public comment period by posting the draft A&S document on its public website. The public is being provided the opportunity to review the draft document and submit comments through the website.

## REFERENCES

- Butler, R. (2014). *Great Aleutian Tsunamis*. Hawaii Institute of Geophysics and Planetology Peer Reviewed Reports, HIGP-2014-1. Retrieved from: <http://www.higp.hawaii.edu/reports/2014/Butler.R.Peer-Reviewed-Report-HIGP-2014-1.pdf>
- Federal Emergency Management Agency (FEMA). (2015). *Coastal High Hazard Area*. Retrieved from: <https://www.fema.gov/coastal-high-hazard-area>.
- Fletcher, C.H., Romine, B.M., Genz, A.S., Barbee, M.M., Dyer, M., Anderson, T.R., Lim, S.C., Vitousek, S., Bochicchio, C., and Richmond, B.M. (2012). *National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands*. U.S. Geological Survey Open-File Report 2011-1051. Retrieved from: <http://pubs.usgs.gov/of/2011/1051/>.
- University of Hawaii Sea Grant College Program (UH Sea Grant). (2014). *Risk and Vulnerability Assessment Level Risk Impact in Honolulu, Hawaii*. Project summary retrieved from: <http://seagrant.soest.hawaii.edu/sites/default/files/csp/noaa-csp-slr-summary.pdf>. Project data retrieved from: <http://oos.soest.hawaii.edu/pacioos/projects/slr/>.
- Department of Business, Economic Development & Tourism (DBEDT). (2013). *2012 State of Hawaii Data Book*. Retrieved from: <http://dbedt.hawaii.gov/economic/databook/db2012/>.
- DBEDT. (2014a). *2013 State of Hawaii Data Book*. Retrieved from: <http://dbedt.hawaii.gov/economic/databook/db2013/>.
- DBEDT. (2014b). *DBEDT Forecasts (1Q 2015): Visitor Arrival*. Retrieved from: [http://files.hawaii.gov/dbedt/visitor/tourismforecast/Forecast\\_Arrivals.pdf](http://files.hawaii.gov/dbedt/visitor/tourismforecast/Forecast_Arrivals.pdf).
- Department of Defense (DOD/HI-EMA), State of Hawaii. (2013). *State of Hawaii Multi-Hazard Mitigation Plan 2013 Update*. Prepared by Martin & Chock, Inc. Honolulu, Hawaii.
- Department of Land and Natural Resources (DLNR), State of Hawaii. (2009). *State Comprehensive Outdoor Recreation Plan (SCORP) 2008 Update*. Retrieved from: <http://state.hi.us/dlnr/reports/scorp/SCORP08-1.pdf>.
- DLNR, State of Hawaii. (2015). *Statewide Comprehensive Outdoor Recreation Plan 2015 Draft Summary Report*. Retrieved from: <http://dlnr.hawaii.gov/dsp/files/2015/04/Draft-SCORP-Summary-2015.pdf>.
- Division of Aquatic Resources (DAR), DLNR, State of Hawaii. (2012). *Commercial Marine Landings Summary Trend Report, Calendar Year 2012*. Retrieved from: <http://dlnr.hawaii.gov/dar/fishing/commercial-fishing/>.
- Division of Aquatic Resources (DAR), DLNR, State of Hawaii. (2015). *Regulated Areas*. Retrieved from: <http://dlnr.hawaii.gov/dar/fishing/fishing-regulations/regulated-areas/>.
- Division of Forestry and Wildlife (DOFAW), DLNR, State of Hawaii. (2011). *Wetland Restoration and Habitat Enhancement Plan, Kawainui Marsh, Kailua, Oahu*. Retrieved from: <http://dlnr.hawaii.gov/wildlife/info/kawainui-marsh-wetland-restoration-and-habitat-enhancement-plan/>.
- Division of Forestry and Wildlife (DOFAW), DLNR, State of Hawaii. (2015). *Na Ala Hele Hawaii Trail & Access System*. Retrieved from: <http://www.hawaiitrails.org/>.
- Division of State Parks (SP), DLNR, State of Hawaii. (2015). *Hiking*. Retrieved from <http://dlnr.hawaii.gov/dsp/hiking/>.
- Hawaii Tourism Authority (HTA). (2013). *2013 Annual Visitor Research Report*. Retrieved from: [http://www.hawaiitourismauthority.org/default/assets/File/reports/visitor-statistics/2013%20ANNUAL%20REPORT%20\(final\).pdf](http://www.hawaiitourismauthority.org/default/assets/File/reports/visitor-statistics/2013%20ANNUAL%20REPORT%20(final).pdf).

- National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program. (2012). *Hawaii Marine Debris Action Plan, 2012-2013*. Retrieved from: [http://marinedebris.noaa.gov/sites/default/files/FINAL\\_HI-MDAP\\_2012-2013\\_web.pdf](http://marinedebris.noaa.gov/sites/default/files/FINAL_HI-MDAP_2012-2013_web.pdf).
- National Oceanic and Atmospheric Administration (NOAA). (2013). *National Coastal Population Report: Population Trends from 1970-2020*. Retrieved from: <http://stateofthecoast.noaa.gov/>.
- NOAA Technical Memorandum, National Marine Fisheries Service (NMFS). (2014). *U.S. Pacific Marine Mammal Stock Assessments, 2013*. Retrieved from: <http://www.nmfs.noaa.gov/pr/sars/region.htm>
- Office of Planning, State of Hawaii. (2013). *Hawaii Ocean Resources Management Plan*. Retrieved from: [http://files.hawaii.gov/dbedt/op/czm/ormp/ormp\\_update\\_reports/final\\_ormp\\_2013.pdf](http://files.hawaii.gov/dbedt/op/czm/ormp/ormp_update_reports/final_ormp_2013.pdf).
- Office of Planning, State of Hawaii. (2010). *Hawaii Watershed Guidance*. Retrieved from: <http://health.hawaii.gov/cwb/files/2013/05/Hawaiis-Watershed-Guidance.pdf>.
- Pacific Coast Joint Venture Hawaii (2006). *Strategic Plan for Wetland Conservation in Hawaii 1<sup>st</sup> Revision*. <http://www.pacificbirds.org/wp-content/uploads/2014/12/HWJVStrategicPlan-3.pdf>.
- U.S. Fish & Wildlife Service (USFWS). (2014a). *Annual Report of Lands under Control of the U.S. Fish & Wildlife Service as of September 30, 2013*. Retrieved from: <http://www.fws.gov/refuges/land/LandReport.html>.
- USFWS. (2014b). *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Hawaii*. Retrieved from: <https://www.census.gov/prod/2013pubs/fhw11-hi.pdf>.
- USFWS. Oregon (2011). *Recovery Plan for Hawaiian Waterbirds, Second Revision*. Retrieved from: [http://www.fws.gov/pacificislands/CH\\_Rules/Hawaiian%20Waterbirds%20RP%202nd%20Revision.pdf](http://www.fws.gov/pacificislands/CH_Rules/Hawaiian%20Waterbirds%20RP%202nd%20Revision.pdf).

## APPENDICES

### *Appendix A. Coastal Hazards Successes*

#### **Completion of the Hawaii-specific Wind Design Standards and Building Code Project Applicable to All New Construction in the State of Hawaii**

The HCZMP has successfully completed the above-named project, which spanned the nine-year period from June 2005 – October 2014. Major project goals were to: (a) build resilient communities by adoption of the latest building codes that include state-of-the-art standards for coastal hazard mitigation specific to each of the State’s four counties, and (b) provide technical support to state and county officials and building industry professionals on the application and interpretation of these building codes. Project highlights by year follow:

**2006:** County of Hawaii wind design maps, standards, and code provisions completed under HICZMP contract. (306)

**2007:**

- V. Act 82, Session Laws of Hawaii establishes the State Building Code Council (SBCC). HICZMP co-drafts the legislation which mandates state adoption of the latest building codes (International Codes) and which specifically requires inclusion of hurricane, tsunami, and flood design standards into the codes.
- HICZMP initiates statewide training in the International Codes (including building, residential, existing, structural, nonstructural, plan reviews, building inspection, transition to the International Codes, mixed occupancies, architectural design, earthquake-resistant design, post-earthquake building inspections, and Hawaii-specific wind design). HICZMP offers training to the public and private sectors in all counties over the seven-year period of 2007-2014. (306, 309)

**2008:** County of Maui wind design maps, standards, and code provisions completed under HICZMP contract. (309)

**2009:**

- The American Society of Civil Engineers (ASCE) 7 Standards Committee revises the 2005 Edition of ASCE 7 by designating the State of Hawaii as a Special Wind Region. This designation represents a national acceptance of the technical accuracy of the Hawaii wind design standards and recognizes that for Hawaii, those standards supersede the more generalized national wind standards.
- Honolulu City Ordinance No. 07-022 (International Building Code with Hawaii wind design standards) are incorporated into the HICZMP as *enforceable policies*, March 12, 2009.

**2010:**

- D. SBCC adopts the Hawaii State Building Code as administrative rules; i.e., *enforceable policies*, (Hawaii Administrative Rules, Title 3, Subtitle 14, Chapter 180 State Building Code). Appendix W of the Code consists of the Hawaii wind design standards developed through Section 306 and 309 funds and FEMA hazard mitigation grant funds. Through this adoption, the most relevant and current building and hazard mitigation science were incorporated into law and practice for all new state buildings.

- E. The wind design standards developed by this project, along with those funded by FEMA for Honolulu and Kauai counties and adopted in Hawaii State Building Code, receives the 2010 American Society of Civil Engineers Hawaii Section Outstanding Civil Engineering Achievement (OCEA) Award. The OCEA Award is the highest recognition given to a Hawaii civil engineering project. It also was selected as ASCE's Best Study and Research Project for 2010.

**2012:** All four counties in the State of Hawaii have adopted the wind-design standards specific to their county, as generally contained in Appendix W of the State Building Code, i.e., *enforceable policies*. The legal effect of these adoptions is that the standards of Appendix W now apply to all new construction of commercial, government, and residential structures in all counties of the State of Hawaii.

**2013:**

- Hawaii Administrative Rules, Title 3, Subtitle 14, Chapter 180 State Building Code (with Hawaii-specific wind design standards) are incorporated with qualification into the HICZMP as *enforceable policies*, January 13, 2013.
  - The International Code Council publishes the *Guide to the Wind Design Provisions of the Hawaii State Building Code* as a comprehensive technical reference for architects, engineers, construction industry suppliers and contractors, and building officials. (306)
  - The goals and objectives of the *2013 Update to the State of Hawaii Multi-Hazard Mitigation Plan* (SMHMP) include the protection of life, property, and structures through updated building codes and standards, and training in the building codes. Thereby, the coastal hazard mitigation and building code projects and policies of the HICZMP are fully integrated elements of the SMHMP.

**2014:** Statewide training in the wind design provisions take place throughout the State, reaching approximately 336 public and private sector building officials on the federal, state, and county levels, design professionals (architects and engineers), and the construction industry. The *Guide to the Wind Design Provisions of the Hawaii State Building Code* is provided to each participant as the reference textbook. (306)

In conclusion, this project significantly improves building performance under hurricane-force winds and thus reduces the risks to life and property throughout the State of Hawaii. The enacted building codes are a critical factor in receipt of federal disaster public assistance aid, as post-disaster federal aid will allow the State to rebuild in conformance to our state-of-the-art disaster-resistant building code. The overarching framework of the State Building Code law provides a streamlined and collaborative process to facilitate future improvements to the State and county building codes. That, and the relevant goals and objectives of the 2013 SMHMP, ensure that the results of this project will continue to be refined, added to, and implemented far into the future.

## ***Appendix B. Ocean Resources Successes***

### **Recent Examples of Collaborative Efforts through the Ocean Resources Management Plan**

Through the ORMP, the HCZMP has successfully collaborated with partner agencies and built partnerships community organizations to coordinate efforts to implement actions for better management of ocean and marine resources. Several recent initiatives include:

#### **Climate Change Adaptation**

Act 234, Session Laws of Hawaii 2007, established the state’s policy framework and requirements to address Hawaii’s green house gas emissions in which the legislature recognized that “...climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of Hawaii. The potential adverse effects of global warming include a rise in sea levels resulting in the displacement of businesses and residences and the inundation of Hawaii’s freshwater aquifers, damage to marine ecosystems and the natural environment, extended drought and loss of soil moisture, an increase in the spread of infectious diseases, and an increase in the severity of storms and extreme weather events.” Subsequently, ORMP-led activities have contributed to the following:

#### **2009: A Framework for Climate Change Adaptation in Hawaii**

In 2009, the ORMP working group partnered with the Center for Island Climate Adaptation and Policy (ICAP) at the University of Hawaii at Manoa to develop “A Framework for Climate Change Adaptation in Hawaii.” The desired outcome of the process outlined in the Framework is for Hawaii to adapt successfully to the impacts of climate change.

#### **2011: Collaborative Workshops**

In August of 2011, with funding support from the Army Corps of Engineers and the National Oceanic and Atmospheric Administration, the HCZMP held workshops to develop a climate change policy that would help Hawaii adjust to climate change so that we can moderate potential damage, take advantage of opportunities, and cope with the consequences.

#### **2012: HRS § 226-109 Climate Change Adaptation Priority Guidelines**

This amendment to the Hawaii State Planning Act requires that all county and state actions must consider the policy in its land use, capitol improvement, and program decisions. The ORMP is the primary vehicle through which implementation of the policy is coordinated. These guidelines were largely based upon the outcomes from the collaborative workshops held in 2011.

#### **Mahuahua Aio Hoi**

A collaborative effort between HCDA and a community-based non-profit, Kakoo Oiwī, to implement a project in Heeia wetlands on the windward coast of Oahu. HCZMP funds helped to fund the planning and training phase of this project to incorporate ahupuaa concepts back to land management. Today, Kakoo Oiwī is one of the main community partners in the NERRS process for site designation in Hawaii. Others include Hawaii Institute of Marine Biology, Paepae o Heeia, Koolaupoko Hawaiian Civic Club, and Heeia State Park.

In conclusion, the ORMP has demonstrated success in collaborative efforts and actions through proven relationships among multijurisdictional levels. Through regular participation and dedication from state, county, and federal agencies and community organizations, the State's ability to work towards meaningful actions to manage ocean and marine resources is strengthened and enhanced through this partnership.

### ***Appendix C. Public Comment Themes***

The Hawaii Coastal Zone Management Program will update this Appendix C at the conclusion of the 30-day public comment period.