

# Maine Department of Marine Resources



Agency Climate Initiatives

# Maine Coastal Program – Climate Initiatives

## 1. Protecting Natural Lands and Waters

- Funded climate projects in 11 coastal towns, including design and engineering of climate resilient working waterfront infrastructure, and model town stormwater ordinances to limit pollution in shellfish growing areas.

## 2. Reducing our Climate Footprint using Natural Carbon Storage

- Maine's salt marshes and its nearshore aquatic vegetation store carbon. This "Blue Carbon" (akin to "Forest Carbon") holds promise to reduce our carbon footprint,. MCP co-chairs the Maine Blue Carbon Network to improve the inventory of Blue Carbon resources, advance research, and conduct pilot projects.

# Maine Coastal Program – Climate Initiatives

## 3. Understanding Climate Impacts on Marine Habitats

- MCP maps bathymetry and bottom habitats in both nearshore and offshore waters. These extremely detailed, publicly-available maps will help DMR track species assemblages over time.
- MCP is measuring changes in saltmarsh elevations to see how sea level rise is affecting their health. In addition to Blue Carbon, saltmarshes offer multiple ecological benefits, including juvenile fish habitat.

## 4. Using Nature to Restore and Improve Coastal Habitats

- Developed a “Coastwise” toolbox to help towns and road owners restore tidal flow to coastal streams, improving ecosystem health *and* reducing flooding.
- Completed three projects to study how oyster shells, fallen trees and plants can combat bluff erosion *and* improve sand supply to healthy clamflats.

# Bureau of Marine Science – 2021 Accomplishments

- Supported Offshore Wind siting and characterization (GEO)
- Published temperature impacts on lobster maturity over three decades (ICES Journal of Marine Science)
- Published in research on implementing ecological-based reference points for menhaden (Frontiers in Marine Science)
- 1,315 landings data requests processed (566 online data portal and 749 direct pulls by staff) for researchers, public and press.
- Development of a harvester smart phone application
- Maintained environmental sensors in BBH (longest temp series in Gulf of Maine)
  - ocean pH, dissolved oxygen, and the partial pressure of carbon dioxide
- Detected 27 individual white sharks on new acoustic array

# Bureau of Marine Science – 2021 Accomplishments

- Received competitive funding from Maine Sea Grant and National Sea Grant (trawl survey and lobster)
- Lobster social indicators (co-pi), Management Strategy Evaluation (co-PI), assessment model parameter updates (co-PI)
- Conducted and collaborated on scallop surveys, somatic measurements and tagging
  - 2021 NGOM survey and biomass estimates for harvest limits
  - In-state surveys to support adaptive management
- Documented shift in the distribution patterns of the North Atlantic right whale
  - Acoustic traps and lobster gear technology innovation

# 2022 Outlook

- Creation of the Division of Ecology and Environment
  - Emphasis on scientific studies to support Department's work of North Atlantic Right Whale and the Lobster Fishery
  - Initiate pre-construction monitoring for proposed Research Array
    - Fishery, resources, physical environment
  - Implement shark monitoring network
- Review DMR monitoring programs with respect to Climate Change
  - Evaluate ability of current programs to detect climate related changes
    - Frequency and intensity of sampling, data elements
  - Propose changes for existing programs
    - Suggest additional programs as deemed necessary

# Bureau of Public Health - Climate Change Initiatives

- The BPH is addressing two specific areas as they relate to bivalve shellfish; public health and resource management.
- Public health:
  - Changes in occurrence, distribution and abundance of Harmful Algal Blooms (HAB)
  - Increase in presence of *Vibrio* bacteria and resulting illnesses
  - Increased incidence of extreme weather events (“flood closures”)
- Resource management:
  - Changes in species presence and abundance, recruitment and survivability
  - Impacts of increased predation by native and non-native species
  - Effects of acidification, low dissolve oxygen and other environmental impacts

# BPH – Climate Change Initiatives

- Public health:
  - Increased HAB monitoring, developing new testing methods with new instrumentation
  - Initiating *Vibrio* monitoring program with new instrumentation to identify high risk areas and develop risk mitigation management
- Resource management:
  - Initiating intertidal sentinel monitoring sites to assess long-term changes and provide early warning to presence of new invasive species or habitat shifts

# Bureau of Sea-Run Fisheries and Habitat

## *Climate Impacts to Sea-Run Fish*

### Stream flows are changing

- Less frequent rain, but larger rainstorms means drought-like conditions and flooding more often

### Temperatures are warming

- Lower stream flows and higher air temperatures are both pushing the limit for our cold-water species
- Higher ocean temperatures are shifting food webs and range of species

### Sea-level is rising

- As sea-level rises culverts and bridges no longer function as they were designed
- Habitat for coastal fish will shift inland, but the habitat inland may not be accessible nor of the same quality

# Bureau of Sea-Run Fisheries and Habitat

## *Initiatives to Address Impacts*

### Upgrading infrastructure

- Replacing undersized culverts and bridges so they are resilient to storms and connect stream habitats
- Reconnecting habitat, so our fish can access more habitat

### Restoring impaired habitat

- Restoring stream beds and stream banks to their natural state
- Removing small dams to reduce warming impacts to streams and heat exposure of fish

### Protecting pristine habits

- Identifying priority areas for land conservation to protect critical habitats
- Identifying and recommending riparian buffers in high quality habitats

### Managing for resilience

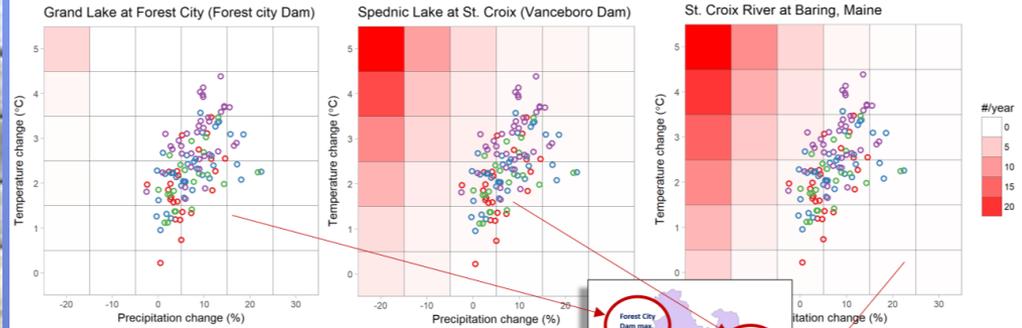
- Managing our resources to increase populations and restore populations to historic habitats
- Monitoring changes in fisheries resources and using adaptive management

# Bureau of Sea-Run Fisheries and Habitat



## Minimum flow violations

Organize → Analyze → Act → Update



Risks of not maintaining min. flow requirement is **higher** at the downstream locations.



Into the unknown: Projections from modeling suggest that climate change will result in future atmospheric and aquatic conditions that have not yet been observed historically, meaning the response of Atlantic salmon to these new conditions is highly uncertain.

—ICES workshop on climate change.



# Land for Maine's Future: Working Waterfront Access Protection Program

