ADAPTATION OPTIONS

REGULATORY AND ORDINANCE CONSIDERATIONS
MUNICIPAL CLIMATE ADAPTATION GUIDANCE SERIES

This guidance series was developed by Blue Sky Planning Solutions and the Lincoln County Regional Planning Commission for the Municipal Planning Assistance Program, Maine Department of Agriculture Conservation and Forestry through a collaborative effort of the following regional planning organizations:

Androscoggin Valley Council of Governments
Greater Portland Council of Governments
Hancock County Planning Commission
Kennebec Valley Council of Governments
Lincoln County Regional Planning Commission
Midcoast Council of Governments
Midcoast Regional Planning Commission
Northern Maine Development Council
Southern Maine Planning and Development Commission
Washington County Council of Governments

This guidance document was funded under awards CZM NA14NOS4190066 and NA16NOS4190018 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration or the Department of Commerce.
MUNICIPAL CLIMATE ADAPTATION GUIDANCE SERIES

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• Blue Sky Planning Solutions

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• Jay Kamm, Northern Maine Development Commission
• John Maloney Androscoggin Valley Council of Governments

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SHORELAND ZONING
• Robert Faunce, Lincoln County Regional Planning Commission

SITE PLAN REVIEW ORDINANCES
• Tom Martin, Hancock County Planning Commission
• Stephanie Carver, Greater Portland Council of Governments

SUBDIVISION ORDINANCES
• Eric Galant, Mid-Coast Regional Planning Commission
• John Maloney Androscoggin Valley Council of Governments
• Phil Carey, Municipal Planning Assistance program, DACF

http://www.maine.gov/dacf/municipalplanning/technical/climate.shtml
Public Wastewater Infrastructure is one of the most important and likely largest pieces of community infrastructure.

Long range planning, maintenance and replacement considerations are complicated even without adding changing climate conditions.

Regardless of the location of the wastewater plant itself, consideration needs to be given to sea-level rise, storm surge and increased storm intensity.

The place to start is with a **vulnerability assessment** of the wastewater treatment and pumping stations.
WASTEWATER INFRASTRUCTURE
WISCASSET AND BOOTHBAY HARBOR WASTEWATER TREATMENT PLANTS AND PUMP STATIONS
WISCASSET WWTP FLOOD AND SLR SUSCEPTABILITY
WISCASSET WWTP VULNERABILITY ASSESSMENT
### Wiscasset WWTP Vulnerability Assessment

**Example of a concrete barrier sea wall** (Source from Ohio Department of Natural Resources Office of Coastal Management)

**Examples of temporary flood barriers for doors** (Image from Flood Control International)

<table>
<thead>
<tr>
<th>Adaptation Strategy</th>
<th>Planning Level Construction Costs</th>
<th>General Considerations</th>
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<tbody>
<tr>
<td><strong>Permanent Barrier Protection</strong></td>
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<tr>
<td>WWTP Perimeter</td>
<td>$1.1 M + 1.25 M</td>
<td>Sheet Vinyl Concrete Sea Wall with High Gates at the Entrance Door/Enter the Site from Set A. This strategy should be considered versus the potential costs for multiple infrastructure improvements within the WWTP</td>
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<tr>
<td><strong>Temporary Flood Barriers (Building Doors and Windows)</strong></td>
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<tr>
<td>Individual Single Door</td>
<td>$5,000</td>
<td>Costs for this adaptation strategy are the same under all three of the planning elevation scenarios</td>
</tr>
<tr>
<td>Individual Double Door</td>
<td>$10,000 - $20,000</td>
<td>Costs for this adaptation strategy are the same under all three of the planning elevation scenarios</td>
</tr>
<tr>
<td>Individual Garage Door</td>
<td>$10,000 - $40,000</td>
<td>Costs for this adaptation strategy are the same under all three of the planning elevation scenarios</td>
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<tr>
<td>Individual Window</td>
<td>$2,500 - $10,000</td>
<td>Costs for this adaptation strategy are the same under all three of the planning elevation scenarios</td>
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<td><strong>Hard Flood Building/Structures</strong></td>
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<tr>
<td>Ctrl Building</td>
<td>$100,000 - $300,000</td>
<td>Costs for this adaptation strategy are the same under all three of the planning elevation scenarios</td>
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<tr>
<td>Headworks Building</td>
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<tr>
<td>Elevation Building</td>
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BOOTHBAY HARBOR WWTP FLOOD AND SLR SUSCEPTABILITY

LEGEND
- VE Zones
- AE Zones
- Other Zones
- Flood Zones after 1 ft SLR
- Flood Zones after 3 ft SLR
BOOTHBAY HARBOR WWTP VULNERABILITY ASSESSMENT
BOOTHBAY HARBOR WWTP VULNERABILITY ASSESSMENT
BOOTHBAY HARBOR WWTP VULNERABILITY ASSESSMENT

Example of a Barrier Wall and Flood Gates (sources from internet)

Examples of Temporary Flood Barriers for Windows (source from internet)

Examples of Elevated Structures to House Electrical and Control Panel Systems, as well as Emergency Power Generators from Other Maine Communities
Using the most current and best available local data:

• Examine a series of Sea-Level Rise scenarios and Storm Surge scenarios;
• Analyze the potential impacts to the wastewater system for each scenario;
• Develop alternative scenarios for each baseline assumption and impact;
• Complete cost benefit analysis for each scenario.

This will lead to three basic courses of action beyond a ‘do nothing’ choice:

• Protect in place
• Retreat by re-aligning the wastewater system location
• Retreat by consolidating systems with a neighboring community

To incorporate resiliency:

• Use planned maintenance and repair to implement adaptation strategies;
• Investigate funding options for work beyond planned maintenance and repair.
CLIMATE ADAPTATION AND THE COMPREHENSIVE PLAN REVIEW CRITERIA RULE

Creating a Comprehensive Plan that is Consistent with the Maine Growth Management Act can:

• Provide legal protection for local zoning, impact fee and rate of growth (building cap) ordinances

• Can help the community qualify for or increase the competitiveness of applications for:
  ✓ Community Development Block Grants
  ✓ Land for Maine’s Future
  ✓ Municipal Investment Trust Fund
  ✓ DEP 319(h) Non-Point Source Protection Grants
  ✓ DEP State Revolving Loan Fund
  ✓ Land and Water Conservation Fund
  ✓ Coastal Community Grants

• Good planning makes good communities
The Municipal Climate Adaptation Guidance Series includes suggestions for incorporating climate change into each of the required elements of a comprehensive plan including suggested language. An example is:

8. Housing Analysis:

- Has the community considered increasing the Base Floor Elevation (BFE) standards in areas vulnerable to flooding?

- Has the community incorporated any other building design specifications that increase resistance to impacts from sea level rise or more intense storm events?
SITE PLAN REVIEW HANDBOOK AND CLIMATE RESILIENCE

• Most Maine communities have adopted a site plan review, development review or similar ordinance to govern local review and approval of projects not covered by the local subdivision ordinance or regulations.

• Site Plan Review Handbook: A Guide to Developing a Site Plan Review System*, is intended to familiarize municipal officials, staff, and the public with the concept of site plan review.

• The Municipal Climate Adaptation Guidance Series includes suggestions for updating the Handbook to reflect the need for, and to promote, greater climate resiliency among Maine municipalities.

* [https://www1.maine.gov/dacf/municipalplanning/docs/siteplanfull.pdf](https://www1.maine.gov/dacf/municipalplanning/docs/siteplanfull.pdf)
Model Subdivision Regulations for Use by Maine Planning Boards* is intended to help guide communities in developing local subdivision regulations by providing recommended language and commentaries.

The Municipal Climate Adaptation Guidance Series includes revisions to the model subdivision regulations that are intended to make local subdivision ordinances and regulations more responsive to the growing need for climate resiliency.

* [http://smrpc.org/images/Municipal_Reg_Planning/Model_Subdivision_Regulations_2006.pdf](http://smrpc.org/images/Municipal_Reg_Planning/Model_Subdivision_Regulations_2006.pdf)
SHORELAND ZONING AND CLIMATE RESILIENCE

• All Maine communities are required to adopt a local shoreland zoning ordinance consistent with the Chapter 1000 Guidelines for Municipal Shoreland Zoning Ordinances (MDEP will impose ordinances for those communities that have not adopted a local ordinance).

• A community can adopt a more stringent ordinance as long as it is equally or more effective in achieving the purposes of the Shoreland Zoning law.

• The Municipal Climate Adaptation Guidance Series includes suggestions for incorporating climate change into Sections 15, 16 and 17 of Chapter 1000. Communities should consult with MDEP before formally amending their shoreland zoning ordinances.
Important qualifier

- There often is little correlation between the shoreland zone, which is a fixed 250’ inland from the coastline, and areas projected to be inundated by sea level rise or storm surge.
LOCAL REGULATION FOR SEA LEVEL RISE

Local Flood Ordinance

- Increase minimum base flood elevation from 1’ to 3’
- Does not address areas outside of FEMA base flood zone subject to SLR
- Town can expand the flood ordinance to regulate development within the 500-year flood zone if such data is available from FEMA
LOCAL REGULATION FOR SEA LEVEL RISE

Overlay Zoning Districts

• Can address areas outside of flood zone and impose minimum building elevation requirements
• Not permitted in Maine unless a town has adopted zoning
• Need to establish boundaries based on defined and replicable criteria that can be reproduced by a professional in the field
And for those who feel none of the above will be adequate ....