



Inland Habitat Conservation for Climate Resilience

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Maine Department of Inland Fisheries and Wildlife

Introduction



Species



Habitats



Access



**BEGINNING
WITH HABITAT**



Planning Roadmap



Planning Need Identified

Climate Plan
Comprehensive Plan
Open Space Plan
Committee formed

Information Gathering

Data, maps, tools
Example plans
Presentations

Community Input

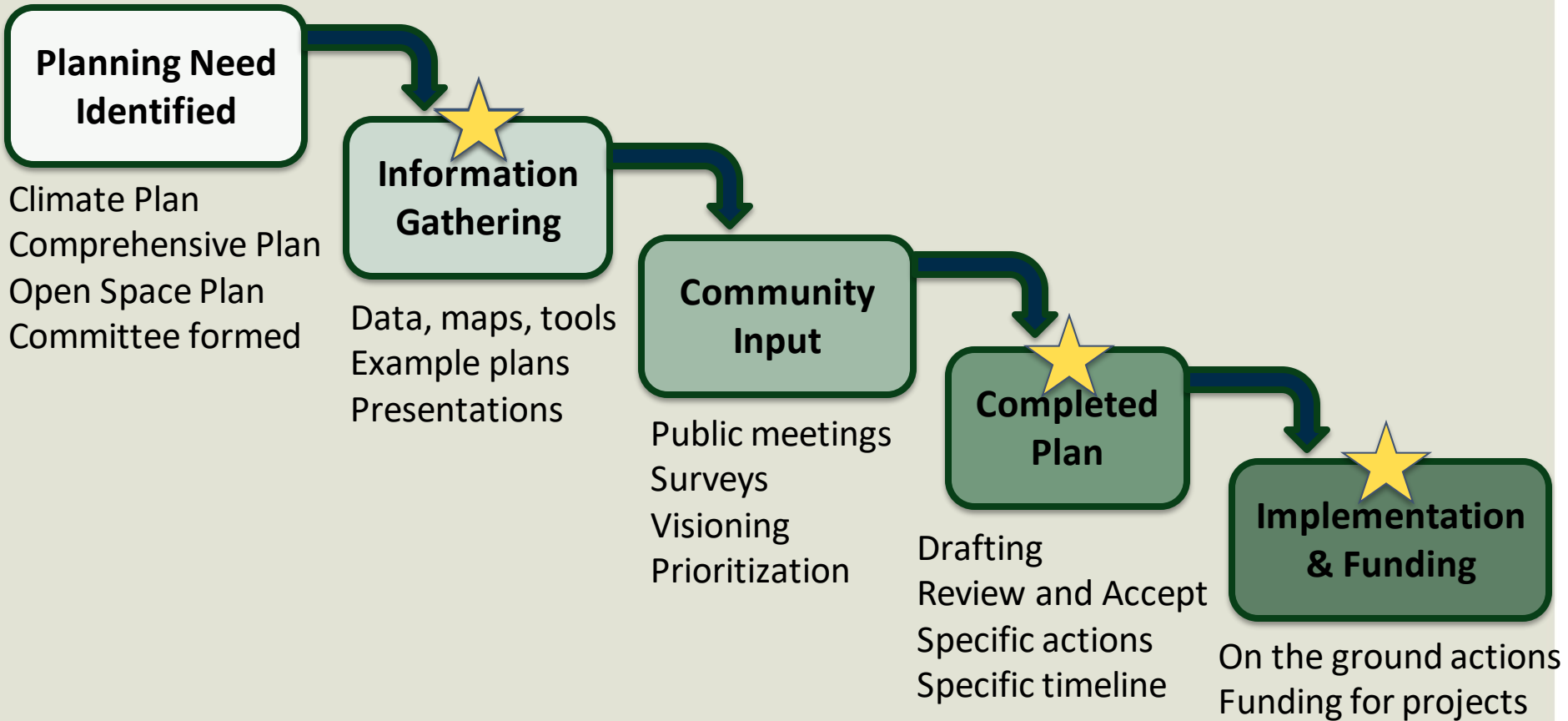
Public meetings
Surveys
Visioning
Prioritization

Completed Plan

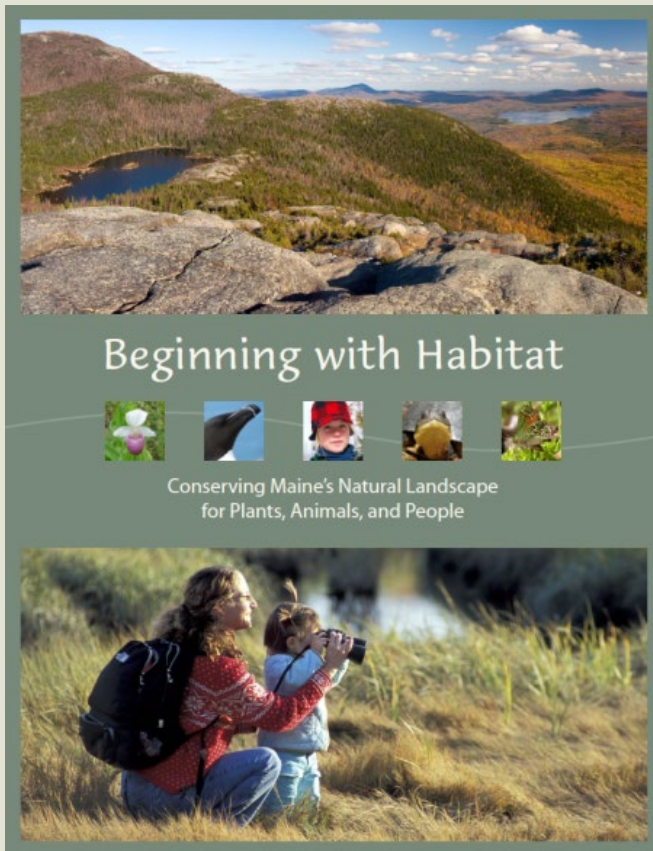
Drafting
Review and Accept
Specific actions
Specific timeline

Implementation & Funding

On the ground actions
Funding for projects



A Resource for the Public: Beginning with Habitat



BwH is...

A landscape-based approach to achieve meaningful conservation of all native species on a developing landscape.

Purpose:

To provide the most up-to-date wildlife and plant habitat information available for use in Comprehensive, Open Space, and Conservation Planning.

Beginning with Habitat Services



Our Services



Information



Spatial Data



Technical Assistance

- Customized presentations & workshops
- Library of ordinance tools, example plans, etc.
- Dedicated landowner biologist for site visits
- Assistance with, and review of comprehensive plans

Our Users



Municipalities



Landowners

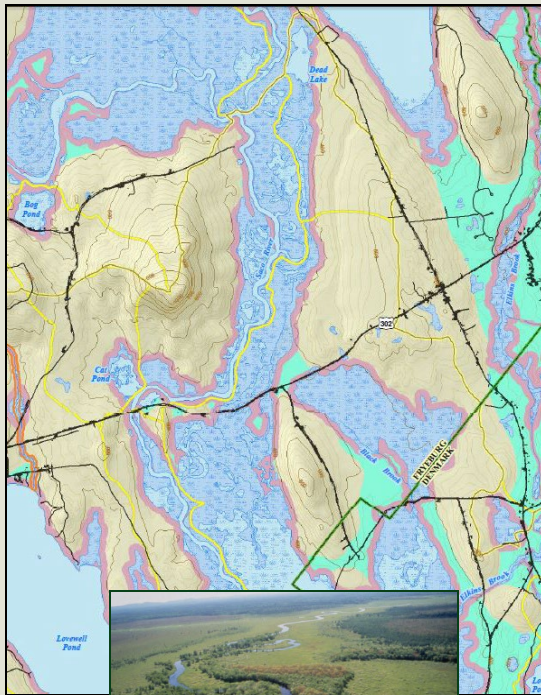


Land Trusts

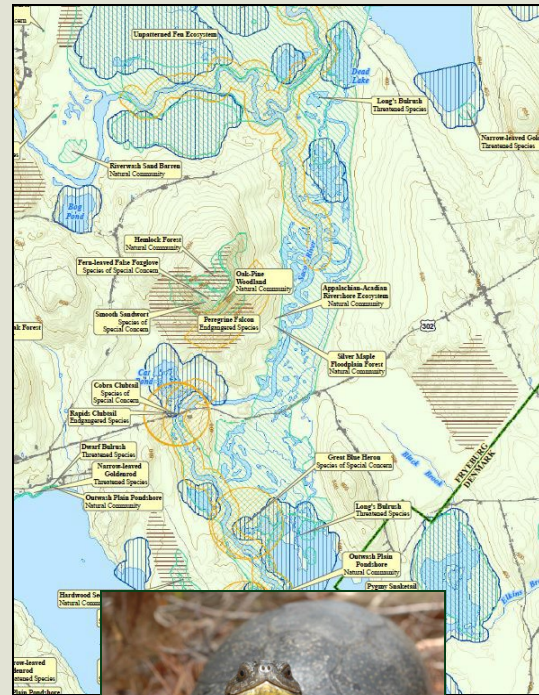
Beginning with Habitat Approach



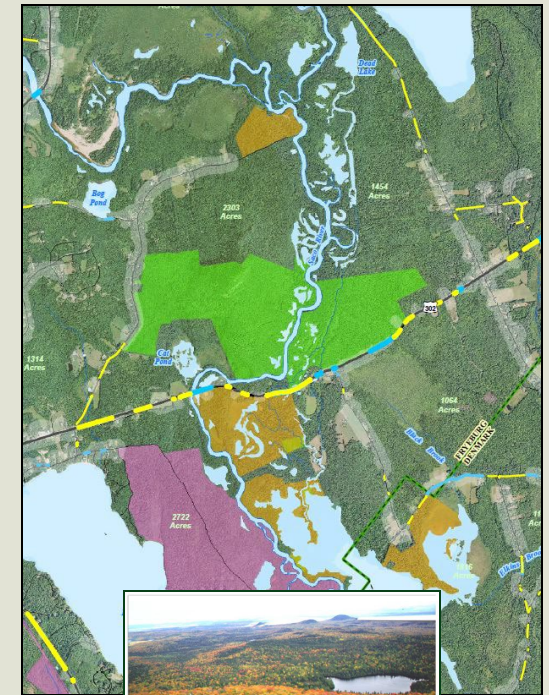
Map 1



Map 2



Map 3

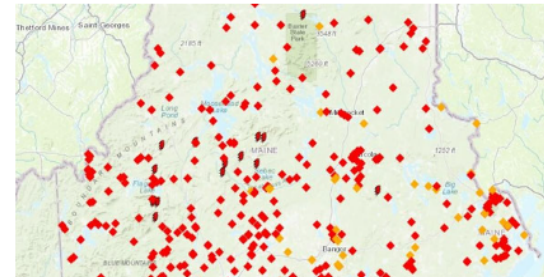


Beginning with Habitat Online Maps



Interactive Map Viewer

This option is the most popular way our users access BwH data. It is best for real-time desktop or mobile browsing. GIS files cannot be downloaded, but maps can be exported as PDFs and printed as 8.5x11 pages.



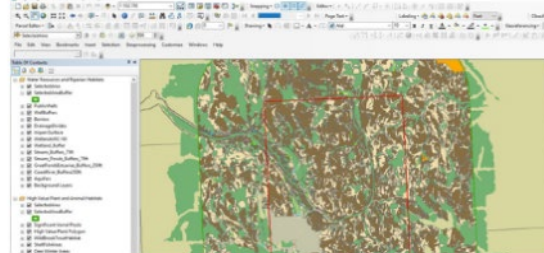
Stream Viewer

The interactive viewer was created to enhance statewide stream restoration and conservation efforts. The Viewer provides a starting point for towns, private landowners and others to learn more about stream habitats across the state.



Online Map Database

Search PDF maps (printable using a large-format printer/plotter) by town.



Digital Data

You can use our GIS data to create your own customized planning maps (GIS software required). [Simply let us know which town or region you'd like data from](#), and we will send you the data via OneDrive or on a CD.

What are some observed and expected effects of climate change?



- Warming temperatures
 - Warmer winters, longer growing seasons, more extreme heat days, invasive species spread
- Changing precipitation patterns
 - Increased heavy rainstorms and flooding, rain-on-snow events, decreased snowpack, increased drought conditions
- Warming waters

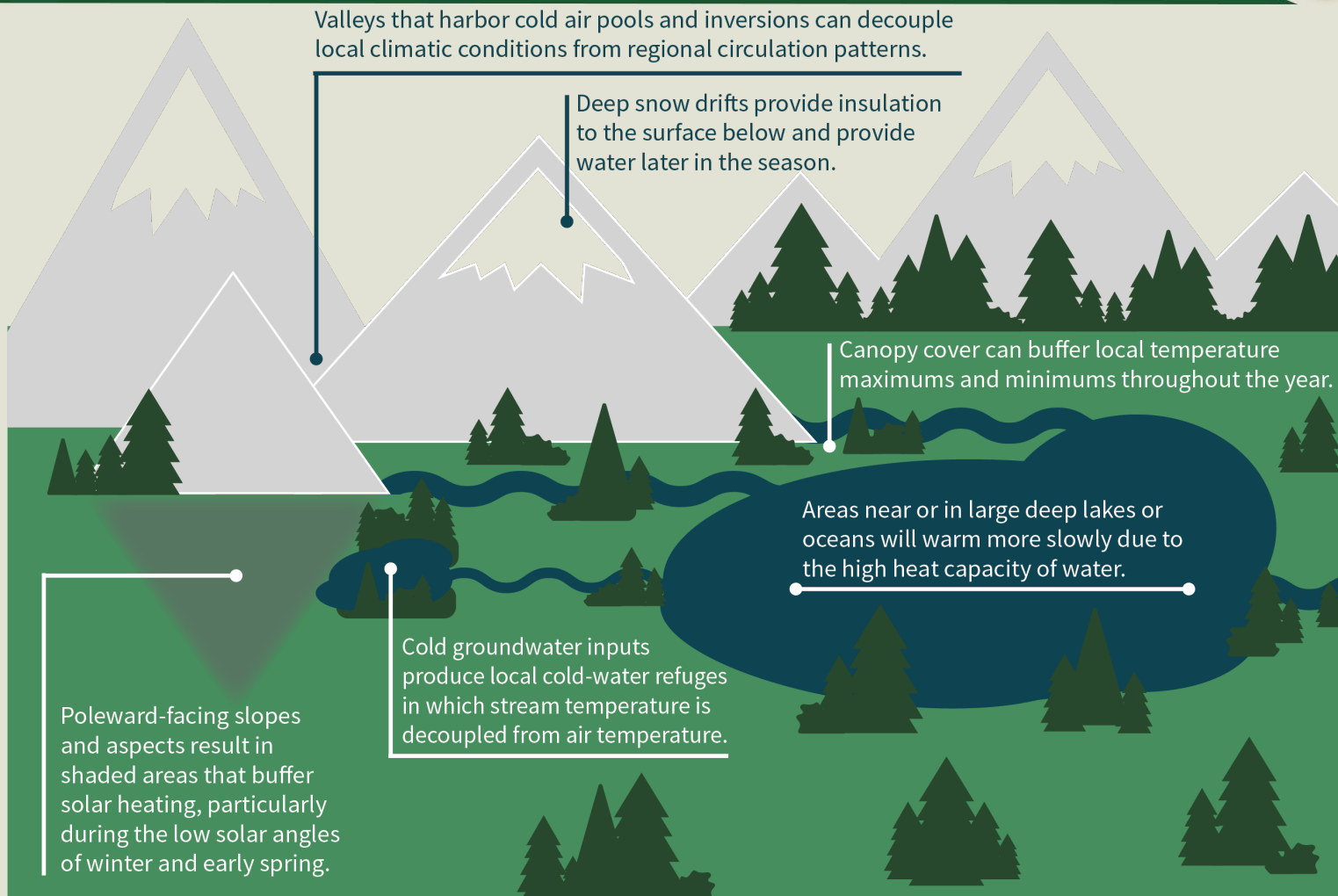


Culvert washout on Pushaw Rd in Glenburn, ME in October 2022 associated with a 25-year storm event. The washout resulted in a 5-mile detour and cost \$111,000 to repair.



Friends of Lake Winnecook

Planning for Resilience: Climate Refugia



Valleys that harbor cold air pools and inversions can decouple local climatic conditions from regional circulation patterns.

Deep snow drifts provide insulation to the surface below and provide water later in the season.

Canopy cover can buffer local temperature maximums and minimums throughout the year.

Areas near or in large deep lakes or oceans will warm more slowly due to the high heat capacity of water.

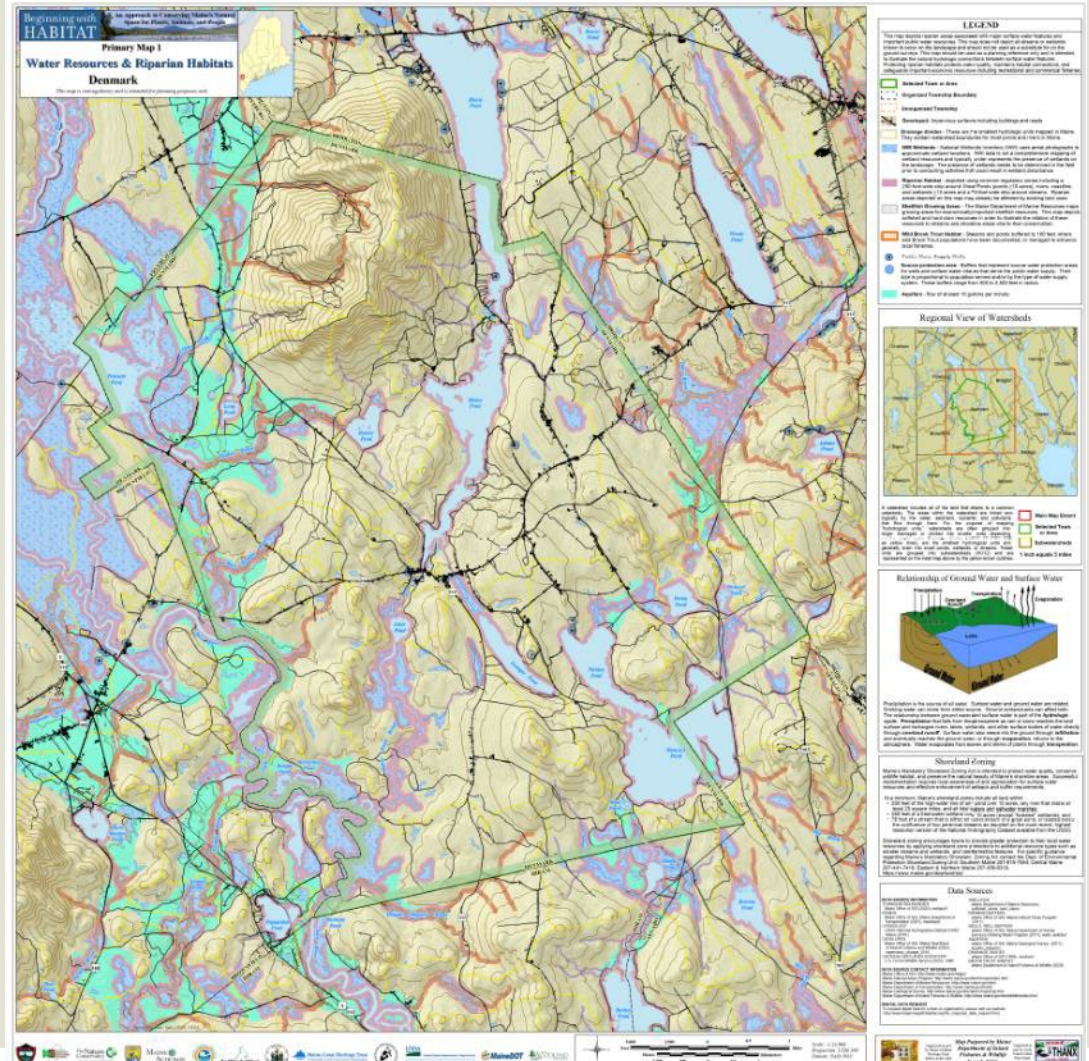
Cold groundwater inputs produce local cold-water refuges in which stream temperature is decoupled from air temperature.

Poleward-facing slopes and aspects result in shaded areas that buffer solar heating, particularly during the low solar angles of winter and early spring.

Water Resources and Riparian Habitats



- BwH Map 1
 - Great ponds
 - Wetlands
 - Streams
 - Riparian buffers
 - Aquifers
 - Priority wild brook trout areas



Online Resources: BwH Map Viewer



BwH Map Viewer

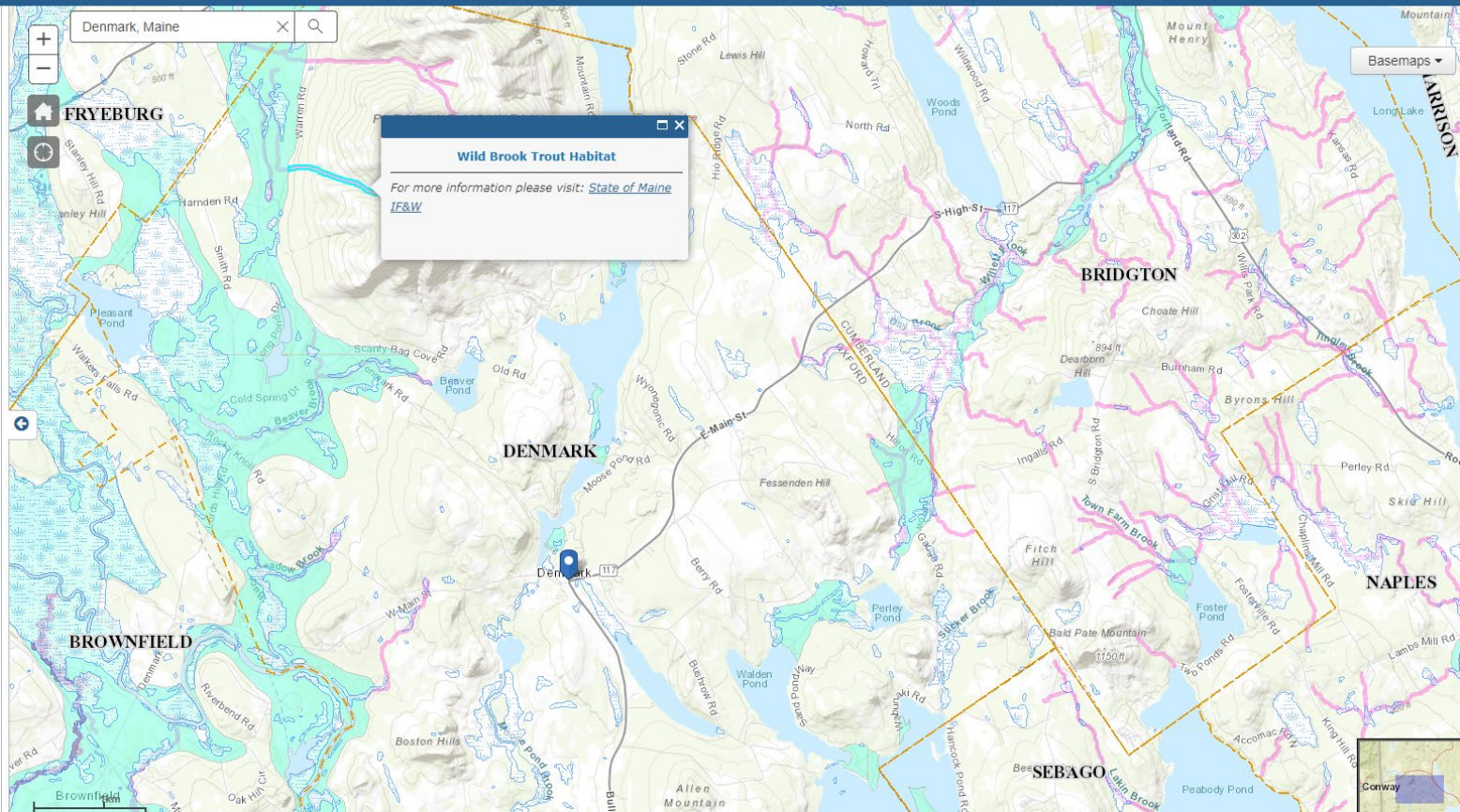
Welcome Layers Legend

Aquatic Species and Habitats

Wild Brook Trout Habitat: Avoid disturbing habitat within 100 feet of Brook Trout habitat; if riparian areas within that zone are cleared or degraded, then restoring the riparian area to natural tree cover is also recommended. These areas may also be candidates for instream habitat restoration and/or stream connectivity enhancement. Consult with MDIFW Regional Fisheries Biologists or the Native Fish Conservation Biologist for further guidance. For more information please visit: [State of Maine IF&W](#)

Atlantic Salmon Habitat: Developed from field surveys conducted on the mainstem and selected tributaries of the Aroostook, Dennys, Ducktap, East Machias, Kennebec, Machias, Passagassawakeag, Penobscot, Pleasant, Presumpscot, Saco, Sheepscot, St. George, Tunk and Union Rivers in Maine by staff of the Maine Dept. of Marine Resources. For more information please visit: [Atlantic Salmon Restoration](#)

Riparian Habitat: Shoreline habitat depicted using common regulatory zones, including a 250-foot-wide strip around Great Ponds (ponds 10 acres in size and greater), rivers, coastline, and wetlands 10 acres in size and greater; and a 75-foot-wide strip around streams. Riparian areas depicted on this map may already be affected by existing land uses. Resource agencies may provide buffer recommendations based on specific habitat values and which may differ from planning-level information represented herein. For example, MDIFW generally recommends maintaining 100-foot undisturbed, forested buffers from the upland edge of all intermittent and perennial



Online Resources: Maine Stream Habitat Viewer



Maine Stream Habitat Viewer

Welcome Layers Adv Search Identify

About Layers

Layers in gray text will not display until you zoom in closer. To see the legend for each layer, click the arrow to the left of the layer name. To get information about a certain feature, simply click on that feature in the map. A pop-up box and the Identify Tab provide information on that feature.

Crossings & Barriers

- Crossings
- Dams
- Natural Barriers
- Impassable Waterfalls

Priority Habitats

- Atlantic Salmon
- Alewife
- Sea-Run Rainbow Smelt
- Wild Eastern Brook Trout
- Heritage Fish Waters
- Brook Trout Habitat

Tidal Marshes

Other Habitats

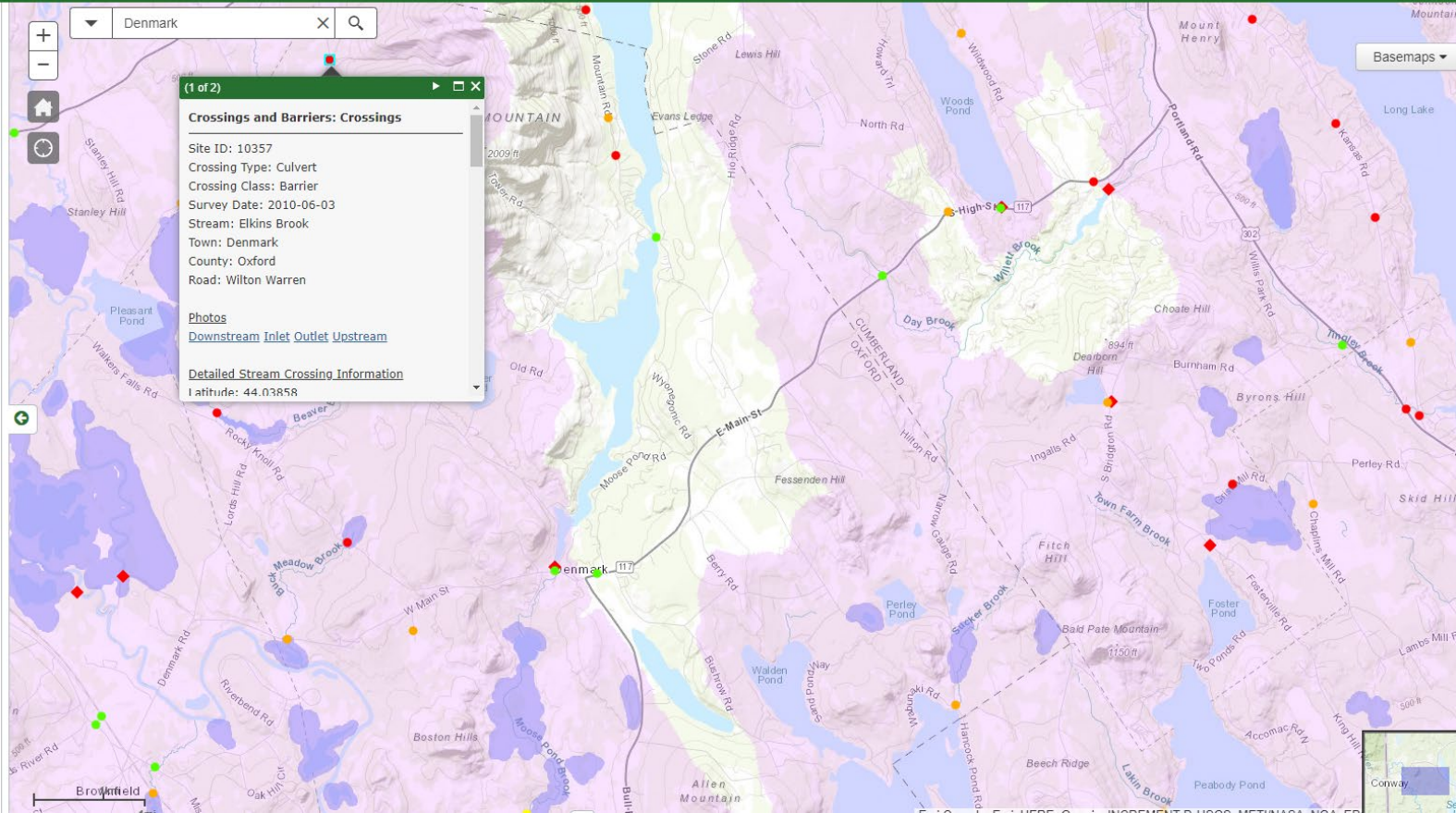
- Non-Native Fish
- Tidal Waterfowl and Wading Bird Habitat
- Inland Waterfowl and Wading Bird Habitat
- Beginning with Habitat Focus Areas

Water Features

- Watersheds
- Other Layers

Labels/Hover:

- Check this box to enable labels on crossings. Labels will appear as you zoom in.
- Check this box to enable labels on dams. Labels will appear as you zoom in.



Strategies for Protecting Riparian Habitat and Improving Resilience



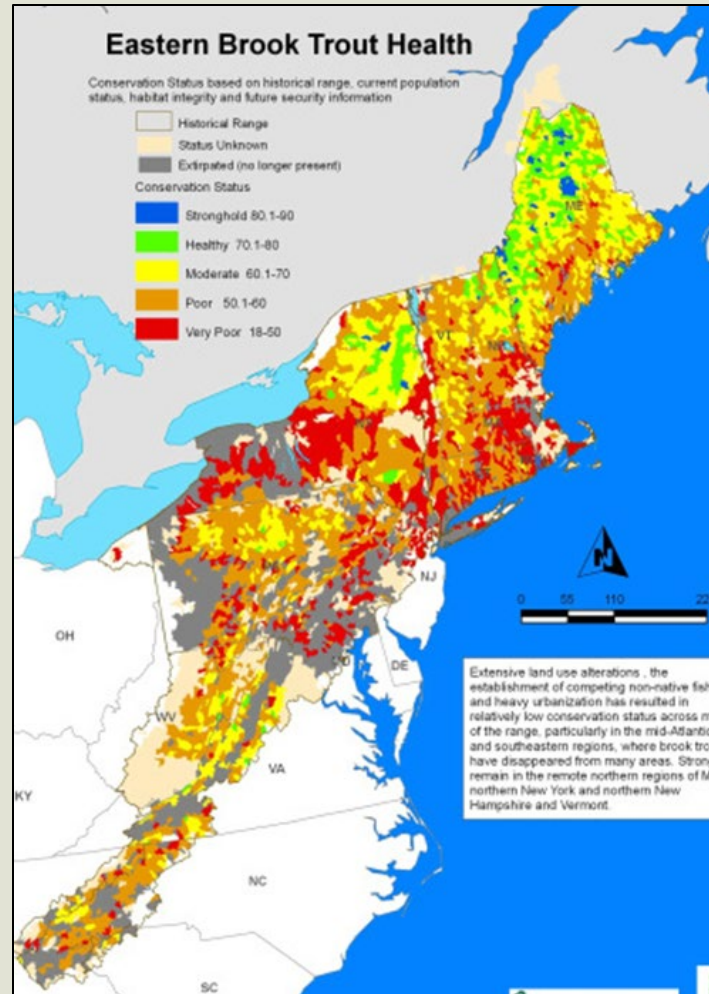
- Consider local standards that go beyond statutory minimums, increasing buffers on streams, wetlands, and floodplains to provide a natural buffer against flooding, erosion, and sedimentation
- Identify opportunities for restoration and culvert replacement to mitigate flooding, increase infrastructure resiliency, and improve aquatic organism passage
- Adopt Stream Smart Crossing
- Promote voluntary riparian conservation options to landowners, such as maintaining 100-foot vegetated buffers along all streams

Case Study: Warming Waters and Eastern Brook Trout

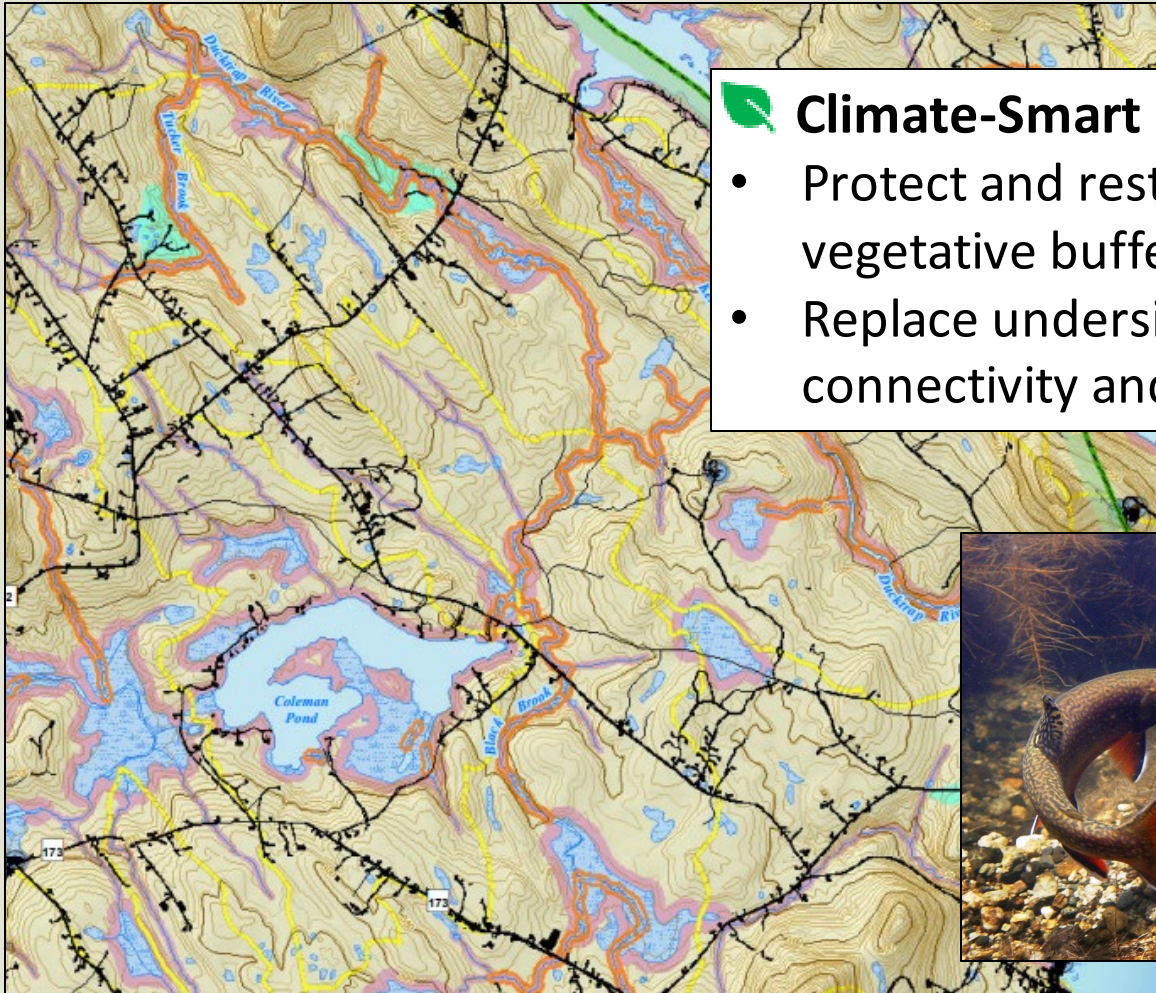


Maine forests are one of the last strongholds for brook trout in the U.S.

Case Study: Warming Waters and Eastern Brook Trout



Case Study: Warming Waters and Eastern Brook Trout



Climate-Smart Conservation Strategies:

- Protect and restore 100-foot wide vegetative buffers along trout streams
- Replace undersized culverts to improve connectivity and manage water flow

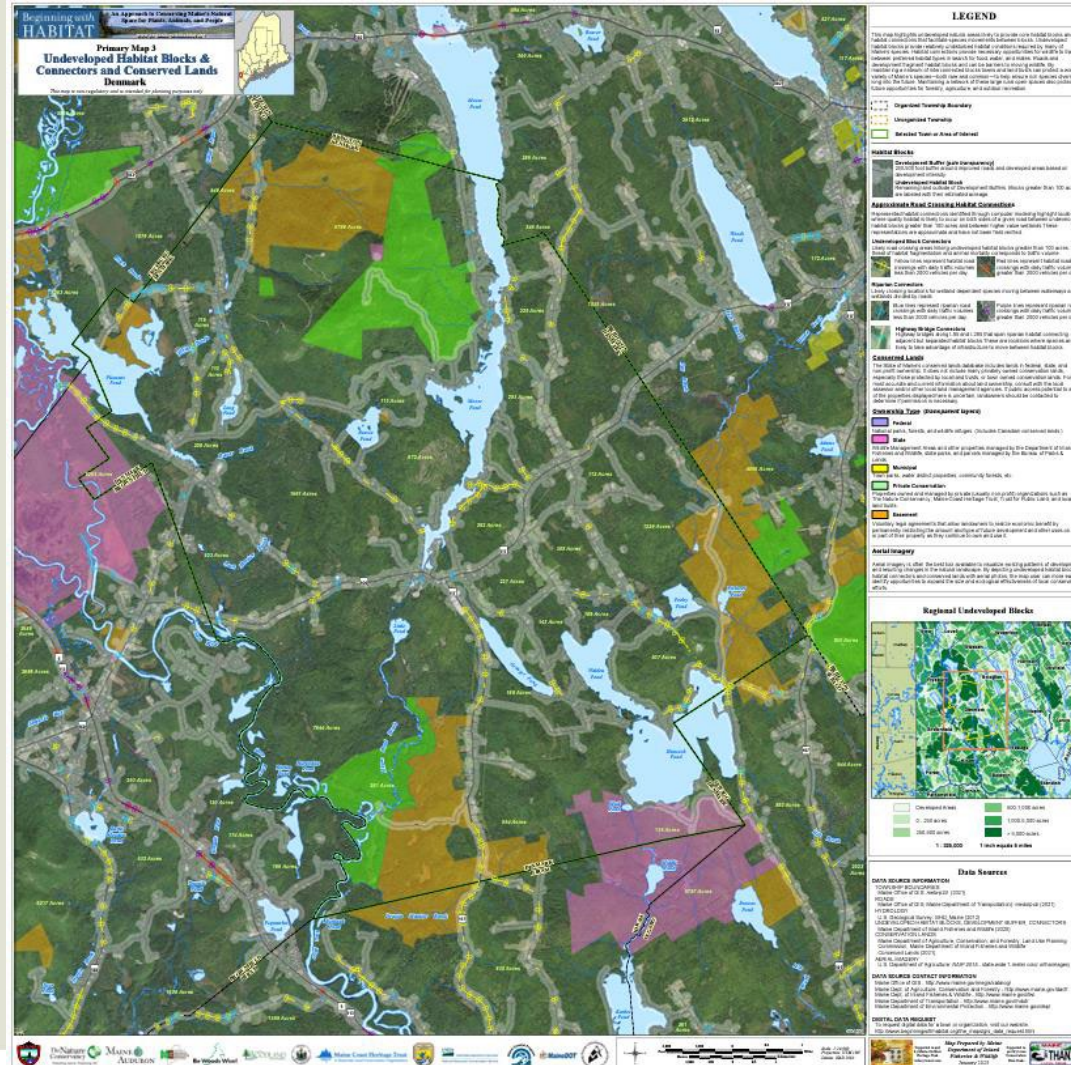


Undeveloped Habitat Blocks, Connectors, and Conserved Lands



• BwH Map 3

- Large undeveloped blocks: essential for maintaining species diversity, water quality, natural resource industries, and more
- Acreage of large blocks
- Potential habitat connections
- Existing conserved lands



Online Resources: BwH Map Viewer



BwH Map Viewer

Welcome **Layers** Legend

Layer Details:
Toggle layers on and off. Layers with gray checkbox will appear once zoomed in or out to visible scale.

- Locator
 - State Of Maine Parcels
 - City/Township
 - Developed Land/Impervious Surfaces
 - Drainage Divides
- Physical Natural Resources
 - Wildlife Habitats
 - Plants and Natural Communities- (not displayed in Unorganized Territories)
- Conservation and Connectivity Planning Resources
 - Undeveloped Habitat Blocks
 - Connectors
 - Conserved Lands
 - Focus Areas

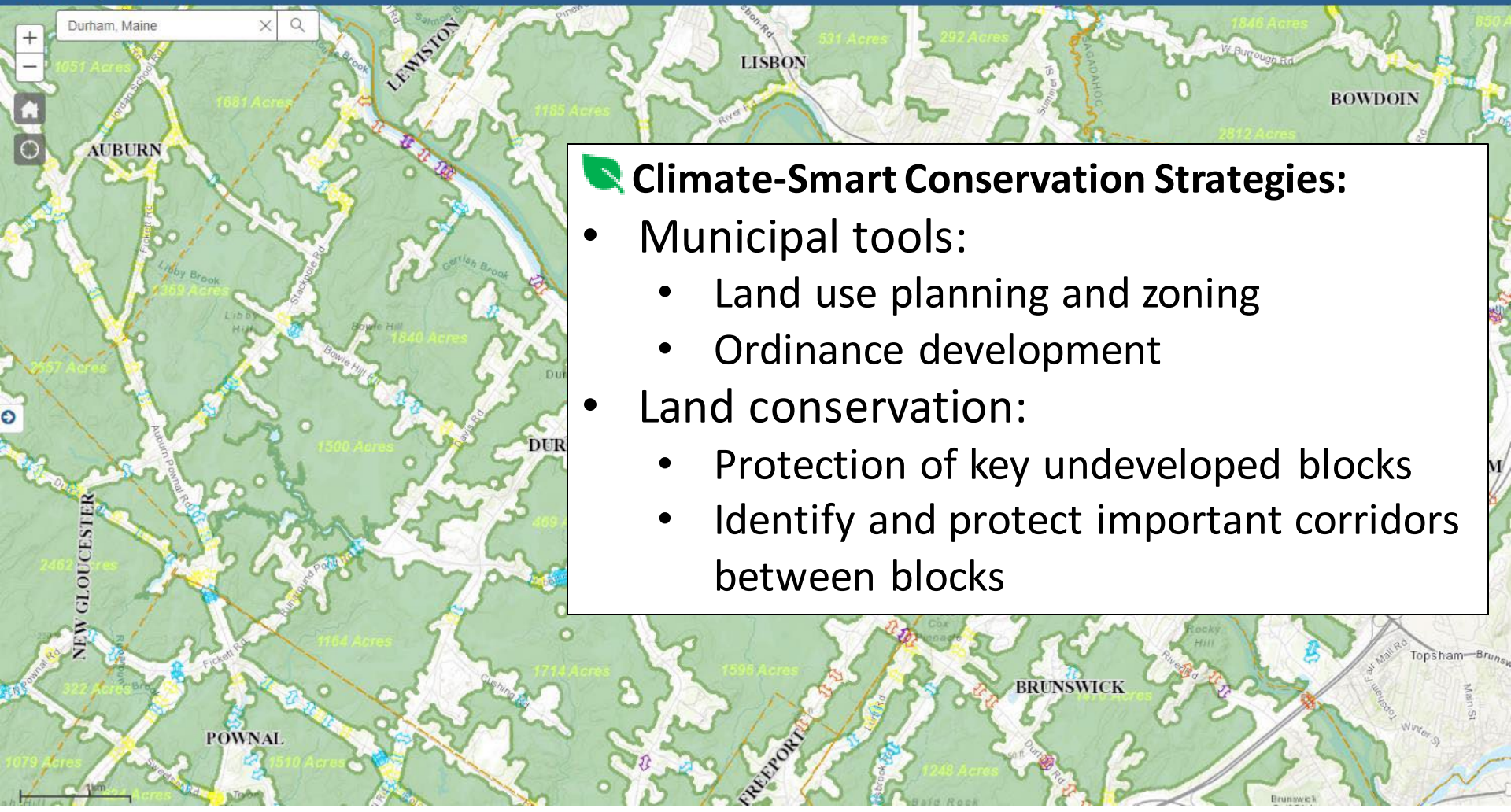
The screenshot shows the BwH Map Viewer interface. On the left is a sidebar with a "Layer Details" section containing a list of layers with checkboxes. The main area is a map of Denmark, Maine, showing various land parcels in shades of green and yellow. A search bar at the top left contains "Denmark, Maine". A scale bar is visible at the bottom left. An inset map at the bottom right shows the location of Denmark, Maine, within the state of Maine. The map includes labels for towns like Fryeburg, Denmark, Brownfield, and Bridgton, as well as various roads and water bodies.

Beginning with Habitat Map Viewer: <https://webapps2.cgis-solutions.com/beginningwithhabitat/mapviewer/>

Undeveloped Blocks and Connectors: Conservation Strategies



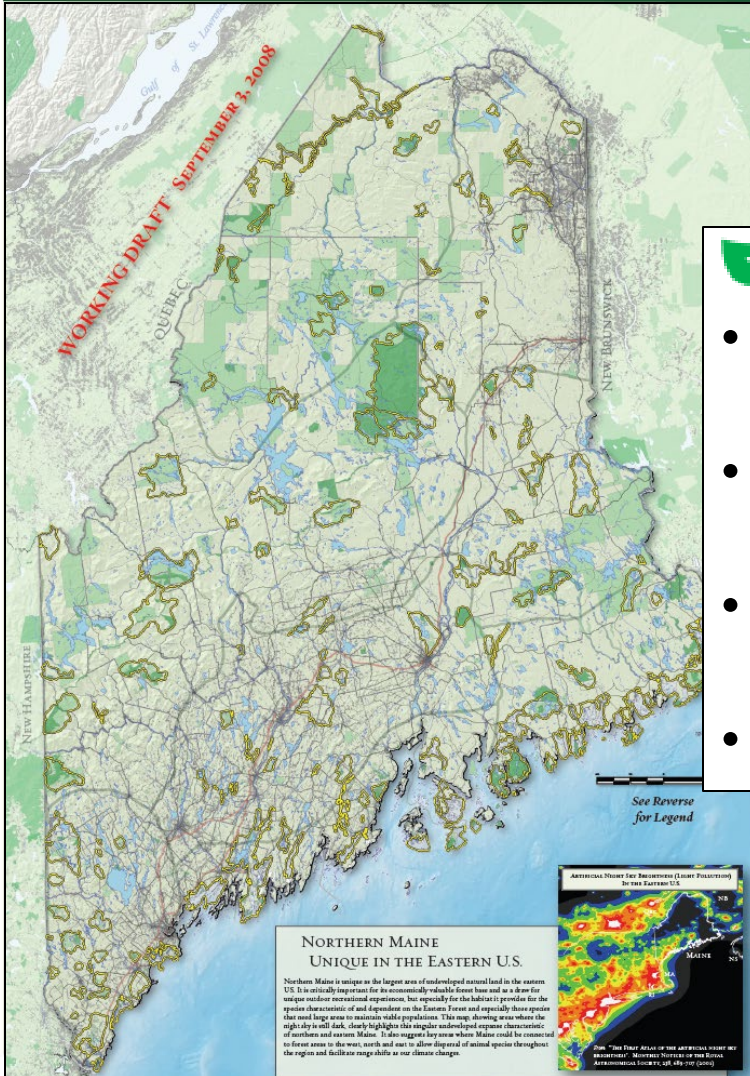
BwH Map Viewer



Climate-Smart Conservation Strategies:

- Municipal tools:
 - Land use planning and zoning
 - Ordinance development
- Land conservation:
 - Protection of key undeveloped blocks
 - Identify and protect important corridors between blocks

Landscape Level Conservation: Focus Areas of Statewide Significance

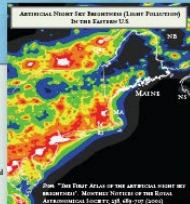


Climate-Smart Conservation Strategies:

- Permanent conservation of unprotected and undeveloped lands within Focus Areas
- Improved connectivity of conserved parcels and riparian corridors
- Maintain intact forested buffers along water bodies and wetlands
- Monitor and remove invasive plants

NORTHERN MAINE UNIQUE IN THE EASTERN U.S.

Northern Maine is unique as the largest area of undeveloped natural land in the eastern U.S. It is critically important for its economically valuable forest base and as a draw for unique outdoor recreational experiences, but especially for the habitat it provides for the species that are sensitive to and dependent on the Eastern Forest and especially those species that need large areas to maintain viable populations. This map, showing areas where the night sky will dark, clearly highlights the unique undeveloped exposure characteristics of northern and eastern Maine. It also suggests key areas where Maine could be connected to forest areas in the west, north and east to allow dispersal of natural species throughout the region and facilitate range shifts as our climate changes.



Conservation in a Changing Climate



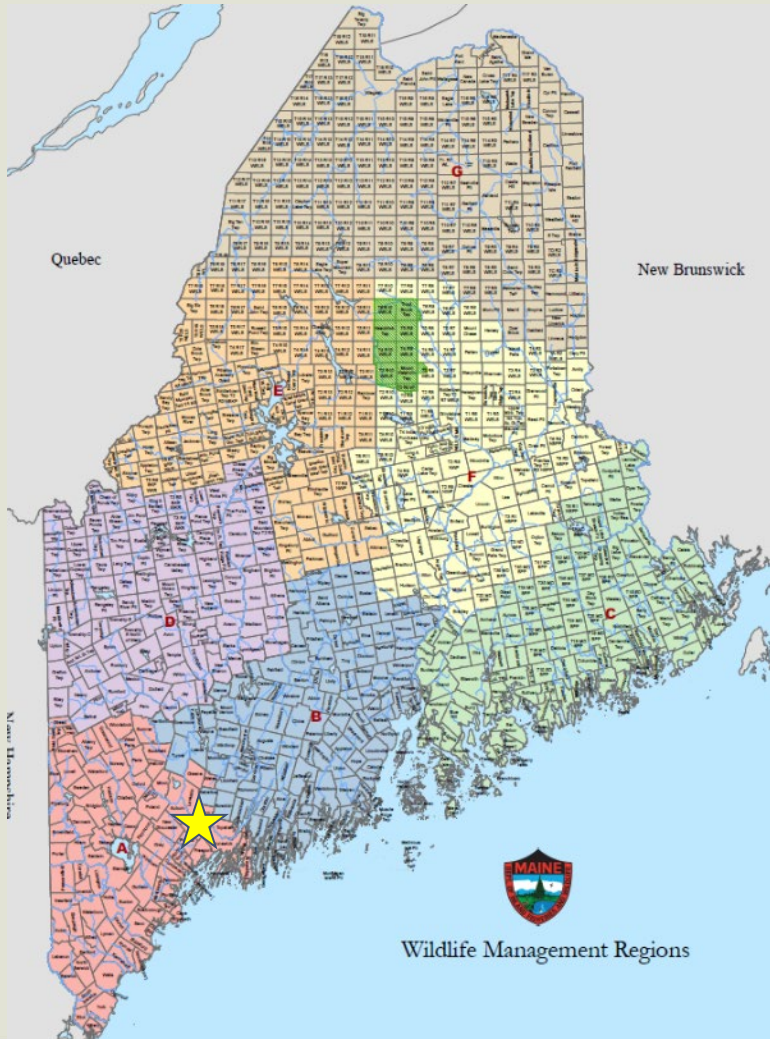
- Beginning with Habitat principles increase resiliency!
 - Conservation of unique and biodiverse Focus Areas
 - Municipal tools to protect undeveloped blocks, open spaces, and riparian corridors
 - Landscape-level connectivity and restoration
 - Local, regional, and state collaboration to increase resiliency and conservation impact

Questions?



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Community Story: Durham, Maine



Photos: Town of Durham

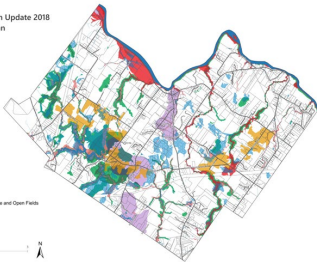
Community Story: Durham, Maine



2018 Durham Comprehensive Plan — Volume I Future Land Use Plan & Policy Sections

Durham, Maine
Comprehensive Plan Update 2018
Future Land Use Plan

- Critical Rural Areas**
- 2017 Wetlands
 - Existing Wetlands
 - One-Ten Acres
 - 100-Year Floodplains
 - 200-Year Floodplains
 - On-Corridor Habitat Values
 - 1-4-6
 - Green Bank II
 - Existing Commercial Agriculture and Open Fields
 - One 50 Acres
 - One 100 Acres
 - One 200 Acres



Town of Durham, Maine Land Use Ordinance

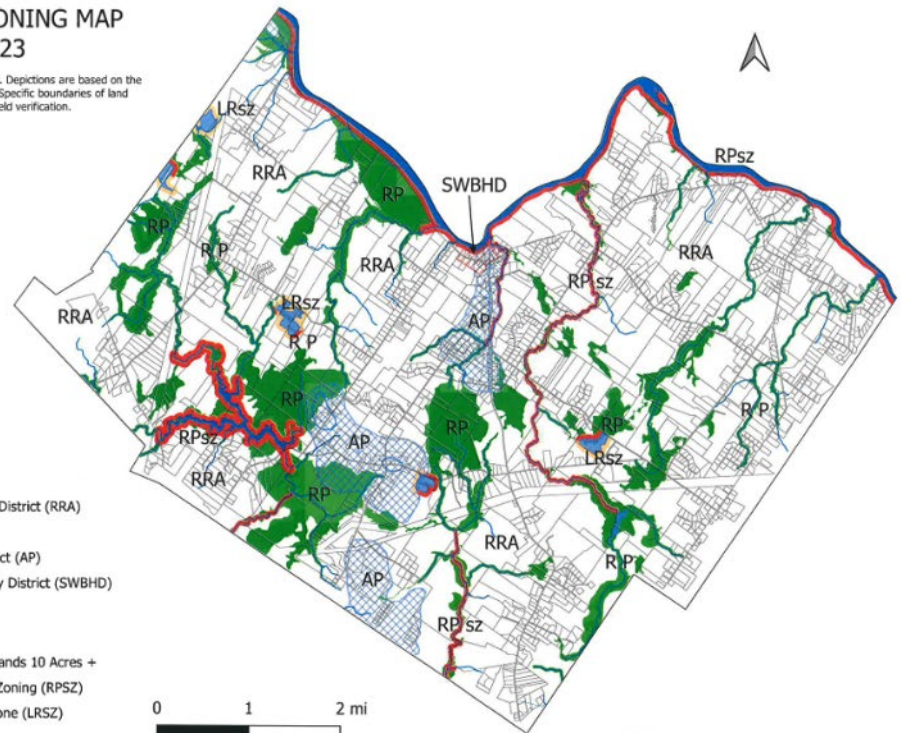
As Adopted at Town Meeting
April 6, 2024

DURHAM MAINE ZONING MAP Adopted April 1, 2023

This map is for informational purposes only. Depictions are based on the best readily available mapping inventories. Specific boundaries of land features and property boundaries require field verification.

Attested a True Copy

[Signature]
Durham Town Clerk



MAP LEGEND

- Rural Residential & Agricultural District (RRA)
- Durham Resource Protection
- Aquifer Protection Overlay District (AP)
- Southwest Bend Historic Overlay District (SWBHD)
- Durham Shoreland Zoning**
 - Durham Rivers & Great Ponds
 - NWI Freshwater Emergent Wetlands 10 Acres +
 - Resource Protection Shoreland Zoning (RPSZ)
 - Limited Residential Shoreland Zone (LRSZ)
 - NRPA Regulated Streams