2025
Multi-Jurisdictional
HAZARD MITIGATION PLAN
For Select Municipalities
located in
Waldo County, Maine

Towns of

Brooks

Freedom

Liberty

Lincolnville

Northport

Searsport

Swanville

HAZARD MITIGATION PLAN

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HAZARD MITIGATION PLAN

SECTION A - OVERVIEW

Introduction

To meet the Local Mitigation Plan requirements in §201.6 of the Interim Final Rule, several municipalities located in the County of Waldo, State of Maine have decided to develop a multi-jurisdictional mitigation plan. The municipalities participating in the development of this plan are too small to complete such an undertaking on their own. The multi-jurisdictional mitigation planning effort has attempted to encourage agencies at all levels, residents, businesses, and the non-profit sector to participate in the mitigation planning and implementation process. Participation in this planning effort has enabled the development of mitigation measures that are supported by various stakeholders and reflect the needs of the wider community.

The Disaster Mitigation Act (DMA) of 2000 requires mitigation planning for natural hazards. It does not require mitigation planning for man-made hazards. This plan has been developed solely for natural hazards.

The Multi-Jurisdictional Hazard Mitigation Plan includes the following sections:

A. Overview
B. Adoption
C. Planning Process
D. Risk Assessment
E. Mitigation Strategy
F. Plan Maintenance Process

Geographic Information

The municipalities within Waldo County, Maine that are participating in the development of this Multi-Jurisdictional Hazard Mitigation Plan include the Towns of:

Brooks	Lincolnville	Searsport
Freedom	Northport	Swanville
Liberty		

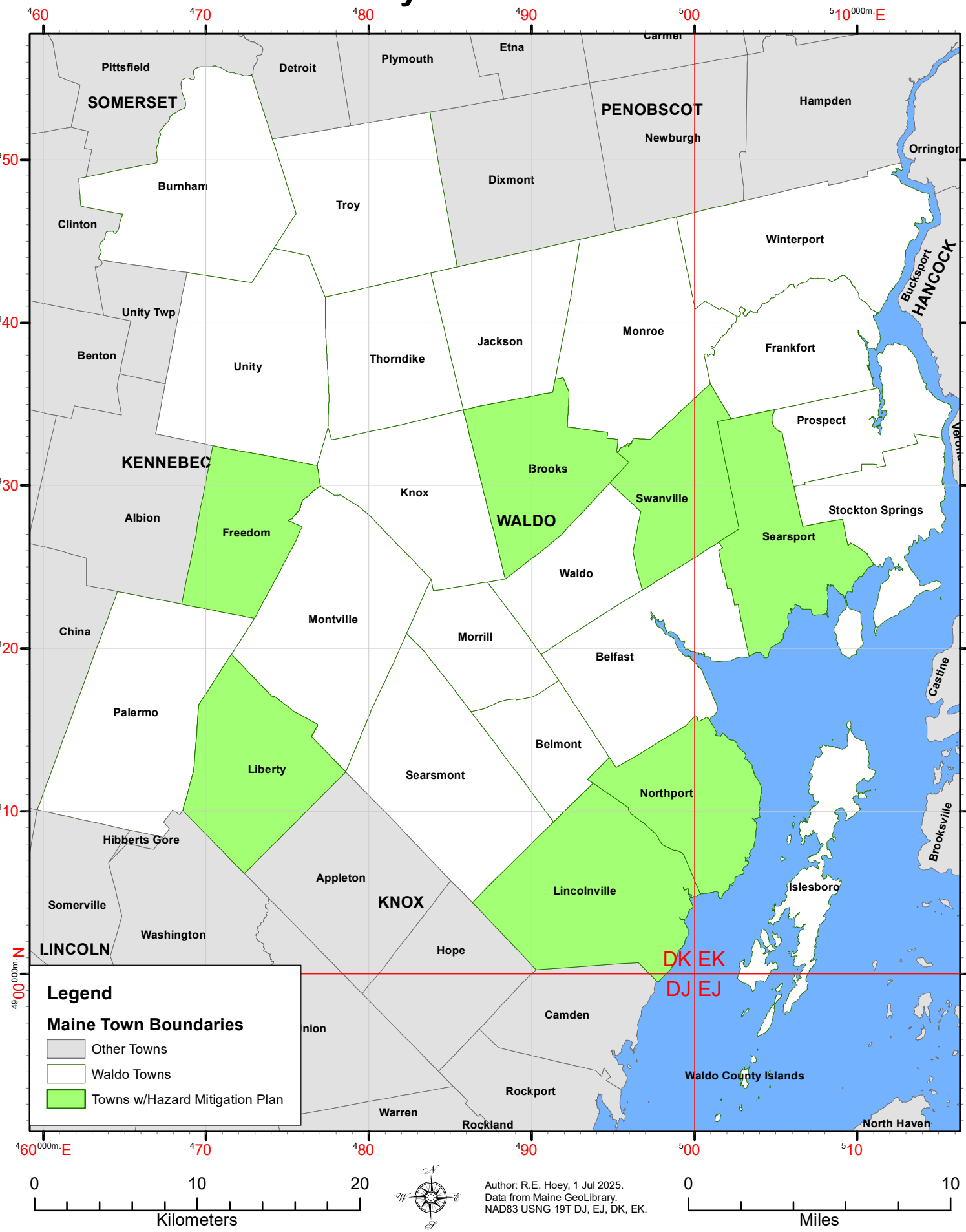
The Towns of Lincolnville, Northport and Searsport are coastal communities. The Towns of Brooks, Freedom, Liberty and Swanville are inland towns. All these towns are heavily forested areas with low population densities. (See map on page A-2)

Town Government Information

The municipalities are responsible for Tax Collection, Town Records, Road Maintenance, Snow Removal, Refuse Collection, Land Use Planning, Code Enforcement, Animal Control, Fire Protection, and Cemetery Maintenance. The Towns of Searsport and Lincolnville have wastewater treatment facilities.

Lincolnville, Northport and Searsport have Town Managers and elected Selectboards. The other towns have elected Selectboards and no Town Managers.

HAZARD MITIGATION PLAN
Waldo County Political Sub-Divisions



Author: R.E. Hoey, 1 Jul 2025.
Data from Maine GeoLibrary.
NAD83 USNG 19T DJ, EJ, DK, EK.

Demographic Information (2020 CENSUS)

Population

Town/City	Year-Round Population	Median Age	Pop Density Pop/sq mi	Total Homes	Occupied Homes	Household Density Ppl/house
Brooks	1,010	38.6	42.5	562	446	2.26
Freedom	711	44.7	32.4	343	292	2.43
Liberty	934	47.2	32.2	718	395	2.36
Lincolnville	2,312	47.5	55.1	1,465	959	2.41
Northport	1,550	47.8	62.7	1,162	681	2.28
Searsport	2,649	46.9	89.0	1,510	1,186	2.23
Swanville	1,377	40.2	64.2	793	558	2.47
TOTAL	10,543	45.4	55.4	6,543	4,517	2.33

The overall 10-year census trend for these towns in Waldo County had a slow population growth of 2.1%, with the median age increasing 6.0%. The household density decreased by 1.7%. The number of total homes increased by 1.6%.

In general, the residents of Waldo County are getting older, and the households are getting smaller. The percentage of children is shrinking, however, the poverty rate among households with children is increasing.

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SECTION B - PREREQUISITES
MULTI-JURISDICTIONAL PLAN ADOPTION

Requirement §201.6(c)(5):	**For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.**
Element F2	**A. Did each participant adopt the plan and provide documentation of that adoption?**
	Minutes of town selectboard meeting where plan was adopted.
	Copy of signed plan signature page.

Each participating municipality adopted the *2025 Multi-Jurisdictional Hazard Mitigation Plan for Select Municipalities located in Waldo County Maine*.

Adoption pages follow.

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Brooks hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

_____ _____
Selectperson, Town of Brooks Date

_____ _____
Selectperson, Town of Brooks Date

_____ _____
Selectperson, Town of Brooks Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Freedom hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

_____ _____
Selectperson, Freedom Date

_____ _____
Selectperson, Freedom Date

_____ _____
Selectperson, Freedom Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Liberty hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

_____ _____
Selectperson, Liberty Date

_____ _____
Selectperson, Liberty Date

_____ _____
Selectperson, Liberty Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Select Board for the Town of Lincolnville hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

Selectperson, Lincolnville	Date
Selectperson, Lincolnville	Date
Selectperson, Lincolnville	Date
Selectperson, Lincolnville	Date
Selectperson, Lincolnville	Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Northport hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

_____ _____
Selectperson, Northport Date

_____ _____
Selectperson, Northport Date

_____ _____
Selectperson, Northport Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Searsport hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

Selectperson, Searsport	Date
Selectperson, Searsport	Date
Selectperson, Searsport	Date
Selectperson, Searsport	Date
Selectperson, Searsport	Date

HAZARD MITIGATION PLAN

RESOLUTION

Whereas natural disasters may occur at any time, we recognize that to lessen the impacts of these disasters, we will save lives, property and the environment;

And whereas the Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas the participating municipalities from Waldo County are committed to the mitigation goals and measures as presented in this plan;

Therefore, the Board of Selectpersons for the Town of Swanville hereby adopt the 2025 Multi-Jurisdictional Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

_____ _____
Selectperson, Swanville Date

_____ _____
Selectperson, Swanville Date

_____ _____
Selectperson, Swanville Date

HAZARD MITIGATION PLAN

SECTION C - PLANNING PROCESS

Requirement §201.6(c)(1)	Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
Element A1	a. Does the plan document how the plan was prepared, including the schedule or timeframe and activities that made up the plan's development, as well as who was involved?
	b. Does the plan list the jurisdictions participating in the plan that seek approval, and describe how they participated in the planning process?

The Multi-Jurisdictional Hazard Mitigation Plan for selected Municipalities located in Waldo County is a regional plan and has been prepared by a Hazard Mitigation Planning Team hosted by the Waldo County Emergency Management Agency (EMA) with representatives from ten of the municipal governments. The Planning Team municipal representatives met or communicated with elected and appointed officials in their municipalities.

Each municipal government held its own outreach activities to collect comments and recommendations from individual residents on the identification of hazards, assessment of vulnerabilities and risks, and the determination of mitigation goals and measures.

The Hazard Mitigation Planning Team consisted of the following representatives:

Dale Rowley	County of Waldo	EMA Director
Shaun King	Town of Brooks	EMA Director
Brian Murphy	Town of Freedom	Volunteer
Elise Brown	Town of Liberty	EMA Director
David Kinney	Town of Lincolnville	Town Administrator
James Kossuth	Town of Northport	Town Administrator
James Gillway	Town of Searsport	Town Manager
Terry Sawyer	Town of Swanville	EMA Director, Fire Warden

Each municipality had at least one representative who attended regional Hazard Mitigation Planning Team meetings. At times a different representative attended if the primary couldn't attend. At the monthly meetings, representatives brought with them the information and decisions made back in their towns. These included the determination of what hazards in their towns were important to mitigate, the status of past mitigation activities, the growth patterns in their communities, and the location of critical infrastructure as it relates to known hazard locations.

The Waldo County EMA office hosted the monthly regional planning meetings at the County EMA office. EMA used a survey poll to schedule the next meeting so that the maximum number of representatives could attend. The County EMA Director chaired the meetings and provided the agenda. The Director sent out planning materials before the meeting for review by the municipal representatives. Each municipal representative would bring their updated documentation to the meeting. Attendance rosters from the regional planning meetings are in the Appendix.

Other municipal officials participated in the collection of data involving land use planning, capital improvement plans, roadway information, and damage information from past disaster events.

HAZARD MITIGATION PLAN

Plan Preparation

The Planning Team held all its planning meetings as open forums and email notices were sent to the municipal planning team representative to inform their other town officials.

Each municipality utilized its own methods of coordinating the planning process.

Town of Brooks	The Town Emergency Management Director attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.
Town of Freedom	A volunteer, chosen by the Board of Selectpersons, attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.
Town of Liberty	The Town Emergency Management Director (EMD) attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.
Town of Lincolnville	The Town Administrator attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.
Town of Northport	The Town Administrator attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure. The Town also utilized the Northport Climate Resilience Committee to discuss, brainstorm, debate and recommend a course of action.
Town of Searsport	The Town Manager attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.
Town of Swanville	The Town Emergency Management Director (EMD) attended the regional meetings and then would brief the Select Board on what happened at the meeting. If decisions were needed the Board would discuss and then vote on the measure.

After each regional planning meeting, or when documentation was emailed to the County EMA office, the County EMA Director compiled the information and drafted sections of the plan. He was assisted by the County EMA GIS Planner in collecting hazard probability, severity, and vulnerability data.
The County EMA Director then sent out the draft portions of the plan to the town hazard mitigation planning team representative. The representative shared the information with other town officials (elected select board, town clerk, fire chief, planning board, road commissioner, code enforcement officer, and citizen committees) and sought comment and input.

The draft plan and planning process was discussed at Selectperson's meeting which are regularly scheduled public meetings with published agendas. The public is given an opportunity to comment on the discussions at these meetings.

Whenever data was required, such as existing ordinances, comprehensive plans, capital improvement plans, emergency plans, expected growth areas, and locations of past storm damages, the regional planning team representative would acquire and provide the data to the County EMA Director.

Each town also utilized its own methods that it finds works best for their community to get the word out about the planning process. Most towns posted information on their website or Facebook page or sent out an email. When the draft plan was completed, the towns posted a pdf copy on their website for the public to review. Facebook and email were used to notify residents of the location of the plan.

Regional Planning Meetings – Schedule and Agenda

On Wednesday, **February 21, 2024**, the regional Hazard Mitigation Planning Team met for the first time to review the steps for the development of the new regional Hazard Mitigation Plan. Blank Memorandums of Understanding (MOUs) were handed out for each Board of Selectpersons to review and sign. The MOU committed each town to active participation. There was discussion on why each town is interested in a Mitigation Plan. The participation process was reviewed in detail. It was understood that each Town will need periodic public hearings throughout the planning process. The County EMA Director handed out copies of mitigation projects that were identified in the 2004, 2011 and 2017 County Hazard Mitigation Plans.

On Wednesday, **April 17, 2024,** the regional Hazard Mitigation Planning Team met to identify what hazards their communities are most vulnerable to. The meeting centered around hazard identification. Past Hazard Mitigation Plans were discussed. The consensus was that the past plans profiled the hazards reasonably well. However, it was decided that a reorganization of the hazards to focus on the specific consequences was needed. Many hazards share the same consequences. Example, summer storms, hurricanes, nor-easters and winter storms can all cause flood damaged roads, and for the coastal community's damages to shoreline properties and infrastructure.

On Wednesday, **June 5, 2024**, the Hazard Mitigation Planning Team met to review the first two draft sections of the Plan. There was further discussion on hazards and consequences. It was decided to add wildfire to the list of hazards that a detailed risk assessment would be completed. The Town of Northport would like to add extreme temperatures to the community-specific assessment.

On Wednesday, **July 24, 2024,** the Hazard Mitigation Planning Team met to review the Plan Overview, Adoption and Planning Process. The Team members provided inputs and comments regarding the risk assessment.

On Wednesday, **August 28, 2024**, the Hazard Mitigation Planning Team met to discuss each town's approval of the hazard analysis, the status of old mitigation projects, mitigation goals and a general review of the text for sections C and D.

On Wednesday, **September 18, 2024**, the Hazard Mitigation Planning Team met to review the municipal efforts at public participation, finalizing approvals of the profiled hazards and another review of the text and information for sections C and D.

On Tuesday, **November 19, 2024**, the Hazard Mitigation Planning Team met to further develop mitigation strategy and projects.

On Wednesday, **February 5, 2025**, the Hazard Mitigation Planning Team reviewed, analyzed and prioritized the Mitigation Actions.

Throughout the month of June 2025, the participating towns held public meetings at their town offices to seek comments from the public.

Public Hearing Data

Town	Date	Time	# Town Officials	# Members of the Public
Brooks				
Freedom				
Liberty				
LincolnVille				
Northport				
Searsport				
Swanville				

The final draft was sent to MEMA on _____ to begin the State and Federal review process.

Stakeholder Involvement

Requirement §201.6(b)(2)	**An opportunity for the neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process.**
Element A2	a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity.

Town Land use Planning Program	Municipal elected and appointed officials reviewed and approved the progress by their Mitigation Team representative and kept their volunteer Land Use Planning Boards and Code Enforcement Officers appraised on the decision made.
County EMA Office	The County EMA office acted as the host and technical advisor for the planning team. EMA also provided research, GIS mapping and drafted the plan.
Neighboring Towns	Neighboring towns were invited to participate in the planning process through e-mails and letters. These towns did not send any inputs or representatives to the planning team.
Maine Forest Service (MFS)	The Maine Forest Service provided up-to-date county data, by town, on the number and size of wildfires. The MFS also provided wildland fire mitigation information. Finally, they were provided a copy of the draft Hazard Mitigation Plan for review and comments.
Maine Dept of Environmental Protection (DEP)	Copy of the draft Hazard Mitigation Plan was sent to the DEP for review and comments.
Maine Floodplain Management Program	The Maine Floodplain Management Program provided up to date county-wide National Flood Insurance Program (NFIP) data.
Maine Dept of Transportation (DOT)	Copy of the draft Hazard Mitigation Plan was sent to the DOT for review and comments.
Mid-Coast Council of Governments	The Mid-Coast Council of Governments (MCCOG) assisted with promoting the mitigation planning effort to all towns in the county.
Businesses located in Towns Involved in Plan	Like their residents, local businesses in each municipality, were provided plan status information on the town websites and social media accounts. A public hearing was also held for which business owners were encouraged to attend.
Academia	There are no colleges or universities located in any of the towns involved in this plan. There are five small elementary schools and one small high school located in these towns. An email was sent out to the school superintendents on (date) to inform them of the plan and if there was any interest in learning more about it. Local business groups, like Head of the Bay Business Association were included in the process.

Public Involvement

Requirement §201.6(b)(1)	**An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.**
Element A3	a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?

Town	How was the public given an opportunity to be involved	How was feedback included in plan
Brooks	Brooks Selectboard encouraged public participation at their regular meetings.	Emergency Management Director reviewed feedback and incorporated into plan as appropriate.
Freedom	Update given to Town Selectboard and Planning Meeting, which are both public meetings. Updates were provided in the July 2024 Town Newsletter.	Freedom Mitigation Planner will review feedback and incorporate into plan as appropriate.
Liberty	The Town of Liberty posted an online survey regarding hazards and proposed projects on the Town website, as well as distributed & collected paper versions of the survey at its annual town meeting.	Emergency Management Director reviewed feedback and incorporated into plan as appropriate.
Lincolnville	Lincolnville Selectboard encouraged public participation at their regular meetings.	Suggestions and comments from Lincolnville officials and public were reviewed for inclusion into the plan.
Northport	The Northport Town Office surveyed the town residents regarding what types of hazards exist in town and suggestions for mitigation projects. They have included the Town's Climate Resilience Committee in their local planning efforts.	Information provided by the town residents, and approved by the Selectboard, was included in the risk assessment and mitigation actions.
Searsport	The Searsport Selectboard discussed the planning process in their meetings. The Plan is available at the town office and posted on our website. We sent out a newsletter asking community and business input to the plan. We have presented and discussed it in may public committee meetings.	We met with the community in a Climate Resiliency Hearing in January and took feedback on this plan and perceived issues.
Swanville	Swanville Selectboard encouraged public participation at their regular meetings.	Emergency Management Director reviewed feedback and incorporate into plan as appropriate.

Existing Information

Requirement §201.6(b)(3)	Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
Element A4	a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?

The Regional Hazard Mitigation Planning Team was assisted with the development of the plan by the County Emergency Management Office, which facilitated the meetings, assisted in research and outreach programs, completed GIS mapping and consolidated the information and comments provided by the planning team and the public.

Town	List existing plans, studies, reports and technical information used.	What information is to be incorporated in Mitigation Plan?
Brooks	2011 County Hazard Mitigation Plan	Information on past projects and their status were incorporated.
Freedom	2011 and 2017 County Hazard Mitigation Plans	Information on past projects and their status were incorporated.
Liberty	Town Road Committee Plan Town Communications Assessment	Recommendations for road work to prevent flooding damages. Recommendations for additional communications equipment.
Lincolnville	- Lincolnville Harbor Evaluation, Planning and Feasibility - Vulnerability Assessment and Resilience Planning - Comprehensive Plan - Road Plan - Maine Stream Habitat Viewer - Drainage Structure Plan - Lincolnville boat Ramp Study and Conceptional drawings	The consensus of each study or report is incorporated into overall plan for the community and our plan of action moving forward.
Northport	Engineering survey and design of four locations in the Town's right-of-way on the shoreline in need of stabilization; Road Commissioner input on culverts and stream crossings prone to blockage and flooding; Town's floodplain map; community climate survey results.	Design plans for shoreline stabilization; and locations of specific culverts prone to flooding.
Searsport	Comprehensive Plan Land Use Ordinance Resiliency Committee Documents Wharf Ordinance Road Ordinance Emergency Response Plan	Flood Zone information, Identifying potential vulnerable flood locations
Swanville	2011 County Hazard Mitigation Plan	Information on past projects and their status were incorporated.

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SECTION D - RISK ASSESSMENT

§201.6(c)(2) of the Rule outlines specific information that Waldo County must consider when completing the risk assessment portion of this mitigation plan. Our local risk assessments provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. This plan includes detailed descriptions of all the potential hazards that could affect the jurisdiction along with an analysis of the jurisdiction's vulnerability to those identified hazards. Specific information about numbers and types of structures, potential dollar losses, and an overall description of land use trends in the jurisdiction are included in this analysis. Because this is a multi-jurisdictional plan, the risks that affect only certain regions of the County were assessed separately in the context of the affected region.

This section includes the following seven subsections as follows:

- Identifying Hazards
- Profiling Hazards
- Assessing Vulnerability: Overview
- Assessing Vulnerability: Identifying Structures
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-jurisdictional Risk Assessment

HAZARD MITIGATION PLAN

HAZARD IDENTIFICATION

Requirement §201.6(c)(2)(i):	**A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.**
Element B1	a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?

The County Emergency Management Agency and the Regional Hazard Mitigation Planning Team reviewed the various natural hazards that could impact the participating jurisdictions. These hazards were identified through an extensive process that utilized input from the municipal emergency management programs, local officials, public input, researching past disaster declarations in the County, a review of current maps, climatology and geologic data, and a hazard identification and risk assessment completed by the Waldo County Emergency Management Agency.

List of Potential Hazards. The following list of hazards has been developed using various information from the following sources:

- 2016 NFPA 1600
- FEMA 386-1: Understanding Your Risks
- IFSTA, First Edition, Emergency Management Handbook
- Risk Identification and Analysis: A Guide for Small Public Entities, Public Risk Entity Institute
- Maine Emergency Management Agency: Hazard Identification and Vulnerability Assessment for Local/County Governments Workbook

The List of Natural Hazards include:

- Avalanche
- Coastal Erosion
- Coastal Storm
- Drought
- Earthquake
- Extreme Heat
- Famine
- Flood
- Geomagnetic Storm
- Glacier
- Hailstorm
- Landslide
- Tornado
- Tropical Cyclone (Depression/Storm/Hurricane)
- Tsunami
- Volcanic Eruption
- Windstorm (Thunderstorm/Microburst/Other)
- Winter Storm (Nor'easter/Ice Storm)
- Wildfire

Due to climate and geography, it is not possible for several of these hazards to occur (within our lifetimes) in the planning area. These include:

- Avalanche
- Glacier
- Volcanic Eruption

Hazards Eliminated. The following table identifies the hazards that were eliminated from further consideration in the plan, due to a lack of historical evidence, lack of overall county-wide severity, lack of climate data or a low likelihood for the event to occur. However, although these disaster events were not profiled in the hazard mitigation plan, it does not "guarantee" that any of these events will not or could not occur and cause great damage.

Drought	Review of State EMA records Review of NOAA records	Historical climate and rainfall data doesn't show a problem sufficient to create disaster conditions. Effects of occasional droughts are limited to a few dry dug wells and lower crop outputs. These are not managed by the jurisdictions. USDA works with local farmers with regular routine programs.
Earthquake	Review of Maine Geological Survey records	Although small earthquakes are common in Maine, no significant damaging movement has occurred in 20,000 years. No damages or injuries have ever been recorded in Waldo County due to earthquakes.
Extreme Heat	Review of NOAA Records	The highest average temperature for Waldo County is 75° F. The highest temperature on record is 104° F, set on August 19, 1935. (https://temperature.weatherdb.com/l/1812/Belfast-Maine) In most years, there are only brief spells where the temperatures reach the upper 80°s F, with an occasion day or two in the 90°s F. The probability for dangerously high temperatures to be maintained for a period is very unlikely.
Famine	Review of historical data	There are no geographical areas in Waldo County that have experienced famine in modern times
Hailstorm	Review of NOAA records Review of Maine EMA records	Although we have periodically experienced hailstorms, they are rare and minor. We have no records of a hailstorm causing any damage in the County.
Landslide	Review of Maine Geological Survey records Historical data.	There have been 11 landslides that have caused damage to homes or roads in Maine since 1868; none in Waldo County. On June 26, 2009, a coastal landslide occurred in Fort Point Cove, in the Town of Stockton Springs. There was no damage or injuries. There is a mapped potential landslide area on low coastal bluffs in Searsport. There is no significant property at severe risk.
Tornado	Review of NOAA records	In Waldo County, there have been two confirmed tornadoes; an F2 on July 7, 1954, and a F1 on July 1, 1968 both on Islesboro. There have been no tornados in the planning area in recorded history.
Tsunami	Review of NOAA records	There have been no recorded tsunamis occurring in the planning area in recorded history. NOAA data shows that due to the coastal water topography anything over 3 feet is improbable.

Hazards Profiled. Natural hazards Identified as having a significant effect on the jurisdiction(s) in the planning area therefore include:

- Coastal Erosion
- Coastal Storm
- Flood
- Geomagnetic Storm
- Tropical Cyclone (Depression/Storm/Hurricane)
- Windstorm (Thunderstorm/Microburst/Other)
- Winter Storm (Nor'easter/Ice Storm)
- Wildfire

Many of these hazards share consequences with other identified hazards. The following table will group hazard effects. The consequences identified from these hazards are:

Identified Hazards	Consequences			
	Loss of Buildings	**Damage to Water/Sewer Systems**	**Loss of Roads**	**Loss of Grid Power**
Coastal Erosion + Coastal Storm (Surge & Flooding)	Coastal Building flooded	Coastal wastewater facilities flooded	Coastal roads washed out	Very limited losses due to floods
(Non-coastal) **Flooding** caused by severe rainstorms, which include all **Tropical Cyclones**, Nor-easters, and spring runoff.	Flooded Basements	None	Roads washed out	Vert limited losses due to floods
Geomagnetic Storm	None	Loss of Operation	None	Long Term Grid Failure
Tropical Cyclone (Wind) **+ Coastal Storm** (Wind) **+ Windstorms**	Some damage to roofs and siding	None	Roads blocked by tree and powerline debris	Short to Long Term Grid Failure
Winter Storm (Ice Storm)	Minor	None	Temporary	Short Term Grid Failure
Wildfire, Major	Buildings in WUI	None	Temporary	Localized

In the following sections, each of the natural hazards identified that have a significant effect on the jurisdiction(s) in the planning area will be profiled to describe the severity and probability of each hazard. However, in the vulnerability analysis, categories will be established and defined for each of the consequences of Loss of Buildings, Damage to Water and Wastewater System, Loss of Roads and Loss of Grid Power.

All these hazards will be classified as severe summer and winter storms, geomagnetic storms and wildfires.

Element B1	d. Does the plan include the history of previous hazard events for each identified hazard?

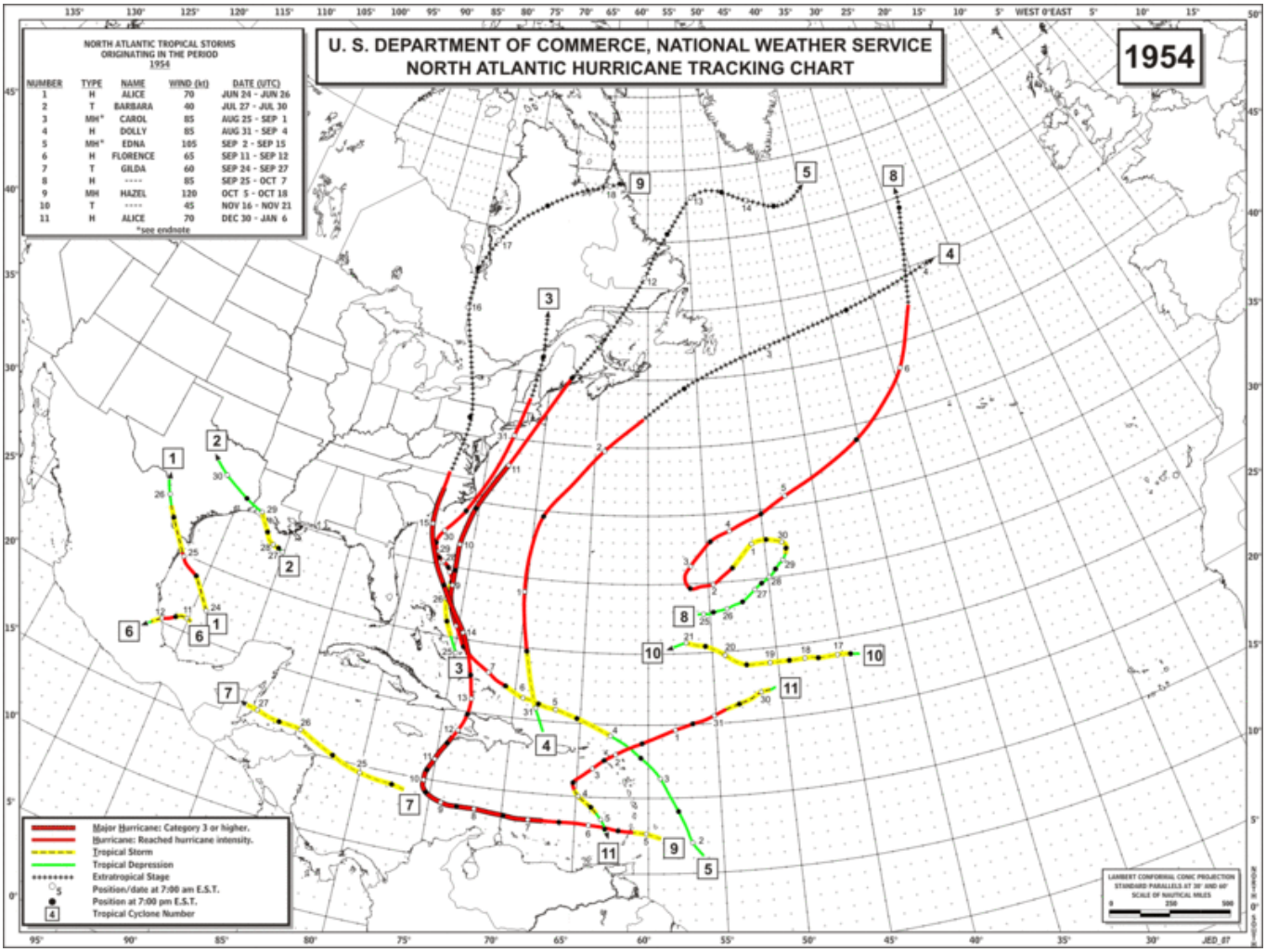
HISTORICAL HAZARD EVENTS IN WALDO COUNTY

YEAR	MONTH	DAY	DAMAGE ESTIMATE	HAZARD TYPE	DECLARED
1888	March	12	?	Great White Hurricane	
1898	November	26	?	The Great Portland Gale	
1900	October	15	?	Extratropical Depression	
1938	September	21	?	Great New England Hurricane	
1938	October	23	?	Extratropical Depression	
1944	September	15	?	Hurricane Cat 2	
1945	September	12	?	Extratropical Depression	
1949	August	23	?	Extratropical Depression	
1952	February	2	?	Extratropical Depression	
1952	August	18	?	Tropical Depression Able	
1954	August	31	?	Hurricane Carol	SBA
1954	September	11	?	Hurricane Edna (Storm of Record)	DR-24
1960	September	12	?	Hurricane Donna	
1963	October	29	?	Hurricane Ginny	
1969	December	25	$198,479	Flooding	DR-284
1972	February		?	Coastal Storm	DR-326
1973	April	24	?	Flooding	DR-384
1973	July	1	?	Flooding	SBA
1973	December	16	?	Flooding	FDAA Storm #410
1974	May	29	$240,110	Flooding	
1976	February	2	?	Coastal Storm	
1978	January	10	?	Winter Storm	
1978	February	8	?	Major Flooding	Disaster
1979	September	6	?	Hurricane David	
1980	October	25	?	Coastal Storm	SBA
1985	September	27	?	Hurricane Gloria	
1987	March	30	$180,149	Flooding (Storm of Record)	DR-788
1991	August	20	?	Tropical Storm Bob	DR-915
1992	March	27	$551,479	Flooding	DR-940
1993	March	15	$85,823	Winter Storm	DR-988
1994	April	15	?	Flooding	DR-1029
1996	January	19	$834,887	Flooding	DR-1106
1998	January	13	$2,530,680	Ice Storm (Storm of Record)	DR-1198
2003	December	11	$322,151	Flooding	DR-1508
2005	March	29	$664,806	Flooding	DR-1591
2007	March	17	$335,734	Flooding	DR-1691
2007	April	16	$970,140	Flooding	DR-1693
2008	April	29	$296,550	Flooding	DR-1755
2009	January	9	$225,158	Snowstorm	DR-1815
2009	April	6	$618,118	Flooding	
2009	June	18	$424,660	Flooding	DR-1852
2013	December	24	$600,000	Ice Storm	

2017	October	30	$87,644	Windstorm	DR-4354
2020	All Year		$34,631	Pandemic	EM-3444
2021	October	30	171,368	Rainstorm Flooding	DR-4647
2022	December	23	$568,000	Rainstorm with winds/flooding	DR-4696
2023	April	30	$262,000	Rainstorm with winds/flooding	DR-4719
2023	December	18	$253,000	Rainstorm with winds/flooding	DR-4754
2024	January	10	1,266,000	Coastal Storm Flooding	DR-4764

Due to the lack of verifiable data, we were only able to go back to 1888 for information on any type of major natural hazard event. Damage levels as determined by government assessments go back to 1987, or around the passing of the Stafford Act. Poor record retention was kept up to the 1950s. Additionally, there was very little development until the 1960s. As such, most of the data we have is from 1960 on. (Damage assessments are for Waldo County and are not adjusted for inflation). Most records date to when the Stafford Act was passed in 1988.

Historically, the primary hazards have been severe storms that involve high winds and large amounts of rainfall. Between 1938 and 1991 there were at least 17 tropical cyclones that affected the mid-coast of Maine. The most severe storms that affected mid-coast Maine were the two hurricanes, Carol and Edna, that struck in 1954. Primary damages are road washouts and damaged powerlines and trees.



HAZARD PROFILES

Element B1	b. Does the plan include information on the location of identified hazard?
	c. Does the plan describe the extent for each identified hazard?
	e. Does the plan include the probability of future events for each identified hazard, including the type, location and range of anticipated intensities of identified hazards?

Severe Winter Storm Events (Blizzards, Nor-easters, Ice Storms)

LOCATION & EXTENT: All the communities in Waldo County are subject to severe winter storm events. All communities are subject to major snowfall events; however, the northern half of the county may occasionally receive slightly larger snowfall amounts. The entire County can experience a major ice storm, as it did in January 1998 and December 2013; however, the coastal communities on the mainland and on the islands, which contain the majority of the County's population, experience ice in their winter storms slightly more often. Finally, the entire County is very susceptible to "Northeaster" storms, especially from the very high winds that are involved in such a storm. The Gulf Stream follows a path up the eastern seaboard bringing major storms with it to the Gulf of Maine. Much colder air flows down from Canada and collides with the Gulf Stream over the New England region.

PREVIOUS OCCURRENCES: There have been four Federally declared winter storm disaster events since 2000. The worst storm in the past 26 years was an ice storm that occurred in January 1998 and caused $2,530,680 in damage throughout the entire County. Three inches of ice resulted. This storm, which severely damaged the electrical transmission system in the State of Maine, caused major damage to the forests, covered many roadways with debris and ice, and caused some limited building damages. In December 2013, the County was hit with an ice storm which accumulated 1-1/2 inches of ice. Power was lost for three days and caused $525,912 in local public damages. However, most winter storms in the County are windstorms (Nor'easter or blizzard) which cause localized power outages.

PROBABILITY: It is expected that a severe winter storm (snow or ice) could cause damage in Waldo County at least once every three to five years. Ice storms tend to result in more regional power outages, but far less roadway snow removal. Both require sand, salt and calcium chloride to treat the roads.

Severe Summer Storms (Tropical Cyclones/Windstorms/Microbursts/Intense Rainstorms)

LOCATION & EXTENT: The communities in Waldo County are susceptible to severe rainstorms, windstorms and tropical storm events. Waldo County is a coastal county located on Penobscot Bay in mid-coast Maine. The County has been affected by 17 tropical storms between 1938 and 1991. In the latter half of the 20th century, the County averaged a tropical storm every three years. However, it has been 33 years since the last hurricane impacted Waldo County. The last tropical storm (Irene) that had a minor effect, was in 2011.

Since the County is only about 25 miles deep from the coast, all parts of the County are subject to the effects of a Hurricane. However the coastal towns will be hardest hit during the storm with storm surge and very high winds and rainfall. The northern half of the county will experience heavy rainfalls that will overwhelm rudimentary storm water control systems and will experience trees on power lines and in the roads.

PREVIOUS OCCURRENCES: Hurricanes Carol and Edna in September and October 1954 were not only the most destructive hurricanes to have impacted Waldo County in recorded times, they were separated by less than 2 weeks. The area had not even begun to recover when the second major storm struck. Two lives were lost in Unity, Maine during Hurricane Edna, due to drowning. In 1985, Hurricane Gloria brushed past Waldo County causing power outages and some localized flooding. In 1991, the Hurricane Bob path went directly over Waldo County, but had downgraded to a tropical storm.

PROBABILITY: It is expected that a Category 1 hurricane could cause major damage in Waldo County at some point within the next decade. However, the waters in the Gulf of Maine are cold enough that even a several degree temperature increase is not enough to see a significant increase in the severity of the tropical storms. Though 17 tropical storms occurred between 1938 and 1991, we have only experienced 1 tropical depression in the last 33 years.

Flooding

LOCATION & EXTENT: The communities in Waldo County are subject to riverine, storm surge, and wetland area flooding. The County EMA has reviewed the County's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) to compile a profile of the flooding hazard in the County. The EMA staff completed research on flooding history in the County and indicated this data on the GIS base maps. The Municipal Base Maps show the areas susceptible to potential flooding. This provides a clear picture of areas and structures most vulnerable to flooding.

There are three major rivers located along the border of Waldo County. The Penobscot River and Bay borders the towns of Belfast, Frankfort, Islesboro, Lincolnville, Northport, Prospect, Searsport, Stockton Springs and Winterport. (Planning Area) The Sebastacook River is bordered by the Town of Burnham. A smaller river, the Passagassawakeg River flows through the City of Belfast. There are no dams on the Penobscot River along Waldo County, although there is a number of dams on the river, north in Penobscot County. Most of the Waldo County dams are small and located at the outlets of lakes and ponds and would not have a major flooding impact. If a large dam on the Penobscot River, such as the Dolby dam in northern Maine were to catastrophically fail, it would take a day and a half for the flooding to occur along the Penobscot River section in Waldo County. This would provide us with sufficient warning time to prepare for the floodwaters. There is one dam in Waldo County on the Sebastacook River, however, that section adjacent to the river in Burnham is an undeveloped boggy area. This Dam is in excellent condition and procedures are in place for effective flood management. Flooding from the

Penobscot and Sebastacook rivers is not expected to be likely; however, flooding along the Penobscot River would cause damage to a handful of residential structures if it were to occur. There are two dams on the Northport/Belfast town line called the Upper Little River Reservoir Dam and the Lower Little River Reservoir Dam. Should these dams fail, the water released could washout U.S. Route 1.

The most susceptible communities to coastal flooding are Islesboro and Lincolnville. Lincolnville Beach, which is also the home of a State of Maine Ferry Service, is susceptible to flooding and several Lincolnville Beach area businesses have experienced minor flooding in the past.

Most of the flood damage in the County is caused by stormwater runoff from a major rain event which undercuts or overtops rural roads. When Maine has an above average snowfall for the winter and quickly warming temperatures and rainfall suddenly arrive in early spring, the snowpack melts off quicker than the watersheds can handle. This causes local water bodies to overflow their boundaries and flood nearby road surfaces. Coastal storm flooding can impact properties directly adjacent to the ocean. We do not get coastal flooding more than a hundred feet inland, except at Lincolnville Beach.

PREVIOUS OCCURRENCES: There have been 39 flooding events occurring in the last 100 years. Most have not resulted in federal disaster declarations. The most destructive flooding events in recent years occurred in 2007 within four weeks of one another. The St Patrick's Day Flood was caused by snowpack melting and heavy rains, especially to the eastern half of the County. Nearly all of the damage was to roads and storm water management systems. Four weeks later, the Patriot's Day Storm caused nearly three times the level of damage and impacted on the entire County, although the majority of the damages occurred in the eastern half of the County. Again, nearly all of the damage was to roads and storm water management systems. From January 10th to 13th of 2024, the County experienced high winds and heavy rainfall. Approximately, $3.8 million of damages occurred mostly along the coast.

PROBABILITY: It is expected that a major flood event could cause road damage in Waldo County at least once every 2-3 years. Flood zones are shown on the Municipal Base Maps included in this section. However, because of our coastal and inland topography, it will not increase the likelihood of homes and businesses being flooded.

Wildfire

LOCATION & EXTENT

The wildland–urban interface (WUI) is comprised of both interface and intermix communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S.Department of Agriculture [USDA] 2001:751–777). Interface areas include housing development(s) that meet or are in the vicinity of continuous vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area where the cover of continuous vegetation and fuels is often greater than cover by human habitation. The Waldo County area WUI involves a mixture of interface and intermix.

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property.

Human encroachment upon wildland ecosystems in recent decades is increasing the extent of the WUI throughout the county, which is having a significant influence on wildland fire management practices.

When combining the collective effects of aggressive suppression policies, resource mismanagement, land use patterns, insect and disease infestations, and the expansion of the WUI into areas with high fire risk has created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI.

Many of Waldo County's forested coastal landscapes are adapted to fire, and it is a necessary component of maintaining the structure and species composition of these natural communities. Some species are fire resilient such as Jack Pine and Quaking Aspen.

In contrast, species such as hemlock and northern hardwood species like sugar maple, beech, and yellow birch are less adapted to fire due to specific characteristics. These species typically possess thin bark, which offers less protection against fire damage. Additionally, trees with thin bark contribute to higher fuel loading on the forest floor (Carey 1993; D'Amato 2018). This means that there is an accumulation of combustible material, such as dead leaves/needles, branches, and other organic matter, which can easily ignite and fuel fires. Therefore, the diversity of fire regimes in a small geographical area such as Waldo County results in a mosaic landscape with a patchwork of vegetation types with differing ecological succession pathways. Complete elimination of fire from the landscape may have a detrimental effect on the natural environment, as fire has been an integral part of the coastal Maine landscape for eons. Should a fire spread even slightly and reach a different vegetation type, significantly more intense fire behavior is possible because of higher fuel loading.

All parts of the County are subject to wildfire; however, the northern portion of the county has the least accessibility to productive forestland due to the lack of roads and development. The southern portion of the County has a larger number of homes and businesses within the Urban-Wildland Interface. Nearly 90% of the County is forest land. To date, there have been very few homes lost to wildfires. It is more likely that a structure fire will cause a minor wildfire.

PREVIOUS OCCURRENCES

The County experienced 317 wildland fires from 1995 to 2001, most have been an acre or less. In May 2001, a forest fire that burned 100 acres in Northport resulting in $67,957.80 in wildfire suppression costs. In May 2015, a wildfire burned 50 acres on the Jackson Road in Searsmont. In October 2017, a wildfire burned 17 acres near Half Moon Pond in Prospect (Planning Area). The most severe forest fire season in the State's recorded history occurred in October of 1947. These fires burned 205,678 acres and caused 16 deaths throughout the State of Maine. However, Waldo County did not have any large wildfires during the 1947 fire season.

Wildfire Damages 2019-2023 (Data from Maine Forest Service)

Town	# Fires	Acres Burned	Homes Destroyed	Other Structures Destroyed
Belfast	10	14.8	1	2
Belmont	2	0.9	0	0
Brooks	6	8	0	0
Burnham	3	0.8	0	0
Frankfort	2	9	0	0
Freedom	4	3.9	0	1
Islesboro	3	2.9	0	0
Jackson	8	3.8	0	0
Knox	2	0.3	0	0
Liberty	8	6	0	0
Lincolnville	4	1.4	0	2
Monroe	4	2.7	0	0
Montville	9	3	1	0
Morrill	2	0.7	0	0
Northport	3	1.6	0	0
Palermo	8	1.8	0	2
Prospect	1	0.2	0	0
Searsmont	3	0.3	0	0
Searsport	10	5.5	0	0
Stockton Springs	3	0.8	0	0
Swanville	5	5.5	0	0
Thorndike	8	3.1	1	3
Troy	3	5.9	0	0
Unity	5	7.9	0	1
Waldo	3	0.4	0	0
Winterport	9	8.3	0	1
TOTAL	128	99.5	3	12

Bolded are Planning Area Towns

PROBABILITY AND CAPABILITY

When analyzing the risks of wildfire susceptibility, WUI areas are helpful determinants. WUIs are areas where wildfires have been shown to have the largest threat to the land, infrastructure, local resources, and local safety. Waldo County is a somewhat sparsely populated area but has witnessed an increase in building growth, causing WUI areas to become increasingly developed. This is a concerning trend as increased human activity in the WUI can lead to more wildfire ignitions and increase wildfire risk.

Due to the variety of developments and values (residential and commercial infrastructures, historic and natural values) throughout the WUI, fire suppression in WUI areas remains a management priority throughout the county.

However, the use of prescribed fire in addition to ecological restoration techniques has proven to help entities throughout Maine utilize effective fire regimes and reduce the potential for catastrophic wildfires. The use of prescribed fire on private land is a decision to be made by the landowner in consultation with fire authorities, and it is acknowledged that such a management technique may not always be feasible in Waldo County due to some of the denser population areas and intermixed nature of the WUI. Prescribed fire, while generally accepted and promoted in many parts of the United States, is still facing an uphill challenge in the northeast due to the lack of understanding and comfort utilizing this wildfire hazard mitigation tool.

Researchers at the National Oceanic and Atmospheric Administration (NOAA) have recognized ongoing drought patterns throughout the northeastern United States. NOAA studies have shown a correlation between potential rising temperatures and drought in the Northeast. A 2022 study identified that dry circulating patterns during the years 2000, 2016, 2020, and 2022 in New England caused economically impactful droughts that result in consequences such as water supply shortage, wildlife disruption, agriculture/crop losses, and higher risk of wildfires.

As wildfires have continued to grow in size and severity over the last decade nationally, it is necessary for fire managers to institute more robust pre-fire planning as well as adapt and improve decision-making tools to reduce risk to fire responders and the public and assess impacts on ecological processes.

Fire response is heavily dictated by availability of local and supporting (mutual aid) resources, fire location, values at risk, and characteristics of individual fires due to weather, fuels and topography.

The allocation of fire response resources for wildfire is subject to the regulations set forth by the state of Maine, as well as municipal, county protocol and mutual aid agreements. Outdoor debris and prescribed fires are restricted by class day and are contingent upon the acquisition of a valid burn permit for anything larger than a campfire. Waldo County typically experiences higher wildfire risk during the dry, blustery stretches of spring and during periods of summer and fall drought. The spring months are particularly susceptible to fire starts and rapid fire spread due to lower average humidities, spring winds, and cured fuels, thereby raising concerns pertaining to fire response times as well as resource shortages.

Under moderate conditions, the wildfire risk is generally mitigated. However, in drought periods, the potential for severe wildfire outbreaks escalates significantly. In incidents of wildfire, local departments will use their own resources initially while gathering additional assistance from mutual aid departments in situations where an incident exceeds an individual town's ability to fulfill appropriate duties of response and suppression.

One idea that has proven successful in Maine to improve wildfire mitigation is the implementation of a Firewise USA Community Recognition program. For Waldo County communities, this Firewise program would help Waldo County's participating communities prioritize mitigation actions based on community wildfire risk site assessments.

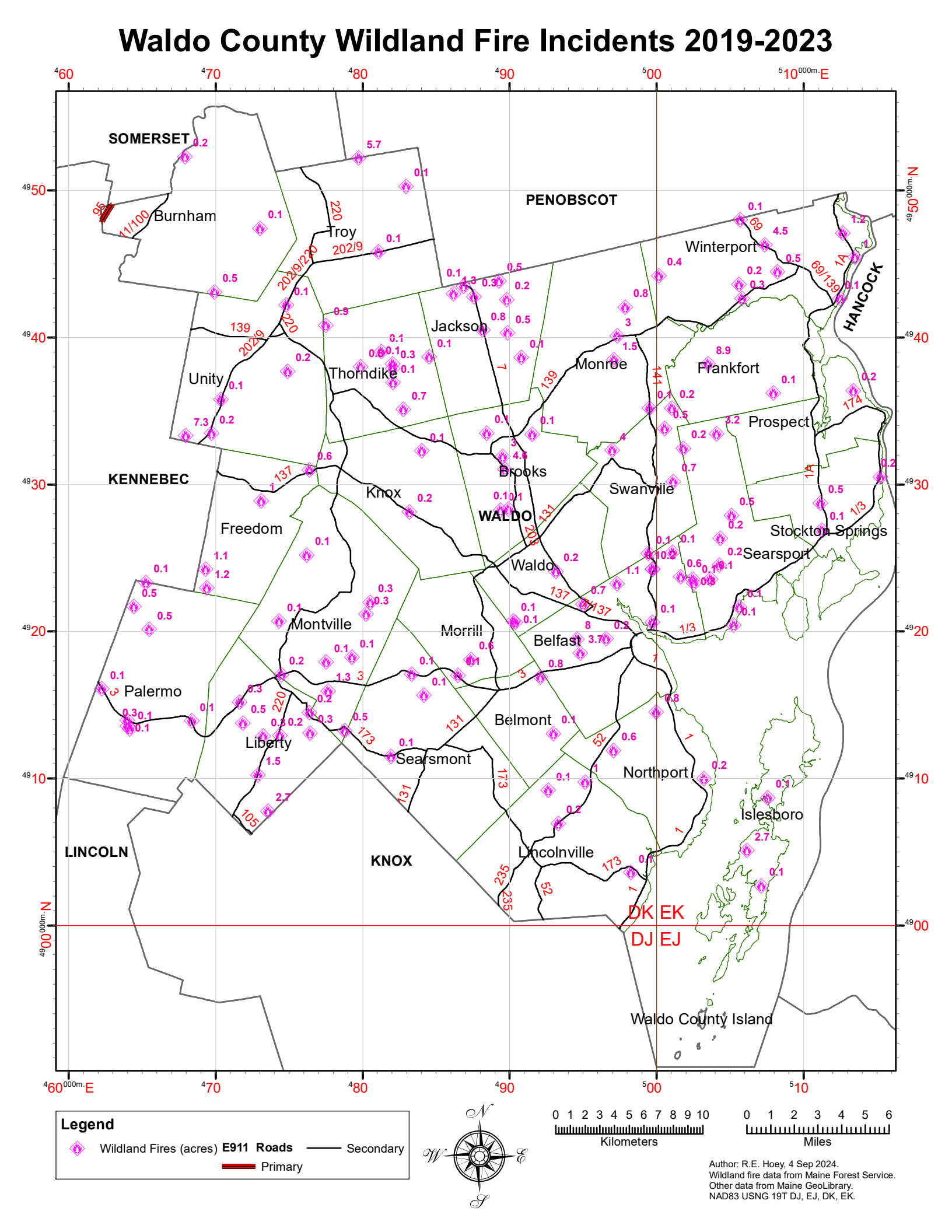
Each fire department in Waldo County is required to provide 9-1-1 emergency and initial response services, to include wildfire response, while following preparedness guidelines. Volunteer and career firefighters in Waldo County communities conduct training and maintain certifications year-round, ensuring effective emergency response. Supporting state and federal fire response organizations may experience variations in available staffing levels depending on the number and intensity of wildfires in the region as well as nationally.

Local municipal firefighters are often deployed as initial attack resources and are used to increase staffing levels in key areas of need. Volunteer firefighting services all across Maine have experienced recruitment and retention issues, often caused by the commitment of long hours away from home and the demanding training obligations associated with volunteer firefighting. While Waldo County staffs several fire departments with volunteer firefighters, their availability for every fire event cannot be guaranteed and state and federal resources may need to be deployed to support local fire response operations when wildfire incidents expand.

The wildland fire community is well known for its development of mutual aid agreements at the international, federal, state, and local levels. Such mutual aid agreements allow for the closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted. The Maine Forest Service – Division of Forest Protection is available 24/7 to assist any municipality in the State with mutual aid requests and organization, up to and including the ordering of Northeast Forest Fire Compact (NFFPC) and federal resources when needed.

We estimate a 10% chance in any given year for a major wildfire event could cause a significant level of damage (greater than 50 acres) in Waldo County. Wildfire danger areas are shown on the County Base Maps included in this section.

Waldo County Wildland Fire Incidents 2019-2023



Geomagnetic Storm

LOCATION & EXTENT: A geomagnetic storm is a temporary disturbance of the Earth's magnetosphere caused by a solar wind shock wave and/or cloud of magnetic field that interacts with the Earth's magnetic field. A coronal mass ejection (or CME) is a giant cloud of solar plasma drenched with magnetic field lines that are blown away from the Sun during strong, long-duration solar flares and filament eruptions. CME can cause Geomagnetic Storms at Earth and induce extra currents in the ground that can degrade power grid operations. (Space Weather Prediction Center). There is a 15-to-96-hour arrival of the CME impact with a 15-60 minute warning that a given location could be impacted.

A Geomagnetic Storm/CME can impact the entire Earth. If a CME strike is sufficient to cause damage to a power grid system, it will most likely be regional or national in scope. Areas of high risk include a northern latitude, closeness to ocean salinity and a granite bedrock. Maine has all these risk factors.

A “Carrington Event” could severely damage the electrical grid by destroying 345-kvolt transformers located in Maine. These transformers could take months to replace.

PREVIOUS OCCURANCES

Starting on September 2, 1859, a powerful geomagnetic storm known as the Carrington Event disrupted telegraph services and caused several fires to telegraph stations. In Portland, Maine, telegraph operators disconnected their equipment from their batteries and continued to send messages using the current on the lines created by the ground induced currents. The undersea telegraph cable that stretched from the United States to Europe was damaged and had to be replaced.

From May 13 to 15, 1921 a geomagnetic storm known as the New York Railroad Storm resulted in damages and problems with railroad signal devices and telegraph systems in the U.S. and Europe.

On March 31, 1989, a CME event with about half the strength of the 1859 event caused the collapse of the Hydro-Québec power network in Québec, Canada. On July 23, 2014 a CME of the 1859 strength passed through Earth’s orbit and missed the Earth by one week.

PROBABILITY

In AGU100, Jan 2020, S.C. Chapman, et al, estimated annual probabilities of severe, great, and Carrington size storms at 28%, 4%, and 0.7%, respectively. Based on these figures the probabilities of at least one of these events in a person’s lifetime are near certain, 96%, and 42%, respectively. These are averages determined over 14 solar cycles. Within a solar cycle the probability is greater/lower during the maximum/minimum of the cycle.

Climate change itself will not increase solar storm activity. However, increased solar activity can cause climate change and has over the last 4 billion years. However, increasing temperatures will reduce the electrical load in the winter (less heating) and more electrical load in the summer (more cooling). However, the drive to electrify cooking, heating, cooling and transportation and retiring reliable electrical generation systems is having a much greater impact on the electrical grid in Maine then climate change.

Element B1	f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those impacting the overall planning area?

Towns that are impacted by the profiled natural hazards.

Town	Coastal Flooding	Storm Water Flooding	High Winds	Ice Storm	GMD Storm	Wildfire
Brooks	No	Yes	Yes	Yes	Yes	Yes
Freedom	No	Yes	Yes	Yes	Yes	Yes
Liberty	No	Yes	Yes	Yes	Yes	Yes
Lincolnville	Yes	Yes	Yes	Yes	Yes	Yes
Northport	Yes	Yes	Yes	Yes	Yes	Yes
Searsport	Yes	Yes	Yes	Yes	Yes	Yes
Swanville	No	Yes	Yes	Yes	Yes	Yes

All the profiled natural hazards will impact all the municipalities, except Coastal Flooding. This is unique to the towns of Lincolnville, Northport and Searsport. The towns of Lincolnville, Northport and Searsport are located on Penobscot Bay.

The coastal hazard is limited to those land areas immediately adjacent to the coastal waters. It does not extend inland from the coast because the area is not flat but rises quickly as you move away from the coast.

The primary consequences of coastal storms are coastal structures such as docks, piers, wharfs, moorings, seawalls, and breakwaters. There have been a few homes that are being threatened by coastal erosion caused by coastal storms. There are no other unique to various parts of the planning area.

Requirement §201.6(c)(2) (ii):	**A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description must include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008, must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:** **A. The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.** **B. An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.** **C. Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.**
Element B2	**Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods?**
	a. Does the plan provide an overall summary of each of each jurisdiction's vulnerability to the identified hazards?

ASSESSING VULNERABILITY: OVERALL SUMMARY

The Hazard Mitigation Plan identified critical facilities located within the County and the hazards to which these facilities are susceptible. A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions.

The critical facilities identified in Waldo County are municipal offices, fire and police stations, ambulance garages, post offices, town garages and sand/salt sheds, hospitals and clinics, electric and communication utilities, water and wastewater treatment facilities, hazardous material sites, large employers and public schools.

Severe Winter Storm Events (Blizzards, Nor-easters, Ice Storms)

Severe winter storms will primarily impact power and telecommunications hard lines and roadways. Electrical and telephone lines may be torn down due to falling trees. Roadways will either be covered in deep snow, ice, or tree and utility line debris. Although residents will be impacted by utility outages, the power and telephone utility companies are private, and utility repairs are not a responsibility of the municipal governments. Municipal governments will look to provide emergency power for public facilities and mass care for its residents.

Severe Summer Storms (Tropical Cyclones/Windstorms/Microbursts/Intense Rainstorms)

Tropical cyclones, windstorms, microbursts or intense heavy rainstorms will impact power and telecommunications hard lines and roadways and cause some roadways to be washed out. Electrical and telephone lines may be torn down due to falling trees. Roadways may be covered with utility line debris or heavily eroded. High winds could cause trees to fall on homes,

businesses and public buildings. There is no history of hurricane winds in Waldo County severely damaging structures. However, public safety radio communications towers could be damaged.

Flooding

Flooding can result at any time throughout the year from both winter and summer storms. Flooding will primarily impact roadways and storm water management systems that become overwhelmed by the storm water runoff. Roadways, culverts, and ditches become flooded and damaged. There are various locations around local lakes that could cause minor flooding to homes and camps along the lakes, especially during spring runoff. Hurricanes may cause local coastal flooding from storm surge to coastal businesses and homes.

Wildfires

Wildfires will endanger residential structures that are in forested areas and do not have adequate setback from stands of trees. There are no critical infrastructure or public facilities located in forested areas without more than sufficient setback from large stands of trees. It is very rare that homes are lost in wildfires in Waldo County. It is more likely that a structure fire initiates a wildfire. The largest known wildfire in Waldo County has been the 100-acre wildfire in the Town of Northport. 100 acres is 0.15625 square miles. There are 50 people/sq mile. This equates to an average of 7.8 people being impacted. There are approximately 2.4 people per household. This equates to about 3 potential homes that could be damaged. Of note, there were no homes damaged in the Northport 100-acre fire.

Geomagnetic Storms

A geomagnetic storm is a solar coronal mass ejection (CME) that strikes the earth and results in ground induced currents. Due to latitude, topography, geology and salinity, the east coast states are more susceptible that most of the United States. In Maine, the southern- and mid-coast counties, of which Waldo is included, are the higher risk areas in Maine. The vulnerability to the planning area is due to damage to the power grid, which could be regional or national in scope. All critical infrastructure, community lifelines and residents will be impacted should a total grid failure of an extended timeframe occur. Though a geomagnetic storm would not cause physical damage to most buildings and infrastructure, it could cause physical damage to electrical transformers and any electrical appliances and equipment connected to the commercial power grid.

Element B2	b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction.

PLANNING AREA MAPS

This section contains maps of the jurisdictions in Waldo County that participated in the Mitigation Plan.

There is no common map scale for any of the maps; the largest view of each town was used. The maps are for reference purposes only and not for detailed measurements.

Although there are 26 municipalities in Waldo County, only seven decided to participate in the development of and adopt the 2025 version of this plan.

Neither the State of Maine nor the National Weather Service maintain data on wind or ice on a town-by-town basis. For Waldo County, the only NWS weather station is in Belfast. Therefore, the entire county is modeled as one entire hazard area for severe storms.

The National Weather Service (NWS) “Maine Weather Regions” is also attached for reference purposes. Waldo County is subdivided into two weather regions – “Interior” and “Midcoast”. Throughout this plan, discussion is made as to the two separate weather patterns that split Waldo County into the “northern” or “interior” and into the “southern” or “coastal”.

GIS Layers and Data include:

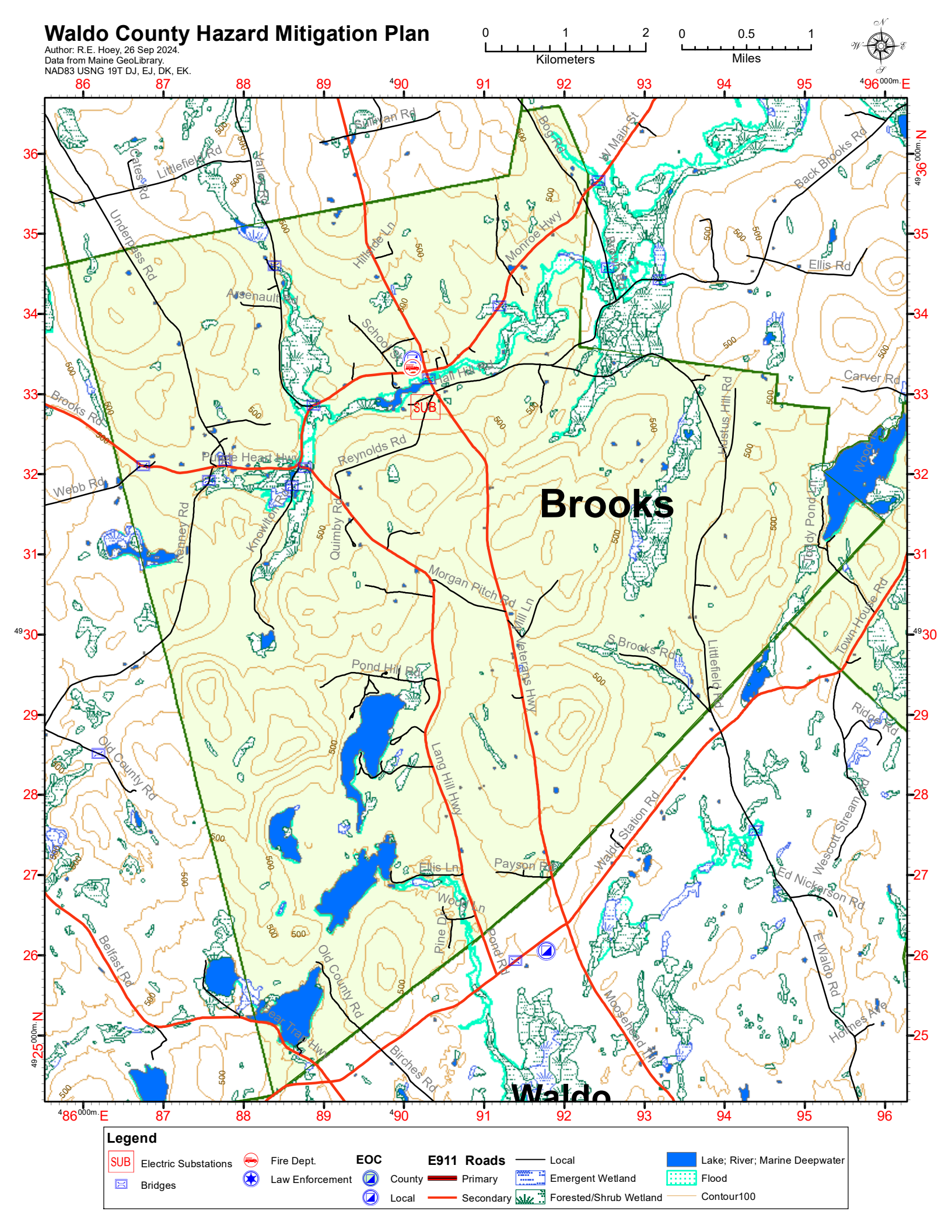
Municipal Boundaries
State and Local Roads and Bridges
USGS Topographical Contours
Ocean, Lakes, Ponds, Rivers, Streams, and Wetlands
Locations of critical facilities
Georeferenced Aerial Photos
FIRM Flood zone Areas
Hurricane Surge Inundation Areas

The purpose of these maps is to graphically identify those facilities that overlap with flood and costal surge zone hazard areas to determine what assets are potentially impacted.

For those municipalities that had critical facilities impacted by potential flood zones or hurricane inundation areas, a second map was created of the potential hazard area which zoomed in on that area. Text balloons were added to these “zoomed in maps” to indicate the facilities or systems that could be impacted.

Waldo County Hazard Mitigation Plan

Author: R.E. Hoey, 26 Sep 2024.
Data from Maine GeoLibrary.
NAD83 USNG 19T DJ, EJ, DK, EK.



Waldo County Hazard Mitigation Plan

Author: R.E. Hoey, 26 Sep 2024.
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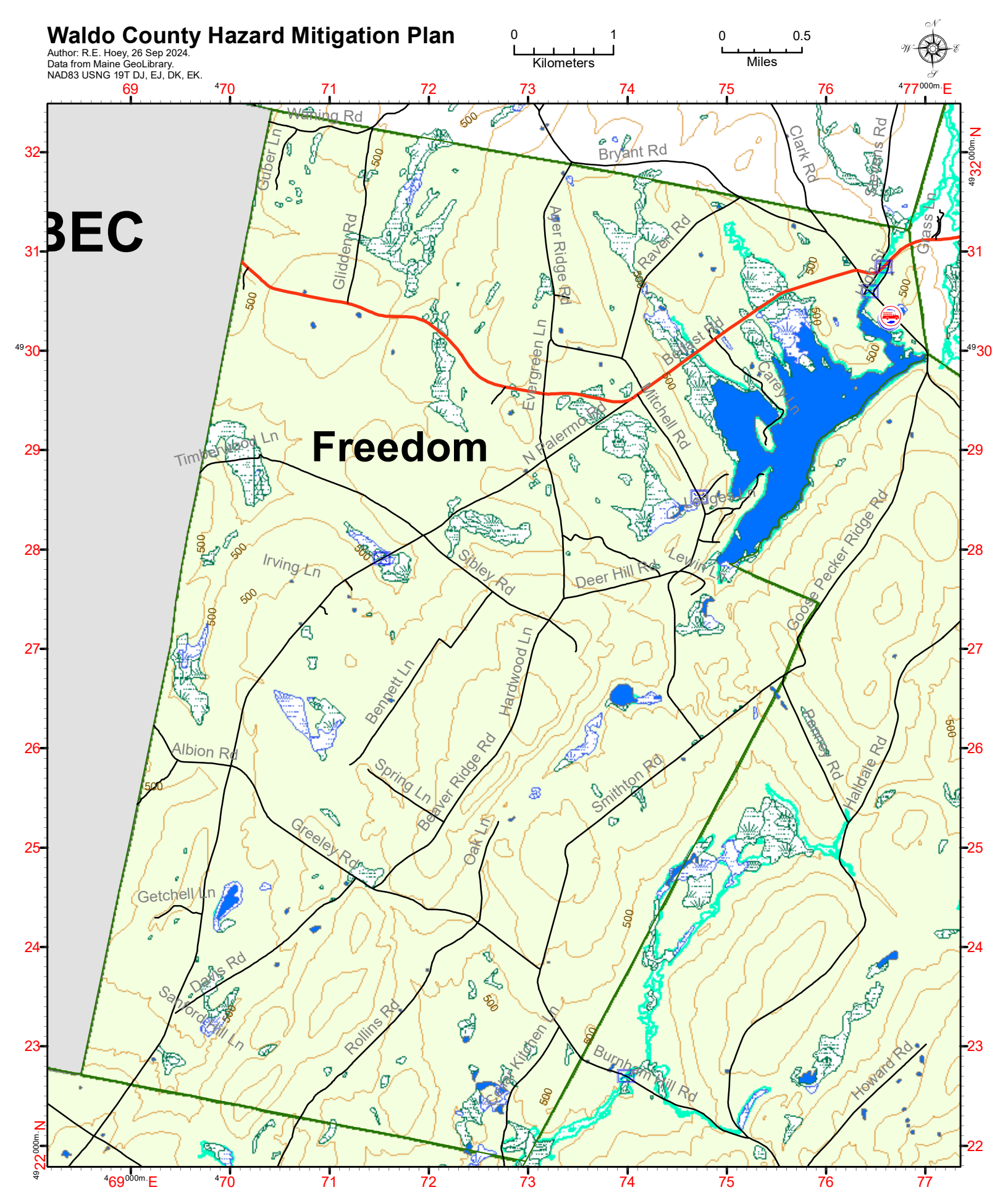

Legend

- Bridges
- Fire Dept.
- Law Enforcement
- EOC
  - County
  - Local
- E911 Roads
  - Primary
  - Secondary
- Local
- Emergent Wetland
- Forested/Shrub Wetland
- Lake; River; Marine Deepwater
- Flood
- Contour100

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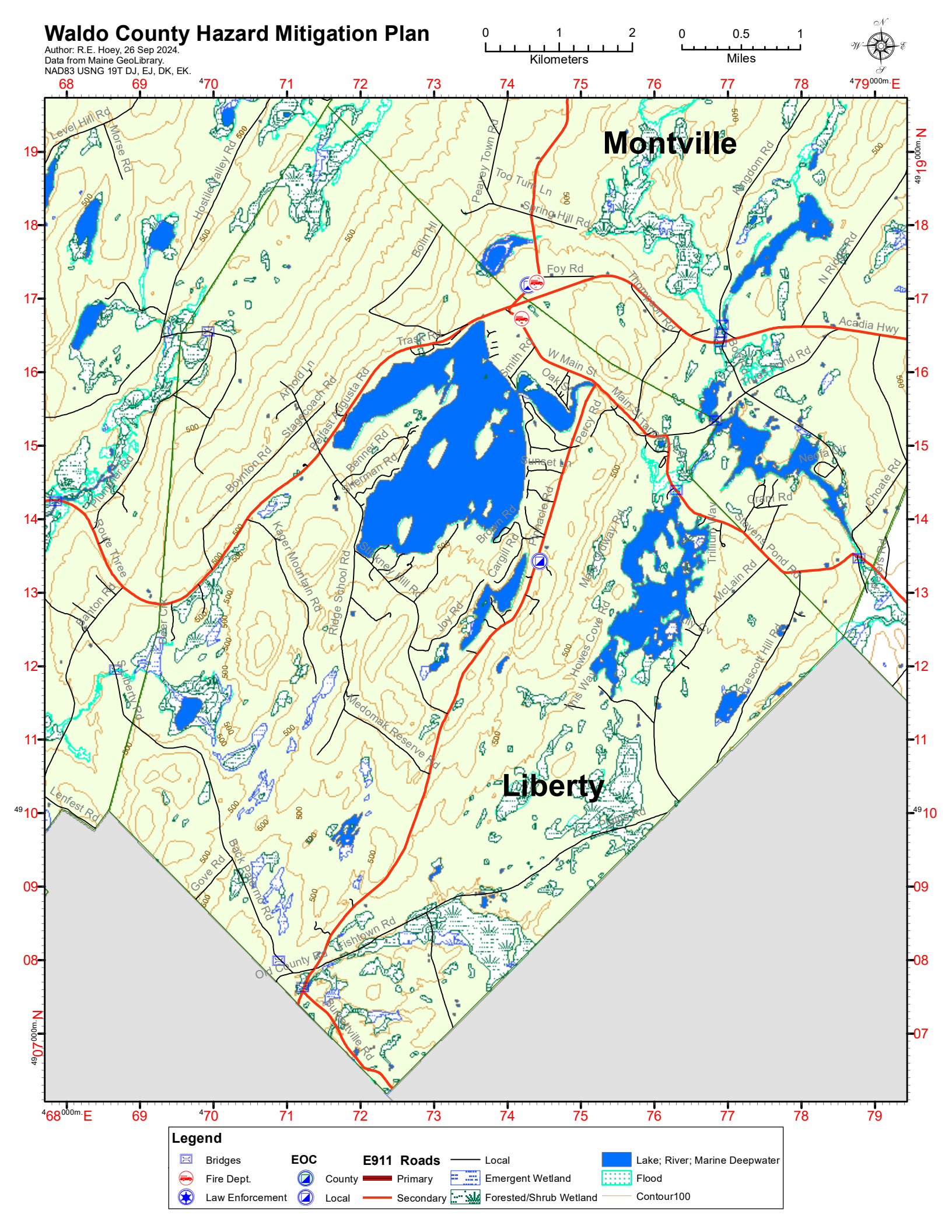

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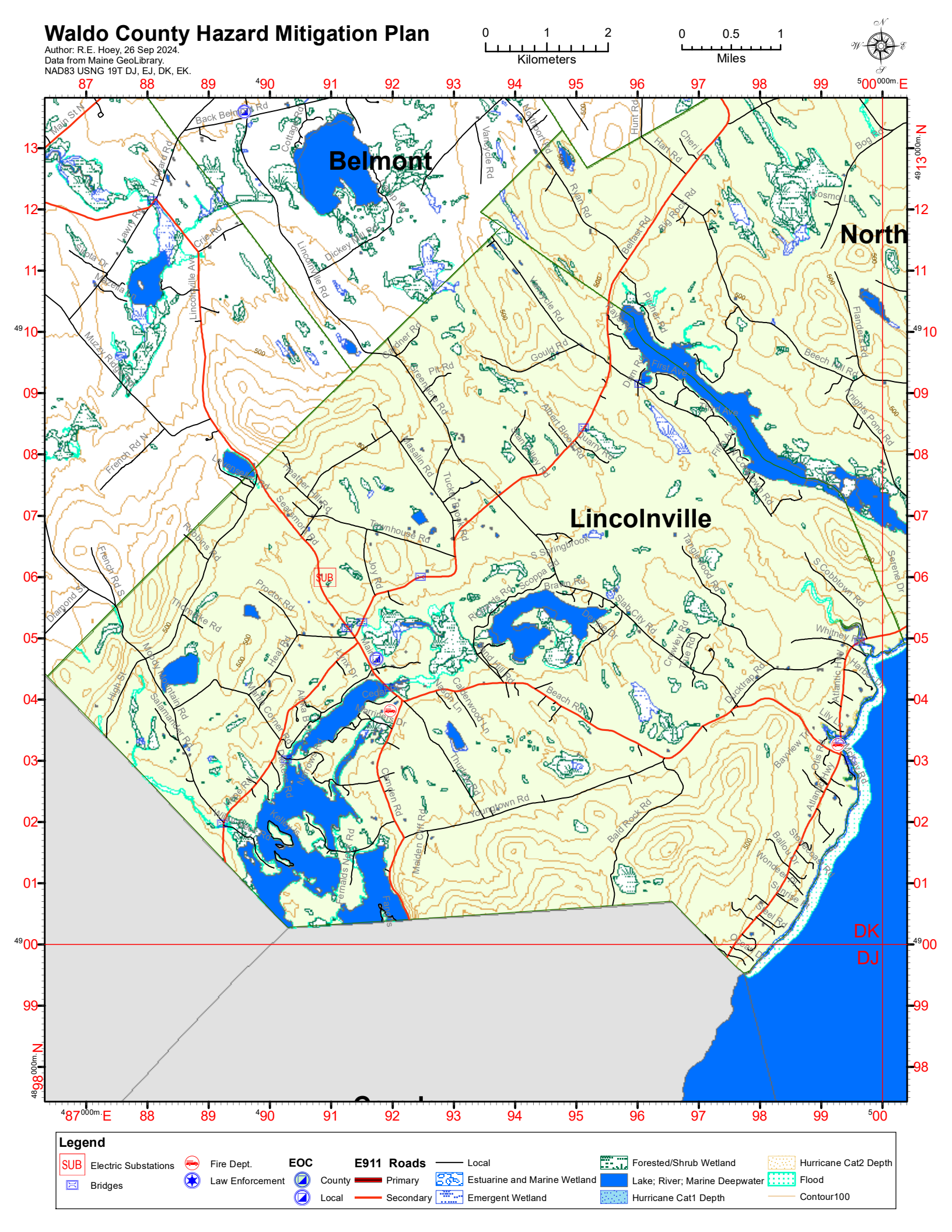

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- Hurricane Cat1 Depth
- Hurricane Cat2 Depth
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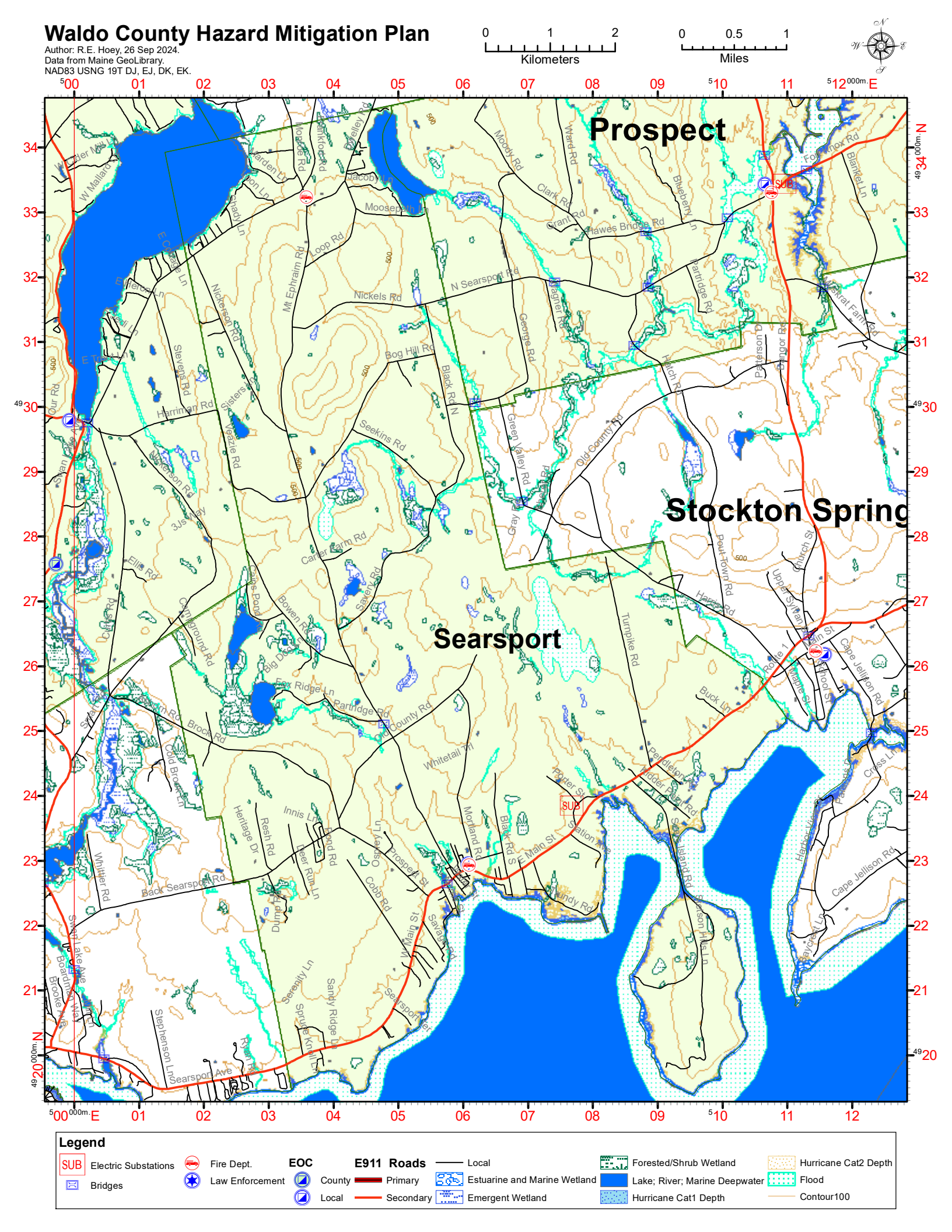

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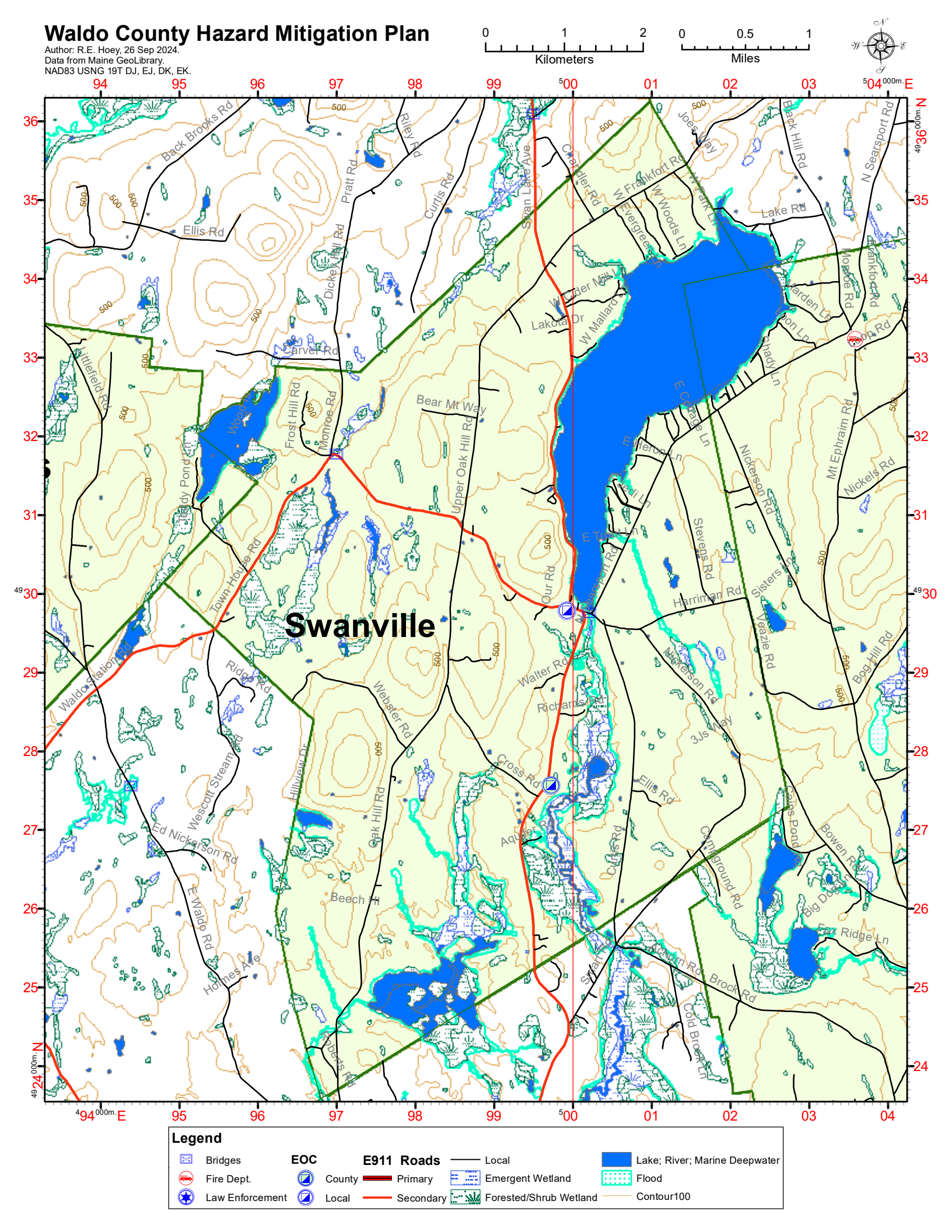

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ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES

Existing Critical Facilities: The Waldo County Emergency Management Agency (EMA) used existing Maine GIS map data to map and locate the planning area's critical facilities and determine which are most likely to be affected by hazards – severe winter storms, severe summer storms, flooding, wildfire and geomagnetic storms. The analysis revealed the following:

Severe Winter Storm: A "Northeaster", blizzard or ice storm of the severity that occurs at least once every 3-5 years could impact most roads and overhead electrical power and telephone lines in the planning area. Roads may be washed out or blocked with tree debris. Utility lines and poles damaged and in the roads. No critical structures/buildings were identified as in danger from a severe winter storm.

Severe Summer Storm: A coastal tropical cyclone (depression, storm or Cat 1 hurricane) or any severe rain and/or windstorm (which occurs at least once every 5-10 years) could impact the majority of roads and overhead electrical power and telephone lines in the planning area. Roads may be washed out or blocked with tree debris. Utility lines and poles damaged and in the roads. No critical structures/buildings were identified as in danger from a severe summer storm.

Flooding: A coastal storm could impact the Searsport and Lincolnville docks and wastewater treatment plants. It could also impact the commercial areas of Lincolnville Beach and Searsport. Some coastal residential properties in Lincolnville, Northport, and Searsport could be partially flooded by a Category 1 Hurricane. A Category 1 hurricane could flood parts of the Lincolnville Beach Fire Station and the Mack Point Cargo Terminal. Though a Category 2 hurricane is very unlikely, this storm level could flood the Lincolnville Beach Post Office.

However, the most likely flooding damage in the County from a severe rainstorm event (which occurs at least once every two years) is erosion damage to local roads.

Wildfire**:** No critical structures/buildings were identified as in danger from a large wildfire. Wildfire is primarily a threat to residential structures on a very limited size. Electrical transmission and distribution lines could be damaged by a large wildfire. This has not occurred to date.

Geomagnetic Storm**:** No critical structures/buildings were identified as in danger from a geomagnetic storm, except for electrical transformer substations. A geomagnetic storm is primarily a threat to "long wires" such as electrical power lines, telephone lines and pipelines. This has not yet occurred.

Other Vulnerability Considerations

In addition to critical facilities, Waldo County contains at-risk populations that should be factored into a vulnerability assessment. These include a relatively large population of elderly residents who live alone in very rural areas and who may have limited mobility.

An analysis of local municipal comprehensive plans and general growth patterns for the Waldo County communities indicates that there will be a slight but constant increase (2 to 3%) in residents expected over the next 10 years. Commercial growth in the Plans Planning Area is limited to slight growth in small businesses.

Future Critical Facilities: All of the municipalities in the Plan's planning area have very small populations, with the largest population being the Town of Searsport with 2,649 residents. The Town of Freedom is the smallest with 711.

These towns are very rural and do not have planning departments, enforce building codes or employ a full-time code enforcement officer (CEO). The State of Maine has a state building code based on the International Building Code. However, only towns with a population of 4,000 or greater are required to enforce the State Building Code. As such none of the towns in the Planning Area are required to enforce building codes.

Assessing where future development will occur in the Planning Area is difficult due to a lack of municipal data, planning, policies and programs. There is very little commercial, industrial, and public construction present in most of these communities. There is some residential construction; however, there is very little controlling guidance on single-family home construction in the State of Maine at any level of government. Shore-land zoning, floodplain ordinances, and septic system designs are about the only controlling guidance in residential construction.

Flooding (All Causes): Due to floodplain management in place since the 1970s and the interest in sea level rise, it is not expected that any future critical buildings and infrastructure are expected to be constructed in areas that could be flooded.

High Winds (All Causes): Though Maine can see high winds, those winds are not expected to be greater than 70 mph sustained and would not cause serious damage to critical facilities and infrastructure except for new electrical distribution lines and solar panel farms. Power lines have been a common item for damage in windstorms. There has been significant growth in solar panel farms, and this is expected to continue. Solar panels could be damaged by flying debris.

Wildfire: Wildfire has not historically and is not expected to significantly impact future critical buildings and infrastructure. Future residential structures (single family homes) could continue to be built in forested areas and therefore could be threatened by future wildfires.

Geomagnetic Storm and all causes of Grid Failure:

An extended loss of electrical power will shut down all equipment and systems that are energized by electricity, unless they have backup power generation and have a constant supply of fuel. Future public and commercial buildings, infrastructure, and critical facilities should be built with backup power generators or battery systems. Except for a few systems, such as telecommunications facilities, this is not a mandatory requirement. However, it is expected that most future public and commercial buildings, infrastructure, and critical facilities will be provided with such generators or batteries.

Public and commercial buildings, infrastructure, and critical facilities could receive damage to electrical equipment connected to commercial power from a low-frequency E3 pulse caused by solar magnetic disturbances, if not protected from such a pulse or if not warned to disconnect from the grid.

Critical Asset Inventory by Municipality within the Planning Area

Town	Municipal Office	Fire Station	Police Station	Public Works	Water Treatment	Waste Water Treatment	Library	Schools	Hospital /Clinic	Nursing Home	Airport	Seaport/Wharfs	Dams	HazMat Facilities	Pipelines	Electrical Substations	Pump Houses
Brooks	1	1	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0
Freedom	1	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0
Liberty	1	1	0	1	0	0	1	0	1	0	0	0	2	0	1	0	0
Lincolnville	1	2	0	1	0	1	1	1	1	0	0	2	0	0	0	1	0
Northport	1	2	0	0	0	1	0	1	0	0	0	2	1	0	0	0	3
Searsport	1	2	1	1	1	1	1	3	1	1	0	2	1	1	1	1	0
Swanville	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0
TOTAL	**7**	**9**	**1**	**4**	**1**	**3**	**3**	**6**	**4**	**1**	**0**	**6**	**6**	**1**	**3***	**2**	**3**

* Same pipeline – several towns

Critical Facilities and Infrastructure Impacted by Profiled Hazards

All Towns have impacts to Public Roads from Floods and Wind/Ice Storm Debris; Homes from Wildfire; and Critical Infrastructure from Grid Failure. The chart below identifies all other Facilities/Infrastructure impacted by Flooding (tropical, coastal, winter, summer).

Brooks	None
Freedom	None
Liberty	None
Lincolnville	Lincolnville Beach Fire Station and Post Office (Coastal Flooding) Lincolnville Ferry Terminal (State-owned), Lincolnville Municipal Pier
Northport	None
Searsport	Mack Point Cargo Terminal and GAC chemical plant (Coastal Storm)
Swanville	None

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

The Waldo County Emergency Management Agency and the Regional Hazard Mitigation Planning Team used GIS modeling, GPS data collection, field inspections, and historical data to estimate the potential dollar losses if the Planning Area were to experience the hazards profiled in the plan. Average costs from tree clearance in public ways were provided by those towns that participated in this version of the plan. The vulnerable structures and facilities were identified earlier in the planning process. See the County and Municipal Base Maps to locate the Facilities impacted by the Hazard Areas.

This plan only determines the cost of potential losses to public property owned by the municipalities in the Planning Area. Numbers of residential structures in flood zones were calculated, and significant private infrastructure is listed. However, costs due to losses for federal or state government, private facilities and commercial utilities were not included. The municipalities in the Planning Area are not responsible (financially or statutorily) for those facilities and infrastructure and will not develop mitigation actions for them.

Potential Loses due to Road Debris (Ice Storms and all Wind Events)

The primary damages expected to occur in the Planning Area due to an ice storm or a severe windstorm, resulting from a "Northeaster", blizzard, high winds, hurricane, tropical storm, or microburst is damage to overhead utility lines and fallen trees, both located in roadways. In calculating the damage costs, the Planning Team assumed that all local roads would be covered in tree and utility line debris.

Damage estimates were not completed for electrical power lines, telephone lines, and cable TV lines because all of these utilities are privately owned and insured. Only the costs to cleanup tree debris will be included.

No critical structures or non-overhead line critical infrastructure were identified as in danger from a severe windstorm in the Waldo County planning area.

The following table includes centerline road miles in each town as provided by the Maine Department of Transportation. The figures are current as of January 1, 2017.

Town	State Aid	Town Way	Town All	State Hwy	Other Roads	Total All Roads
Brooks	5.12	24.9	30.02	6.12	0	36.14
Freedom	6.98	17.84	24.82	4.76	0	29.58
Liberty	10.78	20.67	31.45	4.2	0.59	36.24
Lincolnville	17.95	35.41	53.36	4.15	2.88	60.39
Northport	2.54	35.72	38.26	8.15	0	46.41
Searsport	11.52	33.13	44.65	8.88	0.48	54.01
Swanville	13.6	18.26	31.86	0	0.70	32.56
Total	68.49	185.93	**254.42**	36.26	4.65	295.33

1) State Aid Highways are generally maintained by the Maine Department of Transportation. However, the Towns are responsible for debris removal on these roads. The road miles will be included for tree removal costs from storms.

2) Town Ways are the responsibility of the Towns. All damage cost estimates will be included.

3) State Highways are fully maintained by the Maine Department of Transportation. These road miles will not be included in the damage cost estimates, since none of the Towns in Waldo County are responsible for them.

4) Other Roads are State Park roads and are fully maintained by the Maine Department of Agriculture, Conservation and Forestry. These road miles will not be included in the damage cost estimates, since none of the Towns in Waldo County are responsible for them.

Tree Debris Cleanup Cost Estimates

Each town in the Planning Area provided their average cost to clear tree debris from town roads following a storm that caused debris in the roads. A worst-case scenario (Category 2 Hurricane) of 25% of all roads covered in tree debris was used to determine final costs.

Town	Total Road Miles to Clear	Tree Debris Cleanup Cost per Mile	Total Cost	25% of all roads covered
Brooks	30.02	$6,000.00	$180,120.00	$45,030.00
Freedom	24.82	$6,500.00	$161,330.00	$40,333.00
Liberty	31.45	$5,000.00	$157,250.00	$39,312.50
Lincolnville	53.36	$7,500.00	$415,200.00	$103,800.00
Northport	38.26	$6,000.00	$229,560.00	$57,390.00
Searsport	44.65	$2,788.80	$124,519.92	$31,130.00
Swanville	31.86	$5,500.00	$175,230.00	$43,807.50
TOTAL	374.45			**$360,803.00**

The total estimated loss for cleaning up road debris following a major wind event that impacts all of the above towns during the same storm is $360,803.00.

Costs will vary depending on actual conditions.

Potential Flood Losses
(sea level rise, storm surge erosion, heavy rain events, winter runoff, tropical storms, etc)

The primary damage losses that are expected in the Waldo County planning area during any flood event would be damage to local roads. The Planning Team calculated the cost of roadwork using an average of $350,000/mile ($66/linear foot) for rebuilding Town roads. Figures were rounded to the nearest $1,000.

Very few homes in Waldo County have been damaged by flooding. Those homes that are in a flood zone tend to experience flooded basements. There have only been 2 homes and 1 business in the county of 16,431 homes that have experienced repetitive flood damages in the last 46 years which resulted in NFIP payouts. There have been 87 NFIP payments totaling $1,315.353 in the last 46 years. This is an average of 1.9 structures/year and a payout of $28,000/year.

The following cost figures for roads and public facilities were determined.

Municipality	Critical Facility	Amt of Damage	Damage Cost
Brooks $109,850	Lang Hill Road	24” culvert	$16,500
	Littlefield Road	20” culvert	$3,575
	Knowlton Road	200 LF	$6,000
	Pond Hill Road	24” culvert	$81,775
	Underpass Road	18” culvert	$2,000
Freedom $362,500	Mitchell Road Bridge	1	$325,000
	Mitchell Road	1,000 LF	$12,000
	Rollins Road	1,200 LF	$18,000
	Beaver Ridge Road	500 LF	$7,500
Liberty $250,000	Stevens Pond Inlet	1	$100,000
	Fishtown Road	2,273 LF	$150,000
Lincolnville $779,000	McKay Road	375 LF	$25,000
	Youngtown Road Drainage Structures	5	$85,000
	Beach Fire Station	1	$75,000
	Beach Bathroom Structure	1	$5,000
	Municipal Pier	1	$150,000
	Harbor Boat Launching Ramp	1	$15,000
	Penobscot Park shoreline	424 LF	$200,000
	Beach Parking Lot Seawall	450 LF	$125,000
	Route 1 Sidewalk	250 LF	$75,000
	Beach Wastewater Treatment System	1	$24,000
Northport $5,795,000	Bayside Dock	1	$450,000
	Saturday Cove Dock	1	$300,000
	Bayside Wastewater Treatment System	1	$3,500,000
	Shore Road	5,000 LF	$430,000
	Auditorium Park	1	$800,000
	Crest Street stairs and seawall	1	$25,000
	Bog Road culverts	2	$100,000
	Prescott Hill/Piper Stream culverts	2	$100,000
	Knights Pond Road culverts	2	$90,000

Municipality	Critical Facility	Amt of Damage	Damage Cost
Searsport $35,000	Cottage Street Culvert	200 LF	$35,000
Swanville $180,000	Steven Road Harriman Road Oak Hill Road Upper Oak Hill Road Webster Road Nickerson Road	500 LF 500 LF 500 LF 500 LF 500 LF 500 LF	$30,000 $30,000 $30,000 $30,000 $30,000 $30,000

Total = $7,511,350

Potential Wildfire losses

The primary damage losses that are expected in the Waldo County planning area during any wildfire event would be the destruction of single-family residential structures.

The Forest Service maintains no data that would identify what towns or areas of towns are more susceptible to wildfire than other areas and to what size of wildfires are likely. From our risk assessment, we determined a 10% chance of experiencing a wildfire of at least 50 acres in size. For this loss calculation, we will assume a 100-acre fire in any given town. 100 acres equals 0.15625 square miles.

The average home value in 2024 in Waldo County is approximately $336,000. (Zillow, 2024)

Municipality	#Homes	Sq Miles	Density of Homes	# Homes in 100 acres	Estimated Damages
Brooks	562	25.35	22.17	3	$1,008,000
Freedom	343	22.20	15.45	2	$672,000
Liberty	718	28.38	25.30	4	$1,344,000
Lincolnville	1,465	39.24	37.33	6	$2,016,000
Northport	1,162	24.25	47.92	7	$2,352,000
Searsport	1,510	29.38	51.40	8	$2,688,000
Swanville	793	21.62	36.68	6	$2,016,000
Total	6,553	190.42	34.4	N/A*	N/A*

Note: It is not likely that a 100-acre fire would exist in all 10 towns in the same 5-year period. There is a 10% chance of at least one (1) wildfire in the Planning Area of seven towns.

The worst-case scenario for the Planning Area is a 100-acre wildfire in the Town of Searsport causing $2,688,000 of lost residential property.

Potential Losses Geomagnetic Storm

Small geomagnetic solar storms may cause limited issues due to power fluctuations, GPS signal interruptions and interference to HF radio signals. None of the municipalities located in the Planning Area are impacted by the costs from these impairments.

A geomagnetic storm of the size of the March 13, 1989 event which resulted in a nine-hour province-wide power outage can have major impacts.

"The costs to power system operators involve not only replacement of damaged equipment but also the loss of revenue from sale of power. The Quebec blackout on March 13, 1989, had a net cost of about $13.2 million; damaged equipment accounts for about $6.5 million of that estimated cost. The transformer at the Salem, New Jersey, nuclear generating station, that burnt-out during the March 13, 1989, magnetic disturbance, cost several million dollars to replace. Such expensive units are usually built to order, and the delivery time is normally about one year. Unusually, in the Salem case, a replacement transformer was available, and delivery and installation took only 6 weeks. Even so, having the transformer out of service restricted the power that could be delivered from the Salem generating station and the purchase of replacement power from neighboring utilities cost about $17 million, far more than the cost of the transformer."

Reference: Canda Space Weather - https://www.spaceweather.gc.ca/tech/index-en.php

The Quebec Storm is estimated to have had an electric field strength around one-third of the 1859 Carrington Event. It is estimated that a Carrington Event could cost multi-trillions of damages to the United States alone, if not destroying modern society outright.

Since the Planning Area municipal governments are not involved directly with the costs of repairs to electrical substations, transformers or electrical transmission systems, guesses on the costs to the Planning Area will not be determined.

However, the real cost of a major geomagnetic storm to the Planning Area will be in loss of government services. If the municipal office, fire station, ambulance station, police station, public works garage, water treatment plant, wastewater treatment plant and pump stations, library, schools, and medical clinics do not have backup electrical power generation, these services are nonfunctional for the duration of the outage. Power outages in several of these services can mean a loss of life and private property.

Additionally, if there is a voltage spike across the electrical distribution system, there can be extensive damage to electrical equipment connected to the power grid in these municipal facilities. Examples would include computers, printers, kitchen appliances, telephones, radio systems, and standby generators.

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

Waldo County is located along the mid-coast of Maine and is rural. Much of the County's land use is designated as rural and is primarily forestland or farmland. The largest city, Belfast, which has a year-round population of 6,938 is located on the coast in the southern half of the County. There are no suburbs in Waldo County. The land uses within the county generally consist of: Residential, Resource Protection, Agricultural, Industrial, Institutional and Commercial areas.

The State of Maine Legislature enacted the Growth Management Act in 1989 (Title 30-A, Chapter 187, subchapter 2) which made it voluntary for each community to develop a Municipal Comprehensive Plan. Because it is not mandatory, not every town has a comprehensive plan, as a matter of fact, most do not. The municipal comprehensive plans allow development to occur in appropriate areas considering the environment, physical constraints, location of utility services, similarity to existing development, and proximity to flood zone areas.

The municipalities may review existing conditions and predict future needs in order to develop their own plans, policies, and ordinances. All municipalities in Waldo County have enacted Shoreland Zone ordinances, since this is a state law requirement. All towns in the Planning Area have enacted floodplain ordinances and are in the NFIP. Further breakdown of the land use designations is shown on the following chart.

The Planning Area is expected to undergo a slight increase in residential development. Wildfires could have a greater impact if many of these homes are built in forested areas.

The Searsport Comprehensive Plan indicates that segments of industrial and residential zones are in coastal storm surge areas. The town designated some of these areas to be Marine and Conservation Districts.

The Land Use Types and Growth Areas that have been designated in Waldo County are:

Municipality	Land Use Types	Designated Growth Areas
Brooks	Resource Protection, Limited Residential, Limited Commercial, General Development I and II, Stream Protection	General Development I/II
Freedom	Resource Protection, Limited Residential, Limited Commercial, Stream Protection	None
Liberty	Wetland Preservation, Resource Protection, Limited Residential, Limited Commercial, Stream Protection, Wetland Conservation	None
Lincolnville	General District, Harbor, Limited Commercial, Limited Residential, Resource Conservation, Resource Protection, & Stream Protection	General District
Northport	Residential, Commercial	Commercial
Searsport	Commercial, Industrial, Residential, Marine, and Conservation, Resource Protection	Commercial, Industrial, Residential
Swanville	Shoreland Zone and Rural	None

ASSESSING VULNERABILITY: ADDRESSING REPETITIVE LOSS PROPERTIES

Element B2	c. Does plan address National Flood Insurance Program (NFIP) insured structures within each jurisdiction that have been repetitively damaged by floods?

The Director of the Maine Floodplain Management Program, an office within the Department of Agriculture, Conservation and Forestry, was consulted regarding NFIP insured structures that have been repetitively damaged by floods. The Director provided the information, with the stipulation that the addresses of the properties are not published in the plan, due to privacy issues.

There are 88 NFIP insurance policies in Waldo County, about 0.4 % of the total homes (21,566) in the County. In 2024, total coverage is $25,573,000, with total premiums of $76,755.00. The total number of claims since 1978 is 87, an average of 1.9 claims per year. Total claims paid has been $1,315,353.00 since 1978; an average of $28,595.00 per year. The average paid per claim is $14,947.00.

There were only three repetitive loss properties in all of Waldo County. One is a business located in the Town of Lincolnville. Two are residences, one in the Town of Unity and one in the City of Belfast. The properties in Lincolnville and Belfast were damaged by coastal flooding and the property in Unity was damaged by lakeside flooding.

WALDO COUNTY HAZARD MITIGATION PLAN

SECTION E. MITIGATION STRATEGY

§201.6(c)(3) of the Rule outlines measures that localities must take in developing their mitigation strategies. Specifically, the Local Hazard Mitigation Plan mitigation strategy must provide the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

Regulation Section §201.6(c)(3)	**A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.**
Element C1	**Does the plan document each participant's existing authorities, polices, programs and resources and its ability to expand on and improve these existing policies and programs?**
	a. Does the plan describe how the existing capabilities are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?
	b. Does the plan describe each participant's ability to expand or improve the identified capabilities to achieve mitigation?

Existing Mitigation Authorities, Policies, Programs and Resources

There are no towns in the Waldo County Planning Area that employ any staff dedicated to hazard mitigation. The municipal emergency management directors are volunteers. There are no municipal engineers, planners or GPS specialists on staff. The Planning Boards are made up of volunteers and the code enforcement officer is typically a part-time employee. There are no hazard mitigation policies identified within the Planning Area.

The municipal governments in the Planning Area have no local Hazard Mitigation financial resources at the municipal level, outside of local property taxes that are used to maintain the town roads. The County Emergency Management Agency (EMA) and the Maine Emergency Management Agency (MEMA) are resources for technical assistance. MEMA also oversees the administration of all FEMA mitigation grants awarded in the State.

Some of the municipalities in the planning area are assisted with regional planning support from the Mid-coast Council of Governments (MCOG). MCOG provides technical assistance to support land-use planning, transportation planning, and environmental management.

Building Codes

None of the municipalities in the Waldo County Planning Area have their own building codes. By Statute, the State of Maine has implemented the Maine Uniform Building and Energy Code. The Maine Uniform Building and Energy Code (Title 10, Chapter 1103) or MUBEC applies to all towns within the State of Maine. However, enforcement of MUBEC is based on population for local action for communities under 4,000 residents. Because all are under 4,000, none of the participating municipalities have elected to enforce the building codes.

Title 10, Chapter 1103, §9724. Application, 1-A. Municipalities up to 4,000 residents. A municipality of up to 4,000 residents is not required to enforce but may not adopt or enforce a building code other than the Maine Uniform Building Code, the Maine Uniform Energy Code or the Maine Uniform Building and Energy Code.

MUBEC is made up of the following codes and standards:

- 2015 International Residential Code (IRC)
- 2015 International Building Code (IBC)
- 2015 International Existing Building Code (IEBC)
- 2015 International Energy Conservation Code (IECC)
- 2015 International Mechanical Code (IMC)

Shoreland Zoning

The Mandatory Shoreland Zoning Act (MSZA) requires municipalities to adopt, administer, and enforce local ordinances that regulate land use activities in the shoreland zone. The shoreland zone is comprised of all land areas within 250 feet, horizontal distance, of the

- normal high-water line of any great pond or river;
- upland edge of a coastal wetland, including all areas affected by tidal action, and
- upland edge of defined freshwater wetlands; and
- all land areas within 75 feet, horizontal distance, of the normal high-water line of certain streams.

Shoreland Zoning ordinances are used for the following mitigation purposes:

- to protect buildings and lands from flooding and accelerated erosion
- to control building sites, placement of structures and land uses
- to conserve shore cover
- to anticipate and respond to the impacts of development in shoreland areas.

The shoreland zoning ordinances are administered and enforced by the municipal Planning Board with assistance from the municipal code enforcement officer. The Boards are made up of volunteers and the code enforcement officer is typically a part-time employee.

Floodplain Ordinances

Support to municipal government comes from the two state employees who work in the Maine Floodplain Management Office. Towns are not required to have a Floodplain Ordinance. All towns but one in the Planning Area are members of the National Flood Insurance Program (NFIP). The NFIP provides maps, regulations and insurance. The town is responsible for administering and enforcing the regulations. This is accomplished by the Code Enforcement Officer with oversight by the Planning Board.

Subdivision Ordinances and Land Use Ordinances

The municipal subdivision and land use ordinances usually require new construction to adhere to the Shoreland and Floodplain ordinances.

Road Maintenance Program

Each municipal government employes either a Road Commissioner or Public Works Director to maintain the town roads. Most mitigation actions that take place in the towns are for work to improve the roads and their associated stormwater management devices/systems to repair or prevent future flooding and stormwater damage. The local programs are assisted by the Maine Department of Transportation (MDOT) Maine Local Roads Center which provides training, technical assistance, and information to the municipal road maintenance programs.

Chart of Existing Hazard Mitigation Authorities, Policies, Programs and Resources

Town	Authorities/ Ordinances	Enacted Mitigation Polices	Mitigation Programs	Mitigation Resources
Brooks	Subdivision Building Notification Shoreland Zoning Floodplain Management	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
Freedom	Subdivision Building Shoreland Zoning Floodplain Management Commercial Development	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
Liberty	Subdivision Building Notification Shoreland Zoning Floodplain Management	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
LincolnVille	Subdivision Land Use Shoreland Floodplain Management Harbor Property Assessed Clean Energy	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
Northport	Subdivision Building Site Plan Review Shoreland Zoning Floodplain Management Harbor NVC Zoning	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
Searsport	Subdivision Land Use Site Plan Review Shoreland Zoning Floodplain Management Fire Code & Fireworks	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA
Swanville	Land Use Shoreland Zoning Floodplain	None	Road Maintenance	Code Enforcement Officer Planning Board County & State EMA

Ability to expand or improve the identified capabilities to achieve mitigation

If the municipalities in the Planning Area can acquire federal or state mitigation or climate resiliency grants, they may be able to temporarily expand or improve mitigation capabilities.

However, the very limited tax base of several hundred homes (which is all that some of these towns have) is not sufficient to maintain an active land use and building code enforcement capability.

Element C2	**Does the plan address each jurisdictions' participation in the NFIP and continued compliance with NFIP requirements, as appropriate?**
	a. Does the plan contain a narrative description or a table/list of their participation activities?

Requirements of the National Flood Insurance Program (NFIP)
1. Adoption of Floodplain Ordinance
2. Adoption of the latest effective flood insurance rate map (FIRM)
3. Local Enforcement the Floodplain Ordinance

CID #	Town	Init FHBM	INIT FIRM	Map Date	Emer Date	Enforce NFIP	CRS?
230253A	Brooks	3/14/75	9/18/85	7/6/15	9/18/85	Yes	No
230255A	Freedom	2/14/75	9/27/85	7/6/15	9/27/85	Yes	No
230259A	Liberty	3/14/75	9/27/85	7/6/15	9/27/85	Yes	No
230172A	Lincolnville	11/22/75	5/3/90	7/6/15	5/3/90	Yes	No
230179A	Northport	11/29/74	5/15/91	7/6/15	5/15/91	Yes	No
230185A	Searsport	11/8/74	5/17/90	7/6/15	5/17/90	Yes	No
230267A	Swanville	2/7/75	2/4/87	7/6/15	2/4/87	Yes	No

Each municipality, except Prospect, participates in the NFIP. The legislative body (Town Meeting) has enacted an ordinance drafted by the Town Planning Board. The Town Meeting has approved the latest map. The part-time Code Enforcement Officer (CEO) processes applications as submitted by landowners. The CEO interprets the floodplain ordinance and issues directives and permits. The CEO inspects the work to ensure compliance. Depending on the Town process, landowner appeals will go to the Planning Board and/or Appeals Board.

HAZARD MITIGATION GOALS

Element C3	**Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?**
	a. Does the plan include goals to reduce the risk from the hazards identified in the plan?

The Regional Hazard Mitigation Planning Team met to review and analyze the Planning Area's risk assessment study. The following goals were determined to have the greatest benefit in hazard reduction in the County. The descriptions, goals, and objectives for each are as follows:

SEVERE WINDSTORM or ICE STORM EVENTS

Severe wind events are the result of tropical storms, coastal storms and winter storms. The most likely damage caused by a severe wind event is the loss of electrical power, from downed power transmission lines, and the blockage of roadways, from tree debris or winter snow or ice. This can also be the result of a severe ice storm.

There is no history in the planning area of major wind damage to buildings, other than damaged roofing shingles and siding. However there have been a few instances of large trees falling on homes.

Goal 1: **Reduce road debris caused by a Severe Wind event or Ice Storm**

Goal 2. Reduce impacts from a loss of regional electrical power

FLOODING – COASTAL AND INLAND STORMWATER

Damage from Flooding in the Planning Area is caused by coastal storm erosion, some coastal flooding, and stormwater runoff. The damage consists of beach erosion, damage to seawalls, docks, and other beach structures, and washed-out roads, bridges and other roadway structures.

There have been several instances of private wells contaminated by floodwater over the years, but this is not a consequence that happens often. There have been some flooded basements, but this is primarily due to old rock basements that cannot keep out high groundwater tables caused by ground saturation.

There is little history in Waldo County of flooding resulting in major damage to government and commercial buildings and infrastructure.

Goal 3: **Reduce roadway system damage caused by coastal erosion and stormwater flooding**

Goal 4: **Reduce beach property damage caused by coastal erosion and flooding**

WILDFIRE

Mitigation techniques for fuels and fire management can be strategically planned and implemented in Wildland-Urban Interface. This may include educating the public on the development of defensible space around homes and structures.

One idea that has proven successful in Maine to improve wildfire mitigation is the implementation of a Firewise USA Community Recognition program. For Planning Area communities, this Firewise program could help participating communities prioritize mitigation actions based on community wildfire risk site assessments.

Goal 5: Educate residents about residential wildfire mitigation.

GEOMAGNETIC STORM

An extreme geomagnetic storm event equal to or greater than the 1989 Quebec Storm, could cause a regional power grid failure. Direct damage resulting from this event will have impact on the electrical generation and distribution system, hardwire telecommunications systems, and fuel pipelines. Critical infrastructure and equipment operated by the municipalities or quasi-municipal agencies could be damaged by high voltages spikes on the transmission lines and by a long-term loss of electrical power.

Goal 6: Protect public community lifelines from the E3 electromagnetic pulse of a geomagnetic storm and provide continuity operations during a long-term power outage.

IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

Requirement §201.6(c)(3) (ii)	**The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.**
Element C4	Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?
	a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?

The Planning Area municipal participants have identified several hazard mitigation actions that would benefit their communities and was analyzed by the Regional Hazard Mitigation Planning Team. These actions were identified in the Regional Mitigation Planning Team meetings and during meetings with public officials representing the municipalities. The identified mitigation actions are broken out by the Goals for each hazard and were analyzed using a decision matrix that follows this list.

Goal 1: **Reduce road debris (tree and powerlines) caused by a Severe Wind event or Ice Storm**

Action 1.1. Educate the public on the dangers of electrical power lines on the roadways.

Action 1.2. Complete a survey of roadside “Hazard Trees” that could fall in a windstorm.

Action 1.3. Cut trees located in the road right of way identified as Hazard Trees.

Goal 2. Reduce impacts from a loss of regional electrical power

Action 2.1. Educate the public on how to better survive a long-term power outage.

Action 2.2. Provide backup power generation for critical public facilities and infrastructure.

Action 2.3. Educate the public employees on how to better survive a long-term power outage.

Action 2.4. Develop a Continuity of Operations Plan that includes long-term power outages.

Action 2.5. Identify suitable warming centers.

Goal 3: **Reduce roadway system damage caused by coastal erosion & stormwater flooding**

Action 3.1. Educate the public on the dangers of driving on flooded roads.

Action 3.2. Upgrade ditches, culverts, bridges, and roadway drainage systems.

Action 3.3. Elevate roadway surfaces to get the surface above the floodplain elevations.
Action 3.4. Stabilize shoreland to prevent road system failure caused by coastal erosion.

Goal 4: **Reduce coastal property damage caused by coastal erosion and flooding**

Action 4.1. Upgrade piers, docks, seawalls and other coastal structures and systems to handle stronger coastal surge.

Goal 5: Educate residents about residential wildfire mitigation.

Action 5.1. Educate the public about residential wildfire mitigation.

Goal 6: Protect public community lifelines from the E3 electromagnetic pulse of a geomagnetic storm and provide continuity operations during a long-term power outage.

Action 6.1. Install preventive measures for voltage spikes from a ground induced current.

Action 6.2. All actions are the same as listed in Goal 2.

Element C5 §201.6(c)(3) (iii) §201.6(c)(3) (iv)	**Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review, implemented and administered by each jurisdiction?**
	a. Does the plan describe the criteria used for prioritizing actions?

The Regional Hazard Mitigation Planning Team utilized the STAPLEE process as the means of prioritizing the actions through a cost-benefit analysis. Each action was rated against the STAPLEE criteria and given a +1, -1 or 0, was assigned by consensus of the team. The numbers were then tallied to determine the most beneficial actions.

STAPLEE Action Evaluation Table

Action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
1.1	+1	+1	+1	+1	+1	+1	+1	7
1.2	+1	+1	0	+1	+1	+1	+1	6
1.3	0	+1	0	+1	+1	0	+1	4
2.1	+1	+1	+1	+1	+1	+1	+1	7
2.2	+1	+1	+1	+1	+1	0	0	5
2.3	+1	+1	+1	+1	+1	+1	+1	7
2.4	+1	+1	+1	+1	+1	+1	+1	7
2.5	+1	+1	+1	+1	+1	+1	+1	7
3.1	+1	+1	+1	+1	+1	+1	+1	7
3.2	+1	+1	+1	+1	+1	0	+1	6
3.3	+1	+1	+1	+1	+1	0	+1	6
3.4	+1	+1	+1	+1	+1	0	+1	6
4.1	+1	+1	+1	+1	+1	0	+1	6
5.1	+1	+1	+1	+1	+1	+1	+1	7
6.1	+1	+1	+1	+1	+1	0	+1	6

+ 1 (Favorable) -1 (Less Favorable) 0 (Not Applicable)

STAPLEE Evaluation Criteria for Mitigation Actions: The STAPLEE evaluation method uses seven criteria for evaluating a mitigation action: Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Within each of those criteria are additional considerations.

SOCIAL – Will the public support the overall implementation strategy and specific mitigation actions and the mitigation actions are evaluated in terms of community acceptance?

TECHNICAL – Is the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts? Does it solve the problem without creating additional problems?

ADMINISTRATIVE – Does the municipality have sufficient staffing, funding, and maintenance capability to implement and maintain the mitigation action?

POLITICAL – Is there support from municipal officials to implement the mitigation activities?

LEGAL – Does the municipality have the legal authority to implement the actions? Could the mitigation action be challenged by stakeholders who may be negatively affected?

ECONOMIC – Can the municipality adequately fund the mitigation action, or match a federal grant, to include the engineering and permitting that may be required for the construction? Does the action contribute to other community economic goals, such as capital improvements or economic development? How likely are federal grants?

ENVIRONMENTAL – Will there be a negative or positive impact on the local environment? Are there major restriction due to environmental permitting?

Highest Priority Actions

- 1.1. Educate the public on the dangers of electrical power lines on the roadways.
- 2.1. Educate the public on how to better survive a long-term power outage.
- 2.3. Educate the public employees on how to better survive a long-term power outage.
- 2.4. Develop a Continuity of Operations Plan that includes long-term power outages.
- 2.5. Identify suitable warming centers.
- 3.1. Educate the public on the dangers of driving on flooded roads
- 5.1. Educate the public about residential wildfire mitigation

The primary reason for the high rating is the low cost and low impact to town administrative staff.

Med-Level Priority Actions

- 1.2. Complete a survey of roadside “Hazard Trees” that could fall in a windstorm.
- 3.2. Upgrade ditches, culverts, bridges, and roadway drainage systems.
- 3.3. Elevate roadway surfaces to get the surface above the floodplain elevations.
- 3.4. Stabilize shoreland to prevent road system failure caused by coastal erosion.
- 4.1. Upgrade piers, docks, seawalls and other coastal structures and systems to handle stronger coastal surge.
- 6.1. Install preventive measures for voltage spikes from a ground induced current.

These mitigation actions come in 2nd place primarily due to a need for external funding (i.e. grants).

MULTI-JURISTICTIONAL MITIGATION ACTIONS
IMPLEMENTATION AND ADMINISTRATION

Element C4 §201.6(c)(3) (ii)	**Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?**
	b. Does the plan include one or more actions per jurisdiction for each of the hazards as identified within the plan's risk assessment.
Element C5 §201.6(c)(3) (iii) §201.6(c)(3) (iv)	**Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review, implemented and administered by each jurisdiction?**
	a. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?

The Planning Area municipalities have identified the Mitigation Projects that they have prioritized for their efforts to mitigate the effects of the identified and profiled hazards. The Identified Hazards are:

Hazard #	Hazard
1	Severe Wind event or Ice Storm (Road Debris)
2	Storm water flooding
3	Coastal flooding (only for the coastal municipalities)
4	Wildfire
5	Geomagnetic Storm and Wind Events (Power Outages)

Action for each Hazard for each Municipality

Each municipality in the Planning Area has identified at least one mitigation action for each of the hazards that can impact their jurisdictions. The Coastal Storm only applies to the towns of Lincolnville, Northport, and Searsport and to a minor degree the Town of Prospect.

WALDO COUNTY HAZARD MITIGATION PLAN

2025 Mitigation Projects

Town	Hazard #	Project (In priority order)	Responsible Dept	Time Frame	Estimated Cost ($)
Brooks	1	Educate the public on the dangers of electrical power lines on the roadways.	EM Director	2 months	100
	2	Littlefield Road	Road Commissioner	6 months	10,000
	2	Lang Hill Highway		6 months	34,000
	2	Underpass Road		6 months	5,000
	2	Pond Hill Road		6 months	162,000
	2	Knowlton Road culverts		3 months	12,000
	3	N/A Not a coastal town	N/A		0
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100
	5	Educate the public on power outage preparedness.	EM Director	1 month	100
Freedom	1	Educate the public on the dangers of electrical power lines on the roadways.	EM Director	2 months	100
	2	Replace the Mitchell Road Bridge	Road Commissioner	6 months	325,000
	2	Rebuild ditches on both sides of Mitchell Road near 2nd Mitchell Road Bridge		1 month	12,000
	2	Upgrade Rollins Road with elevated surface and improved ditches. Increase the size of the culvert and riprap sides		6 months	18,000
	2	Rebuild ditches on both sides of Beaver Ridge Road		1 month	7,500
	3	N/A Not a coastal town	N/A		
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100
	5	Identify suitable warming centers	EM Director	1 month	100
Liberty	1/5	Install Ham radio at Town EOC	EM Director	2 months	2,000
	2	Rebuild Fishtown Road	Road Commissioner	8 months	150,000
	2	Rebuild Steven Pond Inlet	Road Commissioner	8 months	100,000
	3	N/A Not a coastal town	N/A		
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100

Time frame = length of time the funds are needed

Town	Hazard #	Project (In priority order)	Responsible Dept	Time Frame	Estimated Cost ($)
Lincolnville	1	Educate the public on the dangers of electrical lines in the rd	EM Director	2 months	100
	2	Elevate McKay Road	Road Commissioner	6 months	100,000
	2	Replace Minnow Brook drainage structure at Youngtown Rd	Road Commissioner	4 months	275,000
	2	Replace Hardy Brook drainage structure at Youngtown Rd	Road Commissioner		300,000
	2	Replace Black Brook drainage structure at Youngtown Road	Road Commissioner		300,000
	2	Replace Black Brook drainage structure at Slab City Road	Road Commissioner		1,520,000
	2	Replace Tucker Brook drainage structure at Greenacre Rd	Road Commissioner		300,000
	3	Raise or replace Municipal Pier	Harbor Master		2,500,000
	3	Redesign, armor and raise Beach Parking Seawall	Town Admin		400,000
	3	Redesign and armor Route 1 sidewalk at Beach parking	Town Admin		200,000
	3	Relocate Beach Fire Station	Fire Chief		500,000
	3	Protect Beach Bathroom structure	Town Admin		20,000
	3	Acquire flood-prone properties at Lincolnville Beach	Selectboard		5,000,000
	3	Armor shoreline at Penobscot Park	Town Admin		350,000
	3	Rebuild the harbor boat launching ramp	Harbor Master		400,000
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100
	5	Identify suitable warming centers	EM Director	1 month	100
Northport	1	Assessing vulnerability of trees to storms along Shore Road	Road Commissioner	1 month	20,000
		Ensuring Town buildings are fortified against severe winds	Town Administrator	1 month	10,000
		Ensure Town has needed public safety, shelter, & comm eq	EMA & Fire/EMS	1 month	10,000
	2	Upsizing culverts throughout Town	Road Commissioner	6 Years	800,000
	3	Shoreline stabilization near 590 Shore Road	Road Commissioner	1 month	140,000
		Shoreline stabilization near Kelly Cove	Road Commissioner	1 month	160,000
		Shoreline stabilization near Temple Heights	Road Commissioner	4 months	300,000
		Raising the Bayside wharf and jetty	Village Corp	6 months	400,000
		Protecting public shoreline access at Bayview Park	Village Corp	2 months	120,000
		Protecting public shoreline access at Auditorium Park	Village Corp	6 months	600,000
	4	Enhance wildfire fighting capacity with better fire road access to large, wooded tracts	Fire Dept	6 months	50,000
		Conducting a forest vulnerability assessment to address wildfire risk and identify possible management and remediation measures to address forest pests	Fire Dept	6 months	5,000
	5	Protect Fire Station from Geomagnetic Storm power surges	FD, Town Admin	1 month	5,000

Town	Hazard #	Project (In priority order)	Responsible Dept	Time Frame	Estimated Cost ($)
Searsport	1	Educate the public on the dangers of electrical power lines on the roadways.	EM Director	2 months	100
	2	Repair and raise Cottage Street	Public Works		1,200,000
	2	Raise Cottage Street Wastewater Pump Station	Private Contractor		600,000
	2	Replace Stream Culvert on Old County Road	Public Works		26,000
	3	Repair Hamilton Wharf	Private Contractor		1,500,000
	3	Replace Seawall at Mosman Park	Private Contractor		420,000
	3	Repair Seawall at Hamilton Wharf Parking lot	Private Contractor		20,000
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100
	5	Identify suitable warming centers	EM Director	1 month	100
Swanville	1	Trim trees on every roadside in town	Selectboard to hire Contractor	4 months	70,000
	1	Redesign/redevelop the debris ramp at the Transfer Station.		2 months	15,000
	2	Seal top of Swan Lake Dam to make it watertight.		6 months	60000
	2	Upgrade road ditches and culverts. (Which ones?)		12 months	100,000
	3	N/A. Not a coastal town	N/A		
	4	Educate the public about residential wildfire mitigation	EM Director	2 months	100
	5	Identify suitable warming centers	EM Director	1 month	100

Possible Funding Resources

State Resources	Federal Resources
Municipal Annual Budget	FEMA Legislative Pre-Disaster Mitigation (LPDM) Grants
Municipal Bonding	FEMA Hazard Mitigation Grant Program (HMGP)
Maine DOT Transportation Capital Improvements	FEMA Build Resilient Infrastructures and Communities (BRIC) grant
Maine DEP Culvert Grants	FEMA Flood Mitigation Assistance (FMA)
	Climate Resiliency grants

Status of 2017 Mitigation Projects

Town	Project (In Priority Order)	Status	Responsible Agency
Freedom	1. Waning Rd: Remove ledge and ditch 500'.	Waiting $$	Road Comm
	2. Mitchell Rd: Replace existing bridge.	Waiting $$	Road Comm
	3. Pleasant St: Repair 275 feet of roadside drainage	Waiting $$	Road Comm
	4. Main St: Repair 100 feet of roadside drainage	Waiting $$	Road Comm
	5. Mill Street: Repair 50 feet of roadside drainage	Waiting $$	Road Comm
	6. Penny Hill: Repair 1,500 ft of drainage, replace culverts, add drain, and geotextile.	Waiting $$	Road Comm
	7. Distribute the County Family Preparedness Guides.	Done	EMA
Liberty	1. Distribute the County Family Preparedness Guides.	Done	EMA
Lincolnville	1. Distribute the County Family Preparedness Guides.	Done	EMA
Northport	1. Distribute the County Family Preparedness Guides.	Done	EMA
Searsport	1. Cottage Rd: Upsize existing culvert and riprap.	Done	Road Comm

The Towns of Brooks and Swanville were not in the 2017 Hazard Mitigation Plan edition.

Existing authorities, policies, programs and resources available to accomplish hazard mitigation.

- **Board of Selectpersons (BS)**: The elected officials for the town government. If a town has no Town Manager, that role is filled by a Board of Selectmen. Depending on the community's size and financial resources, the Board might also serve as Road Commissioner.

- **Town Manager or Administrator (TM):** Three participating towns in the Planning Area have either a town manager or town administrator. Seven towns do not.

- **Road Commissioner (RC)**: Most towns in the Planning Area have a road commissioner. The road commissioner might also be the town manager, administrator or board of selectpersons. A few towns have a full time paid Public Works Director (PW).

- **Flood Zone and Shoreland Zone Ordinances:** All of the planning area towns have a Shoreland Zone Ordinance. All, but one town (Prospect), have a flood hazard ordinance in effect.

All jurisdictions in Waldo County could expand and improve their existing capabilities if additional funds, beyond their existing tax bases, became available to address hazard mitigation projects listed on the previous pages.

Town	Town Management	Paid Staff involved in Local Planning	Road Commission	EMA Director	Flood Hazard Ordinance	Shoreland Zoning Ordinance
Brooks	BS	None	RC	Yes	Yes	Yes
Freedom	BS		PW	Yes	Yes	Yes
Liberty	BS		RC	Yes	Yes	Yes
Lincolnville	TM		TM	Yes	Yes	Yes
Northport	TM		RC	Yes	Yes	Yes
Searsport	TM		TM	Yes	Yes	Yes
Swanville	BS		RC	Yes	Yes	Yes

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HAZARD MITIGATION PLAN

SECTION F. PLAN MAINTENANCE PROCESS

§201.6(c)(4) requires a formal plan maintenance process to take place to ensure that the Mitigation Plan remains an active and pertinent document. The plan maintenance process includes a schedule for monitoring and evaluating the plan at least every five years and continued public participation throughout the plan maintenance process.

This section also includes an explanation of how the participating municipal governments intend to incorporate their mitigation strategies into any existing planning mechanisms they have, such as comprehensive or capital improvement plans, or zoning and building codes.

This section includes the following three subsections as follows:

Monitoring, Evaluating, and Updating the Plan

Incorporation into Existing Planning Mechanisms

Continued Public Involvement

HAZARD MITIGATION PLAN

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement §201.6(c)(4)(i):	**A plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.**
Element D2	**Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)?**
	a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?
	b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.
	c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?
Element E2 §201.6(d)(3)	**Was the plan revised to reflect changes in priorities and progress in local mitigation efforts?**
	a. Does the plan describe how it was revised due to changes in community priorities?
	c. Does the plan describe how jurisdictions integrated the (past) mitigation plan, when appropriate, into other planning mechanisms.

Tracking the Status of Mitigation Actions

Each municipal government will be responsible for tracking the progress and status of their individual mitigation actions. Updating the records for these mitigation actions will be accomplished by the municipal elected officials or their town administrator at the end of each calendar year. Some towns may create a word document, spreadsheet or database. Others may simply mark up the municipality's official copy of the Hazard Mitigation Plan.

Records for structural mitigation projects may include minutes of meetings, construction plans and specifications, contract documents, and expenditure records. Records for educational mitigation projects may include a memo indicating the method of educational outreach (brochures, posters or training programs.

It is doubtful that the most expensive mitigation projects will be accomplished with local funds. It will take federal mitigation grants funds to complete, and this process can take several years, with the possibility that they may never be funded.

Evaluating the Plan Effectiveness

Each municipal government will be responsible for evaluating the effectiveness of the plan, primarily by reviewing the number of mitigation actions which were accomplished. Structural projects, such as road improvements, will be assessed after each storm to determine if the improvements fixed the problem.

Plan Update

Each municipal government will have 12 months to update and make changes to the plan before submitting it to the state hazard mitigation officer. Twelve months prior those municipalities who are interested in continuing with the regional plan will need to convene a meeting of representatives of the participating towns. Monthly meetings will need to be scheduled to complete the updating of their plan.

Community Priorities

The consistent municipal priorities are to improve road systems and their associated stormwater drainage systems and to implement public education regarding local hazards. One priority that has been added in this version of the plan is for coastal flooding and erosion. As is typical, the public is not concerned or interested in a hazard, until it happens. In January 2024, as the planning team was starting this plan revision, the participating coastal towns experienced a coastal storm that caused damage to docks, piers, seawalls and a few commercial structures. Though this type of damage has occurred in the past, it has not occurred since we began hazard mitigation planning in 2003.

Past Mitigation Plan Integration

The Towns of Brooks and Swanville were not in the 2017 version of the Hazard Mitigation Plan. The other eight towns were in the last plan, and they integrated their mitigation projects into the following mechanisms:

- Town Report and Warrant
- Town Budget
- Planned Roadwork
- Emergency Management

Most of the structural mitigation projects from the 2017 plan, which had a high project cost, were not completed due to a lack of funds. No federal grants were applied for, and no state grants were available. No mitigation grants have been awarded to any municipality in Waldo County since 2013.

Public Education mitigation actions involved handing out emergency preparedness guides and brochures at the town offices. This was integrated with the Town Emergency Management program which is assigned to a single volunteer in each town.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement §201.6(c)(4) (ii):	**The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.**
Element D3	**Does the plan describe a process by which each community will integrate the requirement of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate?**
	a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?
	b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?
	c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?

Within Maine, most government authority is with State statutes and rules or with municipal "Home Rule" ordinances. None of the participating municipalities are required to enforce the State building codes, according to State law. Additionally, none of the selected mitigation actions involved prevention measures, such as codes and ordinances. The mitigation actions chosen were primarily educational or road improvements which will not be incorporated into ordinances or comprehensive plans.

Because all selected mitigation actions are either structural, such as road and drainage system upgrades, or public awareness programs, these may be incorporated into existing road improvements projects and potentially funded by annual budgets. However, the most expensive road improvements will only be accomplished through Federal hazard mitigation grants. State grants, such as Maine's Department of Environmental Protection culvert upgrade funds, will be taken advantage of when they are available.

Each individual municipality will integrate their mitigation actions into the following mechanisms.

Municipality	Town Report and Warrant	Town Budget	Grant Applications	Contracts	Planned Roadwork	Emergency Management
Brooks	X	X	X	X	X	X
Freedom	X	X	X	X	X	X
Liberty	X	X	X	X	X	X
Lincolnville	X	X	X	X	X	X
Northport	X	X	X	X	X	X
Searsport	X	X	X	X	X	x
Swanville	X	X	X	X	X	X

CONTINUED PUBLIC INVOLVEMENT

Requirement §201.6(c)(4) (iii):	**The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.**
Element D1	**Is there a description of how each community will continue public participation in the plan maintenance process**
	a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?

Each individual municipality promotes direct public participation in all the business on the towns, to include the continual reshaping and updating of the Hazard Mitigation Plan. The planning team tried many ways to encourage public involvement including, posting notices, sending out emails and using social media and will continue to do so.

Copies of the plan will be in each town office and posted on the town website so that the public may view the plan at any time.

Residents may bring up the topic to the elected officials at any meeting of the Select Board. Comments may also be provided to each town emergency management director or selectperson.

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