

City of Rockland  
2002 Comprehensive Plan

Chapter 3

NATURAL RESOURCES

**State Goals:**

To protect the quality and manage the quantity of the State's water resources, including lakes, aquifers, great ponds, estuaries, rivers and coastal areas.

To protect the State's other critical natural resources, including, without limitation, wetlands, wildlife and fisheries habitat, sand dunes, shore lands, scenic vistas and unique natural areas.

**Introduction**

The natural resources characteristics of Rockland, which include its topography, geology, soils and water resources have significantly influenced the past and present location, rate, and density of development in the community. *The natural physical constraints imposed upon the City will continue to affect the direction of development in the City as it seeks to determine the boundaries of its future residential, commercial and industrial growth areas.*

**TOPOGRAPHY**

The City of Rockland consists of 12.8 square miles or approximately 8,192 acres, which is about one-third of the average sized Maine town. As shown on Map 3-1, it is situated in Knox County and on the western entrance to Penobscot Bay. It is bounded by the Towns of Rockport, Warren, Thomaston, and Owls Head.

The topography is characterized by post-glacial rolling terrain, which is typical of the Maine Coast. The elevation of the City rises fairly rapidly from sea level and low-lying coastal areas to an average elevation of about 200 to 300 feet. The City's highest elevation (663 feet) at Dodge Mountain is in the northeast part of the City. Dodge Mountain and Benner Hill form a ridge cutting across the center of the City in a generally northeast-southwest direction.

Topography and slopes affect the suitability of land for development.<sup>1</sup> Steep slopes, defined as 25% or greater, are typically unsuitable for development. In Maine, septic systems cannot be installed on slopes of 20% or greater. Most streets should not be constructed on slopes of more than 8% to 10% for any distance. If developed, steep slopes can cause serious erosion<sup>2</sup> problems. Slopes that are flat, or less than 3%, can also have drainage problems, as water on level surfaces tends to accumulate or pond. Also public sewer accessibility is affected by topography because public sewers depend on gravity feed to move sewerage along the sanitary and interceptor sewer mains to the wastewater treatment plant. In the absence of gravity flow, pumping stations and force mains need to be constructed in order to overcome steep topographical conditions.

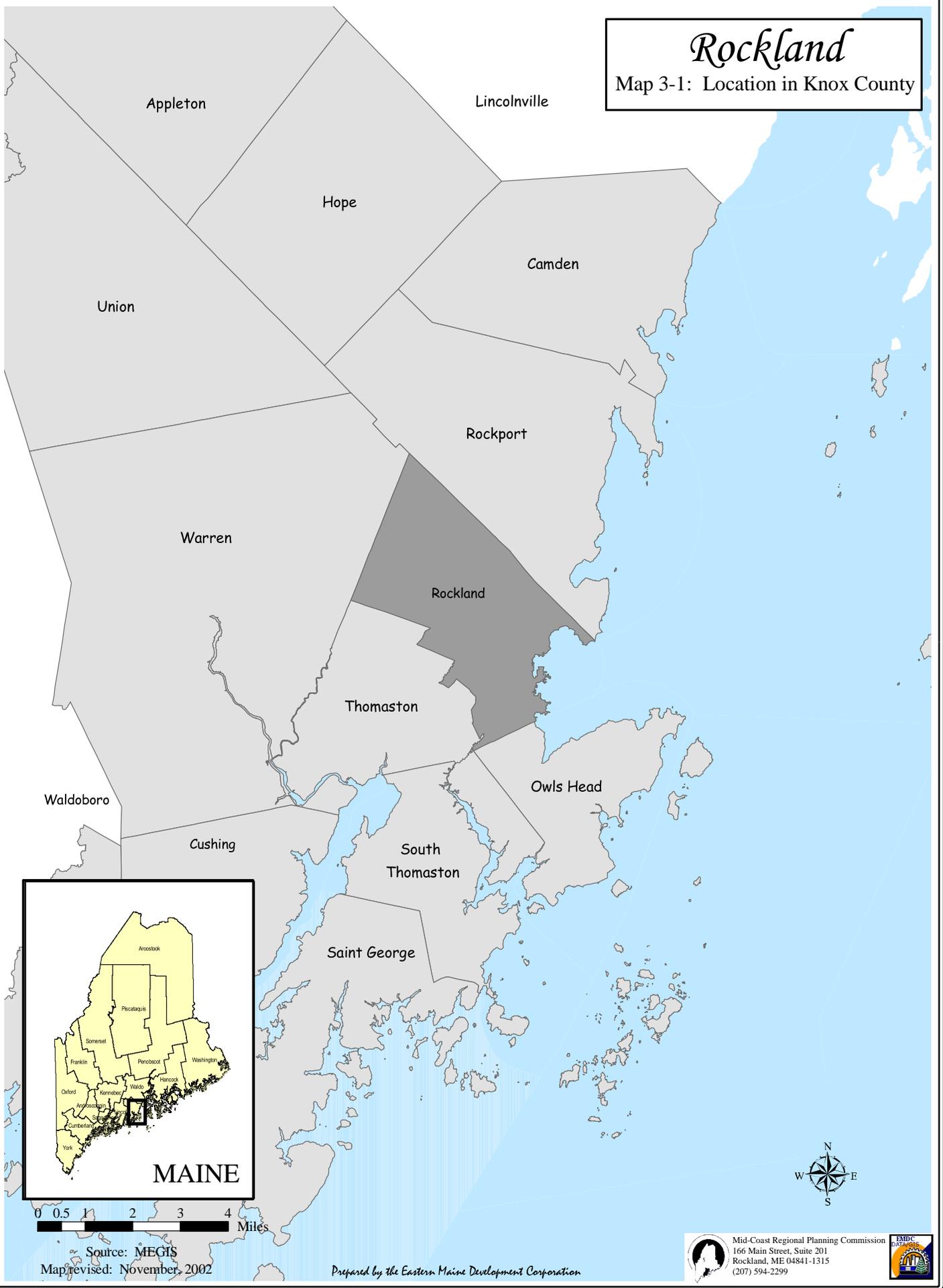
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<sup>1</sup>Slope is the amount of rise or fall over a given horizontal distance and is usually expressed as a percentage. For illustration, an 8% slope means that for a 100-foot horizontal distance, the rise (or fall) in height is 8 feet.

<sup>2</sup> Erosion is the process whereby soil or rock material is loosened or dissolved and removed from the surface of land

# Rockland

Map 3-1: Location in Knox County



Source: MEGIS  
Map revised: November, 2002

Prepared by the Eastern Maine Development Corporation



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## Natural Resources

The built up area of the City west of the harbor to Old County Road and Meadow Brook consists of 3% to 8% slopes, which are considered ideal for development. This area is suitable for single-family homes on smaller and medium size lots, multi-family housing, streets, and commercial and industrial buildings.

Located south of Pleasant Street and along Thomaston Street is a section containing up to 3% slopes, which is suitable for almost all types of construction, especially larger buildings. Since this area is nearly level, problems associated with poor drainage need to be addressed.

The topography of the more rural area of the City, west of Meadow Road, rises to Benner Hill and Dodge Mountain and then falls to the Greater Bog area and consists primarily of 15% to 25% slopes. Interspersed within this area are 8% to 15% slopes which are suitable for single family dwellings on large lots as well as low density multi-family housing. Although the area contains single-family homes on large size lots, construction is more costly on these slopes; it is unsuitable for most on-site septic disposal systems and storm water runoff and erosion problems are likely. Because of the potential damage caused by runoff on steep slopes, erosion and control measures, such as retention ponds, sediment collection basins, vegetative buffers, and rip rap need to be installed. Development constraints on steep slopes can be overcome with proper design, engineering, and sufficient investment.

The large land area in the western portion of the City, containing significant natural resources, consists of 0% to 3% slopes and 3% to 8% slopes. Zero percentage to 3% slopes are found in the vicinity of the various streams and wetlands, which run through the northwest section of the City. Three percent to eight percent slopes are located in the northern triangular corner along Route 90.

Map 3-2A, Topographic Map, of the Natural Resources Inventory map series, has been prepared for the purpose of showing the topography of the City and for indicating where development can take place with the least topographical constraints.

### **Topographical Issues and Implications**

- (1) Rockland's small geographic size limits growth and expansion within its borders. This may require the City to work more closely with its neighboring communities to integrate land and municipal services in order to allow further commercial and industrial development. Should the City encourage regional economic development for this reason?
- (2) The hilly terrain and low-lying areas west of Old County Road, West Meadow Road, and Route 17 are difficult to develop and probably encompass at least 50% of the City's land area. Therefore, future medium and high-density growth and development is restricted to the existing built-up sections east of Old County Road and along the harbor. The Benner Hill and Dodge Mountain ridge line is a physical barrier to any significant growth in the mostly underdeveloped western part of the City. Should this ridge line be the boundary between the Growth Area and the Rural Area?
- (3) The continued residential development on West Meadow Road, Bog Road, Dodge Mountain, and Benner Hill could be expensive to the City if the maintenance of private roads becomes the responsibility of the municipality. Should the City adopt special hillside development regulations that would allow private residential construction under site-specific standards?

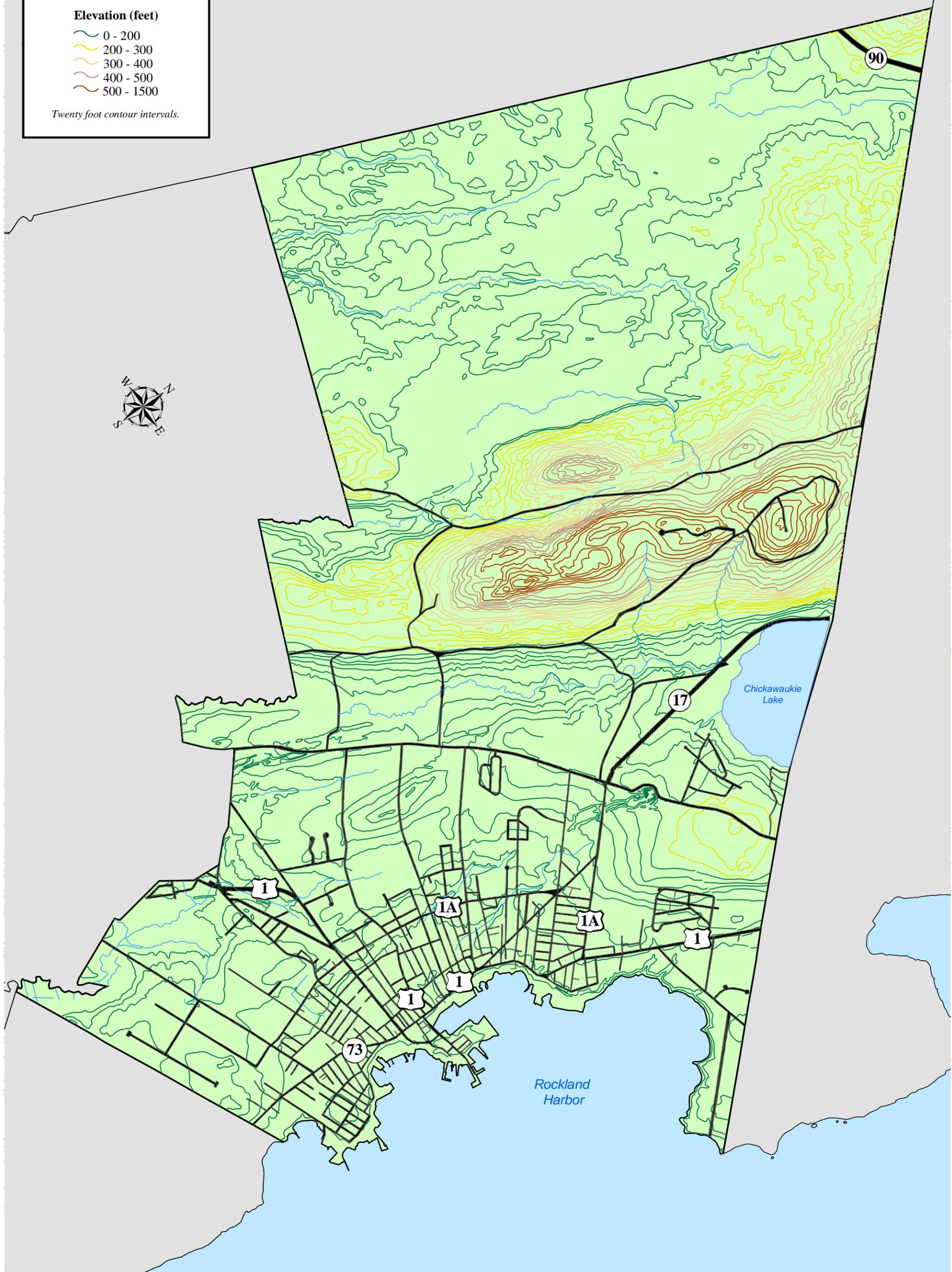
**Legend**

~ Roads    ~ Streams

**Elevation (feet)**

- 0 - 200
- 200 - 300
- 300 - 400
- 400 - 500
- 500 - 1500

*Twenty foot contour intervals.*



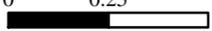
**Rockland**  
Map 3-2: Topography

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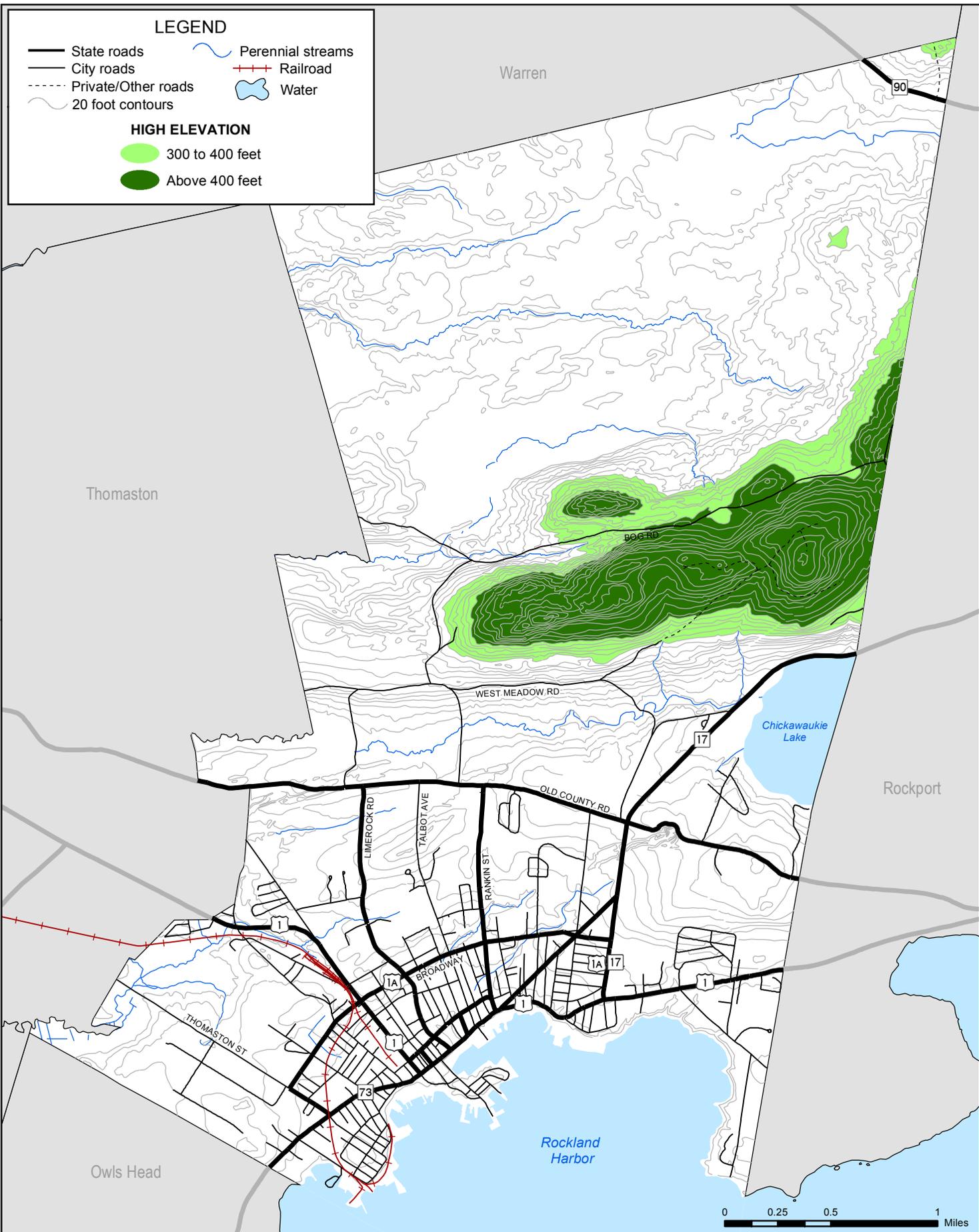


*Prepared by the Eastern Maine Development Corporation*

0 0.25 Miles



Sources: USGS, Photo Science, Inc. and MEGIS  
Map revised: January, 2003



**TOPOGRAPHY**

Prepared as part of the Gateway 1 amendments to the comprehensive plan.

**CITY OF ROCKLAND**

Map revised: October 28, 2010  
 Map prepared by LatLong Logic, LLC  
 Sources: USGS, MEDOT and MEGIS



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## SURFICIAL GEOLOGY

The surficial geology<sup>3</sup> of the City consists of bedrock and surficial deposits. Bedrock is the solid rock that forms the crust of the earth. Where it is exposed at the surface it is called “ledge” or “outcrop.” The bedrock, which in Maine consists primarily of metamorphosed sedimentary and igneous rock, has been formed in a series of ridges and valleys running in a generally northeast-southwest direction. The most important rock in Rockland is metamorphosed calcareous (remains of certain organisms) siltstone and limestone, which extends in a relatively narrow band from Thomaston, through Rockland and Rockport into Camden. Within this band are the still active quarries of the cement plant in Thomaston near Dexter Street. In addition, the City uses an abandoned quarry as a landfill for solid waste.

Rockland quarries have played an important role in the history of Rockland and are a noticeable part of the City's geological landscape. Geologically, these are predominantly limestone quarries consisting of metamorphic rock. In the band of limestone extending through Rockland, the stone, commonly found in nearly horizontal layers, has been forced by geologic action into a near-vertical position. The reason the quarries are so deep is because the miners had to follow the layer where the high quality limestone was located, resulting in the deep penetration of the bedrock to below the water table. Because ground water in rock formations travels slowly through fractures, and since the quarries were excavated to below the water table, water has accumulated in them over the years. The principal products, for which the limestone of Knox County is and can be used, are: (1) agricultural lime, (2) calcium flux stone, (3) high calcium stone for chemical purposes, and (4) cement. It is quite apparent, however, that the greatest part of the Rockland formation in the Rockland-Thomaston limestone belt consists of the so-called Rockport limestone. The Rockport limestone is for the most part a medium-textured crystalline light bluish-gray metamorphosed limestone (marble). Thin white calcite bands, many of which parallel the bedding, give much of the rock a striped appearance when observed in close-up. Certain zones of varying width, such as those seen in many of the quarries along Old County Road west of Rockland, are actually a dolomitic marble. In fact, more magnesium limestone has been quarried in the past from the area for use as plastic limes than strictly high calcium limestone for flux stone and other chemical uses. Excellent high calcium limestone appears to occur in limited amounts as compared to magnesium limestone.<sup>4</sup>

The many inactive quarries along Old County Road and near the Camden-Rockport town line serve as reminders of how important this resource was to the past economy of the community. This formation is surrounded by undifferentiated sedimentary rock in the St. George River basin and north to Belfast. Outcrops of metamorphosed basaltic and trachytic flows and tuffs are visible near the shore at Jameson Point.

Surficial deposits are the unconsolidated materials that overlie bedrock and include sediments deposited by wind, water, and glacial ice. In Rockland, the most abundant surficial deposits consist of marine sediments and glacial till. Continental glaciers covered the entire Rockland area, forming the landscape as it advanced and retreated across the region. The debris formed by the moving glacier was either spread by the ice or was released onto the underlying bedrock as the glacier melting. The manner

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<sup>3</sup> Surficial geology is that branch of geology that deals with the surface of the earth

<sup>4</sup> . Allen, Henry W., Preliminary Report of Limestone Survey of a portion of Knox County, Maine, Maine Geological Survey

## Natural Resources

in which this took place largely determined the location of various soil types. After the retreat of the glaciers, the sea level rose and low elevations were submerged by the ocean. As a result, marine sediments, glacial tills, and glacial outwash soils are found in Rockland, along with some organic soils (muck and peat) in bogs, swamps, and stream valleys. Soils in Rockland are often thin with frequent outcropping of ledge. Marine sediments are found in the built up area along the harbor including the bluff along the north shoreline where slumping and landslides have occurred. Pooling of surface water near the bluff on clayey soils can generate long term moisture in the soil that, if not controlled, will cause slumping or landslide. None of the zoning, site plan, or subdivision controls specifically addresses geologic conditions. However, they cover related soils, water supply and elevation issues.

### Issues and Implications

- (1) The bedrock and surficial geologic features particular to Rockland such as elevation, slopes, soils composition, and groundwater sources have influenced where development has occurred in the City. These affect on-site sewerage disposal, well water yields, and the placement of commercial and residential structures. Does the City wish to use the geologic limitations imposed upon it to help establish its designated growth and rural areas? Does the City see the necessity to include geologic information as part of any development applications or is this knowledge sufficiently covered by other requirements?
- (2) The quarries in Rockland are deeper than the water table, which is the principal reason why they are presently filled with water. The two quarries used by the City for landfill and dumping threaten the adjacent groundwater. If the quarries were not actively pumped out to levels lower than the adjacent water table, contaminants would leach into the groundwater. Such pumping and subsequent treatment at the wastewater treatment plant involves considerable expense to the City. Given the risks to the groundwater and associated expense, should the City continue using quarries for waste disposal?

## SOILS

Rockland's soils are often shallow to bedrock and are sandy and stony. The level of development that can occur in a certain area is largely dependent on the type and characteristics of the soil found there. Soils are identified in the field and plotted on aerial photographs. Soil information sheets are then prepared which rate the development potential of the soil type based on the ability to install septic disposal systems, the building of homes on foundations, and for the construction of streets. From this information, medium intensity soil maps are developed. It should be cautioned that these maps are not a substitute for an on-site soils investigation. Much of Rockland's soils are rated very low to medium for development by the Natural Resources and Conservation Service (formerly the Soil Conservation Service). Table 3-1, Soil Types, rates the various soil types found in Rockland for their development potential (see Maps 3-3A General Soils and 3-3B Development Potential).

Most of the built-up area of the City from the harbor west to Old County Road is rated very low for development. The limitations for septic systems have been overcome through the installation of municipal sewer lines and public water lines.

# Rockland

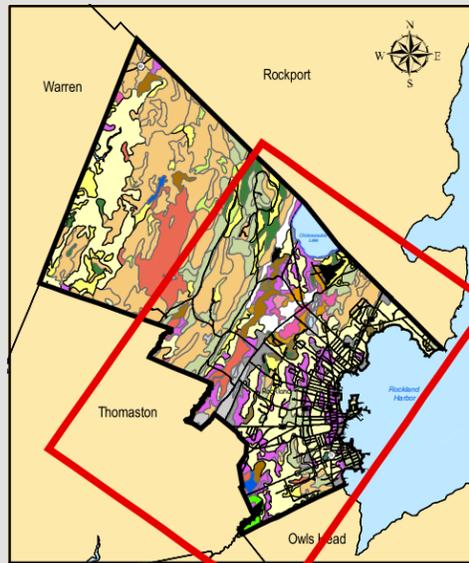
Map 3-3A: General Soils

## Legend

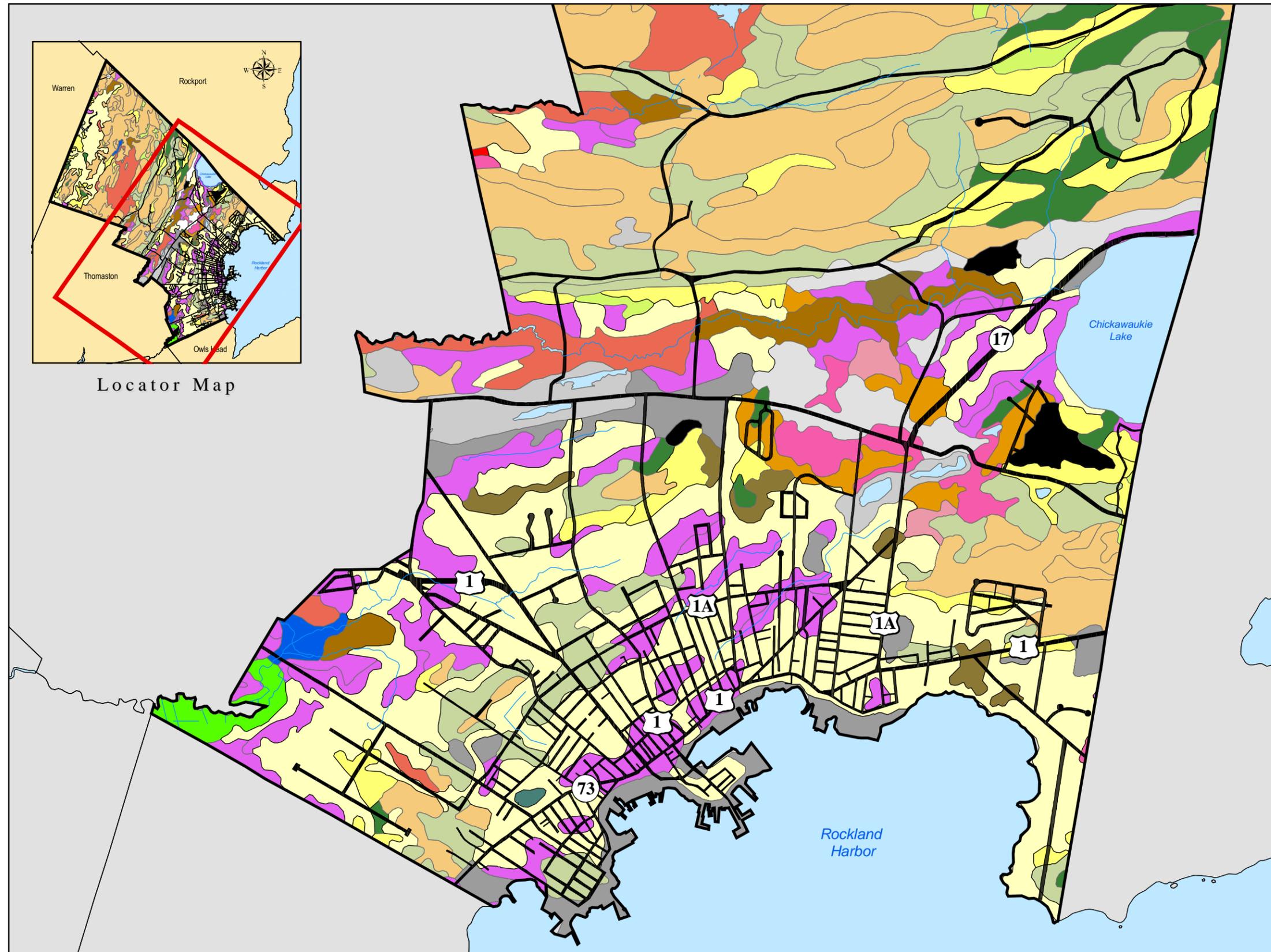
~ Roads      ~ Streams

### Soil Groups

-  Biddeford
-  Boothbay
-  Borosapristis
-  Brayton
-  Charles
-  Dumps-Pits Complex
-  Eldridge
-  Lyman-Rock
-  Madawaska
-  Marlow
-  Medomak
-  Naumburg
-  Peru
-  Pits, Gravel and Sand
-  Searsport
-  Sheepscot
-  Sulfahemists and Sulfaquents
-  Swanville
-  Tunbridge
-  Udorthents
-  Water



Locator Map



0 0.25 0.5 Miles

Sources: USDA-NRCS, Photo Science Inc. and MEGIS  
Map revised: January, 2003



Prepared by the Eastern Maine Development Corporation

## Natural Resources

The land between Old County Road and the Bog Road consists primarily of low to medium density residential development on medium to larger size lots with some commercial uses. The soil types in this area are rated low to medium for development. Public sewer and water are not available.

The large area west of the Bog Road, known as the Rockland Bog, extending to Route 90 contains soils rated low to very low for development. With water often at or near the surface, the area has severe development restrictions.

The commercial corridor on Route 90, on somewhat higher ground near the Rockland Bog, does not exhibit the same soil constraints and is acceptable for development.

### Soil Issues and Implications

- (1) Since public utility services terminate at or near Old County Road, development beyond this point is heavily influenced by soil and geologic characteristics as well as topographical conditions. Since soil limitations can often be overcome by technology and by correct construction methods, should additional lower density residential and lower impact commercial development be encouraged? Should residential lot sizes be related to soil type? Should soil characteristics be included as a performance standard for commercial development in the area? Should the City extend sewer and water to facilitate development?

# Rockland

Map 3-3B: Development Potential

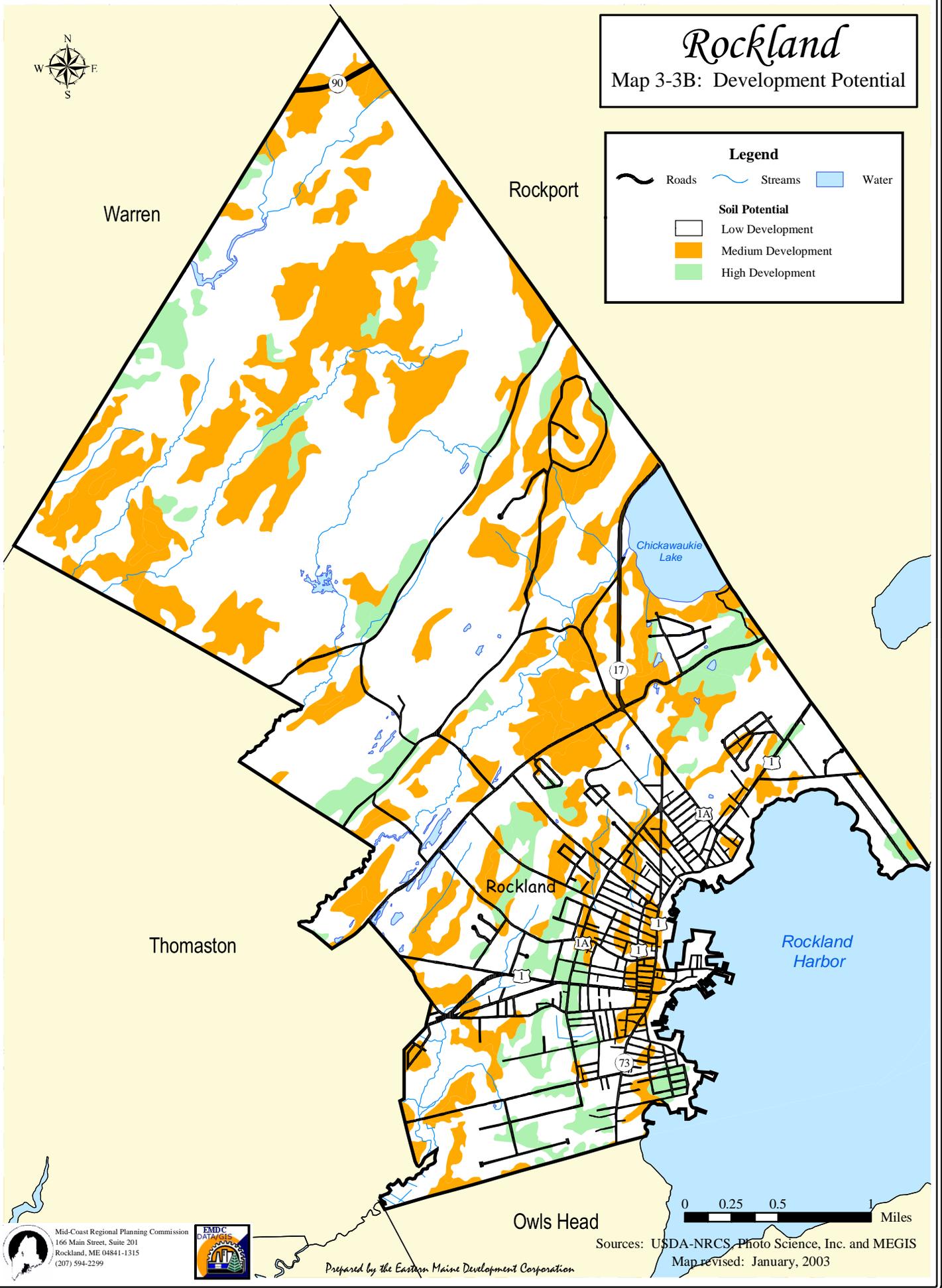


**Legend**

Roads    Streams    Water

**Soil Potential**

- Low Development
- Medium Development
- High Development



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Map revised: January, 2003

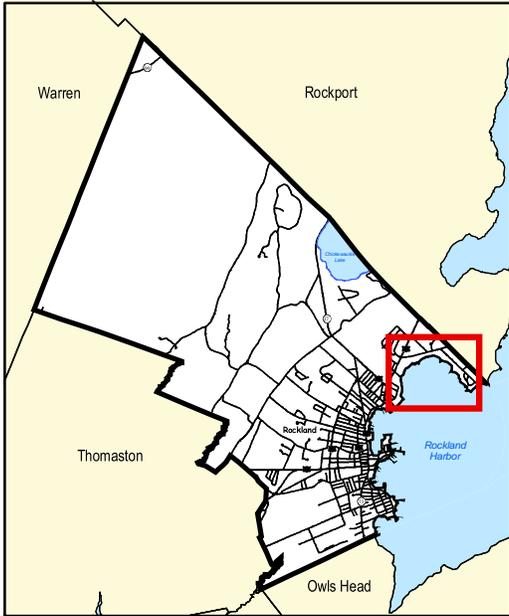
Natural Resources

**Table 3-1**  
**Soil Potentials for Development**  
**(Septic Systems, Homes and Streets)**

| <b>SYMBOL</b> | <b>NAME</b>                                      | <b>DEVELOPMENT POTENTIAL</b> |
|---------------|--|------------------------------|
| Bg            | Biddeford mucky peat                             | Very Low                     |
| BoB           | Boothbay silt loam, 3 to 8%                      | Medium                       |
| BoC           | Boothbay silt loam, 8 to 15%                     | Medium                       |
| BoD2          | Boothbay silt loam, 15 to 25%, eroded            | Very Low                     |
| Bp            | Borosapristis, ponded                            | Very Low                     |
| BtB           | Brayton very stony fine                          | Very Low                     |
| Ch            | Charles silt loam                                | Very Low                     |
| Dp/Pg/Ud      | Dumps, pits, urban land complex                  | non-rated                    |
| Le            | Lovewell very fine sandy loam                    | Very Low                     |
| LrB           | Lyman-Rock outcrop-Tunbridge complex, 3 to 8%    | Medium                       |
| LrC           | Lyman-Rock outcrop-Tunbridge complex, 8 to 15%   | Low                          |
| LrE           | Lyman-Rock outcrop-Tunbridge complex, 15 to 45%  | Very Low                     |
| MaB           | Madawaska fine sandy loam, 3 to 8%               | Medium                       |
| MrB           | Marlow fine sandy loam, 3 to 8%                  | High                         |
| MrC           | Marlow fine sandy loam, 8 to 15%                 | Medium                       |
| MrD           | Marlow fine sandy loam, 15 to 25%                | Low                          |
| MsB           | Marlow very stony fine sandy loam, 3 to 8%       | High                         |
| MsC           | Marlow very stony fine sandy loam, 8 to 15%      | Medium                       |
| MsD           | Marlow very stony fine sandy loam, 15 to 25%     | Very Low                     |
| MxB           | Masardis gravelly fine sandy loam, 3 to 8%       | Medium                       |
| MxC           | Masardis gravelly fine sandy loam, 8 to 15%      | Medium                       |
| MxD           | Masardis gravelly fine sandy loam, 15 to 25%     | Very Low                     |
| My            | Medomak silt loam                                | Very Low                     |
| Na            | Naumburg loamy sand                              | Very Low                     |
| PaB           | Peru fine sandy loam, 3 to 8%                    | High                         |
| PaC           | Peru fine sandy loam, 8 to 15%                   | Medium                       |
| PbB           | Peru very stony fine sandy loam, 3 to 8%         | High                         |
| PbC           | Peru very stony fine sandy loam, 8 to 15%        | Medium                       |
| Sp            | Searsport mucky peat                             | Very Low                     |
| StB           | Sheepscot fine sandy loam, 0 to 8%               | Medium                       |
| Su            | Sulfahemists and Sulfaquents, frequently flooded | Very Low                     |
| Sw            | Swanville silt loam                              | Very Low                     |
| TrB           | Tunbridge-Lyman fine sandy loams, 3 to 8%        | High                         |
| TrC           | Tunbridge-Lyman fine sandy loams, 8 to 15%       | Medium                       |
| TrD           | Tunbridge-Lyman fine sandy loams, 15 to 25%      | Low                          |

# Rockland

## Map 3-4: Landslide Hazards



See Inset

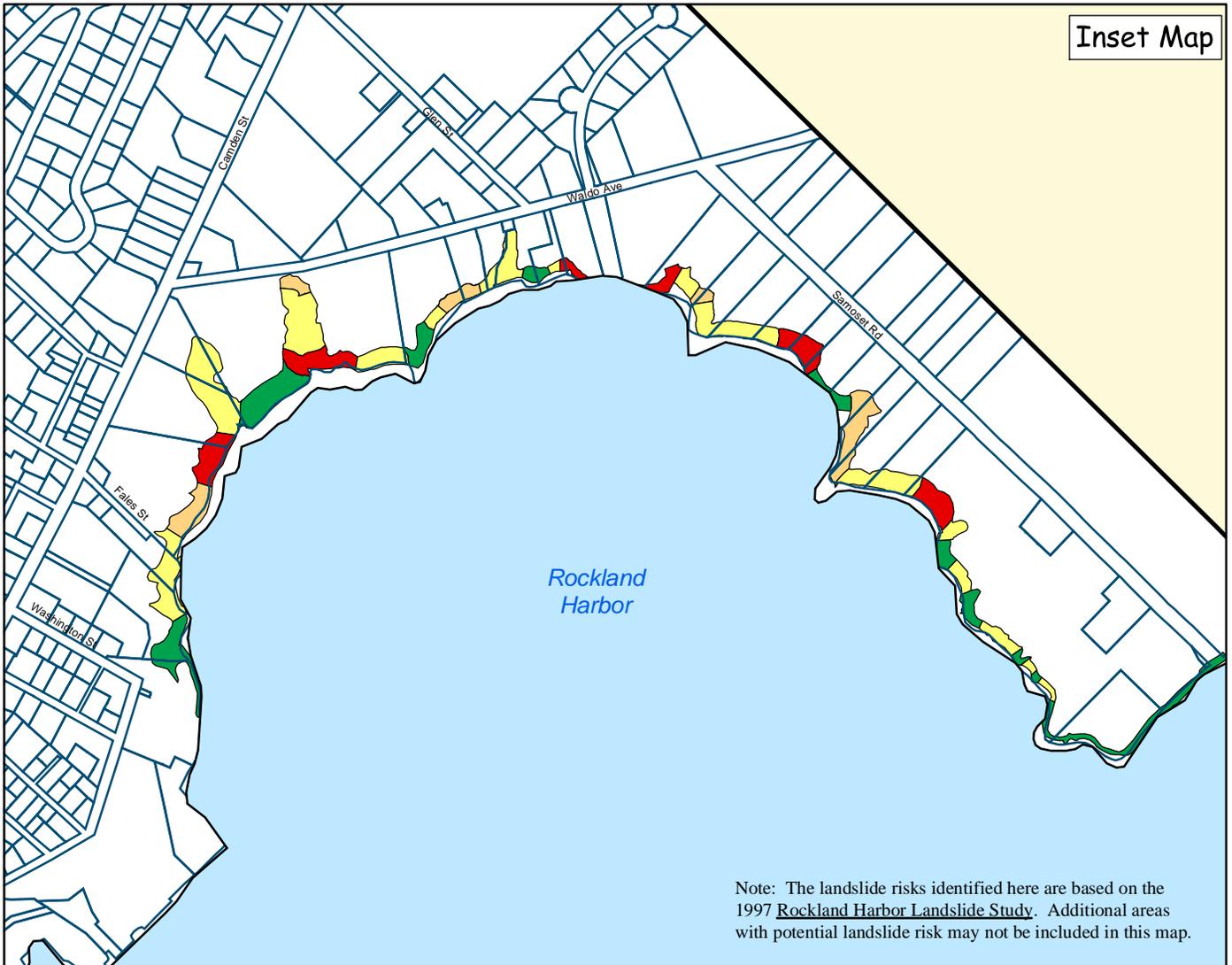
### Legend

Tax parcels

### Landslide Hazard

- High annual probability of landslide with retrogression and need for mitigation is now.
- Medium to high annual probability of landslide and need for mitigation is now.
- Medium annual probability of landslide and mitigation should occur within next 5 to 10 years
- Low probability of landslide and minimal need for mitigation.

### Inset Map



Note: The landslide risks identified here are based on the 1997 Rockland Harbor Landslide Study. Additional areas with potential landslide risk may not be included in this map.

0 250 500 1,000 Feet



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Sources: Gerber-Jacques Whitford, Geo-Systems  
Photo Science, Inc. and MEGIS  
Map revised: January, 2003

## ROCKLAND HARBOR LANDSLIDE

The natural characteristics of Rockland, along with development, have contributed to the landslide activity that has taken place in the bluff along the north shoreline of Rockland Harbor. In the last twenty-five years landslides have occurred along these bluffs. Previous to the 1996 landslide there had been no destruction of homes along the bluff because they were situated far enough away. However, in 1996 two homes on Samoset Road were destroyed in a landslide that moved 60,000 cubic yards of soil up to 300 feet into the harbor. As a result of this property loss, and the fear that such landslides would continue to occur in the future, the City undertook a landslide hazard study. The *Rockland Harbor Landslide Study*, by Gerber-Jacques Whitford/1997, Freeport, Maine, focused on future landslide risks, landslide mitigation, and guidelines for the evaluation of the impact of development on the stability of the bluff.

According to the study, eight notable landslides have occurred along the Rockland Harbor bluffs during the last 50 to 100 years meaning that the annual probability of a reoccurring landslide is approximately 10%-12% annually or about once every eight years. The average rates at which the bluff has retreated inland vary from less than 1 inch to over 20 inches per year. These migration rates were not constant, but instead took quantum leaps and then subsided for relatively long periods of time. The primary cause of the landslides is the saturation of the clay in the bluff, which can undermine the strength and stability of the slope. Saturation can result from surface and storm water runoff upslope from the bluff, with nearby development generally having a greater effect.

Reducing the risk of slope failure can be accomplished through regulatory and physical approaches. Regulatory means can include requiring a building permit for any development within 300 feet of the bluff, and having a geo-technical study performed to demonstrate that the development will have a low risk of landslide. Physical improvements include the rerouting of surface runoff near the bluff through drainage pipes to the harbor, rip-rapping the outlets to the drainage pipes, and removing basement drains which directly discharge onto the slope.

### **Landslide Issues and Implications:**

- (1) The risk of landslide to the property along the bluff is based on the probability that the bluff will fail and the potential impact that failure could have on buildings, roads, and utilities.
- (2) The risk of landslide to development can be reduced by regulatory means, enforcement, and through physical improvements to the drainage system.

## WATER RESOURCES

### **State Goal:**

To protect the quality and manage the quantity of the State's water resources including, lakes, aquifers, great ponds, estuaries, rivers, and coastal areas.

### **State Coastal Management Policy:**

Restore and maintain the quality of our fresh, marine and estuarine waters to allow for the broadest possible diversity of public and private uses.

## Natural Resources

Rockland is divided by three major and three minor watersheds<sup>5</sup> or drainage basin<sup>6</sup> areas, which are all part of the much larger Central Coastal Watershed. According to the provisions of Title 38, M.R.S.A, Section 4, 65 streams and brooks draining directly or indirectly into the tidal waters of Rockland are “Class B” waters. Class B waters are the third highest water classification and are suitable for the following uses: drinking water after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation; and navigation. Watershed areas are depicted on Map 3-5A, Water Resources, of the Natural Resources Inventory map series. The various urban watershed areas in Rockland are important to identify and study because they have been, and continue to be, a determining factor in setting the growth boundaries within the community; they affect the density, type, and amount of development; they determine the amount of storm water flow and urban flooding; they provide for important points of reference; and they identify land use activities within each watershed that are potential nonpoint<sup>7</sup> sources of pollution. As water runs over the ground during flooding or during rain storms it collects pollutants. The polluted water then either permeates the soil and enters the groundwater, is routed into ditches, streams, and discharged into a lake, or directed into combined storm sewers. The excess phosphorous and nutrients<sup>8</sup> in the sediment runoff from these nonpoint sources (NPS) stimulates algae growth, depleting the dissolved oxygen in the water, and causing lake quality to decline and become cloudy or green (eutrophic); builds up sediment deposits on the bottom of the water bodies and on harbor floors; pollutes coastal shellfish beds and beaches causing them to be closed; and may cause drinking water to be unsafe.

### Coastal Major Watershed

The coastal watershed encompasses the area from the harbor west to approximately Broadway and beyond Camden Street. The Lindsey Brook minor watershed constitutes a large portion of the coastal watershed.

**Lindsey Brook Minor Watershed:** Most of the land area between Maverick Street on the north and Thomaston Street on the south, extending west of Broadway, is drained through a number of tributary brooks to Lindsey Brook, which enters Rockland Harbor on the west side of Lermond’s Cove. It has a length of 3 miles. This watershed includes most of the densely built up area of the City and is composed of single family and multi-family residential neighborhoods, institutions, the Main Street downtown, the commercial development along Camden Street and the industrial buildings along the waterfront with all

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<sup>5</sup> Watersheds are comprised of those land areas that water flows across or drains underground on its way to a lake, pond, stream brook or other water body, which is the lowest point in the basin. Usually the watershed is named after the body of water or river it drains into.

<sup>6</sup> The region that contributes to a stream, river or lake.

<sup>7</sup> Unlike point source pollution, which originates from a specific point, like a pipe from a factory or a sewage treatment plant, nonpoint source (NPS) pollution comes from many diffused sources throughout the watershed and includes the following: seepage from failed septic systems, oil residues from recreational boating, excessive pesticide use and fertilizer application on lawns and on farmlands; salt and oil residuals from roads; storm water runoff from parking lots and developments; soil eroding from any land use and, sedimentation resulting from erosion from construction sites

<sup>8</sup> Phosphorus is a naturally occurring nutrient which can act as fertilizer to enhance plant growth in water bodies leading to oxygen depletion in the water and stimulation of algae growth. It is the major pollutant to lakes. Nutrients can be thought of as food for living things to grow on.

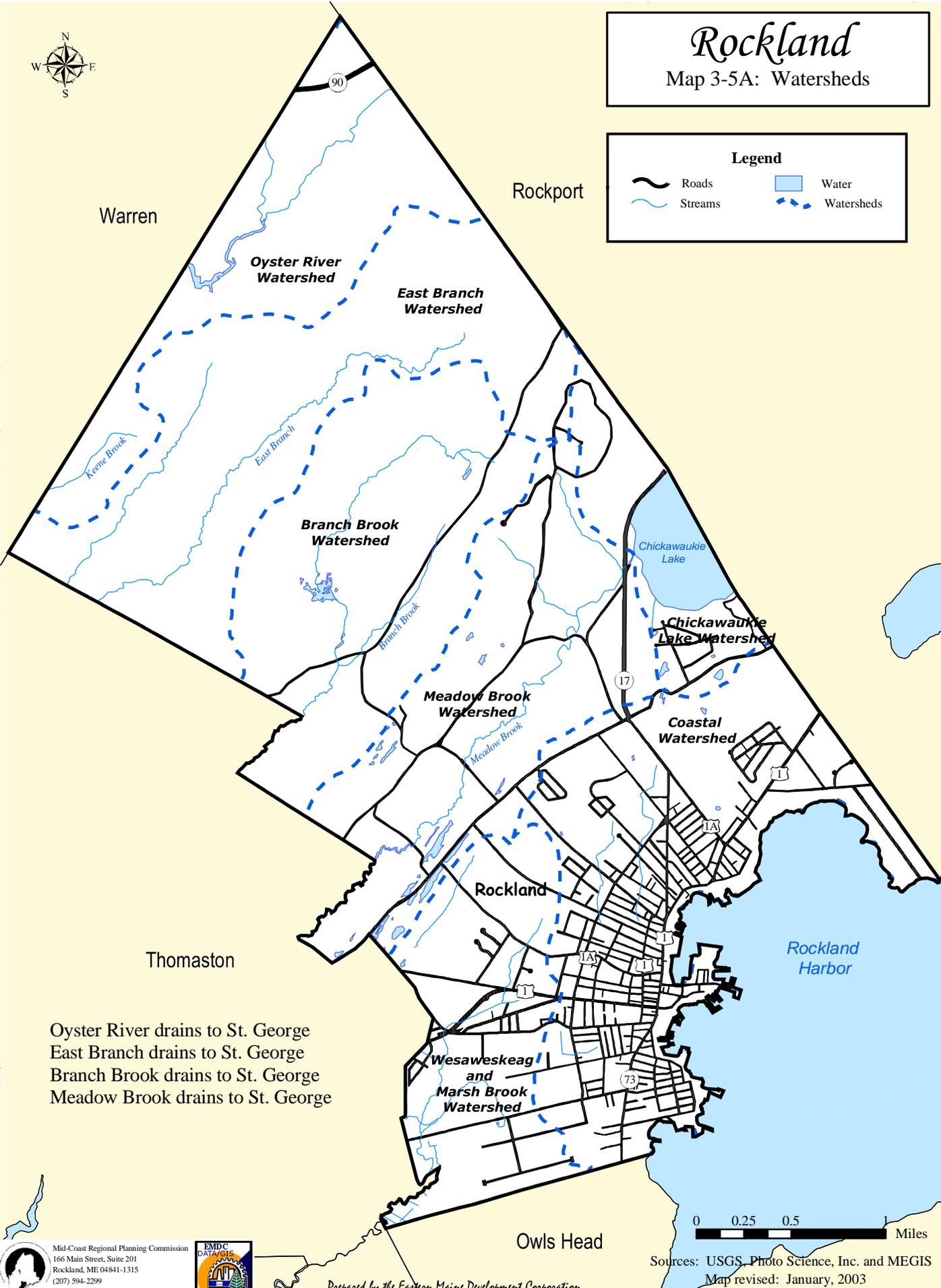


# Rockland

Map 3-5A: Watersheds

**Legend**

- Roads
- Streams
- Water
- Watersheds



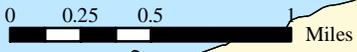
Oyster River drains to St. George  
 East Branch drains to St. George  
 Branch Brook drains to St. George  
 Meadow Brook drains to St. George



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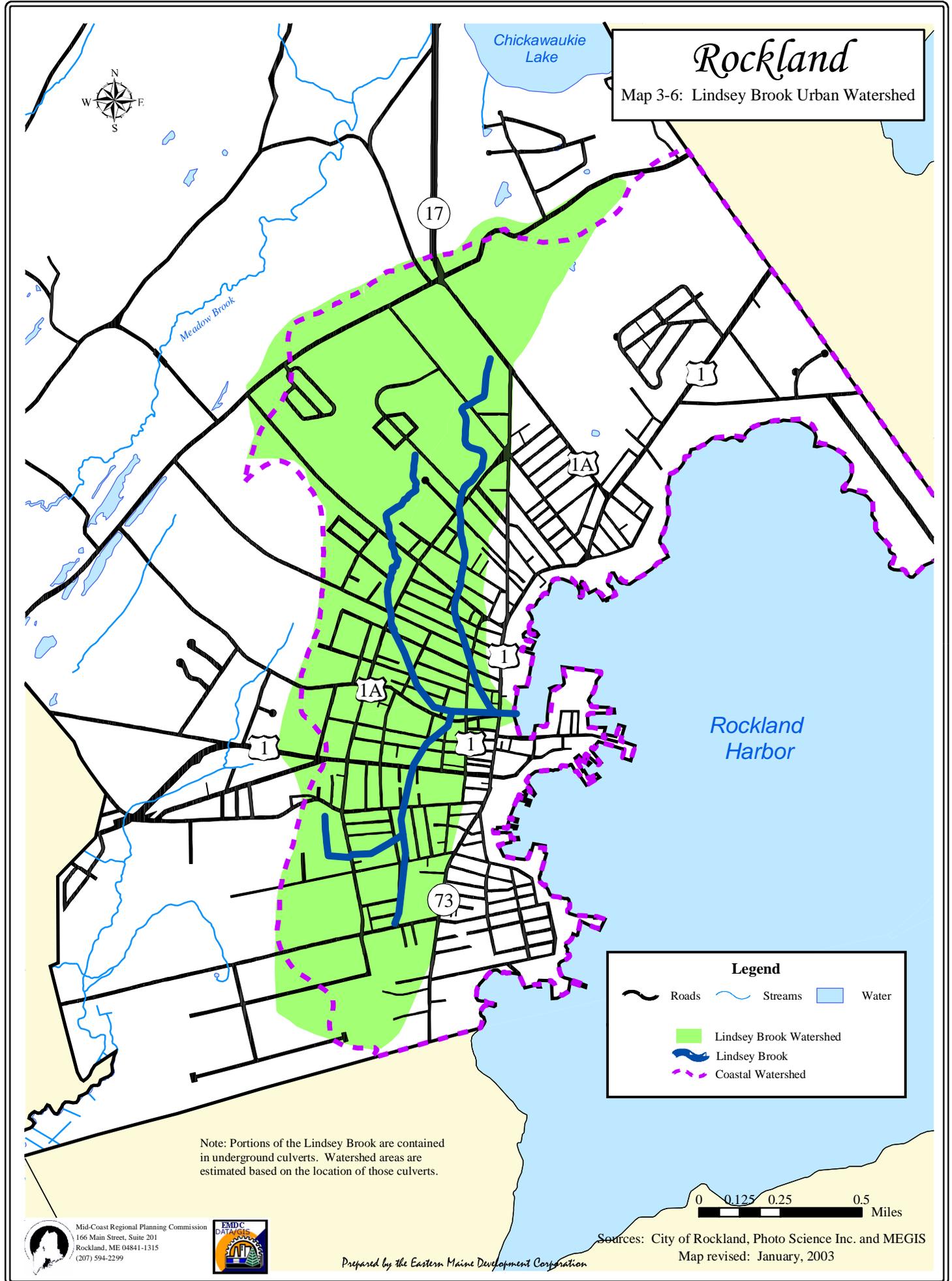
Prepared by the Eastern Maine Development Corporation



Sources: USGS, Photo Science, Inc. and MEGIS  
 Map revised: January, 2003

# Rockland

Map 3-6: Lindsey Brook Urban Watershed



Note: Portions of the Lindsey Brook are contained in underground culverts. Watershed areas are estimated based on the location of those culverts.



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Prepared by the Eastern Maine Development Corporation

Sources: City of Rockland, Photo Science Inc. and MEGIS  
Map revised: January, 2003

## Natural Resources

of their accessory uses. Flood problems in this watershed are generally due to undersized natural and stone lined channels.

Situated within the Lindsey Brook watershed is Waldo Avenue and the Samoset Road, which have been subject to landslides in 1973 and 1996 causing severe property damage. Development in this area has led to increased storm water runoff and erosion that contributes to landslides. It is anticipated that landslides will be a recurring event in that part of the City.

### **Wesaweskeag River Major Watershed**

The Wesaweskeag watershed contains a total of 11 square miles with portions located in Thomaston, South Thomaston, Rockland, and Owls Head. The headwaters of the river begin in Rockland as Marsh Brook and encompass the Marsh Brook Minor Watershed. The Rockland segment of the watershed contains some agricultural fields, the Maine Coast Railroad line, and extensive residential and commercial development. Agricultural runoff in Rockland's portion is insignificant. Several important roads bisect the watershed including Routes 1 and 73, and Thomaston Street.

The river itself has over ten tributaries. It contains many shellfish tidal flats, which until 1996 were closed to harvesting. The Wesaweskeag River is one of the seven coastal watersheds that have been identified as “most at risk from development” under the Site Location of Development Act Title 38 M.R.S.A, Section 480-D (effective July 1, 1997) and under the Department of Environmental Protection’s Storm water Management Rules (effective January 1, 1998). In rating these watersheds for risks, the DEP considered such factors as potential future growth and water quality degradation.

In 1996 and 1997, a survey of the watershed was conducted by the Department of Environment Protection and the State Planning Office (under the Coastal Zone Management Act) for the purposes of shellfish area management. The survey identified several nonpoint source pollution sites in Rockland along Thomaston Street, behind Pleasant Gardens, and off Upper Pleasant and Park Streets associated with ditching, siltation, runoff, collapsed culverts, and discarded debris and car parts. Recommendations for correcting these NPS problems include stream stabilization, bridge crossing and culvert repair, and removal of debris from wetlands.

Potential grant funding sources for planning and implementation include Section 319(h) of the Federal Clean Water Act for the abatement of nonpoint (NPS) sources of pollution, and the proceeds from the June, 1998 State bond issue to correct nonpoint source pollution problems in “watersheds most at risk from development.” The thrust of these programs is to plan and implement locally supported watershed management projects that will either reduce or eliminate NPS pollution to surface waters of the State. These programs are administered by the Watershed Management Division, Bureau of Land and Water Quality, Maine Department of Environmental Protection. They require a local match of up to 40 percent.

The Wesaweskeag River Watershed Survey Project Report, which identifies problem sites and corrective action for Rockland, is contained in the Natural Resources Appendix.

**Marsh Brook Minor Watershed:** Marsh Brook and its tributaries drain much of the land south of Talbot Avenue between Broadway and Old County Road entering the Wesaweskeag River in South Thomaston. It has a length of one mile and consists of a three square mile area. The watershed encompasses a large portion of the built up area and is comprised of residential areas, manufacturing plants and warehousing, institutions, and various commercial services. The majority of lots in the

## Natural Resources

watershed are small to medium size with some larger parcels. Flood problems in the Marsh Stream watershed include damage to single family residences, commercial property, roads and culverts.

The Rockland Industrial Park is located off of Thomaston Street in the southeast corner of the watershed, adjacent to the northwest corner of the Town of Owls Head. Marsh Brook and its adjacent wetland area have curtailed the park's westerly expansion within City limits.

### **The Saint George River Major Watershed**

This major watershed area covers all of the land area of the City west of Old County Road and Route 17 and north towards Route 90. It includes Meadow Brook, which drains Chickawaukie Lake, and joins Branch Brook, which drains the valley the Bog Road is located on, as well as a portion of the Bog, to form the Mill River in Thomaston. Mill River flows to the St. George River. Branches of the Oyster River and its primary tributary, the East Branch, drain the other portions of the Bog and flow to join the confluence with the St. George River just upstream from Route 1 at the Thomaston-Warren Town Line.

This is a low density area with scattered single family homes on medium to larger size lots, agricultural and farming uses, forest lands, wetlands, numerous small streams and brooks, and poorly drained soils. For these reasons, the area is a natural occurring open space, which acts as a physical barrier to any higher density development.

(A more detailed inventory of the resources of the Greater Bog area is contained below in the section entitled "The Greater Oyster River Bog or The Rockland Bog" which is a part of the Other Natural Resources subchapter; see page 3-24.)

### **Meadow Brook Minor Watershed**

Meadow Brook drains Chickawaukie Lake and the land between West Meadow Road and the Bog Road. This area is comprised mostly of older single-family homes situated on medium to larger size lots. Because of the very steep slopes, the brook, and its adjacent wetland areas, the amount of land available for residential development is limited.

**Chickawaukie Lake Minor Watershed Area:** Although most of Chickawaukie Lake and its accompanying watershed area are situated within the Town of Rockport, the portion within the City of Rockland is a valuable natural asset. Chickawaukie Lake is the only large body of fresh water within the boundaries of the City that provides nearby fishing, boating, swimming, and recreational activities. For these reasons, it is being given special study within the Comprehensive Plan.

Chickawaukie Lake is located in the east central part of the City and is bounded on the west by Rockland's portion of Route 17 and by Old County Road on the east. The watershed boundary line, starting at the 663-foot elevation point, follows the steep Dodge Mountain ridge line above the lake along the west side of Route 17, across the lake to the east side to the 262-foot elevation point near the Reservoir on Old County Road, forming the southern portion of the drainage basin.

The direct drainage area of the lake's watershed is 2,264 acres or 4.1 square miles. Approximately twenty percent, or 453 acres, of the drainage area is situated in the City of Rockland, with the remaining acreage in the Town of Rockport. The elevation of the pond is 123 feet with a surface area of 338.5 acres, a maximum depth of 33 feet, and a mean (or average) depth of 24 feet. The flushing rate<sup>9</sup> is 0.788

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<sup>9</sup> Number of times a lake's volume of water is exchanged in a year.

## Natural Resources

times annually; in other words, it is not quite fully flushed or cleaned out each year. There are 13 tributaries from the entire watershed flowing into the lake, four of which are situated in Rockland.

The land uses in the Rockland area of the watershed consist of a golf course, swimming and boating recreational facility, single-family homes on some fairly steep slopes, and the Lake View Subdivision. Land use activities and practices are controlled by the Chickawaukie Watershed Regulations contained in Chapter 19 of the City of Rockland Code, zoning and planning. The overlay zone provides for the submission of an erosion and sediment control plan for activities in excess of 50 square feet. This is intended to control nutrient phosphorus runoff. The shoreland area of the lake, within 250 feet of the high water line, is in the Limited Residential District of the Shoreland Zoning Ordinance. The Shoreland Zoning Ordinance was partially imposed upon the City by the Board of Environmental Protection on May 11, 1994. Partially imposed means the BEP has adopted certain shoreland provisions, which the City did not adopt. The imposed ordinance will be lifted when the City adopts a shoreland zoning ordinance consistent with the *State of Maine Guidelines for Municipal Shoreland Zoning Ordinances*, August 7, 1994, as amended.

Because the overlay zone was enacted in 1987, it needs to be brought up to date. For example, the Environmental Quality Handbook needs to be replaced with current Best Management Practices (BMPs)<sup>10</sup>. Also, any revisions to the watershed zone should reflect the provisions of the new Town of Rockport Chickawaukie Overlay District, which was adopted in June 1997. As a result, the regulations would be consistent for the shared watershed.

Chickawaukie Lake is a secondary water source for Consumers Water Company, which serves the City of Rockland, and as previously indicated, an important recreational area. As such, its water quality has always been of significant concern to the City. The nonpoint sources (NPS) of pollution from the land uses in the watershed were causing the lake to become cloudy or green with culturally-induced algal blooms, worsening turbidity, and summer oxygen depletion at the lower depths of the lake.

In 1991, a special committee consisting of the Chickawaukie Lake Association and officials from Rockland and Rockport was formed for the purpose of improving Chickawaukie's lake quality. With the help of the Department of Environmental Protection and matching grants, a four-step program was developed involving the following:

- (1) A survey of the watershed to identify all nonpoint sources of phosphorous and nutrient loading;
- (2) The preparation of an interim policy on phosphorus export standards to be approved by Rockland and Rockport;
- (3) Alum treatment of the lake bottom; and
- (4) Assistance to landowners in order to help correct faulty septic systems.

In June of 1992, 248 acres of bottom sediment below 12-15 feet was treated with an application of aluminum sulfate and sodium aluminate by underwater sprayer. The aluminum sulfate blocks the release of phosphorous from lake bottom sediment.

In conjunction with the alum application, the project also focused upon NPS remediation of identified pollutant sources. These efforts in Rockland included the re-ditching, installation of culverts

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<sup>10</sup> BMPs are practical methods or measures that when installed or performed are best suited for preventing, reducing or correcting nonpoint sources of surface or ground water contamination.

and paving of 2,100 feet of Barter Road, and ditching and culvert work by the Maine Department of Transportation on Old County Road.

The Department of Environmental Protection (DEP) has developed a systematic method that towns can use to assess the impact of a proposed development on their lakes water quality. This method is called the Phosphorus Control Method and is designed for lake watersheds only. By performing the calculations in the method for lake watersheds, towns can determine the acceptable level of phosphorus that each of their lakes can handle before a noticeable change in water quality occurs. Municipalities can then set a water quality standard for increased phosphorus from new development for each individual lake. The figures used in the method have been calculated by the DEP. This goal is expressed as *the allowable increase of phosphorus export per acre (per acre phosphorus allocation)*.

In order to control the amount of phosphorous export from future subdivisions within the watershed, the City of Rockland was requested to adopt an interim phosphorus control policy, which it has not yet done. The Town of Rockport enacted the policy in April of 1992. For the City of Rockland, the phosphorous coefficient (F), which is the annual amount of phosphorous export from the watershed that will produce a 1 part per billion (ppb) increase in the lake's phosphorous concentration, is 5.02 lbs/ppb/year.

The DEP establishes water quality classifications for all of Maine's water bodies whereas the municipalities determine the level of protection. Chickawaukie Lake is classified as poor/restorable, which means that the Lake supports obnoxious algae bloom with a minimum secchi disk transparency, or water clarity, of 6.6 feet or less. Lakes in this category are candidates for restoration. Land use practices in the watershed should be treated very conservatively because any additional phosphorus loading will reduce the feasibility of restoration efforts. Rockland has determined that an acceptable increase in lake phosphorous concentration (C) is 0.05 ppb.

The formula for determining the Per-Acre Phosphorus Allocation (P), which is the acceptable increase of phosphorus export per acre in the Chickawaukie Lake watershed, is derived from the F coefficient and the Phosphorus Concentration (C) figures in the previous paragraphs along with the Future Area to be Developed (D). The Future Area to be Developed is the estimate of the acreage in the City's share of the watershed that will be developed during the planning period of 50 years. The City must determine its Future Area to be Developed for its share of the Chickawaukie Watershed.<sup>11</sup> The formula is found in the manual entitled *Phosphorus Control in Lake Watersheds-A Technical Guide to Evaluation New Development* published by the Maine Department of Environmental Protection, September 1992 or as updated. The determination of the Per Acre Phosphorus Allocation (P) is part of the phosphorus control policy that the City is supposed to adopt.

To make the formula easier to understand, Table 3-2 gives each figure for Chickawaukie Lake.

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<sup>11</sup> There are two ways of calculating the Future Area to be Developed:

- (1) The short method is less accurate and uses a topographical map to delineate areas in the watershed that are non-developable such as existing structures, roads, cemeteries, wetlands, and steep slopes (over 25%). By multiplying the remaining areas within the watershed, which can be developed by a coefficient factor (found in the Phosphorus Control Manual), the Future Area to be Developed can be arrived at.
- (2) The longer method is more accurate and projects the future by looking at the actual building in the watershed over the last 10 years or so. This method is detailed in the DEP/Androscoggin Valley Council of Government publications entitled "Comprehensive Planning for Lake Protection," July 1990.

**Table 3-2  
Per Acre Phosphorus Allocation for Developments in Chickawaukie Watershed**

| LAKE                 | TOWN     | DD<br>A | ANA<br>D | AAD | GF   | D  | F    | WQC               | LOP | C    | P    |
|----------------------|----------|---------|----------|-----|------|----|------|-------------------|-----|------|------|
| Chickawaukie<br>Lake | Rockland | 333     | 66       | 267 | 0.35 | 93 | 5.02 | mod-<br>sensitive | h   | 0.75 | 0.04 |

- DDA Direct land drainage area in Township in acres
- ANAD Area not available for development in acres
- AAD Area available for development in acres (DDA - ANAD)
- GF Growth Factor
- D Area likely to be developed in acres (GF x AAD)
- F lbs. phosphorus allocated to towns share of watershed per ppb in lake
- WQC Water quality category
- LOP Level of Protection (h=high(coldwater fishery);m=medium)
- C Acceptable increase in lake's phosphorus concentration in ppb
- P lbs. per acre phosphorus allocation (FC/D)

The algae productivity of many lakes can be determined by calculating their Trophic State Index (TSI). The average TSI for monitored Maine lakes is 48 (moderate algal growth) out of possible 100+. Chickawaukie Lake has a TSI that indicates a high algal production due to the restoration project. The lake does not support persistent algal blooms but a slight increase in phosphorus might trigger a return to bloom conditions. Chickawaukie Lake has been treated with alum and some nonpoint pollution sources have been remedied in order to reduce algal productivity and algal blooms. These measures have succeeded in lowering the trophic state of the lake to an acceptable condition and reducing many of the high priority nonpoint sources of phosphorus to the lake and thereby greatly improving water quality. It is not known how long the alum treatment will remain effective, as some similar projects have had a shorter life span than the ten-year design.

**Watershed Issues and Implications**

- (1) The smaller urban watersheds of Lindsey, Marsh, and Meadow Brooks function to relieve excessive flooding in the built up areas. Does the City feel they are adequate to perform this function? Are the channels wide, deep, aligned or lined enough to handle the additional amounts of flow? Are the culverts and bridges adequately sized to handle floods? Does a public works project need to be undertaken to improve them? Are sufficient floodplain regulatory measures in place to minimize flooding such as flood-proofing requirements for buildings to keep water out?
- (2) The nonpoint source pollution from the urban watersheds can pollute the harbor, close beaches and is a source of sediment contributing to the need for expensive dredging. What can the City do to reduce nonpoint source pollution? Should the City consider adopting more current Best Management Practices for sediment control in its smaller watersheds?
- (3) The present provisions of the Chickawaukie Watershed Zone are not current and need to be updated to conform to the latest best management practices for controlling phosphorus and nutrient runoff. In doing so, any such changes should be consistent with the Town of Rockport Chickawaukie Overlay District. Does the City wish to wait until the entire Zoning Ordinance is

## Natural Resources

revised before making any changes to the zone? Or, because of the critical condition of the lake, does the City wish to take action sooner?

- (4). Nonpoint source pollution from the land use activities and practices in the Chickawaukie Watershed will most likely continue to contribute sediment and phosphorus and nutrient loading of the lake causing oxygen depletion and algal growth leading to generally poor water quality. The amount of sediment and phosphorus runoff can be reduced through the adoption of best land use management practices for erosion and sediment control during construction. Does the City wish to adopt the Phosphorus Control Method and Erosion and Sediment Control Standards addressing nonpoint source (NPS) from new sources?
- (5) New sources of nonpoint pollution can be controlled through BMPs but what about NPS from existing sources? Would the City consider encouraging the lake association to conduct a watershed survey? In a watershed survey, volunteers are trained to identify existing and potential erosion problems within a watershed and then develop a plan to address those problems over time. Does the City want to continue the program started by the Department of Environmental Protection to control existing nonpoint source pollution through structural measures<sup>12</sup>?
- (6) The City of Rockland has not adopted an interim phosphorus policy for future subdivision developments in the Chickawaukie watershed as part of its commitment to the DEP fund the alum treatment and the nonpoint source remediation projects. When does the City intend to adopt this policy? Will the policy be included in the Zoning, Subdivision, and Site Plan Ordinances?
- (7) Although the water quality of Chickawaukie has improved, it is still classified as poor by the DEP. This is because the current acceptable water quality can easily be disrupted. Since the DEP is unsure as to how long the alum treatment will remain effective, water quality monitoring needs to be an on-going event. Should the City undertake this expense and task or rely upon the lake association and trained volunteers?
- (8) Despite the fact that Chickawaukie is unlikely to be used as an alternative drinking water supply in the near future (due in part to provisions of the Safe Drinking Water Act), should protection of this water supply remain a commitment of Consumers Water Co., Chickawaukie Lake Association, and the communities of Rockland and Rockport? Is there a need to keep this coalition active as an advocacy group for the lake? What should the City's role be?

## WETLANDS

Wetlands are an integral part of Maine's natural resources. These areas provide habitat for certain types of wildlife and vegetation, including rare and endangered species. They are used for timber harvesting; hunting; education and research; bird, wildlife, and plant observation; they function as passive open space; and offer some recreational opportunities. All of these functions boost tourism and the general economy. Wetlands also provide flood control, bank and shoreline erosion control, sediment retention, groundwater replenishment, and phosphorous and nutrient removal.

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<sup>12</sup> Flood control measures such as dams, dikes, floodwalls, channel alterations, and diversion channels which are designed to keep water away from specific developments and/or populated areas, or to reduce flooding in such areas.



# Rockland

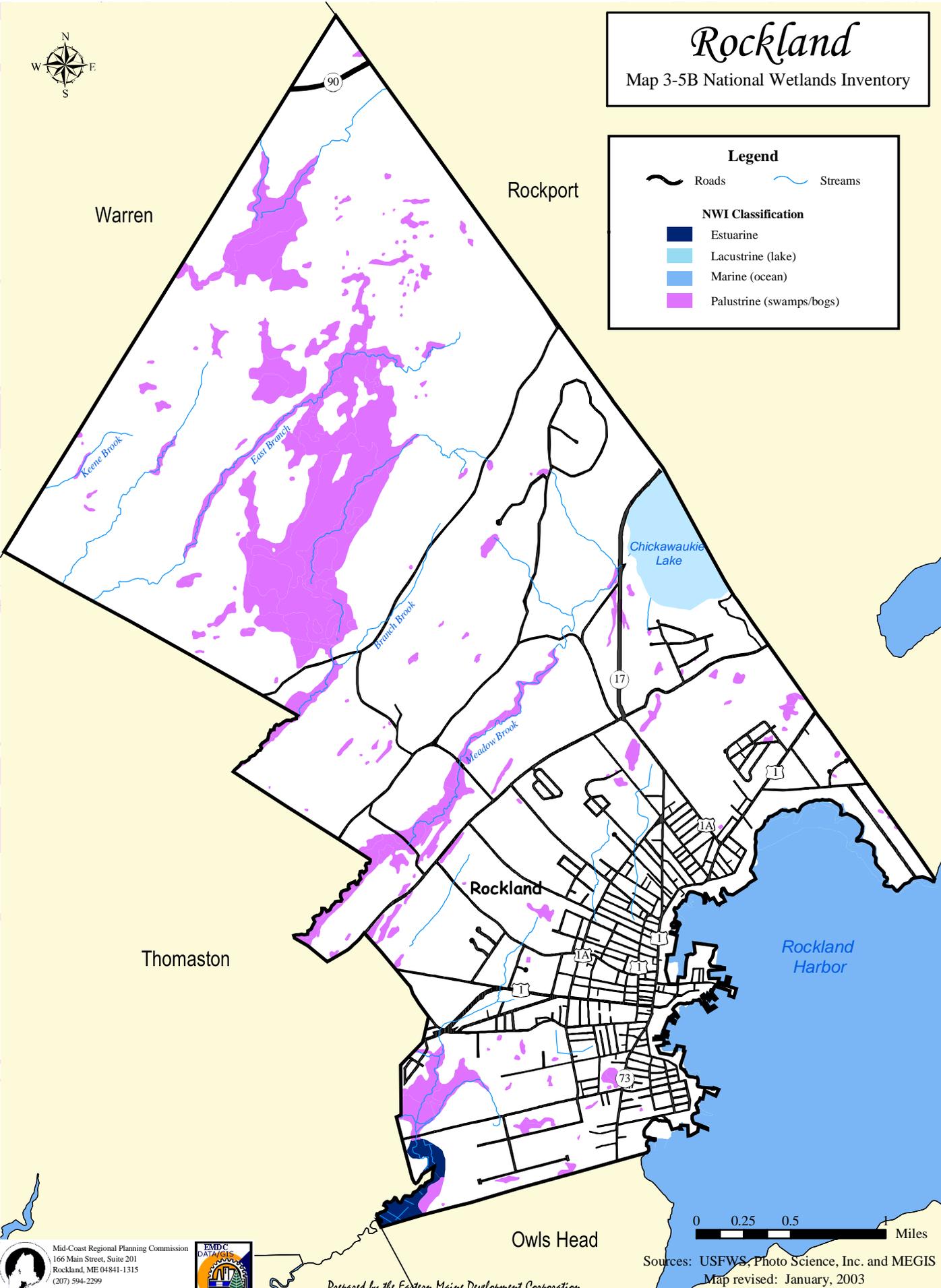
Map 3-5B National Wetlands Inventory

**Legend**

~ Roads      ~ Streams

**NWI Classification**

- Estuarine
- Lacustrine (lake)
- Marine (ocean)
- Palustrine (swamps/bogs)



Mid-Coast Regional Planning Commission  
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Rockland, ME 04841-1315  
(207) 594-2299



Prepared by the Eastern Maine Development Corporation

0 0.25 0.5 Miles  
Sources: USFWS, Photo Science, Inc. and MEGIS  
Map revised: January, 2003

**Natural Resources**

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface and often covered by shallow water. They must have at least one or more of the following attributes in order to be classified as a wetland:

- (1) Periodically support wetland vegetation,
- (2) Contains hydric or waterlogged soils, and
- (3) Water is at or near the surface during the growing season of each year.

The boundaries of Rockland’s wetlands are found on Map 3-5B, National Wetlands Inventory of the Natural Resources Inventory map series. These boundaries were identified by the National Wetlands Inventory, U.S. Fish and Wildlife, 1990 and show wetlands of 1 to 3 acres or larger. Aerial photos, soils mapping, and other wetland inventories along with some field checking were used to identify wetlands. The greatest concentration of wetlands is located west of the Bog Road in the vicinity of the Rockland Bog (340 acres). Other locations include an area adjacent to Meadow Brook (125 acres) west of Old County Road and an area adjacent to Marsh Stream (100 acres) in the southeast corner of the City near the Rockland Industrial Park. Because they are wetlands, it is difficult or prohibitive to fill, excavate or place structures in them. This has been the primary impetus for the City to cooperate with the Town of Owls Head to study expanding the Industrial Park into Owls Head.

Marine or intertidal wetlands are found along Rockland Harbor and consist of unconsolidated, aquatic bed (marine and estuarine wetlands) and bedrock material. Tidal wetlands are exposed to waves and currents. The north shoreline of the harbor, along Waldo Avenue and the Samoset Road, is composed of unconsolidated material, such as mud, marine clay, and subject to regular tidal flooding. These conditions have contributed to the landslide or slumping problem in the area.

Table 3-3 shows the characteristics of various important wetlands in Rockland, as well as their value as a wildlife habitat as rated by the Department of Inland Fisheries and Wildlife.

**Table 3-3  
Summary of Wetlands Information**

| <b>Wetland Number</b> | <b>Maine IFW Wetland Type</b>    | <b>Location</b> | <b>IFW Rating</b> |
|-----------------------|----------------------------------|-----------------|-------------------|
| 5                     | Freshwater forested scrub swamp  | Branch Brook    | Not Rated         |
| 6                     | Freshwater forested scrub swamp  | Meadow Brook    | Not Rated         |
| 8                     | Intertidal estuarine scrub swamp | Marsh Brook     | Not Rated         |
| 209                   | Freshwater wooded swamp scrub    | East Branch     | Not Rated         |
| 210                   | Freshwater scrub swamp           | The Bog         | Not Rated         |
| 211                   | Freshwater forested              | The Bog         | Not Rated         |
| 212                   | Freshwater forested shrub swamp  | The Bog         | Not Rated         |

Wetlands within the City are protected as a Resource Protection District under the Shoreland Zoning Ordinance, the floodplain management regulations, and the Woodland and Wildlife Zone “G” Regulations of Chapter 19 of the City of Rockland Code (zoning and planning). Wildlife Zone “G” encompasses the area of the City west of the Bog Road, including the Greater Bog and extends to the commercial area along Route 90 at the northern triangular corner of the City. Wildlife Zone “G” also includes part of the Marsh Brook watershed south of Route 1. The general intent of Zone “G” is to preserve sensitive undeveloped open lands in their wild and natural state. Freshwater and coastal

## Natural Resources

wetlands are also protected by the State of Maine Natural Resources Act, administered by the Department of Environmental Protection, and by Section 404 of the 1972 Clean Water Act and amendments, administered by the U. S. Army Corps of Engineers.

### Wetlands Issues and Implications:

- (1) Wetlands perform a valuable function for the City. Are they adequately protected by existing regulations and land use policies or do they need to be improved upon? Is the partially imposed Department of Environmental Protection Mandatory Shoreland Zoning Ordinance sufficient to protect Rockland's wetlands? Does the City need to correct its deficiencies and adopt its own Shoreland Zoning Map and Ordinance?
- (3) Although important, the wetland areas do severely constrain the direction and intensity of development within the City. Because of the wetland issues, the City has a present land use policy that allows only low-density construction to take place west of the Bog Road and restricts further expansion of the Industrial Park in Rockland. Does the City wish to continue using this policy? If so, the City must meet the challenge of finding other locations and exploring other options for development, such as the redevelopment of existing older industrial sites, buildings and recycling "brownfield" sites,<sup>13</sup> and extending the existing Industrial Park into Owls Head.

## ESTUARIES

Estuaries are bodies of water along the coast that are formed when fresh water from rivers flows into and mixes with salt water from the ocean. In estuaries, the fresh river water is blocked from streaming into the open ocean by surrounding mainland, peninsulas, barrier islands, or fringing salt marshes. This mixing of fresh and salt water creates a unique environment that brims with life of all kinds. Estuaries along the Maine Coast are productive waters that provide valuable habitat for shellfish and an abundance of marine life. Sheltered harbors in estuaries have long been preferred site for towns and industrial development.<sup>14</sup>

The predominant estuaries in the midcoast are inventoried and mapped in the *Estuary Profile Series*, Maine Coastal Program, Maine State Planning Office, February 1991. The City of Rockland is not shown as part of a major estuarine system.

## AQUIFERS

Aquifers are geologic deposits and bedrock containing large quantities of groundwater<sup>15</sup>. Geologic processes have changed the bedrock from a solid rock mass into a network of fractures, joints, faults and bands of rock composition or rock fabric. This kind of geologic activity provides voids in bedrock for storing and transporting ground water. Water reaches bedrock from precipitation on the ground surface

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<sup>13</sup> "Brownfield" is the term used to refer to older abandoned industrial sites or buildings that contain environmental pollutants and, if cleaned up, can be used once again.

<sup>14</sup> Broadly defined, an estuary is a semi-enclosed embayment receiving freshwater run-off and having an open connection to the sea.

<sup>15</sup> Ground water is that portion of rain and snow melt that has seeped into the ground rather than running over the ground to become surface water or to evaporate

## Natural Resources

in the form of rain or snow melts seeping through the soil to the bedrock below. It is the source that supplies water for wells. Highly productive bedrock aquifers are rare. Sand and gravel aquifers are more productive but because of the geologic formation and the fairly thin soil cover in Rockland there are no major or significant sand and gravel aquifers. A majority of the homes and businesses in the City are on public water and only a small percentage is supplied by private bedrock wells.

The Department of Conservation (DOC) maintains well depth and yield information on Rockland wells provided to it by drillers. Well depths range from less than 100 feet to more than 300 feet with most depths between 100 feet and 200 feet. Well water yields vary from 2 gallons per minute (gpm) to 30 gpm. Most yields are in the vicinity of 3 to 10 gpm. Such yields are adequate for residential use and perhaps for some types of low intensity commercial uses. However, such well yields would be insufficient as a public water supply source. Also, testing by the Consumers Maine Water Company has shown well water to contain iron and magnesium. Iron causes the rusty color in water. It is not harmful for drinking but it can stain clothing.

Knowing the overburden thickness (depth to bedrock) is helpful to well drillers because it is used by the driller to determine the length of the casing needed to seal the well from the direct infiltration of surface water. Information provided by well drillers' shows that estimated overburden thickness in Rockland usually ranges from less than 10 feet to 24 feet.

The water resources map shows only those wells that the DOC has located through a visit to the City offices to match well ownership information with property tax records. This is a total of 7 wells out of 38 wells listed by the DOC for Rockland (see Appendix for Bedrock Well Information). The majority of these 47 well locations are west of Old County Road in areas not served by the Consumers Maine Water Company. Most wells are 100 feet or more in depth, with two wells on Dodges Mountain exceeding 400-foot depth. Most reported yields were 10 gpm or less.

### Well Water Issues and Implications

- (1) Public water service does not extend west of Lakeview Drive (Route 17) and Old County Road. Any development west of Old County Road will either require extension of water mains, as was done on Sherers Lane in the summer of 1999, or must rely upon bedrock aquifers for their water supply. Are the present codes adequate to protect this resource from damage? How will the need to drill fairly deep wells into the bedrock affect future development in the area? Should these limitations be reflected in determining minimum lot size requirements for those lots that are on private wells? Should they be placed in another zone such as Rural Residential-1, which allows dwellings on 20,000 square feet or on one-acre (43,560 sq. ft.) lots depending on the availability of sewers? Should the City extend public sewer and water to encourage development?

## FLOODPLAINS

The National Flood Insurance Program is administered by the Federal Emergency Management Agency (FEMA). The program has been designed to enable landowners to purchase flood insurance for property and to discourage additional development within the 100-year floodplain.<sup>16</sup> The City of Rockland entered the regular National Flood Insurance Program (NFIP) on January 5, 1989.

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<sup>16</sup> A 100-year flood is a flood that has one chance in 100 of being equaled or exceeded in any one year period

## Natural Resources

The coastal areas of Rockland are vulnerable to tidal flooding from major storms such as hurricanes and “nor’easters” (which are the most frequent type of storm in the area). Nor’easters can occur at any time of the year but are more prevalent in the winter months. Hurricanes, which are rarely experienced, occur in the late summer and early fall months.

Rockland does not have major inland or coastal flooding problems. Up to the present, development in Rockland has been mostly above tide levels. The principal objects subject to damage by severe storms include boats, marinas, and shoreland structures. However, the major concern for the City is the coastal shoreline erosion in the residential neighborhood west of the north end of the Rockland Harbor breakwater in the vicinity of Waldo Avenue and Jameson Point, and will continue to be a problem.

The major floodplain areas within the City are situated along Rockland Harbor as well as in the low-lying areas west of Bog Road, including the Greater Bog and its various streams. The harbor is primarily a commercial and industrial area comprised of piers, wharves and marine related boat yards, marinas, terminal, and some non-marine related industrial uses such as FMC.

Floodplains are best suited for uses such as open space, recreational uses not requiring major structures, and wildlife habitat such as the Greater Bog area. When construction does take place in a floodplain, the activity must meet the requirements of the City of Rockland Floodplain Management Ordinance, which was adopted on January 5, 1989. The adoption of a floodplain management ordinance is required for acceptance in the NFIP.

Since the adoption of the ordinance in 1989, numerous changes and updates have been made to the flood insurance program. These have been incorporated in the latest version of the Model Floodplain Management Ordinance prepared by the State Planning Office. Rockland adopted a current Floodplain Management Ordinance effective September 9, 1999.

### **Flood Issues and Implications**

- (1) Coastal storms can cause erosion inside the Breakwater along the north shore of the harbor resulting in heavy property damage. Are adequate floodplain regulatory controls in place? Are property owners eligible for flood insurance? If so, have they purchased it? Will they need assistance with purchasing flood insurance?
- (2). The present Floodplain Management Ordinance incorporates recent changes in the NFIP. Periodic revisions are likely to be needed in the future.

## **AGRICULTURE and FORESTRY**

### **State Goal**

To safeguard the State’s agricultural and forest resources from development which threatens these resources.

### **State Purpose**

In order to ensure the protection of agricultural and forest resources, each municipality shall discourage new development that is incompatible with uses related to the agricultural and forest industries.

## Introduction

The agricultural and forestry resources of Rockland were an important part in the early growth of the community. Dairy farms and blueberry harvesting were important sources of cash for the region. Within the Rockland Bog there were a number of lumber mills that produced timbers for wooden ships, barrels for the lime industry and blueberry crates. However, with increasing manufacturing and industrial development in the nineteenth and twentieth centuries, farming and forestry activities became less important to the economy of the City. Today, there few if any full time working farms and commercial timber harvesting operations, mostly for pulpwood and firewood, are limited to the Bog area.

The 1990 Census grouped agriculture, forestry and fisheries jobs and industries together<sup>17</sup>, so it is difficult to determine how many people in Rockland were employed in just agriculture and forestry. In 2000, 104 persons in the labor force listed their occupation as farming, fishing, or forestry.

## Inventory and Analysis

The purpose of this analysis is to identify the location of prime agricultural and forestry lands, inventory commercial forestry and agricultural land, and to determine the impact of agriculture and forestry upon the present economy, if any.

## Prime Agricultural and Forestry Lands

A substantial part of Rockland's land is classified as prime farmland soils by the Natural Resources Conservation Service. Farmland soils are best suited for producing food, feed, forage, and fiber crops. Such soils have the quality, growing season, and the moisture necessary to produce the highest crop yields using the least energy and economic resources. This partially explains the importance of farming in Rockland's early economy.

Most of the prime farmland lies east of West Meadow Road and southeast of Chickawaukie Lake, including much of the area west of North Main and Main Streets to the Owls Head town line. Much of this land has been developed and has not been used for farming for a long time. The predominant land uses are residential and commercial. Some large tracts of open land remain west of Broadway and on both sides of Old County Road, but they are gradually being developed. Smaller amounts of prime farmland are found close to the Bog Road west of the Benner Hill and Dodge Mountain ridge line as well as in the Rockland Bog. Within the City, there are few, if any commercial farm operations.

Prime forestland is that which has soils capable of growing wood at the economic productive growth rate for a given tree species. Soils with a rating of medium, high, or very high are considered prime forestland soils. In summary, these are the most productive forests. Nearly all of the land area within the City contains prime forestland soils. The section between the harbor and nearly to West Meadow Road has been cut over for development. Most of the remaining forest is located west of West Meadow Road and Route 17 extending towards Route 90. However, because most of this area contains rock outcrops and silty loam soil types, woodland productivity is medium. Due to the presence of these soils, Rockland does not have a significant amount of highly productive forests. Most prime forestlands are situated in the Woodland and Wildlife Zone "G" which allows commercial tree harvesting activities.

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<sup>17</sup> A total of 116 persons were employed in these industries according to the 1990 U.S. Census; 86 of them were Rockland residents.

## Natural Resources

Presently there is only one commercial timber harvesting operation being conducted. This operation is taking place on land in the south central part of the Rockland Bog near the Rockland-Thomaston Line.

### **Tree Growth Tax**

The commercial use of forestlands, as well as the preservation of open space, has been encouraged by the *Maine Tree Growth Law*, Title 36 M.R.S.A., Sections 571-584A. This law allows for the different valuation of land that has been classified as forestland, on the basis of productivity value per acre, rather than on fair market value. Fair market value is the highest and best use of land. This is the method by which most other real estate is valued. To qualify, parcels of land must be at least 10 acres in size. Each year the State Assessor determines the 100% valuation per acre for each forest type (soft, hardwood, and mixed) by county or by region. The results are used by the local assessor to determine the property taxes for forestland placed under the Tree Growth Law. The State provides reimbursement to communities for the loss of tax revenues resulting from the Tree Growth Law.

Within the City, 26 lots, totaling 644 acres, have been placed under Tree Growth. The total includes the following: 16 acres of softwood, 344 acres of hardwood, and 284 acres of mixed. The majority of these parcels are located west of the Bog Road towards Route 90 and including, the Rockland Bog.

### **Farm and Open Space Tax Law**

Not only does State tax policy encourage commercial forest activities, but it also acts to help the preservation of farms and open space through the *Farm and Open Space Tax Law*, Title 36 M.R.S.A., Sections 1101-1121. Under this law, property taxes are based upon the current use of farmland and open space and not upon fair market value or its potential for commercial and residential development.

Within the City of Rockland, there are three parcels totaling 88 acres in open space. These lots are located off West Meadow Road, the Bog Road and in the Bog.

### **Issues and Implications**

- (1) Even though commercial farming and forestry within the City are not as important to the economy today, they are valuable as local sources of food and firewood. Does the City wish to encourage more commercial farming? Because of the large amount of prime forestlands situated in the Rockland Bog area, does the City wish to encourage more commercial forestry activities? If so, what policies need to be adopted by the City?

## **OTHER SIGNIFICANT OR CRITICAL NATURAL RESOURCES**

(Unique Natural Areas, Scenic Vistas)

### **State Goal:**

To protect the State's other critical natural resources, including without limitation, wetlands and fisheries habitat, sand dunes, shorelands, scenic vistas, and unique natural areas.

### **State Coastal Management Policy**

Protect and manage critical habitat and natural areas of state and national significance and maintain the scenic beauty and character of the coast even in areas where development occurs.

**Introduction**

The other natural resources and scenic vistas characteristic of Rockland have influenced the direction and the density in which the City has grown, and will continue to do so in the future.

**UNIQUE NATURAL AREAS**

**Significant Plant Habitats**

The Natural Areas Program of the Department of Conservation maintains a database with information about rare and endangered plants and natural communities throughout the State, as well as the Register of Critical Areas. The data files were checked regarding rare vascular plants, and rare or exemplary natural communities in Rockland. Table 3-4 provides information on rare and endangered plants found in the City.

**Table 3-4 Rare Plants and Natural Communities Documented From Rockland**

| SCIENTIFIC NAME            | COMMON NAME       | STATUS  | HABITAT   |
|----------------------------|-------------------|---|---|
| <i>Botrychium lunaria</i>  | Moonwort          | Critically imperiled in Maine because of extreme rarity or because some aspect of its biology makes it especially vulnerable to extirpation from Maine. | Open turf, gravel, or ledged slopes, shores and meadows, chiefly calcereous |
| <i>Carex atherodes</i>     | Amned Sedge       | Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).  | Calcereous meadows, swales, and shores.                                     |
| <i>Woodwardia areolate</i> | Netted Chain-Fern | Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).  | Acid peat, boggy woods, swamps.   |

**Essential Habitat for Species Designated as Endangered or Threatened**

The Maine Department of Inland Fisheries and Wildlife has identified and mapped areas currently or historically providing physical or biological features essential to the conservation of an endangered or threatened species requiring special management considerations for protection, in accordance with the provisions of Title 12 M.R.S.A., Section 7754 (2,3) and 7755-A (1,2,3). These habitat areas are depicted on the maps contained in the *Atlas of Essential Wildlife Habitats for Maine’s Endangered and Threatened Species*, MDIF&W, 1995 Edition. A review of the maps showed that no habitats essential to endangered or threatened species are located within Rockland. The MDIF&W lists as “significant” wildlife habitats: a deer wintering area near the Oyster River; various waterfowl and wading bird habitats in the Rockland Bog, Meadow Brook and the Wesaweskeag Marsh; and Rockland Harbor as a Coastal Wildlife Concentration Area.

**Significant Marine Wildlife Habitats**

Although there are no threatened species within Rockland, the harbor does contain significant marine wildlife activity. These are listed in the *Penobscot Bay Conservation Plan*, Maine State Planning Office, March 1987 and were identified through a combination of aerial and ground surveys. The marine wildlife include black ducks, cormorants, eiders, goldeneye/bufflehead, harbor seals, mallards, gulls, Canada geese, Great Blue Herons, loons, and shorebirds.

## THE GREATER OYSTER RIVER BOG or THE ROCKLAND BOG

### Introduction

After the harbor and the ocean view, Rockland's greatest natural treasure is the portion of the Great Oyster River Bog<sup>19</sup> situated within the City of Rockland. The Greater Bog Area ecosystem (See *Map 3-7 Greater Oyster River Bog*) encompasses about 6,000 acres or about 9.0 square miles involving parts of Rockland, Rockport, Thomaston and Warren. Approximately 5 square miles (3,339 acres), or roughly two-thirds, lies within the boundaries of the City of Rockland. It is bounded on the north by Route 90, on the west by the main branch of the Oyster River, on the south by the Thomaston town line and on the east by the Bog Road. The actual botanical Bog is a peat bog with deposits ranging from 10 feet to 20 feet in depth. All of its 600 acres are within the City of Rockland. It is located west of the Bog Road. Because the Greater Bog area provides for open space protection, offers low impact recreational opportunities, and encompasses an estimated 40% of the City's land area, it merits special consideration in the Comprehensive Plan.

### Bog Origins

The Greater Bog area originated from the last Ice Age about 10,000 years ago. In the area between Dodge Mountain and Meadow Mountain, glacial action carved a shallow depression or basin out of the bedrock. When the ice retreated northward, leaving a surface deposit of glacial till, the sea advanced into the shallow depression depositing marine clay. This "clam-flat muck" constitutes the floor of the present bog. When the landform rebounded, the land surface rose above the sea and isolated the depression from the coast. Eventually, the depression became a freshwater pond or lake. However, because it was shallow and had little or no drainage, the lake became stagnant or dead (eutrophic). Gradually over the ages, decaying plant life accumulated from which humus and soil built up in the basin to form the present wet or hydric soils in the area.

### Characteristics of the Greater Bog

Upland forest, wetlands, and abandoned agricultural fields make up the Bog area. Most of the land is gently sloping, but the wetlands are flat and the ridges to the north and to the east are steeper than the remainder of the area. A true botanical bog is defined as the vegetation type found in poorly drained depressions underlain by considerable deposits of peat and characterized by a distinctive evergreen-shrub or coniferous flora. Nearly all of the rest is upland forest.

The area is drained by several rivers and streams including the main branch of the Oyster River, the East Branch of the Oyster River, Branch Brook and Keene Brook; all of which flow southerly out of the Greater Bog area to the St. George River.

### Vegetation

The Greater Bog area contains an abundance of vegetation. About thirty kinds of trees, fifty shrubs, and more than two hundred ferns and flowering plants have been found and identified. The State of Maine Natural Areas Program has designated a portion of the Greater Bog as a critical area with the

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<sup>19</sup> The major sources of information on the bog are derived from *A Special Place: Story of the Oyster River Bog* (Rockport Conservation Commission, 1976) and *The Oyster River Bog: A Case Study in Wildlife Management on Private Property in Knox County, Maine* by John Shores (Wildlife Management Center, University of Michigan, 1983) and the Oyster River Bog Association.

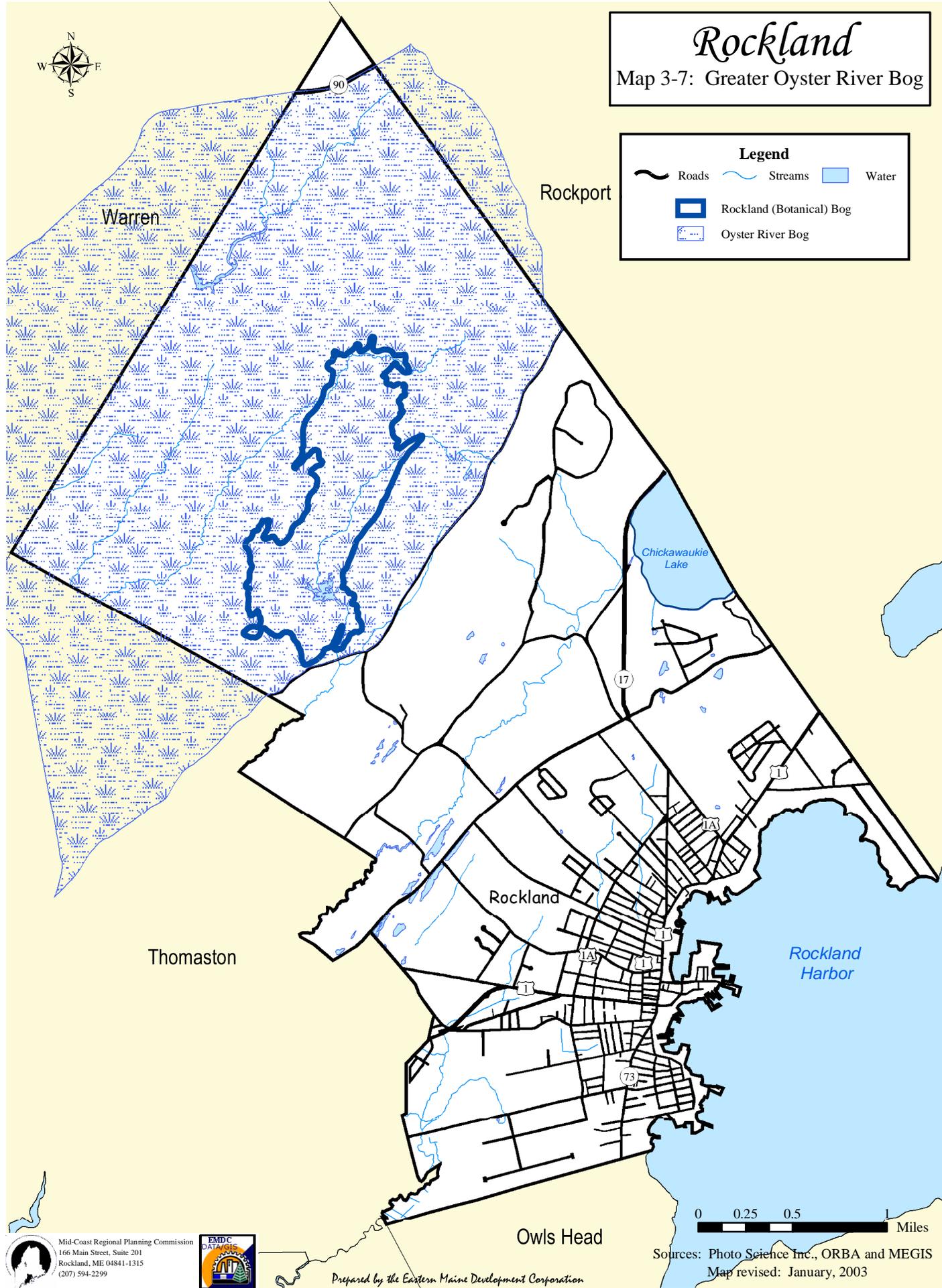


# Rockland

Map 3-7: Greater Oyster River Bog

**Legend**

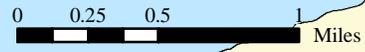
- Roads
- Streams
- Water
- Rockland (Botanical) Bog
- Oyster River Bog



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Prepared by the Eastern Maine Development Corporation



Sources: Photo Science Inc., ORBA and MEGIS  
 Map revised: January, 2003

## Natural Resources

inclusion of the moonwort (*Botrychium lunaria*) to its list of rare plants. The moonwort is a perennial fern found in meadows and ranges to parts of the extreme northern United States.

The much larger upland area, west and northwest of the peat bog, is mostly second growth forest. Big-tooth aspen is the principal tree in the hundreds of acres burned in 1948. In the cut over areas there is much red maple, and some fir, red spruce, white pine, white birch, red oak and white ash. Although nearly all of the Greater Bog shows signs of having been cut over, there remain stands of merchantable saw logs and abundant stands for fuel wood and pulpwood.

### Birds and Animals

Forty-three kinds of birds were recorded in the Greater Bog area including wood ducks, Canada geese, hawks, owls, woodpeckers, and game-bird species such as the woodcock and partridge (grouse).

Although the Greater Bog area supports an assortment of animals, the most noteworthy are a small population of deer and moose. Also, animals such as muskrat, mink, and beaver, which have been trapped for their fur, are well established.

### Land Use Activities

The primary activities conducted in the Greater Bog are commercial forestry and recreation. Timber harvesting is difficult because of the need to cross others lands, lack of a system of interior logging roads and the number of streams and brooks that need to be crossed. Despite these problems, commercial timber harvesting and cutting for firewood will continue as long they are profitable.

Recreational activities include hunting and trapping as well as walking, hiking, cross-country skiing, and snowmobile trails. Increasingly, the trails are being used by All Terrain Vehicles (ATVs) and four wheel drive (4WD) trucks, which cause a great deal of damage.

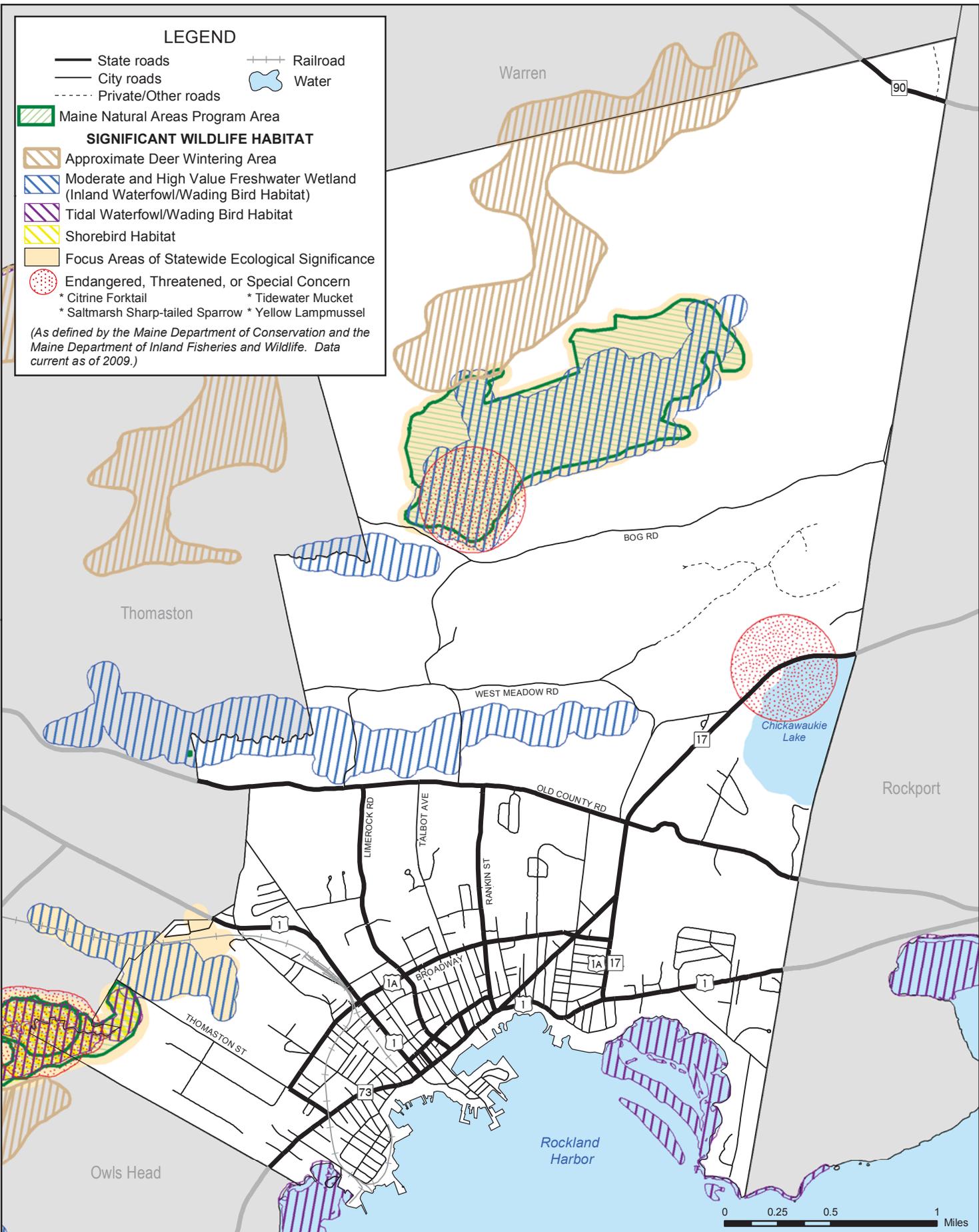
### Protection

Within the Greater Bog area, protection is provided by private means and by municipal ordinance. The total privately protected Greater Bog area in Rockland consists of 1,013 acres, 978 acres of which contain conservation easements<sup>20</sup>. The remaining 35 acres are owned by the Oyster River Bog Association (ORBA). The largest landowner is the City of Rockland, which has 813.5 acres in conservation easement. During the Great Depression, many landowners' lost properties in the Rockland portion of the Bog when they were unable to pay their property taxes and the City acquired the parcels by tax lien.

Except for the Route 90 Corridor and the land along the west side of Bog Road, the Greater Bog area is in the Woodland and Wildlife Zone "G". The general intent of this zone is "to preserve this unique area in its wild and natural state, at the same time allowing private owners and the public enjoyment of the area for recreational purposes and for private owners to continue to harvest timber and cut firewood." Uses permitted in the zone are limited to timber harvesting and outdoor recreational activities. Prohibited uses include construction of roads, except logging roads, and buildings and dwellings, and the operation of motorized vehicles such as ATVs and, 4WD trucks. Of the four municipalities that share the Greater Bog area, only the City of Rockland has adopted a special protection zone. Protection is also provided by the Department of Environmental Protection's partially

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<sup>20</sup> A flexible, voluntary statement, usually inserted into a property deed, by a landowner establishing restrictions as to how a parcel of land is used or developed in the future.



**CRITICAL HABITAT**

Prepared as part of the Gateway 1 amendments to the comprehensive plan.

**CITY OF ROCKLAND**

Map revised: September 19, 2011  
 Map prepared by LatLong Logic, LLC  
 Sources: City of Rockland, MEIFW, MNAP, MEDOT and MEGIS



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## Natural Resources

imposed Shoreland Zoning Ordinance. The land within 250 feet of the upper edge of the botanical Bog and the Oyster River is designated as Resource Protection and Limited Residential District. Limited Residential allows for single-family dwellings on 40,000 square foot lots. This contradicts the Woodland and Wildlife Zone “G” which prohibits dwellings in the Greater Bog area.

Privately owned land along the Bog Road adjacent to the botanical or peat area is designated as Residential “B” which allows for single and multi-family dwellings, institutions and some commercial activities. Lot area for a single-family dwelling is 10,000 square feet. The number of houses along the Bog Road has increased over the years.

### Stewardship

In addition to the management of the Greater Bog by the private landowners and by the City of Rockland, overall stewardship of the Greater Bog is provided by the Oyster River Bog Association (ORBA). This non-profit corporation was formed in 1977. The mission of the association is “to assure that the character and current uses of the area such as wood harvesting, hunting, fishing, nature studies, snow-mobiling, skiing, hiking, etc., remain intact for future generations.” To carry out its mission the association works with landowners to obtain conservation easements and has developed an educational program on the story of the Greater Bog.

Because of its wilderness character and the fact that it has changed little since the Tolman Family settled in and around the Greater Bog area before 1770, this undeveloped area is a game and wildlife habitat, a scientific research laboratory, and a recreational area, which must continue to be preserved.

### Unique Areas Issues and Implications

- (1) Although often overshadowed by the commercial and industrial focus of the community, Rockland does possess significant freshwater and marine wildlife activity. Does the City wish to place more emphasis upon its wildlife attributes? Is there adequate regulatory protection for significant wildlife habitats? Does the City believe that it has struck a balance between the demands of its human inhabitants and the needs of its wildlife?
- (2) About 40% of the land area of the City is within the undeveloped Greater Bog area. Does the City feel that the current Woodland and Wildlife Zone “G” Regulations, which were adopted in 1987, are still adequate to deal with this large section of the City? If not, what does the City feel needs to be done? Study? Modifications? Entire overhaul? Also, the Woodland Zone “G” prohibits dwellings whereas the Shoreland Zoning Ordinance permits such uses. This inconsistency needs to be addressed.
- (3) Currently there are myriad owners with many different shaped and sized lots. Often this was the result of inheritance. This has created problems for trail construction and maintenance and for timber harvesting, as people must ask permission of landowners to cross over their property. Does the City of Rockland see a role for itself in sorting out these relationships among owners? Or should the City deal only with persons wanting to use or cross over its own land? Is this a responsibility that the ORBA should assume?
- (4) Motorized off-road vehicles such as ATVs and 4WD trucks are prohibited from the Rockland portion of the Greater Bog by zoning and by conservation easement. Also, state law bans motorized vehicles from using snowmobile club maintained trails. The bans are not actively enforced. Should the City undertake active enforcement or leave it up to the individual property

## Natural Resources

owners to police? Should such enforcement powers be given to a Greater Bog warden, ranger or constable?

- (5) A noticeable trend in the eastern part of the Greater Bog along the Bog Road has been the substantial increase in residential use. It is expected that these perimeter lots will continue to be sold and built upon. Although this has required very few acres directly, the changes are permanent as each acre of land that is consumed by development is one less acre of wild land. Should the City look at the Residential “B” designation for the Bog Road to see if it is still appropriate? If not, should changes or modifications, such as increasing the minimum lot size, be made?
- (6) Although many landowners are cutting firewood, a small number of owners are selling wood commercially. The amount of wood cut in a year is influenced by market demand. Presently, timber harvesting is manageable as long as the acreage being cut remains a small percentage of the Greater Bog forestland. Is the City satisfied with the present forest cutting practices? Does the City see the need to add timber-harvesting standards to the Woodland and Wildlife Zone “G” Regulations? The Shoreland Zoning Ordinance does contain timber-harvesting standards.

## SCENIC RESOURCES

The scenic resources of a community are the attributes that give it identity and make it an appealing place in which to live and to visit. Within the City of Rockland, the predominant scenic resources consist of views of the Harbor and Penobscot Bay. These views extend from the South End along Main Street and to Jameson Point. Valuable views of the harbor are also found from the Benner Hill and Dodge Mountain ridgeline.

The publication entitled *Scenic Inventory: Mainland Sites of Penobscot Bay* by the Critical Areas Program of the Maine State Planning Office (May, 1990) has identified two important scenic assets. The first area is the Harbor viewshed<sup>21</sup>. The foreground includes parks, parking areas, buildings and structures, wharves, mooring areas and the waters of Rockland Harbor. The more distant views include the breakwater, two lighthouses, mooring area, the opposite shoreline in Owls Head and the islands in the Bay. The overall landscape condition is rated fair to good. The waterfront has a cluttered appearance, typical of Maine’s larger working waterfronts and commercial ports.

The motorist approaching Rockland from the south on U.S. Route 1 encounters the first close up view of the Harbor and Bay on reaching the intersection of Park and Main Streets. Although it is referred to as “Coastal Route 1,” it in fact runs parallel to and away from the coast, crossing many tidal rivers between Bath and Rockland. From Rockland north to Belfast, it runs parallel to the shore of West Penobscot Bay, offering some excellent views of the Bay. One of these views is the half-mile stretch of Route 1 on Main Street from Summer Street on the edge of the Downtown northerly to Front Street. This section allows one to drive slowly and gain filtered views of the waters of Rockland Harbor, Penobscot Bay, and on a clear day, the Bay islands. Presently, full views are blocked by several buildings, two of which are older vacant structures. This stretch of road is located in the Waterfront-3 and Waterfront-4 Zones with a maximum building height of 40 feet.

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<sup>21</sup> A viewshed is all the surface visible from an observer’s viewpoint in which a critical object is seen

## Natural Resources

The Public Landing offers a fine view of Rockland Harbor with the Lighthouse and Breakwater in the distance. The view is framed by the public floats to the right and a pier on the left. Public parking and public restrooms are available here. Thanks to the February 28, 1996 purchase of Merrill Park, a 0.36 acre parcel fronting on Main Street, a clear view is also available over the 3.42 acre Public Landing from Main Street.

To the south of the public landing, redevelopment of a former industrial site has opened new views of the harbor along Water Street. Around the corner on Scott Street is the next public parcel, Sandy Beach, offering an unobstructed view of the harbor. This land, though only 0.36-acre in size, features a small bathing beach with a rough stone breakwater to the left and ledges on the right. The view includes a close-up of the small craft mooring area with more distant views of the fish pier, Coast Guard base and the vessels entering and leaving the Harbor via the channel past the lighthouse. Limited on-street parking is available near the site.

Views of the outer harbor and Owls Head are seen as one continues along Atlantic Street. On Mechanic Street is Snow Marine Park. This 7.68-acre facility includes a double launching ramp and floats (in season), parking for vehicles and trailers, and a large open area adapted, and used, for athletic events. While the views are less spectacular than those mentioned previously, the activity around the launching ramps and at the nearby shipyard and Hurricane Island Outward Bound School is often interesting. The Owls Head peninsula, which forms the southern shore of the Harbor, provides a pleasant background.

On returning to the Public Landing, the next waterfront facility offering good views is Buoy Park, just north of the Public Landing. In fact, this park, which visually lines up with U.S. Route 1, is what provides the motorist coming north on Route 1 with the first view of the Harbor and Lighthouse. A pier and floats offer close observation of the charter and cruise boat activities plus nearby marina facilities. The west side of the fish pier is also easily visible from this site. Parking is available on this 2.1-acre parcel.

In the north end of the city, views of the Harbor and Bay are found along Front Street starting from its juncture with Route 1 easterly for a distance of over 1/10 of a mile to Maverick Street. Presently, the embankment of the long-gone Limerock Railroad restricts the view from the street and provides only a marginal view of the Harbor from the residences in the North End Neighborhood. At one time, benches, a path, and roadside parking were installed by the North End Neighborhood Project. However, over time these improvements have fallen into disrepair and overgrown vegetation has obscured much of the view of the Harbor and Bay. The nearby view from the embankment includes activities of a marine construction firm, a boatyard, and the North End Shipyard serving as the base for many of Rockland's schooners and a metal fabricating firm. There is limited on street parking here.

Proceeding further north on Camden Street (Route 1), there are sporadic views of the harbor. Good views of the harbor are seen along most of Waldo Avenue and Samoset Road. At the end of the Samoset Road is the Marie Reed Park, which provides spectacular views of the Breakwater and Penobscot Bay. From there, a footpath alongside the golf course leads to the inshore end of the granite breakwater that reaches out into Rockland Harbor and ends at the lighthouse. The breakwater and lighthouse are a major community landmark and an attraction for the City as people enjoy walking along the breakwater. Since the main shipping channel passes close to the lighthouse, it provides an excellent viewing point for Rockland's varied marine traffic, which includes state ferries, fishing boats,

## Natural Resources

schooners, yachts, Coast Guard vessels, and many types of small craft. Foreground elements include the Samoset Resort and golf course. Mid-ground views include Rockland Harbor and Penobscot Bay, the Rockland skyline, and the Owls Head Lighthouse. Background views, particularly from the breakwater, include Penobscot Bay, distant islands and the hilltops to the west and north of Rockland.

While the narrative has been loosely based on an automobile trip, most of the “viewpoints” just mentioned are connected by the Rockland Harbor Trail, a pedestrian walkway. During the summer of 1999 the Rockland Harbor Trail was delineated by a painted blue line, which created some controversy. Since then, MBNA has constructed a boardwalk on its property, which is now a part of the Harbor Trail. The Fish Pier and the Maine State Ferry Terminal, while both are publicly owned and offer good close-up views of marine activity, have not been discussed in detail since the nature and intensity of their activities makes their use for public viewing less desirable.

The evaluation reports prepared by the State Planning Office for the Rockland Harbor and Jameson Point viewsheds are contained in the Appendix.

Another area offering scenic views is the top of Dodge Mountain/Benner Hill looking out over the Harbor, Penobscot Bay, the Atlantic Ocean and the Chickawaukie Lake Watershed. Other areas with views of the harbor include some of the lots in the Pen Bay Acres subdivision, some lots in the Juniper Hill area, at the top of the hill on Talbot Avenue, and along portions of West Meadow Road.

Presently, the areas near or at the top of Dodge Mountain are undergoing residential development because landowners wish to take advantage of the spectacular views. Dotted over the landscape, on large lots, are larger single-family homes that can be seen from a long distance. Currently the high ground is zoned Residential “AA” with a lot size requirement of 20,000 square feet and 40% maximum coverage and Residential “B” with a 10,000 square foot minimum area and 60% maximum coverage.

### Scenic Resources Issues and Implications

The Gateway 1 Scenic Quality Assessment Map (Map 3-9) shows one Distinctive Scenic Class View, looking east to Rockland Harbor from US Route 1 in the vicinity of the Maine State Ferry Terminal, and two Noteworthy Scenic Class Views, one of which is north of the Distinctive View on US Route 1, also looking east to Rockland Harbor, and the other from Route 90 looking southeast to Dodge Mountain. The views from US Route 1 are within the developed downtown and the commercial strip growth area north of downtown. The views from Route 90 are within the commercially zoned portion of that roadway, a small portion of which lies in Rockland.

- (1) The views of the Harbor and Bay from Main Street are unique because close water views are rare along Route 1, especially from Portland to Bar Harbor. Does the City wish to take further advantage of this asset by the acquisition and removal of existing buildings? Is the 40-foot maximum building height sufficient to provide unobstructed water views? If not, should the City consider lowering the maximum building height or requiring greater side lot line setbacks? Should greater public access be part of any development along the waterfront?
- (2) The scenic views from Front Street offer much of interest but remain largely unknown. In addition, the improvements have suffered from neglect. Does the City wish to make more use of this asset by making the necessary repairs to the limited facilities? Should the City consider removing the embankment and remains of railroad trestles and opening up the view to the North

## Natural Resources

End Neighborhood? This could result in increased popularity and increase the value of nearby homes.

- (3) For reasons of privacy and views, expensive housing has been built on the side and top of Dodge Mountain, despite the cost and difficulty of undertaking such construction. Should the City enact larger lot size and smaller lot coverage requirements for buildings on Dodge Mountain to preserve, as much as possible, the view of the mountain? Will these development pressures spread to Benner Hill, which is still relatively untouched? Should similar steps be taken to protect the view of Benner Hill as well?
- (4) Benner Hill is the site of three radio (or microwave) towers. With the increasing use of line-of-sight radio communications, by such users as cell phones and VHF radios, there may be pressure to accommodate additional towers on this and other higher ground in Rockland and nearby communities. Should the City enact ordinances to control the placement and shared use of such towers which, however useful they may be, do affect the views of many people?
- (5) The City owns a 43-acre lot off Dodge Mountain Road (also known as Tolman Road) that extends up the easterly side of Benner Hill and across the ridgeline and down the west slope to within about 300 feet of the Bog Road. This land was a portion of the City Poor Farm. If developed with hiking trails, it could offer the public views similar to those now restricted to residents of the subdivision on Dodge Mountain. Purchase of land, or of easements allowing public access, could provide access to this parcel from the Bog Road. Although not as high as Mount Battie, the summit of Benner Hill would offer even better views of the offshore islands than are available from that Camden landmark. Does the City wish to make use of this parcel of public land?

## Goals, Policies, and Strategies

### Topography:

**Goal: To make the best possible use of Rockland's land and water areas and topographic features.**

### Policies:

1. Recognize the constraints inherent in Rockland's topography in planning for future development.
2. Preserve, to the extent possible, Rockland's distinctive topographic features.
3. Retain and encourage public access, both personal and through views, of Rockland's notable topographic features.

### Strategies:

1. Amend ordinances to limit development of steep slopes and higher elevations to low-density natural resource and/or residential uses.
2. Adopt ordinances to limit excavating and filling of land to retain as much as possible of the original contours of the land, except for the installation of buildings and necessary roads and driveways.
3. Limit the construction of roads to grades not exceeding 8%.
4. Require greater area for lots with slopes steeper than 20%.
5. Retain and, as appropriate, develop existing public access to such features as the Rockland Bog, Benner Hill/Dodge Mountain, and the waterfronts of Rockland Harbor and Chickawaukie Lake. Require public access, as appropriate, for future development proposals.

## Natural Resources

6. Recognize that Rockland's limited developable land area will not allow the City to accommodate, within its boundaries, all development desired in the region. This will require cooperation with neighboring municipalities (Owls Head, Thomaston, Warren and Rockport) to achieve regional goals.
7. Carefully consider all extensions of public utilities, so that unwanted development is not encouraged in areas topographically unsuited to such development.
8. Complete and maintain an inventory of environmentally-sensitive areas under private ownership and encourage or provide incentives to owners for voluntary conservation. Require that applicants proposing developments that would substantially change the rural characteristics of a site conduct a natural resource inventory and values assessment as part of site plan or subdivision review and require the applicant to address how natural resources will be maintained or adverse impacts minimized with the development proposal.
9. Work with the Oyster River Bog Association to expand the bog preservation area with conservation easements and to reduce incompatible uses of the preserved areas.
10. Continue to inform landowners about, and advocate for, current-use tax programs, including the Tree Growth, Farmland, and Open Space programs.
11. Establish a local open space fund for voluntary land acquisitions and conservation easements, and seek donations, bequests, and grants, and apply to the Land for Maine's Future program to support this effort.
12. Support land trusts in their work with landowners to protect specified types of land through acquisition, conservation easements, and buy-restrict-resell development projects.

### **Surficial Geology and Soils:**

**Goal: To identify land that has geologic and soil conditions suitable for development.**

**Policy:** Determine geologic and soils information necessary for safe development of land, including the determination of any negative effects on those lands located nearby and/or down slope from the proposed development.

### **Strategies:**

1. Require, as part of the permit application processes for various developments, that sufficient information be provided to determine if the proposed development:
  - A. Has geologic and soil conditions adequate to support the buildings and other proposed improvements on the site.
  - B. That the soils on site are adequate for any proposed wastewater disposal and/or retention of runoff resulting from the proposed development.
  - C. That proposed development would not aggravate subsurface conditions on other lands nearby or down slope from the site.
2. Restrict the development of areas with unsuitable soils and unstable geologic conditions.
3. Consider alternative uses for Rockland's many abandoned lime quarries. Some may be suitable for alternative uses such as aquaculture, recreation, or low-density residential development.

### **Rockland Harbor Landslide:**

**Goal: To prevent, to the extent possible, future landslides into Rockland Harbor.**

### **Policies:**

1. Direct intensive development, especially that involving large structures and paved areas, away from land which drains toward the landslide-prone area of Rockland Harbor.
2. Prevent additional development in the areas most likely to experience further landslides.

## Natural Resources

3. Improve drainage and storm water management to reduce the impact of runoff on the unstable soils of the landslide areas.

### Strategies:

1. Continue to require all development applications in the areas, from which runoff contributes to the instability of the landslide area, to provide geo-technical information necessary in order to determine the risks imposed by the proposed development. Deny or modify those development proposals deemed to impose unacceptable risk of landslide.
2. Consider cost sharing with desired development to provide storm drainage to reduce risk of landslide.
3. Consider cost sharing with desired harbor-side development to re-grade, rip-rap, or otherwise modify the shoreline to significantly reduce risk of landslide.
4. Consider purchase of harbor-side lands deemed at serious risk of landslide for low-intensity public recreation.

### Water Resources:

**Goal: To protect the quality and manage the quantity of Rockland's waters.**

**Policy:** Assure that Rockland's watershed areas are properly managed to minimize flooding, control ground water, and reduce or eliminate pollution of surface waters.

### Strategies:

1. Amend ordinances to require effects of proposed development on storm water flows and flooding to be determined during the application process. Require on-site detention of storm water runoff where appropriate.
2. Work with the Lindsey Brook Committee to carry out the improvements recommended in the recent engineering studies on Lindsey Brook's flooding problems. Determine the most cost-effective means of financing the needed public improvements.
3. Obtain easements or other necessary legal agreements with riparian landowners to enable the City to carry out needed maintenance and repairs, both emergency and ongoing, to Lindsey Brook and all other watercourses within the City.
4. Work with the Department of Environmental Protection to enable the City to carry out improvements and maintenance activities on all watercourses within the City without requiring DEP permits/approvals for each separate activity.
5. Provide the Public Works Department with the means to maintain the watercourses within the City, most of which function as storm drains for the urbanized area.
6. In addition to the Chickawaukie Watershed Plan (which requires the preparation of Erosion and Sediment Control Plans for proposed development along this lake), the city will revise phosphorus control method language in the zoning ordinance, selecting a high level of protection for Chickawaukie Lake to ensure that development minimizes phosphorus runoff. As needed, the City will revise the Chickawaukie Watershed Plan. The City will cooperate with the Town of Rockport to ensure consistent and therefore meaningful regulation for Chickawaukie Lake.
7. Work with the Town of Rockport, the Consumers Maine Water Company and other riparian landowners to maintain and improve the water quality of Chickawaukie Lake.
8. Monitor the infiltration of groundwater into the sanitary sewer system. Repair or replace lines and equipment allowing excess infiltration of groundwater.
9. Establish a program of periodic inspection of on-site wastewater disposal systems (septic tanks and leach fields) to assure their continued effective operation and avoid pollution of groundwater resources.

## Natural Resources

10. For those quarries considered unsuitable for alternative uses, prepare studies to allow filling them with earth and rock and make the necessary applications to the Department of Environmental Protection.
11. The Shoreland Zoning Ordinance will be amended to meet current state requirements and thereby remove the necessity for the Board of Environmental Protection imposed provisions.

### **Wetlands:**

**Goal: To protect and maintain the natural qualities of wetlands, both hydrological and environmental.**

### **Policies:**

1. Control, by ordinance, the use of wetlands.
2. Consider obtaining easements or the purchase of wetlands of particular importance to flood control and/or environmental considerations (i.e., deer yards, wildlife passages, fish spawning/nursery areas of watercourses).

### **Strategies:**

1. Retain the Woodland and Wildlife Zone in the Rockland Bog and Marsh Brook to prevent development harmful to these wetlands.
2. Consider including within the Woodland and Wildlife Zone some undeveloped areas surrounding Meadow Brook and other watercourses to avoid the negative effects of development.
3. Amend other zoning districts as needed to provide setbacks and other protection for wetlands and watercourses to allow their continued effective functioning.
4. Purchase needed lands for retention basins and other “flood control” works necessary to protect properties along Lindsey Brook and other watercourses in the urbanized area.

### **Ground Water/Aquifers:**

**Goal: To have groundwater resources available for possible future use as drinking water supplies.**

**Policy:** Protect groundwater from pollution.

### **Strategies:**

1. Continue pumping those quarries used for solid waste disposal so that pollutants in the water in those quarries does not infiltrate nearby rock.
2. Prohibit utilizing additional quarries for waste disposal, with the exception of the disposal of inert materials including demolition debris, tree stumps, and similar materials as allowed by law.
3. Establish a program of periodic inspection of on-site wastewater disposal systems (septic tanks and leach fields) to assure their continued effective operation and avoid pollution of groundwater resources.
4. Limit development of areas not served by the Consumers Maine Water Company to densities, which can rely on groundwater available on-site.
5. Extend water and sewer lines to those areas whose land uses require more water than is available from groundwater or whose activities threaten to pollute groundwater.

### **Floodplains/ Flood Proofing/ Flood Insurance**

**Goal: To reduce flood damage to public and private properties to the extent possible.**

**Policy:** Limit development of floodplains and areas vulnerable to coastal flooding to reduce the need for the flood proofing of structures and the purchase of flood insurance.

## Natural Resources

### Strategies:

1. Amend ordinances as necessary to continue to limit the development of flood-prone areas, including those areas vulnerable to coastal flooding, and require elevation of buildings sufficient to reduce their vulnerability to flooding.
2. Update the Flood Plain Management Ordinance as necessary to reflect current versions and retain eligibility of Rockland property owners to purchase Flood Insurance through the National Flood Insurance Program. The most recently adopted amendments were effective September 9, 1999.
3. Make the necessary improvements to Lindsey Brook to limit future flooding, including any flood proofing needed for public buildings adjacent to the brook.

### Agriculture and Forestry:

**Goal: To safeguard those areas where lack of development and suitable soil and drainage conditions make future agricultural or silvicultural activities possible.**

**Policy:** Direct development away from areas with high potential of wood production or agricultural activities.

### Strategies:

1. Retain Woodland and Wildlife Zoning where silvicultural activities are, or could be, important to Rockland's future.
2. Work with adjoining landowners in the Bog, in cooperation with the Oyster River Bog Association, to construct and maintain woods roads to provide access for silvicultural activities on those City-owned parcels large enough to warrant such activities.
3. Increase the public access to City-owned properties in the Bog for recreational activities. This will also require an increased presence of City personnel for such activities as trail maintenance, litter removal, fire suppression and enforcement of ATV laws.

### Scenic Resources:

**Goal: To safeguard those scenic resources that make Rockland the special place it is.**

**Policy:** Actively encourage the retention and improvement of scenic views.

### Strategies:

1. Review and amend, as necessary, the zoning along Main Street, particularly between Park and North Streets to the south of "downtown" and between the Maine State Ferry Terminal and the intersection of Front Street on the north of "downtown", to provide improved visibility of Rockland Harbor from the street.
2. Review and amend, as necessary, the zoning along Camden Street between Maverick Street and Waldo Avenue to provide improved visibility of the Harbor from the street.
3. Review the zoning of areas fronting on the Harbor. Require sideline setbacks to increase or preserve views of the water from public rights of way. Consider the effects of placement and heights of buildings on the seaward side of streets paralleling the shore on views and air circulation for those properties on the landward side of those streets.
4. In consultation with the North End Neighborhood Association, purchase land on the waterfront side of Front Street for a neighborhood park. Remove portions of the railroad embankment and trestle to permit landscaping of this area for limited recreational use and improvement of the views from Front Street and the properties along it. An interpretive display could inform the public of the history of this area (as has been done at the waterfront park in Rockport).
5. Make the Harbor Trail a more permanent fixture, including signing, purchase of easements and provision of sidewalks where needed for safety.

## Natural Resources

6. Reduce the building coverage allowed for lots with slopes in excess of 20% on Benner Hill and Dodge Mountain.
7. Adopt provisions in the Zoning Ordinance controlling radio antennas.
8. In consultation with the Parks Commission, create a plan to develop City-owned land on Benner Hill for low intensity public recreation. This area offers the best publicly available, high elevation views within Rockland.
9. Adopt additional view protection/visual impact performance standards in zoning regulations and subdivision and site plan review standards, based upon the Gateway 1 publication 'Scenic Resource Assessment, Gateway 1 Corridor' Chapter 8. Such strategies should include, without limitation, the following:
  - \* Encourage the replacement and placement of utility poles, appurtenances, and road crossings in the corridor in the least environmentally and visually sensitive locations to the extent possible;
  - \* Plant street trees and integrate lighting, sidewalks, and other streetscape features;
  - \* Trim vegetation regularly to retain view corridors and keep/restore naturalized edges;
  - \* Use transportation safety features, e.g. guardrails, with natural-appearing colors and materials (such as Core 10 steel) that blend and enhance rather than look out of place, make-shift utilitarian, or neglected.



# Rockland

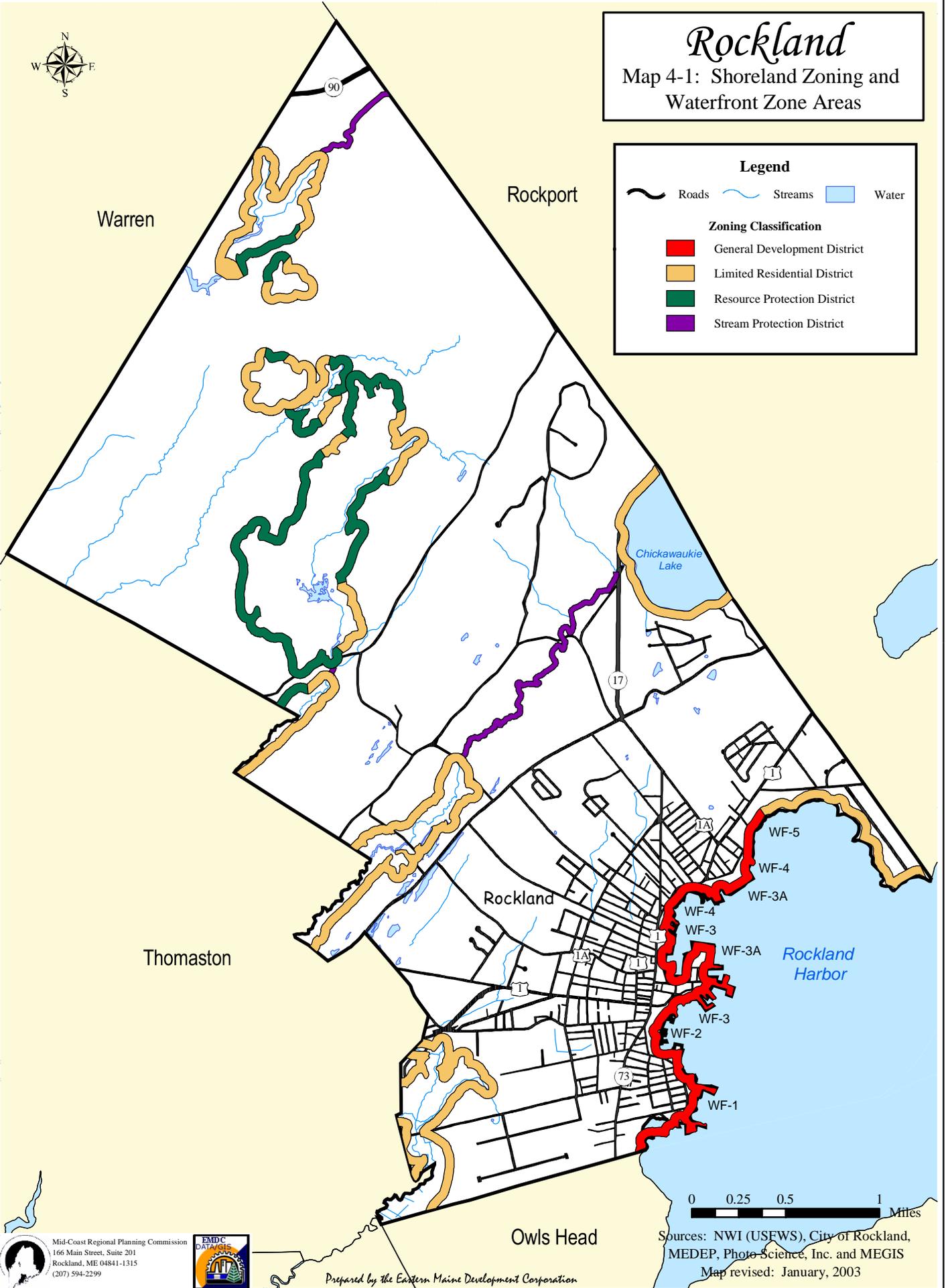
## Map 4-1: Shoreland Zoning and Waterfront Zone Areas

**Legend**

Roads     Streams     Water

**Zoning Classification**

- General Development District
- Limited Residential District
- Resource Protection District
- Stream Protection District



Sources: NWI (USFWS), City of Rockland, MEDEP, Photo Science, Inc. and MEGIS  
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