

Chapter xx: Land and Water Resources

Winthrop is fortunate to be surrounded by exceptional natural beauty and a high quality environment. This makes it easy to take our natural resources for granted. Yet, Winthrop's nearly 40 square miles provide the base for an income for many of the town's residents, as well as for growth and development. Maintaining the quality of our land and water resources is what keeps productive forest and farm land, clean water for recreation and drinking, wildlife for hunting and tourism, and the overall natural beauty of town.

One of the functions of this plan is to ensure that growth and development can be done at the same time as preserving our natural environment. It is possible, but it requires foresight. Some forms of development have more potential impacts than others. Some locations are more suitable than others. It is in our interest to see that new development will be of a kind (and location) that will complement our environment, not destroy it.

The following chapter identifies the physical limitations the natural environment imposes to be addressed in the planning process.

Geology and Soils

The basis of our landscape is our landform. The soils of Winthrop – and the rock that supports them – influence the topography and the type of vegetation, and constrain the type of development, farming, or forestry we do.

The advance and retreat of the glacier molded Winthrop's landscape. As the glacier advanced, the ice mass scraped loose geologic material off the surface of the ground. When it retreated, the glacier left its mixture of sand, silt, clay, and stones, called till. Today, much of Winthrop is covered by this glacial till. The till is a heterogeneous mixture of sand, silt, clay, and stones. Till generally overlies bedrock, but may overlie or include sand and gravel. Glacially streamlined hills may consist of till deposits of over 100 feet thick.

One variety of till in Winthrop is fine grained and compact with low permeability and poor drainage. The other is loose, sandy, and stony with moderate permeability and fair to good drainage. The predominant thick till blanket is interrupted by bedrock outcrops. Some of Winthrop is underlain by a glacial delta, which was formed as glacial meltwater washed into the ocean. Winthrop was once a coastal town.

Winthrop soils are typical of this part of Kennebec County. With few exceptions, Winthrop soils fall into the Hollis-Paxton-Charlton-Woodbridge Association. These are sandy loams, typically found intermingled in hill and ridge areas at elevations of 200 to 700 feet. While the Hollis soils are generally shallow and do not retain water well, the Paxton-Charlton-Woodbridge soils are typically deep and moderately well drained. This soil association has historically been used for forest land, hay, pasture, orchards, cultivated crops, and homebuilding. The "delta area" – Winthrop village to

the south and west – is a different soil association. The Buxton-Scio-Scantic series is a deep soil, with drainage capabilities and development potential depending a lot on the slope of the land.

The Natural Resource Conservation Service has published *Soil Survey Data for Growth Management in Kennebec County, Maine* (1989), which is considered the authority for suitability of soils for specific purposes. The preponderant soils in Winthrop are Woodbridge and Paxton stony fine sandy loams with 3% to 15% slopes. These soils are rated as being relatively high potential for low-intensity development, where slopes do not exceed 8 percent. Scantic and Scio soils are common in the area of Annabessacook Lake. These soils are typically associated with wetland areas. Although these soils can be used for agriculture, the high water table creates severe limitations for residential or commercial development.

A soils map of Winthrop (to be prepared) depicts in general terms the soils which may be problematic for development. In some locales, the Maine Plumbing Code would prohibit new septic systems; in others, the construction of foundations and roads would be expensive or impossible. The mapping of these soils involved a degree of generalization; therefore, the outlined areas may include more suitable soils. The presence of poor soils does not by itself exclude development; it does, however, make it more costly.

All soils, when cleared of vegetation, are subject to accelerated erosion. Eroding soils contribute to the degradation of water quality in lakes, ponds, and streams. Silt can reduce visibility, harm fish populations, and contribute phosphorus and other nutrients to the water body. Phosphorus is a naturally occurring nutrient which, when present in high concentrations in water bodies, can cause algal blooms. Eroding soils and uncontrolled stormwater runoff have been demonstrated to contribute significantly to phosphorus levels in Maine's lakes.

Winthrop's Zoning Ordinance contains performance standards to protect against excessive erosion during and after construction. Sections 4.1.1 and 4.1.6 require developers to provide adequate erosion control and stormwater management, and 4.1.7 requires phosphorus control plans. Advances in the science of stormwater management have occurred since the last updating, however, and the ordinance should encourage "low impact development" stormwater techniques for single family development, particularly in the shoreland zone areas.

Topography

Winthrop has a varied topography, as depicted on the Natural Features Map accompanying this document. The land west of Maranacook is elevated and steep. Several hills exceed 500 feet in elevation, topped by Mount Pisgah at 809 feet. The eastern part of town is just as hilly, but a little lower. South of Route 202, some of the land is actually somewhat flat.

The topography of an individual site accounts for much of the cost, difficulty, and potential adverse impact of land development. Development on slopes greater than 15 percent affects stormwater velocity, erosion, and sedimentation, particularly in sensitive watersheds. The State Plumbing Code limits the installation of septic systems to land with an original slope of 20 percent or less. Road construction on steep slopes becomes expensive and maintenance costs increase



significantly. Therefore, large contiguous areas with slopes in excess of 20 percent are not appropriate for new construction

Areas of slope exceeding 20 percent show up on topographic maps, but mapping of steep slopes is only as accurate as the USGS base map. Development of steep slopes should best be regulated on a site-specific basis.

Winthrop's current Zoning Ordinance contains provisions (section 4.0.5) limiting the development of steep slopes when they cover two acres or more. The ordinance also has standards to control erosion and stormwater.

The topography of the land is responsible for the multiplicity of lakes and drainage basins. A watershed is the area of land within which all water falling ultimately drains to a single water body. The delineation of watersheds (Water Resources Map) shows how water runs off the land, where it accumulates, and how it ultimately collects into larger bodies of surface water.

The Maine Department of Environmental Protection (DEP) identifies each lake and pond as having its own watershed. Therefore, there are twelve separate watersheds in the Town of Winthrop, each corresponding to an individual lake or pond. Since planning for lake water quality is so closely integrated with watershed planning, the discussion of each pond and its watershed will be found in the section on lakes and ponds, below.

Groundwater

Local groundwater is the source of drinking water for all local residents not serviced by the public water system, as well as several summer camps and other businesses. Groundwater is also a potential future source for public supplies. A "significant aquifer" provides a water supply in large enough volumes for commercial use, but all groundwater in the town should be protected from potential contamination by oil, chemicals, or other sources.

In Winthrop there is one significant sand and gravel aquifer defined. It has an estimated yield of 10 to 50 gallons per minute and is located to the west of Annabessacook Lake. There are no existing public water supply wells in this aquifer.

Outside of the aquifer, there are 15 wells serving as public water supplies at nine locations. A public water supply is one which serves 15 or more individual hookups or 25 or more persons from a single source. The following is a summary of public water supplies from groundwater in Winthrop, as reported by the Maine Department of Human Services, Bureau of Health Drinking Water Program, which regulates public water supplies. There are an additional three drinking water supplies from surface waters (following section).

ASSOCIATION OF CAMPOWNERS (east shore of Annabessacook Lake), 110' drilled well;

CAMP MECHUWANA, three wells, serving seasonal camp: 434' drilled well (high existing risk for coliform), 125' drilled well, 135' drilled well.

AUGUSTA WEST CAMPGROUND, 120' drilled well;

COBBOSSEE MOTEL, drilled well (high existing risk for coliform)

DOROTHY EGG FARMS, 350' drilled well (high existing risk of contamination);

FLICKERS RESTAURANT, 325' drilled well (moderate existing risk of contamination);

LAKES REGION MOBILE VILLAGE, five wells, all unknown depth (all high future risk of contamination);

STATE YMCA CAMP, unknown depth drilled well.

The Drinking Water Programs promotes the establishment of Wellhead Protection Planning for public water supplies. The Rule of Thumb is that all wells should maintain a minimum 300' radius of restricted land uses around their wellhead (more for larger systems). Most existing water supplies do not have this level of control or protected area.

Winthrop's Zoning Ordinance, section 4.1.7, contains a routine prohibition on discharging wastes into waterbodies. The ordinance requires that developers demonstrate that they have sufficient water for their own use, but does not require any analysis of impact of development on overall groundwater supplies or public water systems. Winthrop's Subdivision Ordinance, section 8.B.6, requires a study of the concentration of nitrates in the groundwater in certain cases.

Surface Water

An interconnected system of surface waters begins as tiny brooks in the upper reaches of watersheds and flows through a system of streams, ponds, and wetlands, ultimately reaching the sea. Critical points along the surface drainage system include wetlands and lakes. Wetlands serve important natural functions such as wildlife habitat and stormwater regulation, but are susceptible to development. Lakes contribute to the town's character and natural beauty, are an attraction for residents and economic development, a center for recreation, but are vulnerable to pollution and overuse, which in turn lowers property values.

Many land use practices can impact surface water quality. Improperly functioning or unsuitably located systems for sanitary waste may cause bacterial contamination or nutrient (e.g., phosphorus) enrichment of surface waters. Poor agricultural practices can result in nutrient loading to ponds and lakes. Construction creates potential for erosion and siltation of water bodies. Any land use, when managed improperly, can accelerate the process of eutrophication which is characterized by lake water becoming warm, cloudy, and somewhat slimy due to a substantial increase in algal growth in the lake.

The first step in managing the community's surface waters is to understand the systems, their existing quality, and the factors that influence their quality.

Rivers and Streams

There are several perennial streams in Winthrop. In addition to enhancing the scenic landscape, flowing water provides a unique habitat for a number of species and plays an essential role in the drainage of land areas during storms or snow melt. Streams also serve as the flushing and refill conduits for the larger open water bodies to which they are connected. All streams and brooks in Winthrop are Class B. Class B water bodies are suitable for drinking water supply, recreation in and on the water, fishing, industrial process and cooling water supply, hydroelectric power generation, navigation, and on unimpaired habitat for fish and other aquatic life.

Lakes and Ponds

Winthrop's lakes and ponds are the defining feature of the Town's landscape. Large, open bodies of water provide scenic views, a variety of recreational opportunities, important fish and wildlife habitats, sources of drinking water, and prime real estate development opportunities.

The quality of water in any lake or pond depends on many factors, including the surface area and depth of the lake; the flushing rate of the lake; the size of the watershed surrounding the lake; the extent of development along the shore as well as throughout the respective direct watershed; the extent of agricultural activity in the watershed; and the degree to which obvious sources of pollution, such as septic effluent, sewage, agricultural fertilizers, and manure are kept from entering the water body.

By State definition, all lakes and ponds are classified GPA. Class GPA water bodies are suitable for drinking water supply, recreation in and on the water, fishing, industrial process and cooling water supply, hydroelectric power generation, navigation, and a natural habitat for fish and other aquatic life. If a water body is not meeting its classification standards, it is described as a "nonattainment" lake. Winthrop has its share (4) of lakes currently on the state's list of non-attaining, or "impaired", waterbodies.

The single greatest threat to lake water quality at present is the introduction of phosphorus into lakes through runoff throughout the watershed. Phosphorus is a naturally occurring element that serves as an essential plant nutrient and is the nutrient most responsible for causing nuisance algae blooms and excessive aquatic plant (weed) growth in lakes. The amount of phosphorus entering a given lake from its direct watershed is greatly influenced by altering the natural landscape, particularly through human-induced activities. Since most of Winthrop is encompassed in one of several lake watersheds (illustrated on the Water Resources Map), all new development should be conducted in an environmentally sound manner so as not to contribute excessive phosphorus loading to the resource.

The DEP has estimated the future area of development for most of the watersheds listed, and calculated the impact of phosphorus runoff for development. They have indicated the level of

phosphorus (parts per billion per acre year) that may be allowed without significant deterioration (based on the level of protection). The Cobbossee Watershed District has also done more precise calculations for the lakes within its jurisdiction. In general, the lower the amount of allowable phosphorus runoff from an undeveloped parcel of land - or the per acre allocation, designated as the P-value and expressed as pounds of phosphorus per acre per year (lbsP/ac/yr) - the more sensitive the lake is to additional phosphorus loading, and therefore the more intensely stormwater runoff from new development needs to be controlled. For Winthrop lakes, the P-values range from 0.020 for Little Cobbossee Lake to 0.072 for Lower Narrows Pond.

The DEP, in its publication *Phosphorus Control in Lake Watersheds* (1992 and 2008), lists performance standards and techniques for reducing phosphorus from new development. Winthrop requires developments subject to its Subdivision Ordinance (section 8.B.5) and Zoning Ordinance (section 4.1.7) to design according to these standards, and utilizes CWD review capabilities when considering developments located within the various lake watersheds in the town. The CWD provides technical assistance and review of development applications as well as performing lake quality monitoring.

A more recent planning concern in relation to lake water quality is the threat posed by invasive water plants. Maine, for years isolated from the plague of milfoil, is now seeing more and more frequent occurrences of it. Eurasian Water-milfoil, the most aggressive milfoil species, has yet to penetrate this area, but other forms of non-native milfoils, particularly variable Water-milfoil, have shown up nearby, including in Messalonskee Lake, Lake Auburn, and in Pleasant Pond, the terminal waterbody in the Cobbossee Stream watershed. The State has initiated several measures aimed at preventing the spread of invasive plants, including posting signs at strategic points and supporting courtesy boat inspections at most public boat landings. In addition, the CWD has a Maranacook Watershed Management Plan, completed in 2008, which outlines strategies to control the introduction of invasive plants,.

a. Berry/Dexter Pond

Berry and Dexter Ponds, located in Wayne and Winthrop, have approximately 2,080 and 390 acres of drainage area in Winthrop, respectively. Both ponds show dissolved oxygen depletion in the bottom waters during summer periods, which may to some degree, facilitate the internal recycling of phosphorus from bottom sediments during these periods. The ponds have a Trophic State Index (TSI) which indicates moderate algal production usually associated with average transparency and average chlorophyll-a, a photosynthetic pigment that imparts a green color to plants, including algae. Water quality in both Berry Pond and Dexter Pond is rated as moderate-sensitive.

b. Carlton Pond

Carlton Pond, located in Winthrop and Readfield, is currently the secondary water supply for the Augusta Water District, which serves up to 40,000 people per day. Carlton Pond discharges into Upper Narrows Pond, which serves as the primary water supply for the Town of Winthrop.

Cobbosee Lake is available as a backup, and the District recently activated three deep wells to relieve pressure on Carlton Pond. The District has a filtration plant to treat all water.

The watershed of the pond is well-protected. Between 1905 and 1908 the District purchased approximately 600 acres of land in Readfield and 50 acres in Winthrop, and since that time has owned the entire perimeter of the Pond. Today the District owns 710 acres surrounding Carlton Pond. There are no current plans to sell or develop any of the District's ownership. It is currently listed as Tree Growth, and managed for timber production. Portions of the watershed are also a state game preserve, and public access to the pond is highly restricted. The District also owns and operates the dam controlling the Pond's water level, which is located at the outlet in Winthrop.

Carlton Pond is classified "moderate-sensitive" in DEP's water quality classification. Total phosphorus levels are relatively high for such a pristine lake, and in 1998, it experienced an algae bloom. The lake has had several years of poor clarity in monitoring test, and also has a history of low dissolved oxygen levels. None of these problems rise to the level of significant concern for the water district.

The undeveloped nature of the watershed, including a virtually undeveloped shoreline, forces a consideration of major development impacts in the future. The Augusta Water District owns substantial amounts of land in the watershed, which is also valuable as open space.

c. Little Cobbosee Lake

Little Cobbosee (Cobboseecontee) Lake, a 74 acre lake located in northeast Winthrop, shows dissolved oxygen depletion in the bottom waters to levels which are considered to be high risk and has developed, or will develop, a significant phosphorus internal recycling problem. The lake supports algal blooms on a near-annual basis, which severely reduce transparency. Water quality in the Little Cobbosee Lake is classified as "poor," one of only three lakes with watersheds in Winthrop so-designated, but it is relatively undeveloped, with a good portion of the watershed used for agriculture, particularly orchards. The lake remains on the state's list of impaired waterbodies, and as a consequence, a Phosphorus Control Plan – Total Maximum Daily Load (TMDL) report was required by the USEPA. The Cobbosee Watershed District prepared and completed the PCAP-TMDL for the lake in 2005.

d. Maranacook Lake

Maranacook Lake is composed of two distinct basins. The northern basin, located in Readfield, is smaller and shallower and exhibits water quality that is slightly below average for Maine lakes. Phosphorus concentrations have, for several years, hovered at about 12-14 parts per billion (with 15 being a critical threshold), but there has been no significant decline noticed in clarity or other measures. Oxygen depletion occurs in the bottom waters during the summer. The possibility of excessive watershed phosphorus loading and the potential for internal phosphorus recycling are real concerns for future water quality of this basin.

The southern basin of Maranacook Lake is located partially in Readfield and, primarily, in Winthrop, directly downstream of the northern basin. Maranacook Lake is used as a source of drinking water by some lakefront owners. The large south basin of Maranacook Lake is the deepest lake in Kennebec County at over 125 feet deep. During stratification it remains well-oxygenated to the bottom depths, providing a large volume of water to support a cold water fishery.

Together, the north and south basins of Maranacook Lake and their respective direct watersheds pose a challenge to water quality management in Winthrop as well as in Readfield. The lake is rated “moderate-sensitive” by DEP. The watershed in Winthrop consists of over 2,600 acres. There are extensive areas of recent development within the watershed. Concerns expressed by the Cobbossee Watershed District range from erosion along camp roads to runoff from the school parking lots. The CWD completed a Watershed Management Plan for Maranacook Lake in 2008 that was funded, in part, through Section 319 of the federal Clean Water Act. The Plan outlines prescribed actions that should be taken by both citizens and officials of the towns of Winthrop and Readfield to ensure the future protection of the lake’s two basins.

e. Apple Valley Lake

Apple Valley Lake is an isolated pond just east of Mount Pisgah, with virtually no development activity in its direct watershed. Also known as Nancy’s Bog, it was controlled by an earthen dam until the dam failed in 1997, causing a dramatic reduction in pond volume. Prior to the dam failing, the pond had a maximum depth of 25 feet. The current depth profile of the pond is unknown as it has not been surveyed since the dam failure. It was previously listed as having “moderate/sensitive” water quality.

f. Annabessacook Lake

Annabessacook Lake lies in the southwestern corner of town. It is the third largest water body in Winthrop (1,420 acres), and has a direct watershed area within Winthrop of more than 4,400 acres. Lakes immediately upstream of Annabessacook Lake that are located wholly, or partially, within the Town’s boundaries include Maranacook Lake, Wilson Pond, and Lower Narrows Pond. The shoreline is well-developed on the southern and western shores, but less intensely developed along the east shore. Annabessacook has responded in recent years to aggressive treatment with substantially lower phosphorus concentrations, increased clarity, and decreased algal biomass, and now exhibits good water quality, according to the Cobbossee Watershed District. The DEP, however, still classifies the water quality as “poor-restorable,” and recommends a high level of protection. Despite the improved water clarity, the lake remains on the State’s list of impaired waterbodies, and as a result, the USEPA required that a Phosphorus Control Action Plan-Total Maximum Daily Load report be prepared for the lake. The Cobbossee Watershed District prepared and completed the PCAP-TMDL in 2004.

g. Cobbossee (Cobbosseecontee) Lake

Cobbossee (Cobbosseecontee) Lake is the largest of the Winthrop lakes, covering the most acreage and lying along the southeastern boundary of the town. Approximately 2,250 acres of the

town contribute to the direct watershed of the lake. Hydrologically, major surface sources of input to the lake include the outflow from Annabessacook Lake via Jug Stream, inflow from Jock Stream, a major tributary to the south, and the outflow from Little Cobbosseecontee Lake. A considerable fraction of Monmouth, Manchester, West Gardiner, and Litchfield also drain into the lake. Both the shore frontage and the larger watershed of Cobbosseecontee Lake are moderately well-developed, making it very sensitive to additional development. The lake has also been known for serious water quality problems in the past, and water quality is still rated “poor.” Phosphorus loading was nearly cut in half following a 1978 restoration project but the lake continued to frequently experience mid-summer nuisance algae blooms, defined by the Maine DEP as severe enough to reduce water clarity to less than 2 meters (6.7 feet). As a result, the State placed Cobbossee Lake on the list of impaired waterbodies. Beginning in the late 1990’s however, the lake showed consistent signs of improving, and after about 10 years without supporting a “nuisance” algae bloom, the State removed Cobbossee Lake from the list of impaired waterbodies in 2006 and awarded the CWD with the DEP’s Outstanding Achievement Award for three decades of aggressive lake restoration efforts. Algae blooms still do occur in Cobbossee Lake, but they are not as severe as in past years and often do not occur until late summer or early fall. According to the CWD, there is still much that needs to be accomplished to protect and improve Cobbossee lake further

The CWD has focused lake protection efforts since the restoration on agricultural animal waste management and other existing nonpoint sources of pollution in the watershed, as well as on preventing phosphorus loading from new development. Despite recent improvements in water quality, the DEP continues to recommend a “high” level of protection for the lake.

h. Narrows Pond (Upper and Lower)

Upper and Lower Narrows Ponds are located in the central area of the town and each has its own distinct direct watershed separated by the causeway of Narrows Pond Road. Both are in the 250-300 acre size range and are relatively deep at 59 and 106 feet, respectively. Both ponds have moderate shoreline development and are listed as “moderate-sensitive” for water quality. Upper Narrows Pond is the primary source of water for the Winthrop Utilities District.

Upper Narrows Pond is listed on the state’s list of “Lake Most at Risk from Development”, as well as the list of impaired water bodies. Due to its water quality classification and residence on the “list”, Upper Narrows Pond was the subject of a Total Maximum Daily Load (TMDL) report prepared by the Cobbossee Watershed District in 2001, which addressed phosphorus as the pollutant of concern. Fortunately, Upper Narrows does not support algal blooms and generally has wonderful water clarity, but the bottom waters of the pond do become devoid of dissolved oxygen during the summer period, which not only limit the available habitat for coldwater fishes, but raise the potential for phosphorus liberation from the lakes bottom sediments. The main recommendation of the TMDL was to reduce the phosphorus loading from the watershed sufficiently enough to reduce the average phosphorus concentration in the pond by 1 part per billion, albeit a small amount, but considered adequate to stabilize the pond’s water quality.

i. Wilson Pond

Wilson Pond lies upstream from Annabessacook, technically in Monmouth and Wayne. The direct watershed of Wilson Pond covers acres in Winthrop. The pond has had good water quality in the past, but has declined steadily, exhibiting its worst water quality on record in 2004. In 2005, water quality improved somewhat, but this may have been due to higher rainfall totals or the closure of a dairy farm near the lake in Wayne. The CWD surveyed the watershed in 2005-06, identifying locations of existing and potential phosphorus runoff. The DEP assigned a high probability of development to this watershed (even though it is relatively isolated) and the CWD concluded that unless actions are taken to mitigate phosphorus runoff from the watershed Wilson Pond is highly likely to decline further. Due to the general decline in the pond's water quality, the State placed the pond on its List of Impaired Waterbodies in fall of 2006. The CWD and others completed the required Phosphorus Control Action Plan-Total Maximum Daily Load in 2007, and followed that up with a successful grant application to DEP in 2008 to apply funds, available under Section 319 of the federal Clean Water Act, to address some of the major sources of phosphorus pollution to the pond.

Except for Apple Valley, every lake in Winthrop is on the DEP's list of lakes most at risk from development (Appendix A from *DEP Rules Chapter 502, Stormwater Management*). The Town of Winthrop, in cooperation with CWD (of which it is an active member) and DEP, is part of several programs to maintain and improve water quality in our lakes. The Town has participated in restoration work and numerous phosphorus mitigation projects.

Wetlands

Wetlands serve important functions as stormwater storage areas and surface water filtration systems. They also provide critical habitat for certain species of birds, fish, and aquatic mammals, especially as breeding grounds. They provide unique environments necessary for certain aquatic vegetation. In addition, wetlands provide open space for some forms of recreational enjoyment or aesthetic appreciation.

Maps prepared under the National Wetlands Inventory and Maine Department of Inland Fisheries and Wildlife show wetlands with high and moderate value for waterfowl. The riparian area surrounding these wetlands is required to be subject to Shoreland Zoning. These areas are shown in the Water Resources Map.

In Winthrop, there are at least twenty such wetlands. The most significant are often associated with open water; Annabessacook Lake, Apple Valley Lake, Upper Narrows Pond, Kezar Pond, and Little Cobbossee Lake all have wetlands complexes connected to them. There is also an extensive wetland along Case Road.

An emerging issue for the town is the existence and location of vernal pools. Usually associated with wetlands, vernal pools are seasonal bodies of water that provide essential breeding habitat for several species. They are not always recognizable in other seasons, so have been vulnerable to destruction on a regular basis. They are not yet mapped to any extent, but with new attention to their importance in the ecosystem, the Town should incorporate some protection of them into its development standards.

Critical Natural Areas

Water bodies, watercourses, and wetlands provide habitats necessary for the continued survival of many wildlife species associated with Winthrop and its environs. Lakes and their shorelines, streams, brooks, and wetlands provide suitable habitats, nesting areas, or travel corridors for fish, beaver, muskrats, mink, otter, fisher, raccoon, deer, moose, waterfowl, and other birds, to name just a few of the wildlife species indigenous to Winthrop.

Natural Heritage and Critical Areas

The State has identified natural heritage and critical areas reflecting endangered or valuable plants through its Natural Areas Program. Their data (shown on the Natural Features Map) identifies one “Exemplary Natural Community,” an area of northern hardwood forest just to the east of Wilson Pond, featuring a complex of maple, basswood, and ash. The map also identifies three other areas that may contain exemplary populations of rare plant species. They are:

- Water Stargrass, located at the north end of Upper Narrows Pond,
- Broad Beech Fern, on an island in Cobbossee Lake, and
- Stiff Arrow-head, located on the north shore of Little Cobbossee Lake .

A bald eagle nest has been identified on an island in Annabessacook Lake near the Monmouth town line. State rules prohibit development activity within a quarter mile radius of the nest site, which would affect a very small portion of the mainland shoreline in the area.

The Winthrop Zoning Ordinance does not currently require development applications to identify or propose protection measures for rare or endangered species or natural communities. The Subdivision Ordinance (section 8.B.11) permits the planning board to require open space be set aside for “rare or irreplaceable natural areas.”

Deer Habitat

Whitetail deer are the most common large wildlife in Winthrop. Deer are drawn to areas with both food and shelter available, commonly referred to as “edge,” and Winthrop residents are accustomed to viewing them throughout town. The habitat limitation for deer, however, occurs in the Winter, when heavy snow obscures most food sources. At this time, food and shelter are limited to areas of fairly dense evergreen cover, where the ground may be exposed and the climate is somewhat moderated. These areas are known as deer wintering areas or “deeryards.”

According to IF&W, there are at least seven deer wintering yards in Winthrop, none of which are particularly threatened by development. These are depicted on the Natural Features Map. The more significant ones include an area between Route 202 and Annabessacook Road, another to the northwest of Little Cobbossee Lake, and another just south of Maranacook Road.

The IFW does not recommend limitations on development or timber cutting to preserve deer wintering areas, but encourages landowners to adopt management practices that will preserve their integrity.

Analysis and Key Issues

Analysis and Threats to Water Resources

One significant sand and gravel aquifer is defined in Winthrop. The remainder of the Town has a moderate to low potential groundwater yield. The location of the aquifer is such that it could have potential for public water supply; however, the closed town landfill sits on top of it and its quality is unknown.

Regardless of whether the groundwater sits within an aquifer or not, it is susceptible to pollution from either point or non-point sources. Point sources are primarily made up of land use activities that involve chemicals or toxic waste products. These range from gas stations to dry cleaners. All such new activities should be required to have a spill control plan and containment systems.

Non-point sources are those that do not have an identifiable discharge point. One of the principal non-point pollutants is nitrate. Nitrate contamination of groundwater is most likely on agricultural lands, where it can be generated by manure or over-fertilization. A farm such as the egg farm has a high potential for nitrate contamination if their wastes are not adequately managed, as do old dairy farms. Poorly designed or functioning septic systems may also be a source of nitrates. Winthrop's subdivision ordinance contains a nitrate testing requirement.

Winthrop has outstanding surface water resources, though threatened by both point and non-point pollution sources, the same as groundwater. Point sources may include commercial emissions, combined sewer overflows ("CSO's"), or "straight pipes" or malfunctioning septic systems from camps. Winthrop has been working for years to eliminate these potential pollution sources from lakes and streams, together with the Cobbossee Watershed District and state and federal governments. As long as these efforts continue, point sources are considered a negligible threat.

Due to their diffuse nature, non-point sources of pollution are more difficult to bring under control than are point sources. Lake watersheds, in particular, are vulnerable to development and other activities that may cause increases in surface runoff and soil erosion, contributing to a decline in surface water quality. With the exception of Carleton Pond and Apple Valley Lake, the lakes and ponds in, or abutting, the Town of Winthrop are to some extent at risk from new development.

Continued work with the Cobbossee Watershed District addresses both new development and existing development as well. Existing land use and maintenance activities, such as farming, road maintenance, or lawn care, need to be done in an environmentally responsible manner to ensure the continued quality of the town's surface water resources. Landowner education and implementation of Best Management Practices for earth-moving activities are necessary program elements.

Wetlands associated with the Town's hydrologic system provide important functions for water storage, filtration, waterfowl habitat, and open space. Existing protections for wetlands include Shoreland Zoning (local), the Natural Resource Protection Act (state), and Army Corps. of

Engineers (federal – for filling). The conflicts usually occur only when determining where the wetland boundaries lie. This usually requires trained personnel, and is done in conjunction with a development application. Vernal pools are an emerging issue. They are much harder to identify.

Analysis and Threats to Critical Natural Resources

Water bodies, watercourses, and wetlands provide habitats for many wildlife species. Other special habitats are provided by wooded areas. The State has identified six natural heritage or critical areas in Winthrop reflecting endangered or valuable plants or unique habitats. The “Beginning With Habitat” Initiative has produced a series of maps and analyses illustrating how conservation lands together with large blocks of undeveloped space, wetlands, riparian areas and other elements of wildlife habitat can work together to preserve essential natural resource features of a town.

Our natural resources do not stop at the town’s boundaries, nor are they the exclusive responsibility of the town. Successful protection of valuable resources depends on cooperation with neighboring towns, with conservation organizations, and with private landowners. Winthrop’s Conservation Commission, primarily engaged in management of the Mt. Pisgah Conservation Area (discussed in Recreation Chapter), is also charged with coordinating activities of other conservation-related organizations. The Kennebec Land Trust is active in Winthrop.

Resource Constraints to Development

The topography of Winthrop is generally hilly. Soils are derived from glacial till and meltwater and tend to have high water tables, constraining their use for development. Management of these areas is important to protect groundwater quality and quantity and surface water quality.

The natural landscape--its topography, soils, surface water, groundwater, wetlands, vegetation, wildlife, potential for resource production, and other natural areas--as well as the built environment present both constraints to and opportunities for development. The constraints can be generalized as follows:

| | Severe | Significant | Moderate |
|--------------------------------|--------|-------------|----------|
| Slope | | | |
| ! greater than or equal to 20% | X | | |
| Soils (w/septic) | | | |
| ! unsuitable for development | | X | |
| 100-Year Floodplain | X | | |
| Aquifers | | | |
| ! high yield | | | X |
| Lake watersheds | | | X |

Unique Areas and Wetlands

| | | |
|--------------------------------------|---|---|
| ! waterfowl and wading bird habitats | | |
| - high/moderate value | X | |
| ! deer wintering yards | | X |
| ! Critical natural areas | X | |
| Scenic views | | X |

As can be seen from this table, the most severe constraints to development are steep slopes, floodplain, and certain high value natural areas. The best solution is to prohibit development altogether in these areas, though the town's Floodplain Ordinance should permit limited forms and design of development.

Unsuitable soils can present significant constraint to development. In some cases, where the soil type is indicative of wetlands or steep slopes, it becomes a severe constraint. But in other cases, the constraint may be overcome with more expensive design or construction techniques.

Other constraints are considered "moderate," because they present fewer challenges to development. In nearly all cases, these challenges can be met with suitable design standards.

Goals, Policies, Strategies

State Growth Management Goals:

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

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

Policies:

- Protect current and potential drinking water supplies,
- Protect significant water resources from pollution and improve water quality where needed,
- Protect water resources in growth areas while promoting more intensive development in those areas,
- Minimize pollution discharges through the upgrade of existing public sewer systems,
- Cooperate with neighboring communities and local or regional advocacy groups to protect water resources and shared critical natural resources,
- Conserve critical natural resources in the community.

Strategies:

- 1) Amend local land use ordinances to incorporate stormwater runoff performance standards consistent with the Maine Stormwater Management Rules, DEP allocations for phosphorus, and the MPDES program.
- 2) Update the Floodplain Management Ordinance to be consistent with state standards.
- 3) Incorporate low impact development standards for stormwater, particularly for single family development.
- 4) Enact public wellhead and aquifer protection standards or protection mechanisms.
- 5) Provide BMP information to farmers and loggers.
- 6) Adopt water quality protection practices for construction and maintenance of public roads and properties; require their implementation by public employees and contractors.
- 7) Participate in local and regional efforts to monitor, protect, and improve water quality, emphasizing the continued support for Cobbossee Watershed District programs.
- 8) Provide educational materials at appropriate locations regarding invasive species.
- 9) Amend local shoreland zoning to meet state guidelines.
- 10) Designate critical natural resources as Critical Resource Areas in the Land Use Plan.
- 11) Require subdivision and commercial property developers to identify and take appropriate measures to protect critical natural resources on their sites, through site design, construction timing, and/or extent of excavation.
- 12) Require the planning board in development review processes to consult maps and information provided by the Maine Beginning with Habitat Program.
- 13) Adopt natural resource protection practices for construction and maintenance of public roads and properties; require their implementation by public employees and contractors.
- 14) Participate in regional planning, management, and regulatory efforts to protect critical natural resources.
- 15) Pursue public/private partnerships to protect critical natural resources such as purchase of land or easements from willing sellers.
- 16) Make information available to those living near critical natural resources about applicable local, state, or federal regulations.