

## **H. WATER RESOURCES**

### **1. Purpose**

This section will present an overview of Orland's water resources. An understanding of water resources is important since all residents must have a reliable source of drinking water. Specifically, this question will:

- a. describe the characteristics, uses, and quality of Orland's significant water resources;
- b. predict whether the quantity or quality of significant water resources will be threatened by the impacts of future growth and development; and
- c. assess the effectiveness of existing measures to protect and preserve significant water resources.

### **2. Key Findings and Issues**

One of the key fresh water resources within Orland are its many great ponds. Craig Pond has been rated by the DEP as having an outstanding water quality, which is the highest possible rating in the state. While there are no serious water quality problems in the town's other lakes, some have the potential for contamination from phosphorus build-up. There is, however, still time to prevent such problems from occurring.

Most residents depend on private wells for their drinking water supply. Overall, ground water supplies and quality are adequate. The installation of the sewer in the village area eliminated one major threat to water quality.

### **3. Public Opinion Survey and Community Workshop Results**

Several residents mentioned clean water and lakes as assets during the first citizen workshop. About 83 percent of the survey respondents favored ordinances or other measures to protect aquifers while 77 percent favored such measures to protect lakes and ponds.

Sixty-two percent supported measures to protect wetlands. Seventy percent would favor restricting land uses in areas where there is a high likelihood of surface water contamination. Only 12 percent, however, felt that potable water was a problem. Similarly, only 17 percent felt that "air and water quality" was a problem.

## Section H: Water Resources

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### 4. Surface Water Resources

#### a. Fresh Water Bodies and Watersheds

There are twelve great ponds, naturally occurring lakes of ten acres or more or man-made lakes of thirty acres or more, whose watersheds include at least a portion of Orland. These lakes are described in Table H.1. The watersheds of Craig, Heart and Little Ponds lie entirely within Orland. The other watersheds are shared with adjoining towns. In the case of Long Pond, however, only 2.2 percent of the watershed lies within Orland and the pond itself lies entirely outside of the town.

The Maine Department of Environmental Protection rates lakes in terms of their water quality and degree of phosphorus loading. Phosphorus is one of the key factors affecting water quality. While phosphorus is a naturally occurring phenomenon, man-made operations such as timber harvesting, and road and home construction increase the amount of phosphorus in a watershed. Phosphorus washes into water bodies, causing algae to multiply, oxygen levels to fall, fish to die, and water to turn green. A developed area can send as much as ten times the amount of phosphorus into a lake as a forested area. Since phosphorus can originate anywhere in a watershed, shoreland zoning alone does not protect a lake from excessive phosphorus loading.

The water quality categories shown in Table H.1 are based on the water bodies' vulnerability to phosphorus levels. This rating is derived from many variables such as frequency of the flushing of the lake water, population growth and land development rates within the watershed. As seen, Only Craig Pond is rated "outstanding," which means that it has exceptional water quality. Branch Lake has "good" water quality, which is greater than average.

The remaining ponds are either "moderate/sensitive" or "moderate/stable." Lakes that are "moderate/sensitive" have a high potential for phosphorus recycling from lake bottom sediments while those ranked as "stable" have water quality that is not declining under present phosphorus loading. Table H.1 has a complete definition of these and other lake status qualities. Particular attention should be paid to lakes in the "sensitive" category.

The "F" factor shown in Table H.1 is the DEP phosphorus coefficient for Orland's share of a given watershed. For Heart Pond, for example, DEP estimates that 6.90 pounds generated from the watershed per year would result in a one part per billion (ppb) increase in phosphorus in the pond. By contrast, the less vulnerable Alamoosook Lake could handle 107.78 pounds per year before a comparable increase in phosphorus is achieved.

The phosphorus coefficient is not a measure of water quality, but rather an indicator of the pond's capacity to accept phosphorus based on the acreage of the watershed. This coefficient can be used as a planning guide for setting development standards for a given watershed. These standards do not necessarily restrict development, but rather require that certain mitigating measures be undertaken to

## Orland Comprehensive Plan: Inventory and Analysis

minimize phosphorus run-off. Specific examples of such standards are discussed in Section H.7.

<b>Table H.1 Characteristics of Major Ponds and Lakes Orland</b>					
	Direct Drainage Area (acres in Orland)	% of total DDA	Lake Status Quality	F (lbs/ppb/yr)	Other Towns in Watershed
Alamoosook Lake	9,901	75.8	Mod/Stable	107.78	Orland, Bucksport, Penobscot
Branch Lake	1,423	9.5	Good	22.71	Orland, Dedham, Ellsworth
Craig Pond	595	100.0	Outstanding	13.40	Orland
Heart Pond	546	100.0	Mod/Sensitive	6.90	Orland
Hothole Pond	5,512	92.6	Mod/Sensitive	33.69	Orland, Bucksport
Jesse Bog	254	71.3	Mod/Sensitive	1.80	Orland, Ellsworth
Little Pond	84	100.0	Mod/Sensitive	0.70	Orland
Long Pond	266	2.2	Mod/Sensitive	2.13	Orland, Bucksport, Dedham, Holden
Lower Patten Pond	79	1.6	Mod/Stable	1.16	Orland, Ellsworth, Surry
Rocky Pond	1,109	97.6	Mod/Sensitive	11.20	Orland, Ellsworth
Toddy Pond	2,399	21.8	Mod/Stable	36.49	Orland, Blue Hill, Penobscot, Surry
Upper Patten Pond	2,260	58.0	Mod/Sensitive	21.80	Orland, Ellsworth, Surry

Lake status quality refers to the lake's ability to accept additional phosphorus. The following categories are used:

Outstanding: Exceptional water quality  
 Good: Greater than average water quality  
 Moderate/Stable: Average water quality, not declining under present phosphorus loading  
 Moderate/Sensitive: Average water quality, but high potential for phosphorus recycling from lake bottom sediments  
 Poor/Restorable: Lake supports algal bloom - restorable  
 Poor/Low Priority: Lake supports algal bloom, but restoration appears infeasible

**Source:** Maine DEP, Lakes Division

## Section H: Water Resources

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### **b. Marine Water Quality**

The DEP classifies all surface water in Maine. These classifications set the standards allowed for discharges of pollutants. The majority of waters in the state, including most adjacent to Orland, are classified "SB," which is the second highest classification. Per DEP standards, habitats in these waters "shall be characterized as unimpaired." No discharges that would cause closure of open shellfish areas are permitted. Dissolved oxygen contents are set at 85 percent.

Those Orland waters bordering Verona Island, however, are presently classified "SC," the third highest classification for salt waters. Discharges to such waters may cause some changes to estuarine and marine life provided that the receiving waters are of sufficient quality to support all indigenous species and maintain the structure and function of the resident biologic community. The dissolved oxygen content of Class SC waters is set at 70 percent.

### **c. Threats to Surface Water Resources**

There are two types of pollution that threaten surface water: point and non-point. Point pollution is attributable to a specific source such as a pipe discharging into a stream. Non-point pollution comes from a general source such as stormwater runoff that carries oil spilled on a road into a stream.

Since Orland is a rural-residential town, most of the potential threats to water resources come from failing septic systems. The town has been gradually addressing the overboard discharge of untreated domestic waste into marine waters. Water quality has also been improved by the installation of a public sewer in the Orland village area.

As discussed above, the town's ponds and lakes are also vulnerable to contamination. A long-term threat is poorly planned development in the watershed or extensive timber harvesting. Development any place in a watershed could have an adverse impact on lake water quality. Another potential threat is the condition of septic systems in camps around the ponds. Many of the pre-1974 systems (i.e., those that predate more stringent state standards) have been replaced in recent years. There has thus been a gradual upgrading of the systems.

One significant local water quality issue is summer draw downs of Craig and Toddy Ponds. The water is used by the Champion Mill in Bucksport. Since the water rights were granted by the state, the town has little immediate control over this situation. It does, however, result in sedimentation problems.

## **5. Ground Water Resources**

As mentioned in the Housing chapter, the majority of Orland residents depend on individual wells for their water supply. Areas that normally yield large quantities of

## Orland Comprehensive Plan: Inventory and Analysis

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water to wells are called sand and gravel aquifers. There are several aquifer areas in Orland that are shown on Map 1. The yield from these aquifers, according to the Maine Geological Survey (MGS), is at least 50 gallons per minute (gpm).

Normally, a well yielding about 1 gpm is considered sufficient for domestic use. Higher-yielding aquifers are possible sources for a public water supply. Given the low-density population in Orland, it is unlikely that any would be developed as a public water source in the foreseeable future.

Most wells in Orland are drilled in bedrock. According to the 1979 Orland Land Use Data Base: A Summary, wells drilled in bedrock usually yield from 15 to 100 gpm. Most bedrock wells reported by the MGS have yields of between 15 and 25 gpm. One, however, had a yield of between 65 and 75 gpm. The Land Use Data Base reported that wells in one bedrock area near East Orland village had yields as high as 225 gpm. It must be stressed that while sand and gravel aquifers normally have relatively high yields of water, yields from bedrock areas are far less predictable.

### a. Ground Water Quality

The DEP has rated Orland's ground water as GW-A. This is the highest DEP classification and it applies to all ground water in the state unless specifically noted otherwise. DEP standards mandate that these waters be of such quality that they can be used for public water supplies. They shall, per DEP standards, be free of radioactive matter or any matter that affects their taste or odor. The only problems with ground water quality noted in the 1979 Data Base were in the Leaches Point area where there were some complaints about high iron content.

### b. Threats to Ground Water

Non-point sources are a potential threat to ground water. Since it takes much longer for ground water to cleanse itself than surface water, it is very important to avoid contaminating ground water. While it is very costly to restore a lake or stream, the cost of cleaning up ground water is usually prohibitive if it can be redeemed at all.

One potential threat to ground water is leaking underground storage tanks (or **L.U.S.T.**). The DEP maintains records of major tanks and former tank sites in town. Its records do **not** include tanks used to store oil for private dwellings, even those these are now also subject to DEP regulation. As of January 27, 1997, DEP listed 45 major tanks or sites in Orland.

Most of the tank sites in Orland are owned either by stores, construction companies, or gas stations. There are only eight tanks in use, the rest have been removed. The tanks still in service have been installed since 1982 and should meet all DEP and U.S. EPA standards and thus pose little threat to water quality. Therefore, L.U.S.T. does not presently appear to be a major problem in Orland.

## **Section H: Water Resources**

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### **6. Future Adequacy of Orland's Water Resources**

Given the relatively slow rate of growth projected for Orland, current drinking water supplies should be adequate for the foreseeable future. The only possible problem would be threats to individual wells from contamination. A greater concern is protecting the town's many great ponds from phosphorus loading. A deterioration in lake water quality would not only harm the town's quality of life, but also threaten the tax base. Studies have shown that value of lake-front properties often declines if the lake develops serious water quality problems.

### **7. Adequacy of Existing Measures to Protect and Preserve Significant Water Resources**

Orland's current measures to protect water resources consist of the shoreland zoning ordinance and the subdivision review standards. Since there is no zoning outside of the shoreland areas, there is little protection from phosphorus loading in lake watersheds. Nor is there any mention of phosphorus control in the subdivision standards. However, the site plan review ordinance does require applicants to undertake measures to mitigate erosion and minimize adverse impacts from surface water drainage.

If the town decides to enact town-wide zoning, it could develop additional measures to protect water quality. These could include an aquifer overlay district, which would specify standards to reduce the likelihood of ground water contamination. The ordinance could also include additional standards to manage storm water run-off that would build on the current site plan review ordinance.

The town could also consider enacting phosphorus control measures in its subdivision ordinance. These standards would reduce the amount of phosphorus loading from a given development. Specific standards could include stricter guidelines for erosion and sedimentation, tree clearing, and vegetative buffers. Such provisions reduce the volume of phosphorus that is carried into a lake through storm water run-off.

### **8. Regional Issues**

One major regional issue is cooperative protection of lake watersheds. Orland may want to approach surrounding towns with whom it shares major watersheds to discuss coordinating protection measures. One of the town's aquifers is shared with Penobscot. Here again, a cooperative approach to protection may be considered. Since the Penobscot portion of the aquifer is in a remote area, no immediate development pressure is anticipated. Another regional issue is the draw downs from Craig and Toddy Ponds. This issue would best be addressed in cooperation with the town of Bucksport and the state.