

Water Resources

Conditions & Trend

- (1) *The community's Comprehensive Planning Water Resources Data Set prepared and provided to the community by the Department of Inland Fisheries and Wildlife, the Department of Environmental Protection and the Office, or their designees.*

See the maps titled Water Resources and Riparian Habitat for the locations in Bowdoinham of National Wetlands Inventory wetlands by type, and Bowdoinham Water Resources for water body classifications, wetland boundaries (drainage divides), wastewater outfall and overboard discharges, and identified significant vernal pools.

The next table shows information on the Bowdoinham Water District for the most recent year available from the Maine Drinking Water Program, as provided in the Comprehensive Planning Water Resources Data Set. Also see the Bowdoinham Water District Service Area Map.

Public Water Supply Information Assessment for the Bowdoinham Water District	
Location of well	Bowdoin
Service Area	Portions of Bowdoin and Bowdoinham
Date	May 1, 2003
Well identification number	90210201; 90210202
Well type	Gravel wells
Well description	90210201: 30 ft (1959); 90210202: 34 ft at 120 GPM
Overburden thickness	90210201: 30 ft 90210202: 34 ft
Wellhead protection radius around the well	90210201: 1,100 ft 90210202: 1,300 ft
Reported distance of land control around the well	At least 500 ft for both wells
Wellhead Protection Ordinance in effect	No
Existing risk of contamination based on well type and site geology	Moderate risk
Positive coliform test	No
Nitrate test greater than 5 ppm	No
Septic system within 300 feet of the well	No
Existing risk of acute contamination	Low risk
No legal land control or control status is unknown or legal control is less than a 150-foot radius around the well	No
Legal control of at least a 150-foot radius of property around the well	Yes
Legal control of at least a 300-foot radius of property around the well	Yes
Future risk of acute contamination	Low risk
Detection of Chronic Chemical Contaminant	90210201: No 90210202: Yes

Public Water Supply Information Assessment for the Bowdoinham Water District	
Name(s) of Chronic Chemical Contaminant(s) Detected	90210202: Bromodichloromethane and Bromoform
Total No. Potential Sources of Contamination within WHPA	None reported
Distance to nearest "Significant Potential Source of Contamination"	90210201: 2,000 feet
Name of nearest "Significant Potential Source of Contamination"	90210201: Animal grazing
Existing risk of chronic contamination	90210201: Low risk 90210202: Moderate risk
Legal control of Entire Wellhead Protection Area	No
Legal control of 2500 Phase II/V Waiver Radius	90210201: No 90210202: Yes
Future risk of chronic contamination - Land Ownership / Control	High risk

Source: Maine Drinking Water Program

Maine has four water quality classes of rivers and streams: AA, A, B, and C (Title 38 MRSA Section 465). Each classification assigns designated uses and water quality criteria (narrative and numeric) and may place specific restrictions on certain activities such that the goal conditions of each class may be achieved or maintained.

- Class AA waters are the highest classification and are an outstanding natural resources which should be preserved because of their ecological, social, scenic or recreational importance.
- Class A waters are the second highest classification and are suitable for the designated uses of drinking water after disinfection; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as habitat for fish and other aquatic life. The habitat must be characterized as natural.
- Class B waters are the third highest classification and waters are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as habitat for fish and other aquatic life. The habitat must be characterized as unimpaired. All waterways in Bowdoinham are Class B. See Title 38 MRSA Sections 467 and 468.
- Class C waters are the fourth highest classification and are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as a habitat for fish and other aquatic life.

Maine Water Quality Criteria for Classification of Fresh Surface Waters				
Classification	Dissolved Oxygen Numeric Criteria	Bacteria (E.coli) Numeric Criteria	Habitat Narrative Criteria	Aquatic Life (Biological) Narrative Criteria
Class AA	As naturally occurs	May not exceed a geometric mean of 64 CFU or MPN per 100 milliliters over a 90-day interval or 236 CFU or MPN per 100 milliliters in more than 10% of the samples in any 90-day interval.	Free flowing and natural	No direct discharge of pollutants; as naturally occurs
Class A	7 ppm; 75% saturation	Same as above	Natural	As naturally occurs
Class B	7 ppm; 75% saturation	May not exceed a geometric mean of 64 CFU or MPN per 100 milliliters over a 90-day interval or 236 CFU or MPN per 100 milliliters in more than 10% of the samples in any 90-day interval	Unimpaired	Discharges shall not cause adverse impact to aquatic life in that the receiving waters shall be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes to the resident biological community.
Class C	5 ppm; 60% saturation	May not exceed a geometric mean of 100 CFU or MPN per 100 milliliters over a 90-day interval or 236 CFU or MPN per 100 milliliters in more than 10% of the samples in any 90-day interval.	Habitat for fish and other aquatic life	Discharges may cause some changes to aquatic life, provided that the receiving waters shall be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.

Source: Maine Department of Environmental Protection

- (2) *A description of each great pond, river, surface drinking water supply, and other water bodies of local interest including:*
- a. ecological value;*
 - b. threats to water quality or quantity;*
 - c. documented water quality and/or invasive species problems.*

See the map titled Natural Resource Co-occurrence for the location of the Focus Area of Statewide Ecological Significance: Kennebec Estuary. This area comprises about half of the Town and all of its principal water bodies: Kennebec River, Merrymeeting Bay, Cathance River, Abagadasset River, and tributary rivers, streams and brooks. The information on the ecological value, threats to water quality and the documented water quality that follow were excerpted from the Maine Department of Conservation Beginning with Habitat description of the Kennebec Estuary.

Merrymeeting Bay / Kennebec River

At the heart of the Kennebec Estuary is Merrymeeting Bay, one of the most important waterfowl areas in New England. Six rivers, draining one-third of the state of Maine, converge in Merrymeeting Bay to form an inland, freshwater, tidal delta. Extensive beds of emergent and submerged aquatic vegetation support thousands of ducks, geese, rails, wading birds, and other water-dependent species during spring and fall migrations. Wild rice is common throughout the bay, providing an important food source for migratory waterfowl and other birds such as bobolinks. The intertidal mudflats are also important feeding areas for migrating shorebirds. Floodplain forests and shrub swamps serve as key migratory stopover sites for neo-tropical passerines.

Over 50 species of freshwater fish and ten species of anadromous fish use Merrymeeting Bay, including the rare Atlantic salmon (*Salmo salar*), shortnosed sturgeon (*Acipenser brevirostrum*), and Atlantic sturgeon (*Acipenser oxyrinchus*). At least one rare mussel species, the tidewater mucket (*Leptodea ochracea*), inhabits the bay. One of the small tributaries flowing into Merrymeeting Bay is Maine's only known location for the redbfin pickerel (*Esox americanus*). American eels, currently believed to be declining in much of their geographic range, are abundant in parts of the bay.

Merrymeeting Bay has some of the Northeast's best habitat for rare plants associated with tidal freshwater marshes. Several sites around the bay are particularly significant, such as the Cathance River, Chops Creek, Eastern River, Lines Island, Abagadasset Point and River, and Swan Island.

Cathance River

The Cathance River, meaning "crooked river" in Abenaki, is a twenty-mile, roaming river that navigates its way through Bowdoin, Bowdoinham, and Topsham. The surrounding watershed is mostly rural with forests, fields, and agricultural lands. The river and the associated Bradley Pond are known for excellent paddling and fishing. Like many areas of Merrymeeting Bay, the freshwater tidal marshes along the Cathance River are dominated by wild rice (*Zizania aquatica*). Less abundant are pickerelweed (*Pontederia cordata*), water parsnip (*Sium sauve*), soft-stem bulrush (*Schoenoplectus tabernaemontanii*), and river bulrush (*Bolboschoenus fluviatilis*).

Perhaps the most notable inhabitant of this stretch of river is the globally rare Eaton's bur marigold (*Bidens eatonii*). More than a thousand individuals of this rare plant live along a 300-meter section of the riverbank. Also present are the rare estuary bur marigold (*Bidens hyperborea*), spongy arrowhead (*Sagittaria calycina* ssp. *spongiosa*), Parker's pipewort (*Eriocaulon parkeri*), and Long's bittercress (*Cardamine longii*).

Abagadasset Point to Pork Point

The cove on the north side of Abagadasset Point has a broad, extensive tidal flat of approximately 200 acres with bands of vegetation. The ledgy Abagadasset Point supports small populations of Parker's pipewort, mudwort (*Limosella australis*), water pimpernel, and Eaton's bur-marigold.

Ecological Services of the Focus Area

- Nutrient export and sediment retention resulting in a rich and productive habitat for aquatic organisms
- Cleansing of water from several major river systems
- Protection of downstream areas from flooding

Economic Contributions of the Focus Area

- Coastal wetlands and dune systems protect properties from storm surge and sea-level rise
- Food source and nursery for commercially important shellfish and finfish
- Destination for duck hunters, birders, paddlers, and beachgoers

Conservation Considerations in the Focus Area

Although much of the shoreline in the lower Kennebec Estuary has been developed, most of the development is low-density residential. Some large parcels remain undeveloped, offering significant opportunities for conservation. However, residential development pressures are increasing, and further development is likely to degrade existing shoreline buffers, fragment wildlife habitat, lower water quality, and serve as a pathway for invasive species. Protection of undeveloped shoreline parcels along the estuary, especially wetlands and wetland buffers, should be a top priority.

Climate change and sea-level rise may have major impacts on estuaries such as the Kennebec. Tidal marshes and other shoreline habitats may be flooded by rising seas, while the entire ecosystem could be altered by rising air and water temperatures, shifts in ocean circulation, increased erosion due to more intense storms, and other poorly understood effects of climate change.

Culverts and other structures crossing streams and rivers should be large enough and installed properly so that they do not block the passage of fish and other aquatic species. Maintaining connections among aquatic habitats allows species to access areas that they use for breeding, feeding, and shelter. For example, forage fish such as silversides move between salt marshes and the open ocean. Removing barriers to fish passage and tidal flow can benefit offshore species that eat forage fish.

Invasive species such as the common reed (*Phragmites australis*) have expanded rapidly in salt and brackish marshes in parts of New England. While invasive plants do not seem to be a major threat currently in the Focus Area, their distribution and abundance should be monitored.

In recent years, the use of personal watercraft has increased dramatically, including illegal use in some of the smaller creeks. Personal watercraft may have negative impacts on waterfowl and sensitive shoreline vegetation.

This area includes Significant Wildlife Habitat for wintering deer, wading birds and waterfowl and shorebirds. Land managers should follow best management practices with respect to forestry and

development activities in and around wetlands, shoreland areas, and Significant Wildlife Habitat. Vegetation removal, soil disturbance and construction activities may require a permit under the Natural Resources Protection Act.

Pollution in the Focus Area

Because Merrymeeting Bay drains nearly one third of Maine, the potential for water-quality degradation is high. Both the Androscoggin and Kennebec Rivers have major industries upriver. Although these industries are much cleaner than in years past, contamination remains in the bay's fine-grained sediments. Eagle eggs from Merrymeeting Bay have been found to contain some of the highest levels of PCBs (polychlorinated biphenyls) ever recorded. Mitigating past and future contamination of the watershed will be a continuing challenge.

Tributary Waterways

The tributary waterways in Bowdoinham face the threats noted above for the Kennebec Estuary, and the town-wide threats to water quality noted below.

The Abagadasset River (16 miles in length) comes to Bowdoinham from Gardiner, through Richmond. It runs among extended wetlands between Carding Machine Road and Route 24 and into the Bay just beyond Brown's Point Road.

Baker Brook runs north to south from the Richmond Border until it runs into the Abagadasset River.

The Cathance River (16.4-miles length) forms a horseshoe shape in Southern Bowdoinham. It comes to Bowdoinham from Topsham; Bradley Pond is its headwaters, it flows by a cattle farm in Topsham, but after that, its shores are still undeveloped. It flows though the Village, where the new Cathance landing boat access and Park are along its shores.

Carros Brook or Heath's Brook seems to get its start about a third of a mile East of Millay Road where it crosses I-95. It meanders right through the Village.

Denham Stream is the next stream running north to south. It comes to Bowdoinham from Richmond. It flows between the White Road and the Ridge Road. It appears to have steep slopes. It does not appear to have residences anywhere near it. The predominant land use in the immediate watershed is forestry. It runs into the West Branch of the Cathance.

Mallon Brook seems to get its start west of the Post Road and runs into Sedgely Brook.

Sampson's Creek (or Puddledock) is that body of tidal water next to the gas station, exiting to the Cathance.

Sedgely Brook seems to get its start right in Bowdoinham between I-95 and the Old Post Road. It runs south right in the middle strip of I-95, then crosses under the Ridge Road to enter the top of the West Branch of the Cathance. It runs through hilly country, farm, and forestland; again, no residences appear to be along its shores.

Shinglemen's Creek - Runs into the Cathance about one-half mile North of the Topsham line. It gets its start around I-95.

The West Branch of the Cathance appears to be no more than a mile stream formed by the confluence of the Sedgely and the Denham streams. It runs between the Ridge Road and River Road into the Cathance where the Railroad and Route 24 coincide, very close to the village.

Wetlands

In addition to providing needed habitat for nearly all wildlife species, wetlands provide natural stormwater control capabilities. As natural basins in the landscape, wetlands are able to receive, detain, and slowly release stormwater runoff. Wetland shelves along stream banks naturally regulate floodwaters by providing an area for swollen stream flows to expand and slow, thereby protecting downstream properties. Wetlands act as natural sponges that can hold water, allowing suspended particles such as sediment to settle out. The dense vegetation in most wetlands helps to stabilize soil and slow water flows, thereby reducing scouring and bank erosion.

National Wetlands Inventory (NWI) maps (the basis of wetlands shown on the map titled Water Resources and Riparian Habitat) are interpreted from high altitude photographs. NWI Wetlands are identified by vegetation, hydrology, and geography in accordance with "Classification of Wetlands and Deepwater Habitats" (FWS/OBS-79/31, Dec 1979). The aerial photographs document conditions for the year they were taken. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State, or local government. NWI maps depict general wetland locations, boundaries, and characteristics. They are not a substitute for on-ground, site-specific wetland delineation.

Vernal Pools

A vernal pool, also referred to as a seasonal forest pool, is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus* sp.), as well as valuable habitat for other plants and wildlife including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition. Whether a vernal pool is a significant vernal pool is determined by the number and type of pool-breeding amphibian egg masses in a pool, or the presence of fairy shrimp, or use by threatened or endangered species. Identified significant vernal pools are shown on the map titled Water Resources and Riparian Habitat.

Town-wide Threats to Water Quality

As noted in the Analyses section, the potential threats to surface and ground water quality come from two categories of discharges: the point sources at the end of a pipe, and the non-point, or dispersed, sources. Bowdoinham is at the end of two long rivers that carry the waste products of numerous paper mills and effluent from many municipal treatment systems.

Non-point source possibilities include malfunctioning septic systems.

There are other potential sources of contamination. They include, but are not limited to:

- Closed dumps in the Denham and Abagadasset Watersheds which are monitored by test wells

- Fertilizer (nitrates) up river from the site of the chemical plant at an abandoned farm
- Pesticides, fertilizer, manure, and sludge used in farming and residential lawns and gardens
- Erosion of soil from plowing or wood cutting operations along the streams
- Road treatments and spill potential along the highway and other roads

It is not known if any of these potential sources of contamination have become actual.

See the map titled Bowdoinham Water Resources for the locations of point-source pollution (discharges) and Map of Turnpike Streams (non-point) in Bowdoinham. See the Marine Resources Chapter for more information on the Town's coastal waterways.

Underground Oil Tanks

There are registered underground oil tanks at two locations in Bowdoinham: Bowdoinham Community School (23 Cemetery Rd) and G&G Gas and Repair Station (50 River Rd). Both sites are in the village area. According to the State, in Bowdoinham most of the registered underground oil tanks have been removed. Given the potential for oil leakage into the surrounding soils and groundwater and the high costs for cleanup of contaminated sites, the removal of underground oil tanks is recommended.

- (3) *A summary of past and present activities to monitor, assess, and/or improve water quality, mitigate sources of pollution, and control or prevent the spread of invasive species.*

The Maine Department of Environmental Protection (DEP) and Department of Marine Resources (DMR) monitor water quality regionally. The State monitors water quality at the site of discharge of treated effluent from the Bowdoinham Community School (RSU/MSAD 75) wastewater outfall and facilities on a regular basis.

A study of the Kennebec Estuary (Moore, S., and J. Reblin. 2010. *The Kennebec Estuary: Restoration Challenges and Opportunities*. Biological Conservation, Bowdoinham, Maine) noted that mercury concentrations in Kennebec Estuary eels from Bowdoinham exceeded the Maine Center for Disease Control & Prevention mercury fish tissue action levels for developmental and adult health as well as the US EPA mercury subsistence consumption screening value. Lobster tomalley, American eel, rainbow smelt, and smallmouth bass from the Kennebec Estuary have each exceeded Polychlorinated Biphenyls (PCB) tissue action levels for reproductive- developmental health and cancer-related risk. In 2006, Maine DEP documented elevated dioxin concentrations in fish and shellfish of the Kennebec Estuary.

On monitoring, the same study found, "The lack of data allowing assessments of current ecological conditions will hinder restoration efforts until consistent funding sources are marshaled to support and, in some cases, expand programs that have demonstrated benefit. There is also a dire need to initiate new research and monitoring programs that more realistically reflect the complexity of managing natural systems. Currently, accurate assessments of system health and risk to human well-being are hampered by a lack of data that would otherwise characterize lynchpins of ecosystem integrity and resilience such as water quality, dominant plant communities, and toxic contaminant levels."

The Friends of Merrymeeting Bay monitor invasive species on a volunteer basis. Statewide, most monitoring is done through volunteer groups and associations, as State funding is limited.

(4) *A description of the location and nature of significant threats to aquifer drinking water supplies.*

According to current State data, no significant aquifers exist in Bowdoinham. A significant aquifer is capable of yielding 10 gallons or more of ground water per minute to a properly installed well.

Groundwater Resources

Precipitation that does not run off as surface water infiltrates the soil. Some may remain near the surface as soil moisture, where it is drawn up by the roots of plants, but much of it continues to percolate downward, becoming groundwater. Depending on underground conditions, recoverable groundwater supplies may be plentiful or scarce in any given location.

Because virtually all of Bowdoinham's drinking water is drawn from groundwater sources, this is a particularly important resource.

Bedrock Groundwater

Groundwater is found in the cracks and fissures of the underlying granite bedrock (ledge). From wells drilled in bedrock there are usually a relatively low yields and sometimes wells must be drilled to depths of several hundred feet to obtain adequate yields for household use. Typically, yields are below 10 gallons per minute (gpm). Occasionally, there are high yield bedrock wells, but these are rare. Nearly all of Bowdoinham's private wells draw groundwater found in bedrock.

Sand and Gravel Aquifers

In Bowdoinham, the only sand and gravel aquifer is located in the Brown's Point area. It has an estimated yield of 10 to 50 gallons per minute, which is suitable for a small public water supply. This aquifer currently provided water for several residents in the area, the irrigation of the agricultural land in the area and the vegetable washing facilities on Pork Point Road.

Sand and gravel aquifers, are highly porous and allow for both storage and release of greater volumes of water through shallower wells that do not need to penetrate bedrock. Groundwater is available in higher yields from sand and gravel deposits that lie below the ground surface, but above the bedrock.

There is another sand and gravel aquifer of significance to Bowdoinham because it is a source of supply for the Bowdoinham Water Company. It is located in Bowdoin. Its yield is listed as 210 gallons per minute or 302,000 gallons per day. The Public Water System is described in the Public Facilities and Services Chapter.

Threats to Groundwater Quality and Quantity

Because sand and gravel aquifers are porous and transmit water rapidly, they are susceptible to pollution. Once a pollutant enters an aquifer, its movement is governed by the groundwater flow, and it may remain in the aquifer for an indeterminate period. The impact of a pollutant on an aquifer depends on the size and characteristics of the aquifer and on the nature and amount of pollution that is introduced. Sources of aquifer pollution are often located on the ground surface directly above or contiguous to the aquifer. Septic tank effluent, landfill effluent, leakage from ruptured and/or abandoned fuel tanks, uncontrolled hazardous materials sites, road salt, sand-salt storage piles, and agricultural fertilizers and pesticides are all possible sources of aquifer pollution.

Drinking water threats may be particularly acute to those residents with dug wells or well points. East Bowdoinham lies atop a shallow aquifer and as such is particularly prone to water quality threats from the surface.

Gravel mining may expose the water table to direct pollution and may result in increased evaporation.

The town's planning process should carefully assess the availability of groundwater in terms of present and future demands for water; the potential lasting values of groundwater should not be jeopardized by excessive exploitation of their other values.

(5) *A summary of existing lake, pond, river, stream, and drinking water protection and preservation measures, including local ordinances.*

State and federal laws that protect water resources are summarized below. Enforcement of these laws by State agencies can be limited due to agency staffing levels. Compliance with most State and federal environmental regulations is often left to individual landowners. In many communities, there is greater monitoring and enforcement of State and federal regulations through the municipal Code Enforcement Officer. Some of the most significant State laws affecting water resources, and other natural resources, include the following:

- Maine Erosion and Sedimentation Control Law – requires basic controls and stabilization when a project involves filling, displacing, or exposing earthen material. No permit is required, but the law sets minimum across-the-board standards that help prevent harm to surface waters.
- Maine Forest Practices Act – requires that landowners notify the Bureau of Forestry of any commercial timber harvesting activities, and that commercial harvest activities meet specific standards for timber harvesting adjacent to water bodies, clearcutting and forest regeneration following the timber harvest. If harvesting activities result in a clear-cut larger than 5 acres, there must be a separation zone between clearcuts, and regeneration standards must be met. This rule requires a harvest management plan developed by a licensed forester for clearcuts greater than 20 acres. The rules prohibit clearcuts greater than 250 acres.
- Maine Natural Resource Protection Act (NRPA) – regulates activities in, on, over or adjacent to natural resources, such as lakes, wetlands, streams, rivers, fragile mountain areas, high and moderate value waterfowl and wading bird habitats, high and moderate value deer wintering areas, significant vernal pools, and sand dune systems. Standards focus on the possible impacts to the resources and to existing uses.
- Maine Plumbing Code – rules pertain to materials, fixtures, vent and waste piping potable water supply piping, and approved subsurface wastewater disposal (septic) systems necessary to protect the public health, safety, and welfare of the citizens of Maine.
- Maine Site Location of Development Law (Site Law) – regulates developments that may have a substantial impact on the environment (i.e., large subdivisions and/or structures, 20- acre-plus developments, and metallic mineral mining operations). Standards address a range of environmental impacts.
- Maine Storm Water Management Law – regulates activities creating impervious or disturbed areas (of size and location) because of their potential impacts to water quality. In effect, this law extends storm water standards to smaller-than Site Location of Development Law–sized projects. It requires quantity standards for storm water to be met in some areas, and both quantity and quality standards to be met in others.

These provisions in the Town of Bowdoinham Land Use Ordinance affect water resources:

- The Water Quality Protection performance standard states, “No activity shall locate, store, discharge, or permit the discharge of any treated, untreated, or inadequately treated liquid, gaseous, or solid materials of such nature, quantity, toxicity, or temperature that run off, seep, percolate, or wash into surface or ground waters so as to contaminate, pollute, or harm such waters or cause nuisances, such as objectionable shore deposits, floating or submerged debris, oil or scum, color, odor, taste, or unsightliness or be harmful to human, animal, plant or aquatic life.”
- Shoreland Zoning provisions provide considerable protection to water bodies and other natural resources located within shoreland areas. Shorelands are environmentally important because of their relationship to water quality, value as critical wildlife habitat and travel corridors, and function as floodplains. Development and/or the removal of vegetation in shoreland areas can increase runoff and sedimentation, as well as the amount of nitrogen and phosphorus entering the water that can lead to algae blooms. Steep slopes with highly erodible soils are particularly susceptible to erosion. Specifically, as relates to water quality, the ordinance states, “No activity shall deposit on or into the ground or discharge to the waters of the State any pollutant that, by itself or in combination with other activities or substances, will impair designated uses or the water classification of the water body, stream or coastal or freshwater wetland.”
- Site Plan Review provisions include similar requirements as found in the performance standard shown above. Namely, “No proposed development shall locate, store, discharge, or permit the discharge of any treated, untreated, or inadequately treated liquid, gaseous, or solid materials of such nature, quantity, obnoxiousness, toxicity, or temperature that may run off, seep, percolate, or wash into surface or groundwater so as to contaminate, pollute, or harm such waters or cause nuisances, such as objectionable shore deposits, floating or submerged debris, oil or scum, color, odor, taste, or unsightliness or be harmful to human, animal, plant, or aquatic life.” The site plan review provisions include State requirements for the storage of fuel, chemicals, wastes and raw materials, and State requirements for projects within the direct watershed of a ‘body of water most at risk from development’ or ‘a sensitive or threatened region or watershed’, as identified by Maine DEP. In addition, it is stated, “If the project does not require a stormwater permit from the DEP, it must be designed to minimize the export of phosphorous from the site to the extent reasonable with the proposed use and the characteristics of the site.”
- Subdivision provisions on water quality protection note, “The subdivision must not adversely affect the water quality or shoreline of any adjacent water body, to the extent practicable.” In addition, “No subdivision shall increase any contaminant concentration in the ground water to more than one-half of the Primary Drinking Water Standards. No subdivision shall increase any contaminant concentration in the ground water to more than the Secondary Drinking Water Standards.” See the ordinance itself for specific groundwater standards and hydrogeologic assessment requirements.

Analysis

(1) Are there point sources (direct discharges) of pollution in the community? If so, is the community taking steps to eliminate them?

There are three State-identified point sources of pollution from licensed discharges (one wastewater outfall, two overboard discharges). See the map titled Bowdoinham Water Resources for their locations.

Wastewater Outfalls and Overboard Discharges (OBD) in Bowdoinham				
DEP ID	ATS ID	Applicant	Waterbody	Flow GPD
1003	65549	Bowdoinham Community School (Outfall)	Cathance River	7,500
3137	35051	Gaviria, Residential (OBD)	Kennebec River	300
3299	66830	Goodall, Residential (OBD)	Cathance River	720

Source: Maine Department of Environmental Protection (Maine DEP), 2023

Note: GPD is gallons per day

(2) Are there non-point sources of pollution? If so, is the community taking steps to eliminate them?

Since 2010, three of the four sources have been eliminated. The Lapointe OBD on the Kennebec River has been removed and been properly abandoned. The Goodall residential OBD which was along the Cathance River is not currently active since the source of the wastewater was lost to a fire and has not been rebuilt. The permit for this location has expired and a new subsurface investigation will be required before a new wastewater system can be sited. The outfall has not been properly abandoned yet as the property is still being evaluated for redevelopment. Lastly, the outfall at the Bowdoinham Community School is still listed as active with the Maine DEP, however the pipes have all been capped and it is no longer discharging. Once the abandonment process is complete the outfall will be removed from the list.

Further, runoff from rain falling on impervious surfaces, like buildings and pavement and to a somewhat lesser extent from agricultural fields, bare ground and residential lawns is defined as non-point source pollution. In such runoff, pollutants occurring naturally like phosphorous, or from petroleum (motor vehicles and storage tanks), fertilizers and pesticides, in addition to untreated or insufficiently treated wastewater and sewage, can be transported into wetlands and water bodies. Impervious surface percentage maximums, as set in shoreland zoning ordinance provisions, can reduce the amount of runoff into water bodies. In especially sensitive areas, resource protection designations limit or prohibit development. Stormwater best management practices are referenced in the Land Use Ordinance. It is believed that shoreland zoning and related provisions are effective overall. Accordingly, it is recommended that monitoring should occur, especially during construction activities, and where water quality is found to be impaired, increased protections should be adopted.

The Town advises homeowners, business owners and farmers, and responds to citizen concerns on an ongoing basis. The Town informs the Maine Department of Environmental Protection of potential violations that could result in increased runoff, for example in shoreland and wetland areas. See the responses below, the Marine Resources Chapter, Public Facilities Chapter and Capital Investment Plan in the Fiscal Capacity Chapter for more information.

(3) How are groundwater and surface water supplies and their recharge areas protected?

The Town believes that public water supplies and their recharge areas are adequately protected overall through the Land Use Ordinance and its shoreland zoning provisions, and through already conserved areas.

The well of the Bowdoinham Water District is in Bowdoin, and so is subject to protections enacted and enforced in that Town, in addition to State regulations. See the Public Facilities Chapter for more information on the Water District. See the map titled Water Resources for the locations of public

water supplies. Outside of the village area served by the Water District, drinking water for residences and businesses comes from individual private wells, the installation of which are subject to State regulation. Surface waters are not generally used for drinking water. No significant aquifers exist in Bowdoinham. A significant aquifer can yield 10 gallons or more of ground water per minute to a properly installed well. See [Community Water Source Protection Map](#) for location of Bowdoinham's drinking water source.

(4) Do public works crews and contractors use best management practices to protect water resources in their daily operations (e.g. salt/sand pile maintenance, culvert replacement street sweeping, public works garage operations)?

Local road construction, repair, and maintenance are done using best management practices to minimize pollution. For example, appropriate seasonal timing of construction is important to avoid excessive amounts of movement of disturbed soil during the high flows of spring. Other techniques may entail temporary mulching of exposed soil surfaces, temporary seeding, and installation of siltation fences, riprap, gravel-filled trenching or the use of siltation basins. Town public works officials are trained in these practices and the Code Enforcement Office investigates the activities of private construction crews and individuals to ensure that they adhere to these practices as well.

(5) Are there opportunities to partner with local or regional advocacy groups that promote water resource protection?

There are opportunities to continue to partner with local and regional organizations that are working to protect water resources through monitoring, education of landowners and those who use these resources, as well as suggesting more effective regulations. The Kennebec Estuary (Kennebec River, Merrymeeting Bay, Cathance River, Abagadasset River, and other tributary streams and brooks in Bowdoinham) is served by these organizations:

- Brunswick Topsham Land Trust (Topsham)
- Friends of Merrymeeting Bay (Richmond-Bowdoinham)
- Friends of the Kennebec River Rail Trail (Brunswick)
- Kennebec Estuary Land Trust (Bath)
- Kennebec River Network (Augusta)
- Maine Rural Water Association (Richmond)