Section 15
Groundwater

1.0 LOCATION AND MAPS

The Maine GenLead 115-kilovolt transmission line corridor is located across nine U.S. Geological Survey quadrangles (quad): Oakfield, Meduxnekeag Lake, Monument Brook, Alder Brook, Reed Pond, Molunkus Lake, Mattawamkeag Lake, Mattaseunk Lake, and Lincoln Center. A Maine Geological Survey Significant Sand and Gravel Aquifer Map is available for each quad with the exception of Meduxnekeag Lake; the Maine Geological Survey reports that while field mapping was conducted for this quad, no significant aquifers were found and therefore the map was not published. The only significant sand and gravel aquifer in the general vicinity of the project is located along the Mattawamkeag River on the Monument Brook quad (see Figure 15-1). It is approximately 800 to 2,500 feet wide and runs along the Mattawamkeag River. Based on the morphology of the aquifer, it is interpreted to be of moderate to good potential for ground-water yield and consists primarily of glacial sand and gravel. The transmission line runs across the aquifer for just over one-third of a mile (approximately 1,584 feet).

There are no known public drinking water supply wells in the area within 100 feet of the proposed transmission line, and no public or private water wells are located in the corridor along the entire length of the proposed transmission right-of-way (ROW). There are no U.S. Environmental Protection Agency-designated sole source aquifers located in the project area (USEPA 2010).

2.0 QUANTITY

No wells will be established within the ROW.

3.0 SOURCES OF CONTAMINATION

The potential sources of groundwater contamination during construction will be fuel and hydraulic and other lubricating oils used in the operation of vehicles and construction equipment. Any spills of these materials from the vehicles or equipment are typically small and of very short duration. Spills that are properly cleaned up would not pose any risk to groundwater quality. Procedures for handling these materials and preventing spills are detailed below. The basic elements of these respective plans provide descriptive procedures for safe storage and handling of materials in order to prevent spills, as well as spill reporting procedures, emergency contact telephone numbers (including state and federal environmental agencies), and oil spill cleanup guidelines. In the event of an oil or hazardous material spill, employees are trained to promptly contain, report, and clean up the spill in accordance with these procedures. In addition, as a standard operating procedure, operational vehicles carry an oil spill kit that contains material for conducting initial containment and clean-up of spills.

General Requirements:

- Contractors/subcontractors will store, transport, and use oil, hazardous materials, and wastes in accordance with all applicable local, state, and federal regulations and these requirements.
- At a minimum, contractors/subcontractors will follow Best Management Practices when storing, transporting, or using oil, hazardous materials, and wastes.
- Vehicles and equipment containing petroleum that are in use on the ROW will be inspected daily for leaks or signs of deterioration that could cause a leak or spill. Leaking or deteriorated conditions will be repaired prior to use.
- Contractors/subcontractors will take care not to cause an uncontrolled spill or release of oil or hazardous materials to the environment.
- Contractors/subcontractors will provide and maintain on-site sufficient spill cleanup and containment supplies (e.g., absorbent pads, containment booms, protective clothing, debris containers) to control releases of oil, hazardous materials, or wastes. In addition, operational vehicles carry an oil spill kit that contains material for conducting initial containment and clean-up of spills.
- Contractors/subcontractors will remove oils, hazardous materials, wastes, and unused materials from the work site at the completion of the job. This includes full and partially full containers of waste material such as, but not limited to, rags, gloves, trash, scrap material, and empty containers.
- Within six months after the beginning of facility operations, a Spill Prevention Control and

Countermeasure Plan associated with turbine operation, the Operation and Maintenance building, and electrical substation will be completed in accordance with 40 CFR 112 and filed with the Maine Department of Environmental Protection (MDEP) upon completion.

Storage and Handling Requirements:

- Contractors/subcontractors will store only the minimal amount of material (at each work site) necessary to complete the work.
- Handling and application of pesticides and herbicides shall only be in accordance with regulations under the Maine Pesticide Control Act of 1975, as amended, Title 7 M.R.S.A., Section 601.
- Petroleum products and other hazardous materials will not be stored or transferred, including fueling of vehicles and equipment, within 100 feet of waterbodies, wetlands, rare plant or unique natural community locations, and not within at least 200 feet from water supply wells.
- Overnight parking of equipment will not occur within 100 feet of waterbodies, wetlands, rare plant or unique natural community locations, and not within at least 200 feet from water supply wells.
- Petroleum products will be stored in Maine Department of Transportation approved containers or approved tanks in areas not considered to be environmentally sensitive.
- Containers will be kept closed unless material is being transferred.
- Contractors/subcontractors will ensure that all transferring operations are monitored and not left unattended.
- Containers will not be stored on the ground, but will be stored in cabinets or on a firm working surface such as a portable trailer bed or other secure decking.
- If at any time a contractor/subcontractor needs to store oil including, but not limited to, fuel oil, petroleum products, sludge, and oil refuse in excess of an aggregate amount of 1,320 gallons (excluding 55-gallon or less containers) that is located near a pathway to navigable waters, the federal requirements for oil pollution prevention (40 CFR Part 112) must be met. Contractor/Subcontractor Spill Prevention Control and Countermeasure plans must be approved by a licensed, professional engineer, and a copy must be sent to Maine GenLead, LLC no later than one week prior to the commencement of the oil storage activities.
- Storage and handling of flammable and combustible liquids, including gasoline and diesel fuel, will be in accordance with rules developed under Title 25 M.R.S.A., Section 2441 (Fire Prevention and Fire Protection), as amended (See also Code of Maine Rules 16-219 Chapter 317). These regulations include, but are not limited to, bonding and grounding during transfer operations, fire protection requirements, storage quantity limitations, and spacing and location requirements.
- Gasoline and fuel storage tanks with greater than a 25-gallon capacity must have secondary containment constructed of an impervious material and be capable of holding 110 percent of tank capacity.
- Handling and disposal of hazardous wastes will be in accordance with MDEP Hazardous Waste Management rules (06-096 Chapters 850 through 857) developed pursuant to Title 38 M.R.S.A., Section 1301 et. seq., and U. S. Environmental Protection Agency regulations (40 CFR 260 through 272). Handling and disposal of waste oil will be in accordance with MDEP Waste Oil Management Rules (06-096 Chapter 860) and U. S. Environmental Protection Agency regulations (40 CFR 279).

Spill Reporting Requirements:

- Spill reporting requirements are the responsibility of the contractor/subcontractor. As required by Title 38 M.R.S.A., Section 543 and MDEP regulations (06-096 Chapters 600 4.B and 800 4.1), spills of oil or hazardous materials in any amount and under any circumstances must be reported to the MDEP within two hours from the time the spill was discovered at **1-800-482-0777**.
- As required by the federal Clean Water Act (40 CFR Part 110.4), a discharge of oil "which causes a sheen upon the surface of the water or adjoining shore line or oily sludge deposits beneath the surface of the water" must be reported within 24 hours to the National Response Center at **1-800-424-8802**.
- The need to report spills to the National Response Center of hazardous materials other than oil will be determined by the contractor/subcontractor by consulting the Comprehensive Environmental Response, Compensation, and Liability Act list of hazardous substances and reportable quantities

(40 CFR Table 302.4). Any spills that involve a reportable quantity of any hazardous substance must be reported to the National Response Center by the contractor/subcontractor.

- The contractor/subcontractor must also report all spills immediately to Maine GenLead, LLC, the Project and/or Construction Manager, and Local emergency response officials.

Spill Cleanup Requirements:

- It is the responsibility of the contractor/subcontractor to ensure and oversee immediate and complete cleanup of all spills involving oil or hazardous materials in accordance with state and federal requirements. The contractor/subcontractor is also responsible for all health and safety issues related to the cleanup of oil or hazardous materials. The contractor/subcontractor is also responsible for expediting the appropriate disposal of spill debris waste and restoring the site to its original condition.
- If the spill cannot be safely handled by personnel on site, the contractor will immediately arrange for a licensed spill response contractor to contain, clean up, and perform required sampling and disposal of spilled materials and debris and comply with applicable reporting requirements.

Personnel Training Requirements:
Prior to construction, the contractor will instruct construction personnel on the operation and maintenance of construction equipment to prevent the accidental discharge or spill of fuel, oil, and lubricants. Personnel will also be made aware of the pollution control laws, rules, and regulations applicable to their work. During construction, spill prevention refresher briefings with the construction crew will be conducted monthly. These briefings will highlight the following:

- Precautionary measures to prevent spills;
- Potential sources of spills, such as equipment failure or malfunction;
- Standard operating procedures in case of a spill, including applicable notification requirements;
- Equipment, materials and supplies available for clean-up of a spill; and
- A list of known spill events.

4.0 MEASURES TO PREVENT DEGRADATION

The multiple methods, plans, and procedures to prevent groundwater degradation during construction of the proposed transmission line and wind turbines are incorporated in the erosion control requirements (Section 14), and the oil and hazardous material contingency plan described above. These procedures establish a set of minimum requirements for spill prevention and response during construction. The procedures incorporate measures developed and fine-tuned from experience during other transmission line and wind turbine construction projects, including input from the MDEP and other review agencies. The procedures incorporated into the plan have proven successful for preventing spills and for addressing spills if they occur. Both the contractors' and environmental inspectors will ensure that all personnel working on the ROW follow these procedures.

5.0 GROUNDWATER PROTECTION PLAN

The project will not significantly alter existing surface water drainage characteristics, as provided by the stormwater management plan developed for the project (Section 12). Temporary impacts to surface water drainage may occur during construction. The use of herbicides, petroleum, and other hydrocarbon products during construction and operation represent a potential threat to groundwater quality. Measures to be utilized to address potential impacts are included in the procedures found in Section 10, Section 14 and this Section. These documents and adherence to the design and procedural requirements they contain represent the groundwater protection and monitoring plans for the project. Accordingly, the construction or operation of the project is not expected to adversely affect groundwater resources.

6.0 GROUNDWATER PROTECTION DURING OPERATIONS

The proposed ROW will be maintained to keep vegetation a safe distance from electrical components. In addition to hand or mechanical cutting of vegetation that poses a safety or reliability hazard to the lines, low volume, foliar application of herbicides using a backpack with a directional, hand-held sprayer will be conducted as necessary. In addition, herbicides may be applied to cut stumps and surfaces of larger trees. All herbicides used are low toxicity products registered with the U.S. Environmental Protection Agency and approved by the Maine Board of Pesticide Control for the control of woody plants on ROWs. Application of any herbicide will be carried out by licensed professionals in accordance with approved guidelines, as described in the Post-Construction Vegetation Management Plan. This Plan is provided in Section 10 of this application. Application of approved herbicides in accordance with their label specifications and guidelines is designed to prevent adverse impact on groundwater quality.

7.0 REFERENCES

USEPA, Designated Sole Source Aquifers in EPA Region 1. [Online] URL:
http://www.epa.gov/region01/eco/drinkwater/pc_solesource_aquifer.html
(Accessed June 21, 2010)

Maine Geological Survey, Online Significant Sand and Gravel Aquifers Maps. [Online] URL:
http://www.maine.gov/doc/nrimc/mgs/pubs/online/aquifers/aquifers-ad.htm
(Accessed June 21, 2010)

Figure 15-1

Mattawamkeag Quadrangle, Maine

Compiled by
Lauren E. Foster and Troy T. Smith

Preliminary aquifer boundaries mapped by:
Glenn C. Prescott, Jr.

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection and the U. S. Geological Survey.

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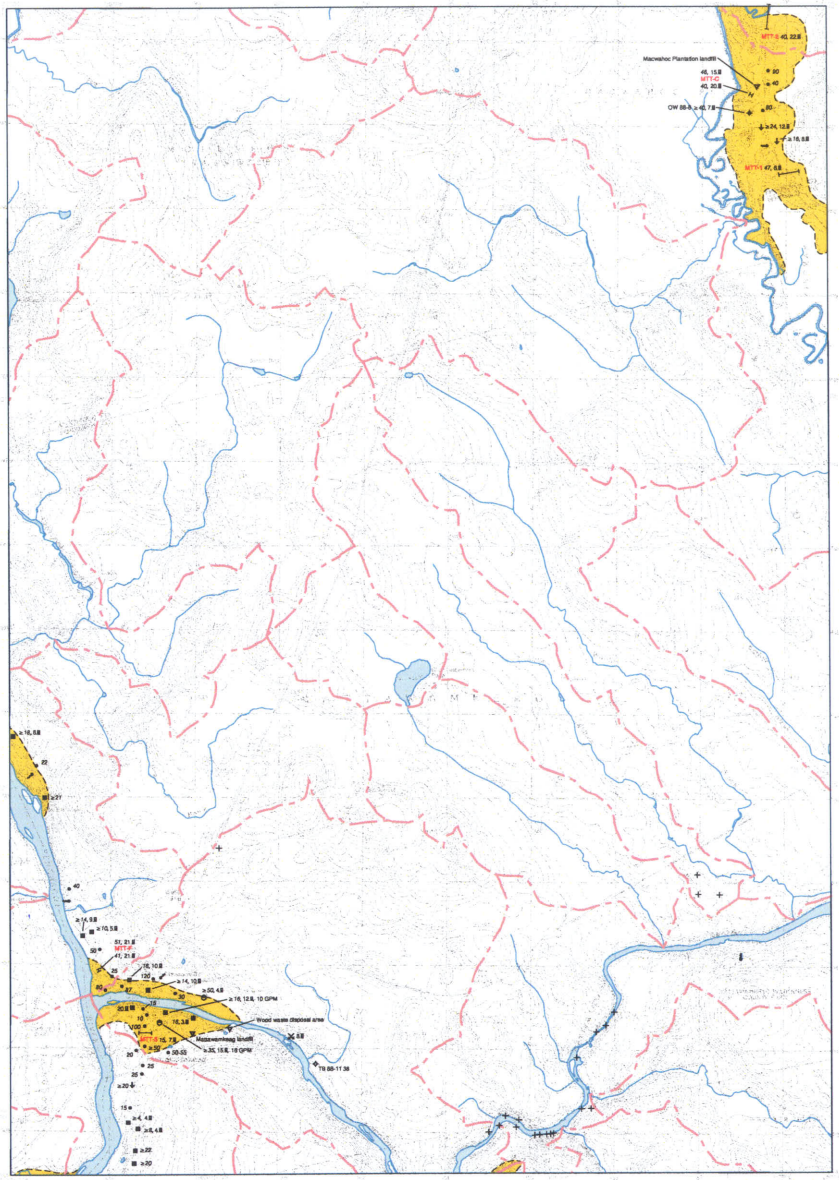
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-147
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanctot, J. M., 1981, Sand and Gravel Aquifer Map 49: Maine Geological Survey, Open-File Map 81-77, scale 1:31,680.

Well inventory data collected by Maine Geological Survey field assistants during the 1988 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Mattawamkeag quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, farm, or local governmental names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and till-veneer; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 7 of Open-File Report 92-2 (Neil and others, 1992). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 500 feet long and are not shown to scale.

53 — Depth to bedrock, in feet below land surface.

≥53 — Depth to bedrock exceeds depth shown (based on calculations).

12 ▽ — Depth to water level, in feet below land surface.

MAP-7 121, 23 ▽ — Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

MAP-E 69, 12 ▽ / 72, 12 ▽ — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by T. T. Smith and C. D. Neil. Twelve-channel seismic interpretation by J. L. Sleiger.

GEOLOGIC AND WELL INFORMATION

50 — Depth to bedrock, in feet below land surface

≥12 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

8 ▽ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Neil, C. D., Striger, J. L., and Weddle, T. K., 1992, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Hancock, Penobscot, Piscataquis, and Waldo Counties, Maine: Maine Geological Survey, Open-File Report 92-2, 73 p.

2. Prescott, G. C., Jr., 2001, Surficial materials of the Mattawamkeag quadrangle, Maine: Maine Geological Survey Open-File Map 01-148.

3. Newman, W. A., and Holland, W. R., 1981, Reconnaissance surficial geology of the Mattawamkeag 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 81-43.

4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 115 p.

5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)

6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Molunkus Lake Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

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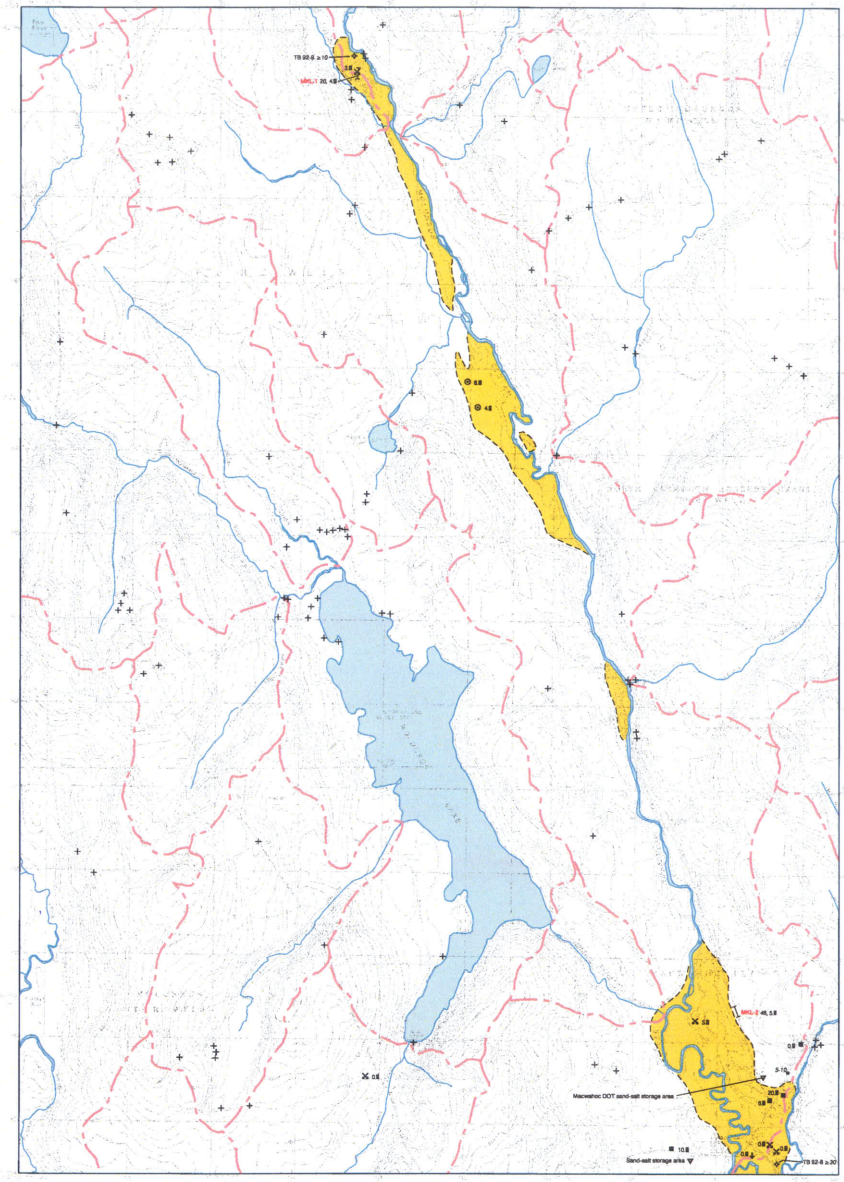
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-161
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanzillo, E. M., 1981, Sand and Gravel Aquifer Map 62: Maine Geological Survey, Open-File Map 81-83, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1992 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Molunkus Lake quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

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SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

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SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

53 — Depth to bedrock, in feet below land surface.

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69, 12 ▽ / MAP-E / 72, 12 ▽ — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 41, the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

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≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 ▽ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine: Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Molunkus Lake quadrangle, Maine: Maine Geological Survey Open-File Map 01-162.
3. Newman, W. A., and Holland, W. R., 1981, Reconnaissance surficial geology of the Mattawamkeag 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 81-43.
4. Cantwell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W. Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Reed Pond Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Susan S. Tolman

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

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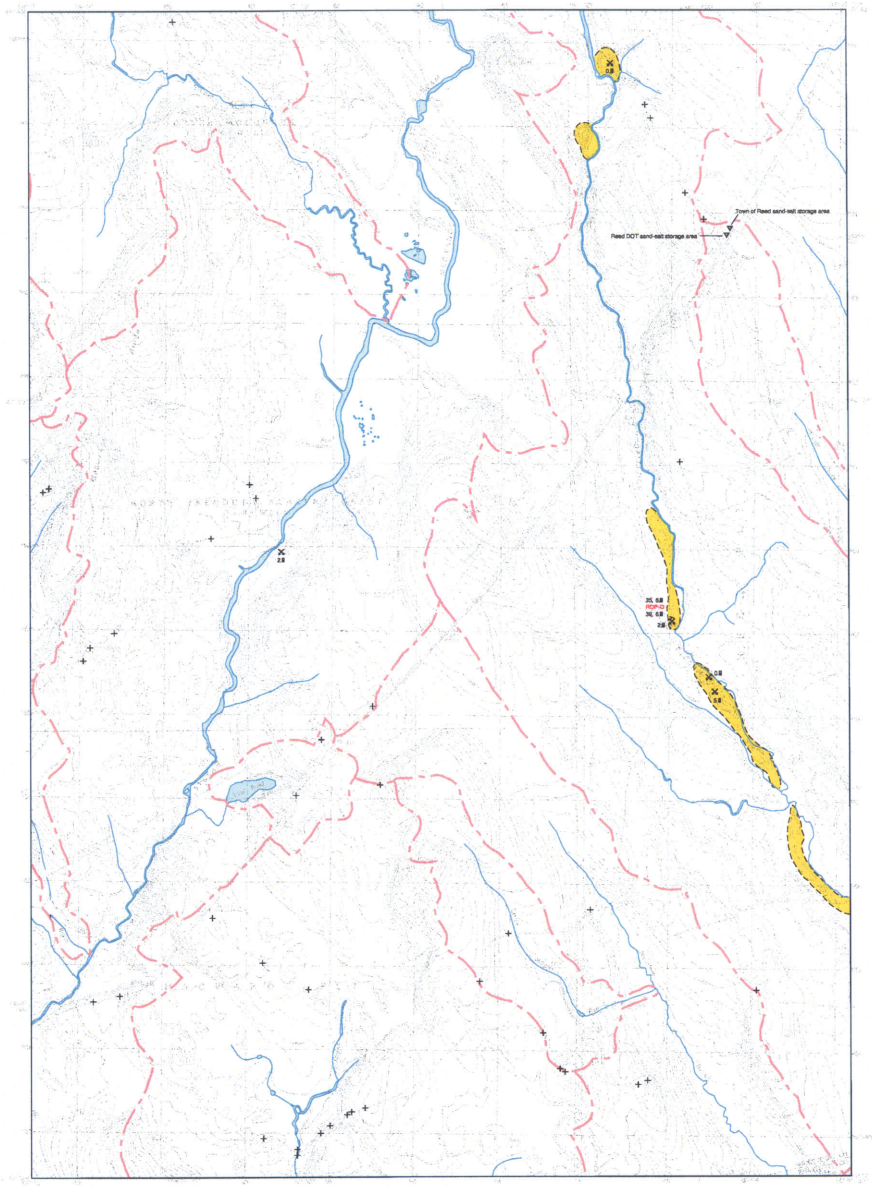
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-216
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanctot, J. M., 1981, Sand and Gravel Aquifer Map 62: Maine Geological Survey, Open-File Map 81-83, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1997 field season.

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Quadrangle Location

SCALE 1 : 24,000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Reed Pond quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

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Drilled overburden well

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Test pit

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Potential point source of ground-water contamination

Bedrock outcrop

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1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine: Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Reed Pond quadrangle, Maine: Maine Geological Survey Open-File Map 01-217.
3. Holland, W. R., 1986, Reconnaissance surficial geology of the Wytopitlock 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 86-27.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 115 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Wytopitlock Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Susan S. Tolman

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

Maine Geological Survey
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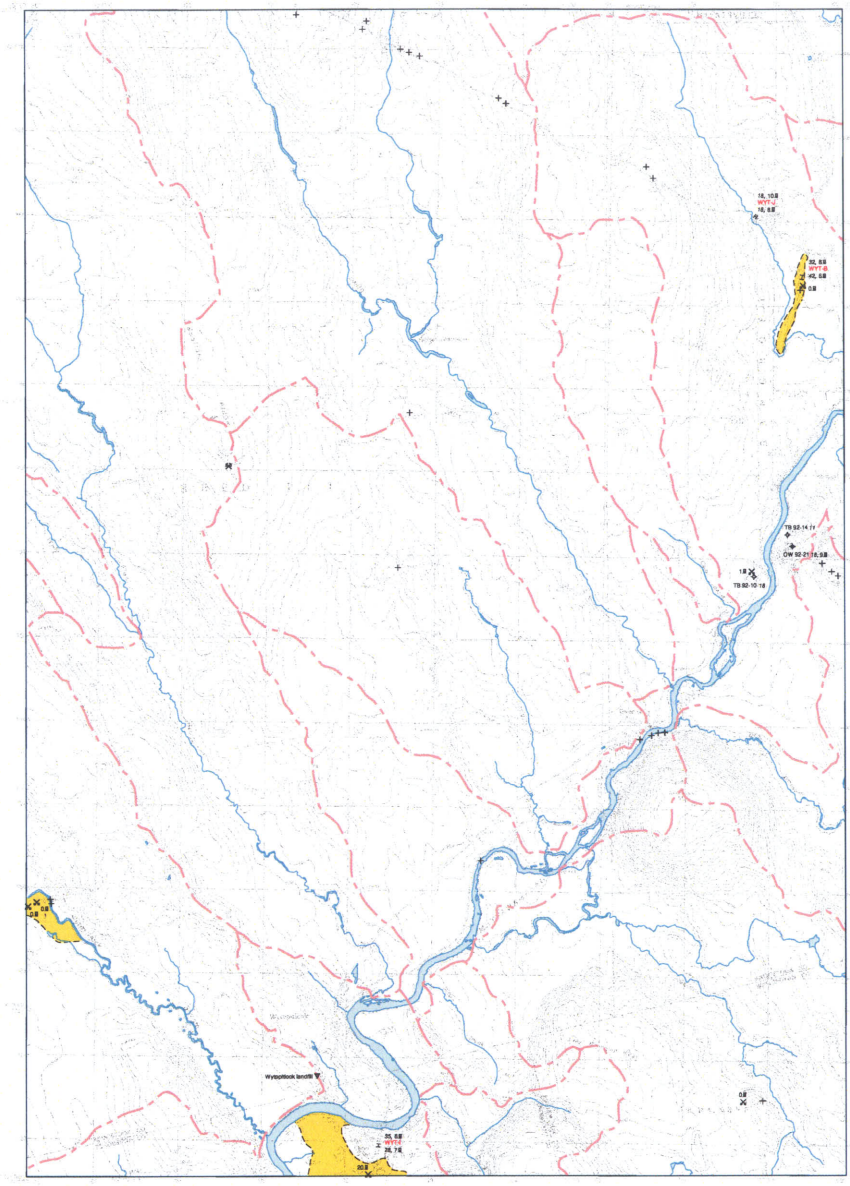
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-278
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanctot, S. M., 1981, Sand and Gravel Aquifer Map 63: Maine Geological Survey, Open-File Map 81-84, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1997 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE
0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Wytopitlock quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

53 — Depth to bedrock, in feet below land surface.

≥53 — Depth to bedrock exceeds depth shown (based on calculations).

12 ▽ — Depth to water level, in feet below land surface.

MAP-7 131, 23 ▽ — Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

MAP-8 80, 12 ▽ / 72, 12 ▽ — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 8), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

50 — Depth to bedrock, in feet below land surface

≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 ▽ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine: Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Wytopitlock quadrangle, Maine: Maine Geological Survey Open-File Map 01-279.
3. Holland, W. R., 1986, Reconnaissance surficial geology of the Wytopitlock 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 86-27.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 66 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Alder Brook Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
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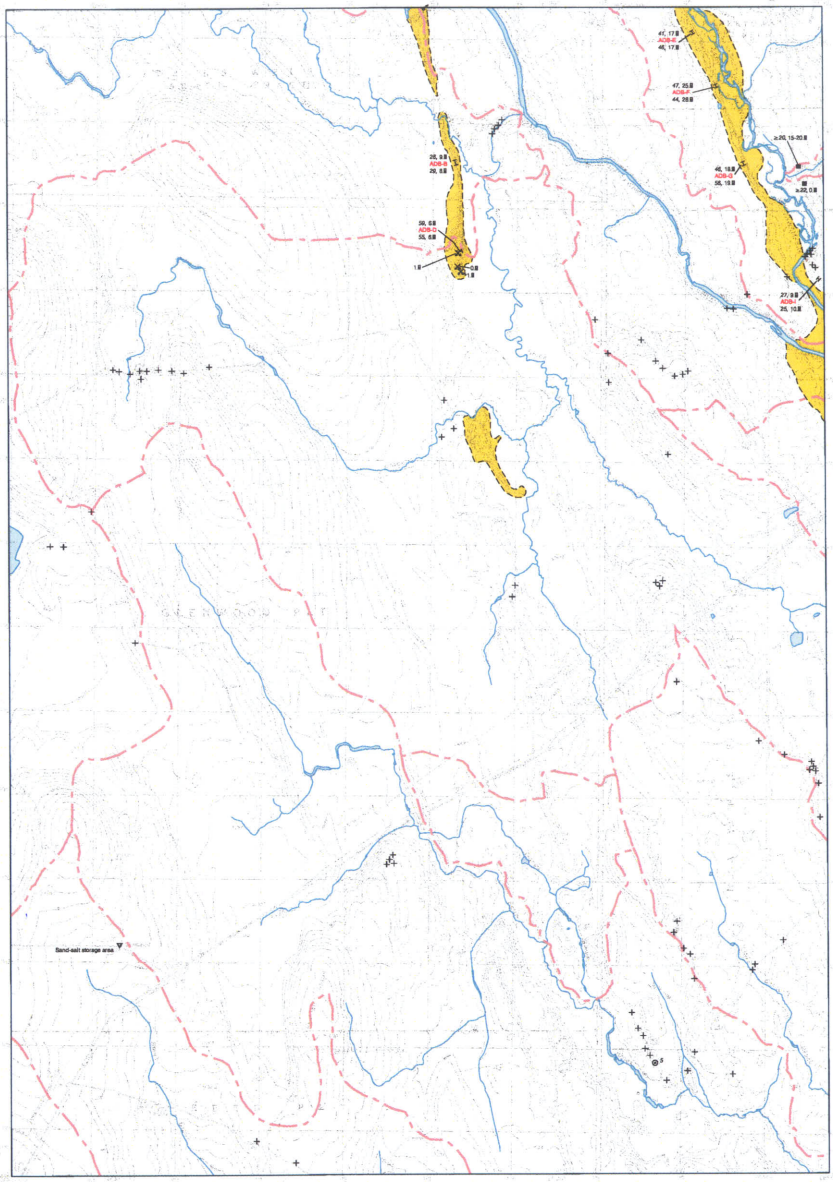
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-1
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Feiman A. L., and Lanctot, S. M., 1991, Sand and Gravel Aquifer Map 63: Maine Geological Survey, Open-File Map 91-84, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1992 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Alder Brook quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local governmental names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 900 feet long and are not shown to scale.

53 Depth to bedrock, in feet below land surface.

≥53 Depth to bedrock, exceeds depth shown (based on calculations)

12 ≥ Depth to water level, in feet below land surface.

MAP-7 **121, 23 ≥** Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

60, 12 ≥ MAP-E **72, 12 ≥** Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

50 Depth to bedrock, in feet below land surface

≥13 Penetration depth of boring. ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 ▽ Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine: Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Alder Brook quadrangle, Maine: Maine Geological Survey Open-File Map 01-2.
3. Newman, W. A., 1980, Reconnaissance surficial geology of the Mattawamkeag Lake 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 80-16.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W. Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Haynesville Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

Maine Geological Survey
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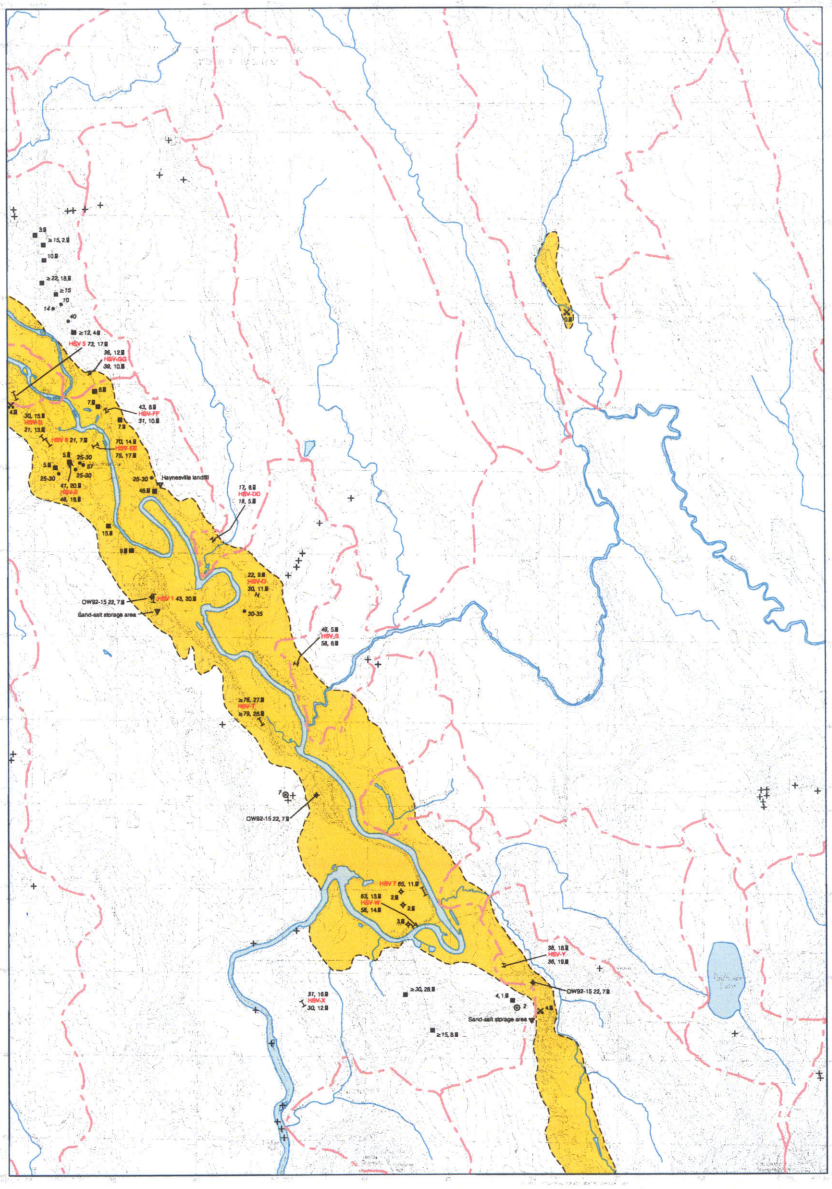
Open-File No. 01-90
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanctot, J. M., 1981, Sand and Gravel Aquifer Map 63: Maine Geological Survey, Open-File Map 81-84, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1992 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Haynesville quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, farm, or local government names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

- 53 — Depth to bedrock, in feet below land surface.
- ≥53 — Depth to bedrock exceeds depth shown (based on calculations).
- 12 ▽ — Depth to water level, in feet below land surface.
- MAP-7 131, 23 ▽ — Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.
- MAP-8 59, 12 ▽ / MAP-9 72, 12 ▽ — Single-channel seismic line, with depth in bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 8), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP-P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

- 50 — Depth to bedrock, in feet below land surface
- ≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal
- 6 ▽ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)
- Gravel pit (overburden thickness noted in feet, e.g. 5-12')
- Quarry
- 4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)
- Spring, with general direction of flow
- Drilled overburden well
- Dug well
- Observation well (project well if labeled; nonproject well if unlabeled)
- Test boring (project boring if labeled; nonproject boring if unlabeled)
- Drive-in point
- Test pit
- Drilled bedrock well
- Potential point source of ground-water contamination
- Bedrock outcrop
- Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Ameatouk, Penobscot, and Washington Counties, Maine: Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Haynesville quadrangle, Maine: Maine Geological Survey Open-File Map 01-91.
3. Brewer, T., 1980, Reconnaissance surficial geology of the Amity 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 80-2.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 115 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Ten-Mile Lake Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Susan S. Tolman

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

Maine Geological Survey
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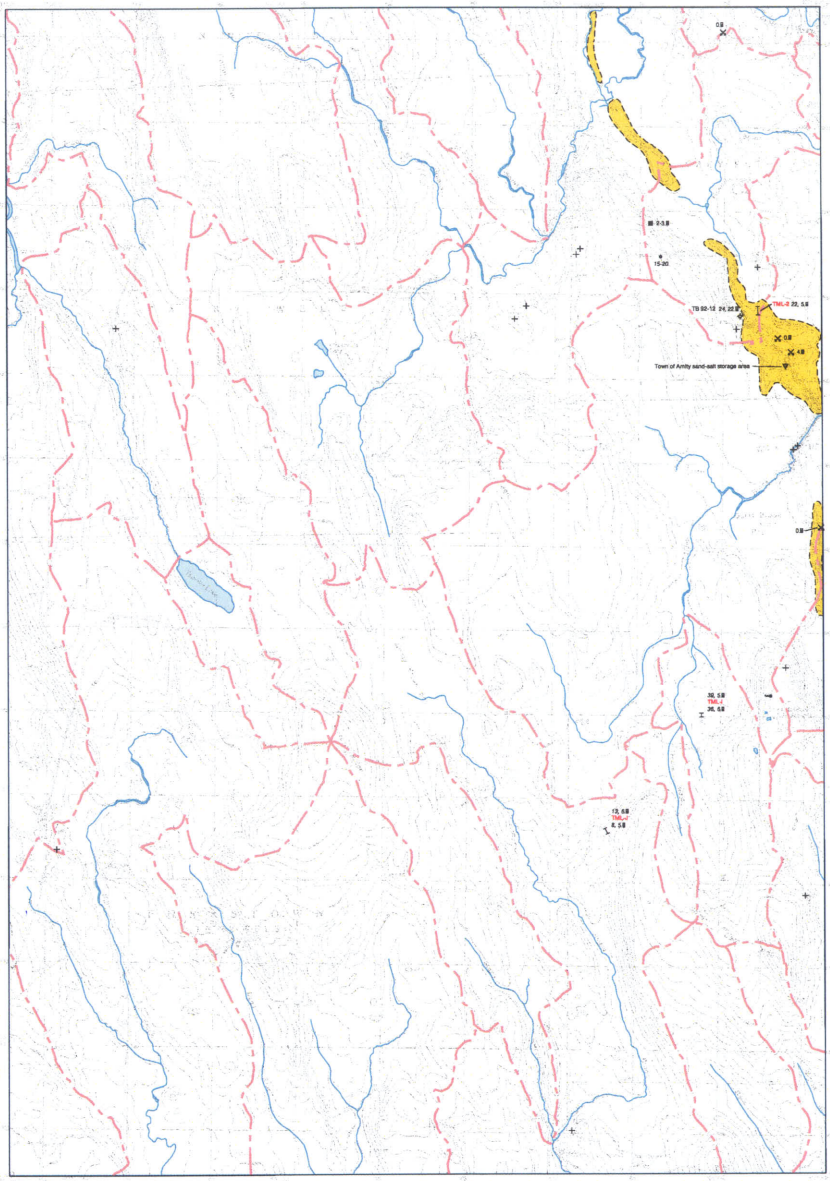
Telephone: 207-287-2801 **E-mail:** mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-252
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanphear, J. M., 1981, Sand and Gravel Aquifer Map 63: Maine Geological Survey, Open-File Map 81-84, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1992 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Ten-Mile Lake quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, farm, or local government names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 7 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 700 feet long and are not shown to scale.

52 Depth to bedrock, in feet below land surface.

≥53 Depth to bedrock exceeds depth shown (based on calculations).

12 ▽ Depth to water level, in feet below land surface.

MAP-7 **131, 23 ▽** Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12 ▽ MAP-E **72, 12 ▽** Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

50 Depth to bedrock, in feet below land surface

≥13 Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

8 ▽ Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

× Gravel pit (overburden thickness noted in feet, e.g. 5-12')

⚒ Quarry

4 GPM Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Dry-tap point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine. Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Ten-Mile Lake quadrangle, Maine: Maine Geological Survey Open-File Map 01-253.
3. Brewer, T., 1980, Reconnaissance surficial geology of the Amity 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 80-2.
4. Caswell, W. B., 1987. Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979. Surficial geology handbook for coastal Maine: Maine Geological Survey, 66 p. (out of print)
6. Thompson, W. B., and Borns, H. W. Jr. 1985. Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Linneus Quadrangle, Maine

Compiled by
Craig D. Neil and Daniel B. Locke

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Robert D. Tucker

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U. S. Geological Survey.

Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
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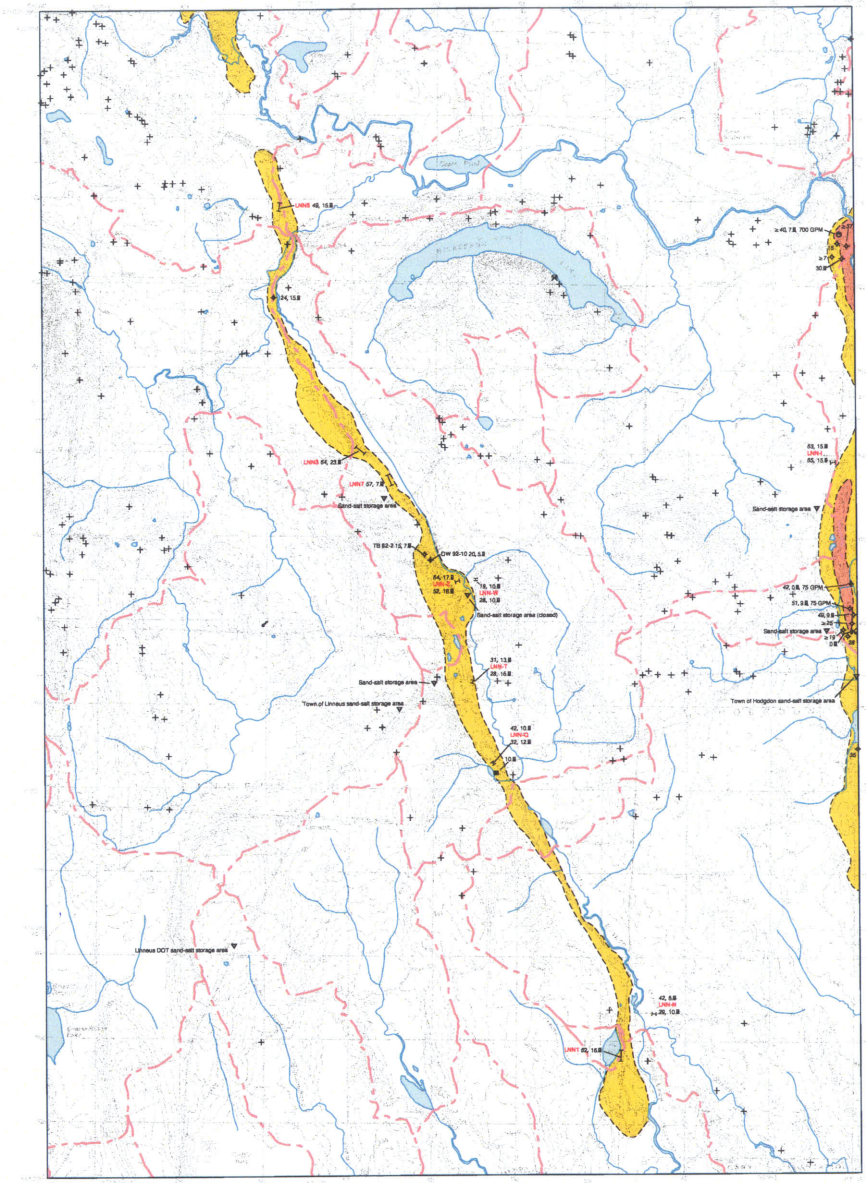
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

Open-File No. 01-130
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman A. L., and Lanctot, J. M., 1981, Sand and Gravel Aquifer Map 64: Maine Geological Survey, Open-File Map 81-85, scale 1:50,000.

Well inventory data from U.S. Geological Survey Basic Data Reports and additional data collected by Maine Geological Survey field assistants during the 1992 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Topographic base from U.S. Geological Survey Linneus quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local governmental names on this map is for location purposes only and does not imply responsibility for any present or intended effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 97-44 (Locke and others, 1997). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 900 feet long and are not shown to scale.

53 — Depth to bedrock, in feet below land surface.

≥53 — Depth to bedrock exceeds depth shown (based on calculations).

12 ≥ — Depth to water level, in feet below land surface.

MAP-7 131, 23 ≥ — Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12 ≥ / MAP-E / 72, 12 ≥ — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by E. B. Lewis. Twelve-channel seismic interpretations by C. D. Neil.

GEOLOGIC AND WELL INFORMATION

50 — Depth to bedrock, in feet below land surface

≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

8 ▽ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Locke, D. B., Neil, C. D., and Nichols, W. J., Jr., and Weddle, T. K., 1997, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Penobscot, and Washington Counties, Maine. Maine Geological Survey, Open-File Report 97-44, 91 p.
2. Locke, D. B., 2001, Surficial materials of the Linneus quadrangle, Maine: Maine Geological Survey Open-File Map 01-131.
3. Brewer, T., 1981, Reconnaissance surficial geology of the Houlton 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 81-9.
4. Carrwell, W. B., 1987. Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 115 p.
5. Thompson, W. B., 1979. Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr. 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

East Winn Quadrangle, Maine

Compiled by
Lauren E. Foster and Troy T. Smith

Preliminary aquifer boundaries mapped by:
Glenn C. Prescott, Jr.

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection and the U. S. Geological Survey.

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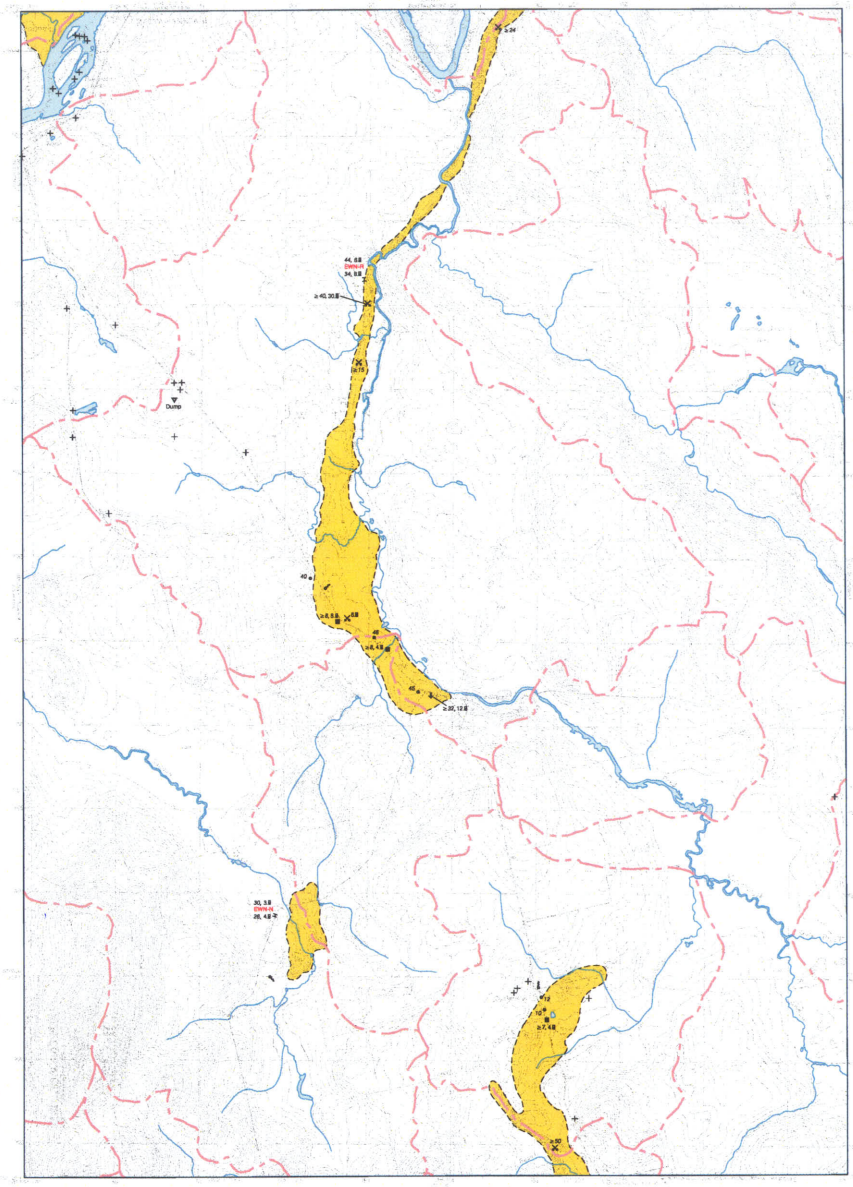
Open-File No. 01-62
2001

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Tolman, A. L., and Lanctot, J. M., 1981, Sand and Gravel Aquifer Map 49: Maine Geological Survey, Open-File Map 81-77, scale 1:50,000.

Well inventory data collected by Maine Geological Survey field assistants during the 1988 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE
0
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
0
1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey East Winn quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not imply responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

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SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Appendix 2 of Open-File Report 92-2 (Neil and others, 1992). Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

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≥53 — Depth to bedrock exceeds depth shown (based on calculations).

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GEOLOGIC AND WELL INFORMATION

50 — Depth to bedrock, in feet below land surface

≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 ≥ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

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Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

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Driven point

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Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Neil, C. D., Steiger, J. I., and Weddle, T. K., 1992, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Aroostook, Hancock, Penobscot, Piscataquis, and Waldo Counties, Maine: Maine Geological Survey, Open-File Report 92-2, 73 p.
2. Prescott, G. C., Jr., 2001, Surficial materials of the East Winn quadrangle, Maine: Maine Geological Survey Open-File Map 01-63.
3. Holland, W. R., 1981, Reconnaissance surficial geology of the Winn 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 81-28.
4. Carmell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.