

# Multiple Agency Investigation of a Water Borne Hepatitis A Outbreak



**Maine CDC's Response to an Outbreak of Hepatitis A on Swan's Island.**

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## **Background**

Hepatitis A is a viral disease causing inflammation, irritation and swelling of the liver.

The incubation period for hepatitis A is 15 to 50 days

Hepatitis A generally is transmitted via a fecal-oral route, either through direct ingestion, or by consumption of contaminated food or water. It is not air borne or transmitted via casual touching.

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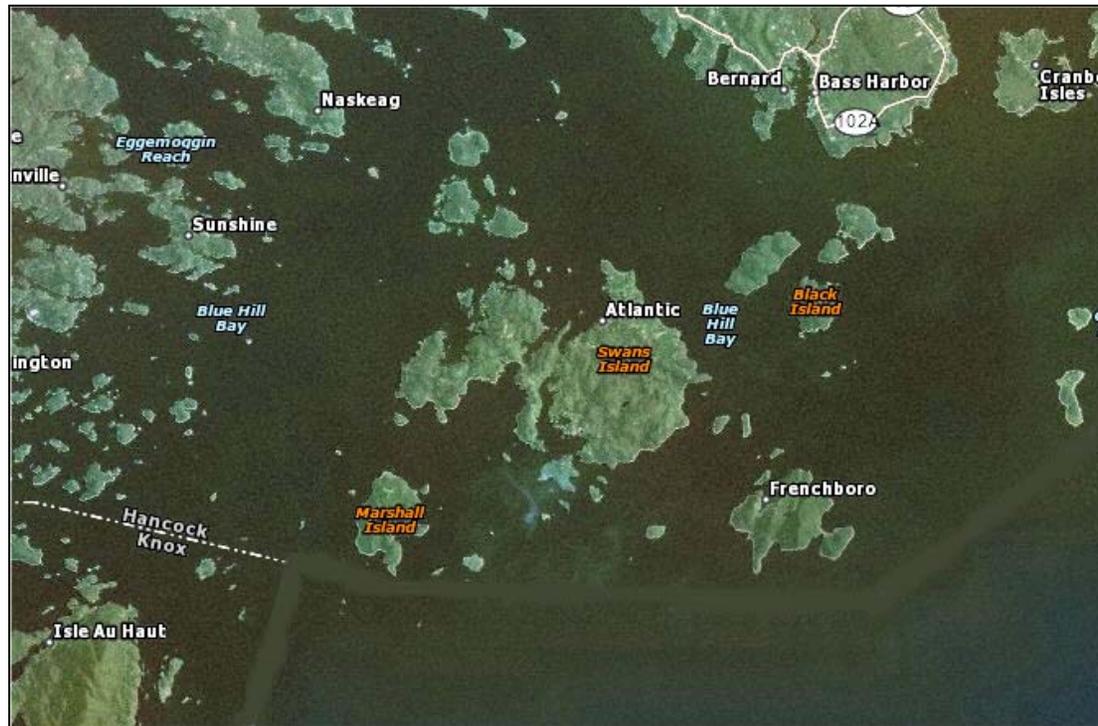
## **Background**

The first reported cases at the site were two visitors from another state, who presented symptoms approximately one week after arriving in July of 2009.

Nine individuals associated with this private residence were confirmed with HAV between July 6, 2009 and September 2, 2009. One fatality was associated with this residence-the first reported case.

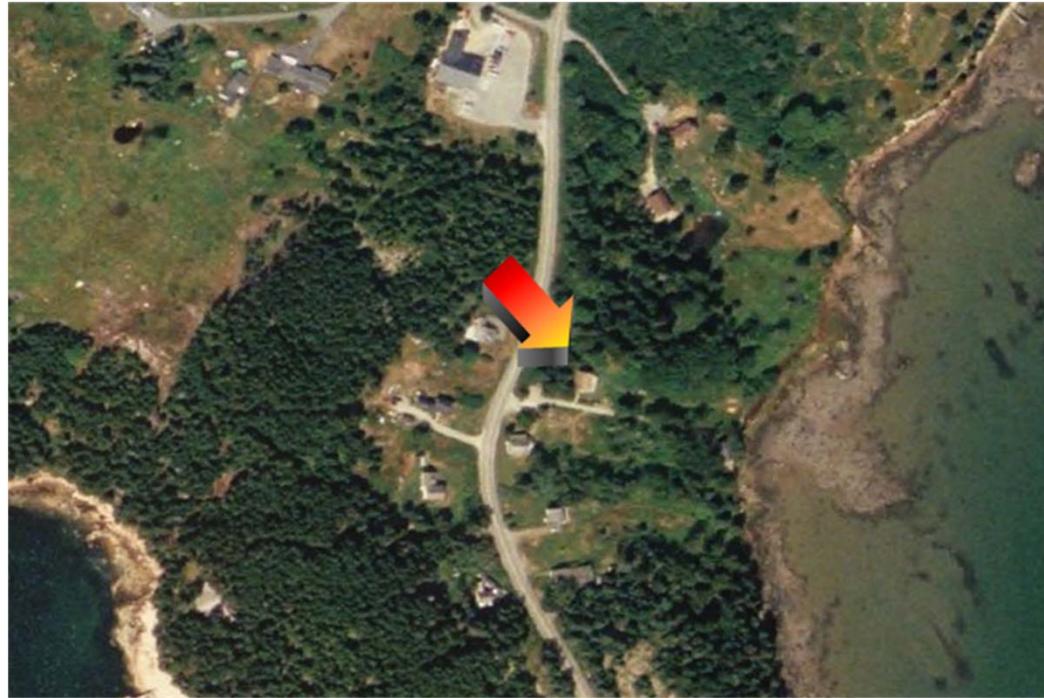
The Division of Environmental Health was made aware of this outbreak on August 26, 2009.

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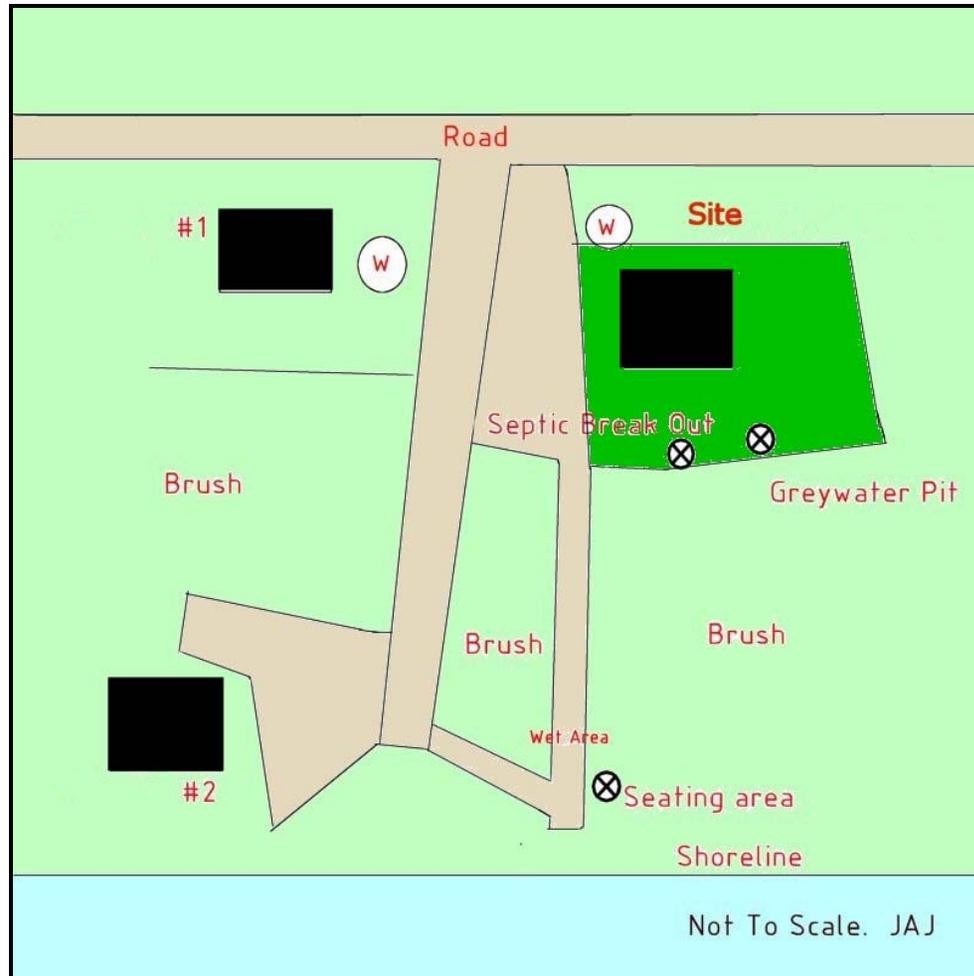
Swans Island is located off the coast of Maine, in Blue Hill Bay, about a 30 minute ferry ride from Bass Harbor.

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A site inspection was performed at the subject property on August 27, 2009. Present were staff from the Department of Marine Resources and the Division of Environmental Health, Subsurface Wastewater Program, two abutters, the Local Plumbing Inspector, the Town's Emergency Management Director, and the First Selectman.

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The site is developed with a seasonally occupied single family dwelling, served by a drilled well and a combined onsite sewage disposal system that predates the Subsurface Wastewater Disposal Rules, e.g., pre-1974.

The abutting property is developed with two seasonally occupied single family dwellings, a drilled well, and unspecified sewage disposal measures.

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The property was unoccupied during the inspection. Access to the property was given by an abutter on behalf of the owners. Division staff inspected beneath the dwelling, which rests on piers, since the Division had been advised that there may be a leaking building drain beneath a toilet. There was no evidence under the building drain of any leaks.

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However, staff discovered that the drain line from the laundry room and kitchen sink had been cut, and the stub to the building drain had been capped. The greywater drain was connected to a black polyethylene pipe.

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This polyethylene pipe extended to a hole in the ground covered by two rocks and a piece of pressure treated wood, comprising an illegal, nonconforming greywater disposal pit.

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Adjacent to the nonconforming greywater disposal pit, there was evidence of an ongoing malfunction of the main disposal area. This was evident by a black, very wet area adjacent to an area overgrown with brush.

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The coloration suggests that this is a chronic condition. The outbreak is set back approximately 200 feet from the normal high water mark of the cove and approximately 127 feet down grade from the subject property's well.

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The above grade portion of the casing of the well which provides potable water to the subject property was examined. There was no visible evidence of anything out of the ordinary adjacent to the casing. Further, examination of the 10 feet or so of land between the well casing and the road, and properties across the road, revealed nothing unusual.

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Plumbing fixtures inside the dwelling were examined for potential cross connections. The photograph on the left shows where the potable water supply enters the building through the floor of the utility room. The photograph on the right shows the water supply and discharge of a laundry machine in the utility room.

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The main supply line from the well travels above grade and passes beneath the dwelling. This is the line below the utility room, showing the PEX tubing supply line going into the dwelling. The end of main line ends in a gate valve used to drain the line for the winter. Note the moisture in the end of the valve, and the valve's position on the ground.

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Water samples from the kitchen sink, downstairs bathroom sink, and upstairs bathroom sink were taken. Division staff delivered these samples to the Department of Health and Human Services' Health and Environmental Testing Laboratory for testing.

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The water samples tested positive for bacteria. Specifically:

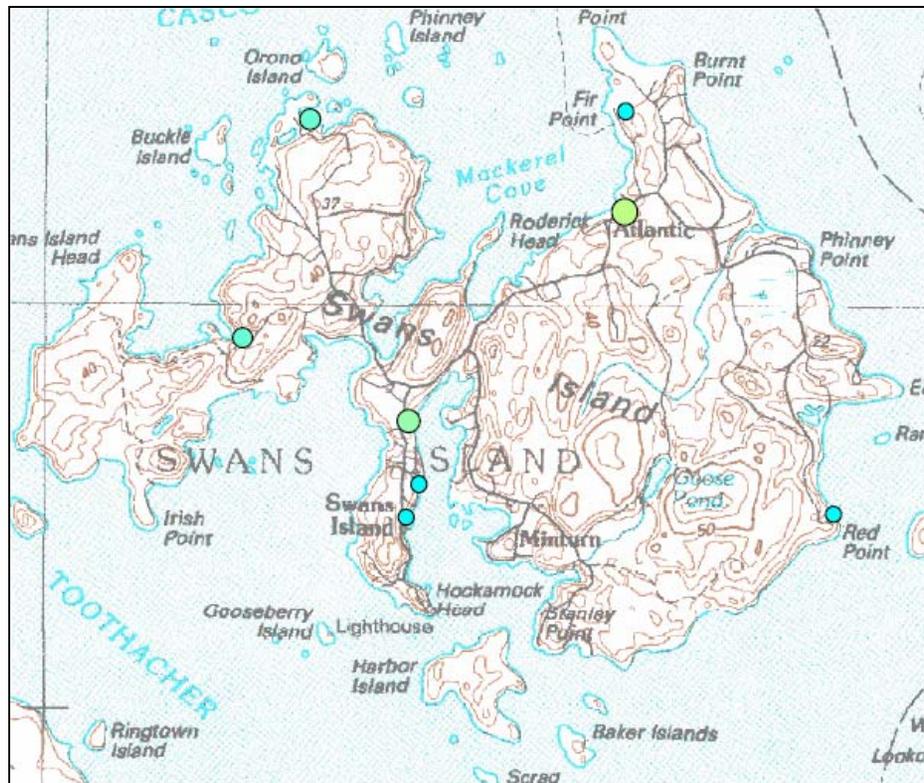
All three sinks tested positive for total coliform bacteria, with levels too numerous to count.

Both of the bathroom sinks tested positive for E. coli.

The kitchen sink did not test positive for E.coli.

Based upon these results, effluent samples taken by DMR staff were tested by the Center for Disease Control in Atlanta, Georgia for Hepatitis A virus. These samples tested positive for the virus.

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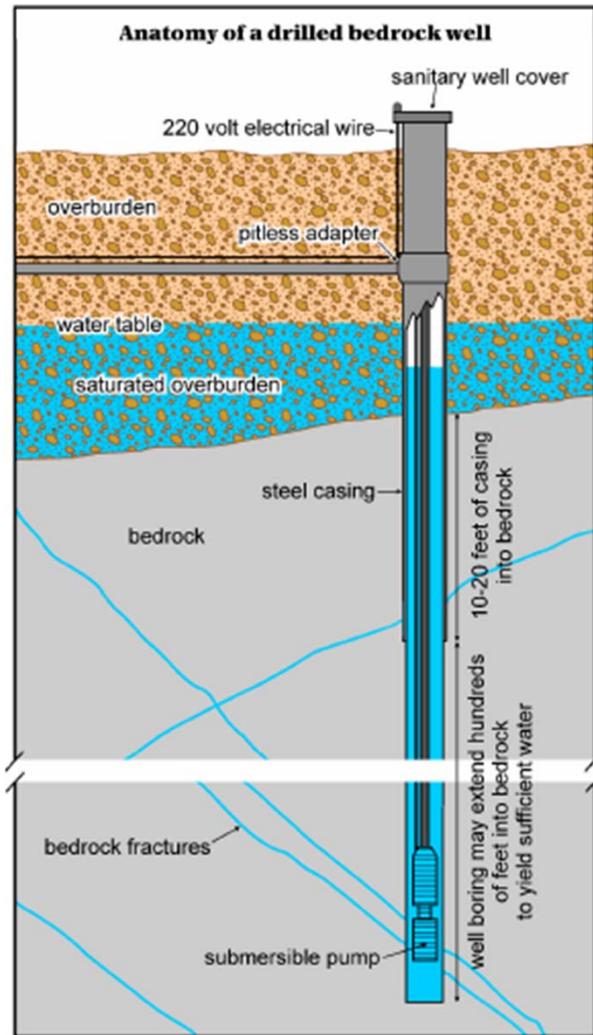
## Explanation

Estimated overburden thickness

- 0-5 feet
- 5-10 feet
- 10-15 feet
- 15-20 feet
- 20-25 feet
- 25-30 feet
- 30-40 feet
- 40-50 feet
- 50-75 feet
- 75-100 feet
- 100-200 feet
- >200 feet

Geology in the vicinity of the dwelling is comprised of shallow soils and glacial erratics. The abutting property displays exposed bedrock in several locations.

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Contamination of drilled wells generally occurs through poor sealing or broken casing, or through transmission of pollutants through bedrock fractures.

The property's well is approximately 300 feet deep, and is located in granite bedrock which is reported by the Maine Geological Service as largely unfractured.

The well is located approximately 127 feet upslope of the malfunctioning disposal area.

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## Conclusions

- The first person who was diagnosed already had the disease upon arrival at the property, and did not acquire it onsite.
- The property owner's septic system is malfunctioning, and the greywater disposal pit does not conform to the Subsurface Wastewater Disposal Rules.
- The water supply plumbing, specifically PEX tubing secured with hose clamps, and the modified greywater drainage line, do not conform to the Maine State Plumbing Code.
- The water supply plumbing in the dwelling is contaminated with bacteria and Hepatitis A virus.
- The drilled well may be contaminated, but absent specific testing it is not possible to draw a definitive conclusion.

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## Recommendations

- The malfunctioning septic system must be replaced, and the greywater reconnected to the dwelling's drainage system. Preparations were underway as of October of 2009.
- The potable water supply lines should be rebuilt with materials that conform to the Maine State Plumbing Code.
- The water supply plumbing in the dwelling should be disinfected with chlorine.
- The drilled well should be examined for integrity, and disinfected with chlorine.
- The potable water supply should be tested for re-contamination several times per year (or season, if used seasonally).

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On September 14, 2009 Vicki Rea, Field Epidemiologist, Maine CDC ; David Braley, Senior Geologist, Drinking Water Program; and James Jacobsen, Environmental Specialist IV, Subsurface Wastewater Program attended an informational meeting on Swans Island, to address concerns expressed by residents. Approximately 50 people attended the meeting.

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## Recommendations for Island Residents

- Any property owners concerned about their wells should have their water tested for bacteria, as an indicator of contamination.
- Any wells that tested positive should be disinfected with all haste.
- Individuals who reasonably believed they may have been exposed should be immunized against Hepatitis.
- The Maine CDC would make information and test kits available at the Swans Island Town Office.
- Maine CDC would monitor for additional cases of Hepatitis A on Swans Island.

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## The End



*Maine Center for Disease  
Control and Prevention*

*An Office of the  
Department of Health and Human Services*

*John E. Baldacci, Governor*

*Brenda M. Harvey, Commissioner*

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Hepatitis A on Swan's Island.**

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