

PROTECTION MEASURES TO PREVENT AND CONTROL MICROBIAL CONTAMINATION

The first step in protecting a public water supply is the development of a watershed or wellhead protection program. Controlling or eliminating microbial sources before they contaminate a water supply goes a long way toward simplifying treatment and reducing costs associated with a contaminated supply.

An effective protection program must address a variety of sources of microbial contamination. Following is a list of those sources and suggested protection measures aimed at reducing the risk they pose to drinking water.



SEWAGE DISPOSAL SYSTEMS

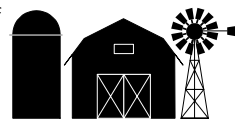
Failing sewage disposal systems represent the major source of microbial contamination from human waste. Contamination sources include large municipal waste treatment systems, pump stations, and on-site sewage treatment systems such as cesspools and septic tanks and leachfields.



- ◆ Implement proper planning for sewage systems within your watershed.
- ◆ Ensure septic systems are inspected and serviced on a regular basis.
- ◆ Promote public education on how to care for a septic system.

AGRICULTURE

Runoff carrying animal waste from barnyards, manure storage areas, dairy farms, pig farms, pastures, and the land application of manure is a significant source of microbial contamination.



- ◆ Ensure animal waste runoff is properly collected, settled, and stored.
- ◆ Manure storage sheds should be sited away from surface waters and should have impermeable floors and roofs.
- ◆ Install vegetative buffer strips to slow runoff flow and to act as a filter for microbial contaminants.
- ◆ Livestock should be kept out of streams and water bodies.

STORMWATER RUNOFF



Rainwater and snowmelt flow over the land picking up pollutants and then depositing them into water supplies. Runoff can also collect microbial contaminants (such as pet waste) from suburban environments.

- ◆ Minimize impervious surfaces within your watershed.
- ◆ Install catch basins and settling basins to slow down flows and filter out contaminants.
- ◆ Use landscaping techniques such as native plants, low maintenance grasses, shrubs, and rock gardens that conserve water and limit runoff.
- ◆ Require the proper removal and disposal of pet waste.

WILDLIFE

Wildlife is an integral part of a balanced watershed. However, birds and small mammals can introduce microorganisms into a water supply either through direct contact or from watershed runoff. *Giardia*, *cryptosporidium*, *salmonella*, *campylobacter*, and *Escherichia coli* (E.coli) are the most commonly identified microorganisms found in mammals and birds. Wildlife commonly associated with microbial contamination of drinking water supplies include deer, beavers, muskrats, gulls, and geese.



The following protection measures should not be considered as general practice but should be carefully deployed in specific areas of a water supply protection

area (around an intake or in areas where the nuisance wildlife population is concentrated). Federal and/or state permits are often required for wildlife control harassment programs.

- ◆ Monitor wildlife populations in and around water supplies.
- ◆ Maintain a daily human presence.
- ◆ Employ scare techniques such as pyrotechnics.
- ◆ Modify habitat (shoreline fencing, mowing, landscaping changes, tree branch pruning).
- ◆ Prohibit the public from feeding wildlife, especially waterfowl.
- ◆ Reduce food sources such as palatable plant species.
- ◆ Keep beavers and muskrats from building dams/dens by installing fencing or drainage devices.
- ◆ Consider permitted trapping or hunting.



CONCLUSION

When it comes to the protection of our drinking water resources, an ounce of prevention is worth a pound of cure. For more information about some of the most prevalent threats to drinking water, request the following brochures from NEIWPC:

What Do You Know About...Nonpoint Source Pollution?

What Do You Know About...Septic Systems?

What Do You Know About...CSOs?

WHAT ARE MICROORGANISMS?

Microorganisms are microscopic creatures such as bacteria, viruses, and protozoa. Because some microorganisms are known pathogens (disease causing agents), microbial contamination of public drinking water supplies can threaten human health.

Contaminants of concern in drinking water include:

- ◆ Bacteria: *Helicobacter pylori*, the Salmonella family, and *Escherichia coli* (E.coli).
- ◆ Viruses: Hepatitis A, Norwalk type viruses, rotaviruses, adenoviruses, enteroviruses, and reoviruses.
- ◆ Protozoa: *Giardia lamblia* and *Cryptosporidium parvum*.

WHAT IS THE THREAT TO HUMAN HEALTH?

When ingested in drinking water, bacteria, viruses, and protozoa can cause a number of infectious waterborne diseases such as cholera, typhoid, hepatitis, and infectious gastrointestinal diseases like cryptosporidiosis and giardiasis. Symptoms of waterborne disease may include fever, fatigue and weight loss (common in viral cases), vomiting, abdominal cramping, diarrhea, and stomachaches. In the most severe cases waterborne disease can prove lethal.

WHO IS AT RISK?

Waterborne diseases pose a risk to everyone. Some individuals are more sensitive to infection and suffer more pronounced symptoms. These sensitive groups include infants, young children, older persons, and immunocompromised individuals such as persons with HIV/AIDS and those undergoing chemotherapy.

HOW CAN WE PROTECT AGAINST MICROBIAL CONTAMINATION?

Treatment

Some microbial contaminants can be removed by water treatment coagulation and filtration processes. Disinfection has proven effective against bacteria and viruses, but protozoa such as *Giardia* and especially *Cryptosporidium* are very resistant to chlorination alone.

Prevention

The most important and cost effective protection for water suppliers is to prevent pathogen entry into source water.

CONTACT INFORMATION

National

American Water Works Association

www.awwa.org

Association of State Drinking Water Administrators

www.asdwa.org

US EPA, New England Regional Office

www.epa.gov/region01/eco/drinkwater/index.html

Interstate

NEIWPCC

978/323-7929

www.neiwpcc.org

NEWWA

508/893-7979

www.newwa.org

State

Connecticut Department of Environmental Conservation Source Water Assessment Program
dep.state.ct.us/wtr/SWAP/swapsumm.htm

Maine Department of Human Services/Division of Health Engineering, Drinking Water Program
janus.state.me.us/dhs/eng/water/index.htm

Massachusetts Department of Environmental Protection, Drinking Water Program
www.state.ma.us/dep/brp/dws

New Hampshire Department of Environmental Services Water Division Drinking Water Source Protection Program
www.des.state.nh.us/dwspp/

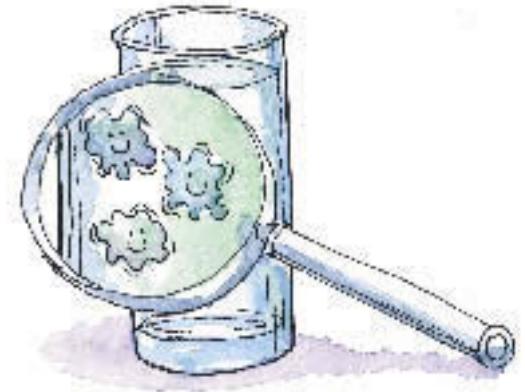
Rhode Island Department of Environmental Management Office of Water Resources
www.state.ri.us/dem/programs/benviron/water/quality/index.htm

Vermont Agency of Natural Resources Water Supply Division
www.anr.state.vt.us/dec/watersup/wsd.htm

What Do You Know About...



Microbial Contamination?



New England Interstate Water Pollution Control Commission

Boott Mills South

100 Foot of John Street

Lowell, MA 01852

Phone: 978/323-7929 ◆ Fax: 978/323-7919

www.neiwpcc.org ◆ mail@neiwpcc.org