



Glossary of Terms

ADVANCED WASTEWATER TREATMENT

Wastewater treatment process that includes combinations of physical (AWT) and chemical operation units designed to remove nutrients, toxic substances, or other pollutants.

Advanced, or tertiary, treatment processes treat effluent from secondary treatment facilities using processes such as nutrient removal (nitrification, denitrification), filtration, or carbon adsorption. Tertiary treatment plants typically achieve about 95% removal of solids and BOD in addition to removal of nutrients or other materials.

AEROBIC

A condition where free oxygen is present.

ALGAE

Any organisms of a group of chiefly aquatic microscopic nonvascular plants; most algae have chlorophyll as the primary pigment for carbon fixation. As primary producers, algae serve as the base of the aquatic food web, providing food for zooplankton and fish resources. An overabundance of algae in natural waters is known as eutrophication.

ALGAL BLOOM

Rapidly occurring growth and accumulation of algae within a body of water. It usually results from excessive nutrient loading and/or sluggish circulation regime with a long residence time. Persistent and frequent bloom can result in low oxygen conditions.

ANAEROBIC

A condition where free oxygen is not present or is unavailable.



Abbreviations and Acronyms

AQUIFER

Geologic formations (rock, sand, or gravel) that are saturated and sufficiently permeable to yield significant quantities of water.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

An area that receives special recognition by the state of Massachusetts because of the quality, uniqueness, and significance of the area's natural and cultural resources.

Designation creates a framework for local and regional stewardship of critical resources and ecosystems.

ATTENUATE

To reduce the force, amount, or magnitude.

BENTHIC REGENERATION

The regrowth of organisms on lake or sea floors.

BEST MANAGEMENT PRACTICES (BMPs)

Conservation practices to reduce non-point and point pollution from sources such as construction, agriculture, timber harvesting, marinas, and stormwater.

BIOCHEMICAL OXYGEN DEMAND (BOD)

The amount of oxygen per unit volume of water required to bacterially or chemically oxidize (stabilize) the oxidizable matter in water. Biochemical oxygen demand measurements are usually conducted over specific time intervals (5,10,20,30 days). The term BOD5 generally refers to standard 5-day BOD test.

horizon, typically 20 years.



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BUILD-OUT

The total of new development and redevelopment that is projected to occur over a planning

CHECKERBOARD SEWER SYSTEM

A wastewater collection system configured to serve only selected properties in a neighborhood. Such a system allows a town to restrict sewer service to only those lots in greatest need, and/or to preserve limited capacity for wastewater treatment or disposal.

CHLOROPHYLL

A group of green photosynthetic pigments that occur primarily in the chloroplast of plant cells. The amount of chlorophyll-a, a specific pigment, is frequently used as a measure of algal biomass in natural waters.

CLUSTER WASTEWATER TREATMENT SYSTEM

As used in this document, a wastewater collection and treatment system that serves more than one property and has a wastewater flow less than 10,000 gallons per day.

COLIFORM BACTERIA

A group of bacteria that normally live within the intestines of mammals, including humans. Coliform bacteria are used as an indicator of the presence of sewage in natural waters.

COMBINED SEWER OVERFLOWS (CSOs)

A combined sewer carries both wastewater and stormwater runoff. CSOs discharged to receiving water can result in contamination problems that may prevent the attainment of

water quality standards.



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COMMERCIAL WATER USE

Water used for motels, hotels, restaurants, office buildings, and other commercial operations.

CONCENTRATION

Mass amount of a substance or material in a given unit volume of solution. Usually measured in milligrams per liter (mg/l) or parts per million (ppm).

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN (CWMP)

A plan that identifies all the community's wastewater needs and problems, evaluates alternative means of meeting those needs, selects the most cost-effective and environmentally appropriate remedy, and proposes an implementation plan and schedule.

CONSTRUCTED WETLANDS

A type of wastewater treatment that mimics a natural wetland ecosystem in which waterloving plants filter wastewater and debris through their roots.

CONSUMPTIVE USE

That part of water withdrawn that is evaporated, transpired, or incorporated into a manufactured product, or consumed by humans or animals, or otherwise removed from the immediate waterbody environment.

CONTAMINATION

Act of polluting or making impure; any indication of chemical, sediment, or biological impurities.

DENITRIFICATION

A process of transforming nitrate to nitrite to nitrogen gas, often mediated by microbial processes.



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DESIGN FLOW

The amount of sanitary sewage, in gallons per day, for which a system must be designed in accordance with CMR 15.203. Design-flow criteria are the amounts of sanitary sewage that are assumed to be generated by a specific land use. For example, under Title 5, one bedroom is assigned a design flow of 110 gallons per day.

DIRECT DISCHARGE

An area where groundwater discharges directly to open coastal water.

DISSOLVED OXYGEN (DO)

The amount of oxygen gas that is dissolved in water. It also refers to a measure of the amount of oxygen available for biochemical activity in water body, and as indicator of the quality of that water.

ECOSYSTEM

An interactive system that includes the organisms of a natural community association together with their abiotic physical, chemical, and geochemical environment.

EFFLUENT

Sewage discharged into the environment, whether treated or not.

EMBAYMENT

A bay or a physical conformation resembling a bay.

ESTUARY

A partially enclosed body of water where fresh and salt water meet.



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EUTROPHICATION

A suite of changes in the condition of a water body that begins with excessive stimulation of growth of algae from nutrient inputs and leads to reduction in dissolved oxygen concentrations and sometimes to the death of organisms.

FLOOR AREA RATIO (FAR)

A measure of building density calculated by dividing building square feet by lot area.

FLOW NEUTRAL REGULATION

A sewer connection regulation that limits the amount of waste-water flow from a parcel to a pre-existing allowed flow.

FLUSHING RATE

The time it takes for an entire volume of water to be ex-changed, usually expressed in days or years.

GROUND WATER

Water below the land surface in a saturated zone.

GROUND WATER DISCHARGE PERMIT PROGRAM

A Massachusetts regulation (314 CMR 5.00) that requires a permit for discharges of 10,000 gallons per day or more of pollutants to ground water.

INFLUENT

Water volume flow rate or mass loading of a pollutant or other constituent into a water body

or wastewater treatment plant.



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INNOVATIVE/ALTERNATIVE (I/A) SEPTIC SYSTEM

Any septic system or part of one that is not designed or constructed in a way consistent with a conventional Title 5 system. A conventional system has a septic tank, a distribution box or dosing mechanism, a soil-absorption system, and a reserve area. Some examples of alternative systems are recirculating sand filters, aerobic treatment units, peat filters, humus/composting toilets, and intermittent sand filters. Some I/A technologies are used to reduce nitrogen in nitrogen sensitive areas.

INTERIM WELLHEAD PROTECTION AREA (IWPA)

A public water system using wells or well fields that lack Massachusetts Department of Environmental Protection (DEP)-approved Zone IIs. The IWPA is a half-mile radius measured from the well or wellfield for sources with an approved pumping rate of 100,000 gallons per day or greater.

LOADING, LOAD, LOADING RATE

The total amount of material (pollutants) entering the system from one or multiple sources; measured as a rate in weight (mass) per unit time.

LOCAL RESIDENCE TIME

The average time for water to migrate from a point in a sub-embayment to a point outside the sub-embayment.

LOW IMPACT DEVELOPMENT (LID)

An approach to land development (or redevelopment) that works with nature to manage stormwater as close to its source as possible. Includes principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create



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functional and appealing site drainage that treats stormwater as a resource rather than a waste product.

MASSACHUSETTS ESTUARIES PROJECT (MEP)

A project of the Massachusetts Department of Environmental Protection (DEP) and the School for Marine Science and Technology at the University of Massachusetts, Dartmouth, that provides water quality, nutrient loading, and hydrodynamic information for 89 estuaries in southeastern Massachusetts. This information is combined in a linked watershed/estuary model that predicts the water quality changes that result from land use management decisions.

MASSACHUSETTS GROUNDWATER DISCHARGE PROGRAM

A state permit program to regulate effluent flows in excess of 10,000 gallons per day.

MILLIGRAMS PER LITER (MG/L)

A unit of measurement expressing the concentration of a constituent in solution as the weight (mass) of solute (1 milligram) per unit volume (1 liter) of water; equivalent to 1 part per million (ppm) for a water density. 1 g cm^{-3} . $1 \text{ mg/L} = 1000 \text{ ug/L}$; $1 \text{ g/L} = 1000 \text{ mg/L}$.

MILLION GALLONS PER DAY (MGD)

Rate of water volume discharge representing a volume of 1 million gallons of water passing

across a given location in a time interval of 1 day. A flow rate of 1 mgd = 1.54723 cubic feet per second (cfs) = 0.04381 cubic meters per second (cms).

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

A federal permit program under the Clean Water Act that regulates the discharge of pollutants into water bodies.



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NATURAL ATTENUATION OF NITROGEN

The naturally occurring retention or attenuation of nitrogen in wetlands or ponds.

NATURAL RESOURCE PROTECTION ZONING

A relatively new form of zoning that is a variation of a clustered subdivision, but with several enhancements. The number of allowed dwelling units is determined by a calculation that first eliminates the amount of important natural resource lands from the determination of the number of allowed units. The net acreage is then divided by the base density to determine the number of buildable units.

NITRATE

The nitrogen species in marine ecosystems that is most responsible for eutrophication, considered a broad indicator of contamination of ground water.

NITRITE

An intermediate oxidation state of nitrogen, between nitrate and ammonia.

NITROGEN

An element abundant in the atmosphere as dinitrogen gas. When combined with oxygen to form nitrate (NO₃), it can cause excessive algal growth in marine waters, which can lead to

eutrophication.

NITROGEN LOADING

The input of nitrogen to estuaries and embayments from natural and human sources.

NITROGEN REMOVAL CREDIT

Under Title 5, an innovative alternative septic systems that achieves an effluent nitrogen concentration of 19 milligrams per liter for a residential property and 25 milligrams per liter



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for a commercial property may qualify for a Nitrogen Removal Credit. The credit allows for an increase in design flow per acre in designated Nitrogen Sensitive Areas such as Zone IIs to public water supply wells, in other areas that have formally been designated as Nitrogen Sensitive Areas, and for new construction in areas that have both private wells and on-site septic systems.

NITROGEN SENSITIVE AREA

A Massachusetts regulatory designation of an area as particularly sensitive to pollution from on-site wastewater systems and therefore requiring nitrogen-loading restrictions; includes Interim Wellhead Protection Areas and Zone IIs of public water supplies, areas with private wells, and Nitrogen Sensitive embayments or other areas that are designated as nitrogen sensitive under Title 5, based on appropriate scientific evidence.

NON-CONFORMING USE OR STRUCTURE

A use or structure that no longer conforms to current zoning, but did conform when first built or established.

NON-POINT SOURCE OF POLLUTION

Pollution from many diffuse sources that is carried to surface waters by runoff or ground water. Non-point source pollution is typically caused by sediment, nutrients, and organic and toxic substances originating from land use activities and/or the atmosphere. Any source of water pollution that does not meet the legal definition of a point source.

NUTRIENT LOADING

The introduction of excessive amounts of nutrients, such as nitrogen or phosphorus, from



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wastewater or fertilizers, which ultimately reach ponds or estuaries.

NUTRIENT MANAGEMENT REGULATIONS

Regulations that establish limits on the amount of flow from on-site septic systems serving new development and redevelopment or use changes.

NUTRIENTS

Any substance required by plants and animals for normal growth and maintenance; for example, nitrogen and phosphorus.

ON-SITE TREATMENT AND DISPOSAL SYSTEM

A natural system or mechanical device used to collect, treat, and discharge or reclaim wastewater from an individual dwelling without the use of community-wide sewers or a centralized treatment facility. It includes a septic tank and a leach field.

ORGANIC MATTER

The organic fraction that includes plant and animal residue at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. Commonly determined as the amount of organic material contained in a soil or water sample.

ORGANIC NITROGEN

Organic form of nitrogen bound to organic matter.

OUTFALL

Location point where wastewater or stormwater flows from a conduit, stream, or drainage ditch into natural waters.



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OUTSTANDING RESOURCE WATERS

A Massachusetts Department of Environmental Protection (DEP) designation assigned to certain water bodies based on their outstanding socio-economic, recreational, ecological, and/or aesthetic values.

OXYGEN DEMAND

Measure of the dissolved oxygen used by a system (microorganisms) and or chemical compounds in the oxidation of organic matter. See also biochemical oxygen demand.

OXYGEN DEPLETION

Deficit of dissolved oxygen in a natural waters system due to oxidation of natural and anthropogenic organic matter.

PARTS PER MILLION (PPM)

Measure of concentration of 1 part solute to 1 million parts water (by weight). See milligrams per liter.

PATHOGEN

An agent such as a virus, bacterium, or fungus capable of causing disease.

PERMEABLE REACTIVE BARRIER (PRB)

A carbon-containing reactive substance that promotes denitrification.

pH

A measure of acidity indicated by the logarithm of the reciprocal of the hydrogen ion concentration (activity) of a solution. pH values less than 7 are acidic; values greater than 7 are basic; pH of 7 is neutral. pH of natural waters typically ranges from 6-8.

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A nutrient essential for plant growth that can play a key role in stimulating the growth of aquatic plants in streams, rivers and lakes.

PHYTOREMEDIATION

The use of plants to take up nutrients, contaminants, or other substances from soils, ground water, and surface water in order to restore ecosystem health.

POINT SOURCE OF POLLUTION

As defined by the US Environmental Protection Agency (EPA), any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

POLLUTANT

A contaminant in a concentration or amount that adversely alters the physical, chemical, or biological properties of a natural environment. The term include pathogens, toxic metals, carcinogens, oxygen demanding substances, or other harmful substances.

PUBLICLY OWNED TREATMENT WORKS

Municipal wastewater treatment plant owned and operated by a (POTW) public governmental entity such as a town or city.

PUBLIC-SUPPLY WITHDRAWALS

Water withdrawn from surface water or groundwater by public or private water suppliers for use within a community. Water is used for domestic, commercial, industrial and public water



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uses such as fire fighting.

RECHARGE

The return of water to an underground aquifer by natural or artificial means.

RESIDENCE TIME

The average time required for a particle of water or a pollutant to migrate through an estuary.

SALINITY

The measure of the salt content of water. ,measured by weight as parts per thousand (ppt).

Salinity concentrations range from 0.5-1 ppt for tidal fresh waters; 20-25 ppt for estuarine waters; 30 ppt for coastal waters to 35 ppt for the open ocean.

SECCHI DEPTH

A measure of the light penetration into the water column. Light penetration is influenced by turbidity.

SEPTAGE

Material physically removed from any part of an on-site system, including, but not limited to,

the solids, semi-solids, scum, sludge, and liquid contents of a septic tank, privy, chemical toilet, cesspool, holding tank, or other sewage waste receptacle. It does not include any material that is hazardous waste.

SEPTIC TANK

A buried tank designed to receive and pre-treat wastewater from individual homes or facilities by separating settleable and floatable solids from wastewater. It is one component



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of an on-site wastewater treatment and disposal system.

SETBACKS

A zoning term used to refer to the distance between a building and property lines.

SEWAGE

The water-carried human or animal wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration and surface water as may be present. The liquid and solid waste carried off in sewers or drains.

SEWER

An artificial, usually underground, conduit for carrying off sewage or rainwater.

SEWERAGE

The removal of wastewater and refuse by means of sewers.

SEWERSHED

The properties within the area of service of a sewer system.

STATE REVOLVING FUND (SRF)

A Massachusetts program that helps with the financing of water pollution abatement

projects. Two types of funding are provided through this program: the Clean Water and Drinking Water State Revolving Fund grants.

STATION (MONITORING)

Specific location in a waterbody chosen to collect water samples for the measurement of water quality constituents. Stations are identified by an alphanumeric code identifying the agency source responsible for the collection of the data and a unique identifier code



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designating the location. Station measurements can be recorded from either discrete grab samples or continuous automated data acquisition systems. Station locations are typically sampled by state, federal or local agencies at periodic intervals (e.g., weekly, monthly, annual etc.) as part of a routine water quality monitoring program to track trends. Station locations can also be sampled only for a period of time needed to collect data for an intensive survey or a special monitoring program.

STORMWATER RUNOFF

Rainfall and snow melt from diffuse (non-point) sources such as roofs, roadways, driveways, and other impervious surfaces.

SUB-EMBAYMENT

A cove within an embayment.

SURFACE WATERS

Water that is present above the substrate or soil surface. Usually refers to natural waterbodies such as streams, rivers, lakes and impoundments, and estuaries and coastal ocean.

SYSTEM RESIDENCE TIME

The average time for water to migrate through an entire estuarine system.

Tidal Flushing

The exchange of water from an estuarine system to the water body into which it empties.

TITLE 5

A Massachusetts state regulation (310 CMR 15.00) governing the siting, construction,

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inspection, upgrade, and expansion of on-site sewage treatment and disposal systems and the transport and disposal of septage.

TOTAL COLIFORM BACTERIA

A particular group of bacteria that are used as indicators of possible sewage pollution.

Total Maximum Daily Load (TMDL)

The greatest amount of a pollutant that a water body can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing.

TRANSFER OF DEVELOPMENT RIGHTS (TDR)

A land use regulation that allows development rights to be transferred from an area where additional development is not desired, to an area where additional development is desired.

WASTEWATER FLOW

The wastewater from septic systems that leaches into groundwater and flows through ground water into receiving waters such as a pond or estuary.

WASTE LOAD ALLOCATION (WLA)

The portion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution.

WASTEWATER TREATMENT

Chemical, biological, and mechanical processes applied to an industrial or municipal discharge or to any other sources of contaminated water in order to remove, reduce, or



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neutralize contaminants prior to discharge to a receiving water.

WATER POLLUTION

Any condition of a waterbody that reflects unacceptable water quality or ecological conditions. Water pollution is usually the result of discharges of waste material from human activities into a waterbody.

WATER QUALITY

Numerical description of the biological, chemical, and physical conditions of a water body. It is a measure of a water body to support beneficial uses.

WATERSHED

An area of land that drains to a common receiving body of water.

ZONE I

The protective radius required around a public water supply well or wellfield.