RI Department of Environmental Management

Presentation to the
Special Legislative Commission on Water Supply Planning
for New Housing Development in Rural Areas

Protecting Water Quality in Rural Rhode Island

October 7, 2026





Susan Kiernan, Administrator
RIDEM Office of Water Resources
Sue.kiernan@dem.ri.gov

Key Roles of State Agencies Related to Water Supply

Water Resources Board
DOA- Division of Planning

Water Supply Management

Water Supply System Mgt Plans – Large Suppliers

Drought Management

Water Use Data Collection & Reporting

Statewide Water Allocation

Financial Assistance

RIDEM

Implement the Clean Water Act

Groundwater & Surface Water Quality Classification and Standards

Wellhead Protection Area Mapping

Water Quality Monitoring and Assessment

Regulation of pollution sources Watershed-based Planning

Land Development Permitting

Financial Assistance

Emergency Response (Spills, etc.)

RIDOH

Implement the Safe Drinking Water Act

Regulation of Public Drinking Water Supply Systems

Public drinking well siting &construction requirements

Maximum Contaminant Levels (MCLs) for drinking water (human consumption)

Source Water Protection & Vulnerability Assessments

Financial Assistance – public water systems

Private Wells Testing and Technical Assistance

State Building/ Plumbing Codes Drinking well siting &construction requirements (DBR)

RI Contractor Registration and Licensing Board – Oversight of well drilling contractors (DBR)

DOA–Division of Planning State Guide Plan Elements

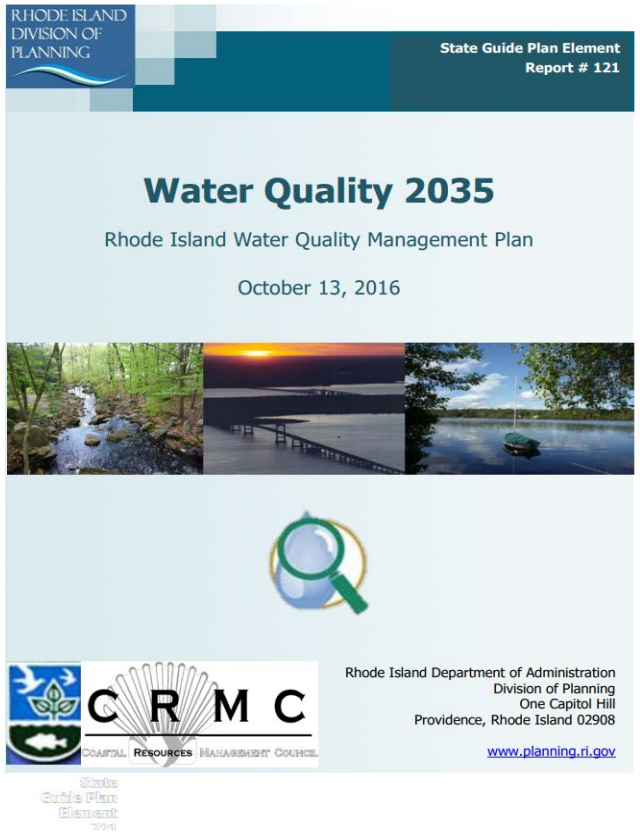
State Guide Plan – Water Quality 2035

Two Overarching Water Quality Goals:

WQ #1. Protect the existing quality of RI's waters and aquatic habitats and prevent further degradation.

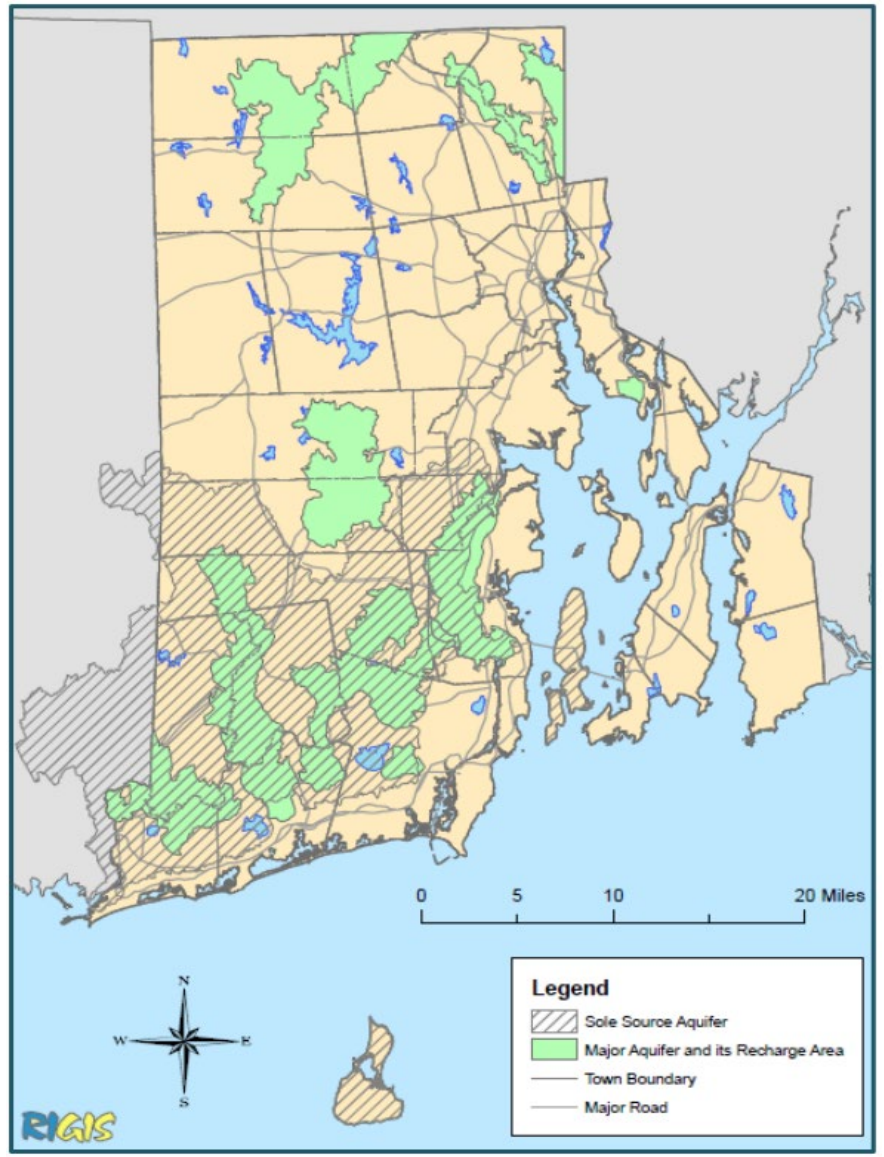
WQ #2. Restore degraded waters and aquatic habitats to a condition that meets their water quality and habitat goals.

Protecting and restoring drinking water supplies is identified as one of four high priorities.



Rhode Island Groundwater Resources

- 22 major aquifers of deep sand and gravel deposits mapped by DEM as potentially significant sources of water (high yield). Support large public wells with pumping capacity of million gallons per day (MGD).
- Remainder of state exhibits glacial till overlaying fractured bedrock. These areas have lower yields generally suitable for individual housing and businesses.
- Four areas designated by EPA as Sole Source Aquifers: Block Island, Jamestown, Wood-Pawcatuck Basin, Hunt-Annaquatucket- Pettasquamscutt (HAP) Aquifers. (No alternative water sources are available.)

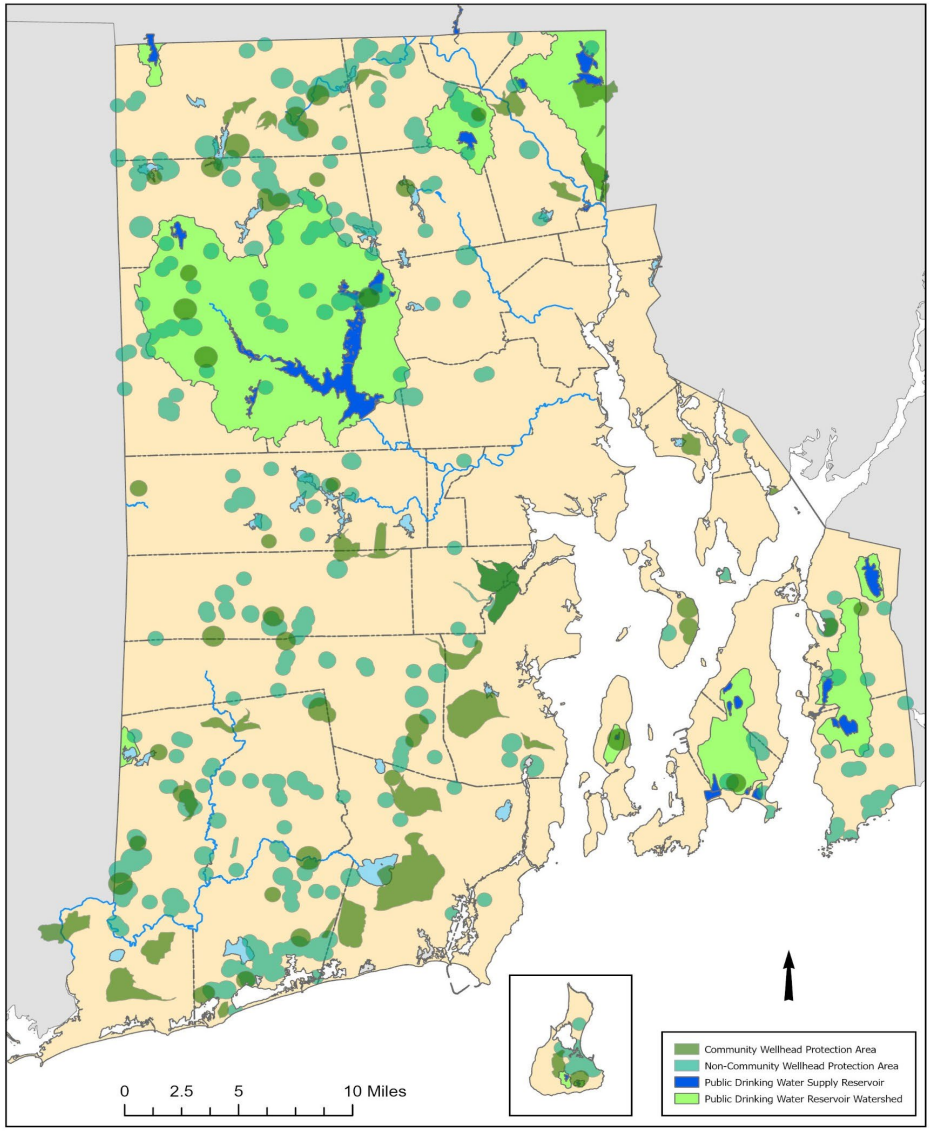


Groundwater Resources Source: Water 2035

Drinking Water Supply Source Waters

RI drinking source waters include:

- 29 designated surface water reservoirs & their watersheds (drainage basins).
- Public wells and their designated contributing wellhead protection area (WHPAs).
- Private wells.



Drinking Water Supply Source Waters

Wellhead Protection Area Mapping

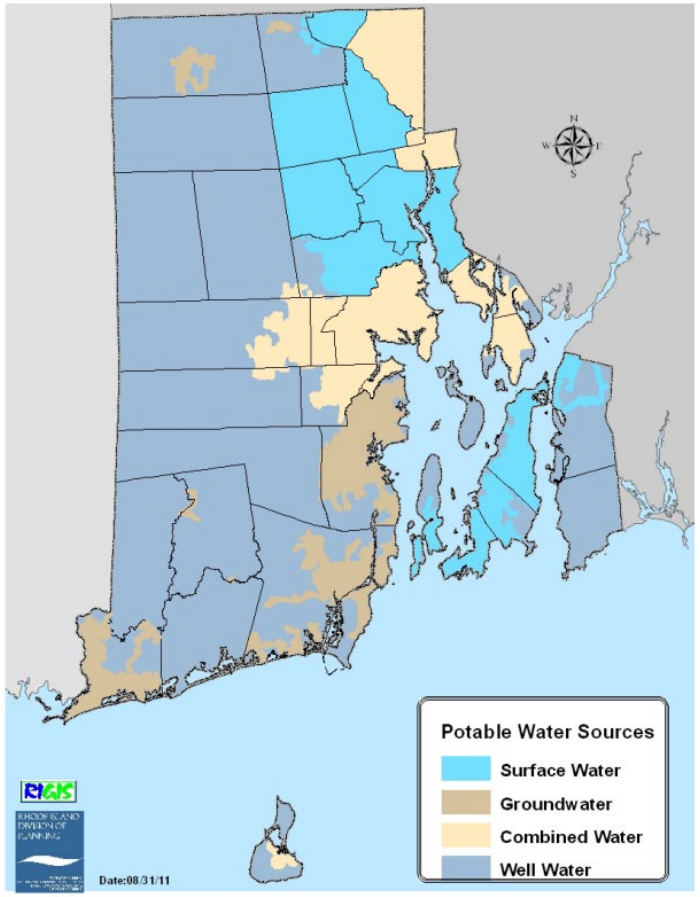
Type of Drinking Water Well	Mapping Approach	Radius Distance (feet)
Community and Non-Community/Non-transient in Stratified Drift	Hydrologic modeling of contributing area Interim circle shape	Polygon shape 2000
Community and Non-Community/Non- transient in bedrock	Circle shape sized to pumping rate	1750-3133
Other wells in glacial till, other groundwater sources (spring), transient wells	Circle Shape	1750

Water Supply Sources by Municipality

Large primarily rural area of RI is dependent on groundwater for its drinking water.

In these areas, prevention of pollution is especially important given the challenges of groundwater remediation.

Figure 3, Potable Water Sources by City/Town



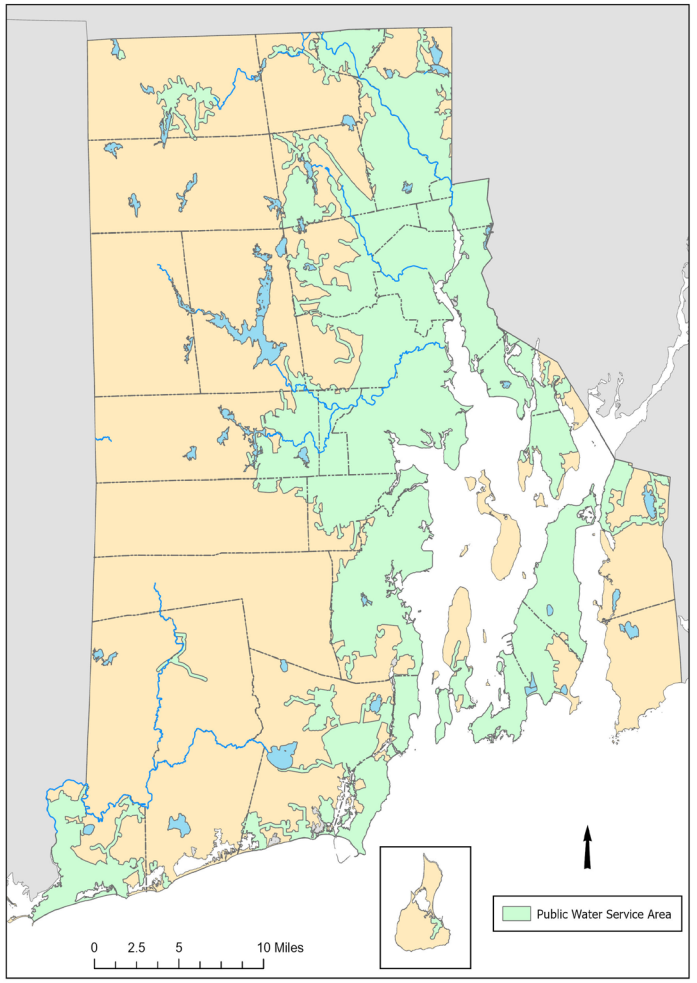
Source: Water 2030

Public Water Service Areas

34% of RI land area falls within a public water service area (groundwater or surface water).

Remainder of the State relies on private wells.

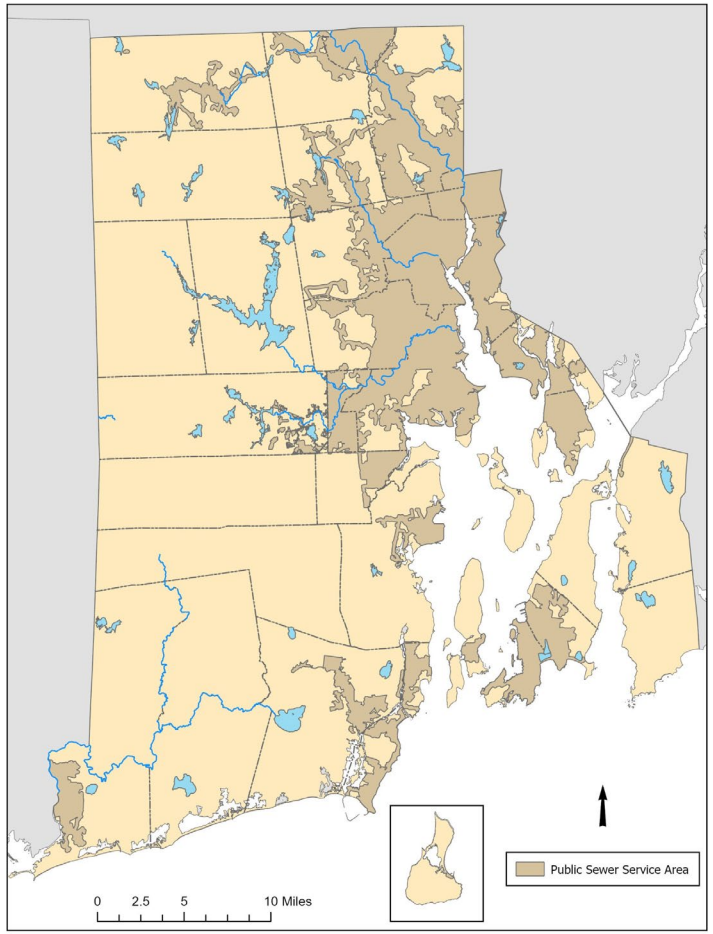
Private wells serve an estimated 10-11% of RI population (USGS, 2022).



Public Water Service Areas

Public Wastewater Service Areas

- 19 major wastewater treatment facilities discharge to rivers and coastal waters.
- About 21% of RI land area has access to public sewers.
- Facility planning documents project 20-year needs and support wastewater system designs. Should be aligned with local comprehensive plans.
- Facility plans updated as needed and subject to DEM review and approval.
- Recent sewer extension projects aimed at abating water quality concerns and not new development (Warwick, Tiverton).



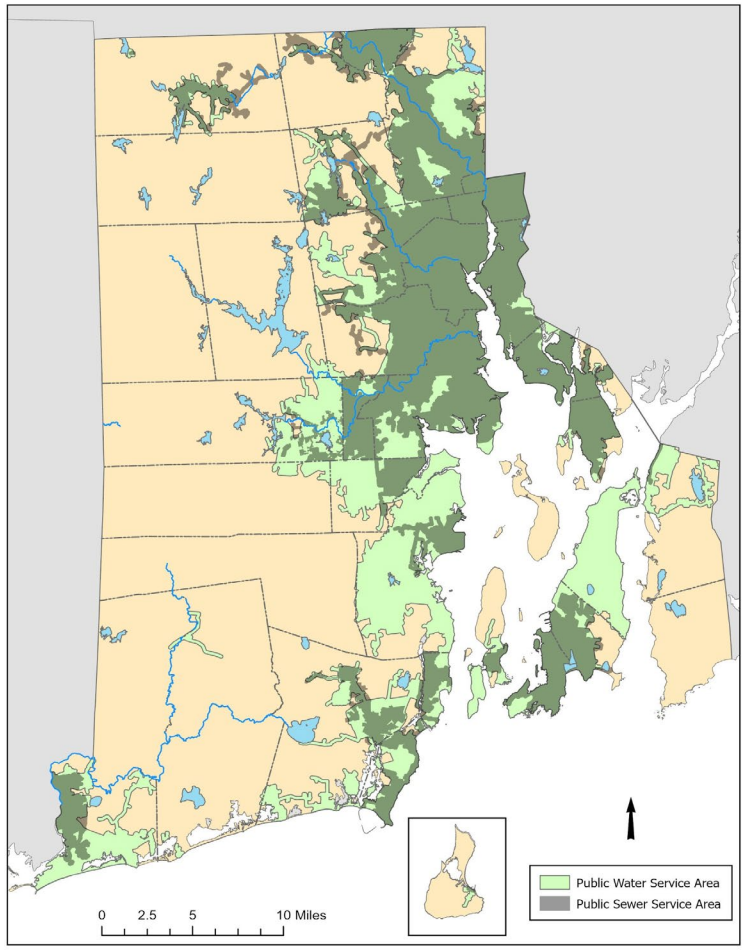
Public Wastewater Service Areas

Areas Served by Public Water & Sewer

About 20% of state land area has access to both public drinking water and wastewater services.

Another 14% of state land area has public water service only.

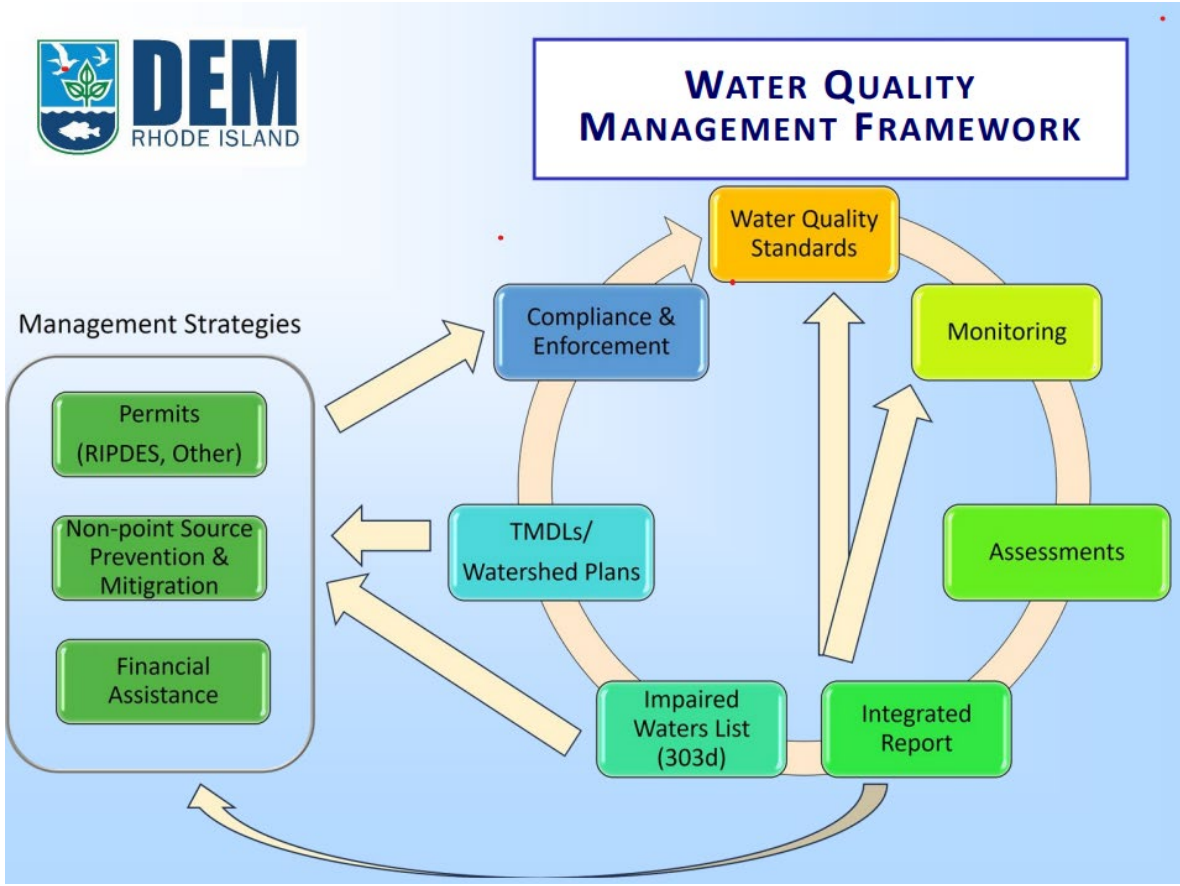
Another 1% of state land area has public sewer service only.



Public Water and Sewer Service Areas

Ambient Water Quality Management Framework

- Classification of all groundwaters and surface waters
- Criteria to protect uses of groundwater and surface water
- Numeric and narrative criteria.
- Monitoring of water quality & comparison to water quality criteria.
- List of "impaired" surface waters updated every two years.
- Waters impaired by a pollutant typically require a "TMDL" to quantify needed actions to restore water quality.



Groundwater Classifications

Groundwater Classifications prioritize protection for drinking water use

GAA – Suitable for public drinking water use including:

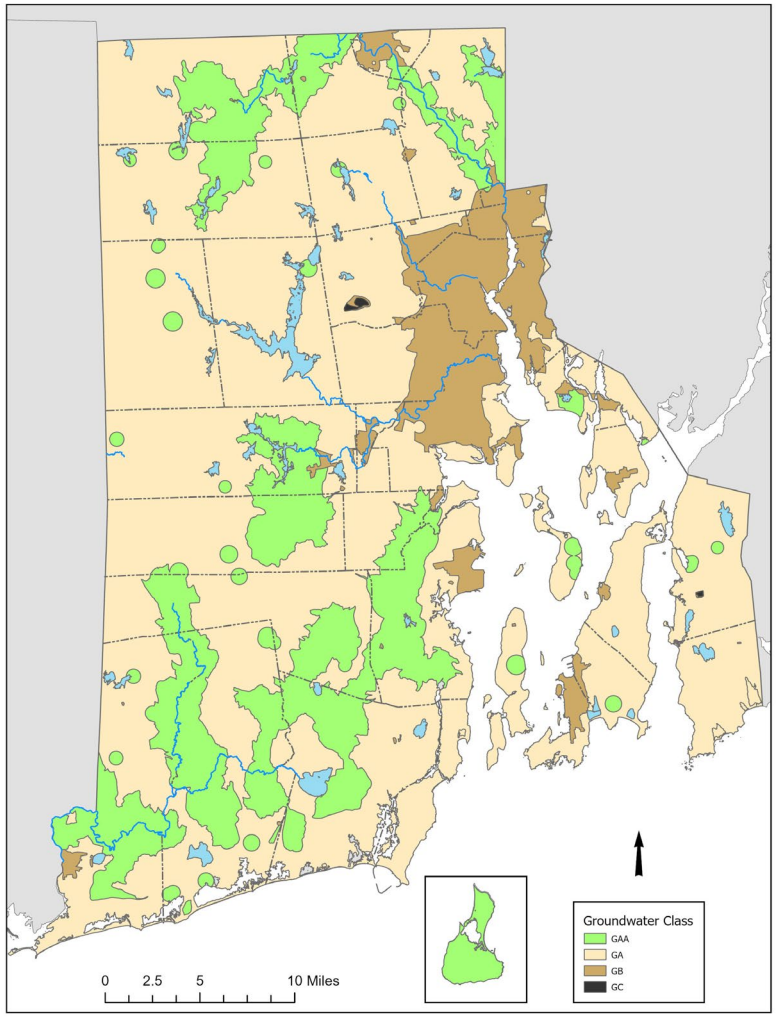
- groundwater reservoirs and recharge area;
- wellhead protection areas for community water supply wells; and
- isolated groundwater dependent areas (Block Island).

GA – Suitable for public or private drinking water use.

GB- Not suitable for drinking water use without treatment due to known or presumed degradation.

GC – Area designated as more suitable for waste disposal (underlying landfills).

Classification is tied to DEM regulatory siting restrictions, New underground storage tanks, etc.



Groundwater Classification

Surface Water Classifications

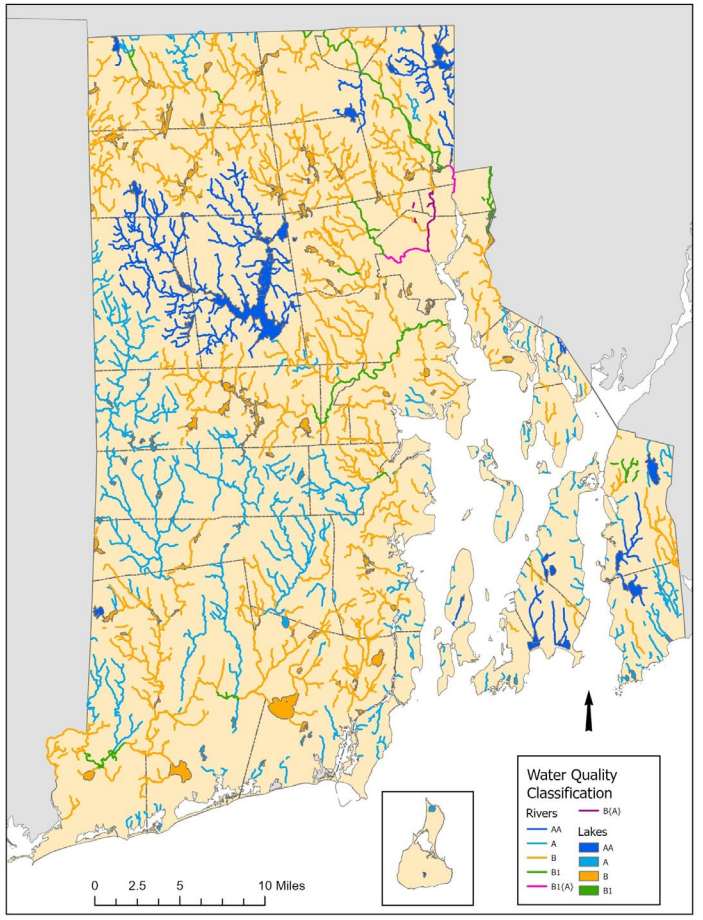
Surface Water Classifications (Freshwaters)

AA– These waters are designated as a source of public drinking water supply (PDWS) or as tributary waters within a PDWS watershed. Also designated for recreational use and fish and wildlife habitat.

Rule acknowledges recreational uses may be restricted by the water supplier.

Other Freshwater Classifications: A, B

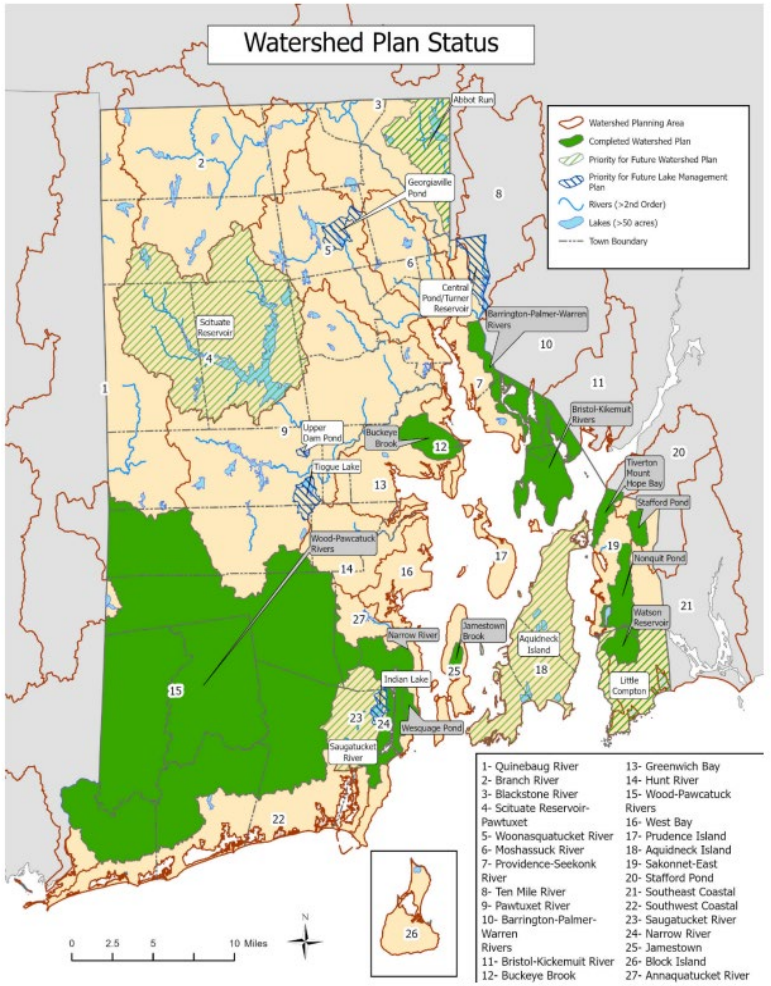
Classification is tied to regulatory restrictions such as no new direct wastewater discharges into Class AA terminal reservoirs and further restriction throughout the rest of the PDWS watershed, with rare exceptions.



Surface Water Classification - Freshwaters

Watershed-Based Water Supply Protection

- Land Conservation in Wellhead Protection Areas and Water Supply Reservoir watershed lands.
- Source Water Pollution Source Inventories – by water suppliers (RIDOH).
- Element of Large Supplier Water Supply System Management Plans (required by WRB).
- DEM Watershed Management Plans developed as part of Nonpoint Source Pollution Management.
- DEM Water Quality Restoration Plans ("TMDLs").



Additional Watershed Protection Strategies

- DEM regulatory pollution source programs (septic systems, UICs, RIPDES, solids and hazardous waste facilities, USTs, ASTs, etc.)
- DEM and CRMC Freshwater Wetland Buffer Zone Designations and standards for buffer protection and restoration.
- Farm Conservation Plans and implementation of agricultural best management practices (BMPs).
- Municipal Stormwater Management Plans & Activities.
- Municipal Onsite Wastewater Management Plans & Activities.
- Municipal Comprehensive Plans – review and comment by state agencies including DEM.
- Municipal Overlay Ordinances (Zoning) & Cluster/Conservation Development.

Water Quality Management &New Rural Housing

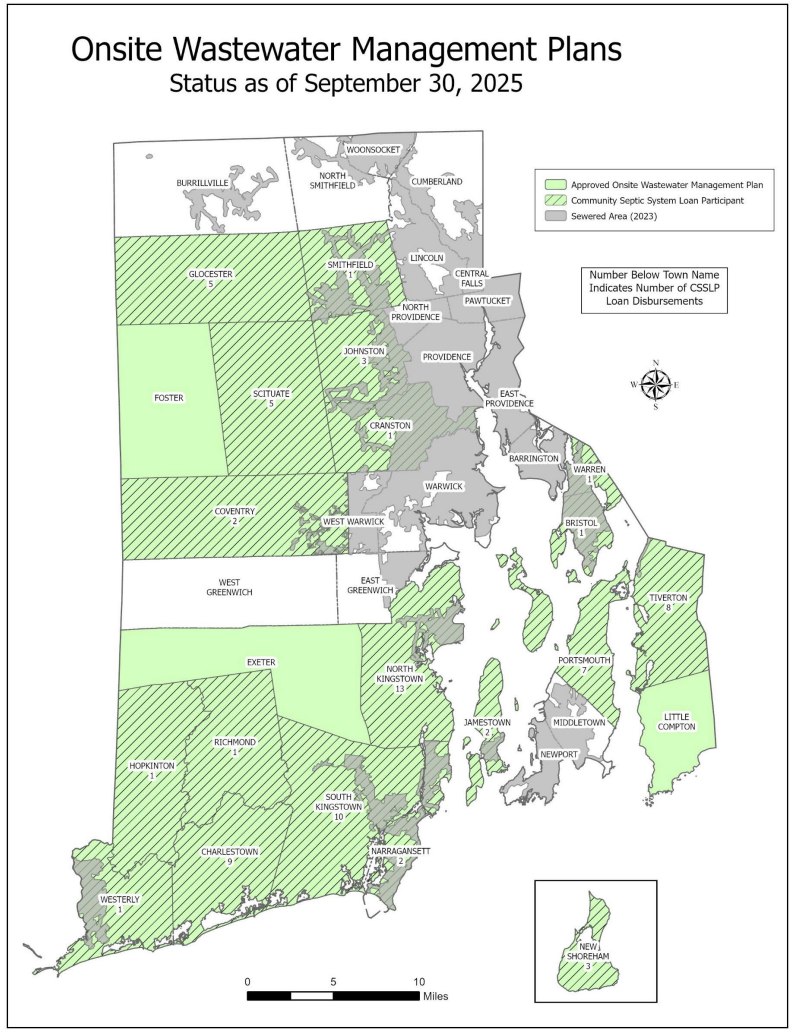
Activity Associated with New Housing Development	Pollutants/Stressor	Management Considerations
Onsite Wastewater Treatment Systems	Nutrients (Nitrogen, Phosphorus) Pathogens	Proper Siting - Soil suitability/ depth to groundwater Protection of drinking water wells Excess nitrogen loadings to coastal waters &GW Groundwater pollutant transport offsite Proper O&M of OWTS
Stormwater Runoff from Impervious Surfaces	Numerous pollutants (nutrients, pathogens, sediment, oils and grease, pesticides, metals, etc.)	Optimize Low Impact Development Optimize infiltration to support local hydrology Provide treatment of stormwater runoff using appropriate BMPs &manage peak flows
Land Disturbance	Alteration of vegetated buffer or wetland resource Soil erosion and sedimentation	Avoidance and minimization of loss of buffer and alteration of freshwater wetlands Adequacy of erosion controls during and after construction

DEM Regulatory Programs Related to Housing Development

Onsite Wastewater Treatment Systems (OWTS)

Purposes of OWTS Program

- Systems are designed &installed to operate properly.
- Sanitary wastewater discharged into the ground will have sufficient time in the ground to neutralize bacteria, viruses, and nutrients (P).
- Septic Systems have sufficient distance and treatment from public and private wells to protect drinking water sources.
- Septic Systems have sufficient distance and treatment from surface water bodies and wetlands to prevent pollution and excess nutrient loading.



DEM Regulatory Setbacks Related to OWTS and Water Supply

Onsite Wastewater Treatment Systems (OWTS)

OWTS Rules requirements:

- Dependent on soil types and water table
- Minimum design flows required for different uses
- Minimum Setback Distances from Drinking Water Wells
- Minimum Setback Distances from Drinking Water Supplies, Adjacent Wetlands, and drainage pathways
- Advanced treatment to reduce nitrogen pollution required in certain coastal areas and may be required to protect drinking water wells.

OWTS Design Flow (gpd)	Distance in Feet from Leachfield/Septic Tank Effluent Pipe, Tanks/Building Sewer (Notes 1 and 5)	Distance in Feet from All OWTS Components (Notes 1 and 5)	
	Private Drinking Water Well (Note 2)	Public Well – Drilled (rock), Driven, or Dug	Public Well – Gravel Packed, Gravel Developed
< 1,000	100/75/50 (Notes 3 and 4)	200	400
1,000 – <2,000	150/75/50	200	400
2,000 – <5,000	200/75/50	200	400
5,000 – <10,000	300/75/50	300	400
= 10,000	400/75/50	400	400

DEM Regulatory Programs Related to Housing Development

Stormwater Management Overview = Shared Regulatory Authority

Federal

- EPA requires regulation of stormwater discharges into surface waters under the Clean Water Act
- EPA requires regulation of the subsurface discharge of stormwater with some exceptions (Underground Injection Control Program)

State

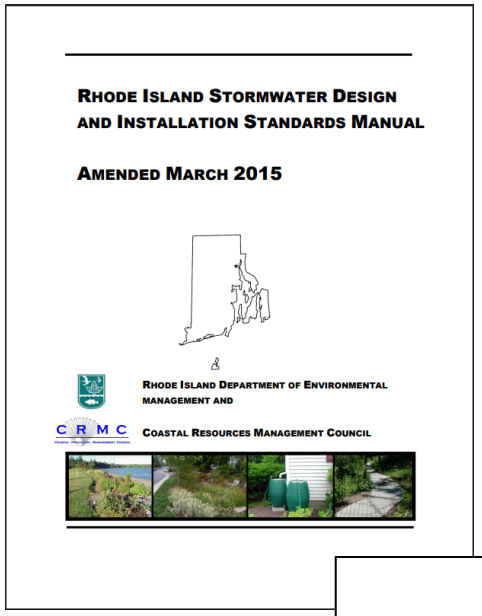
- DEM implements federal requirements via RIPDES, UIC. Stormwater & FWW rules & MS4 program
- DEM conducts detailed stormwater reviews for projects involving 5 acres or more of land disturbance ***with discharge to surface water/wetland*** and all proposed UIC discharges
- Applications of 1 to 5 acres of land disturbance get limited DEM review; may trigger a full review if situation warrants.
- State regulatory programs do not have oversight over all proposed land development.

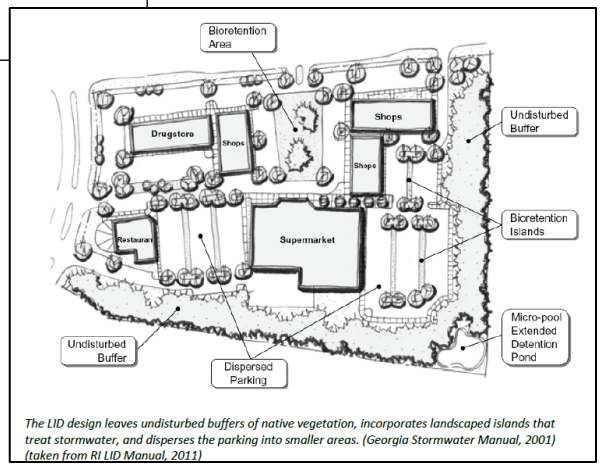
Local

- MS4 program requires local ordinances related to stormwater management in designated MS4 areas; municipality may elect to apply ordinances townwide
- Municipalities own/operate stormwater infrastructure and review/approve connections to their systems
- Municipalities conduct technical reviews of stormwater plans for proposed projects and may review aspects not part of DEM review; e.g. street flooding, capacity of local drainage system.

Stormwater Management Strategies

- State policy – Use of Low Impact Design techniques for new development & redevelopment – minimize new impervious cover.
- RI Stormwater Design and Installation Standards Manual and corresponding rules – new development &redevelopment
- Use of "green Infrastructure" practices to optimize infiltration of stormwater runoff. Certain sites are restricted.





The LID design leaves undisturbed buffers of native vegetation, incorporates landscaped islands that treat stormwater, and disperses the parking into smaller areas. (Georgia Stormwater Manual, 2001) (taken from RI LID Manual, 2011)

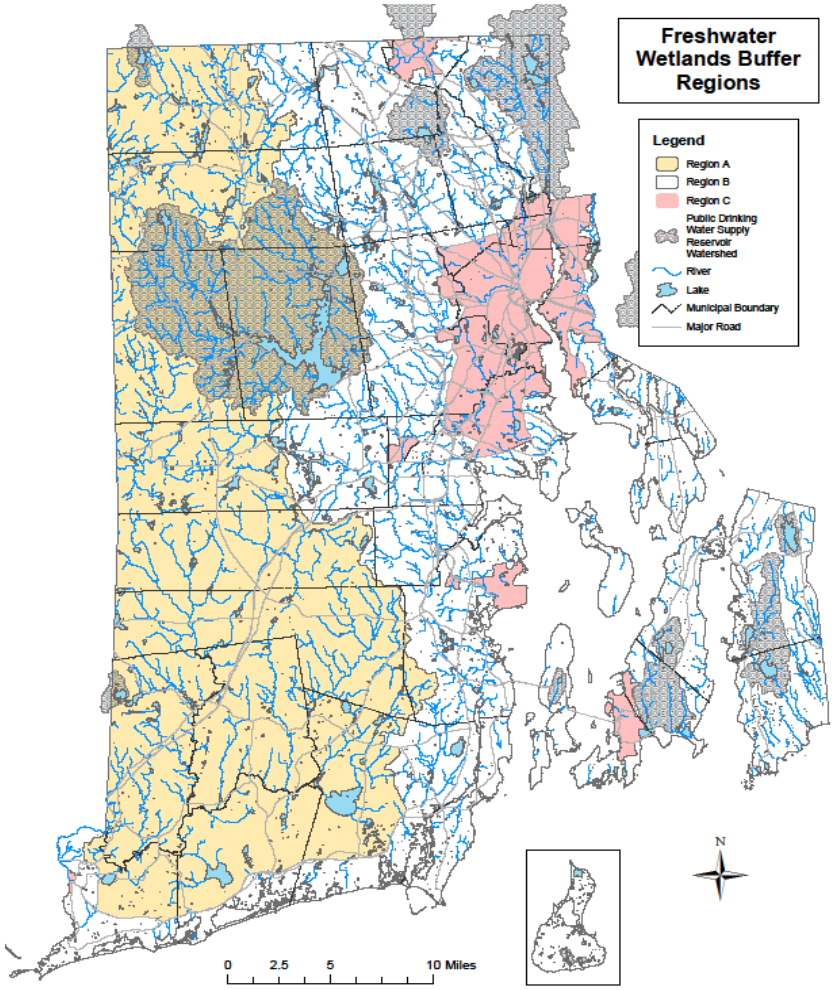
DEM Regulatory Programs Related to Housing Development

Freshwater Wetlands Rules (July 2022)

Tiered Approach to Buffer Protection

- Public Drinking Water Supply Watersheds - includes watersheds of surface water supply reservoirs.
- Non-urban Region – Covers most of the State with mixed land uses. Further designated with 2 river protection regions.
- Urban Region – Includes densely developed areas of the state including portions of watersheds that contain high impervious cover and areas that are already developed or altered.

Administered by DEM and CRMC within their agency respective authorities.



Freshwater Wetland Buffer Regions

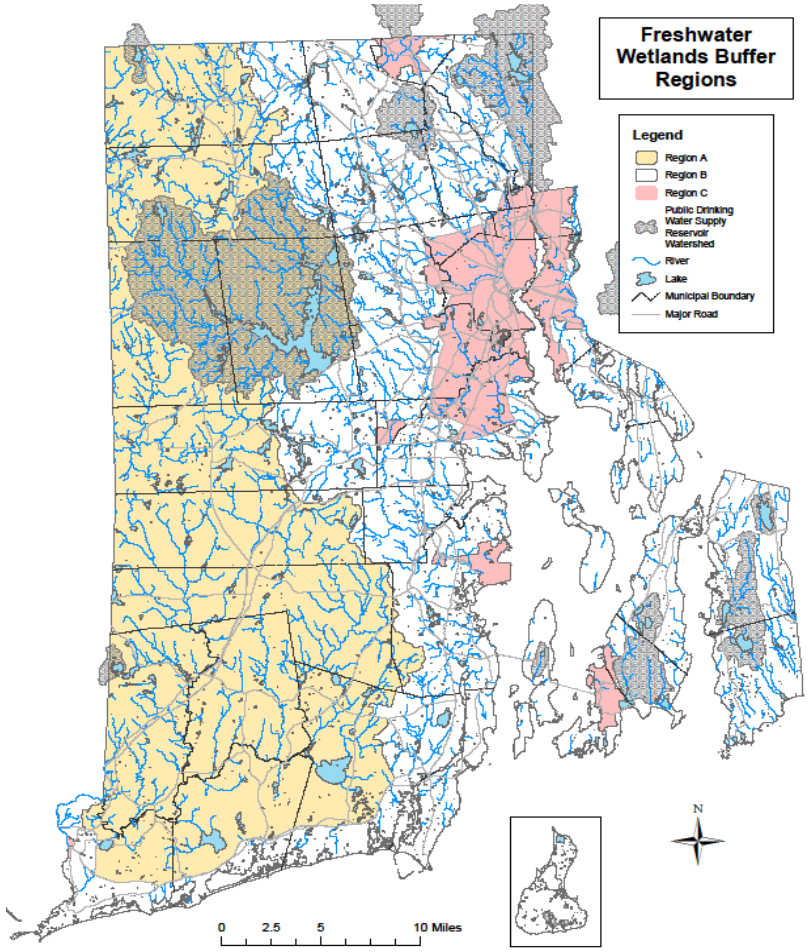
DEM Regulatory Programs Related to Housing Development

Freshwater Wetlands Rules (July 2022)

Public Drinking Water Supply Watersheds – Protective Buffer Zones designated as:

- 200 feet for named drinking water supply reservoirs.
- 200 feet for rivers/perennial streams within the watersheds of drinking water supply reservoirs.
- 100 feet for ponds contiguous with tributary rivers/perennial streams to the reservoirs.

Maximum buffer protection available under DEM and CRMC jurisdiction specified in law reflects prioritizing water supply protection.



Freshwater Wetland Buffer Regions

DEM Regulatory Programs Related to Housing Development

Freshwater Wetlands Rules (July 2022)

Hydromodifcations :

Includes water withdrawals that may affect wetlands. State agency jurisdiction over projects that may:

- Result in a change to the normal surface runoff characteristics which increases the rate or volume of water flowing into, or draining or diverting water away from, freshwater wetlands &buffers.
- Result in diversion of groundwater into or away from freshwater wetland &buffers.
- Result in the modification to the quality of water reaching freshwater wetlands or buffers which could alter their natural character.

Surface Water and Groundwater Diversion Standard applies (no adverse effects)



Links to More Information

Water Quality 2035
https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/quality/pdf/wqmp2035.pdf

DEM Wellhead Protection

https://dem.ri.gov/environmental-protection-bureau/water-resources/waters-wetlands/groundwater-wellhead-protection-programs

DEM Nonpoint Source Pollution

https://dem.ri.gov/programs/water/quality/non-point/index-01.php

DEM TMDLs

https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/restoration-studies-tmdl

DEM Groundwater Quality Rules https://rules.sos.ri.gov/regulations/part/250-150-05-3

DEM Water Quality Rules https://rules.sos.ri.gov/regulations/part/250-150-05-1

DEM OWTS Rules https://rules.sos.ri.gov/regulations/part/250-150-10-6

DEM Stormwater Rules https://rules.sos.ri.gov/regulations/part/250-150-10-8

DEM Freshwater Wetland Rules https://rules.sos.ri.gov/regulations/part/250-150-15-3