RESILIENT RHODY

THREE YEAR IMPACT REPORT

RHODE ISLAND INFRASTRUCTURE BANK

Building a More Resilient Rhode Island

Three years ago, a broad coalition of more than 50 stakeholders – from state agencies, to municipalities, to non-profit groups – came together to craft and release *Resilient Rhody*, Rhode Island's first comprehensive strategy to address the impacts of climate change and present actions to increase our state's resilience in the face of these threats to our infrastructure, environment, and public health.

Given the serious short- and long-term impacts identified in *Resilient Rhody*, allowing the strategy to be filed without commitment to implementation and action was simply not an option.

We are pleased to share the *Resilient Rhody* 3 Year Impact Report detailing the very real progress our state agency and municipal partners have made on turning the original recommendations into success stories. These include infrastructure upgrades, coordinated planning, and innovative financing statewide. Projects large and small are now coming online and the project pipeline to increase Rhode Island's resilience is growing.

From increased coordination and new planning tools, to critical infrastructure and utilities, to natural systems, to emergency preparedness, and community health and resilience, this report shows the breadth of resilience work where partners have been engaged.

The results are clear, Rhode Island infrastructure and communities are better protected against the impacts of climate change than they were three years ago. Green infrastructure is being constructed with greater scale and efficacy, municipalities are investing in energy efficiency, open space is being preserved, and tree planting and health equity zones are contributing to improved public health.

We would like to thank all of our state agency partners and supporting organizations for their work on this report, for the progress we have achieved, and for their continued commitment to building a more Resilient Rhody through coordination and collaboration.

While much work remains to be done, Rhode Island is on the path to increasing resilience so that we can better weather the current and future impacts of climate change.

Shaun O'Rourke
Managing Director
Rhode Island Infrastucture Bank

Climate Resilience Progress By The Numbers

20 municipalities have participated in the **Municipal Resilience Program (MRP)** since 2018

38 of 39 RI municipalities have active **Hazard Mitigation Plans**

1,424 **acres of open space and natural land preserved** since 2018

$20 MILLION in new, dedicated funding to implement **climate resilience** projects

Structure of the Impact Report

This Impact Report is organized into seven sections. The first focuses on statewide coordination, processes, and tools that enable effective climate change adaptation. The remaining six sections correspond to *Resilient Rhody's* core thematic areas: critical infrastructure and utilities, natural systems, community health and resilience, emergency preparedness, and climate resilience financing mechanisms.

Icons are used to track how programs, projects, and policy relate to *Resilient Rhody* and other climate-related initiatives in the state.

TRACKER ICONS

Related to one or more of Resilient Rhody's 61 Actions that adapt Rhode Island to changing climate and natural hazard realities.

MRP

Outcome from the Municipal Resilience Program, which provides direct support to municipalities to identify and implement capital projects that increase local resilience.

Related to a state agency climate-focused report (other than *Resilient Rhody*).

Funded from 2018 or 2021 Green Bond proceeds, which support environmental investments that support Rhode Island's way of life and communities.

Coordination, Process, and Tools

Now is the time to invest in priority projects and reinforce partnerships between the state and municipalities to empower and prepare communities for a new climate reality.

STATE AGENCY RESILIENCE COORDINATORS

All member agencies of the Executive Climate Change Coordinating Council, or EC4, have an appointed Resilience Coordinator. The Resilience Coordinators help originate and champion resiliency-related initiatives within their respective agencies and share progress toward *Resilient Rhody's* goals with one another. This interagency collaboration is essential to building strong partnerships as Rhode Island's state agencies work toward a more climate resilient future.

AQUIDNECK ISLAND REGIONAL RESILIENCE COORDINATOR

All Aquidneck Island municipalities—Newport, Middletown, and Portsmouth—have identified limited staff capacity and technical expertise as a barrier to advancing climate resilience. In response, the Rhode Island Infrastructure Bank (RIIB) will launch a pilot "Regional Resilience Coordinator" position in early 2022 to provide dedicated technical assistance to Aquidneck Island municipalities to implement climate resiliency investments. The position will serve as a statewide model for regional collaboration. This two-year pilot position is made possible with the support of the van Beuren Charitable Foundation.

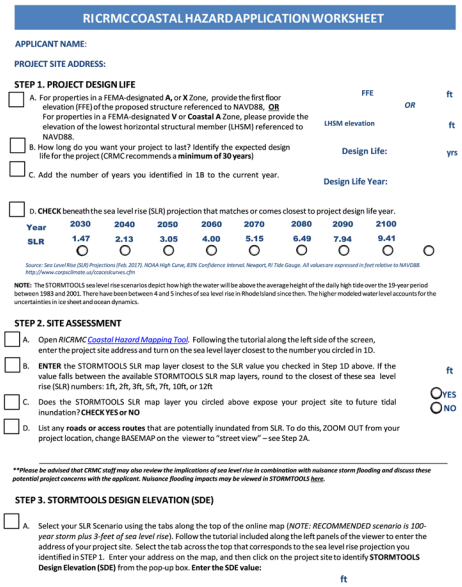
PREP-RI PROGRAM

The University of Rhode Island Coastal Resource Center introduced the Providing Resilience Education for Planning (PREP-RI) program in 2018 to help coastal communities plan for increased storm and flooding intensity and accelerating sea level rise. Initially a set of education modules, PREP-RI now encompasses a diverse portfolio of tools and technical assistance examples that coastal communities, business, and leaders can use to act today and plan for tomorrow.

COASTAL HAZARD APPLICATION PROCESS

The Coastal Hazard Application Worksheet and web-based Viewer is used to notify applicants seeking permits from the Coastal Resources Management Council (CRMC) of potential coastal hazards, such as sea level rise and shoreline erosion, that should be considered when planning shoreline development. The CRMC's goal is to increase understanding and awareness of these hazards among the development community with the intent of guiding development away from vulnerable areas.

The Municipal Resilience Program brings communities together to identify resilience challenges & needs. Regional Resilience Coordinators will build on this work, ensuring implementation of actions. Photo courtesy of RIIB.



RI CRMC COASTAL HAZARD APPLICATION WORKSHEET

APPLICANT NAME:

PROJECT SITE ADDRESS:

STEP 1. PROJECT DESIGN LIFE

☐ A. For properties in a FEMA-designated **A,** or **X** Zone, provide the first floor elevation (FFE) of the proposed structure referenced to NAVD88, **OR** For properties in a FEMA-designated **V** or **Coastal A** Zone, please provide the elevation of the lowest horizontal structural member (LHSM) referenced to NAVD88. — FFE ____ ft *OR* LHSM elevation ____ ft

☐ B. How long do you want your project to last? Identify the expected design life for the project (CRMC recommends a **minimum of 30 years**) — **Design Life:** ____ yrs

☐ C. Add the number of years you identified in 1B to the current year. — **Design Life Year:**

☐ D. **CHECK** beneath the sea level rise (SLR) projection that matches or comes closest to project design life year.

Year	2030	2040	2050	2060	2070	2080	2090	2100	
SLR	1.47	2.13	3.05	4.00	5.15	6.49	7.94	9.41	○

Source: Sea Level Rise (SLR) Projections (Feb. 2017). NOAA High Curve, 83% Confidence Interval. Newport, RI Tide Gauge. All values are expressed in feet relative to NAVD88. http://www.corpsclimate.us/ccaceslcurves.cfm

NOTE: The STORMTOOLS sea level rise scenarios depict how high the water will be above the average height of the daily high tide over the 19-year period between 1983 and 2001. There have been between 4 and 5 inches of sea level rise in Rhode Island since then. The higher modeled water level accounts for the uncertainties in ice sheet and ocean dynamics.

STEP 2. SITE ASSESSMENT

☐ A. Open *RICRMC Coastal Hazard Mapping Tool*. Following the tutorial along the left side of the screen, enter the project site address and turn on the sea level layer closest to the number you circled in 1D.

☐ B. **ENTER** the STORMTOOLS SLR map layer closest to the SLR value you checked in Step 1D above. If the value falls between the available STORMTOOLS SLR map layers, round to the closest of these sea level rise (SLR) numbers: 1ft, 2ft, 3ft, 5ft, 7ft, 10ft, or 12ft ____ ft

☐ C. Does the STORMTOOLS SLR map layer you circled above expose your project site to future tidal inundation? **CHECK YES or NO** ○ YES ○ NO

☐ D. List any **roads or access routes** that are potentially inundated from SLR. To do this, ZOOM OUT from your project location, change BASEMAP on the viewer to "street view" – see Step 2A.

***Please be advised that CRMC staff may also review the implications of sea level rise in combination with nuisance storm flooding and discuss these potential project concerns with the applicant. Nuisance flooding impacts may be viewed in STORMTOOLS here.*

STEP 3. STORMTOOLS DESIGN ELEVATION (SDE)

☐ A. Select your SLR Scenario using the tabs along the top of the online map (*NOTE: RECOMMENDED scenario is 100-year storm plus 3-feet of sea level rise*). Follow the tutorial included along the left panels of the viewer to enter the address of your project site. Select the tab across the top that corresponds to the sea level rise projection you identified in STEP 1. Enter your address on the map, and then click on the project site to identify **STORMTOOLS Design Elevation (SDE)** from the pop-up box. **Enter the SDE value:** ____ ft

RICRMC's Coastal Hazard Application Worksheet, developed as an outcome of the Shoreline Change Special Area Management Plan (Beach SAMP). Image courtesy of RICRMC.

Critical Infrastructure and Utilities

Critical aspects of Rhode Island's infrastructure and utilities are at increased risk due to the impacts of climate change.

Warren Wastewater Treatment Facility - the first to incorporate flood protection measures identified in RIDEM's 2017 climate change vulnerability assessment. Photo courtesy of RIIB.

Slatersville Public Supply Project - North Smithfield Drinking Water Main Extension. Photo courtesy of RIIB.

PLANNING AND DESIGNING FOR MUNICIPAL WASTEWATER COLLECTION AND TREATMENT INFRASTRUCTURE

Many of Rhode Island's wastewater treatment facilities and infrastructure are located within riverine or coastal floodplains. To increase resiliency, the Rhode Island Department of Environmental Management (RIDEM) is leading efforts to incorporate climate change considerations into wastewater system planning and operations. In 2017, RIDEM published its *Implications of Climate Change for RI Wastewater Collection & Treatment Infrastructure* report, which included vulnerability assessments of all major treatment plants and identified adaptation measures. RIDEM subsequently released planning and design guidance for municipal wastewater systems. In 2019, 14 of the 18 approved projects that received grants from RIDEM's newly established Wastewater Treatment Facility Resilience Fund were fully or partially identified in the 2017 study.

DRINKING WATER STATE REVOLVING FUND SMALL WATER SYSTEM ENGAGEMENT

The Rhode Island Department of Health (RIDOH) and RIIB proactively engaged small water systems serving fewer than 10,000 customers. Engagement is intended to increase the technical, managerial, and financial capacity of small water systems to ensure their operational capability and to identify projects eligible for funding through the Drinking Water State Revolving Fund that improve supply, treatment, or transmission infrastructure. RIDOH and RIIB also emphasize increasing system resiliency to extreme weather impacts by accelerating improvements like the installation of emergency generators or renewable energy projects. These investments in small water systems are essential to ensuring Rhode Island ccommunities have access to safe drinking water during all operational conditions.

RIPTA RENEWABLE ENERGY SOLAR FARM COLLABORATION

RI Public Transit Authority (RIPTA) announced its remote net energy agreement with Kearsarge Energy in March 2021. Under the agreement, RIPTA will purchase energy credits from Kearsarge Energy's solar installation on a former brownfield in East Providence. Purchasing energy credits will save RIPTA an estimated $250,000/year in electricity costs and aligns with the agency's broader steps to adopt clean energy within its operations.

RIPTA ZERO EMISSIONS VEHICLE PROGRAM

Using money from the state's Volkswagen settlement funds earmarked for air quality improvement initiatives, RIPTA launched an electric bus pilot program in 2019. The pilot program was an outcome of the Authority's 2019 *Sustainable Fleet Transition Plan* and allowed the Authority to test and demonstrate the use of electric buses within its operations and gather data.

PROGRAM OUTCOMES

1. RIPTA's Board approved the purchase of 14 new battery-electric buses (to arrive in summer 2022). RIPTA will operate the buses on the R-Line, an area where asthma rates and air quality are an acute concern.
2. RIPTA was awarded $5.15 million in Low/No Emissions Vehicle federal funding in June 2021 to determine how to introduce electric buses into its Aquidneck Island service area.

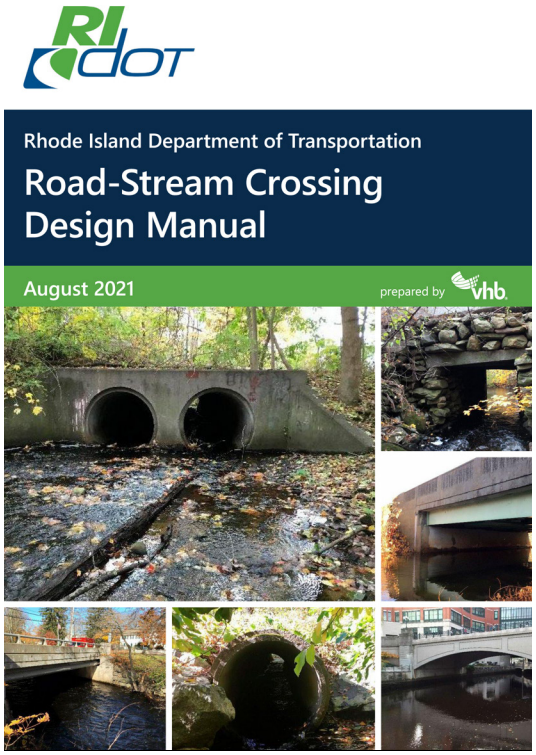
RIPTA's electric bus pilot program. 14 new vehicles are scheduled to arrive in summer 2022. Photo courtesy of RIPTA.

E-STIP DEVELOPMENT AND RESILIENCE

The Rhode Island Division of Statewide Planning, in collaboration with the state Department of Transportation (RIDOT) and RIPTA, is developing its web-based Electronic State Transportation Improvement Program (e-STIP) database. The e-STIP applications will link project information to a location-based online database for improved project management, analysis, and public transparency. One of the most critical layers assessed using this tool is the future impact of sea level rise and storms on infrastructure. To that end, RIDOT is developing data to update past transportation infrastructure studies and review future projects through the lens of climate and resilience.

RIDOT ROAD-STREAM CROSSING DESIGN MANUAL

RIDOT published its Road-Stream Crossing Design Manual in August 2021. The Design Manual is meant to be used in conjunction with the RIDOT Road-Stream Crossing Assessment Handbook. The Design Manual establishes climate change and resiliency criteria and standards focused on the design of safer, cost-effective stream crossings that will meet transportation needs, improve hydraulic function, reduce maintenance costs, and enhance natural stream functions and wildlife migration. The design standards apply to all RIDOT-owned road-stream crossings but can also be implemented by other state agencies, municipalities, regulators, and designers.



RIDOT's Road-Stream Crossing Design Manual, to be used in conjunction with the RIDOT Road-Stream Crossing Assessment Handbook. Photo courtesy of RIDOT.

TRANSPORTATION PLANNING AND NATURAL HAZARD RESILIENCE SEMINAR

Rhode Island Division of Statewide Planning hosted over 50 people at this online seminar in 2020, including municipal and state planners, private sector transportation engineers, and RIDOT employees. Developed and piloted in Rhode Island by the U.S. Department of Transportation Federal Highway Administration and the Federal Highway Administration Highway Resource Center, the seminar focused on ways to incorporate climate resilience measures into transportation planning and transportation asset management.

Schoolhouse Road reservoir causeway crossing. The Upper Kickemuit River Dam is the earthen structure to the left of the roadway. Photo courtesy of RIDOT.

SCHOOLHOUSE ROAD IMPROVEMENTS

The Bristol County Water Authority (BCWA) has proposed removing the Upper Kickemuit River Dam to increase the ecological resiliency of the Kickemuit River and provide community flood resiliency benefits. Prior to the dam removal, RIDOT has begun roadway improvements along Schoolhouse Road, which crosses the Upper Kickemuit Reservoir. The roadway profile will be raised by approximately 1.1 feet and three large culverts will be installed to allow for future removal of the upstream dam at the reservoir causeway crossing.

Macomber Stadium, Central Falls. Photo courtesy of RIIB.

MACOMBER STADIUM GREEN INFRASTRUCTURE

The Narragansett Bay Commission was loaned $6.7 million from the Clean Water State Revolving Fund and granted $800,000 from RIDEM to complete Green Stormwater Infrastructure improvements at Macomber Stadium. These improvements intercept an estimated 778,000 gallons of combined sewer overflow discharges (based on a 25-year storm), while also enhancing and creating recreational opportunities for Central Falls community members.

Woonsocket's new Drinking Water Treatment Plant will eliminate the use of technologies that discharge filter backwash into the Blackstone River and will move the facility out of the floodplain. Photo courtesy of RIIB.

WOONSOCKET DRINKING WATER TREATMENT PLANT

Woonsocket used three loans totaling $55.3 million from the Drinking Water State Revolving Fund for the design and construction of an advanced drinking water treatment plant. The plant will bring Woonsocket's water treatment facilities into compliance with RIDEM regulations and eliminate the use of technologies that discharged filter backwash into the Blackstone River and degraded local water quality. The City also moved the treatment plant location outside of the floodplain, increasing resiliency against extreme weather events. The plant became operational in September 2021.

OER MICROGRID PROGRAM

The Rhode Island Office of Energy Resources (OER) is developing a program to support clean energy microgrid development for critical infrastructure. Microgrids, which can disconnect from the larger electrical grid, increase municipal energy resilience by reducing the risk of power loss to essential facilities and functions like healthcare and wastewater treatment facilities or telecommunications.

ACHIEVING COMMUNITY EFFICIENCY PROGRAM

The Achieving Community Efficiency program is led by OER and is made possible with funding from the U.S. Department of Energy. The pilot program started in 2019 and supports sustainable energy management in towns and schools across the state. Energy efficiency improvements build financial resilience by reducing and stabilizing utility bills while energy savings reduce overall greenhouse gas emissions.

PROGRAM OUTCOMES

1. All pilot participants have completed facility benchmarks, reviewed their energy supply contracts, and created action plans for project implementation.
2. Pilot participants have implemented a variety of energy efficiency projects. For example, the Town of Warren is upgrading the HVAC system at its wastewater treatment facility. The upgrades will enhance the facility's resilience to extreme temperatures.

EFFICIENT BUILDINGS FUND

The Efficient Buildings Fund finances energy retrofits in public buildings such as municipal and school facilities that will result in energy conservation or clean energy production. RIIB administers the fund in collaboration with OER, the program's regulatory partner.

PROJECT SPOTLIGHT

1. East Providence High School, $24 million. East Providence used the EBF to finance energy efficiency work at its new high school. Energy conservation measures are projected to save the City over 18.5 million kWh of electricity. The new building meets the standards of the Northeast Collaborative for High Performance Schools, which promotes energy savings and sustainable design features tailored to be effective in local climates.

ELECTRIC INFRASTRUCTURE, SAFETY, AND RELIABILITY PLAN

National Grid submits its Electric Infrastructure, Safety, and Reliability (ISR) Plan to the Public Utilities Commission on an annual basis to outline its planned capital investment and spending for infrastructure improvements. Between 2018-2021, the Electric ISR Plan's vegetation management budget increased from $9.4 to $10.6 million. Increased vegetation management can reduce the risk of grid damage and power outages due to downed poles and wires during storms.

RI Commerce Corporation has awarded $16 mm to bring 65,000 kW of solar energy online since 2018 through its **Renewable Energy Fund**

Energy efficiency work was completed at East Providence High School through the Efficient Buildings Fund. Photo courtesy of RIIB.

Solar installation on the Powers Building (RI Department of Administration). Photo courtesy of RI OER.

Improvements at Scarborough Wastewater Treatment Facility will reduce future flooding at the facility. Photo courtesy of Town of Narragansett.

SCARBOROUGH WASTEWATER TREATMENT FACILITY DRAINAGE IMPROVEMENTS

Narragansett received $131,250 through the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation Program in 2019 to complete improvements at the Scarborough Wastewater Treatment Facility. The town will modify and improve the facility's drainage system to ensure that extreme storm events and stormwater flows do not result in flooding at the facility.

Repairs to the Wyoming Dam began in June 2021. Photo courtesy of RIDEM.

WYOMING DAM REPAIR

The state-owned Wyoming Dam is a high hazard dam impounding the Wood River in Hopkinton and Richmond. Deemed unsafe in RIDEM's 2020 Dam Safety Annual Report, repairs began in June 2021 and will include a new low-level outlet and sluiceway gates, repaired embankment walls and spillway, and removal of vegetation that posed a threat to the dam's structural integrity. The project is expected to finish in spring 2022 and is made possible through 2018 Green Economy and Clean Water Bond proceeds.

The new Pascoag Utility District Energy Storage System can contribute 650 MWh annually - roughly a quarter of PUD's peak load. Photo courtesy of RIIB.

PASCOAG UTILITY DISTRICT ENERGY STORAGE SYSTEM

Pascoag Utility District (PUD) received $1.42 million low-interest rate loan to add an energy storage system to increase grid resiliency. The energy storage system can contribute roughly a quarter of PUD's peak load, or nearly 650 MWh annually. By supporting peak energy needs and avoiding costly electricity grid upgrades, the "non-wires" infrastructure will result in a roughly $3.4 million total lifetime cost savings for PUD's customers.

Natural Systems

Natural systems are undeveloped portions of the environment that provide important functions and services to communities.

SHORELINE ADAPTATION INVENTORY AND DESIGN PROGRAM

Launched in 2019, the CRMC and its partners inventoried already completed shoreline adaptation projects, and designed new projects, that yield natural systems benefits and address the impacts of coastal issues like storms, sea level rise, and habitat loss.

PROJECT SPOTLIGHT

1. **Sea View Drive Road Relocation.** Warwick, Oakland Beach Neighborhood Association, Save The Bay, and community members are collaborating to address coastal erosion and flooding of a parking area used as a public access point to Brushneck Cove. The project will add a vegetated coastal buffer to mitigate erosion, remove part of the roadway, and extend a public walking path.
2. **Middlebridge Pavement Removal.** Narragansett will relocate a low-lying vehicular access point to the Narrow River inland and remove existing paved surfaces to reduce flood impacts and accommodate future sea level rise. The area will be revegetated with salt-tolerant vegetation. Project scope was developed in collaboration with the Narragansett Land Conservancy Trust.

9
Shoreline Adaptation Inventory and Design projects have been engineered

A site visit to Sea View Drive as part of the SAID program. Here, RICRMC, URI CRC/Sea Grant, and Save the Bay work together with municipal leadership to craft a site vision. Photo courtesy of RICRMC.

COASTAL AND ESTUARINE HABITAT RESTORATION PROGRAM AND TRUST FUND

The Coastal and Estuarine Habitat Restoration Program is a partnership between CRMC and the Narragansett Bay National Estuarine Research Reserve. Projects restore and enhance natural habitats negatively affected by humans. The program is funded via fees collected under the Oil Spill Prevention and Response Act.

PROJECT SPOTLIGHT

1. **Walker Farm Salt Marsh Migration and Buffer Restoration and Resilience Project.** Barrington is using grant funding to restore tidal flow to the salt marsh. The project is expected to decrease the density, height, and vigor of invasive species and allow characteristic salt marsh plant species to recolonize the site. The Town of Barrington also received grant funding from the MRP in 2019 to complete additional resilience enhancements at the site.

The Walker Farm Salt Marsh Migration and Buffer Restoration project, funded through the Coastal and Estuarine Habitat Restoration Program and Trust Fund. Photo courtesy of RIIB.

RIDEM has helped preserve
1,424 acres
of open space and natural land since 2018

LOCAL OPEN SPACE GRANT PROGRAM

RIDEM has awarded $8.55 million in matching grants to municipalities, land trusts, and non-profit conservation land organizations since 2018 through its Local Open Space Grant Program. The program's recent awards use funding made possible through the state's Green Bonds. Grants are used to conserve lands with significant natural or ecological value, including those that support habitat protection, protect water resources, and provide public recreation opportunities. Agricultural land is also eligible for preservation.

PROJECT SPOTLIGHT

1. **Souza property.** The Town of North Smithfield acquired 114 acres of field and forestland in 2020. The property is adjacent to existing drinking water supply protection land owned by the City of Woonsocket. The acquisition creates a contiguous block of roughly 465 acres of protected forestland in the region.

George Washington Management Area in Glocester. Photo courtesy of RIDEM.

FOREST CONSERVATION ACT

Forests provide invaluable ecosystem services like carbon sequestration and storage that are essential to meeting the state's climate change goals. In recognition of this importance, the Rhode Island General Assembly passed the Forest Conservation Act in July 2021. The Act establishes a Forest Conservation Commission (FCC) to inventory the state's forestland, develop stronger tools and incentives for forest conservation, expand urban and community forestry, and grow the state's forest products industry. The FCC will be coordinated and staffed by RIDEM.

WATER QUALITY PROTECTION CHARGE PROGRAM

Administered by RIIB in collaboration with the Water Resources Board, this program offers funding to public drinking water suppliers for drinking water protection projects. The program is funded via a small fee assessed on water delivered by major water suppliers. Eligible projects include watershed land acquisition and water quality improvement projects like nonpoint source pollution mitigation and treatment facility upgrades.

PROJECT SPOTLIGHT

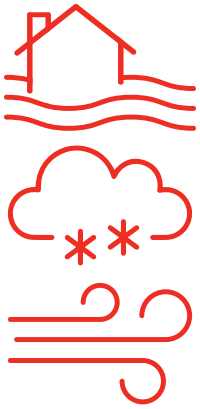
1. **Newport Water Division Reservoir Class I Surveys.** The Newport Water Division (NWD) will conduct boundary surveys on six of its inland and coastal reservoirs. Previous studies recommended that re-establishing and protecting reservoir buffers can decrease nutrient loading, which contributes to decreased water quality and algal growth. The NWD will install boundary markers, remove any identified encroachments onto reservoir properties, and restore vegetative buffers around the six targeted reservoirs.
2. **North Smithfield Conservation Easement.** A Water Quality Protection Charge grant funded Woonsocket Water Division's purchase of a 2.75 acre lot in North Smithfield, RI to be held as a conservation easement. The property is in the watershed for Woonsocket Reservoir #3, the City's primary reservoir, and is approximately 150 feet from Crookfall Brook, the main water supply for the City. Woonsocket Water Department removed numerous cluttered structures and significant debris and decommissioned existing well and septic systems. By returning the parcel to its natural state, along with prescribing forest management, the Water Department was able to prevent raw water supply contamination at this site.

Emergency Preparedness

Preparedness and resilience efforts are necessary to protect the people, infrastructure, and economy of the state.

RHODE ISLAND CRITICAL INFRASTRUCTURE PROGRAM

The Rhode Island Emergency Management Agency (RIEMA) is spearheading the Rhode Island Critical Infrastructure Program, which coordinates between governmental, non-governmental, and private actors active in critical infrastructure sectors to identify and manage vulnerabilities. The program will develop plans to guide resiliency efforts in 16 critical infrastructure sectors. The targeted critical infrastructure sectors include sectors such as dams, emergency services, energy, transportation, and waste and wastewater systems.



38 of 39 cities and towns have active **Hazard Mitigation Plans**

STATEWIDE EVACUATION ROUTE REASSESSMENT

Local emergency managers completed a reassessment of evacuation routes in August 2021 under the guidance of RIEMA. Emergency managers drove the entirety of Rhode Island's evacuation routes to ensure the routes and signage accurately reflect changes to the road network; damaged and missing signage was also identified for replacement.

SMALL BUSINESS RISK REDUCTION PROJECT

The Rhode Island Division of Statewide Planning used $375,000 in U.S. Department of Housing and Urban Development (HUD) Disaster Relief Funds to identify areas most impacted by extreme weather events and assess how well local small businesses are prepared for extreme storm impacts. This project took place from 2018-2019.

PROGRAM OUTCOMES

1. Completed vulnerability assessments with 102 business owners in four inland and coastal project areas.
2. Published risk reduction brochures for eight different business sectors that include potential vulnerabilities and strengths to different hazards, risk reduction strategies, and insurance and flood insurance FAQs.

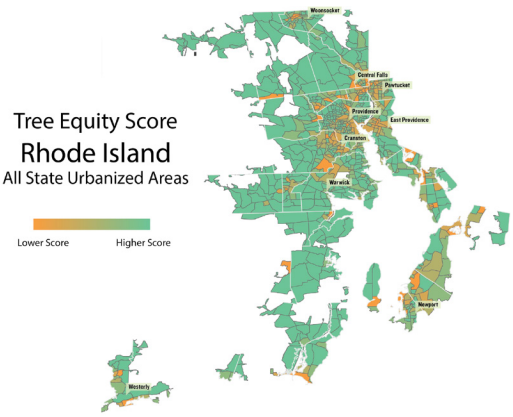
The Small Business Risk Reduction Project was separated into 8 reports. Pictured here is the report focusing on Restaurants & Food Service. Image courtesy of RI Division of Statewide Planning.

DAM EMERGENCY ACTION PLANS

RIEMA and RIDEM have approved 16 Emergency Action Plans (EAPs) for high and significant hazard dams since 2018. EAPs establish monitoring and notification procedures that, in the event of a possible, impending, or actual dam failure, are intended to provide enough time to take remedial action to protect human life and property.

Community Health & Resilience

Community resilience reflects far more than being prepared for storms or other natural disasters.



Tree Equity Score map of Rhode Island, created as a part of the Urban Forests for Climate and Health Program and informed by the RIDOH Heat Watch Program. Image courtesy of American Forests.

Pawtucket and Central Falls were awarded a $100,000 tree planting grant in 2021. American Forests worked with RIDOH & Groundwork RI to initiate this tree planting. Photo courtesy of American Forests.

100% of families reported their child had **fewer asthma symptoms** after participating in the **Cool It Off** pilot program

RIDOH & HEALTH EQUITY ZONES COLLABORATION

RIDOH Climate Change and Health Program worked with the Newport, Olneyville, and Pawtucket Central Falls Health Equity Zones to complete community assessments focused on climate change resilience in 2018-2019.

URBAN FORESTS FOR CLIMATE AND HEALTH PROGRAM

RIDOH, RIDEM, and the nonprofit conservation organization, American Forests, are collaborating to increase tree equity across Rhode Island. Tree equity is the idea that trees and their associated environmental benefits are equitably distributed across all populations.

PROGRAM OUTCOMES

1. The program has mapped Rhode Island's urban tree canopy coverage to develop block group-level tree equity scores to measure how tree canopy is distributed relative to vulnerable populations. The score also takes local climate projections and public health data into account.
2. The Climate & Health Forestry Action Guide was released in 2021. The Guide is a tool to assist municipalities in identifying funding, financing, and policy mechanisms to further urban forestry goals.
3. The Pawtucket Central Falls Health Equity Zone received a $100,000 Tree Planting grant in 2021.

RHODE ISLAND HEAT WATCH PROGRAM

RIDOH, RIDEM, and American Forests collaborated on this community health mapping project in 2020. Community volunteers measured daytime and nighttime ambient air temperature and humidity levels across Central Falls, East Providence, Pawtucket, and Providence. The data will inform future equity-focused heat mitigation initiatives.

"COOL IT OFF" PILOT PROGRAM

Extreme heat can lead to poor health outcomes and hospitalizations, and COVID-19 closed many public spaces and cooling centers that would otherwise provide relief. In response, the Rhode Island Alliance for Healthy Homes, with the support of RIDOH and other key partners, created the "Cool it Off" Pilot Program to provide air conditioning units and funds to cover the associated electricity costs to 22 low-income and medically vulnerable households during summer 2020.

Financing Climate Resilience Projects

Communities across Rhode Island face an urgent need to build climate resilient infrastructure that will survive extreme weather events.

MUNICIPAL RESILIENCE PROGRAM

RIIB's Municipal Resilience Program (MRP) provides direct support to municipalities to enable them to identify adaptation priorities that will increase local resilience to climate hazards. Upon completion of a community workshop run in collaboration with The Nature Conservancy, participating municipalities are eligible for dedicated Action Grant funding to implement resiliency projects. As of 2021, 20 municipalities have participated in the MRP.

$2.5 mm in **MRP Action Grant** funding is being used to implement 22 resilience projects

PROJECT SPOTLIGHT

1. **Almy Pond/Spouting Rock Drive Restoration.** Newport will remove roughly 25,000 ft² of impervious pavement and restore meadow and marshland in the area near Almy Pond. Pavement removal will expand the drainage buffer around the pond, improve local water quality, and allow the pond to act as a more effective storm buffer.
2. **Oakland Beach Nature-Based Resiliency Enhancements.** Warwick is using an Action Grant to construct a bioretention stormwater system to reduce flooding and minimize bacterial pollution in Greenwich Bay. The City is also restoring a coastal embankment to reduce erosion of the beach area and increase wildlife habitat.
3. **Old Canal Street Pump Station Flood Protection Wall**. Westerly will install a flood protection wall around one of its wastewater pump station facilities. The project will limit discharge quantities, limit overtopping by floodwaters, and improve water quality in the Pawcatuck River.

A portion of Spouting Rock Drive that will be removed to expand the drainage buffer around Almy Pond in Newport. Photo courtesy of City of Newport.

STORMWATER PROJECT ACCELERATOR

Established by RIIB, the Stormwater Project Accelerator (SPA) provides upfront capital for municipalities, non-profit organizations, and utilities to implement green infrastructure projects that will eventually be funded through federal, state, and local reimbursement grants.

PROJECT SPOTLIGHT

1. **Stormwater Improvement and Pedestrian Greenway Project at Citizens Bank.** The Woonasquatucket River Watershed Council (WRWC) used an SPA loan to install stormwater best management practices and multi-use pathway in a Citizens Bank parking lot in the Olneyville neighborhood of Providence. RIDOT provided a $250,000 reimbursement grant. The project aims to improve local water quality in the Woonasquatucket River by intercepting and treating stormwater while creating urban green space.

San Souci Bikeway, which connects the Woonasquatucket River and Olneyville Square. This project was financed through the Stormwater Project Accelerator. Photo courtesy of RIIB.

GREEN BOND FUNDING

Rhode Island's Green Bonds provide critical investments that protect environmental quality while supporting local economies and quality of life. The 2018 and 2021 bond measures are directed at a variety of environmental topics, including clean water and drinking water; natural and working land conservation; trail networks; and brownfield redevelopment. Rhode Island residents overwhelmingly recognize the value of environmental quality investments: in 2018, 79 percent of voters approved the $47.3 million Green Economy and Clean Water Bond; in 2021, 78 percent of voters approved the $ 74 million Beach, Clean Water and Green Bond.

East Greenwich Wastewater Treatment Facility. Photo courtesy of RIIB.

WASTEWATER TREATMENT FACILITY RESILIENCE FUND

Administered by RIDEM, the fund has awarded roughly $5 million in grants to municipal and quasi-state wastewater facilities for protection and resilience actions since 2020.

PROJECT SPOTLIGHT

1. **East Greenwich Wastewater Treatment Facility**. East Greenwich will harden the pumping station and treatment plant to protect against coastal flood hazards. The project will protect the facility at FEMA Base Flood Elevation plus 3 feet of freeboard.
2. **Woonsocket Wastewater Treatment Facility.** Woonsocket will complete building hardening improvements to protect against flooding from the Blackstone River. The project will protect the facility at FEMA Base Flood Elevation plus 3 feet of freeboard.

Lower Kickemuit River Dam looking east. Photo courtesy of RIDEM.

CLIMATE RESILIENCE FUND

The fund provides grants to governmental and non-profit entities for climate and community resilience projects. It awarded $4.36 million for 14 resilience projects in 2020. The fund is administered by RIDEM.

PROJECT SPOTLIGHT

1. **Kickemuit Dam Removal Project.** The Bristol County Water Authority received an award to plan for and remove the Upper and Lower Kickemuit River dams in Warren. The project will promote ecological resilience, increase the flood storage capacity of wetlands, and reduce flooding of low-lying roads. It will also restore tidal estuary and salt marsh habitat, creating a corridor for salt marsh migration in response to future sea level rise.

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