



DCR Watershed Protection Program Updates

MWRA Advisory Board

February 16, 2023

John Scannell, Director

Division of Water Supply Protection



Watershed Protection Program



Watershed Protection Plan FY19-FY23



June 2018

Massachusetts Department of Conservation and Recreation
Division of Water Supply Protection
Office of Watershed Management

All Watershed Activities are guided by the 5-year
Watershed Protection Plan



Watershed Protection Plan Update

- ▶ Plan development in progress. Draft shared with MWRA staff
- ▶ Plan will be submitted to DEP in June
- ▶ Plan begins July 1st
- ▶ New elements include discussions of chlorides, climate change impacts
- ▶ Plan revised - went from individual watershed chapters to a unified plan.

Watershed Control Programs



- ▶ Land Acquisition
- ▶ Watershed Preservation Restrictions
- ▶ Land Management
- ▶ Wildlife Management
- ▶ Public Access Management
- ▶ Watershed Security
- ▶ Infrastructure
- ▶ Watershed Protection Act
- ▶ Education and Outreach
- ▶ Water Quality and Hydrologic Monitoring
- ▶ Watershed Monitoring and Assessment
- ▶ Aquatic Invasive Species
- ▶ Wastewater Management
- ▶ Stormwater Management
- ▶ Emergency Response



Recent and Ongoing Highlights\Updates

- ▶ Salt Program
- ▶ DCR Sewer System
- ▶ Public Access Plans
- ▶ Forestry
- ▶ GIS Accomplishments
- ▶ Interpretive Services
- ▶ Asset Mitigation Funds
- ▶ Hiring

Salt Reduction Program

The background of the slide features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic design.

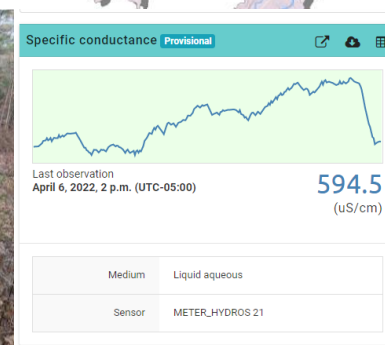
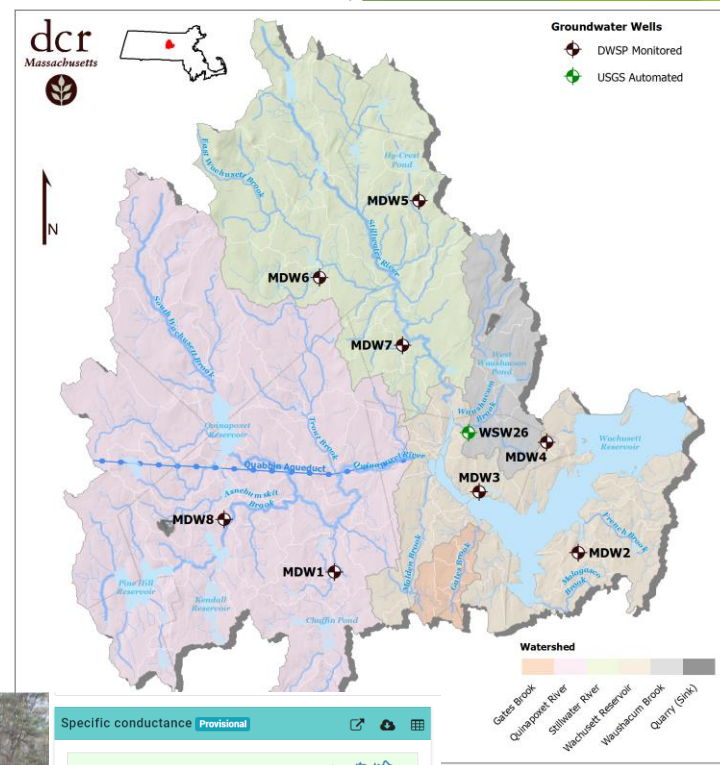


1. Improve data collection
2. Model impact of reducing inputs
3. Education and training
4. Provide a salt reduction grant program to assist Wachusett watershed communities
5. Upgrade DCR practices



Improve Data Collection

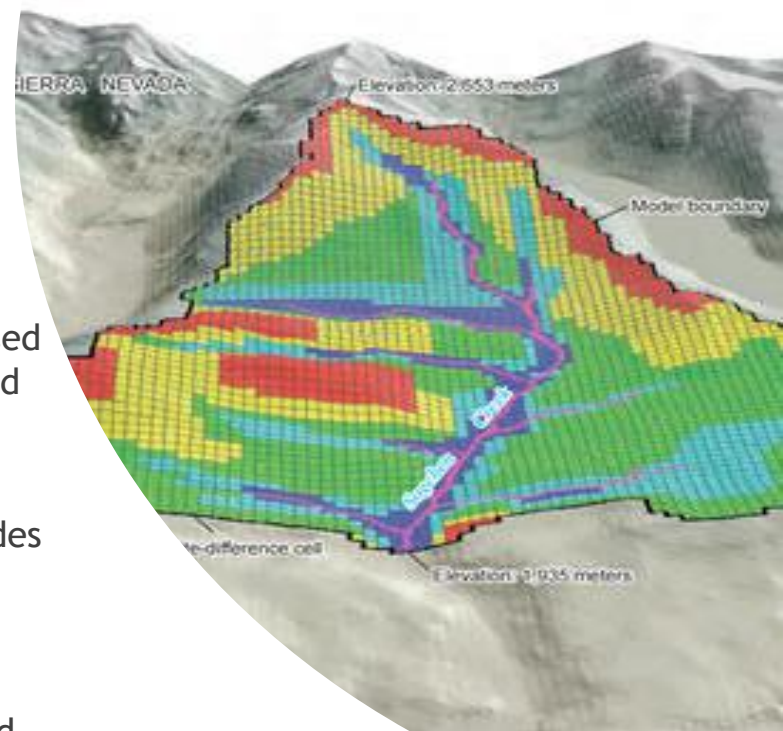
- Gather information on annual salt use by towns and MADOT
- Track the type and quantity of all deicing materials used during all future winter storms by DCR watershed maintenance staff
- Best estimate is that 18,000 tons of salt is applied in the watershed on an annual basis
- WATWEL Groundwater Monitoring Project (2019-present) Monthly chloride sampling at 7 former USGS monitoring wells on DWSP property
- Installation of seven Mayfly Data Loggers powered by solar panels and lithium-ion batteries, with the ability to obtain real-time specific conductance data





Modelling Efforts

- ▶ Partner with UMASS-Amherst to investigate watershed-based reservoir inputs and to use their existing hydrodynamic and water quality model to predict various outcomes under a variety of conditions
- ▶ Investigate and model impact of reducing inputs of chlorides to the reservoir and to predict changes to chloride concentrations at the Cosgrove Intake
- ▶ Soper et al. 2021. Long-term analysis of road salt loading and transport in a rural drinking water reservoir watershed. Journal of Hydrology: “... measurable water quality improvements will only be realized with a sustained long-term decrease in the amount of road salt applied.”





Education and Training

- ▶ DCR and MWRA have cooperated to provide Baystate Roads (UMASS Transportation Center) training on Snow and Ice Operations to Wachusett town DPW, DWSP, and MWRA staff in the fall of 2019, 2021, and 2022
- ▶ Pre-treatment of bare pavement BEFORE a storm prevents snow and ice from binding to pavement which makes it easier to plow and uses less salt overall
- ▶ MA DOT District 3 has seen an estimated 30% reduction in the amount of salt applied within the Wachusett watershed while continuing to protect public safety



Education and Training

- ▶ Concentrated effort on DCR educational programs to include additional messaging on the dangers of salt use and promote behavioral changes that would reduce use
- ▶ Production of a salt use reduction educational video by Interpretive Services: **“The Importance of Road Salt Reduction”** on MassDCR YouTube channel
- ▶ New “Salt Smarter” information poster for kiosks and online
- ▶ Changing public expectations is a necessary component of long-term success
- ▶ Reducing salt does not mean reducing public safety!

The image shows a YouTube video player for a video titled "Road Salt Friend or Foe?" by the DCR Division of Water Supply Protection. The video has 228 views and a "Subscribe" button. To the right of the video is an information poster titled "SALT SMARTER NOT HARDER!" with the subtitle "WAYS TO REDUCE SALT USE". The poster lists several tips:

- THE PROBLEM WITH ROAD SALT**: When salt is put down on a road, it doesn't go away. It washes into waterways or seeps into the ground, contaminating reservoirs and underground wells. Salt put down on the road today can be found in drinking water up to a decade later!
- DID YOU KNOW? ABOUT 30% OF SALT USED IS WASTED**: By using salt in a smarter way, we can stay safe and reduce the harm to our water, wildlife, and the environment.
- MORE SALT DOESN'T MELT ICE FASTER**: More isn't better. A 12 oz. coffee mug full of rock salt is enough to treat a 20 foot driveway. Make sure there is space between the grains.
- SAVE MONEY AND SWEEP UP EXTRA**: Sweep up any leftover salt to use in the next storm.
- USE BRINE**: Try making a brine solution and use a sprayer to pretreat pavement. Liquid can melt ice faster than granular salt and it sticks instead of scatters. Lower salt concentrations are less damaging to fish, wildlife and drinking water.
- STAY HOME DURING A STORM**: This option, if possible, allows snow removal crews time and space to make the roads safer for you today and your drinking water ten years from now.
- CHECK WITH YOUR TOWN**: Has your town started to pretreat roads with brine? Pretreating can reduce salt use by 30%. By Salting Smarter, Not Harder we can remain safe on the roads, save money, and improve our drinking water quality.

At the bottom of the poster, it says "For more information, watch the Road Salt Reduction video: [https://youtu.be/2wZtLqj8w0I](#)" and includes a QR code. The footer of the poster reads "DCR Division of Water Supply Protection".



Salt Reduction Grant Program

- ▶ Launched in FY21, dedicated funding in DWSP budget to administer a 50/50 matching grant of up to \$20,000 to facilitate adoption of salt reduction technologies in watershed towns
- ▶ Total grant distribution of \$109,000 over three years has been awarded to the towns of Holden, West Boylston, Princeton, Sterling, and Paxton.
- ▶ FY23 resulted in four matching grants being awarded (in process).



New salt storage building in Princeton



Upgrade DCR DWSP Winter Operations

- Pre-treatment with granular salt
- Salt brine generator
- Equipment to apply brine
- Replace and upgrade our salt shed
- Provide training



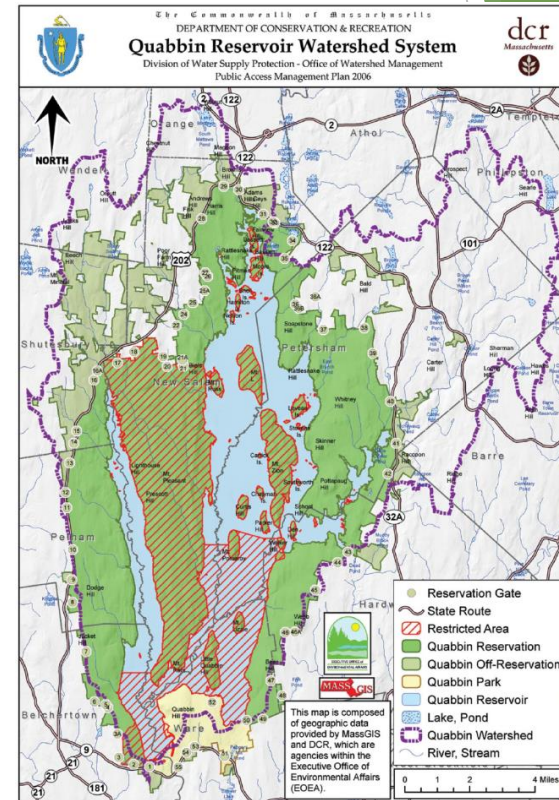
DCR Sewer System Updates

- ▶ DCR owns trunk sewer through Wachusett watershed to Worcester sewer system
- ▶ System collects flows from Rutland, Holden, West Boylston and Anna Marian College
- ▶ MWRA maintains the sewer on DCR's behalf
- ▶ Town of Holden filed lawsuit against Worcester and DCR claiming costs for transport of sewage were not proportionate
- ▶ Court sided with Holden
- ▶ Uncertainty about agreements moving forward

Public Access Management Plans



- Each of the 4 watersheds has a Public Access Management Plan
- Plans are updated every 10 years
- Plans identify what activities recreational activities are allowed\not allowed on watershed lands, where each can occur, the threats from activities





Public Access Management Plan Updates

- ▶ Ware River Plan Update process began in summer 2018
 - ▶ Lots of work with stakeholder groups
 - ▶ Re-initiated in Fall 2022.
 - ▶ Public Comment period until end of February.
 - ▶ Hope to complete plan by June.
- ▶ Sudbury Plan Update completed in Spring 2022.
- ▶ Wachusett Plan Update began with public survey in fall winter.
 - ▶ Expected to be completed in mid-2023



Forestry

DWSP- Managing Terrestrial Invasive Plants

Goal: *Control exotic invasive and interfering plants that present a threat to the natural resources that maintain the ability to produce clean drinking water in perpetuity.*

Impacts of Invasive Plants

- Significant threat to long-term stability of DWSP's forest filter.
- Invasive plant species can grow and reproduce quickly in the absence of natural control mechanisms.
- Invasive plant species can outcompete and displace native vegetation
- "Invasiveness" evaluated by Massachusetts Invasive Plant Advisory Group (MIPAG)

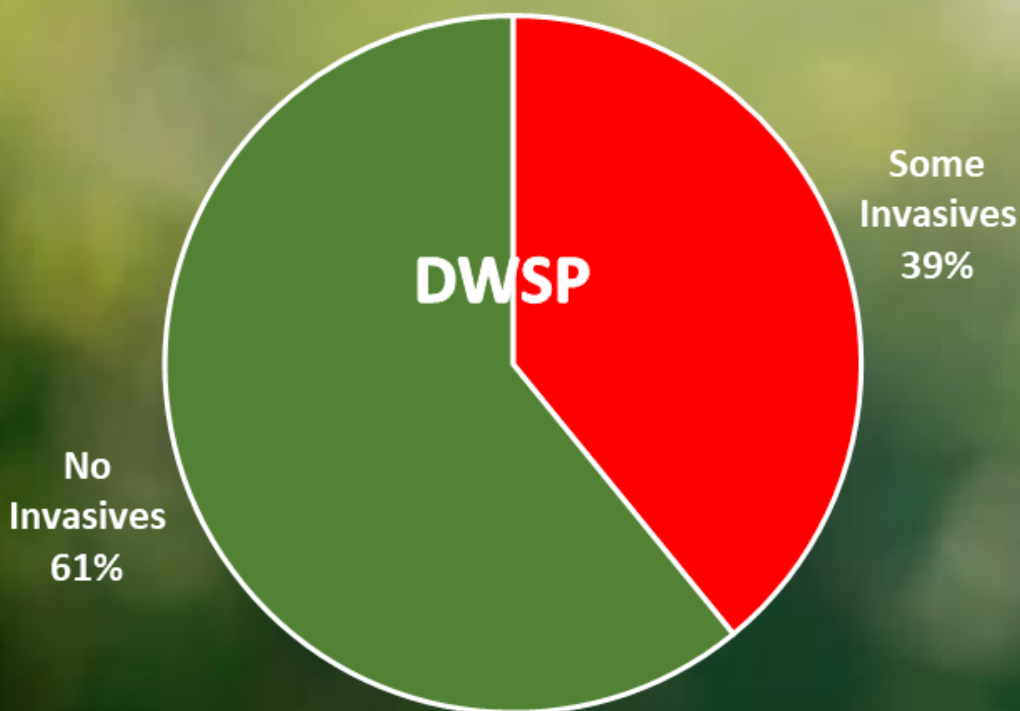


Example: Japanese Barberry (*Berberis thunbergii*)

- occupies a wide range of environmental conditions
- Heaviest at Quabbin on moist soils, riparian zones
- has a longer growing season than most native species
- Reproduces prolifically and has a long-term seed bank
- **forms thickets under which forest regeneration is suppressed or non-existent.**

Invasive Plants on DWSP Lands – Raw results from 2020 CFI survey

- Almost 600 plots Division-wide
- Observers estimate coverage by individual invasive species
- Shown Below: Percent of plots with any amount of invasive present



Quabbin: 38% of plots with invasives
(barberry, buckthorn, bittersweet)

Ware River: 55% of plots with invasives
(buckthorn, bittersweet)

Wachusett: 24% of plots with invasives
(bittersweet, buckthorn, multiflora rose)

Sudbury: 67% of plots with invasives
(bittersweet)

How?

- **Prevention:** The most cost-effective method.
- **Early Detection:** Find invasives before established, watch for new species.
- **Rapid Response:** eradicate immediately
 - Once established control is substantially more difficult and expensive to implement successfully.

Planning for Invasive Plant Management

- Develop objectives and measurable outcomes
- Prioritize areas for management.
- Inventory population sizes and locations.
- Dedicate resources and obtain applicable permits.
- Implement treatments and monitor results.
- **MULTI-YEAR Commitments** – follow-up treatments always required



Effective invasive plant control – at a Watershed scale – will require herbicide use

- Chemical treatments will be necessary when manual removal is too disruptive or not feasible or effective.
- Herbicide use will be appropriate and safe for water supply setting
- MINIMIZE herbicide use to the extent possible to achieve control
 - 1-2 punch of both mechanical and chemical methods.
 - Targeted applications – no broadcast spraying, no residual soil activity



DWSP - Use of Prescribed Fire

What is prescribed fire?

Application of fire:

- purposeful, skilled manner
- within specific weather parameters
- defined location(s)
- specific goals



Why use fire on DWSP lands?

- **Current land management activities to maintain our Forest Filter**
 - Timber harvests to promote age and species diversity in forests.
 - Deer management
 - Maintain open habitats by mowing
- **Moving forward:** use of fire as another tool in reaching our Resiliency goals through landscape diversity.

Use of fire:

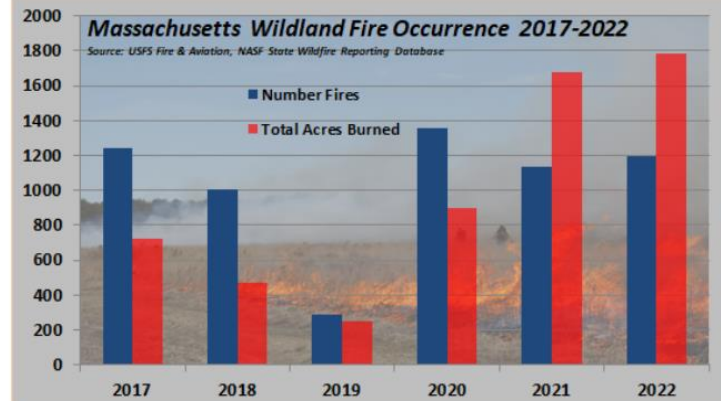
- **Silviculture:** oak diversity in woodlands and forests
- **Restoration:** globally rare inland barrens, grasslands, heathlands
- **Maintenance:** invasive species control and vegetation management of difficult areas; restored areas, woodlands, and fields



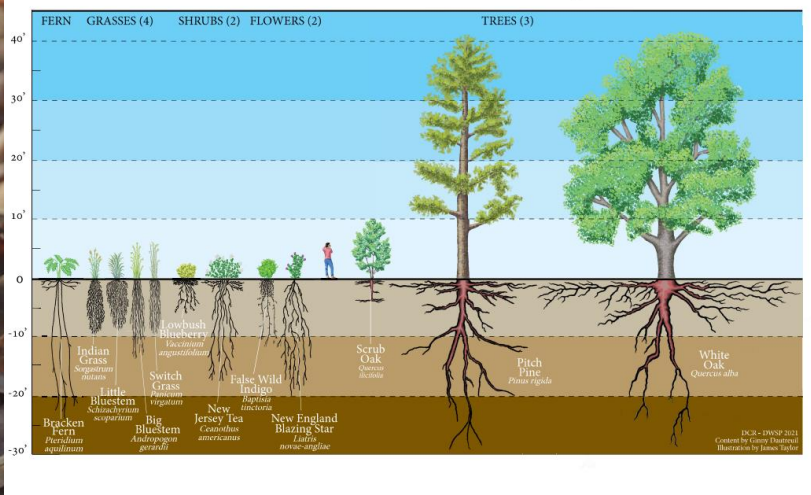
Purple milkweed—Massachusetts state listed species

Additional benefits

- Wildfire fuel reduction:
- Promotion of resilient vegetation
- Improved water quality
- Training

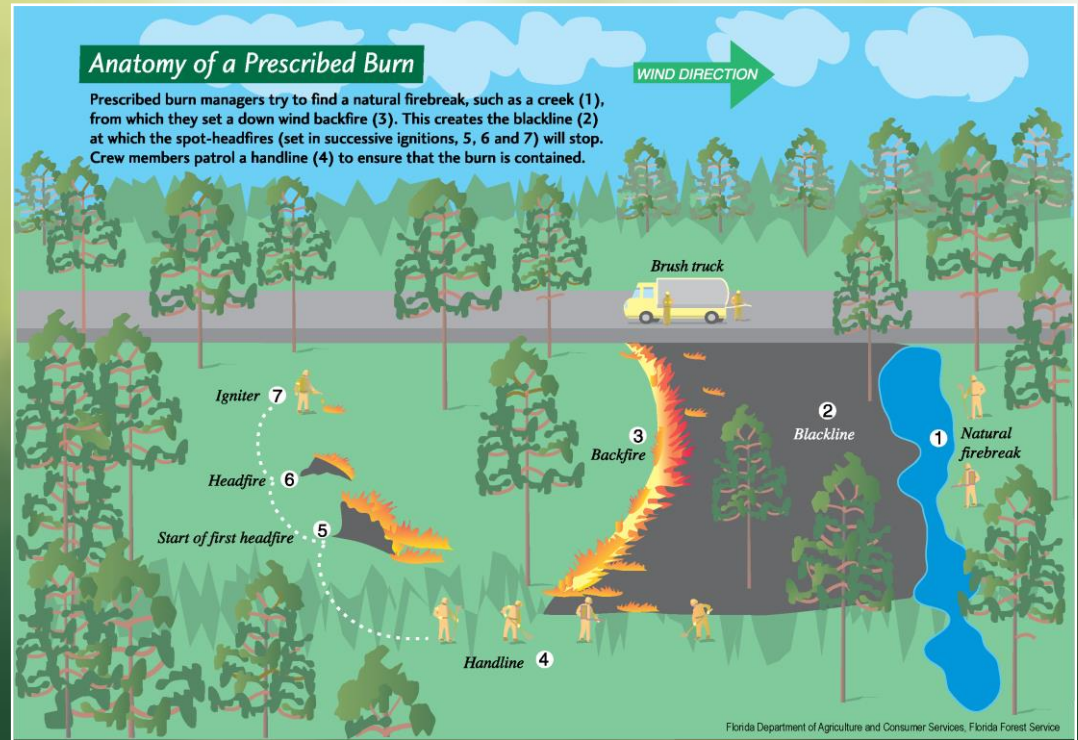


Root Profiles of Northeastern Fire-adapted Plants



Fire Implementation

- **Development of a burn plan:**
 - 21 Elements
- **Preparation of the site:**
 - Fire breaks
- **Day of burn**
 - Ignition and mop-up
- **After the fire**
 - Patrolling and monitoring



GIS Project Highlights



Watershed Protection Act Database Migration

- ▶ New tools & capabilities:
 - ▶ Watershed Protection Act Data Management Tools “Hub”
 - ▶ Restrict “DCR File Number” so that duplicate values can not be entered
 - ▶ “Pull in” parcel shape and attributes when entering new file
 - ▶ Data Update Form flags files that require attention for missing information
 - ▶ Data Exploration Dashboard allows for easy information discovery
 - ▶ Custom report templates allow decisions and quarterly reports to be generated with the click of a button
 - ▶ Email reminders sent based on File Completion Date



Management Tools Hub

dcrc

Collection

Watershed Protection Act Data Management Tools

This provides quick and easy access to WsPA data entry/update forms, the database exploration dashboard and a method for generating applicability/variance documents from a filing.

DCR-DWSP GIS

WsPA NEW FILING DATA ENTRY FORM
Filing Data Entry

WsPA EXISTING FILING DATA UPDATE FORM
Filing Data Update

WsPA DATA EXPLORATION DASHBOARD
Database Exploration

GENERATE WsPA REPORTS
Generate Reports

WORKFLOW: GENERATE REPORTS
WORKFLOW: Generate Reports

Print Maps - Watershed Protection Act Database
Print Maps

Data Entry Form

dcrc Watershed Protection Act Data Management Tools

Filing Data Entry Filing Data Update Database Exploration Generate Reports WORKFLOW: Generate Reports Print Maps

Filing Boundary*

Find Address or Date

180 BEAMAN STREET
WEST BOYLSTON 01583

Owner: COMMONWEALTH OF MA-DCR
Parcel Address: 180 BEAMAN STREET
Location ID: MA_176392_903722
Lot Size: 31,580 Acres
Book: Page: 6, 6
Town ID: 321
Map Number: 124
Parcel ID: 124_A

Perimeter: 0.87 Miles Area: 32.4 Acres

Lot Address (auto-populated from web map)
180 BEAMAN STREET

Lot Town (auto-populated from web map)
West Boylston

Lot LOC ID

Use filters to refine Dashboard information

WsPA Filings Update Form

Filter by Watershed: No Selection Filter by Subtown: No Selection Filter by East Town: No Selection Filter by Date Range: No Selection Filter by Application Status: No Selection Filter by Request Type: No Selection Filter by Outcome Type: No Selection

QA2022-032 27 New Ashford Rd, Peterborough
Request Type: Determination
Decision Issued

45 South Nelson Road, Stoughton
Request Type: Determination
Filing Missing Information

WA2022-037
Request Type: Variance
Decision Issued

49 Hubbard Rd, Hubbardston
Request Type: Violation
Decision Issued

QA2022-033
Request Type: Violation
Decision Issued

5 East Rd, Phillipps
Request Type: Advisory
Decision Issued

QA2022-031
Request Type: Advisory
Decision Issued

290 Queen Lake Rd, Phillipps
Request Type: Advisory
Decision Issued

QA2022-030
Request Type: Advisory
Decision Issued

53 Temple Street, West Boylston

Cards flag files which require additional information using color, text and icons.

Make a selection in the list to the left to view WsPA Filing Information.

Data Update Form

dcrc Watershed Protection Act Data Management Tools

Filing Data Entry Filing Data Update Database Exploration Generate Reports WORKFLOW: Generate Reports Print Maps

WsPA Database Data Exploration Dashboard

Filter by Watershed: No Selection Filter by Subtown: No Selection Filter by East Town: No Selection Filter by Date Range: No Selection Filter by Application Status: No Selection Filter by Request Type: No Selection Filter by Outcome Type: No Selection

WA2023-001 165 Shrewsbury Street, West Boylston
Request Type: Advisory
Decision Issued

QA2022-042 315 East County Rd, Rutland
Request Type: Variance
Decision Issued

QA2022-041 48 Walnut St, Rutland
Request Type: Variance
Decision Issued

QA2022-043 45 Emerald Rd, Rutland
Request Type: Variance
Decision Issued

WA2022-043 45 Emerald Rd, Rutland
Request Type: Variance
Decision Issued

290 Queen Lake Rd, Phillipps
Request Type: Advisory
Decision Issued

53 Temple Street, West Boylston

Total Filings: 4,091
Violations: 40
Monitoring: 25 Required
Pending/Active: 27

Reference Map Request Type Chart

Data Exploration Dashboard



Watershed Protection Act Database Migration Return on Investment

Current Workflow Costs: (Enter values in left column (see wage notes below). Values in right column are calculated, no need to enter these values)			
Hours to complete current workflow	9.0	Time to complete the current workflow once.	Current workflow cost
Hourly wage rate*	35.00		\$315.00
Annual occurrence of workflow	75		Current annual cost
Other workflow costs (consumables/travel exp., etc.)	\$0.00		\$23,625
Enhanced Workflow Costs			
Hours to complete workflow after enhancement	2.0	Time to complete the enhanced workflow once.	Enhanced workflow cost
Hourly wage rate*	35.00		\$70.00
Annual occurrence of workflow	75		Enhanced annual cost
Other workflow costs (consumables/travel exp., etc.)	\$0.00		\$5,250
Enhancement Production Costs and Savings			
Hours to complete enhancement	108.0		Enhancement cost
Hourly wage rate*	35.00		\$3,780.00
Annual maintenance costs of enhancement, if any	\$0.00		Initial Annual Savings
			\$14,595
			Future Annual Savings
			\$18,375
Projected ROI			
ROI=Savings minus Enhancement Cost divided by Enhancement Cost plus Enhanced Annual Cost			Initial Year ROI
			120%
			Future Annual ROI
			203%
Tangible Benefits to the Organization: (i.e., quality or quantity improvements, effects to throughput, cost avoidance, better decisions, etc.)			
Benefit 1: Improved user function and time savings - easier and quicker to search and view files in a spatial ArcGIS format rather than looking through paper files. Provides staff the ability to analyze data in many different ways and print relevant reports.			
Benefit 2: Better access for DCR staff - all project files are available in electronic format in SharePoint for staff who work outside of the West Boylston and Quabbin offices, and staff working remotely.			
Benefit 3: Better tracking of projects - provides staff the ability to easily track a project's application status, construction status, and the status of ongoing monitoring conditions. Creates a better format for staff to determine if a project has been completed as approved by DCR, if there are any construction issues, and if ongoing monitoring conditions are being done as per the decisions.			
Tangible Benefits to Others Outside the Organization: (i.e., other divisions, state agencies, stakeholders, public, etc.)			
Benefit 1: Benefits other state agencies by tracking current trends in development and violations in critical areas of the watershed that overlap with their regulatory requirements and relaying the information to them in a spatial format.			
Benefit 2: Benefits towns in the watersheds - DCR can look up information and answer their questions quickly and thoroughly, email electronic plans and documents to them.			
Benefit 3: Benefits the public by providing a more streamlined way to administer projects for water quality.			



EQ Database Migration

- ▶ Migrating Access database to ArcGIS Online using the WsPA database migration as a model.
- ▶ New tools & capabilities:
 - ▶ Environmental Quality Management Tools “Hub”
 - ▶ Restrict “EQ File Number” so that duplicate values can not be entered
 - ▶ Provide last entered file number (based on watershed selected) so consecutively numbered files are created
 - ▶ “Pull in” parcel shape and attributes when entering new file
 - ▶ Data Exploration Dashboard allows for easy information discovery
- ▶ Will migrate Agricultural Site Monitoring and Construction General Permit Monitoring to similar format.

Data Entry Form

DWSP EQ Database Data Entry Form

This form is for the entry of new EQ files. To update existing EQ files, please refer to the DWSP Environmental Quality Database Data Update Form.

Watershed*
Select watershed:

☒ Wachusett ☐ Sudbury ☐ Quabbin

☐ Ware River

Last File Number Entered:
EQ2023-008

DCR File Number*
Formatting should be as follows: Wachusett and Sudbury files formatted as EQXXXXXXX; Quabbin and Ware River files formatted as QWXXXXXXX.

EQ2023-009

PROCEED WITH DATA ENTRY

The DCR File Number entered is unique. Proceed with data entry.

Data Update Form

DWSP EQ Database Update Form

This form is for updating of existing EQ files. To enter new EQ files, please refer to the Environmental Quality Database Data Entry Form.

Update EQ File Information:

Add new/update existing Update Log entry?

☒ Yes ☐ No

Update Log:

Submit

Download by JAGGIS Survey123

EQ File List:

- EQ2023-003: Sterling Street (Ir-12-46), West Baytown. Issue Type: Release - Hazardous. Staff on File: Dan Crocker.
- EQ2023-004: 145 Boston Road, Southborough. Issue Type: Release - Hazardous. Staff on File: Josh Soggin.
- EQ2023-002: 39 Worcester Street, West Baytown. Issue Type: Other. Staff on File: Josh Soggin.
- EQ2023-001: Main Street, Holden. Issue Type: Release - Hazardous. Staff on File: Josh Soggin.

EQ Database Data Exploration Dashboard

Filter by Watershed: No Selection

Filter by File Date: No Selection

Filter by File Status: No Selection

Filter by Staff: No Selection

Filter by Issue Type: No Selection

Filter by Team: No Selection

Filter by Subbasin: Select Watershed

Filter by File Number: Select Watershed

EQ File List:

- EQ2023-004: 145 Boston Road, Southborough. Issue Type: Release - Hazardous. View Project File.
- EQ2023-003: Sterling Street (Ir-12-46), West Baytown. Issue Type: Release - Hazardous. View Project File.
- EQ2023-002: 39 Worcester Street, West Baytown. Issue Type: Other. View Project File.
- EQ2023-001: Main Street, Holden. Issue Type: Release - Hazardous. View Project File.

Main Page **Database Data** **File Status** **Site Visit & Update Log Data**

Data Exploration Dashboard

DWSP EQ Database File Review

EQ2023-001
Main Street, Holden
Issue Type: Release - Hazardous
View Project File

EQ File Details:

File Type	Watershed	DCR File Number	Status	File Date	Issue Source	Issue Source Other / Description	Location	Location of Activity Description	Subbasin	EQ Staff Name	Issue Type	Release
EQ2023-001	Wachusett	EQ2023-001	Active	1/16/2023, 12:00 PM	Seen (DRP, DCR, DCR)		Wachusett (Ir-12-46) in road in front of 145 Main Street (Wachusett Survey Data Road)	Chaffin (Holden)	Josh Soggin	Release - Hazardous		

Site Visit Details:

Photo: [Site Visit Photo]

Update Log Details:

Current Status of File	Update Type	Update Date
Document Plan Document	Y	Jeff Soggin
EQ Staff Review	Log Notes	Log Notes
How Status of File	Plan Title	U4-Log_Plan_Number
Update Log	Update Type	Update Date
Log Notes	Update Type	Update Date

Last edited by DWSP_joshua.soggin on 1/11/2023, 10:55 AM.

File Review



Trail & Road Inventory

- ▶ Comprehensive DWSP-wide trail and road inventory updated to include Wachusett & Sudbury roads and trails.
- ▶ Allows for tracking of public access issues.
- ▶ Provides clear information on allowed uses of any DWSP-managed trail or road in the watershed.
- ▶ Two versions available:
 - ▶ Internal version not filtered and includes unauthorized trails and more
 - ▶ Public version filtered to only show trails and roads intended for public use
- ▶ **Future goal** - DWSP-wide public access online application

Get directions Zoom to

DCR-DWSP Trails and Roads:

Mass Central Rail Trail

Trail Type: Forest Road/Trail (Multi-use Trail)
Trail Markings: No trail markings present
Physical Characteristics: Packed Stone Dust surface, 15'-20' wide, in Good condition
Access: Public

Allowed Uses:

Hiking	✓
Running	✓
Dogs	✗ (Prohibited)
Mountain Biking	✓
Bicycling	✓
ATV/Off	✗



Other GIS Projects: 2022

- ▶ ArcGIS Pro Training - virtual training for all GIS users
- ▶ Data maintenance & development
- ▶ Beaver Activity Monitoring - revamp & enhancement (NR)
- ▶ Habitat Restoration Field Map - revamp (NR)
- ▶ Kestrel Monitoring - new project (NR)
- ▶ Nuisance Bird Management - new project (NR)
- ▶ Search and Rescue Tracking - new project (Wachusett Region Rangers)
- ▶ Percent Impervious & Paved Area by Subbasin - new analysis (LAP)
- ▶ Rental Boat Availability Dashboard- new project (Quabbin RD for BLAs)
- ▶ Story Map: Overview of Wachusett Programs - revamp (Wachusett Region)
- ▶ Quabbin Park Cemetery Stonework Cleaning Workflow - new project (Quabbin RD)
- ▶ Quabbin Boater Emergency Contact Dashboard - revamp (Quabbin Rangers)



Interpretive Services

- ▶ Watershed Interpretive Staff have expanded offerings to include a number of new videos and remote presentations (initially prompted by the pandemic).
- ▶ <https://www.youtube.com/@MassDCR>
 - ▶ Myths and Mysteries of Quabbin Reservoir and Ware River watershed
 - ▶ Vernal Pools



DCR Asset Mitigation Funding

- ▶ Agency-wide initiative through Comptroller Funding
- ▶ Funding extended into FY23.
- ▶ Quabbin: \$1M for window replacement at Administration Building
- ▶ Wachusett: Salt shed installed, Lancaster St. barn structural work



Hiring

- ▶ FTE count: 140 (rose to 145 in Fall)
- ▶ Finally at a place where we are backfilling vacancies regularly.
- ▶ 10 additional positions in various stages of hiring process



Questions?