

# West Newbury Conservation Commission Draft Wetlands Protection Bylaw Public Info Session

First Floor Hearing Room - December 6, 2023



# Wetlands Protection Act 101 (The *very* brief version)

- **What is a wetland and how do I know if a wet area is a wetland?**
  - A wetland is an area where water covers the soil or is present at or near the surface of the soil all year or for varying periods of time during the year, including the growing season
  - A wetland must have all three – hydrology, hydric soil, and hydrophytic vegetation
  - A wetlands scientist determines if an area is a wetland by studying the hydrology, soils, and vegetation of an area
  - A wetlands delineation is the only way to accurately confirm the location of a wetland
- **Enacted in 1972 the Wetlands Protection Act protects eight presumed public interests provided by wetlands**
  - These eight interests are community benefits ranging from flood control to drinking water protection to protection of wildlife habitat. The eight interests are listed on the next slide
- **Multiple areas are protected under the Wetlands Protection Act**
  - The Act protects a variety of resource areas. These resource areas include (but aren't limited to) land subject to flooding, swamps, banks, and a riverfront resource area of 200' from the edge of rivers and perennial streams. A list of areas subject to protection is included in this slide deck.
- **What does this all mean?**
  - Under the Act, no person shall remove, fill, dredge, or alter an areas subject to protection under the Act without first filing with the Conservation Commission
  - MA DEP and the Conservation Commission have joint jurisdiction to review filings

The Eight  
Presumed  
Public  
Interests of  
Wetlands that  
are Protected  
by the  
Wetlands  
Protection Act

1. Protection of public and private water supply
2. Protection of groundwater supply
3. Flood control
4. Storm damage prevention
5. Prevention of pollution
6. Protection of land containing shellfish
7. Protection of fisheries
8. Protection of wildlife habitat

# Resource Areas Protected Under the Wetlands Protection Act

## Resource Areas Protected under the Wetlands Protection Act

- Any bank
- Any freshwater wetland
- Any coastal wetland
- Any beach
- Any dune
- Any tidal flat
- Any marsh
- Any swamp

### Bordering on:

- The ocean
- Any estuary
- Any creek
- Any river
- Any stream
- Any pond
- Any lake

- Land under any of the waterbodies listed above

- Land subject to tidal action

- Land subject to coastal storm flowage

- Land subject to flooding

- Riverfront area, which is an area that extends a distance of 200 feet from the mean annual highwater line of any river or perennial (flowing year-round) stream. Riverfront area is not a Buffer Zone, it is a resource area.

## But what about the Buffer Zone?

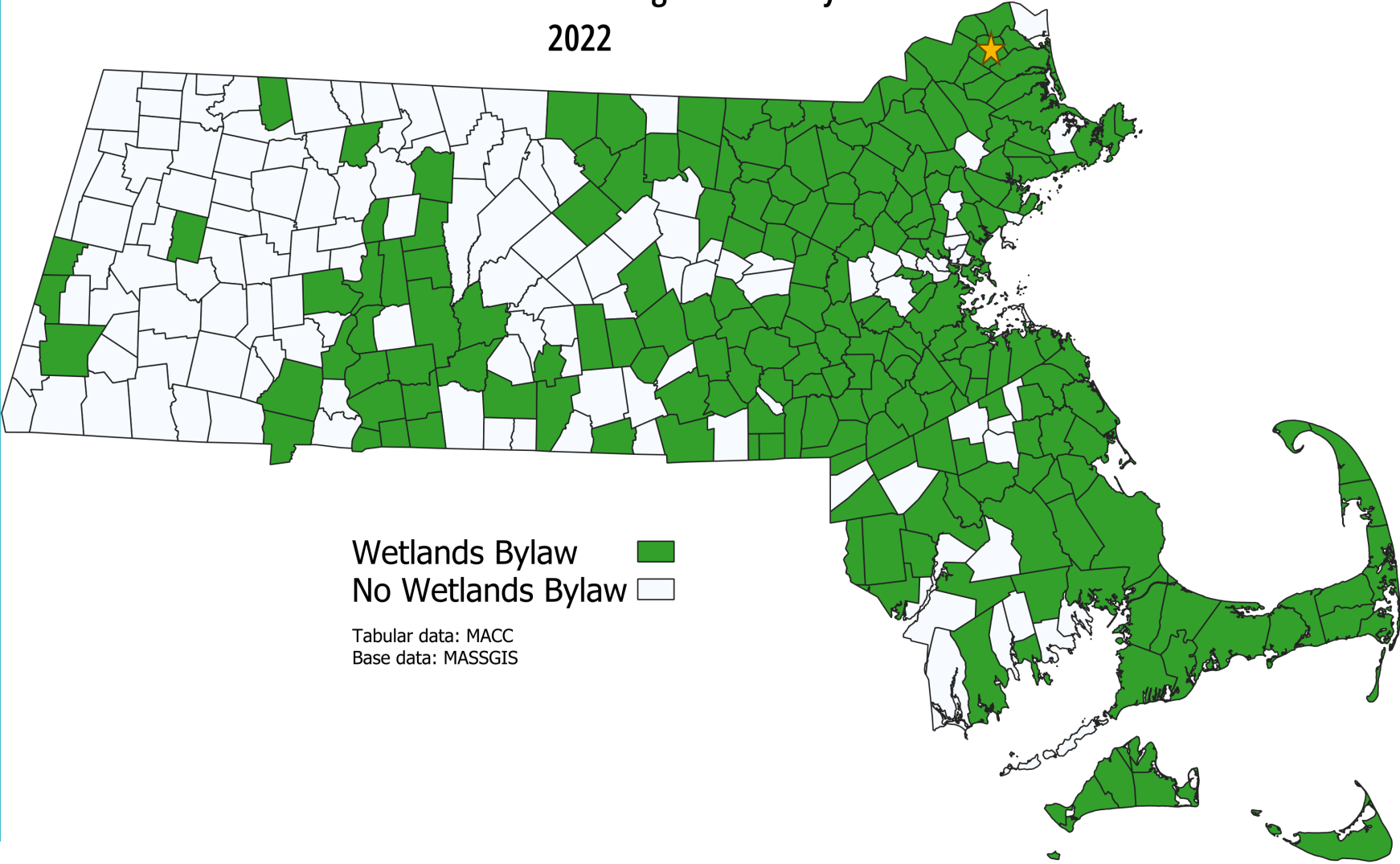
- Under the Act the Buffer Zone, an area of 100 feet extending from the edge of a wetland, is regulated but it is not a resource area
- This means that the regulations of the Act do not have performance standards or design specifications for activities proposed in the buffer zone
- This is a substantial difference from resource areas as the regulations have very specific performance standards and design specifications for activities proposed in resource areas
- The regulations of the Act require a filing for activities in the Buffer Zone so that the Commission can determine if the activities proposed in the Buffer Zone will alter a protected resource area
- The Buffer Zone itself is not protected under the Act

## Why Have a Local Wetlands Protection Bylaw?

- Add stronger protections to wetlands and buffer zones than those provided in the state Wetlands Protection Act and Regulations. This was included as an action item in the town's 2016 Hazard Mitigation Plan
- Recognize and protect additional resource areas and public interests, also called resource area values, than those recognized and protected by the Act
- Codify policies that the Conservation Commission and MA DEP have developed
- Empower the Conservation Commission to take legal action, including the issuance of fines, against violators to bring about a more timely response to wetlands violations
- Increase the competitiveness of the town when seeking grant funding

Municipalities  
with Local  
Wetland  
Protection  
Bylaws as of  
2022

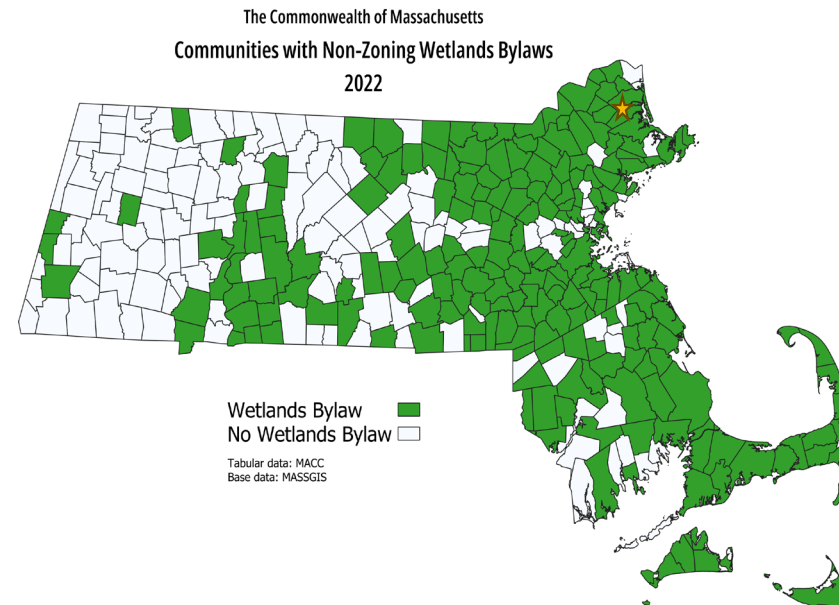
The Commonwealth of Massachusetts  
Communities with Non-Zoning Wetlands Bylaws  
2022



# Existing West Newbury Wetlands Protection Bylaw?

You may have noticed that according to the map, West Newbury already has a wetlands bylaw...

- West Newbury has a wetland bylaw at section XXV of the town bylaws
- Enacted in 1988, the bylaw adopts the state Wetlands Protection Act as the town's wetlands bylaw
- This bylaw also allows the Conservation Commission to set local filing fees in addition to fees charged by the state
- No additional procedures are provided in this bylaw. No additional resource areas are protected by this bylaw





- Substantial changes have been made to formatting and section ordering making the bylaw easier to read, understand, and apply

New to this  
Draft Bylaw...  
Formatting  
Improvements

**DRAFT**

**Town of West Newbury  
Conservation Commission**

**WETLANDS PROTECTION BYLAW**

**I. Purpose**  
The purpose of this bylaw is to protect the wetlands, water resources, flood prone areas, and adjoining upland areas in the Town of West Newbury by controlling activities deemed by the Conservation Commission likely to have a significant or cumulative effect on resource area values, including but not limited to the following: public or private water supply, groundwater supply, flood control, erosion and sedimentation control, storm damage prevention including coastal storm flowage, water quality, prevention and control of pollution, fisheries, shellfisheries, wildlife habitat, rare species habitat including rare plant and animal species, agriculture, aquaculture, and recreation values, deemed important to the community (collectively, the "resource area values protected by this bylaw").

This bylaw is intended to utilize the Home Rule authority of West Newbury to protect the resource areas under the Wetlands Protection Act (G.L. Ch.131 §40; the Act) to a greater degree, to protect additional resource areas recognized by the Town as significant, to protect all resource areas for their additional values beyond those recognized in the Act, and to impose in local regulations and permits additional standards and procedures in addition to those of the Act and regulations thereunder (310CMR 10.00), subject, however, to the rights and benefits accorded to agricultural uses and structures of all kinds under the laws of the Commonwealth and other relevant bylaws of the Town of West Newbury.

**II. Jurisdiction**  
Except as permitted by the Conservation Commission no person shall remove, fill, dredge, build upon, degrade, discharge into, or otherwise alter the following resource areas: any freshwater or coastal wetlands, isolated wetlands, marshes, wet meadows, bogs, swamps, vernal pools, springs, banks, reservoirs, lakes, ponds of any size, beaches, dunes, estuaries, and lands under water bodies; lands adjoining these resource areas out to a distance of

**Town of West Newbury  
Conservation Commission**

**DRAFT 11/21/2023**

**WETLANDS PROTECTION BYLAW**

**Sections:**

<b>1. Purpose</b>	<b>8. Permits and Conditions</b>
<b>2. Jurisdiction</b>	<b>9. Security</b>
<b>3. Exemptions &amp; Exceptions</b>	<b>10. Appeals</b>
<b>4. Definitions</b>	<b>11. Enforcement</b>
<b>5. Burden of Proof</b>	<b>12. Regulations</b>
<b>6. Applications, Fees, &amp; Outside Consultants</b>	<b>13. Relation to Wetlands Protection Act</b>
<b>7. Notice, Public Hearings, and Public Meetings</b>	<b>14. Severability</b>
	<b>15. Effective Date</b>

**1. Purpose**  
The purpose of this bylaw is to protect the wetlands, water resources, flood-prone areas, and adjoining upland areas in the Town of West Newbury by regulating activities deemed by the Conservation Commission ("Commission") likely to have a significant or cumulative adverse effect on resource area values, including but not limited to the following:

- 1.1 Public or private water supply
- 1.2 Groundwater supply
- 1.3 Flood control
- 1.4 Erosion and sedimentation control
- 1.5 Storm damage prevention including coastal storm flowage
- 1.6 Water quality
- 1.7 Prevention and control of water pollution
- 1.8 Agriculture
- 1.9 Fisheries, including aquaculture

Screen capture of the first page of the spring 2022 draft bylaw (left) and current draft bylaw (right)

New to this  
Draft Bylaw...

Additional  
Exempt  
Activities

- Recognition of exemptions already provided by the state Wetlands Protection Act and Regulations (section 3)
- An explicit exemption was added for mowing and maintenance of lawns, gardens, and landscaped areas that lawfully existed before the bylaw or which are lawfully created under the bylaw (section 3.5)

### 3. Exemptions and Exceptions

The following exemptions shall apply and no permit is necessary for:

**3.1** Minor activities in the Buffer Zone and Riverfront Area Pursuant to 310 CMR 10.02(2)(b)(2)(a)-(q), and as may be Amended by the Massachusetts Department of Environmental Protection ("MA DEP")

The exemptions provided in the Wetlands Protection Act (G.L. Ch. 131 §40) and regulations (310 CMR 10.00) shall apply under this bylaw provided that advance written notice of at least 72 hours has been given to the Commission or its agent before the commencement of work and provided that the work also conforms to any performance standards and design specifications as written in the Act and regulations.

**3.2** Emergency Projects

Projects necessary for the protection of the health and safety of the public, provided that the work is to be performed by or has been ordered to be performed by an agency of the Commonwealth or a political subdivision thereof and provided that advance notice, oral or written, has been given to the Commission or its agent before the commencement of work or within 24 hours after the commencement and provided that the Commission or its agent certifies the work as an emergency project and provided that the work is performed only for the time and place certified by the Commission or its agent for the limited purposes necessary to abate the emergency. Upon failure to meet these and other requirements of the Commission, the Commission may, after notice and a public hearing, revoke or modify an emergency project approval and order restoration and mitigation measures.

**3.3** Agriculture

Work performed for normal maintenance or improvement of land in agricultural and aquacultural use as defined by the Wetlands Protection Act regulations at 310 CMR 10.04.

*Screen capture of some of the exemptions provided in Section 3 of the draft bylaw*

New to this  
Draft Bylaw...

No 200-foot  
Buffer Around  
Intermittent  
Streams is  
Proposed

- The 2022 draft bylaw proposed a new jurisdictional area of 200 feet around intermittent streams
- This new jurisdictional area is not proposed in the current draft bylaw (section 2)
- Under the current draft bylaw, banks of intermittent streams would be protected and would have a 100' buffer zone as they do under the WPA today
- Under the current draft bylaw, perennial streams and rivers, those that flow year-round, would have a 200' Riverfront Area as they do under the WPA today

New to this  
Draft Bylaw...

Ponds have a  
Size Threshold

- The 2022 draft bylaw proposed protections for “ponds of any size”
- To ensure that only actual ponds are subject to jurisdiction under the bylaw, the current draft bylaw proposes a threshold that ponds must be at least 1,000 sq. ft. to be protected as a resource area

New to this  
Draft Bylaw...  
No Changes to  
Abutter  
Notifications

- The 2022 draft bylaw proposed increased abutter notifications above what is provided for in the regulations of the WPA for wetlands filings
- The 2022 draft proposed increased abutter notification for Notice of Intent (NOI) filings from abutters within 100' of the property to those within 300' of the property and added a requirement of abutter notification for Request for Determination of Applicability (RDA) filings
- The current draft bylaw proposes no changes to abutter notifications for wetlands filings and follows the abutter notification requirements of the regulations of the WPA (section 7.1)

# Additional Public Interests / Resource Area Values Protected in the Draft Bylaw

## Public Interests Protected Under the WPA

### Protection of:

- Public & Private Water Supply
- Groundwater Supply
- Fisheries
- Wildlife Habitat
- Land Containing Shellfish

### Prevention of:

- Pollution
- Storm Damage

### Control of:

- Floods

## Additional Public Interests Protected Under Proposed Bylaw

### Protection of:

- Agriculture
- Recreation
- Rare Species Habitat
- Water Quality
- Fisheries *Including Aquaculture*

### Prevention of:

- Storm Damage Prevention *Including Coastal Storm Flowage*

### Control of:

- Erosion & Sedimentation

# Additional Resource Areas Protected in the Draft Bylaw

Resource Areas Subject to Protection under the Wetlands Protection Act		
<ul style="list-style-type: none"> <li>Any bank</li> <li>Any freshwater wetland</li> <li>Any coastal wetland</li> <li>Any beach</li> <li>Any dune</li> <li>Any tidal flat</li> <li>Any marsh</li> <li>Any swamp</li> </ul>	<b>Bordering on:</b>	<ul style="list-style-type: none"> <li>The ocean</li> <li>Any estuary</li> <li>Any creek</li> <li>Any river</li> <li>Any stream</li> <li>Any pond</li> <li>Any lake</li> </ul>
<ul style="list-style-type: none"> <li>Land under any of the water bodies listed above</li> </ul>		
<ul style="list-style-type: none"> <li>Land subject to tidal action</li> </ul>		
<ul style="list-style-type: none"> <li>Land subject to coastal storm flowage</li> </ul>		
<ul style="list-style-type: none"> <li>Land subject to flooding</li> </ul>		
<ul style="list-style-type: none"> <li>Riverfront area, which is an area that extends a distance of 200' from the mean annual highwater line of any river or perennial (flowing year-round) stream. Riverfront area is not a Buffer Zone, it is a resource area.</li> </ul>		

Additional Resource Areas Subject to Protection under the Proposed Bylaw (new is highlighted)
<ul style="list-style-type: none"> <li>Any freshwater or coastal wetlands, <b>isolated wetlands, marshes, wet meadows, bogs, swamps and adjoining land extending out to a distance of 100 feet, known as the Buffer Zone</b></li> </ul>
<ul style="list-style-type: none"> <li>Any freshwater or coastal bank or beach bordering on any lake, pond, reservoir, river, stream, brook, or creek and <b>adjoining land extending out to a distance of 100 feet, known as the Buffer Zone</b></li> </ul>
<ul style="list-style-type: none"> <li>Any perennial rivers, streams, brooks and creeks and lands adjoining these resource areas out to a distance of 200 feet, known as the Riverfront Area</li> </ul>
<ul style="list-style-type: none"> <li>Any land under the aforementioned waterbodies and waterways</li> </ul>
<ul style="list-style-type: none"> <li><b>Any vernal pools and adjoining land extending out 100 feet, known as the Vernal Pool Habitat</b></li> </ul>
<ul style="list-style-type: none"> <li>Any lands subject to flooding or <b>inundation by groundwater or surface water</b></li> </ul>
<ul style="list-style-type: none"> <li>Any lands subject to tidal action, coastal storm flowage, or <b>coastal flooding</b></li> </ul>

# Additional Resource Areas Proposed for Protection in the Draft Bylaw... Buffer Zones

Proposed New Resource Area	Specific Difference(s) from the WPA
<p>Land adjoining resource areas listed in sections 2.1 and 2.2 out to a distance of 100 feet known as the Buffer Zone.</p>	<ul style="list-style-type: none"> <li>• The 100 foot Buffer Zone is regulated under the WPA but it is not a resource area which means that the regulations of the Act do not have performance standards or design specifications for activities in the Buffer Zone.</li> <li>• This is a substantial difference from the resource areas protected by the WPA as the regulations have very specific performance standards and design specifications for activities in resource areas.</li> </ul>
<p>Resource areas that would have a 100' Buffer Zone are:</p> <ul style="list-style-type: none"> <li>• Any freshwater or coastal wetlands, isolated wetlands, marshes, wet meadows, bogs, &amp; swamps (section 2.1)</li> <li>• Any freshwater or coastal bank or beach bordering on any lake, pond, reservoir, river, stream, brook, or creek (section 2.2)</li> </ul>	



# Additional Resource Areas Proposed for Protection in the Draft Bylaw... Buffer Zones

## Why does it matter? Considering the science..

- There is a better understanding of wetlands and how they function than there was when the WPA was enacted in 1972. One of the things that is better understood is the importance of intact, undisturbed, naturally vegetative buffers around wetlands
- Wider, naturally vegetated wetland buffers provide more habitat for a larger variety of wildlife
- Vegetated buffers provide hydrologic stabilization by slowing and infiltrating rain water which reduces drastic fluctuations of water levels in wetlands during rain events. This allows wetlands to provide better storm protection and flood control. It also improves the habitat of aquatic organisms in the wetlands
- Vegetated buffers protect wetlands and wildlife from human impacts including the temptation to dump debris, noise and light pollution, and providing cover for wildlife from domestic pets that may prey on wildlife like cats or dogs

# Additional Resource Areas Proposed for Protection in the Draft Bylaw... Buffer Zones

## Why does it matter? Regulatory..

- The regulations of the Wetlands Protection Act do not include design standards or performance specifications for proposed activities in the Buffer Zone
- By protecting Buffer Zones as resource areas in the draft bylaw, the regulations of the Commission can include design standards and performance specifications for proposed activities in the Buffer Zone
- This change provides stronger protections for this important resource area to ensure that wetlands can properly function and provide community benefits
- Without including Buffer Zones as a resource area in the bylaw, these important areas remain at risk
- In addition to protecting Buffer Zones, including Buffer Zones as a resource area allows for a more equitable permitting process. The Commission's regulations will contain design standards, performance specifications, and waiver provisions for activities proposed in the Buffer Zone that anyone can review and that the Commission can consider consistently when reviewing activities proposed in the Buffer Zone

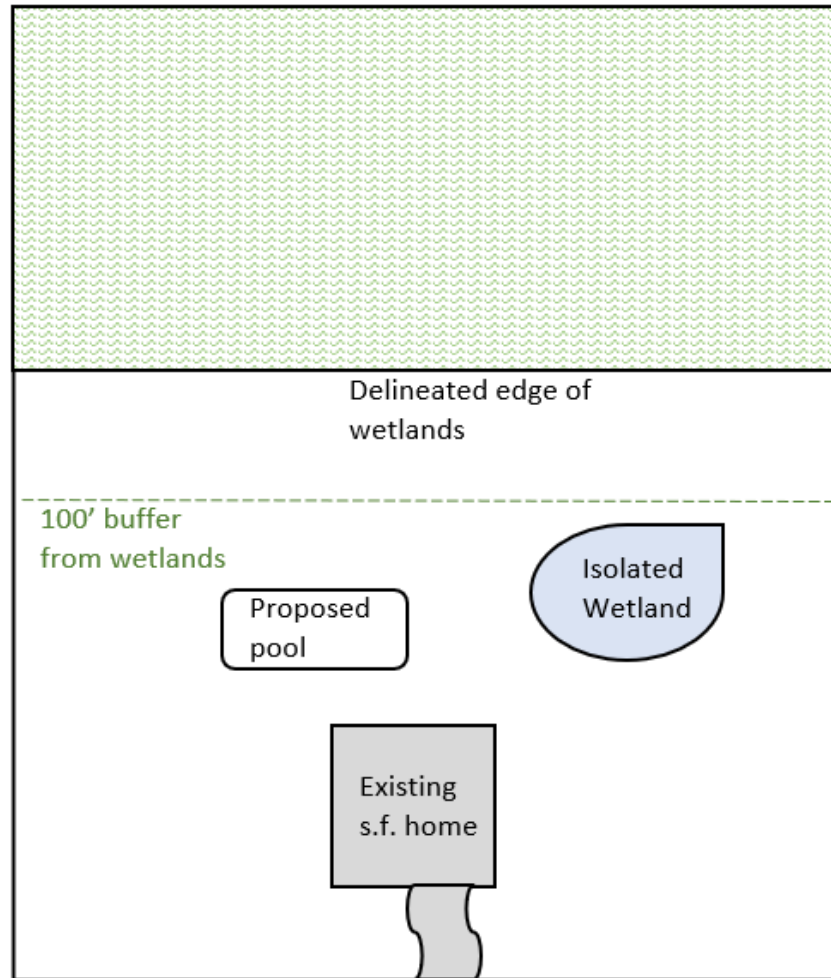
# Additional Resource Areas Proposed for Protection in the Draft Bylaw...

## Isolated Wetlands

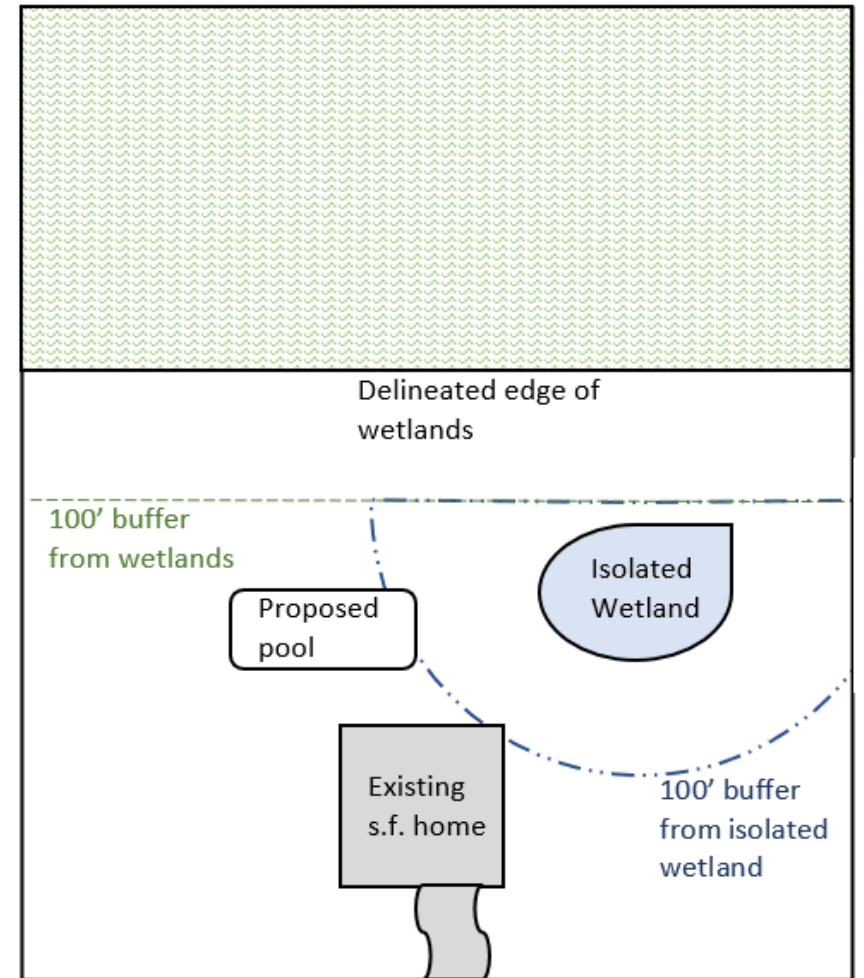
Proposed New Resource Area	Specific Difference(s) from the WPA
Isolated wetlands that are at least 1,000 sq. ft in size square feet (section 2.1) and defined in section 4.	The WPA protects isolated land subject to flooding but only if at least once a year the area confines standing water to a volume of at least ¼ acre-feet (~81,463 gal.) and to an average depth of at least six inches.

# Additional Resource Areas Proposed for Protection in the Draft Bylaw... Isolated Wetlands

Buffer zone around an isolated wetland < ¼ acre-feet under WPA



Buffer zone around isolated wetland greater than XX sq ft under proposed bylaw



# Additional Resource Areas Proposed for Protection in the Draft Bylaw...

## Isolated Wetlands

### **Why does it matter?**

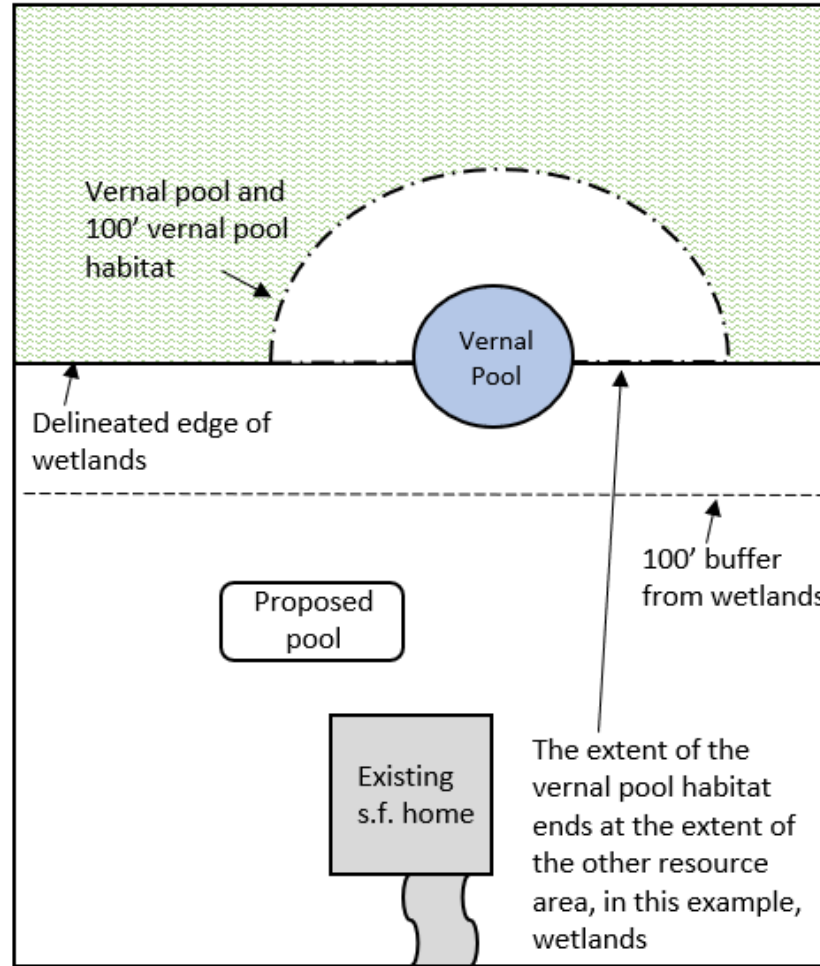
- Isolated wetlands provide habitat to a variety of species including waterfowl and amphibians (Mitsch & Gosselink, 2000)
- Isolated wetlands provide groundwater recharge and flood control helping to minimize storm damage and protect groundwater (Mitsch & Gosselink, 2000)
- Because they are cut off from other surface waters, the slow flow path of isolated wetlands provide increased retention of nutrients and pollutants, preventing them from entering other bodies of water (Marton et al., 2015)

Additional  
Resource  
Areas  
Proposed for  
Protection in  
the Draft  
Bylaw...  
Vernal Pools

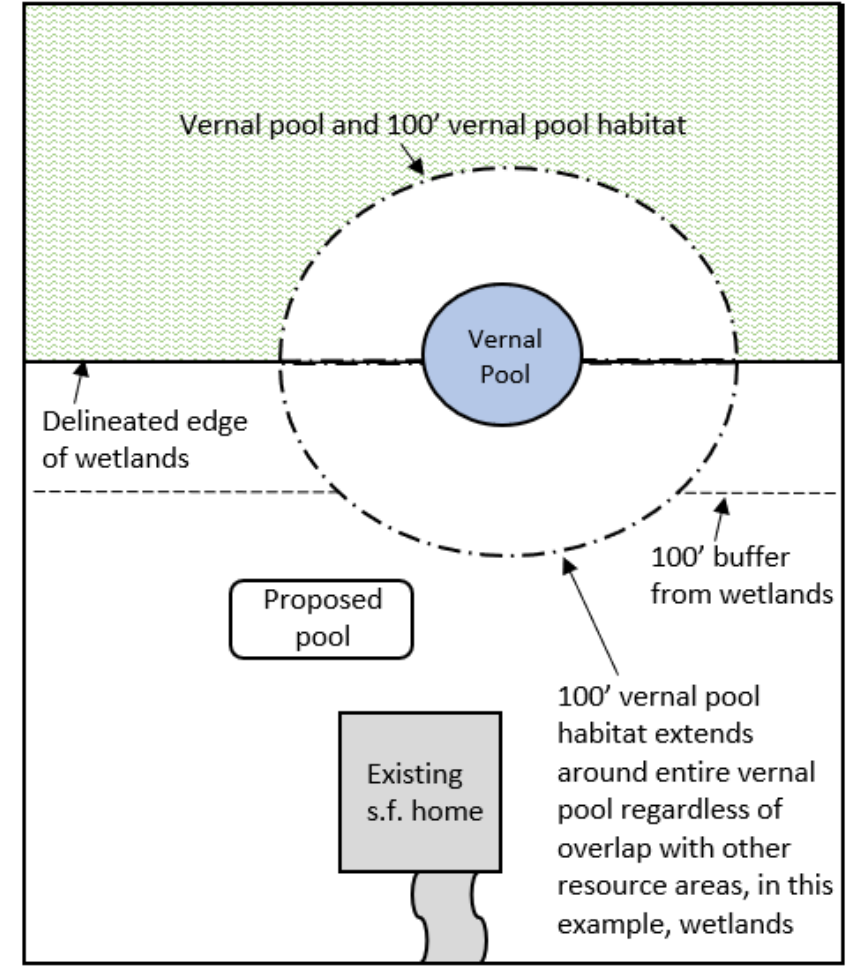
Proposed New Resource Area	Specific Difference(s) from the WPA
Any vernal pools and adjoining land extending out 100 feet, known as the Vernal Pool Habitat (section 2.5). Vernal pools are defined in section 4 of the bylaw.	The WPA extends a 100' vernal pool habitat area around state certified vernal pools only.
The bylaw would apply to all vernal pools regardless of state certification.	Vernal pools that are not state certified receive no specific protections under the WPA.
Vernal Pool Habitat would extend out 100 feet from the edge of a vernal pool regardless if that area overlaps with another resource area.	Vernal pool habitat area under the WPA is limited to its extent that the vernal pool habitat overlaps with another resource area. Under the WPA, there are no protections if the vernal pool habitat overlaps with buffer zone.

Additional Resource Areas Proposed for Protection in the Draft Bylaw... Vernal Pools

Vernal pool habitat around a state certified Vernal pool under the WPA



Vernal pool habitat around any vernal pool under proposed bylaw



# Additional Resource Areas Proposed for Protection in the Draft Bylaw... Vernal Pools

## Why does it matter?

- Vernal pools are unique wetlands that provide habitat for a variety of additional amphibian, reptile, and insect species and also provide groundwater recharge and flood water control (Calhoun et al., 2017, Heiser, 2020)
- Many vernal pools support wildlife with life histories involving annual migrations of up to ~1,800', making the adjacent terrestrial habitat an integral part of conserving vernal pool functions (Calhoun et al., 2017)
- The spotted salamander (whose range includes West Newbury) relies on vernal pools for breeding habitat due to the lack of predatory fish and a symbiotic relationship between her egg masses and the algae in vernal pools. (Ferguson Museum 2021, Gleaton, n.d., Heiser, 2020)
- Spotted salamanders tend to return to breed in the same vernal pool each year and have a lifespan of up to 20 years, but are threatened due to loss of vernal pools & alteration of surrounding habitat (Gleaton, n.d., Ferguson Museum 2021)



# Streamlined Filings, Hearings, and Permits under both the WPA and Bylaw

## To avoid an increased burden to applicants the draft bylaw proposes the following:

- Projects that are jurisdictional under both the WPA and the bylaw, requiring the filing of a Notice of Intent (NOI), Request for Determination of Applicability (RDA), or Abbreviated Notice of Resource Area Delineation (ANRAD) can be filed using the forms provided by the MA DEP, provided that all information required for review under both the WPA and the bylaw is included. For these filings, no additional forms will be required
- Projects that are jurisdictional under both the WPA and the draft bylaw, will be heard in one public hearing or meeting opened under both the WPA and bylaw and not two separate public hearings or meetings
- One document (“permit”), either an Order of Conditions, Determination of Applicability, or Order of Resource Area Delineation, will be issued for projects that are jurisdictional under both the WPA and the bylaw. The issued document will indicate which conditions, findings, and/or decisions apply under the WPA and which apply under the bylaw
- For projects that are jurisdictional under only the bylaw, the Commission may either require the use of the MA DEP forms for filings or require the use of forms created by the Commission

# Mechanism to Issue Fines Under the Bylaw

## The draft bylaw proposes additional tools for the Conservation Commission to bring wetlands violations into compliance

- The WPA does not allow a Conservation Commission to issue fines. Under the WPA, a Conservation Commission can impose fines only through the courts
- The ability to fine a wetlands violator provides another opportunity to bring about compliance without escalating to a lawsuit
- The forms used to issue citations under the bylaw will be in compliance with state laws and regulations
- Serious and repeat violations may still warrant a criminal complaint. Having a record of citations issued without payment or other response is additional evidence to prove noncompliance
- The provision to issue fines is included in other town bylaws, including:
  - 2021 Stormwater Bylaw
  - 2019 ZBA Bylaw
  - 2000 Public Water Supply Bylaw

## Question & Answer Session

**If you have any questions regarding the proposed bylaw, the Commission would be happy to address them now.**

# Contact Information

**Michelle Greene, Conservation Agent**

Office: 978-363-1100 x126

Mobile: 978-891-0238

[Conservation@wnewbury.org](mailto:Conservation@wnewbury.org)

[www.wnewbury.org/conservation-commission](http://www.wnewbury.org/conservation-commission)



Blanding's Turtle, Image Credit: University of Illinois

# References and Resources

- Calhoun, A. J. K., Mushet, D. M., Bell, K. P., Boix, D., Fitzsimons, J. A., & Isselin-Nondedeu, F. (2017). Temporary wetlands: Challenges and solutions to conserving a 'disappearing' ecosystem. *Biological Conservation*, 211, 3–11. <https://doi.org/10.1016/j.biocon.2016.11.024>
- Commonwealth of Massachusetts. (n.d.). *Section 40*. General Law - Part I, Title XIX, Chapter 131, Section 40. Retrieved March 5, 2022, from <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131/Section40>
- Commonwealth of Massachusetts. (n.d.). *Section 53G*. General Law - Part I, Title VII, Chapter 44, Section 53G. Retrieved March 5, 2022, from <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter44/Section53g>
- Downing, J. A. (2010). Emerging global role of small lakes and ponds: Little things mean A lot. *Limnetica*, 29(1), 9–24. <https://doi.org/10.23818/limn.29.02>
- Gleaton, A. (n.d.). *Spotted salamander (Ambystoma maculatum)*. Species Profile: Spotted Salamander (Ambystoma maculatum) | SREL Herpetology. Retrieved March 9, 2022, from <https://srelherp.uga.edu/salamanders/ambmac.htm>
- Heiser, C. A. (2020, April 16). *Seen a salamander? vernal pools are unique habitats*. Seen a Salamander? Vernal Pools are Unique Habitats. Retrieved March 9, 2022, from <https://dwr.virginia.gov/blog/seen-a-salamander-vernal-pools-are-unique-habitats/>
- Henry L. Ferguson Museum. (2021, March 13). *Vernal pools – habitats that support unique biological communities*. Henry L. Ferguson Museum. Retrieved March 9, 2022, from <https://fergusonmuseum.org/2008/03/vernal-pools/>
- Hill, M. J., Greaves, H. M., Sayer, C. D., Hassall, C., Milin, M., Milner, V. S., Marazzi, L., Hall, R., Harper, L. R., Thornhill, I., Walton, R., Biggs, J., Ewald, N., Law, A., Willby, N., White, J. C., Briers, R. A., Mathers, K. L., Jeffries, M. J., & Wood, P. J. (2021). Pond Ecology and Conservation: Research Priorities and Knowledge Gaps. *Ecosphere*, 12(12). <https://doi.org/10.1002/ecs2.3853>
- Marton, J. M., Creed, I. F., Lewis, D. B., Lane, C. R., Basu, N. B., Cohen, M. J., & Craft, C. B. (2015). Geographically isolated wetlands are important biogeochemical reactors on the Landscape. *BioScience*, 65(4), 408–418. <https://doi.org/10.1093/biosci/biv009>
- Massachusetts Department of Environmental Protection. (2014, October 24). 310 CMR 10.00: Wetlands Protection. Boston; Massachusetts Department of Environmental Protection. <https://www.mass.gov/doc/310-cmr-1000-the-wetlands-protection-act/download>
- Mitsch, W. J., & Gosselink, J. G. (2000). The value of wetlands: Importance of scale and landscape setting. *Ecological Economics*, 35(1), 25–33. [https://doi.org/10.1016/S0921-8009\(00\)00165-8](https://doi.org/10.1016/S0921-8009(00)00165-8)
- Mullins, M. L., & Doyle, R. D. (2019). Big things come in small packages: Why limnologists should care about small ponds. *Acta Limnologica Brasiliensia*, 31. <https://doi.org/10.1590/S2179-975X4119>
- National Risk Management Research Laboratory Office of Research and Development, Mayer, P. M., Reynolds, S. K., & Canfield, T. J., Riparian buffer width, vegetative cover, and Nitrogen Removal Effectiveness: A review of current Science and regulations (2005). Cincinnati, OH; U.S. Environmental Protection Agency. <https://www.epa.gov/sites/default/files/2019-02/documents/riparian-buffer-width-2005.pdf>
- University of New Hampshire. (2021, July 8). *Vernal pools*. University of New Hampshire Extension. Retrieved March 4, 2022, from <https://extension.unh.edu/resource/vernal-pools>
- West Newbury. (1970, January 1). Town of West Newbury MA. Retrieved March 5, 2022, from <https://www.wnewbury.org/>