APPENDIX D: PROJECT STEERING COMMITTEE MATERIALS

Consisting of:

- **Meeting Presentations**
- **Meeting Notes**

11 Steering Committee Meetings:
December 9, 2020
February 10, 2021
March 10, 2021
May 12, 2021
June 9, 2021
September 8, 2021
November 10, 2021
January 12, 2022
February 9, 2022
March 30, 2022
May 11, 2022

Steering Committee Meeting #1: A VISION FOR THE APC AND NEMASKET RIVER

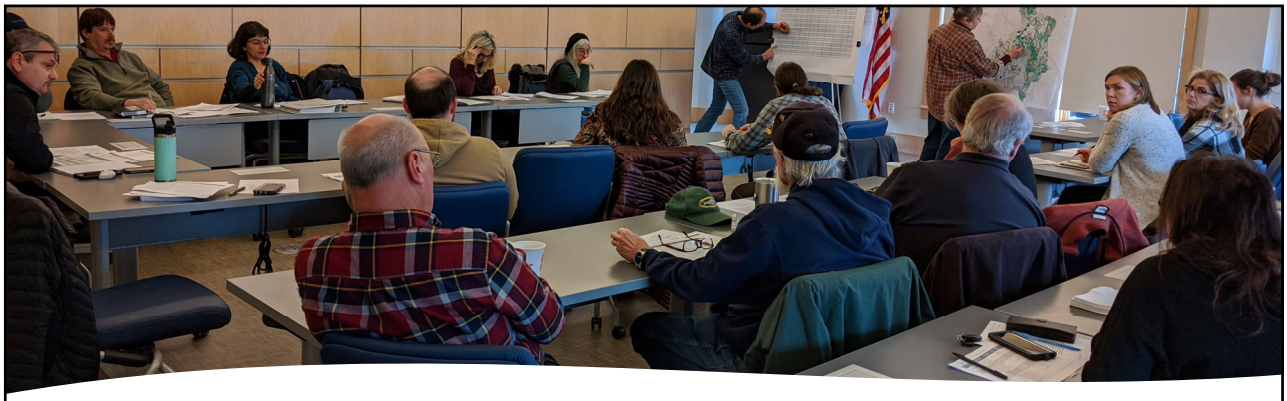
APC - Nemasket River Watershed Management and Climate Action Plan

December 9, 2020

Agenda

- Introductions (5 min)
- Broad Project Overview: Goals and Tasks (5 min)
- Recap of issues discussed to date (15 min)
- Dynamic Changes to 2050 (growth and climate change 5 min)
- Developing a Vision for the APC and Nemasket River (25 minutes)
- Public Participation Update (5 minutes)
- Tentative Plan for Next Meetings (5 minutes)

Clock in at around 1:15



Meet the Project Team

APC Management Team

- City of New Bedford Water Division
- City of Taunton Water Division
- APC Ranger
- Middleborough-Lakeville Herring Fishery Commission
- Mass Division of Fisheries and Wildlife
- Select Board Members
- Legislators
- Local Board and Commission Members
- Volunteers

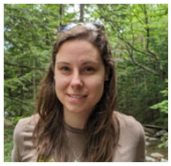
Town Staff

- Patricia Cassady, Middleborough, Conservation Agent
- Laurell Farinon, Rochester, Conservation Agent
- Michele Paul, New Bedford, Director of Resilience and Enviro. Stewardship
- Phillip Duarte, Taunton, City Councilor
- Freetown seat: OPEN
- Nancy Yeatts and Lia Fabian, Lakeville

Meet the Project Team

Bill Napolitano
Environmental Program Director

Helen Zincavage
Environmental Program



Danica Warns
Climate Resilience Coordinator
Mass Audubon

Marea Gabriel
Conservation Projects Manager

Sara Burns
Water Resource Scientist
The Nature Conservancy

Neal Price
Associate Principal, Senior Hydrogeologist

Ellie Baker
Senior Environmental Planner

Courtney Rocha
MVP Coordinator, Southeast Region

Eric Walberg
Senior Program Leader, Climate Services

Neil Williams
Applied Forest Scientist

Overview: Project Goals

A Watershed Management & Climate Action Plan that...

Addresses existing issues.

Sometimes at different scales, but all in service of a watershed that supports human needs while also preserving natural functions and ecology.

Overall watershed issues

- Ex: seasonal drought within watershed

Pinch points disrupting system

- Ex: water movement between APC and Nemasket

Overview: Project Goals

A Watershed Management & Climate Action Plan that...

Addresses dynamic forces shaping the future.

1. Climate Change - for planning purposes, will consider impacts anticipated for 2050 under a high emissions scenario (RCP 8.5)...hope for best but prepare for worse

- What are the anticipated impacts?
  - Ex: Predicted increasing droughts,
  - Ex: Concentration of rainfall into intense storm events
- What are the implications?
  - For water supply, fish passage, water quality, etc
- What steps can we take now in preparation to mitigate these effects?

2. New development

Overview: Project Goals

A Watershed Management & Climate Action Plan that...

Is a living document! Meant to be updated into the future and that can reflect changed context or priorities.

Has a substantial focus on managing the competing ecosystem services that benefit the different interests in the watershed

- Ex: increased recreation and water quality
- Ex: water supply capture and flood control

Overview: Project Tasks

TASK	YEAR 1	YEAR 2
1. Steering Committee Meetings	4-5 Meetings	4-6 Meetings
2. Community Outreach	Prep all materials / logistics for print, digital, and in-person platforms	Hold 6 rotating meetings
3. Data Collection and Synthesis	Gather all necessary data for plan, identify data gaps to point out in plan	
4. Regulatory Review	Review inter-agency agreements (MOU's between localities and state agencies, other entities)	Review aspects of local bylaws
5. Write Plan	Understanding of current issues and anticipated climate conditions	Recommendations, action items, benchmarks of success, implementation schedule

Where We've Been in Previous Discussions

6-month DER Grant process (winter/spring 2020) unearthed many past recommendations and current issues

- **Water Supply** – What is the firm yield? How do we plan for drought?
- **Fish Passage** – Exploring various causes making fish passage difficult from ponds into the Nemasket.
- **Flood Control** – Exploring how water moves from APC to Nemasket River (at times dam not actively holding much back or water not moving rapidly through system). Water movement from Long Pond to Assawompset Pond.
- **Recreation** – Difficult to navigate watercraft on Nemasket where recreation would be a plus…but do not want recreation in Assawompset Pond.
- **Water Quality** – Invasive species, sedimentation.
- Unchecked, climate change will exacerbate these.

DER Action Prioritization Outcome and Status

PROJECT	CURRENT ACTIVITY	NEXT STEPS
Sedimentation	Outback Engineering surveying / sediment sampling commenced. Grant received for Nemasket River Public Engagement.	Review possible alternatives for alleviating sedimentation.
H&H Study	Received a grant for an initial study and hydrological model of upper Nemasket surface water flows.	Scenario testing based on H&H model. Next phases (groundwater) and other geographies.
APC-Nemasket Watershed Mgmt Plan	**Received MVP Action Grant to fund preparation of the plan.**	**Write Plan.**
Snake River Culvert Replacement	Research underway – MassDOT ownership. In process of obtaining access permit. Permit pathway complete.	Field evaluation and identify funding source.
Assawompset Dam Repair	Investigated potential funding sources and dam hazard level. Permit pathway complete.	Use results of field work and H&H model to inform feasibility study.
Wetlands Restoration	Examined riverside sites and expanded search within watershed.	Prioritize sites for acquisition / management.

APC-Nemasket in MVP Plans

TOWN	RECOMMENDATION(S)	PRIORITY LEVEL
Freetown	(1) Review existing management plan for Assawompset Pond and conduct a study of flooding impacts on water quality while including engagement with neighboring towns. (2) Consider milfoil management and partner with Lakeville for improved regulation, education, & monitoring. (3) Explore grant and loan funding for septic system maintenance.	High; High; Low
Lakeville	(1) Develop and implement a Nemasket River Restoration Plan to address issues of silting, invasive species, water quality, dams and herring passage. (2) Apply for Priority Project status with the Division of Ecological Restoration to remove / replace dams and culverts along the river. (3) Conduct a feasibility study to assess invasive species removal in the Pond Complex and Nemasket River. (4) Request a boat-washing station for Long Pond from the Department of Conservation and Recreation, to reduce spread of invasives throughout Lakeville's waterways. (5) Daylight Squam Brook, a former emergency outfall of Long Pond that is no longer in use.	High; Medium; High; Medium; Medium
Middleborough	(1) Remove impediments to proper stream channeling and water movement on the Nemasket and in the Assawompset Ponds Complex, including siltation between the Ponds and the Nemasket, siltation from Routes 44 and 495, and invasive vegetation. (2) Develop a comprehensive management plan for the Assawompset Ponds Complex and the Nemasket River. (3) Study the feasibility of designating the Assawompset Ponds as an Area of Critical Environmental Concern (ACEC). (4) Conduct a vulnerability assessment for the possibility of harmful pollutants migrating from contaminated sites (such as the Rockland Industries Hazardous Waste Site) during flood events and clean these areas so that they are no longer potential toxic floodplain areas.	High; Medium; High; High

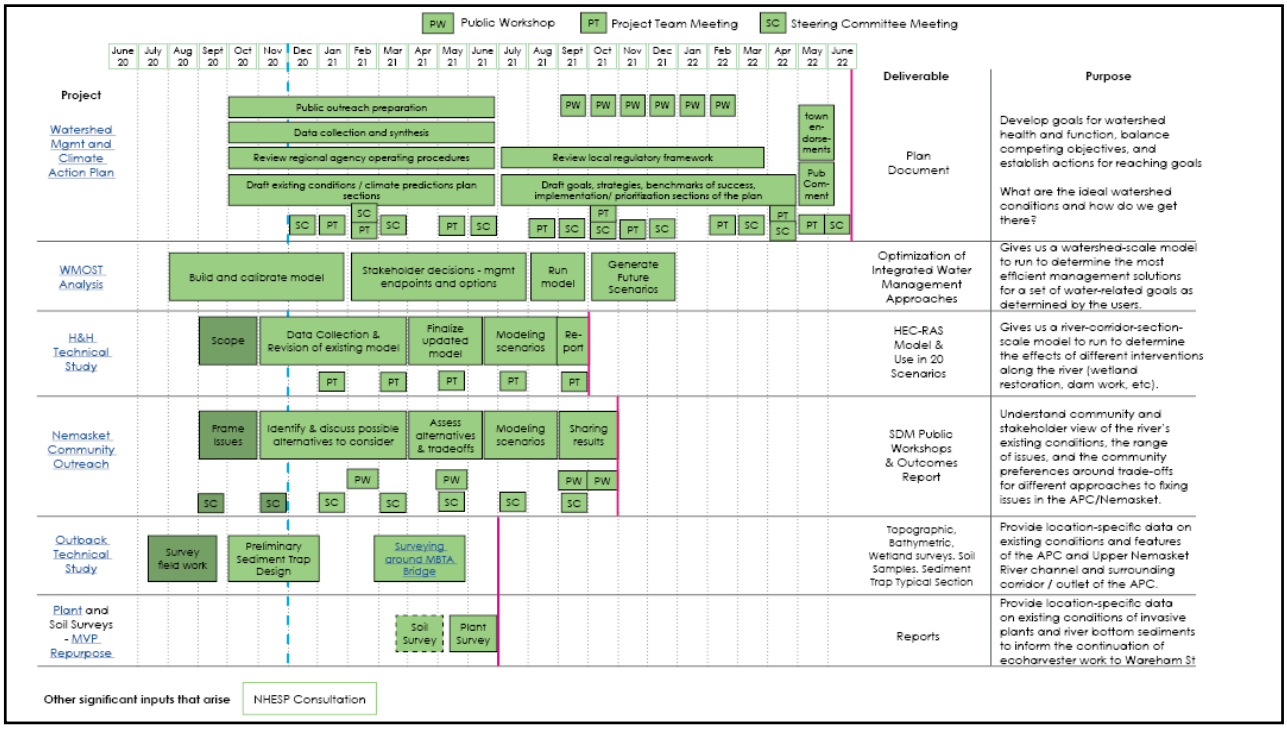
APC-Nemasket in MVP Plans

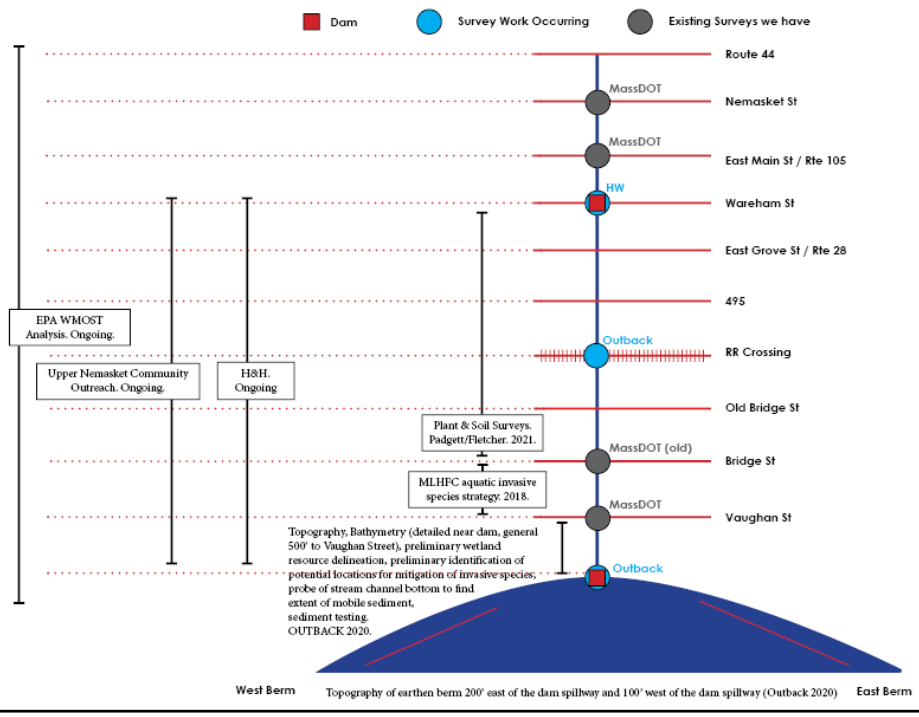
TOWN	RECOMMENDATION(S)	PRIORITY LEVEL
New Bedford	Water supply identified as a strength. Top recommendation = Water conservation programs with maintenance and upgrades around Great Ponds.	High
Rochester	Because the majority of town residents get their water from individual wells, but municipal wells owned by the Town of Marion receive their water from Rochester, and the Assawompset Pond Complex serves the community of New Bedford, Rochester residents face a unique situation wherein local water resources are not primarily locally-controlled. This means that when drought hits, the local water table may be drawn down to supply other communities, leaving Rochester residents without sufficient supply.	High
Taunton	*MVP Plan pending approval*	
Regional MVP	Update the Assawompset Ponds Management Plan with respect to the MVP process and data; include pond levels, infrastructure, herring run, Long Pond issues, other chronic problems/issues.	Top Environmental Issue

Role of the Management Plan

Management Plan is the "Big Tent"

- The Plan will develop comprehensive goals for the entire watershed system.
- Actions prioritized in previous efforts will fit into this comprehensive plan and the goals identified.
- Other recommended actions will also arise.
- A significant contribution of the plan is to see where we can balance potential competing interests and identify where there may be surprising co-benefits.





Information from all these studies will inform and become part of the watershed-scale management plan

Planning for Dynamic Changes

Climate Change – 2050 / High Scenario / Taunton Basin

15.2-33.5 additional days over 90 Degrees F

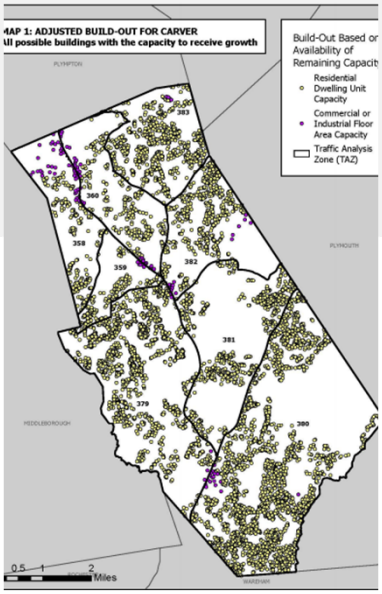
2.56" additional annual precipitation (spring and winter)

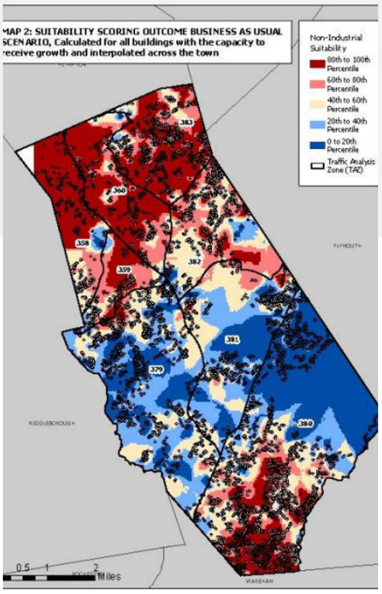
2 additional days of extreme weather per year

1.25 additional consecutive dry days (summer/fall)

Planning for Dynamic Changes

Future Possible Development Build Out Scenarios





What we haven't yet focused on:

VISION FOR A THRIVING APC & NEMASKET WATERSHED

- Want to be explicit about this up front in the planning process
- It will give us a benchmark to validate potential recommendations as they are developed
- It can give us some insight into how we balance potential conflicts between different functions and priorities in the APC and Nemasket

Example Vision Statement

The Harlem River watershed is a critical ecological and social resource where clean water, healthy habitats, and public access to these resources are valued and protected. It is a place where environmentally sound practices, policies, education and stewardship help maintain diverse native habitats, improve water quality, and support public health, recreation, and a high quality of life for local and adjacent communities.

Vision Statement Development

What are your Ideal Watershed Conditions?

- No wrong statements at this point!
- Be as narrow or as expansive as you want to be. (issue focused versus entire watershed scale.)
- We will be combining these into a vision statement to review at the next meeting.

5-minute individual reflections on aspects of

- What should the APC and Nemasket look like in the year 2050?
- What natural functions remain intact or are enhanced?
- How will the surrounding communities interact with and enjoy them?

10-minute group Jamboard exercise:

https://jamboard.google.com/d/120495gK1bMPJ9RszWBUSaAJeorRenAuMGSZd5kpvqaU/viewer?f=0

Public Participation

We're committed to elevating this during the planning process

As one method for doing so, we committed in the grant application to discuss public participation at every SC meeting.

For Today: Project Webpage

Next Meeting (Feb 2021)

Existing Conditions Deep Dive

- We are preparing white papers on existing conditions across different dimensions of interest (water supply, water quality, recreation, fish passage, ect) will circulate these for review and will discuss at the next meeting.
- White papers are also meant to highlight certain conflicting goals for discussion, since one function of the management plan is to delve into these to pursue compromise or surprising win-wins to overcome conflicts
- Final draft vision statement.
- Public Participation: Watershed Management Tour

Meeting After Next (March 2021)

Future Conditions Deep Dive

- Climate Change
- Build Out Predictions

- Public Participation: Tentative Public Meeting Schedule

In 2050 The APC and Nemasket River...

ARE:

- Healthy!
- Sustainable
- free of invasive plant species
- The AP watershed is a cohesive ecosystem providing aquatic, aviary, and terrestrial habitat as well as reliable and consistently clean water supply.

HAVE:

- control of invasives
- Flood Control
- better by laws/rules on development around the water
- volunteers willing to be active in management
- communities that understand the system's value and the impacts that their actions have.
- A team of people protecting it
- a maintenance plan that will be strictly adhered to
- clearly defined work areas and responsibilities
- enough clean drinking water for all
- sediment and invasives removed, and a sand trap installed to capture and additional sedimentation
- No contamination
- improved water and life quality of natural environment
- abundant wildlife
- functioning wetlands
- good water flow
- Active Forest Management
- community attitude of value and need to preserve

PROVIDE:

- passive recreational opportunities
- clean drinking water
- active recreation (canoeing & kayaking)
- Hunting, fishing and trapping opportunities
- Good fish passage
- broad viewsheds
- Educational Opportunities for all age groups

PRESERVE:

- wetlands
- Preserve host towns' property rights and ability to generate tax revenues.
- habitat
- natural environment (water and wildlife)
- unique wilife habitat
- water quality and quality through wise bylaws that guide development throughout whole watershed
- water quality

In 2050, APC and Nemasket River stakeholder communities…

GET _____ FROM THE WATERSHED:

- clean drinking water
- clean drinking water
- Recreation
- passive recreation
- carbon sequestration (conservation lands)
- sustainable life and natural resources
- mental health
- Healthy diverse forest

GIVE _____ TO THE WATERSHED:

- Laws to control overuse
- Management Plan that continues to be a living document and communities that still work together
- respect for natural systems
- protection and preservation of water quality and natural environment
- Educating the public about the importance of the watershed
- cleanup of any releases of hazardous materials
- Support and buy-in
- fixing culverts for better flow and animal passage
- appropriate sited development

In 2050, local residents work to protect ___ in the watershed.

- water quality
- water and natural environment
- by leading walks, picking up trash, and advocating for funding and appropriate regulations
- wildlife/habitats
- stormwater runoff quality
- Wetlands and flood plains
- water supply/flow
- Water Quality and Flood Protection
- Priority Land that surrounds the watershed
- fish passage
- forests
- native species

In 2050, local residents enjoy ___ in the watershed.

- Fishing and boating on Long Pond.
- Kayaking & Canoeing
- passive recreation
- cleaning and protecting
- Passive recreation, Photography & Nature Study
- participating in implementing the management plan
- hiking along the river
- picking up after their pets

Assawompsett Ponds Complex Management Team Quarterly Meeting
Nemasket River Watershed Management & Climate Action Plan, Steering Committee Mtg #1
December 9, 2020

Nancy Yeats opened meeting – Ymane will serve as chairman
APC Management Team – APC is slow now, water coming up, so today's meeting is dedicated to the grant (member Pat Freitas is unable to make it today).

Helen Zincavage (SRPEDD):
Sharing PowerPoint presentation 'APC – Nemasket River Watershed Management & Climate Action Plan' (WMCAP) - today we'll do introductions and share a broad project overview.
Steering Committee for this grant are APC Management Team members with addition of various Town/City representatives; the grant Project Team comprised of staff from SRPEDD, Mass Audubon, Horsley Witten Group, Manomet, The Nature Conservancy, and the MVP Program.

Ellie Baker (Horsley Witten):
The APC-Nemasket River WMCAP looks at ecosystem services, habitat for critters, other issues including drought; it is forward thinking incorporating climate change impacts and development.
Considers the APC/Nemasket as one system with many inter-related issues, pinch points, water movement, dams, recreational opportunities, etc.

We'll establish/describe existing conditions in watershed and build out to 2050 using climate change high emissions scenario and development/growth, and how these will impact the watershed (2050 is standard timeframe used when considering climate change, precipitation, storm events); looking at predicted increases in droughts, length of droughts or dry conditions, and what these mean to the watershed and how we mitigate those; e.g., what do more intense rainfall patterns mean for development and communities using watershed, what are implications of these for water supply, fish passage, water quality, recreation opportunities – what steps can we take now to mitigate for those; we expect climate change and development to continue so how manage this?

Want to stress **this is a living document** – we heard loud and clear in last project from all of you there's a need for a plan that provides an umbrella to house all of this, so this living doc will include actions taken now and preparing for future actions. It will have a focus on managing competing ecosystem services that benefit different interests – how to look at these services, how it provides for all to live in the watershed, and how to balance these to get to a win/win situation.

Overview of Project Tasks:
Work will span over 2 fiscal years with completion end of June 2022:
- Yr 1 – 4-5 SC meetings between now and June, then same the following year;
- Most outreach done in year 2 with hopes can do some in person;
- In year 1 – lot of data collection/synthesis, existing condition statements, and identifying data gaps - will be coming to lot of you on these, need to fill gaps into plan/next steps;
- Regulatory Review – interagency agreements in year 1; year 2 local bylaws and how they work to protect watershed and waterbodies;
- Write plan – some time in year 1 write pieces of plan, year 2 with all of you and community outreach to identify recommended actions/benchmarks for success that will be bulk of plan and action items moving forward.

Bill Napolitano (SRPEDD) – how we've got to where we are:
Done some deep dives into data, DER grant study went back 40 years; if you are new to APC and this process, **visit DER project page on SRPEDD website, very comprehensive summary of all projects. APC-Nemasket Watershed Projects Hub webpage**

- Water supply – what is the firm yield? Drought becoming more frequent, need to plan for future
- Fish Passage – always an issue, how can we facilitate
- Flood Control – how water moves from APC to Nemasket, some people think dam is flood control structure, but it's not, it could be considered a water control structure for supply
- Recreation – always big issue, great opportunities, herring fishery – people come to see; but don't want people to come into the ponds, portage is an issue
- Water quality – invasives, sedimentation
- Unchecked climate change will exacerbate all these

All above issues factored in as we move forward
DER Study –

- Sedimentation – Herring Commission working with Outback Engineering, 1st phase work completed, review possible alternatives for alleviating sedimentation
- H&H – SRPDD worked with SNEP, Horsley Witten looking at flow and test various scenario, we need groundwater data
- Big Plan – all of these are part of this plan
- Snake R Culvert – Bill N wkg with MassDOT, in process of obtaining access permit.
- AP Dam Repair – lkg at pot'l funding sources
- Wetland restoration – one north of dam on eastern side (?), also priority sites for acquisition and management, did great exercise to identify good candidates for acq and restoration (with Sara Burns and Eric Walberg)

APC/Nemasket MVP (with Courtney Rocha)
Put together a regional addendum to individual MVP plans (one of few areas in the state with this), great way to organize these types of projects; we were also consultant for many of these towns;
One of big item that came up pretty consistently across municipalities - was to revise existing management plan for AP and flooding.

Nancy Y. – should Priority Level for Middleborough be High? Helen - this is how it was ranked from the MVP process, it's Medium.

Role of APC-Nemasket River WMCAP – it's the 'big tent' – all of this will fit under this plan, many projects underway right now, all projects flow into this plan, comprehensive goals of entire watershed, doing this with you, not at you, which is why you are all here; actions from previous work fit into this and carried out, come up with outcomes/game plan looking forward to 2050, a living doc to hand off to people who follow us in this process, not an end all/be all, where can balance competing interests and identify surprising co-benefits.

Eric Walberg (Manomet) – planning for dynamic changes:
Change comes in many different ways, but plan will focus on climate and future development and how these factors interact with each other; looking out to 2050 under high emissions scenario, since we don't know exactly what emissions will be, considering possible scenario with business as usual/high end emissions (although hope is there will be some drawdowns in emissions in future).

Lot of surprises with climate change as impacts have come faster/harder than many scientists predicted; 2050 projections provide great bracketing of where we expect to be/trends, but can't get fixated on end points and realize can be surprises along the way. Exacerbation of times with too much and too little water, factors driving potential increase in association with increasing total rainfall over time (a clear trend in NE) and also increase in prevalence of very heavy precipitation events, not just more total rainfall but biasing away from mild/mod precipitation to more extreme events, so could lead to increased flooding issues.

In contrast, increasing impactful drought - modeling in these changes is tough, not a lot of agreement on trend in this part of the world, but rising temps are increasing impact of drought 'hot drought' - will get longer growing season, higher evaporation rates and make today's mild/mod drought more impactful (rising temps really play role here).

Development – changing patterns, anticipation there will be continued development in watershed, no way around that, but importance should be on placement of development, think about impervious surface, as get more paved areas, decrease infiltration of precipitation into groundwater and also increased runoff rates, so we really need to be cognizant of how future development will exacerbate having too much/too little water in a given year, e.g. impervious surface get flashier floods; also with increased development, increase demand for water supply from pond and groundwater withdrawals, need to think about interconnection of these issues – think about what trends are and what alternatives are, particularly in placement of development and interactions.

<u>Danica Warns (Mass Audubon): visioning exercise:</u>
What we want watershed to be, look like in the future, clear idea for that vision, important to be explicit and all in agreement up front, gives us something to work towards; make sure working with this vision in mind and check in throughout the process to make sure working towards vision; it's also a benchmark, something to work towards and help us understand how balance various interests/conflicts (shared Harlem River Watershed example)

Jam Board exercise - What you want watershed to look like, ideal conditions, timeframe 2050 – think about 2050 what is your ideal APC/Nemasket system, 5 minutes on own, indv reflection – 3 Qs in middle of screen.

Tom – add by 2050 invasives, sedimentation removed and have sand trap installed to prevent further sedimentation blocking the river;
Nancy – a maintenance plan strictly adhered to, also all work that has to be done for a functioning system; work areas clearly identified so we know who is to do what, so management plan continues to go smoothly, areas of work clearly need to be clearly defined.

<u>Helen Zincavage (SRPEDD) – Public Participation</u>:
5-10 minutes each Steering Committee mtg to discuss public comments/efforts going forward; as Ellie mentioned, the tasks breakdown yr 1
Visit SRPEDD website – lists all efforts with dedicated project pages.

<u>Sara Burns (The Nature Conservancy) – Existing Conditions</u>:
This is the kick of for the MVP grant/WMCAP, but many of us working in format together in DER grant already; as think about moving forward, content for next mtgs:

- Feb Mtg – deep dive on existing conditions in watershed, different dimension of interest in previous efforts and that came up today during visioning session – put all in one place so can read/review, talk about in Feb
- Managing for increasing floods/droughts – some of solutions might seem to be in conflict but hoping can look into win/win solutions
- Will share draft vision statement at next mtg from input from Jam board
- Planning a watershed management tour for public participation – good example, a narrative way to share values, needs, etc., will be a video tour
- March meeting – planning to dig into changing future conditions touched on today, more in depth on climate change projections and what might mean for watershed/resources, and also build out predictions, and think about public mtg schedule

<u>Presentation complete, next steps</u>:

- Take jam board items, put into draft vision statement that we can discuss further, but any last comments to guide us based on what you saw today or things that came to mind? Any particular way we should approach things?
    - Nancy – we really need Taunton Water Division to be involved in some of this; Bill N. – he was in touch with Cathal, who said he'd make sure Taunton Representative would attend (Kate Sousa and Philip Duarte attended today).
    - Also – Freetown staff person role still needed; Lia Fabian (Lakeville) will try to call contacts.

- Steering Committee meetings will be aligned with quarterly APC Management Team meetings, with some additional meetings in between b/c there is a lot to cover, so other than that will run with regular meetings.

- Tom – can we get 'regional' added to title APC/Nemasket 'regional', b/c so many towns included so make it clear it's an extensive town scope, will get people from other Town's interested that aren't directly on watershed.

APC Steering Committee Meeting #2: Vision statement and white paper topics/outlines
2/10/2021, 9am

Participants: Helen Zincavage, Danica Warns, Bill Napolitano, Ellie Baker, Marea Gabriel, Eric Walberg, Sara Burns, Caitlin Rowley (Sen Rodrigues), Kate Bentsen (DER), Lia Fabian (Lakeville Selectman), Nancy Yeatts, Patti Kellogg, P Gargiulo, Phillip Duarte, Tom Baron, Ymane Galotti, Tricia Cassady, Michele Paul, Courtney Rocha

NOTES

- Draft Vision statement presentation
    - Nancy: LID, consistent zoning/regulations to address runoff/WQ issues
    - Ymane: good statement, captures most, could add consistent boating rules/regs
- White papers overview
    - No comments/questions on topics
    - Nancy (chat): APC map from original management plan & rules handout missing from recreation paper (map available from Lakeville Town Clerk for $2)
    - (Ecology white paper) Nancy:
        - 2 largest water bodies: Assawompsett 2400ac & Long 1700ac
        - Small mouth bass, large freshwater mussel pop
        - Asian clams in Assawompsett
    - Trish: Middleborough cold water fisheries - Puddingshear Brook (near Rt 44) & Stony Brook (near Pratt Farm)
        - Protected shellfish in Tispaquin Pond, Middleborough (Fall Brook flows from Tispaquin → Nemasket)
        - Cyanobacteria in Woods Pond a couple summers ago in Middleborough
        - CRs in Middleborough for new developments to protect Box turtles
        - Atlantic white cedar swamp near/around Tispaquin Pond
    - Sign up sheet for SC to review white papers
    - Courtney Rocha: end result should be focused on impacts of climate change and what towns can do to address
        - Focus in final plan on who will be using the plan, how, what tools have to use moving forward
- Next meeting: second meeting in march
    - Deep dive into climate impacts on watershed
- Project team debrief
    - As a group, can we block out some time to discuss white paper structures, approaches
    - Continue working on our assigned white papers - consulting smaller SC groups that signed up for each as needed
    - Collecting all data vs prioritizing which data to gather for white papers - individual styles
        - Would be good to get everything we can down on paper and let reviewers help narrow down what important for report
    - Prioritization - where can we affect change in the report?
    - Project team meetings:
        - 2/18 after 2:30: prep for march SC meeting (climate impacts, what do we want to get out of SC/SC to get out of meeting? - what changes are they seeing in watershed?)
        - 2/25 12-2: white paper structure discussion

Working Draft Vision Statement
for Review at 2/10/2021 SC
Meeting

A Guiding Vision for the APC and Nemasket Watershed Management Plan

The recommendations contained in this plan are steps toward the following vision for what ideal watershed conditions would look and feel like in 2050, even as climate change progresses. The proposals and actions contained herein have been vetted against this vision of an ideal watershed future.

1. In 2050, the APC and Nemasket River watersheds are recognized as interdependent ecosystems with forest, upland, wetland, and aquatic areas that are intact, protected, continually monitored, managed cooperatively and holistically, and are generally thriving.

Healthy and diverse forest lands, enhanced through active forest management, are protected in priority areas throughout the watershed as vital to the success of water capture and infiltration, as well as carbon capture and storage, providing climate resilience. Wetlands and floodplain areas are preserved and have the hydrological connections and conditions necessary to support the flourishing of abundant wildlife that rely on these habitats, as well as their vital water absorption and filtration functions. Native species predominate, with invasive plant species controlled to the point of equilibrium with native species in ecosystem composition. Any human-induced ecosystem degradation has been eliminated or significantly mitigated. Water quality is improved. Point source contaminants and hazardous materials have been removed or addressed, and strategies for reducing non-point source contaminants like under-ground septic flows and above-ground stormwater run-off have been implemented. Infrastructure installed into the landscape causes minimal impediment to water flows or animal passage.

2. In 2050, the APC and Nemasket River watersheds cohesive ecosystem provides aquatic, aviary, and terrestrial habitat as well as reliable and consistently clean water supply.

The watershed has abundant wildlife and unique wildlife habitats are prioritized for protection. The APC and Nemasket River provide clear fish passage for the river herring population. Local traditions tied to the herring, fish that represent a connective through-line with special significance to Native American, colonial, early industrial, and present-day communities, are able to continue, because the population of herring is supported by the continued availability of essential spawning grounds in the APC and clear passage routes in the Nemasket. Herring numbers have increased. Water quality protections and greater water infiltration promote clean and ample drinking water supplies so that there is enough clean drinking water for all, even during periodic drought conditions. Individuals supplied by the APC are aware of where their drinking water comes from and the resources essential to protecting that supply. Nature-based and man-made systems work together to maintain consistent and safe water flow levels to ensure flows for riverine species and protect property from flood damage.

3. In 2050, people enjoy recreating in the APC and Nemasket River watershed's landscape.

Passive recreation opportunities are plentiful. There are paths for walking and hiking along the river and ponds. Maintained points with broad viewsheds of the water are preserved for enjoyment in photography and nature study, as a backdrop to a picnic, or for pure wonderment. The watershed's public lands and waters also welcome those seeking challenges in a canoe, kayak or boat trip, or in pursuit of hunting, fishing and trapping opportunities. Through these recreational activities, the watershed invigorates mind, body, and spirit, and supports both mental and physical health. Clearly

posted demarcations and prominent online and print materials inform the public about where each recreational activity is permitted, especially highlighting the differences between activities permitted in Long Pond versus the rest of the APC Complex. This information frees visitors to recreate with the peace of mind and clarity that their actions have no outsized negative impacts on the watershed. Coordinated recreational programing from stakeholder municipalities and local interest groups encourages additional people to interact with the land and creates educational opportunities for all age groups.

4. In 2050, a cooperative approach to managing the APC and Nemasket watersheds has led to their constituent communities regularly acknowledging and promoting all of the inherent value that they provide, fostering a local groundswell of stewardship and guiding the decision-making and behavior of residents toward actions that protect these lands and waters.

The Watershed Management Plan's maintenance objectives are adhered to through clearly defined work areas and responsibilities for the teams of people protecting the watershed. To optimize stewardship over time, the Management Plan is a living document that is updated by its constituent communities, which continue to work together through the APC Management Team. Municipalities and interest groups lay the groundwork for community stewardship by consistently identifying platforms for public education on the importance of the watershed system and how local, individual actions impact the larger system. Educational outreach efforts focus on conveying the actions that each individual can take on their own property and as part of their own daily routine to have a positive impact and contribute to the implementation of the watershed management plan. Watershed integrity is further supported by organized local volunteers, who enthusiastically plan and lead management activities like educational walks, trash pick-ups, and drives advocating for funding and appropriate regulations.

5. In 2050, a regulatory framework is in place that better safeguards the unique natural resources of the APC and Nemasket from the impacts of additional development.

This regulatory framework does not erode individual property rights, nor does it threaten town tax revenue generation. Instead, this regulatory framework expands the development possibilities available to property owners by allowing for and incentivizing Low Impact Development practices – modes of development that retain and support natural functions better than conventional development strategies. These regulations preserve property rights while also adding options that preserve water quantity and quality throughout the watershed. Some of these regulations might impose greater short-term costs, but have long-term value in their ability to mitigate issues such as floodwater damage. In areas where future development is simply too great a risk to community assets and safety given flood potential or disruption to prime habitat, open space preservation is pursued through targeted land acquisition, not through over regulation.

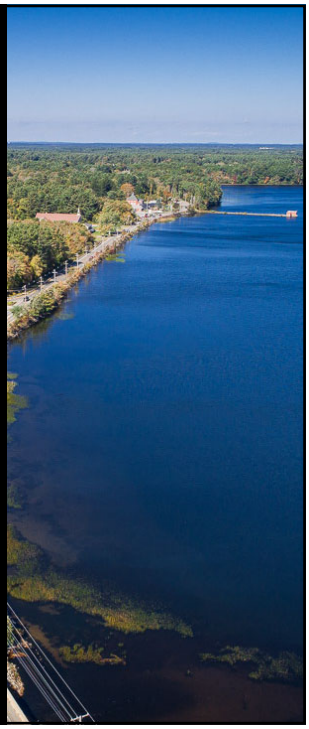
6. Overall, in 2050, the APC and Nemasket River are healthy, sustaining life and natural communities, including our own through clean, safe, and reliable water supply. The inhabitants of the watersheds have developed an environmental ethic based upon choice, not chance, that drives sound local and regional decision-making.

The APC and Nemasket River stakeholder communities show respect for natural systems and their critical ecosystem functions through protection of the water resources and natural environment in the watershed. **Beyond meeting the needs of our current moment, by 2050, our communities have**

recognized the critically beneficial role that the watershed's landscape plays in mitigating climate change impacts through functions such as carbon sequestration and water storage. Preservation efforts enhance the ability of the watershed's landscape to perform these essential services that uphold community resilience in the face of climate change.

Climate Change and Resilience in the APC

Steering Committee Meeting #3 | March 10, 2021



Agenda

- Presentation
  - Climate Change Trends
  - Climate Change Implications
  - Climate and Resilience Planning
- Discussion (using Jamboard online)
- White Paper Update
- Public Participation Opportunities

Meeting Goals

- Improved shared understanding of recent and projected climate change impacts in the APC watershed
- Linkage of climate trends to priority management issues in the watershed
- Initial discussion of incorporation of climate concerns in the watershed management plan

Main Messages

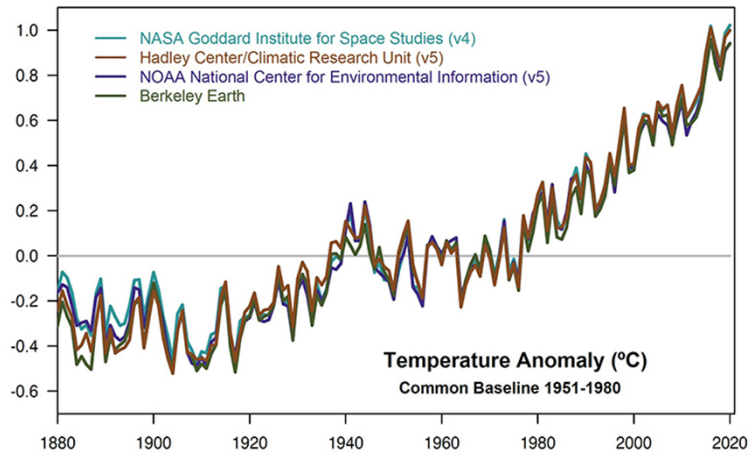
- Climate change is ongoing.
  - We study change (and rates of change) to understand where we are at in the present moment relative to the recent past and previous time periods.
- Climate change is uncertain.
  - Outcomes depend on actions we take now to curtail greenhouse gas emissions.
- Climate change is uneven.
  - Different outcomes will be felt across the globe and across Massachusetts.
- The APC region has a good track record of resilience planning to draw from.
  - MVP Plans
  - Hazard Mitigation Plans

defining terms

Climate Change

Temperature
Precipitation
Sea Level
Extreme Events

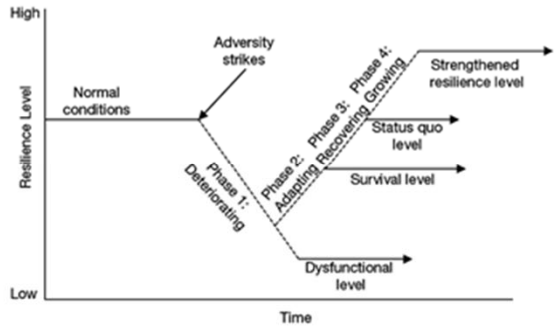
Long-term climate trends tracked in 20-30 year "climatological intervals"



Resilience

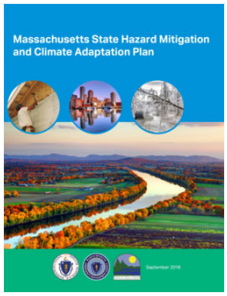
The ability of social, environmental, and economic systems to return to their original form and integrity after enduring stress or disruption

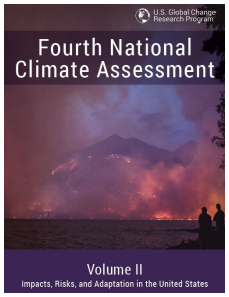
(Image: Patterson & Kelleher, Resilient School Leaders, 2005, Figure 1.2, The Resilience Cycle)



changes that have already occurred

Data Sources





resilient MA
Climate Change Clearinghouse for the Commonwealth

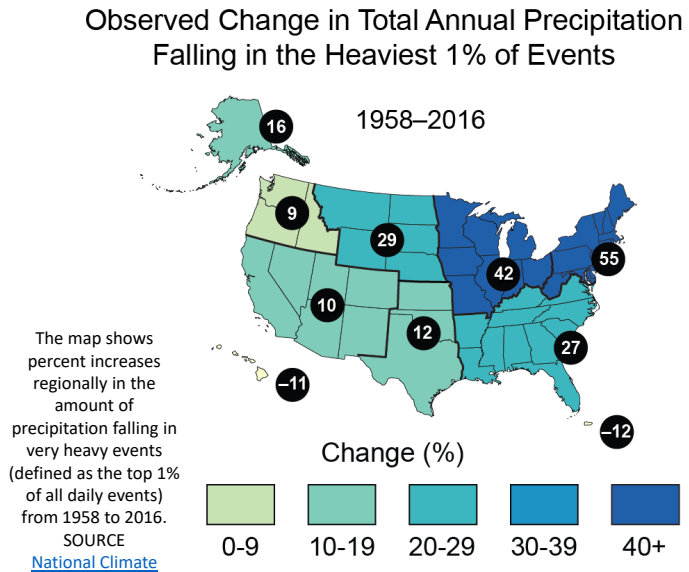
Annaul Average Temperatures have increased +2.9°F in Massachusetts since 1895

Massachusetts
+2.9°F
since 1895

Globe
+1.8°F
Since 1901

Northeast
+3°F
Since 1901

The Northeast has seen a 55% increase in the portion of annual precipitation that falls in the heaviest category of weather events

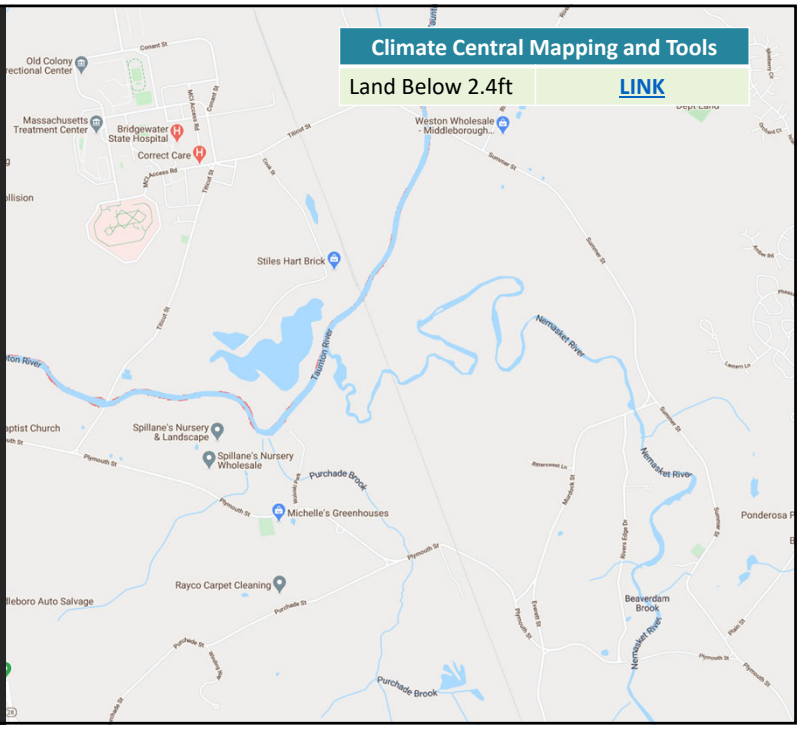


The map shows percent increases regionally in the amount of precipitation falling in very heavy events (defined as the top 1% of all daily events) from 1958 to 2016. SOURCE [National Climate Assessment]

Sea levels on the coast of Massachusetts have risen 10" since 1922

A note on SLR*

Tidal rivers will be affected by SLR. The Taunton is tidal, but predictions do not yet show a clear impact on the Nemasket.

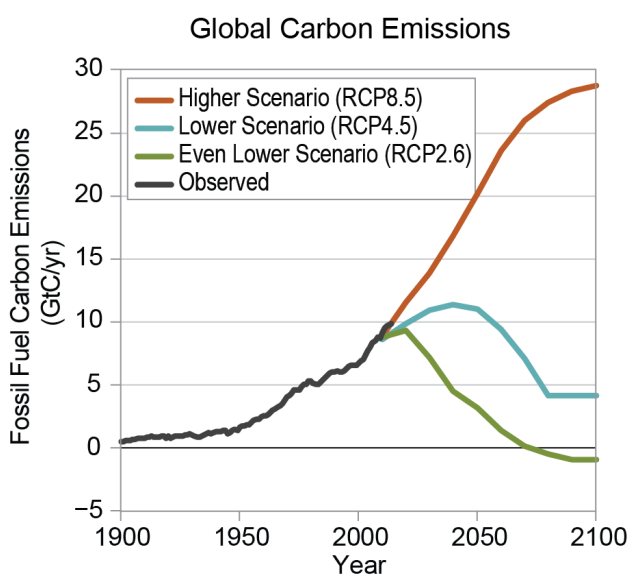


how do we talk about the future...?

...by thinking in ranges.

Future Outcomes depend on Emissions Levels

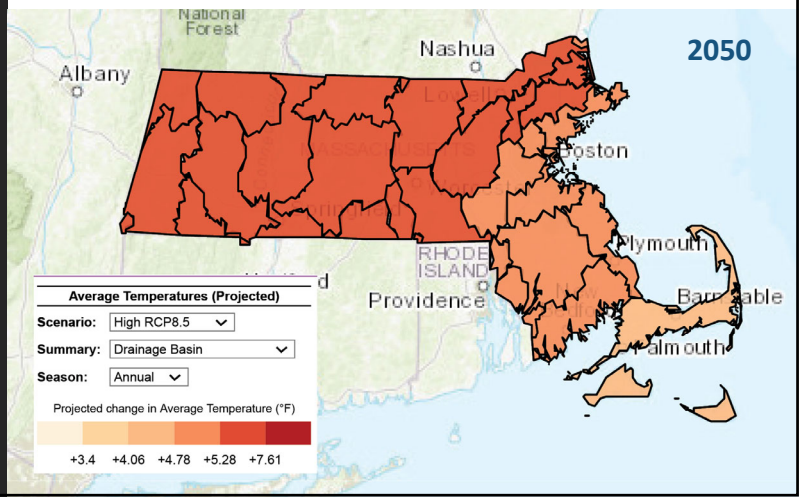
- National Climate Assessment (NCA4) examines three scenarios (Representative Concentration Pathway) of potential emissions futures
- Predicted temp changes **for** 2080-2099 period relative to 1986-2015 period:
- RCP8.5: 2.4°F to 8.5°F
- RCP4.5: 1.7°F to 4.4°F
- RCP2.6: 0.4°F to 2.7°F



Strong likelihood that annual temperatures will increase by 5.2°F **by 2050.**

Baseline: 49.9 °F

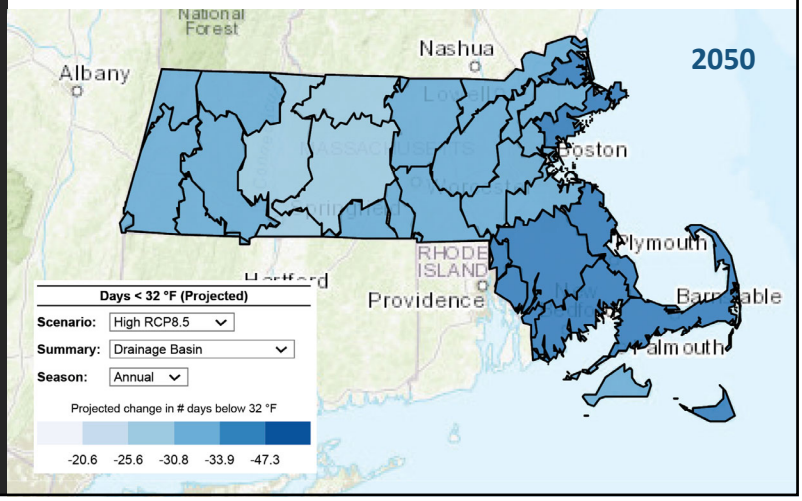
Taunton River Watershed		
	2050	2090
RCP8.5	+5.2°F	+9.0°F



Strong likelihood that annual number of days below freezing will decrease by 36.3 days **by 2050.**

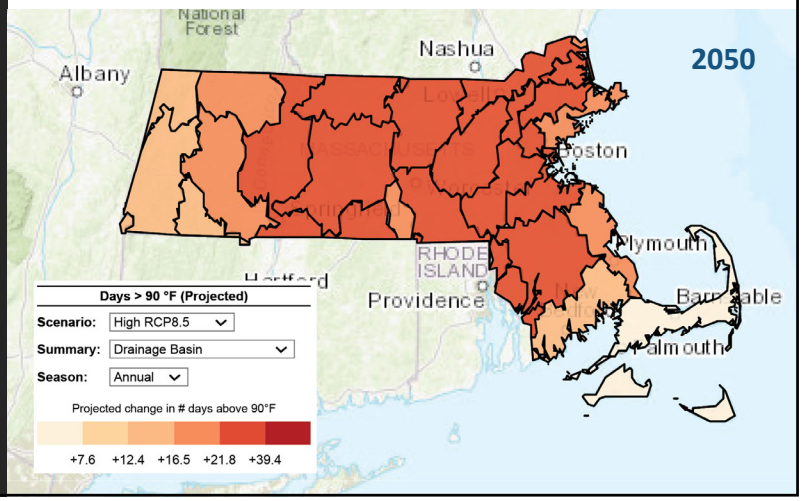
Baseline: 129.8 Days

Taunton River Watershed		
	2050	2090
High	-36.3 Days	-63.5 Days



Strong likelihood that the number of summer days above 90°F will increase by 23.1 days by 2050.

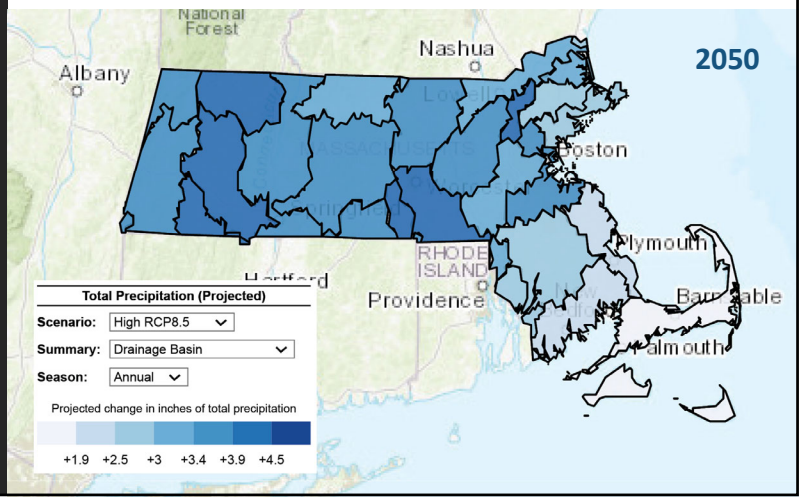
Taunton River Watershed		
	2050	2090
High	+23.1 Days	+53.3 Days



Baseline: 7.4 Days

Strong likelihood that the amount of annual precipitation will increase by 2.6" by 2050.

Taunton River Watershed		
	2050	2090
High	+2.6"	+4.2"



Baseline: 47.5"

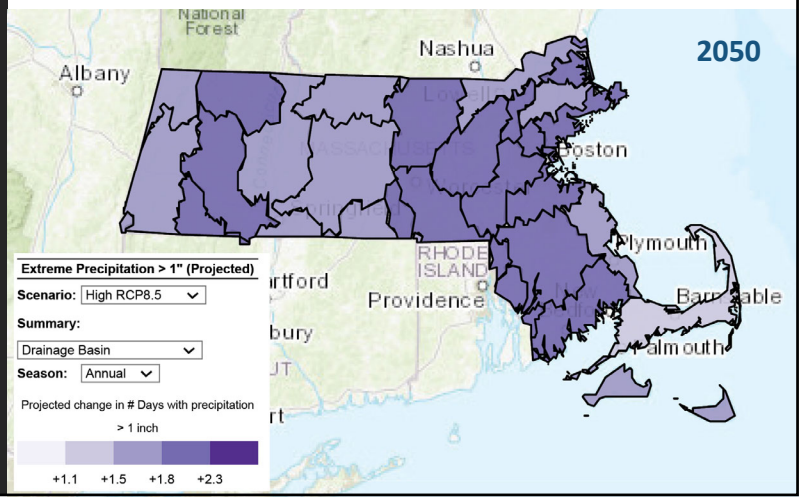
Most of this increase will fall in the spring and winter.

2050 Taunton River Basin	Baseline (inches)	High Scenario (RCP8.5)
Annual	47.5	+2.6
Fall	12.4	+0.6
Spring	11.9	+1.7
Summer	11	0.0
Winter	12.1	+1.1

2090 Taunton River Basin	Baseline (inches)	High Scenario (RCP8.5)
Annual	47.5	+4.2
Fall	12.4	+0.4
Spring	11.9	+1.9
Summer	11	-0.1
Winter	12.1	+2.5

Strong likelihood that the annual number of days with extreme precipitation (>1") will increase by 2 days by 2050.

Taunton River Watershed		
	2050	2090
High	+2.0 Days	+2.8 Days

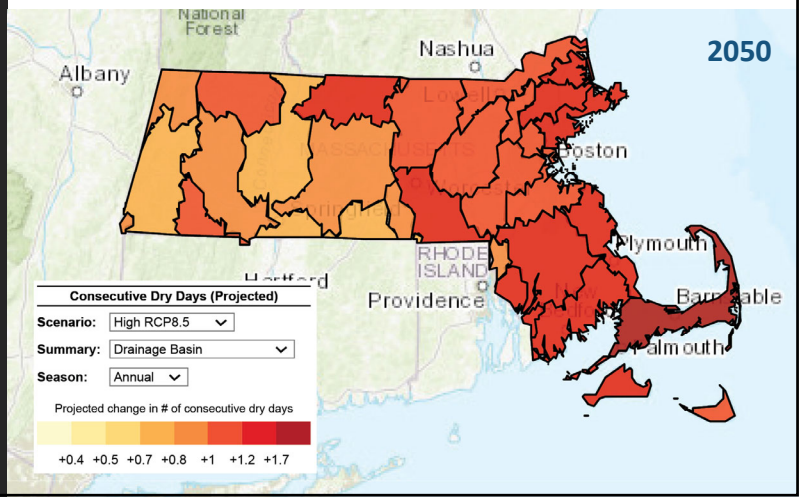


Baseline: 8.2 Days

Strong likelihood that the annual number of consecutive dry days will increase by 1.3 days by 2050.

Baseline: 17.3 Days

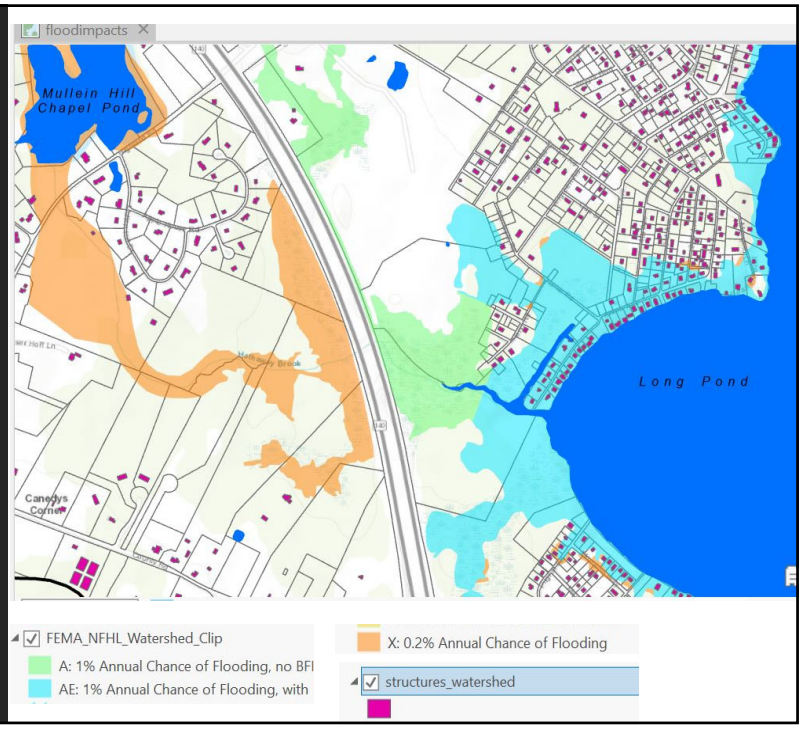
Taunton River Watershed		
	2050	2090
High	+1.3 Days	+1.8 Days



Known Flood Risk Zones

Special Flood Hazard Area	
Parcels	351
Structures > 400 SF	401
Assessed Building Value	$68,978,900

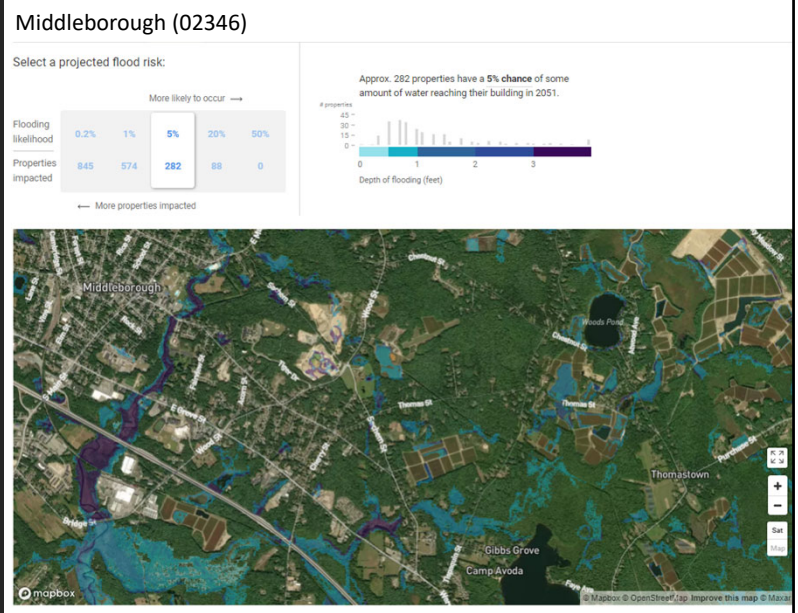
500-Year Hazard Area	
Parcels	50
Structures > 400 SF	51
Assessed Building Value	$11,492,500



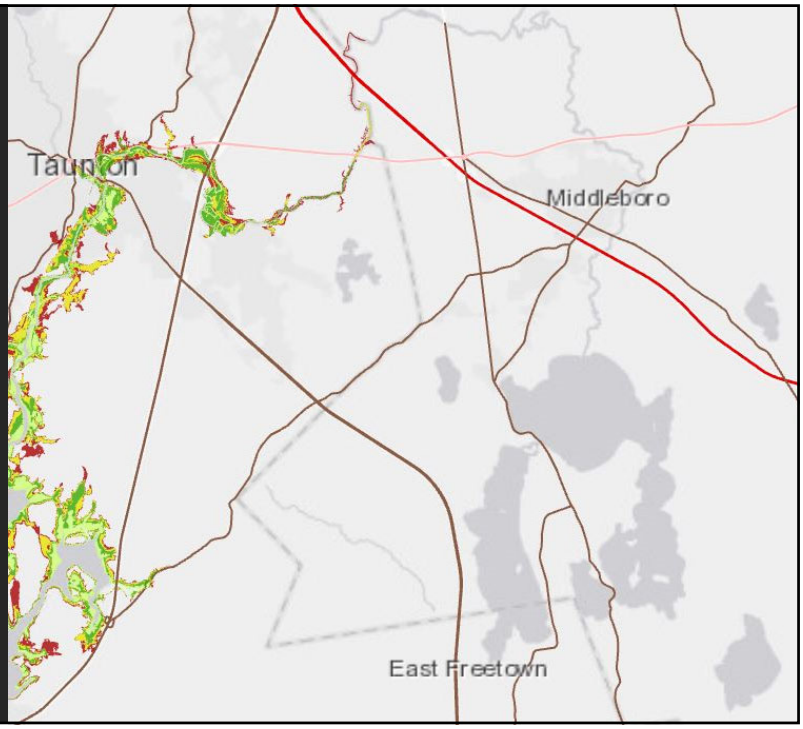
Other tools to predict flooding impacts in 2050

floodfactor.com

Isn't yet great data generally on inland riverine flooding



Currently Predicted Hurricane Inundation Zones



the implications of these changes

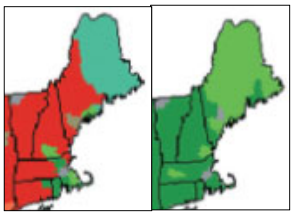
Secondary Impacts: *Land and Atmosphere*

Less Distinct Seasons: **milder, warmer winters,** longer freeze-free period and **earlier spring conditions**

Earlier Snowmelt/Runoff: by 2nd half of century, expected lower spring peak streamflow → **impact aquatic species & reduce water supply**

Longer Growing Season: but **vulnerable to precipitation variability** - intense spring rains w/ increase soil moisture; earlier pest emergence; and summer heat/dry soils → **crop loss**

Transition in Forest Composition: warmer winter & early spring temps → earlier leaf-out/blooming, affect plant productivity, plant-animal interactions, other ecosystem processes



Intensified Riverine Flooding/Erosion: increase risks to people, infrastructure, economies; exacerbate issues of aging and historical infrastructure

Secondary Impacts: *Water*

- **Oceans absorb >¼ of CO2** emitted to atmosphere annually from human activities - **increased sea surface temps** (+1.3°F globally since 1900), **acidification, declining O2**
- **Northeast Continental Shelf** - surface temps **increasing 3x faster than the global avg;** risen 4x faster in last decade than previous 30-yr prd; Gulf of Maine warming faster than 99% of the world's oceans.
- **Acidification in Northeast worse than global avg** - increase atmospheric deposition w/ heavy rainfalls and land/freshwater nutrient inputs in urbanized estuaries
- **Under High Emissions Scenario:**
  - **Sea surface temps +4.9°F** by 2100; **ocean O2 levels -3.5%**; **global avg acidity +100-150%**
- **Warming causing species movement and impacts population productivity:**
  - Species at S extent of range decline as waters warm (shrimp, lobsters, clams, cod)
  - fish & inverts move to cooler waters northward & at greater depths
  - anadromous fish (herring) – rising ocean temps reduce ocean habitat & population distributions, trigger earlier spawning migrations which can be exacerbated by changes in river flow (impact fishway operation)
  - late-summer warming – lead to decreases in min late summer/early fall streamflow by mid-century
  - Sea-level rise – greater extent of inland tidal influence, habitat changes

Secondary Impacts: *Public Health Effects*

By the end of the century, summers in Massachusetts will "feel" more like summers in the South

- **Urban Heat Island Effects** – dense concentrations of pavement, buildings, and other surfaces absorb/retain heat, little natural cover to cool
- **By 2050:** heat-related illness/mortality, +650 deaths per yr in NE
- **By 2100:** LE +960, HE +2,300
- **Air Pollution:** ground-level ozone projected to increase deaths substantially under both LE/HE scenarios
- **By 2065-2080:** elevated risk of Lyme disease transmission in NE will begin 0.9-2.8 weeks earlier
- **Climate-Related Traumas:** cause lasting mental health consequences, such as anxiety, depression, and post-traumatic stress disorder
- **Waterborne & Foodborne Health Risks:** spread of marine toxins/pathogens contaminate seafood, harmful algal blooms toxic people & pets
- **Recreation:** reduced opportunities due to heat, coastal infrastructure flooding,

planning to meet climate change challenges

Municipal Vulnerability Preparedness (MVP) Program and Hazard Mitigation (HMP) Planning

Town	MVP Plan	HMP Status (as of 1/12/21)
Freetown	Y	None
Lakeville	Y	Local Development
Middleboro	Y	Expired 9/30/2020
Rochester	Y	Expired 1/28/2010
New Bedford	Y	Current Plan Expires 9/6/2021 Local Development
Taunton	In Process	Expired 1/28/2010 Local Development
Regional	Y	N

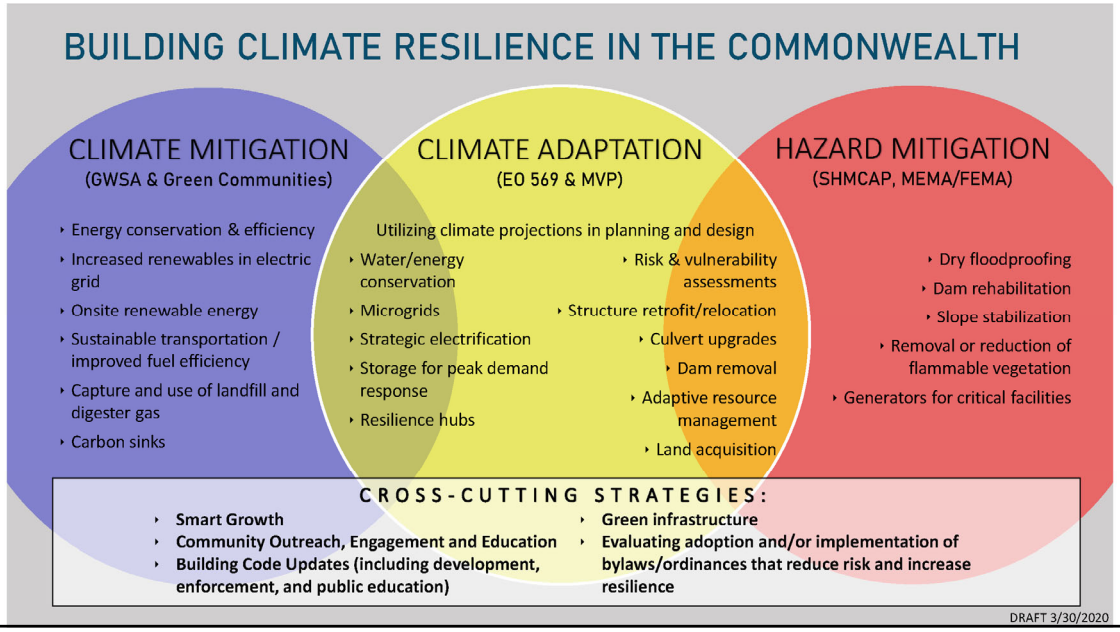
DER Floodwater Management APC Process

- Funding was secured in the FY2020 state budget and managed by the Massachusetts Division of Ecological Restoration (DER).
- Advance the evaluation, planning, and prioritization of tasks related to flooding in the Assawompset Pond Complex (APC).

Top Priorities	Climate Interactions
Remove Sediment Deposition in the first 500 ft of the Nemasket River and install Silt Trap	Increased stream discharge & erosion/sedimentation lead to increased deposition; summer reduced streamflow, increased temps/nutrients, lead to increased dewatering and aqu veg growth.
Develop long-term, scientifically-based hydro model for the APC & Nemasket to support water supply operations, determine firm yield, and support fish passage	precipitation inputs in model need to address hydrological extremes, from low drought condition inputs vs high extreme storms along the system continuum.
Develop a Management Plan for the APC with best practices for handling the dam, sediment, fisheries, Nemasket flow, aquatic invasives management, floodplain, water quality & supply, etc.	Address increased droughts, intense storm events, flow changes and manage competing ecosystem services, recreation & water quality, water supply and flood control/habitat needs.
Replace undersized culverts at the snake River and Route 105	assess increased precipitation & peak runoff volumes; upsize culverts or replace with bridges
Assawompset Dam Replacement	Spillway design to accommodate a higher volume of water during storms; improved operations to address low/high flows;
Wetland restoration at Bridget Street, Wood Street, Wareham Street, Vaughn Street	Enhanced stormwater/flooding mitigation; sediment capture, increased C sequestration

actions to meet climate change challenges

Mitigation vs. Adaptation



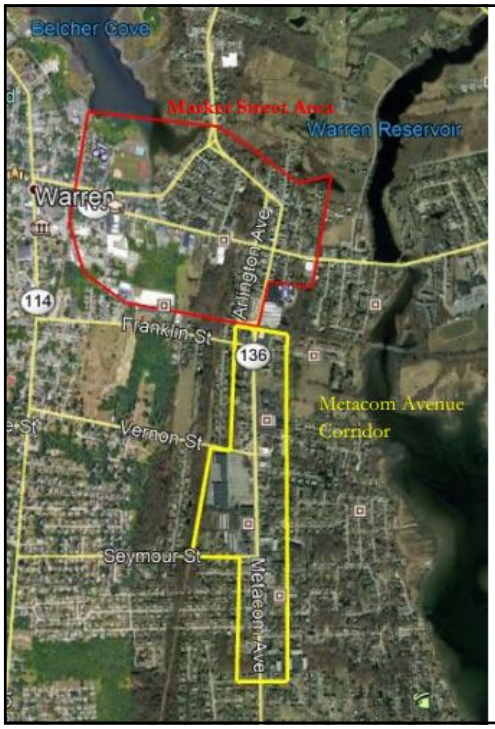
What are Nature Based Solutions (NBS)?

Projects that **restore**, **protect**, and/or **manage** natural systems and/or mimic natural processes to address hazards like flooding, erosion, drought, and heat islands in ways that are **cost-effective**, **low maintenance**, and **multi-beneficial** for public health, safety, and well-being.

From - **Conserving Land -**
to **- Restoration** and **green stormwater management -**
And anything in between!

Nature-based Solutions at Every Scale

1. Conserve the natural green infrastructure already providing free services
2. Integrate LID and green infrastructure design into development
3. Restore local resilience through LID in redevelopment

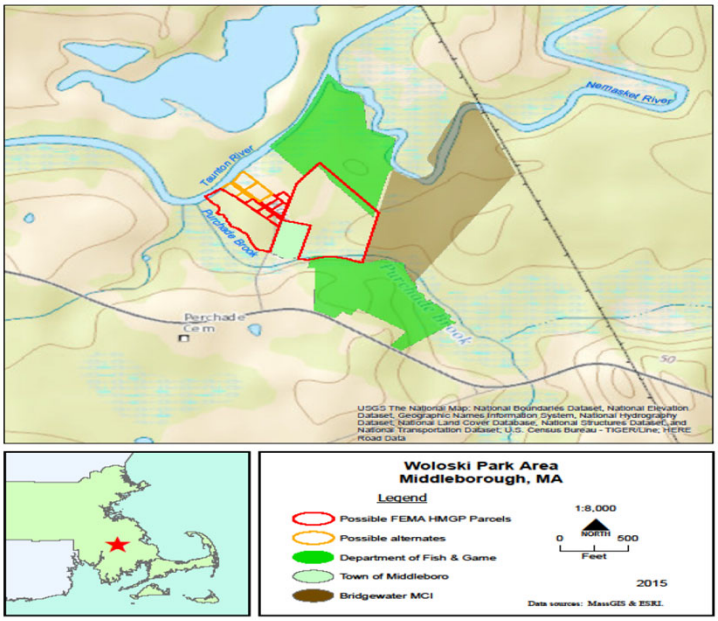


Longer-Term Adaptation Thinking

- Climate Migration
  - Predicted to be more localized than cross-country
  - Where can we look internally and make smart growth decisions that might absorb population in upland areas?
  - Can we preserve wildlife corridors?
- Managed Retreat
  - Studies (example of neighborhood relocation study pictured at left)
  - Buy-out programs, TDR Bylaw
- Population shifts can have significant spill-over impacts
  - Receiving areas have to be able to absorb development
  - Areas losing population may face loss of tax base

Managed Retreat – Local Example

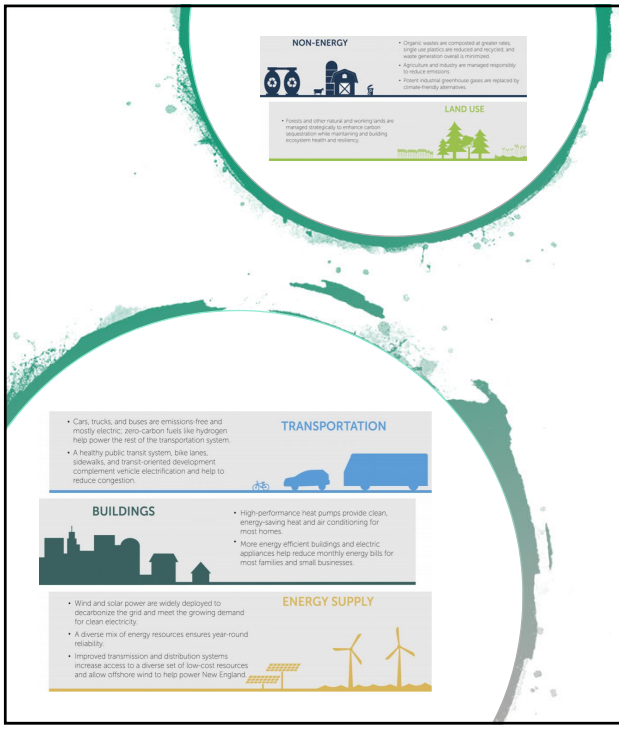
- Low lying Woloski Park neighborhood
- Built 1920s-60s, pre-NFIP
- 2010 FEMA Hazard Mitigation Grant to buy out 10 properties
- Avoided health and safety risks, repetitive flood losses
- Riparian floodplain habitat restoration
- Not all properties bought



Status of State Climate Policy

NEXT GENERATION ROADMAP BILL (LEGISLATION)

- **Net Zero Carbon Emissions by 2050**
- **By 2030 – net emissions 50% of 1990 levels**
- **5-year interim statewide emissions targets**
- **Across 6 sectors:**
  - **transportation**
  - **electric power**
  - **commercial heating/cooling**
  - **residential heating/cooling**
  - **industrial processes**
  - **natural gas distribution**



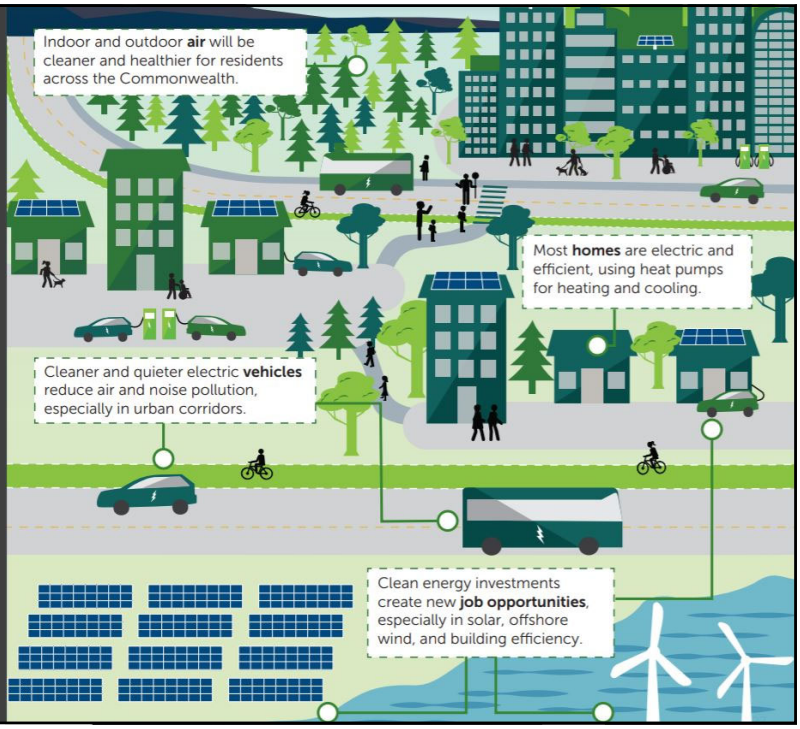
Roadmap Bill Status: Governor has retruned to the legislature with amendments. Legislature will pass with amendments or pass with veto-proof majority.

- Compromise emissions reduction goals for the five-year reduction increments.
- Changing sector-specific emissions reduction targets to recommendations rather than requirements
- Loosening requirements and timelines for net-zero building stretch codes
- Strengthening language around prioritization of Environmental Justice communities
- Dropped opposition to ambitious offshore wind target

Status of State Climate Policy

2050 DECARBONIZATION ROADMAP & DRAFT 2030 CLEAN ENERGY AND CLIMATE PLAN (ADMINISTRATIVE POLICIES)

- **Lay out strategies to get to net-zero by making sweeping changes in the ways that people in Massachusetts heat their homes, get to work and around town, and generate electricity.**



Group Discussion

Any Questions or Initial Thoughts?

Jamboard Q1

What climate change impacts have you noticed in your daily life and/or work?

Jamboard

Jamboard Q2

What responses to climate impacts are already underway in your town(s)?

Jamboard

Jamboard Q3

How do these impacts interact with the management priorities we've already discussed? Including:

- Water Supply
- Ecology
- Floodwater Management
- Interagency Cooperation
- Recreation/Stewardship
- Land Development
- Water Quality

Jamboard

Conclusion

Next Steps

1

Take content received this morning **and put it into a** meeting **summary**

2

Incorporate climate change linkages and impacts into white paper development

A Note on White Papers: Development Schedule

Keep adding ideas into the google drive docs!

Now - April 25: Project Team Completing First Drafts

April 26: First Final Draft sent to Review Teams (you guys per sign-ups)

May 7: Review Team deadline for initial comments

May 15: Second Final Draft sent to Review Teams

June 1: Review Team Deadline for Final Comments

Public Participation

No updates at this time for public workshops specific to Watershed Management Plan

Public workshop specific to the Upper Nemasket study being held on March 30 starting **at 7:00 PM** via **ZOOM**

Thank you everyone!

APC Management Plan Steering Committee Meeting NOTES on 3 – 10 – 21

Water access issues:

- No kayaking allowed on Quittacas Pond due to Eagles nesting
- Recreational Boat permits: only property owners on ponds are grandfathered in

  New condos going up on ponds – in settlement with New Bedford, conditions in deeds for those properties will state no water rights to pond (including swimming, recreation)

- When properties change hands on ponds there is no communication of rules regarding what you can and can't do in ponds (many current owners may not know any better and that is why enforcing rules is a challenge)

New Taunton Water Dept Contact: Mike Arruda

Current and Future Land Development in the APC Watershed

Fourth APC MVP Steering Committee Meeting

May 12, 2021

Meeting Structure and Goals

- Structure
  - Overview of existing land use patterns and zoning
  - Introduction to buildout analysis and CommunityViz
  - Discussion of:
    - Linkage of land use patterns to watershed management issues
    - Future land use priorities and specific elements to be modeled
- Goals
  - Improved shared understanding of current land use and zoning throughout the watershed
  - Identification of future land use concerns and opportunities
  - Initial planning for modeling future land use alternatives

Significance of Today's Topic for the Watershed Management and Climate Action Plan

- Plan time horizon: to 2050
- Additional growth = more people and structures in harm's way of potential climate hazards like increased flooding and drought
- Additional growth = reduction in natural areas and their capacity to perform "ecosystem services" for the watershed
- To some extent, land use is something that municipalities can control and shape through by-laws and policies

Existing Land Use Patterns

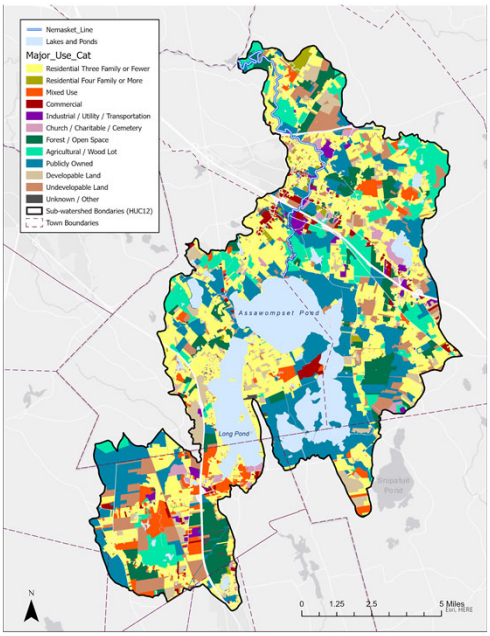
- Synopsis of land use patterns in the watershed
- Overview of zoning by locality

Current Land Use

Dominant Uses:

- Low-Density Residential (pale yellow) - 46%
- Publicly-Owned Land - inclusive of but not limited to Protected Open Space (dark blue) - 18%
- Agricultural/Wood Lot (light green) - 9%
- Forest/Open Space Chapter Land (dark green) - 7%
- Mixed Use (orange) - 7%

Access PDF @ http://bit.ly/APC-LandUSE

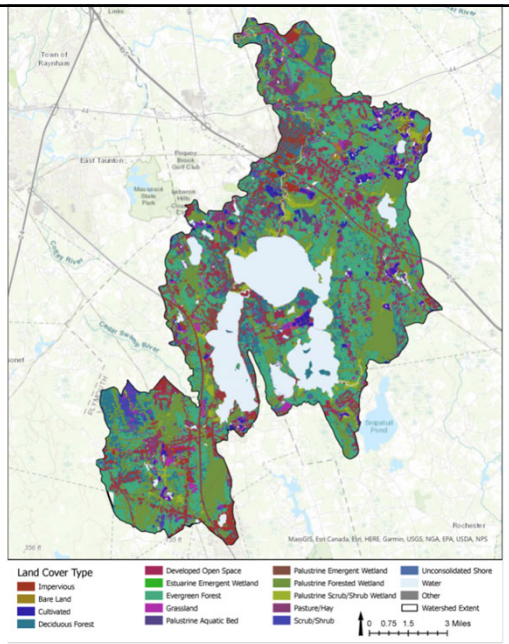


Current Land Cover

Dominant Land Cover:

- Evergreen Forest (aqua) - 24%
- Palustrine Forested Wetland (olive) - 19%
- Deciduous Forest (darker aqua) - 18%
- Impervious surface (red) - 6%
- Cultivated (purple) - 2%

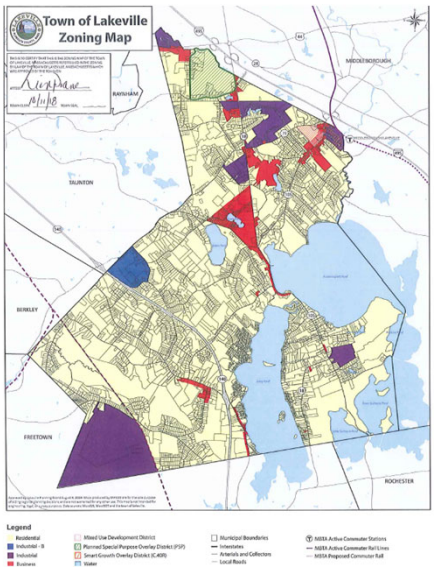
Access PDF @ http://bit.ly/APC-LandCOVER



Lakeville Current Zoning

4 Districts:

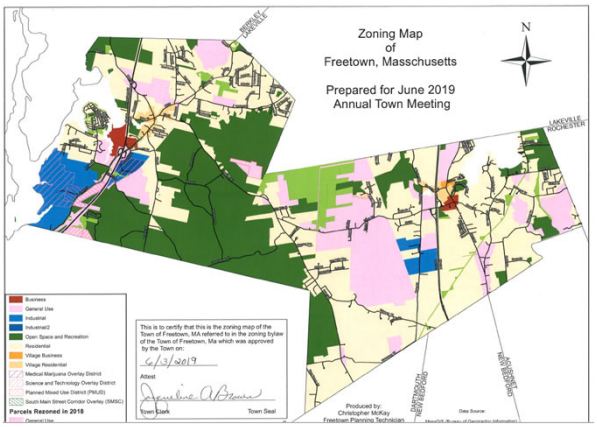
- **Residential (pale yellow) - 86.4% of town**
- **Business (red)**
- **Industrial (purple)**
- Industrial-B (blue)



Freetown Current Zoning

8 Districts:

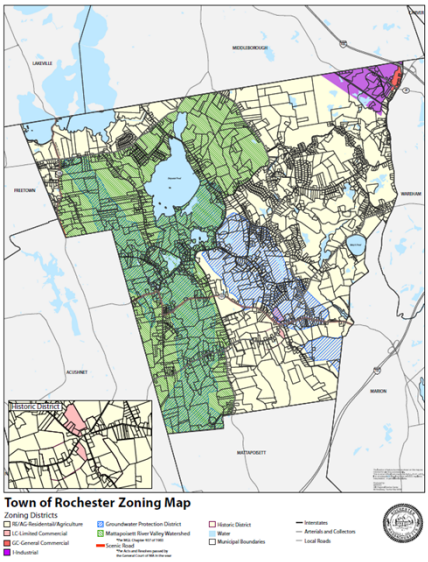
- **General Use (pink)**
- **Residential (pale yellow)**
- **Village Residential (light orange)**
- **Village Business (dark orange)**
- **Business (red)**
- **Industrial (blue)**
- Industrial 2 (darker blue)
- **Open Space & Recreation (green)**



Rochester Current Zoning

4 Districts:

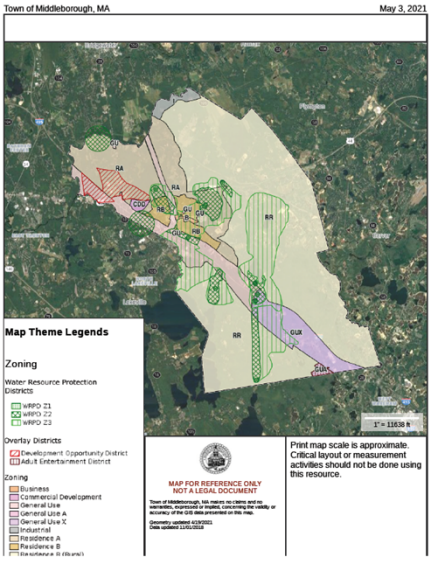
- **Agricultural-Residential (pale yellow)**
- General Commercial (red)
- Limited Commercial (light pink)
- Industrial (purple)



Middleborough Current Zoning

9 Districts:

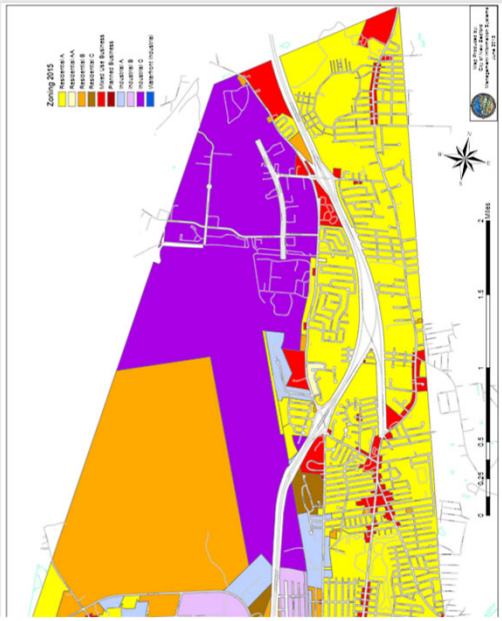
- **Residence A (RA, pale brown)**
- **Residence B (B, peach color)**
- **Residence Rural (RR, pale yellow)**
- **Business (B, peach color)**
- Industrial (I, gray)
- **General Use (GU, pale pink)**
- General Use A (GUA, pink)
- General Use X (GUX, light purple)
- Commercial Development (CDD, magenta)

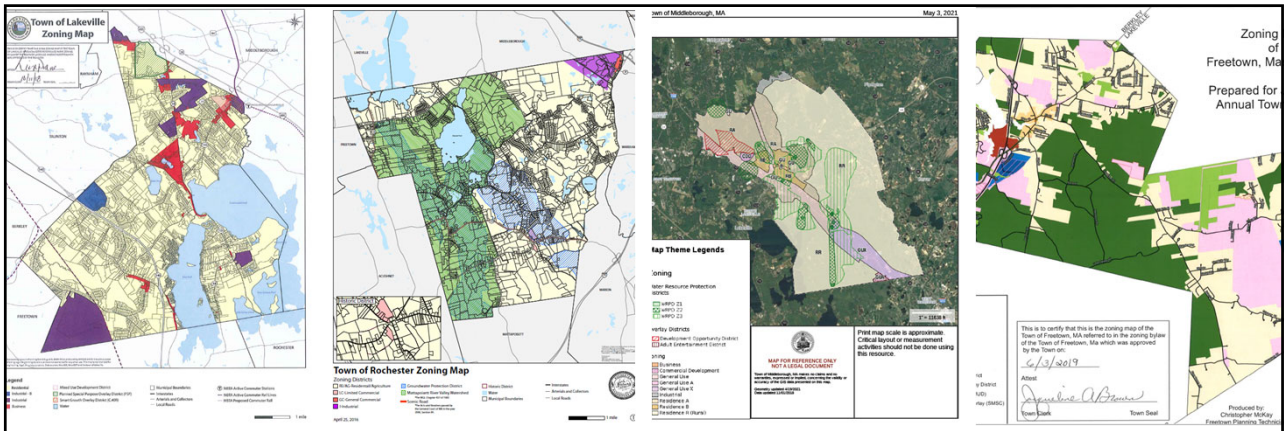


New Bedford Current Zoning

10 Districts:

- **Residential A (yellow)**
- Residential AA
- **Residential B (orange)**
- Residential C
- **Mixed Use Business (red)**
- Planned Business (dark red)
- Industrial A (light blue)
- Industrial B (light purple)
- Industrial C (dark purple)
- Waterfront Industrial





The Role of Overlay Districts

- Overlay districts will either encourage certain uses and densities or discourage growth and development.
- These districts are considered in the suitability portion of the model unless they strictly prohibit development.

Allowed uses within the watershed area

Use	Lakeville	Middleborough	Freetown	Rochester	New Bedford
Residential – single family	Y	Y	Y	Y	Y
Residential – two family	N*	SP	Y	Y	Y
Residential – three or more family	N*	SP	SP	Y	Y
Agriculture	Y	Y	Y	Y	Y
Mixed Use	SP	Y	Y	N	Y
Business / Commercial	Y	Y	Y	N	Y
Industrial	Y	N*	Y	N	N
Open Space	N*	N*	Y	N*	N*

Buildout Analysis and CommunityViz

- Introduction to buildout analysis
- Overview of CommunityViz

Buildout Analysis and CommunityViz

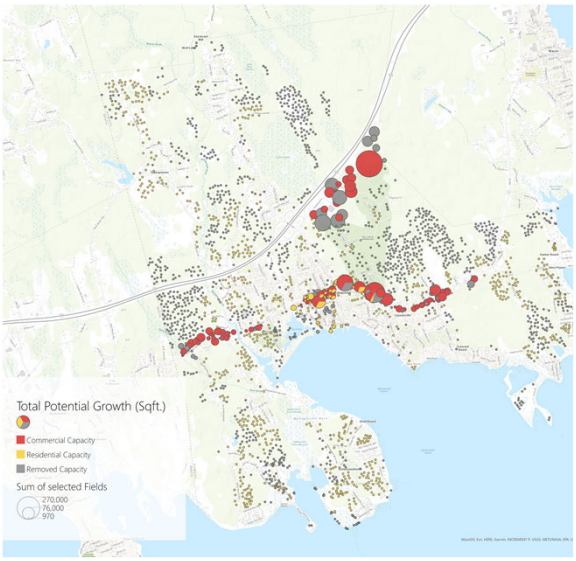
What is a build-out?

Estimate of future growth based on:

- Zoning;
- Constraints;
- Pull-factors;
- Population projections

How is it done? 3 Steps:

1. Build-out (supply)
2. Suitability (demand)
3. Allocation (what and where)



Buildout Analysis and CommunityViz

STEP 1: Build-out Estimates (Supply)

- "Parcel-by-parcel" estimate of potential buildings based on:
  - Existing zoning regulations
  - Permanent constraints (wetlands, permanently-protected open space)
- Each parcel receives a "build-out estimate," or how much total growth (measured in building area and dwelling units) could occur given zoning requirements and usable land. We then go back and refine these estimates.

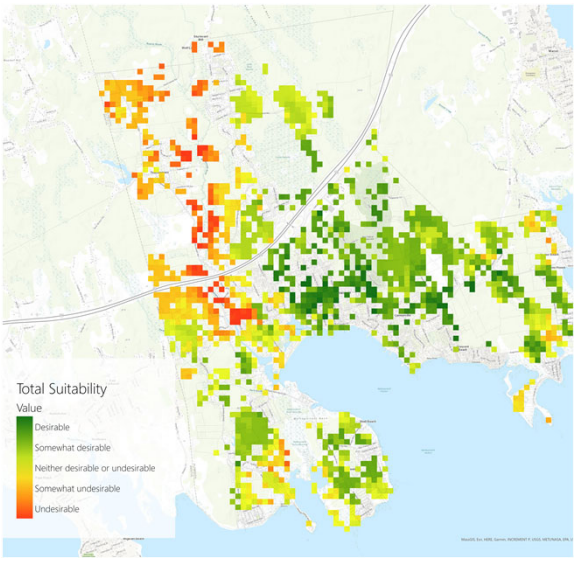
****This is where we are now in the modeling process****

Buildout Analysis and CommunityViz

STEP 2: Suitability Scoring (Demand)

- "Scores" each building's likelihood of being developed based on groupings on inputs.
  - Ex. a building placed within a FEMA flood plain may be less likely to be developed than one that is farther away
- Each suitability group (ex. water resources, open space) is scored, and then a "final score" is calculated based on the group scores.

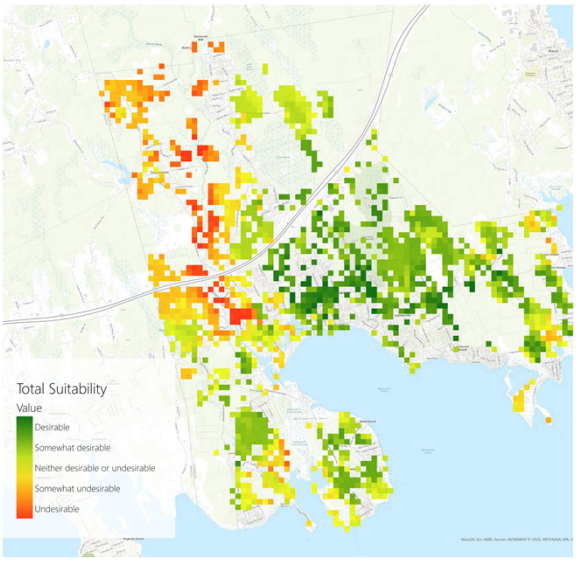
****This is where we are headed next, and where we'd especially like your input to inform next steps****



Buildout Analysis and CommunityViz

What goes into suitability?

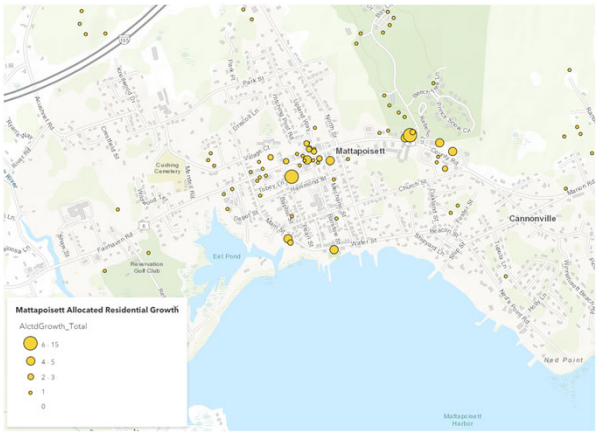
- Town zoning and permitting
- Land characteristics
- Wetlands and permanently protected open spaces
- Geological constraints
- Important water resources
- Agricultural considerations
- Environmental factors
- Local preferences
- Hazards, such as FEMA flood plains
- Civic amenities
- Nearby recent development
- Population and market projections

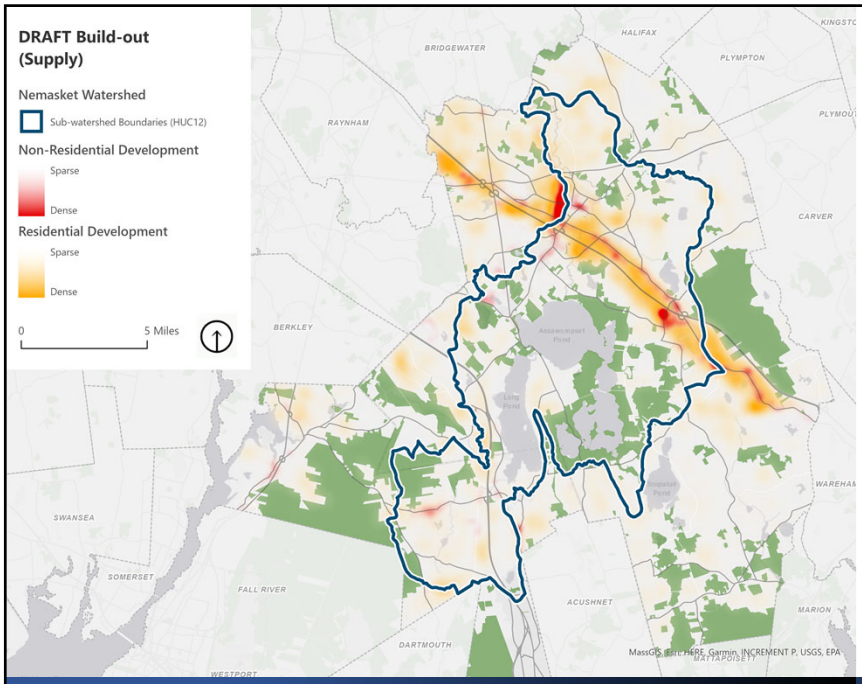


Buildout Analysis and CommunityViz

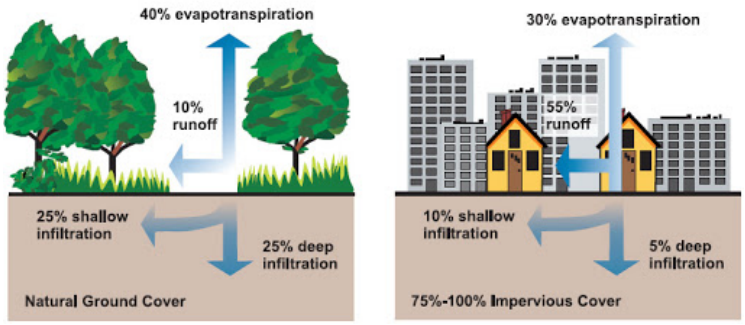
STEP 3: Allocation

- Allocates growth based on employment and population projections
- Creates a more realistic image of growth in a municipality





Identified Areas with Large Potential Supply of Available Developable Land



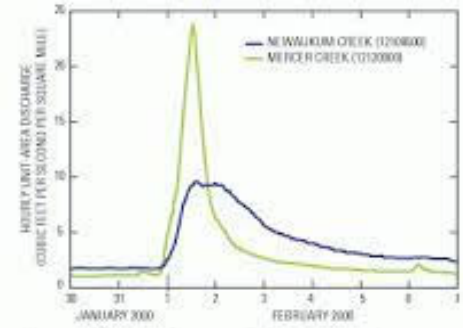
Land Use Linkage to Flooding Issues

Additional Development =

Additional impervious surface and runoff

Additional Impervious surface and runoff =

Effects on streamflow during flood events



Streamflow in Mercer Creek, an urban stream in western Washington, increases more quickly, reaches a higher peak discharge, and has a larger volume during a one-day storm on February 1, 2000, than streamflow in Newaukum Creek, a nearby rural stream, a nearby rural stream that drains a basin of simlar size.

Land Use Linkage to Flooding Issues

Town	Floodplain By-law	Part of 2020 FEMA Map Revision?**	Guiding Features
Freetown	Y	Y	780 CMR of the MA State Building Code
Lakeville	Y	Y	780 CMR / floodway prohibition
Middleborough	Y	Y	780 CMR / floodway prohibition
New Bedford	Y	Y	780 CMR / floodway prohibition
Rochester	Y	Y	780 CMR – but also special permit required

Land Use Linkage to Flooding Issues

Additional development in the floodplain =

Additional people, property, and structures in harm's way of Flooding

****FEMA- and State-mandated revision process under way that must be adopted locally by July 2021. Will need to re-evaluate by-law contents at that time**

Land Use Linkage to Flooding Issues

Potential actions to reduce flooding hazard from land use regulation / policy

- **Enrollment in FEMA's Community Rating System**
- **More stringent floodplain regulations than baseline requirements (higher freeboard, etc)**
- **Floodplain-based TDR by-law**
- **Others…?**

Discussion of Linkage of Current Land Use to Watershed Issues

Fisheries, Wildlife, & Natural Communities

- The resources, stressors, and tools to guide land use planning

BioMap2

Guide strategic biodiversity conservation focusing land prot/stew on areas most critical to ensure long-term persistence of rare/native species, their habitats, exemplary NCs, & diversity of ecosystems.

- *Core Habitat* - SCC, exemplary NCs, & intact ecosystems
- *Aquatic Core* - intact rivers where important physical & ecological processes function for fish & aquatic SCC
- *Critical Natural Landscape* - larger landscapes better able to support ecological processes, disturbances, & wide-ranging species.

APC-Nemasket Basin: ~23,500 ac (52%) of 45k acre basin = CH / AC / CNL

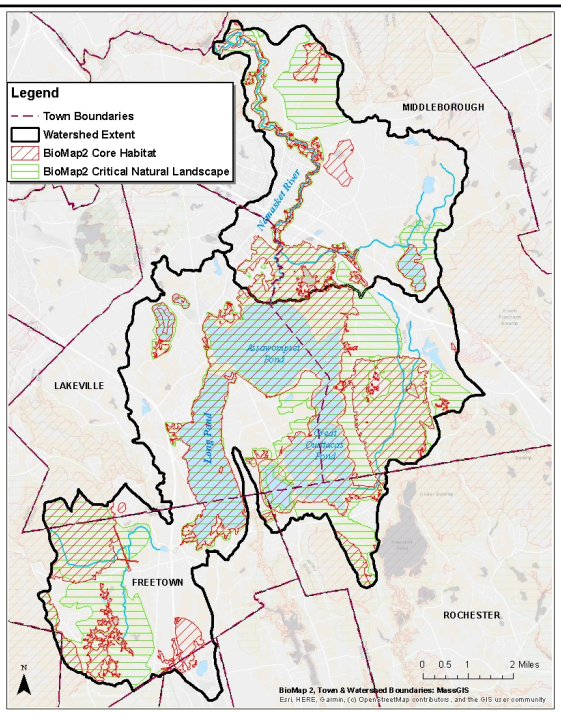
CH: 16 rare sp, some globally imperiled, many uncommon wildlife/plants

AC: APC, Nemasket, Fall & Black Brooks, adj wetlands…

CNL:

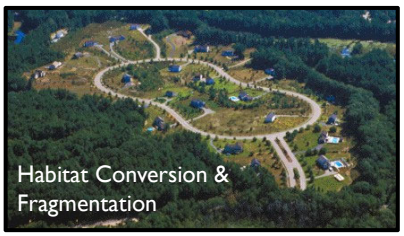
- ***Landscape Blocks*** – large, intact areas w/ natural veg & contiguous forests, wetlands, rivers, lakes, ponds
- ***Forest Cores*** - best examples of large, intact forests less impacted by rds/dev
- ***Aquatic/Wetland Buffers*** - protective upland buffers around wetlands/rivers

BioMap3 is in the works…



Stressors

Fluctuating Pond Levels / Low Water

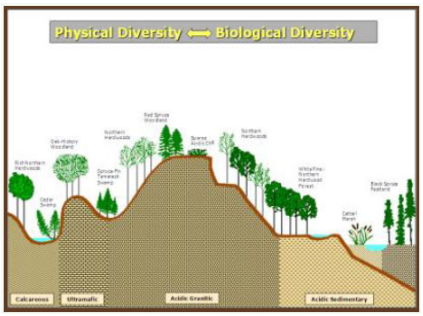


TNC's Resilient Land Mapping Tool

Resilient & Connected Landscapes that will support plants & animals in a changing climate…

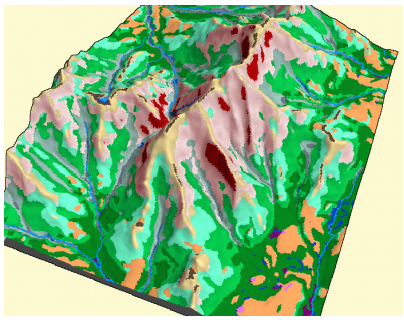
- effects of CC are buffered by natural properties of complex & connected landscapes

1. GEOPHYSICAL SETTINGS:



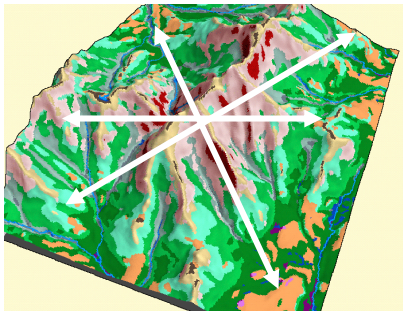
unique combinations of geology, elevation, & landforms

2. COMPLEX LANDSCAPE:



create sites with variety of small, connected, 'micro-climates' – those with range of temps & moisture for species

3. CONNECTED LANDSCAPES:



places that allow species to move & disperse, & processes like water movement or fire can occur unimpeded

TNC's Resilient Land Mapping Tool:

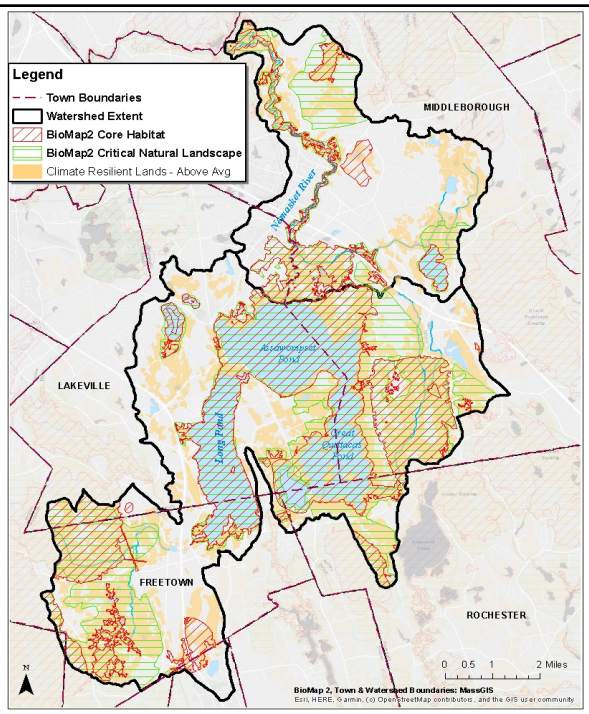
Resilience Scores assigned to land areas:

- ***Far Below*** to ***Far Above Average***
- Est. capacity to maintain species diversity & ecological function as climate changes.

Resilient Sites

- areas where high ***microclimatic diversity*** & ***low levels of human modification*** provide species with ***connected, diverse climatic conditions*** needed to persist/adapt to changing regional climates.

  - Of ~45,000-ac APC-Nemasket basin – **39% scores AAA** (excluding waterbodies)
  - Of the 23,500-ac of *BM2* in basin – **60% score AAA**



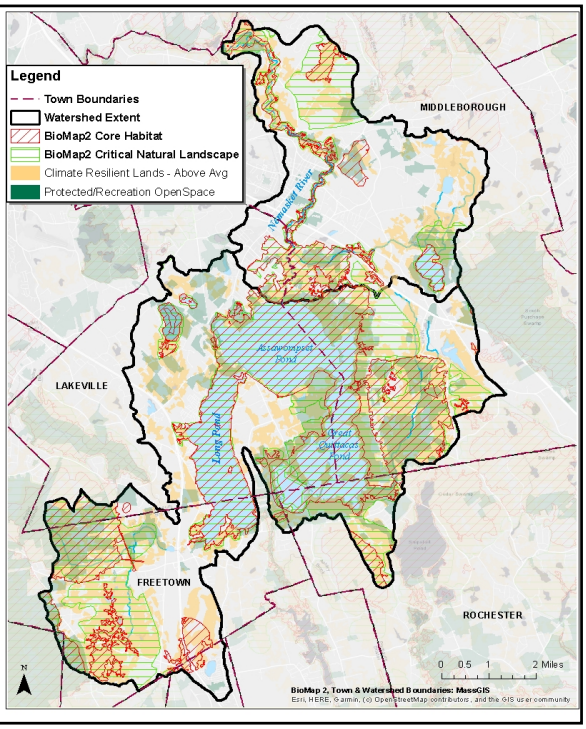
- 17,550 acres = AAA Resilience in basin (39%)
- 9,260 acres = Protected Open Space in basin
- 5,048 acres = AAA Resilient Lands protected
- 4,212 acres = AAA Resilient Lands not protected

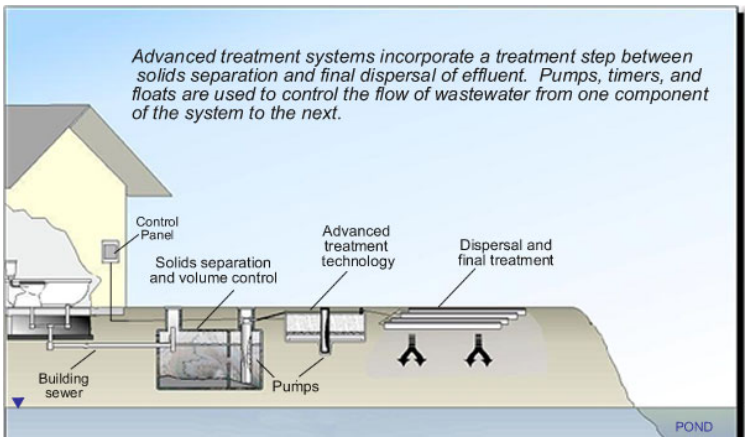
Can't all be protected

BM2 & TNC Resilient Land Mapping Tool - help guide land use planning

Maintaining ecosystem function/intact landscapes = Maintaining ecosystem services for nature and people

- Mitigate flooding & drought
- Filter & clean water
- Carbon storage
- Provide recreation, quality of life
- Cool temperatures





Land Use Linkage to Water Quality Issues

Additional Development outside of the sewer service area =

Additional septic systems

LAND USE SOLUTION: some towns are beginning to mandate the installation of advanced treatment systems, which have a secondary treatment stage and reduce nitrogen

Land Use Linkage to Water Quality Issues

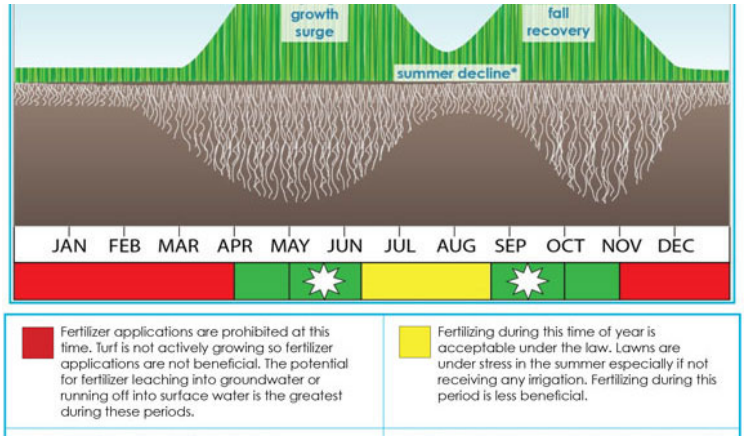
Additional Development =

Additional impervious surface and runoff

LAND USE SOLUTION: creative incentives to reduce impervious cover

Lakeville by-law local example providing incentive in the opposite direction

development in the Business and Industrial District, provided that said development receives approval from the Planning Board under Section 7.6.1 Large Scale Development Site Plan Review, as follows: up to 10% density bonus increase in lot coverage for full compliance with the standards of Section 7.6.3 Building Design Standards, and up to 10% additional density bonus increase in lot coverage for full compliance with Section 7.6.4 Site Design Standards, for a maximum of 70% total percentage of land covered by structures, parking and paved areas, and further provided that the calculation of the percentage of land covered include the area of all impervious surfaces of any type located on the land receiving the density bonus. *(Adopted July 19, 2004; approved by A. G. August 27, 2004)*



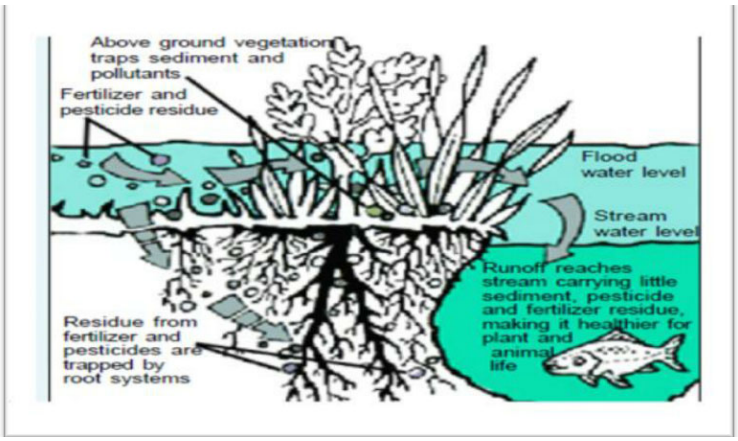
Land Use Linkage to Water Quality Issues

Additional Development =

More lawns and fertilized areas

LAND USE SOLUTION: probably not a regulatory solution possible here

Incentives to landscape without grass? Public education about proper use of fertilizers?



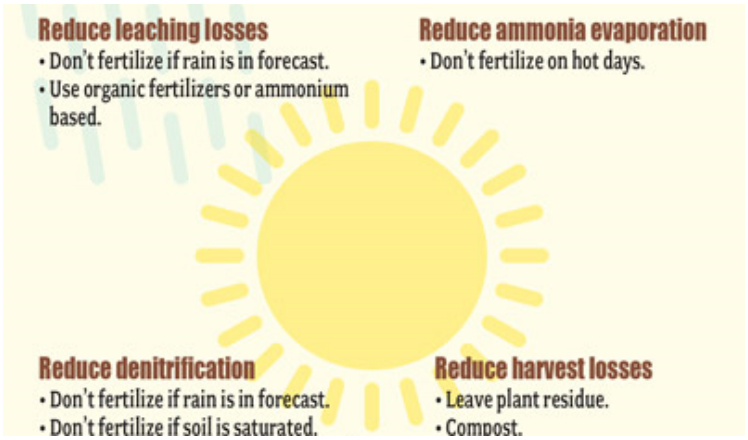
Land Use Linkage to Water Quality Issues

Additional Development =

Less natural vegetation to filter pollutants

LAND USE SOLUTION: allow nature-based stormwater filtration systems (rain gardens / bioswales)

Ensure and enforce adequate stream, waterbody, and wetland buffer areas



Land Use Linkage to Water Quality Issues

Any others to discuss?

Discussion of Linkage of Current Land Use to Watershed Issues

Do you know of other watershed management issues associated with current land use patterns?

Discussion of Buildout Analysis

Big picture future development issues:

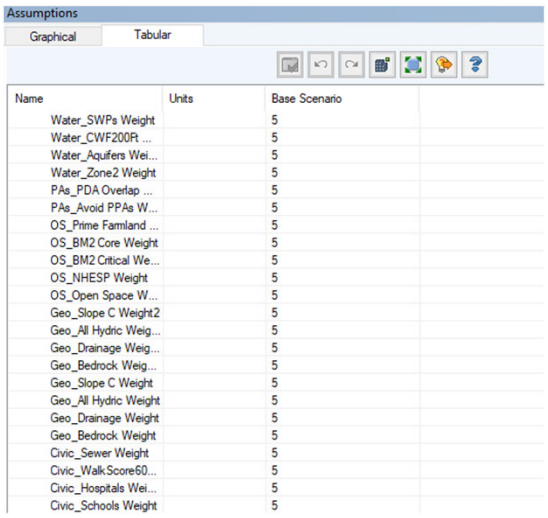
- Which sections of the watershed are best suited for future development? Why?
- Which sections of the watershed are least suited for future development? Why?

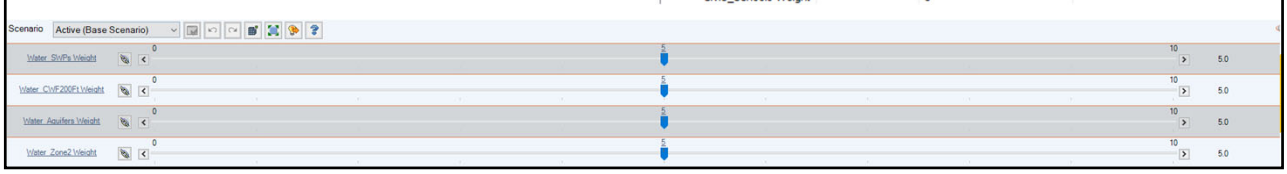
Discussion of Build Out Analysis

CommunityViz: Specific alternatives to model

- Business as Usual Scenario
- Water Quality Protection Scenario
- Climate Hazard Minimization Scenario
- Others?

https://www.surveymonkey.com/r/98HFCHR





APC Management Plan Steering Committee Meeting NOTES on 5 – 12 – 21

Past review:

- Old DER projects & Review
- How to talk about existing condition

Next:

- Transition into thinking about the future
    - Climate Change
    - Future Land Development

Meeting today:

- Overview of existing land use patterns and zoning
- Intro to buildout analysis and CommunityViz
- Discussion of
    - Linkage of land use patterns to watershed management issues
    - Future land use priorities and specific elements to be modeled

Land use in MA is an opportunity for communities to control their own destiny.

- Goals:
    - Improved shared understanding of current land use and zoning throughout the watershed
    - Identification of future land use concerns and opportunities
    - Initial planning for modelling future land use alternatives

Significance of today's topic:

- Plan time to horizon = 2050
- Additional growth: more people and structure in harms' way of potential climate hazards like increased flooding and drought
    - Increased impervious surface area can increase runoff
    - Figure ground relationship between developed areas and natural areas -→ when you switch natural areas to developed, that increases runoff as well as decreases ecosystem services
- Land use is something that municipalities can control

Existing land use patterns:

- Current Land Use:
    - Dominant uses: what decisions the residents have made in how to use the land
        - Low-density residential – 46%
            - In the buildout, we'll think about which areas you target for development and which for open space
        - Publicly owned land (inclusive of but not limited to protected open space) – 18%
        - Agricultural wood lot – 9%
            - Includes cranberry bogs
        - Forest/open space chapter land – 7%
        - Mixed use – 7%

    - bit.ly/APC-LandUSE
- Current Land Cover: what is left on the landscape regardless of what use it currently services.
    - Dominant land cover:
        - Evergreen Forest – 24%
        - Palustrine forested wetland – 19%
        - Deciduous Forest – 18%
        - Impervious surface – 6%
            - Important for development is understanding where future impervious surface will be
        - Cultivated – 2%

Zoning: Based on the town regulations, what is allowed. Zoning is important b/c of development trends b/c that depicts what type of development is possible in the future. Much of the watershed is **zoned** for residential.

Below, bolded indicates within the watershed area

- Lakeville
    - **Residential – 88.6% of town**
    - **Business**
    - **Industrial**
    - Industrial-B
- Freetown: Eastern half of town is in watershed
    - **General use**
    - **Residential**
    - **Village residential**
    - **Village business**
    - **Business**
    - **Indusial**
    - Industrial 2
    - **Open space and recreation**
- Rochester:
    - **Agricultural –residential**
    - General commercial
    - Limited commercial
- Middleborough:
    - **Residence A**
    - **Residence B**
    - **Residence Rural**
    - **Business**
    - Industrial
    - **General Use**
    - General Use A
    - General Use X
    - Commercial Dev

APC Management Plan Steering Committee Meeting NOTES on 5 – 12 – 21

- New Bedford: small area in Northeast corner of the watershed – mostly residential, some mixed use business
- Overlay districts:
    - overlay districts will either encourage certain uses and densities or discourage growth and development
    - These districts are considered in the suitability portion of the model unless they strictly prohibit development.
    - If you want to encourage mixed use in a busy area for ex

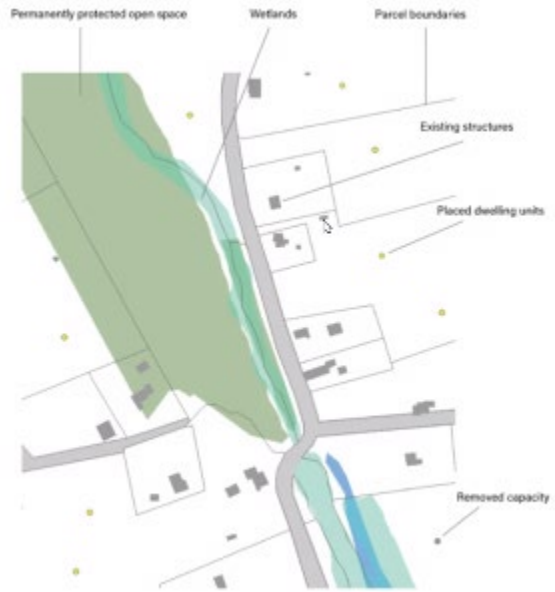
Allowed uses within the watershed area

Use	Lakeville	Middleborough	Freetown	Rochester	New Bedford
Residential – single family	Y	Y	Y	Y	Y
Residential – two family	N*	SP	Y	Y	Y
Residential – three or more family	N*	SP	SP	Y	Y
Agriculture	Y	Y	Y	Y	Y
Mixed Use	SP	Y	Y	N	Y
Business / Commercial	Y	Y	Y	N	Y
Industrial	Y	N*	Y	N	N
Open Space	N*	N*	Y	N*	N*

-
    - If you're only allowing single family houses, then you're going to see a lot more land converted. Allowing more multifamily houses or mixed use could be a way to provide more development and housing, while converting less land. Converting natural areas to pavement means more runoff. More sprawling development means you have to provide more services such as roads and sewer. If you want to allow multi-family housing that's better.
        - Y: Yes
        - N: No
        - SP: Special Permit - a developer has to get a special permit in order to do this. Most developers won't want to do this because it's extra work for both them and the developer
            - If you want to see development somewhere, make it a 'by-right' no special permit

Buildout Analysis and CommunityViz:

- Intro to building agent
- What is a build-out:
    - Estimate of future growth based on:
        - Zoning
        - Constraints

        - Pull-factors
        - Population projections
    - 3 steps:
        - Build-out (supply) → what is technically feasible if you were packing it all in.
        - Suitability (demand) → looking at the supply, what else is in demand, what other municipalities in the watershed will support growth
        - Allocation (what and where) → what growth will happen and where (population and employment projections)
- Build-out:
    - Parcel-by-parcel estimate of potential buildings [not a growth estimate of the whole
        - Existing zoning regulations
        - Permanent constraints (wetlands, permanently-protected open space)
    - Each parcel receives a 'build-out estimate' or how much total growth (measured in building area and dwelling units) could occur given zoning requirements and usable land. We then go back and refine these estimates (for example, if communityViz places development on an institutional parcel)
    - 

        - Dark green is permanently protected open space
        - Aqua is wetlands
- Step 2: Suitability scoring (demand)
    - Scores each buildings' likelihood of being developed based on groupings on inputs → ex, a building placed in a FEAM floodplain is less likely to be developed
    - Each suitability group is scored & then a final score is calculated based on where the group scores.
    - Suitability
        - Town zoning
        - Land characteristic
        - Geological constraints
        - Important water resources

        - Agricultural considerations
        - Local preferences → from South Coast rail we learned what communities wanted to protected
        - Hazards
- Step 3: Allocation
    - Allocates growth based on employment and population projections
    - Creates a more realistic image of growth in a municipality.

Questions about the build out process

Our current stage in the process:

- Identified areas with large potential supply of available developable land
    - Arterials that run through the watershed are most likely to receive the most growth.
    - Commercial development clustered around transportation
    - Residential in Middleborough where it's encouraged by zoning.

How do we want to weigh different scenarios?

- **Chance Perks: is connectivity of open space & open space corridors included in the list of variables?**
- **Michele Paul: Has anyone done any mapping of the hazardous release sites available in DEP?**
    - Bill: some cities and towns go to waste site remediation re-use, those area areas where there could potentially be some significant habitat

Presentations:

- Land use linkage to flooding issues
    - There is a natural condition where water that falls on a land's surface will infiltrate, some will shallow infiltrate, and some would runoff. In a natural condition only 10% runs off
    - When we start to put buildings on land, we alter the system and change the amount of water on these surfaces. WE increase impervious cover and decrease shallow infiltration and increase runoff to 55%
    - Additional impervious surface and runoff = effects on streamflow during flood events
        - In natural conditions when you have a rain event we see a peak. In impervious covered area, the peak is much higher, and increases more rapidly. WE get an increase in both the flood volume and an increase in the velocity of the flood volume.
        - Streams come to an equilibrium with the lands surface →
    - Additional development in the floodplain additional people property, and structure in harm's way of flooding
    - Every community can participate in the flooding bylaw. All five communities have a floodplain bylaw, and also are within the
    - Potential actions to reduce flooding hazard from land use regulation
        - Enrollment in FEMA's community rating system → reduces flood insurance costs

        - More stringent floodplain regulations than baseline requirements (have a higher freeboard requirement btwn. 100 year floodplain and bottom line of the structure → if you have some open space between the highest flood point and lowest point of the structure that's the best, etc.)
        - Floodplain-based TDR by-law → try to promote trading development rights of areas within a floodplain to areas outside a floodplain
        - Floodplains are regulated by the state, but could also be regulated by the community in a slightly more restrictive way
            - Ex: a floodplain bylaw could look at protection of the floodplain, rather than protection of the buildings
- Habitat and fisheries
    - The basin is hugely important for biodiversity
    - Six freshwater mussels → two of whom are state concerned, and the APC is a stronghold for these locations
    - Waterfowl hotspot
    - Supports nesting and overwintering eagles → extensive waterbodies, good quality fish, tall trees
    - Naturally fluctuating water levels support pond shore communities.
    - Wetlands support the box turtle → requires large forested uplands with shallow wetlands
    - BioMap2:
        - Guide strategic biodiversity conservation focusing land protection and stewardship on areas most critical to ensure long-term persistence of rare/native species, their habitats, exemplary NC's and diversity of ecosystems
            - Core
            - Aquatic core: intact rivers where important physical and eco process function for fish and aquatic species of critical concerns
            - Critical natural landscape: larger landscapes better able to support ecological processes, disturbances, and wide-ranging species
                - Landscape blocks: large, intact areas with natural vegetation and contiguous forests, wetlands, rivers, lakes ponds,
                - Forest cores: best examples of large, intact forests less impacted by RDS/Development → important for birds
                - Aquatic/Wetland buffers: protective upland buffers
    - Stressors;
        - Fluctuating pond levels/low water
        - Loss of stream connectivity
        - Flooding
        - Sedimentation/Invasive plants: loss os less tolerant species [bright shiner]
        - Water pollution
        - Degraded water quality
        - Habitat conservation and fragmentation
        - *It is the interconnectivity and stability of the interactions between habitat services that assist*
    - TNC's Resilient Land Mapping tool

- Resilient and connected landscapes that will support plants and animals in a changing climate
- Effects of CC are buffered by natural properties of complex and connected landscapes
    1. Geophysical settings: identify areas of physical diversity with unique combinations of geology, election and landforms
    2. Complex landscapes: create sites with a variety of small, connected 'micro-climate's – those with range of temps and moisture for species
    3. Connected landscapes: places that allow species to move and disperse, and processes like water movement or fire can occur unimpeded

TNC's Resilient Land Mapping Tool:

Resilience Scores assigned to land areas:

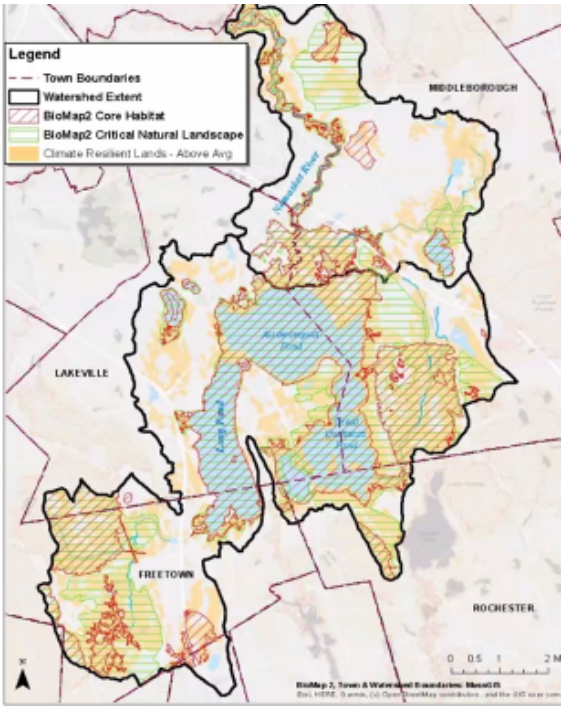
- ***Far Below*** to ***Far Above Average***
- Est. capacity to maintain species diversity & ecological function as climate changes.

Resilient Sites

- areas where high ***microclimatic diversity*** & ***low levels of human modification*** provide species with ***connected, diverse climatic conditions*** needed to persist/adapt to changing regional climates.

➢ Of ~45,000-ac APC-Nemasket basin – **39% scores AAA** (excluding waterbodies)

➢ Of the 23,500-ac of *BM2* in basin – **60% score AAA**



-
- You can use the resilient land mapping tool to estimate resilience in the area → est capacity to maintain species diversity and ecological function as climate changes
    - Resilient: areas where high microclimatic diversity and low levels of human modification provide species with connected, diverse, climatic conditions needed to persist/adapt to changing regional climates

o BioMap2 and the TNC Resilient Land Mapping tool – help guide land use planning

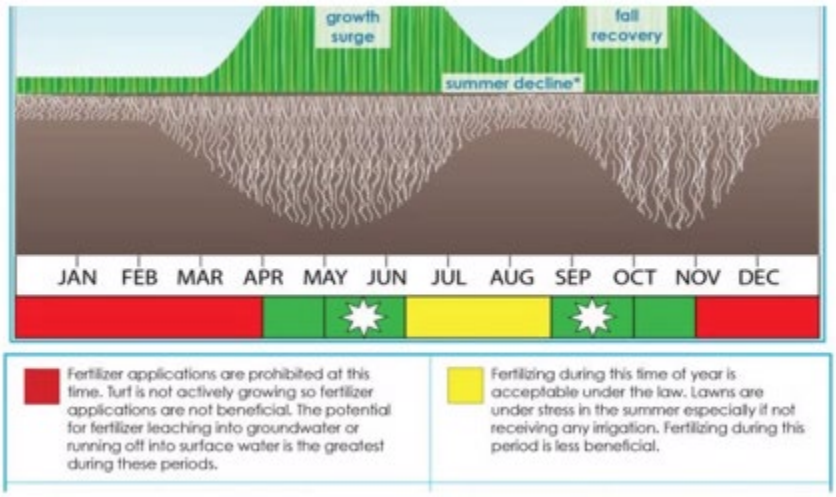
- 17,550 acres = AAA Resilience in basin (39%)
- 9,260 acres = Protected Open Space in basin
- 5,048 acres = AAA Resilient Lands protected
- 4,212 acres = AAA Resilient Lands not protected

-

- Core message: maintaining ecosystem function /intact landscapes = maintaining ecosystem services for nature and people

Questions: How accurate does this get?

- , it classifies areas as developed areas that should be restored, and then those below average and then those all above average invasive, they wouldn't have known if they were there.
- That is the benefit of steering committee members who can go out

- Water Quality & Helen:
  - Land use linkage to water quality issues:
    - Additional development outside of the sewer service area = additional septic systems
    - Land use salutation: some towns are beginning to mandate the installation of advanced treatment systems, which have a secondary treatment stage and reduce nitrogen
  - Additional impervious surface and runoff ➔ land use solution: creative incentives to reduce impervious cover
    - Lakeville by-law local example providing incentive in the opposite direction [they have a 10% density bonus → this is an issue for leading to more bylaw impervious surface]
  - Additional development = more lawns and fertilized area
    - Land use solution; probably not a regulatory solution possible here
    - Incentives to landscape without grass? Public education about proper use of Fertilizers?
    - 

    - Public education on proper usages and proper timing
  - Additional development = less natural vegetation to filter pollutants
    - Land use solution: allow nature-based stormwater filtration system s(rain gardens / bioswales)
    - Ensure and enforce adequate stream, waterbody, and wetland buffer areas
    - *Look at both small scale (single family development) and large scale as well*
      - Make sure land use buffers stay more naturalized
      - Reduce leaching losses: don't fertilize on sunny or rainy days

        - IN Jan, there was a new act passed called 'Enabling Partnerships for Growth' that changed how zoning bylaws happened: it reduces the requirement for bylaw adoption from a super majority to a simple majority for certain land use areas. This is about making it easier to do certain housing developments. Simple majority is now required for a TDR, parking reduction, or density bylaw
    - https://maps.tnc.org/resilientland
    -

<u>Input from steering committee:</u>

Do you know of other watershed management issues associated with current land use patterns:

- Chance Perks: freshwater access: in the watershed, people who don't know or are unaware of access limitations to water in the summer, will enter water supplies. People who may not live in proximity to the water will increase
    - Ymane Galotti: this is part of public access and furthering public education
    - Eric:
        - People using areas that they shouldn't use
        - Need to look at some alternatives for people to have some opportunities given that this area has restrictions
- Chance Perks: what is the name of the act?
    - "an act enabling partnership for growth"

Big picture future development issues:

- Which sections of the watershed are best suited for future development? Why?
    - Mike Schroeder: Need education programs aimed at members of local planning boards. Wise for towns to push open space (cluster-type) development?
    - Ymane Galotti: we want to protect as much area surrounding waterways and tributaries as possible. With Island Harris, that hasn't been as protected as we want to see it. Further conservation and less development surrounding the waterways is important.
    - Chance Perks: Route 105 from APC center to Rochester → if we cut off Route 105, what would that put on development? → that would make development in 495 and Route 140 and we'd see less development in the APC center. **If we restricted through flow such as heavy trucks – or had a 'refinement of use' – then the results of that would be conducive to less development, forcing more industrial development o Route 118 to the west**
        - Mike Schroeder: limit truck traffic on 105to start with
        - Bill: the areas in Rochester are MS4 stormwater areas → the MS4 committees in those areas also have a lot of work there
    - Michele Paul: North in route 105 → are those residences on sewer or septic → try to protect the houses directly north of 105
    - Mike: Package in dense areas around Long pond
    - We can include other areas that are less

    - Ymane Galotti: the impacts on flooding are aligned with conservation of land. Wonder for the modelling → what is the weighted value of the flooding impacts vs. the weighted value of the water quality?
        - Whether or not it's in a floodplain doesn't seem to deter people. Water quality is important
    - Mike: Lakeville has resisted attempts to pass a wetland bylaw. Needs one badly. We tried and failed. How to get another attempt going?
    - Chance Perks: education and empowering local water committees is important b/c these are volunteers who can bring forward the ideas of residents
- Which sections of the watershed are least suited for future development? Why?

105 Corridor

Pond front development → water proximity being a pull factor

Bill: See how nature interacts over the political boundaries. See where you have the carrying capacity to increase development and can also look at ecosystem services right now

- Taylor: let's include community priority protection and priority development areas
    - Bill: priority protection & priority development areas were made for south coast rail. SRPEDD members worked with community members, nonprofits, etc. and identified areas that people would like to see protected in perpetuity, or
- Bill: **when you set aside open space, you also have the responsibility of stewardship. How can we create a stewardship ethic for these areas**

Based on proximity or overlap → we might want to put a water quality layer on these groupings

https://www.surveymonkey.com/r/98HFCHR

It's about stacking of benefits: how can the existing changes and zoning efforts

Steering Committee Meeting #5:

Year 1 Re-Cap & Year 2 Preview

APC - Nemasket River Watershed Management and Climate Action Plan

June 9, 2021

Where We've Been in Year 1

Project Tasks

TASK	YEAR 1
1. Steering Committee Meetings	4-5 Meetings
2. Community Outreach	Prep all materials / meeting schedule
3. Data Collection and Synthesis	Gather data for plan, identify data gaps
4. Regulatory Review	Review inter-agency agreements (MOU's between localities and state agencies, other entities)
5. Write Plan	Understanding of current issues and anticipated climate conditions

Task 1: Steering Committee Meetings

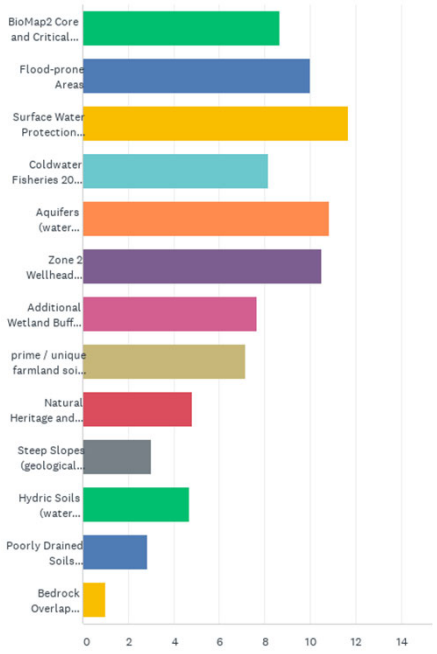
MEETING DATE	MEETING TOPIC	MEETING OUTCOME
December 9, 2020	Project Kick-Off	Common ground on project goals; material for plan vision statement
February 10, 2021	Vision Statement Review & Intro to White Paper Existing Conditions Analysis	Initial plan for white paper development
March 10, 2021	Future Conditions: Climate Change	Feeback from SC on most pressing climate change issues
May 12, 2021	Future Conditions: Growth and Land Development	Feedback from SC on land features that are top priority for preservation
June 9, 2021	Year 1 Re-cap and Year 2 Preview	Project status check-in

Climate Adaptation / Mitigation Priorities

- Drought and flood conditions - water extremes - right now can't control either
- Maintaining adequate flow for herring
- Unknown stormwater runoff impacts on water quality
- Increased demand during drought conditions is typical. How much do you conserve in winter to prep without risking flooding
- How do we insulate the response to climate resilience from political changes?
- Increased demand during drought conditions is typical. How much do you conserve in winter to prep without risking flooding
- Increase in warmer weather also increases population walking around and accessing watershed - increased pollution and need for monitoring
- Forest management for drier conditions and to provide cooling

Land Use Priorities

- Archeological, historical, cultural, scenic areas.
- Do we have a 'human element' suitability layer/score that includes whether Commissions (Conservation, Zoning, etc) promote or require continued education for sitting Commissioners. Or how a municipality scores on bylaw adoption or policy updating.
- Protection for Nemasket River drainage and water quality.
- Stormwater management on-site septic system management MassDEP bureau of waste site cleanup compliance to be ranked highly dependent upon their proximity or direct impact to the surface water resources.



Task 2: Public Participation

SUB TASK	DELIVERABLE	COMPLETE?
1. Preliminary Public Meeting Schedule	Preliminary Meeting Schedule Doc	**Complete**, will be focus of next SC meeting in July
2. Digital Watershed Tour	8 Small Videos	In **final editing** now for 6/30 deadline
3. Child Care RFR	-	*Will not complete in year 1, shift to beginning of year 2*
4. Promotional Materials	Flyers for each meeting and press release to kick of public process	In **final editing** now for 6/30 deadline
5. Website	Project Page	**Complete** and will continue to update

Task 3: Data Collection & Synthesis & Task 5: Write Plan

TASK	DELIVERABLE	COMPLETE?
1. Research	4-5 Meetings	4-6 Meetings
2. Synthesis of Other Inputs	Prep all materials / meeting schedule	Hold 6 rotating meetings
3. Write Existing Conditions White Papers	Collect research and synthesis of other inputs into white papers	In progress for 6/30/2021 deadline, when we will send them to the SC

Task 4: Regulatory Review

TASK	DELIVERABLE	COMPLETE?
1. Collect local bylaws	4-5 Meetings	Complete

Where We're Headed in Year 2

Project Tasks

TASK	YEAR 2
1. Steering Committee Meetings	7 Meetings
2. Community Outreach	Hold 6 rotating meetings, engage with local schools
3. Data Collection and Synthesis	*[completed will spot-fill in where necessary]*
4. Regulatory Review	Conduct reviews of local bylaws
5. Write Plan	Recommendations, action items, benchmarks of success, implementation schedule

Year 2 Steering Committee Meetings

MEETING DATE	MEETING TOPIC
July 14, 2021	Public Participation Process Kick-Off
September 8, 2021	Floodplain Management
November 10, 2021	Water Quality and Water Supply
January 12, 2022	Unique Ecology and Habitats
March 9, 2022	Recreation and Stewardship
May 11, 2022	Land Development
June 8, 2022	Project Wrap Up

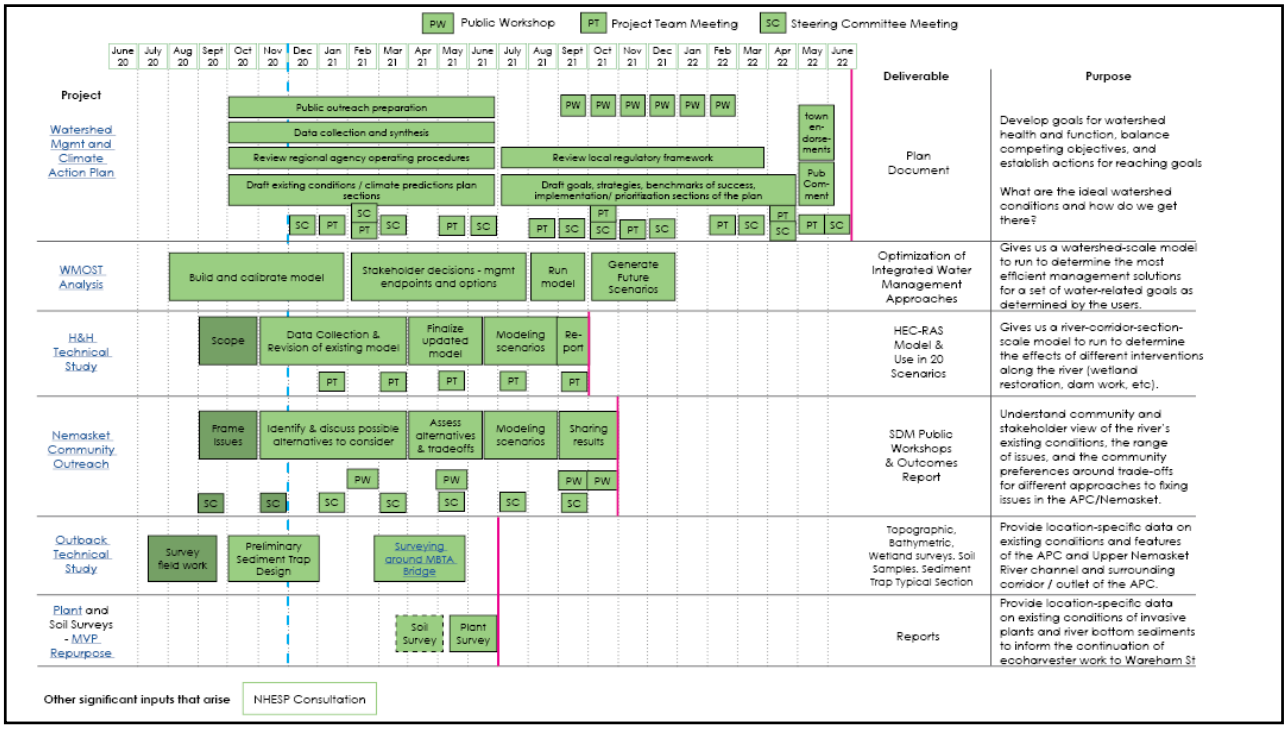
Format will be the same for each meeting:

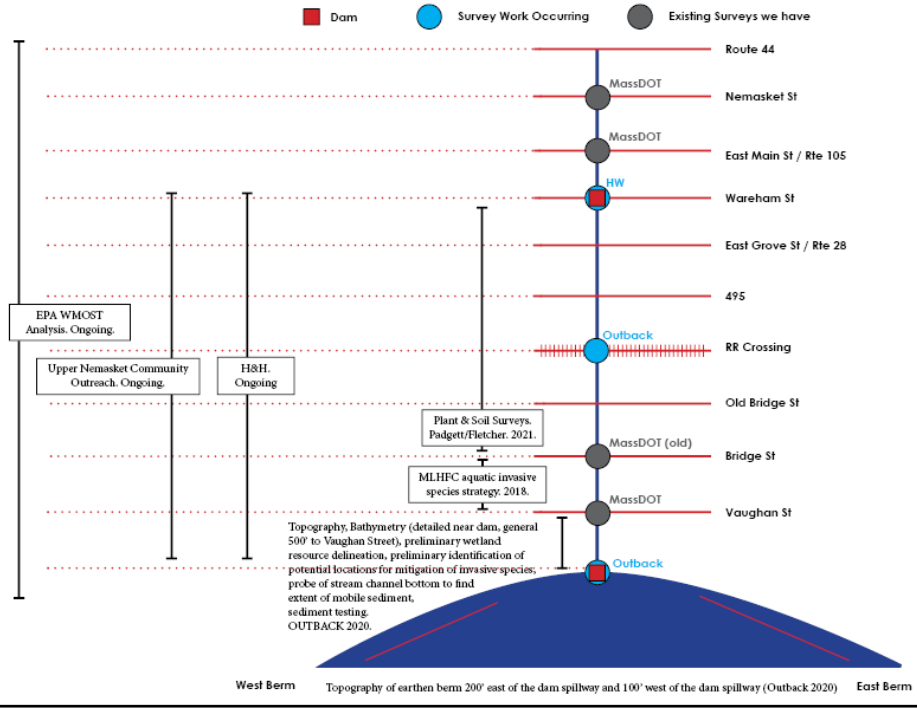
1. Consultant team presents a set of draft recommendations and benchmarks of success on topic (shared prior to meeting).
2. Discussion.
3. Prioritization of recommendations, including any new recommendations developed during discussion.

Corollary Project Progress

DER Action Prioritization Outcome and Status

PROJECT	CURRENT ACTIVITY	NEXT STEPS
Sedimentation	Review possible alternatives for alleviating sedimentation.	Vet alternatives with stakeholders and the public.
H&H Study	Initial study and hydrological model of upper Nemasket surface water flows is on-going	Groundwater study.
APC-Nemasket Watershed Mgmt Plan	**Write Plan.**	**Implement Plan.**
Snake River Culvert Replacement	Research underway – MassDOT ownership. In process of obtaining access permit. Permit pathway complete.	Field evaluation and identify funding source.
Assawompset Dam Repair	Investigated potential funding sources and dam hazard level. Permit pathway complete.	Use results of field work and H&H model to inform feasibility study.
Wetlands Restoration	Examined riverside sites and expanded search within watershed.	Prioritize sites for acquisition / management.

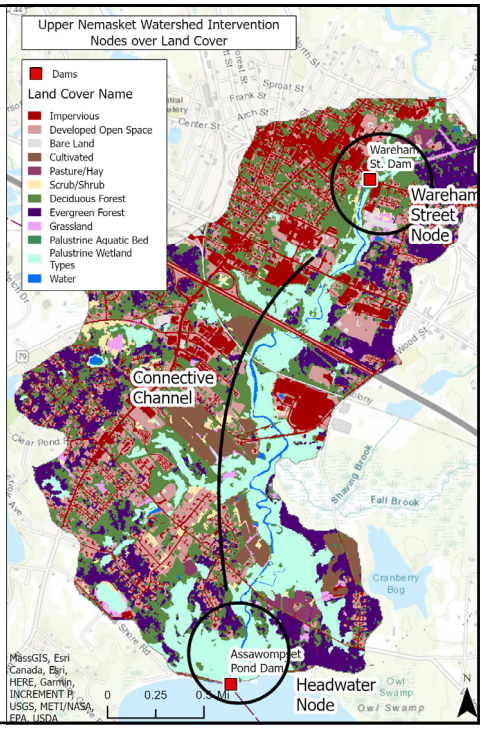




Information from all these studies will inform and become part of the watershed-scale management plan

UNDER REVIEW: SNEP PILOT WATERSHED GRANT

- *5-year grant!*
- *Focused on implementation!*
- *$150,000 federal dollars per year to be used and to be leveraged!*
- *Year 1 Tasks: feasibility studies at dams and public engagement around former Middleboro DPW site*
- *Fingers Crossed!*



APC Management Plan Steering Committee Meeting NOTES on 6 – 9 – 2021

APC Rangers & enforcement challenges:

- Increase in minimum wage has been cutting into ranger budget – need more funding, current amount only covers 22 hrs/week
- Horses using ponds: have given warnings that not permitted (between causeway to gate island)

Recap land use priorities survey:

- Land use priorities to protect from development (survey on weighing priorities for future build-out analysis): water source protection, flood prone areas

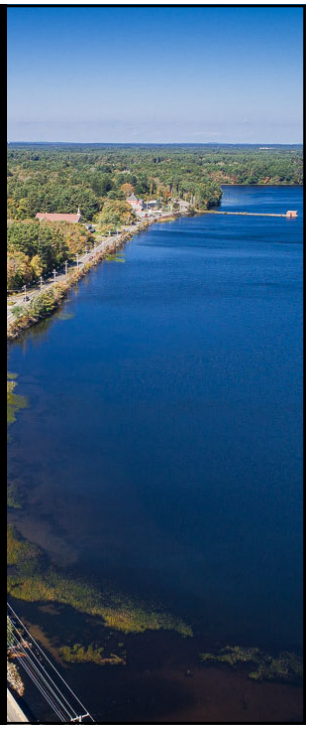
Where we're headed in year2:

- Public meeting schedule drafted – will review in July steering committee meeting
- Year 2 steering committee meeting schedule:
    - July – public participation kick-off
    - Sep – May – each meeting will be focused on 2 topic
    - June: wrap-up draft plan
- Looking to go back to in-person meetings - rotating locations? Start at Lakeville police station and find other locations in each town?
- Town buildings will be reopening with governor's emergency order lifting

- $250k secured with FY22 earmark by Senator Rodrigues for groundwater survey
- Middleborough leftover MVP funds used for Outback Engineering – just completed sediment samples above and below dam and cross section data of bridge
- Lakeville-Middleborough Herring Fishery Commission pulling weeds from Upper NEmasket in Aug – testing Ecoharvester July
    - Need 20" water to be able to work – can release water from dam, if needed)
    - Will pull from Vaughn St down

APC/Nemasket Management Plan Topics: Floodwater & Water Quality

Steering Committee Meeting #6 | September 8, 2021



Agenda

- Revisit vision for the watershed (5 minutes)
- Developing plan recommendations: Floodwater Management
  - Issue summary presentation (15 minutes)
  - Management actions discussion (35 minutes)
- Developing plan recommendations: Water Quality
  - Issue summary presentation (15 minutes)
  - Management actions discussion (35 minutes)
- White paper review updates (5 minutes)
- Public meeting schedule (5 minutes)
- Upcoming outreach: Taunton River Festival (5 minutes)

Vision for the Watershed: Management Goal

Overall, in 2050, the APC and Nemasket River are healthy, sustaining life and natural communities, including our own through clean, safe, and reliable water supply, and the inhabitants of the watersheds have developed an environmental ethic based upon choice, not chance, that drives sound local and regional decision-making.

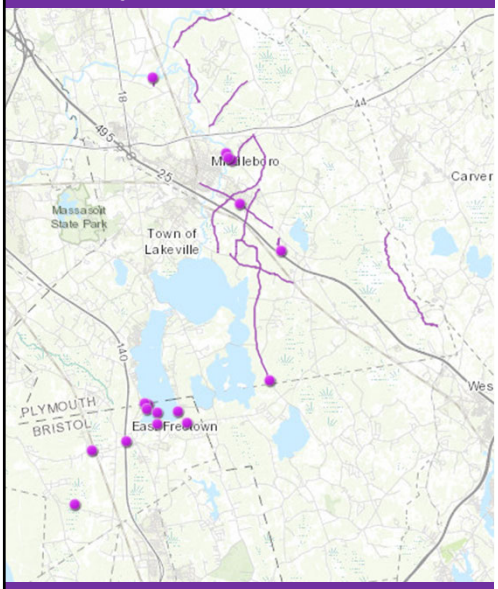
Topics: Flooding and Water Quality

- What are the issues?
- What impacts have already been observed?
- How is climate change likely to impact this issue?
- What are the associated co-benefits of taking action?
- What are potential management actions?
- Which associated regulatory mechanisms should we explore (select 3)?

Flooding – Overview of the Issue

The Assawompset Ponds Watershed has several characteristics that make it prone to flooding. Topography, soils, and development patterns all play a role in both creating flood hazards during wet periods and making the watershed slow to drain once flooding has occurred. In addition, the role of Assawompset Pond as a water supply reservoir creates requirements to maintain water storage within the watershed.

Flood Impact Areas and Road Closures



Map 1 shows flood impact areas and road closures associated with the 2010 flood event. The map was created based on interviews with Freetown and Middleborough staff and is therefore only a partial representation of the total flooding impacts.

Flooding Impacts Observed

Middleborough

- Bascule Dam, Thomas Street Culvert, and Woods Pond dam all potential sources of flooding

Lakeville

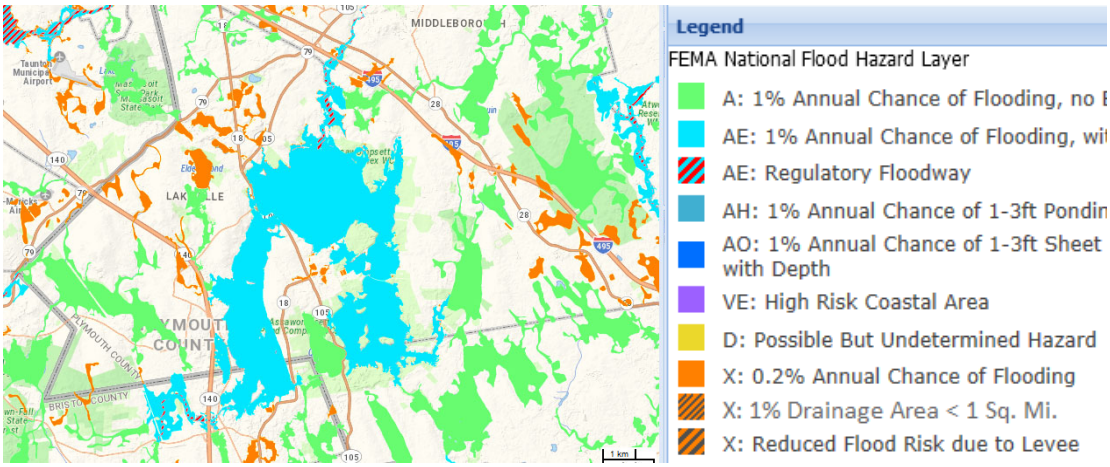
- Culverts: Route 105, Snake River, Taunton Street/Poquoy Brook, Cross Street, Pickens Street, Route 18, Snake River, Pierce Avenue/Bittersweet Road, and Country Road by the Eagles Building
- Highland Road, Bedford Street, Taunton Street, and Cross Street frequently inundated
- Captain's Way, Freetown Street, Country Road, Riverside Drive, and Old Powder House have drainage issues

Freetown

- Chippeway Road culvert along Fall Brook was identified as causing frequent localized flooding.

Rochester: Need more input

Flood hazard areas



Climate Change Impacts on Flooding

Projected climate change impacts in southeastern Massachusetts:

- Increased prevalence of heavy precipitation events: The continued shift towards heavy precipitation events will increase the threat of flash flooding. This problem likely worsen as urbanization continues and impervious surface area in the watershed increases.
- Increasing total precipitation: Increasing total annual precipitation will change the water budget in the watershed resulting in the need to revisit assumptions about water storage capacity of the ponds and flood hazard.
- Warming temperatures: Over time this trend will result in a higher percentage of precipitation coming as rain rather than snow. Also, the combination of longer growing season, higher evaporation rates, and increasing evapotranspiration rates will result in reduced soil moisture and reduced stream and pond levels during dry periods.

In combination these factors will likely exacerbate environmental and community impacts associated with both wet and dry periods across seasons. Planning both for more impactful drought periods and increasing flood hazard during wet periods will be required.

Co-Benefits of Flood Mitigation

- Ecology, Unique Habitats and Natural Resources: Strategic land conservation and wetland restoration efforts have the potential to both maintain/increase flood storage capacity and protect/expand important habitat areas. Conversely, development of priority green infrastructure could worsen flooding in the watershed.
- Stormwater Management: measures that increase local infiltration have the potential to both reduce flooding and reduce potential drought impacts, while reducing stormwater runoff volumes.
- Water Quality: Enhanced stormwater management measures have the potential to reduce nonpoint source pollution of the ponds.
- Inter-Agency Cooperation: Improved coordination between local and state operators on roadway drainage systems could help reduce flood impacts.
- Land Development: Placing new development outside of flood hazard areas will also be required to minimize future flood impacts.

Potential Floodwater Management Actions

Physical projects

- Store the flood water
- Help the flood water flow
- Limit dangers from flood water
- Avoid the flood water

Regulatory mechanisms

- Pursue Regional Participation in FEMA's Community Rating System program
- Review MOUs and maintenance procedures for improved drainage/flows
- Limit types of development in floodplain (floodplain bylaw, wetlands bylaw...)
- Regional buy-out program
- Construction standards: impervious cover, stormwater calculation, freeboard requirements

Discussion: management actions & regulatory approaches

Floodwater Management Focus	Neutral Effect	Inverse Trade Off Effect (as one goes up, the other goes down)	Co-Benefit Direct Effect (both go up or down together)						
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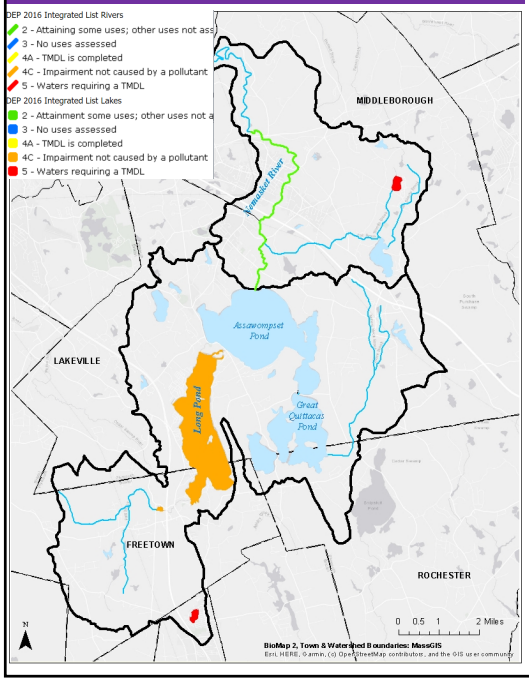
Water Quality – Overview of the Issue

Although largely in natural cover, the APC-Nemasket watershed has several characteristics that make it prone to water quality issues. Many of these are tied to land use and a combination of development and septic systems, stormwater, agriculture, and water withdrawals.

APC-Nemasket - DEP Integrated List



Water Quality Problems, Locations and Impacts

CWA - state monitors surface water quality for support of MA SWQS Regs designated uses (6)

- **Public Water Supply**
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- **Primary (swimming) & Secondary (boating) Contact-Recreation**
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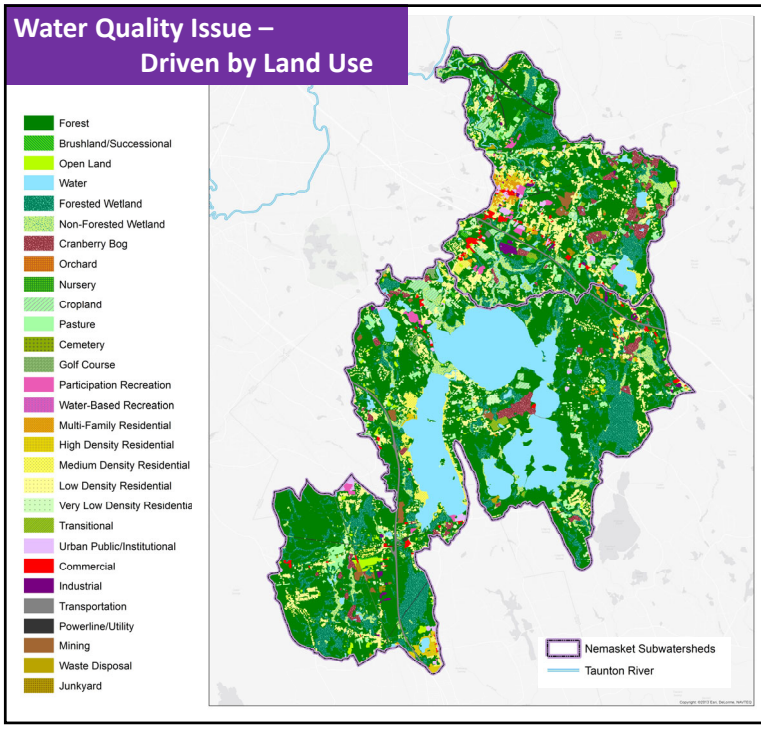
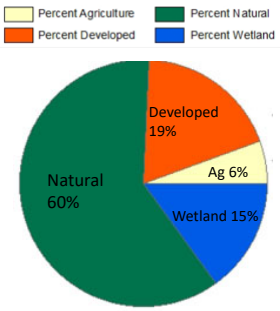
- **Active Cranberry Bogs & Small Horse Farms**
- **Local Roads/Highways**
- **Septic Systems/Cesspools**
- **Residential Land Uses**

Water Quality Issue – Driven by Land Use



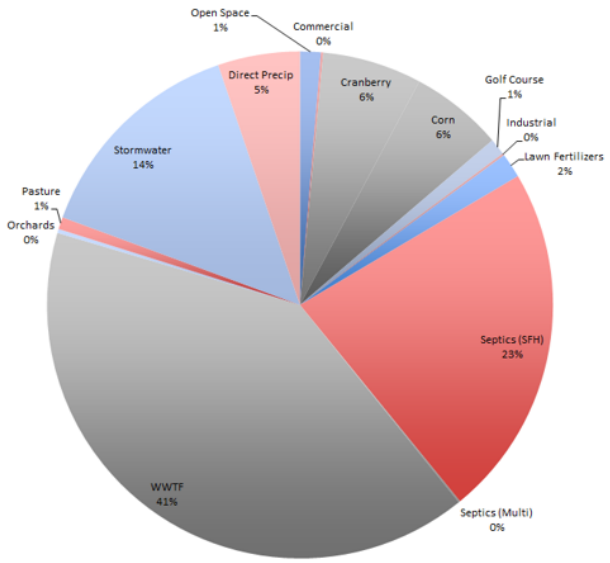
Nemasket Subbasin



Nemasket - APC to WWTP:

- 5km radius of subbasin - Development 19% → 32%
- Within Stream Buffer - only drops to ~15%

Sources of Nitrogen Loads for the APC-Nemasket

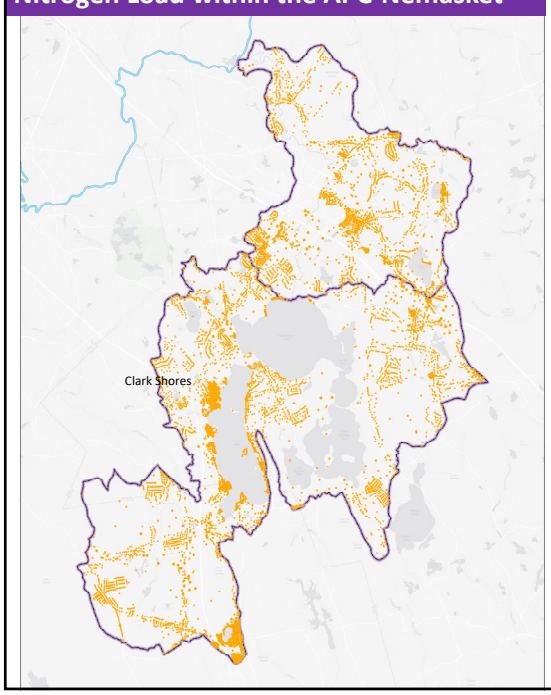


Taunton River Estuary: Allowable TN Load *(avg. 2004-05)*	3,879 lbs/day
Ocean load	1,798 lbs/day
Watershed load	4,228 lbs/day
	6026 lbs/day
Watershed Loads Reduction (~51%)	2,147 lbs/day

Higher proportion of reduction allocated to wastewater point sources

EPA considers 20% nonpoint source reduction reasonable (due to MS4 stormwater discharges, trends in ag uses/population, and pot'l reductions in atmospheric deposition through air quality programs.

Nitrogen Load within the APC-Nemasket



N Load Assumed

- Under 5 kg/year
- 5 - 10
- 10 - 20
- 20 - 50
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- 75 - 100
- 100 - 150
- 150 - 200
- 200 - 250
- Over 250 kg/year
- Nemasket Subwatersheds
- Taunton River

Nitrogen Load
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Septic
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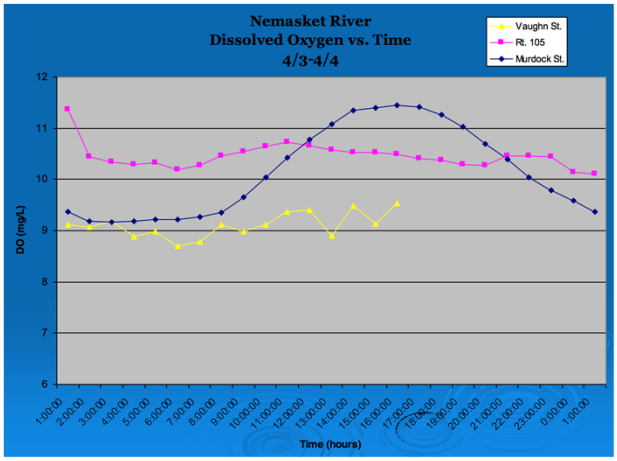
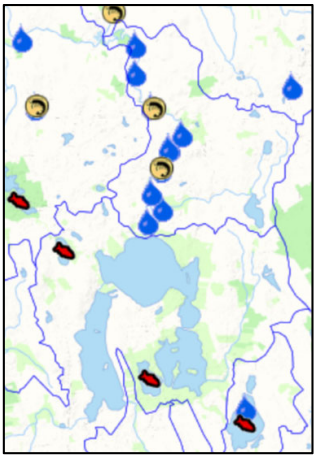
Excessive Nitrogen and Phosphorus

Tied to excessive plant growth, low DO…



DEP WQ Monitoring Stations



Low DO (2001-2021):
Nemasket: Murdock St, Vaughn St., DS of 495
Inputs: Bates Brk, Snipatuit Brk, Long Pond inflow, Black Brk, Fall Brk

APC-NEMASKET CONTRIBUTING SOURCES	WATER QUALITY THREATS						
	Excessive Nitrogen and Phosphorus	Bacteria: Fecal coliform	Low Dissolved Oxygen	Stormwater Runoff / Sedimentation	Hazardous Material Contamination	Increased Air & Water Temps	Altered Hydrologic Flow / Water LevelS
Failing Septic Systems/Cesspools	√	√					
Residential/Commercial Fertilizer Use	√			√			
Cranberry Bogs	√						√
Farms/Livestock/Animals	√	√		√			√
Golf Courses	√			√			√
Stormwater Drainage Systems	√	√		√			
WWTP	√	√					
Water withdrawals	√	√	√				√
Tributary Inputs to APC-Nemasket	√	√	√	√			
Invasive Aquatic Plants/Algae	√		√			√	√
PFAS (water supply)					√		
Contaminated Sites (Rockland Ind.)					√		√
Illegal Dumping					√		
Fuels/Other Hazardous Materials					√		
Local Roads/Highways	√	√		√	√		
Road-stream Crossings	√	√		√	√		√
Impervious Surfaces e.g., parking lots				√	√		
Undersized culverts and bridges							√
Bank/Channel Erosion				√			√
River Fragmentation			√	√			√
Drought	√	√	√			√	√

Climate Change Impacts on Water Quality

Projected climate change impacts in southeastern Massachusetts:

- **Warming Temperatures**: warmer waters hold less dissolved oxygen and can lead to eutrophication and excess algal growth, which will reduce drinking water quality and degrade habitat for fish and other aquatic species, altering food webs.
- **Extreme Storm Events**: the increased frequency of storms will lead to more water entering the APC-Nemasket - bringing increased sediment, nutrients, disease pathogens, and invasive species - degrading water quality and aquatic habitats. As this pollutant load travels downstream, to estuaries and the ocean, it can lead to blooms of harmful algae and bacteria.
- **Higher Surface Temperatures**: may contribute to making water quality standards or temperature criteria more difficult to attain, as well as lead to greater outbreaks of harmful algal blooms. Thus, efforts to reduce the temperature of treated wastewater discharges may be needed to help maintain water quality.
- **Increasing Total Annual Precipitation**: will change the water budget in the watershed resulting in the need to revisit assumptions about water nutrient loading.

In combination, these and other factors will likely exacerbate environmental and community impacts associated with both wet and dry periods across seasons. Planning both for more impactful drought periods and increased water volume during wet periods will be required to protect water quality.

Co-Benefits of Water Quality Protection

- **Ecology, Unique Habitats and Natural Resources**: Strategic land conservation and wetland restoration efforts have the potential to both filter/reduce pollutants and enhance water quality; riparian restoration has been shown to be most cost-effective phosphorus control (WMOST). Conversely, development of priority green infrastructure could worsen water quality in the watershed.
- **Floodwater Management**: Flooding over built areas has the potential to move and migrate pollutants and debris into the water system; reducing these floodwater extents will minimize this effect.
- **Stormwater Management**: Increased stormwater infiltration decreases runoff that carries pollutant loads into the water system, improving water quality.
- **Inter-Agency Cooperation**: Improved coordination between local and state operators on roadway drainage systems could reduce runoff and help improve water quality.
- **Land Development**: Placing new development outside of riparian areas and adjacent uplands, as well as using LID, will also enhance green infrastucture and improve water quality.
- **Recreational Access**: Increased recreation can encourage users to become stewards of the areas they frequent, potentially building support for water quality improvement measures; watercrafts that move between watersheds could transport invasives that can harm water quality.

Potential Water Quality Management Actions

Physical projects

- Reduce nitrogen & phosphorus
- Manage stormwater runoff and sedimentation
- Identify & mitigate potential hazard contamination
- Manage nuisance vegetation
- Enhance water quality & flow

Regulatory mechanisms

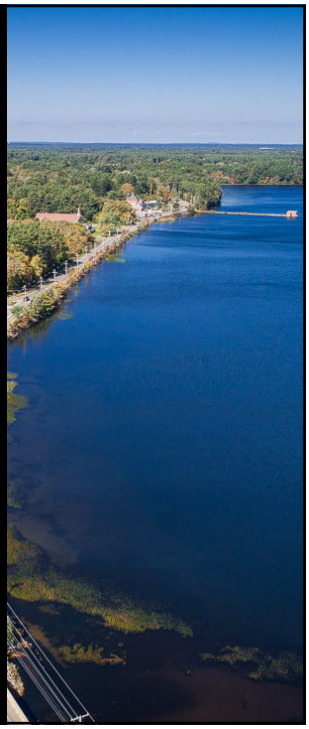
- Wetland buffer protections
- Boat washing stations and enforcement
- Septic system design & maintenance standards
- Municipal fertilizer use and lawn maintenance procedures
- Stormwater regulations favor on-site treatment and infiltration
- Stormwater management/maintenance MOUs
- Coordinate with land owners on water quality protection
- Water quality monitoring programs
- Invasive plant management programs and coordination

Discussion: management actions & regulatory approaches

Water Quality Focus	Neutral Effect	Inverse Trade Off Effect (as one goes up, the other goes down)	Co-Benefit Direct Effect (both go up or down together)						
Seed by providing some examples in this column; add as more are generated by public. Present to SC, refine, then present to public	EFFECT								
POSSIBLE MANAGEMENT ACTIONS	Water Quality	Drinking Water Supply Stability	Stormwater Infiltration	Ecology, Habitats & Natural Resource Conditions	Land Development	Inter-Entity Cooperation	Recreational Access	Public Stewardship	Will this action work under predicted climate conditions? Can it scale / survive?
Reduce Nitrogen & Phosphorus									
Septic system upgrades around APC and Long Pond, as appropriate				Would also restore habitat value					
Install permeable reactive barriers to filter nutrients from groundwater, as appropriate				Would also restore habitat value					
Limit pesticide/herbicide treatments over and around the APC through Integrated Pest Management and better communication with DPH				Would also restore habitat value					
Riparian restoration shown to be most cost-effective phosphorus control (WMOST) - identify candidate restoration sites				Would also restore habitat value					
Work with golf course owners to implement protection measures: vegetated buffers, minimizing pesticide/fertilizer use.				Would also restore habitat value					
Work with bog operators to implement nutrient and water managment plans/DEP BMPs that include requirements for meeting water quality standards and phophorus reduction (for 'impaired' waters) and implement denitrification (NRCS assistance); work with MDAR/DER to restore natural functions of retiring cranberry bogs.				Would also restore habitat value					

APC/Nemasket Management Plan Topics: Floodwater & Water Quality

Steering Committee Meeting #6 | September 8, 2021



Agenda

- Revisit vision for the watershed (5 minutes)
- Developing plan recommendations: Floodwater Management
  - Issue summary presentation (15 minutes)
  - Management actions discussion (35 minutes)
- Developing plan recommendations: Water Quality
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- White paper review updates (5 minutes)
- Public meeting schedule (5 minutes)
- Upcoming outreach: Taunton River Festival (5 minutes)

Vision for the Watershed: Management Goal

Overall, in 2050, the APC and Nemasket River are healthy, sustaining life and natural communities, including our own through clean, safe, and reliable water supply, and the inhabitants of the watersheds have developed an environmental ethic based upon choice, not chance, that drives sound local and regional decision-making.

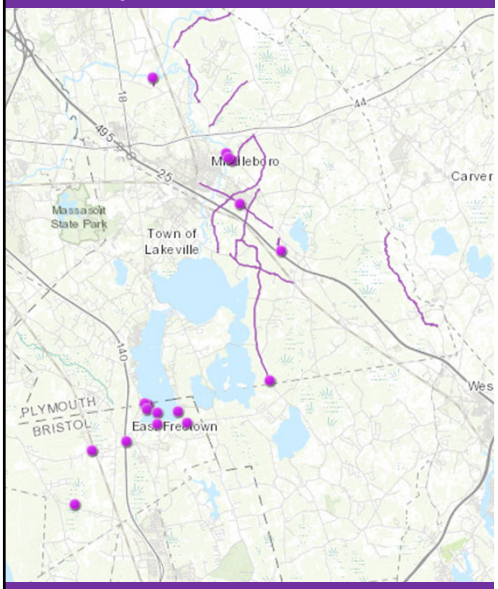
Topics: Flooding and Water Quality

- What are the issues?
- What impacts have already been observed?
- How is climate change likely to impact this issue?
- What are the associated co-benefits of taking action?
- What are potential management actions?
- Which associated regulatory mechanisms should we explore (select 3)?

Flooding – Overview of the Issue

The Assawompset Ponds Watershed has several characteristics that make it prone to flooding. Topography, soils, and development patterns all play a role in both creating flood hazards during wet periods and making the watershed slow to drain once flooding has occurred. In addition, the role of Assawompset Pond as a water supply reservoir creates requirements to maintain water storage within the watershed.

Flood Impact Areas and Road Closures



Map 1 shows flood impact areas and road closures associated with the 2010 flood event. The map was created based on interviews with Freetown and Middleborough staff and is therefore only a partial representation of the total flooding impacts.

Flooding Impacts Observed

Middleborough

- Bascule Dam, Thomas Street Culvert, and Woods Pond dam all potential sources of flooding

Lakeville

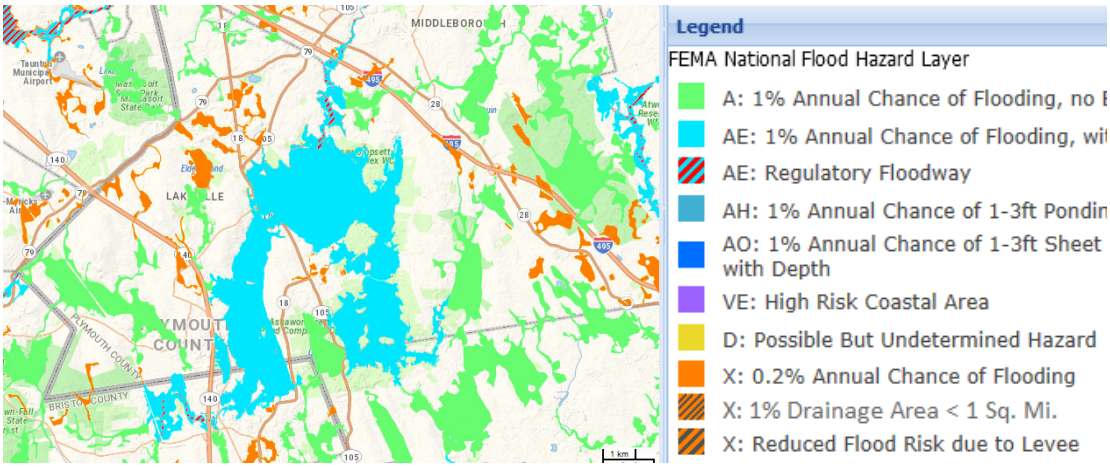
- Culverts: Route 105, Snake River, Taunton Street/Poquoy Brook, Cross Street, Pickens Street, Route 18, Snake River, Pierce Avenue/Bittersweet Road, and Country Road by the Eagles Building
- Highland Road, Bedford Street, Taunton Street, and Cross Street frequently inundated
- Captain's Way, Freetown Street, Country Road, Riverside Drive, and Old Powder House have drainage issues

Freetown

- Chippeway Road culvert along Fall Brook was identified as causing frequent localized flooding.

Rochester: Need more input

Flood hazard areas



Climate Change Impacts on Flooding

Projected climate change impacts in southeastern Massachusetts:

- Increased prevalence of heavy precipitation events: The continued shift towards heavy precipitation events will increase the threat of flash flooding. This problem likely worsen as urbanization continues and impervious surface area in the watershed increases.
- Increasing total precipitation: Increasing total annual precipitation will change the water budget in the watershed resulting in the need to revisit assumptions about water storage capacity of the ponds and flood hazard.
- Warming temperatures: Over time this trend will result in a higher percentage of precipitation coming as rain rather than snow. Also, the combination of longer growing season, higher evaporation rates, and increasing evapotranspiration rates will result in reduced soil moisture and reduced stream and pond levels during dry periods.

In combination these factors will likely exacerbate environmental and community impacts associated with both wet and dry periods across seasons. Planning both for more impactful drought periods and increasing flood hazard during wet periods will be required.

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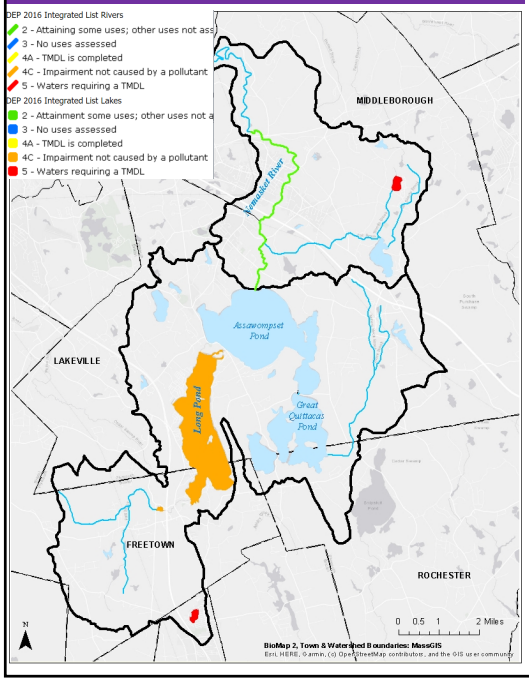

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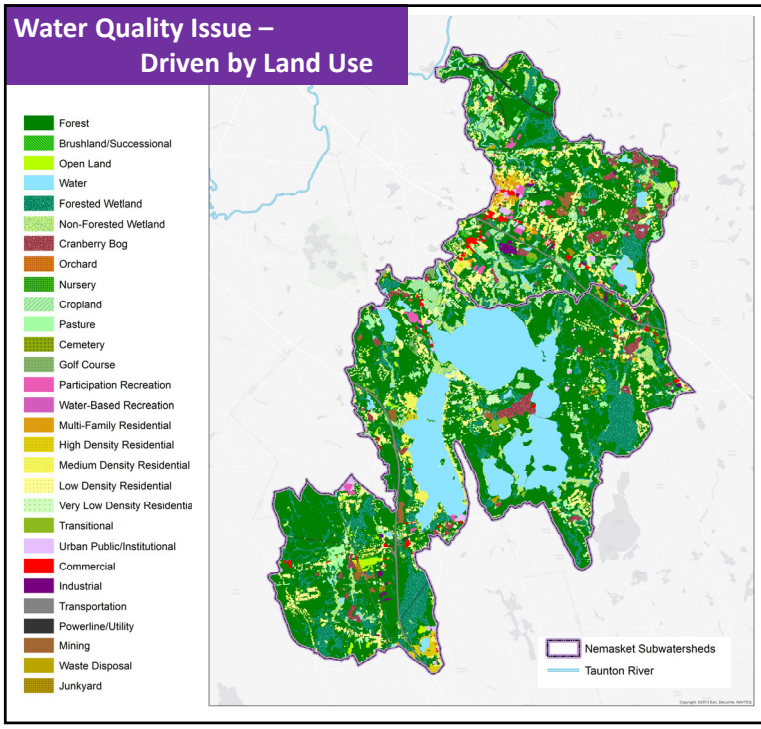

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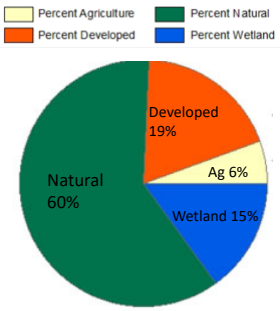

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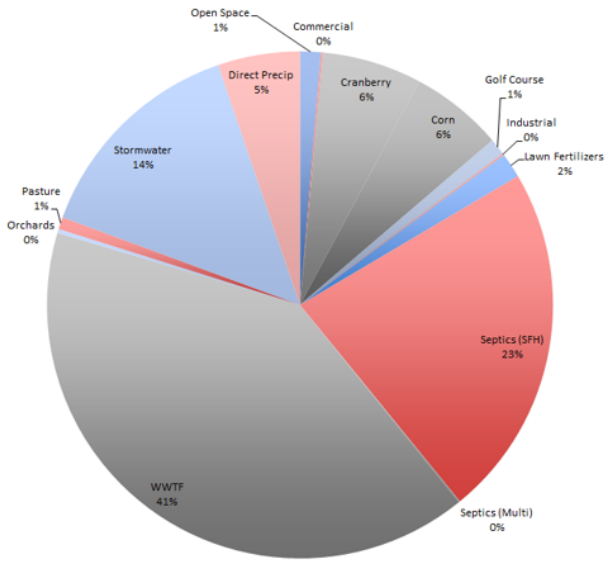

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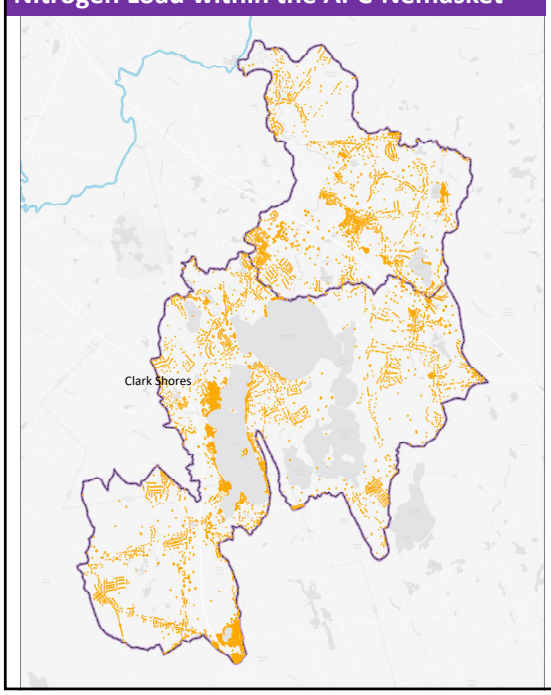

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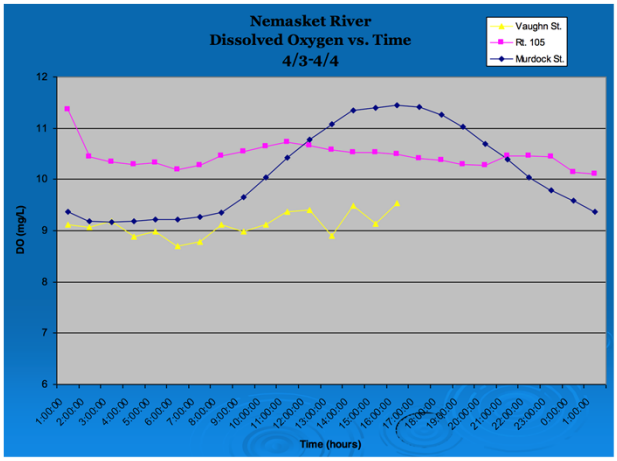

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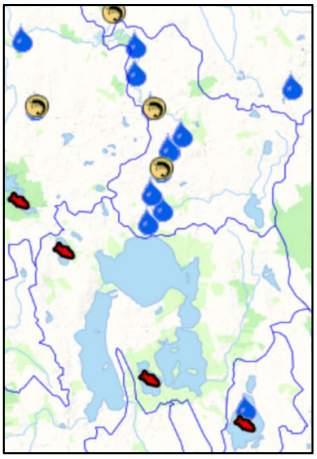

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Residential/Commercial Fertilizer Use	√			√			
Cranberry Bogs	√						√
Farms/Livestock/Animals	√	√		√			√
Golf Courses	√			√			√
Stormwater Drainage Systems	√	√		√			
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PFAS (water supply)					√		
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Undersized culverts and bridges							√
Bank/Channel Erosion				√			√
River Fragmentation			√	√			√
Drought	√	√	√			√	√

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- **Warming Temperatures**: warmer waters hold less dissolved oxygen and can lead to eutrophication and excess algal growth, which will reduce drinking water quality and degrade habitat for fish and other aquatic species, altering food webs.
- **Extreme Storm Events**: the increased frequency of storms will lead to more water entering the APC-Nemasket - bringing increased sediment, nutrients, disease pathogens, and invasive species - degrading water quality and aquatic habitats. As this pollutant load travels downstream, to estuaries and the ocean, it can lead to blooms of harmful algae and bacteria.
- **Higher Surface Temperatures**: may contribute to making water quality standards or temperature criteria more difficult to attain, as well as lead to greater outbreaks of harmful algal blooms. Thus, efforts to reduce the temperature of treated wastewater discharges may be needed to help maintain water quality.
- **Increasing Total Annual Precipitation**: will change the water budget in the watershed resulting in the need to revisit assumptions about water nutrient loading.

In combination, these and other factors will likely exacerbate environmental and community impacts associated with both wet and dry periods across seasons. Planning both for more impactful drought periods and increased water volume during wet periods will be required to protect water quality.

Co-Benefits of Water Quality Protection

- **Ecology, Unique Habitats and Natural Resources**: Strategic land conservation and wetland restoration efforts have the potential to both filter/reduce pollutants and enhance water quality; riparian restoration has been shown to be most cost-effective phosphorus control (WMOST). Conversely, development of priority green infrastructure could worsen water quality in the watershed.
- **Floodwater Management**: Flooding over built areas has the potential to move and migrate pollutants and debris into the water system; reducing these floodwater extents will minimize this effect.
- **Stormwater Management**: Increased stormwater infiltration decreases runoff that carries pollutant loads into the water system, improving water quality.
- **Inter-Agency Cooperation**: Improved coordination between local and state operators on roadway drainage systems could reduce runoff and help improve water quality.
- **Land Development**: Placing new development outside of riparian areas and adjacent uplands, as well as using LID, will also enhance green infrastucture and improve water quality.
- **Recreational Access**: Increased recreation can encourage users to become stewards of the areas they frequent, potentially building support for water quality improvement measures; watercrafts that move between watersheds could transport invasives that can harm water quality.

Potential Water Quality Management Actions

Physical projects

- Reduce nitrogen & phosphorus
- Manage stormwater runoff and sedimentation
- Identify & mitigate potential hazard contamination
- Manage nuisance vegetation
- Enhance water quality & flow

Regulatory mechanisms

- Wetland buffer protections
- Boat washing stations and enforcement
- Septic system design & maintenance standards
- Municipal fertilizer use and lawn maintenance procedures
- Stormwater regulations favor on-site treatment and infiltration
- Stormwater management/maintenance MOUs
- Coordinate with land owners on water quality protection
- Water quality monitoring programs
- Invasive plant management programs and coordination

Discussion: management actions & regulatory approaches

Water Quality Focus	Neutral Effect	Inverse Trade Off Effect (as one goes up, the other goes down)	Co-Benefit Direct Effect (both go up or down together)						
Seed by providing some examples in this column; add as more are generated by public. Present to SC, refine, then present to public	EFFECT								
POSSIBLE MANAGEMENT ACTIONS	Water Quality	Drinking Water Supply Stability	Stormwater Infiltration	Ecology, Habitats & Natural Resource Conditions	Land Development	Inter-Entity Cooperation	Recreational Access	Public Stewardship	Will this action work under predicted climate conditions? Can it scale / survive?
Reduce Nitrogen & Phosphorus									
Septic system upgrades around APC and Long Pond, as appropriate				Would also restore habitat value					
Install permeable reactive barriers to filter nutrients from groundwater, as appropriate				Would also restore habitat value					
Limit pesticide/herbicide treatments over and around the APC through Integrated Pest Management and better communication with DPH				Would also restore habitat value					
Riparian restoration shown to be most cost-effective phosphorus control (WMOST) - identify candidate restoration sites				Would also restore habitat value					
Work with golf course owners to implement protection measures: vegetated buffers, minimizing pesticide/fertilizer use.				Would also restore habitat value					
Work with bog operators to implement nutrient and water managment plans/DEP BMPs that include requirements for meeting water quality standards and phophorus reduction (for 'impaired' waters) and implement denitrification (NRCS assistance); work with MDAR/DER to restore natural functions of retiring cranberry bogs.				Would also restore habitat value					

Water Quality Focus	Inverse Trade Off Effect (as one goes up, the other goes down)	Co-Benefit Direct Effect (both go up or down together)

Seed by providing some examples in this column; add as more are generated by public. Present to SC, refine, then present to public

EFFECT

POSSIBLE MANAGEMENT ACTIONS	Drinking Water Supply Stability	Stormwater Infiltration	Ecology, Habitats & Natural Resource Conditions	Land Development	Inter-Entity Cooperation	Recreational Access	Public Stewardship	Will this action work under predicted climate conditions? Can it scale / survive?	Barriers to Implementation?
Reduce Nitrogen & Phosphorus									
Septic system upgrades around APC and Long Pond, as appropriate			Would also restore habitat value						
Install permeable reactive barriers to filter nutrients from groundwater, as appropriate			Would also restore habitat value						
Limit pesticide/herbicide treatments over and around the APC through Integrated Pest Management and better communication with DPH - these treatments would be reviewed by Natural Heritage and Water Supply. Sometimes used but with conditions.	non-chemical options - inputs would be reviewed by City of New Bedford and City of Taunton. Would need to consider many factors.		Would also restore habitat value						
Riparian restoration shown to be most cost-effective phosphorus control (WMOST) - identify candidate restoration sites			Would also restore habitat value						
Work with golf course owners to implement protection measures: vegetated buffers, minimizing pesticide/fertilizer use.			Would also restore habitat value						
Work with bog operators to implement nutrient and water managment plans/DEP BMPs that include requirements for meeting water quality standards and phophorus reduction (for 'impaired' waters) and implement denitrification (NRCS assistance); work with MDAR/DER to restore natural functions of retiring cranberry bogs.			Would also restore habitat value						
Work with farmers to implement manure management BMPs; encourage financial/technical assistance for conservation improvements on their land (NRCS)			Would also restore habitat value						
Excessive salting - Best Management Practices for de-icing needed as salting is becoming an issue. NOTE that some of the "alternatives" are high in phosphorus, esp those derive from animal products.									
Manage Stormwater Run-Off/Sedimentation									
Country drainage along roadways; bioswales			Would also restore habitat value						
Wetland restoration at Bridge St, Wood St, Wareham St, Vaughn St			Would also restore habitat value						
Work with natural systems/green infrastructure to infiltrate water from impervious surfaces (e.g. at Ocean Spray and South Coast Rail Parking lots)			Would also restore habitat value						
Implement green infrastrcture, channel restoration, and gray infrastructure to channel stormwater and prevent Nemasket flooding from overtopping WWTP's effluent discharge pipes.			Would also restore habitat value						
Remove sandbars and MassDOT broken drain (495/44)			Would also restore habitat value						
Enhance cooperation between local/state operators on roadway drainage systems, i.e., MassDOT better coordination with DPW 5-yr maintenance plans/3-year outfall maintenance permits (Rte 18 salting occurring again?), DEP permits and Orders of Conditions.									
Better coordination with MassDOT to address stormwater effects on roadway infrastructure, i.e., better outfall maintenance (catch basin at Rte 44/Plymouth St) and drainage issues on Rts 44 and 495 that contribute to Nemasket sedimentation (remove sandbars and broken drain).									
Work with MassDOT to explore new road surface quality and road bed design standards also an approach that may help alleviate drainage issues and maintain roads over time.									
Resources needed to incorporate climate resilience into MS4 permits and for monitoring sewer system releases. Middleboro implemented stormwater bylaw - catch all for permitting that doesn't happen in other departments.									
Enhanced water quality assessment through expanded water quality monitoring program									
Increase WQ sampling sites and encourage educational institutions (BSC or TRWA?) to develop and/or undertake specific monitoring programs in coordination with DEP (e.g., Nemasket below 495 and Vaughn St, Long Pond inflow, Bates Brk, Snipatuit Brk, Fall Brk, Black Brk).									
Identify and mitigate potential hazardous material contamination									

DEP published PFAS public drinking water standard (10/2020) MMCL of 20 ng/L (ppt); are Taunton and New Bedford sampling for PFAS. Thankfully 4 samples so far have been very low.							
Conduct a vulnerability assessment of harmful pollutants migrating from contaminated sites during flood events (DPW site, Rockland Industries Hazardous Waste Site); remdiate sites if necessary.							
Biosolid disposal - not permitted in landfalls anymore per state requirements. Tied to PFAS issue. Sludge handling locations - have witnessed it being used/dropped at locations near 105 near Halifax, off Summer Street... dropoff near the Nemasket River.							
Manage Invasive Plants/Algae Blooms			interplay with low DO observations				
Install Long Pond boat washing station and educate about recreational uses and invasive species transmission.			Would also restore habitat value				
Long Pond homeowners group working with lake management contractor to manage invasives aquatic plants (e.g., non-herbicide treatment, mechnical harvesting, etc.)	Physical removal would be an easier method in agency review		Would also restore habitat value		Long Pond Association is looking to become a non-profit and will be considering non-chemical and chemical		
Remove vegetation mass from Wareham St Pond (Herring Commission has begun removal in Nemasket with Ecoharverster)			Would also restore habitat value				
Plymouth street bridge and murdock street bridge is another choke point. Plymouth Street bridge still a stone bridge.							
Personal collection - largest challenge is where to put it once collected. Can ag. animals eat it? Has been used in uptstate NY as a fertilizer.							
Enhance Water Quantity and Flow							
Continue to monitor compliance with WMA registration / permit water withdrawal limits and other special conditions (water supply, cranberry bogs, golf courses).			Would also restore habitat value				
Remove impediments to flow on Nemasket and APC, including: remove sediment/vegetation below APC dam and Wareham St pond, replace railroad bridge over Nemasket, elevate Bedford St, replace Murdock St Bridge			Would also restore habitat value				
Reconnect Assawompset Pond to surrounding weltands beyond berm							
Replace culverts at Snake River/Rte 105 and Squam Brook							

Floodwater Management Focus	Neutral Effect	Inverse Trade Off Effect (as one goes up, the other goes down)	Co-Benefit Direct Effect (both go up or down together)

EFFECT

POSSIBLE MANAGEMENT ACTIONS	Water Quality	Drinking Water Supply Stability	Stormwater Infiltration	Ecology, Habitats & Natural Resource Conditions	Land Development	Inter-Entity Cooperation	Recreational Access	Public Stewardship	Will this action work under predicted climate conditions? Can it scale / survive?	Barriers to Implementation
Store the Floodwater										
Restore wetland areas where previous assessment has found the potential to achieve floodwater storage - [Reference DER project outcomes - Route 18 East of boat ramp back towards water treatment facility in Freetown/Squam Brook] - with weeds coming out might have more storage		Could also mitigate drought condition (postulation); consider that storing in another place might remove from dw supply; restoration needs to consider water supply infrastructure piping [can we get that?] Consider inter-basin transfer SWIMMI issues in wetland restoration / also safe yield - how it would impact safe yield as currently set (Ymane will look for info)	Tension in that restored wetlands/bogs can have a capacity to hold water and not allow it to flow through	Would also restore habitat value						
Wetland replication and expansion in upland areas.										
Cranberry bog restoration in the watershed (no votes)										
Help the Floodwater Flow										
Replace culverts at Snake River and Route 105 (4)										
Reconnect Assawompset Pond to surrounding weltands beyond berm		same considerations as above it wetland restoration								
Remove sediment deposition in the first 500ft of the Nemasket (1)										
Restore the Nemasket River Channel, which would include limited and targeted dredging as part of channel restoration										
Remove the bascule dam to gain topography and reduce impoundment										
Remove vegetation mass from Wareham St Pond (7)										
Replace railroad bridge over the Nemasket (6)										
Remove sandbards and MassDOT broken drain (495/44) (8)										
Replace Plymouth Street Bridge in Middleboro										
Replace Murdock Street Bridge in Middleboro (8)										
Cross Street Culvert (Purchard Brook) - applied for a replacement project not awarded										
Replace Squam Brook Culvert (tie to wetland comment above no votes)										
Make Rules that Limit Dangers from Flood Water										
Pursue Regional Participation in FEMA's Community Rating System program - provide technical assistance at scale by going through process with multiple communities at once (Cape Cod Commission example) - iterative process working together as a region; find areas of agreement on which actions to pursue										
Review MOUs and procedures with entities like MassDOT that have a role in scheduled maintenance that affects drainage, sedimentation and water flow (plus renewed handle on where the outfalls are located)										
Limit development in the floodplain (floodplain zoning, wetland bylaw, etc.)					40Bs bypass Floodplain, other bylaws - can we be more proactive in siting these away from the watershed's sensitive areas so that they do not land here [state bill under consideration to amend 40B - Marea info]. Note that they cannot bypass conservation commission review for WPA standards.	Town planner and local staff to coordinate with other agencies and engage with state laws				
Specifically - adopt a local stormwater bylaw that is above minimum infiltration and other standards. [Effort at state level to increase the size of the storm that is designed for in consturction]										
Transfer of Development Rights bylaw (TDR) - under consideration in Middleboro / Lakeville has considered previously										
Identify more stringent construction standards (impervious cover limits, stormwater calculations that account for climate change, freeboard requirements, etc.)										
Build Infrastructure that Limits Dangers from Flood Water										
Elevate Bedford Street (no votes) - two culvert replacements; enlarging these would help to alleviate flooding even if entire road is not elevated. Might be a more cost effective option as well when considering overall feasibility.										

Install green infrastructure to control on-site flooding and runoff from properties abutting the river (e.g. at Ocean Spray and South Coast Rail Parking lots) Is SCR/MBTA doing anything like this? More like traditional stormwater management options being installed...could retrofit the Lakeville Parking area as this will be used for shuttle service (7) Middleboro WRPD Zone 2 area - SCR followed to extent practicable but can more be done?									
Intall green infrastructure (swales, "country drainage" systems) to control flooding on roadways									
Avoid the Flood Water									
Create a regional buy-out program - proposed state-run buyout program under consideration									

APC-Nemasket Steering Committee Meeting #6: 9/8/2021, 9am

APC Committee business

- Boat access on homeowner properties issue – want to increase enforcement next summer
    - Revise boating permits next year, keep access to property owners only, not renters
- Released baby loons recently, one was adopted by resident loon (exciting sign of success)
- Lowered dam in expectation of coming storms/rainfall
- No police calls necessary this year in Lakeville; did need no trespassing signs in Rochester(?)
    - More signs needed along ponds so people know you can't swim or get in water
    - Many renters getting in water, others see and think it is okay to do too – property owners need to do better to communicate to renters
- Herring have enough water to get out, recent rain storms have started migrations downstream, boards lowered so can go any time
    - No huge migrations seen yet
- Ecoharvester used to remove weeds 8/3-4 – was success in removing weeds (~120 yards) and restored current, need to wait and see the long-term success
    - Removed weeds to clear channel, but did not get all the way to banks, but improved current may help prevent weeds taking over again?
    - Demonstration project – call attention to problem and see how it may help
    - Issue is both weeds and sand clogging river

APC-Nemasket SC presentation

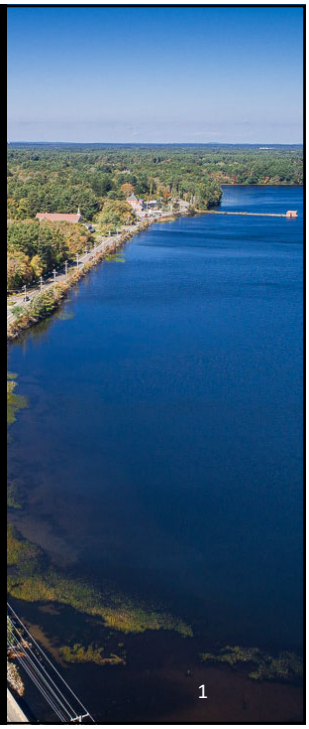
- Flooding impacts
    - Lia noted diff ideas people have about flooding --> bedford st between lakes essentially shut town down (higher level of flooding that needs to be addressed)
    - Nancy noted that map doesn't reflect all areas that flooded
    - Freetown flooding (Pete DeFusco): RT 18 in Freetown flooded 2010 – recent development around tribs, concern about additional flooding impacts
    - Tom noted another rd in Lakeville – missed?, additional areas along Long Pond
    - Tricia, Middleborough: Other areas in Middleborough flooded during the March 2010 event. Vernon Street at Poquoy Brook, Woloski Park/Plymouth Street, Murdock Street/River's Edge Drive, Marion Road, Plymouth Street at Taunton River (Bridgewater Town Line), Summer Street at the sharp curve a bog culvert blew out under the road, Stony Brook Dam at the Pratt Farm property was breached
    - Purchade brook flowed backwards from taunton around Woloski Park due to flooding
    - Ymane questioned whether 2021 flooding happened outside of FEMA 100yr flood map?
- Floodwater matrix discussion
    - Ymane – wetland restoration co-benefit with drinking water supply – could also exacerbate drought conditions of waters being stored in a separate location? Impacts on safe yields? Need hydrological model to confirm...
    - Affordable housing developments in Lakeville – large development near train station --> any regulatory mechanisms to prevent environmental impacts?
        - 40B can bypass local bylaws, less local control
        - Additional septic tanks/leachage fields being constructed since no sewer
        - Recent bill going through legislature to update 40B

        - 40b bypasses wetland bylaws but not cons commission review/WPA, no PB...
    - Lakeville has tried to pass local wetland bylaw using MACC model, but too extensive, couldn't adopt --> look into adopting simple wetland bylaw
        - Hiring town planner currently to help with some of these issues
    - Community Rating System, Michele Paul: great to lower flood rates, but how would regional approach look? Technical assistance from SRPEDD?
        - Done community by community, but we could pull communities to go through process together (current model in Cape Cod – CCC has regional person who goes through process with each community)
        - Approaching from regional basis – either APC or SRPEDD – similar concerns/considerations, can tackle together as a region and support multi communities at once
        - MVP could inform, help support enrollment? Regional MVP application to pursue?
        - Towns could also come together to select most appropriate project types to pursue
    - Another consideration for floodplain planning – some of communities in Taunton Watershed vs Buzzards Bay Watershed, though considerations will be applicability to both watersheds, actions will benefit either
    - Chance – benefits of cranberry bog restoration – slow down water
        - Active cranberry bogs can also be part of solution
    - Nancy recommended TDR bylaw
        - Middleborough has also been talking about adopting one, no towns have yet
    - Speak to all town DPWs – list of culverts to replace (Middleborough has list)
        - Ymane – hydrological analyses to prioritize culvert replacements based on biggest impacts?
    - Raising Bedford st – feasible? Less costly alternatives – increase culvert sizes?
- Water Quality discussion
    - Herbicide treatment of invasive weeds in Long Pond under consideration – permitting / costs, impacts to drinking water supply – realistic?
        - NHESP will also review due to mussel rare species habitat – but chemical herbicides can/are used in rare habitats elsewhere
        - Ymane – NB preferns non-chemical treatments, need to fully consider impacts to drinking water quality
        - Long Pond Assoc (looking to become non-profit) – will look into alternative methods of controlling weeds (herbicide not only option), also looking into using ecoharvester
    - Deicing / excessive salting – elevated sodium in water supply
        - Consider some alternatives are high in phosphorus (limiting nutrient tied to algal blooms in FW)
    - Physical removal of weeds – can be used for livestock feed??
        - Encourage volunteer stewardship – remove weeds and drop off somewhere for use?
        - Can be used as fertilizer, mulch

Assawompset Pond Complex & Nemasket River Watershed Management & Climate Action Plan

Steering Committee Meeting #7 | Ecology, Unique Habitats and Natural Resources

November 10, 2021



1

Agenda

- Grants Update (5 min)
- Public engagement update & meeting recaps (15 min)
- Developing plan recommendations: Ecology, Unique Habitats and Natural Resources
  - Issue summary presentation (15 min)
  - Management actions discussion (45 min)
- Next steps/updates (10 min)
  - White paper review updates
  - Future public meeting schedule

2

Summary from Meeting on Floodwater Management

The Floodwater Management meeting was hosted on **Sept. 29th,** in person and online in Lakeville.

The presentation included information on the dynamics of floodwater, its impacts on communities surrounding the ponds on a watershed and pinch-point (culvert/parcel) scale, and future climate stresses.

Some general themes in public comment included:

1. A feeling of a lack of transparency regarding who maintains Assawompset Pond at the set water level.

2. A need for a discussions about management of the APC water levels in the future, including possibly redesigning the APC Dam to be more flexible to address high water periods within the system.

3. Prioritizing addressing invasive species removal in Long Pond prior to encouraging water flows between components of the APC systems (such as at Snake River Culvert).

4. Cultivating water sharing relationships between water suppliers and surrounding communities to increase water level draw downs during high water periods.

5. Support for strengthening wetlands protections bylaws.

3

Summary from Meeting on Water Quality

The Water Quality meeting was hosted on **October 13th,** in person and online in Taunton.

The presentation included information on water quality issues in specific watershed waterbodies, including toxicity, system flow, sources of contaminated runoff, and possible future climate stresses on water quality.

Some general themes in public comment included:

1. A need to reduce the contribution of toxic chemicals and nutrient-loading elements (nitrogen and phosphorus). The towns should particularly use nature based solutions, and hold developers to standards by using funds in escrow to pay for these solutions when developers will not fund NBS.

2. Enhanced septic system controls should be implemented for new property developments and sales, including Title 5 transfers. New construction should use nitrogen-reducing septic systems.

3. Better control of invasive species is a significant need, and should be done particularly in the Long pond and Nemasket River region. The member towns should investigate financing the purchase of an EcoHarvester. All invasive removal efforts should be planned on a multi-year, dedicated, funding schedule.

4. The towns should investigate options for recruiting and deploying volunteers to run the EcoHarvester and to engage in manual removal of weeds by hand (wetlands reg issue?).

4

Ecology, Unique Habitats, and Natural Resources in the APC & Nemasket

- What are the issues?
- What impacts have already been observed?
- How is climate change likely to impact the issues?
- What are the associated co-benefits of taking action?
- What are potential management actions and regulatory mechanisms to address the issues?

5

Ecology, Unique Habitats & Natural Resources – Overview of the Issue

The APC-Nemasket is critical habitat for the largest herring run in MA and its variety of wetlands and uplands provide a wide range of habitats rich in biodiversity. Although largely in natural cover, several features in the watershed – including development, habitat fragmentation, water quality/quantity – degrade habitats and stress fish, wildlife and plant populations.

BioMap2

Guide strategic biodiversity conservation focusing land prot/stew on areas most critical to ensure long-term persistence of rare/native species, their habitats, exemplary NCs, & diversity of ecosystems.

APC-NEMASKET BASIN: 52%, or ~23,500 of 45k acre basin = CH / AC / CNL

Core Habitat: SCC, exemplary NCs, & intact ecosystems

- *16 rare/globally imperiled sp, many uncommon wildlife/plants*

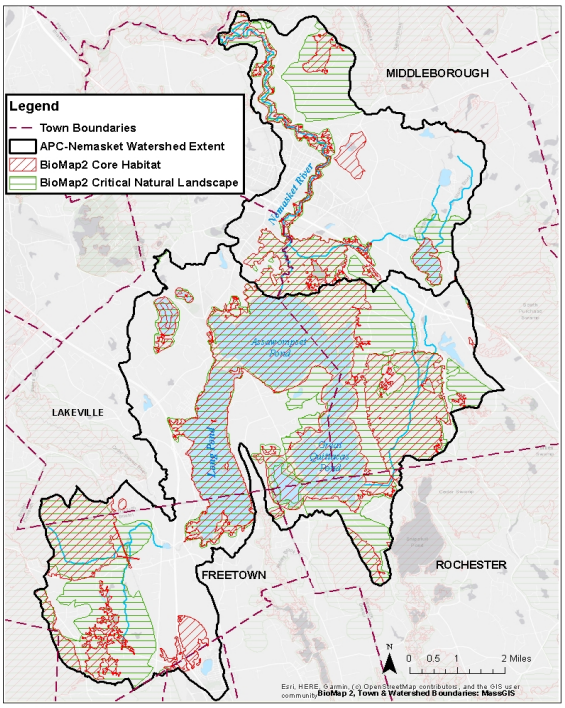
Aquatic Core: intact rivers where physical/ecological processes function for fish/aquatic SCC

- *APC, Nemasket, Fall & Black Brooks, adj wetlands…*

Critical Natural Landscape: larger landscapes better able to support ecological processes, disturbances, & wide-ranging species.

- ***Landscape Blocks*** *– large, intact areas w/ natural veg & contiguous forests, wetlands, rivers, lakes, ponds*
- ***Forest Cores*** *- best examples of large, intact forests less impacted by rds/dev*
- ***Aquatic/Wetland Buffers*** *- protective upland buffers around wetlands/rivers*

BioMap3 is in the works…

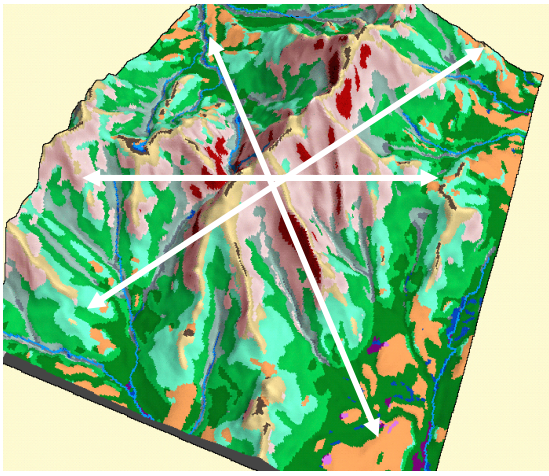


TNC's Resilient & Connected Landscapes

Landscapes that will support plants & animals in a changing climate…

- *effects of CC are buffered by natural properties of complex & connected landscapes*

1. **GEOPHYSICAL SETTINGS:** unique combinations of geology, elevation, & landforms
2. **COMPLEX LANDSCAPE:** sites with variety of small, connected, 'micro-climates' - those with range of temp/moisture
3. **CONNECTED LANDSCAPES:** low level of human modification that allow species to move & disperse, & processes like water movement or fire can occur unimpeded



Site Resilience Scores: **Far Below** to **Far Above Average -**

- estimate capacity to maintain species diversity & ecological function as climate changes

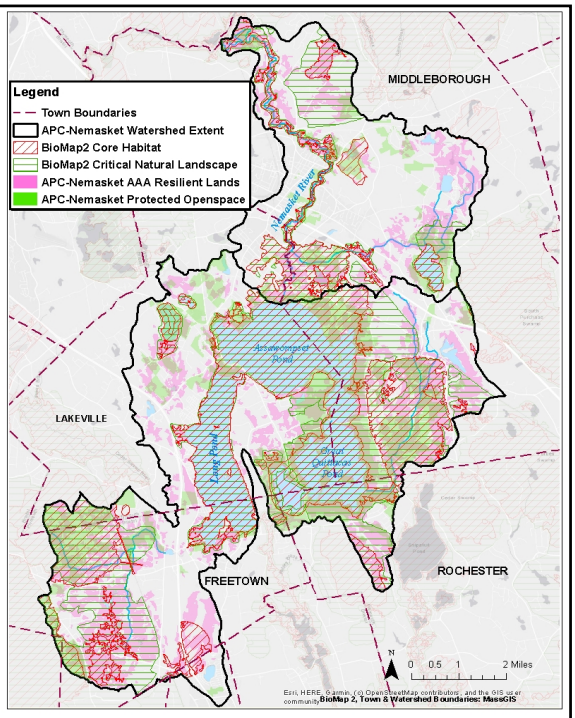
APC-Nemasket
Above Average (AAA) Resilience Lands & BioMap2

APC- Nemasket Basin	Acres	Acres Protected
Total Area	45,000	9,260
BioMap2*	23,500	6,923
AAA Resilience**	17,550	5,048
BioMap2 AAA	14,100	4,364

*including waterbodies; **excluding waterbodies

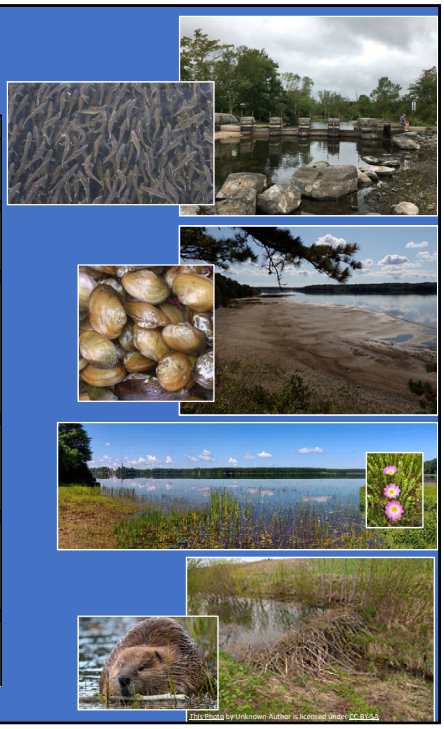
Maintaining ecosystem function/intact landscapes = Maintaining ecosystem services for nature and people

- Mitigate flooding & drought
- Filter & clean water
- Carbon storage
- Provide recreation, quality of life
- Cool temperatures



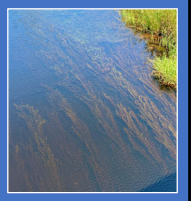
STRESSOR: Altered Water Levels/Flow

TAXA / NC	IMPACTS
Herring	**Low flow**s restrict downstream emigration; 2016 drought reduced juvenile recruitment & resulted in low 2020 runs elsewhere - 2020 drought impacts yet to be seen
Coldwater Fisheries	**Altered flow** to small spring fed headwater streams reduces avaialble habitat and **warm water impoundments** preclude connectivity with habitats for different life stages
Freshwater Mussels	**Water level fluctuations & rapid/prolonged dewatering** of nearshore sandy areas in APC (for water supply, flood control, or maintenance activities) strand/kill mussels, reduce juvenile recruitment; **low flows** & loss of stream connectivity can limit host fish passage, reduce mussel dispersal, limit upstream colonization, and lead to habitat/population fragmentation compounded by potential genetic isolation
CPP/Rare Plants	**Artificially maintained high water levels for consecutive yrs & excessive drawdowns/prolonged dewatering** eliminate naturally fluctuating water levels, preventint CPP plant growth & woody veg encroachment, respectively
Beaver	No reports of flooding concerns but observed in Pocksha; **dam construction** in nearby areas creating some **public health/safety concerns** - e.g., dams on Mattapoisett during drought raised concerns from cranberry growers
Turtles	**Increased flooding** along the Nemasket & **water level fluctuations** in the APC may reduce and limit available basking sites/objects for 2nd turtle species



STRESSOR: Water Quality

TAXA / NC	IMPACTS
Herring	**Poor WQ** in APC can affect all age classes including eggs
Warmwater Fisheries	**Residential/roadway run-off & excessive use of personal watercraft (Long Pond)** increases turbidity & aquatic veg reducing water clarity/feeding efficiency (e.g., Bridle Shiners)
Coldwater Fisheries	**Land use changes** degrade headwater stream hab due to loss of forested riparian areas, increased water temps, low DO, & reduced grounwater recharge
Freshwater Mussels	**Development/impervious surfaces & excessive run-off/nutrients** degrade WQ - particularly reduced DO, increased water temps, & turbidity - & interfere with mussel filter feeding/reproduction & potential loss of less tolerant species; upper Nemasket **Impaired/not support Aqu Life Use (TMDL) due to Chronic Aquatic Toxicity, DO, Temp; Alert - benthic macroinvert sample naid worm**
	Impoundments along Nemasket with warmer temperatures and less DO
Birds / Waterfowl	**Chemical/sediment runoff** and marsh degradation likely cause of recent declines to **Least Bittern** pops; invasions of by Purple Loosestrife & Phragmites are also major threats to habitat
CPP/Rare Plants	**Runoff/nutrient enrichment** enhance growth of non-native aquatic vegetation which can displace native vegetation**; Long Pond** 'Impaired' (2019) for Aquatic Life use due to non-native aquatic plants (Variable Milfoil, Fanwort)

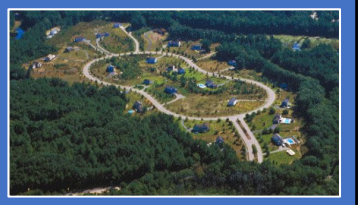


STRESSOR: Stream Connectivity / River Fragmentation

TAXA / NC	IMPACTS
Herring	**Pinch points** - AP dam, bridges, undersized culverts (Rt 18), sedimentation/emergent plants (invasive) above Wareham St. and other slow moving sections of the Nemasket - limit/restrict DS juvenile emigration & can limit US movements (2016 drought reduced juvenile recruitment & resulted in low 2020 runs elsewhere, 2020 drought impacts yet to be seen); **Fall Brk** not supporting 'Aquatic Life' use due to diadromous fish passage barriers (Happy Hollow & Rte 28 Dams)
Coldwater Fisheries	**Dams, obstructions, warm water impoundments** degrade/fragment coldwater habs for movement & different life stages (e.g., Fall Brk, Little Quittacas & Long Pond tribs, several Nemasket tribs)
Freshwater Mussels	**Pinch points** (same as above) - limit host fish passage, reduce mussel dispersal, limit US colonization, lead to hab/pop fragmentation compounded by pot'l genetic isolation
Wildlife	**Beaver dams** could disrupt herring runs

STRESSOR: Development / Habitat Fragmentation

TAXA / NC	IMPACTS
Waterfowl & Birds	**Development/disturbance** of intact forested shoreline & loss of tall trees eliminate critical buffer from human activities as well as nesting, roosting, & perching w/ unimpeded water views
	Loss and Chemical/sediment runoff of freshwater marshes that fringe the APC are likely cause of **Least Bittern** (E) declines
	Loss/fragmentation of forested riparian corridors along the Nemasket important for forest interior species, including rares - **Sharp-shinned Hawk, Coopers Hawk, Northern Parula Warbler**
	Loss of extensive grassland habitat is leading to decline of **Bobolinks**
	Development & loss of regular disturbance (fire) reduces/eliminates important dry, open woodlands for breeding/nesting **Whip-poor-will** (SC); as ground nesters, vulnerable to dogs, cats, & high predator populations (raccoons/skunks) associated with development
Turtles	Increased development threatens some of best remaining **Box Turtle** (S-SC) due to fragmentation of large, intact habs w/ access to nesting sites, road mortality (bridges/culverts lack wildlife corridor structures), nesting disturbance, & increased predation;
	Residential/agricultural development & degradation of exposed sand/gravel nesting areas close to the APC-Nemasket (e.g., White Banks, Betty's Neck area, yards) are significant threats to **2nd turtle sp**; also, fire suppression & encroaching vegetation makes movement to/from nesting areas difficult
Coastal Plain Pondshore	**Beach development** can restrict or eliminate CPP/rare plant growth
Wetlands & Vernal Pools	**Development** threatens remaining connected VP clusters critical for migration corridors (BM2 IDs top 5%); the remaining shrub/forested swamps & deep marshes with veg buffers/limited fragmentation - like **Owl Swamp & Nelsons Grove** - will most likely maintain critical wetland functions into the future



STRESSOR: Invasive Species

Taxa / NC	Impacts
Herring	**Personal watercraft & nutrient loading** (septics, lawn management) in Long Pond, APC, & Nemasket can lead to excessive aquatic plant growth (e.g., **variable milfoil, fanwort**) limiting fish movements & restrict juvenile downstream emigration in Nemasket
Warmwater Fisheries	Same sources as above; non-native plants displace native submergent vegetation used as cover/spawning habitat for some fish (e.g., Bridle Shiner)
Freshwater Mussels	Invasive aquatic plants in Long Pond/APC occupy same shallow nearshore areas as mussels & dense concentrations can limit/obliterate available substrate for mussels; Nemasket invasives aggregate sediments, limiting suitable mussel substrate, & can block host host fish movements
	Asian clam in Long Pond, AP, Nemakset - dense populations & rapid reproduction, growth, & high filtering capacity can alter aquatic ecosystem processes; high levels of nitrogen released during excretion can further stimulate plant/algal growth & decomposition after massive clam die-off can reduce DO/degrade WQ
	If **Asian clam** present in Little Quittacus, juveniles could potentially pass through filter screens/colonize intake pump at NB WT plant, potentially obstructing flows & become costly management problem
Waterfowl / Birds	Invasions of **Purple Loosestrife** & **Phragmites** major threats to marsh habitat **Least Bittern** (S-E)
CPP / Rare Plants	**Purple Loosestrife** is already well established in the emergent marsh bordering **Sampsons Cove & along Pocksha Pond** & its spread can reduce available habitat for CPP

Climate Change Impacts on Ecology, Unique Habitats & Natural Resources

Projected climate change impacts in southeastern Massachusetts:

- **Extreme Storm Events**: the increased frequency of storms will lead to more water entering the APC-Nemasket - bringing increased sediment, nutrients, disease pathogens, and invasive species - degrading water quality and aquatic habitats. As this pollutant load travels downstream, to estuaries and the ocean, it can lead to blooms of harmful algae and bacteria.
- **Warming Temperatures**: warmer waters hold less dissolved oxygen and can lead to eutrophication and excess algal and plant growth, which degrades water quality and habitat for fish and other aquatic species (e.g., fish kills) and alters food webs.
- **Increased Temperatures, Erratic Precipitation, Droughts:** are predicted to make many **coldwater streams** too warm in summer to support Eastern Brook Trout. Even some warmwater fish could be pushed towards thermal tolerance limits forcing them to seek new cooler habitats ***if hydrologic connectivity is intact***.
- **Shortening Annual Ice Cover Duration, Longer Growing Seasons:** will likely benefit aquatic invasive plants (McPhedran) and there's evidence **warmer lake temperature**s favor growth of milfoil species (Patrick et al. 2012).
- **Extreme Weather, Drought, Drier Climate:** estimated will cause 3/4 of **Eagle's** current summer range to become unsuitable by 2080 - although 73% could be expanded to new areas, success will be contingent upon securing suitable food/nesting habitat; breeding habitats are predicted to be sought further N into Canada & Alaska.

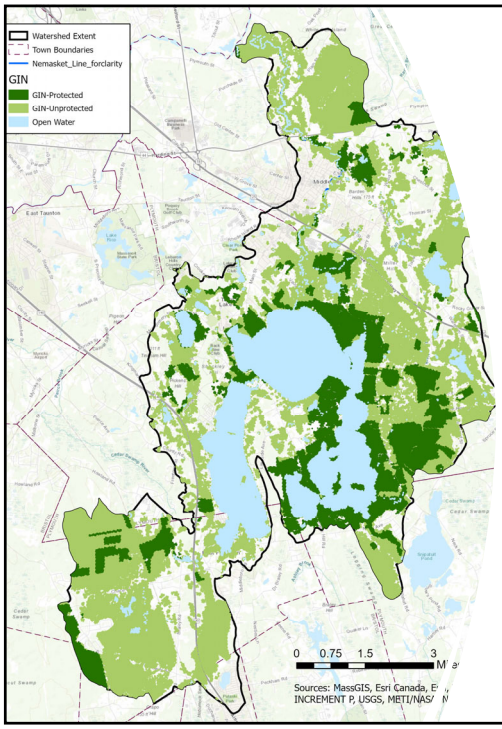
In combination, these and other factors not only exacerbate ecological impacts, but associated environmental and community impacts. Planning to maintain ecosystem function/intact landscapes will help maintain ecosystem services for nature and people.

15

Co-Benefits of Ecology, Unique Habitats & Natural Resources Protection

- **Water Quality**: Strategic land conservation and wetland restoration efforts have the potential to both filter/reduce pollutants and enhance water quality; riparian restoration has been shown to be most cost-effective phosphorus control (WMOST). Conversely, development of priority green infrastructure could eliminate habitat for plants/wildlife and degrade water quality in the watershed.
- **Floodwater Management**: Flooding over built areas has the potential to move and migrate pollutants and debris into the water system; reducing these floodwater extents will minimize this effect.
- **Stormwater Management**: Increased stormwater infiltration decreases runoff that carries pollutant loads into the water system, improving water quality and aquatic habitat.
- **Inter-Agency Cooperation**: Improved coordination between local and state operators on roadway/bridge projects could help with implementation of wildlife corridor structures and implementation of green infrastructure/nature based solutions to help improve habitat and water quality.
- **Land Development**: Placing new development outside of riparian areas and adjacent uplands, as well as using LID, will also enhance riparian habitat connectivity, maintain movement/migration corridors, and an enhance water quality.
- **Recreational Access**: Increased recreation can encourage users to become champions of the flora/fauna they encounter and stewards of their habitats, potentially building support for land conservation and habitat management recommendations.

16



What is Green Infrastructure?

Natural features that perform critical processes and provide benefits to nature and people (For example: wetlands and floodplains provide stormwater storage and reduce flooding)

The Green Infrastructure Network (GIN) is comprised of:

- TNC Resilient and Connected Landscapes: Areas of Above Average Resilience
- BioMap2 Core & Critical Natural Landscapes
- Areas within 100ft of Surface Waters, Wetlands, and Flood Zones
- Areas vulnerable to sea level rise (elevations 4m and under)

17

Potential Natural Resource Management Actions

Physical projects

- Improve aquatic habitat and passage
- Control the presence of invasive species
- Prepare forests for climate change
- Protect critical and endangered species and their habitats

Regulatory mechanisms

- Adopt the Community Preservation Act to fund open space protection
- Open Space and Recreation Planning
- Open Space Residential Design
- Allow more flexible subdivision design and zoning dimensions that preserve the existing landscape
- Coordinate invasive plant management programs

18

Discussion:

Management Actions & Regulatory Approaches

- Do you agree with the issues identified? Have we missed any?
- Do you agree with the potential management strategies identified?
- Which do you think will or won't work?
- Which actions should be prioritized?
- Have any of these strategies been tried before?
- What are potential trade-offs and co-benefits for each strategy?
- Any additional ideas or recommendations?

19

Possible Management Actions:

Improve Aquatic Habitat and Passage

Remove barriers to fish passage	Reconfigure the APC and bascule dam fish ladders to enhance water flow and fish passage in both spawning and return seasons Remove sediment and vegetation in the Nemasket River channel that impede flow Explore dam removal options at the bascule dam Explore stream crossing upgrades to reduce choke points to migration and/or flow Preserve flow during drought with water use restrictions
Improve aquatic habitat	Enhance coldwater fisheries: protect flow to small spring-fed headwater streams & provide shading/temperature control Identify and conserve critical rare/endangered species habitat
Improve water quality for aquatic species	Install septic system upgrades around the Ponds, as appropriate Implement Best Management Practices for de-icing to avoid excessive salting near waterways Install green infrastructure (swales, "country drainage" systems) to mitigate stormwater runoff

20

Possible Management Actions:

Control Invasive Species

Remove invasive species	Investigate options for invasives species removal, including fanwort, variable milfoil, Asian clams, buckthorn and others Continue the Ecoharvester program Acquire regular maintenance permits Implement Integrated Pest Management around the APC to limit pesticide/herbicide treatments
Prevent the spread of invasive species	Monitor and prevent spread of aquatic invasive plants from Long Pond to Assawompset Pond Install boat washing stations to prevent introduction of aquatic invasives from one water body to others Train volunteers and members of the public to recognize and report new infestations Reduce nutrient loading (i.e. from septic systems around ponds) that fuels aquatic plant growth

21

Possible Management Actions:

Prepare Forests for Climate Change

Monitor changing forest health and vigor	Track changing tree species composition, pest and disease impacts, and mortality events Update forest management plans to reflect new conditions
Protect native forests from invasives and pests	Monitor and treat for impacts from oak decline, winter and gypsy moth, emerald ash borer, southern pine beetle, etc.
Prepare forests for changed conditions	Introduce/promote tree species that are well adapted and resilient to projected conditions Manage for changing drought and fire threat including promotion of fire and drought resistant tree species and application of selective thinning Monitor and remove fire hazards, including dead standing wood and invasive species

22

Possible Management Actions:

Protect Native Species and Their Habitats

Protect native species	Support clams and mussels during their spawning season through removal of competitors and other supports Coordinate with MA NHESP for all aquatic plan management Install wildlife corridor & road crossing structures
Protect habitat	Identify and codify low impact development approaches that protect critical habitat (i.e. OSRD, cluster development) Open space acquisition and/or permanent protection (i.e. Conservation Restrictions, Ch. 61) Prioritize conservation of large, unfragmented habitats Preserve nesting and other critical habitats from detrimental uses
Restore habitat	Identify candidate riparian restoration sites to improve habitat and water quality Restore/enhance wetland areas (including retiring cranberry bogs)

23

Possible Management Actions:

Protect Ecology & Unique Habitats through Key Regulations

Open Space and Recreation Planning	Adopt local OSRPs and keep current Prioritize high value natural areas for protection (i.e. Green Infrastructure Network) Coordinate with neighboring communities to protect connected habitat and/or wildlife corridors
Open Space Residential Design	Allow by-right and encourage developers to adopt low impact development in new subdivision development Align OSRD bylaw with OSRP land protection priorities Require contiguous land protection between parcels
Invasive Plant Management Programs	Coordinate with local and state regulatory entities to implement best practices Adopt a holistic approach to invasive plant removal that does not harm other wildlife

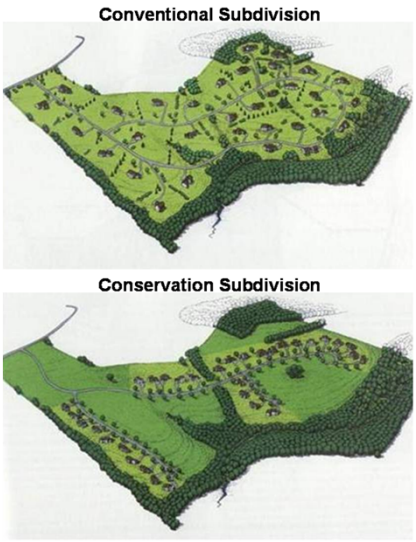
24

Protect Green Infrastructure in Open Space & Rec Plans

Section 1	Plan Summary: Reference state/regional green infrastructure analysis as part of regional context to be considered in the plan
Section 3. A.	Regional Context: Include a more detailed explanation of the state/regional green infrastructure analysis and the regional green infrastructure map
Section 4	Environmental Inventory and Analysis: Include discussion of green infrastructure in pertinent sections
Section 8	Goals and Objectives: Prioritize land conservation to support the local priorities map
Section 9	Five Year Action Plan: Include local priorities map

Open Space Design

- Flexible subdivision regulations
- Smaller lot sizes
- Land set aside for conservation at no cost to town
- By-right is most effective
- Types of OSD:
  - Open Residential Design (OSRD)
  - Natural Resource Protection Zoning (NRPZ)
  - Conservation Subdivision



Protect Green Infrastructure in Open Space Design

Set clear criteria for open space protection	Require open space dedication to contribute to protection of the local green infrastructure network (link to local priorities map created for your Open Space & Recreation Plan)
Require protection of the GIN	When land being subdivided overlaps the green infrastructure network, require on-site protection
Allow TDR for GIN protection elsewhere	When land being subdivided does not overlap the green infrastructure network, utilize transfer of development rights (TDR) to protect the network elsewhere in the locality

Aquatic Invasive Plant Management Best Practices

Resources from MA Dept of Conservation & Recreation Lakes and Ponds Program

www.mass.gov/lakes-and-ponds-program

- Aquatic plant ID and management guides
- Weed Watcher volunteer training program
- Boat Ramp Monitor program

Early Detection is Key	Addressing an infestation before plants have had a chance to establish is the best way to ensure eradication Monitor waterways regularly and be on the look out for invasives Public education and awareness can help spot invasives early on
Prevent the Spread	Public education and awareness will prevent unintentional contamination and spread Boat washing stations, especially at already contaminated spots, are essential to prevent boats from introducing invasives elsewhere
Take an Integrated Approach	Invasive control should be in the context of holistic ecosystem management, tailored to specific water body and species present, and address causes (nutrients, re-introduction) Consider targeted treatments (i.e. physical removal) first & protect native species present Build in adaptive management and post-treatment monitoring
Use Care with Herbicides	Chemicals should be used as a last resort to reduce collateral damage Avoid applying in rare or sensitive species habitat & during critical times of year (i.e. spawning or migratory seasons) Consult with Board of Health, Conservation Commission, MA Natural Heritage Program before application for guidelines and permitting

Public Meeting Schedule

Join us for in-person, outdoor public workshops! Come to all of them, or to as many meetings as topics interest you. NOTE that there is an online meeting option as well, at the same date and time via Zoom.

TOPIC	DATE	LOCATION
Flooding	**9.29.21** 5-7 PM	Lakeville
Water Quality	**10.13.21** 5-7 PM	Taunton
~~Water Supply~~	~~**11.10.21** 5-7 PM~~	~~Zoom Only~~
Unique Habitats	**3.23.22** 5-7 PM	Middleboro
Recreation	**4.13.22** 5-7 PM	Rochester
Land Devel-opment	**4.27.22** 5-7 PM	Freetown
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29

APC Management Plan Steering Committee Meeting NOTES on 11 – 10 – 2021

Floodwater public meeting report back:

- Buyouts at Woloski Park: appraisals were too low; support state buy-out program in future
- Middleborough, Lakeville don't have wetlands bylaws – need to get them (tried but failed in past)
- Lia wants to meet about wetlands bylaws

Invasive aquatic weeds:

- Long Pond Association: volunteer aquatic weed management program – used to train volunteers
- New group reformed, looking to become 501(c)3 → could revamp program
- purchase Ecoharvester (~$84k)?
    - CRWA, Wrentham, Plymouth County have Ecoharvesters – can use but need to pick up + transport and have trained staff to use
    - LM HFC rented from CT – had it delivered and they provided operators (more feasible than training local staff)

Other water-related concerns:

- Beavers: neighboring communities have seen return and are concerned about impacts in future
    - Middleborough has seen evidence of beavers at Woloski Park, Purchade Brook
    - MAWildlife, Board of Health can grant permits to remove beavers and their dams for public health and safety concerns (prevent flooding)
    - There is a recreation trapping season for beavers, but not very popular
- Lakeville perennial stream of concern at John Pond Park (?): mowing to streams edge continually (even though only allowed to mow once per year), Mike has reached out to ConComm, Nat Heritage (listed species are present)
- Reed Canary Grass present in watershed – threat to waterfowl
- For co-benefits – add drought management
- Lakeville septic system and de-icing: no funding for projects → need to find funding and enforcement solutions for alternative septic options
- Funding and enforcement need to be considered generally
- De-icing alternatives:
    - NB has tried to find alternatives, but non-salt ones are usually high in P – have yet to find a good alternative that works well
    - Middleborough has tried beet juice, molasses (have P)
- Remove invasives: talk to state about electrical/RR right-of-ways, herbicide application
    - Towns could use databases of private wells where groundwater needs to be protected (should avoid herbicide application there)

    - Roger Williams University is working with Rehoboth to map wells and septic systems – could do similar project in watershed

Forestry Management Plans:

- Middleborough ConComm lands have Forestry Management Plans
- DPW director is also tree warden – too stretched thin to care for street trees
- New Bedford is using FEMA/MEMA funds to remove fallen trees
- Forest health monitoring:
    - Opportunities to partner with universities and students on monitoring, could try remote sensing monitoring approaches
    - Beech trees become invasive
    - General every 5-10 years monitoring, but monitoring for pests annually
    - New Bedford uses Survey 123 – interested in other community monitoring programs

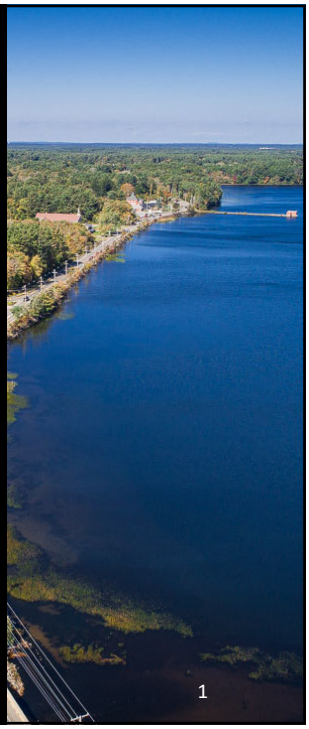
OSRD:

- Middleborough allows it but it's not very popular (saves roadway infrastructure money), may be more recent developments (reach out to Leeann to see)

Assawompset Pond Complex & Nemasket River Watershed Management & Climate Action Plan

Steering Committee Meeting #8 | Recreation & Stewardship

January 12, 2022



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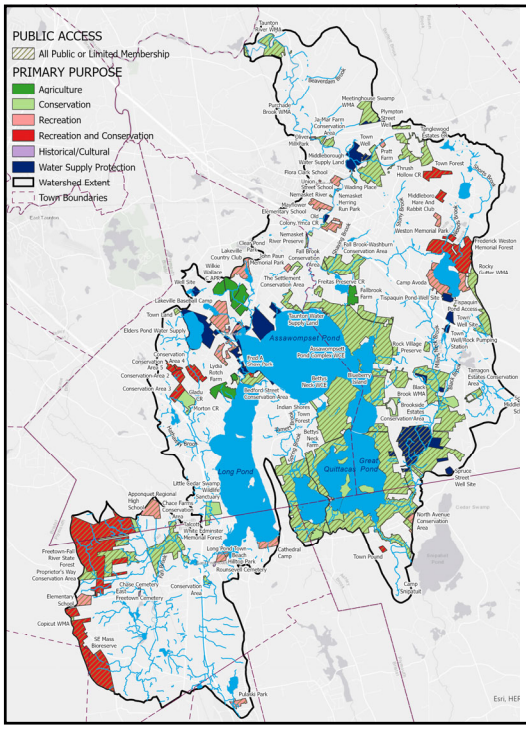
Agenda

- Recreation & Stewardship topic (30 min)
  - Overview of recreational access & stewardship capacity
  - Management goals
  - Developing plan recommendations - discussion
- Updates & Next steps (15 min)
  - Grants update
  - Public engagement update & meeting Schedule

2



Existing recreational access & public information

	Lakeville	Middleborough	Freetown	Rochester
Recreational rules and/or guidelines	- No rules or regulations in bylaws or on town website - Motor Boat ban on Loon Pond - APC brochure linked on town website includes general uses allowed and guidelines for land-based recreation	- No rules or regulations in bylaws or on town website	- Recreational Facilities bylaw authorizes enforcement by town - No outdoor recreational use or guidelines posted on town website	- No rules or regulations in bylaws - ConComm website has downloadable trail guide with recreational use guidelines
Public information accessible online	- APC page on town website with map & access guidelines - limited info on Park Commission website	- Rec info on town website limited to event registration and facility reservation info - Discover Middleborough website has outdoor recreational info	- No park dept website - Limited info posted on ConComm page	- Parks Commission page limited to facility use request form - Separate ConComm & Town Forest Committee website has outdoor recreation details with downloadable public trail guide

3

Watershed Stewardship Capacity

Town Staff

- Pondside communities' Parks and Recreation Departments largely run by volunteer commissions (Middleborough has greatest capacity with 4 staff members)
- New Bedford and Taunton have staffed Parks Departments for land they own in watershed

Land Trusts

- Rochester Land Trust only known local land trust (currently no land held within watershed)

Local Environmental Groups

- Long Pond Association (Lakeville & Freetown)
- Middleborough-Lakeville Herring Fishery Commission
- Middleborough High School & Environmental Club
- Sustainable Middleborough (clean energy & climate change focus)

State and Regional Entities

- State: DCR, DEP Southeast Regional Office
- Environmental nonprofits: Mass Audubon, Wildlands Trust
- Watershed groups: Taunton River Stewardship Council, Taunton River Watershed Alliance, Buzzards Bay Coalition

Volunteer Stewardship Programs

- Middleborough Conservation Commission
- Long Pond Association

4

Recreation & Stewardship Management Goals

- Provide quality outdoor recreational opportunities that do not impair natural resources and public water supplies
- Increase public awareness of outdoor recreation opportunities, use regulations & stewardship guidelines
- Increase local capacity for enforcement of proper outdoor recreation uses and regulations, and public education
- Cooperatively and strategically expand the watershed's open space network and recreational programming and activities
- Increase local capacity of town staff and volunteer networks to manage and enhance open space for both ecological function and recreational opportunities

5

Discussion: Developing Plan Recommendations

- Do you agree with the goals identified? Have we missed any?
- Do you agree with the potential management strategies identified?
- Which do you think will or won't work?
- Which actions should be prioritized?
- Have any of these strategies been tried before?
- What are potential trade-offs and co-benefits for each strategy?
- Any additional ideas or recommendations?

6

Recreation & Stewardship Management Actions

Public Information & Signage	Invasive Plant Management	Open Space Protection & Management	Recreational Programming	Enforcement of Recreational Use Rules
• Universal informational signage explaining allowed uses, rules, and public access boundaries • Public education to increase awareness of responsible recreation and environmental stewardship	• Coordination between towns and local stewardship groups on volunteer invasive plant management efforts • Prevent spread through public education and boat washing stations	• Strategically expand the watershed's open space network • Enhance land and water trails through regular maintenance • Cooperative regional stewardship	• Expand spiritual, cultural, and historic education and recreational programming opportunities • Local adoption of Community Preservation Act to fund open space & recreation	• Formalize funding stream for APC Rangers program and enforcement • Advertise rules and regulations for public recreation on town websites and with clear signage at public sites

7

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8

Meeting Notes – APC Steering Committee Meeting – January 12th 2022

Topic of Conversation: Recreation & Stewardship

Existing Recreational Access & Public Information (Map)

	Lakeville	***Middleborough***	***Freetown***	***Rochester***
Recreational rules and/or guidelines	- No rules or regulations in bylaws or on town website - Motor Boat ban on Loon Pond - APC brochure linked on town website includes general uses allowed and guidelines for land-based recreation	- No rules or regulations in bylaws or on town website	- Recreational Facilities bylaw authorizes enforcement by town - No outdoor recreational use or guidelines posted on town website	- No rules or regulations in bylaws - ConComm website has downloadable trail guide with recreational use guidelines
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Feedback from SC Members

- Cranberry Bogs south of Betty's Neck allow people to visit during this season. Those lands could/should be updated to reflect this
- Map should reflect a lack of access for the Water Treatment Plant and reservoir areas
- Land south of Little Quitticas should be classified as off-limits
- KOA Campground off Route 44 should be included as Ch. 61B Recreation as well.

Water Stewardship Capacity

<u>Town Staff</u>

- Pondside communities' Parks and Recreation Departments largely run by volunteer commissions (Middleborough has greatest capacity with 4 staff members)
- New Bedford and Taunton have staffed Parks Departments for land they own in watershed

Feedback from SC Members:

- Middleborough's capacity is not 4 full time staffers – they are part time, and includes some staff who are seasonal for overseeing the pools.

- New Bedford/Taunton parks and recreation staff do not tend to the lands within the APC watershed – New Bedford does have a seasonal or volunteer groups which go out (Green Team).
- Middleborough has a (now dormant) Citizens Environmental Health Impact Committee (focused on contamination)
- Taunton and New Bedford continue to contribute funding for the rangers who keep an eye on the watershed and do the majority of enforcement actions.

Land Trusts

- Rochester Land Trust only known local land trust (currently no land held within watershed)

Feedback from SC Members:

- Wildlands Trust: they hold a fee on a piece of land and own Blueberry island (either outright or restriction rights) on Pocksha Pond/Assawompset Pond

Local Environmental Groups

- Long Pond Association (Lakeville & Freetown)
- Middleborough-Lakeville Herring Fishery Commission
- Middleborough High School & Environmental Club
- Sustainable Middleborough (clean energy & climate change focus)

Feedback from SC Members:

- Buzzards Bay Coalition: they not only own land, but are also doing organized runs on the edge of Betty's Neck. This is problematic, as the parking at Betty's Neck cannot accommodate a mass number of people, and the town needs to be notified and requested for a permit for any event above 10 people.
- Long Pond Association is returning as a 501(c)3
- There is an organized trail running group and an equestrian group – one land owner is renting / permitting the equestrian group to pass through their land.

State and Regional Entities

- State: DCR, DEP Southeast Regional Office
- Environmental nonprofits: Mass Audubon, Wildlands Trust
- Watershed groups: Taunton River Stewardship Council, Taunton River Watershed Alliance, Buzzards Bay Coalition

Feedback from SC Members:

Volunteer Stewardship Program

- Middleborough Conservation Commission
- Long Pond Association

Feedback from SC Members:

- Middleborough has some dedicated individuals but it is an informal group – try to plan out days and organize different things

Recreation & Stewardship Management Actions

Public Information & Signage	Invasive Plant Management	Open Space Protection & Management	Recreational Programming	Enforcement of Recreational Use Rules
• Universal informational signage explaining allowed uses, rules, and public access boundaries • Public education to increase awareness of responsible recreation and environmental stewardship	• Coordination between towns and local stewardship groups on volunteer invasive plant management efforts • Prevent spread through public education and boat washing stations	• Strategically expand the watershed's open space network • Enhance land and water trails through regular maintenance • Cooperative regional stewardship	• Expand spiritual, cultural, and historic education and recreational programming opportunities • Local adoption of Community Preservation Act to fund open space & recreation	• Formalize funding stream for APC Rangers program and enforcement • Advertise rules and regulations for public recreation on town websites and with clear signage at public sites

Feedback from SC Members:

<u>Public Info and Signage</u>

- Signage should not be attached directly to trees
- Signage which is put up on posts will be vandalized or torn down
- Have uniform signage across the entire watershed stating 'Managed Watershed Lands' with 'Police Take Notice' – this gives the understanding that these are *managed* lands and not just wilderness (relates to enforcement)
- There should be conversations with the recreation groups in the areas that spray-painting directional signage on trees (such as for running clubs) is *not* permitted.

<u>Invasive Plant Management</u>

<u>Open Space Protection & Management</u>

- 40B proposed development in the watershed could increase strains on the existing capacity. The SC should investigate opportunities to purchase it.
    - Purchase could be done through: a multi-municipal use of CPA funds, ARPA funds, water protection fund grants, including this parcels as a flood retention option in MVP / HMP.
- There will be a Land Acquisition Subcommittee formed. The following members indicated their interest in joining
    - Ymane, Marea, Lia, Patricia, Chance, Nancy Durfee

Recreational Programming

- It will soon be the 20th Anniversary of the APC SC (?), and there will be a celebratory event on Betty's Neck
- There is a need for more children / youth oriented educational opportunities

Enforcement of Recreational Use Rules

- Freetown Boat Ramp has a huge issue with enforcement – limited oversight, lots of parking, backups onto the highway, etc. The town has attempted to increase the boat ramp fee to cover rangers and other enforcement, but the state has not allowed that.
    - Freetown is trying to get power and wifi to the supervisor's shack to assist with remote permitting and ticketing.
- Tispaquin Pond Boat Ramp is also bad: limited oversight, area used as a beach
- Regulation is on the whole, difficult. There are a number of repeat offenders, but tracking who they are and how many offenses they have committed is time consuming and puts the rangers in conflict with some users. The rangers do not attempt night-time enforcement of the rules due to the high potential for conflict with intoxicated individuals, etc.
- Increasing enforcement could increase the availability of open space areas for recreational activities (by allowing people to feel more comfortable going out into the OS areas).
- The Environmental Police will do paid details. The Cape Cod Canal funds several details every month in season.
- Directing attention to a few 'problem areas' could make limited resources last longer.

Meeting Chat

09:07:39 From Ben Myers (SRPEDD) to Everyone:
The webinar is at 1 pm!
09:07:48 From SRPEDD Comprehensive Planning to Everyone:
https://www.mass.gov/info-details/multi-family-zoning-requirement-for-mbta-communities
09:11:07 From pcssdy to Everyone:
Cranberry bogs of which we have many in Middleborough should be considered ag. too. Are you only counting APR land? If so, Soule Homestead should be included as well.
09:12:14 From pcssdy to Everyone:
Oh, Maybe Soule is out of the scope of this. Nevermind.
09:12:15 From SRPEDD Comprehensive Planning to Everyone:
Yeah these would be the APR as reflected in the state OSRP database where "primary purpose" is agriculture - we should definitely add Soule Homestead, good catch!
09:12:34 From SRPEDD Comprehensive Planning to Everyone:
ahh gotcha
09:12:47 From Nancy Yeatts to Everyone:
APC official map differs from what is shown
09:12:56 From ymane to Everyone:
yes agreed with Nancy
09:13:07 From ymane to Everyone:
what is considered "water supply"?
09:13:24 From ymane to Everyone:
the treatment plant and ponds were not included
09:13:36 From pcssdy to Everyone:

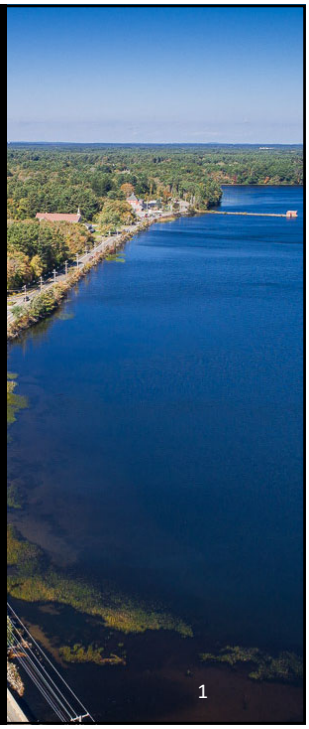
Would you want any MOU's that the Conservation Commission has with other groups? So no Recreation/Open Space Policies in Middleborough per se but we do have a couple MOU's.
09:15:31 From pcssdy to Everyone:
KOA Campground off Route 44 should be included as Ch. 61B Recreation as well.
09:17:08 From pcssdy to Everyone:
Middleborough has a Citizens Environmental Health Impact Committee but it is dormant right now.
09:17:23 From pcssdy to Everyone:
Their charge is looking at contaminated sites.
09:19:58 From pcssdy to Everyone:
State & Regional Entities: There is a state boat ramp at Tispaquin Pond overseen by the Dept. of Fish & Game.
09:21:45 From pcssdy to Everyone:
The Nature Conservancy holds CR's on some Freitas Land off Vaughan Street and Parks and Parks/Cardin land off Miller Street.
09:22:17 From pcssdy to Everyone:
Wildlands Trust owns the Freitas land I mentioned above. Has a historic home on it too that has a HPR.
09:30:25 From pcssdy to Everyone:
Some of the Open Space & Recreation Plans for APC/Nemasket communities may have some of these goals too.
09:34:14 From Martha to Everyone:
The freetown boat ramp is a huge problem. It has very limited oversight. I know the state has a problem with this, but the parking fee needs to be raised to cover the cost of having an attendant there.
09:34:59 From pcssdy to Everyone:
Same with the Tispaquin Pond Boat Ramp. Limited oversight and people have been using the area as a beach. People leaving trash etc...
09:35:50 From pcssdy to Everyone:
We need to have more environmental police positions. State needs to fund this. We need to be like North Woods Law in NH and ME. :)
09:36:55 From Deb Pettey to Everyone:
Freetown has requested to increase the fee at the boat ramp to $15. The state has comer back and said it would be the highest fee in the state.
09:39:23 From Dave Cavanaugh to Everyone:
It may be cost prohibitive … but the Environmental Police will do paid details. The Cape Cod Canal funds several details every month in season.
09:49:36 From Michele Paul, New Bedford to Everyone:
Purchase could be a multi-municipal use of CPA funds
09:50:57 From pcssdy to Everyone:
Water Protection Fund Grants too
09:51:49 From Martha 's iPad to Everyone:
Comes down to capacity and popularity....look at the parking at the Freetown ramp. On a weekend the lot fills up early and the overflow is up and down rte 18.
09:52:42 From Martha 's iPad to Everyone:
If it becomes a popular spot and it’s not properly planned, it can create problems
09:56:17 From ymane to Everyone:
yes I would like to participate in the subcommittee
09:56:33 From Marea Gabriel, TNC to Everyone:

I'd be interested in working on strategic land protection plan
09:56:41 From Lia Fabian-Lakeville Selectman to Everyone:
I'm available for a land acquisition subcommittee
09:56:54 From pcssdy to Everyone:
I would be happy to participate in the land protection subcommittee.
09:57:22 From Chance Perks - NB Cons. Agent to Everyone:
I'm interested in a Long Pond subcommittee with Nancy
09:57:41 From Nancy Durfee to Everyone:
I'd be interested
09:57:45 From pcssdy to Everyone:
Middleborough has a lot of examples of land protection strategies. Especially the land in the APC area already protected - Black Brook lands and Morgan Property.

Assawompset Pond Complex & Nemasket River Watershed Management & Climate Action Plan

Steering Committee Meeting #8.5 | Land Development

February 9, 2022



1

Agenda

- Updates (5 min)
- Land development topic (35 min):
  - MBTA Zone
  - Management goals
  - Regulatory Review and Recommendations
- Land Conservation Subcommittee (2 min)
- Public Engagement Schedule (5 min)

2

UPADTE: DER H&H Phase 2 Grant

Five Main Deliverables

1. Groundwater H&H Model – 8-12 monitoring wells / 3 gauges
2. Conceptual Model – but we'll need to populate it with data
3. Initiation of a Volunteer Monitoring Program
4. Extension of Surface Water H&H Down Nemasket
5. Initial Design concepts for APC / Wareham St Dam alternative

3

MBTA Multi-Family Housing Legislation

Relevant Section from the Economic Development Bill:

Chapter 358 of the Acts of 2020
SECTION 18. Said chapter 40A is hereby further amended by inserting after section 3 the following section:-

Section 3A. (a)(1) An MBTA community shall have a zoning ordinance or by-law that provides for at least 1 district of reasonable size in which multi-family housing is permitted as of right; provided, however, that such multi-family housing shall be without age restrictions and shall be suitable for families with children. For the purposes of this section, a district of reasonable size shall: (i) have a minimum gross density of 15 units per acre, subject to any further limitations imposed by section 40 of chapter 131 and title 5 of the state environmental code established pursuant to section 13 of chapter 21A; and (ii) be located not more than 0.5 miles from a commuter rail station, subway station, ferry terminal or bus station, if applicable.

Click to add text

(b) An MBTA community that fails to comply with this section shall not be eligible for funds from: (i) the Housing Choice Initiative as described by the governor in a message to the general court dated December 11, 2017; (ii) the Local Capital Projects Fund established in section 2EEEE of chapter 29; or (iii) the MassWorks infrastructure program established in section 63 of chapter 23A.

(c) The department, in consultation with the Massachusetts Bay Transportation Authority and the Massachusetts Department of Transportation, shall promulgate guidelines to determine if an MBTA community is in compliance with this section.

6

https://srpedd.maps.arcgis.com/home/webmap/viewer.html?webmap=fb0d494582b446b4aca893bc2245417c

4

APC-Nemasket Member Communities' MBTA Profile

Name	Current MBTA Community Type	Current Min. Capacity Requirement	Revised Community Type (South Coast Rail)	Revised Min. Capacity Requirement
Freetown	MBTA Adjacent	750	Commuter Rail	750
Lakeville	Commuter Rail	750	No change	-
Middleborough	Commuter Rail	1,471	No change	-
Rochester	MBTA Adjacent	750	No change	-
Taunton	MBTA Adjacent	2,497	Commuter Rail	3,745
New Bedford	Not subject to law	N/A	Commuter Rail	6,688

Land Development Management Goals

1. Proactively plan for future development by prioritizing areas for protection and development
2. Reduce the environmental impacts of development through low impact development and stormwater management practices
3. Build for the future and ensure all new and re-development is designed for future climate projections
4. Work with nature to preserve and leverage natural functions that provide community resilience
5. Encourage more flexible housing options and development practices to limit sprawl

6

Regulatory Review: Stormwater Management

	Freetown	Lakeville	Middleborough	Rochester
MS4 Regulated?	Y	Y	Y	N
Stormwater bylaw?	brief section in general bylaws	brief section in general bylaws	standalone bylaw and thorough rules & regs	regulated in subdivision rules & regs
Enforcement/ Oversight	Building Commissioner	Building Commissioner	Board of Selectmen, Stormwater Committee	Planning Board
Stormwater Permit	N	N	Y, over 10,000 sq. ft.	N, but SW Management Plan required for SPR and reviewed by other depts
LID Stormwater management	not specified; bylaw targets illicit discharges	not specified; bylaw targets illicit discharges	required with clear guidelines, design standards	enabled and preferred in performance standards, but should be more clearly encouraged upfront

Regulatory Review: Impervious Cover Controls

	Freetown	Lakeville	Middleborough	Rochester
Lot dimensions (residential)	Min 70,000 sqft	Min 70,000 sqft	Min 20k-80k sqft	Min 43,560 sq ft
Impervious cover maximums	30% (residential) to 80% (business & industrial) maximums	25% (residential) to 50% (business & industrial) maximums	No maximum for residential; 60-65% for general use & business	20% max (residential) and 70% elsewhere
Parking	- Mins by use - Shared options for commercial	- Mins by use - Max in Smart Growth Overlay District - Shared parking by SP	- No requirements for residential development - Commercial min by use - Shared parking by SP	- Min driveway size for residential lots - Common driveways allowed for 2-4 lots by SP
Roads	24-40ft min widths	24-30ft min widths	24-26ft min widths (residential)	18-30ft min widths
Sidewalks	Required along all streets, both sides for primary and one side for secondary streets	Required along all streets, on one side only	Required along all streets serving 25+ homes, both sides in Res A/B and one side in Res-Rural	Required along all streets serving 3+ homes, on one side only
Permeable pavement	Concrete pavement standards No mention of permeable options			

Regulatory Review: Site Plan Review

	Freetown	Lakeville	Middleborough	Rochester
Site Plan Review	Standalone rules & regulations	Outlined in zoning; no separate rules and regs	Not addressed in zoning, except for Business District	Outlined in zoning; no separate rules and regs
Triggers	2500sqft gross floor area (single family exempt)	**Business/industrial**: 1500sq ft aggregate floor area **Residential**: 43,560 sqft	Business district and subdivision permits	675sqft total gross floor area (residential and agricultural uses exempt)
Reviewers	Planning Board, Board of Health, Building Inspector, Highway Surveyor, Police/Fire Chief, Conservation Commission	Planning Board, Police/Fire Chief, Board of Health, Conservation Commission, Highway Surveyor, Building Dept, Open Space Committee, Board of Selectmen	**Business district**: Zoning board of appeals reviews site plans for business district **Subdivision**: Planning Board	Planning Board, Conservation Commission, Board of Health, Building Commissioner, Highway surveyor, Police/Fire Chief
LID & resilience considerations	LID favored in design guidelines	SW management plan required; LID not specified	No design guidelines provided	Design guidelines require minimal environmental impacts; LID not specified

Land Development Management Actions

Improved Stormwater Management

- Limit conversion of natural areas to impervious cover that contributes to stormwater runoff
- Prioritize on-site treatment and infiltration in drainage designs
- Disconnect impervious areas from water bodies to improve water quality

Proactive Land Use Planning

- Prioritize areas for development vs. protection in Master Plans
- Prioritize valuable natural areas for protection in Open Space Plans
- Encourage development in priority development areas through expedited permitting

Low Impact Housing & Development Design

- Enable more multi-family housing options in zoning
- Encourage cluster developments and open space design to minimize footprint
- Allow more flexible lot dimensions and designs in zoning and subdivision

Build for the Future

- Consider climate change and rainfall projections in construction design & planning
- Build all new infrastructure to withstand larger storm events
- Require climate resilience considerations in all site plans

Work with Nature

- Leverage natural functions that protect communities from flooding, extreme heat, and intense storms
- Enable flexible site plan design that conforms to, rather than alters, nature
- Favor "green" stormwater infrastructure over "gray"

10

Public Meeting Schedule

Join us for in-person, outdoor public workshops! Come to all of them, or to as many meetings as topics interest you. NOTE that there is an online meeting option as well, at the same date and time via Zoom.

TOPIC	DATE	LOCATION
Flooding	**9.29.21** 5-7 PM	Lakeville
Water Quality	**10.13.21** 5-7 PM	Taunton
~~Water Supply~~	~~**11.10.21** 5-7 PM~~	~~Zoom Only~~
Unique Habitats	**3.23.22** 5-7 PM	Middleboro
Recreation	**4.13.22** 5-7 PM	Rochester
Land Devel-opment	**4.27.22** 5-7 PM	Freetown
Open House	**6.1.22** 6-8 PM	Lakeville

To receive updates on the project status, please make sure that you have completed the registration form!

Register for future in-person or virtual meetings:
bit.ly/register-apc

All virtual meetings will use the same Zoom meeting link:
https://us02web.zoom.us/j/8150125172

11

Summary of Discussions:

MBTA Conversation:

There are a few communities which already have mixed use (40R) development in the area including Middleborough and Rochester – are those communities able to get credits for these developments?

Rochester (Nancy Durfee) believes that the cost of allowing all of this development and the new units it will allow and the subsequent impact it could have on school enrollment (and therefore costs) far outweighs the benefits of qualifying for the state grants. The state should conduct its own cost benefit analysis on this. Also, for Rochester their only available area that is not in a watershed protection zone is zoned for industrial, and so if the town puts this new development requirement in the industrial zone then they will lose potential revenue.

Ymane brought up that we should investigate the impact that new development will have on the water table, particularly if package treatment plants or any other development taps into groundwater.

The size requirements for both the construction of these new units and the placement of the requisite waste treatment facilities (whether septic, package treatment, or alternative) would be far beyond what existing lots allow.

Lia Fabian (and several others) asked if it would be possible to get an exemption from the state for all of this development on the basis that the towns, by protecting water supplies, are serving a valuable function in terms of water protection for the watershed.

Land Development discussion:

Patricia Cassady asked if the PDA and PPA maps will be updated (Nancy Durfee and Rochester would also be interested in that)

Chance Perks said to combine land development management goals #2 and #4

Stormwater Bylaw discussion:

Middleborough used Greenseal Environmental to help develop the Stormwater Bylaw and Regulations and then approved the bylaw at town meeting. There wasn't a lot of resistance. Developers will have to get approval for their stormwater designs either at the Stormwater Committee or through the planning committee – this is done because Middleborough doesn't have a site plan review process.

Rochester does have a site plan review process which specifically looks at stormwater drainage. They also have a peer review process through which the plan is sent out to external engineering partners and then reviewed. They have a continuous review process. It is very important to have boots on the ground and people actually taking a look at this review as it develops.

Impervious Cover Controls discussion:

Lakeville's maximum of 50% impervious cover for industrial uses must be *earned* – it is a bonus for meeting additional requirements of planting tree coverage and etc.

There was discussion of the impervious surface implications of solar power – it appears that green pavers are an option and come up a lot at meetings.

Nancy Yeatts' conservation commission offers an opportunity to individuals who are looking to increase their driveway sizes while also pursuing septic system repairs that they will approve / administer pervious surfaces on the site to keep the driveway expansion small (and the lot below 25% impervious coverage) so that the applicant doesn't have to go to the planning board.

Site Plan Review Discussion:

Nancy Durfee said that it is important to influence the actual people who sit on the planning boards and not just rely on the rules and regulations. This should include training for the planning board, conservation commission, and others.

Nancy Yeatts described that the peer review for stormwater management is essential (Patricia Cassady also said that this was the case in Middleborough where if the proposal doesn't go to planning and zoning boards then the Conservation Commission has their own stormwater peer review process)

- Under Conservation Commission law Chapter 44 Section 53-G it is the conservation commissions choice *who* the outside peer reviewer is, but it is the developer's responsibility to pay for this. This payment is usually included in the fee table. (Middleborough, Lakeville, Freetown, Rochester all do this)
- It is useful to ensure that the peer review process does not end after the planning board meeting and that it continues through the end of construction.

White Paper Reivew Comment Tables - Steering Committee Feedback Review discussed during 3/30/22 Meeting
LAND DEVELOPMENT COMMENTS

Comment No.	Comment
1	On Pages 1 & 4 (more general comment on the MBTA): " We need our state legislators and SRPEDD to engage the state in possibly allowing less than a 750 unit commitment of housing so close to the watershed area. At a minimum, a completely separate permitting process should be created to be sure big land development near the watershed will not negatively impact the water quality, flooding, increased recreational with little regard to good stewardship, etc. "
2	OVERALL COMMENT: Overall guidance to local planning and zoning boards & conservation commissions should be provided on any special considerations that towns should consider before approving new developments bear the watershed including alternative landscaping to reduce the use of fertilizers that may run off into the water.
3	Note that both Middleboro and Lakeville have potential huge distribution centers coming. One proposed for Middleboro (over 1 million sq ft) abuts Fall Brook, tributary for Nemasket. Lakeville has two potential ones, one 400,000 sq feet has gone through regulatory process but is held up by lawsuit. Lakeville's second one proposed would be on wetlands with hydrological connection to Assawompset.
4	Note that forest cover mentioned in tables looks good but condition matters. Much deadfall in areas around Assawompset so excessive tinder, dangerous in periods of drought and wind. Only way to get it out of the forests without devastating understory would be with horses, oxen or some such.
5	Note that Lakeville has a bylaw on the ballot 4/4 that would permit open space design development. Also on ballot is CPA hopefully meaning charts may need editing!
6	In Table 5 Can the distinction between natural land and open land be clarified

RECREATION COMMENTS

Comment No.	Comment
1	Page 11, Paragraph 2 (after invasives): add: "I would add “eco harvesting” to the last sentence"
2	Page 2, Paragraph 2, recommendation for SC action: " Need to clarify boat permit process on Assawompset with a VOTE on the process so we have a plan that is agreeable to most stakeholders and not just one city or one person.
3	Page 4 (3), Paragraph 4, recommendation for SC action: (Lia Fabian): I can work on clarifying or amending Lakeville's webpage content on the parks town webpage & make sure the couple sites that list being "under construction" are completed.
4	Page 6 (5), Paragraph 5, recommendation for SC action: (Lia Fabian): Will ask for recommendation of lakeville Police chief on a possible record keeping system of violations when rangers do NOT call local police but I agree if police are called more often, we may have better incident/violation history.
5	Page 7 (6), paragraph 5, clarifying question: Does Middleboro actually have rights to water supply for future development?
6	Page 11 (12),within the data gap documentation, recommendations to consider include: " 1. Yes to better record keeping needed 2. Needs to be a better way to permit any motorized boats including jet skis on long pond because waterfront residents allow others to use their docks 3. Signage is imperative but unfortunately, easily vandalized. Need to find more permanent signage."
7	Page 12 (13), paragraphs 5,6,7, add in: " Need a boat wash station at freetown boat ramp and state environmental police or funding from state to monitor it. 2. Need to have a land development special permit process as part of towns regular permitting process that covers water concerns and not just typical planning board overview 3. Cooperation between all parties should perhaps begin with a designated stakeholder from each municipality's governing body i.e. advisiry boards that select board members or mayors belong to. Some of the decisions on flooding issues should be made by governing bodies or a representative of the governing body like one select board member. "

8	Page 2 (3), paragraph 2 ("given its role…"), add in: "Boats that receive permits from Taunton are in fact inspected and a double sticker is issued - one part for the motor and one part to be displayed on the boat. There is a problem with un-permitted boats accessing the Pond, a problem Taunton, New Bedford, and the APC Rangers are working on together. Each residence is allowed two boats so the fee is $25 per boat."
9	Page 5 (6), paragraph 3 (under Taunton), correct: "Taunton lands uner the APC Management plan are open to the public See APC map and refer to Aaron Best from fisheries and wildlife and oversees the CR's in our area."
10	Page 6 (7), paragraph 2 (pay rates), correct: "Taunton New Bedford and Lakeville increased controbution to $9,000. per year in 2022."
11	Page 6 (7), paragraph 3 (on number of people attemptingto portage), add in / update: "over 100 people in one day!"
12	Page 1, paragraph 3, add: "There is also protected land along Fall Brook in Middleborough, a tributary of the Nemasket River"
13	Page 2, bulleted upland rec sites list, add: Stuart F. Morgan Conservation Area in Middleborough on Pocksha Pond, Nemasket River Village/Ja Mar Turkey Farm Property in Middleborough on the Nemasket River, Oliver Estate Property & Conservation Land in Middleborough on the Nemasket River
14	Page 4, top, add to list of non profits: Taunton River Stewardship Council
15	Page 5, bulleted list of websites, add: New England Mountain Bike Association (NEMBA)
16	Page 6, paragraph 4, add: trash issues here too (in addition to portage issues at Assawompset dam)

17	Page 7, table 1, recommendation #3, correction: this last statement (acquisition of Andreattola Property?) is not correct; also note Middleborough has an OSRP from 2015-2022 (not sure if this is the one that was reviewed?)
18	Page 9, bullet 3, update: "Is this the DFG land that was formerly the Jigerjian Property? If so, that acquisition is complete."
19	Page 9, bullet 7, add: "The Town of Middleborough is actively trying to protect this property as open space and for farming." (Picone-Sunnyside Farm)
20	Page 9, bullet 8, update: "Funding though the Community Preservation Committee a feasibility study will be discussed for a vote at the April 2022 Annual Town Meeting."
	Page 2 - hunting and trapping. Shoreline fishing. Those rights are inlcuded in the purchase of CRs when those are put in place.
	Page 5 - include state stakeholders in the listing - MassWildlife, DCR, Marine Fisheries
	Need to look at town/local goals and visions and the public recreation limitations that CRs may impose - look at these for consistency across documents.
	Lakeville open space date - make sure 2012 not 2019

WATER SUPPLY TABLE

Comment No.	Comment
1	Page 8 (9), paragraph on alternative management approaches: " When discussing history ... in the mid 1990s, juvenile herring were trapped between the lakes. New Bedford was 'less than helpful or concerned'. The Middleborough Town Manager and several volunteers transferred juveniles from Great Quitticas to Pocksha by hand net. This helped lead to the development of the current Middleborough-Lakeville Herring Fishery Commission. "
2	Page 10 (11), paragraph 2, consider: " The cities need to develop and IMPLIMENT placing restrictions on water use during low water much more than currently. "
3	Page 12, paragraph on trade offs, consider: " The dam management is not legally concerned with fisheries management; only flow and leveles for water supply. Fisheries and wildlife should be legally binding in some way."

4	Page 2(3), section of 'Treated Drinking water, correct data: "The paper titled "Drinking Water Supply", page 2 (not including the cover), in the section "Treated Drinking Water" the statement about Taunton's turbidity is a little bit misleading in the current context. In 2020, we had a single highest turbidity result of 0.36...for the whole calendar year. Our average range is nowhere near that. Typical turbidity here is = or < 0.05 NTU 99% of the time. I wouldn't want someone to come away with the impression that our turbidity is "normally" in the 0.3 range; that would in fact be a regulatory violation (95% of monthly measurements must be below 0.30 NTU or it is a Treatment Technique violation)."
5	Page 6 (7), paragraph 5, correct data: "Land area New Bedford owns is not 12,352, closer to 3,200"
6	Per conversation with Ymane: edits needed to page 7 Stakeholders'Drinking Water Supply Management Concerns section
	recommendation related to those who are are well-water and the need for households on these systems to also implement water conservation measures; APC booth at fall fair and similar
	Page 7 (6), paragraph 5, clarifying question: Does Middleboro actually have rights to water supply for future development?
	N. Durfee: Regional water supply overall - Rochester example, where basin lands contribute to water supply for Mattapoisett River valley, APC - water resources not only in ponds but in region.

	Verify that we have the Fall River Long Pond rights referenced in the white paper (Histories of legislative action paper - we'll put it in the plan/white paper)
	General comment about audience: This one is mind-spinningly technical. Perhaps it has to be. I am unsure who the audience is for these white papers, but for those who might not be in the water supply regulation/business but who might still have to make decisions based on the paper's findings, summarizing text might be added.

STEWARDSHIP TABLE

Comment No.	Comment
1	On Page 2, after the discussion on the CPA, change to reflect this: "Confirmation that CPA has already passed at the fall 2021 Town Meeting and is definitely on the April 4, 2022 ballot.
2	On Page 3, paragraph 2, add: " Need to improve communication with property owners who live on the water, Long Pond or Assawompset, that stewardship is a big responsibility with recommendations on how they can help. Communication could be mailings, social media, local cable. Informational sheets and/or videos on importance of stewardship but also including what the municipalities are doing so property owners know they're not alone. "
3	On Page 3, Paragraph 3, clarify. " Are we suggesting Lakeville create more opportunities to attract folks to the watershed area in hopes of encouraging a better relationship& understanding of the water and therefore potential better stewardship? "
4	OVERALL COMMENT: Good stewardship is an ongoing communication process.
5	OVERALL COMMENT: Any discussion of recreation land, whether traditional park land or open space recreation land, must prominently include maintenance and upkeep; and funding for such. Otherwise, the land will look abandoned and people will not have a sense of 'ownership'.
	Archeological / historical entities that can be brought into the process / stewardship on a more regular basis? What are the options here (local HCs, tribal leadership, others?) note that archeological investigations on CR land requires a permit from MassHistoric.
	Stewardship balance between rights and responsbility. Takes active participation and is meant to be hands-on in some ways. Vocalize this point in how we frame stewarship. On-the ground rangers are part of this active stewardship and monitoring activity around the APC.
	Danica will cross-reference the brochure sent from Nancy on permitted / not permitted activities.

	General comment: I only skimmed this one . While it seems very through, I am struck to the extent it is very much a what -it-ought -to -be in a perfect world white paper. Lakeville's open space recommendations of 2012 were valued by the towns administration as much as the paper it was so poorly printed on.

FLOOD TABLE

Comment No.	Comment
1	Page 3, Paragraph 4, add: " We need to encourage MASS DOT to reconstruct any culvert (like the one on route 18) that is not adequate to let water pass before the ponds. Same may be true for a couple of bridges that were replaced over the Nemasket River with a smaller footprint creating chokepoints. "
2	Page 6, Paragraph 5, feedback: To state that roads became impassable is an understatement. Perhaps more emotion of what folks went through trying to live with the devastation including having the National Guard in town, could be captured for emphasis here.
3	OVERALL COMMENT: The solutions to flooding need to start being discussed with the municipalities so that decisions can start being made. That being said, there must be a cohesive plan in place that can withstand any one municipality not agreeing to commit to a specific solution being carried out in their town. Cooperation must be stressed.
4	Page 1, paragraph 4, clarification/potential correction: "I didn't know it was called Nemasket Park dam"
5	Page 2, clarification: "Wareham Street dam is ~340' long, 23'high. It's no more than 20-25' wide, drops `9', than the diverter dam is ~3'high."
6	Page 3, paragraph 2, correction/clarification: "Poshsha not Assawompset borders G. Quiticas. The pump house has a pipe and a meter on it to determine how many gallons New Bedford is taking from Poksha into G.Quiticas, told to me from Charlie Kennedy the former water Superintendent."

7	Page 6, paragraph 5: "I believe that most all the homes on Staples Shore Rd. were evacuated, electrical power turned off, and the vast majority were condemned by the board of health."
8	photo to include in paper: flooding in the Woloski Park neighborhood from 2010 (from Tricia - saved to white papers \ working versions \ SC comments folder)
9	Page 1, paragraph 2, add: excessive aquatic vegetation growth (as result of watershed being slow to drain and buil-up of water after precipitation, 3rd sentence)
10	Page 1, paragraph 2, corrections: "This indicates that flooding concerns in the area are less likely...Long Pond is characterized by a lower percentage of coarse glacial deposits than the APC area as a whole...50-60% low permeability till deposits...characterized by slower infiltration of precipitation"
11	Page 1, paragraph 3, add: "Other dams, two at Pratt Farm Conservation Area. The Stony Brook Dam is considered a Significant Hazard (Pare 2020 EAP report) and a smaller dam; flumes and dikes at various cranberry bog operations/farms throughout the watershed."
12	Page 6, paragraph 5, add: "Purchade Brook in Woloski Park flowed backward from the swollen Taunton River. Vernon Street at the Poquoy Brook to the Taunton River was also overtopped. Also, Murdock Street at the Nemasket River had a sink hole. The culvert on Summer Street Jeff Cornell's bogs blew out. I know our Fire Dept. has more info." (tricia)
13	Page 8, table 3, Middleborough row, add: Murdock Street and River's Edge Drive
14	Page 9, paragraph 2, add: Middleborough will be starting the update of the Hazard Mitigation Plan in August 2022. Middleborough passed a Floodplain Bylaw in 2021 and a Stormwater Management Bylaw in 2020.
15	Page 11, paragraph 1 (immediately under bullet list), add: "Again, Middleborough updated the Flooding Bylaw & Regulations in 2021."
16	Page 13, trade-offs bullet point 1, comment: "Don't forget - Middleborough also has water supply concerns at their East Grove Street well site and the two wells off East Main Street, both directly influenced by the Nemasket River. "

17	Page 13, trade-offs bullet point 5: "Need to get the state DEP Wetlands Protection Act regulations in line with the FEMA Regs as far as building or not building in floodplains."

WATER QUALITY TABLE

Comment No.	Comment
1	Add "lack of a rapid response plan for invasive species" to the bulletd list of 'Summary of threats' on page 5
2	OVERALL: "Clearing sand bars on the Nemasket River below the Assawompset dam, just upstream from 495, and just below Rt. 44 would help free flow of the river and contribute to drainage flow."
3	OVERALL: "The immediate construction of the sediment trap (which SRPEDD was instrumental in moving forward) and subsequent maintenance program of the sediment trap would immeasurably assist in preventing siltation in the Nemasket River and restricting flow."
4	OVERALL: "A regional/state approach to invasive weed control would assist in free flow of the river and contribute to drainage flow."

ECOLOGY TABLE

Comment No.	Comment
1	Page 1, paragraph 5, correction: fish migrate upstream 46 miles...APC is the largest such habitat in the state
2	Page 3, paragraph 2, add: "Woods Pond had cyanobacteria I believe in 2016. Check with Middleborough Health Dept. "
3	Page 4, paragraph 3, add: "Puddingshear Brook, Poquoy Brook, Stony Brook that goes to Pratt Farm are all considered cold water fisheries."
4	Page 5, paragraph 3, add: "I believe Tispaquin Pond has a protected mussel."
5	Page 6, paragraph 1, update/correction: "Middleborough's wastewater treatment plant was recently upgraded to meet current EPA standards."
6	Page 7, paragraph 1: "Dr. Kevin Curry, BSU also has many years of data for this section of the Nemasket River. Going back to I believe 1994."
7	Page 8, paragraph 2, add: "Maybe mention the introduction of Loons."
8	Page 9, paragraph 1, add: "Melissa Guimont of Middleborough and Conservation Commissioner has been putting blue bird boxes at Betty's Neck for several years. She submits the data to Cornell."
9	Page 10, paragraph 4, add: "We also have Blandings and Wood Turtle at a particular site off Route 44 near the Rotary. Not sure if they have been observed there recently though. Near Poquoy Brook."
10	Page 10, paragraph 5, add: "Would we mention common turtles too like Snapper, painted and spotted?"

11	Page 12, paragraph 1, add: "Suspected beaver reported at the Purchade Brook at Woloski Park. Also, I believe in Lakeville too - I will defer to Nancy Y. and Tom B."
12	Page 16, paragraph 4, add: "What about using benthic mats for milfoil?"
	Tupelo not mentioned (very common trees along Nemasket & Assawompset); Shrub layer can also be added
	Invasive species; reed canary grass present - research that it reduces habitat quality for water fowl (from Mike Schroeder - no source, but heard about it in reference to midwest lakes and has seen waterfowl use in Nemasket over past 20 yrs decline as reed canary grass came in)
	Dead fall - liable to have severe drought and there is presently a lot of tinder in the lands around the APC; observable from trails. New Bedford does contract out work like this; larger-scale plan for this as well.
	Comment in land development white paper, but I think this is more appropriate to address in ecology paper, if we have the data, or if not to note as a data gap for future assessment: "Note that forest cover mentioned in tables looks good but condition matters. Much deadfall in areas around Assawompset so excessive tinder, dangerous in periods of drought and wind. Only way to get it out of the forests without devastating understory would be with horses, oxen or some such."
	from water supply comments (more appropriate here?): Page 12, paragraph on trade offs, consider: " The dam management is not legally concerned with fisheries management; only flow and leveles for water supply. Fisheries and wildlife should be legally binding in some way." - include min flow requirements for certain species, tradeoff with maintaining drinking water levels, regulatory agencies (DMF, Natural Heritage, Army Corps, etc)
	this comment on water supply paper also relevant to ecology paper: "in the mid 1990s, juvenile herring were trapped between the lakes. New Bedford was 'less than helpful or concerned'. The Middleborough Town Manager and several volunteers transferred juveniles from Great Quitticas to Pocksha by hand net. This helped lead to the development of the current Middleborough-Lakeville Herring Fishery Commission. "

GENERAL COMMENTS

Review for anecdotalness - remove wherever possible

Review for clarity for a general audience (esp. water supply paper)

Ensure that we have clearly stated where responsibilities exist and where they don't for cities and towns

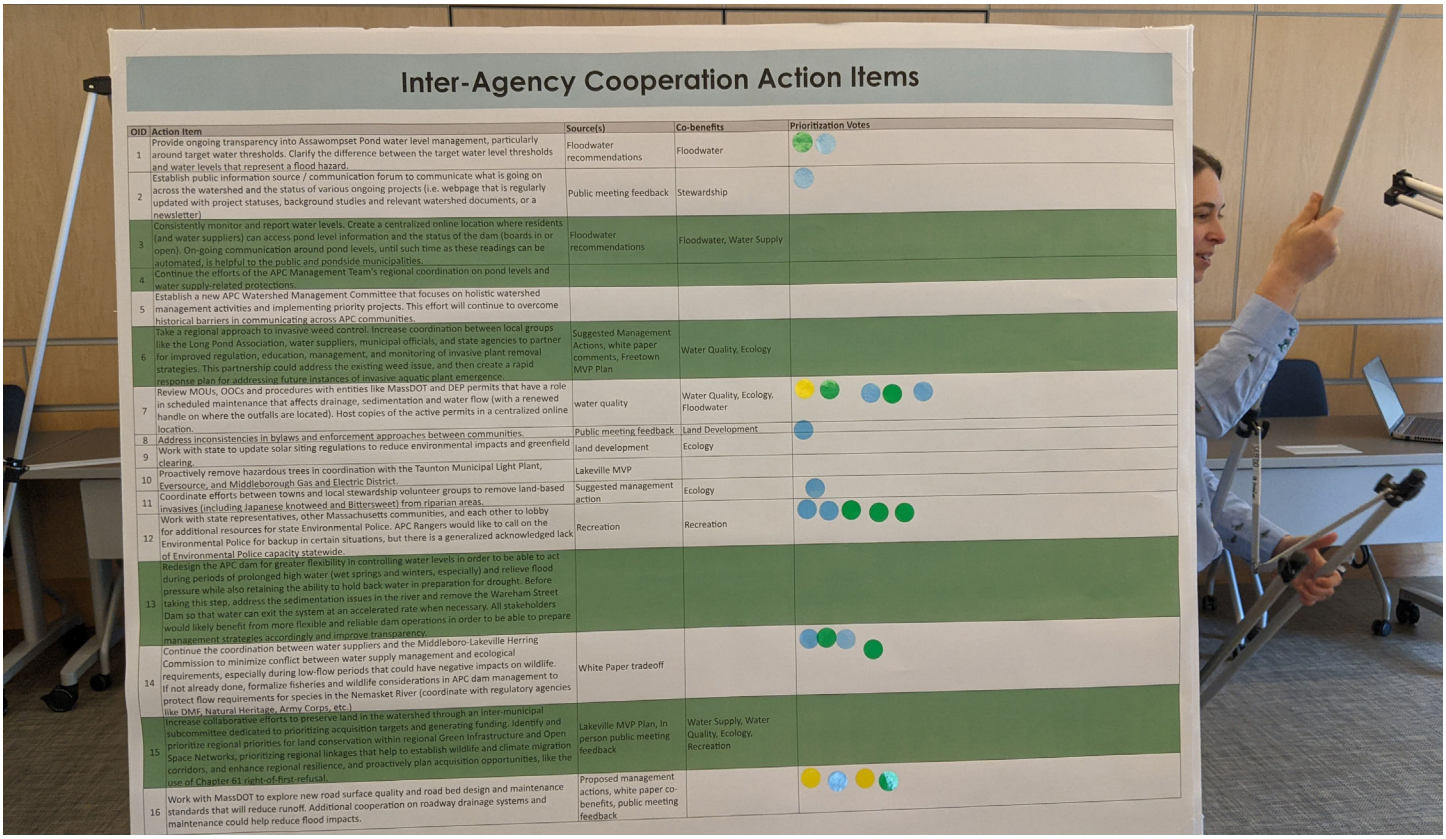
PICTURES FROM MAY 2022 MEETING (FIRST IN PERSON)
MANAGEMENT ACTION PRIORITIZATION EXERCISE

Ecology Action Items

OID	Action Item	Source(s)	Co-benefits	Prioritization Votes
1	Launch public education campaign about the importance and efficacy of protection in perpetuity and garner support for land acquisitions.	Public Workshop Comment	Land Development	
2	Implement public education campaign to increase awareness and knowledge of invasive species, how to prevent spread, and how to report sightings, to help spot invasives early on and prevent new infestations. Also provide education on the proper way to remove/dispose of weeds (especially regarding hand-pull techniques for aquatic vegetation removal on Long Pond).	Aquatic Invasive Plant Management Best Practices, regulatory review recommendations, suggested management actions	Water Quality, Stewardship	
3	Evaluate impacts of & methods for controlling/removing invasive reed canary grass.	Public Workshop Comment, white paper comments		
4	Institute volunteer monitoring programs for rapid detection and management of invasive plants. Identify local residents who would be interested in getting involved in the monitoring program.	Public Workshop Comment; suggested management action; best practice recommendation	Stewardship, Water Quality	
5	Monitor and control spread of spongy moth (aka gypsy moth) in forests	Rochester MVP		
6	Implement holistic invasive control methods that utilize targeted mechanical treatments (in lieu of herbicide treatments), build in post-treatment monitoring and adaptive management, and address causes (nutrients, re-introduction).	Aquatic Invasive Plant Management Best Practices, suggested management actions	Water Quality, Water Supply, Interagency Cooperation	
7	Adopt/update forestry management plans, especially for town forest areas (Betty's Neck, James Jasper Vigers Jr. Conservation Area, and the night soil repository area) that include monitoring changes and adaptive management for climate resilience, disease and pests; coordinate with Taunton & New Bedford for maintenance of water supply lands.	Public Workshop Comment, suggested management actions, Rochester MVP	Water Quality, Stewardship	
8	Conduct regional assessment of forest cover and condition, including tree surveys.	White Paper Comments	Stewardship	
9	Preserve large & unfragmented natural land, conserving rare & endangered species habitats and migratory corridors, as well as ecosystem function (i.e. flood storage, water purification) through both land acquisition and through minimizing land disturbance when development does occur.	Suggested Management Actions, regulatory review recommendations	Water Quality, Water Supply, Land Development	
10	Update Open Space & Rec Plans, prioritizing high value natural areas, as well as connected habitat and wildlife corridors for conservation, to improve community well-being, climate resilience, and habitat/wildlife protection(i.e. Green Infrastructure Network).	Suggested Management Actions, regulatory review recommendations	Land Development	
11	Adopt the Community Preservation Act to fund open space protection.	Suggested Management Actions	Land Development, Recreation, Water Quality	
12	Require protection of high priority, contiguous natural parcels that contribute to the regional Green Infrastructure Network in OSD bylaws.	Suggested Management Actions, regulatory review recommendations	Land Development	
13	Address barriers to fish passage in the Nemasket River at dams, fish ladders, and stream crossings (i.e. dam removal, bridge replacement).	Suggested Management Actions	Floodwater, Water Quality	
14	Protect headwater stream flow and shading for Coldwater fish.	Suggested Management Actions	Water Quality	
15	Install wildlife corridor & road crossing structures	Suggested Management Actions		
16	Support clams and mussels during their spawning season (i.e. removal of competitors)	Suggested Management Actions		
17	Remove prominant invasive vegetation masses (e.g. first 500ft of Nemasket River, Long Pond).	Proposed management actions		
18	Monitor and prevent spread of aquatic invasive plants from Long Pond to Assawompset Pond	Proposed management actions		
19	Improve red bellied Cooter habitat by various conservation and restoration means.	White Paper review of OSRP action items		
20	Institute management plan for removal of downed trees (especially from the red pine die offs in recent winters) and other debris	Public Workshop Comment, white paper comments	Recreation	

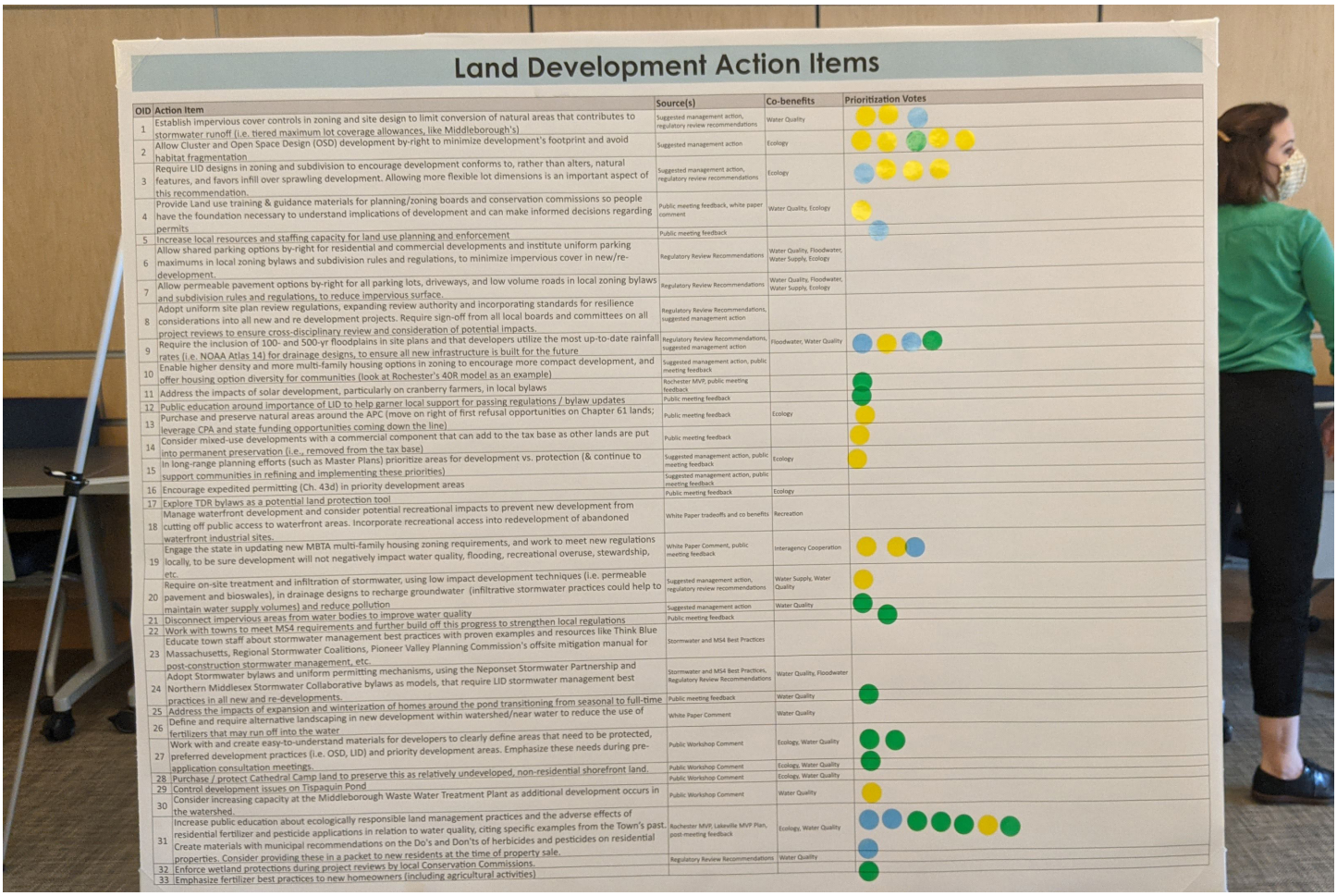
Flood Management Action Items

	Action Item	Source(s)	Co-Benefits	Prioritization Votes
1	Remove the Snake River Culvert (but not before addressing invasive weeds in Long Pond so as to mitigate their transference between waterbodies.)	Public Meeting comment, Steering Committee Feedback	Water Quality	
2	Restore the Nemasket River Channel (especially in the first 500 ft), which would include limited and targeted sediment removal or dredging, installation and maintenance of a sediment trap, and vegetation removal.	Proposed Management Action	water quality	
3	Remove the Wareham Street Dam to gain topography, increase flows, and reduce impoundment.	Proposed Management Action	Recreation	
4	Pursue regional participation in FEMA's CRS program, on a local and regional basis	Proposed Management Action, Steering Committee Feedback		
5	Create a regional buy-out program and/or prepare to participate in a potential state-run program (currently under consideration) to acquire properties for flood storage. Focus this on older houses with aging septic systems.	Proposed Management Action, Public Meeting Comment		
6	Conduct cost-benefit analyses for the most effective mechanisms, including nature based solution options, to increase floodwater water storage capacity in preparation for grant application opportunities. Focus on retired cranberry bogs and Route 18.	White paper co-benefits tradeoffs, Proposed Management Action, Public Meeting Comment, Steering Committee Feedback	Water Quality	
7	Adopt shared wetland regulations across all communities that include 'flood control' and 'climate change' in their definition and which expand the Conservation Commission's jurisdiction in permitting projects to 100 feet around all wetland resource areas to uniformly protect floodwater storage areas and their buffers across the watershed from development. Ensure these regulations are in line with FEMA regulations restricting building in wetlands and are more expansive than state standards.	Reg Review, Steering Committee Feedback, In Person Feedback	Land Development, Water Quality	
8	Expand the floodplain overlay district to the 500-year FEMA flood zones, and take a climate change - aware stance in accounting for floodplain shifts.	Reg Review, Steering Committee Feedback, In Person Feedback	Land Development, Water Quality	
9	Restrict development into the floodplain to by special permit only, subject to review by Con Com, Planning Board, BOH, DPW, and/or building department. If the floodplain is developed, follow FEMA guidelines of elevation, record flood events, and require a 2:1 ratio for compensatory floodwater storage, with adequate provisions to ensure success of wetland replication projects, if a project may reduce storage in Bordering and Isolated Land Subject to Flooding	Reg Review	Land Development	
10	Establish a minimum 25' no disturb zone buffering all state-defined and identified wetland resource areas within all communities' bylaws.	Reg Review	Land Development	
11	All local jurisdictions should adopt a current Hazard Mitigation Plan that prepares the community for future climate impacts, incorporating the latest information and predictions.	Reg Review	Land Development	
12	Document all flood losses and repetitive losses, regardless of their location with respect to the floodplain. Record any mitigation activities taken to protect repetitive loss properties.	Reg Review (from HMP)	Land Development	
13	Address flooding at known flood prone culverts. Come up with a definitive prioritization of which cause the worst flooding and pursue upgrades accordingly: Pickens Street, Route 18, Pierce Avenue/Bittersweet Road, Country Road by the Eagles Building, Chippeway Road culvert along Fall Brook, pond and river based culverts insufficient to allow flow between ponds, Squam Brook Millers Bridge and Dam, Snipatuit Causeway, Doggett Culvert, Hathaway Pond Dam, Mattapoisett River, and Thomas Street Culvert	Rochester MVP, Lakeville MVP, White Paper Feedback, SC In Person Feedback		
14	Address flooding and riverine flow impediments/issues at these bridges, including repairs and/or replacements: Bridges on the causeway leading to Assonet Bay Shores, bridges on Beach Bluff Road leading to Hemlock Point (Long Pond), Vernon St Bridges, Plymouth St. Bridge, the Railroad Bridge Murdock Street Bride, over Poquoy Brook and Taunton River, and the Millers Bridge and Dam			
15	"Look for opportunities to address flooding along these known flood prone roadways: Highland Road, Bedford Street, Taunton Street and Cross Street, Captain's Way, Freetown Street, Country Road, Riverside Drive, Old Powder House, (all above from Lakeville), Chippeway Road culvert along Fall Brook (Freetown), Vernon Street at the Poquoy Brook to the Taunton River, Precinct Street between Thompson Street and Plymouth Street, Fall Brook at Chippeway Road, Around Bedford Street near Tamarack park"			
16	Allow for a larger spillway on the APC dam and reconnect the pond to dam-adjacent wetlands, maintaining desired pond levels and also permitting overflow during high water into adjacent wetlands.	Proposed management actions	Water Supply, Water Quality	
17	Identify and prioritize areas where nature-based stormwater management (i.e. green infrastructure, swales, etc.) may have the greatest impact on mitigating stormwater and flooding	White paper tradeoffs / co benefits	Water Quality	
18	Restore natural wetland habitat and function, including on retiring cranberry bogs, so that these lands can act like a sponge to hold and slowly infiltrate and filter water.	Proposed management actions	Ecology, Water Quality	



Inter-Agency Cooperation Action Items

OID	Action Item	Source(s)	Co-benefits	Prioritization Votes
1	Provide ongoing transparency into Assawompset Pond water level management, particularly around target water thresholds. Clarify the difference between the target water level thresholds and water levels that represent a flood hazard.	Floodwater recommendations	Floodwater	
2	Establish public information source / communication forum to communicate what is going on across the watershed and the status of various ongoing projects (i.e. webpage that is regularly updated with project statuses, background studies and relevant watershed documents, or a newsletter)	Public meeting feedback	Stewardship	
3	Consistently monitor and report water levels. Create a centralized online location where residents (and water suppliers) can access pond level information and the status of the dam (boards in or open). On-going communication around pond levels, until such time as these readings can be automated, is helpful to the public and pondside municipalities.	Floodwater recommendations	Floodwater, Water Supply	
4	Continue the efforts of the APC Management Team's regional coordination on pond levels and water supply-related protections.			
5	Establish a new APC Watershed Management Committee that focuses on holistic watershed management activities and implementing priority projects. This effort will continue to overcome historical barriers in communicating across APC communities.			
6	Take a regional approach to invasive weed control. Increase coordination between local groups like the Long Pond Association, water suppliers, municipal officials, and state agencies to partner for improved regulation, education, management, and monitoring of invasive plant removal strategies. This partnership could address the existing weed issue, and then create a rapid response plan for addressing future instances of invasive aquatic plant emergence.	Suggested Management Actions, white paper comments, Freetown MVP Plan	Water Quality, Ecology	
7	Review MOUs, OOCs and procedures with entities like MassDOT and DEP permits that have a role in scheduled maintenance that affects drainage, sedimentation and water flow (with a renewed handle on where the outfalls are located). Host copies of the active permits in a centralized online location.	water quality	Water Quality, Ecology, Floodwater	
8	Address inconsistencies in bylaws and enforcement approaches between communities.	Public meeting feedback	Land Development	
9	Work with state to update solar siting regulations to reduce environmental impacts and greenfield clearing.	land development	Ecology	
10	Proactively remove hazardous trees in coordination with the Taunton Municipal Light Plant, Eversource, and Middleborough Gas and Electric District.	Lakeville MVP		
11	Coordinate efforts between towns and local stewardship volunteer groups to remove land-based invasives (including Japanese knotweed and Bittersweet) from riparian areas.	Suggested management action	Ecology	
12	Work with state representatives, other Massachusetts communities, and each other to lobby for additional resources for state Environmental Police. APC Rangers would like to call on the Environmental Police for backup in certain situations, but there is a generalized acknowledged lack of Environmental Police capacity statewide.	Recreation	Recreation	
13	Redesign the APC dam for greater flexibility in controlling water levels in order to be able to act during periods of prolonged high water (wet springs and winters, especially) and relieve flood pressure while also retaining the ability to hold back water in preparation for drought. Before taking this step, address the sedimentation issues in the river and remove the Wareham Street Dam so that water can exit the system at an accelerated rate when necessary. All stakeholders would likely benefit from more flexible and reliable dam operations in order to be able to prepare management strategies accordingly and improve transparency.			
14	Continue the coordination between water suppliers and the Middleboro-Lakeville Herring Commission to minimize conflict between water supply management and ecological requirements, especially during low-flow periods that could have negative impacts on wildlife. If not already done, formalize fisheries and wildlife considerations in APC dam management to protect flow requirements for species in the Nemasket River (coordinate with regulatory agencies like DMF, Natural Heritage, Army Corps, etc.)	White Paper tradeoff		
15	Increase collaborative efforts to preserve land in the watershed through an inter-municipal subcommittee dedicated to prioritizing acquisition targets and generating funding. Identify and prioritize regional priorities for land conservation within regional Green Infrastructure and Open Space Networks, prioritizing regional linkages that help to establish wildlife and climate migration corridors, and enhance regional resilience, and proactively plan acquisition opportunities, like the use of Chapter 61 right-of-first-refusal.	Lakeville MVP Plan, In person public meeting feedback	Water Supply, Water Quality, Ecology, Recreation	
16	Work with MassDOT to explore new road surface quality and road bed design and maintenance standards that will reduce runoff. Additional cooperation on roadway drainage systems and maintenance could help reduce flood impacts.	Proposed management actions, white paper co-benefits, public meeting feedback		



Land Development Action Items

OID	Action Item	Source(s)	Co-benefits	Prioritization Votes
1	Establish impervious cover controls in zoning and site design to limit conversion of natural areas that contributes to stormwater runoff (i.e. tiered maximum lot coverage allowances, like Middleborough's)	Suggested management action, regulatory review recommendations	Water Quality	
2	Allow Cluster and Open Space Design (OSD) development by-right to minimize development's footprint and avoid habitat fragmentation	Suggested management action	Ecology	
3	Require LID designs in zoning and subdivision to encourage development conforms to, rather than alters, natural features, and favors infill over sprawling development. Allowing more flexible lot dimensions is an important aspect of this recommendation.	Suggested management action, regulatory review recommendations	Ecology	
4	Provide Land use training & guidance materials for planning/zoning boards and conservation commissions so people have the foundation necessary to understand implications of development and can make informed decisions regarding permits	Public meeting feedback, white paper comment	Water Quality, Ecology	
5	Increase local resources and staffing capacity for land use planning and enforcement	Public meeting feedback		
6	Allow shared parking options by-right for residential and commercial developments and institute uniform parking maximums in local zoning bylaws and subdivision rules and regulations, to minimize impervious cover in new/re-development.	Regulatory Review Recommendations	Water Quality, Floodwater, Water Supply, Ecology	
7	Allow permeable pavement options by-right for all parking lots, driveways, and low volume roads in local zoning bylaws and subdivision rules and regulations, to reduce impervious surface.	Regulatory Review Recommendations	Water Quality, Floodwater, Water Supply, Ecology	
8	Adopt uniform site plan review regulations, expanding review authority and incorporating standards for resilience considerations into all new and re development projects. Require sign-off from all local boards and committees on all project reviews to ensure cross-disciplinary review and consideration of potential impacts.	Regulatory Review Recommendations, suggested management action		
9	Require the inclusion of 100- and 500-yr floodplains in site plans and that developers utilize the most up-to-date rainfall rates (i.e. NOAA Atlas 14) for drainage designs, to ensure all new infrastructure is built for the future	Regulatory Review Recommendations, suggested management action	Floodwater, Water Quality	
10	Enable higher density and more multi-family housing options in zoning to encourage more compact development, and offer housing option diversity for communities (look at Rochester's 40R model as an example)	Suggested management action, public meeting feedback		
11	Address the impacts of solar development, particularly on cranberry farmers, in local bylaws	Rochester MVP, public meeting feedback		
12	Public education around importance of LID to help garner local support for passing regulations / bylaw updates	Public meeting feedback		
13	Purchase and preserve natural areas around the APC (move on right of first refusal opportunities on Chapter 61 lands; leverage CPA and state funding opportunities coming down the line)	Public meeting feedback	Ecology	
14	Consider mixed-use developments with a commercial component that can add to the tax base as other lands are put into permanent preservation (i.e., removed from the tax base)	Public meeting feedback		
15	In long-range planning efforts (such as Master Plans) prioritize areas for development vs. protection (& continue to support communities in refining and implementing these priorities)	Suggested management action, public meeting feedback	Ecology	
16	Encourage expedited permitting (Ch. 43d) in priority development areas	Suggested management action, public meeting feedback		
17	Explore TDR bylaws as a potential land protection tool	Public meeting feedback	Ecology	
18	Manage waterfront development and consider potential recreational impacts to prevent new development from cutting off public access to waterfront areas. Incorporate recreational access into redevelopment of abandoned waterfront industrial sites.	White Paper tradeoffs and co benefits	Recreation	
19	Engage the state in updating new MBTA multi-family housing zoning requirements, and work to meet new regulations locally, to be sure development will not negatively impact water quality, flooding, recreational overuse, stewardship, etc.	White Paper Comment, public meeting feedback	Interagency Cooperation	
20	Require on-site treatment and infiltration of stormwater, using low impact development techniques (i.e. permeable pavement and bioswales), in drainage designs to recharge groundwater (infiltrative stormwater practices could help to maintain water supply volumes) and reduce pollution	Suggested management action, regulatory review recommendations	Water Supply, Water Quality	
21	Disconnect impervious areas from water bodies to improve water quality	Suggested management action	Water Quality	
22	Work with towns to meet MS4 requirements and further build off this progress to strengthen local regulations	Public meeting feedback		
23	Educate town staff about stormwater management best practices with proven examples and resources like Think Blue Massachusetts, Regional Stormwater Coalitions, Pioneer Valley Planning Commission's offsite mitigation manual for post-construction stormwater management, etc.	Stormwater and MS4 Best Practices		
24	Adopt Stormwater bylaws and uniform permitting mechanisms, using the Neponset Stormwater Partnership and Northern Middlesex Stormwater Collaborative bylaws as models, that require LID stormwater management best practices in all new and re-developments.	Stormwater and MS4 Best Practices, Regulatory Review Recommendations	Water Quality, Floodwater	
25	Address the impacts of expansion and winterization of homes around the pond transitioning from seasonal to full-time	Public meeting feedback	Water Quality	
26	Define and require alternative landscaping in new development within watershed/near water to reduce the use of fertilizers that may run off into the water	White Paper Comment	Water Quality	
27	Work with and create easy-to-understand materials for developers to clearly define areas that need to be protected, preferred development practices (i.e. OSD, LID) and priority development areas. Emphasize these needs during pre-application consultation meetings.	Public Workshop Comment	Ecology, Water Quality	
28	Purchase / protect Cathedral Camp land to preserve this as relatively undeveloped, non-residential shorefront land.	Public Workshop Comment	Ecology, Water Quality	
29	Control development issues on Tispaquin Pond	Public Workshop Comment	Ecology, Water Quality	
30	Consider increasing capacity at the Middleborough Waste Water Treatment Plant as additional development occurs in the watershed.	Public Workshop Comment	Water Quality	
31	Increase public education about ecologically responsible land management practices and the adverse effects of residential fertilizer and pesticide applications in relation to water quality, citing specific examples from the Town's past. Create materials with municipal recommendations on the Do's and Don'ts of herbicides and pesticides on residential properties. Consider providing these in a packet to new residents at the time of property sale.	Rochester MVP, Lakeville MVP Plan, post-meeting feedback	Ecology, Water Quality	
32	Enforce wetland protections during project reviews by local Conservation Commissions.	Regulatory Review Recommendations	Water Quality	
33	Emphasize fertilizer best practices to new homeowners (including agricultural activities)			

Recreation Action Items

OID	Action Item	Source(s)	Co-benefits	Prioritization Votes
1	Enhance canoe access to the river.	Public Workshop Comment		
2	Improve the access road to Betty's Neck	Public Workshop Comment		
3	Encourage responsible and appropriate recreation in the region by improving signage in and around the area about permitted uses, including existing kiosks, large printed banners, and the electronic sign around the Old Town Hall in Lakeville. Ensure that installed signage is robust (i.e., metal or plastic, not paper) and located to help ensure its longevity	Public Workshop Comment, SC Feedback		
4	Ensure there are no outboard motors permitted on the Nemasket	Public Workshop Comment		
5	Install a boat washing station at the Long Pond Freetown Boat Ramp to reduce the spread of water-quality degrading invasive plants. This action would take place in partnership with the Department of Conservation and Recreation, state and local police enforcement, and should be undertaken alongside a public awareness campaign of the importance of using the boat wash station to reduce invasive species spread, both in online digital resources and in on-site signage.	Public Workshop Comment, White paper tradeoffs / co benefits, Suggested management action	Ecology, Water Quality, Interagency cooperation	
6	Take people on nature walks along the Nemasket and throughout the watershed.	Public Workshop Comment		
7	Strategically expand the watershed's open space network for connected water and land based recreational opportunities. OSRD set asides may provide candidate lands for this opportunity.	Suggested management action	Ecology	
8	Expand spiritual, cultural, and historic education and recreational potential within municipal programming offerings to encourage better relationships with, and understanding of, the water.	Suggested management action	Stewardship	
9	Manage and improve the Nemasket River ecosystem to encourage water and land based recreational use around and on the river.	White Paper review of OSRP action items	Stewardship	
10	Increase public awareness of the scenic and ecological value of the Nemasket river by exploring the possibilities of creating a Nemasket / Taunton River Corridor designation similar to the Natural Heritage Corridor (Blackstone Valley), State Heritage Corridor, or Greenways State Park (Connecticut River Valley). Support efforts of involved communities in nominating this corridor for distinction.	White Paper review of OSRP action items		
11	Manage over-use of recreational areas which can threaten ecology, habitats, and natural resources. For example, in trails around the Quitticas area.	White paper tradeoffs / co benefits, public workshop comment		
12	Adopt the Community Preservation Act in all watershed communities to fund recreational improvements.	Regulatory Review Recommendations	Ecology	
13	Increase public access to information about where and how to recreate across the watershed, permitted uses, rules and regulations, maps with detailed access locations, alternative recreation areas (to avoid overuse of particular assets), and permitted uses all posted on Town websites.	Regulatory Review Recommendations	Stewardship, Ecology, Water Supply, Water Quality	
14	Provide a larger annual budget for the APC Rangers program to increase their presence around the ponds during peak months, for both public education and enforcement. The rangers are the first line of defense for protecting the watershed and water supply from inappropriate use.	Regulatory Review Recommendations	Water Supply	
15	Increase municipal funding for local Park Commissions/Departments to improve maintenance of open space.	Regulatory Review Recommendations		
16	Improve the regional trail network, especially along the Nemasket River, Wading Place, the Wareham Street Herring Run at Thomas Memorial Park (incl. ADA access), the Andrealotta Property, and the New Bedford Water Works property (with limited access).			
17	Create a formal system / database for logging reports submitted by the APC rangers to keep track of repeat rule breakers.			
18	Remove debris off of Vaughn Street Trail	Public Workshop Comment		
19	Use more oversight from state and local environmental police at the boat launch for long pond, especially if there is a boat washing station put in	Public Workshop Comment		

Stewardship Action Items

OID	Action Item	Source(s)	Co-benefits	Prioritization Votes
1	Launch public education campaign about the importance and efficacy of protection in perpetuity and garner support for land acquisitions.	Public Workshop Comment	Land Development	
2	Implement public education campaign to increase awareness and knowledge of invasive species, how to prevent spread, and how to report sightings, to help spot invasives early on and prevent new infestations. Also provide education on the proper way to remove/dispose of weeds (especially regarding hand-pull techniques for aquatic vegetation removal on Long Pond).	Aquatic Invasive Plant Management Best Practices, regulatory review recommendations, suggested management actions	Water Quality, Stewardship	
3	Evaluate impacts of & methods for controlling/removing invasive reed canary grass.	Public Workshop Comment, white paper comments		
4	Institute volunteer monitoring programs for rapid detection and management of invasive plants. Identify local residents who would be interested in getting involved in the monitoring program.	Public Workshop Comment; suggested management action; best practice recommendation	Stewardship, Water Quality	
5	Monitor and control spread of spongy moth (aka gypsy moth) in forests	Rochester MVP		
6	Implement holistic invasive control methods that utilize targeted mechanical treatments (in lieu of herbicide treatments), build in post-treatment monitoring and adaptive management, and address causes (nutrients, re-introduction).	Aquatic Invasive Plant Management Best Practices, suggested management actions	Water Quality, Water Supply, Interagency Cooperation	
7	Adopt/update forestry management plans, especially for town forest areas (Betty's Neck, James Jasper Vigers Jr. Conservation Area, and the night soil repository area) that include monitoring changes and adaptive management for climate resilience, disease and pests; coordinate with Taunton & New Bedford for maintenance of water supply lands.	Public Workshop Comment, suggested management actions, Rochester MVP	Water Quality, Stewardship	
8	Conduct regional assessment of forest cover and condition, including tree surveys.	White Paper Comments	Stewardship	
9	Preserve large & unfragmented natural land, conserving rare & endangered species habitats and migratory corridors, as well as ecosystem function (i.e. flood storage, water purification) through both land acquisition and through minimizing land disturbance when development does occur.	Suggested Management Actions, regulatory review recommendations	Water Quality, Water Supply, Land Development	
10	Update Open Space & Rec Plans, prioritizing high value natural areas, as well as connected habitat and wildlife corridors for conservation, to improve community well-being, climate resilience, and habitat/wildlife protection(i.e. Green Infrastructure Network).	Suggested Management Actions, regulatory review recommendations	Land Development	
11	Adopt the Community Preservation Act to fund open space protection.	Suggested Management Actions	Land Development, Recreation, Water Quality	
12	Require protection of high priority, contiguous natural parcels that contribute to the regional Green Infrastructure Network in OSD bylaws.	Suggested Management Actions, regulatory review recommendations	Land Development	
13	Address barriers to fish passage in the Nemasket River at dams, fish ladders, and stream crossings (i.e. dam removal, bridge replacement).	Suggested Management Actions	Floodwater, Water Quality	
14	Protect headwater stream flow and shading for Coldwater fish.	Suggested Management Actions	Water Quality	
15	Install wildlife corridor & road crossing structures	Suggested Management Actions		
16	Support clams and mussels during their spawning season (i.e. removal of competitors)	Suggested Management Actions		
17	Remove prominant invasive vegetation masses (e.g. first 500ft of Nemasket River, Long Pond).	Proposed management actions		
18	Monitor and prevent spread of aquatic invasive plants from Long Pond to Assawompset Pond	Proposed management actions		
19	Improve red bellied Cooter habitat by various conservation and restoration means.	White Paper review of OSRP action items		
20	Institute management plan for removal of downed trees (especially from the red pine die offs in recent winters) and other debris	Public Workshop Comment, white paper comments	Recreation	

Attendees:

Chance Perks, Jodi Raposa, Mike Schroeder, Kate Bentsen, Nancy Yeatts, Maura (DEP), Tom Barron, Maureen Flanagan (Sen. Rodrigues' office), Aaron Best, Lia Fabian, Gary Santos, Marc Resnick

General Notes:

- Lakeville hospital and another location are also going to be developed
- Be more explanatory with actions in plan (i.e. explain terms public may not understand such as "by-right")
- Lakeville trying to pass OSRD Bylaw (public hearing 5/12, town meeting vote 5/23), new town planner from Foxborough using Foxborough's bylaw as template, Nancy has concerns about the bylaw because it requires all open space to go to town and ConComm doesn't have capacity to take on more land, hoping to table vote until fall so the bylaw can be updated (update: bylaw was tabled at town meeting)

<u>Recreation</u>

- It is not actually possible to 'improve' the access road to Betty's Neck to any large extent aside from putting in gravel.
    - The Division doesn't own the current access road (outside the conservation restriction) – not the access road defined in easement, rather it is running through a cranberry bog (belongs to bog owner).
    - They could move the road to the actual easement defined in the CR, but there are a lot of issues with that road including flooding, so will be a challenge to formalize that access for public
    - Long-term should look into improving and using the actual easement, but not a priority right now
- #18 should note Vaughn St trail is in Middleborough
- Advertising allowed uses is priority
    - Including hunting and fishing – many people don't want these activities on open space lands, but those licenses are what provide revenue for open space conservation and state enviro police, so it is critical to encourage more hunting/fishing where allowed (and make public more aware of this)
    - Better awareness of allowed uses at each site (post notices/signs at access points) will help avoid conflicts between users, because people will know what other types of users to expect to encounter (i.e. hunters, horses)
- Centralized public information source would be helpful – potential regional OSRP opportunity
    - Mike Schroeder interested in including this type of regional collaboration/ planning in Lakeville's upcoming OSRP (send language she can use for action plan)
- APC rangers need more funding – could ask all members to contribute funds (currently only water suppliers and Lakeville have contributed?)

<u>Water Supply</u>

- Red dot on 'increase drinking water sampling' put by Jodi Foster. This Is because the city already does a significant amount of testing on the finished water and has demonstrated that there is little to no PFAS in the water (it is currently at 'undectable' amounts).
    - PFAS is a "legacy contaminant" – if not present now probably won't become so, so no need to continuously monitor
    - State's UCMR program is effective at detecting emerging contaminants, so no need for town's to do additional monitoring
    - The finished water coming out of the water supply is highly regulated, and any testing that the city does on the finished water has to be reported to the state regardless of contaminants levels. Because this is expensive, the water dept. Would prefer to avoid doing additional testing.
    - The city could do more testing of the source water in the APC (update action to say "source" specifically vs "drinking"), and this would / could include the UCMR 5 – 29 additional PFAS chemicals to be reviewed
- Lithium is an additional contaminant of concern.
- #10 consider/manage new development's impacts on drinking water is top priority
    - There is local uncertainty around managing wells and groundwater – whose jurisdiction? (DEP only has authority over public water supply/wells, not individual/private)
    - Are there any requirements for reporting water demand in new development permits? Uncertain, but should be
        - Taunton – new development has to comply with their WMA permit (condition of permit), but they are well below their approved permit withdrawal amount, and recent water use has declined, so no concerns about new development
        - Education for boards to be aware of this issue
        - There are several overlapping jurisdictions when it comes to drilling new wells – the BOH, USGS, DEP (in case of larger wells)
- Does safe yield amount need to be updated? DEP previously said no need to reassess because of private sewage/septic systems (replace groundwater locally), but Middleborough does have public sewer (which is more of an issue because not returned to groundwater)

<u>Land Development</u>

- Public support for bylaw updates is difficult
- A lot of the actions are already underway in Lakeville (i.e. OSRD Bylaw – have draft bylaw trying to pass at Town Meeting; increasing local capacity – new town planner; training materials; new SPR bylaw passed at town meeting, managing waterfront development with new ConComm restrictions)
- New Long Pond Association website can be a public education source
- Would like to see an action related to responsible mosquito control (concerns about people spraying chemicals, should monitor impacts)
- Public education is a top priority (buffer protection/planting, where can towns/orgs get correct info to share with public, would like a model property to showcase for public to learn from)

<u>Flood Management</u>

- Update text for Snake River Culvert action (#1) – should say "replace" (not remove)

- Cost-benefit analysis for floodwater actions was popular action
    - Tom emphasized need to remove sediment before floodwater storage, because storage doesn't matter if the water can't get there
    - Some (Chance) may have chosen that action specifically because of the cranberry bog component (maybe that should be its own action? More important than the analysis component) – note DMF/DER already doing this work in region (partnership)
    - Chance perks things that cranberry rowers will be unable to remain financially viable soon --> retrofitting bogs to be biofilters and flood storage would be a way to value the land and pay cranberry bog owners for preservation
    - **Freitas family has many unused cranberry bogs that could make good flood storage sites, Mill Brook bogs in Freetown, Ray Fave in Rochester**
- Uniform wetland regulations –
    - Lakeville finds it hard to enforce existing regs, need to be stricter enforcing buffer regs (There are a lot of developers on the planning board who take a 'letter of the law' not spirit of the law approach '
    - New Bedford doesn't allow any development within 25ft buffer zone, even though not law (can be effective as a policy of the board, even if not official regulation)
    - Lakeville used to have similar policy not allowing development in buffer, until board changed and abandoned policy

<u>Interagency</u>

- Review and coordinate on MOU/OOCs – got most votes
    - Agreements should be publicly available, but may be difficult to find online
    - Automated systems to help towns manage agreements, get auto reminders when the time comes for reporting or to renew a permit/agreement (update language to include this technology component)
    - Potential example: Wildlands Trust has a tracking system they use for renewing deed restrictions
- We do need an apc management team – this is a requirement of the WMA
- **Taunton must submit a report by 12/31/22 on the APC Management Team's progress**
- Want to increase presence of State Enviro police, but acknowledged they are understaffed and underfunded just like local rangers
    - Focus of enviro police (and funding) comes from hunting/ fishing/ trapping, but not a lot of that happens in state, so limited resources → need to change state funding source

<u>Ecology</u>

- Forestry management plans – there is interest but need $ to fund
    - DFW: lot of conservation restrictions require a 10 year forestry management plan, but once these are lapsed (ex, if there is a new owner or it goes into a trust), new owners do not want to do this.
    - **Preventative / continuing to maintain this is important**
    - Difficult to get fallen trees and dead wood out of the forest b/c dead red pines are worthless
    - The machinery used to get the wood out of the forest also destroys the understory.

- DFW requires foresters for all of these
- Aging trees & gypsy moth are the main issues
- Even town forests have challenges with this resulting from convincing towns to get dead wood out of the area
- **Finding examples from around MA of how people have funded FMPs would be helpful**
- Chance: the Freetown fire suppression organizations are underfunded – due to the drought, we are a match away from a big fire. We need **preventative fire control measures**

<u>Stewardship</u>

- It is important to prioritize the conservation of large contiguous parcels.