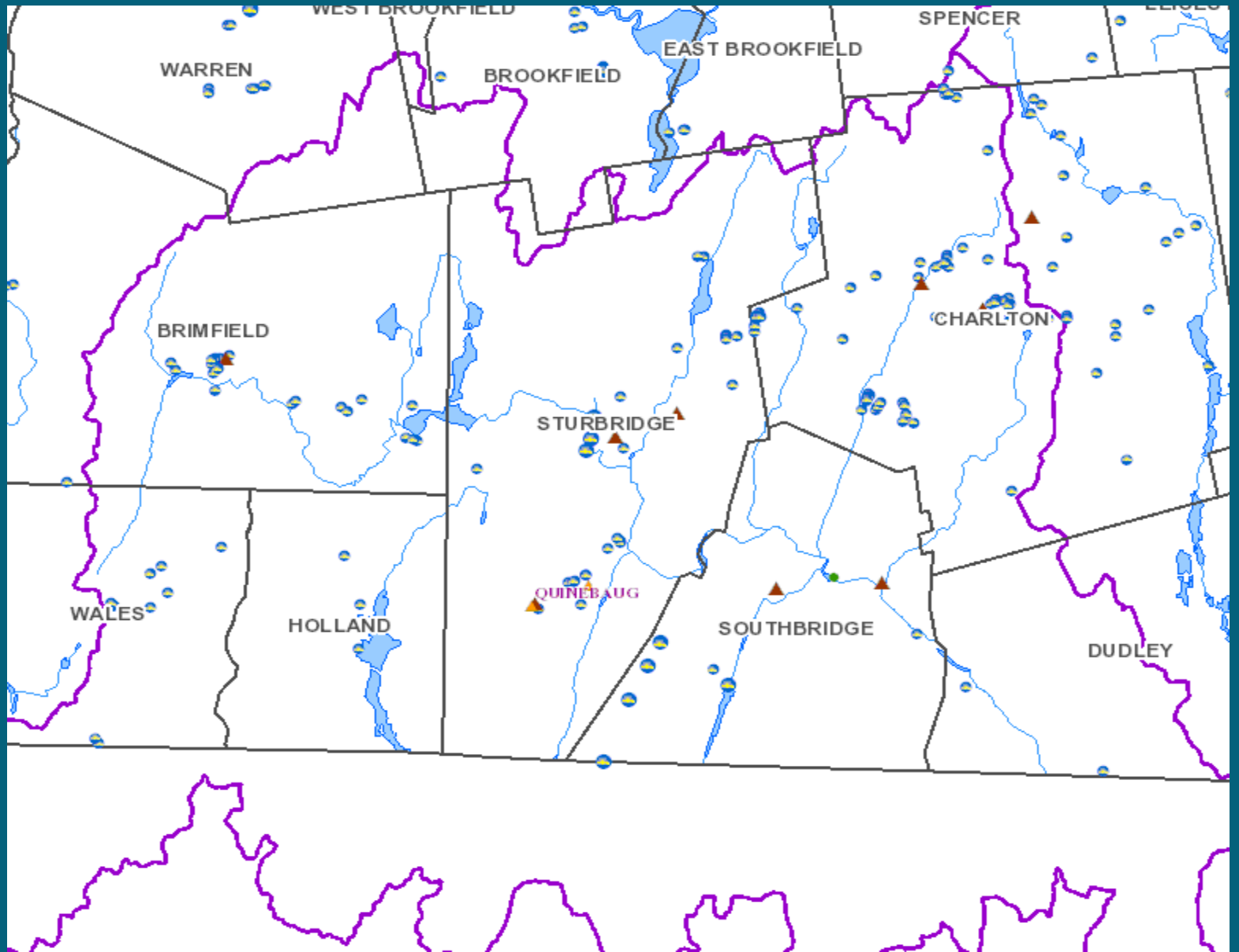
Quinebaug Basin Permit Renewals

June 15, 2016
Southbridge Town Hall

MA Executive Office of Energy and Environmental Affairs
- Department of Conservation and Recreation
- Department of Environmental Protection
- Department of Fish and Game

Quinebaug Basin



Water Management Act Purpose

Chapter 21G, Section 7 Reasonable protection of …

- Public drinking water supplies
- Navigation
- Hydropower resources
- Fish and wildlife
- Water quality
- Water-based recreation
- Wastewater treatment capacity
- Agriculture
- Waste assimilation capacity
- Reasonable conservation practices consistent with efficient utilization of water
- Groundwater recharge areas
- Flood plains
- Wetland habitat
- Reasonable economic development and creation of jobs

Quinebaug Permit Renewal Schedule

Activity	Notes
Individual Outreach meetings	June 2016
Water Needs Forecast	Under development
Consultation meetings	On going, as necessary
Renewal Application Filing Period	June 30, 2016– Aug. 31, 2016
MassDEP issues Order to Compete (OTC)	TBD
Applicant prepares response to OTC	TBD
OTC response due back	TBD
MassDEP reviews	Mtgs. as necessary
Draft permit and public comment period	TBD
Issue final permits*	TBD

* Permits may be appealed for up to 21 days after permit issuance. Permits under appeal are not considered final permits.

Safe Yield

55% of Annual Drought Basin Yield + Reservoir Storage

- New methodology* determines maximum withdrawal volumes on annual basis and major basin scale.

*For more detailed description, see the Sustainable Water Management Initiative Framework Summary (November 28, 2012)

Basin	Safe Yield	Total Annual Authorized Withdrawals*	Total Annualized Registered Volume *	2015 Reported Use
Quinebaug	33.9 mgd	5.62 mgd	2.69 mgd	3.07 mgd

* Withdrawal volume calculated based on 365 days

Water Needs Forecasts (WNF)

- Applications for WMA Permits require a forecast of water needs for the permit term
- DCR develops forecast
- WRC Method:
  - Population and Employment forecasts
  - 65/10 and Current Trends scenarios
  - + 5% Buffer
  - At least 3 years of reliable data
  - Temporary allocation where necessary

- URL: www.mass.gov/eea/wnf-method

Steps in Developing a Water Needs Forecast

- DCR compiles and analyzes data
- Public Notices: *Environmental Monitor*; status report to WRC
- DCR develops draft forecast; discussions with water supplier
- Basin-wide public meeting (this meeting)
- PWS includes forecast in WMA permit application

Data from Water Supplier

1. Water-use data based on actual metering for 3 to 5 years (from ASRs):
   - Residential
   - Industrial, Commercial, Municipal (Nonresidential)
   - Treatment plant losses (if any)
   - UAW
2. Population served by water system (including out of town and seasonal)
3. Anticipated significant changes in water use (large projects not captured in projections)

Data Obtained by DCR

Data	Sources
Current Town-wide Population	U.S. Census, Planning Office
Population Projections	Regional Planning Agency
Current Employment	Regional Planning Agency
Employment Projections	Regional Planning Agency

Permit Renewal Volumes

You can renew only as much as you currently have

- Existing Allocation vs Requested Volume
  - Existing Allocation = Your registration + permit = 2.0 mgd
  - DCR Projection = 2.30 mgd
- Up to 2.0 mgd can be done through the Permit Renewal Application
- Additional 0.3 mgd requires a new Permit Application (BRPWM03)
- Permit Renewal and the new Permit can be done simultaneously

  or
- New Permit can be done in the future (but before water is needed)

WMA Permit Conditions

1. Efficiency Requirements
   - 65 residential gallons per capita day (RGPCD)
   - 10% unaccounted-for-water (UAW)
   - BMPs (leak detection & repair, metering, pricing, public education etc.)
2. Seasonal limits on nonessential outdoor water use

Quinebaug

Nonessential Outdoor Water Use Restrictions

Non-Essential: Uses not required for health or safety reasons, by regulation, for production of food or fiber, for maintenance of livestock, or to meet the core function of a business

RGPCD for prior year	CALENDAR		STREAMFLOW		
	May 1 to Sept 30	7 day Low-Flow Trigger	Flow above ABF	Flow below ABF	7 day Low-Flow Trigger
< 65 →	7 days *	1 day *	7 days	7 days*	1 day*
>65 →	2 days *	1 day*	7 days	2 days*	1 day*

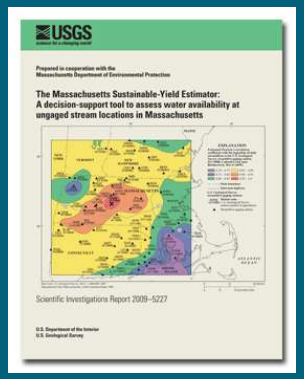
* No watering 9 am to 5 pm on any day

ABF= Aquatic Base Flow
7 Day Low Flow calculated from period of record flows from a local USGS stream gage

Surface water PWSs with a Seasonal Demand Management Plan with environmental considerations approved by MassDEP may vary from above requirements

Science and Policy Informing WMA Permit Requirements

- USGS Studies: August withdrawals and impervious cover have significant impact on fluvial fish



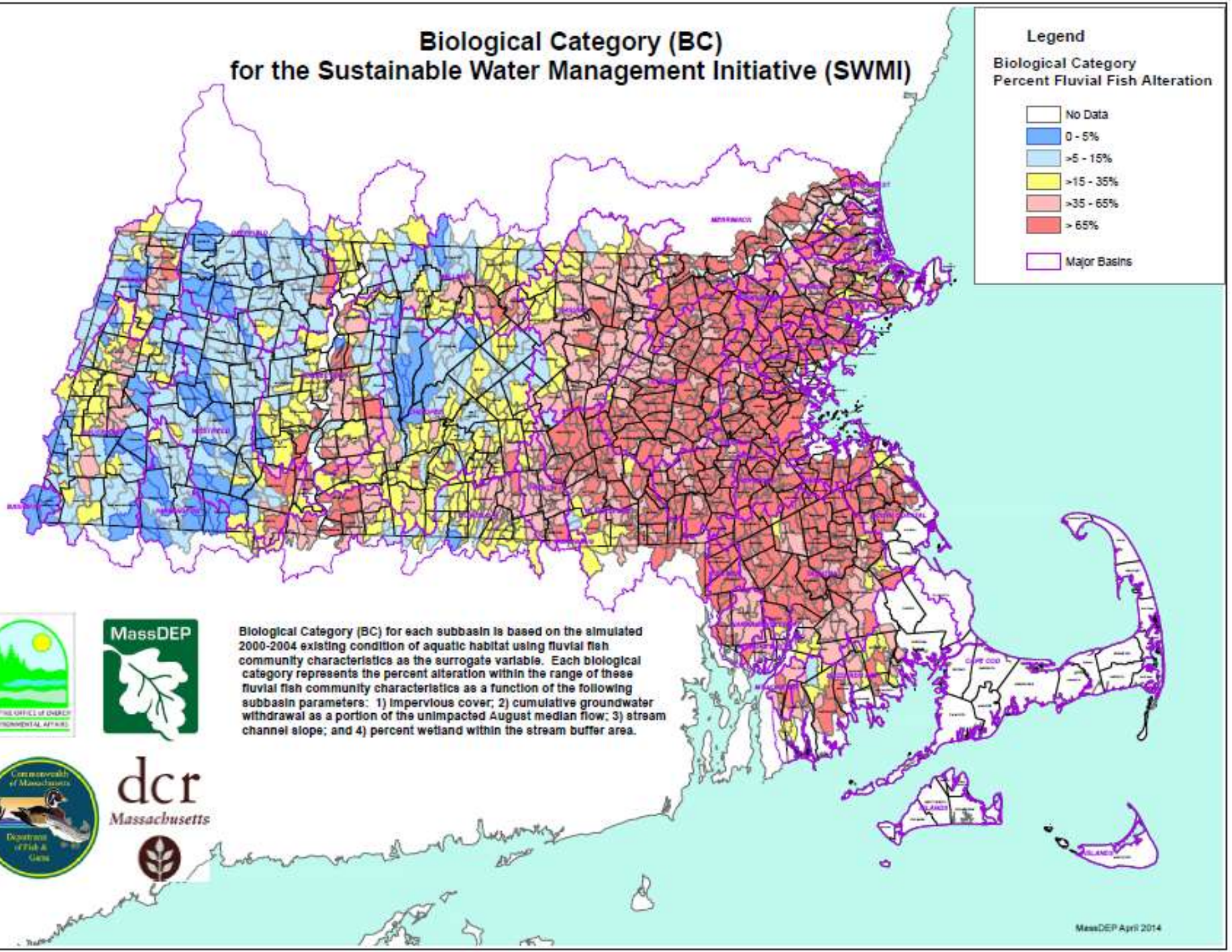
SYE

MWI

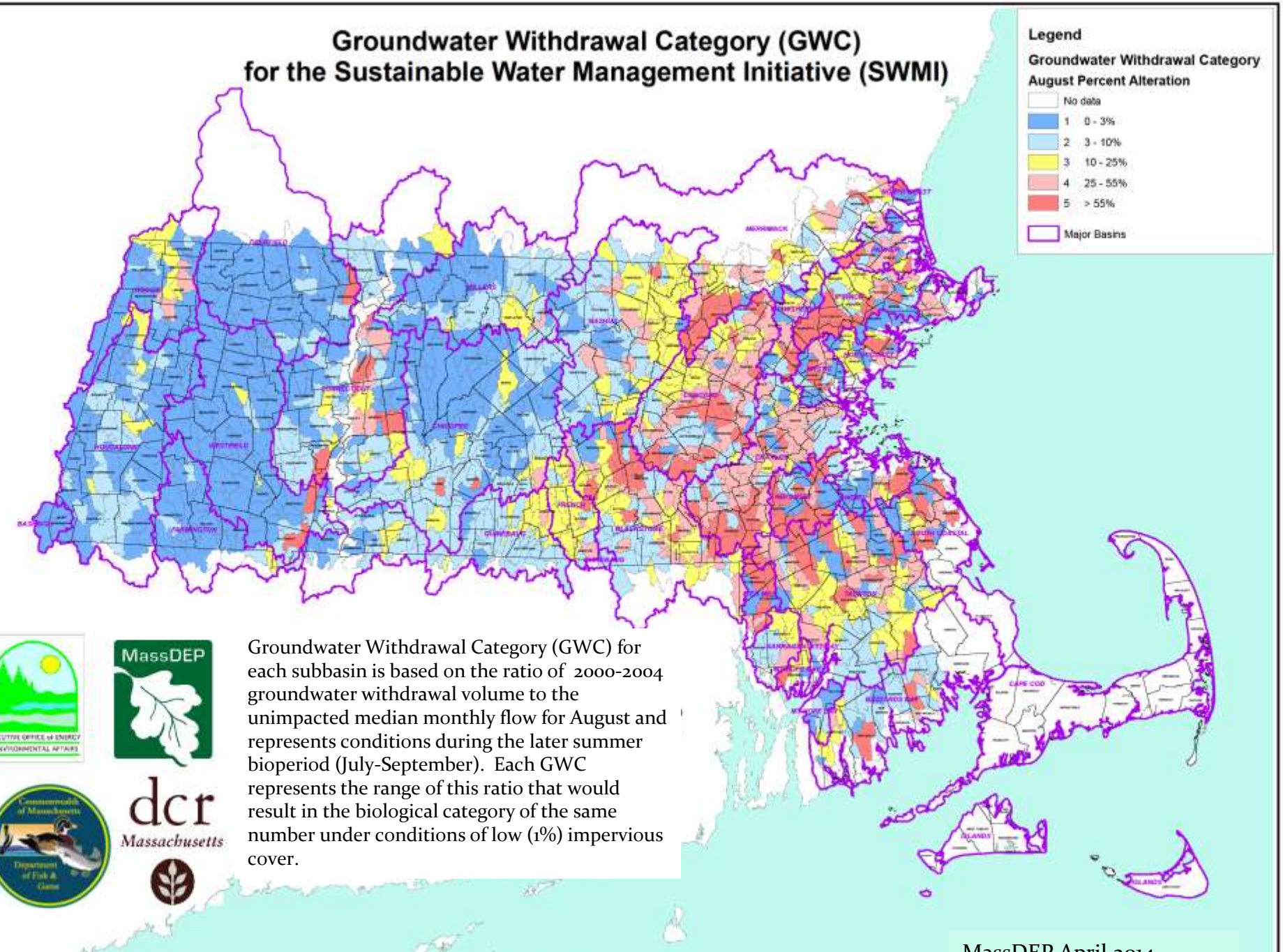
Fish and Habitat

- SWMI Advisory and Technical Committees helped us develop policy from science
- Five Biological and Groundwater Categories (1=least impact, 5 = most impact)
  - Categories use fluvial fish as surrogate for healthy aquatic habitat,
  - Impervious cover and August groundwater withdrawals used to represent impacts
- Streamflow Criteria mark the boundaries between categories (310 CMR 36.14)

Biological Category (BC)
for the Sustainable Water Management Initiative (SWMI)



Groundwater Withdrawal Category (GWC) for the Sustainable Water Management Initiative (SWMI)



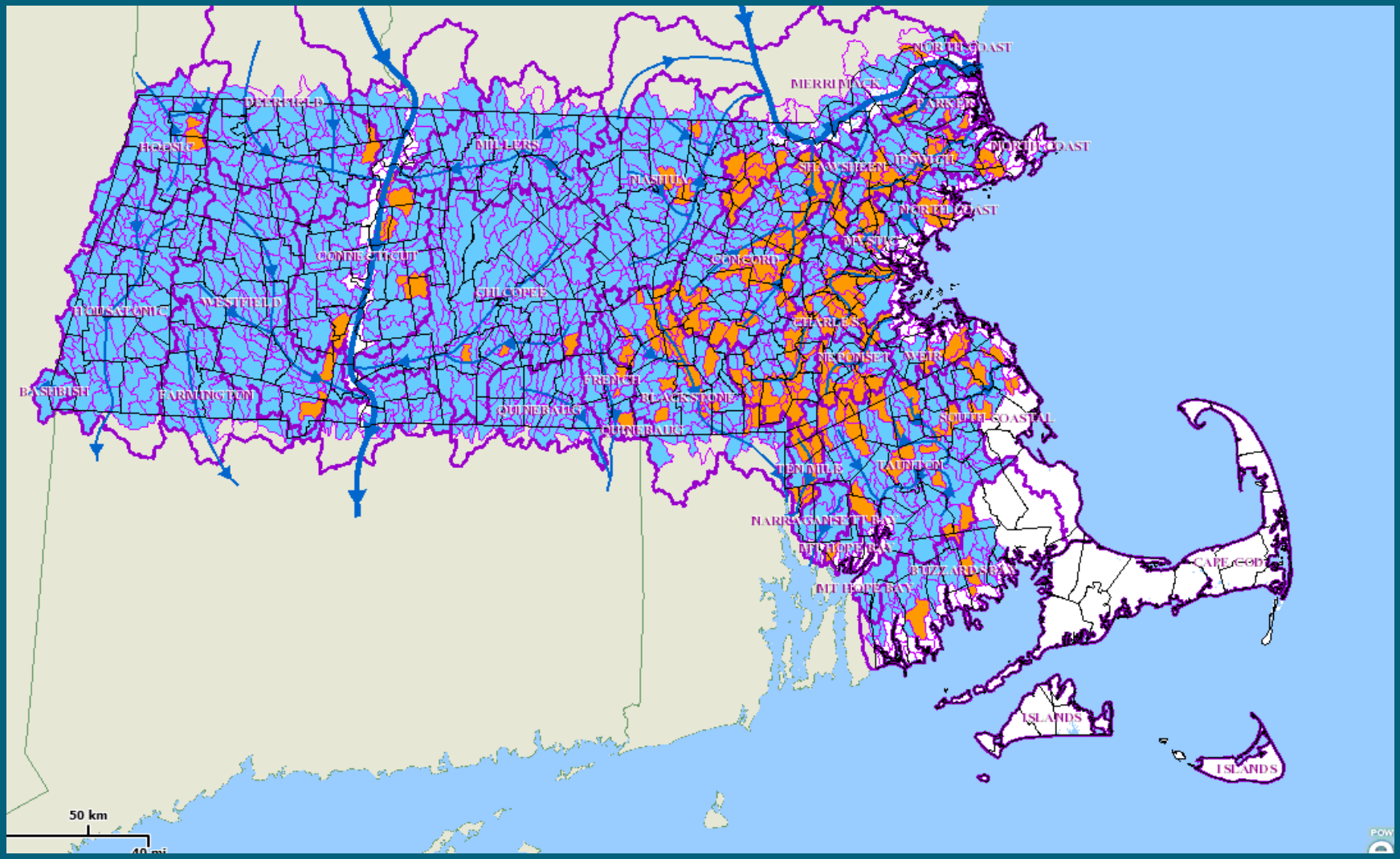
Groundwater Withdrawal Category (GWC) for each subbasin is based on the ratio of 2000-2004 groundwater withdrawal volume to the unimpacted median monthly flow for August and represents conditions during the later summer bioperiod (July-September). Each GWC represents the range of this ratio that would result in the biological category of the same number under conditions of low (1%) impervious cover.

MassDEP

dcr
Massachusetts

MassDEP April 2014

August Net Depletion



New Permit* Requirements

- CFR Consult for withdrawals in subbasins with Coldwater Fishery Resources (CFRs)
- Minimization for groundwater withdrawals in "≥25% August Net Groundwater Depleted" Subbasins
- Mitigation commensurate with impact, for requests above baseline, in consultation with agencies
- Show no feasible alternative for requests that change a category

*Those with only registrations are not subject to these requirements

Coldwater Fisheries Resource (CFR) Consult

- Basin meeting serves as the preliminary consult
- Goal: Reduce impacts to CFRs through optimization
- Optimization guidance will be provided

Minimization

Required* in subbasins that are August net groundwater depleted (NGD) by 25% or more according to MA Water Indicator Study data.

(NGD= *Aug unaffected flow – Aug GW withdrawals + Aug GW returns)*

Minimization Requirements (to the greatest extent feasible):

- Desktop Optimization
- Water Releases and Returns
- Additional Conservation Measures (Including more stringent outside water use restrictions)

***Permittees may avoid Minimization through:**

1. **Data refinement- showing August NGD is less than 25%, or**
2. **By conducting a Site-Specific Fish Community Assessment**

Mitigation

Mitigation Standard:

- "commensurate with impact", defined as:
  - volume of increase over baseline
  - does the increase cause a category change?
- considers cost and efficacy

Baseline is the largest of the following:

- 2003 – 2005 water use + 5%
- 2005 water use +5 %
- the community's registered volume
- Must be in compliance with volume authorized in 2005

Permit Tiers		Mitigation Requirements
Tier 1 = No increase above baseline	→	no mitigation
Tier 2 = Increase but no category change	→	commensurate mitigation
Tier 3 = Increase and category change	→	commensurate mitigation (2:1 if indirect mitigation) show no feasible alternative

Direct Mitigation

Can be volumetrically calculated

Eligible Activities:

1. Infiltration and inflow improvements
2. Stormwater recharge (directly connected impervious area redevelop to recharge)
3. Surface water releases

Indirect Mitigation Activities

Qualitative Credit System

- Install & maintain fishway
- Culvert replacements meeting crossing standards
- Stream restoration
- Private well bylaw
- Stormwater utility, bylaw with recharge or implement MS4*

*must result in increased recharge to get credit

- Acquire property in Zone I or II, or for other resource protection
- Infiltration/Inflow removal program
- Remove dam

Mitigation Plan Development

Action hierarchy

1st: Demand Management to stay below baseline

2nd: Direct/quantifiable mitigation

3rd: Indirect/non-quantifiable mitigation

Location hierarchy (where a choice exists)

1st: same subbasin as withdrawals (considering water quality)

2nd upstream from the subbasin of withdrawals (considering water quality)

3rd: same major basin as withdrawals

4th: different major basin

Take cost and feasibility into account

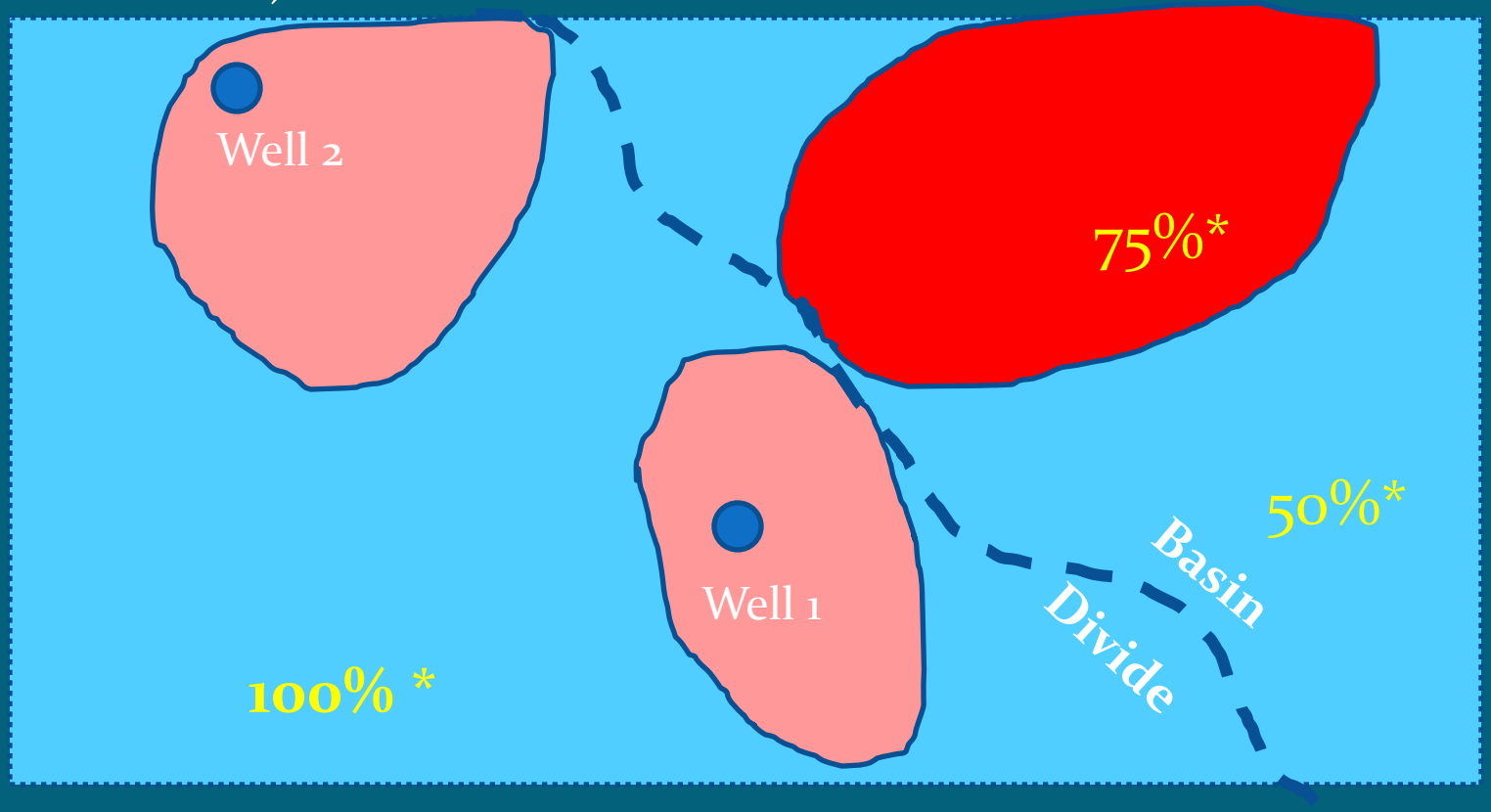
Mitigation Plan Timing

- Mitigation Plan is a live document
- Must be submitted at start of permit, can be phased-in based on use
- Retroactive credits (since 2005) considered if activity/benefit still in effect
- Volumes over Baseline must be mitigated prior to withdrawal (with allowances if withdrawals are already over baseline)

Mitigation Adjustments

Withdrawal location(s) and wastewater returns may result in adjustments in mitigation volumes and credits

- Wastewater Adjustment (* also adjusted by consumptive use factor)
- Location Adjustment Factor



Quinebaug Basin Specifics

- Who withdraws & how much?
- What are my water use restriction triggers?
- Who needs to minimize?
- Who has Cold Water Fishery Resources?
- What is my baseline?
- Do I need to mitigate? Projected Tier?
- What mitigation options exist?

Community-Specific One-Page Summary Sheet

Includes 6 summary tables:

1) Reported Use 2010-14
2) Performance Standards
3) WNF Scenarios
4) Permit Data
5) Subbasin Data
6) Streamflow Triggers

example

Permit Requirements*	
CFR Consult?	Yes/no
Minimization required?	Yes/no
Estimated renewal request in mgd	1.47
Baseline (BL) in mgd	1.54
Projected increase above BL in mgd	-0.07
Estimated Permit Tier	1
Mitigation Required?	no

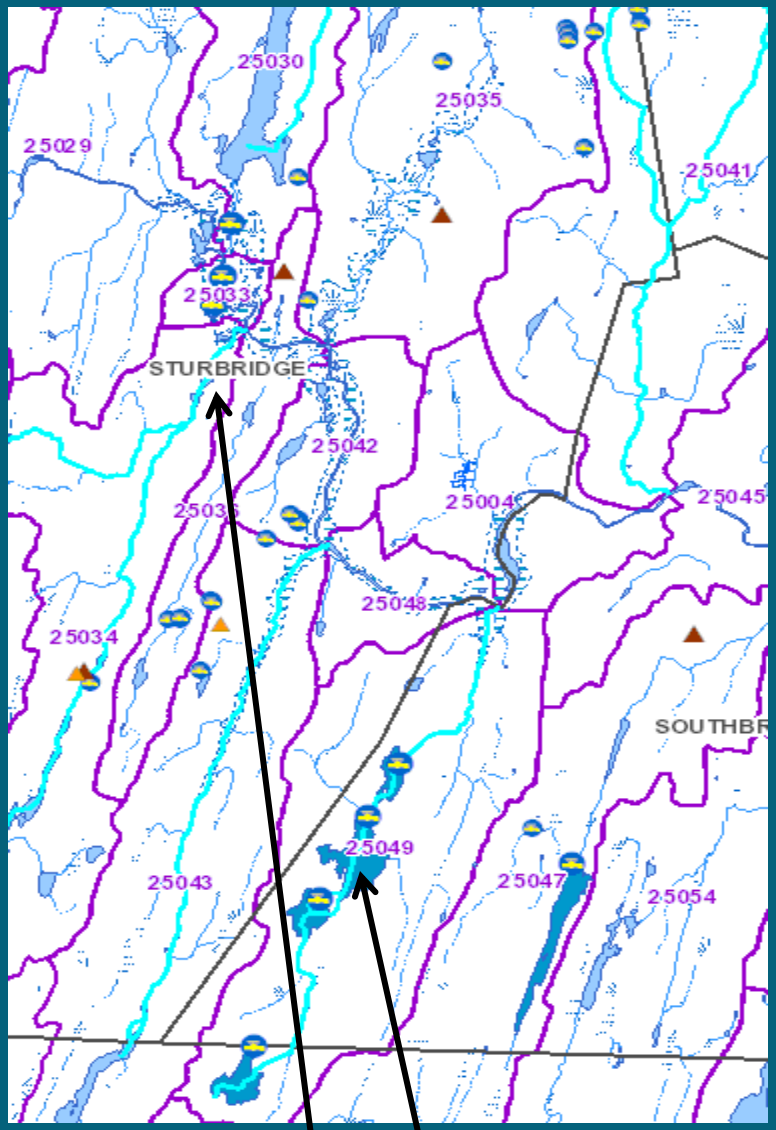
*includes comments to explain data sources and decisions

Total Quinebaug Water Use

Name	Registration Volume (mgd)	Current Permit Volume (mgd)	Total Authorized Volume (mgd)
Southbridge DPW	2.00	0	2.00
Sturbridge Water Department	0.69	0.43	1.12
Millennium Partners LP	0	2.50	2.50

* Withdrawal volume calculated based on 365 days

Chicopee Fishery Resources

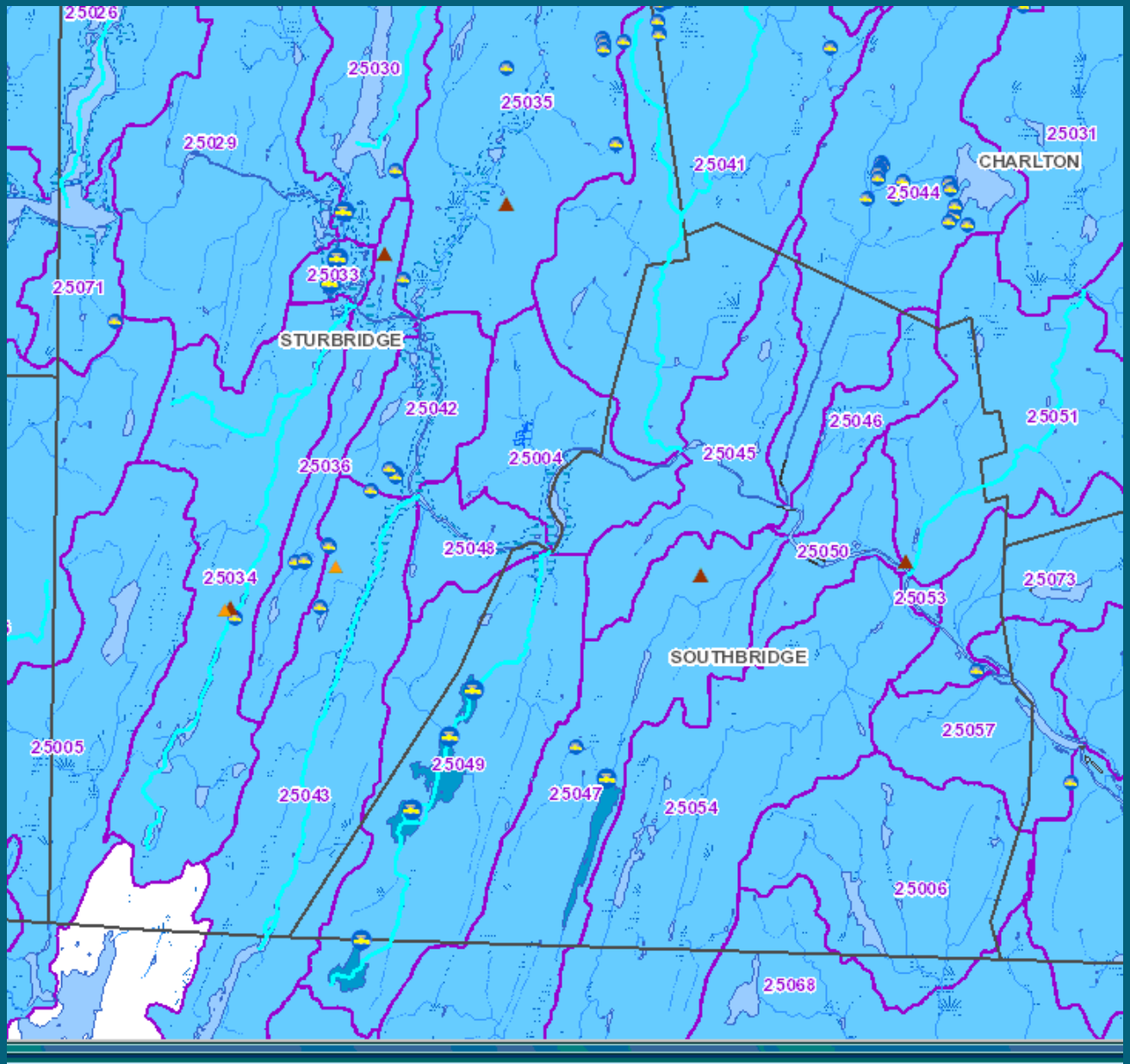


CFRs are considered a particularly sensitive receptor warranting protection.

CFR Present
Southbridge*
Sturbridge

*Consultation with DFW required

Quinebaug Minimization Requirements



Permits Requiring Minimization
None

Quinebaug Baseline Volumes

Quinebaug Permit holders	Baseline Volume (mgd)	Reported Pumping 2013 (mgd)	Reported Pumping 2014 (mgd)	Reported Pumping 2015 (mgd)
Southbridge DPW	2.00	1.85	1.87	1.81
Sturbridge Water Department	0.72	0.55	0.60	0.58
Millennium Partners LP	0.36	0.51	0.50	0.69

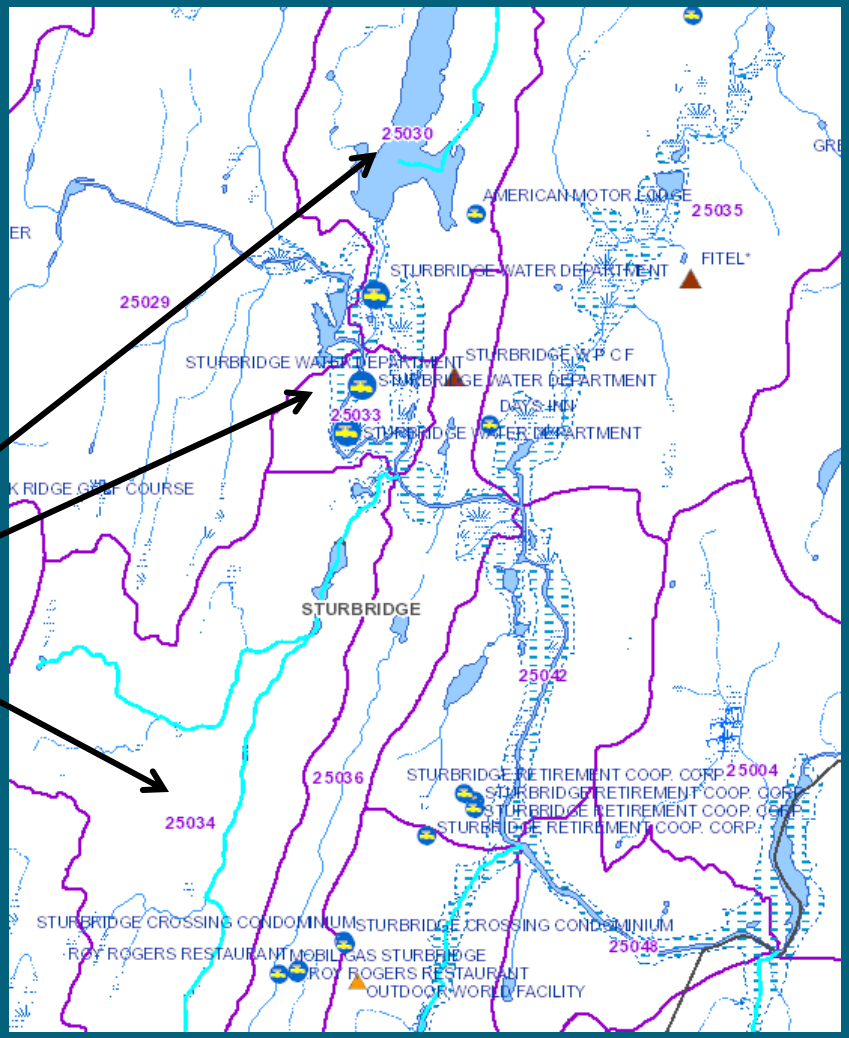
Projected Demands for Quinebaug Permits

Quinebaug Permits	Current Total Allocation (MGD)	DCR 65/10 +5% Buffer Forecast for 2033 (MGD)	Potential Permitted Volume (MGD)
Southbridge DPW*	2.00	2.41	Pending
Sturbridge Water Department	1.12	0.90	0.90
Millennium Partners LP	2.50	-	2.50

* Volumes shown reflect the projected water needs for Southbridge only and does not include volumes contracted with Charlton (up to 0.50 mgd) or Millennium Partners (up to 1.00 mgd).

Additional Volumes before GWC or BC changes

Sub-basin	MGD to change GWC	MGD to Change BC
25030	0.112	0.146
25033	0.24	1.07
25034	0.057	0.052



Quinebaug Nonessential Water Use Triggers

Trigger *	May- June Trigger Value (cfs)	July – Sept. Trigger Value (cfs)	7 Day Low Flow Trigger Value (cfs)	Permittees assigned
01123600- Quinebaug River at Westville Dam	89	48	18	Southbridge, Sturbridge
2015 Days below trigger threshold	5/13- 5/31; 6/13- 6/14;	7/17- 9/30	8/9- 8/10; 8/15; 8/18- 9/8; 9/15 – 9/18; 9/20 – 9/29	
2014 Dates below trigger threshold	6/9-6/30	7/1-7/4; 7/10-7/16; 7/18-8/14; 8/17-9/30	8/8-8/14; 9/9-9/30	

* Millennium must augment flow or cease withdrawals when flow falls below 0.30 cfsm at their monitoring location

Online SWMI Interactive Maps

- GIS map provides an interactive graphic display that includes:
  - GWC & BC
  - August Net groundwater depletion
  - Water use points
  - Cold Water Fishery Resources
  - Aquifers and more

- Map is at

http://www.mass.gov/eea/agencies/massdep/water/watersheds/sustainable-water-management-initiative-swmi.html

MassDEP Permitting Tool

- Displays data and equations to determine BC, GWC, August NGD for 1400 subbasins.
- User may increase or decrease water use and see resulting change in above values.
- Two main views:
  - PWS information includes: recent usage, baseline volumes, projected usage, sources, and other users
  - Subbasin information includes: cumulative area, % of impervious cover, streamflow values, etc.

MassDEP Permitting Tool

Click on "X" in upper right of this form to close this window and return to main page.

Double Click on Sub Basin ID to view water use volumes

Subbasin Characteristics

Sub Basin ID:	Major Basin:	HUC12 Name:
25033	Quinebaug	Quinebaug River-Long Pond Dam to Cady Brook

Subbasin Cumulative Data (includes this subbasin and all upstream contributing subbasins)

Subbasin Information		August Wastewater Discharges (mgd)		August Groundwater Withdrawals (mgd)		Additional GW Withdrawal Volume to Cause a Change in Existing GWC and BC:	
Area (Square Miles):	70.80	Ground Water Discharge:	0.000	PWS and Commercial Wells:	0.966	To Change GWC (mgd):	0.241
Impervious Cover (%):	3.7	Septic Systems:	+ 0.475	Private Wells:	+ 0.586	To Change BC (mgd):	1.0696
Surface water withdrawals exist in or upstream of subbasin:	NO	Total Subsurface Discharge:	= 0.475	Total Groundwater Withdrawals:	= 1.551		
		Surface Water (NPDES):	0.000				

Individual Subbasin Data (only includes this subbasin)

Coldwater Fisheries Resource Exist: No

Net Groundwater Depletion (NGD)

Net Groundwater Depletion (%): 6.0

Positive value indicates depleted.
Negative value indicates surcharged.

Unaffected streamflow, Ground Water withdrawals, Groundwater Withdrawal Category (GWC) and Biologic Category (BC).

Estimated August Condition			Proposed Changes to existing GW Withdrawal			Existing vs. Proposed	
Affected Streamflow (mgd)*		16.850	Change (+/-) to existing GW Withdrawal (mgd)		0	Calculate / Clear	
Unaffected Streamflow (mgd)**		17.924	Unaffected Streamflow(mgd)		17.924		
GW Withdrawals (mgd)***	-	1.551	Proposed Total GW Withdrawal (mgd)	-	1.551		
(Unaffected Streamflow) - (GW Withdrawals)	=	16.373	(Unaffected Streamflow) - (Prop. GW Withdrawal)	=	16.373		
(GW Withdrawals) / (Unaffected Streamflow)	=	8.7%	(Proposed GW Withdrawal) / (Unaffected Streamflow)	=	8.7%	0.0%	Percent Difference
Groundwater Withdrawal Category (1-5)	GWC:	2	Proposed Groundwater Withdrawal Category (1-5)		2	NO	Change in GWC?
Biologic Category (1-5)	BC:	3	Proposed Biologic Category (1-5)		3	NO	Change in BC?

USGS report SIR 2009-5272 ("Mass. Indicators") describes subbasin delineation, streamflow simulation, and water withdrawal and discharge volume calculations.

* August affected streamflow = Aug. unaffected streamflow – Aug. groundwater withdrawals + Aug. wastewater discharges

Summary Info for Quinebaug Permits

Quinebaug Permits	CFR Present	Minimization required	Projected Permit Tier	Alternative analysis
Southbridge DPW	Yes*	No	2	No
Sturbridge Water Department	Yes	No	3	Yes
Millennium Partners LP	No	No	2	No

* Consultation with DFW is required

Quinebaug Permit Review Staff

Permit Holder	DEP Reviewer	DCR Reviewers	DCR Email Address	Phone #
Southbridge DPW	Susan Connors*	Michele Drury	Michele.drury@state.ma.us	616-626-1366
Sturbridge Water Department	Connors	Erin Graham	Erin.Graham@state.ma.us	617-626-1426
Millennium Partners LP	Connors	-	-	-

* Susan Connors can be reached at susan.connors@state.ma.us or 508-767-2701.

WMA Regulations and Permit Assistance

- Regulation (Promulgated November 7, 2014) and Policy Development (Ongoing)
- Permit application forms and worksheets
- Financial assistance (Annual Grant Program)
  - Eligible planning projects:
    - Optimization
    - Outdoor water use restrictions
    - Implementation of reasonable water conservation
      - NEWWA and MWWA Toolbox of BMPs
  - Eligible implementation projects:
    - Demand management (water audits, soil moisture sensors etc..)
    - Mitigation projects designed to improve flow impacts

      ex. dam removal, culvert replacement, etc.

Further information

- MassDEP Technical Resources webpage at:
  http://www.mass.gov/eea/waste-mgnt-recycling/water-resources/preserving-water-resources/sustainable-water-management/

- MassDEP SWMI webpage at:
  http://www.mass.gov/dep/water/resources/swmi.htm

- Massachusetts Sustainable Water Management Initiative (SWMI), Framework Summary, November 28, 2012 at :
  http://www.mass.gov/eea/docs/eea/water/swmi-framework-nov-2012.pdf

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Water Needs Forecast Contacts

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