



Massachusetts Water Resources Authority

MWRA Drought Response Plan & Impacts of Climate Change

North Shore Water Resilience Task Force
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Expected Climate Change Impacts on MWRA System

*Climate change isn't about less or more water
– it's the shifting pattern of water availability*

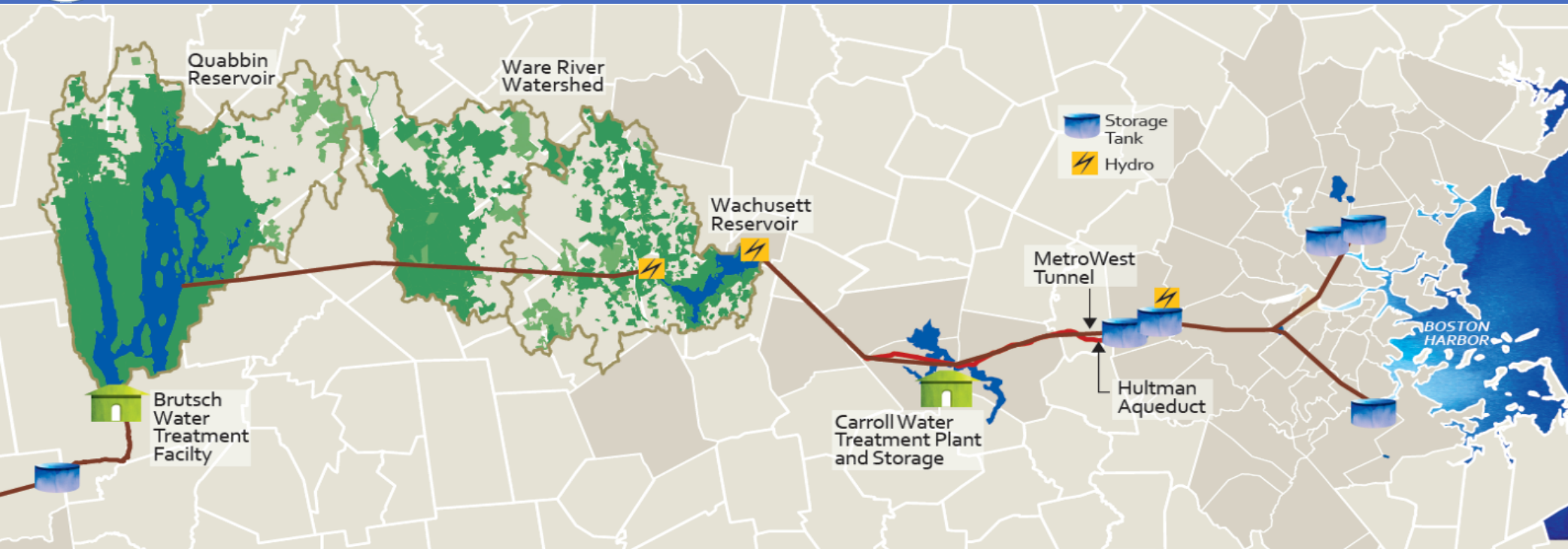
Expected Impacts on Reservoir Behavior

- Wetter Wet, Dryer Dry
- Storm intensity, Drought length
- Multi-year reservoir built to capture and hold

Due to net increase in precipitation, project a slight increase in reservoir yield



MWRA Water System – Quabbin + Ware + Wachusett



Around 400 square miles of watershed

~60% of the watershed is protected land
~85% designated forest & wetland



Reservoirs – Capture & Hold

Capture - Watershed

- Protected watersheds capture and slow intense storm run-off
- Reduced impacts on water quality

Hold - Multi-year Drought Storage

Total Storage Capacity	477 BG
– Quabbin Reservoir	412 BG
– Wachusett Reservoir	65 BG

Current Withdrawal Rate of 200 MGD

6.5 Years of Multi-Year Storage



MWRA Drought Response Plan

Purpose:

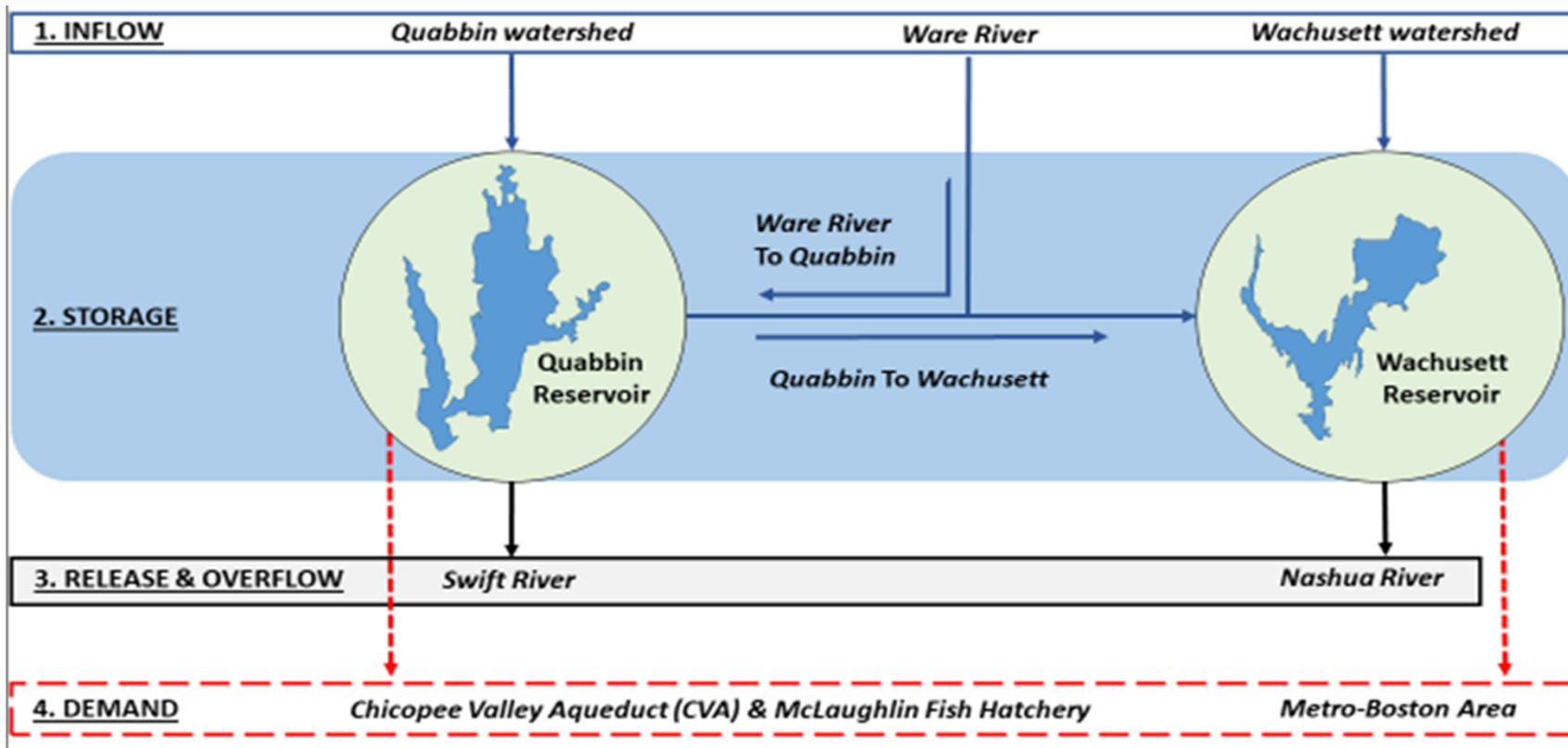
- Integrate
 - *Drought Triggers* - based on Reservoir Elevation
 - *Response Actions* - initiated by triggers - coordinate & communicate strategy

Methodology:

- *Drought Triggers* must be credible, predictable, and easily communicated
- *Response Action* Progression
 - Provide lead-time for implementation and impact of conservation actions
 - Coordinate effectively
 - Avoid message fatigue

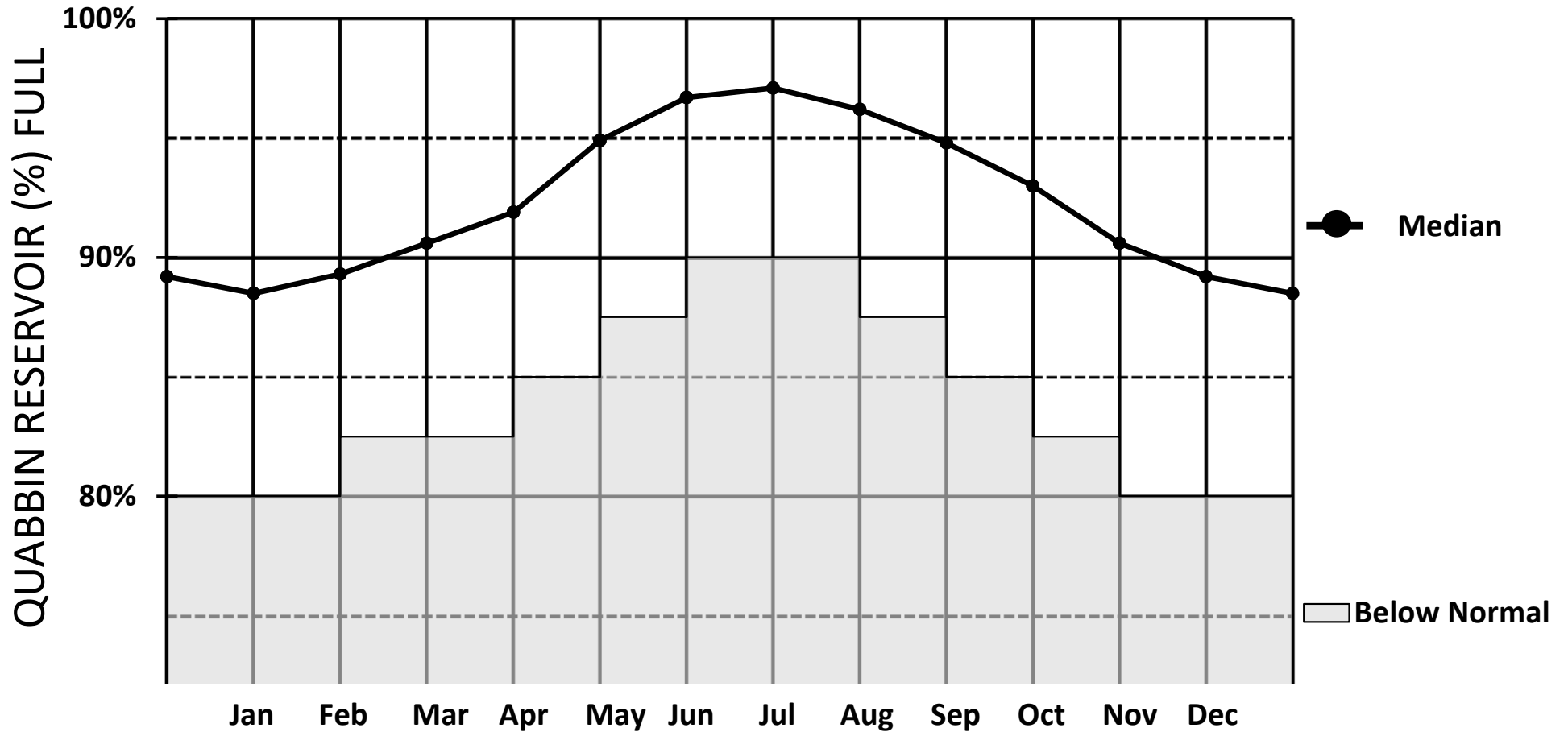


How to view a Reservoir System – Technical Assessment



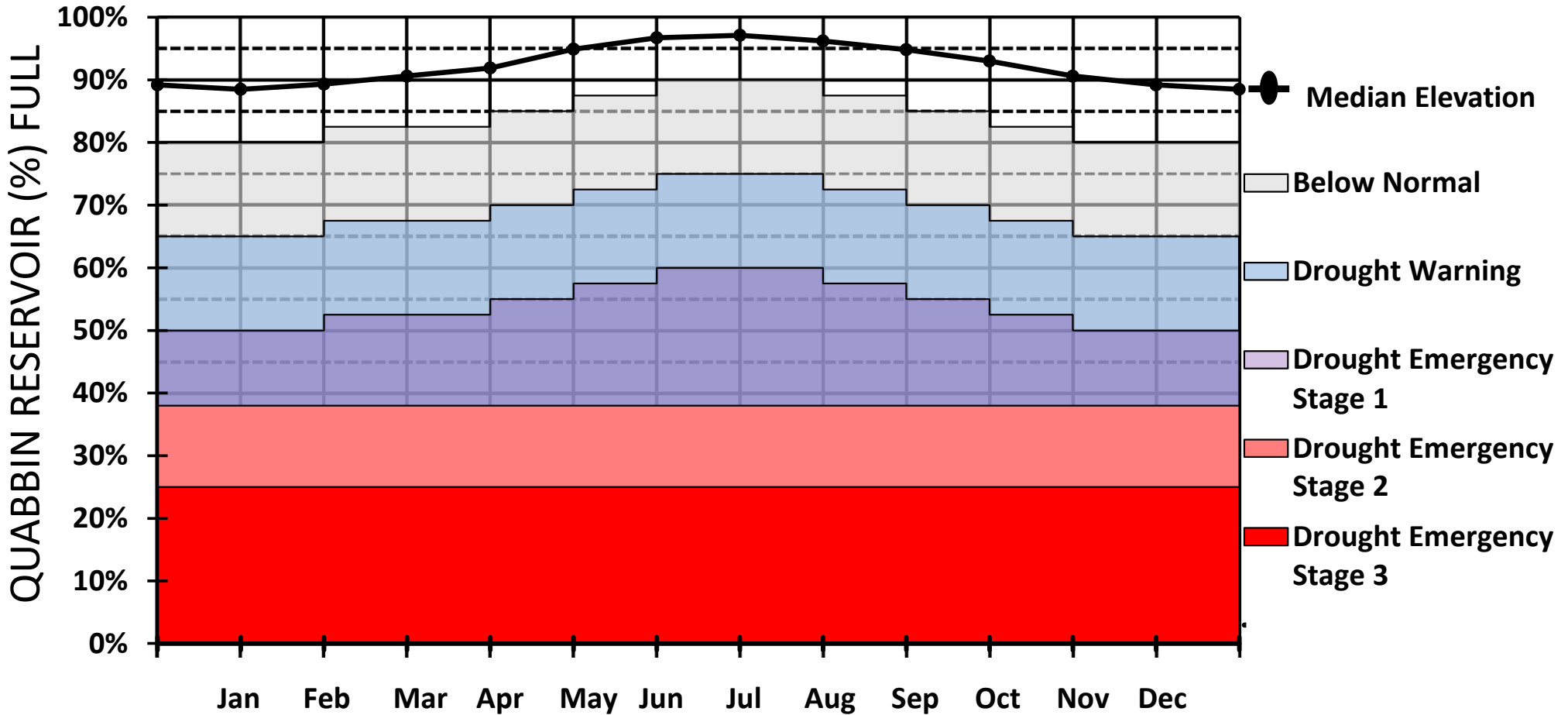


Reservoir Elevations – Understanding the Triggers





MWRA Drought Trigger Plan - Seasonal Sawtooth Chart





Drought Response Plan – Response Action Categories

Response Action Category	Purpose
1. Analysis & Planning	Data Collection. Assess conditions and potential impacts.
2. Coordination	Engage with stakeholders, agencies, and municipalities.
3. Public Outreach	Communicate water conservation measures and expectations
4. Technical Assistance	Provide guidance and support to MWRA communities. *
5. Operational Adjustment	Implement system-wide measures to optimize water use. *

Progression into lower Drought Triggers escalates Response Action Intensity:

- Voluntary to Mandatory Restrictions
- Monthly to Daily Updates, Frequency increase
- Passive to Active & Direct Engagement



Progression of Response Actions

<u>Drought Stage</u>	<u>Conservation Goal Reduction (%)</u>	<i>Notable Action Progression</i>	
		<u>Technical Assistance</u>	<u>Operational Adjustment</u>
Below Normal	0%	a. Support flushing schedules, leak detection, & customer outreach	N/A
Drought Warning	5%	a. Optimize flushing schedules, leak detection, & customer outreach b. Facilitate meter data sharing for local analysis c. Develop emergency procedures, as needed	Voluntary Restrictions
Drought Emergency Stage 1	10%	a. Expand meter data sharing to help evaluate reductions at local level b. Assist with <ul style="list-style-type: none"> ○ enforcement procedures ○ evaluating drought pricing 	Mandatory Restrictions Bans
Drought Emergency Stage 2	15%	a. Develop rationing protocols	Mandatory Restrictions Bans with Enforcement
Drought Emergency Stage 3	30%	a. Optimize municipal usage and customer outreach b. Implement <ul style="list-style-type: none"> ○ ration protocols ○ drought pricing ○ emergency connections, as needed 	Rationing Drought pricing

Realistic and adaptable conservation targets for both MWRA operations and the public

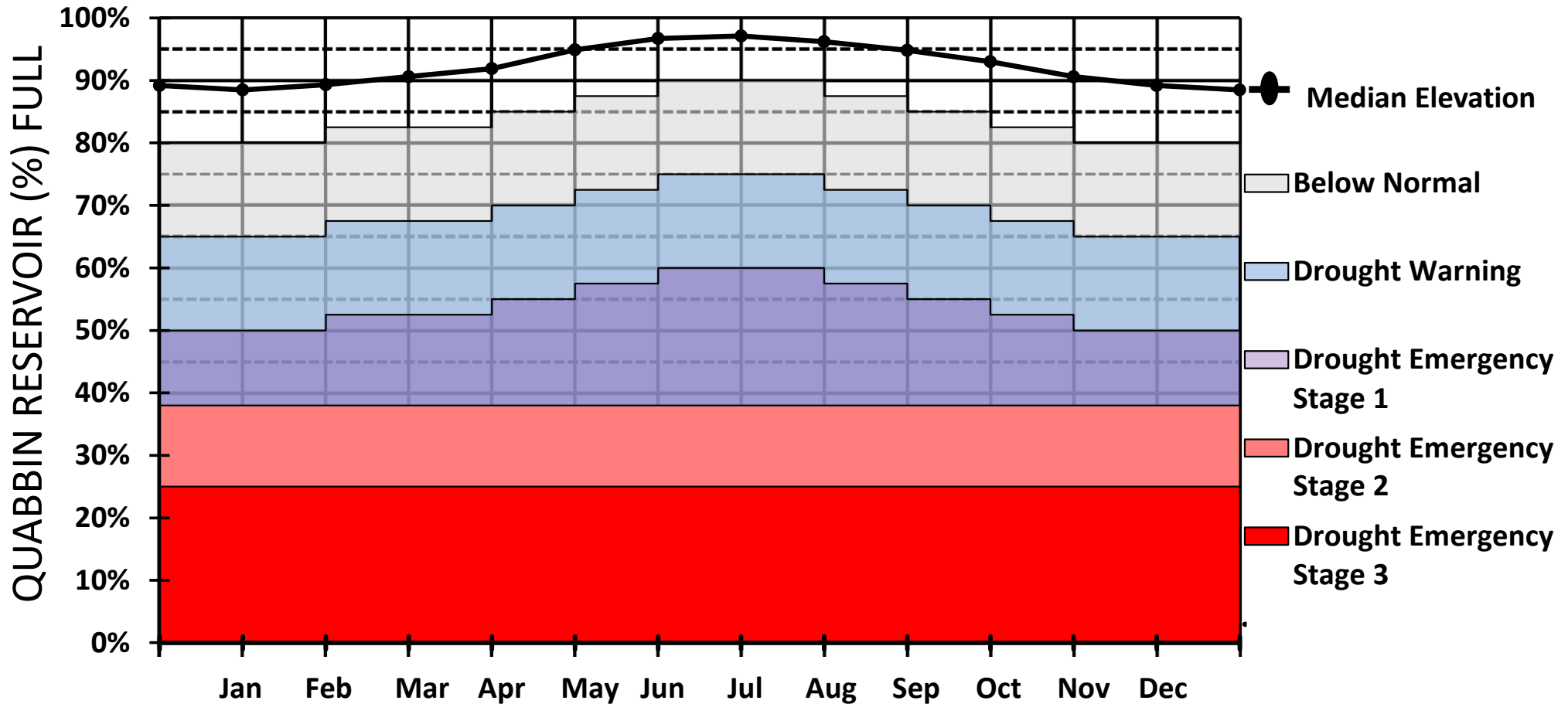


Communicating Water System Status – Provide a Timeline

	1- Month	3 - Month	6 - Month	12 - Month	24 - Month
Wettest (of Record)					
Wet (25th percentile)					
Median	Below Normal	Below Normal	Below Normal	Normal	Normal
Dry (75th percentile)					
Dryest (of Record)	Below Normal	Below Normal	Below Normal	Below Normal	Drought Warning

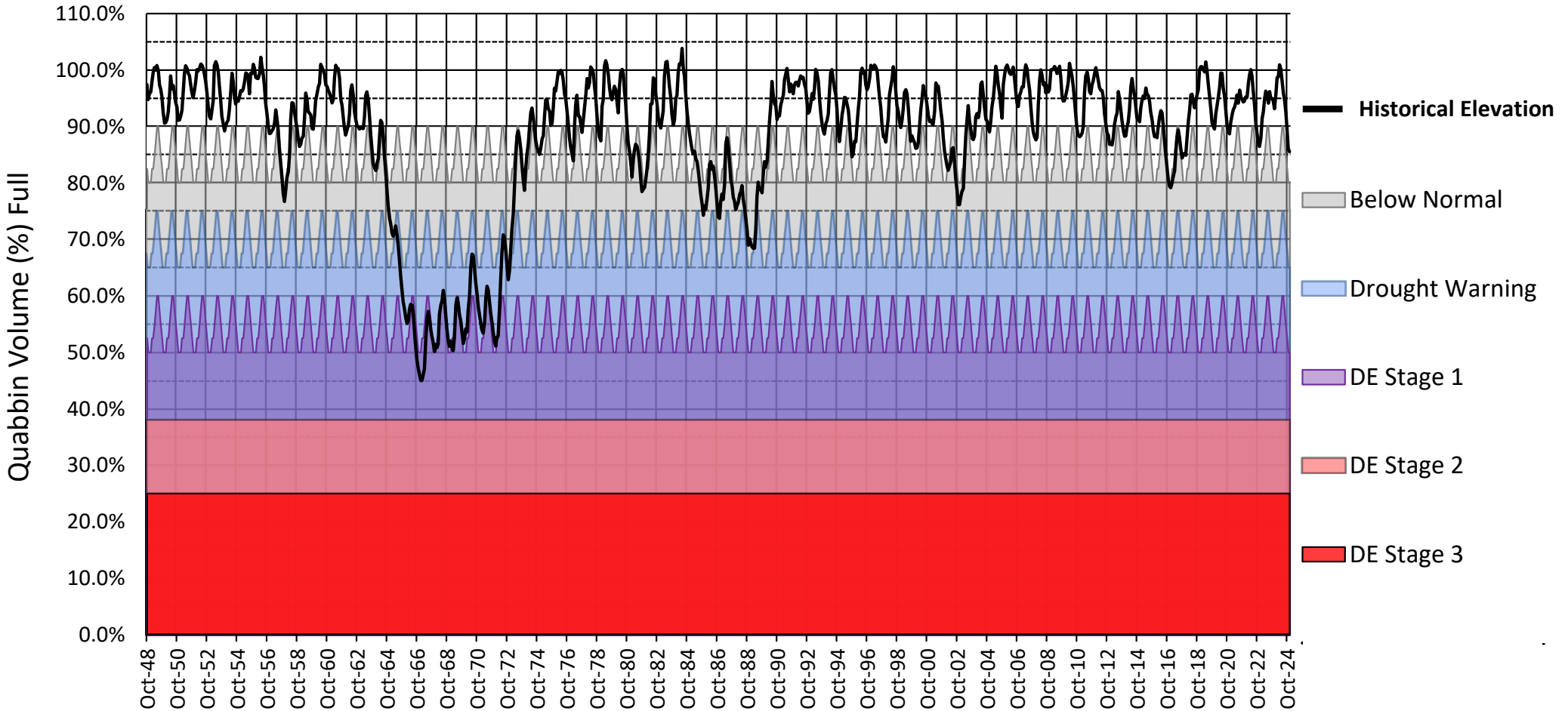


MWRA Drought Trigger Plan - Seasonal Sawtooth Chart



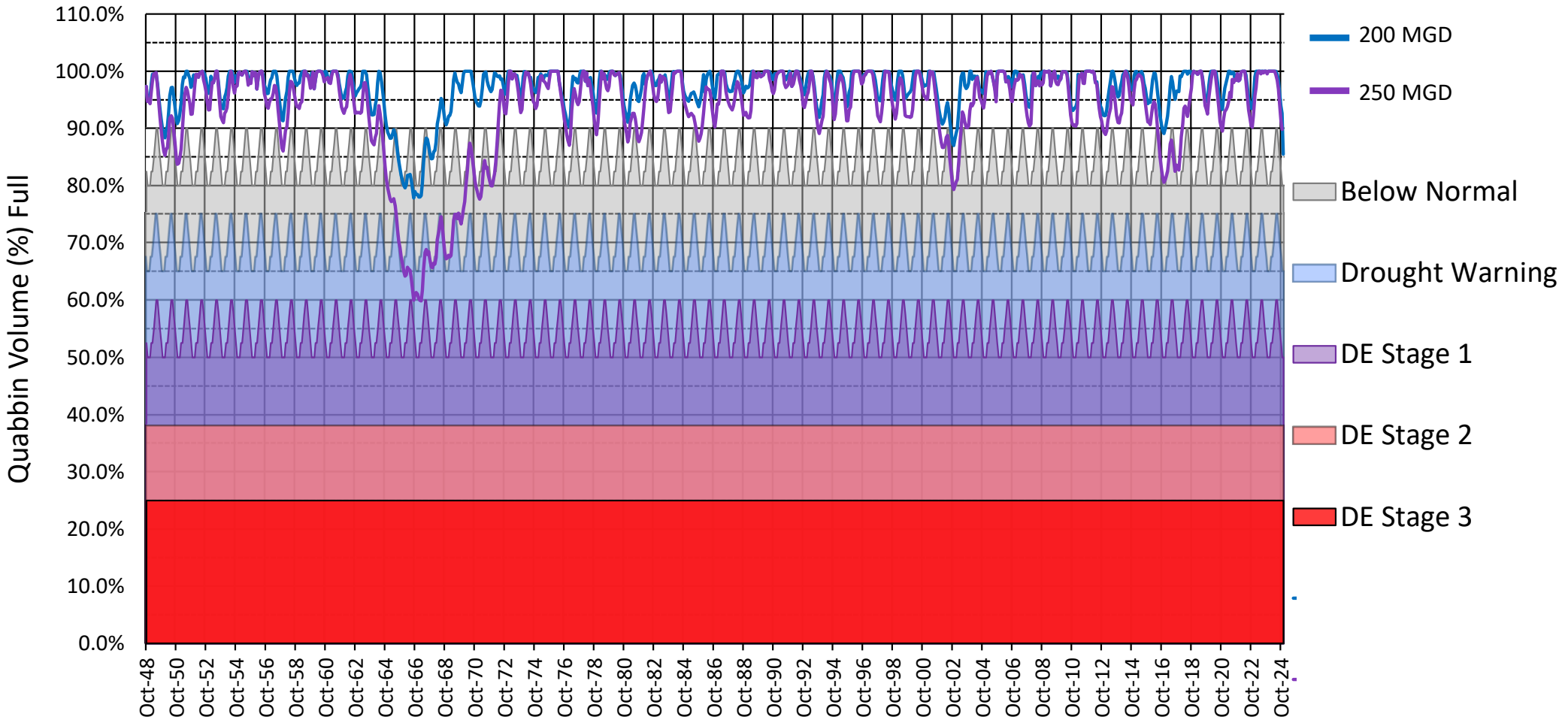


Impacts of Drought on Quabbin Volume (1948 – 2024)





Impact of Drought on Quabbin Volume – Model Values





Conclusions – Climate Change & Drought Response Planning

Impacts of Climate Change

- Shifting pattern of water availability
 - Proactive management to storm intensity and drought length
 - Watershed & Water Quality Relationship
- Benefit of Multi-Year Reservoir

Capture Wetter Wet, Smooth out Dryer Dries

Drought Response Plan

- Model reservoir / water supply behavior
- Provide lead-time
- Progression of Action, as needed
- Communicate effectively



MWRA Water System Legacy

MWRA was blessed by our predecessors with an incredibly resilient water system

Their planning of our reservoir system, along with...

- Dramatic reductions in water use
- Proactive management & redundancy planning
- Supporting conservation programs

All lead to our reliable supply of excellent quality water, which supports the vitality of the region, and provides an option for communities struggling with water availability.



Massachusetts Water Resources Authority

Questions
Comments

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See More Info: mwra.com