

JBCC Aquifer Study

Cape Cod Commission presentation to
NASEM Committee

September 2, 2026



CAPE COD
COMMISSION



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COMMISSION

The Cape Cod Commission

...is the regional land use planning,
economic development, and
regulatory agency created in 1990
to serve the citizens and 15 towns
of Barnstable County,
Massachusetts



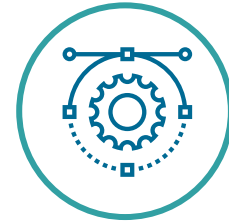
MISSION

...To protect the unique values and quality of life on Cape Cod by coordinating a balanced relationship between environmental protection and economic progress.

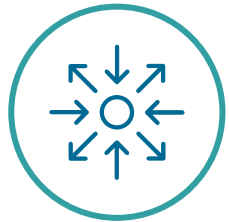
What does the Commission do?



Prepare and oversee implementation of a **Regional Policy Plan**



Review and regulate **Developments of Regional Impact**



Provide **Technical Assistance** to towns



Recommend **Districts of Critical Planning Concern**



Enter into **Development Agreements** and **Certify Local Comprehensive plans**



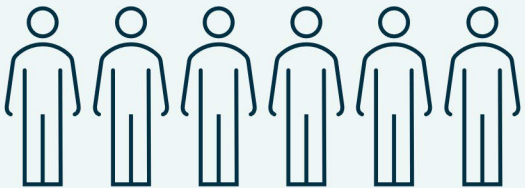
Prepare and oversee **Regional Plans**

THE CAPE COD CONTEXT

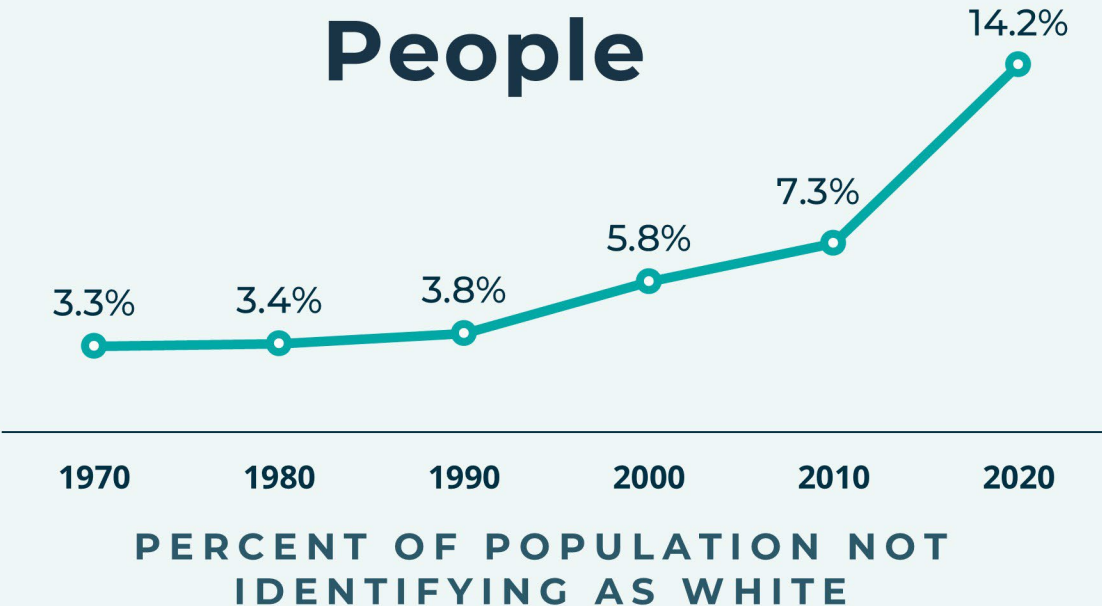
People

229,000

Year-round Residents



6% increase from 2010 to 2020



FEDERALLY
RECOGNIZED
MASHPEE
WAMPANOAG
TRIBE

MEDIAN AGE

55

40

39



CAPE COD



MA



UNITED STATES

33% 
of the population
is 65 years or older
compared to 18% statewide

14% 
DECREASE IN
PUBLIC SCHOOL
ENROLLMENT
FROM 2015-16
TO 2025-26

THE CAPE COD CONTEXT

Places

80% 
of homes are detached
single-family homes

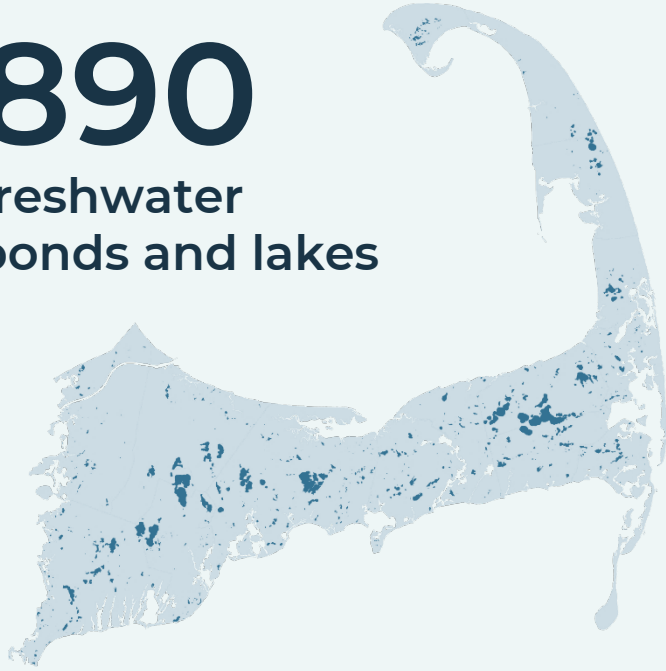
OVER 
500 MILES OF COASTLINE

19% 
of the region
is in the floodplain

More than
44,000
ACRES IN
CAPE COD
NATIONAL
SEASHORE



890
freshwater
ponds and lakes



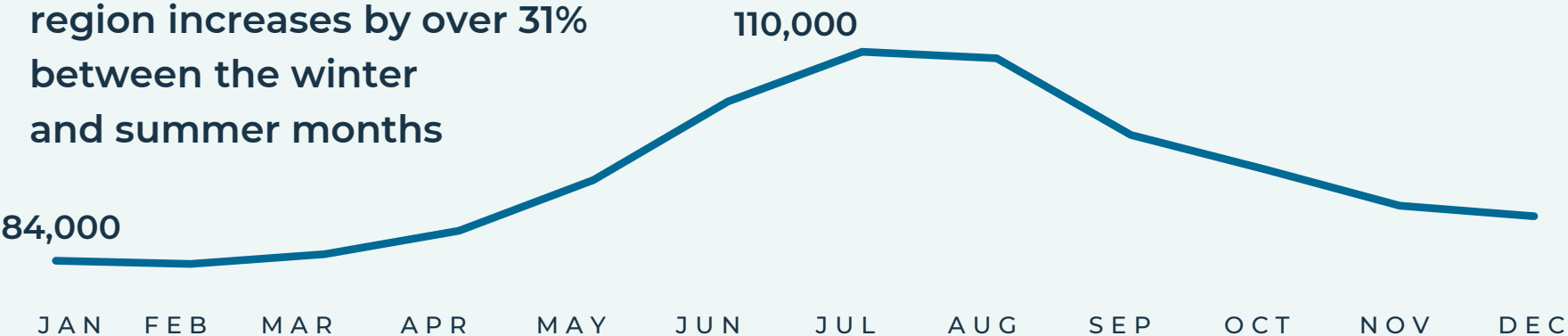
33% 
of homes are used seasonally
compared to 4% statewide

  **8**
DESIGNATED
CULTURAL DISTRICTS

THE CAPE COD CONTEXT

Economy

On average, employment in the region increases by over 31% between the winter and summer months



Over  **5 Million** Visitors Annually

LABOR FORCE PARTICIPATION RATE

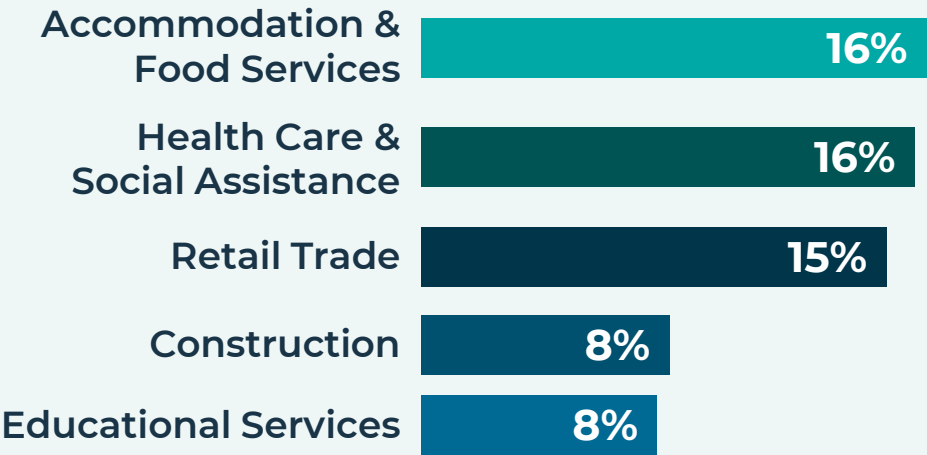
56% **67%**



CAPE COD



MA



TOP INDUSTRIES BY EMPLOYMENT

MEDIAN ANNUAL EARNINGS

\$51,500  **TOTAL** **\$57,200**
\$59,100  **MALE** **\$65,900**
\$44,700  **FEMALE** **\$49,100**

CAPE COD

MA

Data Sources: 10-year average of Massachusetts Department of Economic Research ES-202 Data (not seasonally adjusted) from 2015-2024; Cape Cod Commission Analysis; 2024 American Community Survey 5-year Estimates, Tables S2301, DP03 and S2001

An aerial photograph of a coastal area in Cape Cod. The image shows a sandy beach curving along the edge of turquoise water. To the right of the beach, there is a dense line of green trees, and behind them, several houses with light-colored roofs and walls are visible. The houses are nestled among the trees, and some have solar panels on their roofs. The overall scene is bright and sunny, with a clear sky.

CAPE COD REGIONAL POLICY PLAN 2025

CAPE COD COMMISSION

GOALS & OBJECTIVES

Natural Systems

WATER RESOURCES
OCEAN RESOURCES
WETLANDS RESOURCES

WILDLIFE & PLANT HABITAT
OPEN SPACE

Built Systems

COMMUNITY DESIGN
COASTAL RESILIENCY
CAPITAL FACILITIES &
INFRASTRUCTURE

TRANSPORTATION
ENERGY
WASTE MANAGEMENT
CLIMATE CHANGE

Community Systems

CULTURAL HERITAGE
ECONOMY
HOUSING

GOALS & OBJECTIVES

NATURAL SYSTEMS

Water Resources

Goal: To maintain a sustainable supply of high quality drinking water and protect, preserve, or restore the ecological integrity of Cape Cod's fresh and marine surface water resources.

Objectives:

- Protect and preserve groundwater quality
- Protect, preserve or restore fresh water resources
- Protect, preserve or restore marine water resources
- Manage and treat stormwater to protect and preserve water quality
- Manage groundwater withdrawals and discharges to maintain hydrologic balance and protect surface and groundwater resources

REGIONAL REGULATORY REVIEW



DEVELOPMENT OF REGIONAL
IMPACT REVIEW



MEPA AND
NEPA
COMMENTS



GOALS AND
OBJECTIVES
OF THE RPP



TECHNICAL
GUIDANCE



REGIONAL
PERSPECTIVE

CCC Involvement with JBCC

- MMR Master Plan Final Report - 1998
- Upper Cape Water Supply Reserve - 1999
- Joint Land Use Study (JLUS) – 2005 & 2013
- Shared Wastewater Study - 2017

JBCC Oversight

Environmental Management Commission

Ensures the permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (Reserve, or northern 15K acres)

Community Advisory Council

Provides forum for comment on the oversight, monitoring, and evaluation of all activities on the northern 15K acres

Science Advisory Council

Advises the EMC on technical issues related to the oversight of the northern 15K acres

Military Civilian Community Council

Discusses projects and policies that affect the southern 5K acres of JBCC

JBCC Cleanup Team

Receives updates on and provides input to the IAGWSP & IRP

Regional Water Supply Planning

**Potential
Public Water
Supply Areas
(PPWSA)**

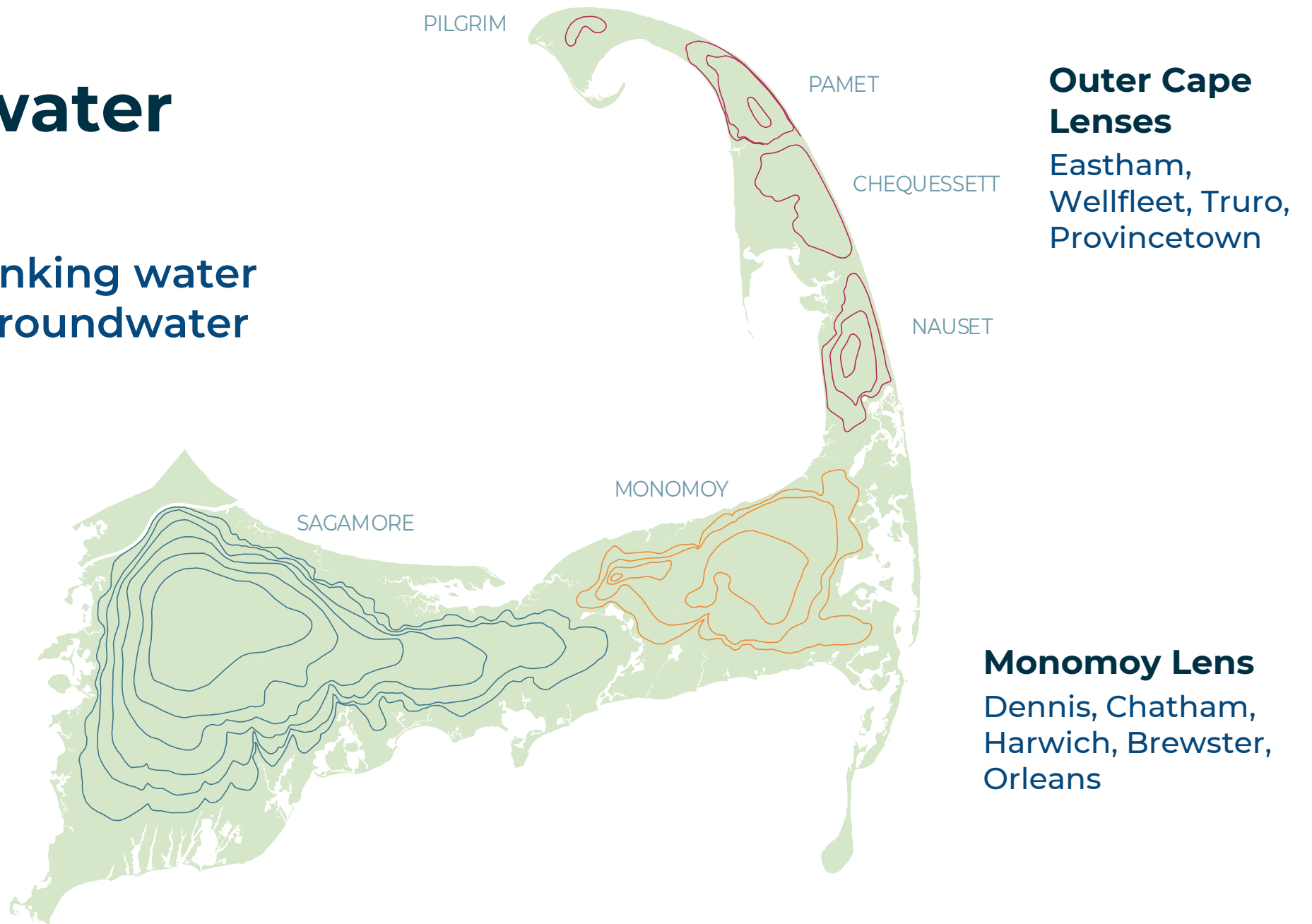
Drought

**Upper Cape Water
Supply Reserve**

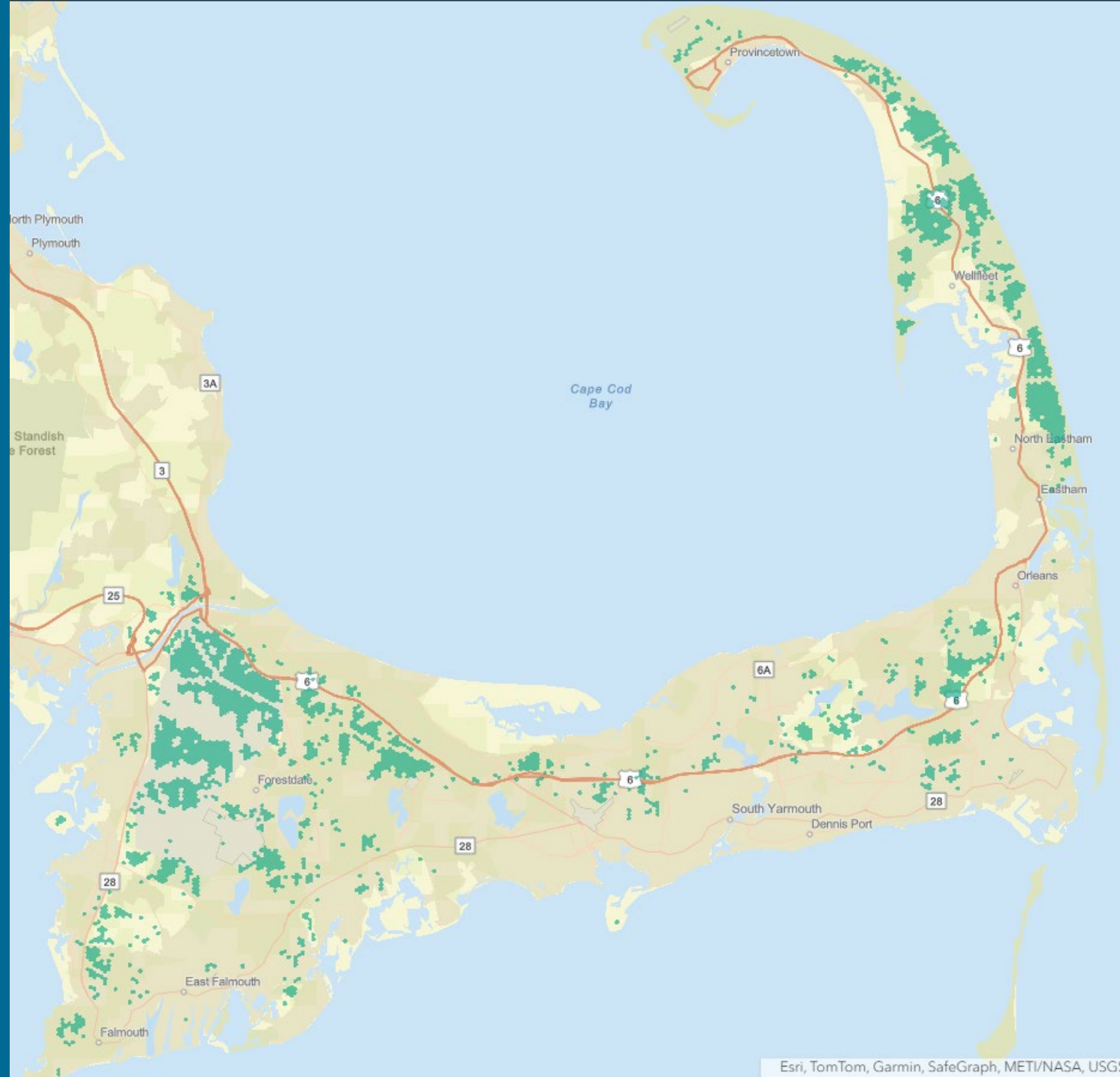
Sole Source Aquifer

Groundwater Lenses

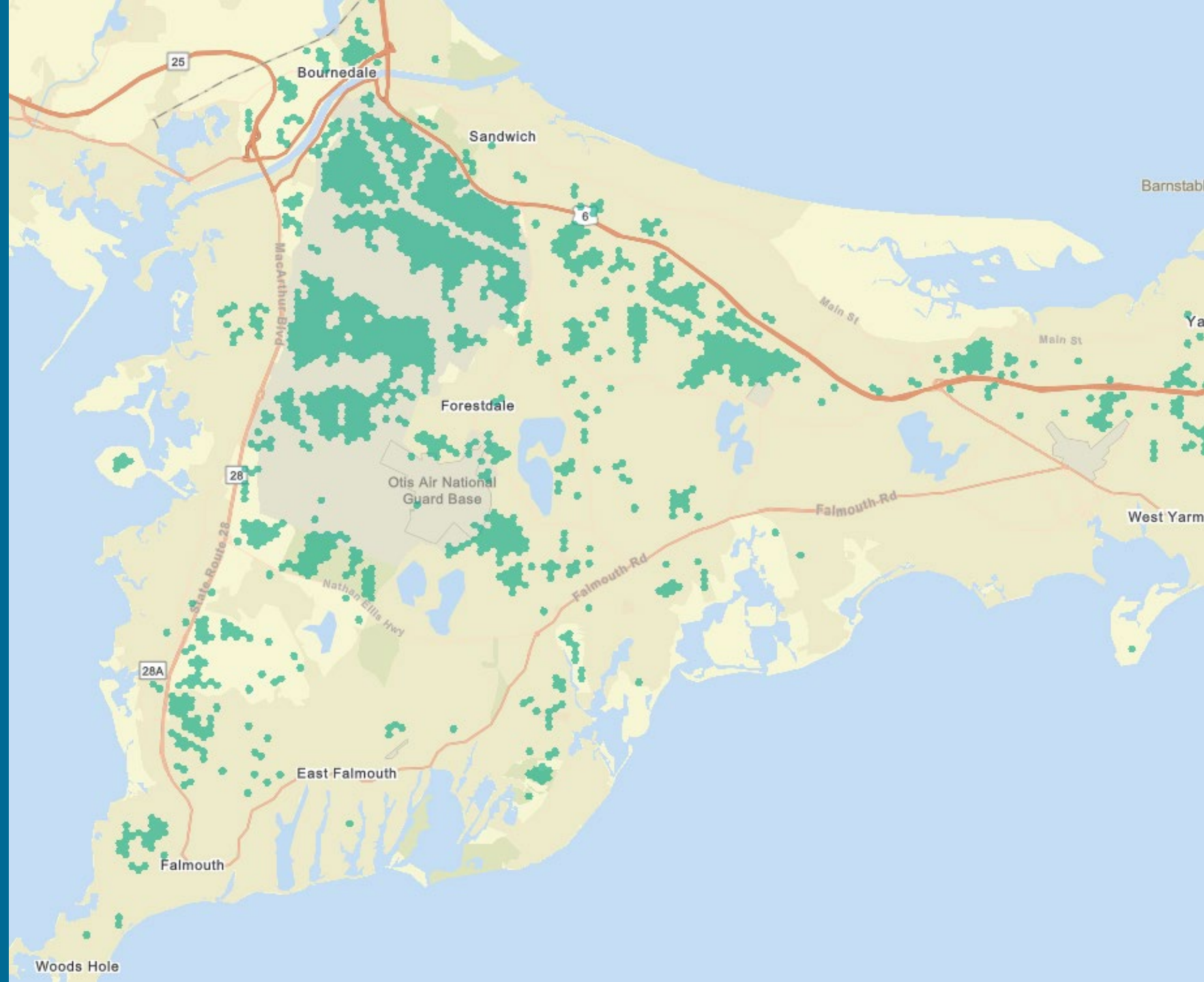
Majority of drinking water comes from groundwater lenses



Potential Public Water Supply (PPWSA)

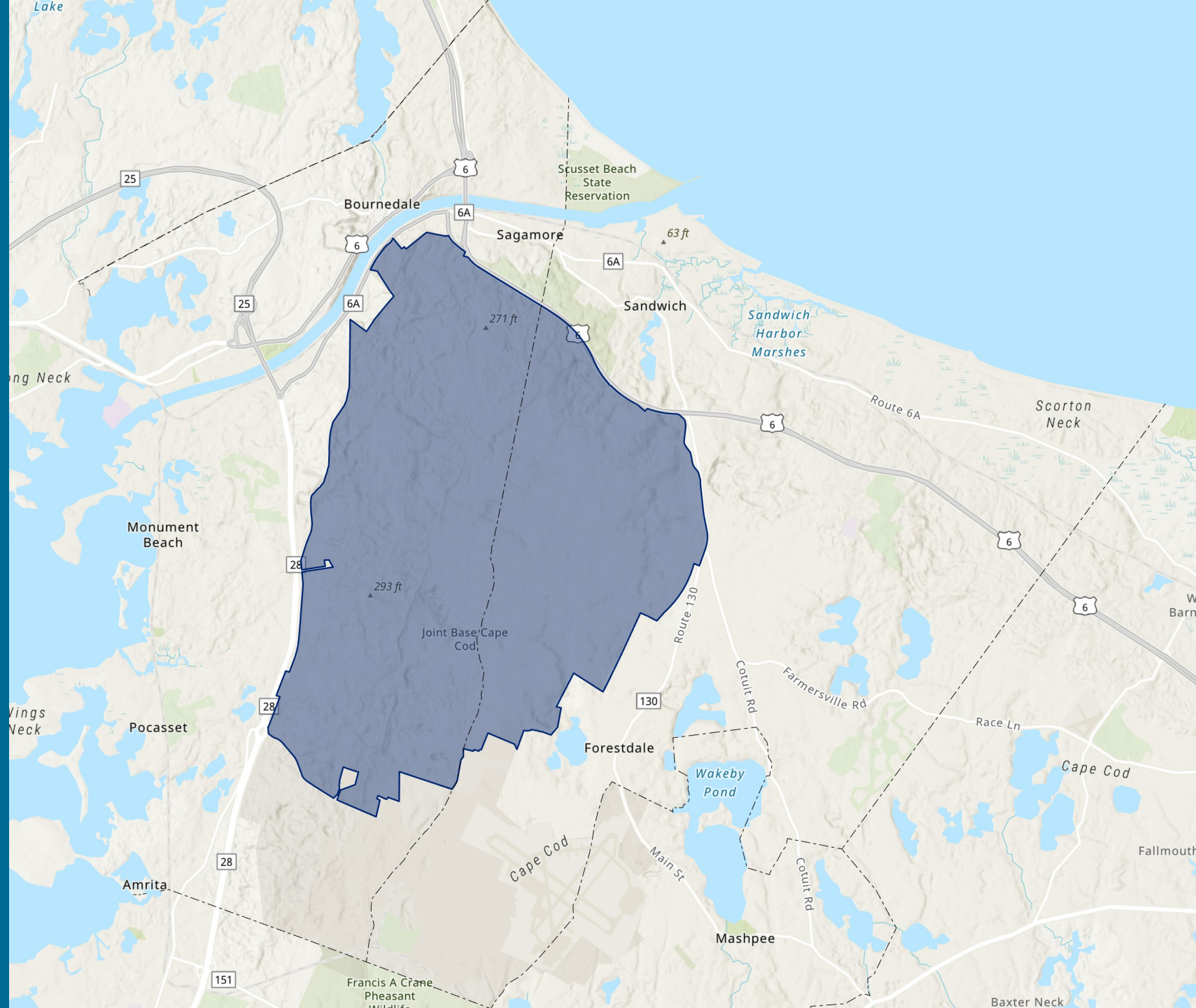


Upper & Mid-Cape PPWSA



Upper Cape Water Supply Reserve

- 15,000 acres
- Sagamore Lens – drinking water for the Upper Cape
- Habitat for 37 state-listed species



GROUNDWATER CONTAMINATION EVENTS

Contaminant plumes found in groundwater wells on and near the base. First major well closure in Falmouth

LATE 1970 –
EARLY 1980

MMR listed on the Superfund National Priorities List due to severity of contamination

Additional contaminants found in drinking water wells in Falmouth and Mashpee

1980s

Impact Area Groundwater Study Program (IAGWSP) established

Air Force Civil Engineer Center's Installation Restoration Program (IRP) established

Formation of the Upper Cape Water Supply Reserve

MMR Master Plan Finalized

1990s

Ongoing cleanup of source areas & groundwater contamination

2000s

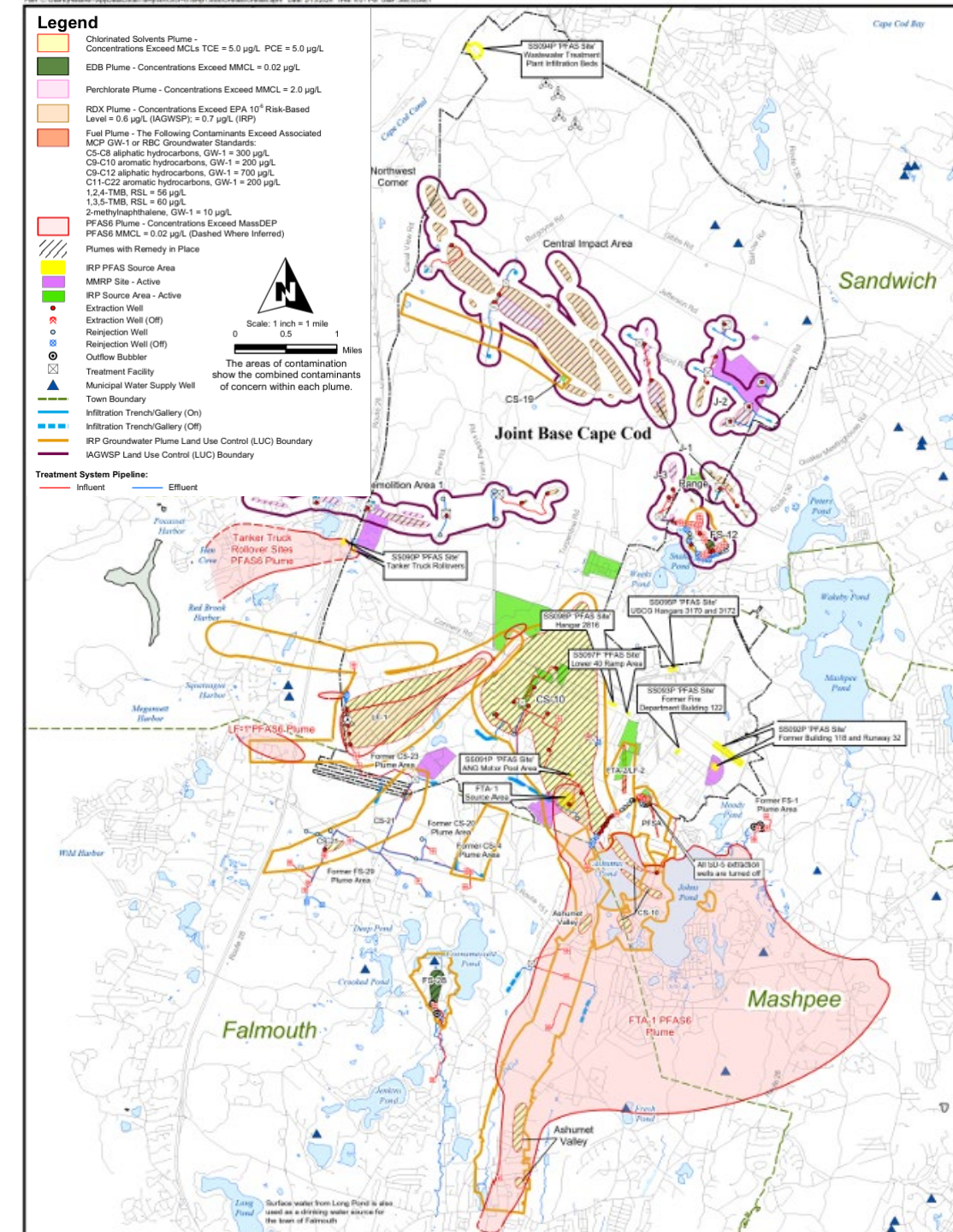
77 of 80 contaminant sources cleaned up or require no further treatment

Mashpee & Falmouth public drinking water wells taken offline

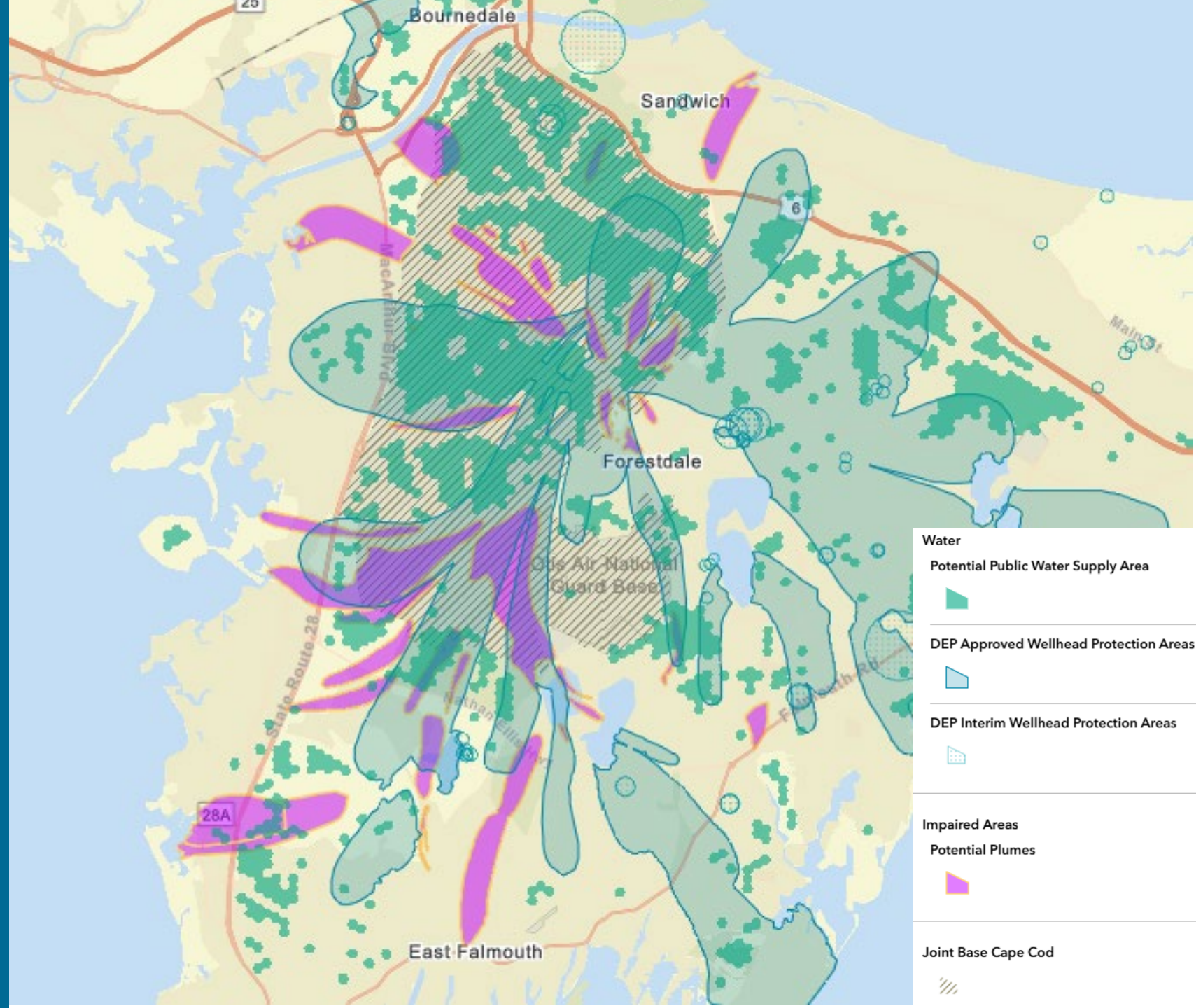
2010s

IAGWSP, December 2025

- EDB
- Lead
- PFAS
- RDX
- Perchlorate
- 1,4 Dioxane
- Fuel spill plumes
- Chemical spill plumes



Water Resource Areas & Plumes

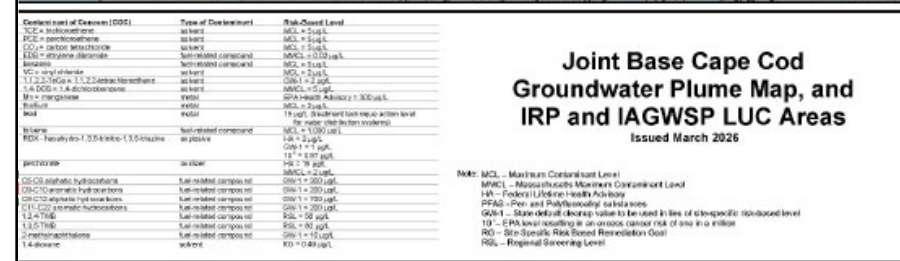
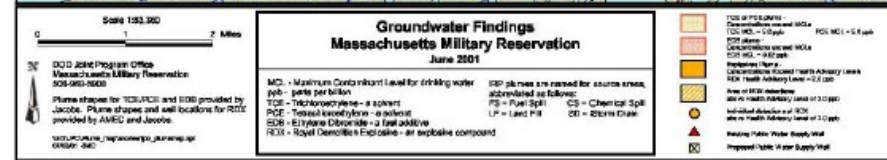


Impacts to Drinking Water Supplies

- Impacts to water supplies began with legacy contaminants
 - Chlorinated solvents from Ashumet Valley plume impacted Ashumet Pond, Johns Pond, and Falmouth Water Department's Ashumet Valley Well
- Impacts continue despite (and as a result of) cleanup activities
 - The similarly located Fire Training Area 1 plume includes PFAS from use of AFFF at fire training area, AFFF used for emergency response during Ashumet Valley cleanup activities, and sewage treatment plant discharge
- Contamination continues to appear from unexpected locations/sources on JBCC
 - PFAS have been detected at munitions disposal sites upgradient of Upper Cape Water Supply wells (J-2 range), and upgradient of Snake Pond (J-3 range)

Clean Up Activities

- Impact Area Groundwater Study Program (IAGWSP) established in 1996
- More than 4.1 million gallons of groundwater is treated per day and over 12 billion gallons have been treated to date
- The known source areas for five plumes have been removed and treated, and more than 120,000 tons of soil have been excavated and treated.
- Approximately 300 acres have been partially cleared of unexploded ordnances and over 660 tons of munitions-related scrap have been recycled

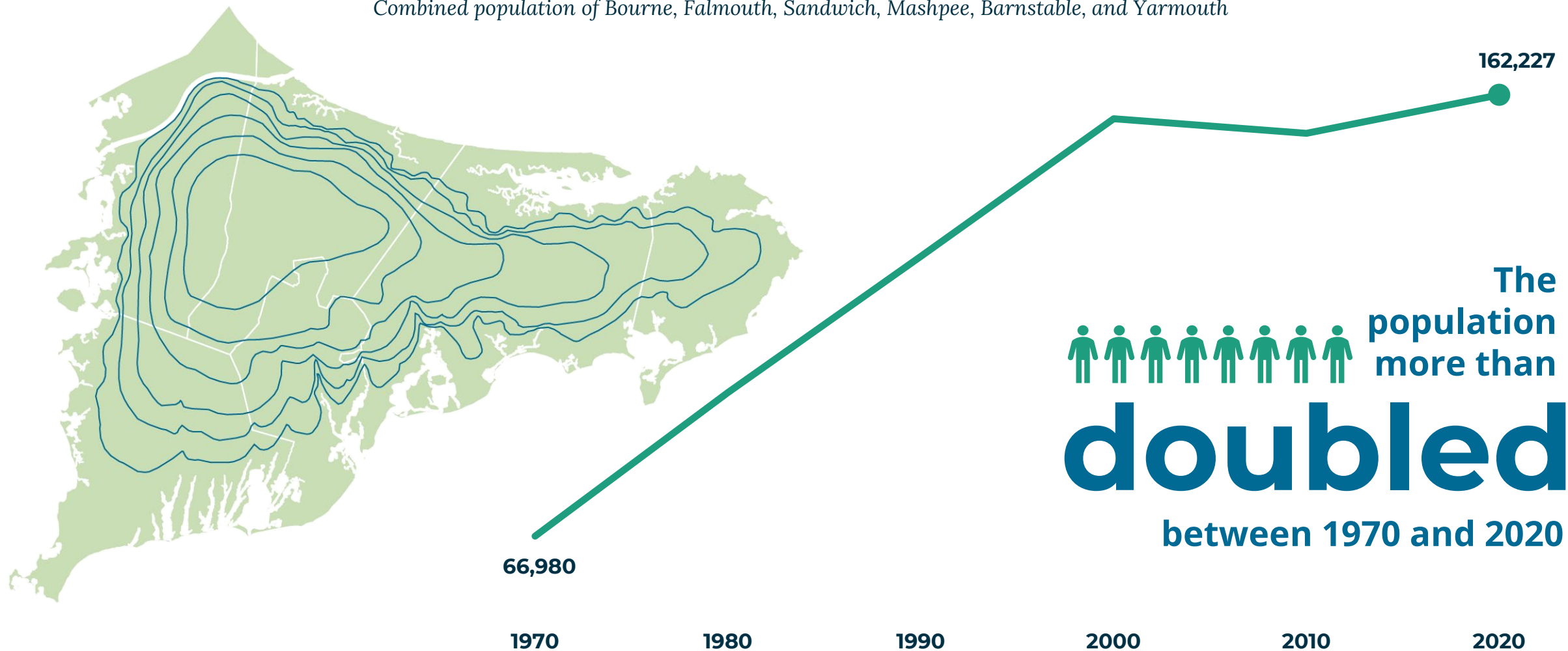


Impacts are Regional

- Drinking water supply impacts from JBCC:
 - Wells have been impacted in 3 towns (Bourne, Mashpee, Falmouth), all towns still have land use controls in place
 - Over 1,300 private wells have been abandoned and connected to public water
 - Community scale wells have been abandoned and connected to public water, or were taken offline until wellhead treatment could be provided
 - Municipal wells in Mashpee and Falmouth were taken offline for multiple years awaiting wellhead treatment
- Municipal hookups resulting from widespread contamination have resulted in increased demand for public water. Suppliers have been simultaneously challenged on the supply side by contamination of their source wells

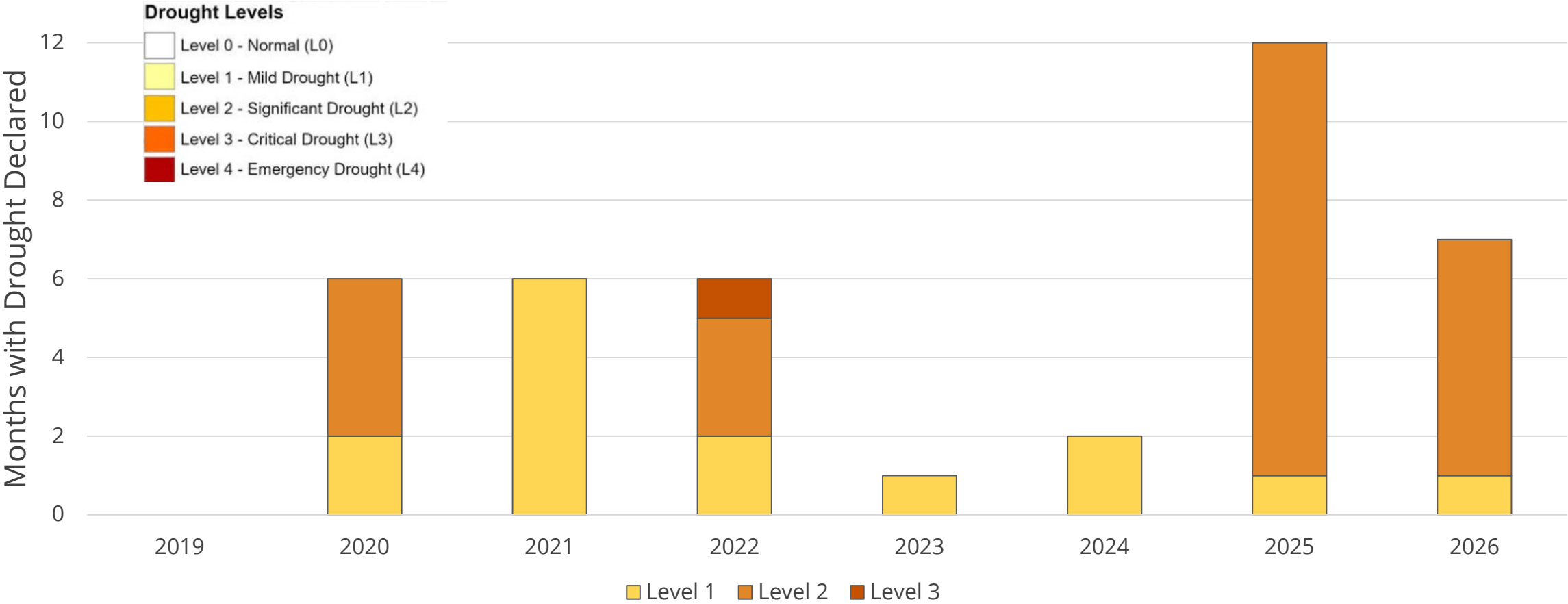
Population Growth in the Area

Combined population of Bourne, Falmouth, Sandwich, Mashpee, Barnstable, and Yarmouth



Months with Drought Declarations

MASSACHUSETTS 2019-2026



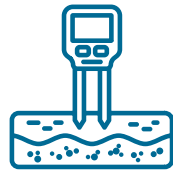
Summary

- A history of contamination led to the establishment of UCWSR. That legacy of contamination continues to create challenges for PWSs on the supply side
- Cape Cod public water suppliers are increasingly challenged by population growth and seasonal peak demand
- Persistent drought conditions have exacerbated those challenges in recent years
- Prevention is critical because remedies are slow (new well takes >7 yrs, treatment on existing wells 3-4 yrs),

What should NASEM address through this study?



CONFIRM that hazards associated with ammunition, propellants, other substances associated with range operation are accurately characterized

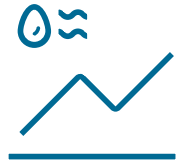


ASSESS SOIL AND GROUNDWATER MONITORING, including methodology, measurement parameters, frequency, and response thresholds



Unintended consequences of previous activities have resulted in over \$1B in impacts. Using the precautionary principle this study should also **ASSESS REMAINING KNOWLEDGE AND INFORMATION GAPS**

What should NASEM address through this study?



Assess whether **EXISTING SOIL, POREWATER, AND GROUNDWATER MONITORING DATA** provides sufficient baseline site characterization



Examine whether **FATE AND TRANSPORT MODELS AND STUDIES** from prior analyses are sufficient to accurately assess risk potential



Evaluate **IMPACTS OF VEGETATION CHANGE/REMOVAL** to habitat, carbon sequestration, chemical uptake, and groundwater recharge

JBCC Aquifer Study

NASEM Committee

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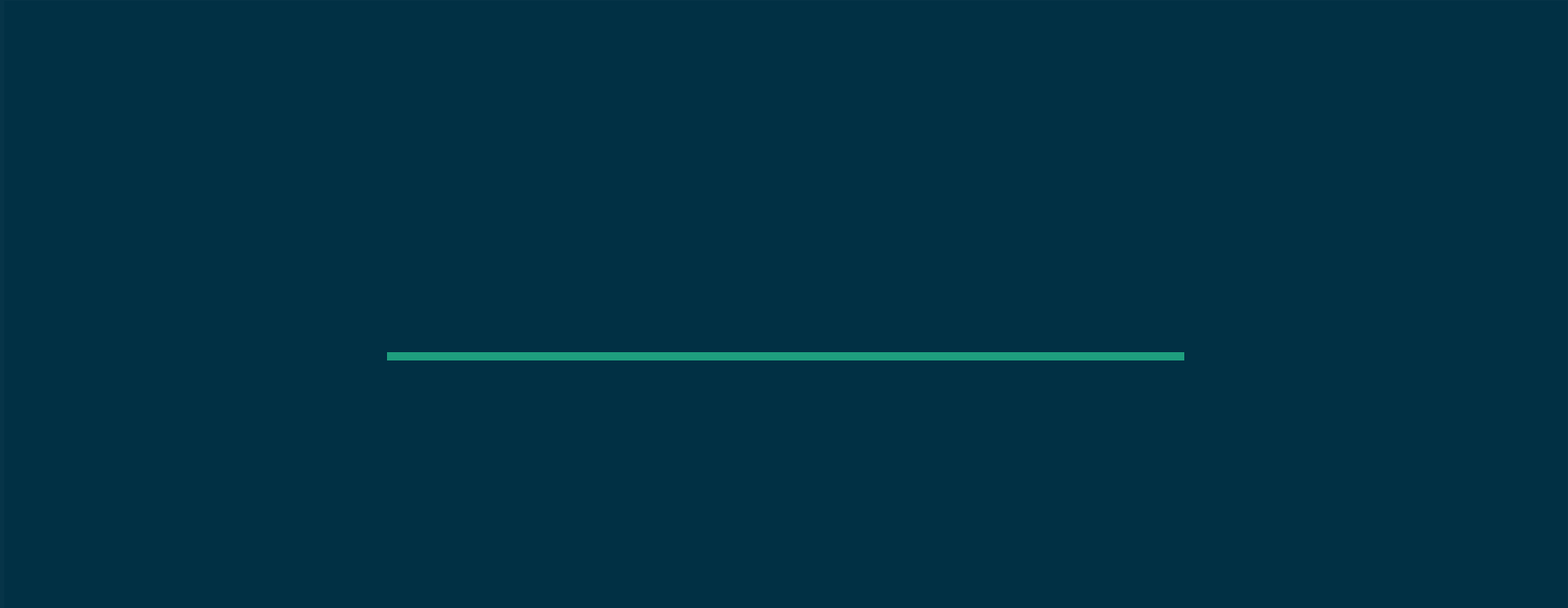
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