



Truro Safe Water

A CALL TO ACTION FOR TRURO BOARD OF HEALTH

Dec 1, 2020

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About Docs for Truro Safe Water

A voluntary group of medical practitioners and scientists collaborating to compile, understand and communicate the science related to safe water.

We aim to broaden public engagement and enable knowledge-based decisions, especially those that lead to town-wide mitigation efforts that forestall or reduce contamination and support a sustainable supply of safe water.

We are apolitical and will not advocate for any position other than one based on scientific evidence.

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Executive Summary

Water and public health

Science

Regulations

Recommendations for action

Q&A

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Truro's water supply sources

Outer Cape's sole source aquifer

Pamet Lens

Chequesset Lens

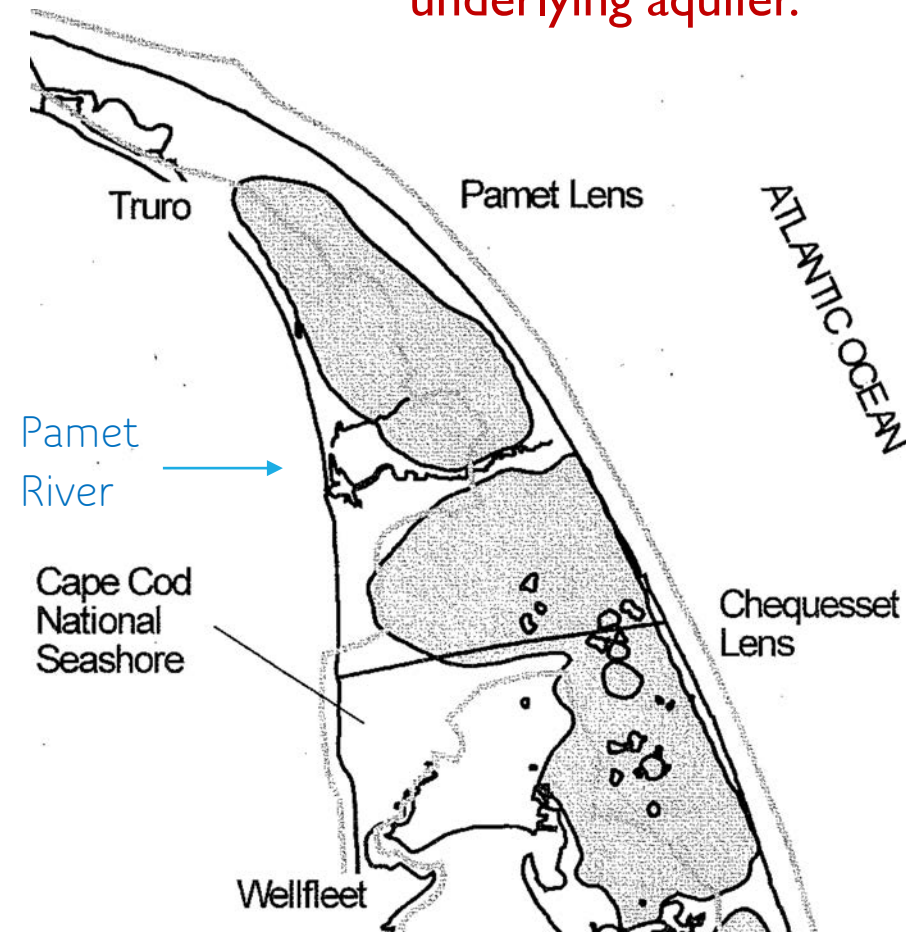
Replenished by

Rainfall

Runoff from hard surfaces

Wastewater from septic tanks/cesspools

Nitrate, a major component of human waste, along with other contaminants, passes through septic systems virtually untreated and is introduced to the underlying aquifer.



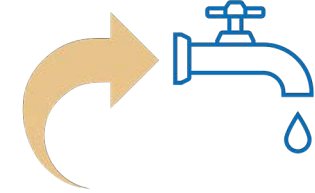
Septic systems leach **nitrates** into groundwater, well & drinking water



*“Water quality in certain areas in the Town of Truro is degraded. **Excessive nitrogen loading** in our watersheds has been identified as a major cause of this degradation. The primary source of excess nitrogen is wastewater **from on-site septic systems.**”*

- Truro Board of Health Regulations

Contaminants in well water



- Nitrogen (nitrates) from human waste
- Organic Wastewater Compounds (OWCs)
- Other toxic chemicals

What Are Organic Waste Compounds (OWCs)?

OWCs are ingredients and by-products of common agricultural, industrial, and household substances. For this study, 69 individual compounds were aggregated into 15 classes:

- Antioxidants
- Dyes/pigments
- Fire retardants
- Polycyclic aromatic hydrocarbons (PAHs)
- Plasticizers
- Fuels
- Solvents
- Herbicides
- Insecticides
- Antimicrobial disinfectants
- Detergent metabolites
- Flavors and fragrances
- Human drugs (nonprescription)
- Sterols
- Miscellaneous

*“Your **local board of health** regulates them....*

The local BOH is empowered to adopt a Private Well Regulation that establishes criteria for water quality.”

- Massachusetts State Law



FEDERAL
STATE
TRURO

- EPA does **not** regulate private wells
- MassDEP does **not** regulate private wells
- Board of Health **can and should** regulate private wells

UNSAFE vs SAFE water

Scientific Research Evaluations
Last 25 Years

Evolving nitrate scientific awareness over time

Table of all relevant scientific studies found through extensive review of the scientific literature

Additional information available at docsTruro.org

Timeline Summary | Level of Nitrates in Water and Serious Health Risks

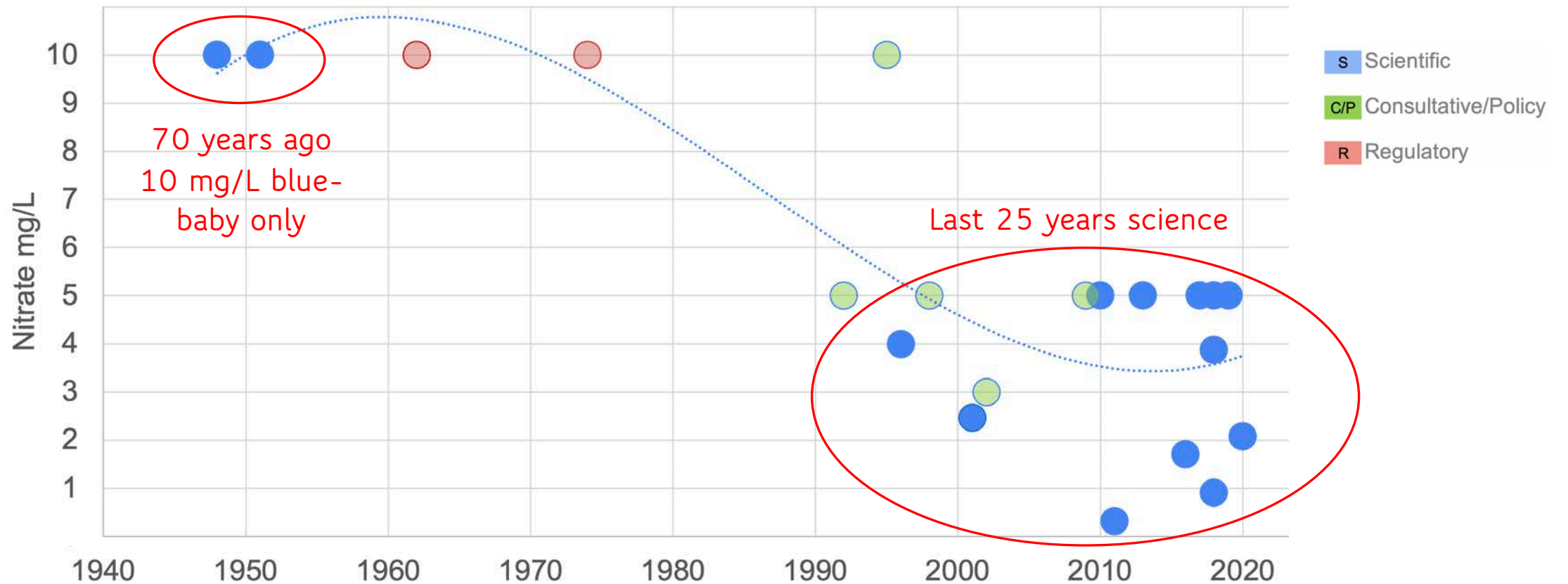
Year	Nitrate	Reference Source	Type	Health Risk
1948	10	Minnesota Department of Health	S	methemoglobinemia
1951	10	Graham Walton, PhD	S	methemoglobinemia
1962	10	US Public Health Service	R	methemoglobinemia
1974	10	US Safe Water Drinking Act	R	methemoglobinemia
1992	5	Cape Cod Commission Nitrogen Loading	C/P	Nitrogen loading standard
1995	10	US Environmental Protection Agency	C/P	methemoglobinemia
1996	4	Epidemiology/National Cancer Institute	S	non-Hodgkin's lymphoma
1998	5	Lower Cape Water Management Task Force	C/P	general
2001	2.46	Epidemiology	S	bladder and ovarian cancer
2002	3	The Journal of Preventive Medicine	C/P	Max Contam Limit Goal
2009	5	Cape Cod Commission Regional Policy Plan	C/P	Nitrogen loading standard
2010	5	Epidemiology	S	thyroid cancer
2011	0.31	Journal of Toxicology and Environmental Health	S	childhood brain tumors
2013	5	Environmental Health Perspectives	S	birth defects
2016	1.7	Spain and Italy	S	colorectal cancer
2017	5	Environmental Health Perspectives	S	bladder cancer
2018	3.87	International Journal of Cancer	S	colorectal cancer
2018	5	Environmental Health Perspectives	S	birth defects
2018	0.9	Denmark	S	colorectal cancer
2019	5	Silent Spring Institute	S	cancers and birth defects
2019	5	Environmental Research	S	colorectal cancer
2020	2.07	Epidemiology	S	bladder cancer

Scientific

Consultative/Policy

Regulatory

Evidence-Based Changes in Unsafe Nitrate Levels Over Time



Evidence-based changes in **unsafe** nitrate levels

This chart plots each of the scientific papers reviewed, with the publication date on the horizontal axis, and the critical nitrate level discussed in the publication on the vertical axis.

70 years ago vs last 25 years

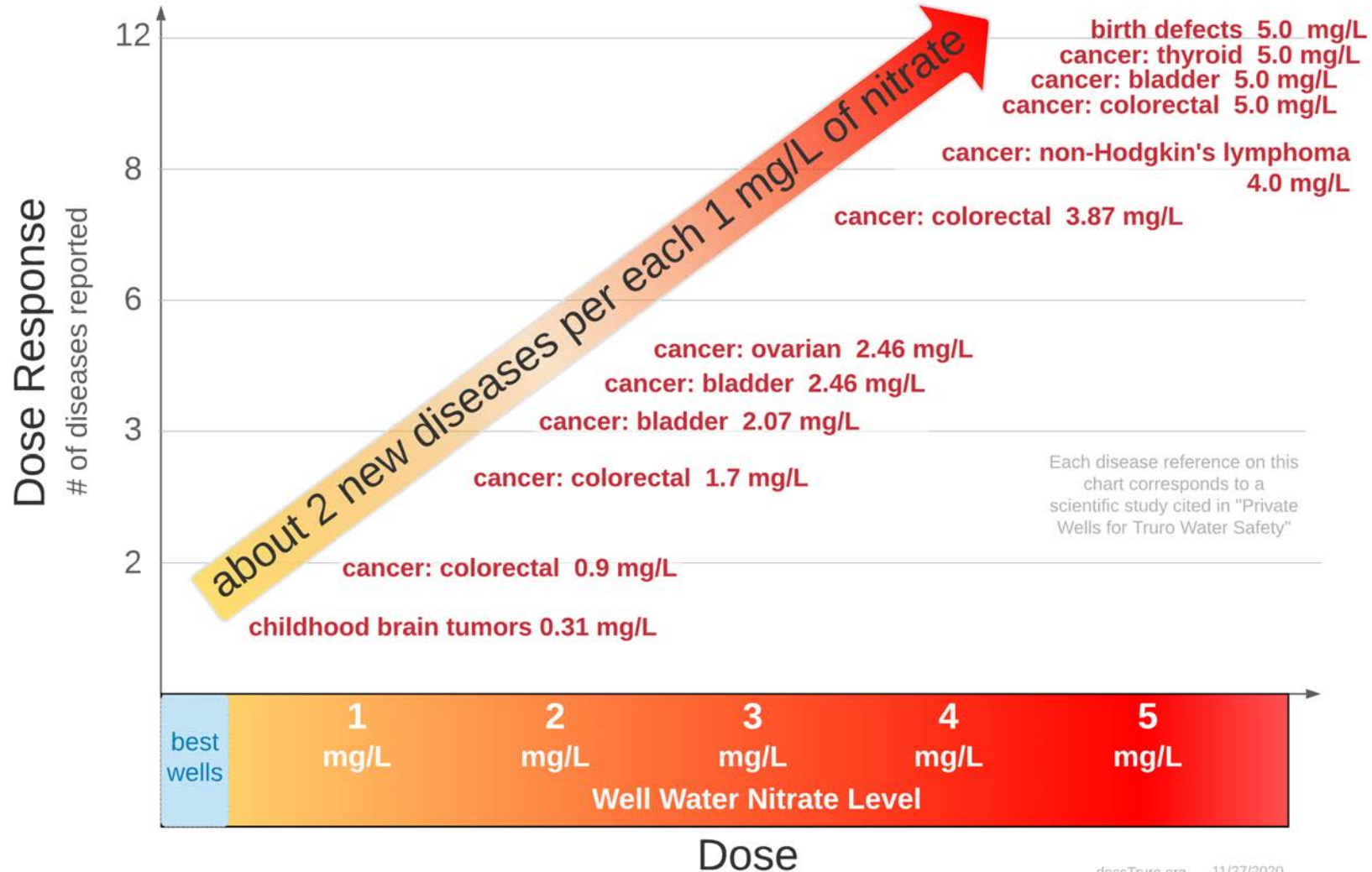
It has been over 70 years since the first “blue-baby” finding about unsafe levels of nitrates in drinking water.

For decades, this was the only finding of substance, and so the EPA’s 10 mg/L Maximum Contamination Limit was interpreted wrongly as a private well safe drinking water limit.

In the last 25 years of numerous scientific studies, **none** we can find suggest that 10 mg/L is appropriate for safeguarding health risks.

Instead, adverse health consequences appear at **5mg/L and less** -- **half** the EPA level.

Unsafe water & cancer/non-cancer diseases





Current science should inform Safe Water Standards

FOR TRURO PUBLIC HEALTH



Nitrate levels

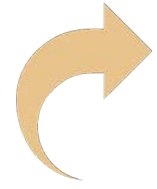
Nitrates serve as a marker for human activity, and human activity is the source of other harmful organic and chemical contaminants.

Many contaminants are not easily filtered out even in public water supplies and pose a risk of cancer and other health problems to residents.

If contamination rises at a neighborhood level, a community can start experiencing **psychological** issues (anxiety, depression, sleep disorders).

Scientific evidence indicates action on nitrate levels is clearly **necessary and appropriate** for the Board of Health.

Truro's groundwater contamination



Contaminants Exceeding EWG Health Guidelines in Town Water*	Potential Effect	Times EWG Guideline
Bromodichloromethane	cancer	16x
Bromoform	cancer	2.1x
Chloroform	cancer	5.8x
Chromium (hexavalent)	cancer	24x
Dibromoacetic acid	multiple	8.5x
Dibromochloromethane	cancer	18x
Haloacetic acids (HAA5)†	cancer	25x
Radium, combined (-226 & -228)	cancer	5.5x
Tetrachloroethylene	cancer	3.9x
Total trihalomethanes (TTHMs)†	cancer	47x

Nitrate as a Marker

- Indicative of other contaminants present in the water.
- Easy to measure via a low-cost test.

*Water is pumped from **Truro's large protected wellhead sites** and piped to Provincetown Water Dept. where it is tested by Environmental Work Group. See ewg.org/tapwater/system.php?pws=MA4242000 (results as of 9/22/2020)

† HAA5 is a contaminant group that includes monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid. TTHM is a contaminant group that includes bromodichloromethane, bromoform, chloroform and dibromochloromethane.

Truro's Board of Health is responsible for Truro's public health

"The Board of Health considers protection of groundwater their **top priority** and are continually looking for ways to **protect and improve groundwater quality**.

The Board has and will continue to aggressively **adjust their Regulations** for the town of Truro to address ways **to protect the Public Health.**"

- *Board of Health, July 2020*

"All wastewater regulations should be revisited every 5 years. The review will include but not be limited to: ground water and surface water sample data, wastewater treatment technology, and county, state, and federal regulations."

- *Weston & Sampson, Feb 2018*
Truro Integrated Water Resources
Management Plan Phase II Report

Board of Health current regulations focus on Nitrogen loading

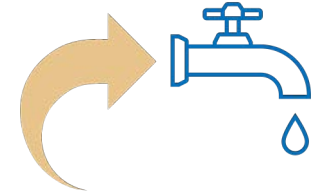
LOADING



Regulations aim to **mitigate** excessive groundwater contamination via a maximum nitrogen *loading* standard, e.g., **¼ acre per bedroom**

(Section VI, Article 14, ref: MA Title 5)

CONTAMINATION



Nitrate *contamination* levels in private well water are **not addressed** in regulations

(currently not regulated)

Loading restrictions

Cape Cod Commission recommends **5 mg/L** as a maximum Nitrogen *loading* limit.

Truro Board of Health

- Limits the density of human activity by restricting development to 1 bedroom per 10,000 square feet of land up to the limits of total acreage, i.e., **¼ acre per bedroom**.
- Larger properties (more than 5 bedrooms i.e., 600 gallons per day) must take additional steps to reduce Nitrogen loading.

So, what can we do?

Immediate action is necessary

Increasing evidence - based on science - shows **harmful effects of nitrate** on human health. Nitrates are a marker for **additional contaminants** that are also harmful to human health

The arc of lower threshold levels has been consistent for more than 25 years, finding **significant health consequences at and below nitrate concentrations of 5 mg/L, and as low as 1 mg/L**

This **warrants immediate action locally**

This has become Truro's public health emergency

Affects all of Truro

Data indicates nitrate levels are rising

When and how will the Town act?

Call to action

Truro Board of Health can and should **set new local standards** in conformity with current scientific evaluations and with Cape Cod conditions for both nitrate contamination and nitrogen loading at a **level at or under 5 mg/L**.

In addition, Truro's BoH should take all needed steps to **ensure that levels of contamination are regularly measured throughout Truro**, to **identify** areas of concern, **mitigate** through effective strategies, and **measure and report** progress.

We can help – at no cost – here’s how

- ✓ Propose safe well water regulation, including triggers and suggested actions
- ✓ Survey other towns and propose updated regulations for
 - Larger wastewater systems (2,000 to 10,000 GPD)
 - Mid-sized wastewater systems (600 to 2,000 GPD)
 - Residential-sized wastewater systems (<600 GPD)
- ✓ Suggest health-focused budget measures so public health priorities receive adequate focus in the FY22 budget and after

Truro depends on you

Thank you



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Gastroenterology

Public Health

Epidemiology

For more information see: docstruro.org