

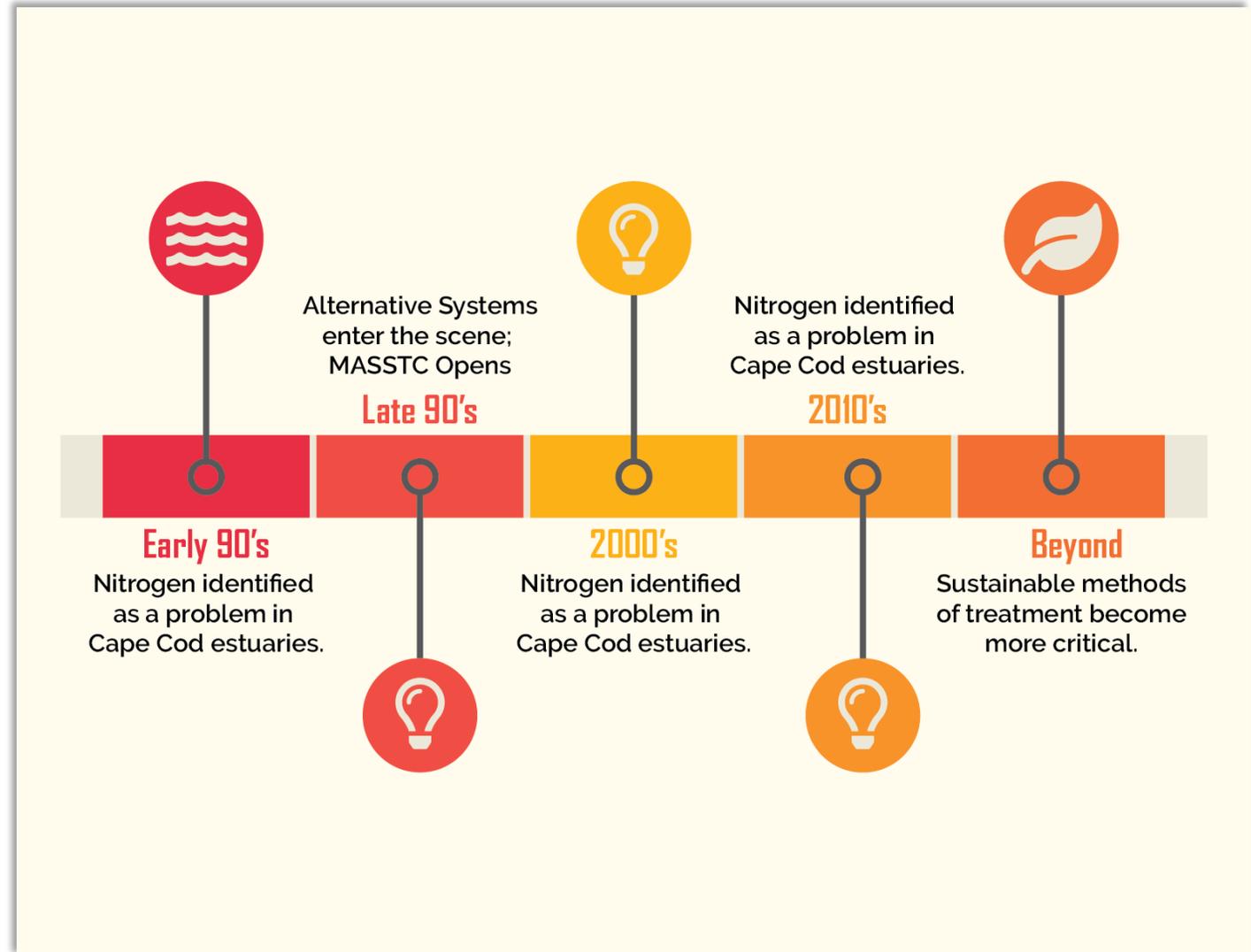


MASSTC: Twenty Years of Backyard Innovations

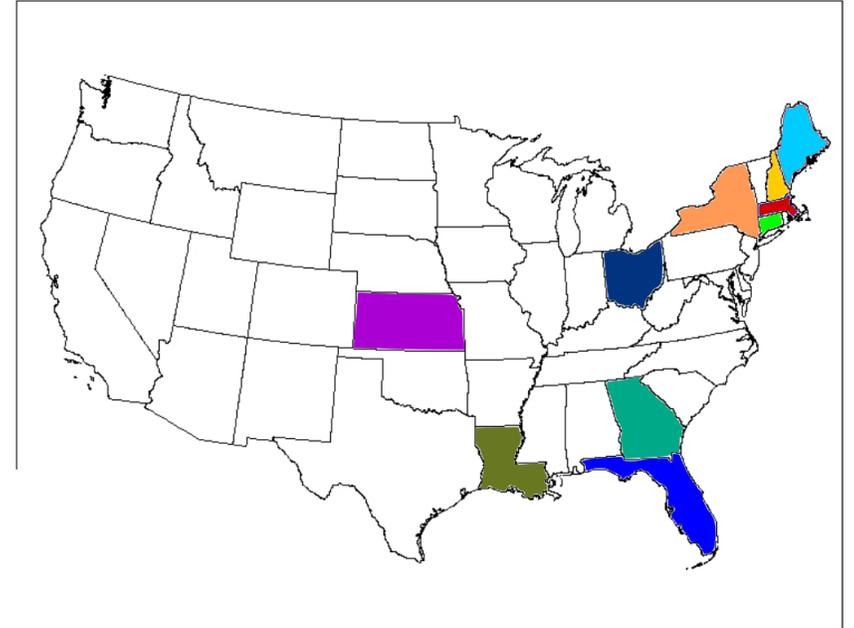
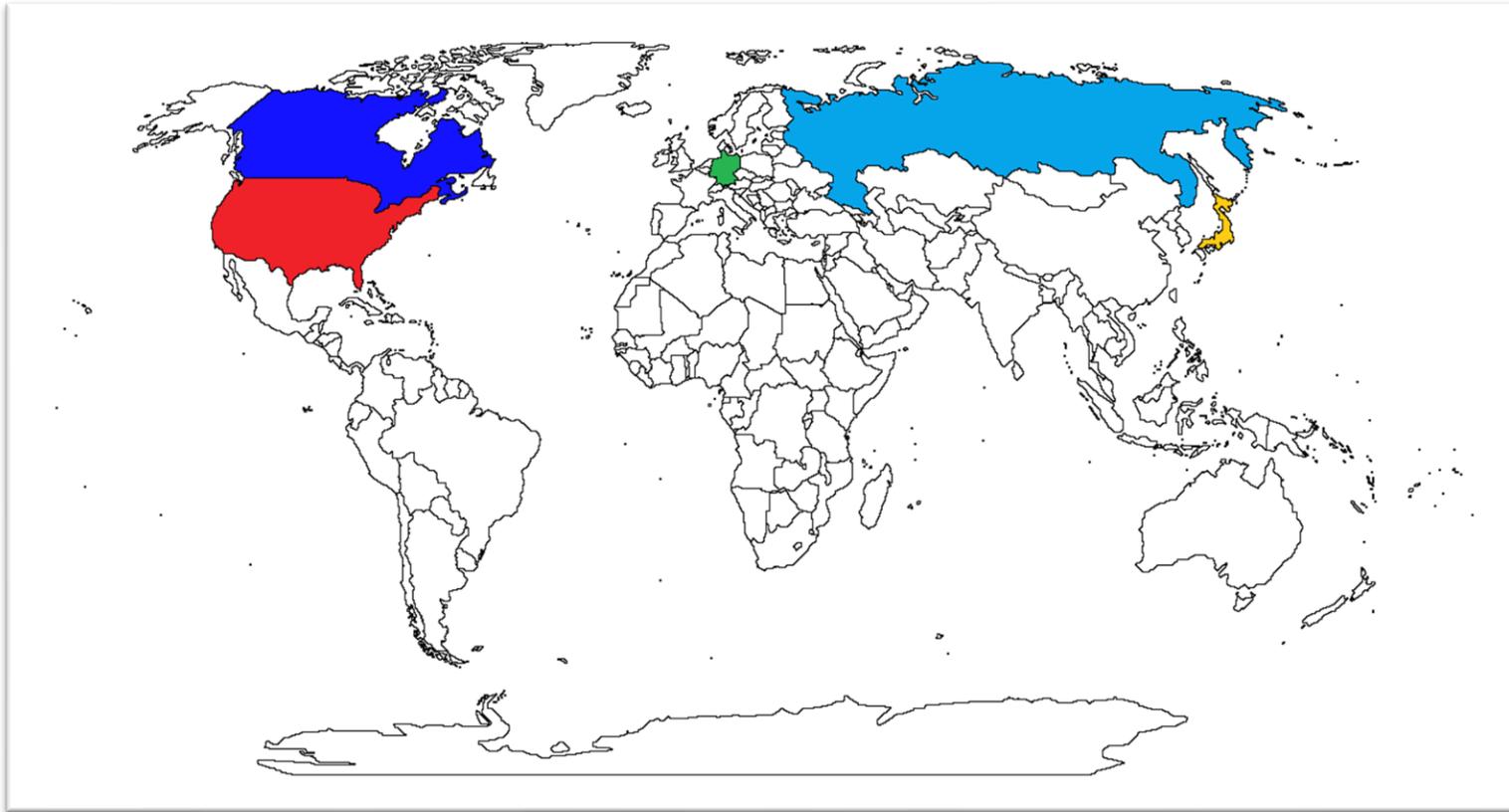
Brian Baumgaertel
Director, MASSTC

What's a Masstech?

MASSTC is the nation's premier third-party testing and research facility for innovative/alternative (I/A) onsite septic system treatment technologies.



Global Representation



Cross-Discipline Collaboration



Product Testing and R&D

Testing for Certification or Regulatory Approval



Research and Development

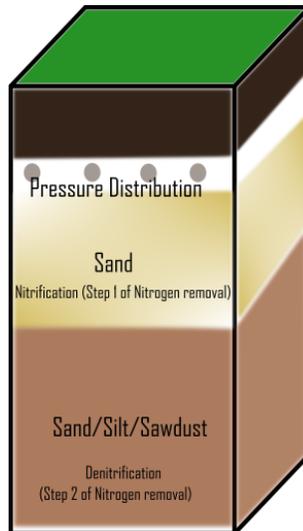


Active Research Projects

Nonproprietary Technologies

a.k.a. “Layer Cakes”

- Expansion of research originally done at University of Waterloo and later in Florida
- Layering organic material under a leachfield to boost nitrogen removal performance
- Massachusetts DEP funding for research
- 5 years -> 84% removal
- Later collaboration with Stony Brook University
- Now being looked at as an option for Suffolk County, New York



Phosphorus

The Problem:

- Primary cause for eutrophication in freshwater bodies
- Septic systems a large contributor of P on Cape Cod
- Not many available P removal technologies in Massachusetts

The Project:

- Install P removal systems as pilot technologies
- Sample effluent

Viruses

- Massachusetts DEP funded study to analyze removal rates of pathogens through a variety of depths of sand beneath a soil absorption system
- Pathogens: MS-2 and somatic bacteriophages, E. coli, fecal coliform, enterococcus

Groundwater Separation Study

- DEP reviewing Title 5 as part of Governor's Order to review regulations.
- Groundwater separation (distance between bottom of leach field and groundwater) one of the setbacks under review.
- DEP approached MASSTC about doing a study to determine if a reduction in groundwater separation would provide adequate public health protection.
- Study will monitor 5 indicator organisms as they travel through a variety of depths of sand to determine what separation is appropriate.
 - Bacterial Indicators: Escherichia coli, Fecal Coliform, Enterococcus
 - Viral Indicators: MS-2 Coliphage, Somatic Coliphage

Phase One: Set Up a Lab at MASSTC

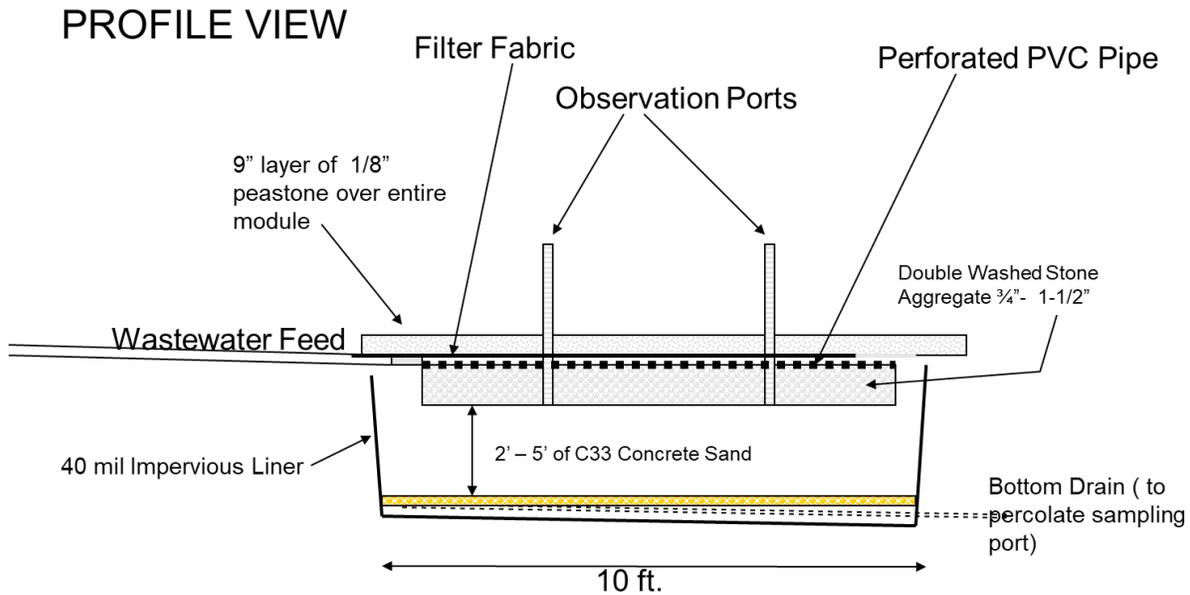
- Viral analyses are unique and have short holding times.
- DEP contracted with MASSTC to construct and outfit laboratory at MASSTC. \$195,000 in capital funds.



Phase 2: Construct the Test Cells

- Two leach field dosing regimes: gravity (typical) and pressure distributed
- Four depths of sand for gravity dosed:
 - 2 feet
 - 3 feet
 - 4 feet (Current separation in tight soils)
 - 5 feet (Current separation in sand)
- Three depths of sand for pressure distribution:
 - 2 feet
 - 3 feet
 - 4 feet
- Five replicates per dosing regime and depth = 35 cells!

Phase 2: Construct the Test Cells



Phase 3: Sample Test Cells and Analyse

- Each test cell type sampled and analyzed once per month for all indicators.
- Study will run at least 12 months to include both summer and winter treatment.
- MASSTC hired full-time microbiologist to do analyses.
- Phase 2 and 3 paid for with \$200,000 grant from MADEP (319 Grant Program)

USEPA Nitrogen Sensor Challenge

- Challenge issued by USEPA to spur development of a low-cost nitrogen sensor package that can monitor advanced onsite septic systems remotely.
- Teams must pass a series of increasingly difficult tests.
 - 1-week
 - 1-month
 - 6-month
- Winner of the challenge receives ISO 14034 (ETV) certification and order of up to 200 units from Nature Conservancy and others.

Sensor Challenge @ MASSTC

- Designed & built testing apparatus
- Provided challenge water
- Sampling and Field Measurements
- General Technical Support

Testing Setup

