



How to Manage Wastewater Sludges and Septage in Vermont



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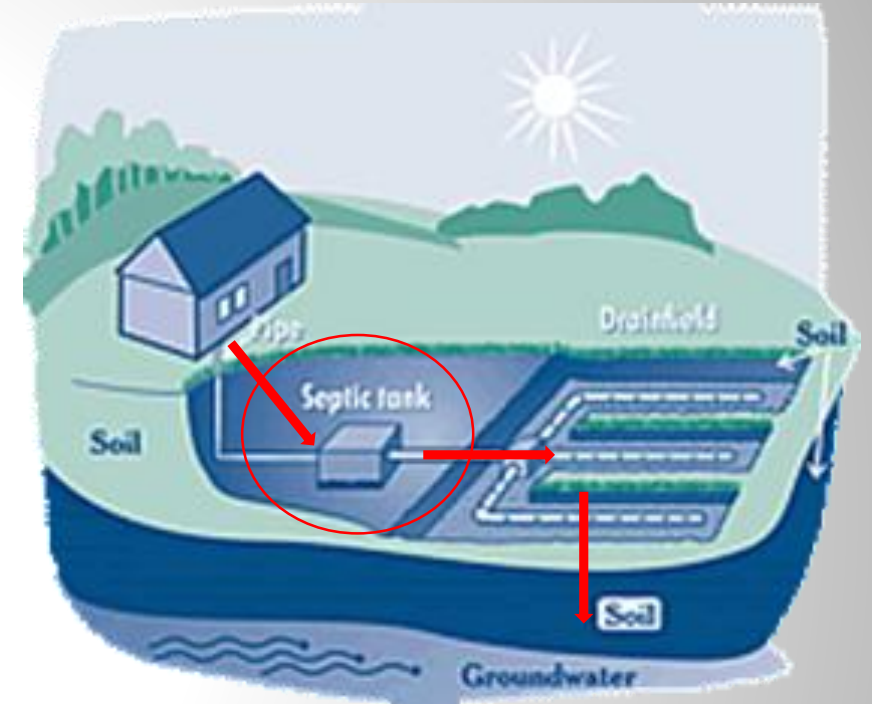


What is Sludge?



Credit: Encore Renewable Energy

What is Septage?

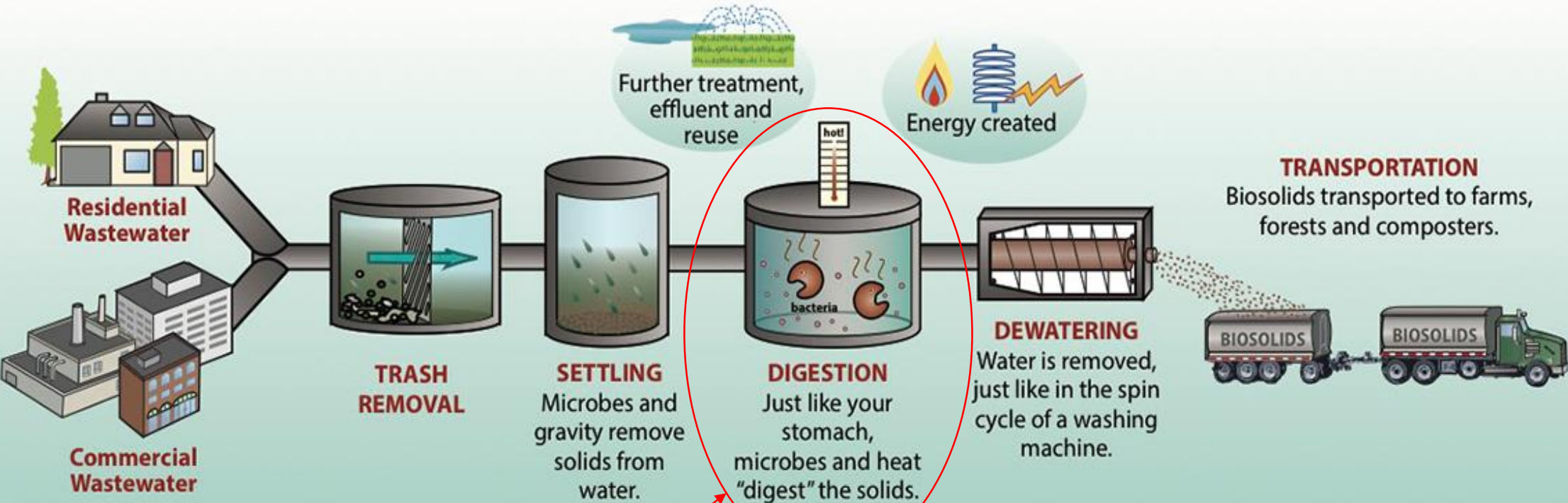


during wastewater treatment - solids and liquids are separated, treated & discharged

Sludge and Septage = the solids removed during wastewater treatment process

How are Biosolids made?

WASTEWATER TREATMENT PROCESS - HOW BIOSOLIDS ARE MADE



<https://nwbiosolids.org/what-are-biosolids-overview>

Treated sludge = biosolids

What are Biosolids?

The nutrient-rich organic materials resulting from the treatment of sewage sludge (EPA)

Regulated under 40 CFR Part 503 “*Standards for the Use or Disposal of Sewage Sludge*” and VT Solid Waste Management Rules

- All biosolids meet VT’s metals standards (arsenic, lead, cadmium, etc)
- All biosolids meet VT’s PCBs (polychlorinated biphenyls) standards
- All biosolids treated in Fed approved process to meet pathogen and vector attraction reduction requirements – 2 classes:

Class B: treated in Process to Significantly Reduces Pathogens

example: anaerobic digestion (low temp)
lime stabilization (pH raised)*

Class A: treated in Process to Further Reduces Pathogens

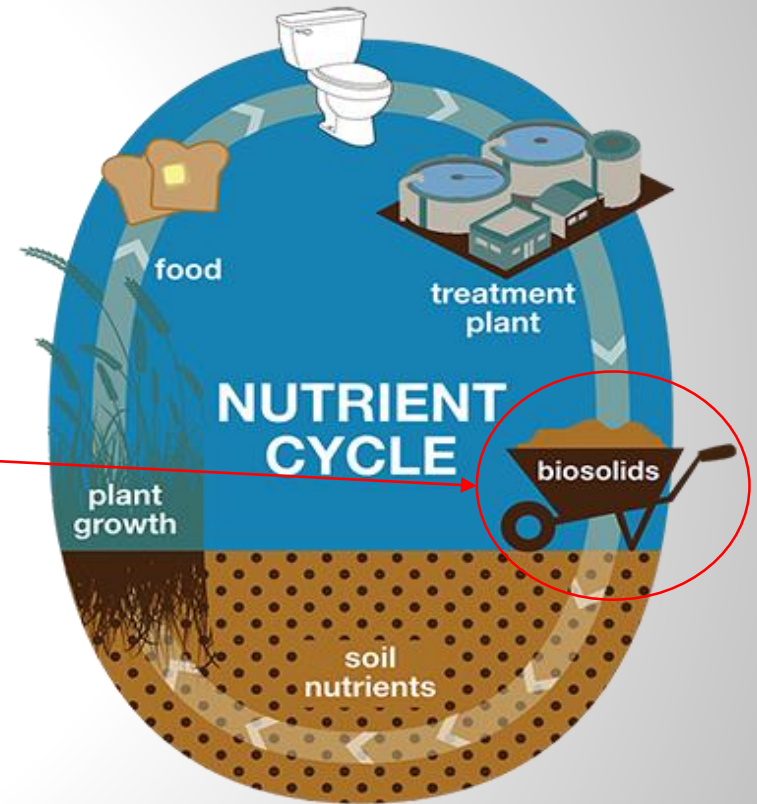
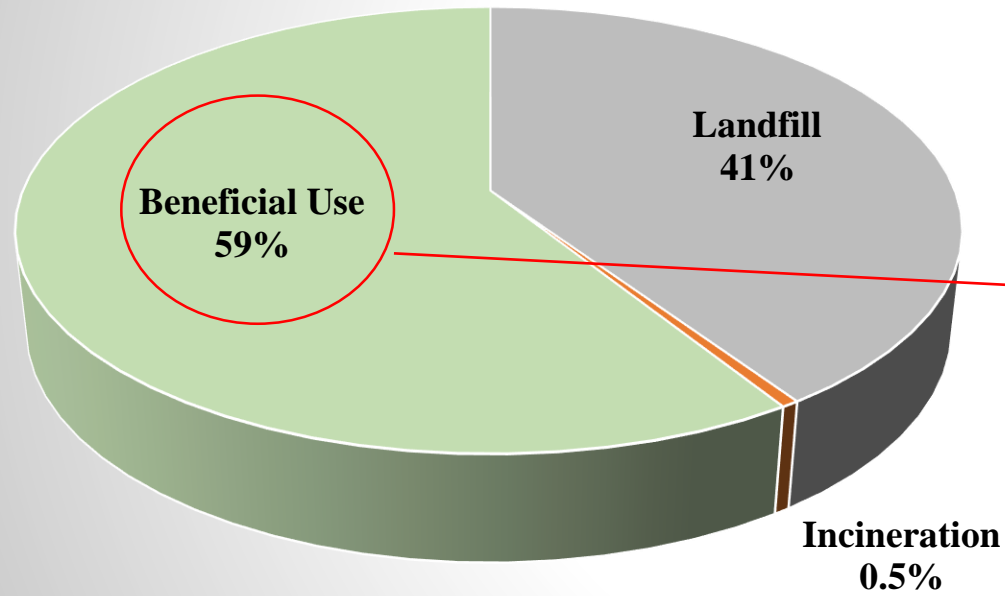
example: anaerobic digestion (high temp)
composting



Biosolids ready for land application, Hartford VT

Biosolid Management Options

2016:
~11,000 dry tons
~13,000 cubic yards
~ 5200 pick up truck loads



Beneficial Use in State Statutes

Title 10: Conservation And Development
Chapter 159: Waste Management
Subchapter 1: General Provisions
§ 6604. Solid waste management plan

(c) A portion of the State's Solid Waste Management Plan shall set forth a comprehensive Statewide program for the collection, treatment, beneficial use, and disposal of *septage and sludge*... consideration shall be given to...

(1) the varying characteristics of septage and sludge;

(2) its *value as a soil amendment*;

....

(7) appropriate monitoring and reporting requirements;

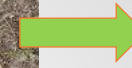
(8) actions which can be taken through existing State programs to *facilitate beneficial use of septage and sludge*;

(9) the *need for regional septage facilities*;



Benefits of Biosolids = Beneficial Use

- Building Soil
 - Adds nutrients – slow release *fertilizer*
 - Adds carbon – greenhouse gas ‘sink’ (storage)
 - Adds organic matter – reduces erosion, increases water holding capacity – *flood resiliency!*
 - Enhances soil microbial population
- Land restoration tool
- Conserves landfill capacity
- Regulated - siting prohibitions, set backs, public access/site use restrictions, soil & groundwater monitoring



Risks Associated w/ Biosolids

- Potential for nutrient concentration and/or loss to water resources (similar to any fertilizer)
- Pathogens reduced, not eliminated
- Potential for odor complaints
- Public perception challenges – the ‘ick’ factor
- Emerging contaminants present in material

Benefits of Landfill Disposal of Sludge/Biosolids

- Electrical power generation via landfill methane capture
- Only disposal option for WWTFs that do not treat sludge to biosolids standards and a contingency option for WWTFs that do

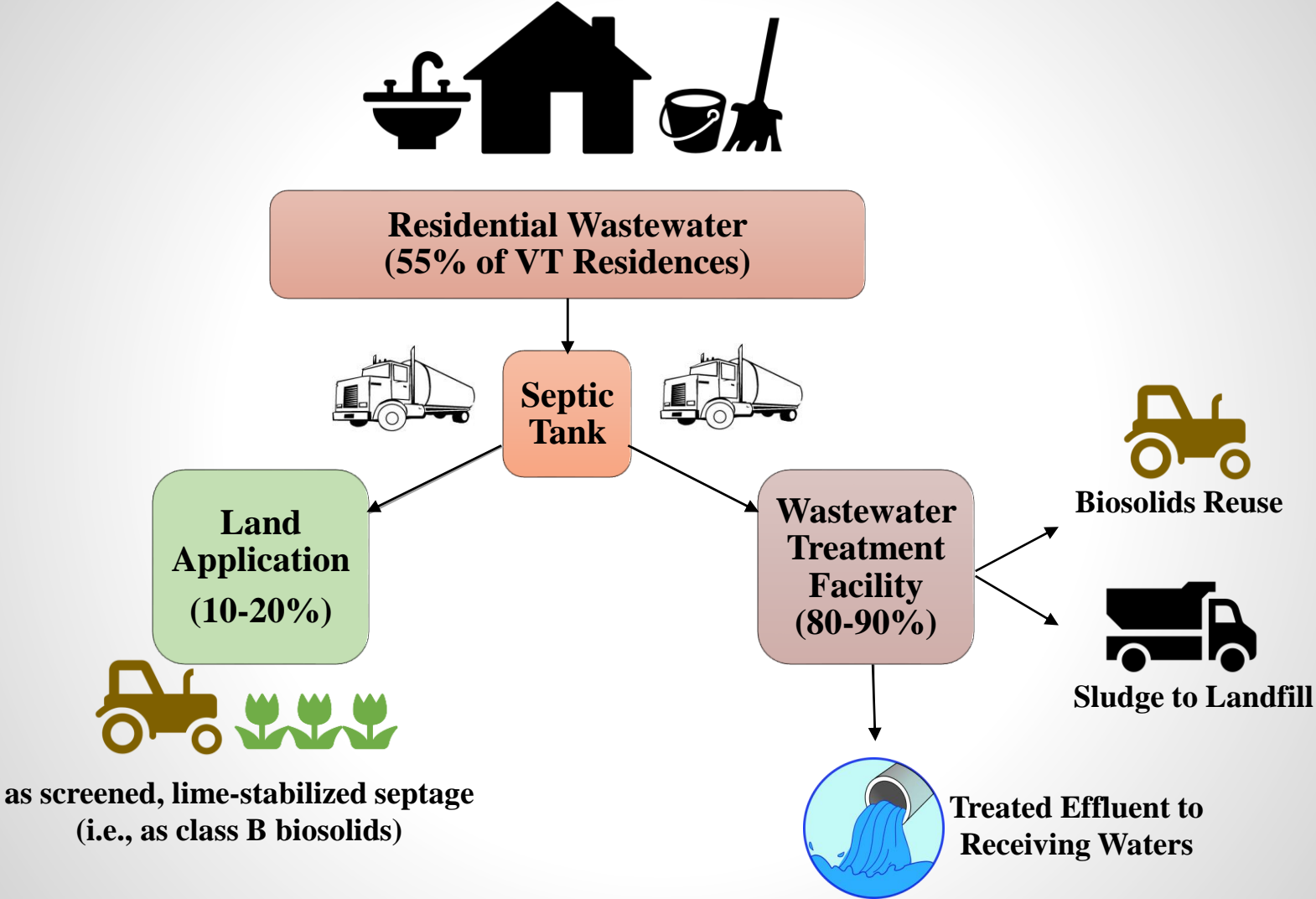


Risks Associated with Landfill Disposal of Sludge/Biosolids

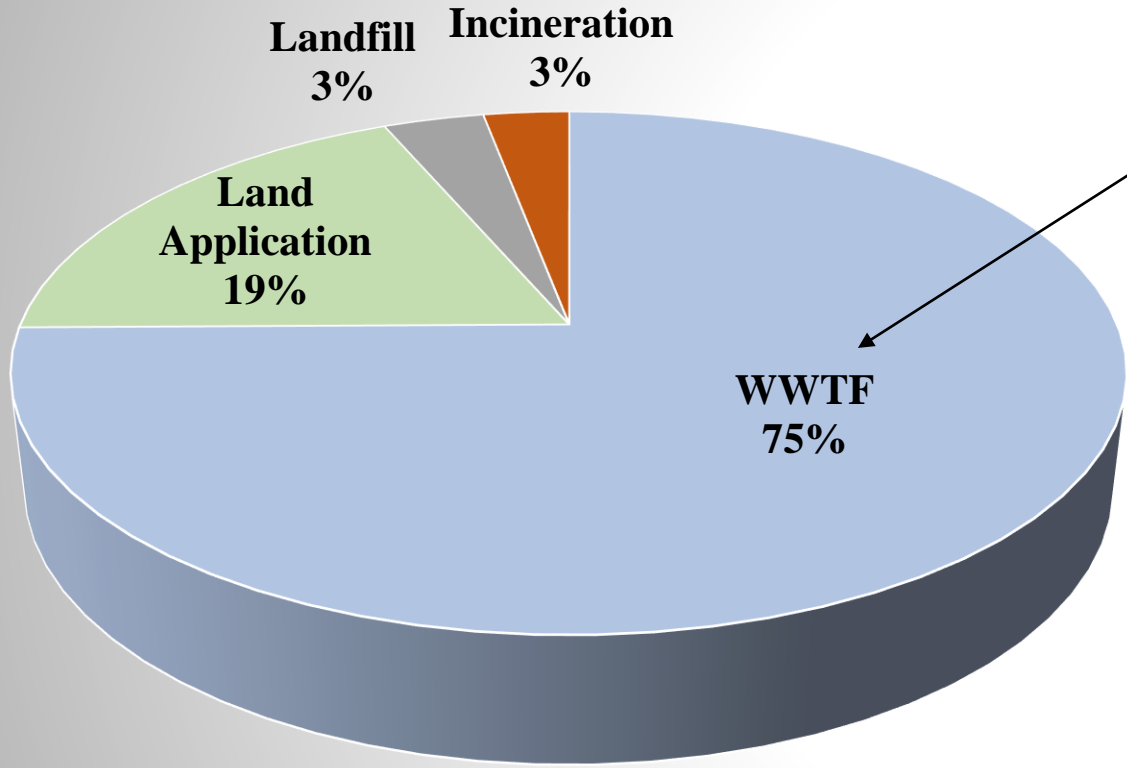
- Increases landfill methane emissions* (even with capture)
- Increased vehicle emissions & greenhouse gases from hauling
- Reduces landfill space capacity
- Potential for odor complaints
- Increases generation of *landfill leachate* – disposed at WWTFs where partial treatment increases pollutant loading in discharge to surface waters

* Landfill methane emissions 3rd largest man-made source in United States

Septage Management - Flow Chart



Septage Management Options



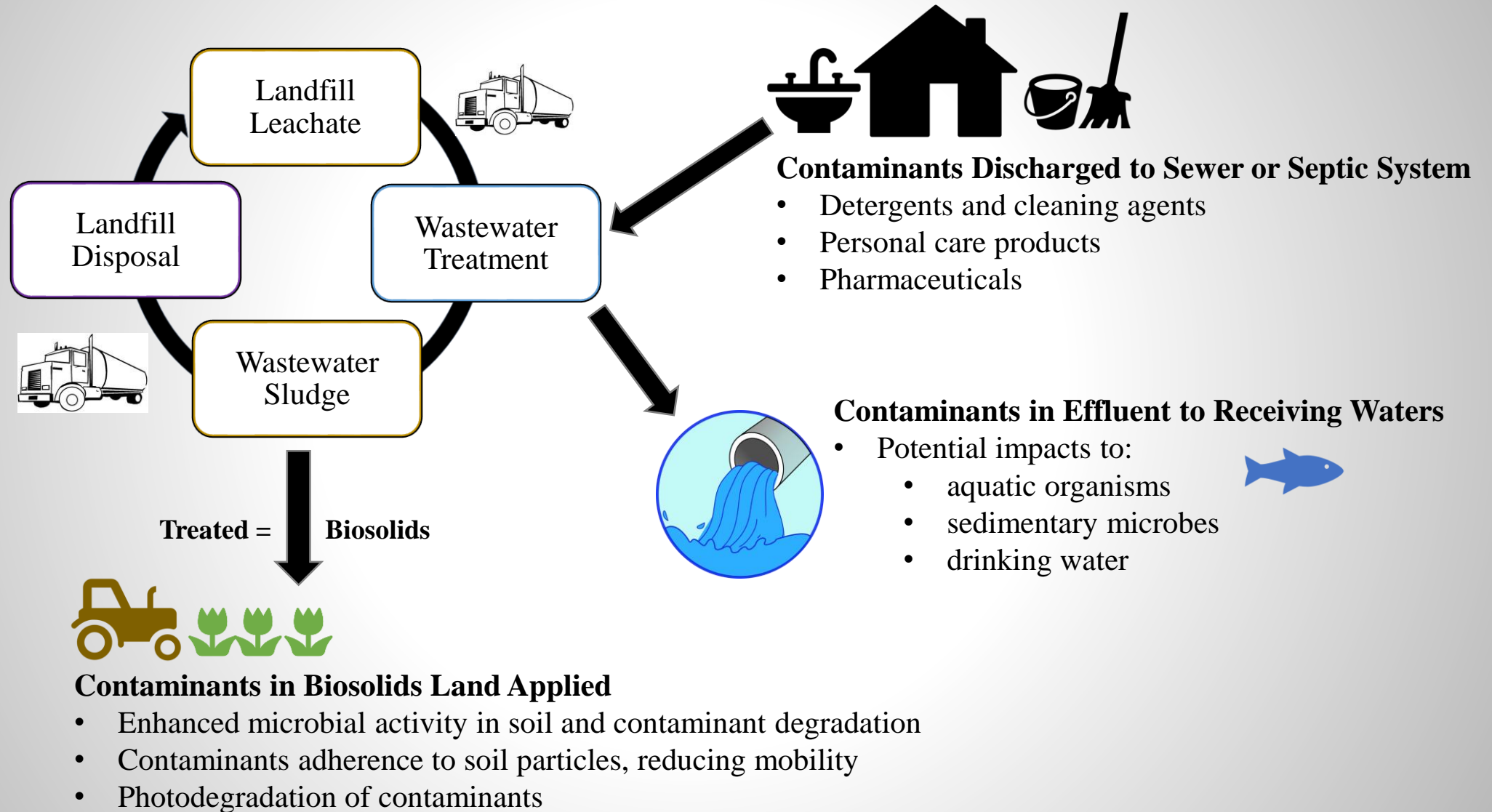
In 2016, 41M gallons of septage managed in VT

In addition to incoming wastewater from sewer, *high strength wastes* compete for capacity at WWTFs:

Montpelier (gallons)	Waste Type & Relative* Strength	Essex Jct. (gallons)
6.6M	Septage <i>1-20x</i>	14,000
7.3M	Landfill Leachate <i>5-100x</i>	190,000
1.7M	Wastewater Sludge <i>5x</i>	17,500
212,000	Portable Toilets <i>30x</i>	199,000
121,000	Dairy <i>400x</i> Brewery <i>3-700x</i>	192,000

* Organic strength (does not include phosphorus)

Fate & Transport of Contaminants via Wastewater Management



Take Home

- 1. VT ANR recognizes land application of sludge (i.e., biosolids) and septage as a appropriate practice for the management of these materials**
 - Vermont Statute: facilitate *beneficial use* of septage and sludge
 - Biosolids are a fertilizer used to sustainably improve and maintain *productive soils*
 - Greenhouse gas (carbon) modelling favors land application (storage) over landfilling (release)
 - Soil-based systems allow for microbial degradation of contaminants in biosolids/septage (ie leachfield)
 - Land application if heavily regulated
- 2. Need to maintain multiple options for material management – *land application and landfilling***
- 3. Land application of septage relieves pressure on WWTF capacity to treat, must consider in context of:**
 - Million of gallons of other high strength wastes competing for disposal at WWTF
 - NPDES permit compliance (phosphorus, Lake Champlain TMDL)
 - Additional energy usage for treatment = increasing costs = increasing wastewater utility rates

