



# Vermont Phosphorous Removal Project

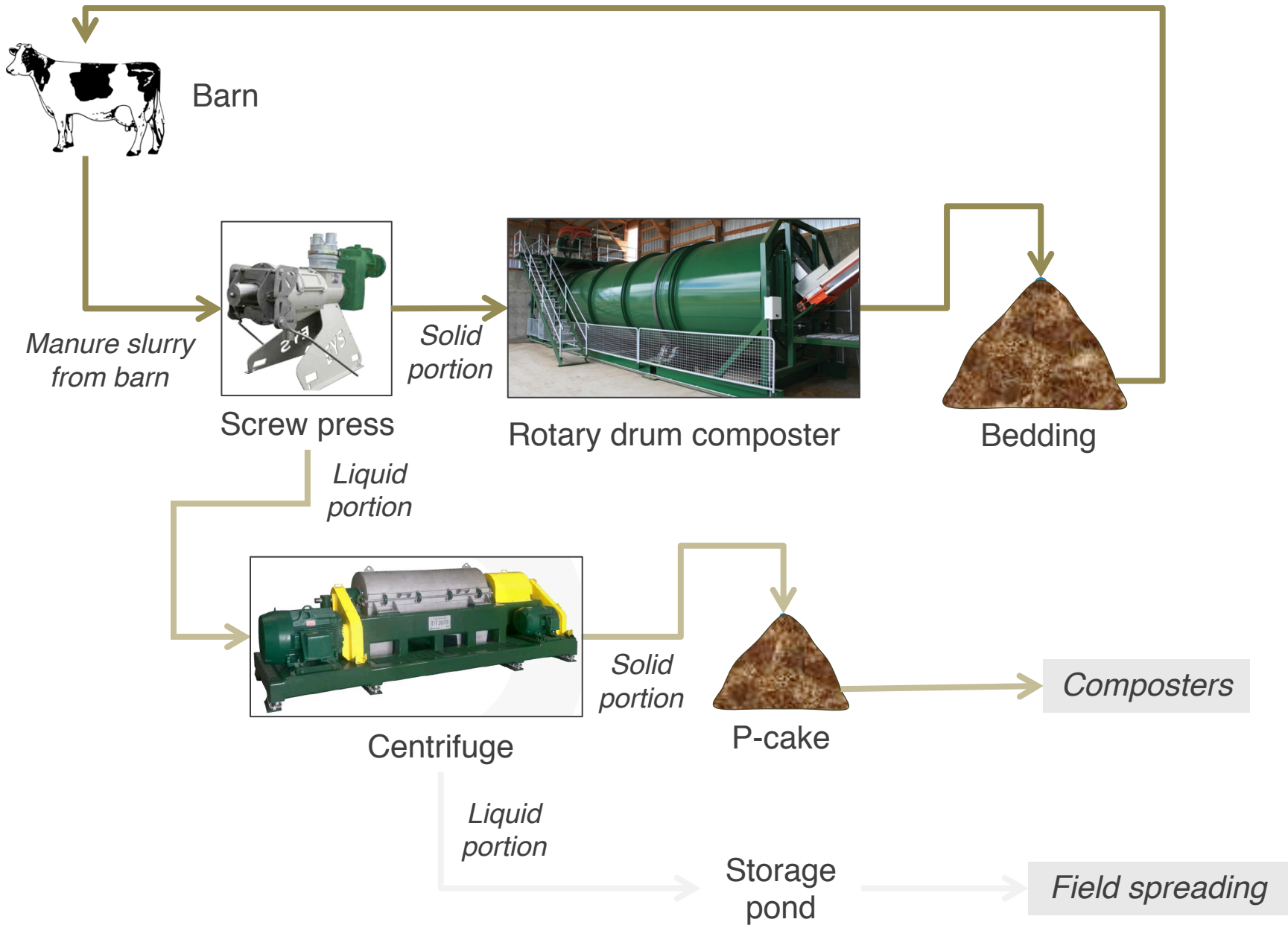
Presentation to the House Natural Resources Committee

March 1<sup>st</sup>, 2017

# Farm Separation Project: Machia & Sons Dairy

- Owned and operated by the Machia's for more than 20 years
- Located in Sheldon, VT in the the Missisquoi watershed
- 730 milking cows (80 non-milking)
- 2 Stage Project
  - Solid Separation and Compost: 2013
  - Phosphorus Separation: 2016

















# Two Stage Separation Provides Multiple Benefits

## Stage 1

### Separation and Composting

#### Product

Composted Solids

#### Benefits

- Farms save money on sawdust bedding
- Farms can sell excess bedding or compost
- Greenhouse Gas Reductions (methane) can be marketed or used by corporate partners

## Stage 2

### Centrifuge

#### Product

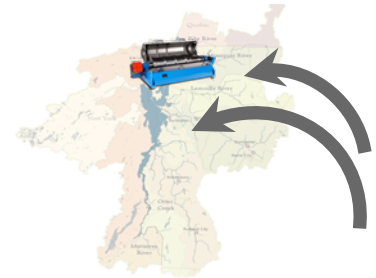
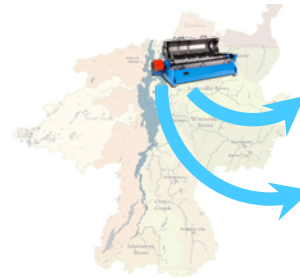
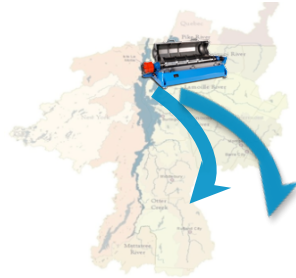
P-Cake

#### Benefits

- Farms reduce Phosphorus loading in lagoon and spreading (allows strategic application of P)
- P-Cake provides nutrient rich compost option
- Phosphorus reduction/removals

Currently no markets for these benefits

# Objective: Create a Phosphorous Removal Project



## Validate

- Developed protocol for quantifying removals of P from the watershed

## Remove

- Export P from watershed in the form of P cake and/or compost, without nutrient replacement

## Verify

- Monitoring of performance
- P testing, export records, nutrient purchase records

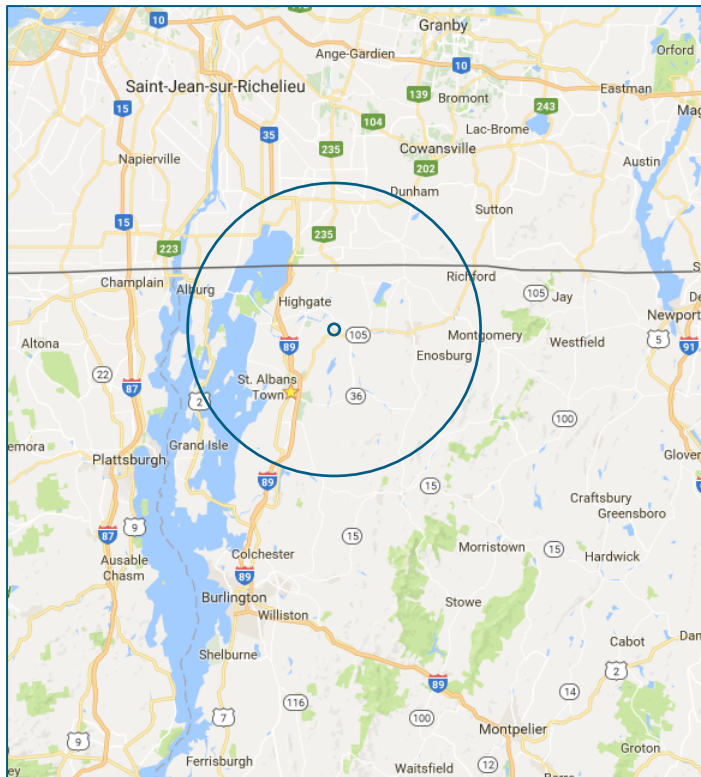
## Transact

- Facilitate voluntary market funding (public and private)

- Provides confidence that the benefits are real
- Enables simple transactions between voluntary project developers & funding sources

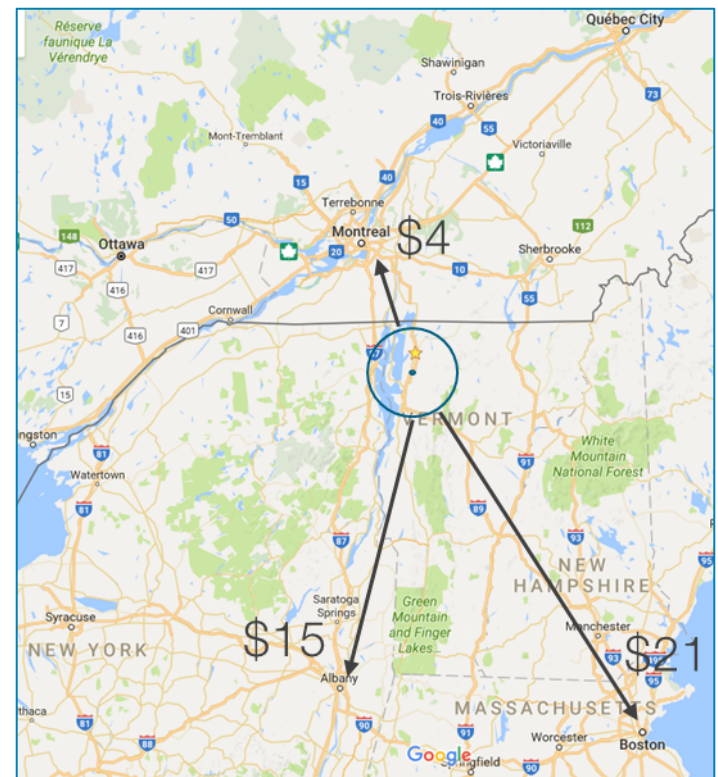
# Payments for P Removal Opens Up Markets for P-Cake Sales Outside of the Watershed

## Without P Removal Payment



- 20 miles from farm
- Demand constrained

## With P Removal Payment



- Every \$1/lb payment increases radius by 20 miles
- Alternative Costs: \$126/lb to reduce agricultural P loading (2015 Kaiser/Tetra Tech Report)

# Payments for P Removals Creates Additional Options for Value-Added Products and Services in Vermont

- Pelletized fertilizer for organic farms
- Upgrading P-Cake to Premium Compost Product

# Reductions will increase with a portfolio of mandated and voluntary practices and investments

## Mandated (Act 64)

- Required Ag Practices (RAPs)
- Best Management Practices (BMPs): Farm-specific

Mandated RAPs and BMPs may not achieve all necessary reductions.

## Voluntary

- Non-mandated BMPs
- Innovative Projects/Practices

Voluntary actions provide a means to achieve reductions at a lower cost.

# Benefits of Funding the P Removals Now

- While quantification of P-loading reductions continues to evolve
  - We can quantify removals now from this project
  - Quantifying and transacting on projects will accelerate the science
- Shows that projects can generate additional returns which will increase investment on farms
- Market price will evolve
  - Stimulates innovation and new practices at the most efficient costs
  - Allows funders to prioritize payments based on cost of actual reductions
- Gets over 8 tons/year of VT Phosphorous out of the watershed with high confidence that it will never end up in the lake