An Organic Waste Inventory for Alberta's Agrifood Sector

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Organic Waste Inventory Project

Contributing Partners:

Alberta Government

Alberta Innovates Energy and Environment Solutions

ALMA Alberta Livestock and Meat Agency Ltd.

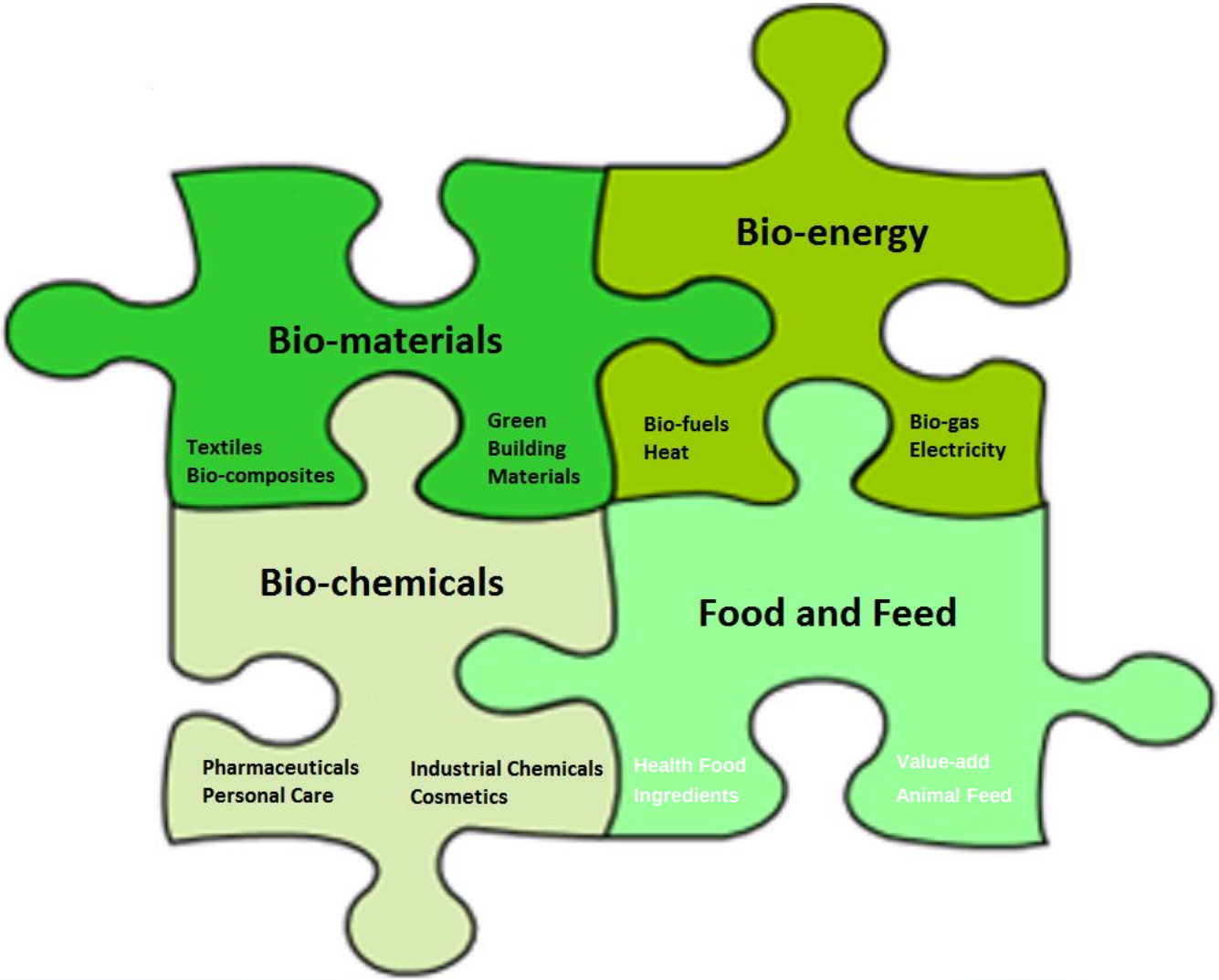
Team Members:

- Jeff Bell (project lead)
- Ruth DeSantis
- Tanishka Gupta
- Mohammad Ullah
- Siddarth Jain

Advisory Committee:

- Above partners
- RCA
- AFPA
- AI Bio
- EWMC
- City of Calgary
- Ind. Retail Grocers Association
- Waste Management of Canada

Bio-Industrial Opportunities Section



Website: http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/bt14861

Bio-Industrial Opportunities Section

Source: Bridge 2020- http://bridge2020.eu/our-work/

Why do study?

- Agriculture → an important Alberta industry
- Limited understanding of the sectors' wastes and byproducts
- Frequently contacted by organizations looking for availability of organic waste
  - Quantity, seasonality, location, quality/composition
- Aimed to fill data void

Food Wastes in Canada

- On farm
- Transport/Distribution
- Food Processing*
- Retail (grocercy stores, distributors)*
- Food Service (restaurants, hotels)
- Households

Source: Value Chain Management, 2014

Industry Size

Livestock:	+1,800 operations
Food Processing:	+500 operations
Grocery industry:	+35 possible brands
Yard waste:	+1.3 million households (in addition to commercial and institutional)

Project Scope

- Focus areas:
  - Livestock industry (NRCB data)
  - Food processing industry (new data)
  - Grocery industry (new data)
  - Residential yard waste (existing data)
- Data collection:
  - Total mass/volume
  - Location
  - Description (type, moisture, state, etc)
  - Seasonal Variability

Methodology

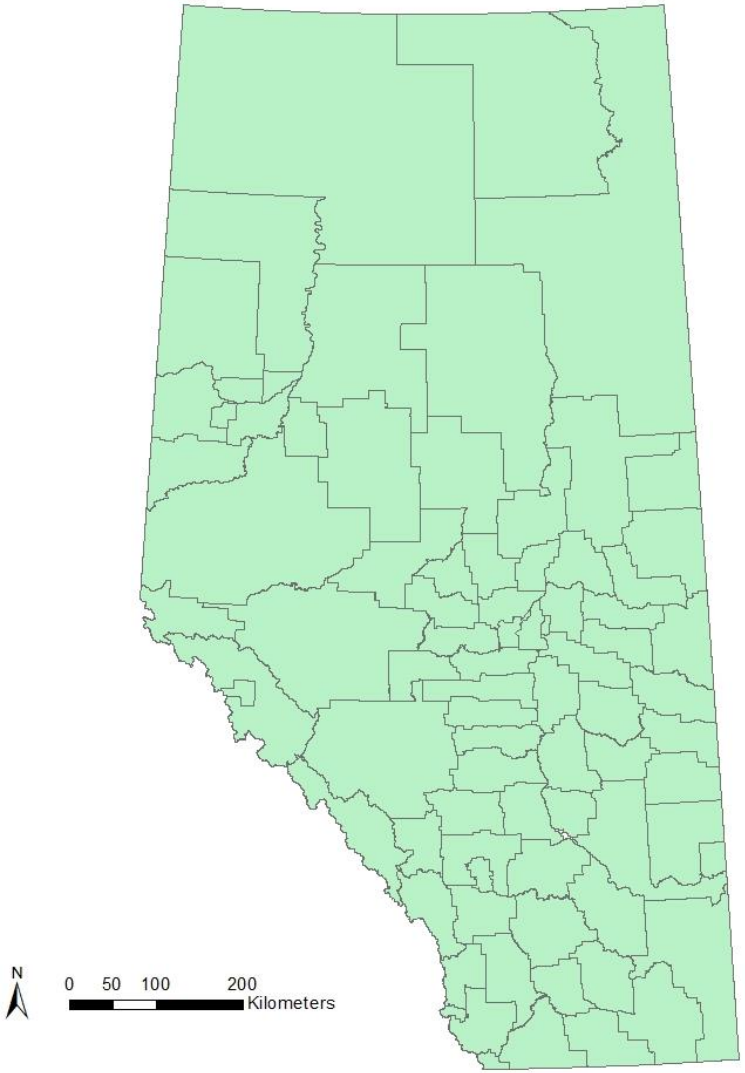
- Literature review
- Data Gathering and Processing
  - Compilation
  - Verification
  - Aggregation
  - Anonymization
  - Extrapolation
  - Addition of geographic metadata/Mapping

Assumptions

- Data correct?
  - Are we asking the right question(s)?
  - How were primary data collected?
- Extrapolations
  - Not all stakeholders were contacted
  - Not all contacted stakeholders responded
- Moisture content
- Production capacity

Anonymization

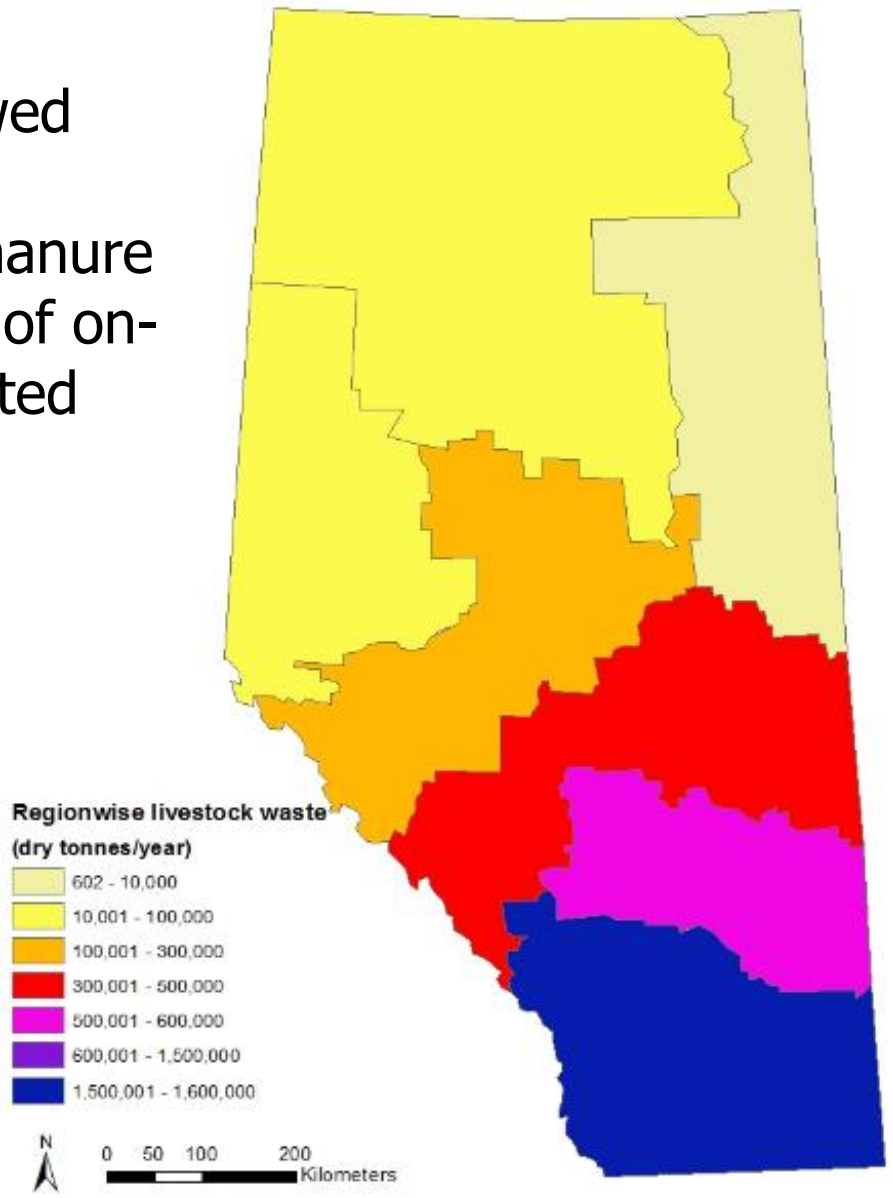
Countywise



Landuse Regionwise

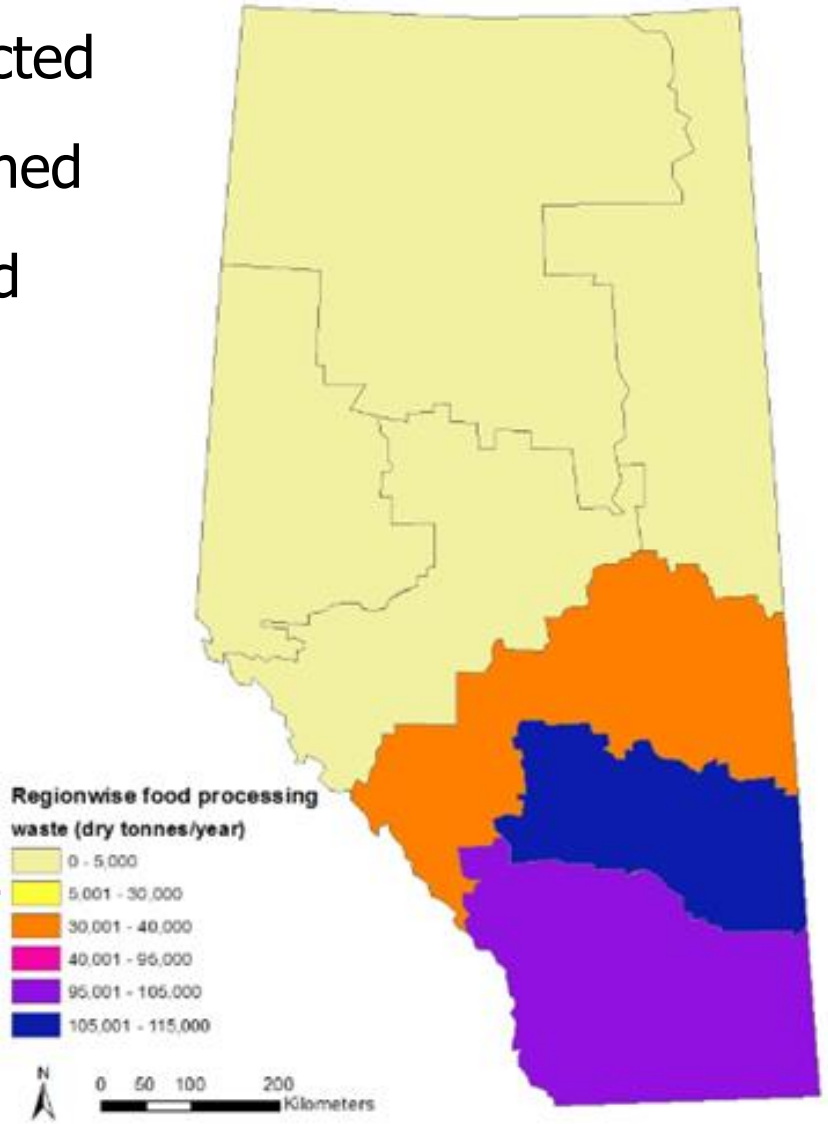
1. Livestock

- 1649 livestock operations reviewed
- Over 2.5 million dry tonnes of manure per year and 70,000 dry tonnes of on-farm dead per year were estimated
- No good information on current management or disposal of manure or on-farm dead
- >95% of manure is land applied
- Little seasonal variation



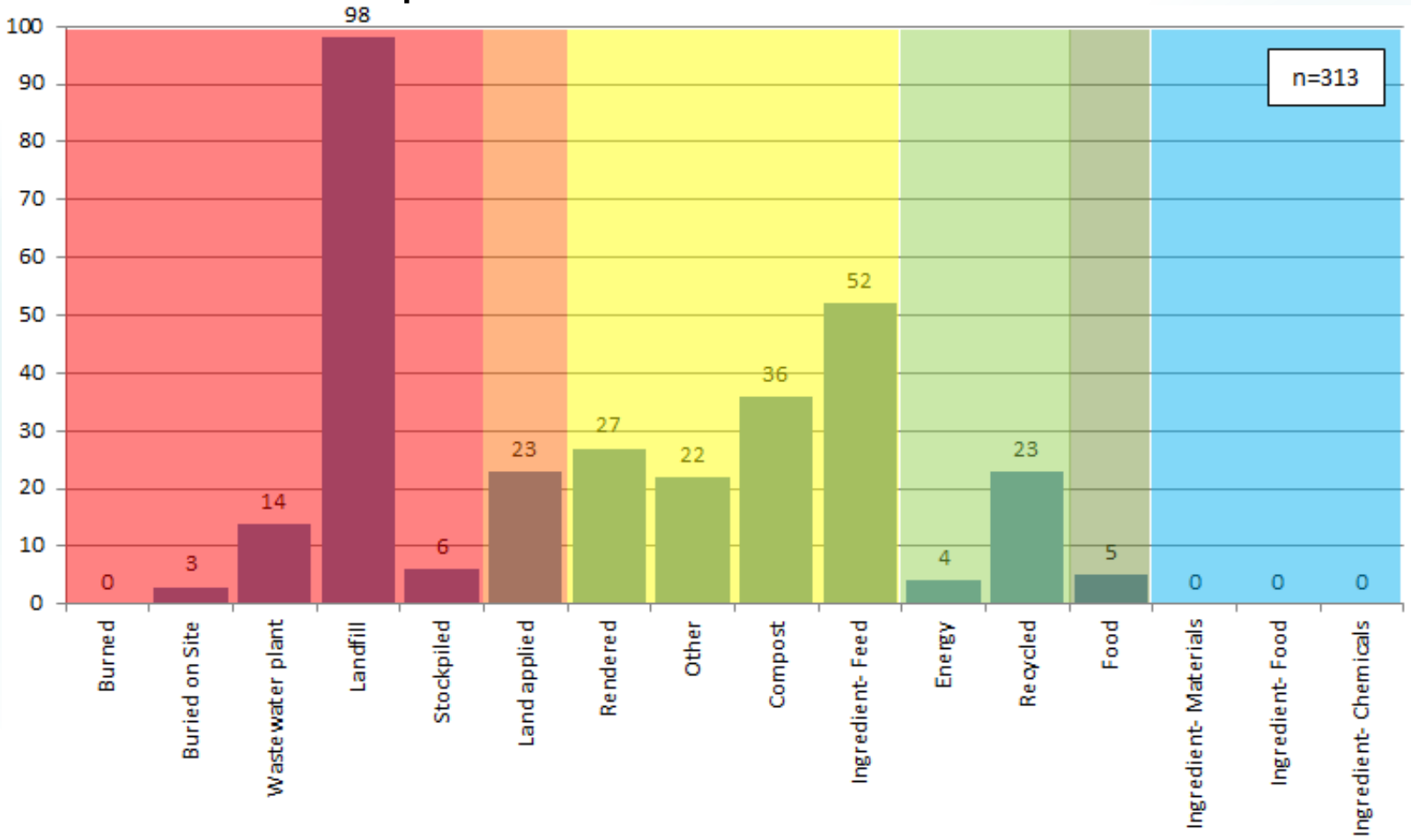
2. Food Processing

- 200/500+ Food Processors contacted
- Data from ~180 companies obtained
- 250k dry tonnes per year reported
- ~500k dry tonnes per year extrapolated
- Data quality varied widely
- Best waste stream resolution
- Large waste streams were more homogeneous than smaller waste streams
- Little seasonality observed



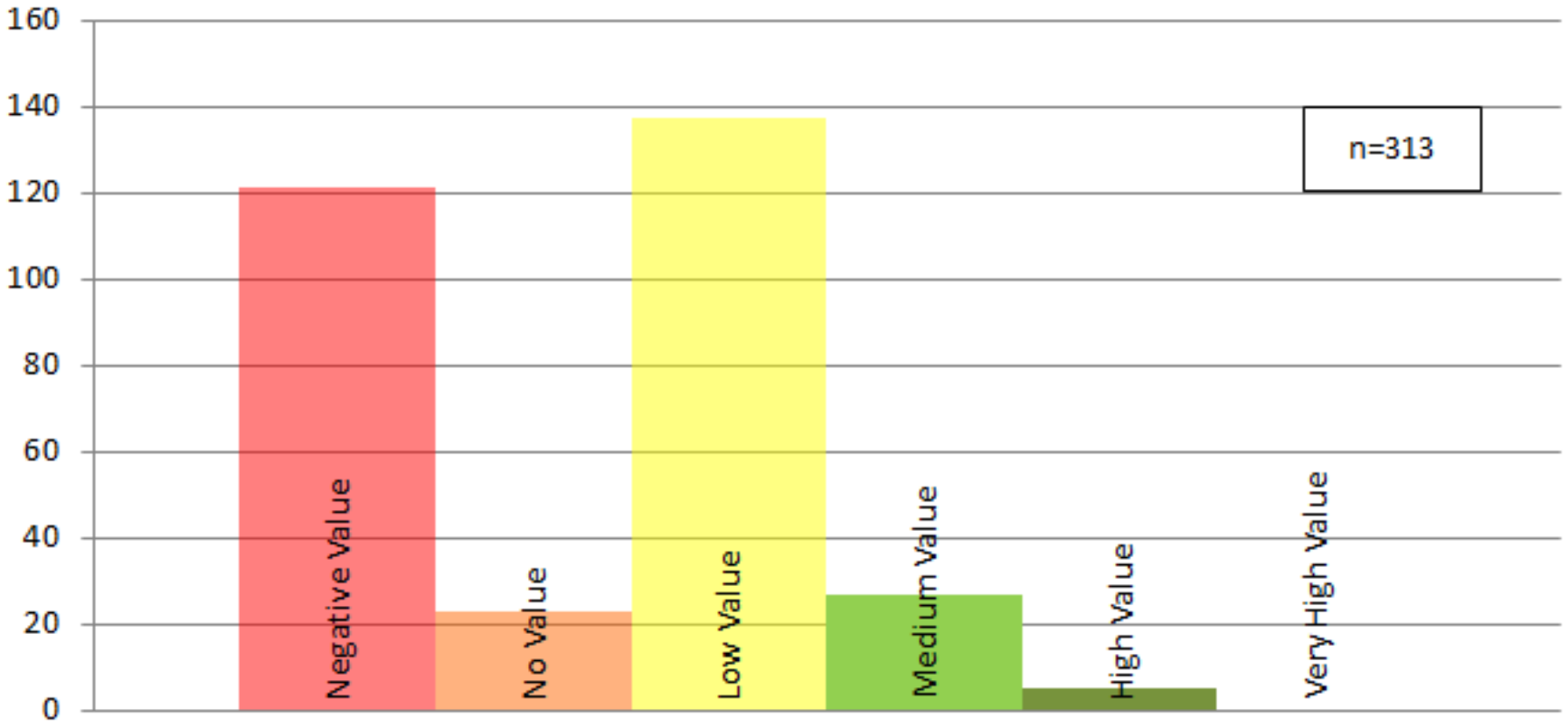
2. Food Processing

- Best resolution on waste management practices out of 4 subsectors
- Waste volumes and disposal practices do not correlate
- Most common practice = landfill



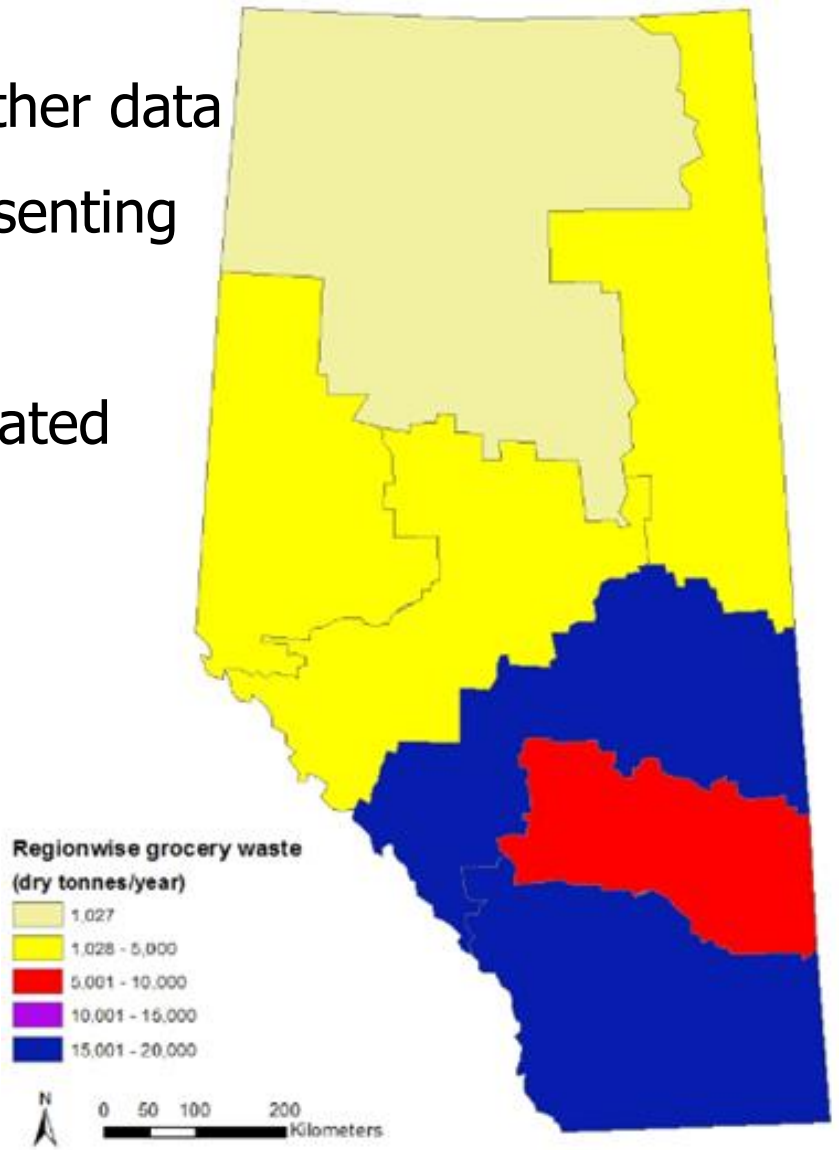
2. Food Processing

- Most disposal methods → negative to low value

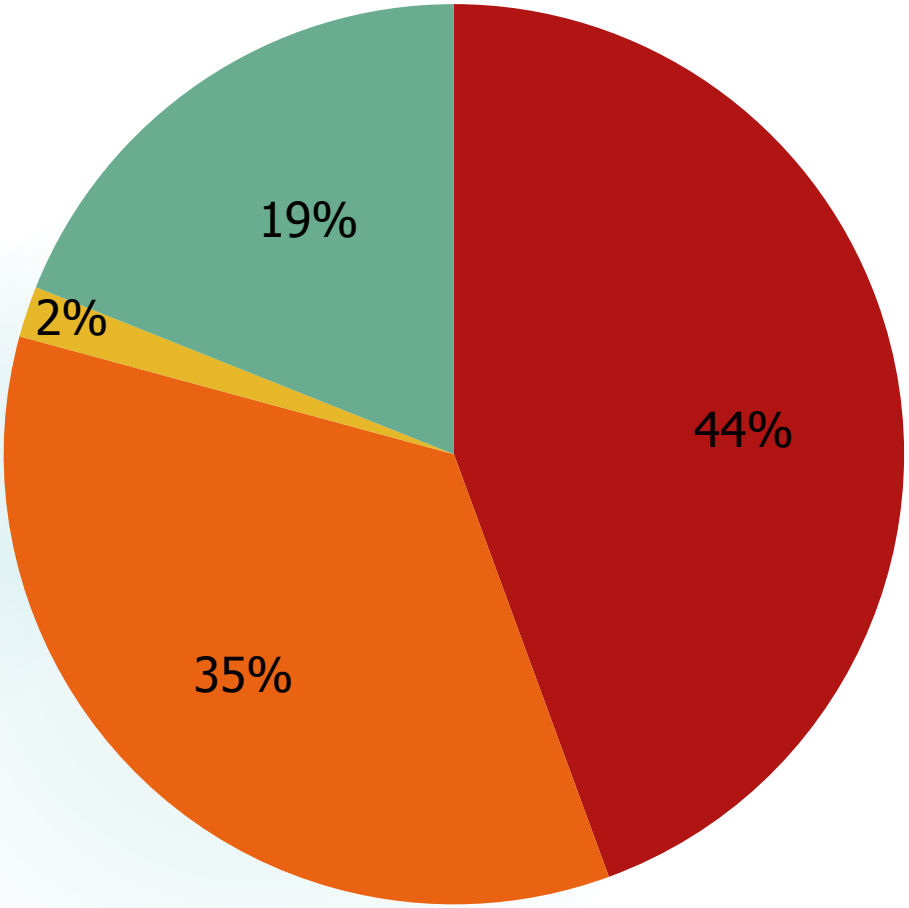


3. Grocery

- Most challenging subsector to gather data
- 30 grocery brands included representing more than 500 stores
- 50,000 dry tonnes per year estimated
- Very few companies willing to share complete data
- Data quality varied widely



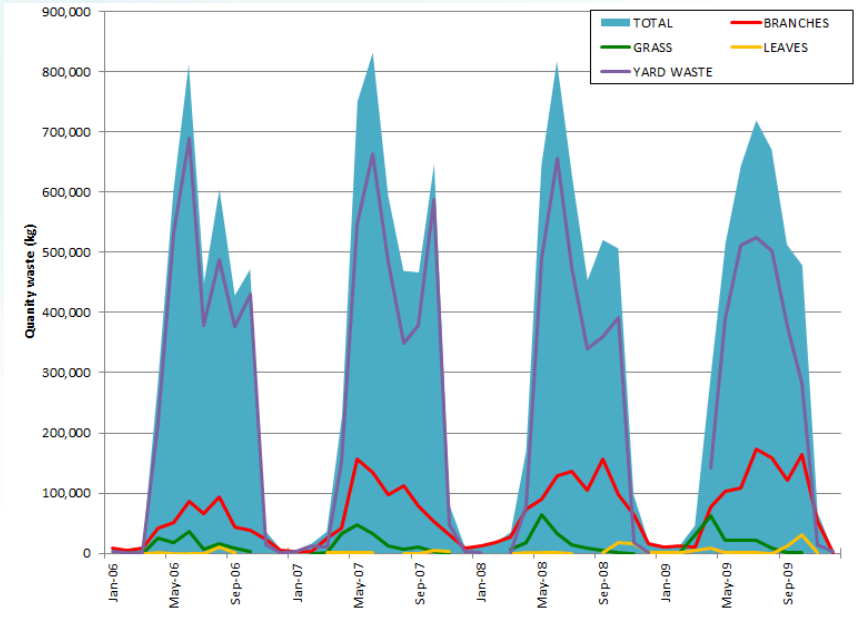
3. Grocery

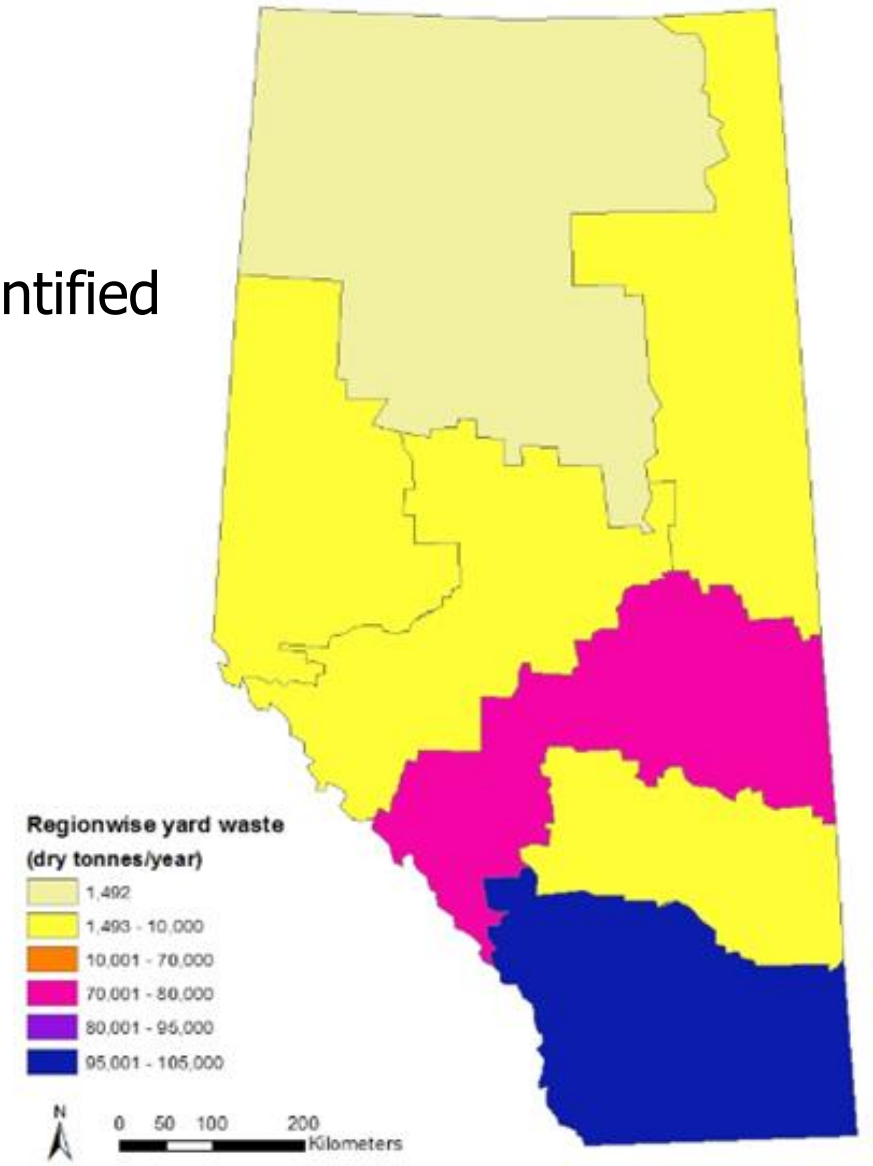


- Food Waste (including packaging)
- Source Separated Cardboard
- Source Separated Plastic
- Other (metal, glass, etc)

4. Yard

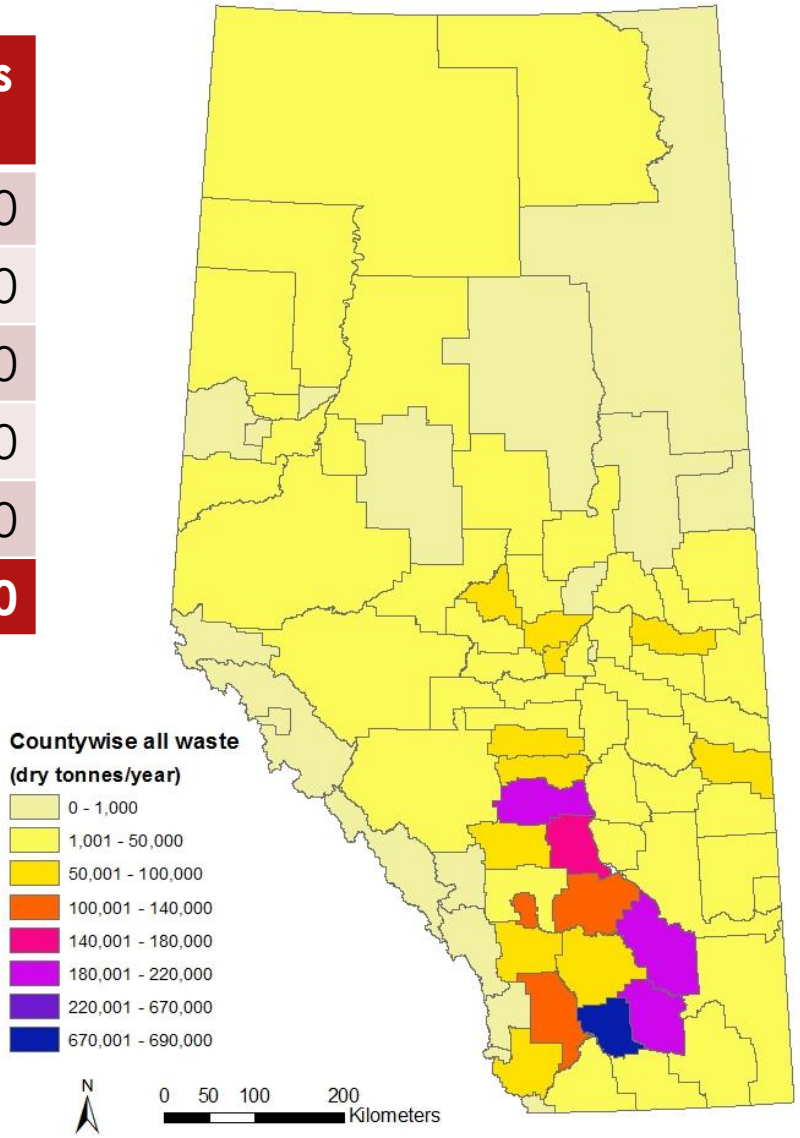
- Used existing data set from E&P
- Added county data
- 200,000 tonnes of dry waste identified
- Highly seasonal



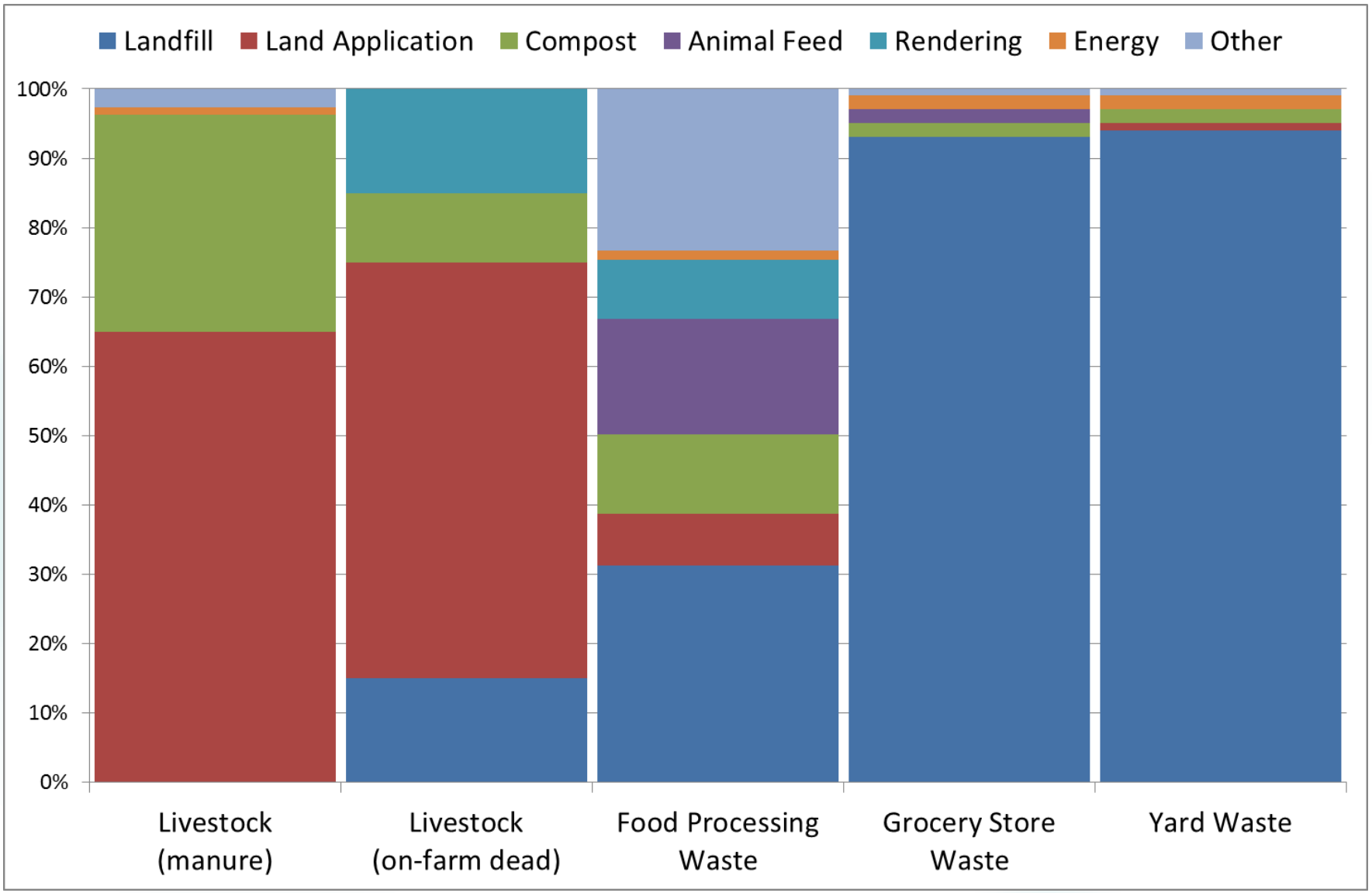


Summary of Results

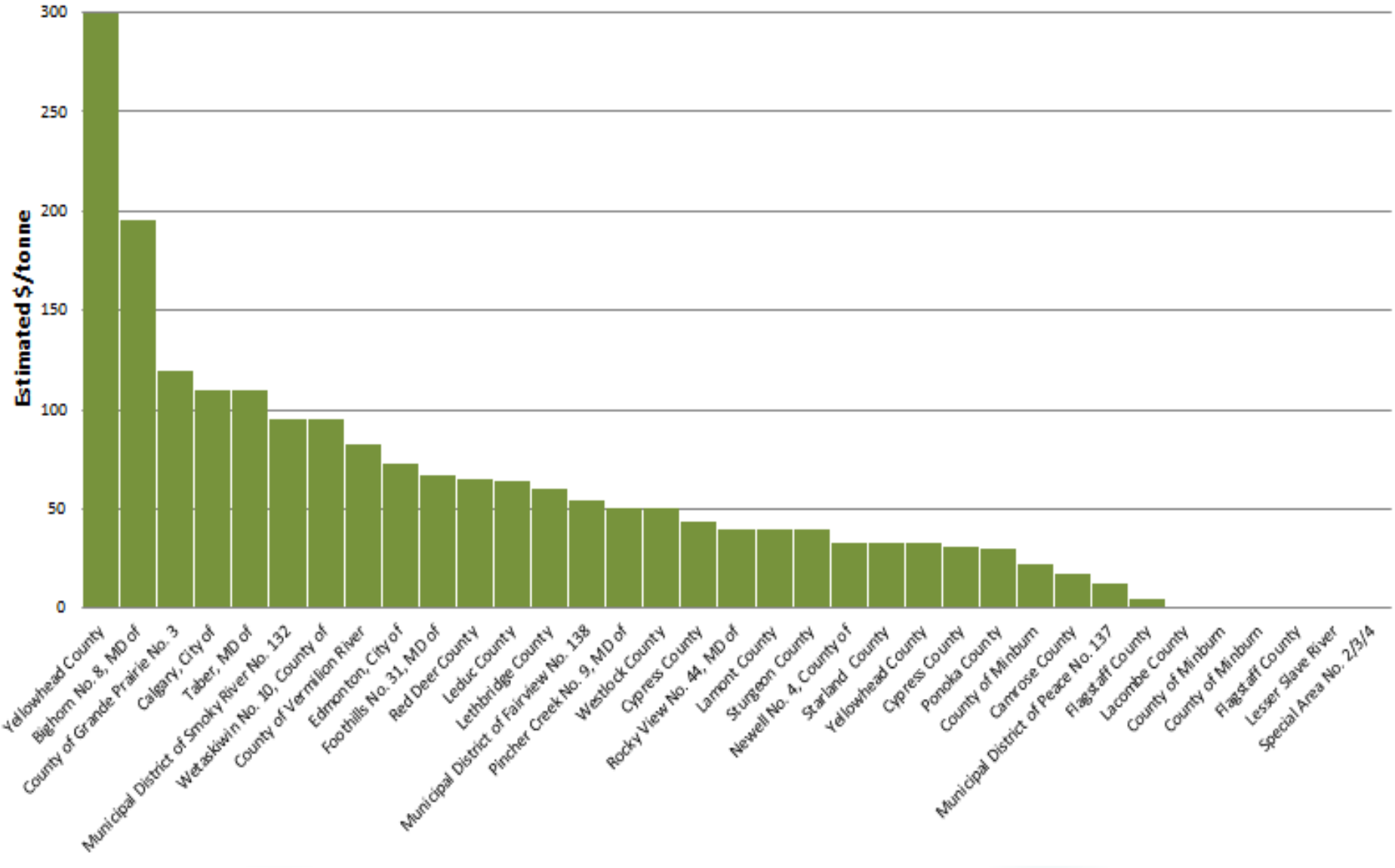
Subsector	Dry tonnes per year
Livestock - manure	2,560,000
Livestock – on-farm dead	70,000
Food processing waste	500,000
Grocery store waste	50,000
Yard waste	200,000
Total	**3,380,000**



Waste Disposal Practices



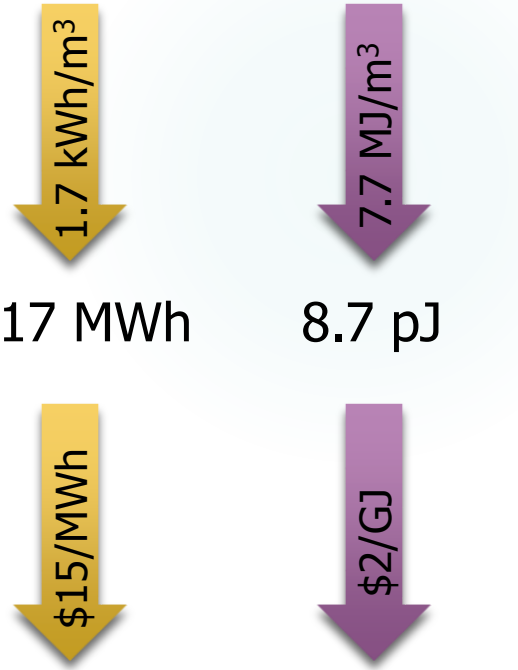
Disposal Fees for Mixed Wastes



Biogas Potential?

Organic type	m^3/t	'000 t/yr
Beef cattle manure	19-46	1822
Hog manure	28-46	216
Dairy manure	25-32	366
Poultry manure	69-96	130
Other manure	19-46 (est)	24
Animal carcasses	348-413	70
Food processing and grocery wastes	143-214	550
Yard waste	72-216	200
Wheat residuals	48-146	805
Barley residuals	169-291	3467

801 - 1435 M m^3 biogas/yr

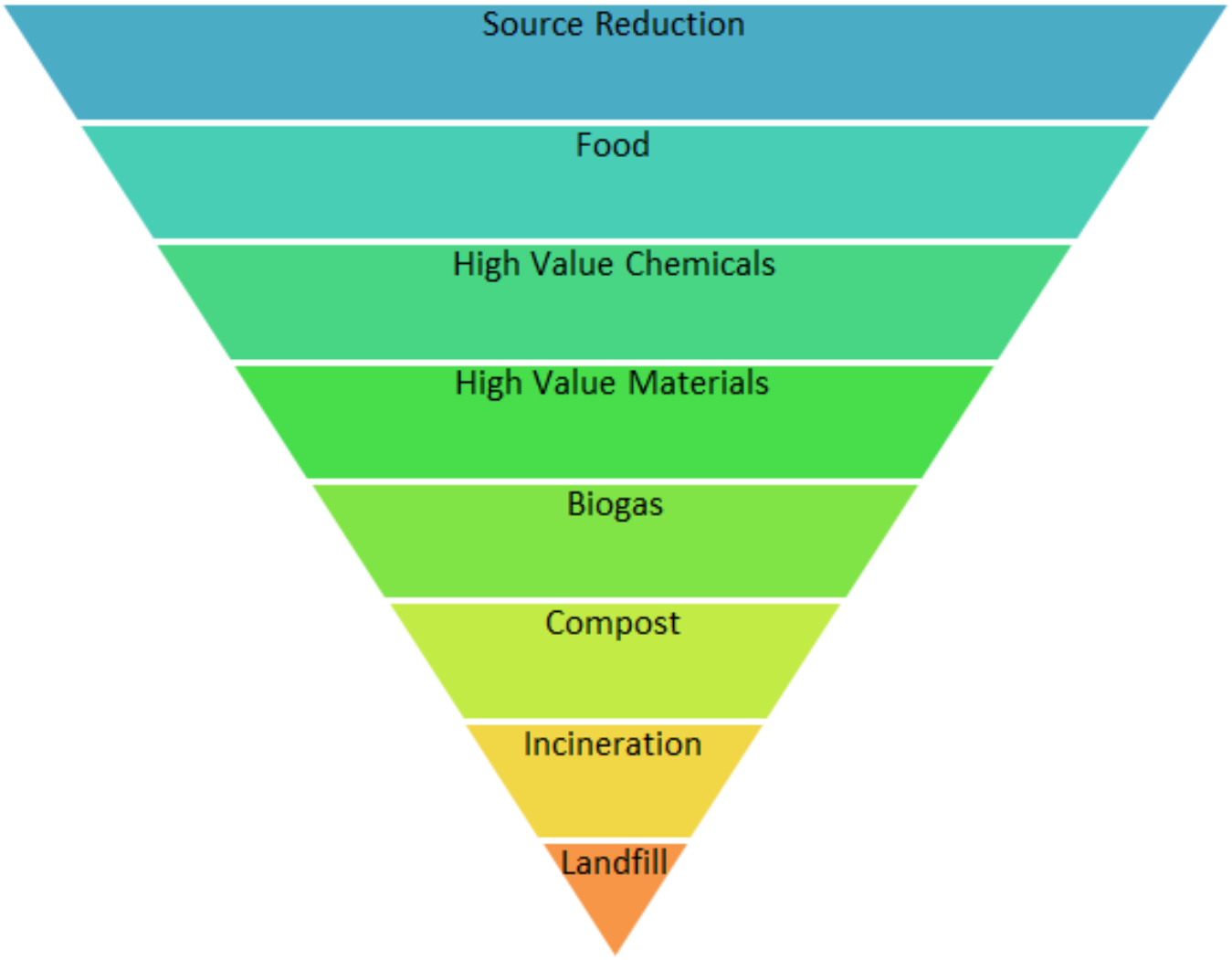


*Excludes other organic feedstocks such as biosolids, animal fats, household and MSW, other agricultural residues, etc

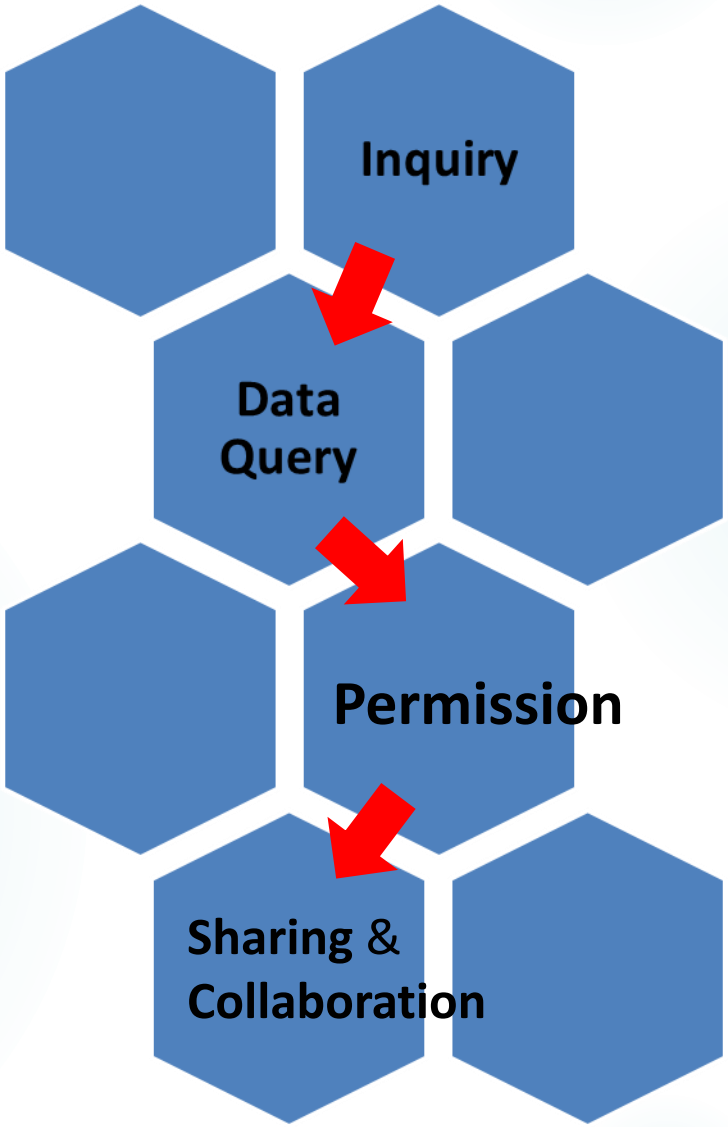
Outcomes

- Stakeholder engagement
  (directly engage ~300 stakeholders)
- Waste Reduction opportunities identified
- Value-add opportunities identified
- Knowledge Foundation on which to:
  - Inform policy
  - Catalyze industry investment

Outcomes


Source Reduction
Food
High Value Chemicals
High Value Materials
Biogas
Compost
Incineration
Landfill

Outcomes



Challenges and Next Steps?

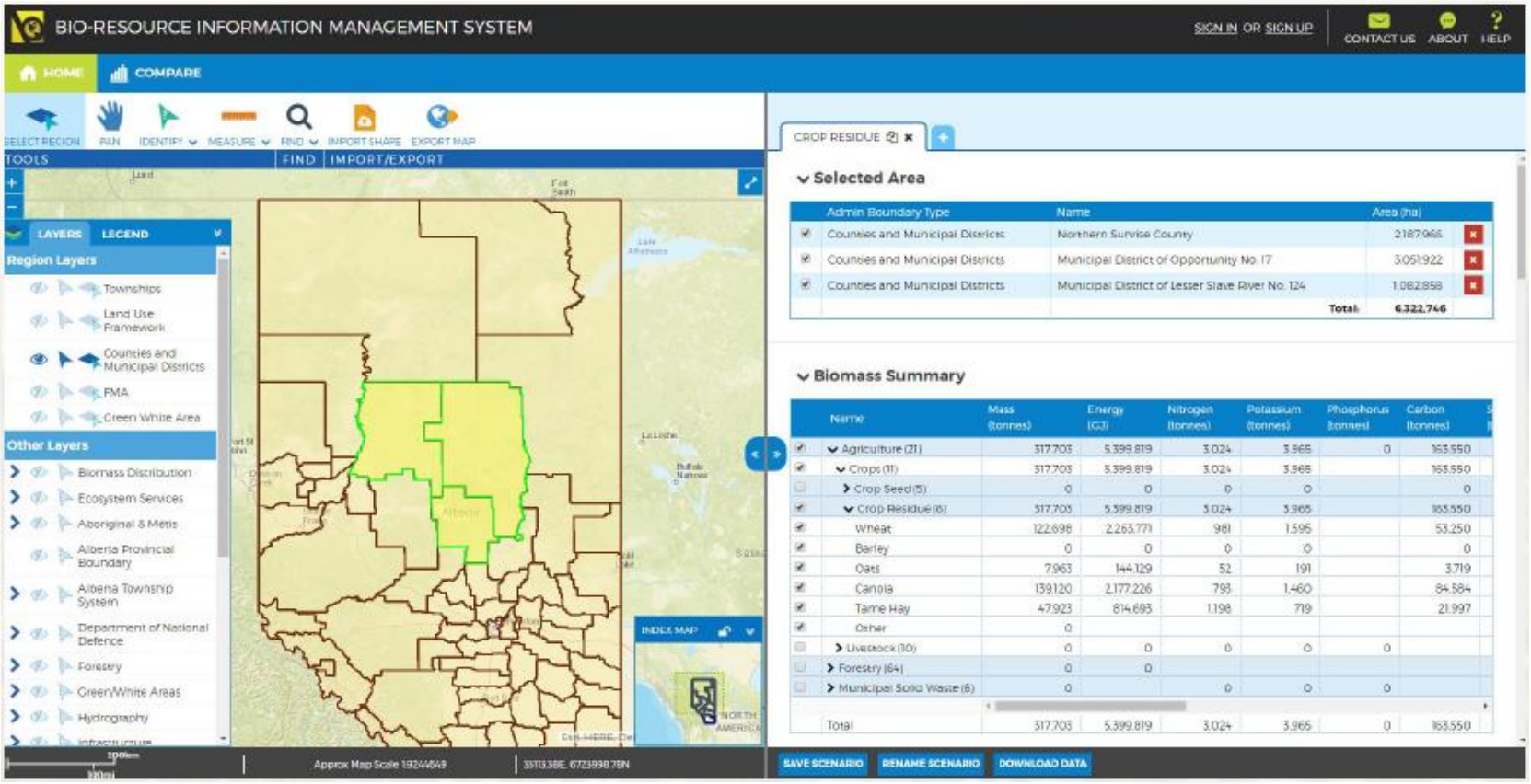
- Refine data and harmonize data?
- Data is a snap shot in time - routine data collection and sharing
- Set up program to support companies who wish to divert wastes to higher value uses
- Coordinate approaches to keep organic wastes out of landfills
- Incorporate data into BRIMS database?
- Waste water

BRIMS

Bio-Resource Information Management System

Biomass Data Framework:

- Crops
- Livestock
- Tree Components
- Landbase Allocation
- Mill Waste
- Mixed Solid Waste
- Residential Sludge



Challenges for industry

- Transportation costs
- Commodity pricing (especially in AB)
- High capital investment needed

- Homogeneity + moisture content
  - pre-processing?
- Time decay factor
- Secure constant supply stream
- Farmers worry about traceability of product

Acknowledgements

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ALMA
Alberta Livestock and Meat Agency Ltd.

Alberta Innovates
Energy and Environment Solutions

Also thanks to:

- Advisory Committee Members
- Project team:
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~~Waste~~ Value

END

Detailed report can be found here