

# **Advancing the Bioeconomy: A Sustainable, Scalable, Replicable Model for Rural Economic Development**

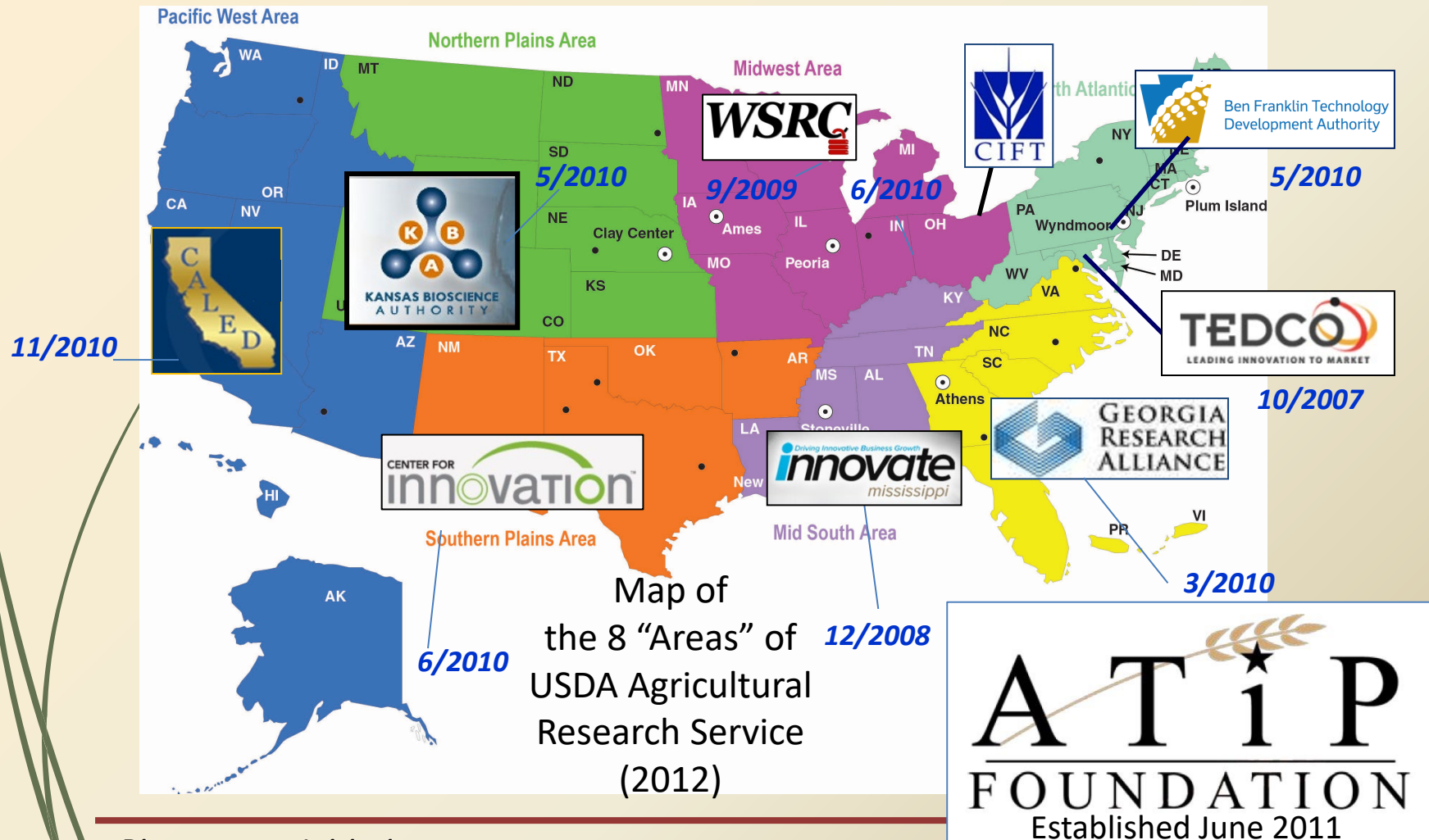
**Todd Campbell**

Advisor to the ATIP Foundation  
Principal at Clean Economy Works LLC

CAAFI Biennial General Meeting  
June 3, 2022

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# The Agricultural Technology Innovation Partnership (ATIP) Network



## **-- mission ---**

To provide both a unifying entity for member organizations, as well as flexibility to engage other organizations that have a vested interest in seeing USDA research outcomes adopted by the private sector to create goods and services for public benefit, wealth creation, and rural economic development.

**ATIP Foundation 2016 Regional Bioeconomy Forums:**  
***“Addressing the Challenges & Opportunities of  
Advancing the Billion Ton Bioeconomy”***

**Venues and Regional Co-hosts**

**Southeast: September 16, Atlanta, GA** (Georgia Institute of Technology)

**Southwest: September 29, Mineral Wells, TX** (Chamber of Commerce)

**Northwest: October 3, Seattle-Tacoma, Washington** (Washington State University)

**Northeast: October 18, Orono, ME** (University of Maine)

**Midwest: November 15, Columbus, OH** (The Ohio State University)

**National Sponsors**



**ATIP Foundation Biojet Fuel 2017 Regional Forum Series:**  
***“Accelerated Commercial Development of Hydrotreated Renewable Jet Fuel (HRJ) from Redesigned Oilseed Feedstocks Supply Chains”***

**Venues and Regional Co-hosts**

**June 5-6, Richland, WA**

(Washington State University)



**June 13, Fargo, ND**

(ND Department of Commerce / ND State University)



**July 11, Wichita, KS**

(Wichita State University / Kansas State University)



**Research Grant Participants & Partners**

AeCAP  
Agrisoma Biosciences  
 ATIP Foundation  
 Cornell University  
 Kansas State Univ.  
Keygene

Michigan Technological Univ.  
 North Central Regional Sun Grant Center  
 South Dakota School of Mines and Technology

University of Idaho  
 University of Maryland  
 University of Tennessee  
 UOP/Honeywell

USDA Agriculture Research Service  
 USDA National Institute of Food and Agriculture  
 USDA Natural Resource Conservation Service

## Four Critical Forum Issues

- **Development of diversified supply chains that are financially sustainable**
- **The support of the financial investment community**
- **Consistent public policy**
- **An extensive public education and awareness campaign**

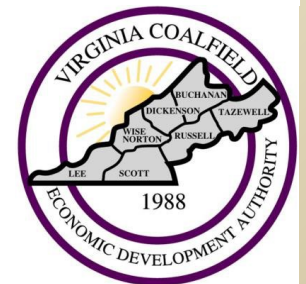
## DEVELOPING SCALABLE, REPLICABLE MODELS

***The fundamental premise*** : demonstrate how the informed integration of six stakeholder sectors can serve as a catalyst for a strategic approach that will translate federal and academic research outcomes into rural wealth creation, thereby fostering the bioeconomy.

***The approach***: ATIP Foundation is working with USDA and other federal agencies to establish and work with our regional project steering committees to develop paths forward to establish a bioeconomy industry in the region.

- Launched in 2017
- Currently working in Texas, California & Ohio
- Launching in Virginia, Wisconsin later this year

# Virginia SAF Implementation Team In Place



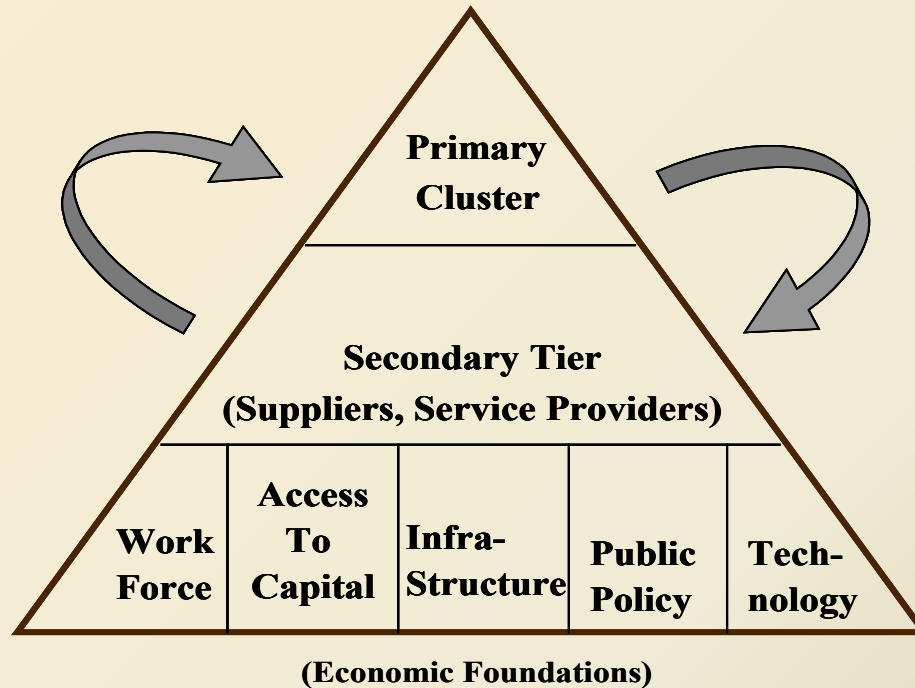


# ECONOMIC DEVELOPMENT 101

**Three things happen in economic regions**

- **Production Generates Wealth**
- **Suppliers & Service Providers Re-circulate Wealth generated**
- **Wealth migrates to other regions**

# ATIP Established Replicable Model Based on Industry Cluster Model



***Strengthening the 5 primary economic foundations in alignment with and support of our primary industry clusters is equally critical to our economic sustainability.***

# BIOECONOMY INDUSTRY CLUSTER

**Clusters require 5 economic foundations**

- **Access to technology**
- **Access to infrastructure**
- **Supportive public policy**
- **Access to capital**
- **Access to a trained skilled workforce**

# SECTOR ENGAGEMENT

**Economic Development provides the integration & alignment of the stakeholders in the 6 sectors**

- **Academia, provides access to technology**
- **Government provides infrastructure, public policy**
- **Financial Services provides capital**
- **Education & Workforce development providers the workforce**
- **Business & Industry provide supplies & service providers**
- **Supply Chain from biomass source to end users provides the logistical support**

# ESTABLISHING THE MODEL

Three primary components:

## ➤ Biomass and Support Service Inventories via GIS Database

- CA: <https://arcgis.com/apps/webappviewer/index.html?id=ca5799270e4b4fe68ef7c57fcd1d861c>
- OH: <https://arcgis.com/apps/webappviewer/index.html?id=8861b925efcc47c2b6bc448d76ec75bo>
- TX: <https://arcgis.com/apps/webappviewer/index.html?id=e4e4ae3e65304d3593a03819f3915ece>

## ➤ Building the Economic Foundations

### ➤ Job Creation from:

- Start Up businesses
- Expansion of existing businesses
- Recruitment of businesses

# Thank you!

## Q & A

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**712.660.0264**

## Identifying Business Opportunities

- **Generate Regional Feedstock Resource Assessment & Inventory Reports and Heat Maps;** *identifying volume of biomass feedstocks for conversion to bioenergy and co-products through conversion units to be deployed*
  - Dairy wastes
  - Commodity crop residues
  - Downed trees (storm damage), utility right-of-way trimmings
  - Food and Food Processing wastes
  - Purpose-grown crops for remediation of phosphorus levels, waste-water treatment facility (WWTF) spray fields
  - Invasive plant spp. management
- **Database of resources** *will also include infrastructure & services (people, product, information flow; logistical capabilities); informed & engaged financial services sector; economic development organizations, academic & workforce systems; and supportive state & local governments.*

# Inventory of biomass: Wastes from Animal Production

The screenshot displays the ArcGIS Pro interface. The main map shows a distribution of CAFAO facilities across California, with a concentration in the Central Valley. A pop-up window for 'Elk Creek Dairy' is visible, showing the following details:

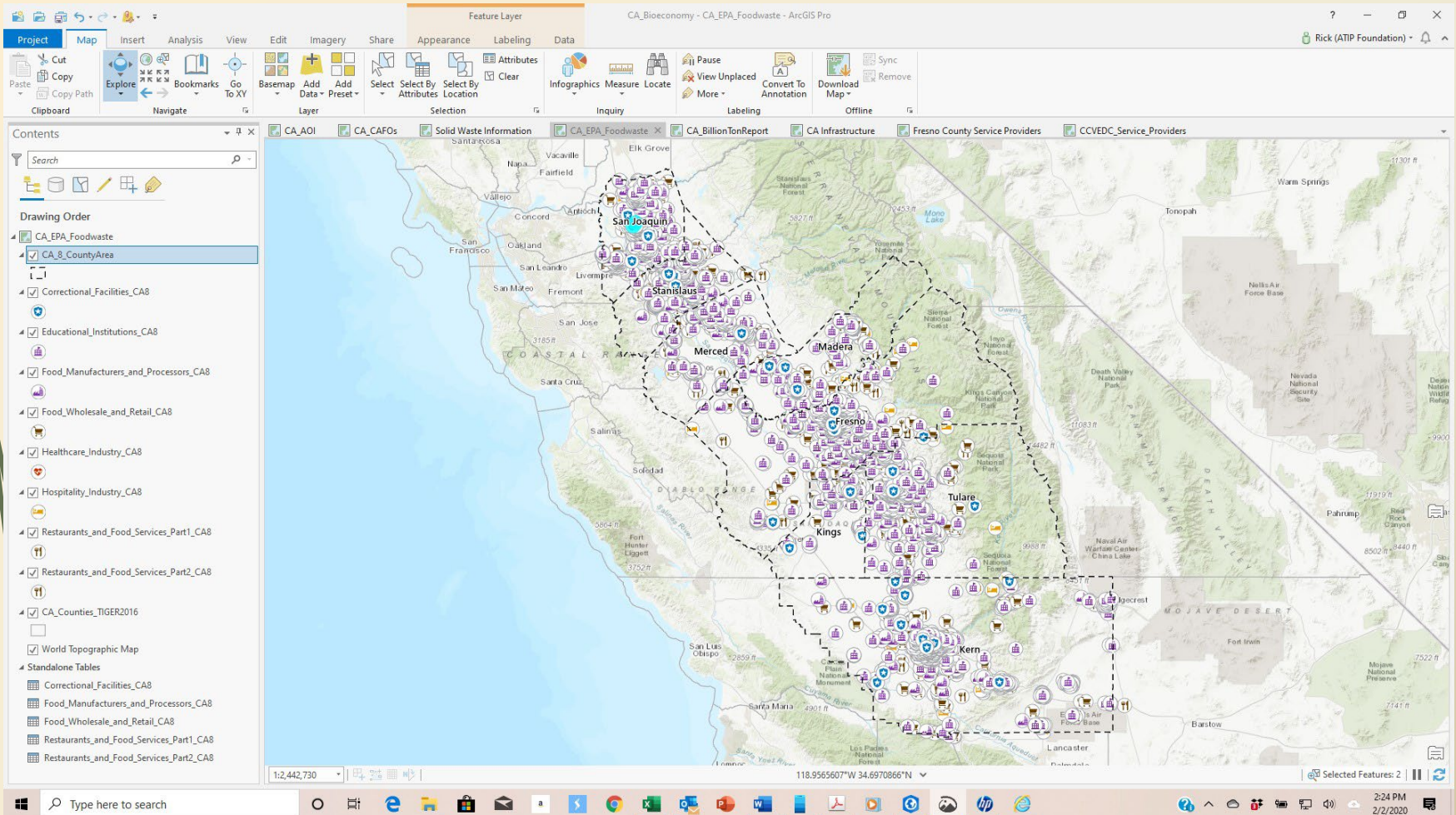
- ObjectID: 217
- Reg Measure ID: 170271
- WDID: 5C54NC00218
- Region: <Null>
- Program Type: CAF
- Order #: R5-2013-0122
- CAFO Type: Dairies
- CAFO Subtype: DC
- CAFO Population: 1323
- Place Name: Elk Creek Dairy
- Place Street: 17993 ROAD 96
- Place City: TULARE
- Place State: CA
- Place Zip: 93274
- Latitude: 36.11649
- Longitude: -119.35799

Below the map, a data table is shown with the following columns: ObjectID, Shape, Reg Measure ID, WDID, Region, Program Type, Order #, CAFO Type, CAFO Subtype, CAFO Population, Place Name, Place Street, Place City, Place State, and Place. The table contains 11 rows of data, with the row for ObjectID 217 highlighted in blue.

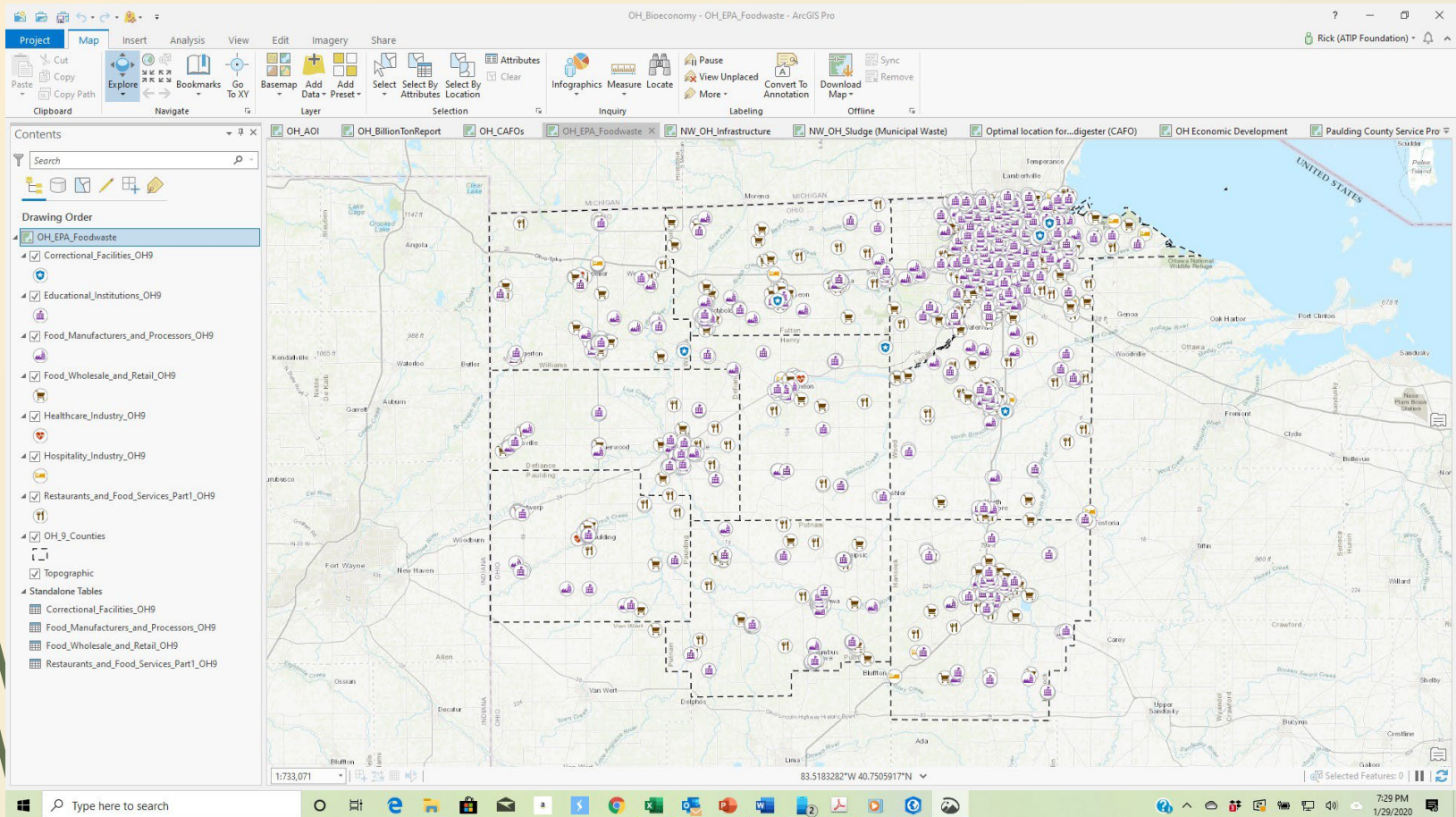
ObjectID	Shape	Reg Measure ID	WDID	Region	Program Type	Order #	CAFO Type	CAFO Subtype	CAFO Population	Place Name	Place Street	Place City	Place State	Place
214	Point	341209	5C54NC00196	<Null>	CAF	R5-2013-0122	Dairies	DC	455	Mendonca Dairy	176411	Tulare	CA	931
216	Point	335570	5C54NC00070	<Null>	CAF	R5-2013-0122	Dairies	DC	3950	Ribeiro Dairy	17983 Road 128	Tulare	CA	931
217	Point	170271	5C54NC00218	<Null>	CAF	R5-2013-0122	Dairies	DC	1323	Elk Creek Dairy	17993 ROAD 96	TULARE	CA	931
218	Point	333456	5C54NC00194	<Null>	CAF	R5-2013-0122	Dairies	DC	960	Golden Valley Dairy	181931	Tulare	CA	931
219	Point	335655	5D545022N01	<Null>	CAF	R5-2013-0122	Dairies	DC	3385	Curtimade Dairy	18337 Road 24	Tulare	CA	931
220	Point	334116	5D545090001	<Null>	CAF	R5-2013-0122	Dairies	DC	1745	Rib-Arrow Dairy	18287 Road 136	Tulare	CA	931
221	Point	335555	5C54NC00046	<Null>	CAF	R5-2013-0122	Dairies	DC	1500	SIMOES SANDLIN FA...	10248 Avenue 184	Tulare	CA	931



# Inventory of biomass: EPA Estimates of Food Waste

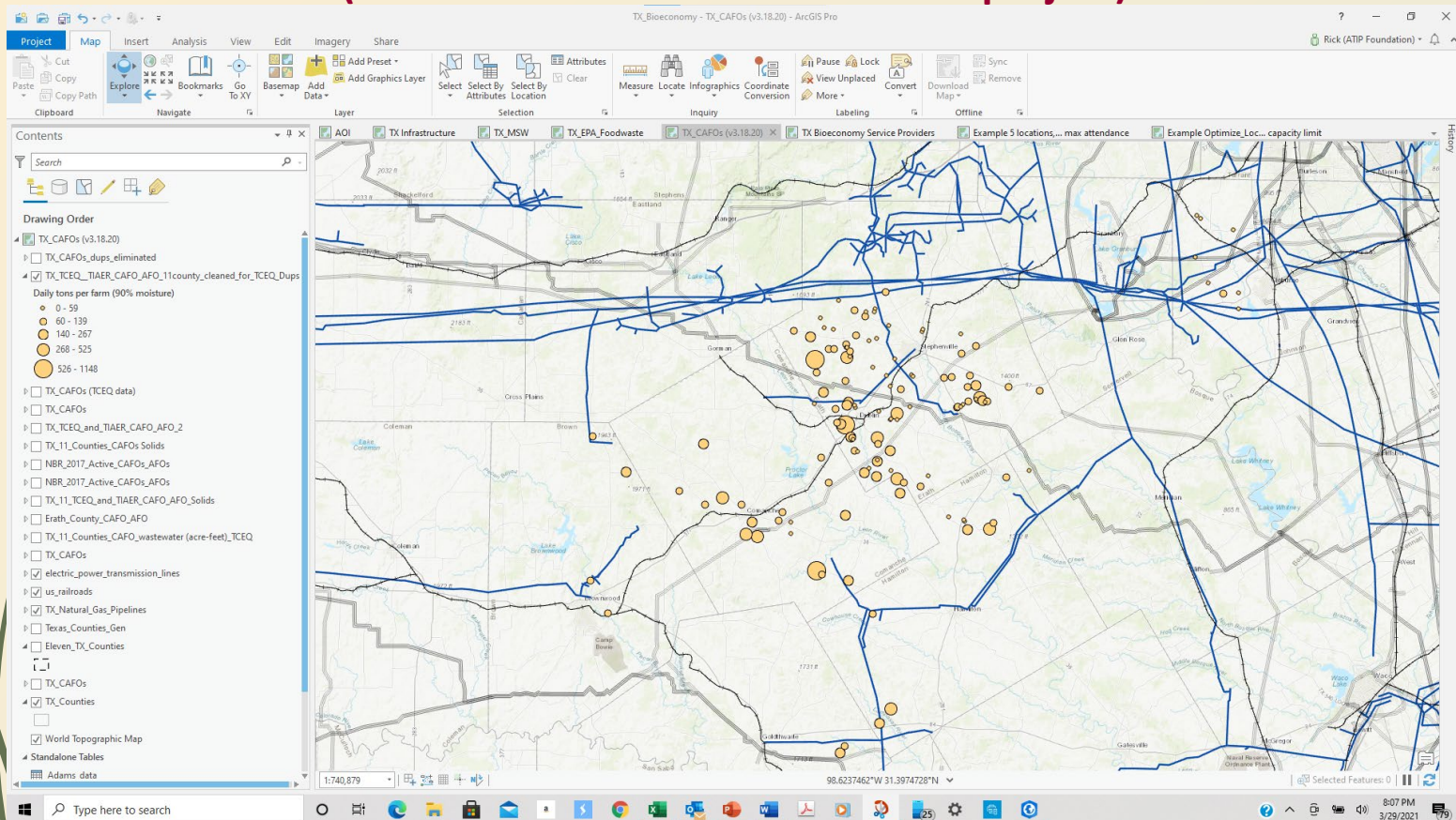


# Inventory of biomass: EPA Estimates of Food Waste

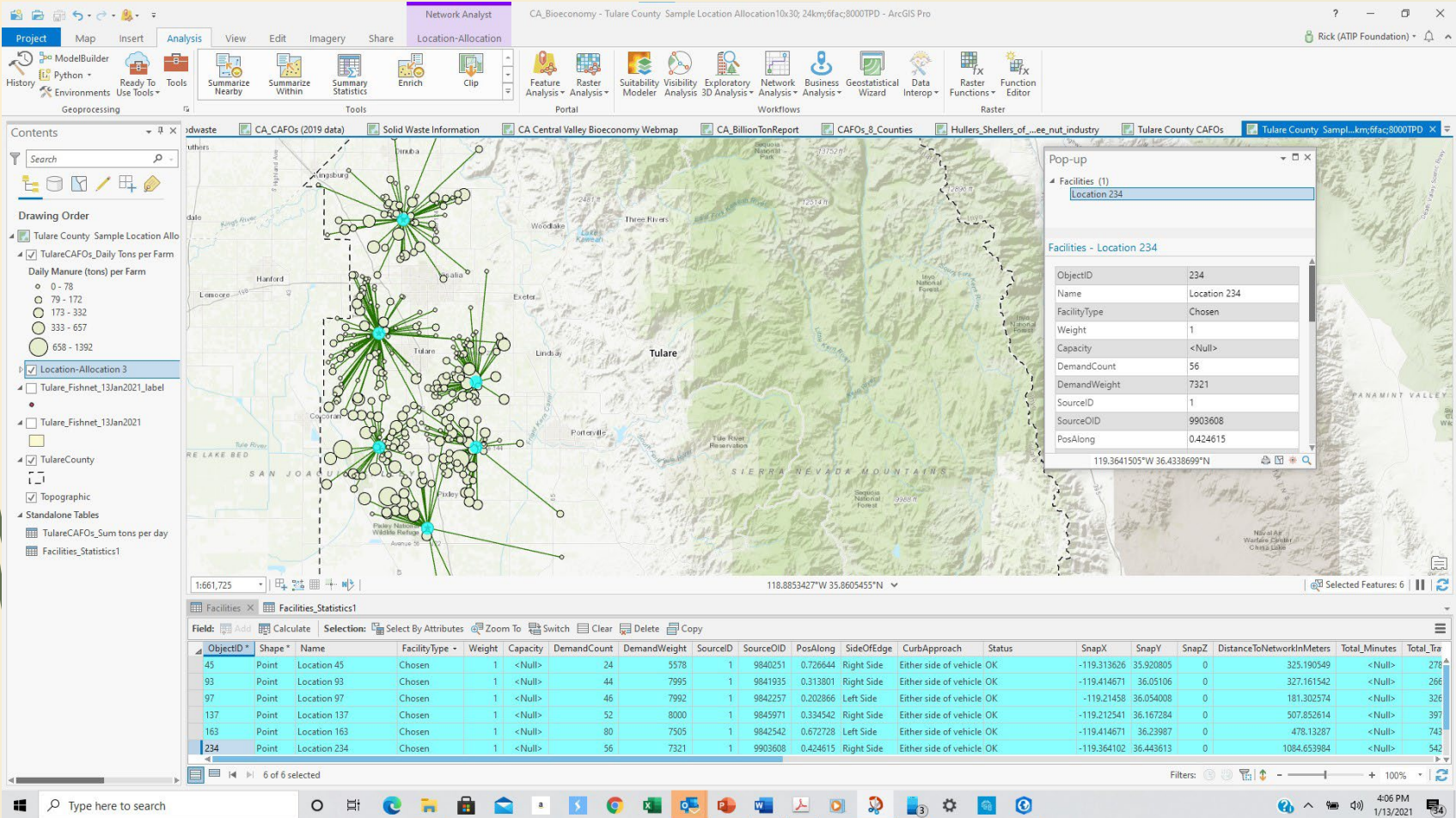


**Query: If installing biomass conversion facilities, where are the optimal locations relative to manure sources, gas pipelines, other infrastructure?**

**(from Northcentral TX 2019 RBDG project)**



## Example Tulare County: Optimal location for 6 facilities, 15 mi radius, 8,000 Tons/day limit on amount of manure each facility can process.



# Inventory of Service Providers: Economic Development

The screenshot shows the ArcGIS Pro interface with the following components:

- Map View:** Displays a map of the Central Valley of California with service provider icons. The icons are color-coded and shaped according to their service category. Major cities and counties labeled include San Francisco, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern.
- Contents Pane (Left):**
  - Search:** Search bar for layers.
  - Drawing Order:**
    - CCVEDC\_Service\_Providers
      - Bank\_Loan\_Program\_GeocodeAdd
        - Loan Program
          - SBA
          - USDA
          - <all other values>
        - Tulare\_County\_Service\_Prov
          - SanJoquinServiceProv25
          - Madera\_Service\_Prov25
          - Fresno\_County\_Service\_Prov2
        - Kings\_Co\_Service\_Providers
          - Service Category
            - Financial services
            - Util: electric\_gas
            - elected officials, city/county commissioners
            - transport (e.g., haulers of animal waste, crop residues, etc.)
            - util: fiber\_internet\_phone
            - util: public works (waste water)
            - waste: food (animal rendering, manufacture / processing, spoilage)
            - waste: general
            - workforce training (community colleges, trade schools, trucking sch
            - <all other values>
        - T\_CCVEDC\_Service\_Providers\_1
          - Service\_Category
            - Economic Development Entity
              - financial
              - util: electric\_gas
              - util: public works
              - util: sanitation