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# Challenges at the beginning

Farm market was limited

In key county: 12 farms with sales more than $100,000; average net income: $1,397

Isolation from markets makes it harder to sell products (especially grass hay) – overproduction has meant not selling products, rather than simply receiving a lower price

Not many farmers are large enough to capitalize on economy of scale

Farming areas seeing residential development, less acceptance of agricultural impacts

Unclear Minnesota laws related to township bans led to loss of customers

# Operational changes produced a higher-quality product, communications changes emphasized benefits

1997: Biosolids program starts with lime-stabilized, bulk-distribution Class B product

2001: Anaerobic digestion

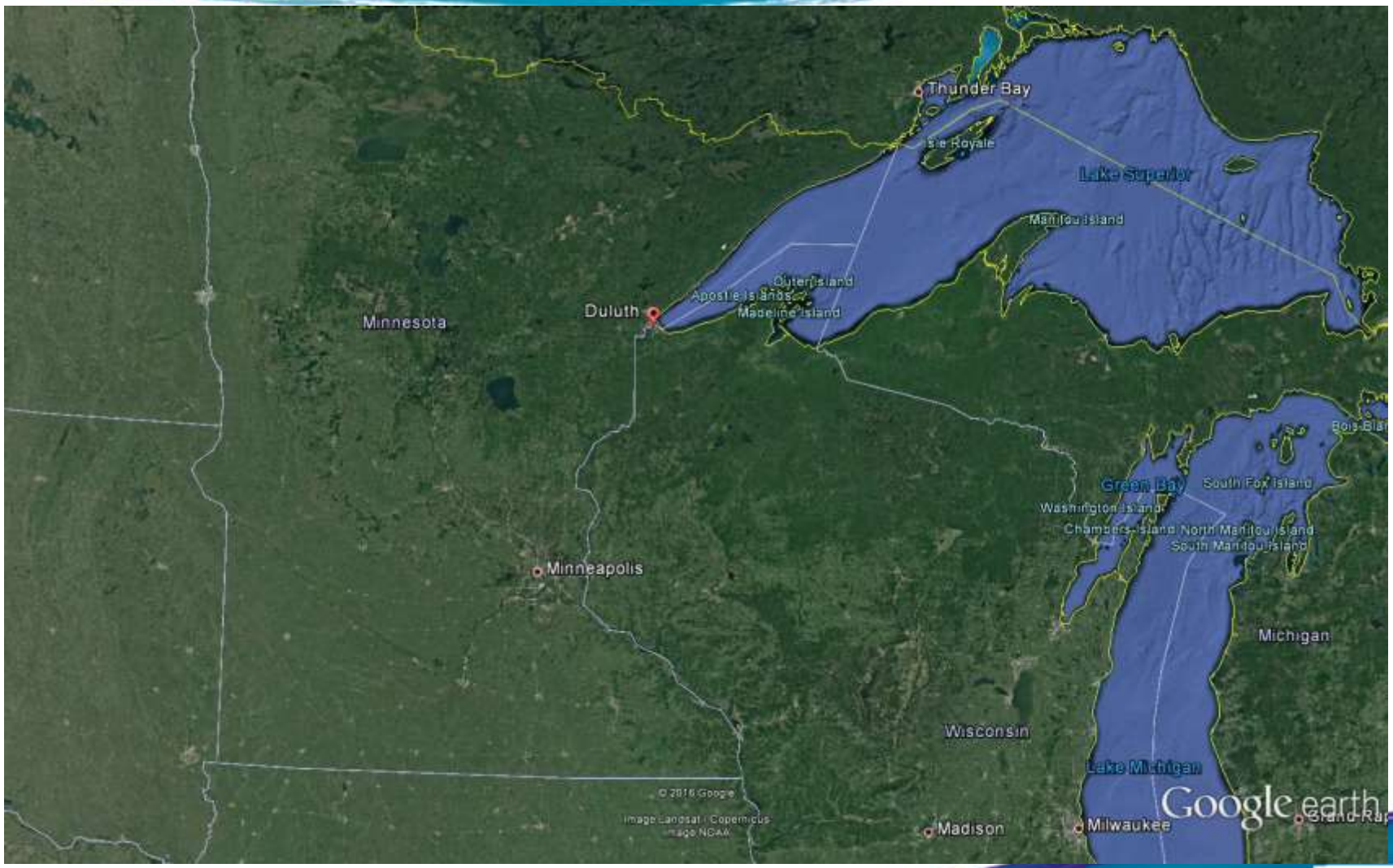
2001: Mineland program

2009: Service fee

2010: Douglas County, Wisc., expansion

2011: Thermo-thermo staging, odor reduction

# WLSSD is located in Duluth, on the border of Minnesota and Wisconsin



Our primary mission is to protect the lower St. Louis River and its estuary, the largest tributary and estuary on the U.S. side of Lake Superior

# WLSSD


- Created by the Minnesota legislature in 1971 to protect and improve the waters of the St. Louis River Basin.
- A regional wastewater system serving 17 communities.
- Award-winning wastewater treatment.
- Nationally recognized leader in pollution prevention.

# Facts about WLSSD and Field Green

40 mgd plant

Size of plant and biosolids production higher because two pulp-and-paper mills discharge to us: almost 50 percent of influent

Paper mill influent creates more biosolids

Population is about 120,000 in region

75 miles of interceptor pipe

30,000 wet tons of biosolids a year, about 8,000-10,000 dry tons

Operation is staffed internally

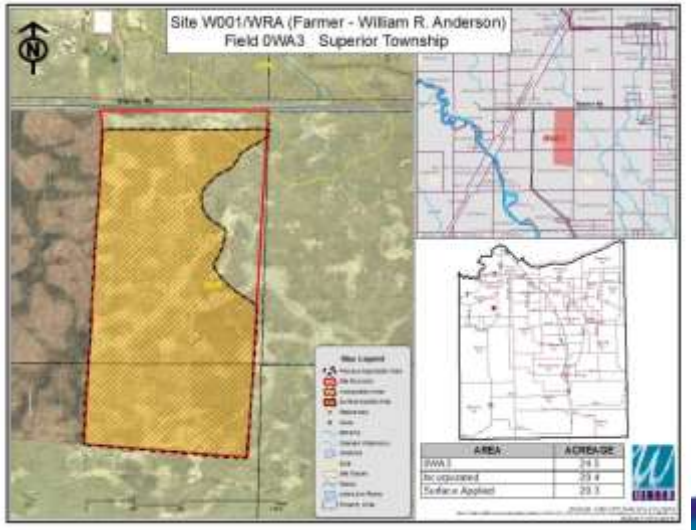
Temperature-phased anaerobic digestion

- At the beginning: thermo-meso
- Switched to thermo-thermo-meso
- VSR has reached 60 percent
- Also tweaked centrifuge operation/polymer/ferric use

Result: lower odor product, better acceptance than lime-stabilized product


GIS and GPS technology

- More precise acreages for nutrient calculations
- More efficient in field
- Increased certainty for buffers and setbacks



## Customer communications

Nutrient information and suggestions for balancing with other nutrients

All soil tests and maps are sent to customer

We work with farmers to educate neighbors, respond immediately to odor or other complaints

# Public communications

Newsletter to farmers, local and state officials, and interested residents twice each year.

Meetings with town boards at key points and upon request.

Attend events like county fairs

Field days with public education and useful information for farmers

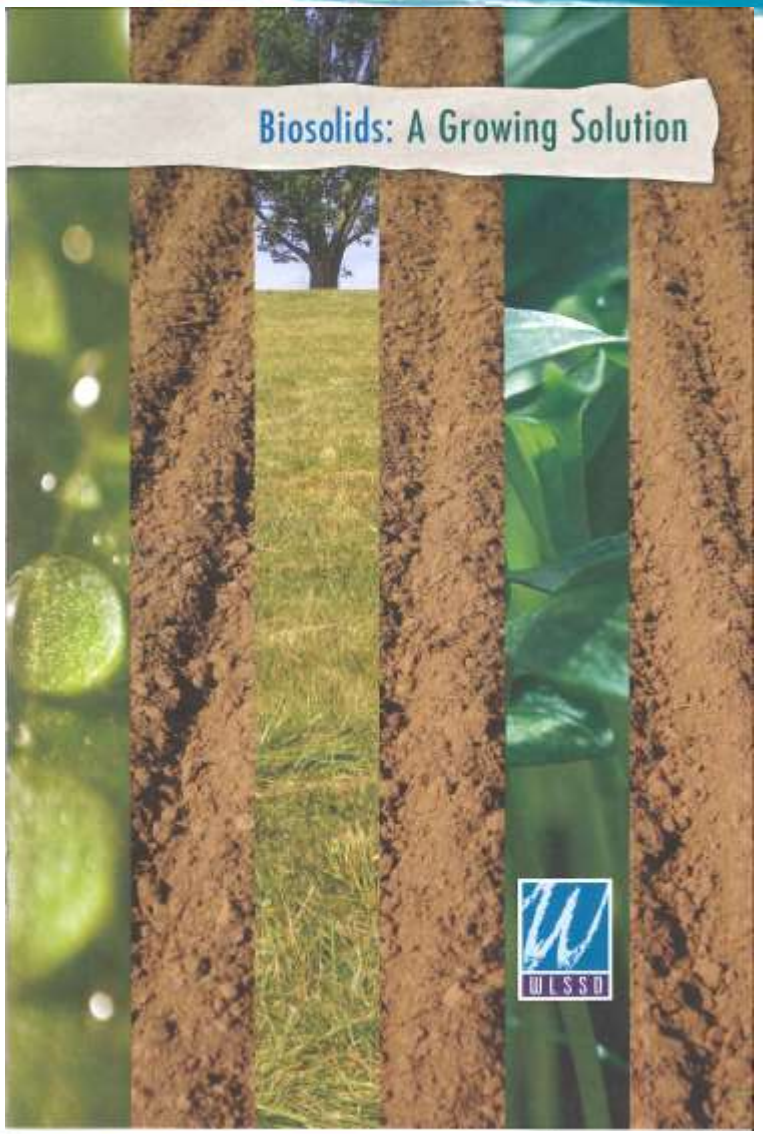
Collaborative research with Extension services

Shifted focus to value and benefits of product

# Benefits of biosolids

# Extension research showed value

# Public communication uses simple language and good design




## Using biosolids to enrich soil

The use of biosolids as a fertilizer has been common practice in Minnesota and throughout the United States for decades. Spreading biosolids onto the soil surface or incorporating or injecting them into the soil as a fertilizer is called land application.

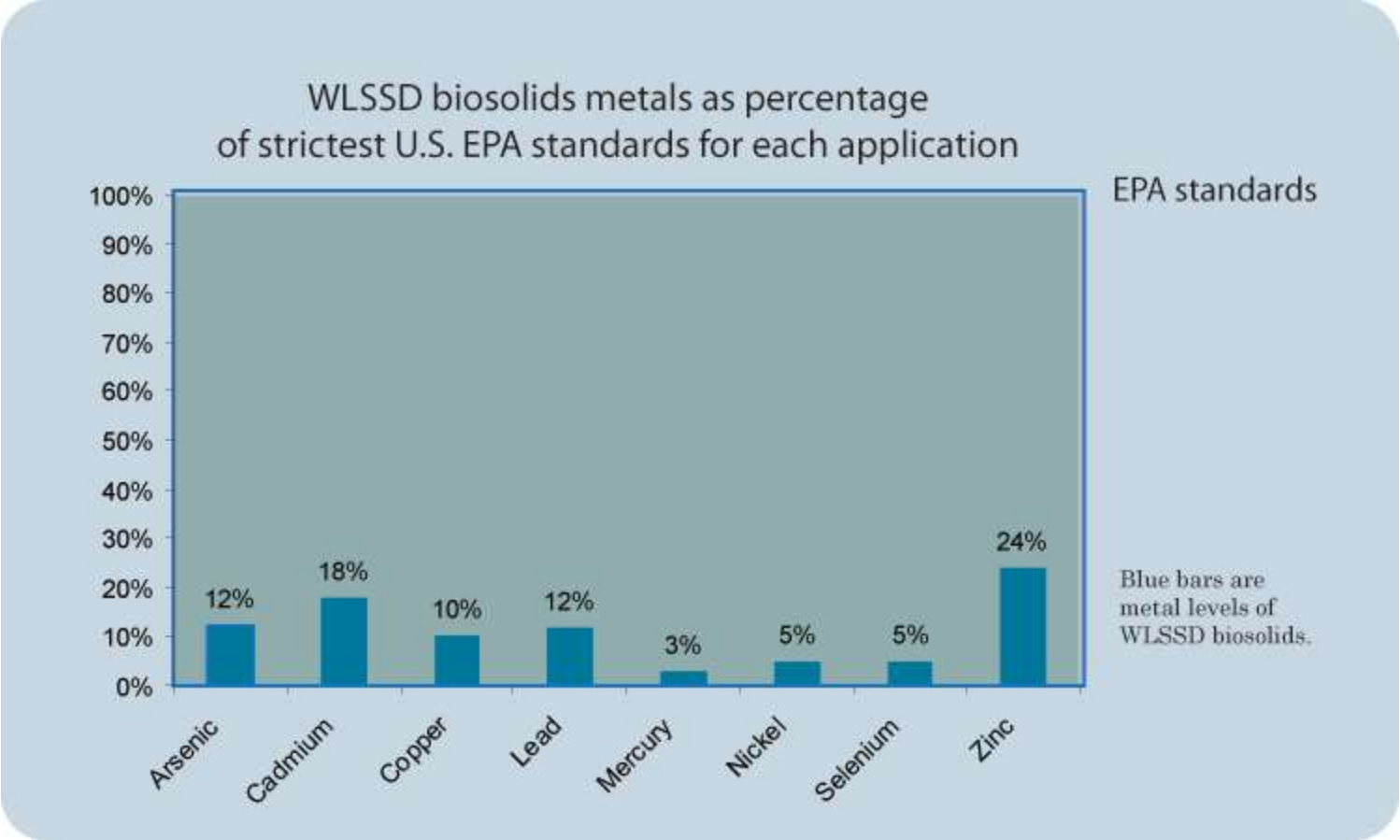
Biosolids are an effective fertilizer because they contain nutrients such as nitrogen, phosphorus, potassium, boron, sulfur and zinc. These nutrients are beneficial to plant growth and can dramatically improve crop yields. The organic matter in biosolids can also improve soil structure and moisture retention.

*Field Gro*® *biosolids have the appearance and consistency of moist soil.*

*Increased yields from biosolids are apparent in this cornfield. Field Gro*® *biosolids were applied in the back area, where the crop is much taller and deeper green. No biosolids were applied in the foreground area.*

WLSSD

# Quality of product sets stage for Class A transition



# Questions?

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