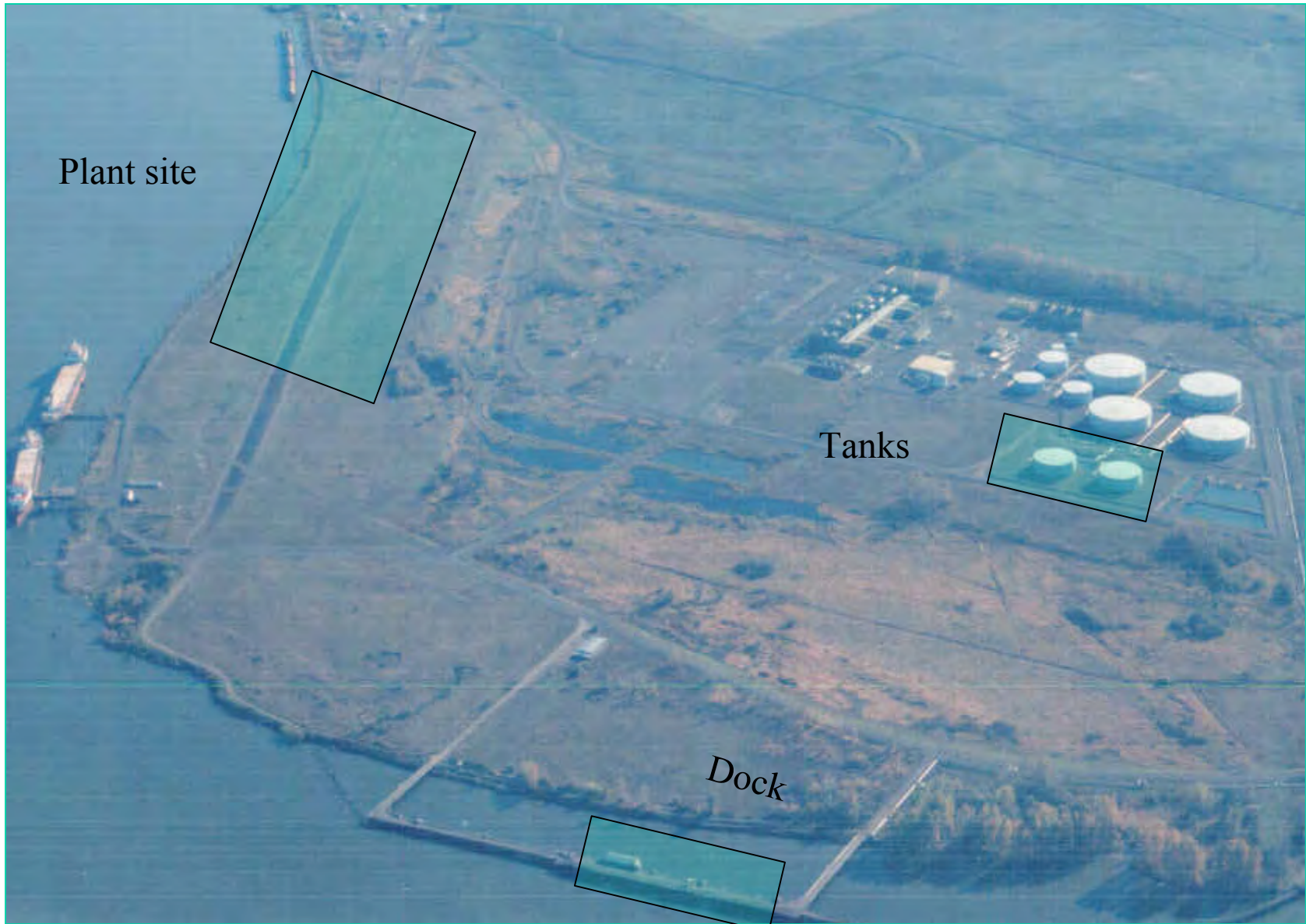




# Cascade Grain

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# The Site at Port Westward



Plant site

Tanks

Dock

# History of Cascade Grain

- Initial development started in 1999
  - Originally an 84 million gallon combination wheat fractionalization plant and corn dry mill
  - Late 2004 Equity found and due diligence begins
  - Spring of 2005 first round to get bank financing
    - B term market explored
  - Fall 2005 lost initial contractor
    - equity stays on and a new contractor is sought
  - April 2006-new EPC is signed
  - June 2006-financing completed
  - Construction to be completed in 2008
  - **9 years from inception to construction completion**

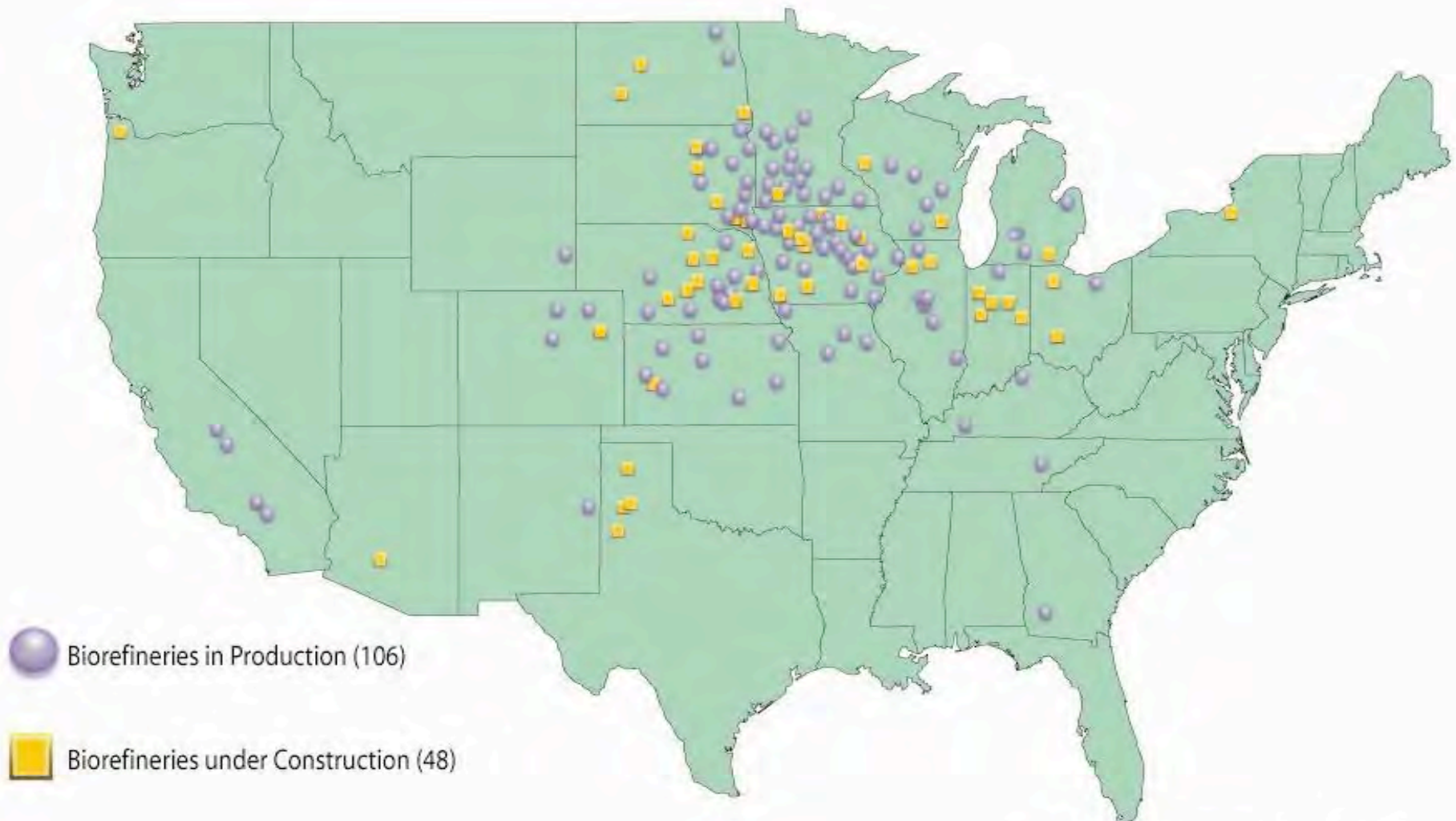


# Today's Ethanol Industry

108 Ethanol Plants producing 5.161 billion gallons  
Another 62 plus plants under construction and expanding that  
will add another 4.367 billion gallons for a total of 9.528

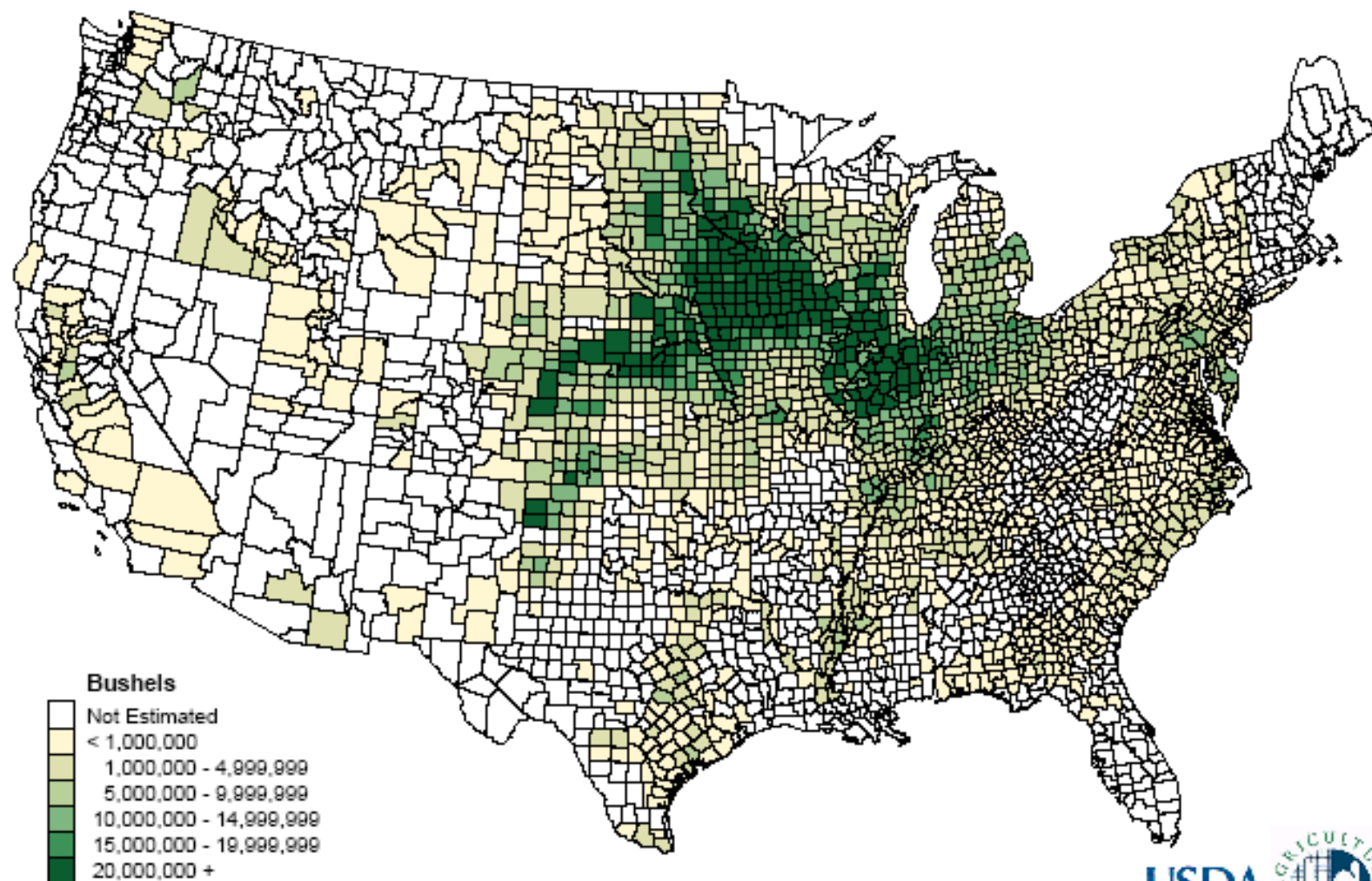


# U.S. Ethanol Biorefinery Locations



Source: Renewable Fuels Association

## Corn for Grain 2005 Production by County



U.S. Department of Agriculture, National Agricultural Statistics Service



## Dry-Milling Average Yield Per Bushel

**1 bushel**



**becomes**

- **2.7 - 2.8 gallons Ethanol**
- **17 - 18 lbs DDGS**
  - **18 lbs CO<sub>2</sub>**

# DDGS



**High protein feed source for livestock and dairy industry. (27 to 30% protein)**



# Ethanol Production from Cellulose

- Wood waste
- Landfill material
- Agricultural residue
  - California Energy Department est. by 2030
    - Midwest conventional 13.27 billion gallons
    - Midwest cellulose 9.00 billion gallons
    - California all sources 3.92 billion gallons

# Conversion of Cellulose to Ethanol

- Acid Hydrolysis
  - Dilute or concentrated
- Enzymatic Hydrolysis
  - Iogen Process on wheat straw
  - Both Gencor and Novozymes have been funded for further research in this area
- Gasification

# Problems to Overcome

- Storage of cellulosic material
  - Agricultural residue comes off in a short time period after harvest.
    - Storage concerns: availability and suitability
    - Working capital requirements for payment
  - Agricultural residue is needed in the soil profile for erosion control and fertility.
    - Agricultural residue will have a definite cost to the ethanol plant which adds to the cost of production

# Problems to Overcome

- Municipal Solid Wastes
  - Consistent supply not an issue
  - Reduced input costs and should be able to get tipping fees
  - Problems
    - Not a even content mixture
    - Sorting out plastics, metals and other non desirable items is probably the biggest problem area

# The Big Question

How much ethanol can we make annually from cellulose?

10 billion gallons

20 billion gallons

30 billion gallons

**More**

And by **When?**