



# NISAC

unclassified

## Food Protection & the National Infrastructure Simulation & Analysis Center

Paul Kaplan  
Sandia National Laboratories  
SAND 2007-4293C

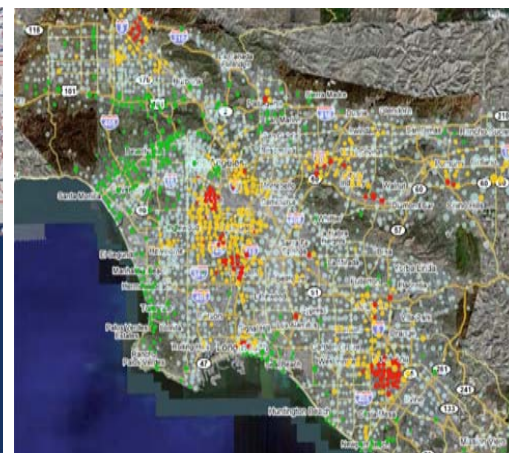
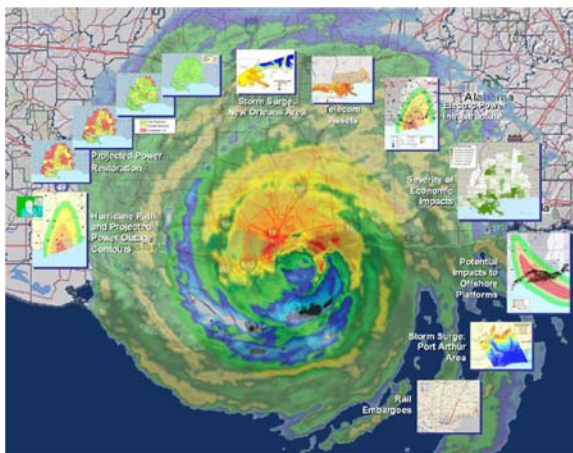
2007 Heartland Security Conference  
Minneapolis, MN  
July 10





# The National Infrastructure Simulation & Analysis Center

- Modeling, simulation, and analysis of
  - all critical infrastructures
    - interdependencies and national security consequences
  - formally established under the 2001 US Patriot Act
  - expanded under 2007 Homeland Security Appropriations Act
    - formal relationship with additional federal agencies





# Food Safety Versus Food Defense

- Food Safety Inspection Service Definitions

**Food defense** focuses on protecting the food supply from ***intentional contamination***, with a variety of chemicals, biological agents or other harmful substances by people who want to do us harm. These agents could include materials that are ***not naturally-occurring*** or are not routinely tested for.

**Food safety** addresses the ***accidental contamination*** of food products during processing or storage by biological, chemical or physical hazards. The main types of food safety hazards are microbes, chemicals and foreign objects. This unintentional contamination of food products can be ***reasonably anticipated*** based on the type of processing.

Developing a Food Defense Plan for Meat and Poultry Slaughter and Processing Plants, January 2007, [http://www.fsis.usda.gov/PDF/Food\\_Defense\\_Plan.pdf](http://www.fsis.usda.gov/PDF/Food_Defense_Plan.pdf)



# Food Defense Versus Food & Agricultural Infrastructure Defense

## NISAC's Unique Role

**Infrastructure defense** focuses on understanding what ***intentional and natural events***, regardless of which critical infrastructure is originally impacted, would threaten our ability to provide quality food to the citizens of America in sufficient quantity at an acceptable price.

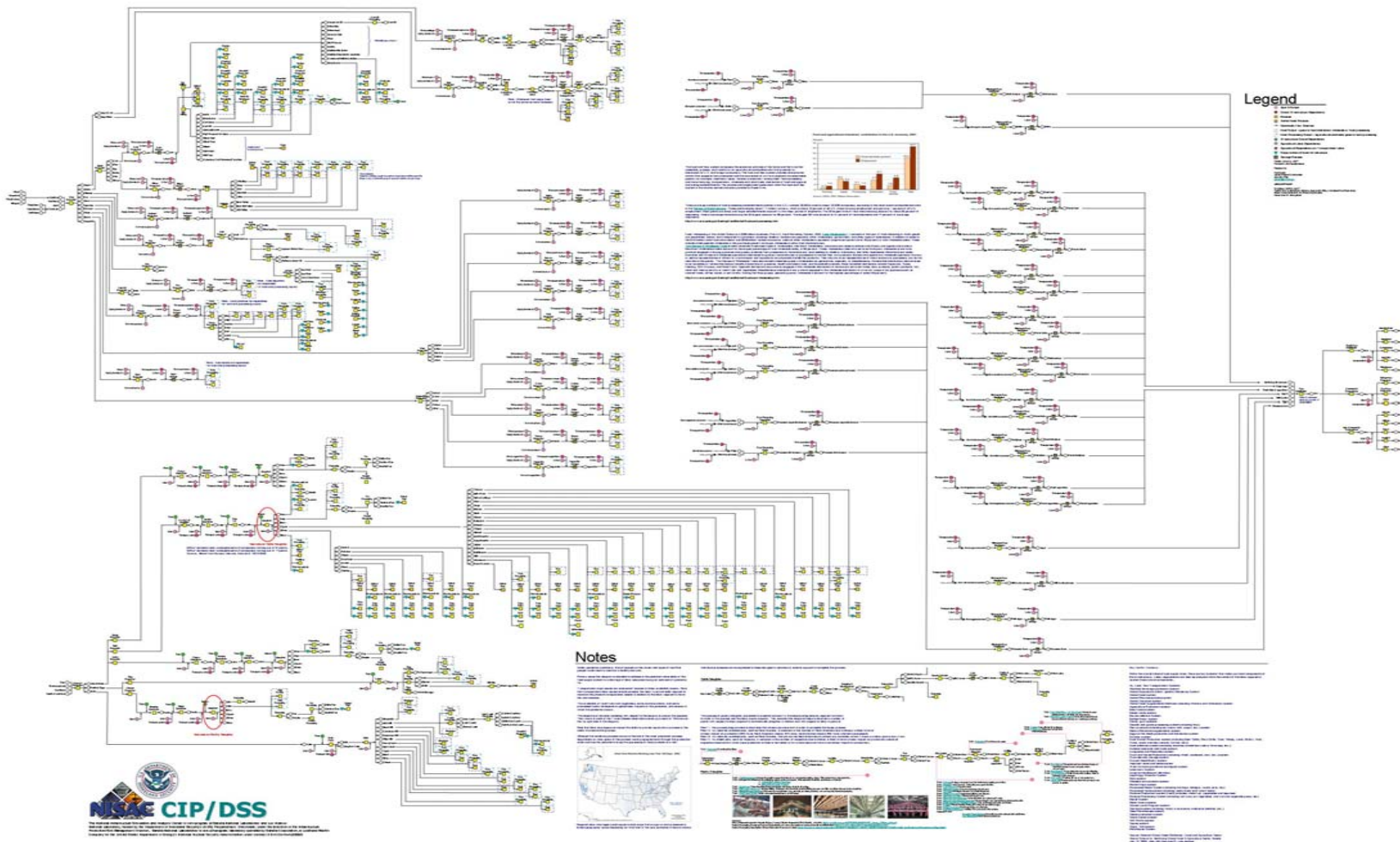




# Food & Agricultural Infrastructure

Food & Agriculture Commodity Flow System Labor Inputs  
Input/Process/Output Diagram

Production Inputs \_\_\_\_\_ Livestock & Crop Production \_\_\_\_\_ Food Processing \_\_\_\_\_ Food Distribution Wholesale \_\_\_\_\_ Food Service





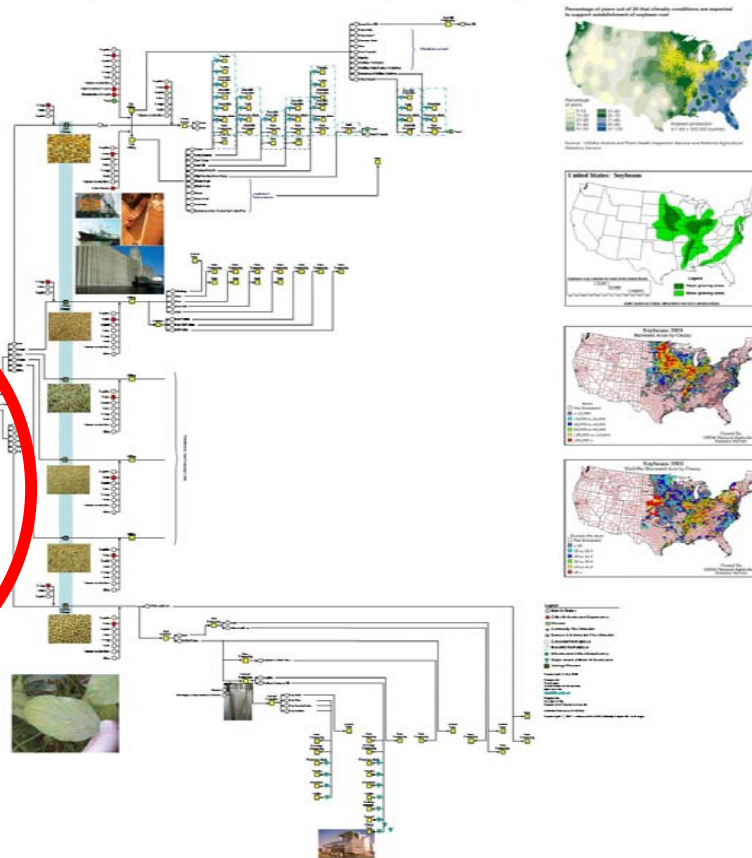
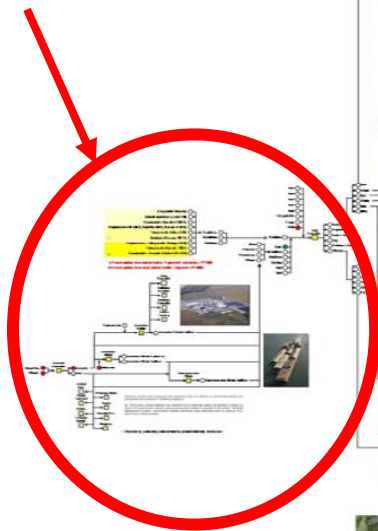
# Agricultural Dependencies On Other Infrastructures & Critical Assets

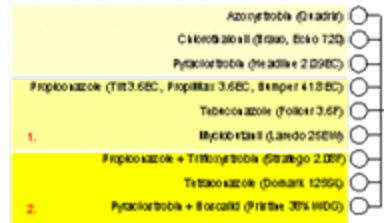
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## Soybean Rust Project

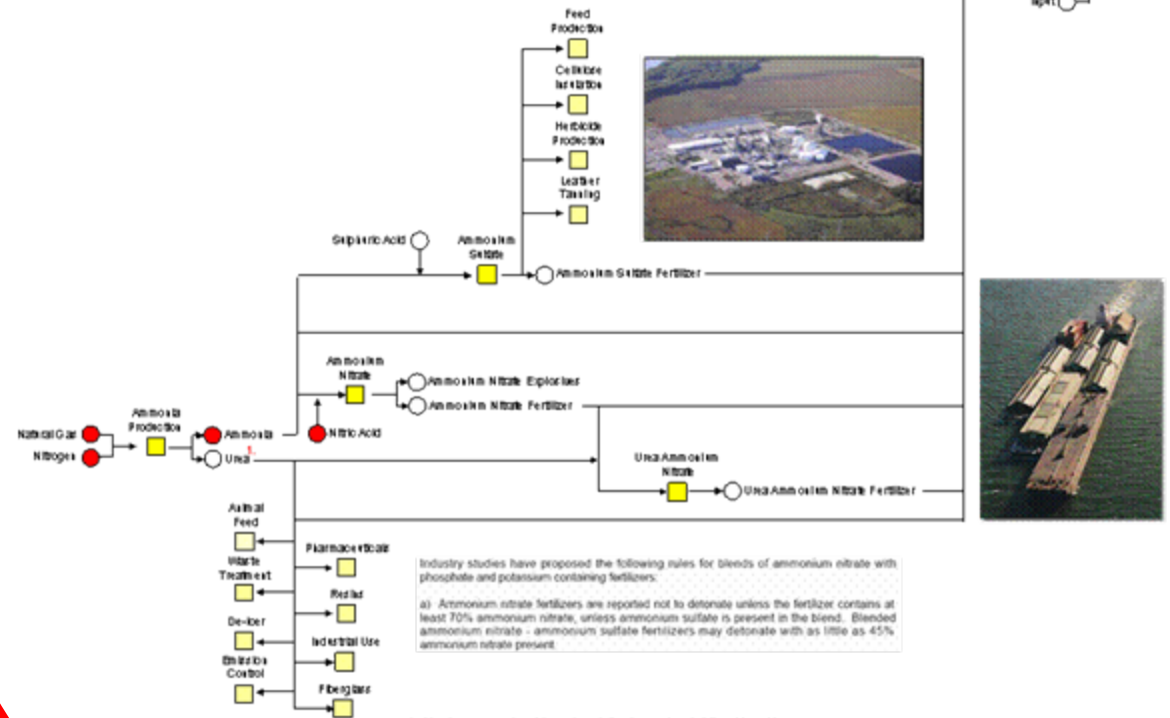
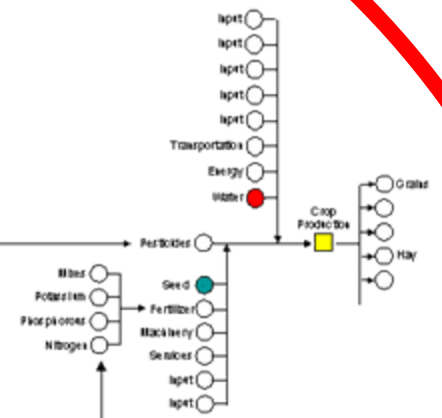
### Soybean Input/Process/Output Diagram

# Chemicals





- 1) These fungicides have received Section 18 approval in our states (5/27/2009)
- 2) These fungicides have not yet received Section 18 approval (1/27/2009)



Industry studies have proposed the following rules for blends of ammonium nitrate with phosphate and potassium containing fertilizers:

a) Ammonium nitrate fertilizers are reported not to detonate unless the fertilizer contains at least 70% ammonium nitrate, unless ammonium sulfate is present in the blend. Blended ammonium nitrate + ammonium sulfate fertilizers may detonate with as little as 45% ammonium nitrate present.

1. Air, potassium, carbamide, carbonyl diamine, carbamide acid, and iron





# Agricultural Dependencies On Other Infrastructures & Critical Assets

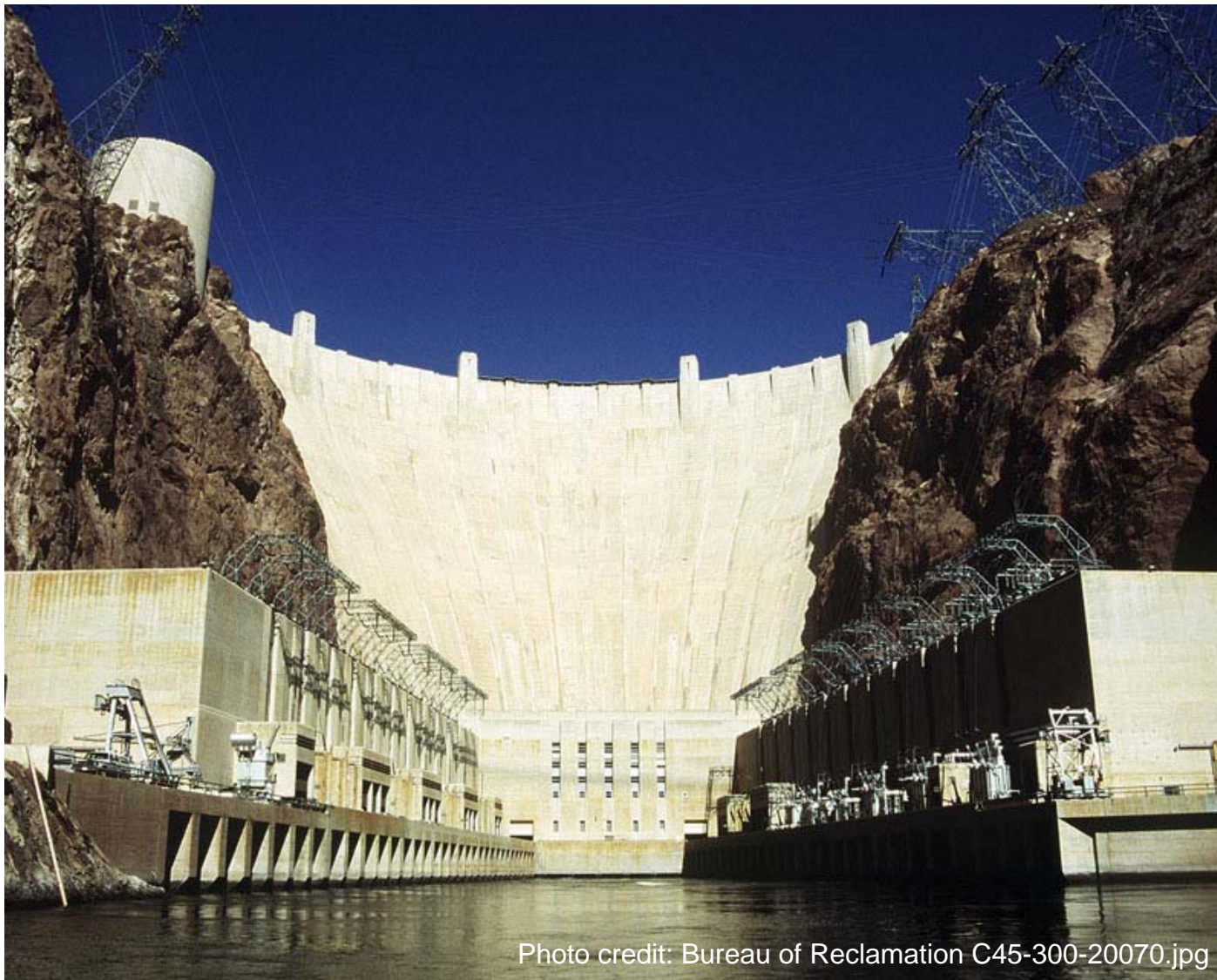


Photo credit: Bureau of Reclamation C45-300-20070.jpg

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# Agricultural Dependencies On Other Infrastructures & Critical Assets

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What is the primary purpose of Hoover Dam?

What is the secondary purpose of Hoover Dam?







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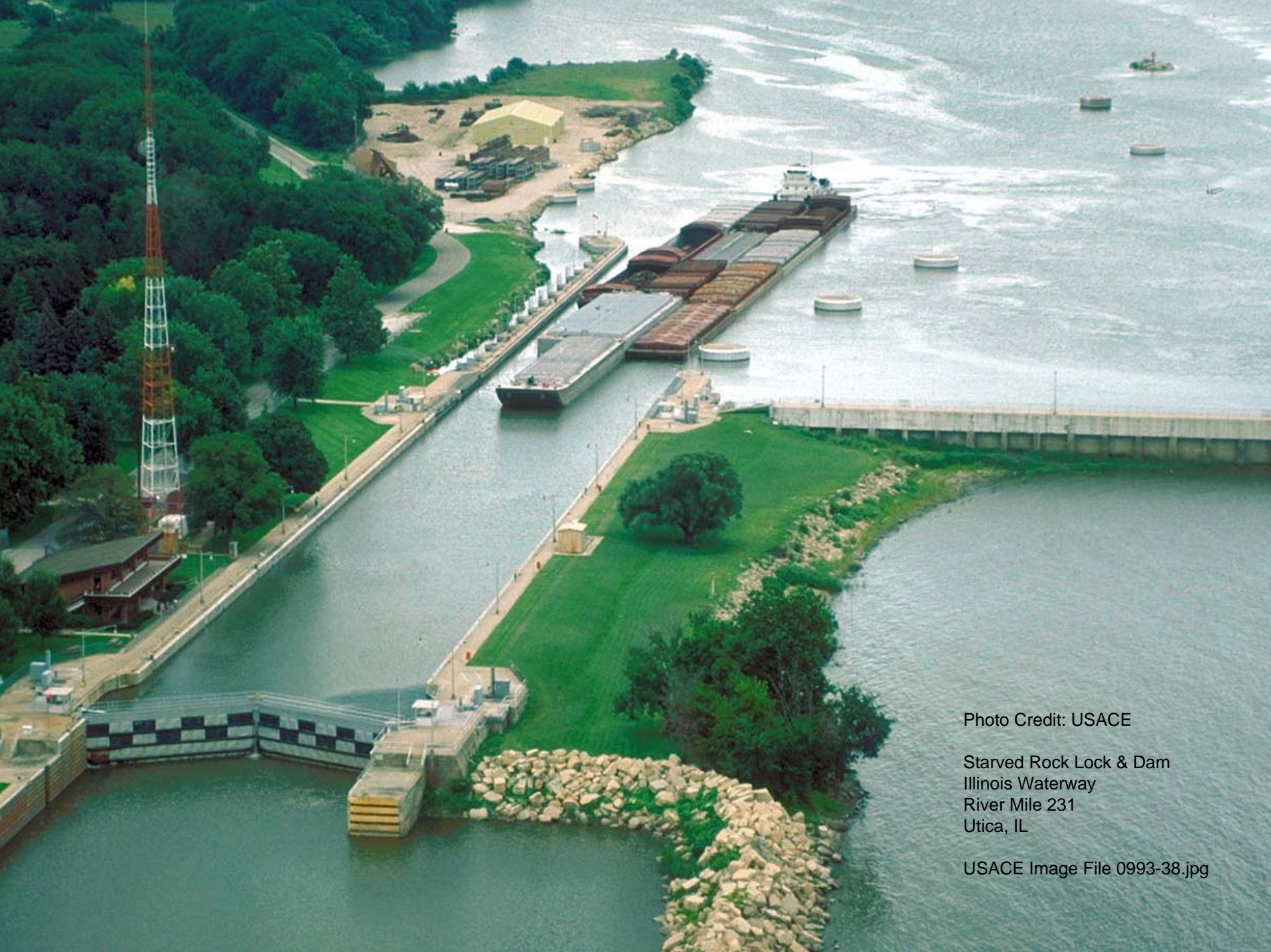


Photo Credit: USACE

Starved Rock Lock & Dam  
Illinois Waterway  
River Mile 231  
Utica, IL

USACE Image File 0993-38.jpg





# Agricultural Dependencies On Other Infrastructures & Critical Assets

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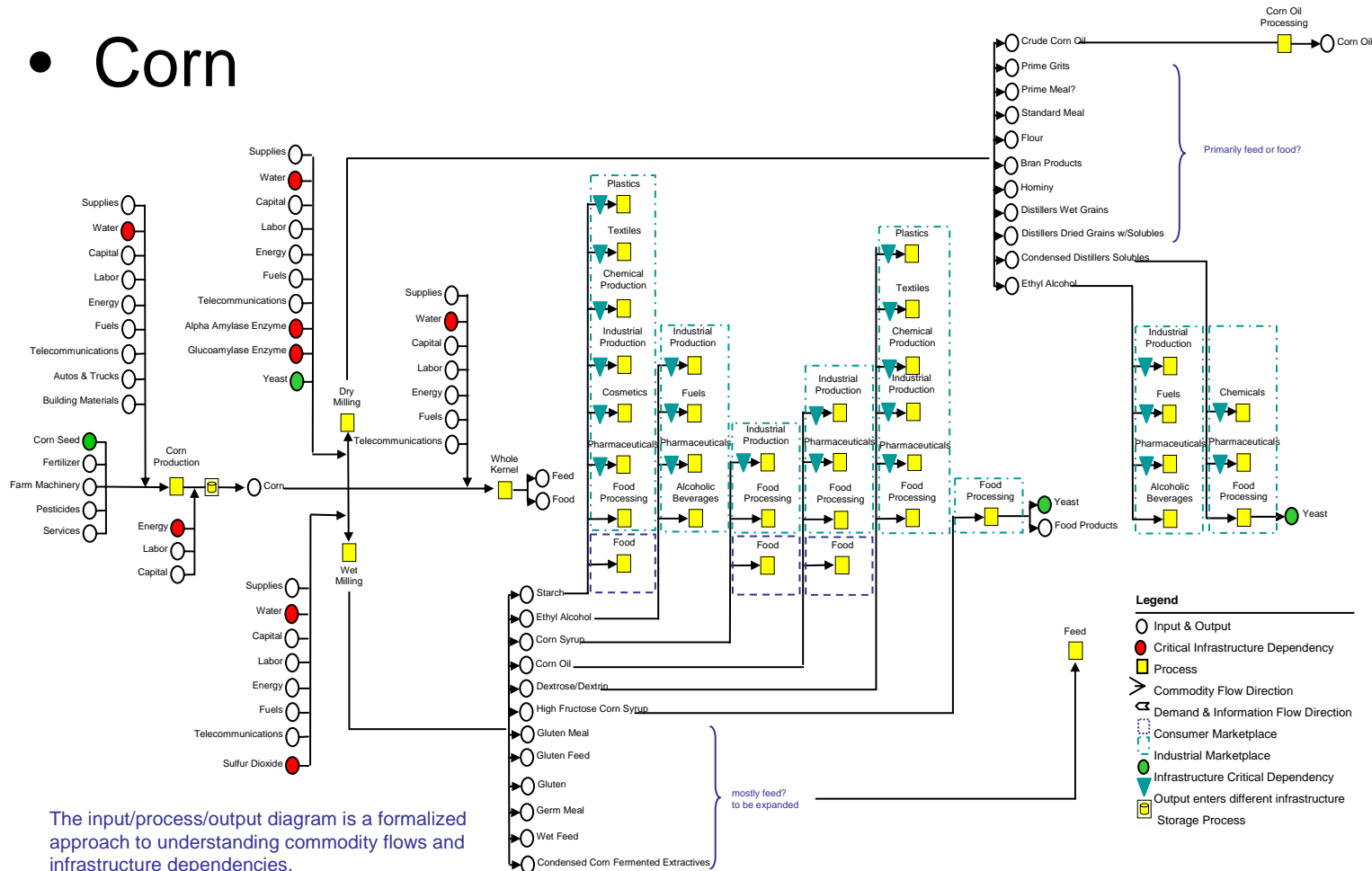






# Agricultural Commodity Versus Food

## • Corn



The input/process/output diagram is a formalized approach to understanding commodity flows and infrastructure dependencies.

Version 11/3/2003 CIP/DSS



# With Corn Prices Rising, Pigs Switch To Fatty Snacks

**On the Menu: Trail Mix, Cheese Curls, Tater Tots; Farmer Jones's Ethanol Fix**

**By LAUREN ETTER**  
*May 21, 2007; Page A1*

GARLAND, N.C. -- When Alfred Smith's hogs eat trail mix, they usually shun the Brazil nuts.



**Alfred Smith**

"Pigs can be picky eaters," Mr. Smith says, scooping a handful of banana chips, yogurt-covered raisins, dried papaya and cashews from one of the 12 one-ton boxes in his shed. Generally, he says, "they like the sweet stuff."

Mr. Smith is just happy his pigs aren't eating him out of house and home. Growing demand for corn-based ethanol, a biofuel that has surged in popularity over the past year, has pushed up the price of corn, Mr. Smith's main feed, to near-record levels. Because feed represents farms' biggest single cost in raising animals, farmers are serving them a lot of people food, since it can be cheaper.

Besides trail mix, pigs and cattle are downing cookies, licorice, cheese curls, candy bars, french fries, frosted wheat cereal and peanut-butter cups. Some farmers mix chocolate powder with cereal and feed it to baby pigs. "It's kind of like getting Cocoa Puffs," says David Funderburke, a livestock nutritionist at Cape Fear Consulting in Warsaw, N.C., who helps Mr. Smith and other farmers formulate healthy diets for livestock.

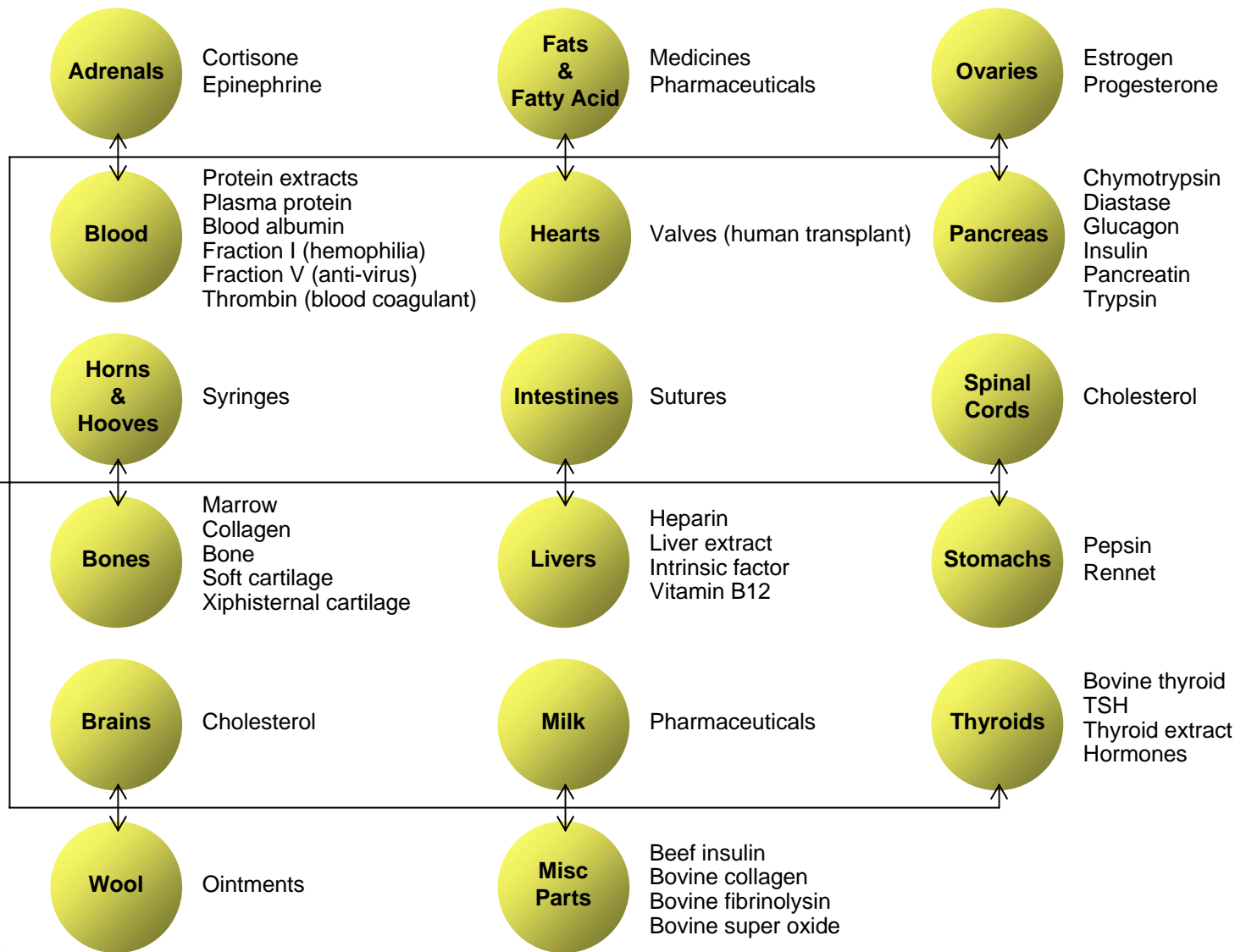
The Wall Street Journal



# Medical Use of Agricultural Commodities

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Meat Animals





# Blood Supply & BSE

## American Red Cross donor eligibility rules

- At this time, the American Red Cross donor eligibility rules related to vCJD are as follows:

**You are not eligible to donate if:**

- From January 1, 1980, through December 31, 1996, you spent (visited or lived) a cumulative time of 3 months or more, in the United Kingdom (UK), or
- From January 1, 1980, to present, you had a blood transfusion in any country(ies) in the (UK). The UK includes any of the countries listed below.

- Channel Islands
- England
- Falkland Islands
- Gibraltar
- Isle of Man
- Northern Ireland
- Scotland
- Wales

***You are not eligible to donate if...***

- You were a member of the of the U.S. military, a civilian military employee, or a dependent of a member of the U.S. military who spent a total time of 6 months on or associated with a military base in any of the following areas during the specified time frames
  - From 1980 through 1990 - Belgium, the Netherlands (Holland), or Germany
  - From 1980 through 1996 - Spain, Portugal, Turkey, Italy or Greece.
- You spent (visited or lived) a cumulative time of 5 years or more from January 1, 1980, to present, in any combination of country(ies) in Europe, including in the UK from 1980 through 1996 as listed in above, on or associated with military bases as described above, and in other countries in Europe as listed below:

- Albania
- Austria
- Montenegro (Federal Republic of Yugoslavia)
- Belgium
- Bosnia/Herzegovina
- Bulgaria
- Croatia
- Norway
- Poland
- Czech Republic
- Denmark
- Romania
- France

- Slovak Republic (Slovakia)
- Germany
- Greece
- Spain
- Finland
- Hungary
- Ireland (Republic of)
- Italy
- Kosovo (Federal Republic of Yugoslavia)
- Liechtenstein
- Luxembourg
- Macedonia
- Netherlands (Holland)
- Portugal
- Serbia (Federal Republic of Yugoslavia)
- Slovenia
- Sweden
- Switzerland
- Turkey
- Yugoslavia (Federal Republic includes Kosovo, Montenegro, and Serbia)





# Does the Price of Coffee in Brazil Threaten Critical Infrastructure & National Security?

- *Coffea Arabica* L.





# Things That Go Bump In the Night

## Globalization



Photo credit: NASA

## Terrorism







# Mother Nature



Aelbert Cuyp, 1620-1691



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<http://www.sandia.gov/nisac/>