

How Can The Aging US Transportation Infrastructure Support the Movement of Agricultural Commodities In the Future?

Background for Farm Bureau
Discussion Meet Training
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Jerry Fruin

DEPARTMENT OF APPLIED ECONOMICS AND



CENTER FOR
TRANSPORTATION STUDIES

UNIVERSITY OF MINNESOTA^{ES}

Department of
**APPLIED
ECONOMICS**

References and Readings

Report of the National Surface Transportation Policy and Revenue Study Commission, Dec 2007
(A major policy document –must reading for transportation policy groupies)

Transportation in America 20th Edition , Eno Foundation 2007 83p (Full of statistics, data, and graphs)

USDA Agricultural Marketing Service, Transportation Services Division, *Grain Transportation Report*
(weekly about 20 pages covering current events in ag transportation)

Traffic World (a weekly news magazine published by Commonwealth Business Media that specializes in US transportation news and issues)

USDA Agricultural Marketing Service, Transportation Services Division, *A Reliable Waterway System Is Important to Agriculture*, July 2008

Salin, Delmy. April 2008. *U.S. Grain and Soybean Exports to Mexico—a Modal Share Transportation Analysis*. USDA Agricultural Marketing Service, Transportation Services Division

Freight Railroads: Industry Health Has Improved, but Concerns about Competition and Capacity Should Be Addressed.” GAO-07-94. United States General Accountability Office, Washington, DC, October 6, 2006.

Schneft, Randy, *Upper Mississippi River-Illinois Waterway Navigation Expansion CSRS Report for Congress* Order code RL32470 July15, 2004

Today's Topics

- The current situation
- Some modal comparisons
- Observations by transportation mode
 - highways
 - rail
 - water
- Transportation and Biofuel issues

- Roads and transportation facilities are provided by local, state and federal governments as well as private sources (e.g. railroads and port facilities).
- Over half of the total US expenditures on roads are from state and local sources.
- However an integrated national transportation infrastructure is unquestionably a federal responsibility

“Our unity as a nation is sustained by free communication of thought and by easy transportation of people and goods...

Together the unifying forces of our communication and transportation systems are dynamic elements in the very name we bear—United States.

Without them, we would be a mere alliance of many separate parts”

President Dwight Eisenhower, 1995

From the Report of the National Surface Transportation Policy and Revenue Study Commission, Dec 2007

Why is the Federal Government Responsible for the National Transportation Infrastructure ??

- Transportation is a public good that contributes to the general welfare by facilitating the movement of goods and people
- A modern society is mobile and its population depends on transportation
- State and regional economies are interconnected
- An efficient and well maintained logistics infrastructure is needed to for compete internationally
- Road, rail, air, water and pipelines are all networks that cross state lines
- Concern about public safety and it's role in reducing accidents and casualties through uniformity and efficiency

Some Background Comments

- It is important to recognize that transportation “subsidies” are not necessarily bad.
- Transportation subsidies may facilitate economic growth and/or the greater welfare of individuals.
- Actual costs frequently cannot be attributed to a single user or function-
E.g.

Common costs-Freight and passenger trains use the same rail bed and tracks

Joint costs- Front hauls and back hauls-can't have one without the other

More Background Comments (or why all the Controversy about needed improvements)

Transportation infrastructure is **expensive**

Generally not reversible--need to be right the first time

Transportation projects **will impact** the environment

Well-meaning people can find **economic or environmental reasons** to oppose almost any transportation project!!

Some well-meaning people are **very** misguided

1980-2000 were the Golden Years for US Transportation

- Completion of the interstate system
- Improved utilization of the transportation infrastructure and transportation equipment after **deregulation in 1980**
- rail, trucking, air all benefited
- Transportation Innovations and efficiencies
 - hopper bottoms unit trains, containers, lighter tare weights
- Cheap and abundant energy
- Freight costs as a percentage of GDP
 - 8% in 1980
 - Bottomed out at 5.5% in 2002 and 2003
 - but are now increasing (about 6.2% in 2007)
- U.S. transportation and infrastructure system was the best in the world in 2000
- **The biggest problem now is that the US is consuming its transportation Infrastructure** It is living off depreciation and not reinvesting enough in the system , let alone making improvements and expansion for future growth

Rule-of-thumb: National bulk freight capacity needs to expand at about 2/3 the growth in GNP each year.

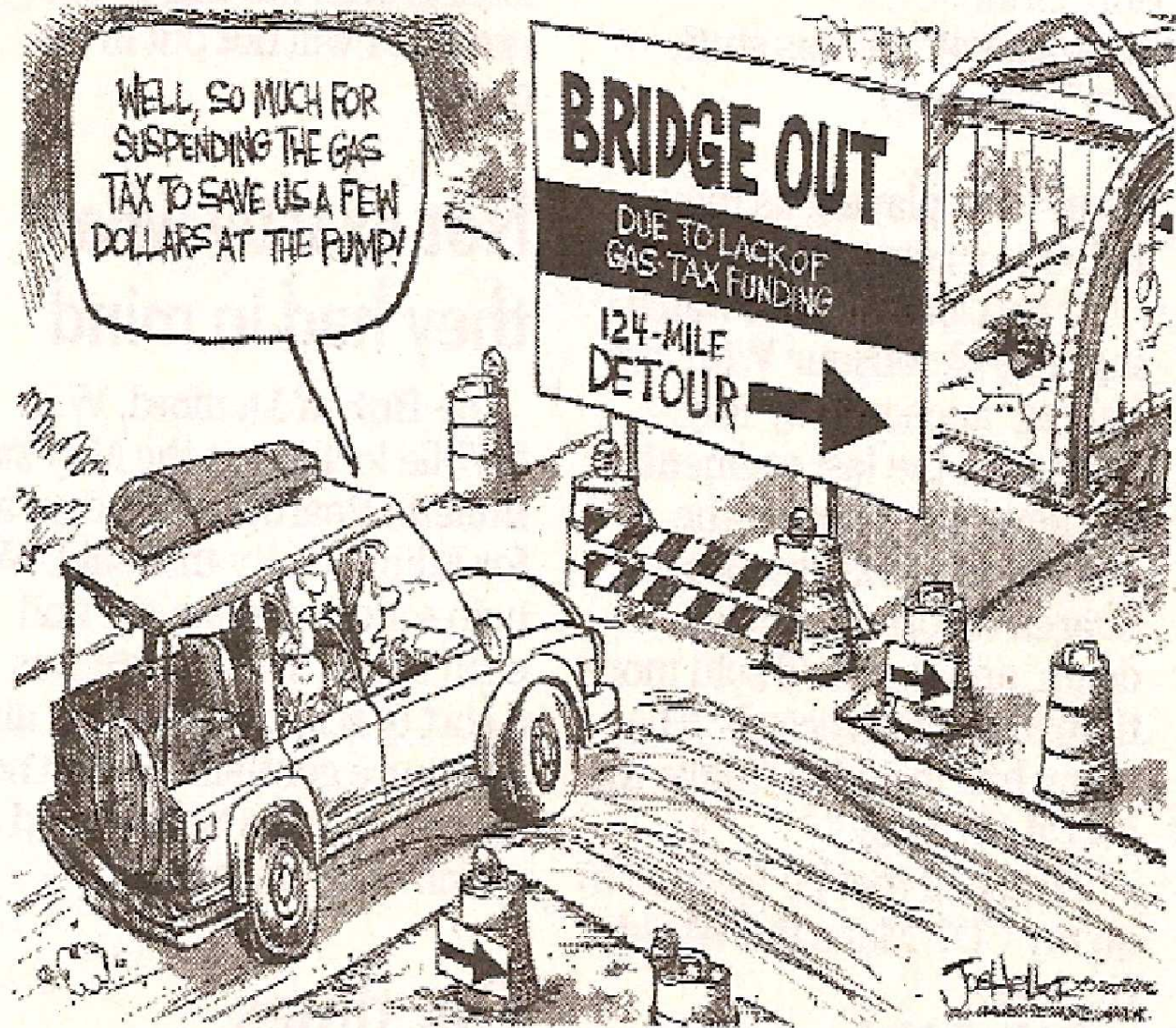
Current Situation

The US Transportation Infrastructure Now

- The US no longer has enough capacity and has an increasing number of “Choke Points” or bottle necks
- Lacks the extra capacity needed to met demand surges
- Constant maintenance and expansion of all modes are needed to serve a growing economy
- Faces Energy Issues-Price, Supply, Security
- Other regions including China and Europe are making major improvements in highways rail and waterways

WHY IS US Falling Behind??

- Political reluctance to tax and/or raise revenue through user charges and tolls
- Environmental concerns and opposition
- Fragmented support and single issue advocates
- Public distrust or disgust with process i.e. pork barreling and bridges to nowhere
- People think gasoline taxes are being diverted to non-transportation uses.








Capital Investment Needed per Year to 2020

Mode	Current Sustainable Spending in BILLION \$	Low Needs BIL\$	High Needs BIL\$	Diff Low Needs BIL\$	Diff High Needs BIL\$	Low Needs Cents per gallon	High Needs Cents per gallon
Highway	68	207	240	139	172	71	88
Transit	13	21	32	8	19	4	10
Freight Rail	4	5	7	1	3	1	2
Pass Rail	1	7	7	6	6	3	3
Total	86	241	286	155	200	79	102

Source: page 6 in "Report of the National Surface Transportation Policy Study and Revenue Commission Dec 2007
Includes Federal, state, local, and private sources

Modal Comparisons and Efficiencies

Alternate Transportation Mode Comparison

				
Barge 1500 Ton 52,500 Bushels 453,000 Gallons	15-Barge Tow 22,500 Ton 767,500 Bushels 6,804,000 Gallons	Jumbo Hopper Car 100 Ton 3,500 Bushels 30,240 Gallons	100 Car Unit Train 10,000 Ton 350,000 Bushels 3,024,000 Gallons	Large Semi 26 Ton 910 Bushels 7,865 Gallons



Equivalent Lengths



1/4 Mile
15 Barge Tow

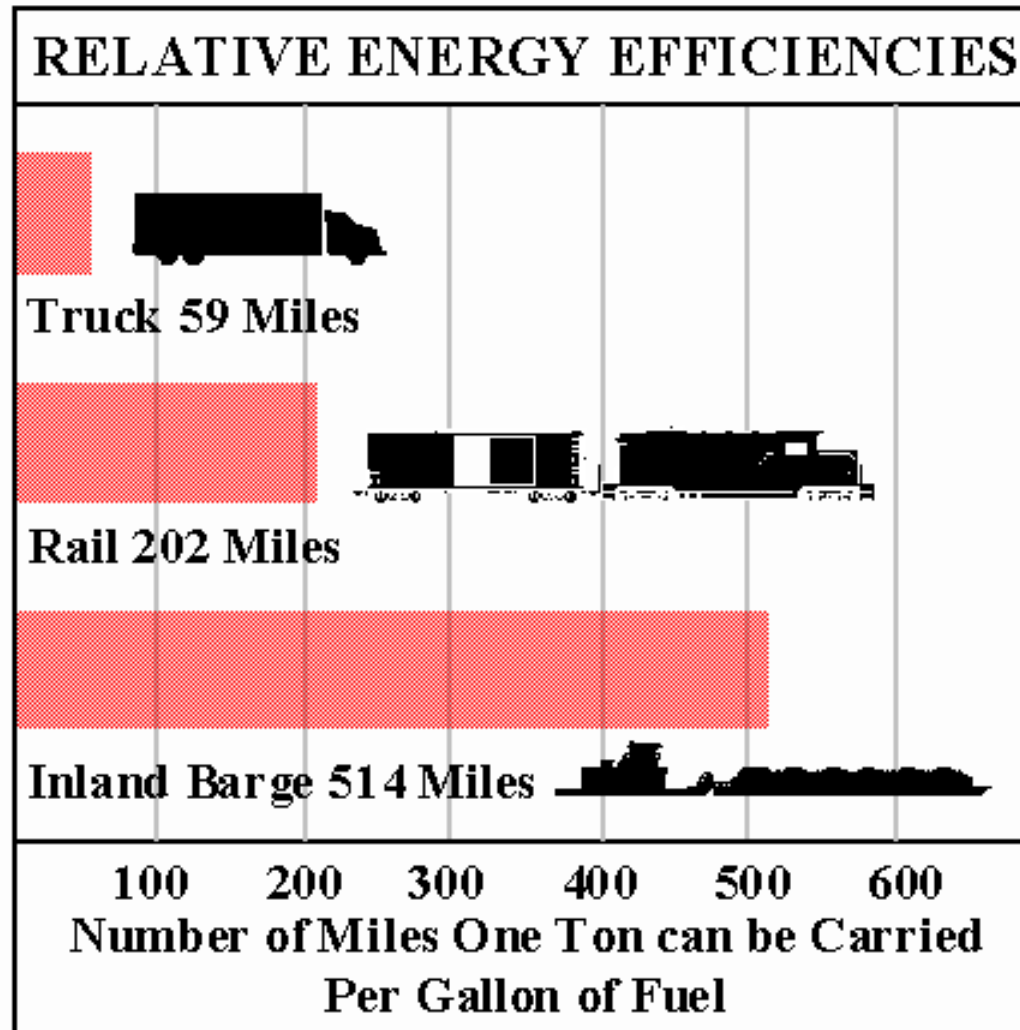


2 3/4 Miles
2 1/4 Unit Trains



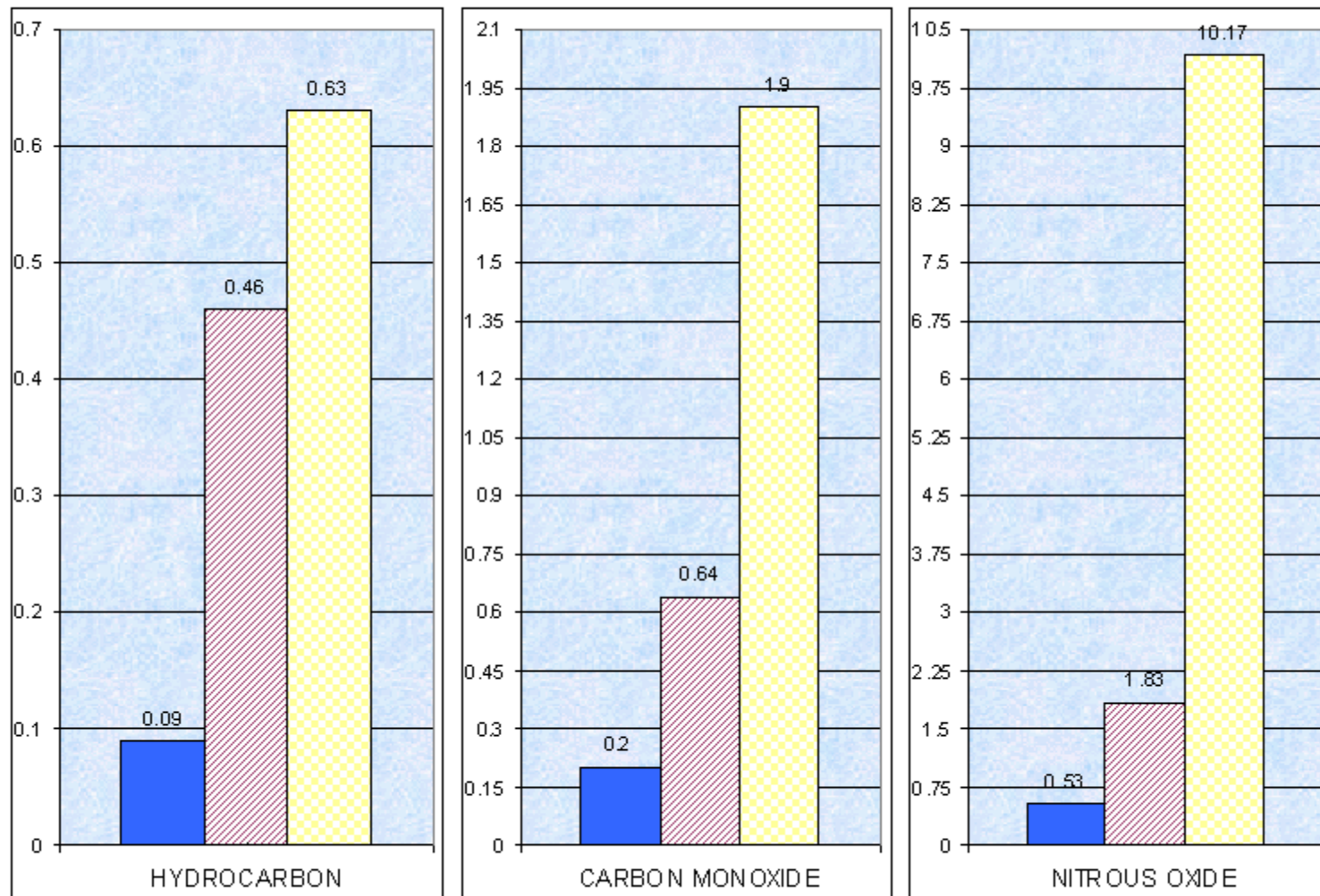
34 1/2 Miles
Assuming 150 Ft. Between Trucks

Environmental Comparisons



EMMISSIONS PRODUCED

Pollutants (in pounds) produced in moving one of cargo 1,000 miles



INLAND BARGE
 TRAIN
 TRUCK

2001 Intercity Freight Statistics

	Ton-miles in billions		Tons in millions		Revenue in billions		Revenue per ton-mile
Trucks	1051	28.15%	4122	50.91%	467.1	88.73%	\$0.113
Rail	1558	41.72%	2121	26.19%	26.7	5.07%	\$0.013
Oil Pipeline	616	16.50%	1123	13.87%	9.1	1.73%	\$0.008
River/canal/domestic and foreign	400	10.71%	616	7.61%	4.6	0.87%	\$0.007
Great Lakes/domestic and foreign	94	2.52%	100	1.24%	0.5	0.09%	\$0.005
Air	15	0.40%	15	0.19%	18.4	3.50%	\$1.227
TOTAL	3734	100.00%	8097	100.00%	526.4	100.00%	

NOTE: There are minor inconsistencies because of coastwise and foreign movements

MOTOR And HIGHWAY ISSUES



Motor and Highway Issues

- Highway/Freeway capacity expansion – need more lane miles
- Bridge Replacement and Maintenance needs
- How to finance- Highway Trust Fund will be depleted next year
 - Higher gasoline taxes?
 - Tolls?
 - General Revenues?
 - Public Private Partnerships? Auction off existing toll roads? Franchise rights for new roads to private firms?
- Federal, state and local roles

Motor and Highway Issues

- Longer heavier trucks
 - would Increase efficiency but present maintenance and safety issues
 - Mexico, Canada have now
 - Rail opposition
 - Bridge weight limits are a significant concern
- Driver shortages –
 - Demographics
 - Working conditions
 - Wages
 - Security Clearances
- Rest stops for trucks
 - Fatigue and safety
- Energy
 - Higher fuel costs
- Role of Mass Transit
 - Reduce Congestion in urban areas
 - Reduce pollution
 - Low benefit cost ratios
 - Who should Fund??

Railroad ISSUES



Rail Issues

1. Class 1 Railroads have continuing problems with
 - Power –Locomotive shortages
 - Car supply
 - Main line miles (coal fields)
 - Manpower
2. Grain and coal rates declined from 1981 to 1993 – but have been increasing since about 2002
3. Intermodal traffic gets preference
4. STB provides little regulatory oversight
5. Does a common carrier responsibility still exist??

Regulation of Class 1 Railroads

Class 1 RR's are at capacity and need to expand
How will they finance track and rolling stock ?

- **From monopoly profits** to meet Wall Street required ROI
-Result -Limited expansion with returns well above cost of treasuries – resulting in even more traffic on highways!
- **or from Federal grants and loans**

Rate making power--shippers cannot afford to protest to STB

STB has changed Revenue Adequacy Formula now RRs are revenue adequate

Is there a common carrier obligation? Deregulation eliminated many restrictions on entry and pricing but did not do away with the common carrier principles--if you are a common carrier

To What Extent Are RRs Still Common Carriers??

Common Carrier Principles From early Common Law, i.e., 1600s)

In return for charter (franchise) from the crown (government) the carrier assumes certain basic obligations

- to serve the public generally
 - to deliver the goods
 - to charge reasonable prices
 - to avoid discrimination in price and service (to like groups)
- These basic principles became statutory law as part of the Interstate Commerce Act of 1887 and were unchanged or expanded until deregulation in the 1980s.
 - Deregulation eliminated many restrictions on entry and pricing but did not do away with the common carrier principles--if you are a common carrier!

Rail Shortline Issues

- There will still be more abandonments!
- Larger, heavier cars desired by mainlines
- Bridges and old track need upgrading
- Paper barriers
- Environmental and NIMBY opposition to expansion
- Future of rail banks

WATERWAY ISSUES





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The Mississippi River Watershed and It's Major Navigable Waterways



ECONOMICS

Upper Mississippi -Illinois Waterway Situation

- 29 Locks on upper Miss from St. Louis north to Minneapolis
- 8 Locks on Illinois River from Chicago to Mississippi River
- The bulk of these locks were built in the 1920s and 1930s.
- They are worn out, costs of keeping operational are increasing.
- Traffic and configuration of flotilla's has changed from when built.
 - Congestion increasing
 - Processing Times Increasing

UMISS-ILL Cost/Benefits

What was (is) the fuss?

-
- New state of the art locks at 1200 feet cost about \$200 million each
- Lock extensions cost about \$120 million per lock.
- Proposed Mississippi/Illinois improvements
 - 5 new locks (Locks 20-25) on Mississippi
 - 2 New locks on the Illinois
 - 5 lock extensions (Locks 14-18).
 - Total Cost of Construction: \$2 billion

UPPER MISS-ILL Waterway Cost/Benefits

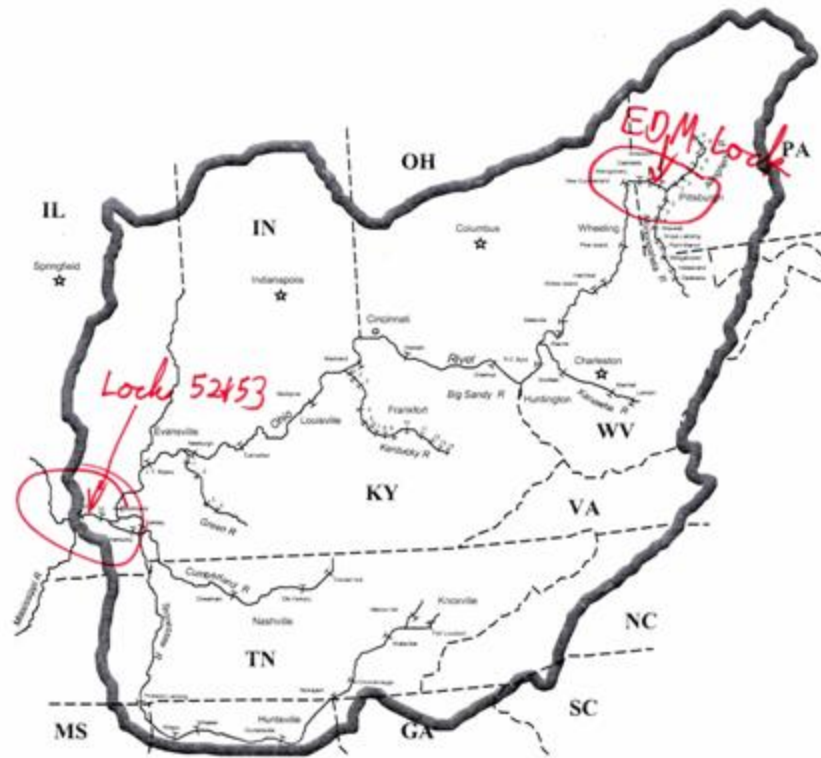
What was (is) the fuss?

- UMIWW expansion study started in late 1980s.
 - An Army Corp economist conducted a study and introduced a new methodology.
 - The effect was to sizably decrease the benefits of the projects and with the new model the benefits were less than the costs. The study was redone using the “old” assumptions and benefits came out >costs.
 - The whistle was blown
 - The upshot of a long history was that the Corp eventually invited the National Academy of Sciences to review all the methodologies.
 - NRC found:
 - Forecasting was not appropriate (basically trend analysis, which tended to overstate quantities).
 - Demand structures not warranted.
 - Non-structural measures should be considered (e.g., congestion pricing, scheduling)

UPPER MISS-ILL Waterway Improvements

- Congress in 2007 approved (but has not yet appropriated funds) for
 - 5 new locks (Locks 20-25) on Mississippi
 - 2 New locks on the Illinois
 - 5 lock extensions (Locks 14-18).
 - Total Cost of Construction: \$2 billion
 - Environmental Mitigation \$200 million
 - Environmental Restoration \$5 billion
 - Total \$7.2 billion
 - **NEW QUESTION: What is the cost benefit ratio for the restoration??**

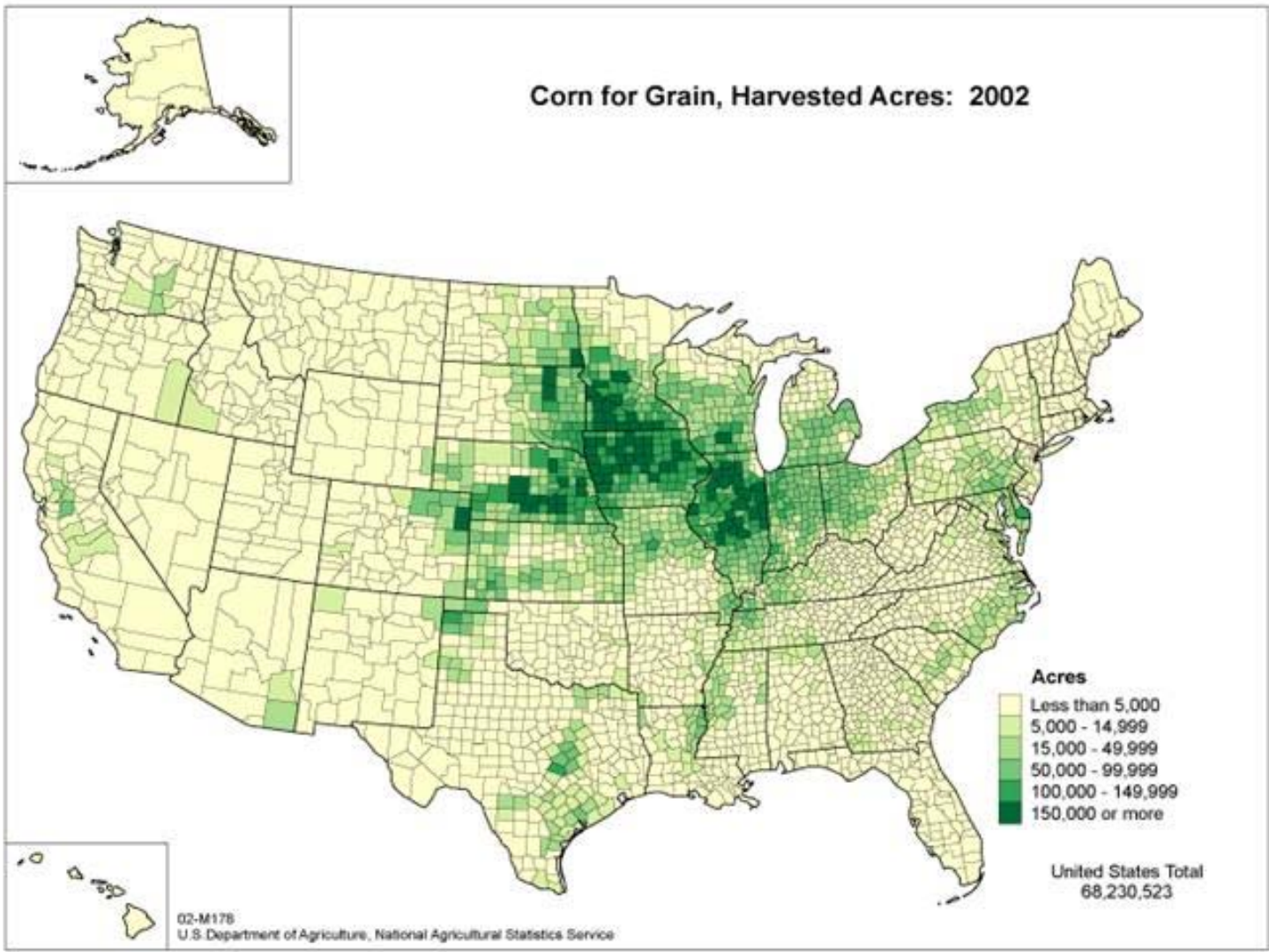
Ohio River Rehabilitation Needs



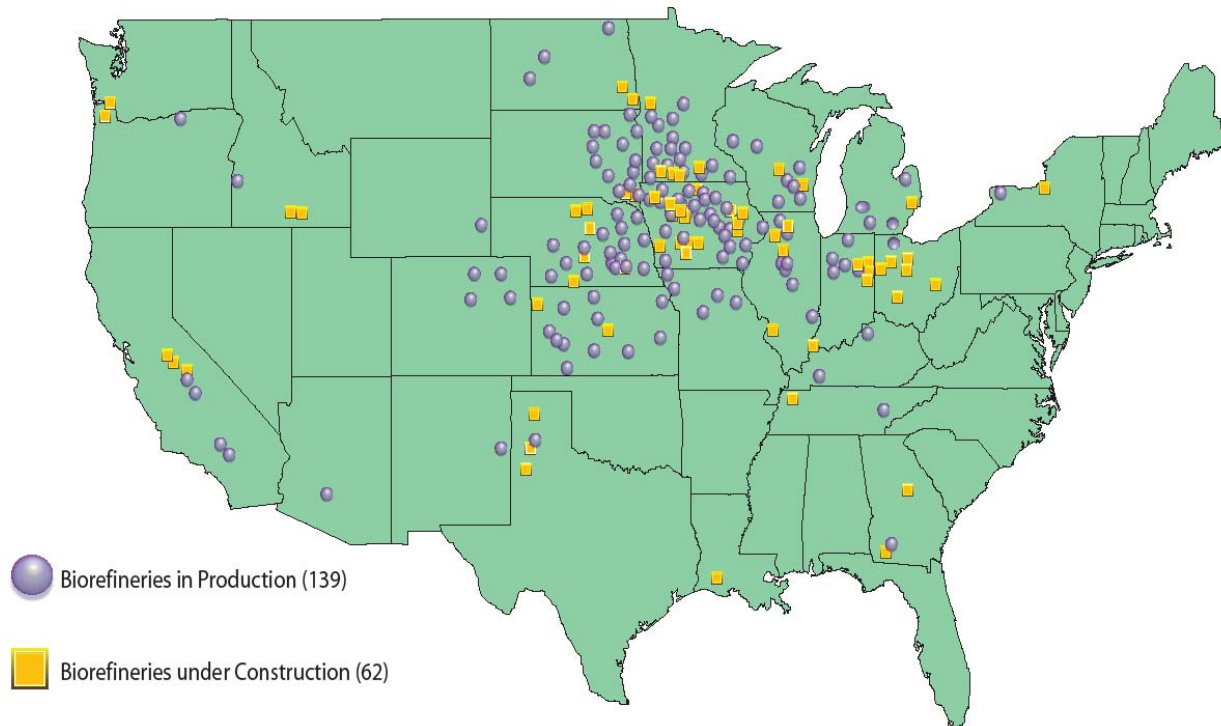
BIOFUELS AND TRANSPOTATION

Implications for Roads and Congestion

- More grain from farm to first handler because corn yields are three times soybeans
- Longer hauls when corn bypasses local elevator to ethanol plant
- Changes in local market patterns
- Changes in export routes and quantities



U.S. Ethanol Biorefinery Locations



Source: Renewable Fuels Association
01.24.08



Potential Demand by State and Region of Ethanol, assuming

State	E-10 mill gal	CNGV mill gal	RFB mill gal	Total mill gal
AK	170	105		105
CA	107	58		58
CO	270	225		225
DC	22	25	105	152
DE	17	20		20
FL	88	58		58
GA	46	25		25
IA	296	25	105	396
IND	1000	58	345	703
IL	544	100	200	300
IN	222	100		100
KS	228	25		25
KY	502	25		25
LA	120	25	100	205
MA	2000	275	300	725
MD	200	105	200	375
MI	227	2075		2075
MO	228	102	220	550
MT	224	102	100	1042
NE	1000	200	400	600

ESTIMATED POTENTIAL ETHANOL DEMAND AS E-10

BILLION GALLONS PER YEAR
PRG_Ethanol_Map, E10-08-04, May-07-08

11/2007



Ethanol Transportation Implications

- 90 % of the ethanol production capacity is in 8 Midwestern States
- 80% of the US population (and implied ethanol demand) lives along its coastlines
- Transportation costs are typically the 3rd largest producer expense after feedstock and energy
- Ethanol Movement by Mode in 2005
 - Rail 60%
 - Trucks 30%
 - Barge 10%
 - Pipeline 0%

Rail Transportation Issues

- Limited number of blenders who can take 100 (or 30 car trains)
- Many plants located on short lines
- Tank cars -30,000 gal Capacity
- \$95000 per car (\$9.5M per 100 car train)
- Up to a two year wait list for cars

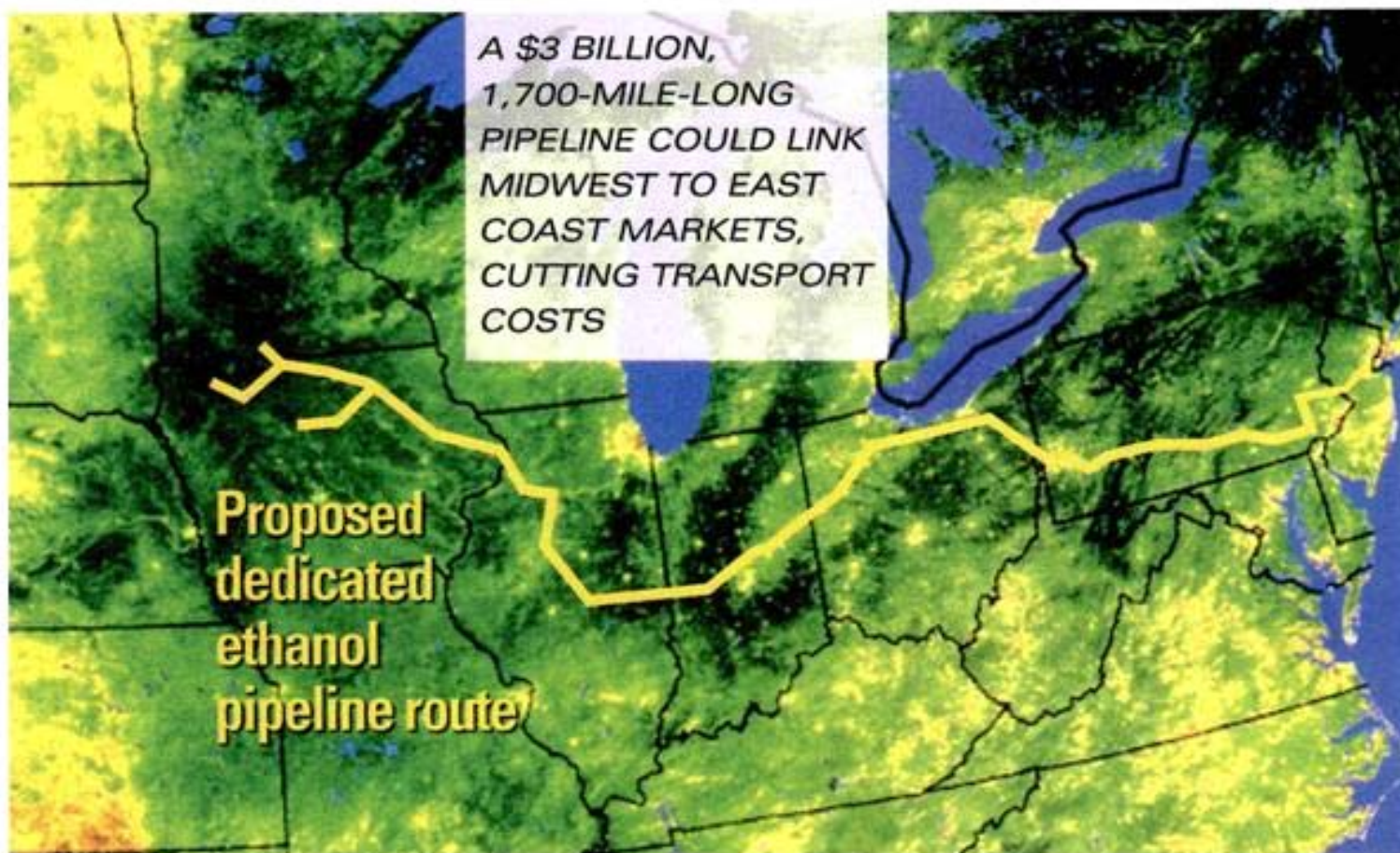
Why No Pipeline Movements ?

- Small volumes (less than 7% of gasoline to date) make dedicated lines relatively uneconomic
- Dispersed origin locations
- Early indifference of big oil
- Corrosion Issues
- Adherence to water
- Tax implications of master limited partnership rules (corrective legislation recently introduced)

Pipeline Movements Will Evolve

- Growing total volume of ethanol
- Clustering of production in Midwest
- Probably small dedicated lines
- Solutions to the corrosion and contamination issues are under investigation and might not be an issue for E-10 anyway

Potential Pipeline



Source: Farm Futures Apr 08

Moving DDGS Long Distances

- Rail capacity is a short run constraint
- Can ship dry DDGS in 5700 CF grain hopper cars
- Weight penalty -- DDGS bulk density less than corn and beans
- Railroad owned hopper cars **not permitted** for DDGS because of flow issues.
- New larger cars with wider hopper doors will become the standard but have long manufacturing lead times.

Ideal Location

- Have Feedlot Next to Ethanol plant so DDGS have no transportation costs

Cellulosic Ethanol

The Solution or Subsidy Pit?

- About 10 pilot plants are being developed with government aid of more than \$500M
- Possible feed stocks include
 - Corn stover (and/or corn cobs)
 - Prairie grasses
 - DDGS
 - Forest residues
 - Trash
- In-plant burning as processing fuel is a likely use

Storage, Handling, and Other Issues to Consider

Storage facilities –space, type, cost, losses
Size of biomass shed-Density of production
and distances to facilities
Density of product for hauling
Commitment risk of tying up land
Length of Harvest window
New types of harvesters?
Seed availability
Are there alternative markets for surplus production in
good years

Jerry Fruin
231 Classroom Office Building
1994 Buford Ave
St Paul MN 55108
612 625 8720
Fax 612 625 2729
fruin001@umn.edu

Department of Applied Economics
College of Food, Agriculture and Natural Resource
Sciences
University of Minnesota