

Navigation Data & Needs

May 9, 2003

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Topics

- Introduction
- Available Data
- Data Applications
- Waterway Network
- What We Model
- What We Would Like to Model
- NAS Comments

Introduction

What Does The Modeler Have To do?

- P & G Compliant
- Use Engineering Input
- Provide Environmental Inputs
- Determine Key Drivers

Introduction

Ultimately, The Modeler Has To Provide Decision Makers Enough Information To Make a Decision, Given:

- Time
- Money
- Data

Data

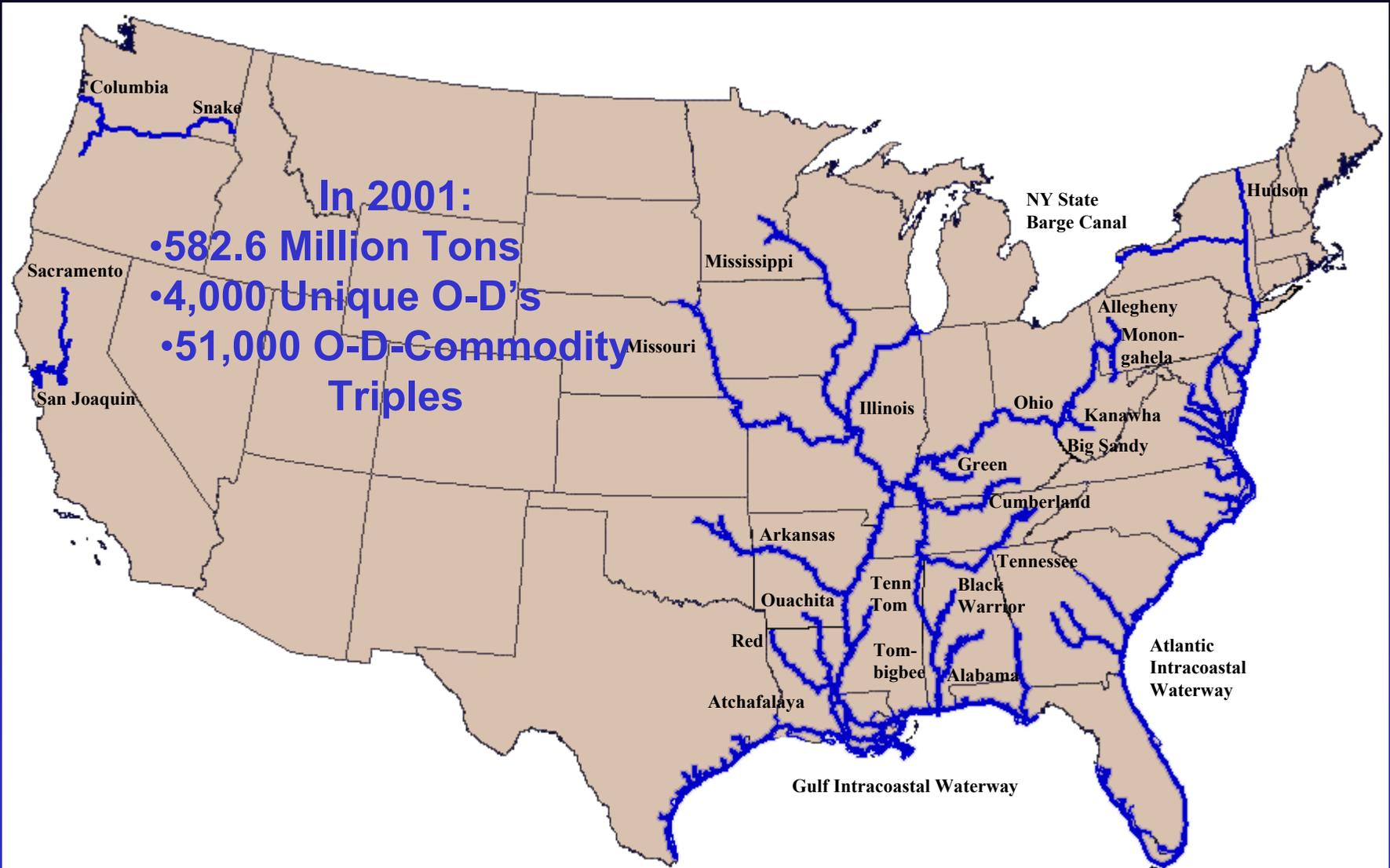
Most Originate From National Data Center (NDC)

<http://www.iwr.usace.army.mil/ndc/index.htm>

- Waterborne Commerce Statistics Center (WCSC)
- Lock Performance Measurement System (LPMS)
- Cost Data
- Other

WCSC Data

- Point To Point
- Commodity
- Operator
- Registered Vessel
- Tons (or Other)
- Route



Columbia

Snake

Sacramento

San Joaquin

In 2001:

- 582.6 Million Tons
- 4,000 Unique O-D's
- 51,000 O-D-Commodity Triples

Missouri

Mississippi

Illinois

Ohio

Green

Cumberland

Arkansas

Ouachita

Red

Atchafalaya

Tenn Tom

Black Warrior

Tombigbee

Alabama

Tennessee

Kanawha

Big Sandy

Allegheny

Monongahela

NY State Barge Canal

Hudson

Atlantic Intracoastal Waterway

Gulf Intracoastal Waterway

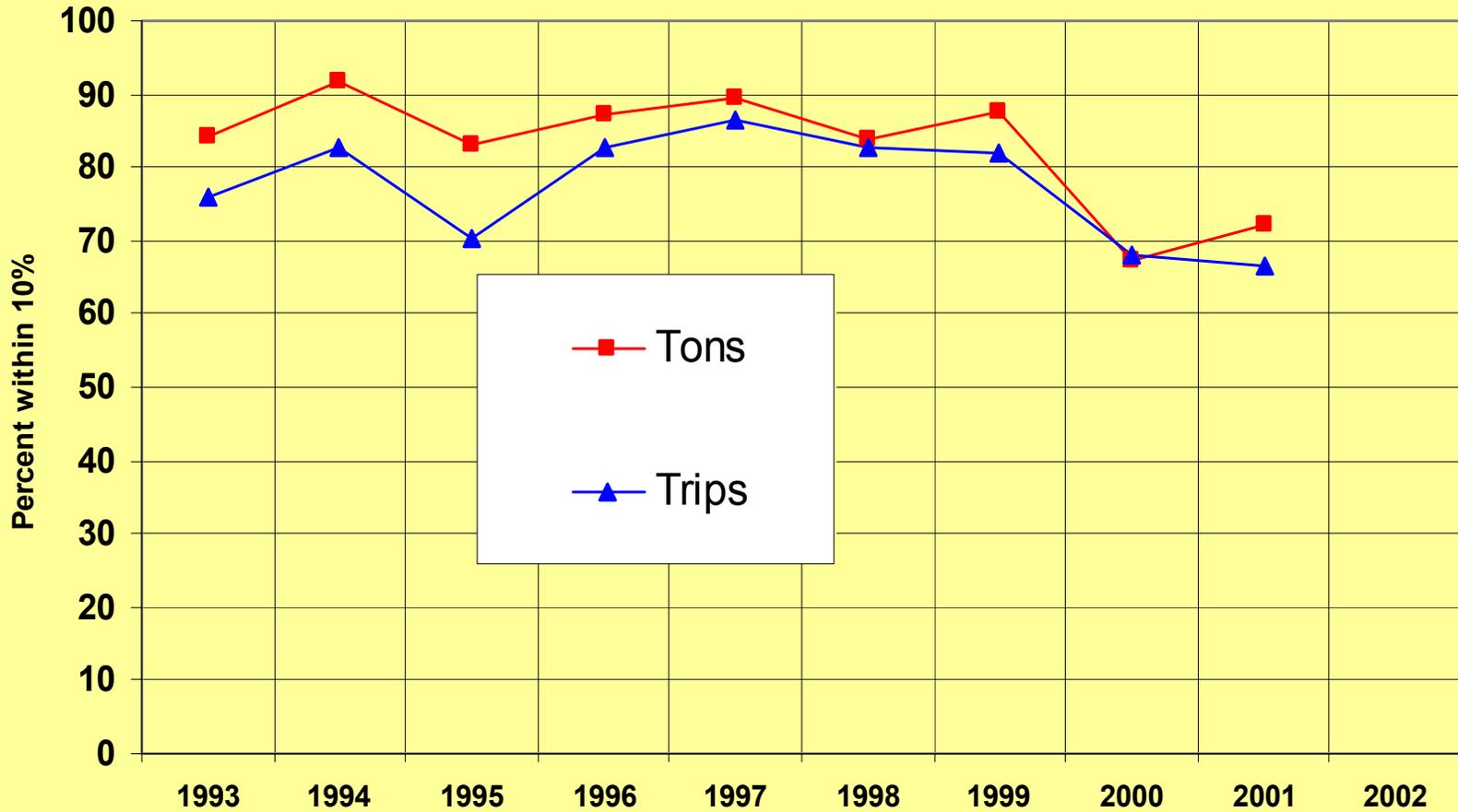
LPMS

- Availability
- Lockage Type
- Times - Delay and Processing
- Flotilla
- Vessel Types
- Commodity
- Tonnage

Use This Data

	WCSC	LPMS
Barge Type	X	X
Loaded Barges		X
Loading	X	
Empty Barges		X
Commodity	X	
Powered Vessel		X
Flotilla		X

LPMS - WCSC LOCK COMPARISONS



Vessel Operating Costs

http://www.usace.army.mil/inet/functions/cw/cecwp/General_guidance/guidance.htm

- Planning Guidance Memoranda
- General Guidance
- Economic Guidance Memoranda
 - Interest Rates
 - Deep Draft Operating Costs
 - Shallow Draft Operating Costs
- Study Guidance Memoranda

Other Costs

- Inventory Holding Costs
- Is it Important ?
 - Most Inland Probably Not
 - Containers and Specialized – Yes
- Where do we get the Commodity Value ?
- In LRD – 1-2% of Delay Cost

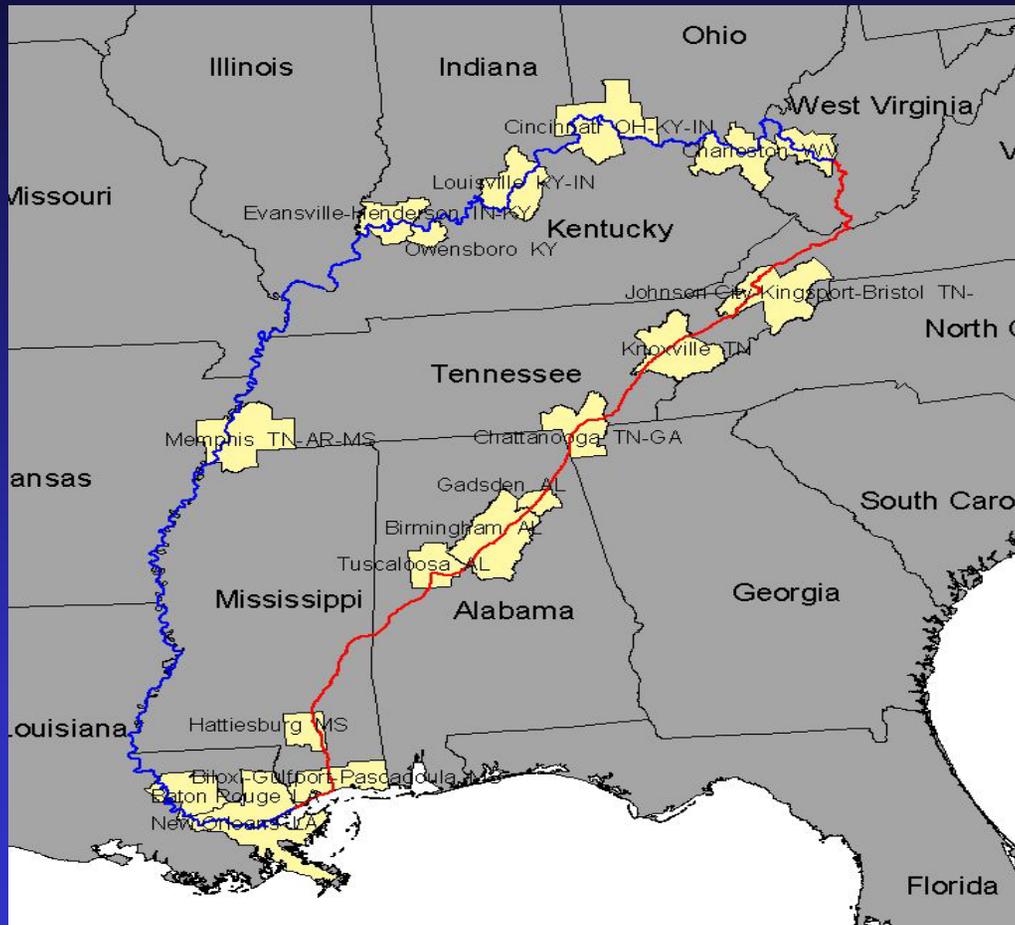
Other Data

- OMBIL
- Port Series
- Navigation Charts
- Waterway Point Directory
- Vessel Master File
- Port Master File
- Lock Characteristics
- Passengers and Containers
- Dredging

Data Applications

- WCSC
 - Rate Analysis
 - Forecasts
- LPMS
 - Lock Performance
- Vessel Costs
 - Adjust Waterway Portion Of Rates

Rate Analysis



-  Water Routing
-  Land Routing
-  Metropolitan Statistical Area

Forecasts

- WCSC gives :
 - History
 - Shippers and Carriers Identified
- What are the Drivers ?
- Why are They Here ?
- What Will They Do ?
- What are the Possible Futures?
- How Are They Affected by Congestion?
- Are There Alternative Sources?

Lock 101

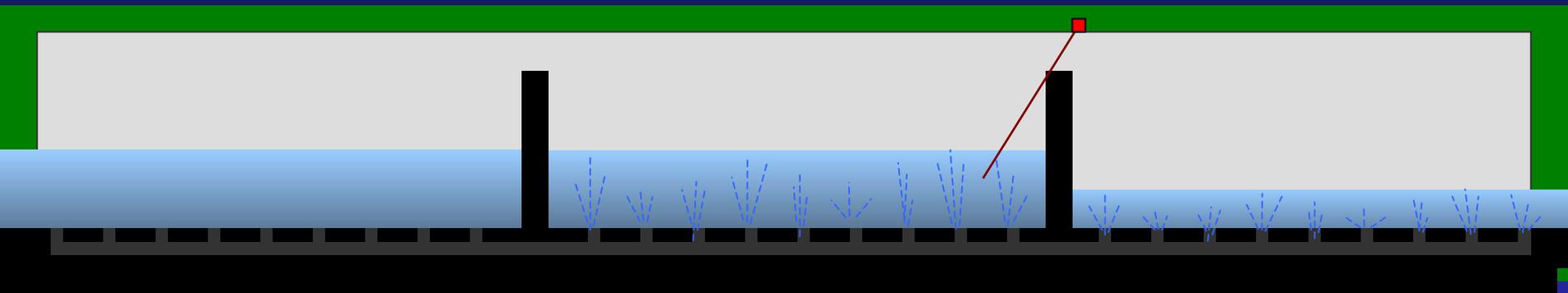
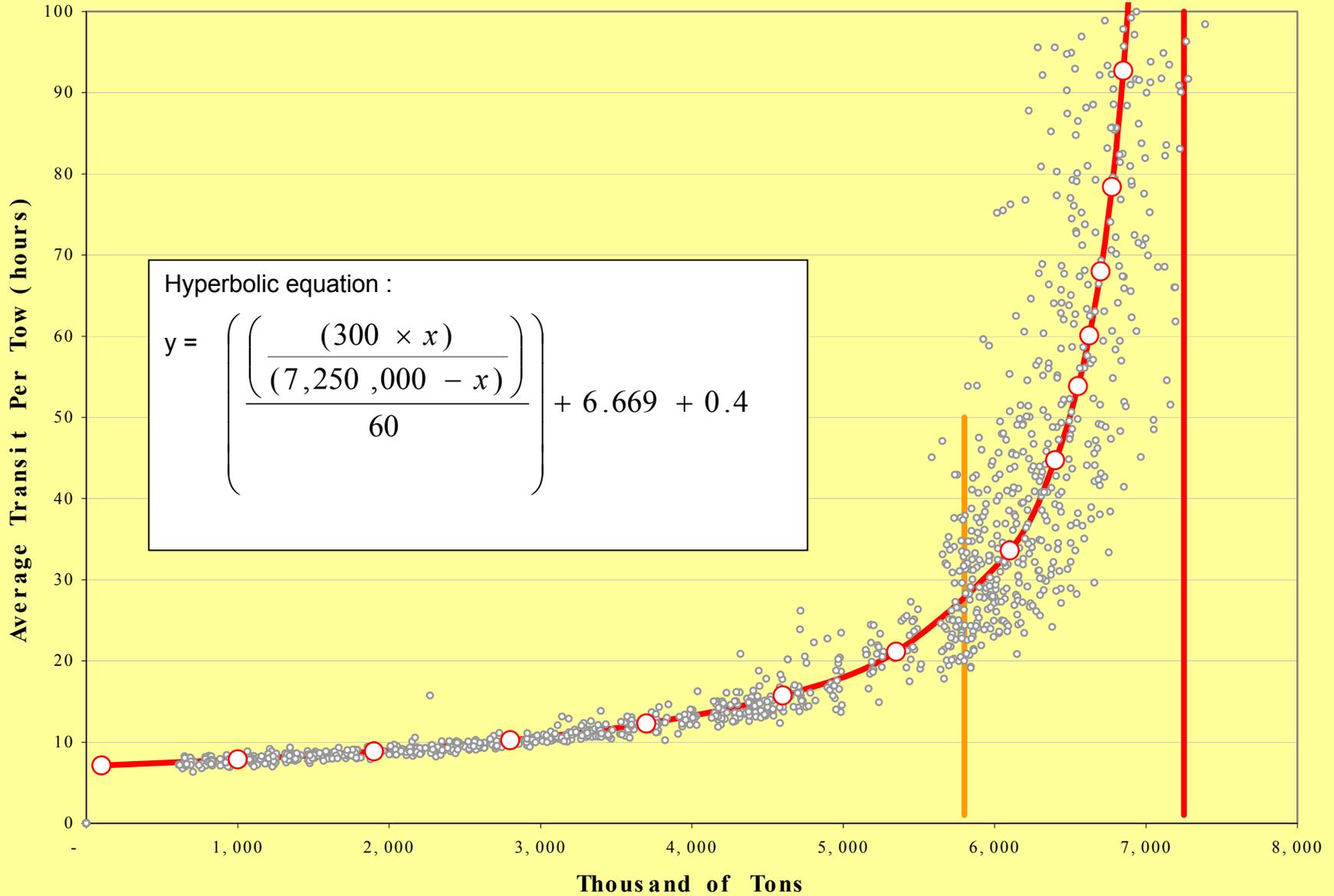
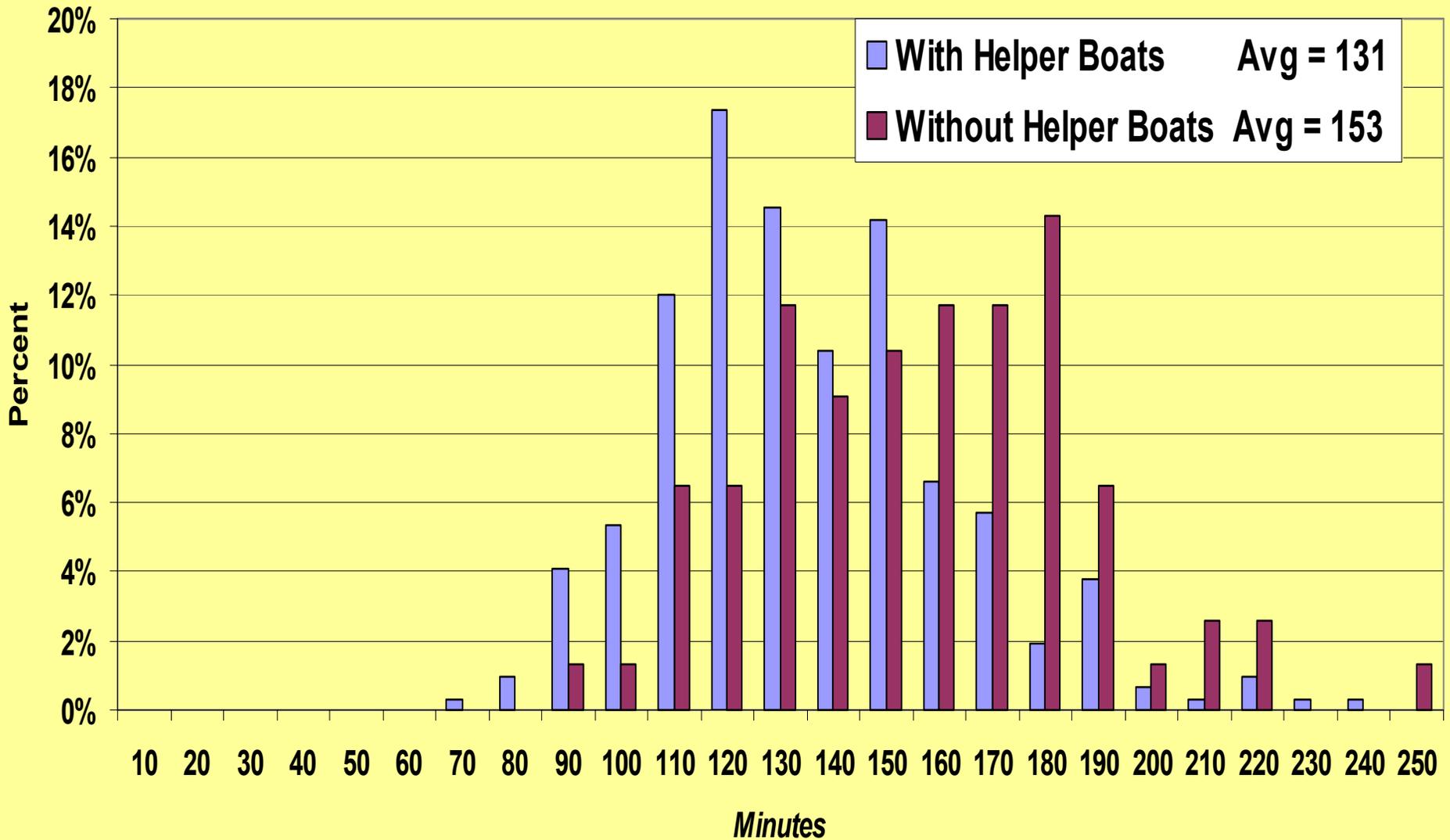


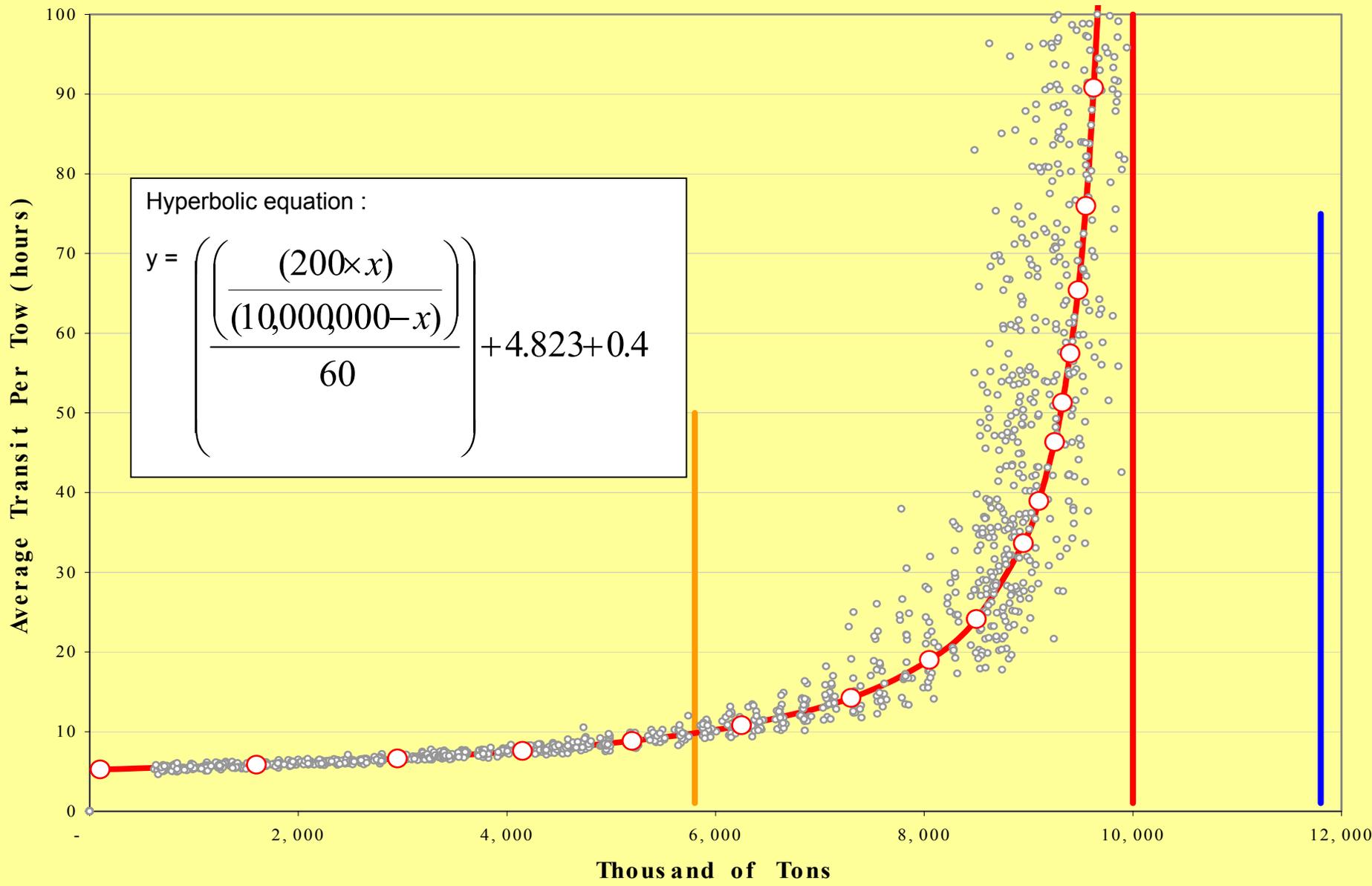
FIGURE I-32-supplement CHICKAMAUGA – 360' x 60'
TONNAGE-TRANSIT SIMULATION RESULTS



New Cumberland 2002 Main Chamber Closure Processing Times



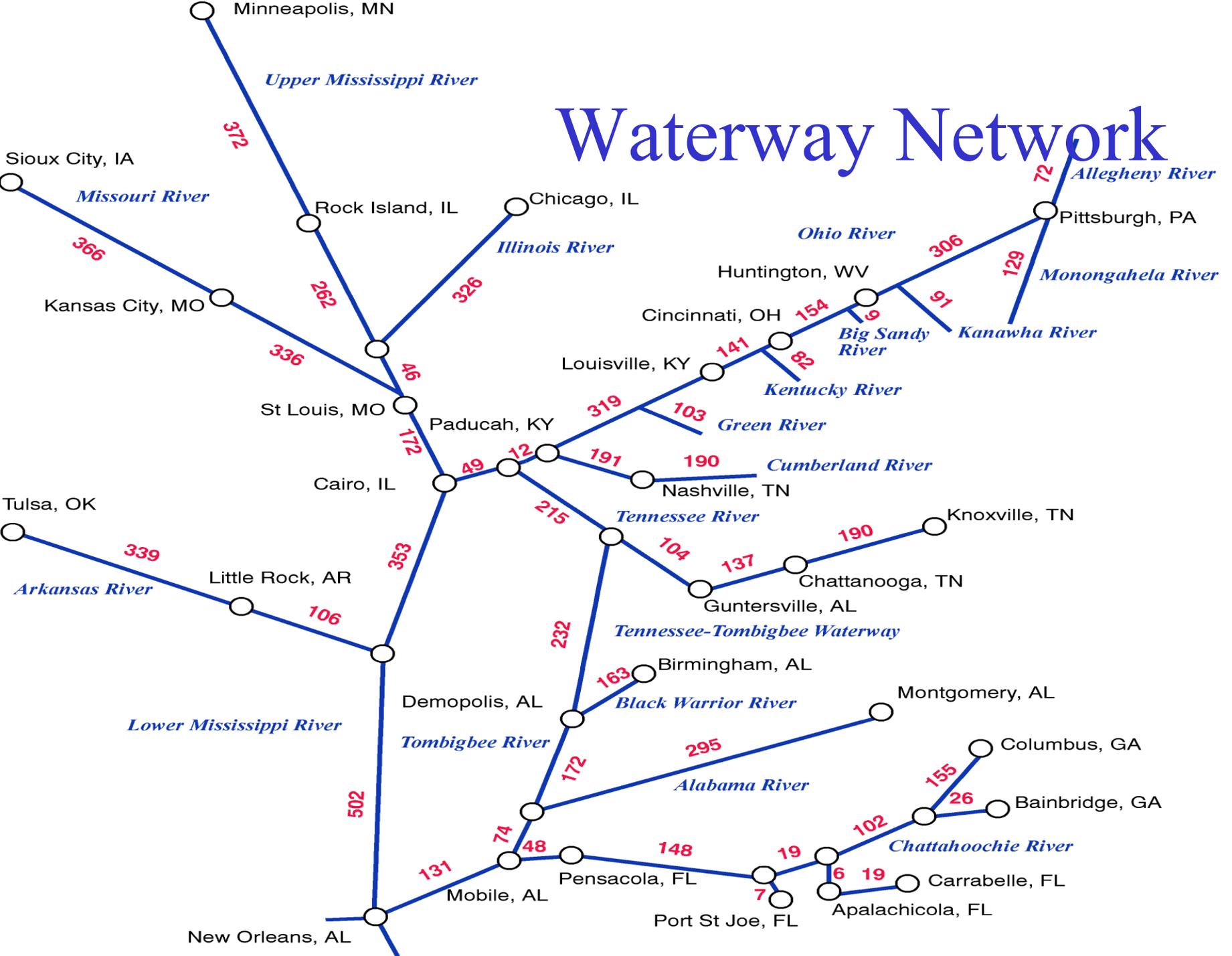
**FIGURE I-34-supplement CHICKAMAUGA – 360' x 60'
WITH HELPER BOATS TONNAGE-TRANSIT SIMULATION RESULTS**



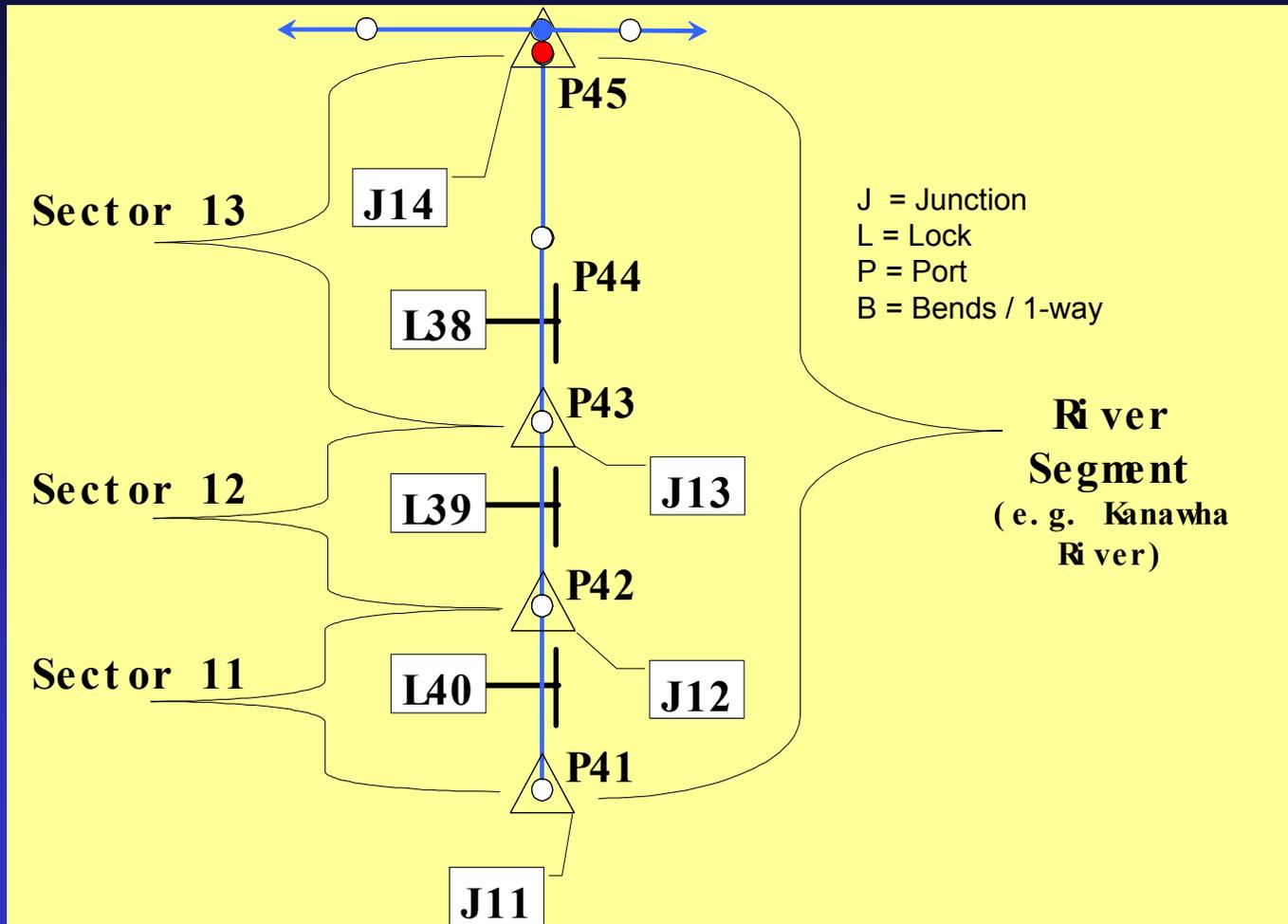
Vessel Cost Application

- Use LPMS Flotilla Data
- Apply IWR Costs to Equipment Types
- Yields Underway and Delay Costs (\$/Hr or \$/Ton-Hr)

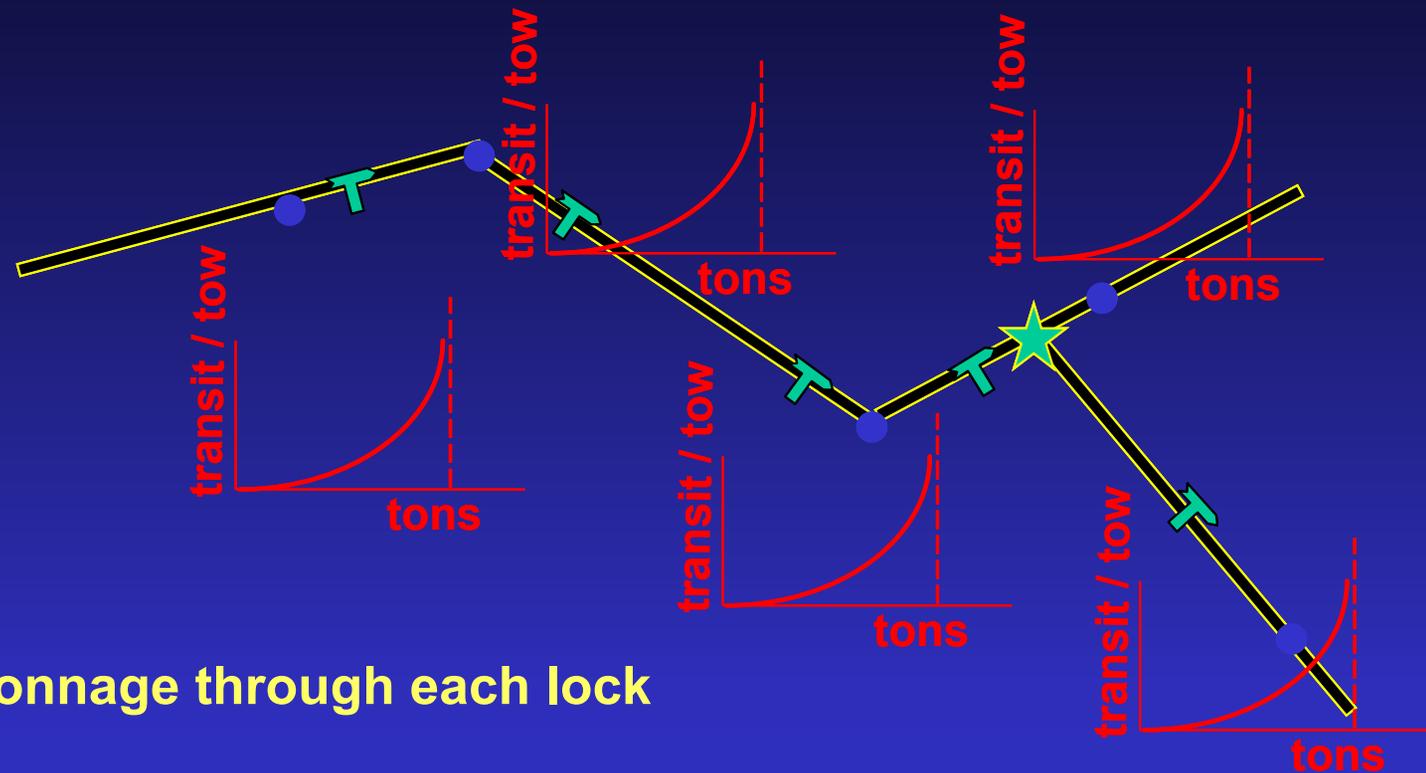
Waterway Network



Network Elements



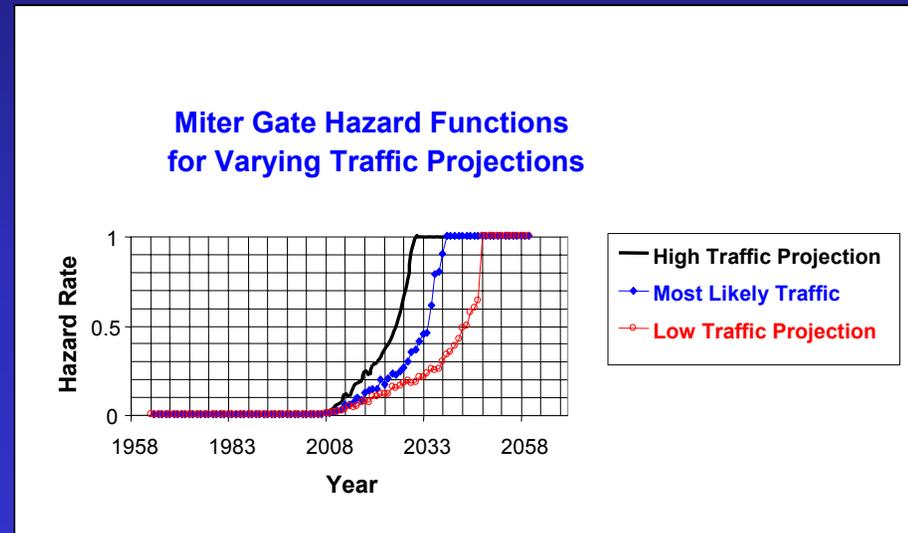
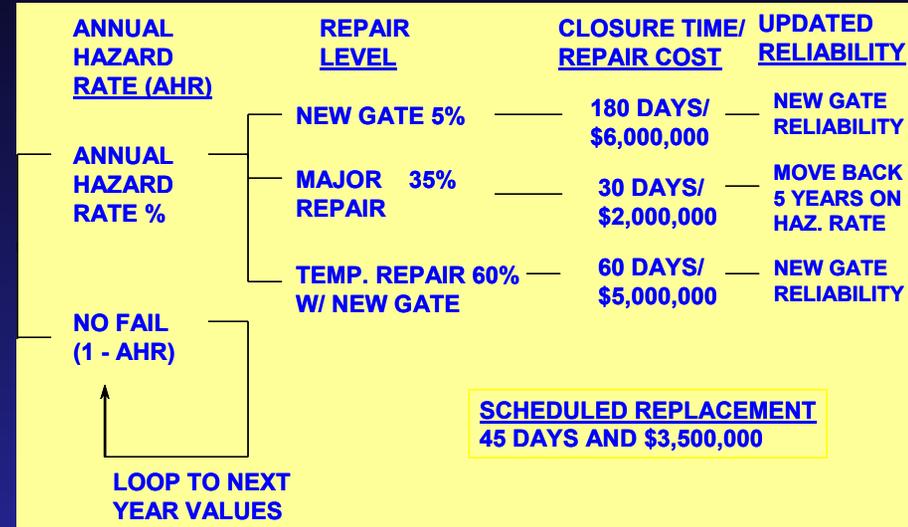
System Network (Cost Module)



- Add annual tonnage through each lock
- Determine delay at each lock using curves
- Compute travel costs for each annual shipment

Link To Structural Reliability

- **Engineering Reliability Analysis**
 - Detailed structural condition studies
 - Develop hazard functions & Probabilities of Unsatisfactory Performance (PUPs) for major lock components
 - Identify consequences of unsatisfactory performance (Repair costs & Closures)
- **Economic Reliability Analysis**
 - Simulate 50 year project-life
 - Evaluated alternatives



Integration of Environment

Are environmental values woven into the formulation and evaluation process to insure that we are practicing adaptive management?

- **EOP - Environmental concerns are part and parcel of all USACE missions, decision-making, programs and projects**
- **Economic Outputs linked to NAVPAT**



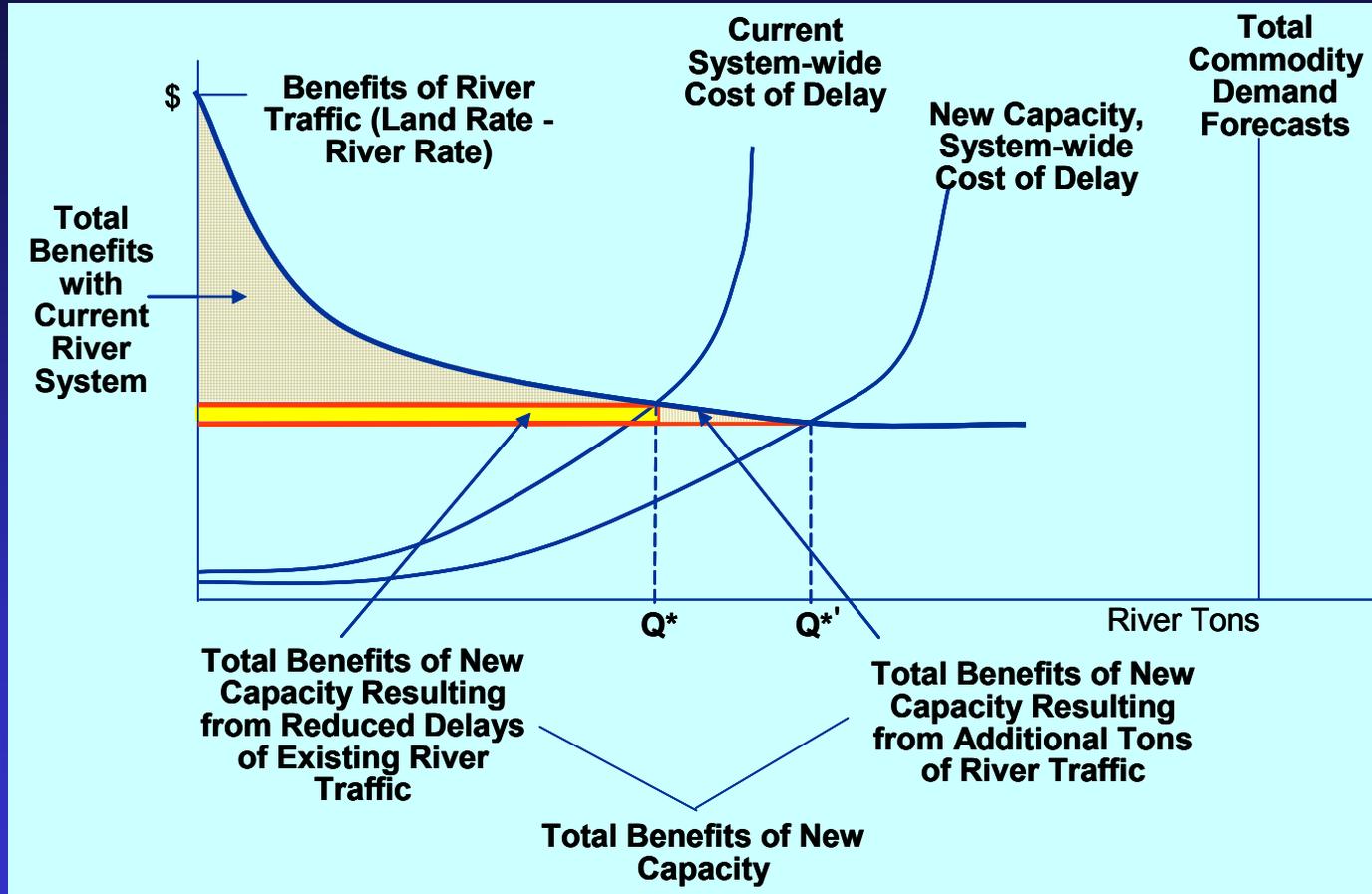
What We Model

Waterway Cost Changes That Arise From Changes:

- Traffic Levels and Flow Patterns
- Vessel Fleet
- Lock Operation (Lockage Polices and Helper Boats, for Example)
- Structural Reliability of Lock Facilities
- Taxes and Fees

What We Model

- Demand - ARS
- Supply – ATC
- Cost Reduction for existing moves (yellow box)
- Cost savings for moves that shift to the waterway (yellow with hash marks)



What We'd Like to Model

- Benefits From Waterway System Improvements
- In So Doing, We Want the Model to be:
 - Realistic
 - Consistent With Theory
 - Consistent With State of Practitioners' Art
- NAS Had Some Specific Comments

NAS Comments

- *Systems Analysis*
- Assessments of Nonstructural Alternatives
- Better Integration of ED, EC and EV
- *Forecasts and Uncertainty*
- *Sensitivity of Barge Traffic to Rates*
- *Modeling Lock Congestion*
- *Transportation Rates*
- *Structural Reliability*