By any measure, the U.S. has the most well-developed Freight Transport Infrastructure in the World and it is a global competitive advantage.
TRANSPORTATION’S ROLE IN U.S. ECONOMY

While water carriage requires just 4% of freight costs, it accounts for 11% of the ton-miles produced.
## TRANSPORTATION’S ROLE IN U.S. ECONOMY

### Comparison: Barge Industry versus Rail Industry

<table>
<thead>
<tr>
<th></th>
<th>Barge Industry</th>
<th>Class I Railroads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles of Right-of-Way</td>
<td>26,000</td>
<td>96,000</td>
</tr>
<tr>
<td># of Barges/Freight Cars</td>
<td>28,000</td>
<td>364,000</td>
</tr>
<tr>
<td># of Towboats/Locomotives</td>
<td>4,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Annual Revenue</td>
<td>$5 billion</td>
<td>$68 billion</td>
</tr>
</tbody>
</table>

SOURCE: 2012 AMERICAN WATERWAYS OPERATORS/ASSOCIATION OF AMERICAN RAILROADS
## TRANSPORTATION’S ROLE IN U.S. ECONOMY

### Modal Comparison

<table>
<thead>
<tr>
<th>Geographic Coverage</th>
<th>Barge: Limited to navigable channels</th>
<th>Rail: Limits shipper options</th>
<th>Pipeline: limited to build network</th>
<th>Truck: ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipment size</td>
<td>1,500 ton minimum</td>
<td>100 ton minimum</td>
<td>very large</td>
<td>40 ton minimum</td>
</tr>
<tr>
<td>Speed</td>
<td>5-10 MPH</td>
<td>25 MPH</td>
<td>---</td>
<td>50 MPH</td>
</tr>
<tr>
<td>Capital cost</td>
<td>moderate</td>
<td>high</td>
<td>very high</td>
<td>low</td>
</tr>
<tr>
<td>Operating cost</td>
<td>low</td>
<td>moderate</td>
<td>very low</td>
<td>very high</td>
</tr>
<tr>
<td>Environmental hospitality</td>
<td>good</td>
<td>poor</td>
<td>good for existing</td>
<td>bad</td>
</tr>
<tr>
<td>Cargo Types</td>
<td>bulk liquid or dry</td>
<td>ALL</td>
<td>bulk liquid</td>
<td>ALL</td>
</tr>
</tbody>
</table>

SOURCE: 2012 AMERICAN WATERWAYS OPERATORS/ASSOCIATION OF AMERICAN RAILROADS
The United States Navigable Waterways System is an essential part of the nation’s transportation infrastructure.

Under the Jones Act, the right to serve this market is reserved to U.S. operators (owned, operated and built).
A **towboat** is a manned vessel that transports/pushes barges.

There is a large variation in:
- size
- power
- construction, and
- area of operation
Generally, there are four main types of towboats:
LOWER MISSISSIPPI

LINEHAUL
LOWER MISSISSIPPI

HARBOR

LOCKING
RIVERS

CANAL
Towboats assigned to operating territories to achieve lowest possible unit towing cost.
### LINEHAUL TOWBOATS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power:</strong></td>
<td>4,000 hp to 11,000 hp</td>
</tr>
<tr>
<td><strong>Towing Capacity:</strong></td>
<td>Up to 60,000 tons (25 to 40 loaded barges)</td>
</tr>
<tr>
<td><strong>Cost:</strong></td>
<td>$10,000,000 to $25,000,000 depending on power and configuration</td>
</tr>
<tr>
<td><strong>Useful Life:</strong></td>
<td>35 years, extendable to 50 years with major rehab at mid-life</td>
</tr>
<tr>
<td><strong>Crew Size:</strong></td>
<td>8 - 10 person</td>
</tr>
<tr>
<td><strong>Fuel Consumption:</strong></td>
<td>1 gallon per horsepower per day</td>
</tr>
<tr>
<td><strong>Area of Operation:</strong></td>
<td>Lower Mississippi and Lower Ohio Rivers</td>
</tr>
</tbody>
</table>
## Locking Towboats

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>1,800 hp to 6,000 hp</td>
</tr>
<tr>
<td><strong>Towing Capacity</strong></td>
<td>15,000 to 25,000 tons (9 to 16 loaded barges)</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>$5,000,000 to $15,000,000 depending on power and configuration</td>
</tr>
<tr>
<td><strong>Useful Life</strong></td>
<td>35 years, extendable to 50 years with major rehab at mid-life</td>
</tr>
<tr>
<td><strong>Crew Size</strong></td>
<td>7 - 10 person</td>
</tr>
<tr>
<td><strong>Fuel Consumption</strong></td>
<td>3/4 gallon per horsepower per day</td>
</tr>
<tr>
<td><strong>Area of Operation</strong></td>
<td>Upper Ohio, Upper Mississippi, Tennessee and Illinois Rivers</td>
</tr>
</tbody>
</table>
# Canal Towboats

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>1,000 hp to 2,000 hp</td>
</tr>
<tr>
<td>Towing Capacity</td>
<td>3,000 to 8,000 tons (2 to 4 loaded barges)</td>
</tr>
<tr>
<td>Cost</td>
<td>$2,000,000 to $6,000,000 depending on power and configuration</td>
</tr>
<tr>
<td>Useful Life</td>
<td>30 years, extendable to 45 years with major rehab at mid-life</td>
</tr>
<tr>
<td>Crew Size</td>
<td>4 - 7 person</td>
</tr>
<tr>
<td>Fuel Consumption</td>
<td>3/4 gallon per horsepower per day</td>
</tr>
<tr>
<td>Area of Operation</td>
<td>Gulf Intracoastal Waterways and Tributaries</td>
</tr>
</tbody>
</table>
Generally, there are three main types of barges:
Liquid Tank Barges

More diversity than hoppers; two main types:

• Clean petrochemical linehaul barges
• Oversized petrochemical barges
Liquid Tank Barges

<table>
<thead>
<tr>
<th>Capacity:</th>
<th>1,500 to 4,000 tons (10,000 bbls to 30,000 bbls) when loaded to a 9' draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size:</td>
<td>150’ to 300’ long, 35’ to 54’ wide, 10’ to 13’ deep</td>
</tr>
<tr>
<td>Useful Life:</td>
<td>25 years, extendable to 40 years with major rehab at mid-life</td>
</tr>
<tr>
<td>Hull Type:</td>
<td>Mix of single hull and double hull</td>
</tr>
<tr>
<td>Cost:</td>
<td>$950,000 to $2,000,000 depending on size and configuration</td>
</tr>
</tbody>
</table>
The Lower Mississippi is an open river with no lock structures, allowing larger tows moving more than 80,000 tons.
Maximum **Tow Sizes**

**BELOW CAIRO, IL TO NEW ORLEANS**

¼ Mile 1,145’

200’

280’
Maximum Tow Sizes

Above St. Louis, Illinois, Ohio, Tennessee

¼ Mile 1,145'

200'

105'

½ Mile 1,145'
Why are barges such odd odd sizes?
The navigable channel is maintained by the Army Corps of Engineers using Lock & Dam structures.

The standard lock chamber size limits the barge length, width and depth.
Lock Chamber – 600'

LINEHAUL TOW

UNIT TOW
HOW A **LOCK** WORKS

- **Upper Gates Closed**
- **Lower Gates Closed**
- **Filling Valve Closed**
- **Drain Valve Opened**
HOW A LOCK WORKS

- Upper gates closed
- Lower gates opened
- Filling valve closed
- Drain valve opened
Advantages of Inland Barge Transportation

1. 15-BARGE TOW

2. 216 RAIL CARS + 6 LOCOMOTIVES

3. 1,050 LARGE SEMI TRACTOR-TRAILERS
Advantages of Inland Barge Transportation

Transporting freight by water is also the most energy-efficient choice

For one ton of cargo per gallon of fuel...

- A barge moves 616 miles
- A rail car moves 478 miles
- A truck moves 150 miles

Ton-miles Traveled per Gallon of Fuel
Advantages of Inland Barge Transportation

Inland waterways transport generates fewer emissions than rail or truck per ton-mile.

Barge transportation generates the lowest emissions as measured in grams per ton-miles in four standards tracked by the EPA:

- PARTICULATE MATTER (PM)
- HYDROCARBONS (HC)
- CARBON MONOXIDE (CO)
- NITROGEN OXIDES (NOx)
Today's Barge Industry Economic Impact of Barge Transportation

- More than 33,000 people employed aboard tugs & towboats
- 30,000 people employed by shipyards
- Almost 500,000 workers in industries that rely on raw materials delivered by barge

- $5 billion contributed by industry each year to nation’s economy
- $750 million combined yearly total industry pays in payroll and corporate income taxes
## Today’s Barge Industry

Type and Number of Barges Operated (2012)

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>7,274</td>
<td>35%</td>
</tr>
<tr>
<td>Cover</td>
<td>10,520</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Total Dry</strong></td>
<td><strong>17,794</strong></td>
<td><strong>85%</strong></td>
</tr>
<tr>
<td>Total Liquid</td>
<td>3,188</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total Barge Fleet</strong></td>
<td><strong>20,982</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
About 560 million tons of cargo move each year on the U.S. inland waterways, most of it in bulk (2012)

- **Chemicals**: 37M tons
- **Coal**: 170M tons
- **Petroleum Products**: 145M tons
- **Crude Materials**: 108M tons
- **Farm Products**: 75M tons
- **Other**: 23M tons

**Major Commodities shipped on U.S. Waterways (Tons)**
Today’s Barge Industry

Dry Cargo Barge Market (2012)

Other includes Alumina, Salt, Cement, Fertilizer, Forest Products, etc.
Presently, Ingram is the largest dry cargo carrier

<table>
<thead>
<tr>
<th>Cargo Carriers</th>
<th>Quantity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingram</td>
<td>4,459</td>
<td>25%</td>
</tr>
<tr>
<td>AEP</td>
<td>3,199</td>
<td>18%</td>
</tr>
<tr>
<td>ACBL</td>
<td>1,961</td>
<td>11%</td>
</tr>
<tr>
<td>ARTCO</td>
<td>1,786</td>
<td>10%</td>
</tr>
<tr>
<td>Cargo Carriers</td>
<td>1,278</td>
<td>7%</td>
</tr>
<tr>
<td>SCF</td>
<td>1,167</td>
<td>6%</td>
</tr>
<tr>
<td>Crounse</td>
<td>1,035</td>
<td>6%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>14,885</td>
<td>83%</td>
</tr>
<tr>
<td>Total Industry</td>
<td>17,996</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Informa Economics, March 2012 Barge Fleet Profile & Public Financial Filings
Ingram’s numbers are YTD and reflect the May 2012 acquisition of U.S. United Barge Line, LLC
Industry dry cargo fleet has been stable since 2000

Construction

Retirements

Ill-considered legislation incents barge construction boom that results in gross over-capacity

Strong rate environment of early 90s results in a second, less-pronounced bubble

Source: Informa Economics
GRAIN EXPORTS

- Nearly 100M tons annually
- 72% of soybean and 61% of corn exports by barge
COAL FOR POWER PLANTS

- 227M tons annually — inland, lakes, coastal
- 20% of utility coal supplied by waterway
Today’s Barge Industry

is challenged by several issues...
117 out of 240
Locks are over 50 years old
AGING LOCK INVENTORY (242 CHAMBERS)

Includes all operational deep and shallow draft Corps and TVA navigation locks and control structures

Age in 2012 (Years)

- 0-9: 3
- 10-19: 9
- 20-29: 16
- 30-39: 17
- 40-49: 53
- 50-59: 31
- 60-69: 19
- 70-79: 55
- 80+: 39

60% > 50
Major Locks and Dams Requiring Emergency Repairs
November 2002 through Feb 2012

- **Lock and/or Dam Requiring Major Emergency Maintenance**
- **Major Closure – Industry Accident**

Dwindling Resources

Inland Waterways O&M Funding

1977-2011 Current $ and 1996 Constant $ *

* Fuel-Taxed Waterways Only
Dwindling Resources

AGING INFRASTRUCTURE + DWINDLING RESOURCES = INCREASING “DOWNTIME” AT LOCKS
Although service interruptions have been manageable so far, O&M related outages continue to concern the Barge Industry and its customers.

- **Crumbling Lock Wall, Lower Mon 3, Opened in 1907**
- **Concrete Deterioration at Chickamauga**
- **Leaking Spare Miter Gates, Upper Miss Lock 19**
INDUSTRIES AT RISK

- Fertilizer
- Aggregate
- Grain
- Cement
- Agriculture Support
- Oilseed Farming
- Power Generation
- Waterborne Transportation
- Coal
- Steel Manufacturing
- Chemical
- Petroleum
- Waterborne Transportation
- Coal
- Steel Manufacturing
- Chemical
- Petroleum
Regulatory Challenge

- Jones Act

- Safety Management Systems

- Federal authorities may change release flows on the Missouri River, which could negatively impact barge transportation on the Upper Mississippi

- Various states have imposed their own regulations on the federal waterways system. Their goals and regulatory enforcement can be inconsistent, making compliance difficult [VGP & NPDES]
SAFETY AND STEWARDSHIP
Safety Challenge

Ingram is actively involved with several public and private initiatives to further improve safety along the inland waterways:

- Safety Partnerships
- Responsible Carrier
- Simulator Training
What are the Major Variables for Direct Cost?

What are the **major variables** for direct cost?

- Labor
- Fuel
- External Services (e.g., cleaning, shifting, etc.)
- River operating conditions
- Ratability of shipments
- Equipment utilization level

**Other Variables**

- Strategic – Vessel Construction
- Tactical – Insurance Operator/Terminal Vetting (SIRB, TMSA)
How are Barge Rates Calculated?

Contract of Affreightment (Voyage); Term/Time Charter; Bareboat

- Most spot rates are market driven, with a floor near carrier’s variable operating costs
- Long-term contract rates are also market driven, but set at a level which generates a satisfactory return on investment
- For both spot and term contract bids, a distinction is made between fronthaul and backhaul movements, to optimize round-trip revenues and earnings
What are keys to improved equipment productivity?

1) Faster loadings and unloadings
2) Heavier loads per barge; bigger barges
3) Complete removal of cargo to avoid cleaning expense & time
4) Reliable schedules and forecasts
5) Ratable shipments; less seasonality
6) Balanced traffic flows
The Business of Towing

• Coming up: Stakeholder Partnerships