



# WATERWAY FACT SHEET

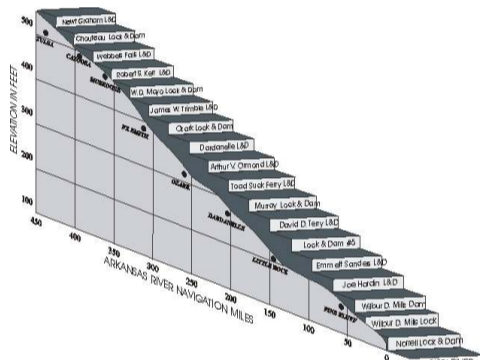
## McClellan-Kerr Arkansas River Navigation System

### HISTORICAL INFORMATION

The McClellan-Kerr Arkansas River Navigation System (“MKARNS”) is the official name of the waterway. In 1946, the Rivers and Harbors Act authorized the building of the multi-purpose system. Beneficiaries include: navigation, recreation, hydropower, water supply, wildlife conservation, and flood control (when considered as a part of the Arkansas River Basin Project and its upstream reservoirs that control water flows).

Construction of the upstream reservoirs in Oklahoma began in 1950. Construction of the navigation system started with Dardanelle Lock and Dam # 10 @ Russellville, Ark., in 1957.

Completed in 1970 at a cost of \$1.2 billion, the system is 445-miles long (137 miles in Oklahoma & 308 miles in Arkansas) and has 17 locks and dams — 5 in Oklahoma and 12 in Arkansas. Currently, an 18<sup>th</sup> lock is being constructed on the system at Montgomery Point in Desha County, Ark. The system includes the Verdigris, Arkansas and White Rivers.



### LOC

A virtual staircase of water was constructed to overcome the 420-foot elevation differential from mile 600 on the Mississippi River to the head of navigation at the Tulsa Port of Catoosa. The dams form a series of navigation pools, each of which is connected to the next by a lock which enables vessels to move from one pool to another. The locks and pools create the staircase of water that permits vessels to ascend and descend from the Mississippi River to Catoosa, Okla.

Each lock chamber measures 110-feet wide and 600-feet long, enabling it to accommodate up to one towboat with a tow of eight barges.

*Tow in lock chamber*



### CHANNEL DIMENSIONS

Channel widths are 300 feet on the White River and Arkansas Post Canal; 250 feet to 300 feet on the Arkansas River, and 150 feet on the Verdigris River (from Muskogee to Catoosa). Channel depths are a minimum 9 feet throughout the navigation system, but are much deeper at various locations.

### BRIDGES

Highway bridges across the main waterway are fixed high level spans. Railroad bridges across the main waterway are lift spans from the mouth through Fort Smith, Ark., and fixed high level spans from Fort Smith to Catoosa, Okla. The railroad and highway bridges across the navigable portion of San Bois Creek are fixed spans. The 2-percent flow line for each bridge is the elevation of flows exceeded less than 2-percent of the time. The MKARNS is crossed by 29 highway bridges and 10 railroad spans.

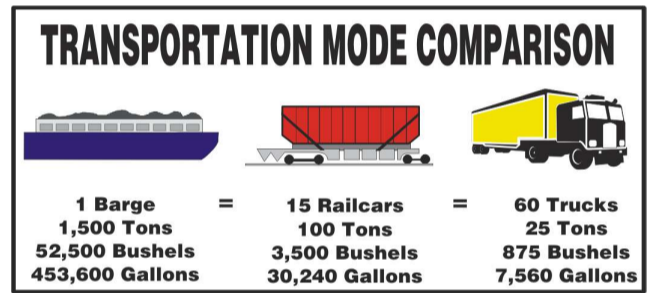
### GAGES

*Clearance gages:* All bridges have clearance gages installed on the pier protection cells or the navigation span pier located on the right side of the channel. The gages indicate the vertical clearance available under the bridge.

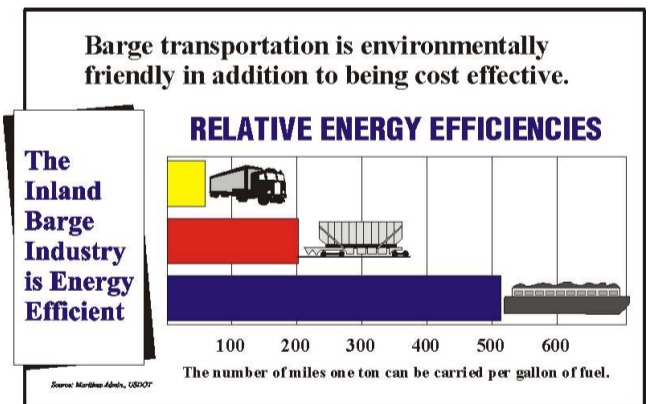
*U.S. gages:* U.S. gages have been established throughout the waterway to provide current water elevations.

### BARGE TRANSPORTATION

The transportation of cargo in barges on our nation’s inland waterways is the most energy-efficient, cost-effective and environmentally-friendly form of transportation today. Because of barge inland waterway transportation, farmers can ship 60 tons of grain from the Tulsa Port of Catoosa to the Port of New Orleans for less than the cost of a postage stamp.

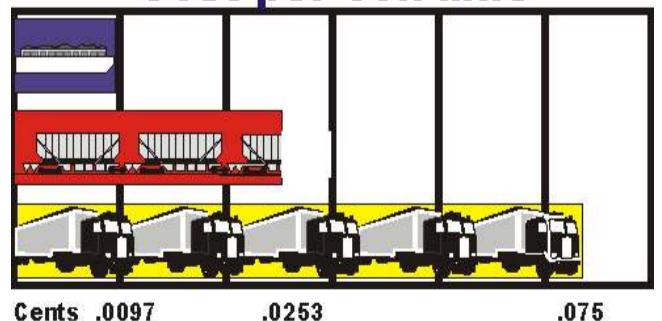


Courtesy of MARAD, USDOT



*The use of one barge eliminates the potential exhaust from 60 semitrailer trucks or the power used to move 15 railcars.*

### Cost per Ton Mile



*One gallon of diesel fuel will carry one ton of cargo 59 miles by truck; 202 miles by railcar; or 514 miles by barge.*

## 2001 TONNAGE

There are 144 miles of navigable waterway in Oklahoma on which commerce is transported by barge into and out of Oklahoma to and from ports around the world. In 2001, 4.3+ million tons valued at \$1.3 billion were shipped on the Oklahoma portion of the navigation system — three percent more than the 4.2 million tons shipped in 2000. The tonnage is equivalent in carrying capacity to 2,899 barges, 43,478 railcars or 72,463 semitrailer trucks.

Tonnage on the entire system totaled 11.8 million tons valued at \$2.4 billion and is equivalent to 7,897 barges, 118,457 railcars, or 473,828 semitrailer trucks.

### **Oklahoma Tonnage by Commodity and Value (\$1,000)**

<b>Iron &amp; Steel</b>	
569,200 tons	\$ 639,781
<b>Chemical Fertilizer</b>	
1,635,900 tons	\$ 292,826
<b>Other Chemicals</b>	
81,500 tons	\$ 44,744
<b>Petroleum Products</b>	
379,600 tons	\$ 119,954
<b>Sand, Gravel &amp; Rock</b>	
7,200 tons	\$ 54
<b>Coal &amp; Coke</b>	
207,500 tons	\$ 13,903
<b>Other Grains, Food/Farm Products (Rice and Sorghums)</b>	
229,000 tons	\$ 29,629
<b>Wheat</b>	
951,300 tons	\$ 130,594
<b>Soybeans</b>	
197,400 tons	\$ 38,108
<b>Miscellaneous: includes cement, equipment and other unknown</b>	
46,500 tons	\$ 10,695
<b>Forest Products, Bldg. Materials, Minerals</b>	
42,700 tons	\$ 9,864

## TANK BARGES

Tank barges are designed to carry liquid cargoes such as petroleum products, chemicals and commodities such as molasses for cattle feed. Typical tank barges are 195' long by 35' wide. The tank barges involved in the accident measured 295' long by 54' wide, with a 12' hull and can carry up to one million gallons of product. The larger barges have a dead weight of approximately 500 to 600 tons; net tons about 3,200.

Other types of barges include: hopper barges that can be open or seal covered (also covered with lift or roll covers), flat deck barges and LASH barges.



*An integrated tow heads downstream from the Port of Catoosa*

## RIVER SPEAK

### Commonly-used terms on the inland waterways

**Barge** - flat bottom boat used to transport goods on inland waterways and propelled by a towboat

**CFS** - cubic feet per second; river flow is stated as so many thousands of CFS.

**Downbound or downstream** - proceeding in the direction of the flow; in the direction of the flow.

**Harbor boat** - small towboat used for short haul towing and fleeting work

**Head of navigation** - uppermost extent of the deep channel on a river

**Hull** - body of a vessel, generally below the main deck level

**Integrated tow** - combination of a towboat and one or more specially designed barges operated as a combination

**Jumbo barge** - most common size barge used on the rivers: 35' wide by 195 or 200' long, with a cargo capacity of 1,200 to 1,500 tons

**Left bank** - left shoreline, as seen looking downstream. This is always the left bank, even if looking upstream, when it will be on the observer's right. Also, **left descending bank**.

**Load/offload** - to load cargo on a barge; to unload cargo

**Lock** - gated chamber used to raise or lower vessels to pass a dam; to transit through a lock

**M/V** - Motor Vessel, used as a name prefix; a steamboat would be Str.

**Pilot, Captain, Master** - operator of a towboat; officer in command of a towboat on the after watch, equivalent to the chief mate of a ship; one licensed as a First Class Pilot, with a special knowledge of navigation hazards and requirements in a particular area; to operate a towing vessel.

**Right bank** - opposite of Left bank

**Tow** - group of barges lashed solidly together for pushing as a unit; a flotilla

**Towboat** - (boat that pushes the tow) - snub-nosed boat with push knees used for pushing barges. A small towboat (called a push boat) may push one or two barges around the harbor; a large towboat is used to push as many as 40 barges in a tow. A typical tow on the MKARNS is eight (8) barges. A towboat does not pull.

**Tug boat** - strong v-hull shaped boat used for maneuvering ships into and out of port and to carry supplies. A ship is too powerful to pull up to the wharf on its own. It cuts power and lets the tug nudge it in. Generally, barges are pushed by towboats, not tugs.

**Upbound or upstream** - toward the head of the river; opposite to the direction of the flow

**Wheel house or pilot house** - command bridge of a towboat where all of the controls and instruments are located and the pilot steers the towboat.

— Carol King  
ODOT Waterways Branch  
PO Box 660; Tulsa, OK 74101-0660  
(918) 838-9933; FAX: (918) 832-9074  
E-mail: [cking@odot.org](mailto:cking@odot.org)