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Recent Lower MS River Disruptions to Grain Flows and Markets

CFTC Agricultural Advisory Presentation

July 19, 2023

Overview

- Costly disruptions to grain transport by barge on the Mississippi River have been common over the last decade.
- Recent events include the Great Flood of 2019, Hurricane Ida's landfall in late August 2021, and the extreme low water on the Lower Mississippi in the latter quarters of 2022.
- Today's presentation highlights impact of disruptive events on logistics and markets from the perspective of unique data from a grain tow's journey to New Orleans.

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Importance of MS River Barge Freight

- Barge freight is a core part of the market discovery for the CIF NOLA basis, the most liquid cash forward market for US grain.
- The freight delivery cost to destination (NOLA) is a dominant part of the equation to determine the delivery value equivalent of a futures position.
- As such, barge freight impacts the convergence of futures contracts.
- Using data can help recognize logistics snarls and recoveries that impact barge freight and markets.

$$DVE = Differentials + Costs$$

$$Differentials = QD + LD$$

$$Costs = Lo + S + I + Fr$$



DVE: delivery value equivalent
QD: quality differential
LD: location differential
Lo: loadout
S: storage and interest
I: inspection/grading/weighting/shrink
Fr: freight

Vicksburg, MS as a Waypoint for Lower MS Metrics



- Main line tow boats push grain barges down the Lower MS River for export from NOLA.
  - ✓ About half of US exports go out of NOLA
  - ✓ 90+% of the grain to NOLA is delivered by barge
- Most of these tows are built, meaning the barges are attached to the tows for transit, in St. Louis or Cairo.
- Vicksburg is a waypoint that may be used to look at the tow traffic headed to and from NOLA.

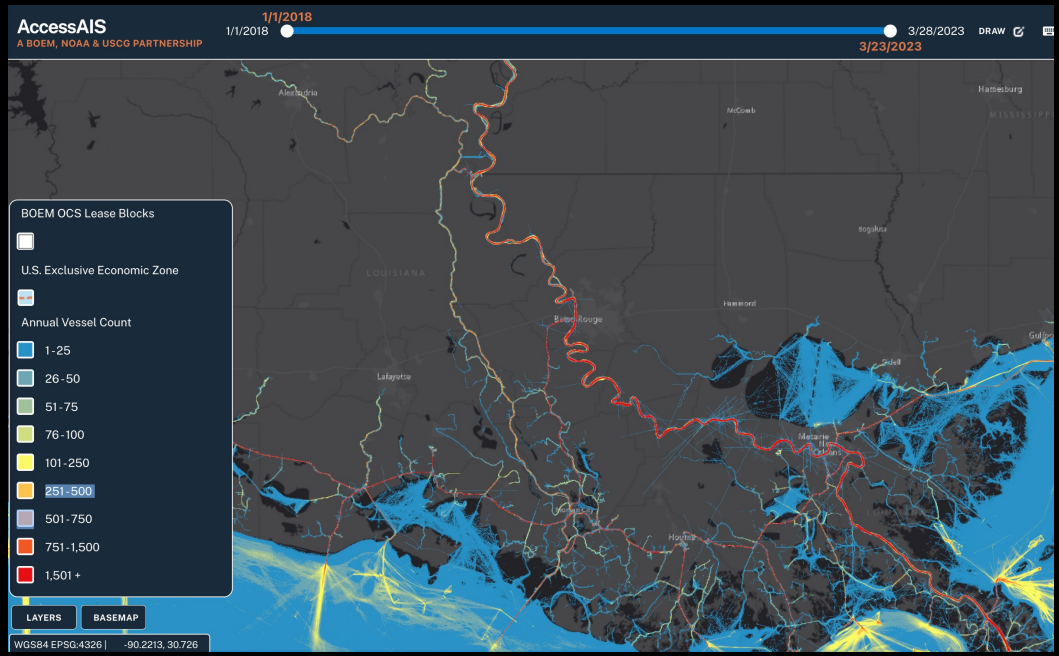
Deriving Metrics for Analysis

Data sources:

- AIS data (location transponders from towboats)
- USDA data (barge freight, barge unloads)
- Geospatial data, satellite imagery, river gage data, ACBL Currents history (events log)

Data preparation:

- Extensive data cleaning and filtering
- Multiple quality assurance points
- Main line tow identification
- Daily/weekly aggregation and benchmarking
- … even with QA, data is never perfect!



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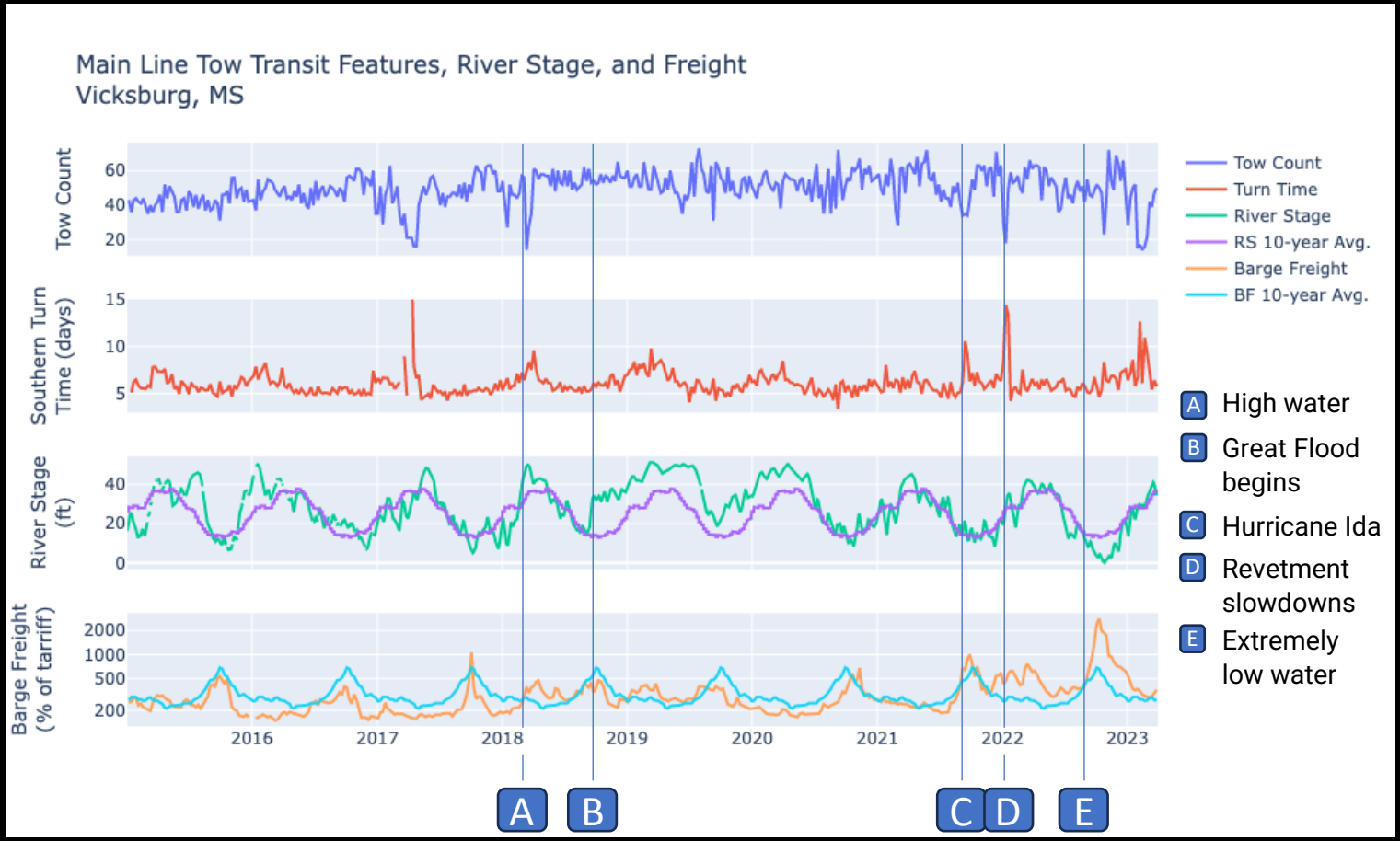
Deriving Transit Metrics for Analysis

- ”Features” are new, more meaningful data streams engineered with data science from raw data. Features presented today:

Tow direction and Turn time	Tow count (total, downstream)	Seasonal averages
The number of days it takes a southbound tow to return to Vicksburg	The number of tows cross through Vicksburg over a period (day or week)	Week of year averages where seasonality is present

- Other data presented today:
  - River gage at Vicksburg (USACE)
  - Spot barge freight CAR-MEM (USDA)
  - CBOT Soybeans futures (Barchart)
  - Export inspections volumes (USDA)

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Historic Metrics and Disruptive Events on Lower MS Grain Transit

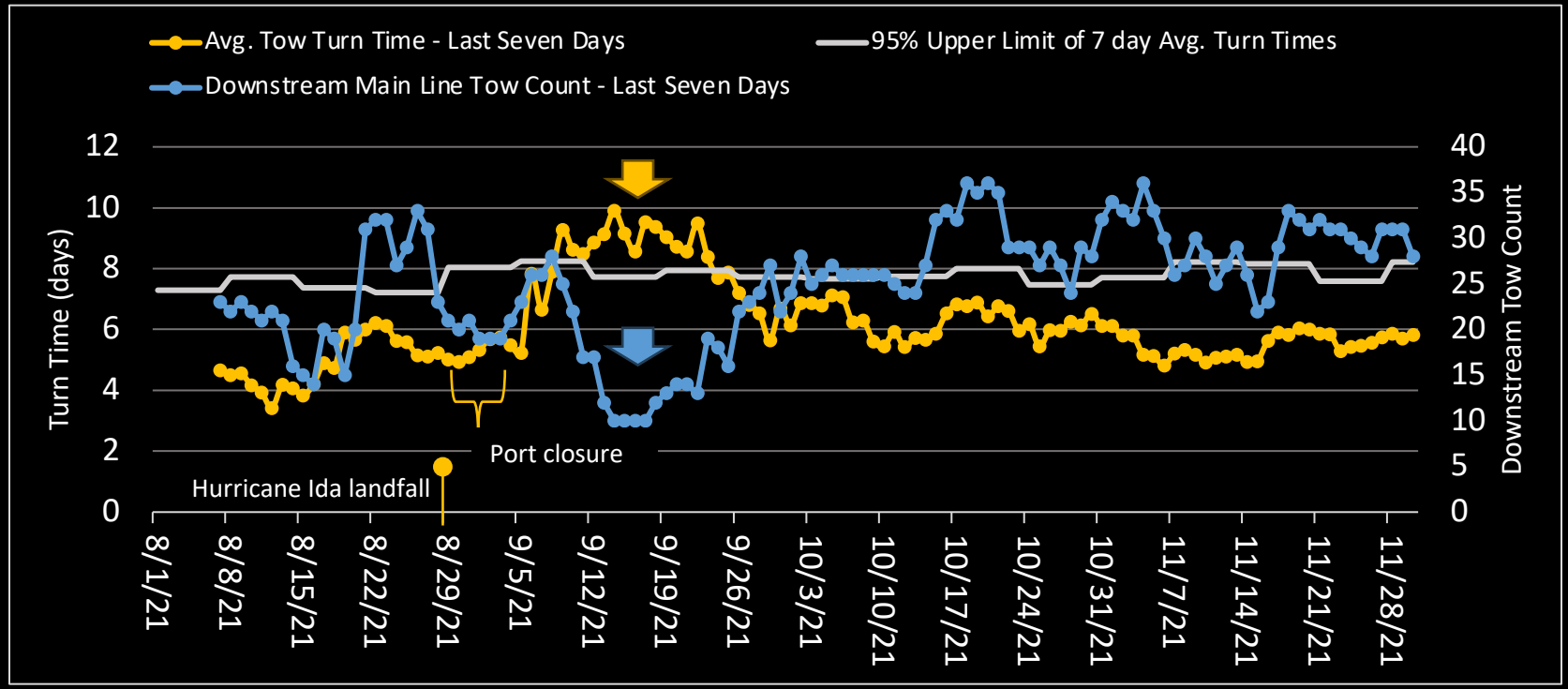
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Deeper Dive into Hurricane Ida: Background

- Made landfall late on 8/29/21
- NOLA area of river closed to traffic through 9/4
- Export facility damage at Cargill, others
- Power outages more extensive than Katrina; impacted at least three major exporters on the order of weeks



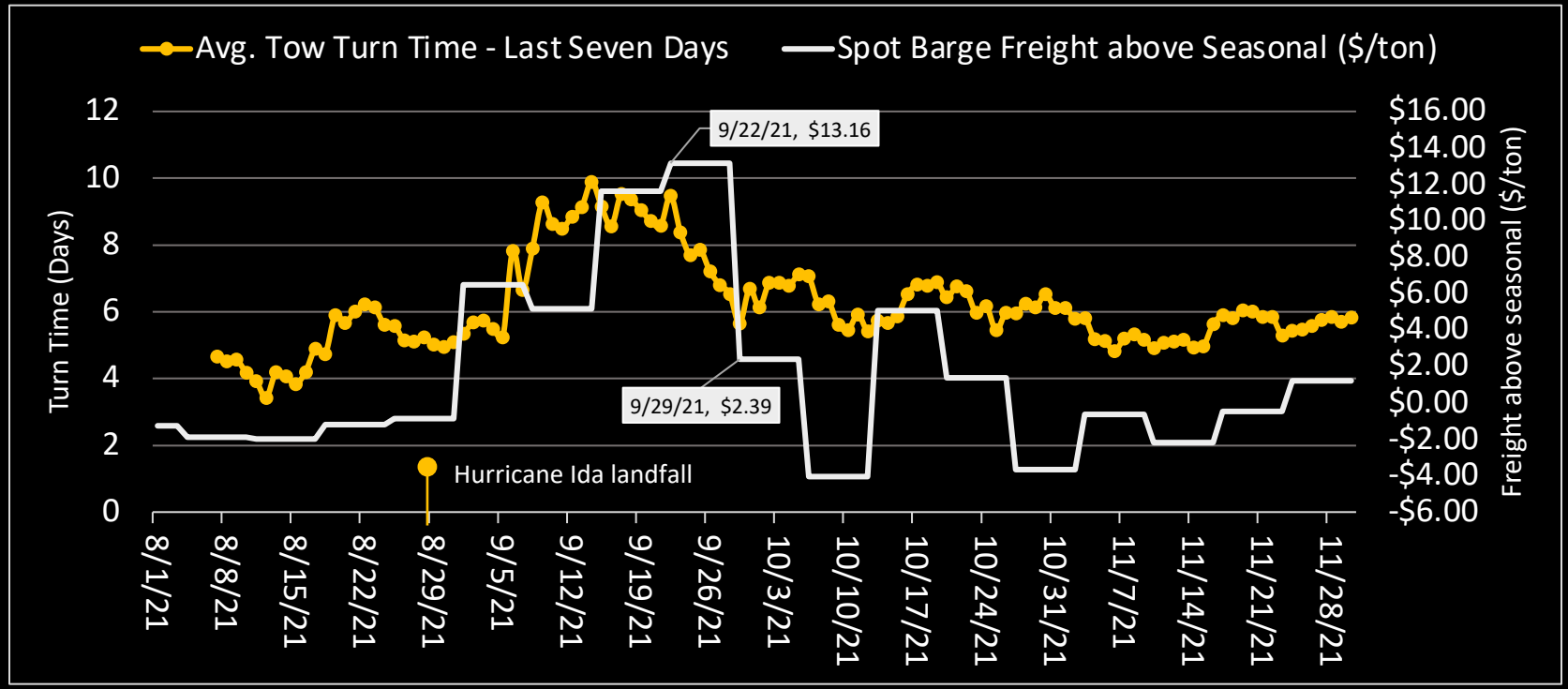
Hurricane Ida Logistical Impact Q3-Q4 2021



Observations

- Elevated turn times and reduced tow traffic for about three and a half weeks after Ida's landfall

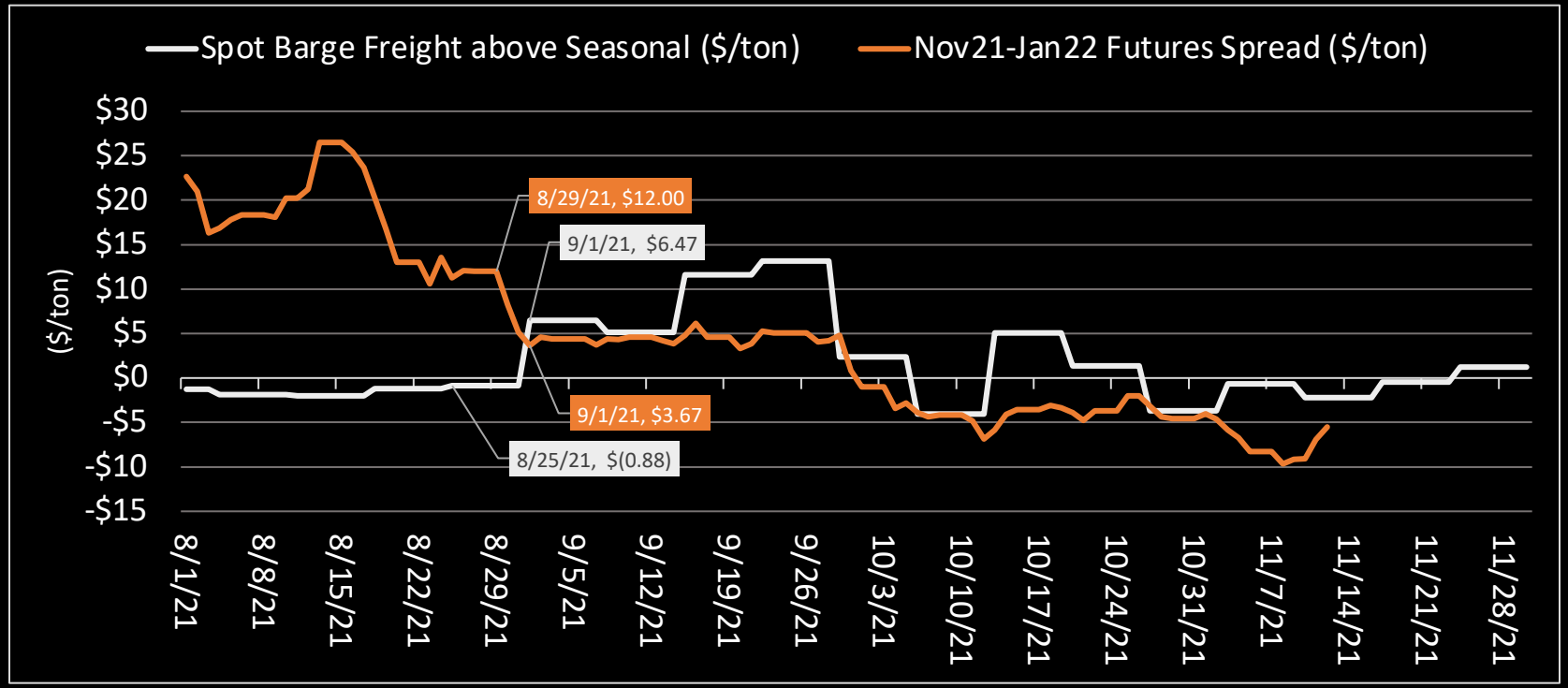
Hurricane Ida Spot Freight Impact Q3-Q4 2021



Observations

- Elevated turn time (and reduced tow count) corresponded to period of higher spot freight. Recovery in turn time (and tow count) corresponded to drops in spot barge freight.

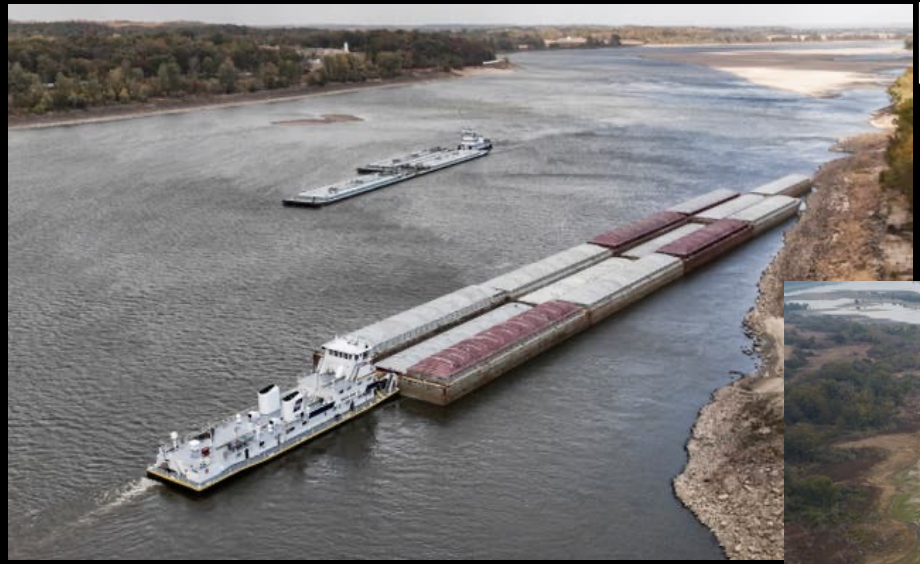
Spot Freight and Futures Spreads Q3-Q4 2021



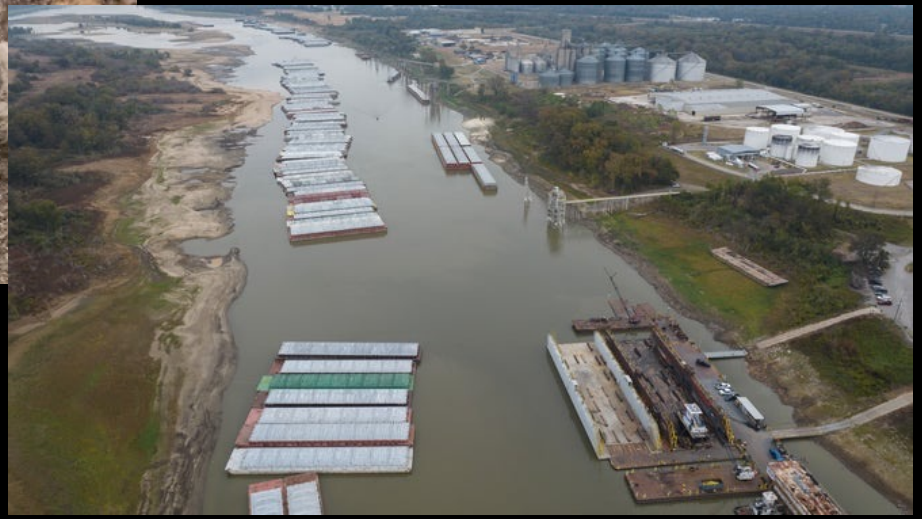
Deeper Dive into 2022 Drought – Overview

- Record low river levels in Cairo, IL; Memphis, TN; and Greenville, MS
- Saltwater back flowing into MS River (USACE built sill in October)
- Tow size reduced from typical 30-40 barges to 25 barges from middle of September to first part of December
- Drafts reduced to 9’0” on Oct. 17 both north and southbound, reflecting a 24% to 30% reduction to tons per barge versus normal conditions.
    - Some barge volumes reduced below loading draft to get on the water
    - Occurrences of dead freight incurred by shippers

Deeper Dive into 2022 Drought – Overview



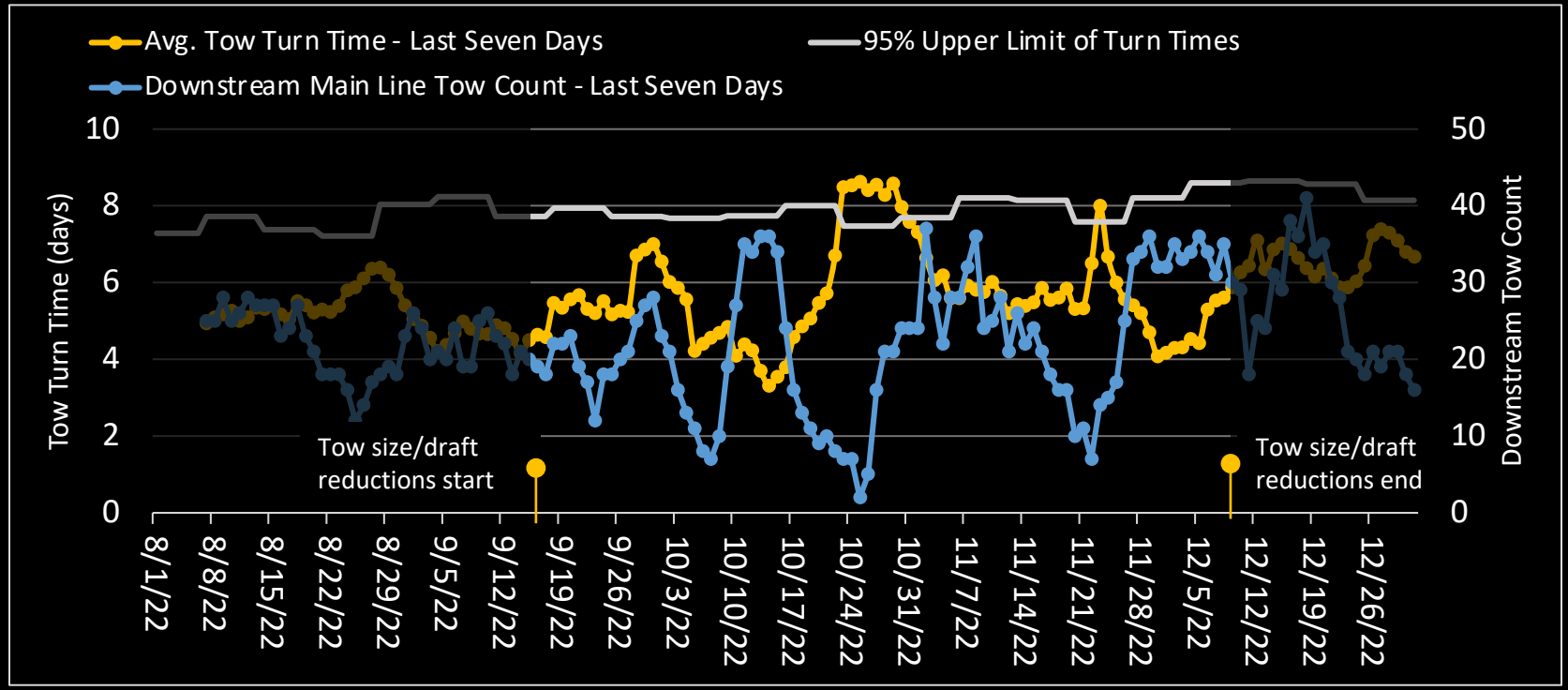
Navigation and bottleneck issues



Barge fleet access issues

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Historic Low Water Logistic Impact Q3-Q4 2022

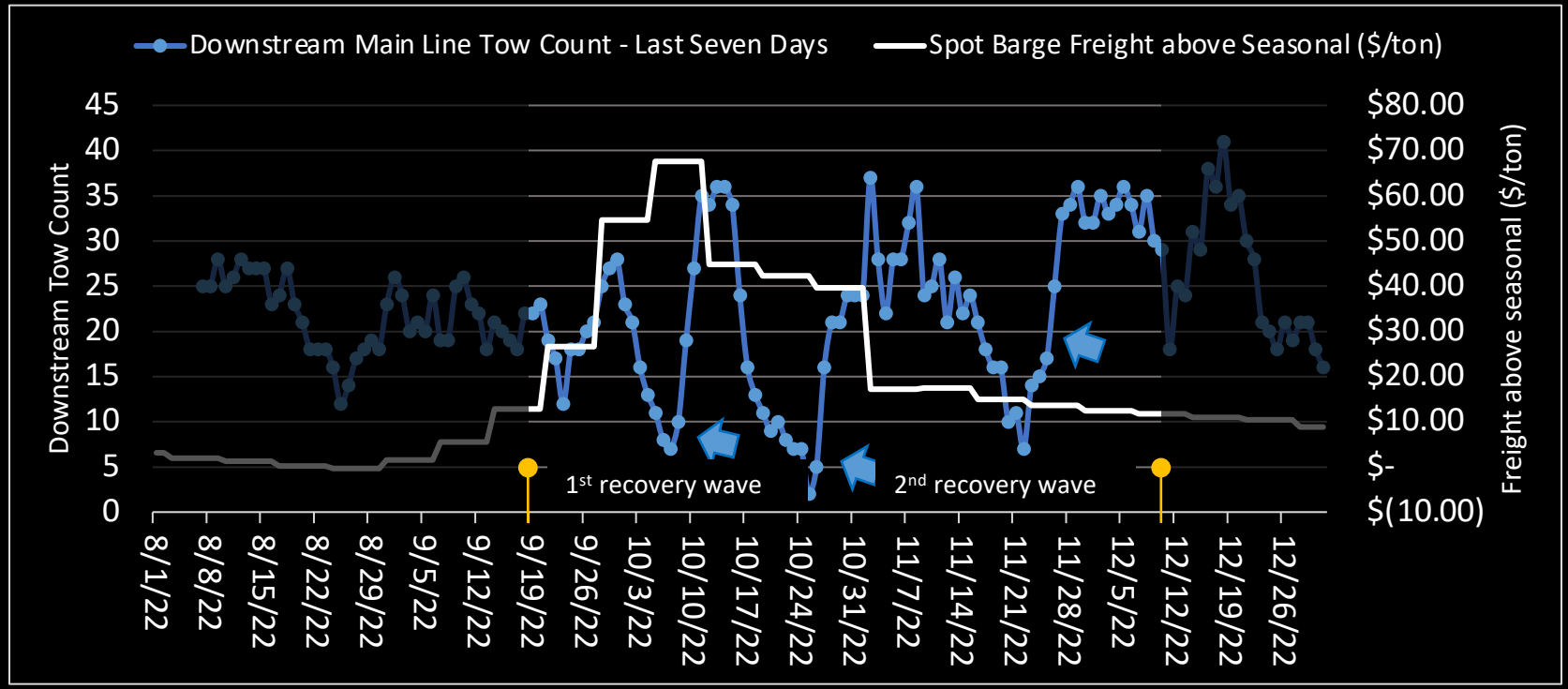


Observations

- In addition to tow size and draft reductions, the number of tows traveling downstream was reduced and recovered in waves in October and November.
- Moderate increases in turn time were observed in late October.

Historic Low Water Spot Freight Impact Q3-Q4 2022

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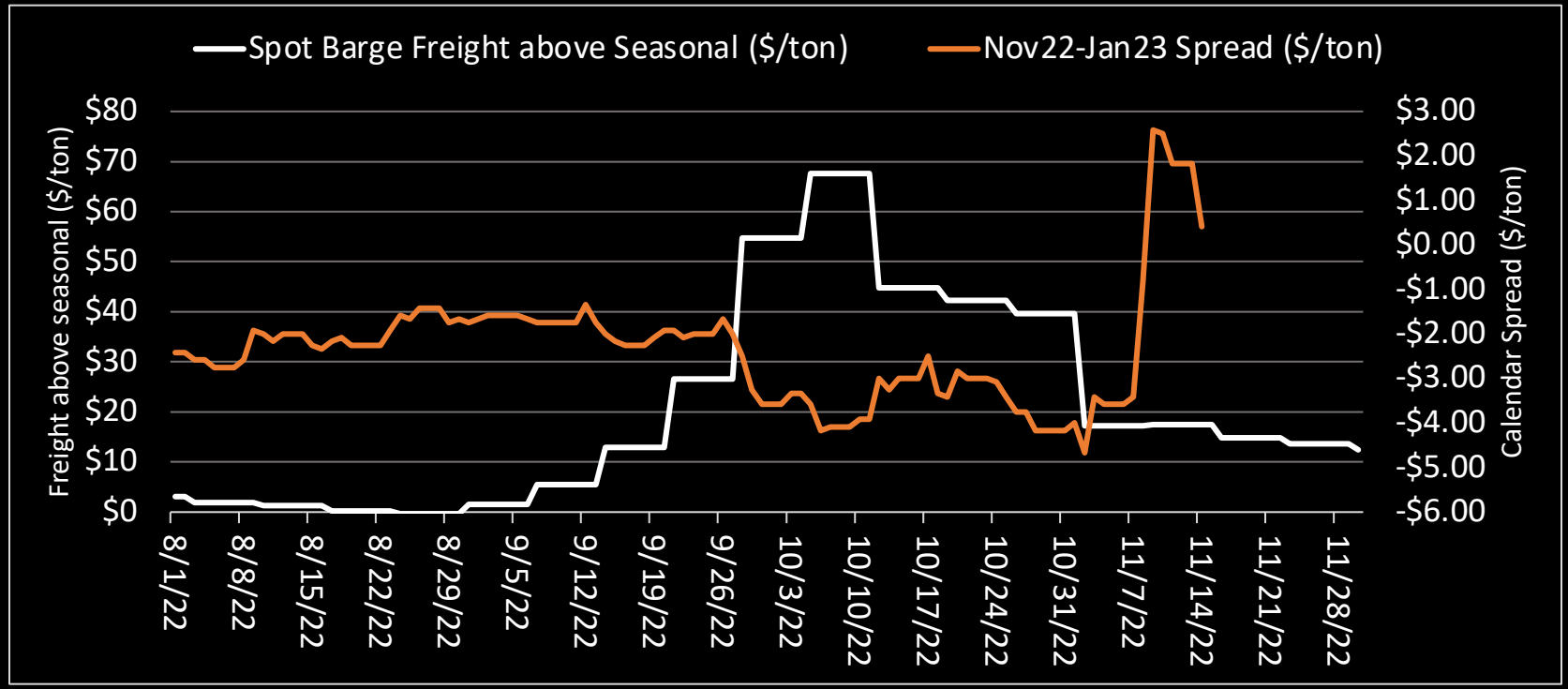


Observations

- Timing of recovery of downstream tow flow corresponded to the timing of drops in spot barge freight. Turn time recovery happened in late Oct/early Nov.

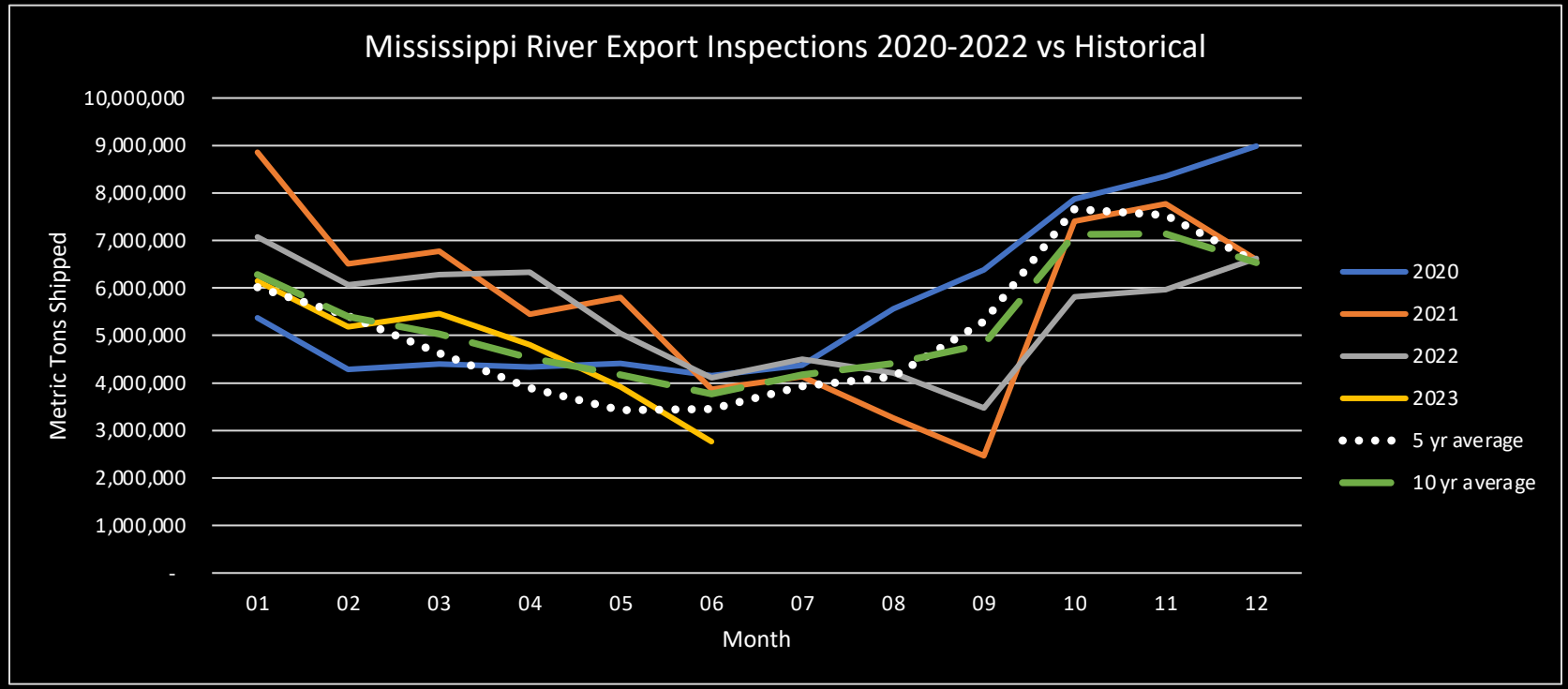
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Spot Freight and Futures Spreads Q3-Q4 2022



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USDA Grain Export Inspection Volumes



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Thank you!

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