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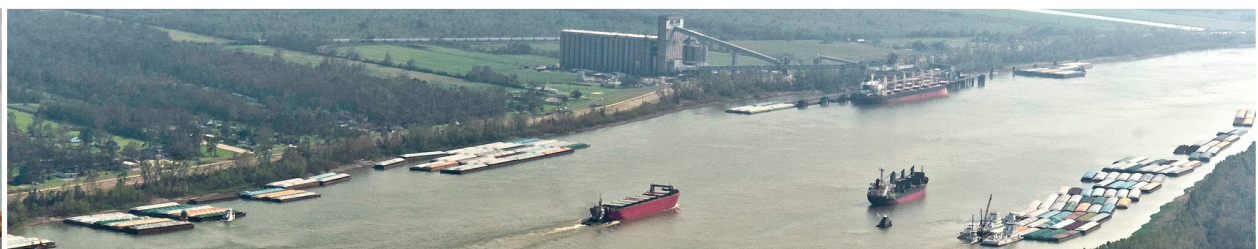
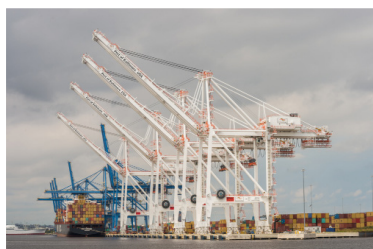
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# A Reliable Waterway System Is Important to Agriculture

A publication of the Agricultural Marketing Service • [www.ams.usda.gov/services/transportation-analysis](http://www.ams.usda.gov/services/transportation-analysis) • FEBRUARY 2022

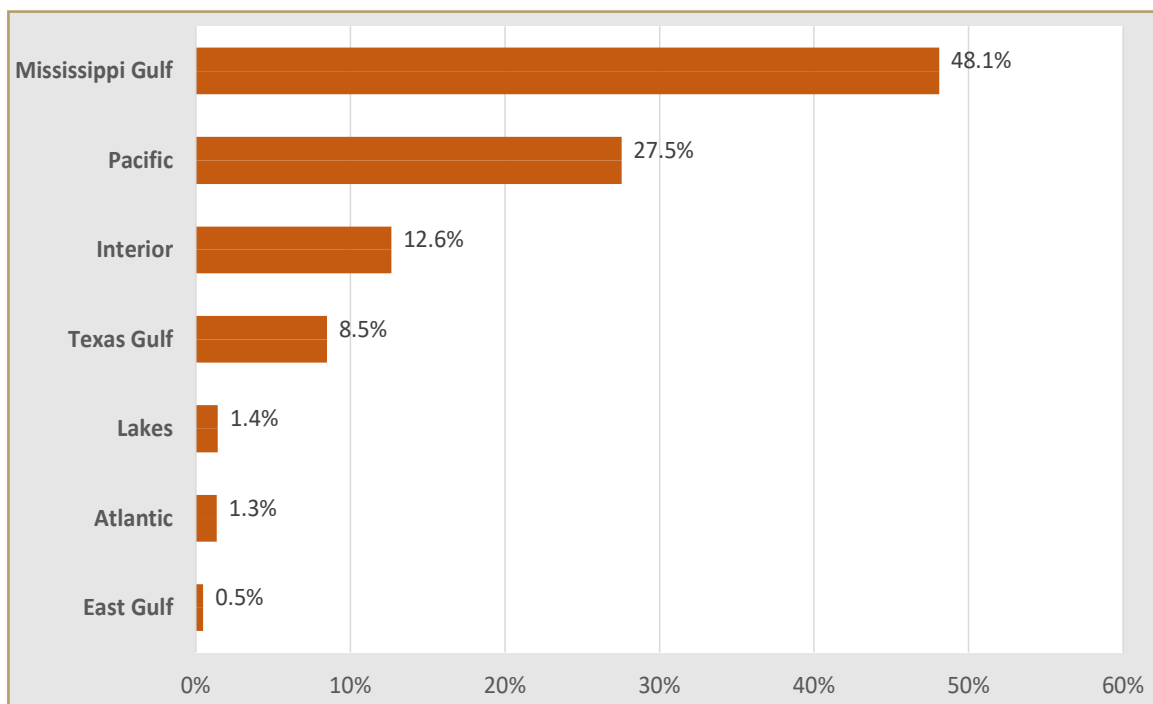
## Overview

- U.S. agriculture is expected to contribute \$10.5 billion to the U.S. balance of trade in fiscal year (FY) 2022.<sup>1</sup>
- All U.S. exports are forecast to reach \$175.5 billion. Imports are forecast to reach \$165.0 billion in FY 2022.<sup>2</sup>
- In addition to forestry and fishery products, critical farm inputs (such as fertilizer, feed, and fuel) move on the waterway system.<sup>3</sup>
- In calendar year 2019, U.S. agricultural exports of \$142 billion generated an additional \$161.4 billion in the U.S. economy and supported 1,102,000 jobs. The farm sector's share of the income supported by agricultural exports was 25.5 percent.<sup>4</sup>
- In 2019, every \$1 billion of U.S. agricultural exports required approximately 7,784 full-time civilian jobs throughout the economy. U.S. agricultural exports in 2019 required a total of 1,102,000 such jobs.<sup>5</sup>
- In 2020, 166.9 million metric tons (mmt) of agricultural exports and 40.5 mmt of agricultural imports were waterborne.<sup>6</sup>
- Exporters, importers, and domestic shippers depend on maintaining the authorized depths and widths of ports, waterways, locks, and dams.<sup>7</sup>
- The Harbor Maintenance Tax (HMT) was created by the Water Resources Development Act of 1986. HMT is a 0.125 percent ad valorem tax on the value of imports and certain domestic waterborne cargo deposited in the Harbor Maintenance Trust Fund (HMTF) for harbor maintenance and dredging.<sup>8</sup>
- Estimated FY 2019 HMT receipts and investment interest were \$1.8 billion, and congressional appropriations from the HMTF were \$1.5 billion, yielding an estimated year-end balance of \$9.5 billion.<sup>9</sup>
- Commercial vessels engaged in waterborne transportation in the inland waterways system generate revenues and investment interest from a tax on diesel fuel of 29 cents per gallon. The tax is deposited in the Inland Waterways Trust Fund (IWTF) to finance the Federal costs of authorized locks and dams projects.<sup>10</sup>
- During FY 2021, the funding for the U.S. Army Corps of Engineers (USACE) was \$7.8 billion, with \$113 million appropriated from IWTF. Congress lowered the required IWTF contribution from 50 percent to 35 percent for construction projects funded from FY 2021 through FY 2031, thereby increasing the general fund share to 65 percent.<sup>11</sup>

# Grain Exports

- Based on the October 2021 estimates for marketing year (MY) 2021/22, the United States is projected to export 22 percent of the grain it produced. This will include 53 percent of wheat, 48 percent of rice, 44 percent of soybeans, and 18 percent of corn.<sup>12</sup>
- The Mississippi River, Texas Gulf, and East Gulf ports accounted for 57 percent of grains inspected and/or weighed for export in calendar year 2020, nearly 81.2 mmt.<sup>13</sup>
- Pacific Northwest (PNW) ports accounted for 28 percent of grains inspected and/or weighed for export in 2020, nearly 39 mmt.<sup>14</sup>
- The October 2021 estimates for MY 2021/22 exports include:<sup>15</sup>
  - Corn—71.9 mmt
  - Soybeans—58.0 mmt
  - Wheat—23.81 mmt
  - Soybean meal—13.1 mmt
  - Rice—2.9 mmt
  - Soybean oil—0.8 mmt

## Grains Inspected and/or weighed for export by region and port area, 2020, by share of total metric tons\*



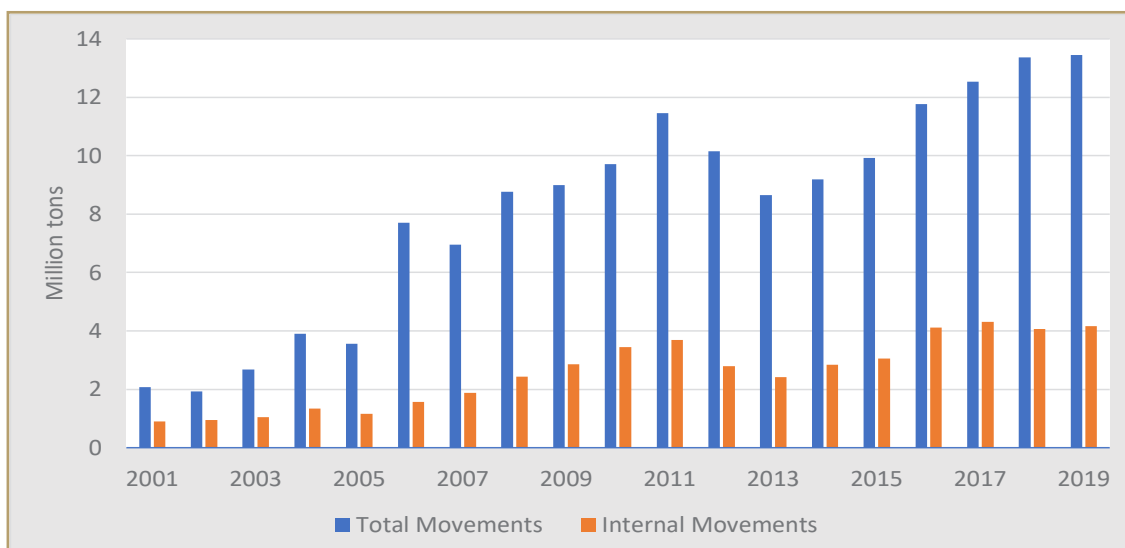
\*136.5 million metric tons

Source: USDA, Agricultural Marketing Service.

# Ethanol, Corn Production, Fertilizer, and Barge Traffic

- U.S. ethanol operating production at 209 refineries is over 17.4 billion gallons per year.<sup>16</sup>
- More than 1.3 billion gallons of ethanol were exported in calendar year 2020.<sup>17</sup>
- Major multimodal ethanol terminals include Albany, NY; Baltimore, MD; Chicago, IL; Houston, TX; Linden, Newark, and Sewaren, NJ; Mount Vernon, IN; New Orleans, LA; Sauget, IL; Providence, RI; and Tampa, FL.<sup>18</sup>
- About 90 percent of ethanol is transported by train or truck. The remaining 10 percent is mainly transported by barge.<sup>19</sup>
- Over 324 million gallons of ethanol were moved by tanker and barge between Petroleum Administration for Defense Districts (PADD) in calendar year 2020, from PADD 2 Midwest to PADD 3 Gulf Coast and from PADD 3 to PADD 1C Lower Atlantic.<sup>20</sup>
- Barges also move some of the fertilizer needed to grow corn to produce ethanol, as well as some of the distillers' grains, an ethanol byproduct used for animal feed.<sup>21</sup> A bushel of corn yields 2.7 gallons of ethanol and 17.5 pounds of distillers' grains.<sup>22</sup>
- Nearly 11.0 mmt of distillers' grains were exported in calendar year 2020.<sup>23</sup>
- USDA estimates an area of 85.1 million corn acres harvested in October 2021 yielded (in MY 2021/22) 176.5 bushels per acre—amounting to 5.2 billion bushels, or 35 percent of the total corn supply. This crop will be converted to ethanol and byproducts including distillers' grains, corn gluten feed, corn gluten meal, and corn oil.<sup>24</sup>
- Corn is the largest user of nitrogen in terms of application rates per acre, total acres treated, and total applications.<sup>25</sup>
- In 2019, U.S. waterways carried more than 41.9 million tons (38.0 mmt) of fertilizer movements. Of this total, 16.8 million tons (15.2 mmt) moved by barge through the inland waterways.<sup>26</sup>

## Ethanol movements on the U.S. waterways



Source: U.S. Census Bureau Trade Data

# Barge and Rail Competition

- In calendar year 2020, barges carried over 40 million short tons (36.3 mmt) of corn, wheat, and soybeans downbound through Mississippi Locks 27, Ohio Locks and Dam 52, and Arkansas Lock and Dam 1.<sup>27</sup>
- In 2020, the U.S. waterways carried 305.2 million tons (276.9 mmt) of food and farm products, including 200.8 million tons (182.2 mmt) of grain and oilseeds.<sup>28</sup>
- In 2020, a total of 37,611 grain barges were unloaded in the New Orleans port region, showing that an additional 12,227 grain barges entered the river below these locks.<sup>29</sup>
- Railroads sent 317,564 carloads, approximately 35.2 million short tons (31.9 mmt) of U.S. grain, to ports in 2020.<sup>30</sup>
- Railroads consider barge rates and the spread between U.S. Gulf and Pacific Northwest ocean vessel freight rates, and price their services accordingly.<sup>31</sup>
- USDA's *Transportation of U.S. Grains, A Modal Share Analysis, 1978-2019 Update* shows that barges moved 49 percent of all grain exports in 2019 and railroads moved 38 percent.<sup>32</sup>
- Barges moved 48 percent of corn, 62 percent of soybeans, 28 percent of wheat, and 47 percent of all grains to export grain elevators in 2019.<sup>33</sup>
- In 2019, railroads moved 33 percent of corn, 29 percent of soybeans, 60 percent of wheat, and 38 percent of all grains to export locations.<sup>34</sup>
- Studies have shown that, without barge competition, agricultural shippers pay higher rail transportation costs, the farther they are from an inland waterway.<sup>35</sup>

## Agriculturally significant waterways

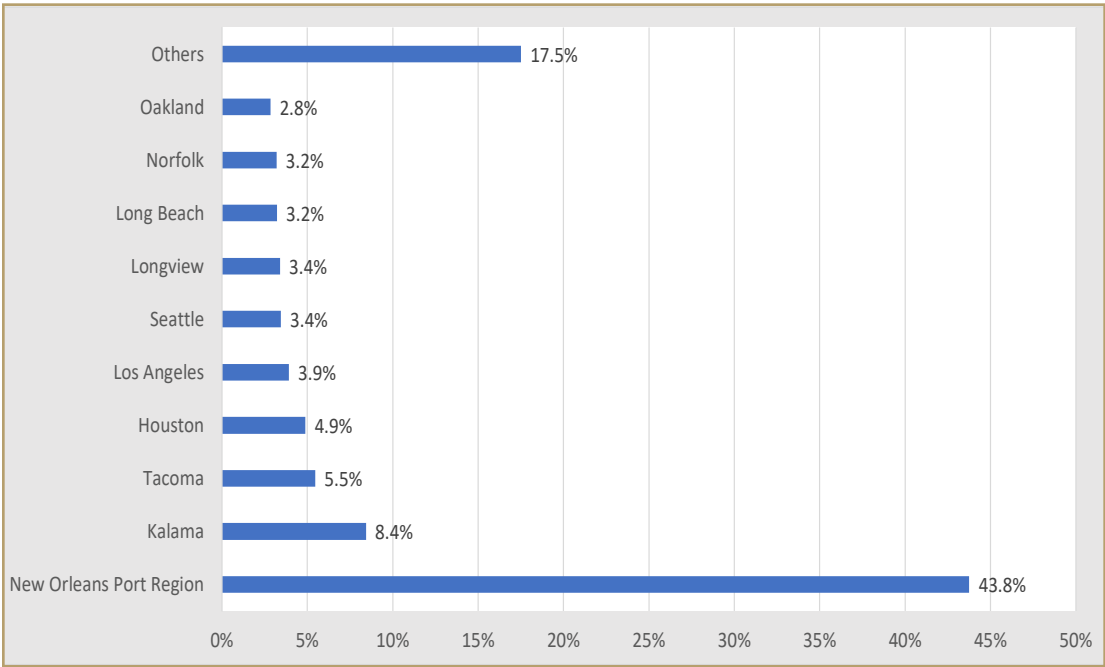


Source: USDA, Agricultural Marketing Service.

# Top U.S. Ports for Agricultural Exports

- In calendar year 2020, U.S. bulk and containerized waterborne agricultural exports totaling 166.9 mmt were valued at \$120.0 billion. Of the total exports (39.1 mmt), 23 percent were moved in containers. During the same period, containers were used to transport 7.5 percent of total U.S. waterborne grain exports.<sup>36</sup>
- The top five U.S. ports for bulk and containerized agricultural exports in 2020 were the New Orleans Port Region, LA; Kalama and Tacoma, WA; Houston, TX; and Los Angeles, CA. In terms of containerized exports, the top five ports were Los Angeles, Long Beach, and Oakland, CA; Norfolk, VA; and Tacoma, WA.<sup>38</sup>
- In 2020, the top five U.S. bulk agricultural export destination countries were China, Japan, Mexico, Columbia, and Philippines.<sup>37</sup>

Top U.S. ports for waterborne agricultural exports, 2020

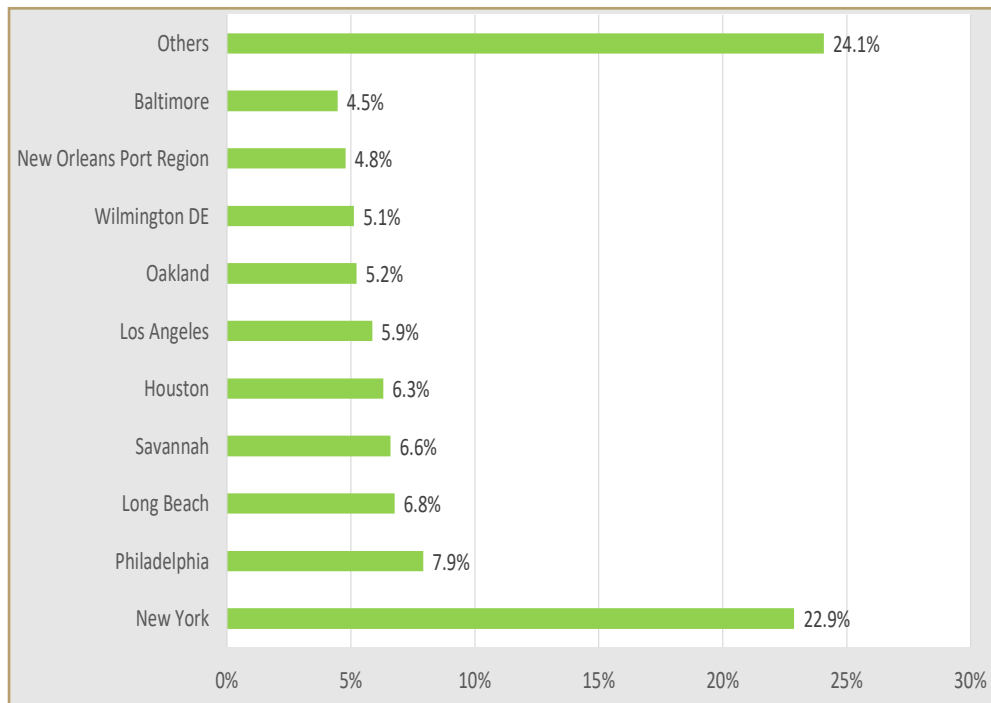


Source: PIERs, formerly known as the Port Import Export Reporting Service.

# Top U.S. Ports for Agricultural Imports

- In calendar year 2020, U.S. bulk and containerized waterborne agricultural imports totaled 50.6 mmt valued at \$113.0 billion, of which 80 percent of the total imports (40.5 mmt) were moved in containers.<sup>39</sup>
- The top five U.S. ports for bulk and containerized agricultural imports in 2020 were New York, NY; Philadelphia, PA; Long Beach, CA; Savannah, GA; and Houston, TX. In terms of containerized imports, the top five ports were New York, NY; Philadelphia, PA; and Long Beach, Los Angeles, and Oakland, CA.<sup>40</sup>

## Top U.S. ports for waterborne agricultural imports, 2020



Source: PIERS.

# Harbor Channel and Inland Waterway Draft Issues

- Inadequate channel depths and widths due to drought and sedimentation (shoaling) can lead to higher transportation costs, as barges and vessels may be loaded to less than capacity because of low water.<sup>41</sup>
- The number of barges in a tow may be reduced to the available channel width, and one-way, or daytime-only traffic restrictions may be imposed.<sup>42</sup>
- In these cases, more barges and vessels and additional time may be required to ship a given weight of commodities.<sup>43</sup>
- There have been extended periods in which low river levels, shoaling, and reduced channel widths impeded barged grain movements and access to shallow draft ports.<sup>44</sup>
- At a 9-foot draft, a typical U.S. barge size is 195 feet by 35 feet, which holds up to 1,500 short tons (1,360.8 metric tons (mt)) of cargo;<sup>45</sup> for each foot of reduced draft, the barge loses about 200 short tons (181.4 mt) of capacity.<sup>46</sup>



- When harbor channels are at less than authorized depths, S-Class container vessels lose 3,840 tons (3,483.6 mt) of cargo capacity per foot;<sup>47</sup> Panamax bulk grain carriers lose 2,148 tons (1,948.6 mt) per foot;<sup>48</sup> and the largest Great Lakes vessels lose almost 3,200 tons (2,903.0 mt) per foot.<sup>49</sup>
- The ongoing dredging project led by USACE and the State of Louisiana to deepen the shipping channel from the Gulf of Mexico to Baton Rouge from a depth of 45 feet (13.7 meters) to 50 feet (15.2 meters) aims to reap an average annual benefit of \$96.8 million to the Nation's economy, with a benefit-to-cost ratio of about 5.47 to 1.<sup>50</sup>

## Effects of Temporary Closures on Costs, Receipts, and the Federal Budget

- U.S. exporters compete based on world prices.<sup>51</sup>
- Temporary closures and restrictions on traffic in harbors and channels can occur because of high water, storm debris, drought, shoaling, groundings, natural disasters, human-made disasters, slowdowns, strikes, and lockouts. These impediments can lead to congestion, delays, spoilage, diversion to other modes and ports, higher transportation costs, reduced farm income, and lost sales.<sup>52,53,54,55</sup>
- Higher transportation costs can result in lower cash bids in interior markets.<sup>56</sup>
- U.S. exporters may be unable to pass on higher transportation costs, as customers can purchase similar products from other countries.<sup>57</sup>
- In contrast, U.S. importers may be able to pass on higher transportation costs to their customers.<sup>58,59</sup>
- Users of railroads and highways face congestion, constrained capacity, and driver and equipment shortages.<sup>60,61,62</sup>
- USACE maintains authorized depths and widths of channels, locks, and dams. This maintenance moderates the effects of congestion, provides resiliency, and enhances recovery after transportation disruptions.<sup>63</sup>
- USACE works to maintain operable navigation channels through accelerated dredging, rock removal, river training structures to remove sediment, strategic management of water releases from reservoirs, routinely scheduled surveys, and close collaboration with channel users and the U.S. Coast Guard on river conditions.<sup>64</sup>
- Important partners in a reliable waterway system include:
  - U.S. Coast Guard, which provides security, aids to navigation, and implements vessel traffic safety restrictions.<sup>65</sup>
  - National Oceanic and Atmospheric Administration, which provides nautical charts and maps, marine weather and river level information, surveys after disruptions, and marine debris removal.<sup>66</sup>
  - Maritime Administration, which promotes the development and maintenance of an adequate, well-balanced, U.S. merchant marine and marine highways.
  - Saint Lawrence Seaway Development Corporation, which promotes use of the Seaway and maintains and operates the two U.S. Seaway locks and vessel traffic control in areas of the St. Lawrence River and Lake Ontario, in collaboration with its Canadian partner, the St. Lawrence Seaway Management Corporation.
  - Federal Maritime Commission (FMC), which regulates oceanborne transportation to ensure a competitive and reliable international ocean transportation supply system that supports the U.S. economy. FMC also protects the public from unfair and deceptive practices.



# Want To Know More? Try These Publications:

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# Endnotes

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## NOTE:

Consistent with established practices, this report only considers those trade actions which are in place or have had formal announcement of effective dates as of the time of publication of the monthly [World Agricultural Supply and Demand Estimates](#) on October 12, 2021 and the quarterly [Outlook for U.S. Agricultural Trade](#) on November 23, 2021. Further, unless a formal end date is specified, this report also assumes such actions are in place throughout the time period covered by these forecasts.

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