THE ANATOMY OF THE CONTAINER TERMINAL LOGISTICS SUPPLY CHAIN CONGESTION ISSUES AT THE SAN PEDRO BAY PORTS DURING THE COVID-19 PANDEMIC – AN UPDATE

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The Impact of "Outside the Terminal" Logistics Constraints - Summary

- The terminal and vessel backlogs that occurred in San Pedro between July 2020 and August 2021 were the result of a cumulative collapse of the entire logistics supply chain.
- There was an unprecedented increase in TEU volume at San Pedro bay Ports starting in April 2020 and peaking in October 2020, March 2021 reaching an all time monthly high in May 2021. TEUs throughput has remained at historical high levels from July 2020.
- ILWU labor hours increased in response this volume growth, also remaining at historical levels from July 2020. However, production per ILWU hour began to decline with increasing throughput, reflecting terminal congestion.
- Terminal dwell times also began increasing in July 2020, peaking in May 2021 and remained at historical high levels through August 2021. Terminal dwell times grew from 2 days in March 2020 to an historical high level of 5.4 days in August 2021.
- Truck turn times (from pedestal to pedestal) reflecting queue time outside the gate, retrieval time in the terminal and exit, grew from about 60 minutes in June 2020 to a record high of 93 minutes in December 2020, declined through April 2021 to 74 minutes, and returned to 86 minutes in August 2021.

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- This on-terminal congestion reflects the growth in on-street dwell time of trucks (measured in terms of chassis turns) moving to and from transload facilities, inferring congestion at the regional transload and distribution centers, as well as the declining and very limited vacancy rate of industrial warehouse property in Southern California and the Inland Empire.
- Further exacerbating the off-terminal congestion is the fact that rail capacity was curtailed through 2020 and the first half of 2021, as reflected by the reduced number of intermodal trains moving daily through the Alameda Corridor. The dwell time of intermodal containers has been escalating, reducing off-dock storage capacity of intermodal containers, and hence the flow of the containers through the San Pedro Bay marine terminals.

The Impact of "Outside the Terminal" Logistics Constraints - Summary

- Longshore labor responded to the terminal volume demand, but the breakdown in off-terminal logistics systems, primarily warehouse/transload capacity and intermodal rail service actually contributed to the terminal and vessel congestion.
- Productivity at automated marine terminals was nearly double that at non-automated terminals, and actually was not impacted during high terminal congestion.
- The percentage of container vessels at berth either cancelling labor gangs and/or not requesting labor increased to more than 40% per day per shift in peak days in November 2020, and averaged more than 13% per day through March 2021, reflecting the outside the terminal congestion issues. The percentage of labor cancellations and/or ships at berth idle declined from April 2021 through June 2021, but the percentage of ships cancelling labor of not requestion labor has been increasing steadily since July 2021.

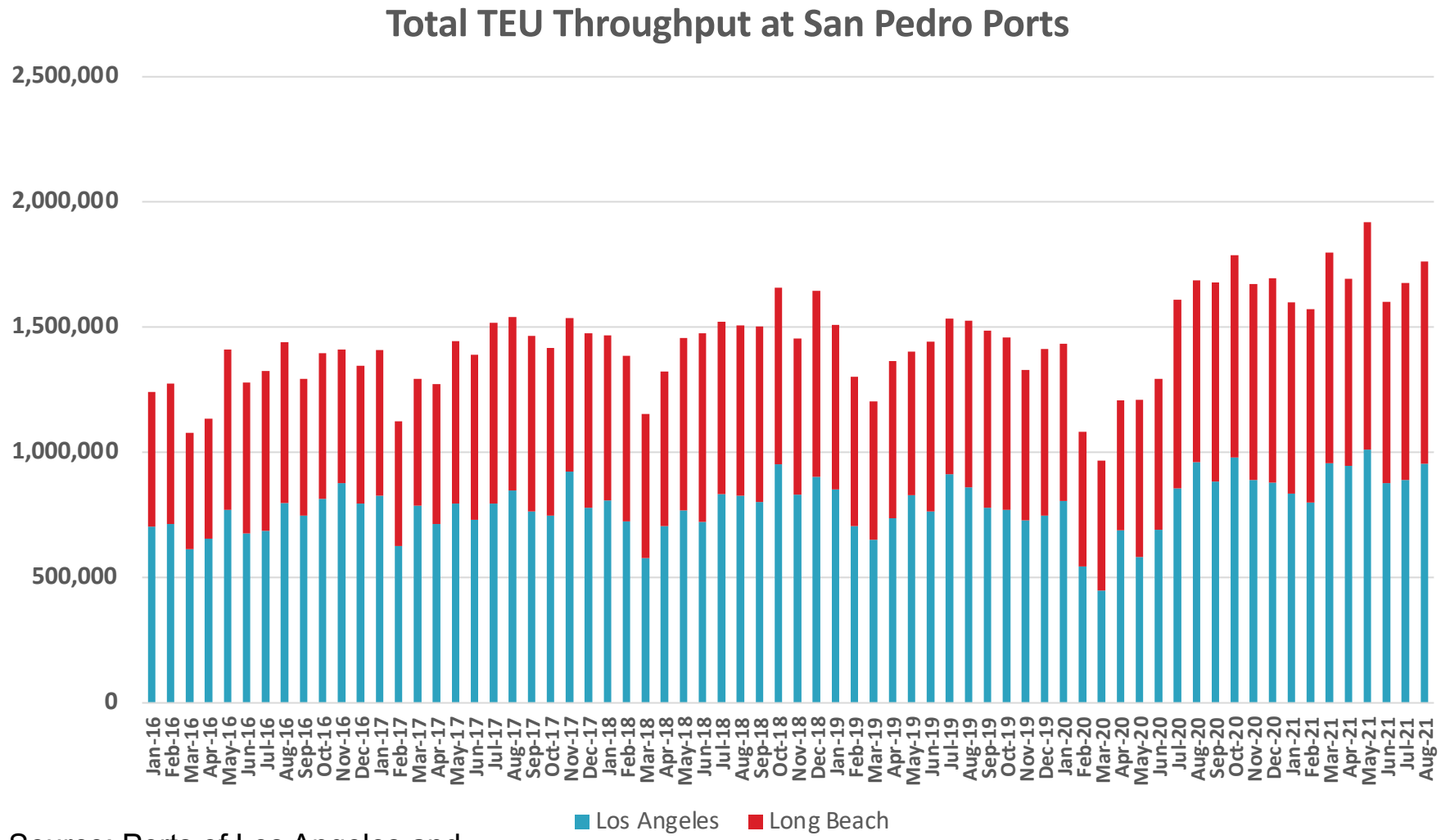
The Impact of "Outside the Terminal" Logistics Constraints - Summary

- **Solutions to the collapse of the logistics supply chain in San Pedro since June of 2020 include both non-structural and structural.**
- **Non-structural solutions include expansion of operating hours throughout the entire logistics system and will be constrained by the weakest link in the supply chain as well as labor availability and operating costs. The use of second tier ports is also an option, but infrastructure is limited at these ports.**
- **Structural solutions include:**
  - New warehouse capacity and improved productivity - automation
  - New rail capacity and equipment
  - Expansion of chassis supply
  - Increased marine terminal capacity and productivity – automation:
    - Increased capacity with no additional waterfront land available
    - 24/7 efficient operation
    - Minimize carbon footprint of container operations

Key Data - Identify the Operational/Supply Chain Constraints in San Pedro Bay

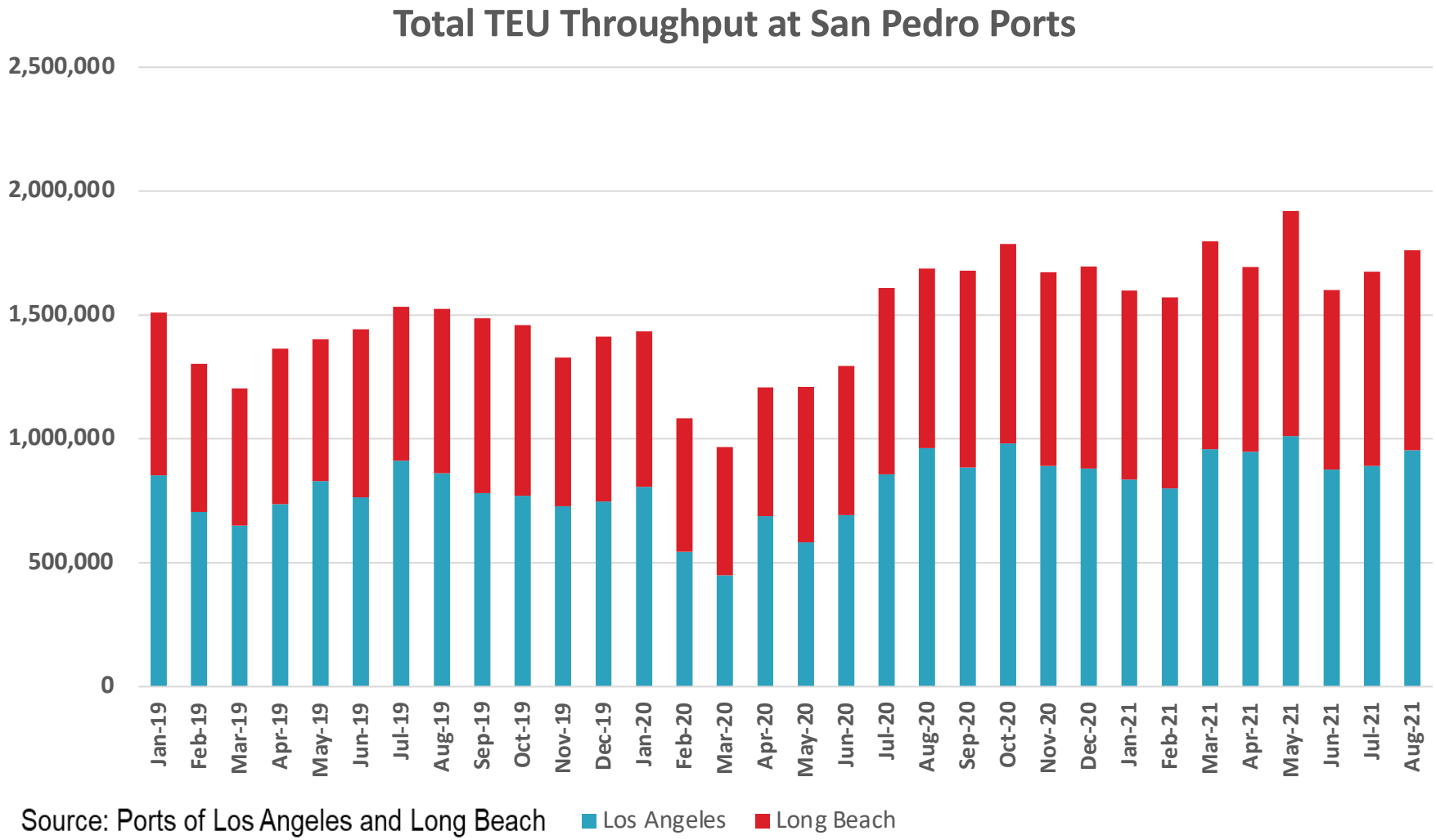
- Container volume by month, by terminal
- Labor hours worked by terminal by month
- Number of labor gangs cancelled or not ordered per month by vessels at berth
- Container dwell time by month
- Truck turn time by terminal, by month
- On-street dwell time by month (indication of warehouse availability)
- Transload vacancy rate by quarter by region in Southern California
- Intermodal rail dwell time by month since records kept
- Average number of trains per day on the Alameda Corridor by month
- TEUs moved intermodally directly and from other rail yards by month

Total TEU Throughput Peaked in October 2020, March 2021 and May 2021. From July 2020 through August 2021, TEU Throughput Has Been at Sustained High Levels.

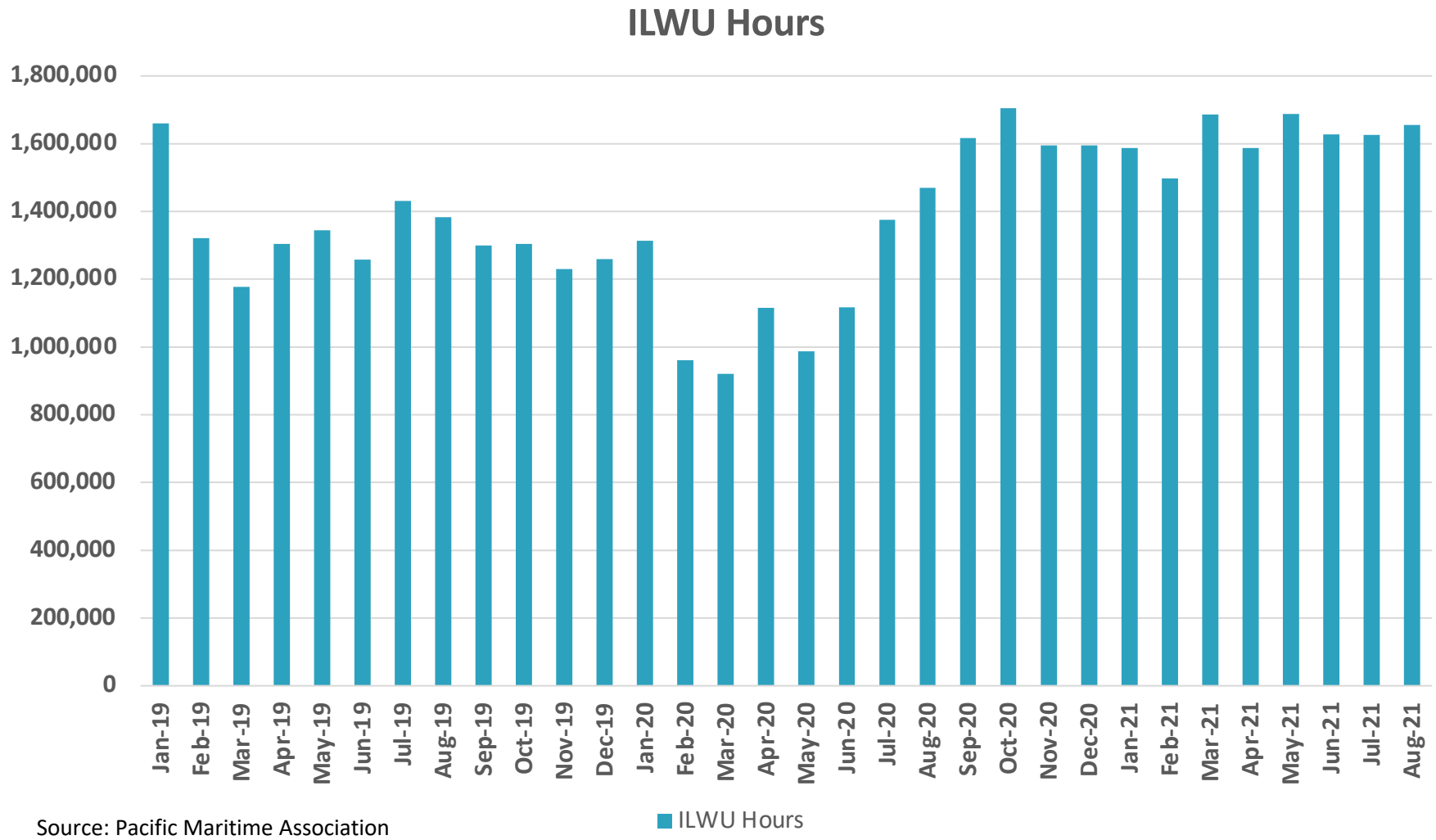


Source: Ports of Los Angeles and Long Beach

Total TEU Throughput Reached Peaks in October 2020, March 2021, and May 2021 -- From July 2020 through August 2021 TEU Throughput Has Been at Sustained High Levels.

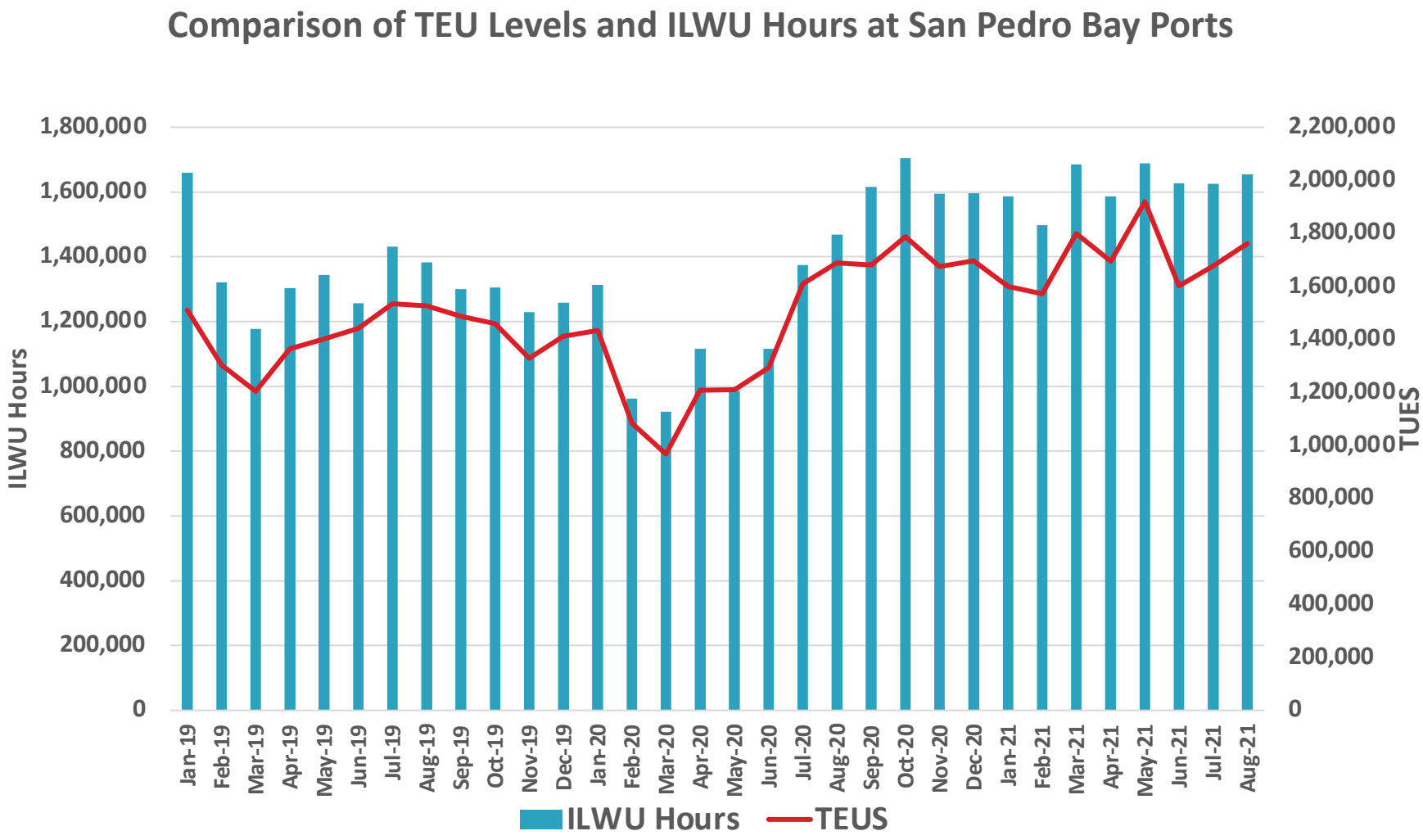


Labor Hours Worked at San Pedro Bay Have Responded to TEU Growth During the Pandemic, and Peaked in October 2020, with Similar Peaks in March 2021 and May 2021, Remaining at Sustained High Levels through August 2021.

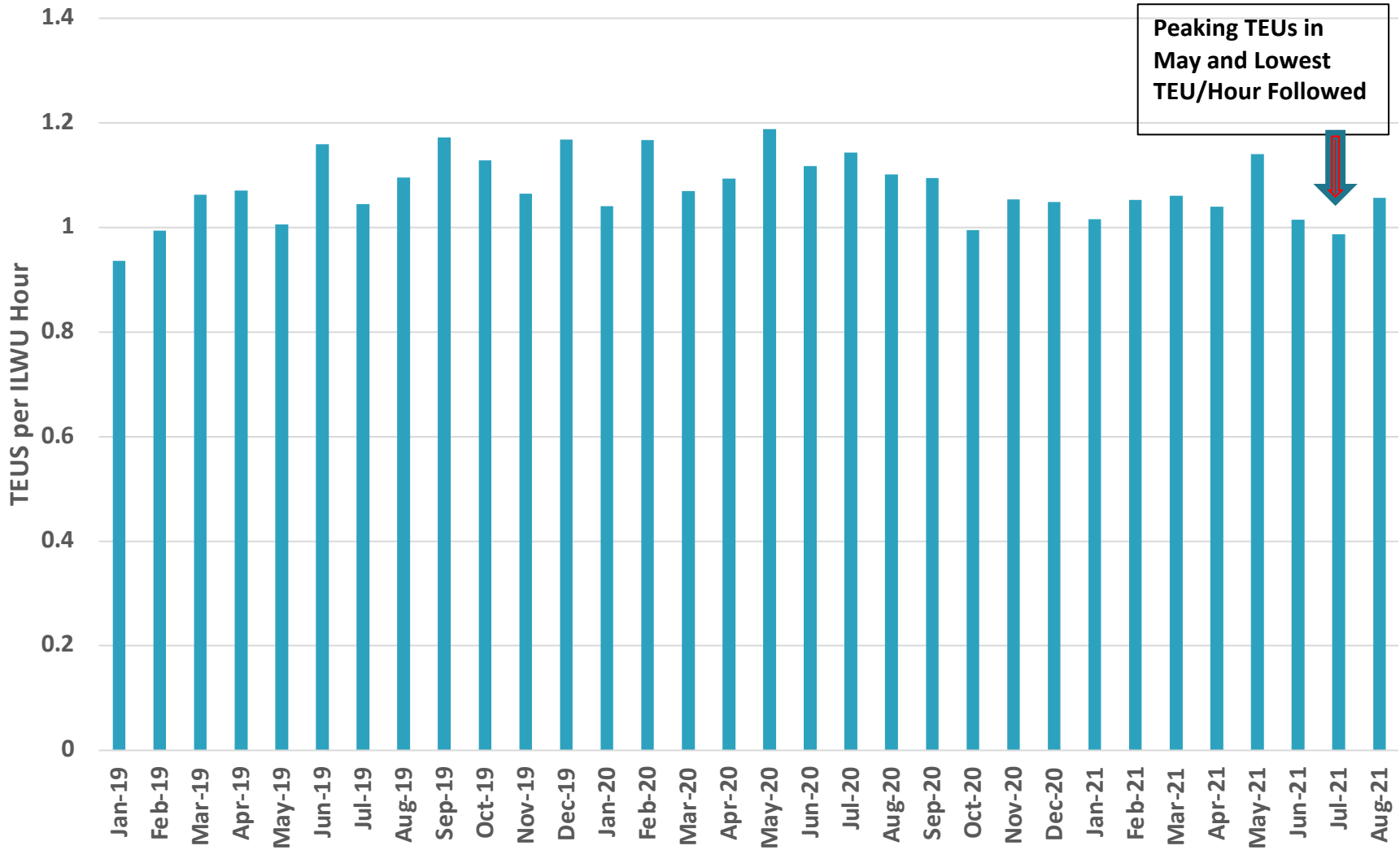


Source: Pacific Maritime Association

ILWU Hours Responded to TEU Throughput During the Pandemic.

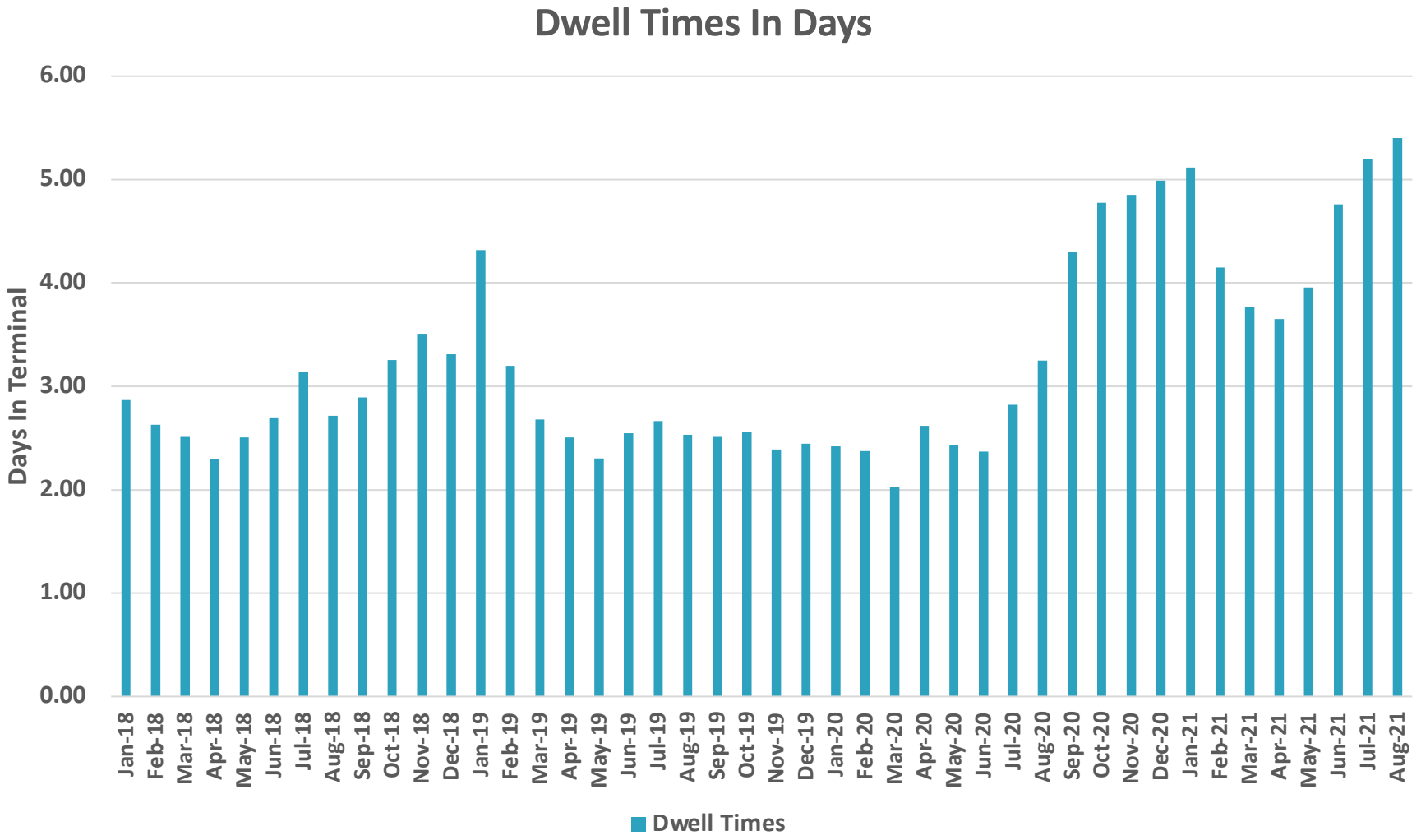


TEUs Per ILWU Hour Declined Through the Pandemic Beginning in May 2020 Reaching a Low Point in July 2021, as Congestion Mounted from the May 2021 Surge.



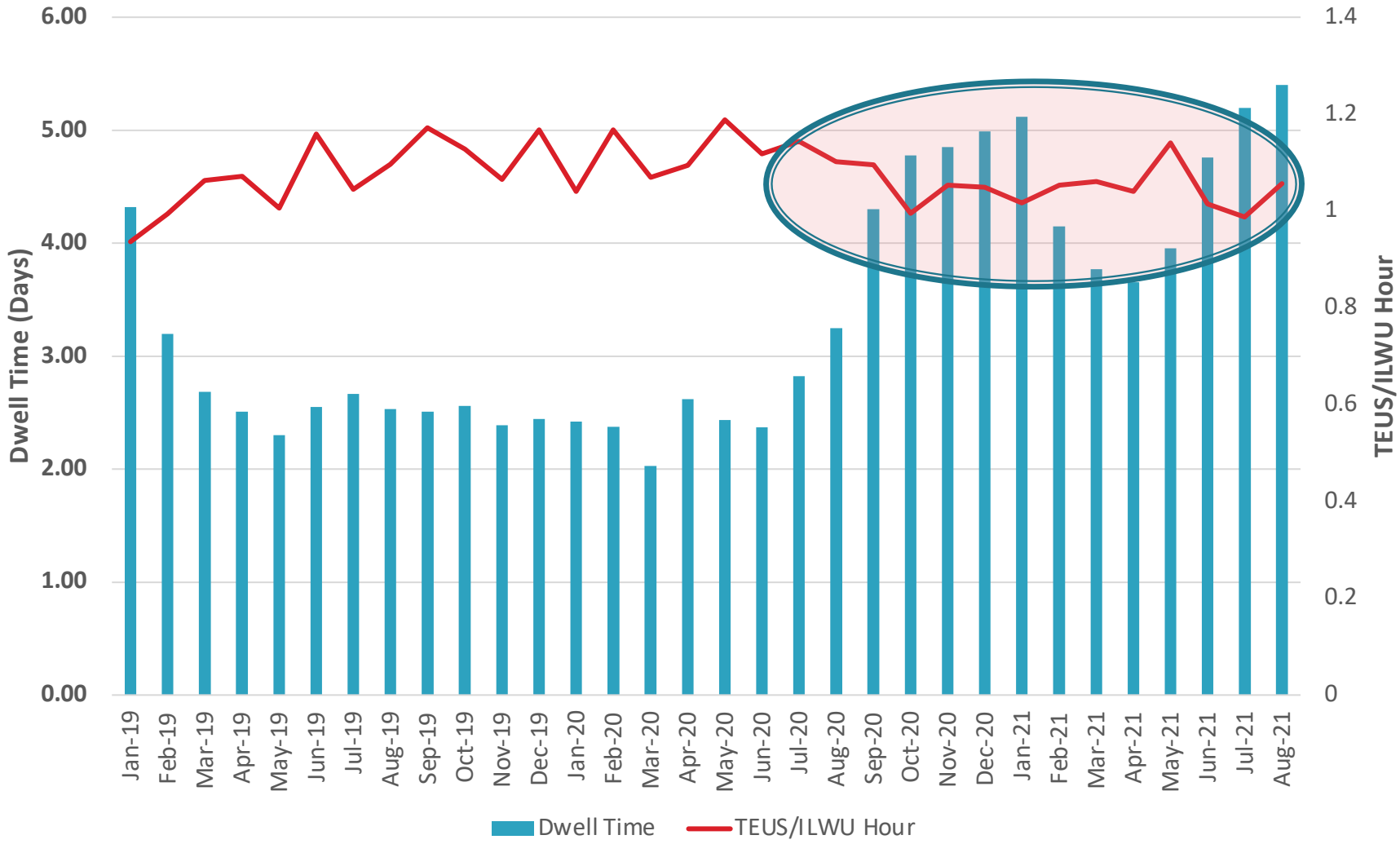
Source: Pacific Maritime Association

Terminal Dwell Times Began Increasing in June 2020 and Peaked in January 2021 and again in August 2021. A Sustained Increase in Dwell Times Began in April 2021, Reaching an All-Time High in August 2021.

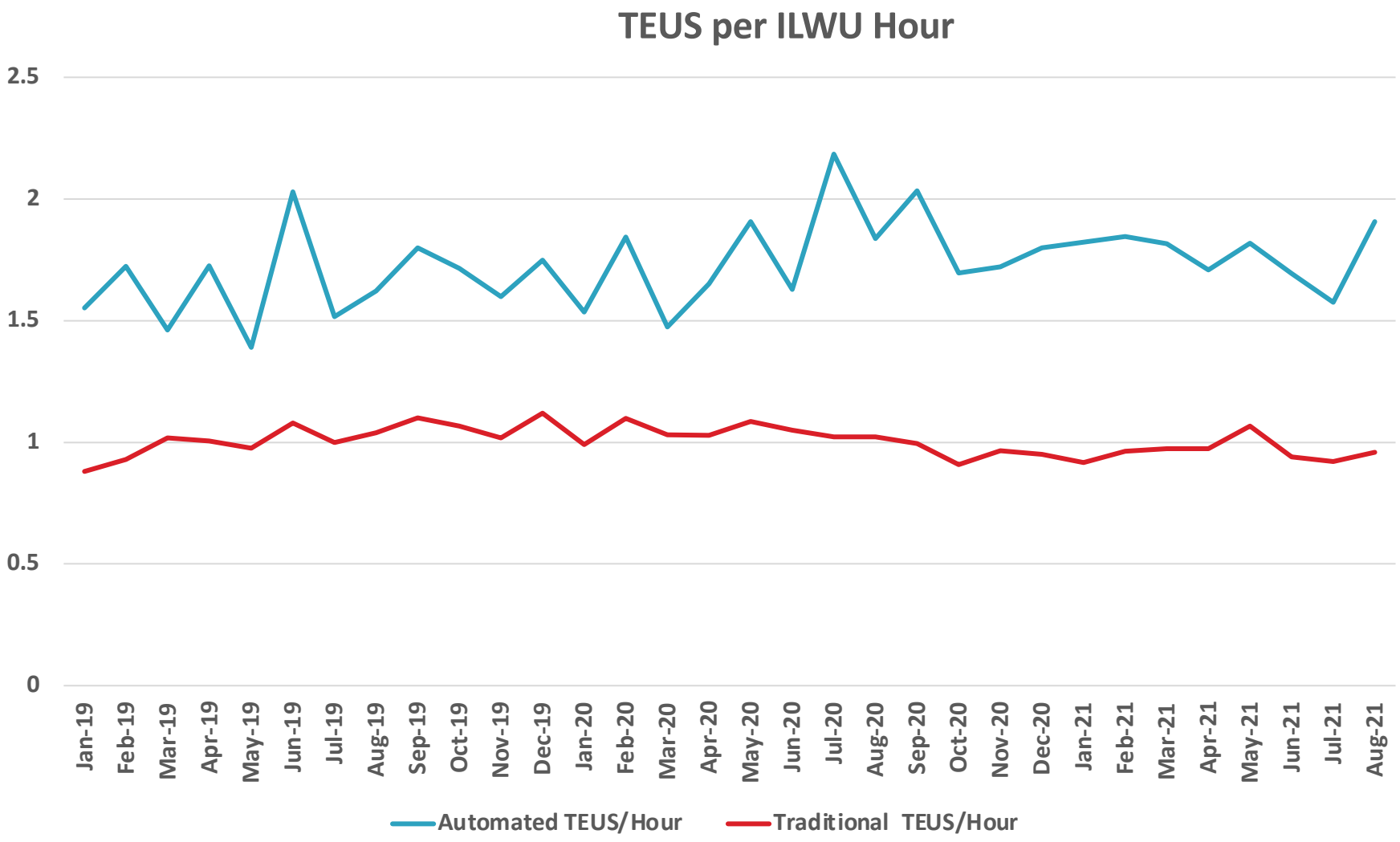


Source: PMSA

The Increase in Terminal Dwell Time/Terminal Congestion Resulted in Lower TEUs Moved per ILWU Hour During the Pandemic, Beginning in July 2020.

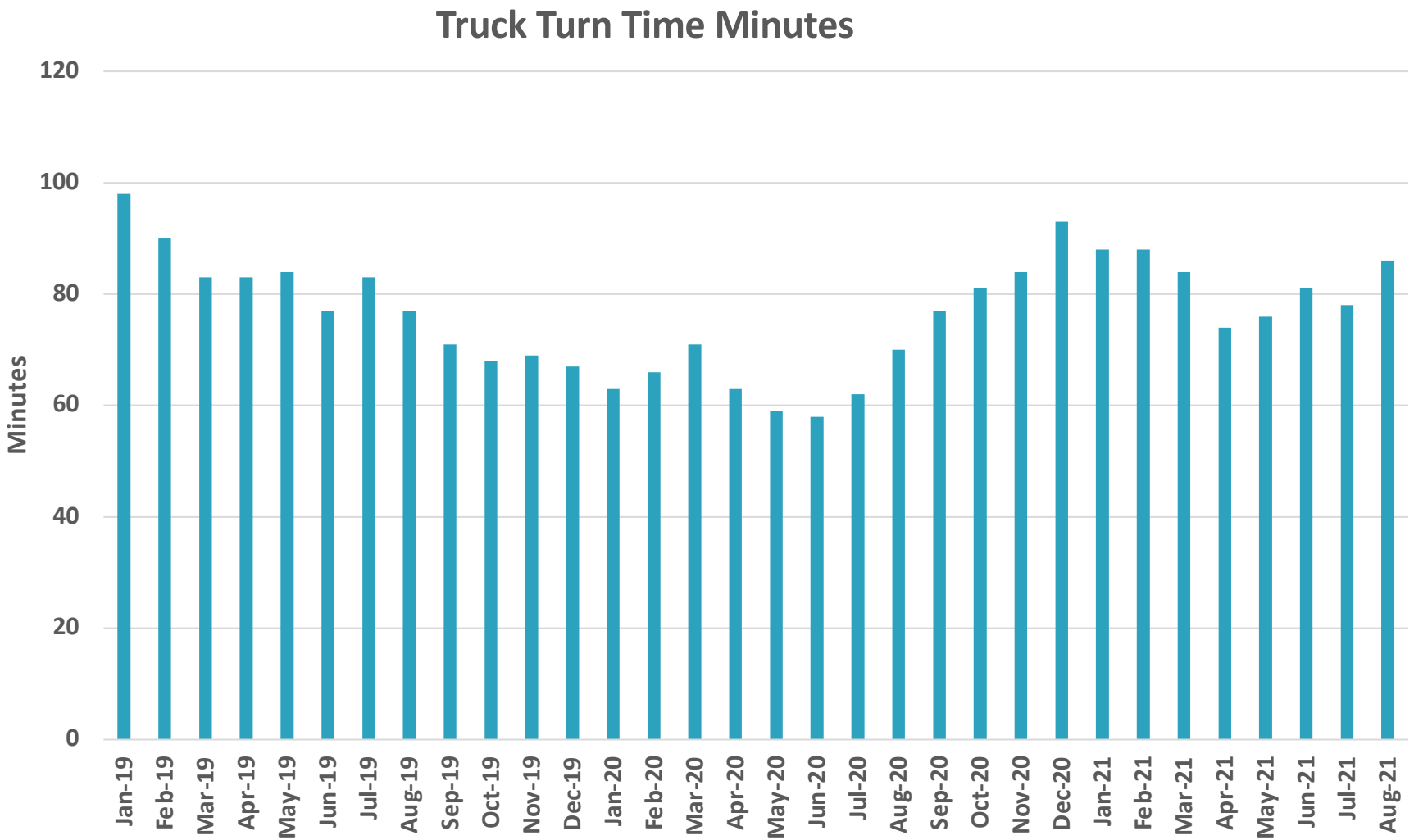


Automated Terminals' TEUs Per Hour Continued a Slightly Upper Trend During the Pandemic Compared to Traditional Terminals, and Averaged Nearly Two Times the Productivity of Traditional Terminals. The Gap in Automated vs. Traditional Terminal Productivity Has Widened as Throughput Increased.

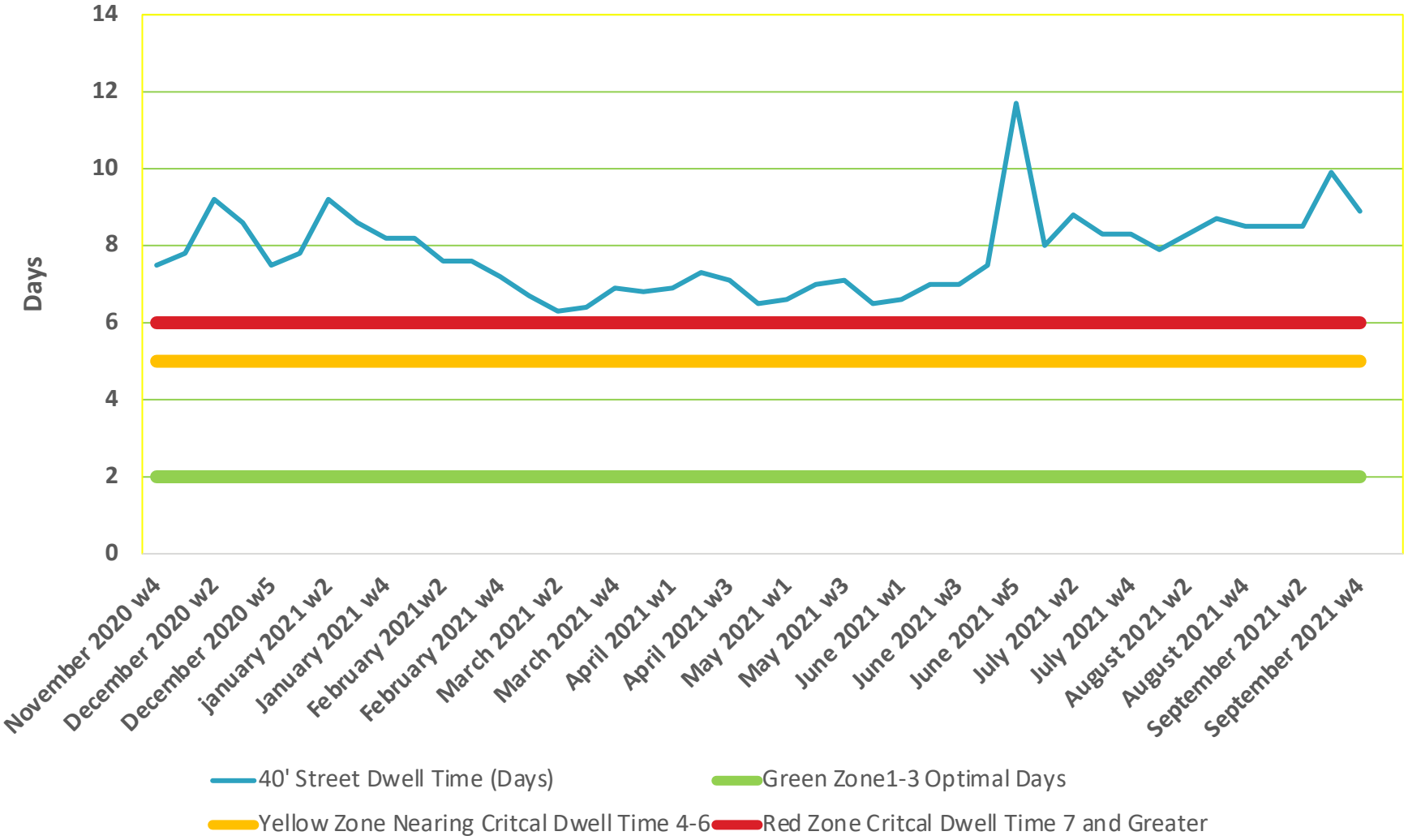


Source: Pacific Maritime Association

After a Declining Trend in Truck Turn Times during the Pre-Pandemic Period, Turn Times Peaked in December 2020 (93 Minutes) and Have Been on the Increase Since April 2021, Reflecting the May Surge in TEUs. In August 2021, Truck Turn Times Averaged 86 Minutes

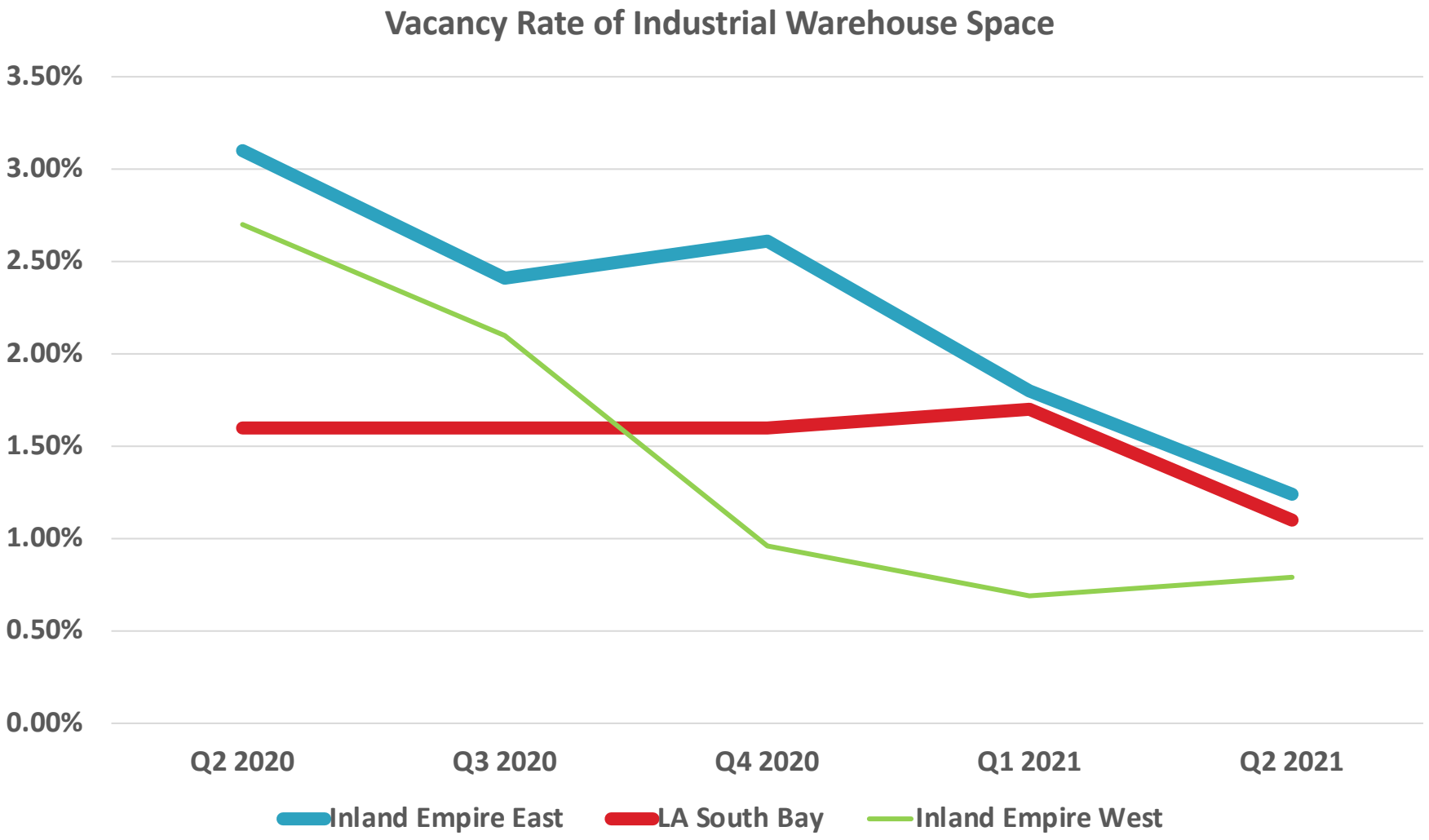


Street Dwell Times of 40 Ft. Chassis have Exceeded the "Critical Level" since November of 2020. Beginning in Week 4 of June 2021, and Reflecting the May 2021 TEU Surge, Street Dwell Times Began an Increasing Trend, with a Peak in the Last Week of June 2021 of Nearly 12 Days. This Reflects the Inability of Area Warehouses to Accept the Cargo.



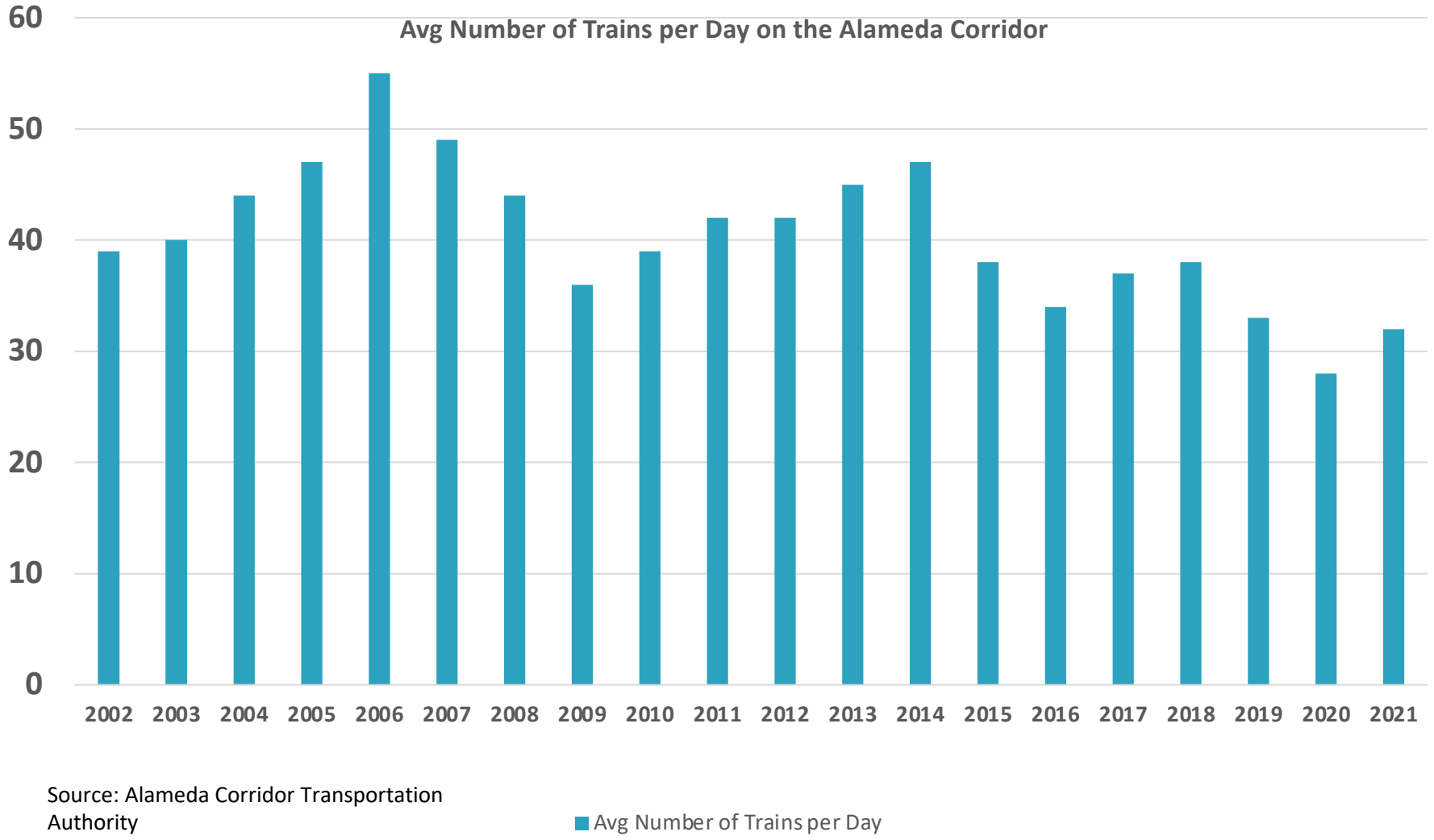
Source: Pool of Pools and Harbor Trucking Association

The Vacancy Rate of Industrial Warehouse Space Has Been Declining in the Inland Empire and the Los Angeles South Bay Area. This Suggests a Critical Warehouse/ Transload Shortage in the Region.



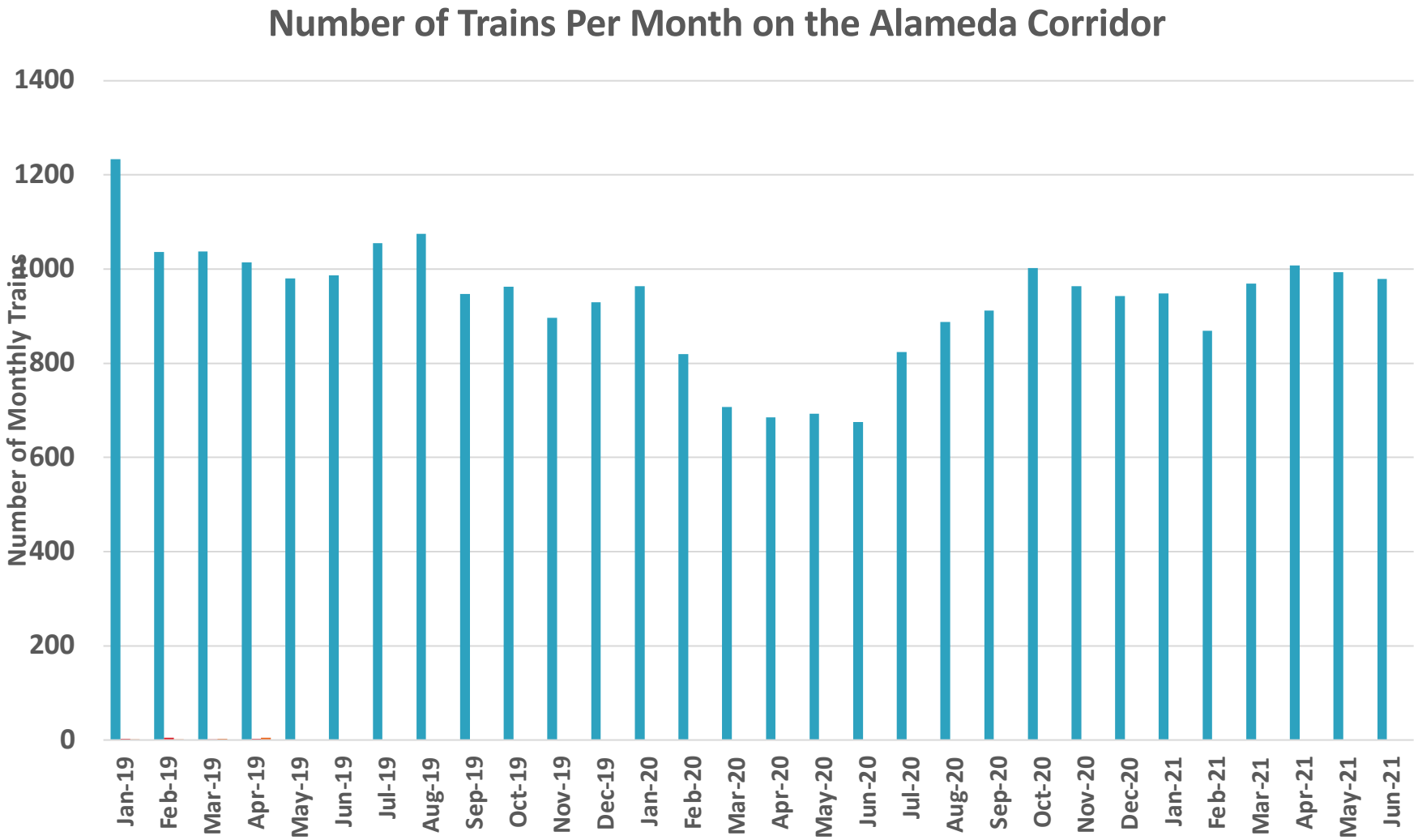
Source: Lee & Associates

During 2020 and "To Date" in 2021, the Average Number of Daily Trains Through the Alameda Corridor Was at Historically Low Levels, Reflecting Potential Rail Car Shortages. However, 2021 Shows Some Improvement, but Still Lags Historical Levels.



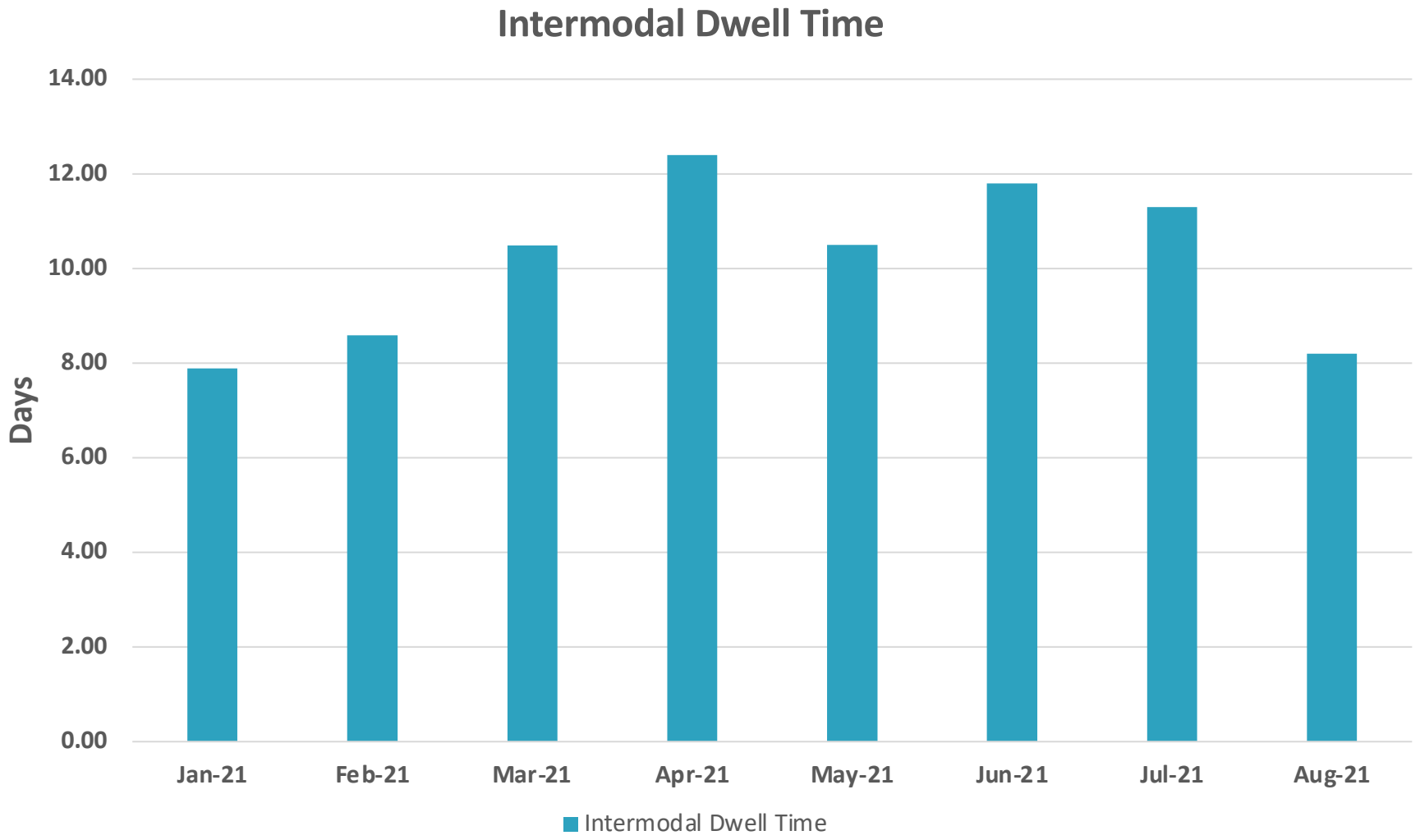
Source: Alameda Corridor Transportation Authority

During the Height of COVID-19 Induced TEU Throughput, the Number of Intermodal Trains per Month Through the Alameda Corridor Declined from Previous Levels, but Are Increasing Since January 2021 – However, the Number of Trains per Month Is Still Below Pre-Pandemic Levels.



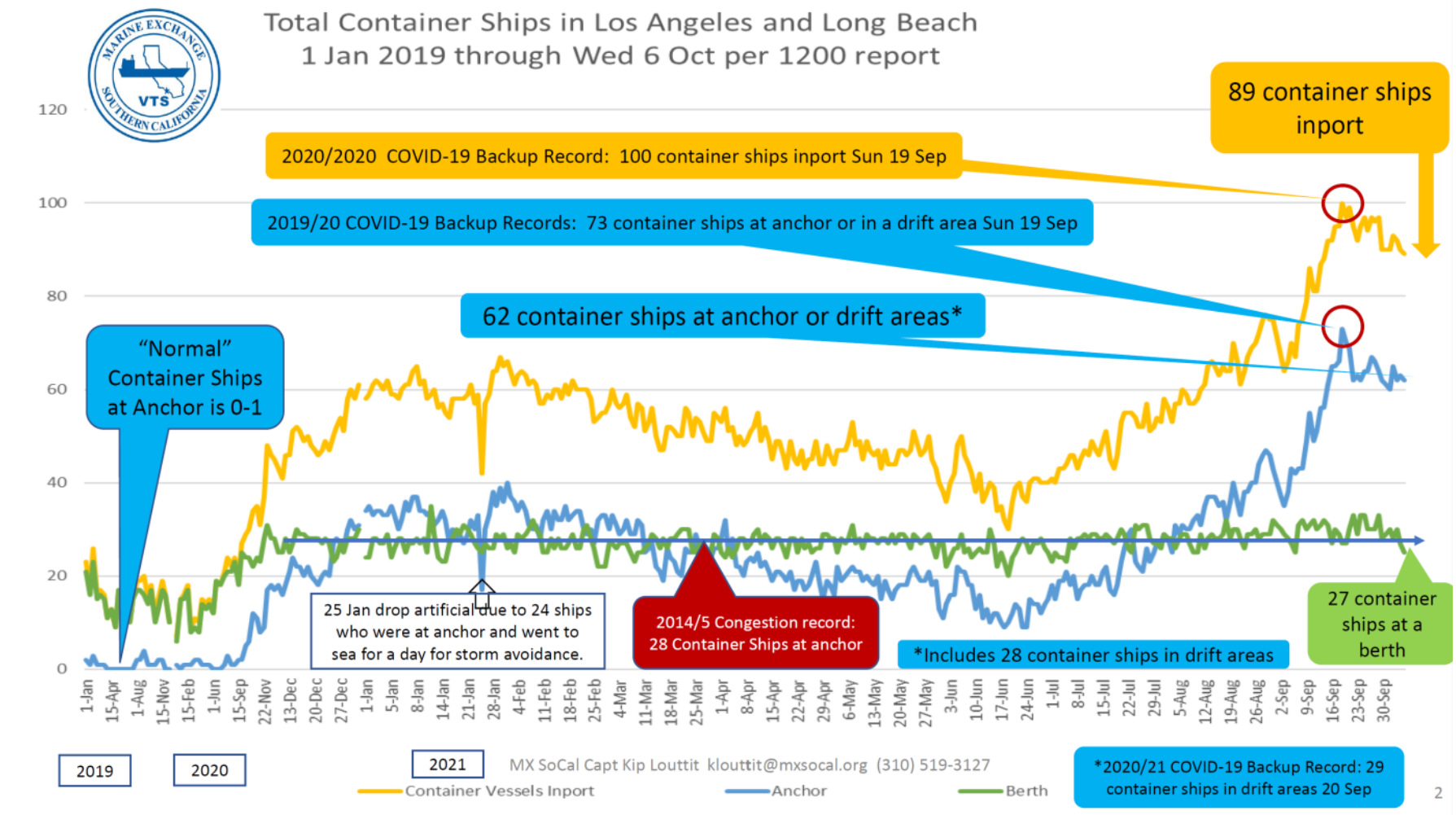
Source: Alameda Corridor Transportation Authority

Intermodal Container (Containers Waiting for a Rail Car) Dwell Time Steadily Increased through April 2021, Remained High through July 2021, and Improved in August 2021, Reflecting Increased Rail Car Availability in San Pedro Bay. However, The Intermodal Dwell Time Still Above 8 Days.



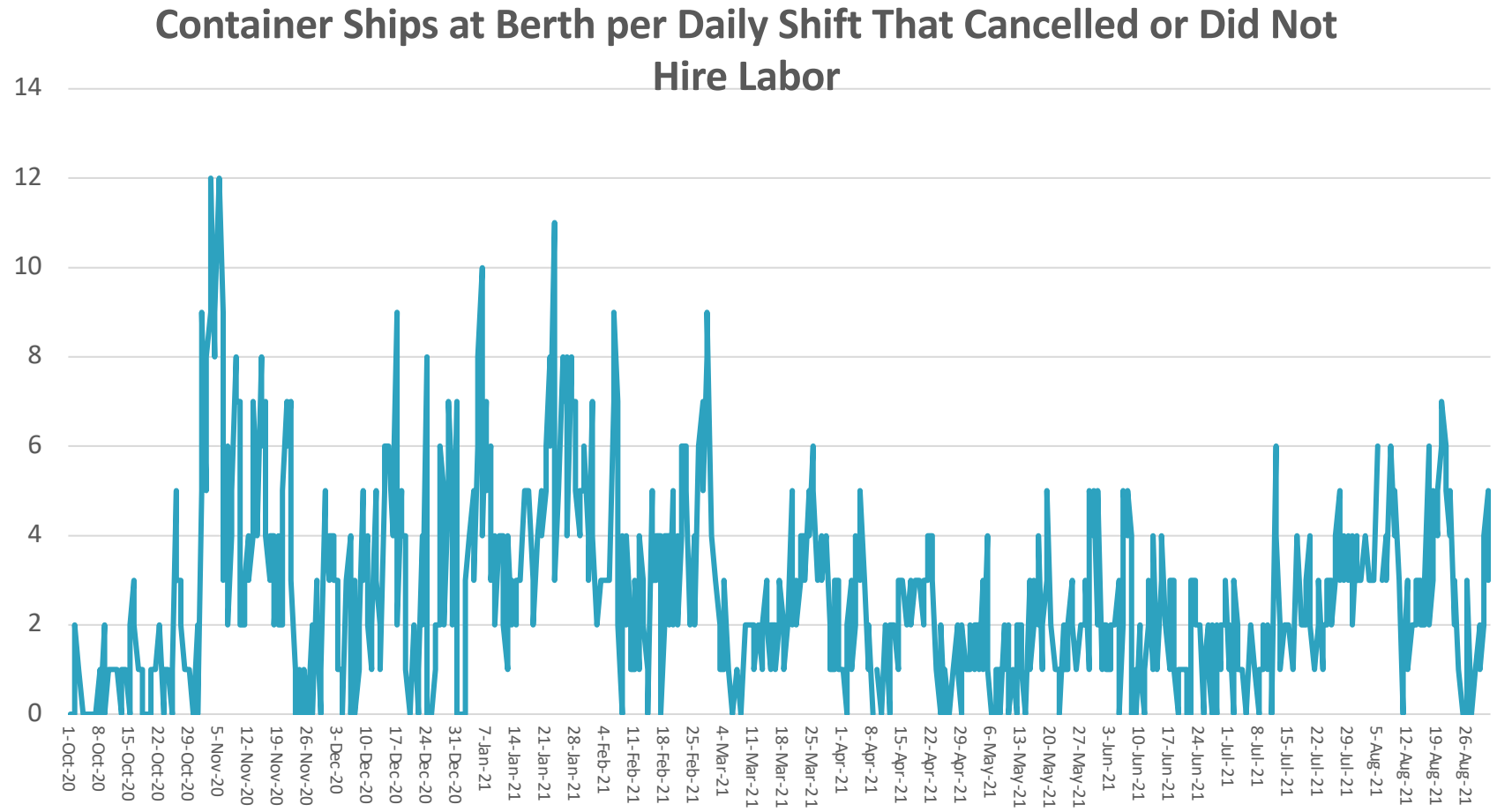
Source: PMSA

Container Ships at Berth and Anchored in San Pedro Bay Ports - On Average About 27 Ships Are at Berth Per Day.



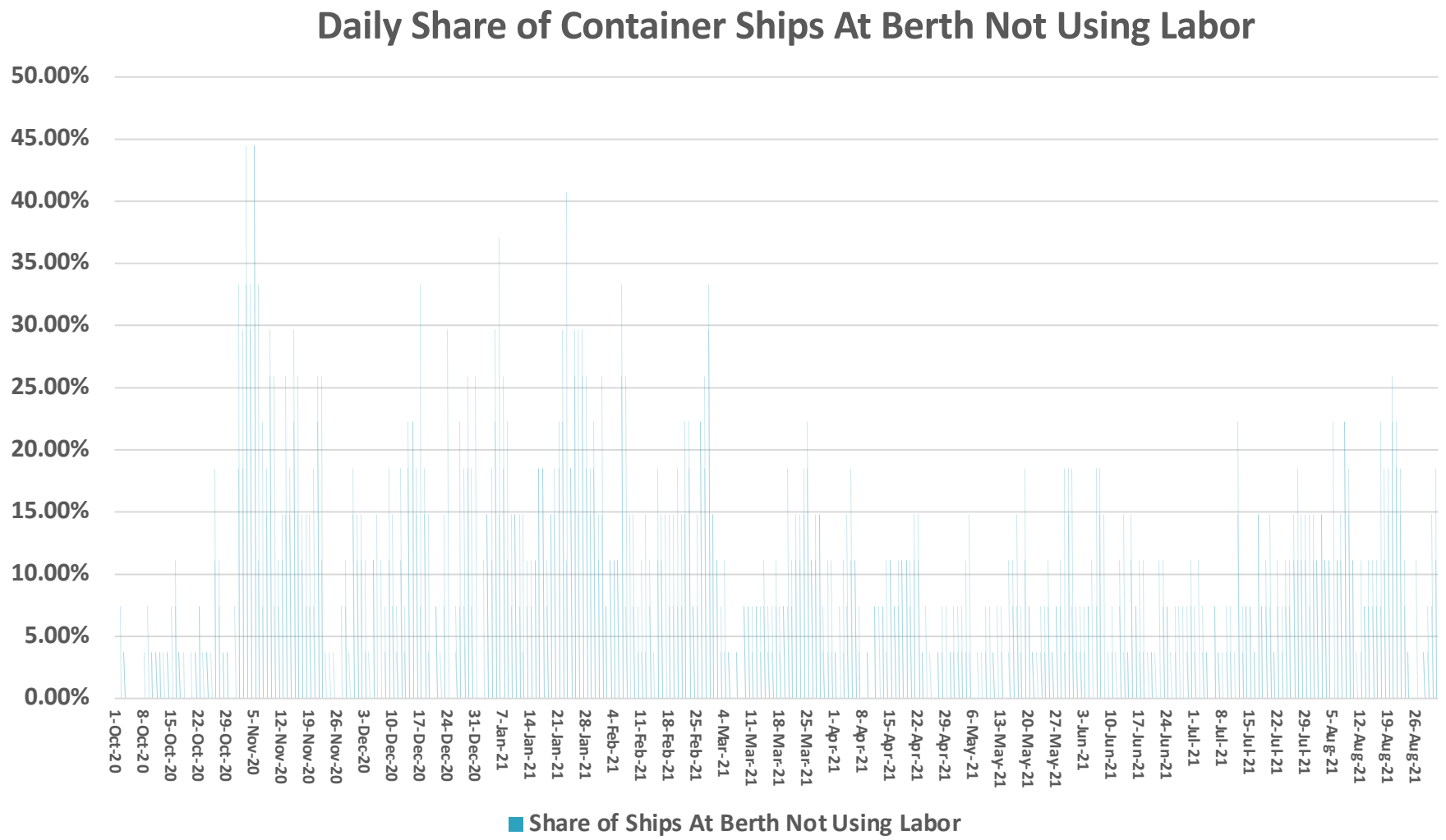
Source: Marine Exchange of Southern California

Daily Ships At Berth per Shift at San Pedro Bay Ports that Either Did Not Order Labor or Cancelled Labor after Ordered, Suggesting Yard Was Too Congested to Discharge. Labor Cancellations Peaked between November 2020 and February 2021, and Have Lessened in More Recent Months.



Source: Pacific Maritime Association

The Number of Container Vessels at Berth that Canceled Labor or Did Not Order Labor Typically Ranged Between 10% and 40% of Container Vessels at Berth per Daily Shift through February 2021. Between the Beginning of November 2020, through March 2021, an Average of 13.3% of Container Vessels at Berth Either Cancelled or Did Not Hire Labor On a Daily Basis. Labor Cancellations Have Been Increasing Since July 2021.



Solutions – Non-Structural vs. Structural

- **Non-Structural:**
  - Increase operating hours throughout entire supply chain:
    - Marine terminals
    - Warehouses/transload centers/import DCs
    - Regional DCs
    - Retail stores
    - Consumers
  - Increase rail velocity
  - Increase labor productivity
  - Utilization of second tier ports with capacity
  - Deployment of “loaders”
  - Threats:
    - One components does not operate at 24/7
    - Labor availability – trucking, warehouse, marine terminal
    - Operating Costs
    - Second tier ports infrastructure:
      - Intermodal capacity
      - Water depth
      - Overall DC infrastructure

Solutions – Non-Structural vs. Structural

- **Structural:**
  - Increase warehouse capacity:
    - 14.3 million sf under construction in Inland Empire East
    - 8.2 million sf under construction in Inland Empire West
    - 1.1 million sf under construction in South Bay
  - Increase chassis supply
  - Increase rail trackage/dual trackage
  - Increase marine container production
  - Increase marine terminal capacity - limited waterfront land so capacity is limited under traditional terminal operations (non-automated)