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North American Supply Chain H1 2020: Challenges and the Impact on Crude Quality

Hillary Stevenson, Oil Markets and Business Development Director

Oil and Refined Products Services

Thermal Imagery



Visual Imagery



ANALYTICS

Production forecast Provides forecasts for drilling rig activity and crude oil production.

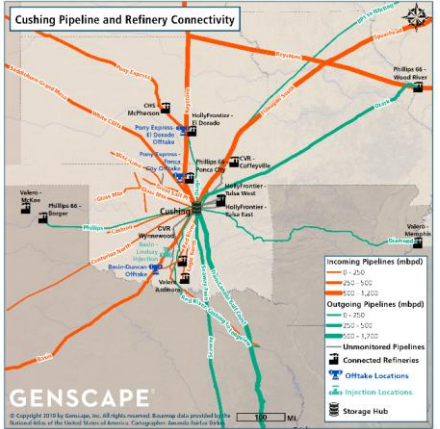
FUNDAMENTAL DATA

Oil Production Using a combination of technologies to monitor produced gas, Genscape calculates daily oil production for over 55mn bpd globally

Storage Uses thermal and visual imagery to provide a weekly and bi-weekly view of oil and refined products inventory levels at key trading hubs.

Transportation Using proprietary remote sensors, measures real-time crude oil pipeline, waterborne, and crude-by-rail movements.

Oil Refineries Real-time thermal imagery provides transparency into the operational status of crude and downstream refinery units.



Full List of Genscape Oil and Refined Product Services

Product	Frequency [Timing (US ET)]	Data available from date [*]
Storage – Crude		
ARA Crude Storage	Weekly [Wed, 4am] Weekly measurements of crude oil inventories & capacities throughout the ARA region	Aug 2012
Canada Crude Storage	Weekly [Tues, 10am] A weekly snapshot of physical crude oil inventories held in above-ground tanks at Edmonton, Hardisty, Kerrobert & Alberta Heartland as well as cavern storage at Hardisty	April 2011 [June 2011]
Cushing Crude Storage	Twice Weekly [Mon, Thurs, 10am] Twice-weekly measurements of the crude oil inventories & capacity at Cushing with granularity to the operator & tank level. Gives key insight into supply changes at the WTI delivery point	May 2009
Louisiana Gulf Coast Crude Storage	Weekly [Tues, 10am] Weekly snapshot of oil storage, inbound rail, outbound pipeline & waterborne movements in the Louisiana Gulf Coast region. Key storage locations monitored are: St. James, LOOP, Houma & several LA Refineries	May 2012 [Mar 2017]
Patoka Crude Storage	Weekly [Mon, 10am] Provides a weekly snapshot of crude stocks held in above-ground tanks at the largest PADD 2 hub outside of Cushing	June 2010
Texas Gulf Coast Crude Storage	Weekly [Tues, 10am] Weekly USGC crude oil storage measurements for both refinery & terminal storage locations along the Texas Coast, delivered a full day before EIA estimates. Includes inventories at all delivery points for CME HCL and ICE HOU contracts and Texas export terminals	July 2014
West Texas Crude Storage	Weekly [Mon, 10am] Weekly USGC crude oil storage measurements for both refinery & terminal storage locations along the Texas Coast, delivered a full day before EIA estimates. Includes inventories at all delivery points for CME HCL and ICE HOU contracts and Texas export terminals	Oct 2010
Storage – Refined Products & Ethanol		
ARA Ethanol & Methanol Storage	Weekly [Wed, 4am] Weekly snapshot of ethanol and methanol inventories and capacity in the ARA region. As fuel additives or components used to make fuel additives, the data complements other storage reports in the region, particularly Genscape's ARA Gasoline & Naphtha Storage report	Jan 2019, ethanol; Mar 2019, methanol [April 2019, both]
ARA Gasoil & Jet Fuel Storage	Weekly [Wed, 4am] Weekly snapshot of gasoil & jet inventories & capacities tank by tank in the ARA region. Gasoil inventories align with ICE Gasoil futures contract	Aug 2012
ARA Gasoline & Naphtha Storage	Weekly [Wed, 4am] Weekly snapshot of gasoline, naphtha, & gasoline blending components inventories & capacities tank by tank in the ARA region. Gasoline inventories give insight into supply and demand for swap contracts and transatlantic arbitrage	Sep 2015
Chicago Ethanol Storage	Weekly [Mon, 12pm] Weekly snapshot of ethanol inventories & capacities for the industry's most traded hub	Aug 2014
Gulf Coast Ethanol Storage	Weekly [Tues, 10am] Weekly ethanol inventories and capacities for one of the most active regions for ethanol movement. Includes Houston, Beaumont, & Louisiana	Nov 2014 [July 2015]
New York Harbor Product Storage	Weekly [Tues, 9am (ethanol only), 10am (all commodities)] Weekly gasoline, ethanol, jet fuel & diesel/heating oil storage measurements delivered a full day before EIA estimates. Inventory values align with the CME Group RBOB and ULSO futures contracts	Nov 2013
Transportation – Pipelines & Rail		
U.S. Mid-Continent Pipelines	Real-Time [every 30 min]; Daily [8:30am]; Weekly [Mon, 9am] Insight into critical U.S. & Canadian pipelines supplying the Cushing & Patoka, IL, storage hubs & connected refineries	July 2009 [2011]
U.S. Gulf Coast Pipelines	Real-Time [every 30 min]; Daily [10am]; Weekly [Mon, 9am] Flow data for key crude pipelines moving barrels to the Texas Gulf Coast from PADD 2 and the Permian/Eagle Ford production regions	July 2009 [2014]
Canada Pipelines	Real-Time [every 30 min]; Daily [9:30am]; Weekly [Mon, 9am] Near-comprehensive coverage of crude and diluent pipeline flow between the U.S. and Canada, updated every 30 minutes	June 2010 [2015]
PetroRail	Real-Time [every 30 min: pipeline data]; Daily [9:30am]; Weekly [Tues, 10am] Analysis & market implications of crude-by-rail movements in North America	Aug 2011 [2013]
Forties Supply Chain Monitor	Real-Time [every 30 min: pipeline data]; Daily [5am: oil balance] Near-real-time tracking of the Forties Pipeline System, including pipeline flows, inventories, stabilization operations & cargo shipments	Feb 2011 [2012]
Transportation – Waterborne		
North American Waterborne Crude	Weekly [Wed, 10am]; 3 weekly supplementals [Mon, Tues, Fri, 9am] Imports, exports & domestic crude volumes moving along North American coasts & intracoastal waterways with market analysis. Includes U.S. Import and Export forecast supplements on Friday and Monday ahead of EIA data	Aug 2014 [Import data since: Jan 2017]
European Waterborne Products	Daily; Daily data alerts [3:30 am]; Twice weekly [Tues, Fri, 7am] Key refined products flows touching Europe & North Africa, including trans-Atlantic and East of Suez-to-Europe shipments. Includes cargo details & daily destination change alerts	Aug 2014
Rhine Barges	Daily [7am]; Weekly [Wed, 7am] Gasoil/diesel, jet fuel and light ends flows from ARA into Germany, France and Switzerland, includes barge listing and German cargo imports	Jan 2016

Product	Frequency [Timing (US ET)]	Data available from date [*]
Refinery Utilization		
North American Refinery Intelligence	Real-Time; Twice Daily [10am, 2pm] Real-time view into the daily status of refinery operations in the U.S. & Canada with detailed commentary & market implications	April 2010 [2014]
European Refinery Intelligence	Real-Time; Daily [8am] Real-time view into the daily status of major refinery operations across Europe with detailed commentary & market implications	June 2011 [2016]
Refinery Stream Monitor	Weekly [Fri, 10:30am]; Monthly Weekly crude oil and downstream inputs on a U.S. and PADD-level basis, published five days ahead of the EIA crude input release and several months ahead of EIA's monthly downstream input data release. Based on Genscape's real-time proprietary monitoring of U.S. refineries	Jan 2016
Forecasting & Supply		
Canadian Crude Oil Production Forecast	Weekly [Mon]; Every 6 Weeks Most detailed, comprehensive five-year oil production forecast across the significant oil producing regions in Canada, including detailed project-level analysis for oil sands and quality-level conventional onshore and offshore crude production outlook	Jan 2007
U.S. Crude Oil Production Forecast	Daily [11am]; Weekly [Mon]; Every 6 Weeks Unique, five-year forecast for crude oil production in the U.S., aggregated by region & by crude quality (heavy, intermediate, light & condensate)	Weekly; Jan 2006; Daily; Jan 2010
North American Crude Oil Balance	Weekly [Wed]; Every 6 Weeks [Thurs] A three-year outlook for supply and demand balances in the U.S. and Canada, utilizing the U.S. Crude Oil Production Forecast, Canadian Crude Oil Production Forecast, and North American Crude Oil Runs forecast to provide monthly outlook for PADD-level and Canadian balances	Jan 2008
North American Crude Oil Runs	Weekly [Wed]; Every 6 Weeks [Thurs] A three-year refinery demand outlook at both regional and individual refinery levels. Examines publicly available turnaround information, proprietary refinery infrared camera signals, and forward crack spread prices to guide an industry-leading crude oil demand forecast	Regional: Jan 2008; Individual refineries: Jan 2010
Global Oil Supply Report	Every 6 Weeks Comprehensive, monthly global production forecast that is broken down by country and by product type, i.e., oil, condensate, NGL, and other liquids. Each nation's history and forecast is built from the individual field level.	Jan 2010
High Frequency Oil Production Monitor	Daily High-frequency estimate of daily oil production using proprietary flare signature evaluation methodology (alongside other signals intelligence sets) covering 54mm bpd across 21 countries and regions – including Saudi Arabia, UAE, Kuwait, Qatar, Oman, U.S., Iran, Iraq, Libya, Mexico, the North Sea, Venezuela and more – delivered daily via API. (Product complement to Global Oil Supply Report.)	July 2013
Supply Chain Monitoring & Intelligence		
North American Crude Oil Fundamentals	Weekly [Wed, 9am] A comprehensive look at the factors driving the North American crude market with highly accurate storage, pipeline, rail & refinery data	May 2009 [July 2014]

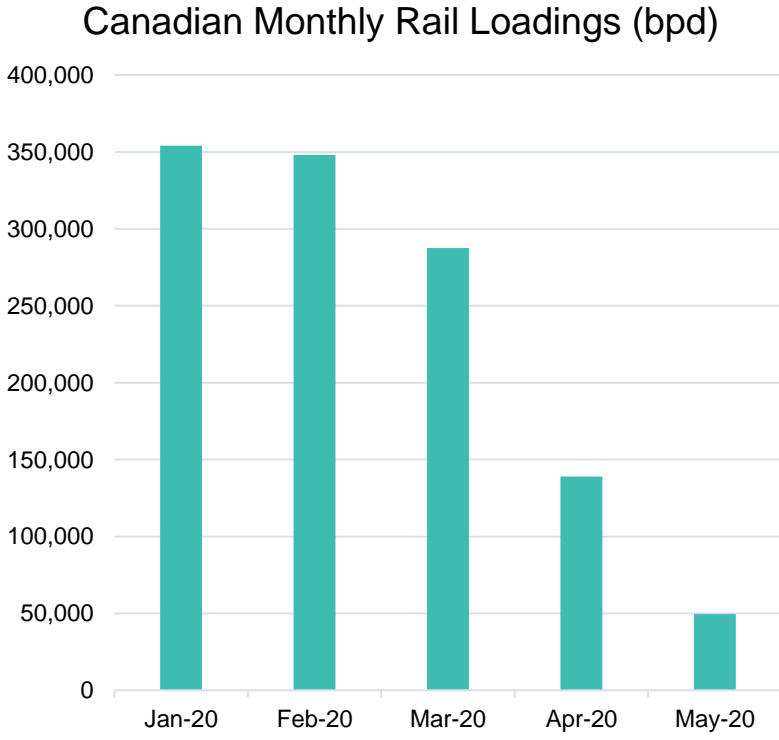
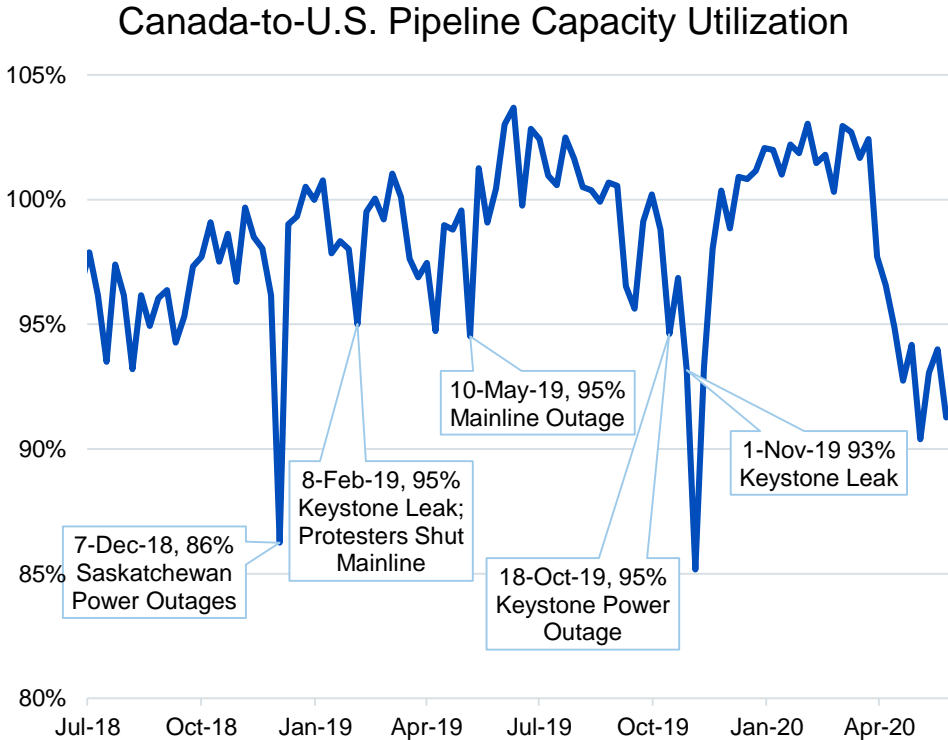


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Canada

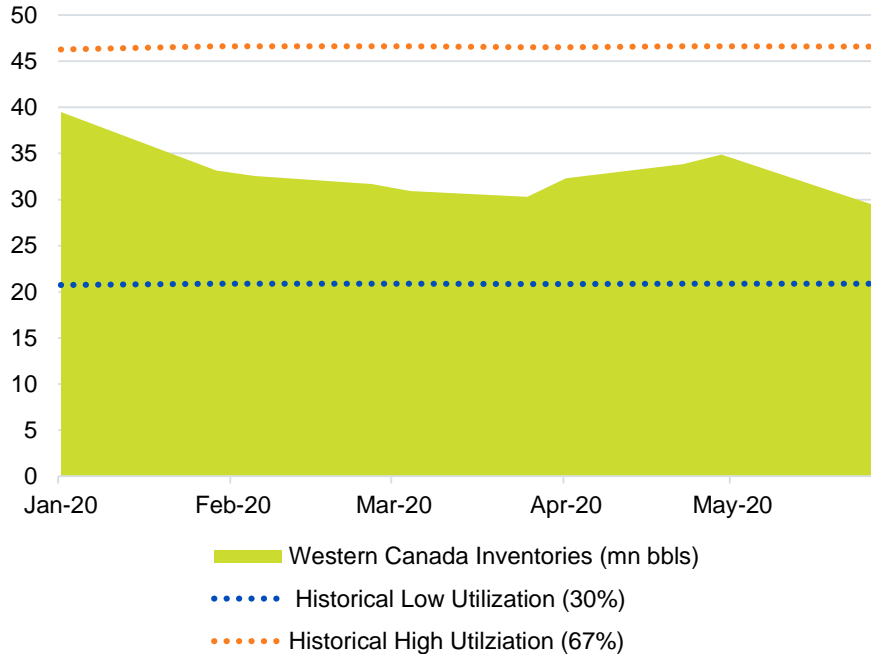
W. Canadian outbound transportation flows fell with production & demand



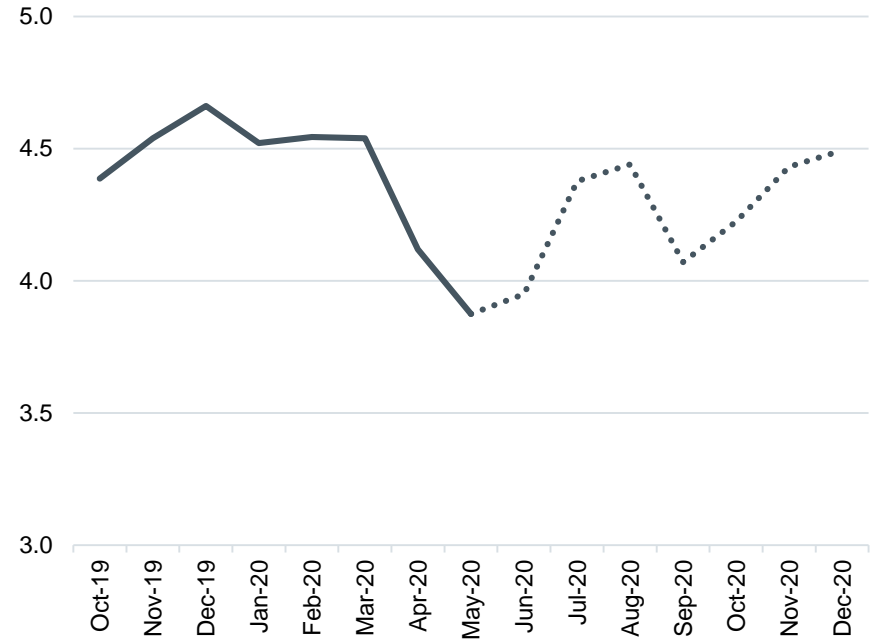
Source: Genscape

Canadian crude production declines primary driver of inventory draws

Western Canada Inventories (mn bbls)



Canadian Unblended Production (mn bpd)



Source: Genscape, Forecast as of May 29

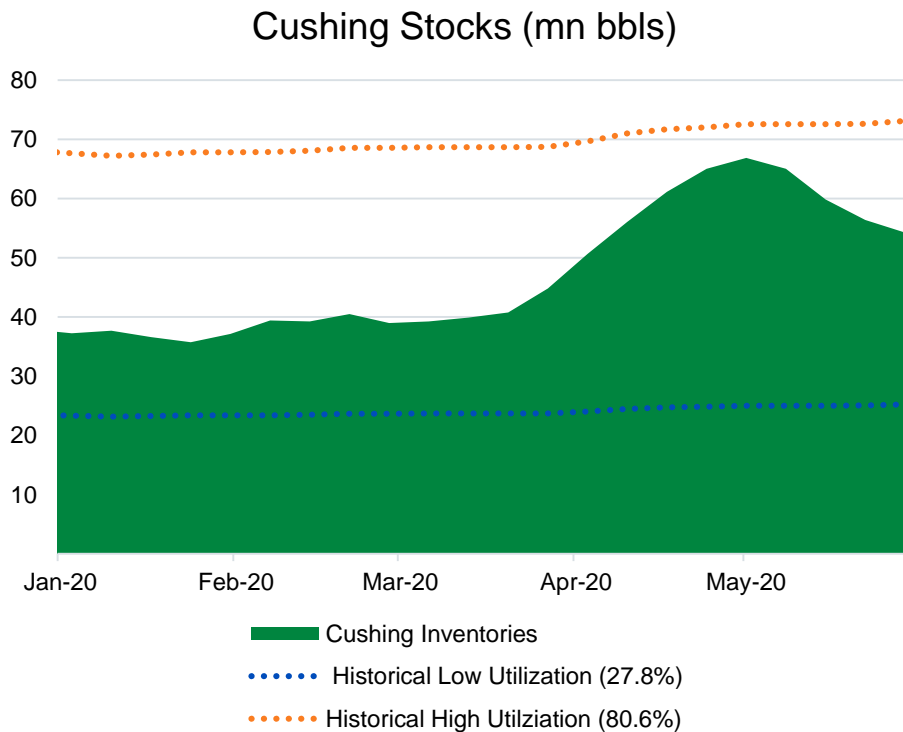


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Cushing

The Cushing contango/price crash roller coaster



Source: Genscape



Cushing neared maximum capacity in late April (Source: Genscape)



Aerial overview of trailers near NGL Energy Partner tanks. (Source: May 7 Genscape aerial imagery)



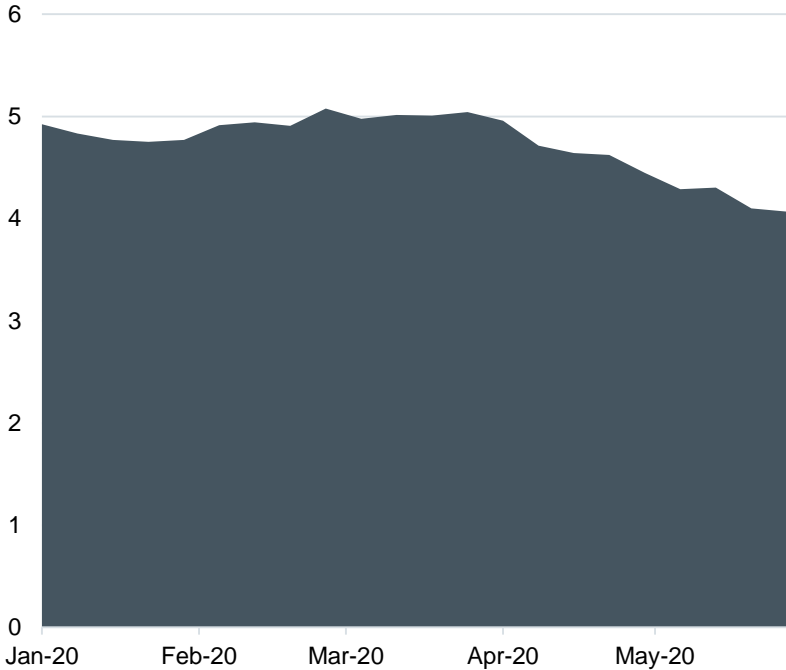
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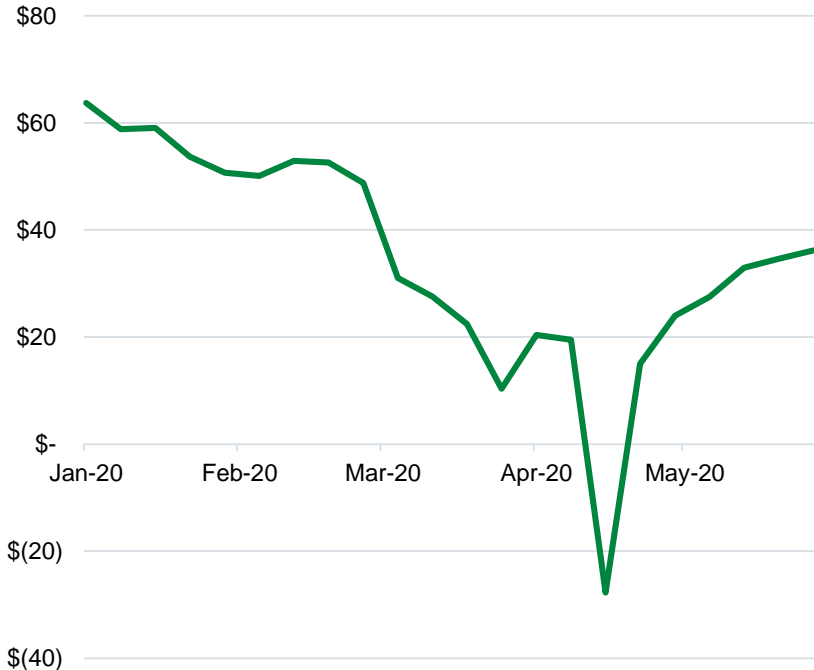
Texas

Permian Production: More responsive than expected

Permian Production (mn bpd)



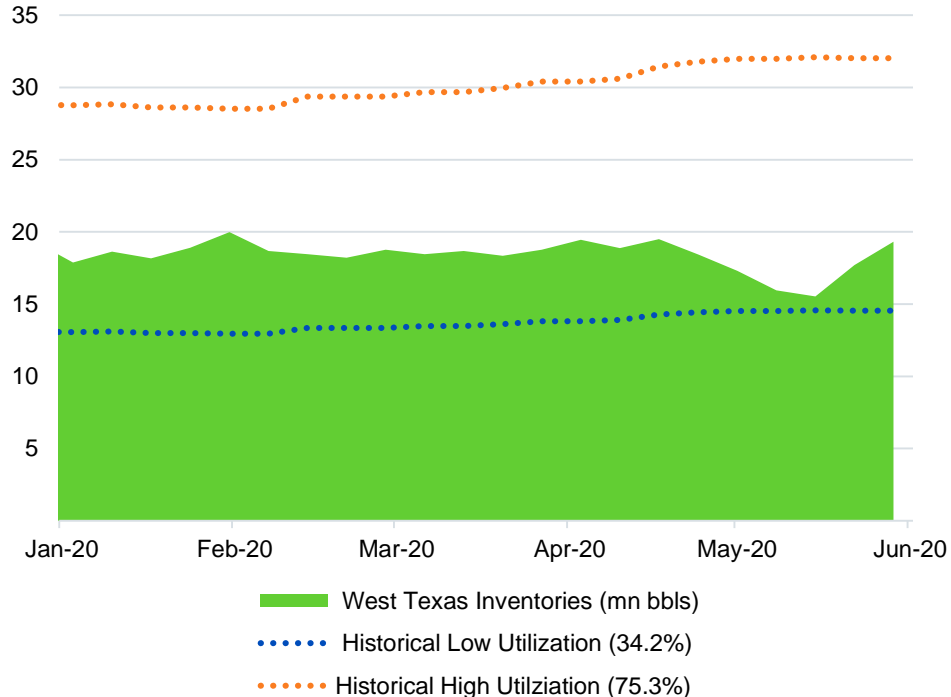
WTI Midland (\$/bbl)



Source: Genscape

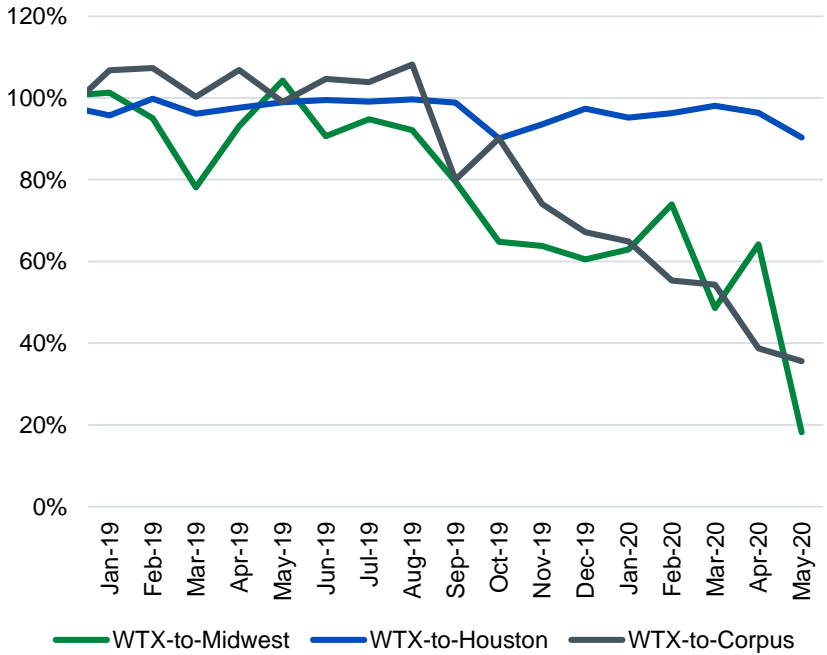
West Texas inventories hit relative bottom

West Texas Inventories



Source: Genscape

Pipeline Capacity Utilization by Region (Genscape-monitored)





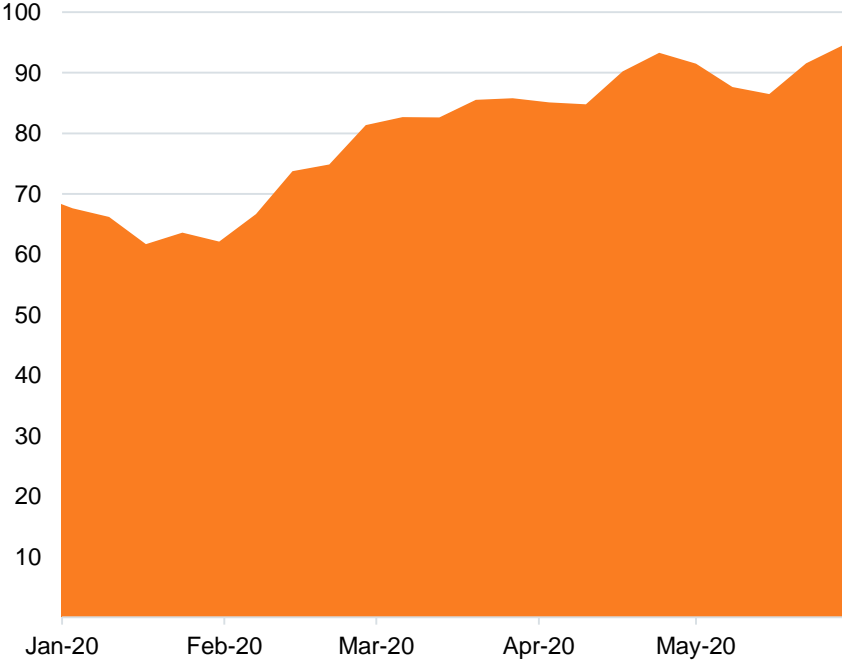
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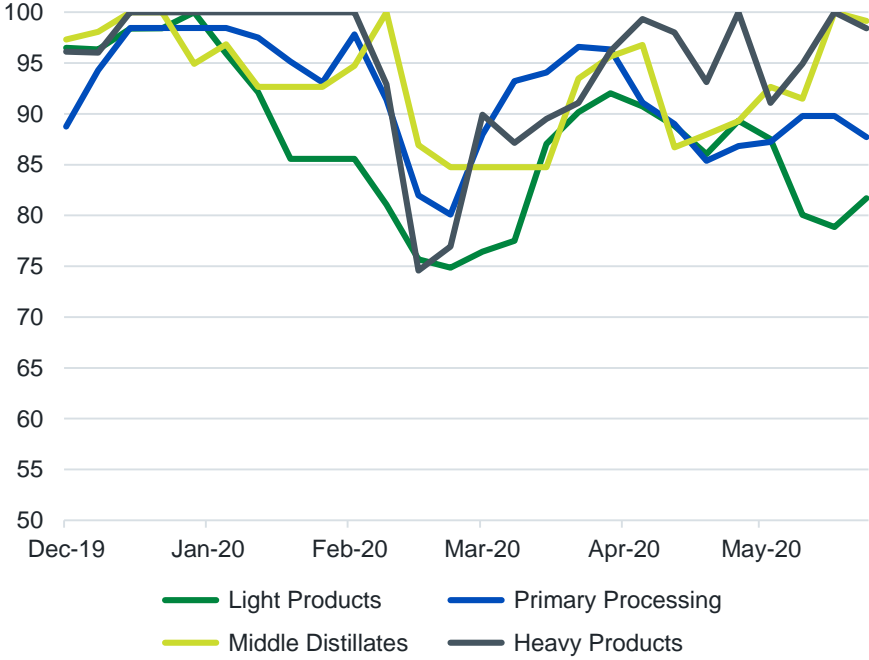
Louisiana

Louisiana inventories: A balance between refining and LOOP Loadings

Louisiana Crude Stocks (mn bbls)



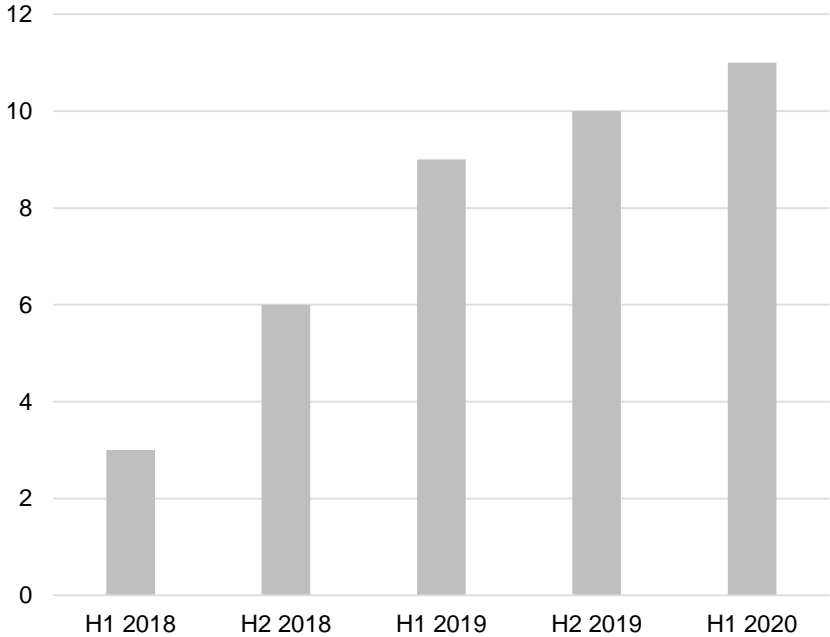
Louisiana Refinery (% Capacity Online)



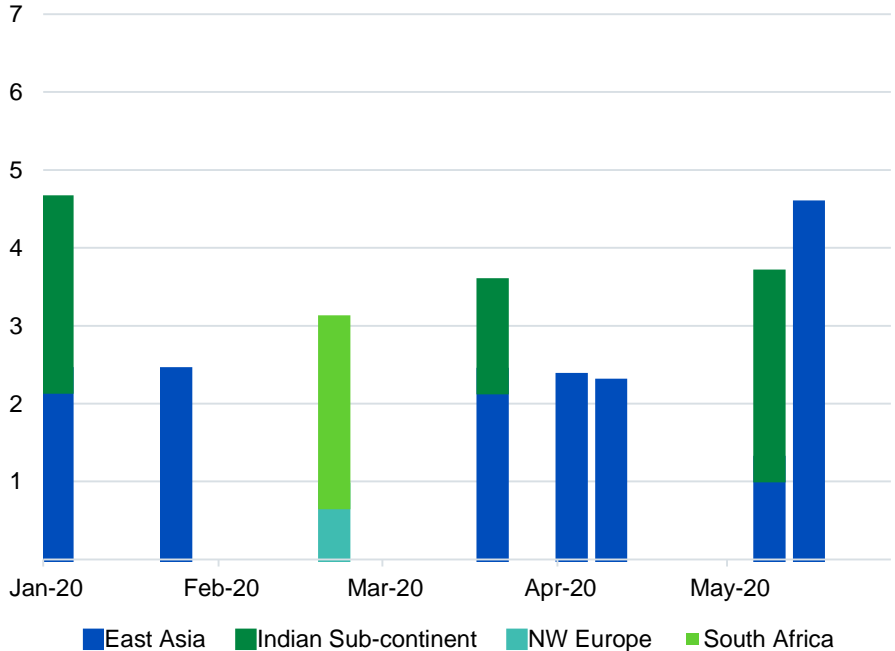
Source: Genscape

H1 2020 already busiest period for LOOP vessel loadings

LOOP Vessel Loading Count



LOOP Loadings (mn bbls)



Source: Genscape



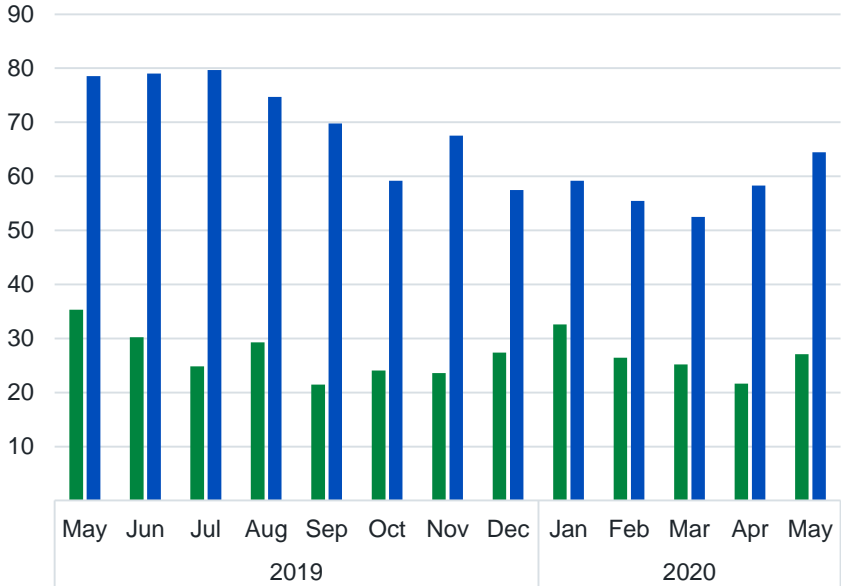
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What does this mean for Crude Quality?

Imports fill the Canadian Gap

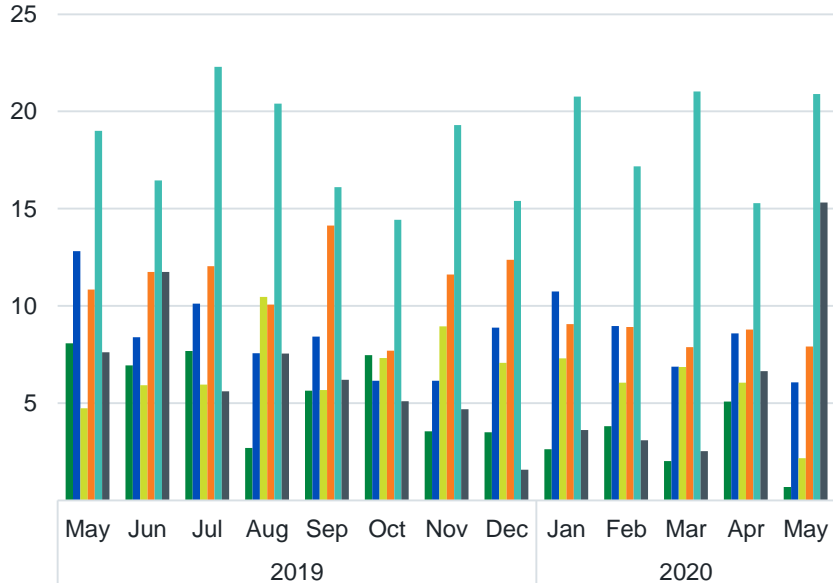
U.S. Waterborne Imports by Quality (mn bbls)



■ Light ■ Medium/Heavy

Source: Genscape

Medium/Heavy U.S. Imports from Top Origin Countries (mn bbls)



■ Brazil ■ Colombia ■ Ecuador ■ Iraq ■ Mexico ■ Saudi Arabia



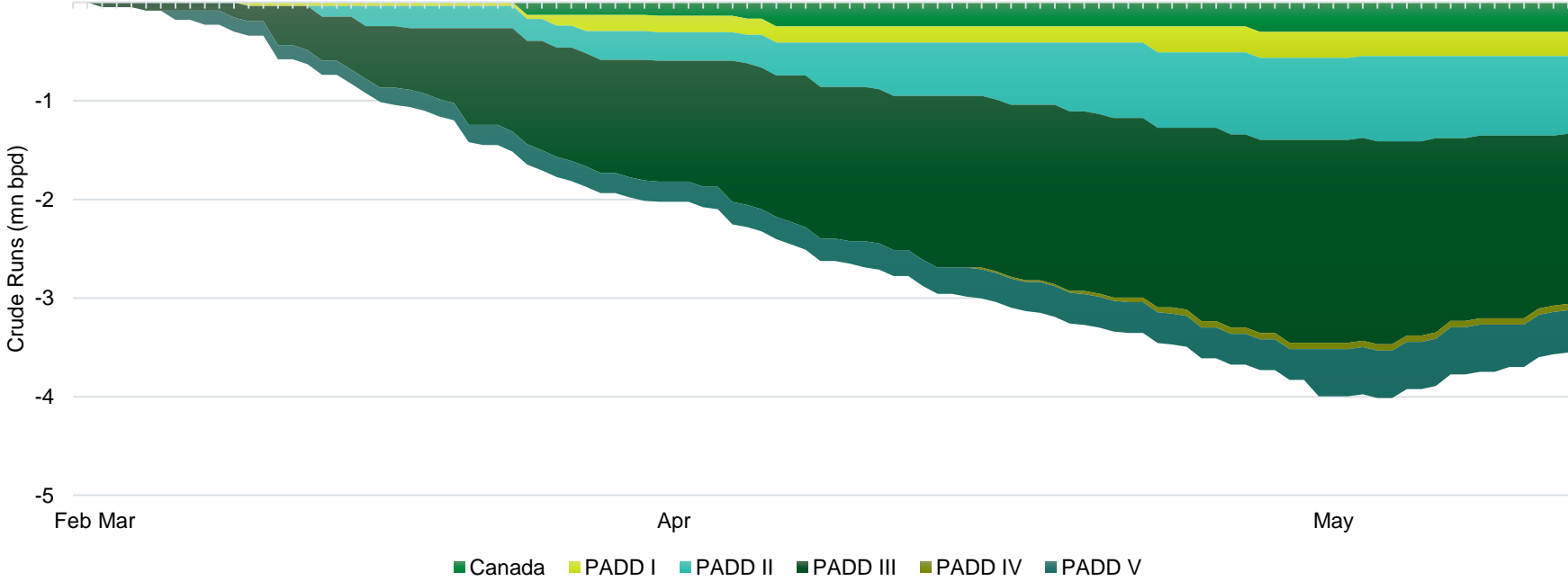
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Refineries

Refinery runs are returning

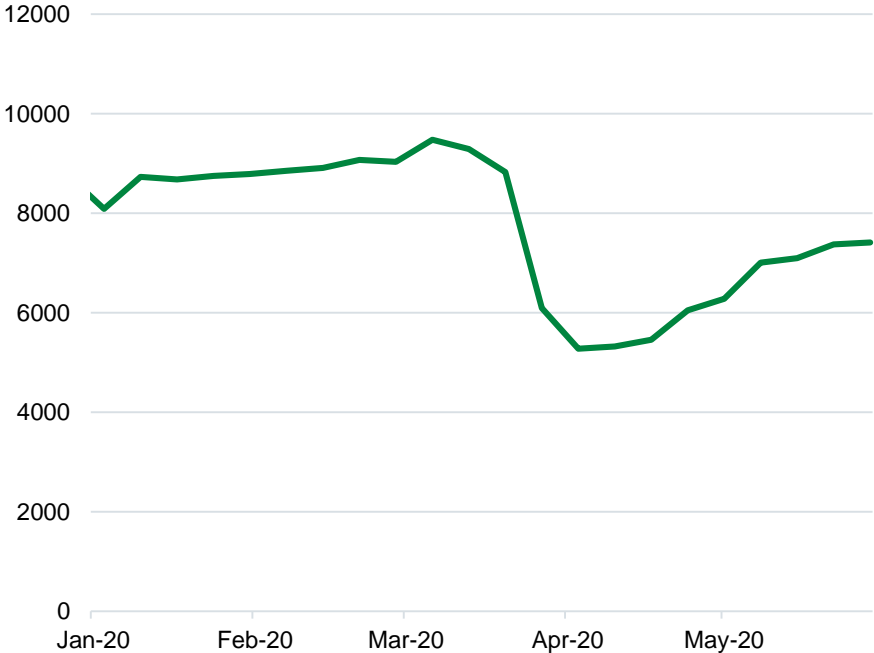
COVID-19: North America Refinery Run Reductions



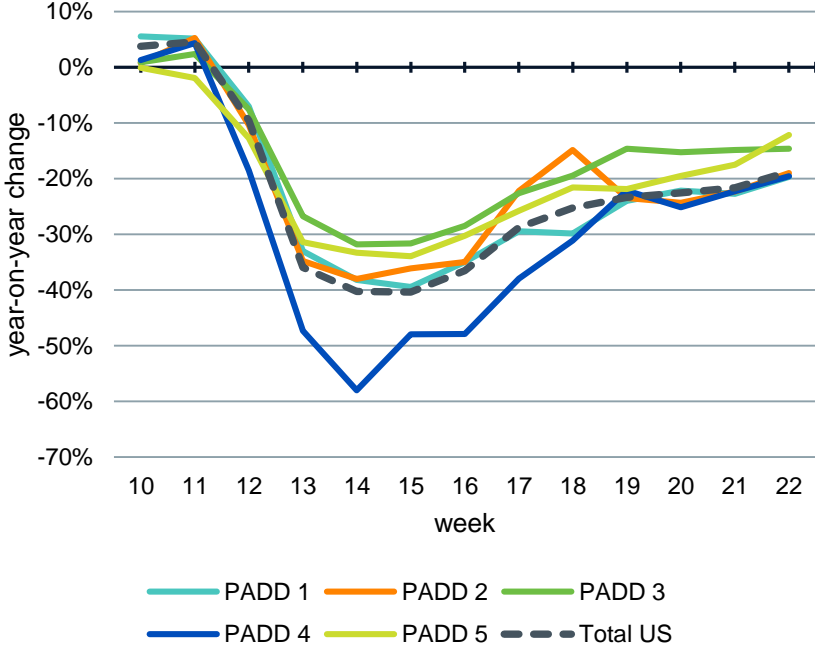
Source: Genscape

We've got to get out of here!

Gasoline Demand (Thousand bpd)



Weekly Gasoline Demand 2020 vs. 2019



Source: Genscape



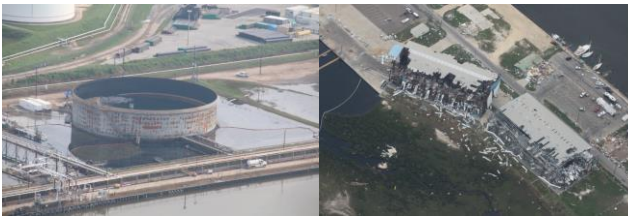
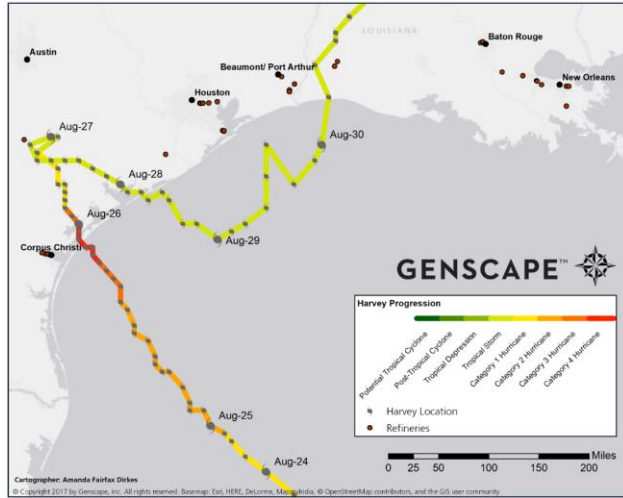
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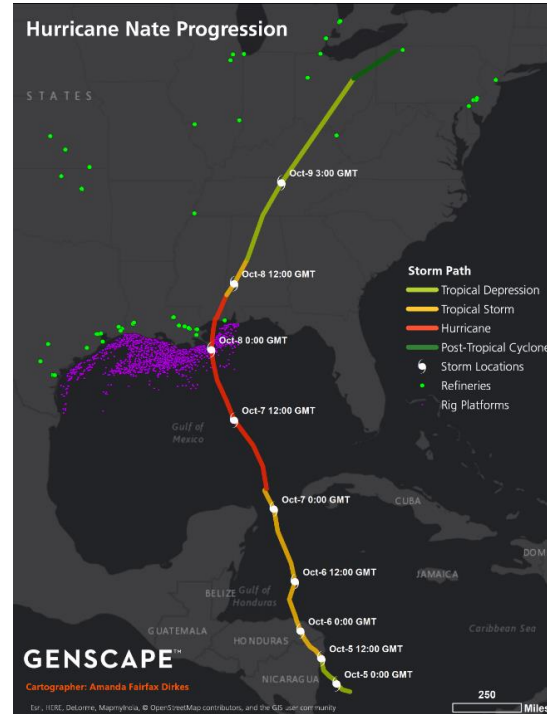
But Wait... There's More!

Hurricane Season – Heads Up!

Harvey: Refinery Demand



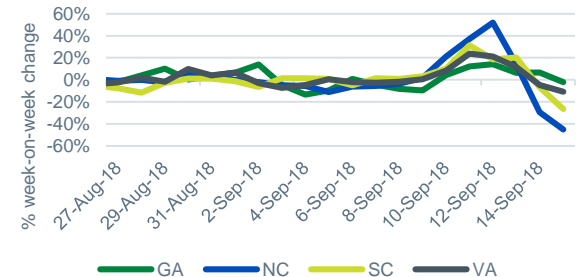
Nate: Offshore Production



Florence: Gasoline Demand



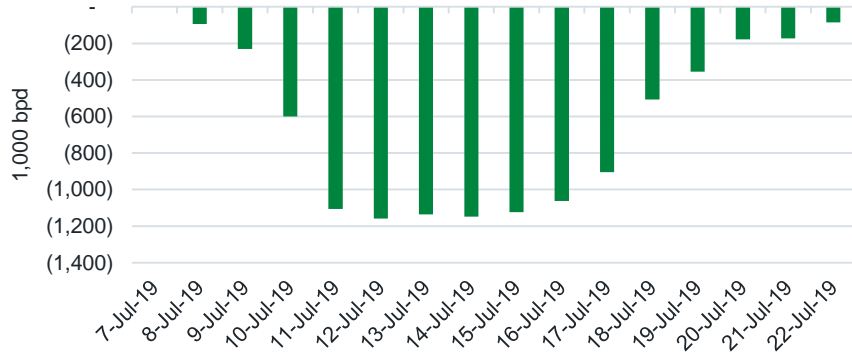
Supply Side Gasoline Rack Activity



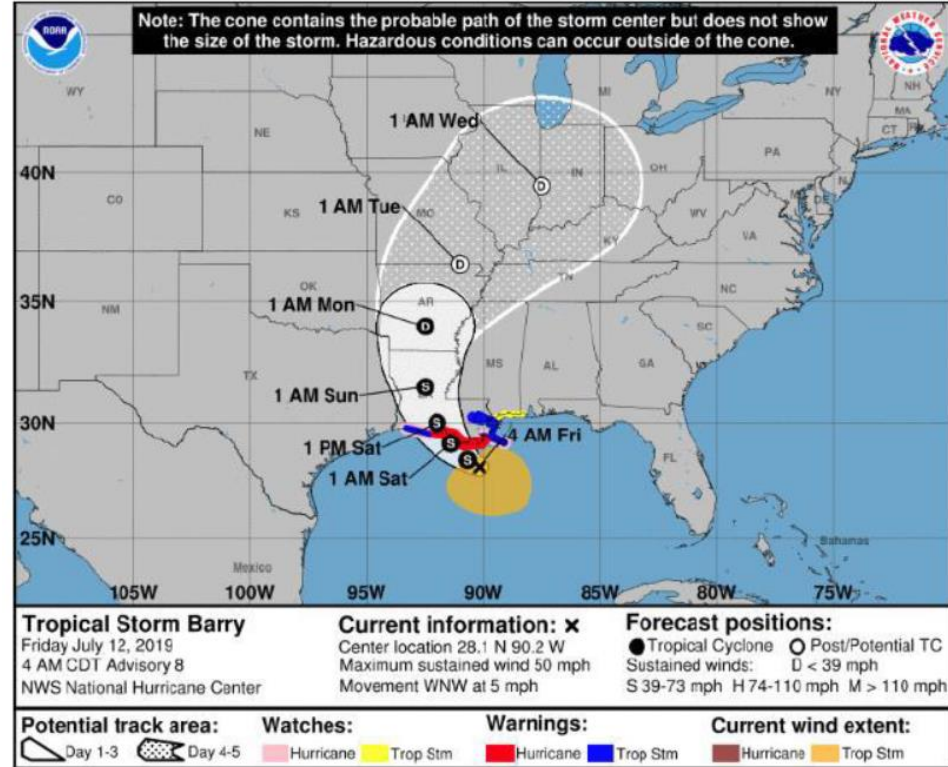
Hurricane Barry Impacts

- **Hurricane Barry made landfall in Louisiana** on July 13, 2019. The storm was briefly classified as a Category 1 hurricane, before it was downgraded to a Tropical Storm
- Barry **shuttered oil production in the Gulf of Mexico** as several platforms were evacuated. Storm-related shut-ins reached a peak of **1.159mn bpd** on July 12
- **Phillips 66 shut their 247,000 bpd Alliance, LA, refinery** July 10 ahead of Barry's landfall. Most units restarted by July 18

Gulf of Mexico Shut-In Production



Source: Genscape, NOAA



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