



DEPARTMENT OF
ECOLOGY
State of Washington

Crude Oil Movement by Rail and Pipeline

*Quarterly Report: April 1, 2020 through
June 30, 2020*

July 2020
Publication 20-08-011

Publication and Contact Information

This report is available on the Department of Ecology's website at <https://fortress.wa.gov/ecy/publications/SummaryPages/2008011.html>

For more information contact:

Spill Prevention, Preparedness, and Response Program
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-407-7455

Washington State Department of Ecology – www.ecology.wa.gov

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Union Gap 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

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Spill Prevention, Preparedness, and Response Program
Washington State Department of Ecology
Olympia, Washington

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Introduction

To enhance crude oil spill preparedness and response in Washington State, on August 24, 2016, Ecology adopted the rule, [Oil Movement by Rail and Pipeline Notification](#). The rule establishes reporting standards for facilities that receive crude oil by rail and pipelines that transport crude oil in or through the state.¹ Additionally, the rule identifies reporting standards for Ecology to share information with emergency responders, local governments, tribes, and the public.

This rule is the result of 2015 Legislative direction to provide a better understanding of the changing risk picture for crude oil transported in Washington State as a result of the introduction of crude oil transport by rail and the associated changes in both the volume and properties of crude moving through Washington.

Timely notice of oil movement information is necessary for emergency responders and planners to effectively prepare for and respond to oil spills and other incidents associated with transporting crude oil by rail and pipeline. Providing adequate information about the dates, routes, and properties of crude oil can help protect people living and working near railroads and pipelines, the economy, and environmental resources of Washington State.

Ecology is required to publish information collected under the rule to its website on a quarterly basis. The quarterly reports provide:

- Aggregated information on crude oil transported by rail to facilities in Washington.
- Information about crude oil movement by pipeline in or through the state.
- Reported spills during transport and delivery of crude by rail and pipeline.
- Volume of crude oil transported by vessel.

The reports are intended to inform the public about the nature of crude oil movement through their communities.

The reporting period for this quarterly report is April 1, 2020 through June 30, 2020.

¹ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

Crude Oil by Rail Summary

Movement of crude oil by rail in Washington State began in 2012 and has continued to increase since that time. Rail routes transporting crude oil enter the state from Idaho near Spokane and from British Columbia near Bellingham, and Ecology continues to monitor other potential routes. Large segments of the rail routes travel along the I-5 corridor, and cross or run next to major waterways, including the Columbia River and Puget Sound. (See Appendix A for a map of railroad routes in the state.)

Capturing information on the properties of crude oil, the volume transported, and the routes used to transport it allows for proper planning, placement of resources, and opportunities to provide detailed information to responders in the event of a spill, ensuring a more effective overall response. The rule directs Ecology to gather this information by requiring facilities receiving crude oil by rail to report all scheduled crude oil deliveries to be received by the facility each week for the succeeding seven-day period. Facilities enter this information into Ecology's Advance Notice of Transfer (ANT) database.

Information reported by facilities on scheduled crude oil deliveries includes the region of origin of crude oil, the railroad route taken to the facility within the state (if known), scheduled time and volume in barrels (bbls) of the delivery, and gravity of the oil. Ecology uses the standard American Petroleum Institute (API) gravity ranges to define the crude type in the ANT database. (See Appendix B for the API gravity definition and crude type ranges.)

Ecology is required to aggregate the information provided on a statewide basis by route, week, and type of crude oil. Aggregate information from the ANT database is provided in Table 1 for the period April 1, 2020 through June 30, 2020, representing the 2nd Quarter of 2020. Each week is numbered by calendar week and is aggregated by route and type of crude. The information provided includes:

- Total weekly volume in barrels (bbls) of crude oil transported by rail
- Route
- Region of origin
- Crude type
- Route volume
- Estimated number of railcars per route delivering crude oil (assumes each car holds 680 bbls)

Fourteen calendar weeks are reported in the 2nd Quarter of 2020 starting at calendar week 14 and ending at calendar week 27.

Table 1: Crude oil movement by rail**Calendar week 14**

Week 14 consists of only four days of reported ANT volumes due to the dates of the reporting period.

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	138,024	202
1A, 2, 3, 4	North Dakota	Light Crude	196,498	288
1A, 2, 3, 4, 5	North Dakota	Light Crude	358,104	526
1B, 2, 3	Alberta	Heavy Crude	61,285	90
Weekly totals			753,911	1,106

Calendar week 15

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	199,062	292
1A, 2, 3, 4	North Dakota	Light Crude	259,900	382
1A, 2, 3, 4, 5	North Dakota	Light Crude	780,690	1,148
1B, 2, 3	Alberta	Heavy Crude	125,350	184
5	Saskatchewan	Light Crude	129,184	189
Weekly totals			1,494,186	2,195

Calendar week 16

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	262,526	386
1A, 2, 3, 4	North Dakota	Light Crude	258,301	379
1A, 2, 3, 4, 5	North Dakota	Light Crude	355,767	523
1B, 2, 3	Alberta	Heavy Crude	63,842	93
Weekly totals			940,436	1,381

Calendar week 17

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	197,820	290
1A, 2, 3, 4	North Dakota	Light Crude	195,000	286
1A, 2, 3, 4, 5	North Dakota	Light Crude	564,633	830
1B, 2, 3	Alberta	Heavy Crude	125,108	183
5	Saskatchewan	Light Crude	64,788	95
Weekly totals			1,147,349	1,684

Calendar week 18

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	264,221	388
1A, 2, 3, 4	North Dakota	Light Crude	130,000	191
1A, 2, 3, 4, 5	North Dakota	Light Crude	567,352	834
1B, 2, 3	Alberta	Heavy Crude	61,163	89
5	Saskatchewan	Light Crude	64,852	95
Weekly totals			1,087,588	1,597

Calendar week 19

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	196,896	289
1A, 2, 3, 4	North Dakota	Light Crude	130,000	191
1A, 2, 3, 4, 5	North Dakota	Light Crude	212,283	312
1B, 2, 3	Alberta	Heavy Crude	125,136	184
Weekly totals			664,315	976

Calendar week 20

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	200,393	294
1A, 2, 3, 4	North Dakota	Light Crude	195,000	286
1A, 2, 3, 4, 5	North Dakota	Light Crude	212,906	313
1B, 2, 3	Alberta	Heavy Crude	122,475	180
5	Saskatchewan	Light Crude	63,939	94
Weekly totals			794,713	1,167

Calendar week 21

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	201,703	296
1A, 2, 3, 4	North Dakota	Light Crude	130,000	191
1A, 2, 3, 4, 5	North Dakota	Light Crude	285,586	419
1B, 2, 3	Alberta	Heavy Crude	54,898	80
5	Saskatchewan	Light Crude	64,771	95
Weekly totals			736,958	1,081

Calendar week 22

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	137,295	201
1A, 2, 3, 4	North Dakota	Light Crude	195,000	286
1A, 2, 3, 4, 5	North Dakota	Light Crude	214,354	315
1B, 2, 3	Alberta	Heavy Crude	60,248	88
5	Alberta	Light Crude	209,682	308
Weekly totals			816,579	1,198

Calendar week 23

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	130,544	191
1A, 2, 3, 4	North Dakota	Light Crude	195,585	287
1A, 2, 3, 4, 5	North Dakota	Light Crude	213,293	313
1B, 2, 3	Alberta	Heavy Crude	117,891	173
5	Saskatchewan	Light Crude	64,000	94
Weekly totals			721,313	1,058

Calendar week 24

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	203,305	298
1A, 2, 3, 4	North Dakota	Light Crude	131,690	193
1A, 2, 3, 4, 5	North Dakota	Light Crude	212,810	312
1B, 2, 3	Alberta	Heavy Crude	57,583	84
Weekly totals			605,388	887

Calendar week 25

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	198,319	291
1A, 2, 3, 4	North Dakota	Light Crude	260,776	383
1A, 2, 3, 4, 5	North Dakota	Light Crude	214,470	315
1B, 2, 3	Alberta	Heavy Crude	116,095	170
5	Saskatchewan	Light Crude	64,506	94
Weekly totals			854,166	1,253

Calendar week 26

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	201,750	296
1A, 2, 3, 4	North Dakota	Light Crude	256,471	377
1A, 2, 3, 4, 5	North Dakota	Light Crude	138,876	204
1B, 2, 3	Alberta	Heavy Crude	59,963	88
5	Saskatchewan	Light Crude	64,500	94
Weekly totals			721,560	1,059

Calendar week 27

Week 27 consists of only three days of reported ANT volumes due to the dates of the reporting period.

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	66,099	97
1A, 2, 3, 4	North Dakota	Light Crude	65,285	96
1A, 2, 3, 4, 5	North Dakota	Light Crude	70,415	103
1B, 2, 3	Alberta	Heavy Crude	57,491	84
Weekly totals			259,290	380

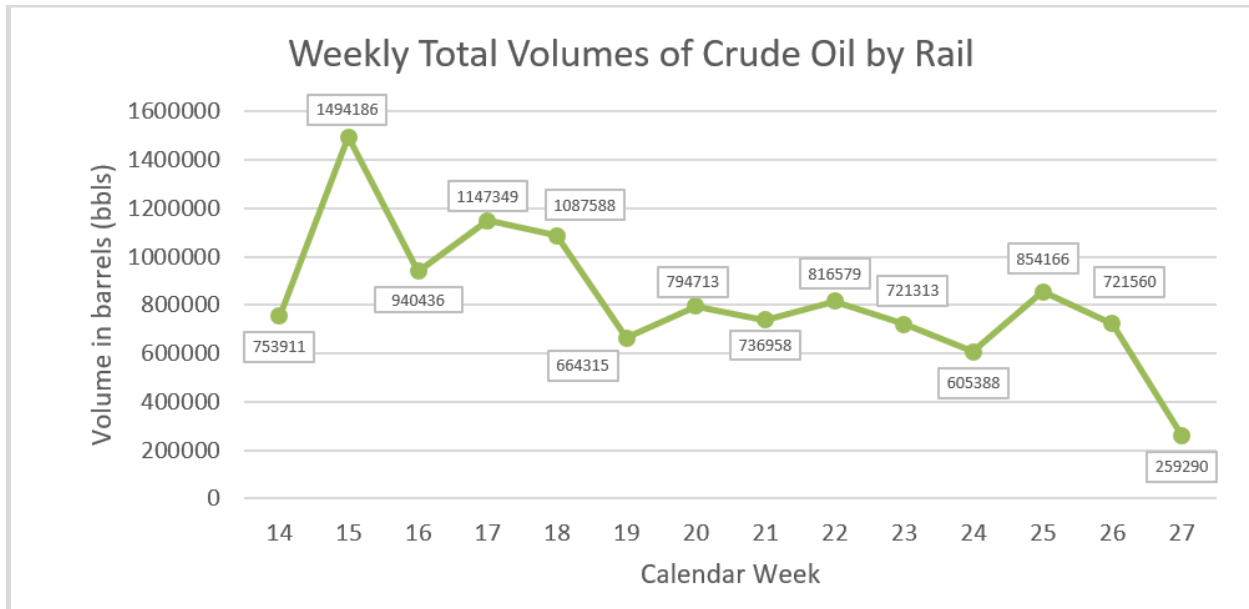
Note: The data provided in Table 1 was reported to Ecology by the receiving facility into the ANT database as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

2020 Quarter 2 total volume (bbls): 11,597,752

A summary of the data shows:

- Three regions of origin were reported: North Dakota, Alberta, and Saskatchewan.
- Two types of crude oil were reported: light and heavy.
- Routes 1A, 1B, and 2 through 5 were used to transport crude by rail.
- The total volume of crude oil transported by rail during the quarter was 11,597,752 barrels (487,105,584 gallons).
- The average weekly volume of crude oil transported by rail was 892,135 barrels (37,469,660 gallons).
- The total number of rail cars moving crude oil by rail was 17,022 cars.
- The average number of rail cars per week moving crude oil by rail was 1,309 cars.
- 89.58 percent of crude oil transported by rail was light crude.
10.42 percent of crude rail transported by rail was heavy crude.
- North Dakota was the region of origin for 82.77 percent of crude oil transported by rail.
Alberta was the region of origin for 12.23 percent of crude oil transported by rail.
Saskatchewan was the region of origin for 5.01 percent of crude oil transported by rail.

Figure 1 shows the weekly total volumes of crude transported by rail for each calendar week in the 2nd Quarter of 2020.



Note: Week 14 consists of only 4 days of reported ANT volumes due to the dates of the reporting period. Week 27 consists of only 3 days of reported ANT volumes due to the dates of the reporting period.

Figure 1: Weekly total volumes of crude oil by rail for the 2nd Quarter of 2020

The lowest weekly volume was 605,388 barrels (25,426,296 gallons) in Week 24. The highest weekly volume of crude transported by rail was 1,494,186 barrels (62,755,812 gallons) in Week 15.

Figure 2 displays crude transported by rail, by route, for the 2nd Quarter of 2020.

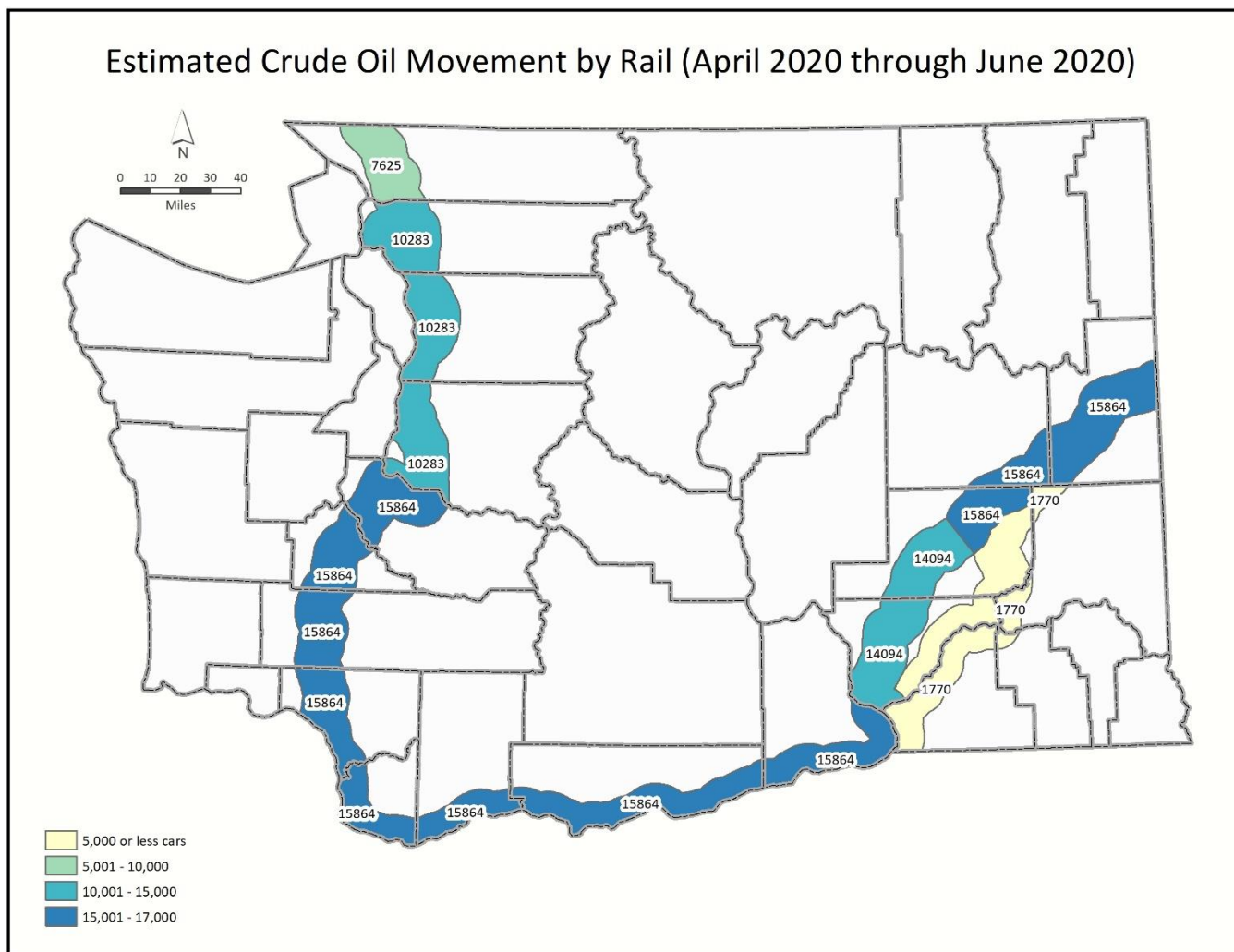


Figure 2: Crude oil movement by route for the 2nd Quarter of 2020

Crude Oil by Pipeline Summary

Pipelines exist inland and may be located near waterbodies and populated areas. Knowing the types and quantities of crude oil transported through pipelines in Washington State helps Ecology properly plan for and execute a rapid, aggressive, and well-coordinated response to a spill.

Under the rule, transmission pipelines that transport crude oil in or through the state must provide Ecology biannual notice of all crude oil transported in or through the state.² Biannual notice must be submitted each year by July 31 for the period from January 1 through June 30, and by January 31 for the period from July 1 through December 31. Biannual notice provided by pipelines includes contact information for the pipeline and the total volume of crude oil transported in or through the state during the reporting period by state or province of origin.

The most recent biannual notices from pipelines covered the period from January 1, 2020 through June 30, 2020. [Table 2](#) below provides the total volume of crude oil transported in or through the state by pipelines during this period.

Table 2: Crude oil movement by pipeline

Period	State or Province of Origin	Volume (bbls)
January 1, 2020 – June 30, 2020	Alberta	31,178,895

Note: The data provided in Table 2 was reported to Ecology by the pipelines transporting crude oil in or through the state, as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

The next biannual notices from pipelines will cover the period from July 1, 2020 through December 31, 2020 and must be submitted to Ecology by January 31, 2021.

Crude Oil Spills – Rail and Pipeline

Oil spills can have significant impacts to the public, environment, and economy. Ecology strives to protect Washington’s environment, economy, and public health and safety through a comprehensive spill prevention, preparedness, and response program.

The rule directs Ecology to provide the number and volume of spills to the waters of the state during the transport and delivery of crude oil by rail and pipeline in each quarterly report.³ For the period of April 1, 2020 through June 30, 2020, zero crude oil spills to the environment by rail or pipeline were reported. In the event there are spills to report in the future, Ecology will provide this information and include the date of the spill, the county where the spill occurred, the source, material, and volume of the spill.

² Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

³ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

Crude Oil Movement by Vessel

In 2006, the state adopted rules for advance notice of oil transfers for vessels and facilities. Ecology has been receiving advance notice of transfer data for all transfers to or from vessels in Washington State since that time.

In order to provide a full picture of crude oil movement in Washington State, a summary of crude oil movement by vessel is provided below, which is in addition to the requirement for this quarterly report as described in the rule.⁴

Table 3 below provides the total volume of crude oil in barrels of inbound and outbound vessel transfers for the period of April 1, 2020 through June 30, 2020. Inbound vessel transfers refers to crude oil movement from vessels to facilities, while outbound vessel transfers refers to crude oil movement from facilities to vessels.

Table 3: Crude oil movement by vessel

Vessel transfers	Volume (bbls)	Volume (gallons)
Inbound	15,463,012	649,446,506
Outbound	1,196,000	50,232,000
Total	16,659,012	699,678,506

Note: The data provided in Table 3 was reported to Ecology into the ANT database as required by Chapter 173-180 WAC and Chapter 173-184 WAC. Ecology cannot confirm the data or verify its accuracy.

A summary of vessel transfer data for the quarter shows:

- There were 48 total vessel transfers of crude oil (inbound or outbound).
- The average volume of crude oil transferred to or from vessels per week was 1,281,462 barrels (53,821,424 gallons).

⁴ Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification

An Overview of Crude Oil Movement in Washington

A broad view of crude oil movement in Washington State can be seen when comparing the movement of crude oil transported into the state by vessel, rail, and pipeline.

Figure 3 shows the estimated percentage of crude oil transported by vessel (inbound only), rail, and pipeline for the last four quarters, covering the period of July 1, 2019 through June 30, 2020.⁵

Reported Crude Oil Movement by Mode in Barrels
July 1, 2019 - June 30, 2020

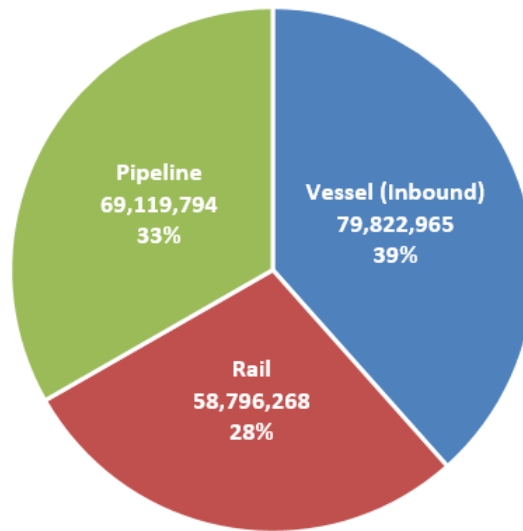
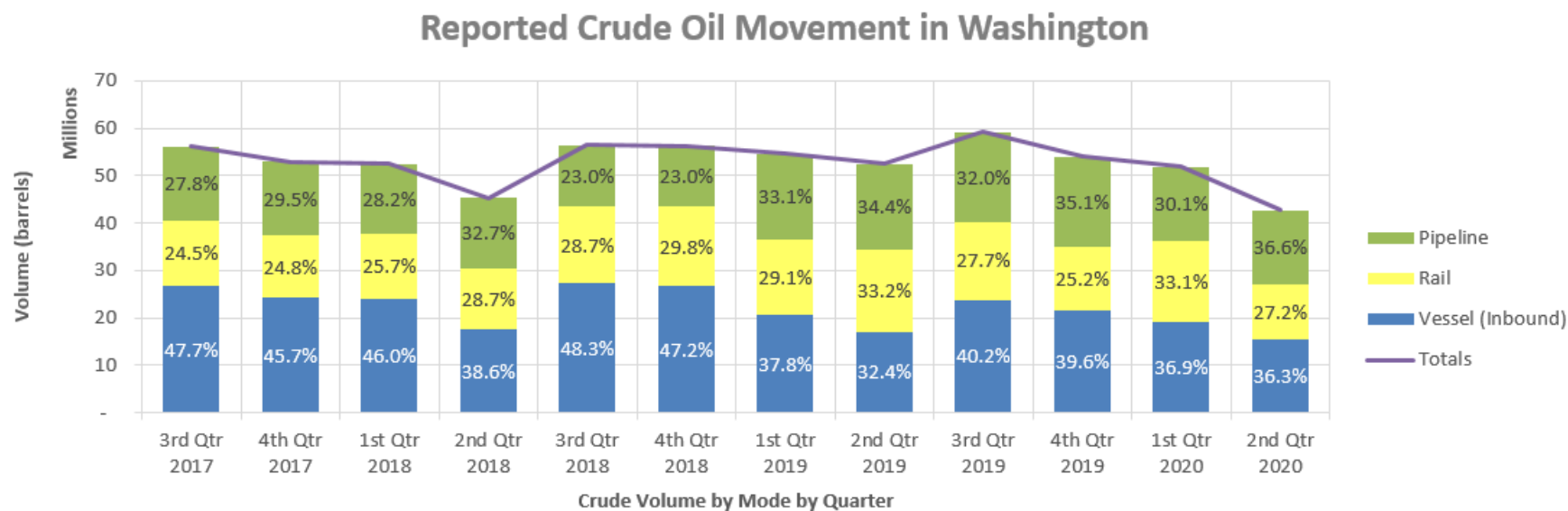


Figure 3: 12-month crude oil movement by mode

Between July 1, 2019 and June 30, 2020, vessels were responsible for 39 percent of reported crude oil movement into the state, rail was responsible for 28 percent, and pipeline for 33 percent.

⁵ The most recent biannual notices from pipelines were submitted to Ecology for the period from January 1, 2020 through June 30, 2020. The next biannual notices submitted by pipelines will cover the period from July 1, 2020 through December 31, 2020, and must be submitted to Ecology by January 31, 2021.

Figure 4 shows crude oil movement, by mode, covering the period of July 1, 2017 through June 30, 2020.



Mode	3rd Qtr 2017	4th Qtr 2017	1st Qtr 2018	2nd Qtr 2018	3rd Qtr 2018	4th Qtr 2018	1st Qtr 2019	2nd Qtr 2019	3rd Qtr 2019	4th Qtr 2019	1st Qtr 2020	2nd Qtr 2020
Vessel (Inbound)	47.7%	45.7%	46.0%	38.6%	48.3%	47.2%	37.8%	32.4%	40.2%	39.6%	36.9%	36.3%
Rail	24.5%	24.8%	25.7%	28.7%	28.7%	29.8%	29.1%	33.2%	27.7%	25.2%	33.1%	27.2%
Pipeline	27.8%	29.5%	28.2%	32.7%	23.0%	23.0%	33.1%	34.4%	32.0%	35.1%	30.1%	36.6%

Figure 4: Quarterly crude oil movement by mode, July 2017 – June 2020

Ecology will continue to receive information about crude oil movement and use the data to summarize changes over time.

Contact Information

Eli Seely

Department of Ecology

Spills Program

P.O. Box 47600

Olympia, WA 98504-7600

Phone: (360) 480-3095

Email: eli.seely@ecy.wa.gov

Kevin Truong

Department of Ecology

Spills Program

P.O. Box 47600

Olympia, WA 98504-7600

Phone: (206) 276-7286

Email: kevin.truong@ecy.wa.gov

Appendix A – Washington Railroad Routes

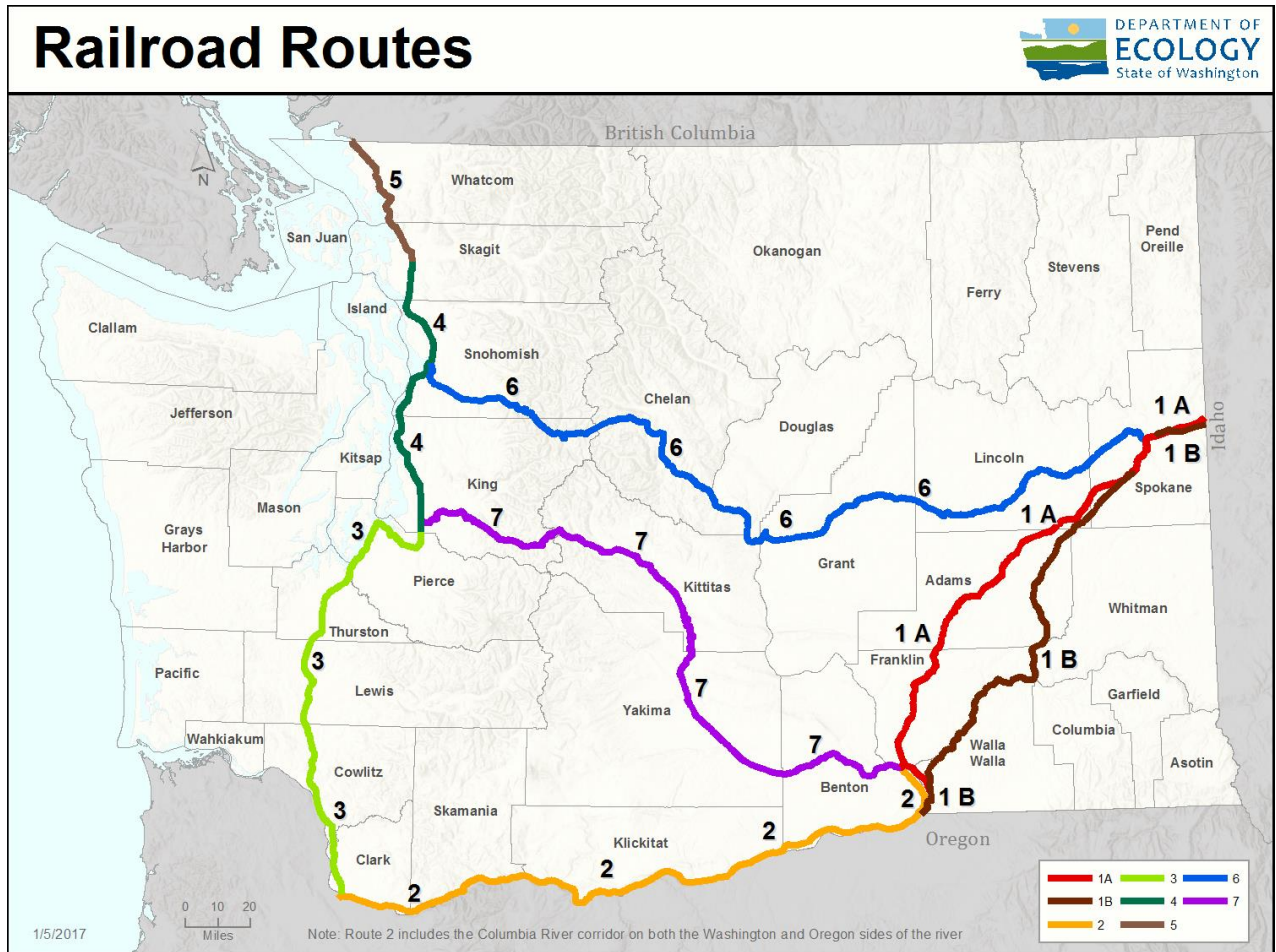


Figure 5: Railroad routes in Washington

Appendix B – API Gravity and Crude Oil Types

Information reported by facilities on scheduled crude oil deliveries includes the gravity of the oil. Ecology uses the standard American Petroleum Institute gravity (API gravity) ranges to define the crude type in the ANT database.

API gravity is the measure of the density of petroleum liquid in relation to the density of water and is used to classify oils as light, medium, heavy, and extra heavy. The lower the API gravity, the more likely it is to sink in water. Crude type by API gravity is shown in the table below.

Table 4: Crude type by API gravity

Crude Type	API Gravity Range
Light Crude	31.2-50 API
Medium Crude	22.3-31.1 API
Heavy Crude	10-22.2 API
Extra Heavy Crude	0-9.9 API