



DEPARTMENT OF
ECOLOGY
State of Washington

Crude Oil Movement by Rail and Pipeline

*Quarterly Report: October 1, 2020 through
December 31, 2020*

January 2021
Publication 21-08-004

Publication and Contact Information

This report is available on the Department of Ecology's website at <https://apps.ecology.wa.gov/publications/SummaryPages/2108004.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

To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-6831 or visit <https://ecology.wa.gov/accessibility>. People with impaired hearing may call Washington Relay Service at 711. People with speech disability may call TTY at 877-833-6341.

Crude Oil Movement by Rail and Pipeline

Quarterly Report: October 1, 2020 through December 31, 2020

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

This page is purposely left blank.

Table of Contents

	<u>Page</u>
List of Figures and Tables.....	ii
Introduction.....	1
Crude Oil by Rail Summary	2
Crude Oil by Pipeline Summary.....	9
Crude Oil Spills – Rail and Pipeline.....	9
Crude Oil Movement by Vessel.....	10
An Overview of Crude Oil Movement in Washington.....	11
Contact Information	13
Appendix A – Washington Railroad Routes.....	14
Appendix B – API Gravity and Crude Oil Types.....	15

List of Figures and Tables

Page

Figures

Figure 1: Weekly total volumes of crude oil by rail for the 4 th Quarter of 2020.....	7
Figure 2: Crude oil movement by route for the 4 th Quarter of 2020.....	8
Figure 3: 12-month crude oil movement by mode.....	11
Figure 4: Quarterly crude oil movement by mode, January 2018 – December 2020.....	12
Figure 5: Railroad routes in Washington.....	14

Tables

Table 1: Crude oil movement by rail.....	3
Table 2: Crude oil movement by pipeline.....	9
Table 3: Crude oil spills by rail or pipeline.....	9
Table 4: Crude oil movement by vessel.....	10
Table 5: Crude type by API gravity.....	15

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 October 1, 2020 through December 31, 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 October 1, 2020 through December 31, 2020, representing the 4th 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 4th Quarter of 2020 starting at calendar week 40 and ending at calendar week 53.

Table 1: Crude oil movement by rail**Calendar week 40**

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	138,536	203
1A, 2, 3, 4	North Dakota	Light Crude	65,778	96
1A, 2, 3, 4, 5	North Dakota	Light Crude	279,528	411
1B, 2, 3	Alberta	Heavy Crude	59,255	87
5	Saskatchewan	Light Crude	64,221	94
Weekly totals			607,318	891

Calendar week 41

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	139,385	204
1A, 2, 3, 4	North Dakota	Light Crude	263,531	387
1A, 2, 3, 4, 5	North Dakota	Light Crude	553,466	813
1B, 2, 3	Alberta	Heavy Crude	59,544	87
Weekly totals			1,015,926	1,491

Calendar week 42

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	68,941	101
1A, 2, 3, 4	North Dakota	Light Crude	197,244	290
1A, 2, 3, 4, 5	North Dakota	Light Crude	411,368	604
1B, 2, 3	Alberta	Heavy Crude	57,499	84
5	Saskatchewan	Light Crude	64,193	94
Weekly totals			799,245	1,173

Calendar week 43

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	208,824	307
1A, 2, 3, 4	North Dakota	Light Crude	132,102	194
1A, 2, 3, 4, 5	North Dakota	Light Crude	633,515	931
1B, 2, 3	Alberta	Heavy Crude	117,350	172
5	Saskatchewan	Light Crude	63,824	93
Weekly totals			1,155,615	1,697

Calendar week 44

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	206,808	304
1A, 2, 3, 4	North Dakota	Light Crude	197,558	290
1A, 2, 3, 4, 5	North Dakota	Light Crude	416,829	612
1B, 2, 3	Alberta	Heavy Crude	63,261	93
Weekly totals			884,456	1,299

Calendar week 45

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	71,051	104
1A, 2, 3, 4	North Dakota	Light Crude	198,027	291
1A, 2, 3, 4, 5	North Dakota	Light Crude	485,747	714
1B, 2, 3	Alberta	Heavy Crude	61,376	90
5	Saskatchewan	Light Crude	64,328	94
Weekly totals			880,529	1,299

Calendar week 46

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	208,701	306
1A, 2, 3, 4	North Dakota	Light Crude	66,122	97
1A, 2, 3, 4, 5	North Dakota	Light Crude	487,610	717
1B, 2, 3	Alberta	Heavy Crude	124,785	183
5	Alberta	Medium Crude	63,961	94
Weekly totals			951,179	1,397

Calendar week 47

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	208,765	307
1A, 2, 3, 4	North Dakota	Light Crude	263,817	387
1A, 2, 3, 4, 5	North Dakota	Light Crude	413,991	608
1B, 2, 3	Alberta	Heavy Crude	125,023	183
5	Alberta	Medium Crude	64,000	94
5	Saskatchewan	Light Crude	129,000	189
Weekly totals			1,204,596	1,768

Calendar week 48

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	135,357	199
1A, 2, 3, 4	North Dakota	Light Crude	197,567	290
1A, 2, 3, 4, 5	North Dakota	Light Crude	697,214	1,025
1B, 2, 3	Alberta	Heavy Crude	63,668	93
5	Alberta	Medium Crude	125,431	184
Weekly totals			1,219,237	1,791

Calendar week 49

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	208,845	307
1A, 2, 3, 4	North Dakota	Light Crude	131,471	193
1A, 2, 3, 4, 5	North Dakota	Light Crude	630,960	927
1B, 2, 3	Alberta	Heavy Crude	61,536	90
5	Saskatchewan	Light Crude	64,535	94
Weekly totals			1,097,347	1,611

Calendar week 50

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	278,751	409
1A, 2, 3, 4	North Dakota	Light Crude	132,148	194
1A, 2, 3, 4, 5	North Dakota	Light Crude	565,631	831
1B, 2, 3	Alberta	Heavy Crude	63,788	93
4, 5	Alberta	Heavy Crude	61,326	90
5	Alberta	Medium Crude	63,000	92
Weekly totals			1,164,644	1,709

Calendar week 51

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	206,840	304
1A, 2, 3, 4	North Dakota	Light Crude	131,410	193
1A, 2, 3, 4, 5	North Dakota	Light Crude	853,330	1,254
1B, 2, 3	Alberta	Heavy Crude	62,741	92
5	Saskatchewan	Light Crude	64,500	94
Weekly totals			1,318,821	1,937

Calendar week 52

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	139,641	205
1A, 2, 3, 4	North Dakota	Light Crude	197,915	291
1A, 2, 3, 4, 5	North Dakota	Light Crude	637,019	936
1B, 2, 3	Alberta	Heavy Crude	62,698	92
Weekly totals			1,037,273	1,524

Calendar week 53

Week 53 consists of only five 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	208,624	306
1A, 2, 3, 4	North Dakota	Light Crude	197,594	290
1A, 2, 3, 4, 5	North Dakota	Light Crude	284,172	417
5	Alberta	Light Crude	62,716	92
Weekly totals			753,106	1,105

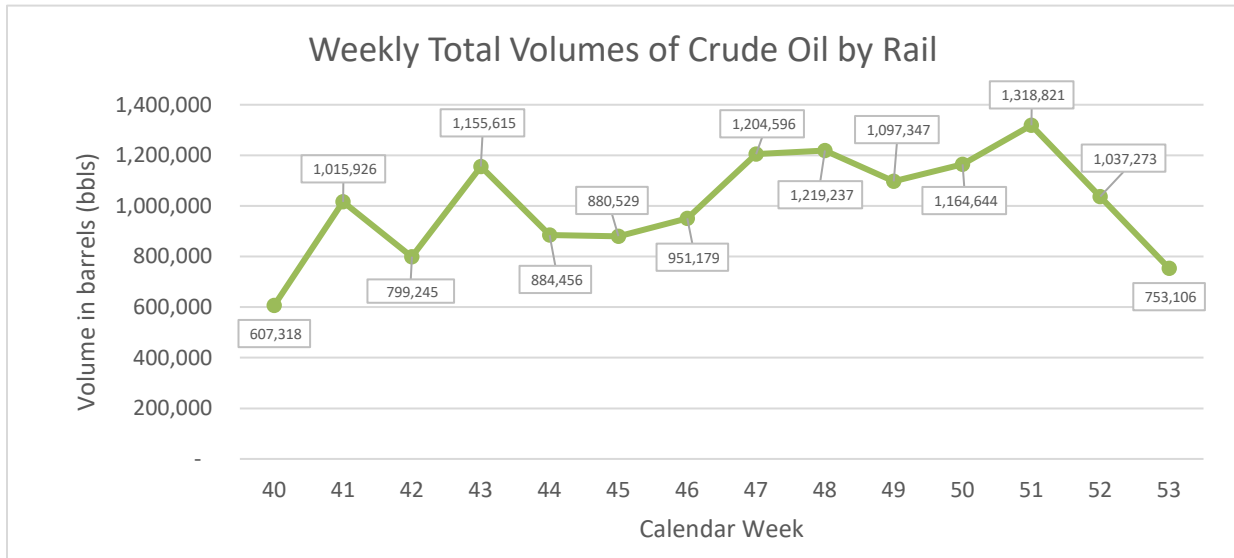
Note: The data provided in Table 1 was reported to Ecology by the receiving facility into the ANT database as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

2020 Quarter 4 total volume (bbls): 14,089,292

A summary of the data shows:

- Three regions of origin were reported: North Dakota, Alberta, and Saskatchewan.
- Three types of crude oil were reported: heavy, medium, and light.
- 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 14,089,292 barrels (591,750,264 gallons).
- The average weekly volume of crude oil transported by rail was 1,072,011 barrels (45,024,477 gallons).
- The total number of rail cars moving crude oil by rail was 20,686 cars.
- The average number of rail cars per week moving crude oil by rail was 1,574 cars.
- 90.35 percent of crude oil transported by rail was light crude.
2.25 percent of crude oil transported by rail was medium crude.
7.41 percent of crude rail transported by rail was heavy crude.
- North Dakota was the region of origin for 86.25 percent of crude oil transported by rail.
Alberta was the region of origin for 10.10 percent of crude oil transported by rail.
Saskatchewan was the region of origin for 3.65 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 4th Quarter of 2020.



Note: Week 40 consists of only 3 days of reported ANT volumes due to the dates of the reporting period. Week 53 consists of only 5 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 4th Quarter of 2020

The lowest weekly volume was 799,245 barrels (33,568,290 gallons) in Week 42. The highest weekly volume of crude transported by rail was 1,318,821 barrels (55,390,482 gallons) in Week 51.

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 July 1, 2020, through December 31, 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)
July 1, 2020 – December 31, 2020	Alberta	40,665,029

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 January 1, 2021, through June 30, 2021, and must be submitted to Ecology by July 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 October 1, 2020, through December 31, 2020, one crude oil spill to the environment by rail or pipeline was reported. Table 3 shows information on each reported spill that occurred during transport or delivery of crude oil by rail or pipeline.

Table 3: Crude oil spills by rail or pipeline

Incident Date	County	Source	Material	Volume (Gallons)
December 22, 2020	Whatcom	Train	Crude Oil	28,962

Note: The spill data provided in Table 3 was reported to Ecology. The incident is under investigation and actual volume will be determined at the conclusion of the investigation report .

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 4 below provides the total volume of crude oil in barrels of inbound and outbound vessel transfers for the period of October 1, 2020, through December 31, 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 4: Crude oil movement by vessel

Vessel transfers	Volume (bbls)	Volume (gallons)
Inbound	13,528,500	568,197,000
Outbound	315,000	13,230,000
Total	13,843,500	581,427,000

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 41 total vessel transfers of crude oil (inbound or outbound).
- The average volume of crude oil transferred to or from vessels per week was 1,053,310 barrels (44,239,011 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 January 1, 2020, through December 31, 2020.⁵

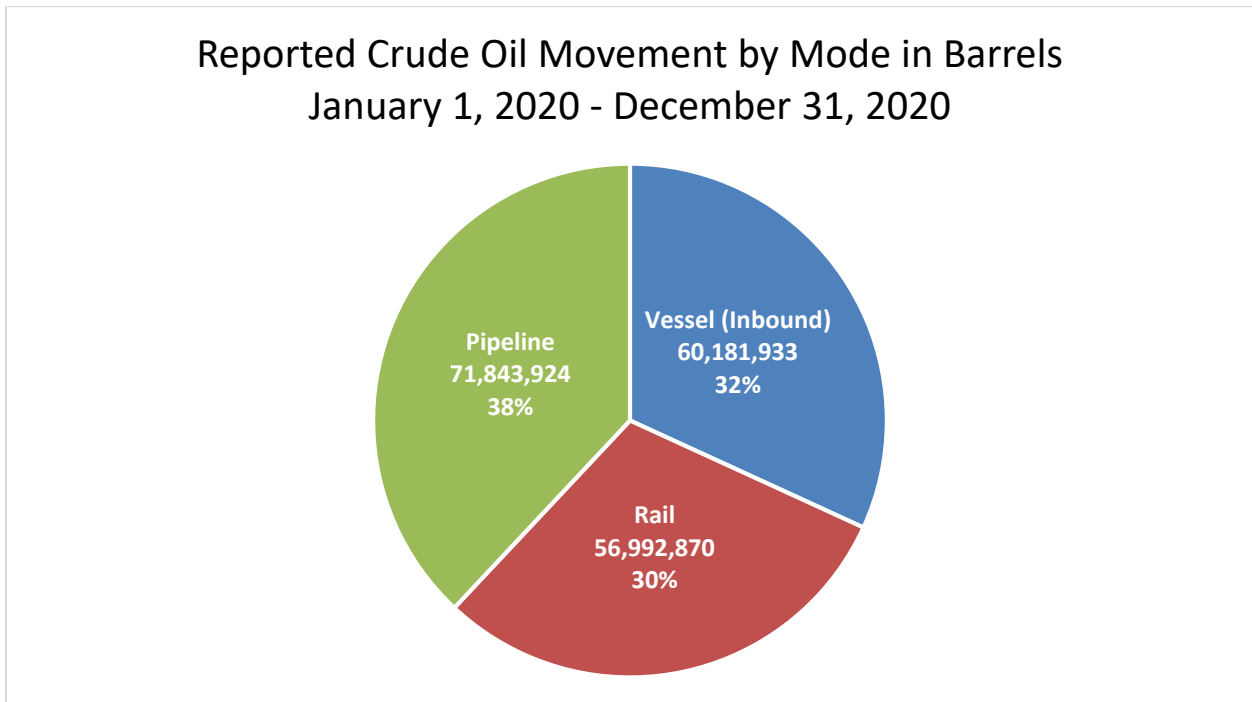
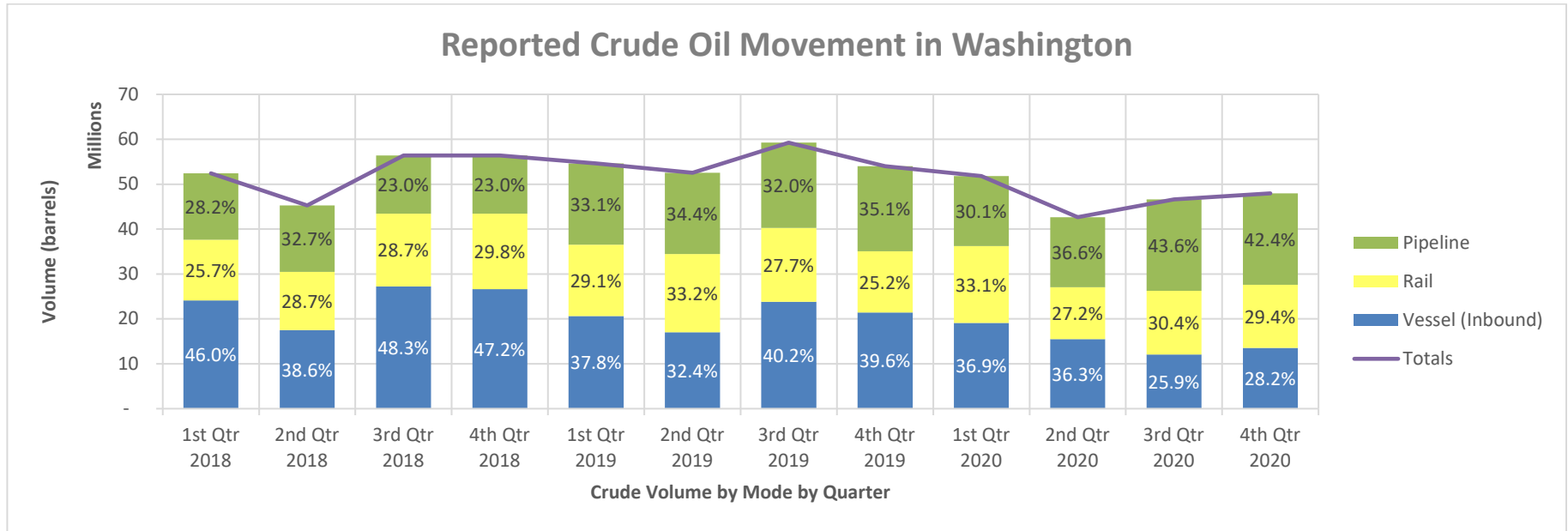


Figure 3: 12-month crude oil movement by mode

Between January 1, 2020, and December 31, 2020, vessels were responsible for 32 percent of reported crude oil movement into the state, rail was responsible for 30 percent, and pipeline for 38 percent.

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

Figure 4 shows crude oil movement, by mode, covering the period of January 1, 2018 through December 31, 2020.



Mode	1 st Qtr 2018	2 nd Qtr 2018	3 rd Qtr 2018	4 th Qtr 2018	1 st Qtr 2019	2 nd Qtr 2019	3 rd Qtr 2019	4 th Qtr 2019	1 st Qtr 2020	2 nd Qtr 2020	3 rd Qtr 2020	4 th Qtr 2020
Vessel (Inbound)	46.0%	38.6%	48.3%	47.2%	37.8%	32.4%	40.2%	39.6%	36.9%	36.3%	25.9%	28.2%
Rail	25.7%	28.7%	28.7%	29.8%	29.1%	33.2%	27.7%	25.2%	33.1%	27.2%	30.4%	29.4%
Pipeline	28.2%	32.7%	23.0%	23.0%	33.1%	34.4%	32.0%	35.1%	30.1%	36.6%	43.6%	42.4%

Figure 4: Quarterly crude oil movement by mode, January 2018 – December 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

Appendix A – Washington Railroad Routes

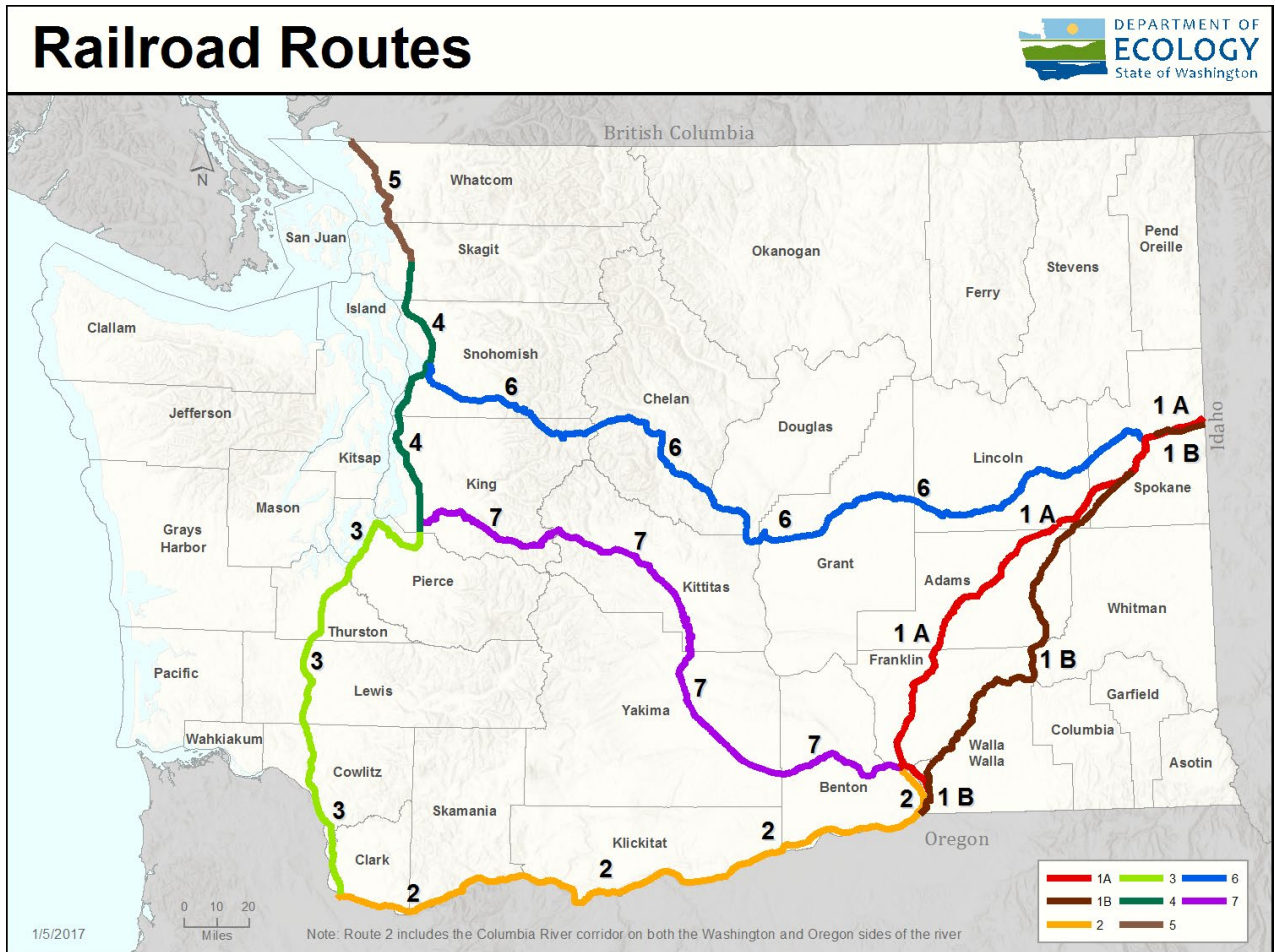


Figure 5: Railroad routes in Washington

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 5: 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