



DEPARTMENT OF
ECOLOGY
State of Washington

Crude Oil Movement by Rail and Pipeline

*Quarterly Report: July 1, 2020 through
September 30, 2020*

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

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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 3 rd Quarter of 2020.....	7
Figure 2: Crude oil movement by route for the 3 rd Quarter of 2020.....	8
Figure 3: 12-month crude oil movement by mode.....	11
Figure 4: Quarterly crude oil movement by mode, October 2017 – September 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 movement by vessel.....	10
Table 4: 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 July 1, 2020 through September 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 July 1, 2020, through September 30, 2020, representing the 3rd 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 3rd Quarter of 2020 starting at calendar week 27 and ending at calendar week 40.

Table 1: Crude oil movement by rail**Calendar week 27**

Week 27 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	132,597	194
1A, 2, 3, 4	North Dakota	Light Crude	196,499	288
1A, 2, 3, 4, 5	North Dakota	Light Crude	212,617	312
1B, 2, 3	Alberta	Heavy Crude	59,794	87
Weekly totals			601,507	881

Calendar week 28

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	138,706	203
1A, 2, 3, 4	North Dakota	Light Crude	127,306	187
1A, 2, 3, 4, 5	North Dakota	Light Crude	357,103	525
1B, 2, 3	Alberta	Heavy Crude	57,476	84
5	Saskatchewan	Light Crude	64,441	94
Weekly totals			745,032	1,093

Calendar week 29

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	132,436	194
1A, 2, 3, 4	North Dakota	Light Crude	261,007	383
1A, 2, 3, 4, 5	North Dakota	Light Crude	283,452	416
1B, 2, 3	Alberta	Heavy Crude	117,171	172
5	Saskatchewan	Light Crude	64,689	95
Weekly totals			858,755	1,260

Calendar week 30

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	203,994	299
1A, 2, 3, 4	North Dakota	Light Crude	65,000	95
1A, 2, 3, 4, 5	North Dakota	Light Crude	487,464	716
1B, 2, 3	Alberta	Heavy Crude	59,700	87
Weekly totals			816,158	1,197

Calendar week 31

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	68,925	101
1A, 2, 3, 4	North Dakota	Light Crude	263,054	386
1A, 2, 3, 4, 5	North Dakota	Light Crude	633,845	932
1B, 2, 3	Alberta	Heavy Crude	57,559	84
Weekly totals			1,023,383	1,503

Calendar week 32

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	275,415	405
1A, 2, 3, 4	North Dakota	Light Crude	256,134	376
1A, 2, 3, 4, 5	North Dakota	Light Crude	634,369	932
1B, 2, 3	Alberta	Heavy Crude	117,106	172
5	Saskatchewan	Light Crude	64,564	94
Weekly totals			1,347,588	1,979

Calendar week 33

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	207,890	305
1A, 2, 3, 4	North Dakota	Light Crude	331,481	487
1A, 2, 3, 4, 5	North Dakota	Light Crude	427,220	628
1B, 2, 3	Alberta	Heavy Crude	117,048	172
5	Alberta	Light Crude	66,561	97
Weekly totals			1,150,200	1,689

Calendar week 34

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	206,410	303
1A, 2, 3, 4	North Dakota	Light Crude	263,219	387
1A, 2, 3, 4, 5	North Dakota	Light Crude	641,131	942
5	Saskatchewan	Light Crude	64,291	94
Weekly totals			1,175,051	1,726

Calendar week 35

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	139,956	205
1A, 2, 3, 4	North Dakota	Light Crude	131,856	193
1A, 2, 3, 4, 5	North Dakota	Light Crude	425,482	625
1B, 2, 3	Alberta	Heavy Crude	117,672	173
5	Alberta	Light Crude	65,944	96
Weekly totals			880,910	1,292

Calendar week 36

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	277,554	408
1A, 2, 3, 4	North Dakota	Light Crude	196,193	288
1A, 2, 3, 4, 5	North Dakota	Light Crude	427,750	629
1B, 2, 3	Alberta	Heavy Crude	57,521	84
5	Alberta	Light Crude	66,302	97
5	Saskatchewan	Light Crude	129,240	190
Weekly totals			1,154,560	1,696

Calendar week 37

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	208,802	307
1A, 2, 3, 4	North Dakota	Light Crude	264,070	388
1A, 2, 3, 4, 5	North Dakota	Light Crude	568,179	835
1B, 2, 3	Alberta	Heavy Crude	59,489	87
5	Alberta	Light Crude	66,465	97
Weekly totals			1,167,005	1,714

Calendar week 38

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	276,661	406
1A, 2, 3, 4	North Dakota	Light Crude	264,272	388
1A, 2, 3, 4, 5	North Dakota	Light Crude	492,820	724
1B, 2, 3	Alberta	Heavy Crude	117,110	172
5	Saskatchewan	Light Crude	64,394	94
Weekly totals			1,215,257	1,784

Calendar week 39

Route Segments	Region of Origin	Crude Type	Volume (bbls)	Est # Cars
1A, 2, 3	North Dakota	Light Crude	209,860	308
1A, 2, 3, 4	North Dakota	Light Crude	263,039	386
1A, 2, 3, 4, 5	North Dakota	Light Crude	773,422	1,137
1B, 2, 3	Alberta	Heavy Crude	57,457	84
Weekly totals			1,303,778	1,915

Calendar week 40

Week 40 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	139,073	204
1A, 2, 3, 4	North Dakota	Light Crude	132,011	194
1A, 2, 3, 4, 5	North Dakota	Light Crude	341,375	502
1B, 2, 3	Alberta	Heavy Crude	59,421	87
5	Saskatchewan	Light Crude	64,704	95
Weekly totals			736,584	1,082

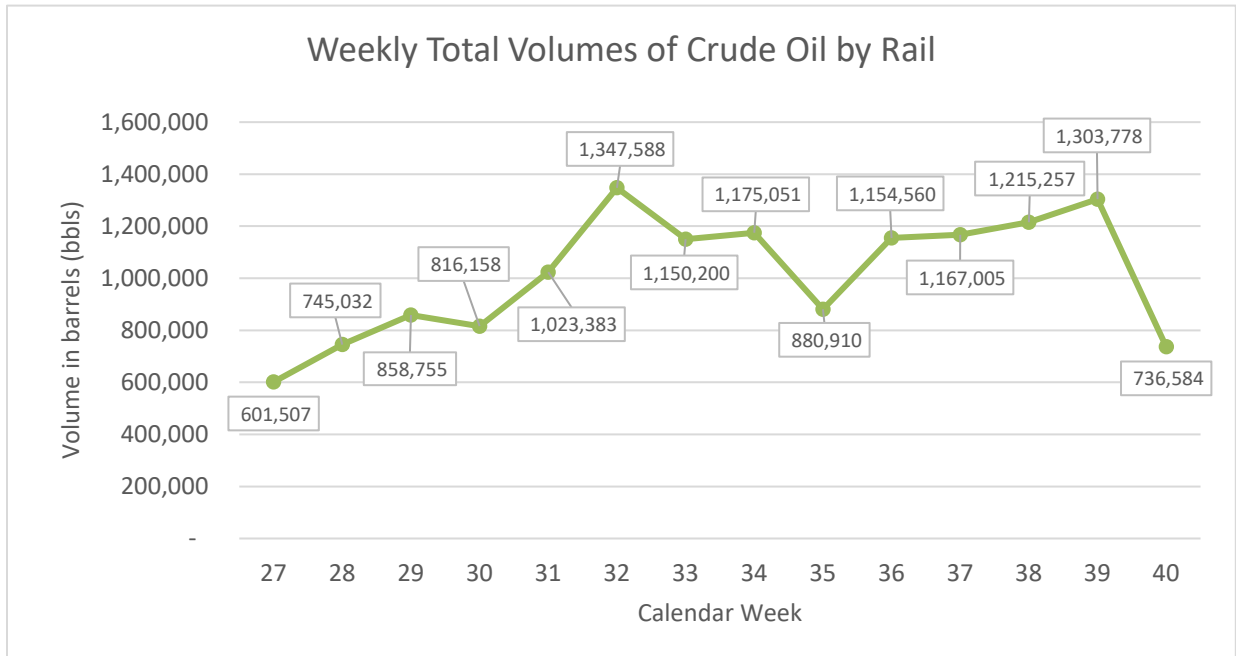
Note: The data provided in Table 1 was reported to Ecology by the receiving facility into the ANT database as required by Chapter 173-185 WAC. Ecology cannot confirm the data or verify its accuracy.

2020 Quarter 3 total volume (bbls): 14,175,768

A summary of the data shows:

- Three regions of origin were reported: North Dakota, Alberta, and Saskatchewan.
- Two types of crude oil were reported: heavy 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 14,175,768 barrels (595,382,256 gallons).
- The average weekly volume of crude oil transported by rail was 1,078,591 barrels (45,300,824 gallons).
- The total number of rail cars moving crude oil by rail was 20,810 cars.
- The average number of rail cars per week moving crude oil by rail was 1,583 cars.
- 92.56 percent of crude oil transported by rail was light crude.
7.44 percent of crude rail transported by rail was heavy crude.
- North Dakota was the region of origin for 87.05 percent of crude oil transported by rail.
Alberta was the region of origin for 9.31 percent of crude oil transported by rail.
Saskatchewan was the region of origin for 3.64 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 3rd Quarter of 2020.



Note: Week 27 consists of only 4 days of reported ANT volumes due to the dates of the reporting period. Week 40 consists of only 4 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 3rd Quarter of 2020

The lowest weekly volume was 745,032 barrels (31,291,344 gallons) in Week 28. The highest weekly volume of crude transported by rail was 1,347,588 barrels (56,598,696 gallons) in Week 32.

Figure 2 displays crude transported by rail, by route, for the 3rd Quarter of 2020.

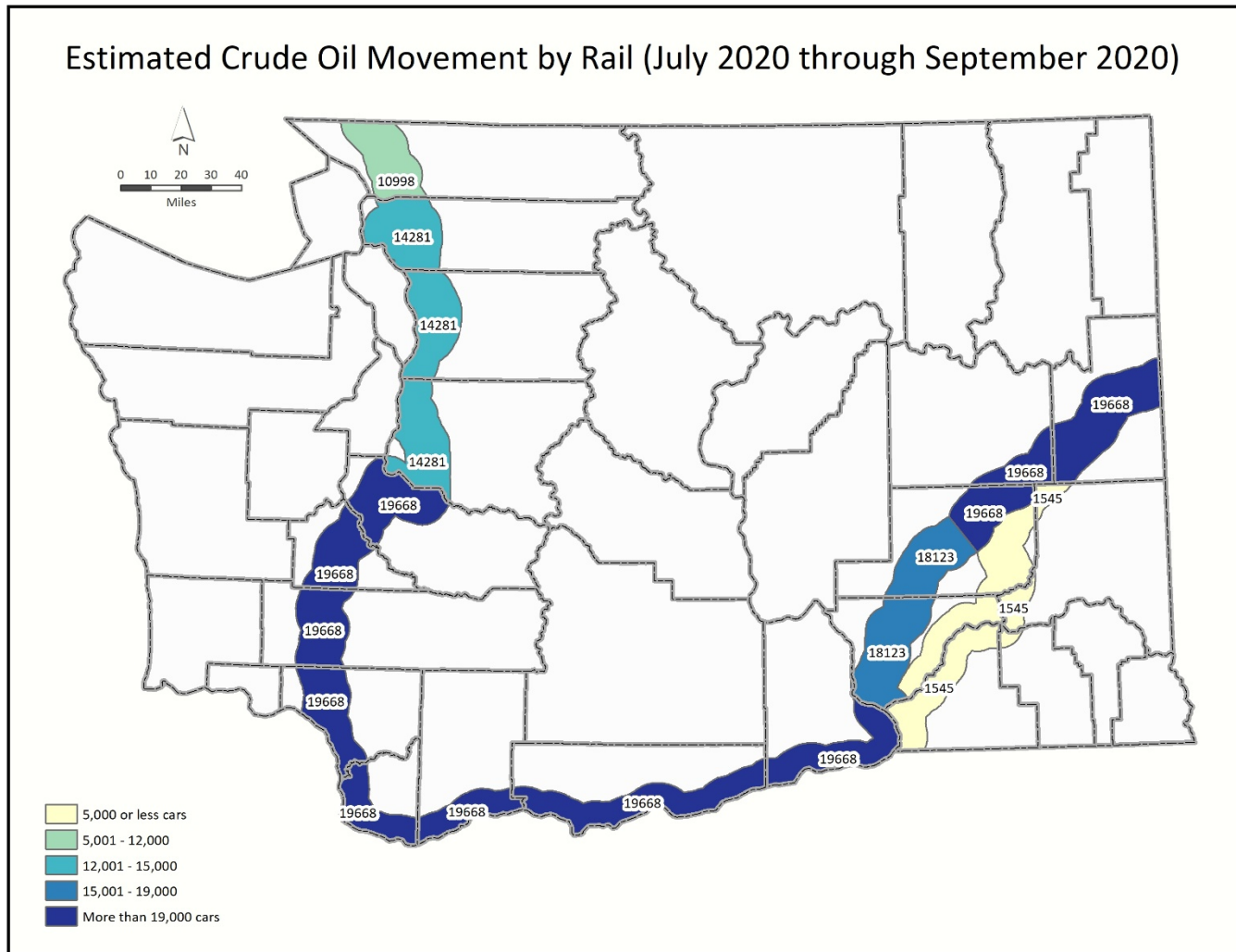


Figure 2: Crude oil movement by route for the 3rd Quarter of 2020

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 notices 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 notices 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 July 1, 2020 through September 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 July 1, 2020, through September 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	12,086,071	507,614,982
Outbound	272,000	11,424,000
Total	12,358,071	519,038,982

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 38 total vessel transfers of crude oil (inbound or outbound).
- The average volume of crude oil transferred to or from vessels per week was 940,288 barrels (39,492,096 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 October 1, 2019, through September 30, 2020.⁵

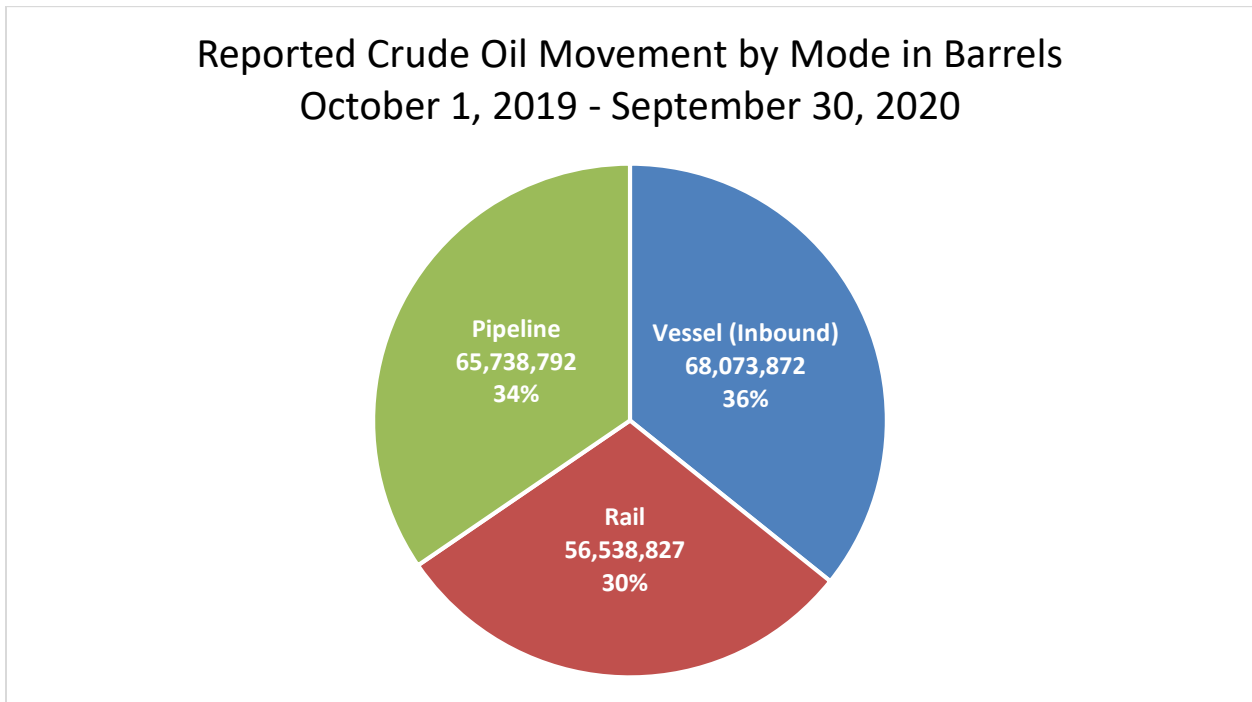
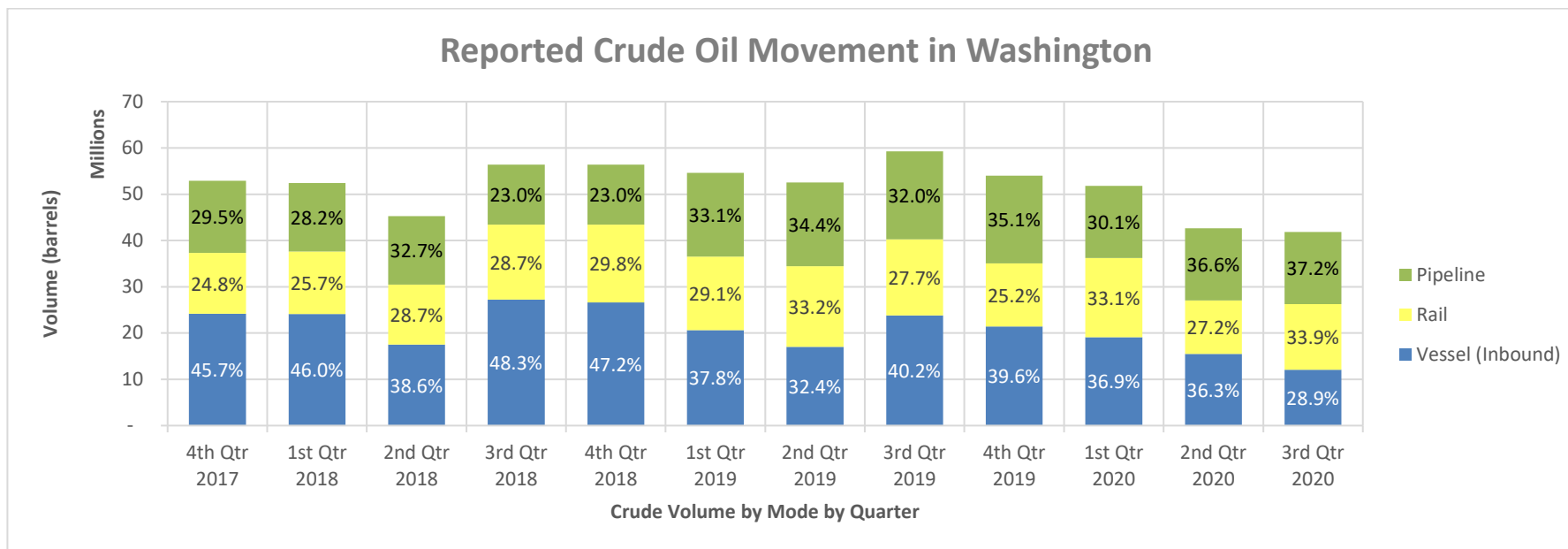


Figure 3: 12-month crude oil movement by mode

Between October 1, 2019, and September 30, 2020, vessels were responsible for 36 percent of reported crude oil movement into the state, rail was responsible for 30 percent, and pipeline for 34 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 October 1, 2017, through September 30, 2020.



Mode	4 th Qtr 2017	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
Vessel (Inbound)	45.7%	46.0%	38.6%	48.3%	47.2%	37.8%	32.4%	40.2%	39.6%	36.9%	36.3%	28.9%
Rail	24.8%	25.7%	28.7%	28.7%	29.8%	29.1%	33.2%	27.7%	25.2%	33.1%	27.2%	33.9%
Pipeline	29.5%	28.2%	32.7%	23.0%	23.0%	33.1%	34.4%	32.0%	35.1%	30.1%	36.6%	37.2%

**Note: The most recent biannual notices from pipelines were submitted to Ecology for the period from January 1, 2020, through June 30, 2020. For more recent quarters, Ecology estimated crude oil movement by pipeline for the period based on data provided in that previous biannual notice.*

Figure 4: Quarterly crude oil movement by mode, October 2017 – September 2020

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

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Appendix A – Washington Railroad Routes

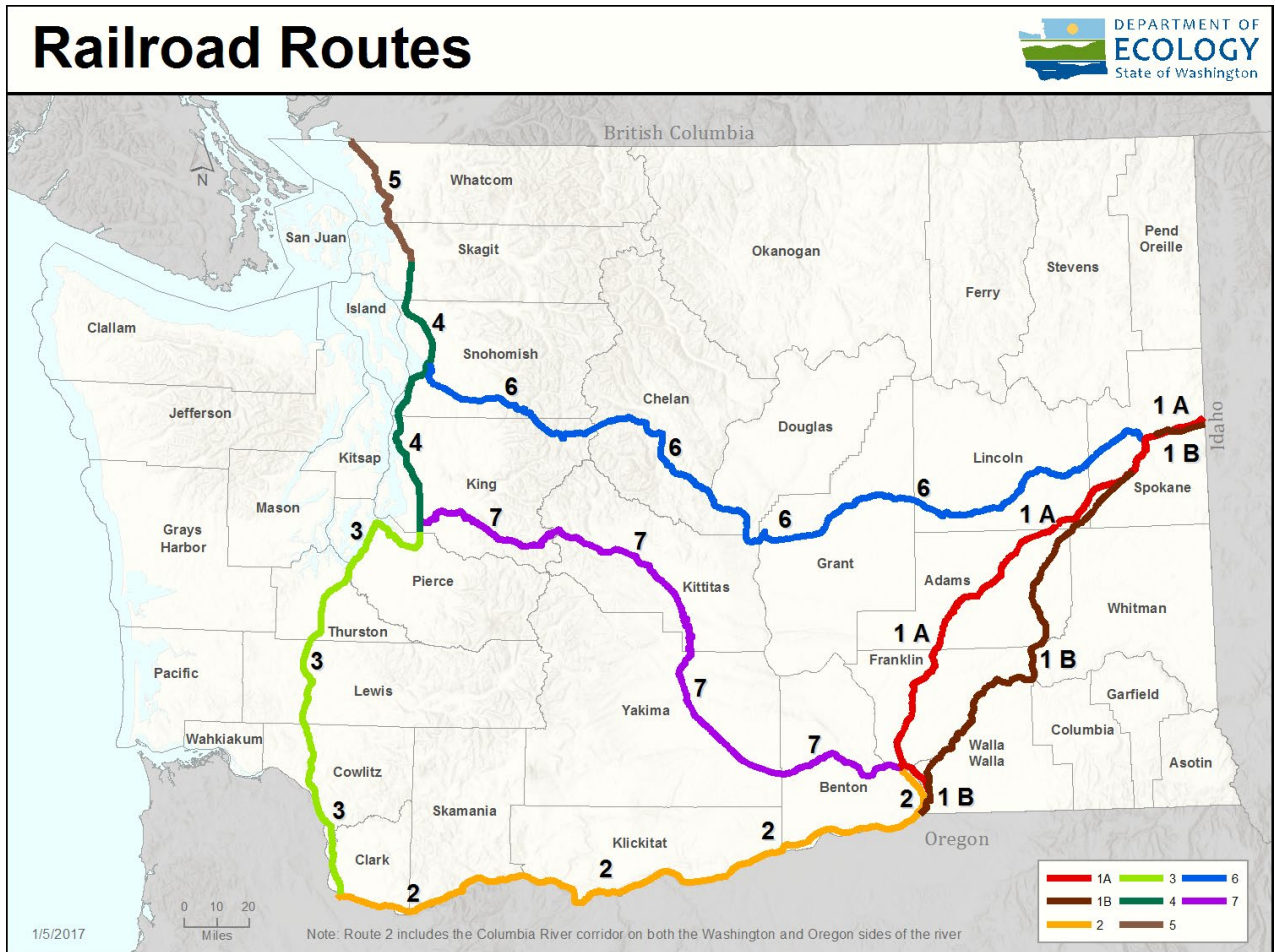


Figure 5: Railroad routes in Washington

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