



Biodiesel Use by Washington State Agencies

January through December 2017

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Contacts:

Chris Liu, Director, Department of Enterprise Services, (360) 407-9201

Eci Ameh, Assistant Director, Department of Enterprise Services, (360) 407-8820

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REPORT HIGHLIGHTS

- During 2017, biodiesel purchased by state agencies under state fuel contracts reached a new high, totaling over 1.2 million gallons. This is the fifth year in a row that state agency biodiesel purchases topped 1 million gallons.
- Washington State Ferries (WSF) is the largest state agency consumer of diesel fuel. WSF purchased 882,000 gallons of biodiesel during 2017, which is about 74,000 gallons more than that purchased in 2016. This increase was due primarily to overall increased fuel use. WSF averaged 4.7 percent biodiesel in 2017, up from 4.3 percent in 2016, with fuel containing 5 percent biodiesel (B5) the standard fuel for the fleet.
- Beyond WSF operations, Washington State Department of Transportation (WSDOT) accounted for the state's second largest purchaser of diesel fuel. WSDOT purchased 364,000 gallons of biodiesel (B100) during 2017, almost the same amount purchased in 2015 and 2016. Biodiesel made up 19 percent of total diesel fuel purchased in Western Washington and 10% percent in Eastern Washington. Statewide, WSDOT averaged 14 percent biodiesel, down 1 percent from 2016. Not included are the gallons from 11 WSDOT sites that are not feasible for biodiesel use because they are in areas that experience cold winter temperatures and have low fuel turnover. These 11 sites accounted for 141,947 gallons of the diesel delivered during 2017.

Other agencies and higher education institutions accounted for bulk purchases of just over 13,000 gallons.

BACKGROUND

As a part of the state's efforts to reduce its dependence on foreign oil, reduce emissions, and stimulate local production and use of biodiesel, state law has mandated state agencies to use biodiesel fuels to operate diesel-powered vessels, vehicles, and construction equipment since 2009. Under current law, Washington State Ferries (WSF) is to use a minimum of 5 percent biodiesel in all vessels as long as the price of B5 does not exceed the price of diesel by 5 percent or more. All other state agencies are to use a minimum of 20 percent biodiesel by total volume to operate diesel vessels, vehicles, and construction equipment. (See [RCW 43.19.642](#) and [WAC 914-28](#).)

State law ([RCW 43.19.646](#)) requires the Department of Enterprise Services (DES) to compile and analyze the use of biodiesel fuel by state agencies and report its findings and recommendations to the Governor and Legislature in an electronic format. For nine years, these reports were required every six months; in 2016, the legislature amended RCW 43.19.642 so that reporting is now an annual requirement. DES collaborates with key state agency stakeholders to prepare the report.

This report covers January 1 through December 31, 2017, and focuses on bulk fuel

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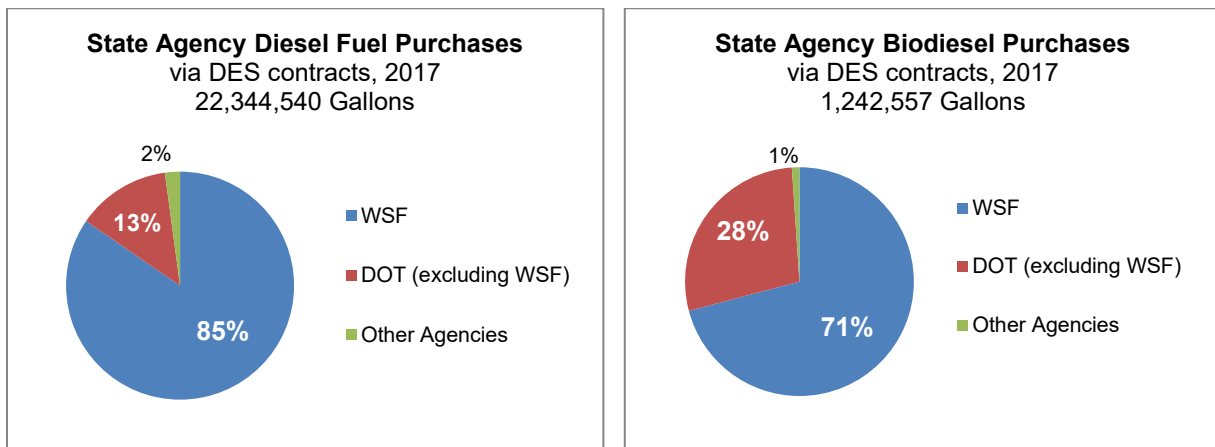
purchased through state fuel delivery contracts to operate diesel-powered vessels, vehicles, and equipment. The term “biodiesel” means pure biodiesel (B100) unless clearly indicated otherwise. Biodiesel blends are specified by the capital letter “B” followed by a value representing the volume percentage of biodiesel, such as B5 and B20. Therefore, B5 contains 5 percent biodiesel and 95 percent diesel. In tables and charts, biodiesel is expressed in B100 gallons.

STATE BIODIESEL PURCHASES

State agencies are required to purchase bulk fuel through the state fuel contracts that cover gasoline, heating oil, and diesel fuel (including biodiesel). The contracts are also used by many higher education institutions, cities, counties, school districts, and transit systems.

In 2017, state agencies and higher education institutions purchased 22.3 million gallons of diesel fuel through state fuel contracts, including just over 1.2 million gallons of biodiesel. Since the biodiesel use mandate was enacted, state agency purchases have increased significantly and topped 1 million gallons for the fifth year in a row in 2017.

As the largest consumer of diesel fuel among state agencies, WSDOT purchased 98 percent of the diesel fuel and 99 percent of the biodiesel purchased during 2017. Of those purchases, WSF alone accounts for 84 percent of the diesel and 71 percent of the biodiesel. Other purchases made by state agencies for diesel-powered vehicles and equipment made up 2 percent of total diesel fuel purchased and 1 percent of the biodiesel purchased on state contracts.



WASHINGTON STATE FERRIES (WSF) BIODIESEL USE

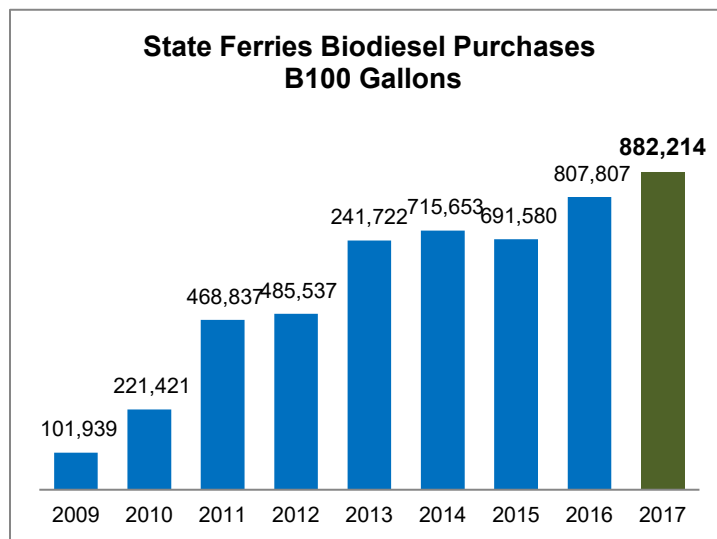
- WSF purchased 882,214 gallons of biodiesel during 2017. This is a 9 percent increase from the 807,807 gallons purchased during 2016. Total fuel purchased during the period increased about 1.4 percent, due to the integration of new Olympic Class vessels, which replaced smaller vessels. Overall, WSF purchases averaged 4.6 percent biodiesel for 2017, up from 4.3 percent for 2016.

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Washington State Ferries Biodiesel Use: 2009 to 2017

Year	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
2017	17,976,949	882,214	18,859,163	4.7%
2016	17,799,290	807,807	18,607,097	4.3%
2015	16,687,482	691,580	17,379,062	4.0%
2014	16,480,334	715,653	17,195,987	4.2%
2013	16,701,761	687,741	17,389,502	4.0%
2012	16,749,738	485,537	17,235,275	2.8%
2011	17,107,676	468,837	17,576,513	2.7%
2010	16,915,217	221,421	17,136,638	1.3%
2009	16,733,093	101,939	16,835,032	0.6%

- WSF’s progress using biodiesel has occurred in stages, corresponding with the availability of in-line blended B5 fuel. WSF began using B5 for vessels fueled by truck from the Harbor Island truck facility in Seattle in 2009. Vessels fueled by truck from Anacortes began using B5 in 2011. Installation of infrastructure for in-line blending at the Seattle Harbor Island dock facility was completed in early 2013.



- During 2017, all delivery locations received B5 fuel, with 9 of the 10 locations averaging at least 3.1 percent biodiesel. Notably, fuel at the Seattle Dock Facility, which accounted for over 38 percent of all fuel delivered this period, averaged 5.9 percent biodiesel, while fuel deliveries to Eagle Harbor averaged 2.5 percent biodiesel, as one of the two fuel deliveries made to Eagle Harbor was diesel.
- On average, the price of B5 for WSF exceeded the price of diesel by 1.8 percent.
- Beginning in February 2017, WSF commenced a one-year pilot program to test the use of 10 percent biodiesel on one of its largest vessels, the M/V Tacoma, and assess the impact of 10 percent biodiesel on vessel equipment, performance, and maintenance requirements.
- WSF did not report any biodiesel-related quality or performance issues during the period.

LAND SECTOR USE

State agency purchases of biodiesel for use in vehicles and equipment totaled 360,000 gallons in 2017, about the 27,000 gallons less than what was purchased the previous year. Overall, state agency biodiesel purchases averaged 10.3 percent of total diesel fuel

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purchased under the state fuel contract.

In the land sector, Washington State Department of Transportation (WSDOT) is the largest single purchaser of diesel fuel. In 2017, WSDOT purchased 3 million gallons of diesel fuel, accounting for 13 percent of all diesel fuel and 28 percent of all biodiesel purchased by state agencies under the state fuel contract.

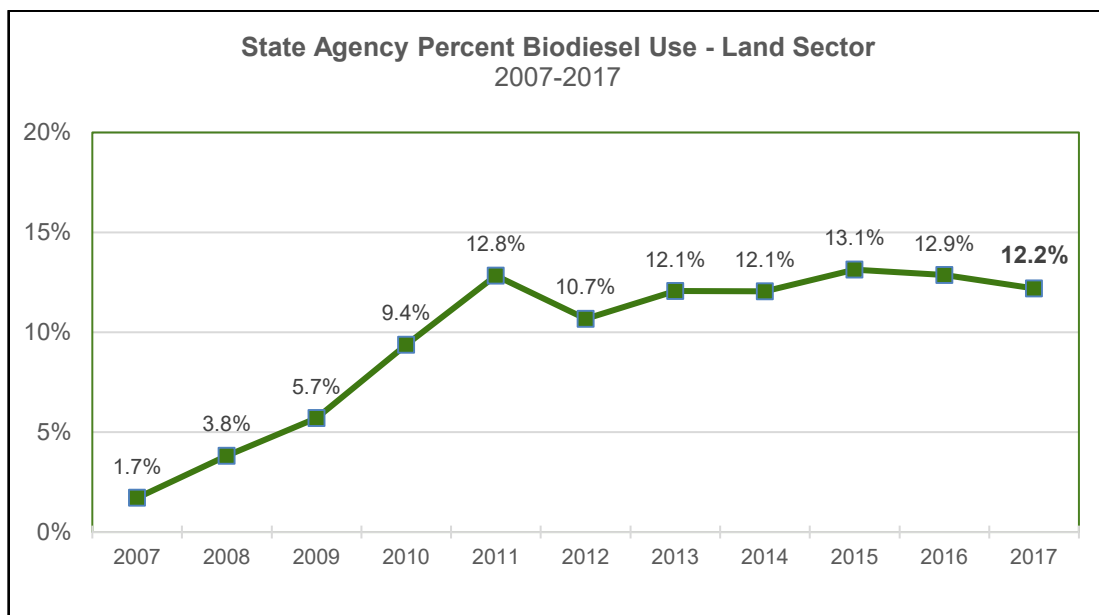
WSDOT maintains a comprehensive statewide network of fueling stations that serves the majority of the state’s diesel-powered vehicles and equipment. Of the twelve other agencies purchasing diesel fuel under the state contract, only four purchased more than 30,000 gallons of bulk fuel during the period – the departments of Corrections, Natural Resources, Fish and Wildlife, and Social and Health Services.

Among the 14 higher education institutions purchasing diesel fuel off the state contract, Washington State University was the largest purchaser, accounting for 75 percent of the fuel purchased for diesel-powered vehicles and equipment. Biodiesel was not purchased by any higher education institute.

State Agency Biodiesel Purchases (Land Sector): 2017

Agency	Diesel Gallons	Biodiesel Gallons	Total Gallons	Biodiesel %
WSDOT	2,207,675	363,912	2,571,587	14.2%
Other Agencies	325,566	13,200	338,766	3.9%
Higher Education	184,136	0	184,136	0.0%
Total	2,717,377	377,112	3,094,489	12.2%

On a percentage basis, the biodiesel content of diesel fuel purchased by state agencies for use in vehicles and equipment has averaged above 10 percent for the last six years. Prior to 2011, a lack of availability in Eastern Washington limited efforts to use biodiesel fuels.



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DETAILS ON WSDOT PURCHASES AND USE

- Overall, WSDOT’s total biodiesel purchases in 2017 were down 1/2 percent, while total fuel purchased was up 6 percent from 2016. As a result, biodiesel compared to the total diesel volume was down slightly, dropping from 15.1 percent to 14.2 percent. This is primarily due to availability of biodiesel from vendors in eastern Washington.
 - WSDOT had 42 fuel sites with biodiesel fuel available in Western Washington. About 90percent of the deliveries to these sites were B20, 11 percent B15, and remainder primarily were B10. Vendors experienced availability issues and delivered diesel instead of the ordered biodiesel blend on two dates impacting two sites. Subsequently, B99 was delivered to achieve the desired blend at one site.
 - WSDOT had 54 fuel sites with biodiesel fuel available in Eastern Washington. Almost 30 percent of the deliveries to these sites were B20, 38 percent were B10, 31% were less than B10, and 1 percent were B25 or greater. Vendors experienced availability and dispatching issues and delivered diesel instead of the ordered biodiesel blend on 17 dates impacting at least 16 sites. Total biodiesel purchases for Eastern Washington sites dropped 9% as compared to 2016 total biodiesel purchases. Eastern Washington receive lower biodiesel blends during the fall to transition to colder weather blends.

WSDOT Biodiesel Purchases by Region: 2017

Region	Total Gallons	Diesel Gallons	Biodiesel Gallons	Biodiesel %
Westside	1,122,382	909,723	212,659	18.9%
Eastside	1,449,205	1,297,952	151,253	10.4%
Statewide Total	2,571,587	2,207,675	363,912	14.2%

Note: Excludes 11 sites where no biodiesel is delivered.

- WSDOT continued its suspension of purchases of biodiesel blends higher than B20. After a review of EPA regulations, May 2012 published guidance, and biodiesel handling guidelines on materials compatibility, the department determined that its diesel fuel tanks must be replaced to meet certification requirements to store biodiesel blends above B20. During 2017, WSDOT replaced diesel tanks at Mottman (Olympia), Goldendale, and Prosser.
- WSDOT’s experience with biodiesel fuels and testing biodiesel blends up to B90 has demonstrated the importance of: (1) managing biodiesel concentration based on climate and conditions; and (2) limiting biodiesel at sites with low fuel turnover. Currently, WSDOT has 11 sites that are not feasible for biodiesel use because they are in areas that experience cold winter temperatures and have low fuel turn-over (no fuel use for periods of four to six months or longer).
- WSDOT experienced gelling issues in Eastern Washington January 5 and 6, 2017 in Newport and Windermere in several pieces of equipment and fuel

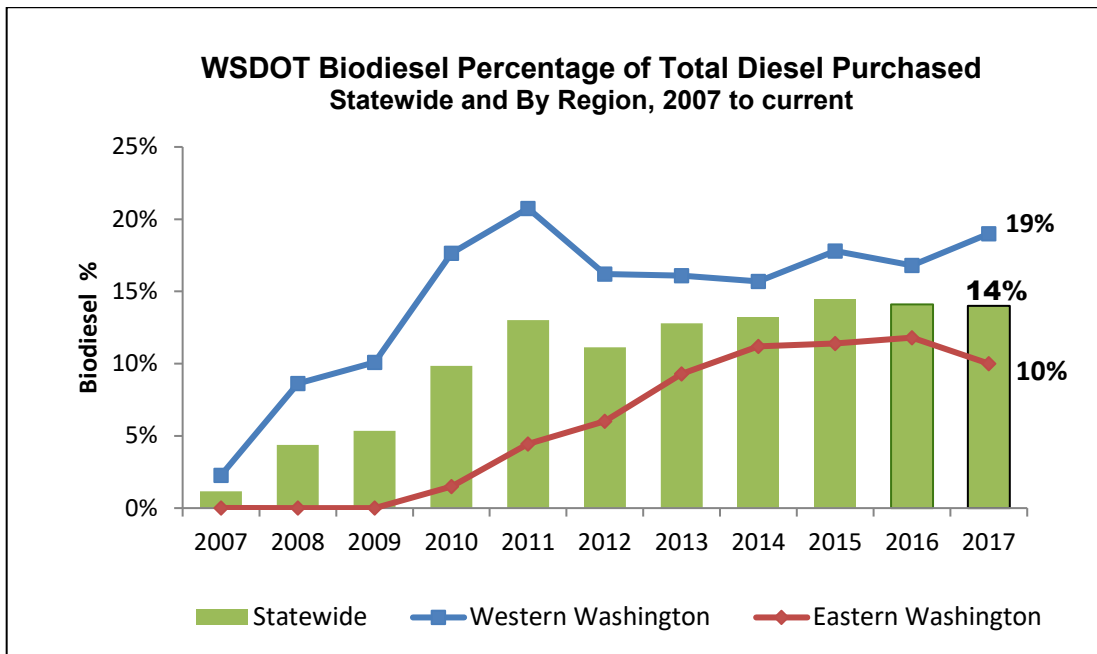
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dispensers. In Western Washington, Toledo fuel dispensers gelled on January 12, 2017, however, the possible cause was that the fuel received was not winter mix fuel.

- WSDOT continued to employ best practices for using biodiesel. Operational issues included: (1) replacing fuel dispenser filters at twice the previous rate; (2) using a more porous filter to minimize filter failure; and (3) cleaning tanks at a higher frequency. WSDOT continues to experience higher rates of fuel injector and filter failure, which may be attributable to biodiesel use.

WSDOT biodiesel purchases have averaged above 15 percent for seven years in Western Washington and topped 10 percent for the past four years in Eastern Washington. Prior to May 2012, some sites in Western Washington provided biodiesel blends of up to B40. Use of these blends was suspended subsequent to a 2012 review of EPA regulations and newly published guidance on materials compatibility. Before 2011, the lack of biodiesel availability from contractors serving Eastern Washington limited WSDOT's efforts to use biodiesel fuels in that region.



FUEL QUALITY

The Washington State Department of Agriculture (WSDA) monitors the quality of diesel and biodiesel used by state agencies as part of the state's Motor Fuel Quality Program. During 2017, WSDA submitted 127 diesel and biodiesel blend fuel samples to a contract laboratory to test compliance with ASTM quality standards. Samples were obtained from fuel terminals, retail outlets, and state and local government fueling sites. They included 98 diesel samples, 4 B10 samples, 19 B20 samples, and 6 B99 samples. The diesel samples included 35 samples from pumps with the added label "may contain up to 5% biodiesel." Fifteen of these samples were found to contain biodiesel, with most testing as B5. One B10 labeled site tested as Diesel.

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Test results continued to show problems with diesel fuel meeting flash point specifications. Of the 23 samples that did not meet ASTM specifications, 18 samples (78 percent) failed to meet flash point specifications. Flash point failures do not affect engine performance but can be an indicator of contamination. These failures are often caused by contamination with small amounts of gasoline usually attributed to the tank management of transport trucks or design flaws with underground storage tank systems. All B20 and B99 fuel samples met ASTM specifications.

WSDA issued 8 notices of correction and 3 civil penalties to businesses for selling diesel fuels that did not meet specifications. In addition, WSDA issued one notice of correction for labeling violations.

Overall, WSDA did not identify any significant quality issues with biodiesel fuels during this reporting period. WSDA reported that it is harder and harder for its inspectors to find retail stations offering fuels with more than 5% biodiesel.

STATE CONTRACTING

DES has four Master Contracts that provide multiple types of fuel products and are utilized by numerous purchasers across the state. The following is a list of the Master Contracts including unique provisions of each Contract:

- **Bulk Fuel (#00311)** - provides bulk fuel and will call fuel deliveries for products such as gasoline, diesel (clear & dyed), and biodiesel
 - There are five (5) Contractors awarded regionally across the state. The Contractors are Associated Petroleum Products (APP), RE Powell, PetroCard, Wilcox & Flagel and Coleman Oil.
 - The current term ends in May 20, 2018. There are extensions available through 2021.
 - Biodiesel provisions include:
 - Biodiesel can be made from any feedstock so long as it meets ASTM specifications
 - Contractors must provide state agencies with biodiesel that is at least 51 percent in-state sourced
 - In 2016, Purchasers were interested in the availability of Renewable Diesel and sought changes in the Contract that would address emergencies and lower administrative transaction costs. Based on this need, DES rebid the Bulk Fuels Contract. Bid submissions are due in February 2018. DES plans to maintain Master Contract #00311 until it is superseded by the new Contract.
- **Pier 15 (Seattle Dock Facility) (#00414)** – provides diesel and a B5 biodiesel blend to Washington State Ferries (WSF) – Pier-to-Vessel

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- This is a sole source contract with Maxum Petroleum Co.
- The current term ends September 4, 2018
- Biodiesel provisions include:
 - Biodiesel can be made from any feedstock so long as it meets ASTM specifications
 - Contractors must provide state agencies with biodiesel that is at least 51 percent in-state sourced
- **Marine Refueling Services (#02207)** – provides diesel and a B5 biodiesel blend to Washington State Ferries (WSF) via Truck-to-Vessel
 - Maxum Petroleum Co. is the Contractor
 - The current term ends on April 27, 2018
 - DES plans to rebid this Contract in 2018
 - Biodiesel provisions include:
 - Biodiesel can be made from any feedstock so long as it meets ASTM specifications
 - Contractors must provide state agencies with biodiesel that is at least 51 percent in-state sourced
- **Over the Water Marine Refueling (Keller Ferry) (#07613)** – provides diesel and a B5 biodiesel blend to Washington State Ferries (WSF) for the Keller Ferry run
 - Connell Oil, Inc. is the Contractor
 - The current term ends on January 13, 2018. There are extensions available through 2024
 - Biodiesel provisions include:
 - Biodiesel can be made from any feedstock so long as it meets ASTM specifications
 - Contractors must provide state agencies with biodiesel that is at least 51 percent in-state sourced

OTHER ACTIVITIES RELATED TO BIODIESEL USE BY STATE AGENCIES

The interagency Alternative Fuels and Vehicles Technical Advisory Group met six times in 2017, with much of the group's focus on transportation electrification. The group includes the 12 agencies and 4 universities that collectively represent more than 98 percent of state agency fuel use, as well as the 65 local governments now covered by similar annual reporting requirements. The group's objective is to facilitate

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implementation of the alternative fuel and vehicle procurement rules adopted in May 2013 ([WAC 194-28](#)) and October 2016 ([WAC 94-129](#)) for state and local governments, respectively.

RECOMMENDATIONS/ACTION ITEMS

- Complete a yearlong pilot test of B10 with one state ferry.
- Add the 51 percent in-state sourced biodiesel requirement to the Marine Refueling Services contract. Take necessary steps to rebid the contract in 2018.
- As part of the planned rebid of the Bulk Fuel Contract, specify that all diesel purchases are, at a minimum, B5, where feasible.
- Address changes in the biodiesel market and work to provide competitively priced biodiesel and other alternative fuel products that keep current with agency needs and the marketplace.

CONTRIBUTORS

Contributors to this report include:

- Washington Department of Enterprise Services, Corinna Cooper, (360) 407-9420
- Washington State Department of Agriculture, Timothy Elliott, (360) 902-1984
- Washington Department of Commerce, Peter Moulton, (360) 725-3116
- Washington State Department of Transportation, Greg Hansen, (360) 705-7862
- Washington State Ferries, Rick Singer, (206) 515-3403