

Department of Natural Resources

# Economic & Revenue Forecast

Fiscal Year 2016, Third Quarter  
February 2016



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**



## Forecast Summary

**Lumber and Log Prices.** Lumber and log prices have fallen markedly since peaking in mid-2014. Random Lengths' Coast Dry Random and Stud composite lumber price peaked at \$393/mbf in January 2014 but fell throughout the rest of the year to average \$373/mbf. The composite lumber price continued to fall precipitously to a low of \$287/mbf in May 2015 before rebounding to \$333/mbf in July. As of December the price had fallen to \$295/mbf, to average \$311/mbf for 2015.

Beginning in 2013, the price of a 'typical' DNR log moved up sharply from a two-year plateau to average \$591/mbf in 2014. However, prices dropped through 2015 to average \$521/mbf. This decline is mostly due to the dramatic slowdown in demand from China and an ample regional supply of both logs and lumber.

Log prices are expected to increase throughout FY 16 to average as much as six percent more than FY 15.

**Timber Sales Volume.** As of the November forecast, the timber sales plan suggested that 500 mmbf was a realistic base estimate for DNR's FY 16 sales volume. However, there were a number of fires on trust lands during the record 2015 fire season; in order to recover some of the value from these lands and hasten recovery, many have been prepared as fire salvage sales. Given the large volume of sales coming forward in the last five months of this fiscal year, we expect that some of the salvage and greenwood volume may not sell. With no-bids taken into account, our overall sales volume forecast is increased from 500 mmbf to 515 mmbf, and it is heavier to salvage sales than the November forecast.

Given current timber sales plans—and absent a new sustainable harvest calculation—sales volumes are still pegged at 500 mmbf in FY 17 and beyond.

**Timber Sales Prices.** Stumpage price expectations for FY 16 have lowered from \$340/mbf to \$310/mbf. This is primarily due to the large volume of fire salvage sales, which are appraised much lower. Ad-

ditionally, stumpage prices have been weaker than expected for sales thus far in FY 16, held back by the same issues plaguing lumber prices.

Stumpage price forecasts for further years are unchanged at \$371, \$369 and \$367/mbf for FYs 17, 18, and 19, respectively.

**Timber Removal Volume and Prices.** Changes in harvester plans, largely due to continued weak lumber prices, have reduced expectations for FY 16 removals to 491 mmbf (-32 mmbf). This continues the trend from the November forecast, which reduced removal volume expectations by 40 mmbf. The reduced volume is shifted to FYs 17 and 18. Removal volumes for FYs 17-19 are forecast to be 632 (+36), 523 (+12) and 514 (+0) mmbf. Timber removal prices are projected to be about \$322 (-\$11), \$331 (-\$15), \$360 (-\$2) and \$368 (+0) per mbf for FYs 16-19. These removal prices reflect changes in the removal timing and follow from, and lag behind, the changes projected in timber sales prices.

**Bottom Line for Timber Revenue.** The above changes to timber sales prices, sales volumes, and harvest timing have shifted projected revenue down in FYs 16 and 19, but up in FYs 17 and 18. Revenues for the 2015-2017 biennium are forecast to total \$367 million, down four percent (\$14 million) from November's forecast. Revenues for the 2017-2019 biennium will be up by one percent to \$378 million.

**Uplands and Aquatic Lands Lease (Non-Timber) Revenues.** In addition to revenue from timber removals on state-managed lands, DNR also generates sizable revenues from managing leases on uplands and aquatic lands.

Projected uplands revenue for FY 16 is increased by around \$2 million to \$39 million, due to higher than expected earnings from irrigated agriculture and orchards and vineyards, and to continued strength in mineral sales. These increases outweigh drops in expected dryland, commercial, and communications leasing revenues. Higher revenue from irrigated agriculture, orchards and vineyards, and communications leases will outweigh reductions in revenue from commercial leases, such that the revenue forecast is increased by a little over \$1 million

in each outlying year.

Aquatics revenue expectations for FY16 have been revised up slightly to \$27 million due to larger geoduck volume to be harvested in the current year. However, this larger harvest volume is shifted from FY17, decreasing its revenue outlook. Geoduck prices have continued to be much weaker than previous years; the price outlook for the next year has been lowered accordingly. Aquatics revenues are expected to be \$27 (-\$3), \$29 (-\$0), and \$29 (-\$0) million in FYs 17-19.

**Total Revenues.** Forecast revenues for the 2015-2017 Biennium (FYs 16 and 17) are reduced by \$14 million to \$499 million. Most of the revenue change is driven by a change in expected timber harvests and timber sales volume.

**Notes to the Forecast.** Although the sales volume estimates in FY16 are based on the best available internal planning data, they are subject to downward adjustments due to ongoing operational and policy issues. These issues may also affect sales volumes in outlying years, where the assumed sustainable harvest volume of 500 mmbf could prove too high.

A continuing major downside risk for the forecast is timber and lumber demand from China. While it seems that a decrease in demand has largely been accounted for in the current prices, the Chinese economy continues to have issues, with growth slowing more quickly than previously expected. There is continuing concern that the slowdown in China could result in a hard landing with a much more dramatic impact than currently expected.

In the November forecast, we noted that the expiration of the Softwood Lumber Agreement posed a major downside risk to the forecast because the expiration of tariffs might allow a flood of cheap logs and lumber to stream across the border with Canada. This has not occurred and probably will not because of constraints on Canadian log supply as they run out of excess wood from beetle-kill, the importance of China to the BC lumber market, and the significant presence of Canadian companies that own U.S.-based sawmills.

Robust growth in U.S. housing demand would provide much needed, if unlikely, high-side potential. This has not yet eventuated, despite strong employment growth and some wage growth for the last two years. The lack of housing demand is likely due to a number of impediments—persistently stringent lending standards, a continued tough labor market for younger workers, student loan debt, and general malaise—all of which are lessening, but none of which show signs of completely abating just yet.

It seems that China may have once again declared restrictions on imports of geoduck from the Pacific Northwest due to PSP and arsenic concerns. Although there does not seem to have been an official announcement, there are anecdotes of geoduck being held up at ports. This happened previously in late 2014, but it is unclear how much of an effect it had then, or is having now. Purchasers appear to be harvesting at a normal (or even brisk) pace, so it is unclear whether the restriction is being enforced.

Additionally, while the December geoduck auction prices were lower than forecast, they were in line with recent prices and do not appear to have been suppressed by the ban. On-going friction between purchasers and divers could further disrupt the market. PSP closures in late October have added uncertainty around harvest volumes as well. Taken all together, both the geoduck sales price and harvest volumes may become even more difficult to predict in the coming years.

DNR Office of Budget and Economics

Kristoffer Larson, Economist

David Chertudi, Lead Economist

Table 1: February 2016 Forecast by Source (millions of dollars)

| <b>Timber Sales</b>          |          | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
|------------------------------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Volume (mmbf)                |          | 497             | 473             | 515             | 500             | 500             | 500             |
|                              | Change   |                 |                 | 15              | -               | -               | -               |
|                              | % Change |                 |                 | 3%              | 0%              | 0%              | 0%              |
| Price (\$/mbf)               |          | \$ 356          | \$348           | \$ 310          | \$ 371          | \$ 369          | \$ 367          |
|                              | Change   |                 |                 | \$ (30)         | \$ -            | \$ -            | \$ -            |
|                              | % Change |                 |                 | -9%             | 0%              | 0%              | 0%              |
| <b>Value of Timber Sales</b> |          | <b>\$ 177.2</b> | <b>\$ 164.5</b> | <b>\$ 159.8</b> | <b>\$ 185.5</b> | <b>\$ 184.6</b> | <b>\$ 183.5</b> |
|                              | Change   |                 |                 | \$ (10.2)       | \$ -            | \$ -            | \$ -            |
|                              | % Change |                 |                 | -6%             | 0%              | 0%              | 0%              |
| <b>Timber Removals</b>       |          | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| Volume (mmbf)                |          | 471             | 451             | 491             | 632             | 523             | 514             |
|                              | Change   |                 |                 | (32)            | 36              | 12              | (0)             |
|                              | % Change |                 |                 | -6%             | 6%              | 2%              | 0%              |
| Price (\$/mbf)               |          | \$ 323          | \$ 358          | \$ 322          | \$ 331          | \$ 360          | \$ 368          |
|                              | Change   |                 |                 | \$ (11)         | \$ (15)         | \$ (2)          | \$ 0            |
|                              | % Change |                 |                 | -3%             | -4%             | -1%             | 0%              |
| <b>Timber Revenue</b>        |          | <b>\$ 152.1</b> | <b>\$ 161.4</b> | <b>\$ 158.4</b> | <b>\$ 209.1</b> | <b>\$ 188.1</b> | <b>\$ 189.4</b> |
|                              | Change   |                 |                 | \$ (16.4)       | \$ 2.8          | \$ 3.0          | \$ (0.1)        |
|                              | % Change |                 |                 | -9%             | 1%              | 2%              | 0%              |
| <b>Upland Leases</b>         |          | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| Irrigated Agriculture        |          | \$ 6.7          | \$ 7.8          | \$ 7.5          | \$ 6.9          | \$ 6.9          | \$ 6.9          |
|                              | Change   |                 |                 | \$ 1.0          | \$ 0.6          | \$ 0.6          | \$ 0.6          |
|                              | % Change |                 |                 | 15%             | 9%              | 9%              | 9%              |
| Orchard/Vineyard             |          | \$ 9.4          | \$ 8.3          | \$ 6.7          | \$ 6.8          | \$ 7.0          | \$ 7.0          |
|                              | Change   |                 |                 | \$ 1.0          | \$ 1.0          | \$ 1.0          | \$ 1.0          |
|                              | % Change |                 |                 | 17%             | 17%             | 17%             | 17%             |
| Dryland Ag/Grazing           |          | \$ 7.4          | \$ 5.0          | \$ 6.0          | \$ 6.5          | \$ 6.6          | \$ 6.6          |
|                              | Change   |                 |                 | \$ (0.4)        | \$ -            | \$ -            | \$ -            |
|                              | % Change |                 |                 | -6%             | 0%              | 0%              | 0%              |
| Commercial                   |          | \$ 9.6          | \$ 8.2          | \$ 8.8          | \$ 9.4          | \$ 9.4          | \$ 9.4          |
|                              | Change   |                 |                 | \$ (0.2)        | \$ (0.5)        | \$ (0.5)        | \$ (0.5)        |
|                              | % Change |                 |                 | -2%             | -5%             | -5%             | -5%             |
| Other Leases                 |          | \$ 8.8          | \$ 9.4          | \$ 9.8          | \$ 9.3          | \$ 9.6          | \$ 9.8          |
|                              | Change   |                 |                 | \$ 0.2          | \$ 0.0          | \$ 0.2          | \$ 0.3          |
|                              | % Change |                 |                 | 2%              | 0%              | 2%              | 3%              |
| <b>Total Upland Leases</b>   |          | <b>\$ 41.9</b>  | <b>\$ 38.6</b>  | <b>\$ 38.8</b>  | <b>\$ 38.9</b>  | <b>\$ 39.5</b>  | <b>\$ 39.8</b>  |
|                              | Change   |                 |                 | \$ 1.6          | \$ 1.1          | \$ 1.3          | \$ 1.4          |
|                              | % Change |                 |                 | 4%              | 3%              | 3%              | 4%              |
| <b>Aquatic Lands</b>         |          | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| Aquatic Leases               |          | \$ 10.5         | \$ 10.9         | \$ 10.4         | \$ 10.9         | \$ 11.0         | \$ 11.1         |
|                              | Change   |                 |                 | \$ (0.2)        | \$ -            | \$ -            | \$ -            |
|                              | % Change |                 |                 | -2%             | 0%              | 0%              | 0%              |
| Geoduck                      |          | \$ 22.1         | \$ 21.0         | \$ 16.8         | \$ 15.6         | \$ 17.5         | \$ 17.9         |
|                              | Change   |                 |                 | \$ 0.5          | \$ (3.1)        | \$ (0.2)        | \$ (0.2)        |
|                              | % Change |                 |                 | 3%              | -16%            | -1%             | -1%             |
| <b>Aquatic Lands Revenue</b> |          | <b>\$ 32.7</b>  | <b>\$ 31.9</b>  | <b>\$ 27.2</b>  | <b>\$ 26.5</b>  | <b>\$ 28.5</b>  | <b>\$ 29.0</b>  |
|                              | Change   |                 |                 | \$ 0.3          | \$ (3.1)        | \$ (0.2)        | \$ (0.2)        |
|                              | % Change |                 |                 | 1%              | -10%            | -1%             | -1%             |
| <b>Total All Sources</b>     |          | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| <b>Total</b>                 |          | <b>\$ 226.6</b> | <b>\$ 231.9</b> | <b>\$ 224.4</b> | <b>\$ 274.4</b> | <b>\$ 256.1</b> | <b>\$ 258.2</b> |
|                              | Change   |                 |                 | \$ (14.5)       | \$ 0.9          | \$ 4.0          | \$ 1.1          |
|                              | % Change |                 |                 | -6%             | 0%              | 2%              | 0%              |

Table 2: February 2016 Forecast by Fund (millions of dollars)

| <b>Management Funds</b>       |                                     | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
|-------------------------------|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 041                           | RMCA - Uplands                      | \$ 33.2         | \$ 30.4         | \$ 35.4         | \$ 42.8         | \$ 37.6         | \$ 39.0         |
|                               | Change                              |                 |                 | \$ (0.9)        | \$ 0.6          | \$ 0.8          | \$ 0.4          |
|                               | % Change                            |                 |                 | -2%             | 1%              | 2%              | 1%              |
| 041                           | RMCA - Aquatic Lands                | \$ 14.8         | \$ 14.4         | \$ 12.0         | \$ 11.6         | \$ 12.6         | \$ 12.8         |
|                               | Change                              |                 |                 | \$ 0.2          | \$ (1.5)        | \$ (0.1)        | \$ (0.1)        |
|                               | % Change                            |                 |                 | 2%              | -12%            | -1%             | -1%             |
| 014                           | FDA                                 | \$ 19.6         | \$ 23.2         | \$ 20.5         | \$ 26.9         | \$ 24.5         | \$ 24.7         |
|                               | Change                              |                 |                 | \$ (3.3)        | \$ (0.1)        | \$ 0.3          | \$ (0.0)        |
|                               | % Change                            |                 |                 | -14%            | -1%             | 1%              | 0%              |
| <b>Total Management Funds</b> |                                     | <b>\$ 67.6</b>  | <b>\$ 68.0</b>  | <b>\$ 67.9</b>  | <b>\$ 81.3</b>  | <b>\$ 74.7</b>  | <b>\$ 76.5</b>  |
|                               | Change                              |                 |                 | \$ (4.0)        | \$ (1.0)        | \$ 1.0          | \$ 0.3          |
|                               | % Change                            |                 |                 | -6%             | -1%             | 1%              | 0%              |
| <b>Current Funds</b>          |                                     | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| 113                           | Common School Construction          | \$ 56.6         | \$ 50.4         | \$ 57.2         | \$ 66.2         | \$ 67.5         | \$ 69.2         |
|                               | Change                              |                 |                 | \$ (0.6)        | \$ 0.5          | \$ 1.5          | \$ 0.8          |
|                               | % Change                            |                 |                 | -1%             | 1%              | 2%              | 1%              |
| 999                           | Forest Board Counties               | \$ 52.0         | \$ 64.8         | \$ 52.1         | \$ 68.0         | \$ 60.8         | \$ 60.7         |
|                               | Change                              |                 |                 | \$ (7.6)        | \$ (0.8)        | \$ 0.7          | \$ (0.0)        |
|                               | % Change                            |                 |                 | -13%            | -1%             | 1%              | 0%              |
| 001                           | General Fund                        | \$ 2,173.5      | \$ 1.8          | \$ 2.9          | \$ 3.8          | \$ 3.8          | \$ 3.9          |
|                               | Change                              |                 |                 | \$ (0.4)        | \$ 0.5          | \$ 0.2          | \$ 0.0          |
|                               | % Change                            |                 |                 | -13%            | 14%             | 5%              | 0%              |
| 348                           | University Bond Retirement          | \$ 1.8          | \$ 2.8          | \$ 2.2          | \$ 2.8          | \$ 3.0          | \$ 2.1          |
|                               | Change                              |                 |                 | \$ (0.1)        | \$ 0.2          | \$ 0.1          | \$ 0.0          |
|                               | % Change                            |                 |                 | -6%             | 9%              | 4%              | 1%              |
| 347                           | WSU Bond Retirement                 | \$ 1.7          | \$ 1.8          | \$ 1.6          | \$ 1.7          | \$ 1.7          | \$ 1.7          |
|                               | Change                              |                 |                 | \$ 0.1          | \$ 0.1          | \$ 0.1          | \$ 0.1          |
|                               | % Change                            |                 |                 | 4%              | 5%              | 6%              | 7%              |
| 042                           | CEP&RI                              | \$ 5.5          | \$ 5.2          | \$ 3.8          | \$ 4.5          | \$ 4.5          | \$ 4.6          |
|                               | Change                              |                 |                 | \$ (0.2)        | \$ 0.1          | \$ 0.1          | \$ 0.0          |
|                               | % Change                            |                 |                 | -6%             | 3%              | 3%              | 1%              |
| 036                           | Capitol Building Construction       | \$ 6.7          | \$ 4.9          | \$ 6.4          | \$ 9.9          | \$ 9.3          | \$ 9.0          |
|                               | Change                              |                 |                 | \$ (0.3)        | \$ 0.6          | \$ (0.0)        | \$ (0.0)        |
|                               | % Change                            |                 |                 | -5%             | 6%              | -1%             | 0%              |
| 061/3/5/6                     | Normal (CWU, EWU, WWU, TESC) School | \$ 0.2          | \$ 0.1          | \$ 0.2          | \$ 0.2          | \$ 0.2          | \$ 0.2          |
|                               | Change                              |                 |                 | \$ 0.0          | \$ 0.0          | \$ 0.0          | \$ 0.0          |
|                               | % Change                            |                 |                 | 7%              | 7%              | 7%              | 7%              |
| Other Funds                   |                                     | \$ 1.5          | \$ 0.5          | \$ 0.0          | \$ 0.7          | \$ 0.2          | \$ 0.2          |
|                               | Change                              |                 |                 | \$ (0.2)        | \$ (0.5)        | \$ (0.2)        | \$ (0.0)        |
|                               | % Change                            |                 |                 | -82%            | -41%            | -48%            | -11%            |
| <b>Total Current Funds</b>    |                                     | <b>\$ 128.1</b> | <b>\$ 132.4</b> | <b>\$ 126.6</b> | <b>\$ 157.7</b> | <b>\$ 150.9</b> | <b>\$ 151.6</b> |
|                               | Change                              |                 |                 | \$ (9.4)        | \$ 0.7          | \$ 2.6          | \$ 0.9          |
|                               | % Change                            |                 |                 | -7%             | 0%              | 2%              | 1%              |
| (Continued)                   |                                     |                 |                 |                 |                 |                 |                 |

Table 3: February 2016 Forecast by Fund (millions of dollars), cont'd

|                              |  | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
|------------------------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>02R</b>                   | <b>Aquatic Lands Enhancement Account</b> | <b>\$ 17.9</b>  | <b>\$ 17.4</b>  | <b>\$ 15.1</b>  | <b>\$ 14.9</b>  | <b>\$ 15.9</b>  | <b>\$ 16.1</b>  |
|                              | Change                                   |                 |                 | \$ 0.1          | \$ (1.5)        | \$ (0.1)        | \$ (0.1)        |
|                              | % Change                                 |                 |                 | 1%              | -9%             | -1%             | -1%             |
| <hr/>                        |  |                 |                 |                 |                 |                 |                 |
| <b>Permanent Funds</b>       |  | FY 14           | FY 15           | FY 16           | FY 17           | FY 18           | FY 19           |
| 601                          | Agricultural College Permanent           | \$ 3.5          | \$ 4.1          | \$ 6.3          | \$ 9.6          | \$ 5.0          | \$ 4.3          |
|                              | Change                                   |                 |                 | \$ (0.4)        | \$ 2.7          | \$ 0.4          | \$ 0.0          |
|                              | % Change                                 |                 |                 | -6%             | 40%             | 9%              | 1%              |
| 604                          | Normal School Permanent                  | \$ 1.8          | \$ 1.7          | \$ 2.5          | \$ 4.1          | \$ 3.3          | \$ 3.1          |
|                              | Change                                   |                 |                 | \$ (0.3)        | \$ (0.4)        | \$ (0.2)        | \$ (0.0)        |
|                              | % Change                                 |                 |                 | -11%            | -10%            | -6%             | -1%             |
| 605                          | Common School Permanent                  | \$ 0.4          | \$ 0.7          | \$ 0.3          | \$ 0.3          | \$ 0.3          | \$ 0.3          |
|                              | Change                                   |                 |                 | \$ -            | \$ -            | \$ -            | \$ -            |
|                              | % Change                                 |                 |                 | 0%              | 0%              | 0%              | 0%              |
| 606                          | Scientific Permanent                     | \$ 6.1          | \$ 7.1          | \$ 5.2          | \$ 6.1          | \$ 5.5          | \$ 5.5          |
|                              | Change                                   |                 |                 | \$ (0.5)        | \$ 0.5          | \$ 0.4          | \$ 0.0          |
|                              | % Change                                 |                 |                 | -9%             | 8%              | 7%              | 0%              |
| 607                          | University Permanent                     | \$ 1.1          | \$ 0.4          | \$ 0.4          | \$ 0.4          | \$ 0.5          | \$ 0.6          |
|                              | Change                                   |                 |                 | \$ 0.0          | \$ (0.0)        | \$ 0.0          | \$ (0.0)        |
|                              | % Change                                 |                 |                 | 14%             | -2%             | 1%              | 0%              |
| <b>Total Permanent Funds</b> |  | <b>\$ 13.0</b>  | <b>\$ 14.0</b>  | <b>\$ 14.8</b>  | <b>\$ 20.6</b>  | <b>\$ 14.6</b>  | <b>\$ 13.9</b>  |
|                              | Change                                   |                 |                 | \$ (1.2)        | \$ 2.8          | \$ 0.6          | \$ 0.0          |
|                              | % Change                                 |                 |                 | -7%             | 15%             | 4%              | 0%              |
| <hr/>                        |  |                 |                 |                 |                 |                 |                 |
| <b>Total All Funds</b>       |  | FY 14           | FY 15           | FY 16           | FY 17           | FY 17           | FY 17           |
|                              | <b>Total</b>                             | <b>\$ 226.6</b> | <b>\$ 231.9</b> | <b>\$ 224.4</b> | <b>\$ 274.4</b> | <b>\$ 256.1</b> | <b>\$ 258.2</b> |
|                              | Change                                   |                 |                 | \$ (14.5)       | \$ 0.9          | \$ 4.0          | \$ 1.1          |
|                              | % Change                                 |                 |                 | -6%             | 0%              | 2%              | 0%              |

# Contents

|   |           |
|---|-----------|
| <b>Forecast Summary</b>                     | <b>I</b>  |
| <b>Macroeconomic Conditions</b>             | <b>1</b>  |
| U.S. Economy . . . . .                      | 1         |
| Gross Domestic Product . . . . .            | 1         |
| Employment and Wages . . . . .              | 1         |
| Inflation . . . . .                         | 3         |
| Interest Rates . . . . .                    | 3         |
| The U.S. Dollar and Foreign Trade . . . . . | 4         |
| Petroleum . . . . .                         | 5         |
| World Economy . . . . .                     | 5         |
| Europe . . . . .                            | 5         |
| China . . . . .                             | 5         |
| Japan . . . . .                             | 6         |
| <b>Wood Markets</b>                         | <b>7</b>  |
| U.S. Housing Market . . . . .               | 8         |
| Existing Home Sales . . . . .               | 8         |
| New Home Sales . . . . .                    | 9         |
| Shadow Inventory . . . . .                  | 9         |
| Household Formation . . . . .               | 9         |
| Housing Starts . . . . .                    | 10        |
| Housing Prices . . . . .                    | 10        |
| Housing Affordability . . . . .             | 11        |
| Export Markets . . . . .                    | 12        |
| Timber Supply . . . . .                     | 12        |
| Price Outlook . . . . .                     | 13        |
| Lumber Prices . . . . .                     | 13        |
| Log Prices . . . . .                        | 13        |
| Stumpage Prices . . . . .                   | 14        |
| DNR Stumpage Price Outlook . . . . .        | 14        |
| <b>DNR Revenue Forecast</b>                 | <b>16</b> |
| Timber Revenue . . . . .                    | 16        |
| Timber Sales Volume . . . . .               | 16        |
| Timber Removal Volume . . . . .             | 16        |
| Timber Sales Prices . . . . .               | 17        |
| Timber Removal Prices . . . . .             | 17        |
| Timber Removal Revenue . . . . .            | 17        |
| Upland Lease Revenues . . . . .             | 19        |
| Aquatic Lands Revenues . . . . .            | 20        |
| Total Revenues from All Sources . . . . .   | 21        |
| Some Caveats . . . . .                      | 21        |
| Distribution of Revenues . . . . .          | 22        |



## List of Tables

|   |  |     |
|---|--|-----|
| 1 | February 2016 Forecast by Source (millions of dollars) . . . . .       | III |
| 2 | February 2016 Forecast by Fund (millions of dollars) . . . . .         | IV  |
| 3 | February 2016 Forecast by Fund (millions of dollars), cont'd . . . . . | V   |

## List of Figures

|    |   |    |
|----|---|----|
| 1  | U.S. Gross Domestic Product . . . . .                                 | 1  |
| 2  | Unemployment Rate and Monthly Change in Jobs . . . . .                | 2  |
| 3  | Employment and Unemployment . . . . .                                 | 2  |
| 4  | Labor Market Indicators . . . . .                                     | 3  |
| 5  | U.S. Inflation Indices . . . . .                                      | 3  |
| 6  | Trade-Weighted U.S. Dollar Index . . . . .                            | 4  |
| 7  | Crude Oil Prices . . . . .  | 5  |
| 8  | Lumber, Log and Stumpage Prices in Washington . . . . .               | 7  |
| 9  | Lumber, Log, and DNR Stumpage Price Seasonality . . . . .             | 7  |
| 10 | Home Sales and Starts as a Percentage of Pre-Recession Peak . . . . . | 8  |
| 11 | Existing Home Sales . . . . .   | 8  |
| 12 | New Single-Family Home Sales . . . . .                                | 9  |
| 13 | Housing Starts . . . . .  | 10 |
| 14 | Case-Shiller Existing Home Price Index . . . . .                      | 11 |
| 15 | Housing Affordability . . . . .                                       | 11 |
| 16 | Log Export Prices . . . . .   | 12 |
| 17 | Log Export Volume . . . . .   | 12 |
| 18 | DNR Composite Log Prices . . . . .                                    | 13 |
| 19 | DNR Timber Stumpage Price . . . . .                                   | 15 |
| 20 | Forecast Timber Sales Volume . . . . .                                | 16 |
| 21 | Forecast Timber Removal Volume . . . . .                              | 17 |
| 22 | Forecast Timber Sales Price . . . . .                                 | 17 |
| 23 | Forecast Timber Removal Price . . . . .                               | 17 |
| 24 | Forecast Timber Removal Value . . . . .                               | 18 |
| 25 | Forecast Timber Removal Revenue . . . . .                             | 18 |
| 26 | Forecast Upland Lease Revenue . . . . .                               | 19 |
| 27 | Aquatic Lands Revenues . . . . .                                      | 20 |
| 28 | Geoduck Auction Prices . . . . .                                      | 20 |
| 29 | Total Revenues . . . . .  | 21 |

## Acronyms and Abbreviations

|      |  |
|------|--|
| bbf  | Billion board feet   |
| BLS  | U.S. Bureau of Labor Statistics  |
| CAD  | Canadian dollar  |
| CNY  | Chinese yuan (renminbi)  |
| CPI  | Consumer Price Index   |
| CY   | Calendar Year  |
|      |  |
| DNR  | Washington Department of Natural Resources                             |
| ECB  | European Central Bank  |
| ERFC | Washington State Economic and Revenue Forecast Council                 |
| FDA  | Forest Development Account   |
| FEA  | Forest Economic Advisors   |
| Fed  | U.S. Federal Reserve Board   |
|      |  |
| FOMC | Federal Open Market Committee  |
| FY   | Fiscal Year  |
| GDP  | Gross Domestic Product   |
| HMI  | National Association of Home Builders/Wells Fargo Housing Market Index |
| IMF  | International Monetary Fund  |
|      |  |
| mbf  | Thousand board feet  |
| mmbf | Million board feet   |
| PPI  | Producer Price Index   |
| Q1   | First quarter of year (similarly, Q2, Q3, and Q4)                      |
| QE   | Quantitative Easing  |
|      |  |
| RCW  | Revised Code of Washington   |
| RISI | Resource Information Systems, Inc.                                     |
| RMCA | Resource Management Cost Account                                       |
| SA   | Seasonally Adjusted  |
| SAAR | Seasonally Adjusted Annual Rate  |
|      |  |
| TAC  | Total Allowable Catch  |
| USD  | U.S. Dollar  |
| WDFW | Washington Department of Fish and Wildlife                             |
| WWPA | Western Wood Products Association                                      |
| WTO  | World Trade Organization   |

## Preface

This *Economic and Revenue Forecast* projects revenues from Washington state lands managed by the Washington State Department of Natural Resources (DNR). These revenues are distributed to management funds and beneficiary accounts as directed by statute.

DNR revises its Forecast quarterly to provide updated information for trust beneficiaries and state and department budgeting purposes. Each DNR Forecast builds on the previous one, emphasizing ongoing changes. Each re-evaluates world and national macroeconomic conditions, and the demand and supply for forest products and other goods. Finally, each assesses the impact of these economic conditions on projected revenues from DNR-managed lands.

DNR Forecasts provide information used in the *Washington Economic and Revenue Forecast* issued by the Washington State Economic and Revenue Forecast Council. The release dates for DNR Forecasts are determined by the state's forecast schedule as prescribed by RCW 82.33.020. The table below

shows the anticipated schedule for future *Economic and Revenue Forecasts*.

This Forecast covers fiscal years 2016 through 2019. Fiscal years for Washington State government begin July 1 and end June 30. For example, the current fiscal year, Fiscal Year 2016, runs from July 1, 2015 through June 30, 2016.

The baseline date (the point that designates the transition from "actuals" to predictions) for DNR revenues in this Forecast is January 1st, 2016. The forecast numbers beyond that date are predicted from the most up-to-date DNR sales and revenue data available, including DNR's timber sales results through January 2016. Macroeconomic and market outlook data and trends are the most up-to-date available as the Forecast document is being written.

Unless otherwise indicated, values are expressed in nominal terms without adjustment for inflation or seasonality. Therefore, interpreting trends in the Forecast requires attention to inflationary changes in the value of money over time separate from changes attributable to other economic influences.

## Economic Forecast Calendar

| Forecast       | Baseline Date   | Draft Revenue Data Release Date | Final Data and Publication Date (approximate) |
|----------------|-----------------|---------------------------------|---|
| June 2016      | May 1, 2016     | June 17, 2016                   | June 30, 2016                                 |
| September 2016 | August 1, 2016  | September 10, 2016              | September 30, 2016                            |
| November 2016  | October 1, 2016 | November 10, 2016               | November 30, 2016                             |
| February 2017  | January 1, 2017 | February 18, 2017               | February 31, 2017                             |

## Acknowledgements

The Washington Department of Natural Resources' (DNR) *Economic and Revenue Forecast* is a collaborative effort. It is the product of information provided by private individuals and organizations, as well as DNR staff. Their contributions greatly enhance the quality of the Forecast.

Special thanks are due to those in the wood products industry who provided information for DNR's survey of timber purchasers. These busy individuals and companies volunteered information essential to forecasting the timing of timber removal volumes, a critical component of projecting DNR's revenues on behalf of beneficiaries.

Thanks also go to DNR staff who contributed to the Forecast. Tom Shay, Andrew Hayes, Rick Roeder, Tom Heller, Duane Emmons, Taylor Mizar, Kristin Swendall, and Blain Reeves provided data and counsel, including information on revenue flows in their areas of responsibility.

In the final analysis, the views expressed are our own and may not necessarily represent the views of the contributors, reviewers, or DNR.

DNR Office of Budget and Economics

Kristoffer Larson, Economist

David Chertudi, Lead Economist

## Macroeconomic Conditions

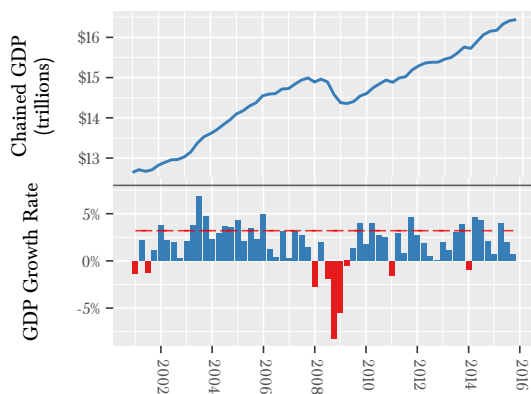
This section briefly reviews macroeconomic conditions in the United States and world economies because they influence DNR revenue—most notably through the bid prices for DNR timber sales and lease revenues from managed lands.

### U.S. Economy

#### Gross Domestic Product

Since the end of the Great Recession during 2008 and 2009, when GDP declined in five out of six quarters, GDP growth has averaged a weak 2.2 percent on a real annualized basis (Figure 1). This is markedly less than the annualized average of 3.2 percent over the previous 50 years (1960-2009). The Great Recession set back economic growth and seriously harmed many sectors of the economy, particularly employment and wages.

Figure 1: U.S. Gross Domestic Product



The year 2014 was widely predicted to be the year that broke the pattern of stagnation, but annual growth was held down to 2.4 percent because a harsh winter and business inventory adjustments caused GDP to contract. The year 2015 was also widely predicted to be the year that broke the pattern, with a continuation of the strong employment

growth from 2014 finally causing an increase in consumption and investment. However, the first quarter of 2015 was also quite poor, with a harsh winter again stifling consumption and investment and the strong dollar constraining exports. Growth recovered in the second quarter 2015 to 3.9 percent, but fell to 2.0 percent in the third quarter and further to 0.7 percent in the fourth quarter (advanced estimate). The advanced estimate for GDP growth over 2015 is the same as 2014, 2.4 percent.

Predictions for real GDP growth in 2015 from various sources were repeatedly reduced as the year progressed, as actual growth disappointed and as headwinds to growth mounted (particularly the Chinese slowdown and the strength of the dollar). This pattern of reduced expectations has already begun for 2016, with analysts dropping forecasts from around 3.0 percent to around 2.5 percent after disappointing fourth quarter 2015 growth and since the headwinds to growth show no signs of slowing. As of the December meeting, the FOMC had a median prediction of 2.4 percent growth for 2016, with a range of 2.0-2.7 percent.

#### Employment and Wages

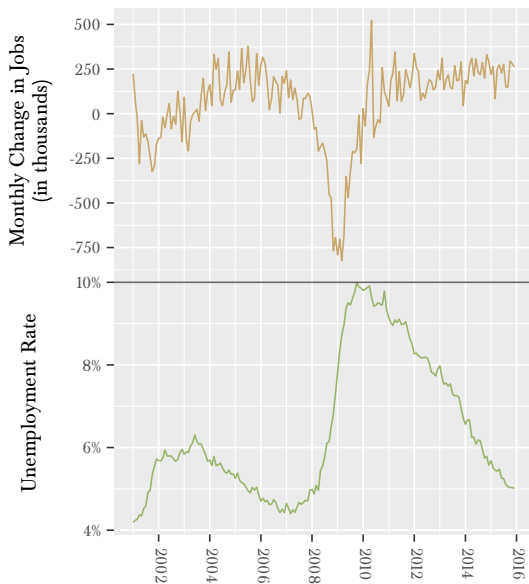
The U.S. headline unemployment rate declined through 2015 from 5.7 percent in January to 4.9 percent in January 2016 (Figure 2). This is down from a high of 10.0 percent in October 2009 and is below the average unemployment rate of 5.2 percent from 2001-2006. In January 2016 an estimated 151,000 jobs were created, much less than the 262,000 jobs created in December, but still enough to continue pushing down the unemployment rate. Analysts are predicting somewhat slower growth in jobs in 2016, averaging 185,000 jobs per month compared to 2015's average of 221,000. The FOMC projects a median of 4.7 percent unemployment for 2016, with an estimate range from 4.3-4.9 percent.

The unemployment rate is an important indicator to track because it gives insight into slack in the labor market, that is, how many people are available to work before job growth starts driving problematic inflation. The health of the labor market is the driving force behind consumption, which con-

stitutes about 70 percent of GDP and naturally extends to the demand for housing, which is the major driver of timber demand in the U.S. Data and anecdotes abound that show that one of the major effects of high unemployment rates, particularly among young adults, is lower demand for housing as more people live with their parents or take on housemates.

Although the unemployment rate continues to decline, it has not yet translated into strong wage growth, which is a prerequisite for broader improvement in the economy, nor into a strong increase in the demand for housing. One possibility for the lack of wage growth is that the headline unemployment rate may be underestimating the number of people willing to work. During the 2008-09 recession the number of people who were underemployed or marginally attached to the workforce increased dramatically. Additionally, since the recession the labor force participation rate has declined significantly, possibly because workers left the labor force after they were unable to find jobs.

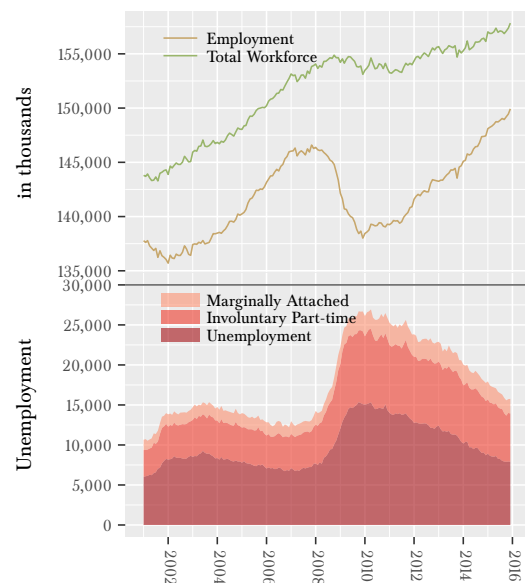
Figure 2: Unemployment Rate and Monthly Change in Jobs



The U-6 unemployment rate includes involuntarily

part-time employment and marginally attached workers, who are not included in the headline unemployment rate but who, nevertheless, are likely looking for work and would benefit from better job prospects. The U-6 has declined from a high of 17.1 percent in 2010 to 11.3 percent in January 2015 to 9.9 percent in December. It remains higher than the average of 9.1 percent from 2001-2006 (Figure 3). The decline in the year-on-year U-6 is the result of a drop in all three of its components.

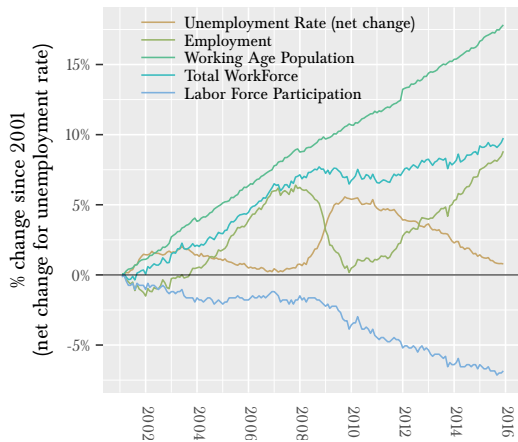
Figure 3: Employment and Unemployment



Reductions in the labor force participation rate have also helped move the unemployment rate and the U-6 lower (Figure 4). The decline in the labor force participation rate is an important confounding factor when examining the unemployment rate and is a key consideration when forecasting whether an increase in employment will trigger an increase in wages and inflation. If there are many people waiting to look for employment until jobs are easier to find—such as when people stay out of the labor force and the participation rate declines—then as employment grows, more people will enter the labor force and there will be little or no pressure on wages despite a low unemployment rate. How-

ever, if people are not in the labor market for other reasons, then the labor pool is relatively fixed and wages will be pushed up as companies compete for labor.

Figure 4: Labor Market Indicators



The drop in the participation rate since 2008 suggests that something about the recession itself caused people to leave the labor market, and implies that they may return when things are looking a bit better. However, Federal Reserve analysts have suggested that the recent decline in participation may be part of a longer-term trend starting in the late 1970s and pausing during the 1990s, not as a result of the recession. Indeed, according to statistics released by the Federal Reserve Bank of Atlanta, many of those dropping out of the labor force can't or don't want to work.

BLS data show that in January, out of the 95 million Americans not in the labor force, six million want a job but have not been searching for one. Almost two million of these were marginally attached and are included in the U-6, leaving about four million who may take on work when conditions are right, but who aren't included in the statistics. Given that the current number of unemployed included in the headline unemployment rate is around seven million, an additional four million potential workers is a significant additional labor population. This suggests that, while the labor force participation rate decline may indeed be structural, there may still be

significant slack in the labor market.

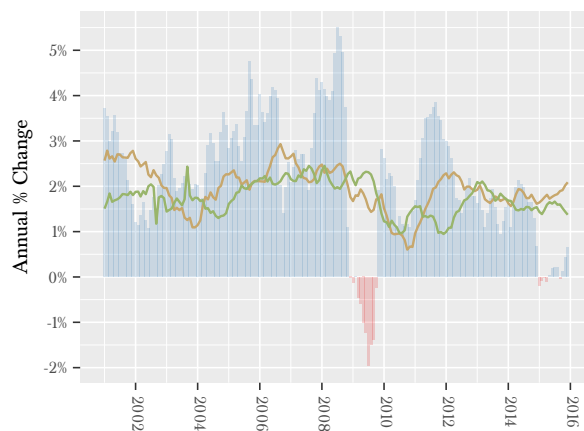
**Inflation**

The inflation outlook for 2015 deteriorated significantly through 2015 from a predicted range of 1.0-2.2 percent in the FOMC's December 2014 Summary of Economic Projections, to a final average of 0.7 percent for the year. However, this decline has largely been due to the fall in oil and food prices (Figure 5).

For policy purposes, the FOMC uses the core Personal Consumption Expenditures (PCE) index as the guiding measure of inflation, which removes the more volatile fuel and food prices. This measure shows long-term inflation at or below the two percent target since September 2008. The FOMC has reduced its predicted range for 2016 to 1.4-2.1 percent in the December Economic Projections.

The consensus among forecasters, including the FOMC, is that core inflation will remain at or below two percent through 2018.

Figure 5: U.S. Inflation Indices



**Interest Rates**

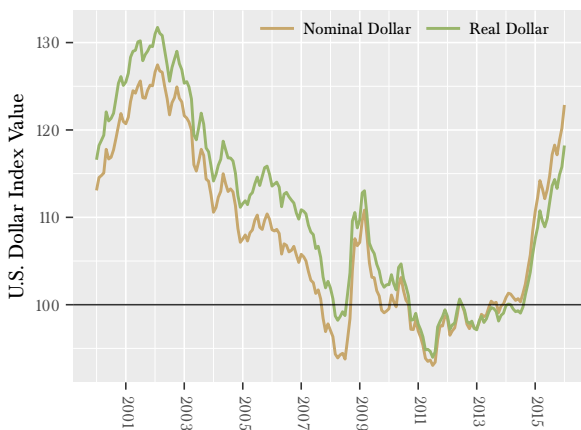
Seldom in U.S. history has it been so inexpensive to borrow money. From December 2008 to December 2015, the Federal Reserve held the federal

funds rate in the 0.0-0.25 percent range. During that time the Fed pledged to keep the rates near zero until it judged that there had been sufficient progress toward its dual-mandate of maximum employment and two percent inflation.

In December 2015, the FOMC raised interest rates to 0.25-0.5 percent after determining that sufficient progress had been made in the recovery of employment and inflation and, importantly, that there was a sufficiently strong outlook to begin lifting interest rates from their historic lows. This was widely expected because the FOMC had been carefully preparing markets for it with each successive meeting statement. However, it was not an uncontroversial decision.

Pressure had been building to increase interest rates since mid-2014. Arguments for raising interest rates revolve around the steady increase in employment, the need to avoid sharp increases in inflation, and the need for the Fed to maintain the confidence of markets. Arguments resisting the increase in rates are manifold. They generally note that sharp increases in inflation are not a danger from any reasonable economic model, that inflation somewhat above the target rate is not a disaster and easily addressed when it happens, that the inflation target itself is too low, and that raising rates too quickly could further undermine the weak recovery we have experienced.

Figure 6: Trade-Weighted U.S. Dollar Index



The question of whether to raise interest rates is important because it is the key tool of monetary policy. An increase in interest rates will slow down economic growth—business investment slows down because borrowing money becomes more expensive, so job and wage growth slow down (constraining consumption). Similarly, it becomes more expensive for consumers to borrow, impeding demand in the housing and auto markets. In normal times, a decrease in interest rates will expand investment, employment, wages, and consumer credit.

The effect of the recent increase may not be felt for some time, but it is small enough that its effect will likely be overshadowed by larger forces in the economy, such as oil prices or China's slowing growth.

### The U.S. Dollar and Foreign Trade

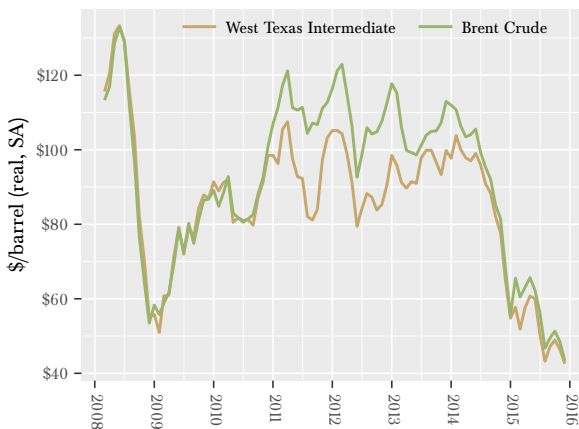
The trade-weighted U.S. dollar index has climbed dramatically, increasing by more than 20 percent since mid-2014. (Figure 6).

The climb in the dollar has threatened the recent improvement in the U.S. economy by making imported goods relatively cheaper than those locally produced, while also making U.S. exports less competitive abroad. This has had a measurable effect on GDP growth, as net exports (exports less imports) subtracted 0.7 percent points from GDP growth in 2015. It is likely that this would have been a much larger impact if not for the expansion of U.S. oil production, which has offset a significant amount of oil imports.

Importantly, a rising dollar means that timber and lumber from the Pacific Northwest become more expensive for international buyers and imported timber and lumber become less expensive. This will tend to suppress local prices and DNR's timber and agricultural revenues. Wildstock geoduck revenue will also be negatively affected because geoduck is primarily marketed abroad.



Figure 7: Crude Oil Prices



## Petroleum

Crude oil and its derivatives strongly affect production, transportation, and consumption in the world and U.S. domestic economies. Prices for Brent crude oil have plummeted from \$108/barrel in January 2014 to \$38/barrel in December 2015, a 65 percent drop.

Broadly, a drop in oil prices acts like a tax cut for consumers and can encourage consumption. However, data suggest that households are saving the windfall or paying down debt instead of spending it. Additionally, the drop has been sudden and severe enough that it has undermined business investment in oil production, which has created another drag on economic growth.

All other things being equal, this drop in petroleum prices has lowered diesel fuel prices and will make transportation-sensitive industries—such as PNW logging and agriculture—more competitive in international markets. However, all other things are not equal: as discussed above, the U.S. dollar has risen dramatically and will make PNW timber more expensive internationally. These two forces are opposing and it is unclear which will be more influential on PNW natural resource exports.

## World Economy

### Europe

Forecasts for the U.S. economy often cite Europe's ongoing financial crisis and very weak economic performance as a significant downside risk. The EU (28 countries) is the fourth largest trading partner of the U.S. and, as a whole, was hammered by the Great Recession, collectively suffering a 4.5 percent contraction in 2009. This was followed by two years of slow growth, and another year of contraction. After no growth in 2013, 2014 saw real EU GDP growth of 1.3 percent—finally surpassing 2007's GDP in real terms.

After several dramatic months as the primary concern of the European economy, a deal was reached in July 2015 between Greece and its eurozone creditors that averted (at least temporarily) a Greek default or exit from the euro. Unfortunately, it appears that Greek debt will not be repaid without significant restructuring because it simply cannot grow fast enough to maintain or resolve the debt, though there seems to exist little political will within Europe to restructure.

Other issues with the European economy include persistent low inflation, though the risk of a deflationary spiral appears to have abated, and an unemployment rate that remains above 10 percent, though it varies widely between countries.

Weakness in Eurozone economies means reduced demand for U.S. exports, but it has thus far been difficult to identify specific tangible effects on the U.S. economy.

### China

China is a major export market for logs and lumber from the Pacific Northwest. Since 2011, between 50 and 60 percent of the softwood log exports leaving the Seattle and Columbia River Customs District have gone to China. Changes to the Chinese economy can have a dramatic impact on the prices for logs and lumber (and geoduck) in the Pacific Northwest.

China's GDP and employment weathered the global economic and financial crises of the past seven years better than most other economies. However, that resilience is proving to be illusory, as the costs of propping up investment and maintaining significant political control over the economy mount and the likelihood of a dramatic slowdown increase. Already, Chinese GDP growth has slowed from 10.4 percent in 2010 to a 6.9 percent in 2015. The IMF forecasts a further decline to 6.3 percent in 2016.

The dramatic stock market crash in the middle of 2015 and the botched attempt by the government to prop up the markets have undermined confidence in both the government's ability to manage the economy and its commitment to transitioning to a market-based economy. Although the crash was more a correction of the speculative bubble that had built up over the prior year—the Shanghai index increased over 150 percent from late 2014 to June 2015—and does not necessarily reflect the underlying economy, where there are still a number of concerns.

For example, there is growing concern that the IMF forecasts are overly optimistic and that Chinese GDP growth will fall much lower, possibly even into recession. This risk is mostly due to the prominence of investment as a component of GDP, the huge amount of debt in the country, and the way that debt is held. Household and corporate debt (to non-financial corporations) has ballooned from about 110 percent of GDP in 2008 to over 190 percent in 2014, and much of it is linked to real estate. Investment comprises almost 50 percent of China's GDP. At those levels of debt a slowdown in an economy can lead to a drop in income and an inability to service debt en-masse, potentially leading to a debt crisis that would undermine that investment and have a tremendous impact on China's GDP.

Analysts seem to broadly agree that in order to continue growing and to stabilize its economy China needs to pivot from its heavy reliance on investment toward a broader consumption basis. In order to do this it would need to encourage domestic spending and move away from saving, but the polit-

ical measures to do this are impeded by entrenched interests.

## Japan

Japan is another major export market for the Pacific Northwest—importing around 35 percent of the softwood logs exported from the Seattle and Columbia River customs districts since 2012. Unfortunately, Japan's growth has stagnated since the early 1990s after a stock market and property bubble bust trapped the economy into a deflationary spiral. After his election in late 2012, Japanese Prime Minister Shinzo Abe began a fairly bold combination of economic policy moves, dubbed 'Abenomics', in an attempt to revitalize Japan's economy.

These policies were initially well received by the Japanese, judging by increasing consumer confidence and GDP growth. However, GDP in 2014 actually shrank by 0.1 percent and advanced estimates show essentially no growth for 2015. The IMF expects weak growth of around 1.0 percent in 2016.

In 2014, Japanese CPI grew by 2.7 percent, suggesting they may have escaped their deflationary spiral. However, monthly CPI fell from the middle of 2015, so that overall inflation for the year is likely to be only weakly positive.

The Bank of Japan announced a plan in late January to institute negative interest rates to augment their quantitative easing activities. Ideally this would spur spending and force inflation and GDP higher, but this is a very unconventional tactic and its full effects will be unknown for some time.

## Wood Markets

Over the past decade, timber stumpage revenue has constituted over 75 percent of total revenues. DNR is, therefore, vitally concerned with understanding stumpage prices, log prices, lumber prices, and the related supply and demand dynamics underlying all three. This section focuses on specific market factors that affect timber stumpage prices and overall timber sales revenues generated by DNR.

In general, timber stumpage prices reflect demand for lumber and other wood products, timber supply, and regional lumber mill capacity. There is a consistent, positive relationship between log prices and DNR’s stumpage prices, despite notable volatility in stumpage prices (Figure 8). High log prices make access to logs more valuable and increase purchasers’ willingness to pay for stumpage, or the right to harvest. Volatility in stumpage prices arises not only from log prices, but also from the volume of lumber and logs held in mills’ inventories and from DNR-specific issues, such as the quality and type of the stumpage mix offered at auction.

Figure 8: Lumber, Log and Stumpage Prices in Washington

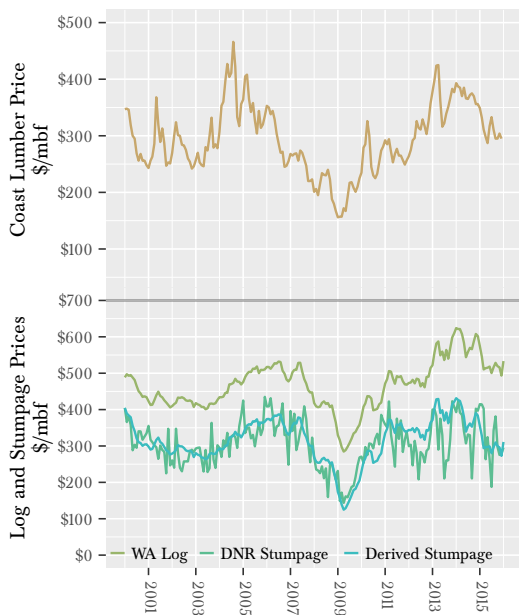
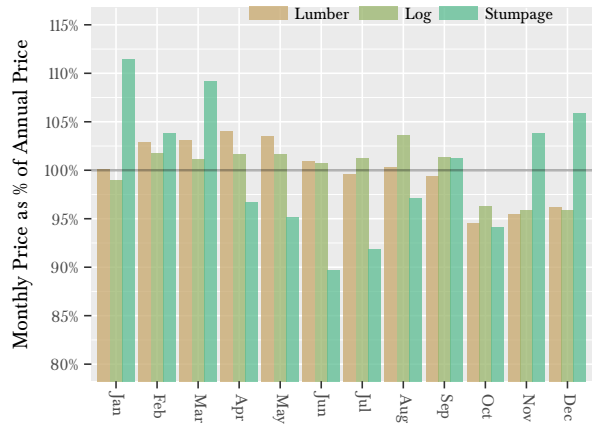


Figure 9: Lumber, Log, and DNR Stumpage Price Seasonality



The relationship between lumber and log prices is less consistent. Lumber prices are significantly more volatile and both the direction and size of price movements can differ from log prices. This is due to both demand- and supply-side factors. On the demand side, mills will often have an inventory of logs in their yards, as well as an inventory of ‘standing logs’, so they do not always need to bid up log prices to take advantage of high lumber prices. From the supply side, land owners do not often need to sell their timber, so when prices fall too far, they can withhold supply and allow their trees to grow and increase in quality.

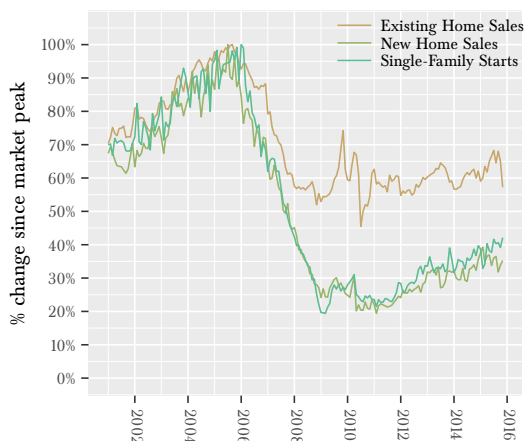
There are differences in price seasonality between lumber, logs, and stumpage, as illustrated in Figure 9. These prices are affected by a degree of seasonality that is largely the result of when each of these commodities will be used. For instance, lumber prices tend to peak in spring, when housing construction picks up, and decline through fall as the demand wanes, while stumpage prices tend to be highest when harvesters are lining up harvestable stock for the summer. DNR stumpage price volatility is also affected by the firefighting season and the quality of the stumpage mix, which varies throughout the year but tends to be lowest from July through September.

## U.S. Housing Market

This section continues with a discussion of the U.S. housing market because it is particularly important to overall timber demand in the U.S.

New residential construction (housing starts) and residential improvements are major components of the total demand for timber in the U.S. Historically, these sectors have constituted over 70 percent of softwood consumption—45 percent going to housing starts and 25 percent to improvements—with the remainder going to industrial production and other applications.

Figure 10: Home Sales and Starts as a Percentage of Pre-Recession Peak



The crash in the housing market and the following recession drastically reduced demand for new housing, which undermined the total demand for lumber (Figure 10). Since the trough from 2009-11, the increase in housing starts has driven an increase in lumber demand, though not to nearly the extent of the peak. Prolonged growth in starts is essential for a meaningful increase in the demand for lumber.

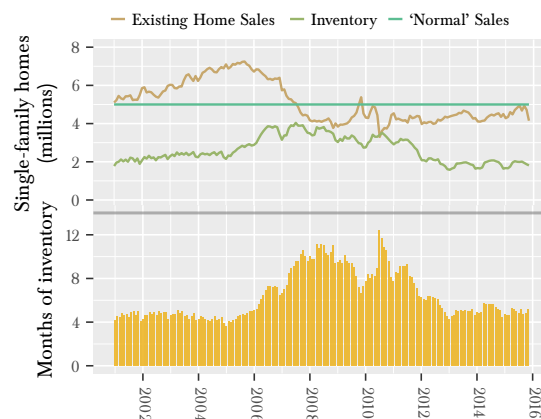
Housing demand has remained broadly subdued due to tight lending standards, weak labor markets, and increasing prices at the same time as stagnant or declining real wages for much of the population. However, lending standards have relaxed a little and the labor market is tightening. A number

of measures suggest that the modest recovery in housing demand has resumed after stalling through late 2014.

## Existing Home Sales

Existing home sales plummeted during the recession from around 6.5 million (SAAR) in 2006 to a low of around 4.1 million in 2012. They rose to average 4.6 million (SAAR) in 2015, an increase on the 4.3 million average of 2014 (Figure 11).

Figure 11: Existing Home Sales



Changes in inventory can be a useful signal about the current relationship between supply and demand. A decreasing inventory suggests that demand is outstripping supply, which should put upward pressure on prices and encourage more homes to be listed or built. The current inventory has averaged around two million since 2012, suggesting that demand for existing houses is, on average, matching well with supply.

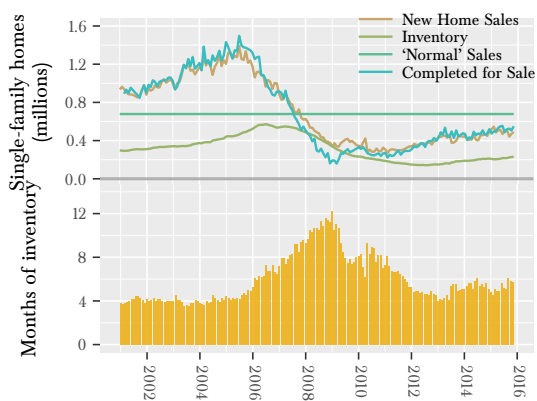
After house prices fell in the recession, private investors moved into depressed housing markets and purchased large numbers of lower-priced foreclosed residential properties. These investors have helped drive demand and may have set a floor under several key urban housing markets. There has been concern among analysts about the potential impact on house prices if investors were to begin selling

en-masse and increase the housing supply while demand continues to be weak. However, without significant potential returns from other investment, there seems little chance of a mass sell-off.

### New Home Sales

Unsurprisingly, new home sales also plummeted during the recession, reaching a record low of 306,000 in 2011 before beginning a slow rise (Figure 12). New home sales have increased from 440,000 (SAAR) in 2014 to an average of 495,000 in 2015, still well below the long-term (1963-2010) 'normal' rate of 678,000 sales per year.

Figure 12: New Single-Family Home Sales



As low as new home sales fell, new home construction fell even lower from early 2007 through mid-2011, causing the inventory of newly built homes for sale to decline over the period. After bottoming out in July 2012, the inventory of new homes has crept up as construction slightly outpaced sales. However, both sales and construction are still well below 'normal' levels.

### Shadow Inventory

The inventories of existing and new homes discussed above are made up of those housing units that are currently listed for sale ('on the market').

While it exists even in normal times, there is also a 'shadow inventory' that gained attention after the recession as an important measure of the health of the housing market. The shadow inventory comprises homes not currently on the market, but expected to be listed in the next few years. The shadow inventory usually includes the number of properties currently in the process of foreclosure, with seriously delinquent mortgages, or owned by banks or real estate firms. A large shadow inventory is reflected in distressed sales (including short sales) and can put downward pressure on prices and stifle housing starts.

On the other hand, a declining shadow inventory will reduce available inventory, putting upward pressure on prices at a given demand. The shadow inventory has been declining for some time. Serious delinquencies have declined from 1.6 million in October 2014 to 1.2 million in December 2015. During the same period, the number of houses in the process of foreclosure fell from 589,000 to 433,000.

### Household Formation

Household formation (or the growth in the number of households) is the key component of housing demand and a major driver of U.S. housing starts. Due to the job and income losses and to the greater financial precarity that the recession created, household formation fell as people shared housing and many younger people, who were hit especially hard, moved back in with their parents. Net immigration from Mexico also approached zero following the recession, and may have actually been negative, contributing to slowing household formation.

The drop in household formation and the consequent reduction in demand for home purchases contributed to the surge in the inventory of available housing units and significant drop in housing starts. Historically, U.S. household formation has ranged between 1.2 and 1.3 million per year; following the recession, household formations dropped dramatically to average 0.7 million per year from 2009-2014.

An important concept frequently discussed in relation to household formation is that of ‘pent-up’ demand—the demand for housing from those who wish to form households, but are currently unable to because of employment, earnings, or credit eligibility issues. Much of the discussion from analysts in the past several years has been about a large, and growing, pent-up demand as more young adults want to move out and create their own households. Analysts have consistently overestimated its impact on the housing market, repeatedly predicting a strong rebound in household formation and housing starts that has yet to emerge. In other words, pent-up demand has so far failed to become real demand, largely because of issues with employment, wages, credit requirements, and affordability.

Looking forward, household formation will depend on both the continued recovery in the U.S. labor market—more than just job growth, but also real wage growth—and improvements in housing affordability and mortgage access.

### Housing Starts

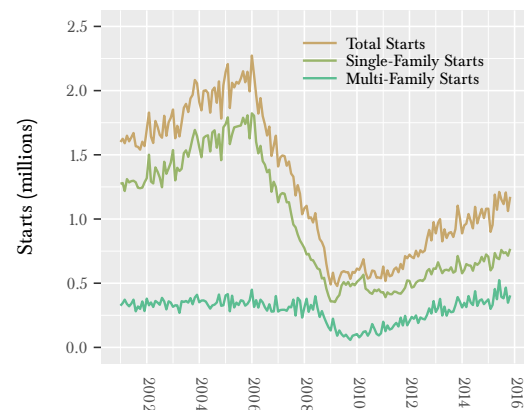
U.S. housing starts picked up in 2011 and continued to rise, largely because of increases in multi-family starts. Single-family starts were more or less flat after the recession through 2012, but have been rising slowly since (Figure 13). In April 2009, U.S. housing starts fell to record lows since the Census Bureau began tracking these data in 1959. In 2014 there were around 1.0 million starts.

The dependence of total housing starts on multi-family units is a new development. It is notable because multi-family structures use much less lumber than single-family houses per unit, so this increase in overall starts has had a more muted effect on timber prices than historical increases.

The outlook for housing starts is fairly positive going into 2016, which is forecast to see about 1.3 million starts. The year 2015 averaged 1.1 million (SAAR) starts, overcoming low first quarter starts that were dragged down by severe weather. Continued improvements in household formations will

increase demand, though it is unclear how long it will take before formations increase. Additionally, a recovery in house prices should facilitate the ‘move-up’ market. Combined with low market and shadow inventories constraining the supply of existing housing, prices should start increasing and provide incentives to build more houses.

Figure 13: Housing Starts



Impediments to increased housing starts include the sentiment of construction companies, who until recently appeared wary of building more houses until demand clearly picked up, and supply impediments, such as the shortage of buildable lots or permit delays. Given the lead time necessary to build houses, these are likely to cause volatility in both prices and supply.

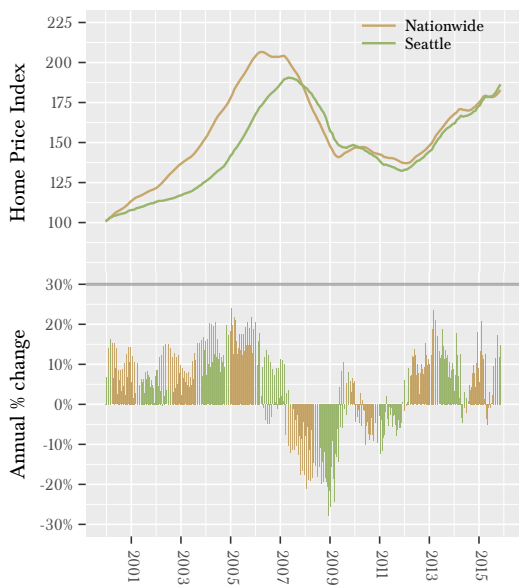
### Housing Prices

U.S. housing experienced six unprecedented years of falling or flat prices following the recession. House prices started rising again only in 2012 as economic and employment indicators continued to improve. Figure 14 charts the seasonally adjusted S&P/Case-Shiller Home Price Index for the 20-city composite, which estimates national existing home price trends. The 20-city composite index has increased most months since bottoming out in January 2012—its lowest point since October 2002, almost ten years earlier.

Seattle house prices are growing somewhat faster than national prices, having increased 8.2 percent year-on-year as of December 2015. When Seattle prices bottomed in February 2012—their lowest point since June 2004—the average existing house in Seattle was worth only 70 percent of the May 2007 peak. As of December, the average Seattle home was worth 98 percent of its peak price.

The increase in prices is bringing back more normal foreclosure conditions, where homeowners can make rational decisions about whether to sell—as opposed to being forced to sell or to remain ‘underwater’ to avoid selling at a loss or compromising their credit.

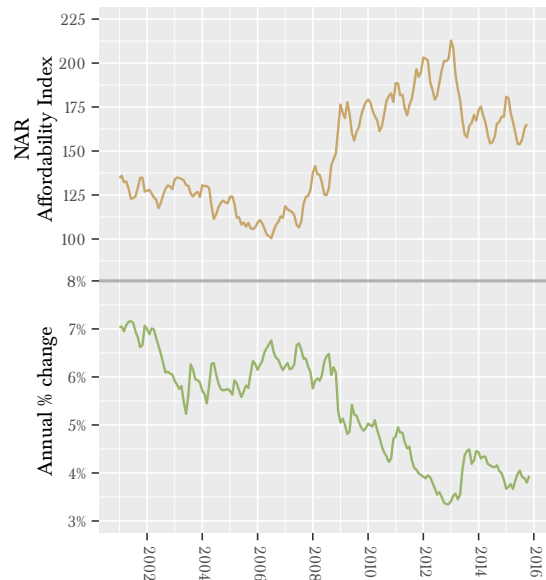
Figure 14: Case-Shiller Existing Home Price Index



**Housing Affordability**

The National Association of Realtors’ (NAR) U.S. Housing Affordability Index is a useful, though imperfect, measure of how affordable or attainable houses are to the average American. Index values increase as affordability increases, and decline as homes become less affordable.

Figure 15: Housing Affordability

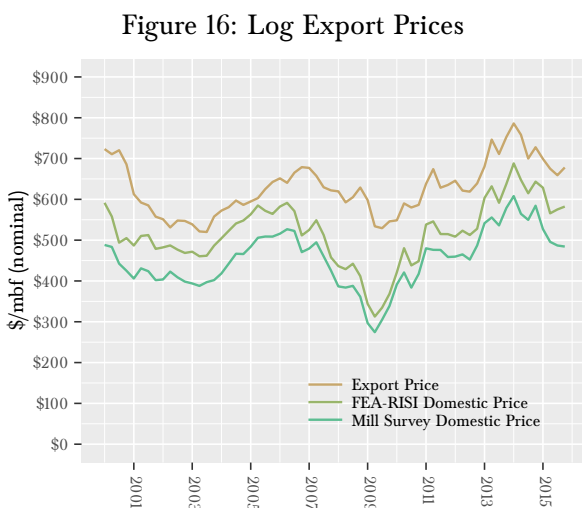


Affordability peaked at a record high of 213 in January 2013 and then crashed to 158 in August of that year—its steepest decline in 30 years—on the back of increased interest rates and house prices (Figure 15). Following that decline the index rose and fell as housing market sentiment oscillated between bullish in the wake of price increases and bearish as buyers withdrew and interest rates increased. The index increased through late 2014 and peaked in January 2015 at 183, before falling through July and then increasing again later in the year. These fluctuations appear to be primarily driven by changes in median prices, which increased through early summer before falling back after June.

The income needed to purchase a house is growing much faster than actual annual incomes. For now, low mortgage rates are muting this effect, but the trend cannot continue indefinitely—either price growth will need to slow or incomes will need to rise. The urgency for this type of adjustment increases as mortgage interest rates begin to rise.

## Export Markets

Although Federal law forbids export of logs from public lands west of the 108th meridian, log exports still have a meaningful impact on DNR stumpage prices. Exports compete with domestic purchases for privately sourced logs and strong export competition pulls more of the supply from the domestic market, thereby raising all domestic prices. However, changes in export prices do not influence domestic prices in a one-to-one relationship.



Export prices are almost always higher than domestic prices, a difference which is referred to as the ‘export premium’ (Figure 16). The export premium is primarily due to the characteristics of the export markets, which can include a demand for higher quality wood, a high value placed on long-term contracts, and high transaction costs.

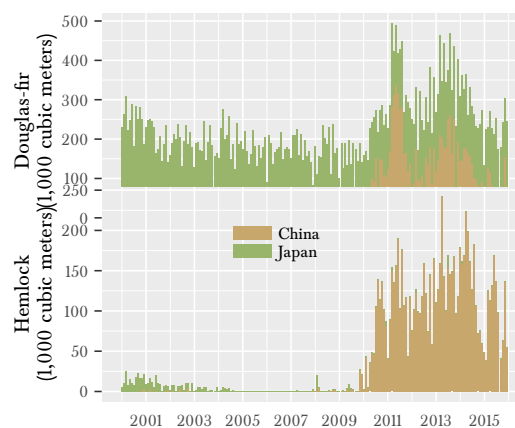
Note that the export prices shown in Figure 16 are weighted by DNR’s typical species mix, not the species mix of actual export volumes.

Since 2010, demand from China has been a major support of log and lumber prices in Washington. That demand waned significantly in late 2014 as China’s economic health wavered, the U.S. dollar appreciated while the value of the euro and ruble dropped (making U.S. timber comparatively more costly), and the Russian tariff on log exports was

reduced. The downward trend in demand continued into 2015, with Douglas-fir log exports down 46 percent and hemlock (and other whitewood) exports down 33 percent from 2014 (Figure 17).

In May, China re-entered the North American lumber and hemlock log markets, but did not come back to the Douglas-fir markets with their previous gusto. Analysts expect demand to remain comparatively elevated in the near term, but further out the export premium is expected to shrink due to strong demand from recovering domestic markets and decreased demand from importing countries, China in particular. In the long run, the export premium may shrink yet more as West Coast log exports face stronger international competition and export prices are pushed down. Much will depend on supply constraints from key international suppliers and transportation constraints from the southeastern U.S.

Figure 17: Log Export Volume



## Timber Supply

Timber supply is up in the Coast region, as well as in the competing U.S. Inland and South timber regions, because timberland owners reduced harvests during the recession in response to low prices. Although timber growth has exceeded timber harvest since the beginning of the recession, thereby increasing the potential timber inventory, strong log exports in the U.S. West Coast have constrained the



growth of the timber inventory in that region. Thus the deferred volume in the Coast region is not as great as elsewhere. Harvesting on the U.S. West Coast reportedly exceeded growth in 2014, which will begin to deplete the stumpage inventory.

British Columbian forests were devastated by the mountain timber beetle, which affected about a third of the province's timber resources. This damage has increased British Columbia's timber supply since 2007: typically, timber killed by beetles must be harvested within 4 and 10 years, so the government increased the allowable harvest to ensure that the dead timber not be wasted. Analysts expect that British Columbia's elevated timber supplies will begin to fall in 2016. The supply from Canada will be further diminished by Quebec's allowable annual cut being reduced by Bill 57, which was implemented in April 2013, and may be additionally reduced by the 'North for All' plan (formerly Plan Nord).

## Price Outlook

### Lumber Prices

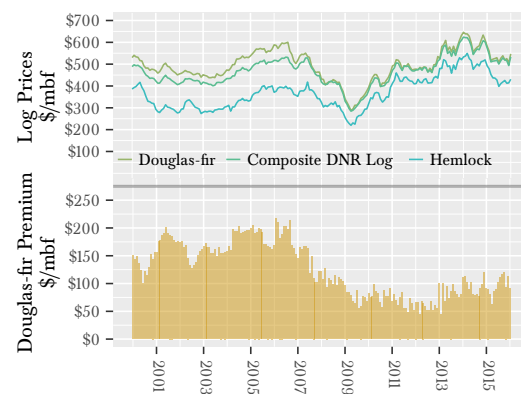
As shown in Figure 8, lumber prices dropped precipitously from mid-2014 to mid-2015, before leveling off. Random Lengths' Coast Dry Random and Stud composite lumber price peaked at \$393/mbf in January 2014, but fell throughout the rest of the year to average \$373/mbf. This was largely due to a bitterly cold winter across much of the U.S. weakening domestic demand, ample local timber and lumber inventories, and the drop in export demand from China. Since May, when composite lumber prices reached a low of \$287/mbf, prices increased to a brief peak of \$333/mbf in July as China re-entered the market, but fell to \$295/mbf in December for an average of \$310/mbf for 2015.

Ignoring intra-year cycles, prices are expected to be flat, or only increase slightly, in 2016 as many of the same issues that held back prices in 2015 continue to weigh down markets.

### Log Prices

Figure 18 presents prices for Douglas-fir, hemlock, and DNR's composite log. The latter is calculated from prices for logs delivered to regional mills, weighted by the average geographic location, species, and grade composition of timber typically sold by DNR. In other words, it is the price a mill would pay for delivery of the typical log harvested from DNR-managed lands. The dark green line for the DNR composite log price on Figure 18 is the same as the light green line on Figure 8.

Figure 18: DNR Composite Log Prices



Readily visible on the graph is the decline in the premium for Douglas-fir—due in large part to Chinese demand fortifying hemlock prices. Also readily visible is the continued drop in prices since late 2014. The price of a 'typical' DNR log moved up sharply from a two-year plateau in 2013 to \$591/mbf in 2014. However, prices declined through 2015 to average \$521/mbf. The decline in log price is primarily due to the slowdown in demand from China and ample regional supply of both logs and lumber. A price decline was largely foreseen, though the depth of the drop was unexpected.

The outlook for log prices in 2016 has been revised downward, held back by the same issues plaguing lumber prices, but they are still expected to be somewhat higher than 2015 prices.

## Stumpage Prices

Timber stumpage prices are the prices that successful bidders pay for the right to harvest timber from DNR-managed lands (Figure 19). At any time, the difference between the delivered log price and DNR's stumpage price is equivalent to the sum of logging costs, hauling costs, and harvest profit (Figure 8). Subtracting the average of these costs from the log price line gives us a derived DNR stumpage price.

When actual DNR stumpage prices differ significantly from the derived stumpage prices, some sort of correction is likely to occur. For instance, in 2012 actual stumpage prices were generally lower than stumpage prices inferred from log prices, suggesting that an upward market 'correction' would be forthcoming. This correction seems to have occurred with generally higher stumpage in 2013 and 2014. However, the situation reversed in late 2014, when actual DNR stumpage prices were well above the inferred stumpage prices. As of the October 2015 timber sale, DNR stumpage prices had fallen back toward the inferred stumpage price and has remained very close to it.

## DNR Stumpage Price Outlook

There is a significant downward adjustment to the expected annual average stumpage price in FY 16, but the outlying years are unchanged (Figure 19). The downward adjustment in FY 16 is pri-

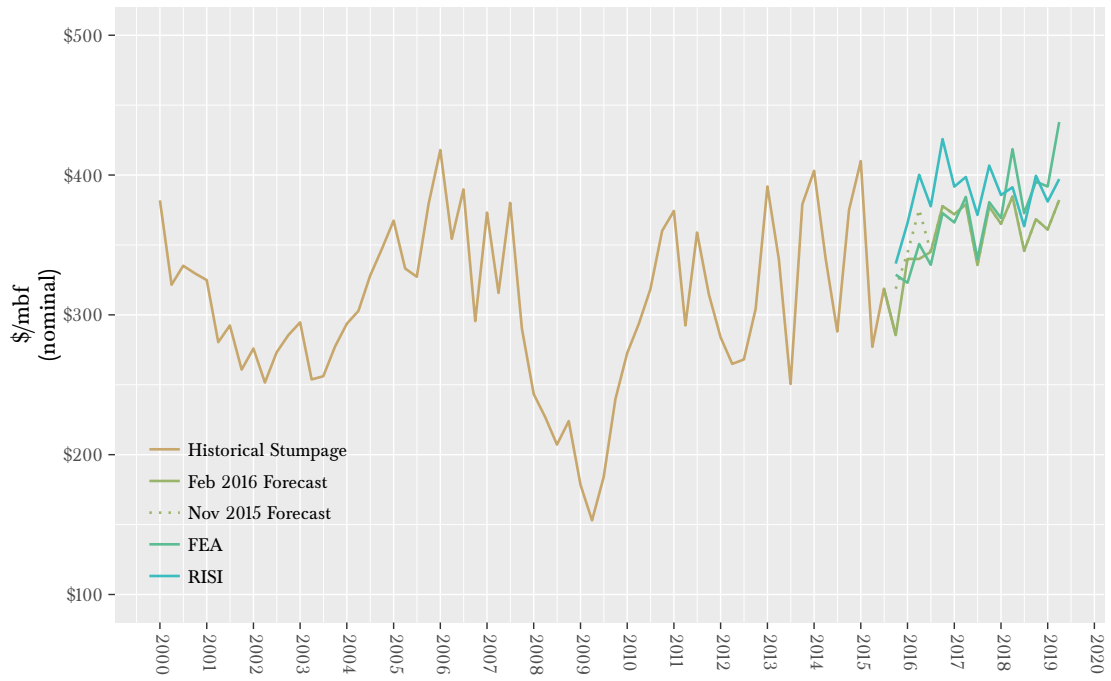
marily due to the proportion of fire salvage volume, which is generally much less valuable than greenwood.

DNR currently contracts with two forest economics consulting firms that provide log and timber stumpage price forecasts, as well as valuable insights into the housing, lumber, and timber markets. By modeling DNR's historical data on their price forecasts, we arrive at two alternative stumpage price outlooks (Figure 19, note that the RISI and FEA 'forecast' series are both adapted to reflect the species and class characteristics of typical DNR timber; the original series were West Coast averages).

Previously, the updated DNR Forecast represented a weighted middle ground between the two consultants' outlooks; however, in the September Forecast we took a more pessimistic view with our spot price forecasts. This decision appears to have been well founded, as both consultants lowered their price forecasts and DNR stumpage sales prices underwhelmed. Our current forecast is only slightly more pessimistic than the median modeled stumpage prices and is still well within the range of likely stumpage prices. This decision reflects a more cautious approach to the downside risks.

It is important to note that these price expectations are for nominal prices. In real (inflation adjusted) terms, the forecast stumpage prices will be much lower than the highs achieved during the housing boom.

Figure 19: DNR Timber Stumpage Price



## DNR Revenue Forecast

This Revenue Forecast includes revenue generated from timber sales on trust uplands, leases on trust uplands, and leases on aquatic lands. In the final summary table, it also forecasts revenues to individual funds, including DNR management funds, beneficiary current funds, and beneficiary permanent funds. Caveats about the uncertainty of forecasting DNR-managed revenues are summarized near the end of this section.

### Timber Revenue

DNR sells timber through auctioned contracts that vary in duration. For instance, contracts for DNR timber sales sold in FY 2014 needed to be harvested between three months and four and a half years from the date of sale, with an average (weighted by volume) of about 25 months. The purchaser determines the actual timing of harvest within the terms of the contract. As a result, timber revenues to beneficiaries and DNR management funds lag behind sales, are subject to purchaser's harvest decisions, and are likely based on their perceptions of market conditions.

For the purposes of this chapter, timber that is sold but not yet harvested is referred to as 'inventory' or 'under contract'. Timber volume is added to the inventory when it is sold and placed under contract, and it is removed from the inventory when the timber is harvested.

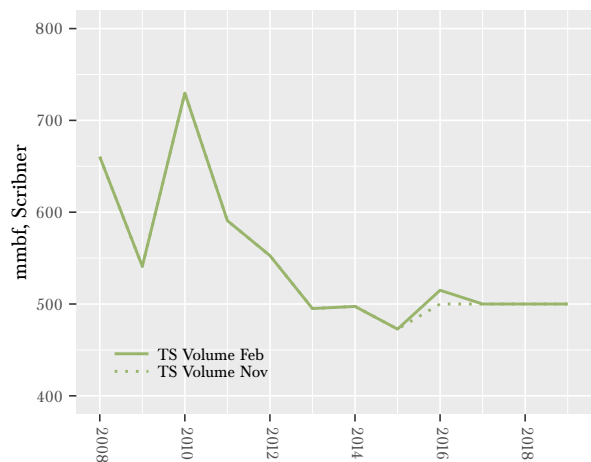
### Timber Sales Volume

DNR sold 18 mmbf less than expected at the end of FY 15. In the June and September Forecasts, those sales were pushed out to FY 16, yielding a sales volume forecast of 518 mmbf. Forecast sales volume for FY 16 was reduced in November to the more realistic expectation of 500 mmbf. However, the volume of planned fire salvage sales is larger than previously expected, as a result of the record 2015 fire season. This has pushed up our expectations of sales; though given the large volume of sales coming forward in the last five months of this fiscal

year, we suspect that there may be a number of sales with no bids. Taking no-bids into account, our sales volume forecast has been increased to 515 mmbf FY 16, with salvage sales comprising a much higher proportion than the November Forecast (Figure 20). Through January, DNR has sold 216 mmbf, leaving a remaining 299 mmbf in expected sales volume for the fiscal year.

FY 15 was the first year of the new sustainable harvest decade (FY 15 through FY 24) for western Washington; however, new harvest targets for the this sustainable harvest decade have not yet been determined or approved by the Board of Natural Resources. Without an updated sustainable harvest limit, annual Westside sales volumes are forecast to be 450 mmbf for future years. Together with projected Eastside timber sales of 50 mmbf for each of the next several years, we arrive at a projected annual timber sales volume of about 500 mmbf for FYs 17-19.

Figure 20: Forecast Timber Sales Volume



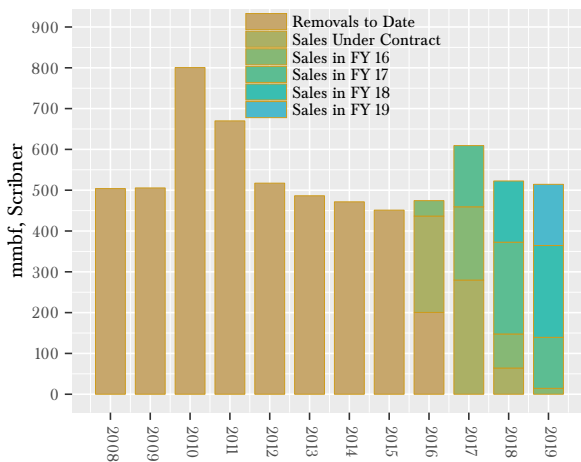
### Timber Removal Volume

At the end of January, DNR had 586 mmbf of timber under contract, valued at \$187 million, or \$320/mbf. For each Forecast, we survey timber sale purchasers to determine their planned harvest timing for the timber volume they have under contract at the time of the survey. This Forecast's survey, conducted in the first half of January, indicates

that purchasers will likely harvest 236 mmbf of current inventory volume in the remainder of this fiscal year, 279 mmbf in FY17, and the remaining 64 mmbf in FY18 (Figure 21). This reduction in FY16 is largely due to continued weak timber and lumber prices as purchasers push their removal plans out to FY17 and beyond.

Including the survey responses, removals to date, and removals expected from future FY16 sales, about 491 mmbf will be removed in FY16, six percent less than the November estimate of 524 mmbf. Due to the changes in harvest plans, our harvest forecasts have increased to 632 mmbf (+36 mmbf) for FY17 and 523 (+12 mmbf) for FY18.

Figure 21: Forecast Timber Removal Volume



**Timber Sales Prices**

The price results of monthly DNR timber sales are quite volatile (Figure 8). As discussed in the stumpage price outlook, the DNR sales price (stumpage) forecast uses estimates from two forest economics consulting firms. FY16 prices are significantly reduced to \$310/mmbf due primarily to the higher proportional volume of low-value salvage sales, but also to changes in the log price outlook. (Figure 22).

Figure 22: Forecast Timber Sales Price



**Timber Removal Prices**

Timber removal prices are determined by sales prices, volumes, and harvest timing. They can be thought of as a moving average of previous timber sales prices, weighted by the volume of sold timber removed in each time period (Figure 23).

Figure 23: Forecast Timber Removal Price



**Timber Removal Revenue**

Figure 24 shows projected annual timber removal revenues, broken down by the fiscal year in which

the timber was sold ('sales under contract' are already sold as of January 1st, 2016). Expected removal value for FY16 is reduced by around \$16 million, to \$158 million, due to the lower removal prices and volume. Removal revenue for outlying years are increased slightly due to higher harvest volume expectations.

Forecast timber removal revenues for the 2015-2017 Biennium are projected to decrease by almost four percent to \$367 million.

Figure 24: Forecast Timber Removal Value

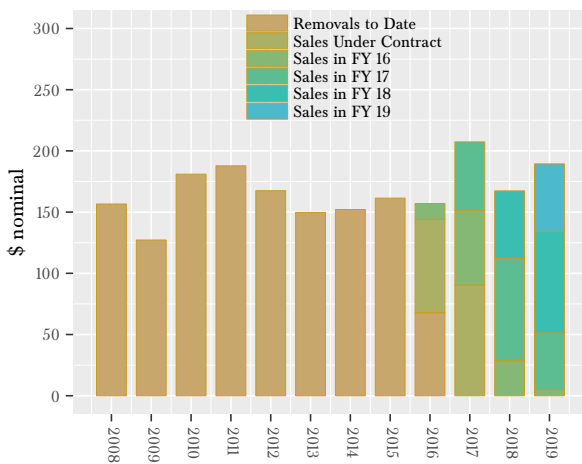
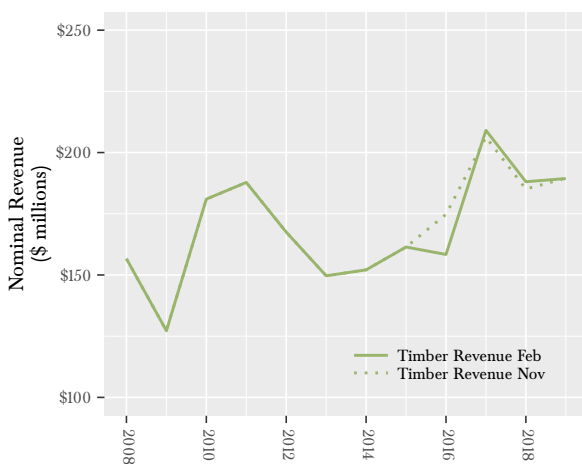


Figure 25: Forecast Timber Removal Revenue



### Upland Lease Revenues

Upland lease revenues are generated primarily from leases and the sale of valuable materials, other than timber, on state trust lands. There are a number of changes to the Uplands revenue that, in aggregate, increase the upland revenue forecast by \$1.6 million for FY 16 (Figure 26).

This increase is due to higher expected earnings for irrigated agriculture and orchards and vineyards as these leases transition to cash based rents, which are less dependent on output prices and production than crop-share arrangements. Additionally, continued strength in mineral sales has pushed up expectations for the current fiscal year. These increased expectations have offset weakness in dryland, commercial, and communications leasing revenues. In outlying years, commercial lease revenue is not expected to recover fully, while communications rents will slowly increase.

Overall, in outlying years, the uplands lease revenue forecasts are increased by \$1.1, \$1.3 and \$1.4 million in FYs 17-19 respectively.

Figure 26: Forecast Upland Lease Revenue



### Aquatic Lands Revenues

Aquatic lands revenues are generated from leases on aquatic lands and from sales of geoduck. On average leases account for one-third of the revenue while geoduck sales account for the remainder.

Aquatics lands lease revenue expectations have been lowered by \$0.2 million for FY16 due to lower than expected water dependent and easement rents (Figure 27). Forecast revenue for outlying years is unchanged.

The expected revenue from geoduck marketing is increased by \$0.5 million in FY16, but decreased by \$3.1 million, \$0.2 million, and \$0.2 million in FYs 17-19 respectively (Figure 28). The increase in the current fiscal year is due to a change in the forecast volume of sales, which has increased some of the volume expected to be harvested in FY16 at the expense of harvesting it in FY17. This change in volume has offset a drop in the forecast price for FY16, but compounds the effect of the price drop in FY17. Our price forecasts have been consistently high for the past several auctions and the consistently lower prices, compared to our forecast and to prices from FY10–FY14, suggest that there has been some change in the equilibrium price of geoducks—that these prices aren’t just part of the natural volatility of the market, but a fundamental shift.

There are significant downside risks to geoduck revenues, even in the near term, that are important to consider but difficult to forecast:

- Harvests (and therefore revenues) could be deferred or lost if geoduck beds are closed due to occurrence of PSP toxin.
- A further slowdown in China’s economic growth could lower demand for this luxury export in its largest market.
- In light of recent WDFW surveys of closed south Puget Sound geoduck tracts showing declining recovery rates, and of evidence of active poaching, future commercial harvest levels may be further reduced.

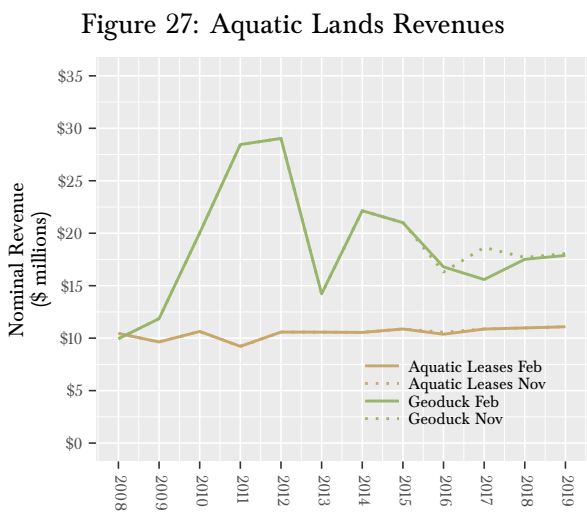
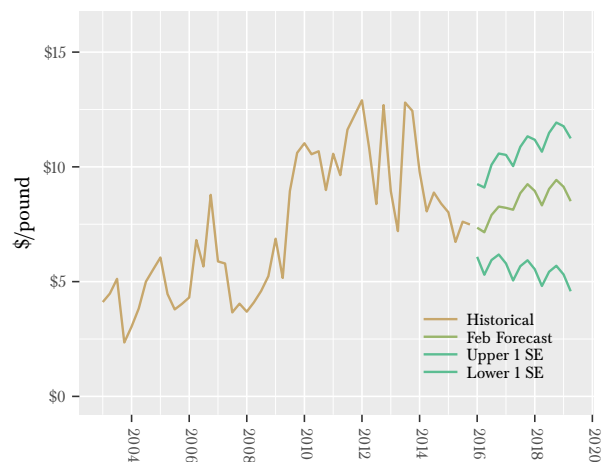


Figure 28: Geoduck Auction Prices





## Total Revenues from All Sources

Forecast revenues for the 2015-2017 Biennium (FYs 16 and 17) are reduced by \$14 million to \$499 million (Figure 29). Most of the revenue change is driven by a change in planned timber harvests and timber sales prices.

Figure 29: Total Revenues



### Some Caveats

DNR strives to produce the most accurate and objective projections possible, based on DNR's current policy directions and available information. Actual revenues will depend on future policy decisions made by the Legislature, the Board of Natural Resources, and DNR, as well as on market and other conditions beyond DNR's control.

As events and market conditions develop, DNR will incorporate new information into future Forecasts. We judge the downside to the overall forecast to be slightly greater than the upside because of the risks to the timber sales volume (and therefore to timber removal volume and revenues) as well as the ongoing weakness and vulnerabilities of the U.S. and world economies that affect the housing market, and therefore stumpage prices.

See the Forecast Summary for more details.

**Distribution of Revenues**

The distribution of timber revenues by trust are based on:

- The volumes and values of timber in the inventory (sales sold but not yet harvested) by trust;
- The volumes of timber in planned sales for FY16 by trust, and relative historical timber prices by DNR region by trust; and
- The volumes of timber by trust for FYs 17-19 based on provisional output of the sustainable harvest model and relative historical timber prices by DNR region by trust.

Since a single timber sale can be worth over \$3 million, dropping, adding, or delaying even one sale can represent a significant shift in revenues to a specific trust fund.

Distributions of upland and aquatic lease revenues by trust are assumed to be proportional to historic distributions unless otherwise specified.

**Management Fee Deduction.** The underlying statutory management fee deductions to DNR as authorized by the legislature are 25 percent or less, as determined by the Board of Natural Resources (Board), for both the Resources Management Cost Account (RMCA) and the Forest Development Ac-

count (FDA). In budget bills, the Legislature has authorized a deduction of up to 30 percent to RMCA since July 1, 2005, now in effect through the 2013-2015 Biennium.

At its April 2011 meeting, the Board adopted a resolution to reduce the RMCA deduction from 30 to 27 percent and the FDA deduction from 25 to 23 percent. At its July 2011 meeting, the Board decided to continue the deductions at 27 percent for RMCA (so long as this rate is authorized by the legislature) and at 23 percent for FDA. At its October 2011 meeting, the Board approved a resolution to reduce the FDA deduction from 23 to 21 percent. The Board decided in July 2013 to raise the FDA deduction to 25 percent and the RMCA deduction to 29 percent. In August 2015 the Board raised the RMCA deduction up to 31 percent for the 2015-2017 biennium.

The Forecast uses the 31 percent deduction for the 2015-2017 biennium, but assumes that the deduction will be reduced back to 29 percent in the following biennium. This assumes that the Legislature will approve RMCA deductions of up to 30 percent, continuing its practice which started in FY 06.

Given this background of official actions by the legislature and the Board, the management fee deductions assumed in this Forecast are:

|      | FY 2015 | FY 2016 | FY 2017 | FY 2018 | FY 2019 |
|------|---------|---------|---------|---------|---------|
| FDA  | 25      | 25      | 25      | 25      | 25      |
| RMCA | 29      | 31      | 31      | 29      | 29      |