Department of Natural Resources

Economic & Revenue Forecast

Fiscal Year 2023, First Quarter
Sep 2023

Forecast Summary

Lumber and Log Prices. Lumber prices have been exceptionally volatile throughout the past three years. In 2021, prices peaked at around $1,600/mbf in May, then plummeted to a low of $414/mbf in August[1]. Prices rebounded over the next several months to peak at $1,400/mbf in March 2022, but again fell dramatically to $640/mbf in August. Prices continued to decrease until December, and stayed between $370/mbf and $440/mbf through July. In August prices increased to $480/mbf, bringing the average for the year to-date to $413, but is likely to be a blip. Prices are expected to be fairly stable in the remainder of calendar year 2023, possibly increasing a little such that the average is between $410 and $430/mbf. Lumber prices are expected to increase in calendar year 2024 to average $450-500/mbf.

High lumber prices appear to have pulled up log prices, with the price of a "typical" DNR log rising from a low of $500/mbf in April 2020 to peak at $720/mbf in April 2021. Prices then softened to a trough of $600/mbf in October 2021, before increasing again to peak at $790/mbf in July 2022. However, the decline in lumber prices hasn't pulled log prices down as much. The July 2022 log prices seem to have been the peak, with prices following a downward trend to around $630/mbf in July 2023. This is still higher than the $580/mbf average from 2015-2019. Log prices are expected to remain in a fairly narrow range from $610-680/mbf for the remainder of 2023 and the majority of 2024. Only at the end of 2024 are prices expected to start increasing.

Timber Sales Volume. DNR plans to offer between 550-575 mmbf in FY 24. However, the sales volume is unchanged at 500 mmbf. This is to take into account the likelihood of some contracts remaining unsold at auction and others being delayed or cancelled for some reason.

Historically, a buffer of around 10 percent of volume has been adequate for these risks, however, there appears to be an increase in community opposition to more DNR timber sales that appears to have driven administrative decisions in the last couple of years that dorpped the volume offered well below what had been expected. It is not clear yet how this type of risk will change in the future, though it seems likely that there is a high risk of actual sales volume being below our forecast is all years.

Timber Sales Prices.

Timber sales prices for FY 23 ended the year at $390/mbf, slightly higher than our June forecast of $380/mbf.

The forecast timber sales price for FY 24 is unchanged at $360/mbf. While this is well below the FY 23 price, it is inline with the average sales price from January-June 2023. The July average sales price was only $269/mbf, but July prices are typically much lower than those for the rest of the year and aren't usually indicative of anything.

Outlying years' prices are unchanged at the long-term average of $350/mbf.

Timber Removal Volume and Prices.

The 508 mmbf removal volume in FY 23 was slightly higher than the 500 mmbf forecast. The FY 24 removal forecast is unchanged at 510 mmbf, while the outlying years' forecast remains 500 mmbf.

The removal price forecast is virtually unchanged for all years.

Timber Revenue. The timber revenue forecast is virtually unchanged for all years.

Forecast revenues for the 2023-25 biennium are decreased to $371 million — a 0.5 percent decrease.

Non-Timber Revenues. In addition to revenue from timber removals on state-managed lands, DNR generates sizable revenues from managing leases on uplands and aquatic lands.

Uplands revenue for FY 23 was slightly above expectations, with higher orchard/vineyard and other

[1] The prices used here are for West Coast standard or better 2x4 Douglas-fir/Hemlock boards. Also, see (figure 11) for a chart showing how these prices have moved

revenue. The revenue forecast for FY 24 is decreased slightly due to lower commercial revenue — with one major lessee having cancelled their lease and another commercial building with a roof failure. It is notable that the forecast FY 24 and outlying years' revenue is around $2 million lower than the FY 23 revenue. This is largely because of risks to orchard/vineyard revenue. Wine grape demand has fallen substantially, with at least one major buyer reducing their purchasing contracts — equivalent to around 1/6 of the total wine grape acres in production in the state.

Aquatic lease revenue for FY 23 was $2 million higher than we had expected in the June forecast. This was primarily due to much higher, and unexpected, revenue in water-dependent and non-water-dependent leases. It is unclear why the revenue increased so much, but it appears likely that it is due to increases from both lease reassessments and from high inflation, leading to larger-than-normal rent escalation.

The geoduck forecast revenue for FY 23 was increased to $21.1 million in June, but ended up at $18 million. This was simply because the bonus bids from the March auction were expected to become revenue in FY 23, but didn't. This bonus bid revenue is shifted to FY 24, which, with a small forecast price increase, increases that fiscal year's revenue foreast to $21 million. Outlying years' revenue forecast is increased slightly due to an increase in the forecast price.

In addition to the normal risks that can swing geoduck revenue wildly — including paralytic shellfish poison closures, compliance vessel availability, and sewage contamination from flooding run-off — there are ongoing concerns about the strength of geoduck demand from China. In the lower revenue, but still possible, scenarios, a drop in geoduck demand will lead to a market more like FY 20 and FY 21, with revenue in the $10-$13 million range.

Additionally, geoduck are still covered by tariffs initiated during the trade war between China and the U.S. from 2018. These have been suspended during the COVID-19 pandemic, but, as far as we can tell, they are still on the books.

Total Revenues. Total revenue for the 2021-23 biennium was $537 million, $7 million higher than forecast in June. The forecast revenue for the 2023-25 biennium is increased to $531 million.

Other notes to the Forecast.

There are, as always, a number of sources of uncertainty around DNR revenue specifically, and the overall economy more broadly. These include:

- increasingly frequent legal challenges to timber sales as well as policy uncertainty about what prepared sales will actually be brought to auction;
- uncertainty about the type and quality of stumpage DNR is able to bring to market more than six months out; and
- the ongoing (but apparently dormant) trade war and political tension with China directly affecting timber, agricultural products and geoduck exports and price.

Timber sales volume estimates are based on the best available internal planning data, but they are always subject to adjustments as the year progresses.

Climate change has emerged as a meaningful short- and long-term risk as opposed to an amorphous risk in the far future, as previously rare extreme weather events become more common. In 2021, drought in Washington decreased wheat production on DNR lands by about 40 percent. In September and October 2021, extraordinary rainfall in British Columbia destroyed roads and railways, essentially halting timber harvests, lumber production, and timber exports through the Port of Vancouver. In mid-June 2022, there was concurrently: massive flooding in Montana and Wyoming, thunderstorms that took out power-grids in the Great Lakes, and a record setting heat-wave that killed over 2,000 cattle in Kansas[2].

Climate change will increasingly affect Washing-

[2] https://www.washingtonpost.com/climate-environment/2022/06/16/summer-climate-disasters/

ton's fire seasons — drought and rising temperatures dry out fuels fast, leaving conditions ripe for wildfires to begin earlier in the year, burn longer, and spread more unpredictably than in the past. Although these haven't seriously affected DNR timberland revenue since 2015, they pose a significant risk to both our short-term timber revenue forecast — potentially destroying standing timber under contract — and long-term revenue by destroying younger stands that would be harvested in future decades. Research suggests that the massive fires in Oregon around Labor Day 2020 caused not only immediate damage, but will reduce future Oregon harvests by *115 to 365 mmbf per year for the next 40 years*. That, with the more immediate damage from the fires, suggests an overall economic impact of $5.9 billion on Oregon's Forest Sector[3].

[3] 2020 Labor Day Fires: Economic Impacts to Oregon's Forest Sector, Oregon Forest Resources Institute ``https://oregonforests.org/node/840''

Table 1: September 2023 Forecast by Source (millions of dollars)

Timber Sales		FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29
Volume (mmbf)		552	546	429	477	500	500	500	500	500	500
	Change				12	-	-	-	-		
	% Change				3%	0%	0%	0%	0%		
Price ($/mbf)		282	393	419	389	360	350	350	350	350	350
	Change				$ 9	$ -	$ -	$ -	$ -		
	% Change				2%	0%	0%	0%	0%		
Value of Timber Sales		**155.3**	**214.2**	**179.7**	**185.6**	**180.0**	**175.0**	**175.0**	**175.0**	**175.0**	**175.0**
	Change				$ 8.9	$ -	$ -	$ -	$ -		
	% Change				5%	0%	0%	0%	0%		
Timber Removals											
Volume (mmbf)		526	521	491	508	510	510	500	500	500	500
	Change				8	(0)	(0)	(0)	-		
	% Change				2%	0%	0%	0%	0%		
Price ($/mbf)		347	342	363	387	368	359	353	350	350	350
	Change				8.2	(1.5)	(1.8)	0.2	-		
	% Change				2%	0%	0%	0%	0%		
Timber Revenue		**182.3**	**178.2**	**178.5**	**196.6**	**187.9**	**183.0**	**176.3**	**175.0**	**175.0**	**175.0**
	Change				7.1	(0.9)	(1.0)	0.0	-		
	% Change				4%	0%	-1%	0%	0%		
Upland Leases											
Irrigated Agriculture		9.0	8.8	8.9	9.3	9.4	9.2	9.2	9.2	9.2	9.2
	Change				(0.1)	-	-	-	-		
	% Change				-1%	0%	0%	0%	0%		
Orchard/Vineyard		8.8	9.4	8.2	9.4	8.4	8.4	8.4	8.4	8.4	8.4
	Change				0.4	-	-	-	-		
	% Change				5%	0%	0%	0%	0%		
Dryland Ag/Grazing		6.2	6.8	6.0	7.0	6.4	6.1	6.1	6.1	6.1	6.1
	Change				(0.6)	-	-	-	-		
	% Change				-8%	0%	0%	0%	0%		
Commercial		10.3	11.3	11.2	11.1	11.0	11.2	11.2	11.2	11.2	11.2
	Change				(0.1)	(0.2)	-	-	-		
	% Change				-1%	-2%	0%	0%	0%		
Other Leases		10.0	13.7	11.9	12.3	11.6	12.0	12.1	12.4	12.5	12.7
	Change				0.6	(0.0)	(0.0)	(0.0)	(0.0)		
	% Change				6%	0%	0%	0%	0%		
Total Upland Leases		**44.3**	**50.0**	**46.3**	**49.1**	**46.8**	**46.9**	**47.0**	**47.3**	**47.4**	**47.6**
	Change				0.3	(0.2)	-	(0.0)	(0.0)		
	% Change				1%	0%	0%	0%	0%		
Aquatic Lands											
Aquatic Leases		12.7	9.7	14.5	14.5	13.6	13.6	13.6	13.6	13.7	13.7
	Change				2.0	1.4	1.4	1.4	1.4		
	% Change				16%	11%	11%	11%	11%		
Geoduck		10.6	13.0	19.2	18.3	21.0	18.1	18.1	18.1	18.1	18.1
	Change				(2.8)	3.4	0.6	0.6	0.6		
	% Change				-13%	19%	3%	3%	3%		
Aquatic Lands Revenue		**23.4**	**22.6**	**33.8**	**32.8**	**34.6**	**31.7**	**31.7**	**31.7**	**31.8**	**31.8**
	Change				(0.8)	4.8	2.0	2.0	2.0		
	% Change				-2%	16%	7%	7%	7%		
Total All Sources		**249.9**	**250.8**	**258.6**	**278.5**	**269.3**	**261.6**	**255.0**	**254.0**	**254.2**	**254.4**
	Change				6.6	3.7	1.0	2.0	2.0		
	% Change				2%	1%	0%	1%	1%		

Table 2: September 2023 Forecast by Fund (millions of dollars)

Key DNR Operating Funds		FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29
041	RMCA - Uplands	33.5	33.5	38.1	44.1	44.5	41.8	40.2	40.0	40.0	40.0
	Change				0.4	(0.3)	(0.3)	0.1	(0.0)		
	% Change				1%	-1%	-1%	0%	0%		
041	RMCA - Aquatic Lands	9.9	10.2	14.8	14.3	15.3	13.8	13.8	13.8	13.8	13.8
	Change				(0.6)	2.2	0.8	0.8	0.8		
	% Change				-4%	17%	6%	6%	6%		
014	FDA	28.3	27.2	23.9	19.3	21.0	21.9	21.4	21.3	21.3	21.4
	Change				1.1	0.0	(0.0)	(0.2)	(0.2)		
	% Change				6%	0%	0%	-1%	-1%		
21Q	Forest Health Revolving	8.5	11.4	14.1	24.9	11.7	11.2	11.4	11.5	11.5	11.5
					0.2	2.2	0.5	0.6	0.6		
					1%	24%	5%	5%	6%		
Total DNR Key Operating Funds		**80.3**	**82.4**	**90.9**	**102.7**	**92.4**	**88.8**	**86.9**	**86.6**	**86.7**	**86.7**
	Change				1.0	4.2	1.0	1.2	1.2		
	% Change				1%	5%	1%	1%	1%		

Current Funds											
113	Common School Construction	59.5	53.2	57.6	67.3	70.6	68.4	66.3	66.1	66.1	66.2
	Change				1.4	0.2	(0.1)	0.1	0.0		
	% Change				2%	0%	0%	0%	0%		
999	Forest Board Counties	68.7	69.5	53.6	46.2	48.8	53.0	52.4	52.2	52.3	52.3
	Change				3.1	(0.8)	(0.1)	(0.6)	(0.4)		
	% Change				7%	-2%	0%	-1%	-1%		
001	General Fund	4.7	4.4	5.5	4.3	4.2	3.7	3.4	3.4	3.4	3.4
	Change				0.4	0.2	0.0	(0.0)	(0.0)		
	% Change				11%	5%	0%	0%	-1%		
348	University Bond Retirement	0.6	1.6	2.6	2.9	1.4	1.7	1.9	1.9	1.9	1.9
	Change				(0.1)	(0.8)	(0.2)	(0.0)	0.0		
	% Change				-4%	-38%	-8%	0%	1%		
347	WSU Bond Retirement	1.9	2.6	1.6	2.0	1.7	1.7	1.7	1.7	1.7	1.7
	Change				0.3	(0.0)	(0.0)	(0.0)	(0.0)		
	% Change				16%	0%	0%	0%	0%		
042	CEP&RI	3.6	2.2	3.7	5.8	5.1	4.8	4.6	4.6	4.6	4.6
	Change				0.4	(0.1)	0.0	0.0	0.0		
	% Change				8%	-3%	1%	0%	0%		
036	Capitol Building Construction	4.4	7.7	6.0	11.8	10.8	8.4	7.6	7.5	7.5	7.5
	Change				(0.4)	(0.2)	(0.3)	0.0	(0.1)		
	% Change				-3%	-2%	-3%	0%	-1%		
061/3/5/6	Normal (CWU, EWU, WWU, TESC) School	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Change				(0.0)	-	-	-	-		
	% Change				-21%	0%	0%	0%	0%		
Other Funds		1.1	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Change				(1.0)	(0.2)	(0.1)	(0.0)	(0.0)		
	% Change				-90%	-62%	-46%	-2%	-1%		
Total Current Funds		**144.7**	**141.9**	**130.8**	**140.5**	**142.9**	**141.9**	**138.2**	**137.6**	**137.7**	**137.8**
	Change				4.1	(1.9)	(0.6)	(0.5)	(0.5)		
	% Change				3%	-1%	0%	0%	0%		

(Continued)

Table 3: September 2023 Forecast by Fund (millions of dollars), cont'd

Aquatic Lands Enhancement Account		FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29
02R		13.5	12.4	19.0	18.5	19.3	17.9	17.9	17.9	18.0	18.0
	Change				(0.2)	2.6	1.2	1.2	1.2		
	% Change				-1%	16%	7%	7%	7%		

Permanent Funds											
601	Agricultural College Permanent	5.4	5.7	3.9	6.8	4.2	4.0	3.9	3.8	3.8	3.8
	Change				1.9	(1.6)	(0.4)	0.0	0.0		
	% Change				38%	-28%	-9%	0%	1%		
604	Normal School Permanent	2.6	2.8	4.0	2.6	5.1	3.4	2.7	2.6	2.6	2.6
	Change				(0.5)	1.1	0.1	0.1	(0.0)		
	% Change				-16%	28%	4%	2%	0%		
605	Common School Permanent	0.2	0.4	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
	Change				(0.1)	-	-	-	-		
	% Change				-33%	0%	0%	0%	0%		
606	Scientific Permanent	3.1	4.9	9.3	5.2	4.6	4.8	4.6	4.6	4.6	4.6
	Change				0.0	(0.5)	(0.2)	(0.0)	(0.0)		
	% Change				1%	-10%	-4%	-1%	-1%		
607	University Permanent	0.1	0.3	0.5	2.1	0.4	0.5	0.5	0.5	0.5	0.5
	Change				0.4	(0.3)	(0.1)	(0.0)	(0.0)		
	% Change				23%	-37%	-14%	-1%	-1%		
Total Permanent Funds		**11.4**	**14.2**	**17.8**	**16.9**	**14.7**	**13.0**	**12.1**	**11.9**	**11.9**	**11.9**
	Change				1.7	(1.2)	(0.6)	0.0	(0.0)		
	% Change				11%	-8%	-4%	0%	0%		

Total All Funds		**249.9**	**250.8**	**258.6**	**278.5**	**269.3**	**261.6**	**255.0**	**254.0**	**254.2**	**254.4**
	Change				6.6	3.7	1.0	2.0	2.0		
	% Change				2%	1%	0%	1%	1%		

Figure 1: Timber Forecast Charts

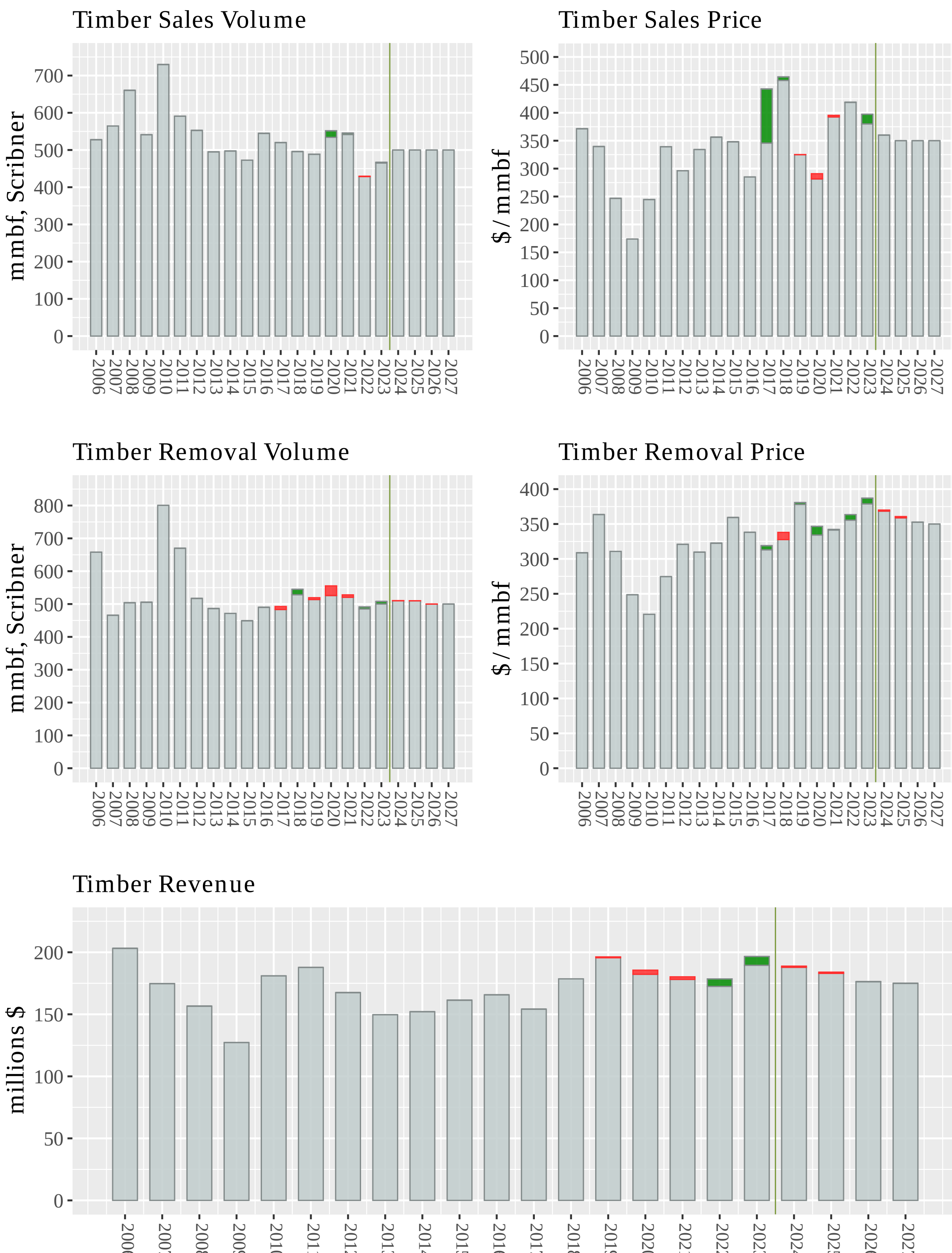


Figure 2: Other Uplands Forecast Charts

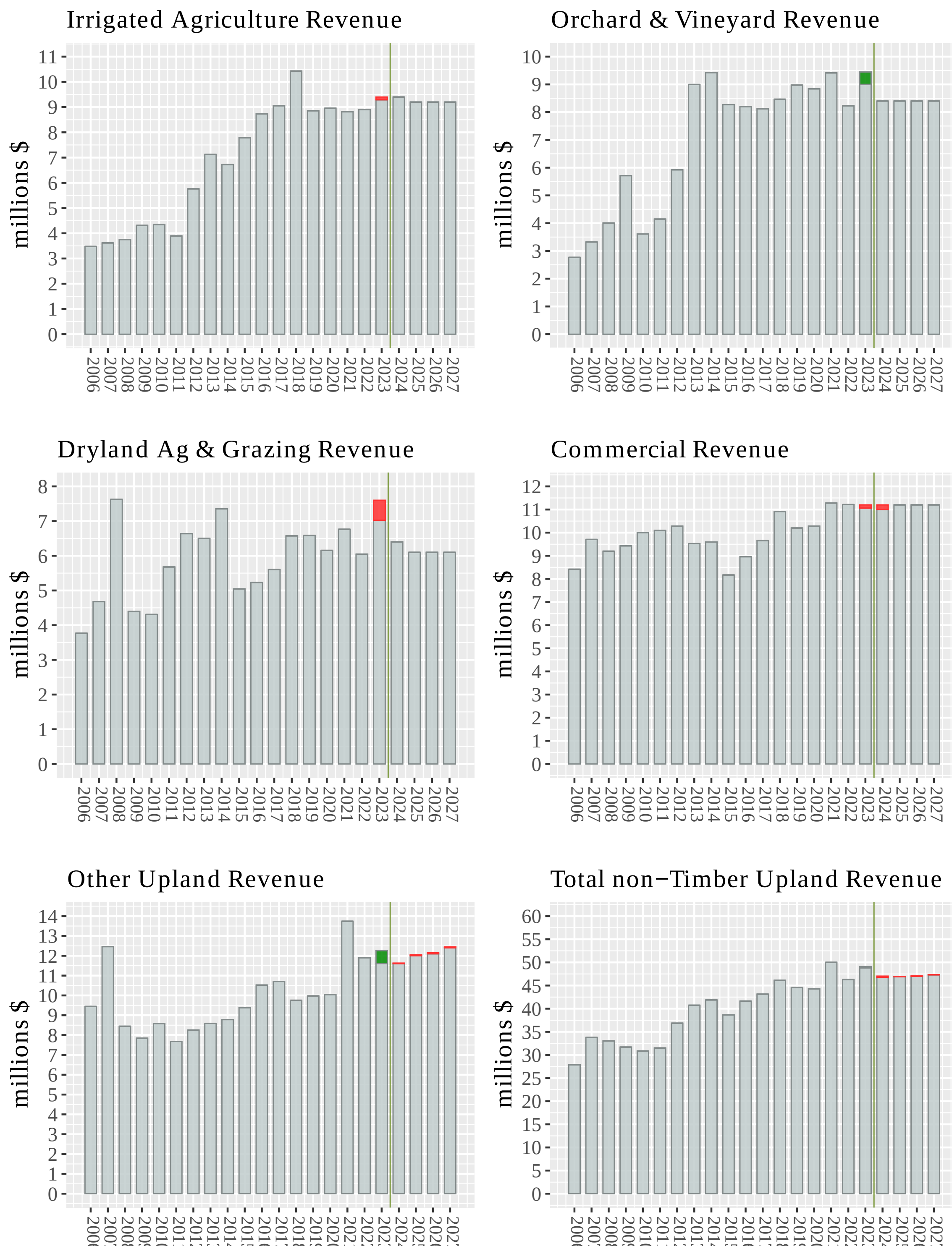
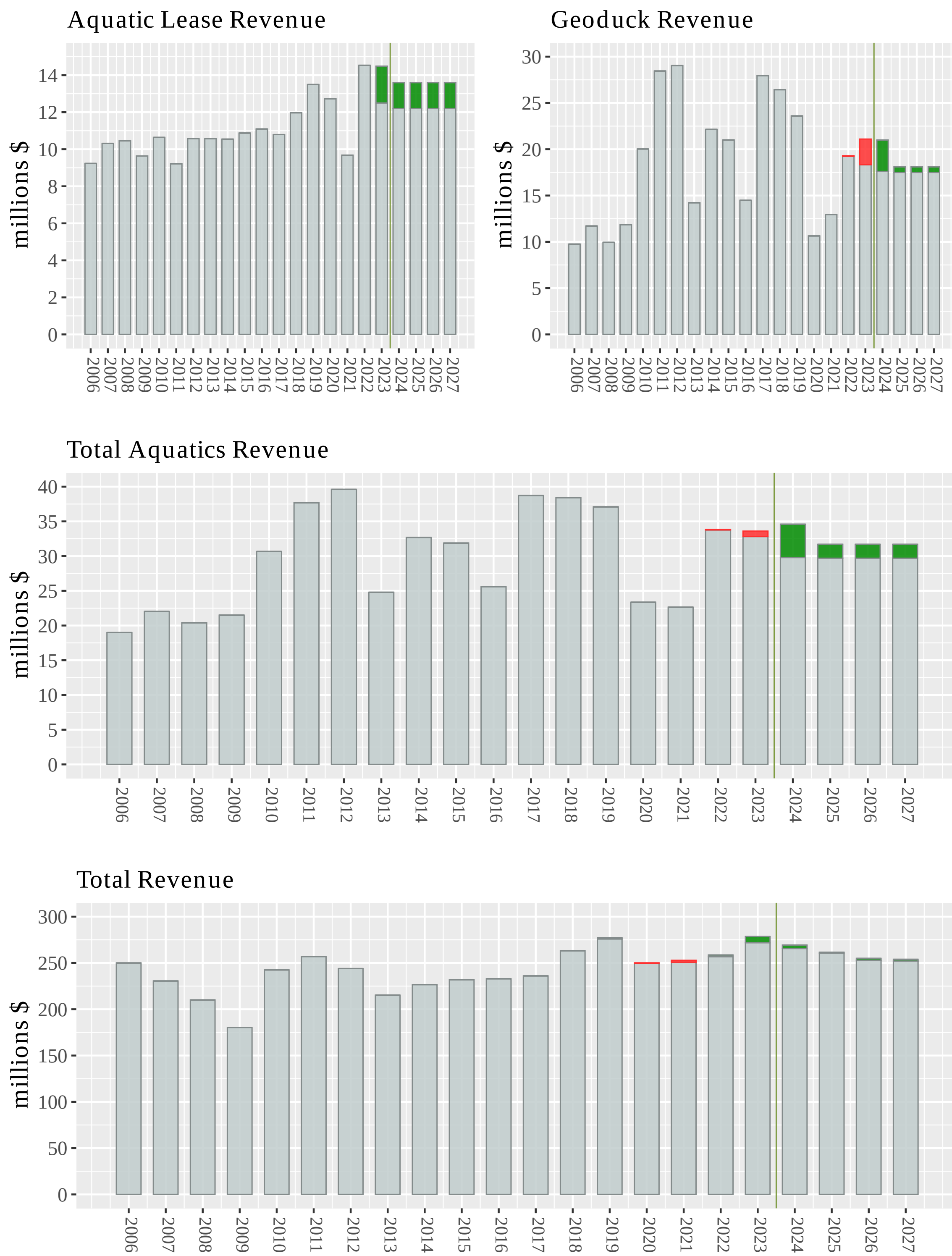


Figure 3: Aquatics and Total Forecast Charts



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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 State 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
ITC	U.S. International Trade Commission
mbf	Thousand board feet
mmbf	Million board feet
PSP	Paralytic shellfish poisoning
PPI	Producer Price Index
Q1	First quarter of year (similarly, Q2, Q3, and Q4)
QE	Quantitative easing
RCW	Revised Code of Washington
RMCA	Resource Management Cost Account
SA	Seasonally adjusted
SAAR	Seasonally adjusted annual rate
SLA	Softwood Lumber Agreement
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. Forecasts re-evaluate world and national macroeconomic conditions, and the demand and supply for forest products and other goods. Finally, each Forecast 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 influenced 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 2024 through 2029. Fiscal years for Washington State government begin July 1 and end June 30. For example, the current fiscal year, Fiscal Year 2024, runs from July 1, 2023, through June 30, 2024.

The baseline date (the point that designates the transition from "actuals" to predictions) for DNR revenues in this Forecast is August 1, 2023. 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 July 2023. 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	Final Data and Publication Date (approximate)
November 2023	October 1, 2023	November 15, 2023
February 2024	January 1, 2024	February 15, 2024
June 2024	May 1, 2024	June 15, 2024
September 2024	August 1, 2024	September 15, 2024

Acknowledgements

The Washington State 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.

Thanks go to DNR staff who contributed to the Forecast: Padraic Callahan, Michael Sly, Tom Heller, Patrick Ferguson, Steven Teitzel, Kari Fagerness, Scott Nelson, Michael Kearney, Sherry Land, Linda Farr, Michelle McLain, Michal Rechner, and Tom Gorman. They provided data and counsel, including information on markets and 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.

Office of Finance, Budget, and Economics

Kristoffer Larson, Acting 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 and geoduck auctions and lease revenues from managed lands.

U.S. Economy

Gross Domestic Product

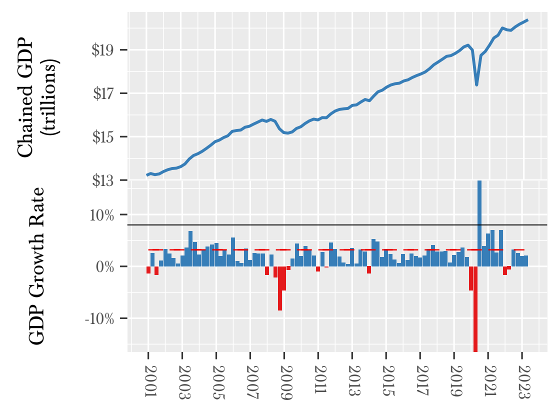
Typically, GDP is a useful indicator of how the U.S. economy is growing overall. When GDP is growing well, then generally there will be an increase in jobs, spending, and overall economic welfare. This often includes growth in housing spending and construction, which influences timber prices and DNR's income from timber. It is a useful indicator of how other, more directly relevant indicators may move in the future.

After falling 2.8 percent in 2020 due to the onset of the COVID-19 pandemic, GDP increased in 2021 by 5.9 percent. This was very rapid growth that was largely due to a rebound from the contraction due to the pandemic, as well as the fiscal and monetary policies enacted in response to the pandemic. GDP growth slowed to 2.1 percent in 2022.

In the first quarter of 2023, U.S. GDP grew by 2.0 percent (increased from a first estimate of 1.6 percent), while second quarter growth was 2.1 percent.

Forecasts for overall 2023 calendar year GDP have diverged as the year has progressed. Initially, most analyses were relatively pessimistic about the year, forecasting an average growth consistent with the FOMC's December Central Tendency of 0.4-1.0 percent. These typically included a small recession in the latter half of the year. However, the continued strength of the economy has lowered the recession expectations for 2023 and pushing them into early 2024.

Figure 4: U.S. Gross Domestic Product



Note that the y-axis of the bottom chart is limited to 15 percent because the Q2 and Q3 2020 GDP growth are such outliers that they distort the chart.

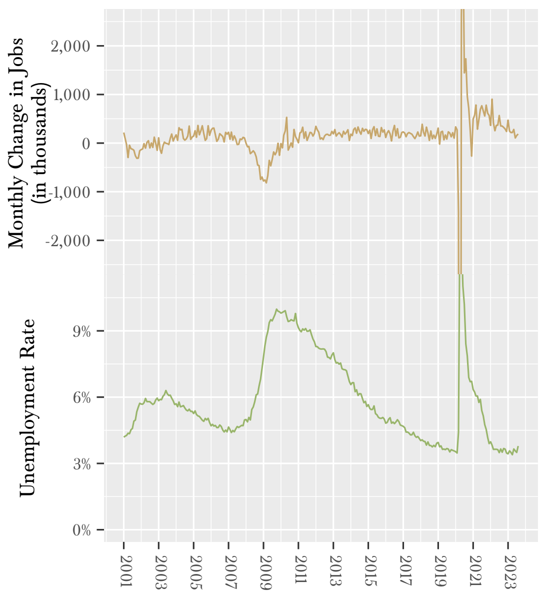
Current forecasts for 2023 GDP range from 1.1 to 1.8 percent. However, the high frequency GDPNow forecast for the third quarter GDP is 4.9 percent and the Blue Chip consensus is 2.9 (annualized). If these high frequency forecasts are close, then the fourth quarter GDP growth will have to be very low, or even negative to lead to annual GDP growth of only 1.1 percent.

Employment and Wages

The labor market is the primary driving force behind consumption, which typically constitutes about 70 percent of GDP and naturally extends to the demand for housing, the major driver of U.S. timber demand. The U.S. headline unemployment rate measures the number of people looking for work as a percentage of the number of people in the labor force.

After exploding to 14.7 percent near the beginning of the COVID-19 pandemic in mid-2020, the unemployment rate has fallen considerably. Since February of 2023, the unemployment rate has been between 3.4 and 3.8 percent - which is historically very low (Figure 6). During this time, the labor force participation rate also recovered, from 60.1 percent in April 2020 to 62.8 percent now. Overall, there are around 4.1 million more jobs in August 2023 than in February 2020 and about 4.0 million more people in the labor force (that is, employed or looking for work).

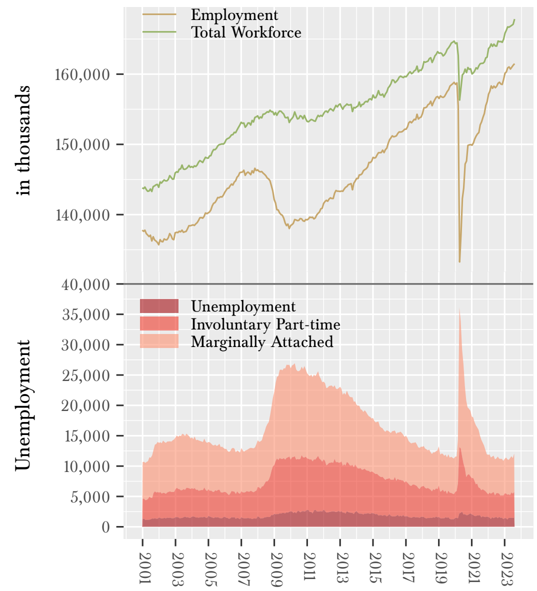
Figure 5: Unemployment Rate and Monthly Change in Jobs



Note that the y-axes for these charts are limited because of the extreme changes in Q2 2020.

There was some expectation that increasing wages would draw back people who lost or left their jobs during the pandemic — increasing labor force participation rates. This would increase the unemployment rate from its very low levels, or at least put a lower limit on it, and decrease wage pressures. However, the labor force participation rate has been increasing very slowly, and, at 62.8 percent in August 2023, is still below the pre-pandemic rate of 63.3[4]. It seems that people aren't re-entering the labor force as quickly as they left.

Figure 6: Employment and Unemployment



It appears that the main reasons for the lower labor force participation rates include early retirement among baby boomers, lack of reliable childcare, health issues (either their own or others), and people returning to improve their earning potential[5]. None of these issues seem likely to be reversed in the near future.

However, it does appear that wages in the U.S. are now growing faster than inflation. In August 2023, the Atlanta Fed's Wage Growth Tracker[6], showed 5.3 percent (annualized) growth in wages, while CPI was 3.7 percent (12-month change). This will increase purchasing power and may pull some people back into the labor force.

The unemployment rate is likely to either remain stable or increase slowly from its current level. Given that one of the stated purposes of the Fed raising rates is too slow down job growth, it seems fairly likely that the Fed will continue raising rates until the national unemployment rate starts to meaningfully increase. In their June meet-

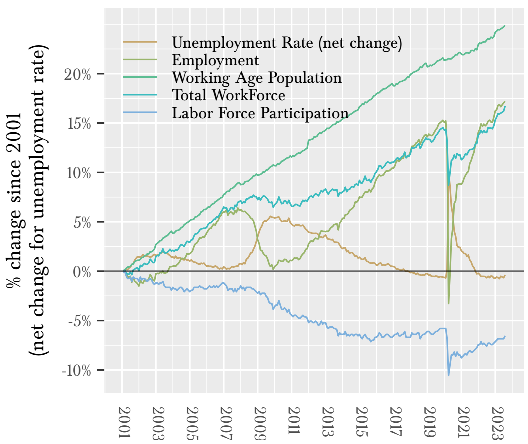
[4]While the difference here is only 0.5 percentage points, these represent an additional 2 million potential workers

[5]`https://www.uschamber.com/workforce/the-pandemic-unemployed-survey-why-americans-are-staying-out-of-the-workfo`

[6]`https://www.atlantafed.org/chcs/wage-growth-tracker`

ing, the FOMC expected unemployment to be between 4.0 and 4.3 percent in the fourth quarter of 2023, meaning it has to climb at least 0.3 percentage points to reach that average in the next three months.

Figure 7: Labor Market Indicators



Inflation

Aside from a short period in 2012, core inflation was below the FOMC's two percent target between the recession in 2008 and early 2021. During that period, inflation forecasts were consistently too high, with each year predicted to break the cycle of weak inflation, only to disappoint as the year progressed (Figure 8).

For policy purposes, the FOMC uses the core Personal Consumption Expenditures (PCE) index as the measure of inflation, which removes the more volatile fuel and food prices. In a fairly striking policy change, the FOMC announced in September 2020 that it would "aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time and longer-term inflation expectations remain well anchored at 2 percent." This was a marked departure from policy in the previous decade, when there were a number of (sometimes-contentious) interest rate increases, even though inflation was well below 2 percent.

Since April 2021, core PCE inflation has been higher than the FOMC's target, and remained high on the back of supply chain issues and strong demand, as well as shocks to the market like Russia's invasion of Ukraine and high household savings bouyed by the stimulus packages in response to the COVID-19 pandemic. In March 2022 the FOMC decided to start raising interest rates to bring inflation down.

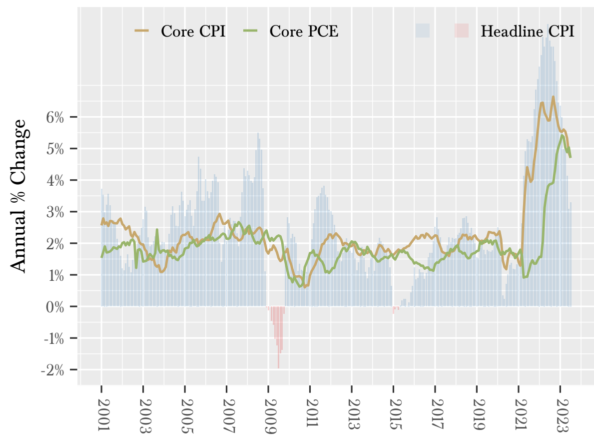
Core PCE inflation was 5.0 percent in 2022, substantially higher than the 2.5 to 3.0 percent the FOMC expected at their December 2021 meeting.

The outlook for inflation is unclear. Although the CPI had slowed through the latter half of 2022, it jumped to an annualized rate of 6.3 percent in January, from 1.6 percent in December. This motivated the Chair of the FOMC, Jerome Powell, to say that interest rates would have to rise faster than previously expected — widely taken to mean that the Fed will increase the pace of interest rate rises.

Since then, the three-month average annualized CPI inflation almost doubled, from 2.2 percent in May 2023 to 4.0 percent in August. This is largely due to sharp increases in gasoline and housing in August.

Inflation is expected to continue to slow in the coming months, mainly because of the pace of interest rate increases. However, there may also be sudden increases, particularly due to gasoline costs with Saudi Arabia and Russia recently curtailing production.

Figure 8: U.S. Inflation Indices



Interest Rates

Interest rates are a powerful tool used by the Federal Reserve Bank to influence the U.S. economy[7]. An increase in interest rates will generally 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, particularly in the housing and auto markets. The opposite of all of this is also true — decreasing or lowering interest rates can help drive economic expansion through expanded investment and consumption.

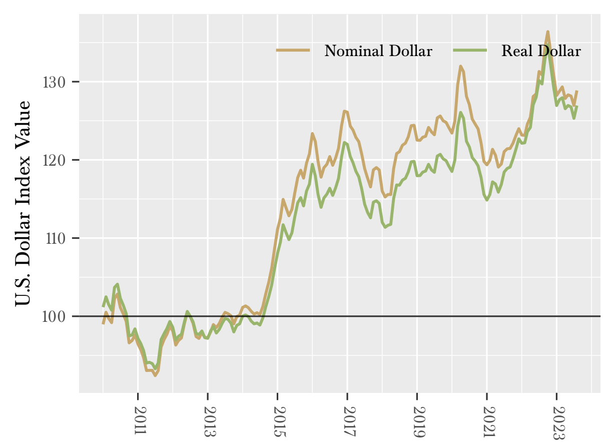
As mentioned in the previous section, the Fed began increasing interest rates in March 2022 due to continued high inflation. They increased rates by 0.25 percent in each month from March through May 2022, and then increased rates more rapidly by 0.75 percent in June, September *and* November 2022. As inflation has remained high, expectations for interest rates have gradually increased since mid-2022. The June 2022 FOMC meeting materials show an expected federal funds interest rate between 3.1 and 3.6 percent at the end of 2022. This increased to between 4.1 and 4.4 percent in September and 5.1-5.4 in December. At the June 2023 FOMC meeting, this was raised to 5.4-5.6 percent. As of this writing, given that the current Federal Funds rate is between 5.0-5.25 percent, it appears that the FOMC expects to raise rates one or two more times this year.

The U.S. Dollar and Foreign Trade

Between February and April 2020, the U.S. dollar trade-weighted index jumped almost 6 percent, largely due to a "flight to safety" from the uncertainty caused by the pandemic (Figure 9). From April 2020 to mid-2021, the index fell, but then quickly climbed through October 2022 to its highest point since at least 2006 (the earliest date for the data set we use). Since October 2022, the US dollar has fallen back, but remains extremely high compared to the last decade and a half.

A higher dollar means that timber and lumber from the Pacific Northwest become more expensive for international buyers and, conversely, timber and lumber imported into the U.S. becomes less expensive. This will tend to undermine local prices and DNR's timber and agricultural revenues. Wildstock geoduck revenue will also be negatively affected because geoduck is primarily marketed abroad.

Figure 9: Trade-Weighted U.S. Dollar Index



Foreign trade and access to export markets is nor-

[7] We refer to interest rates broadly, but the Fed specifically governs the Federal funds rate, which heavily influences interest rates across the economy.

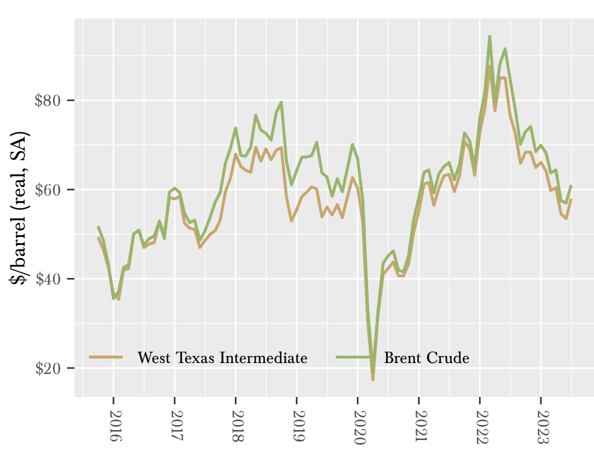
mally important for DNR revenues. Chinese demand for timber and lumber was a major support for lumber prices after 2010, even though DNR timber cannot be exported directly. Additionally, much of the soft white wheat produced in Washington is exported to Asia and the vast majority of the Pacific Northwest geoduck harvest is exported to China.

Overall, the dollar's strength isn't particularly concerning right now. While domestic demand has fallen from its highs in the last two years, there is still enough domestic demand for timber products to offset the price effect of the higher dollar. Additionally, Agricultural product prices also remained high, and geoduck auctions continued to have very strong prices. These all suggest that the dollar's strength is being offset by other pressures.

Petroleum

Crude oil and its derivatives strongly affect production, transportation, and consumption in the world and U.S. domestic economies. Broadly, an increase in oil prices acts like a tax increase for consumers and can discourage consumption. Additionally, all other things being equal, higher petroleum prices will increase diesel fuel prices and will make transportation-sensitive industries — such as Pacific Northwest logging and agriculture — less competitive in international markets.

Figure 10: Crude Oil Prices

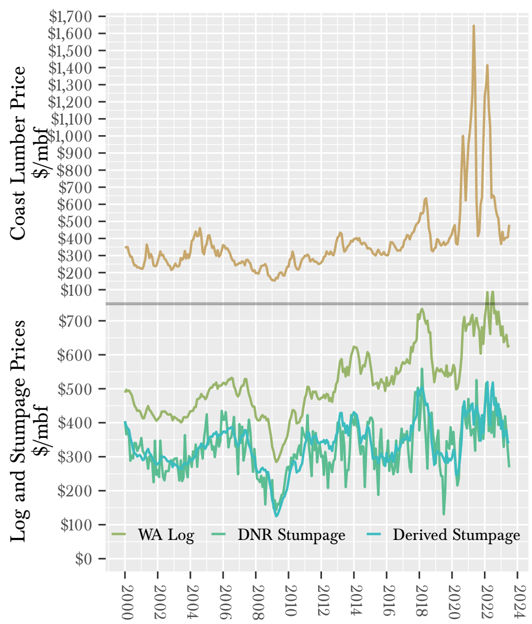


The Russian invasion of Ukraine in early 2022 initially pushed oil prices much higher, with the nominal Brent Crude spot prices jumping from $86/barrel (nominal) in January to $122/barrel in June — the highest they had been since 2014 (Figure 10). These prices were high enough to create a drag on economic growth. However, they were fairly short-lived. After peaking in June 2022, prices dropped to $80/barrel in December and have stayed between $75 and $85/barrel through August. However, it appears that prices have jumped in September with high demand and continued production restrictions from Saudi Arabia, Russia and OPEC.

Wood Markets

Timber stumpage revenue constitutes about 70 percent of total DNR revenues on average. Therefore, DNR is 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 revenue generated by DNR.

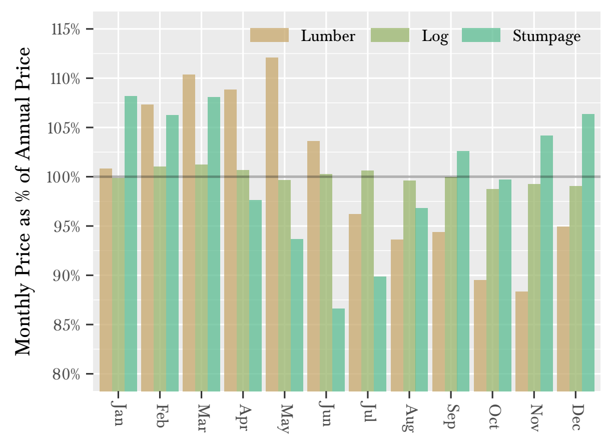
Figure 11: Lumber, Log, and Stumpage Prices in Washington



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 11). High log prices make access to logs more valuable, increasing purchasers' willingness to pay for stumpage (the right to harvest). Volatility in stumpage prices arise 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, the region, and the road-building requirements of a particular sale.

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 or stumpage prices to take advantage of high lumber prices. From the supply side, landowners often do not 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.

Figure 12: Lumber, Log, and DNR Stumpage Price Seasonality



There are differences in price seasonality between lumber, logs, and stumpage, as illustrated in Figure 12. 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 be higher starting in February, when housing construction starts to pick up, and decline through fall as demand wanes, while stumpage prices tend to be highest in December-March, 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 lower from July through September.

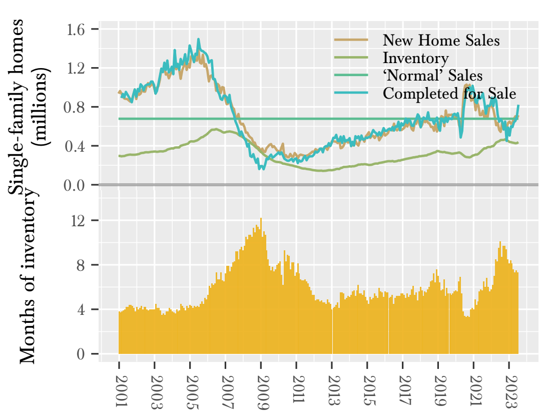
U.S. Housing Market

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

New residential construction (housing starts) and residential improvements are major components of the total demand for timber in the U.S. From 2000-18, these sectors have averaged 69 percent of softwood consumption — 37 percent going to housing starts and 32 percent to improvements — with the remainder going to industrial production and other applications.

The 2007 crash in the housing market and the following recession drastically reduced demand for new housing, which undermined the total demand for lumber. Since the 2009-11 through to the beginning of the COVID-19 pandemic in early 2020, an increase in housing starts drove an increase in lumber demand.

Figure 13: New Single-Family Home Sales



As with almost every other part of the economy, the coronavirus pandemic created a lot of uncertainty in the housing market. After the initial collapse in activity in early 2020, both starts and new home sales increased substantially — largely driven by strong household balance sheets and record-low mortgage rates. However, since the Fed began increasing interest rates, mortgage rates more than doubled from under 3.0 percent to above 7.0 percent. The increased costs of financing have significantly affected both sales and construction of homes.

New Home Sales

Unsurprisingly, new home sales plummeted during the 2008-09 recession, reaching a record low of 306,000 (SAAR) in 2011 before beginning a slow rise to average 680,000 (SAAR) in 2019 (Figure 13).

From January through April 2020, new single-family home sales fell from 708,000 to 570,000 (SAAR) as the initial effects of the pandemic took hold. However, April was the bottom. From then, new home sales quickly grew well beyond their January 2020 highs to a peak of 1,036,000 (SAAR) in August 2020, averaging 960,000 in the latter half of the year. New home sales slowed a little in 2021, averaging 769,000 (SAAR) per month. With the increased mortgage rates since March 2022, new single-family sales fell to a low of 588,000 in September 2022, basically at the level of April 2020. Sales have rebounded since then, increasing to 714,000 in July 2023. This is still higher than the long term average of 678,000 new home sales.

New home completions declined more slowly than sales through 2022, so that the inventory of new homes for sale on the market increased from its low point in 2021. Typically, an increase in inventory could help suppress home prices. However, there is currently a dearth of existing houses on the market, suggesting there will be very little price suppression from the increased inventory of new homes.

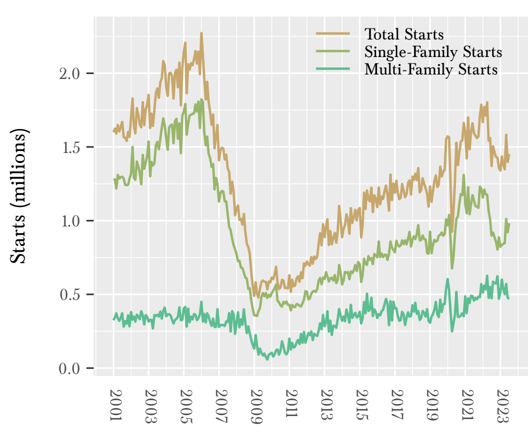
There is still strong demand for housing — as long as mortgage rates aren't too high. Households still have strong balance sheets and wages are increasing, which will mitigate some of the effect of increased interest rates on housing demand. Additionally, the housing stock in the U.S. is quite old. New housing was underbuilt from 2008 and there are very low inventories of existing housing on the market while there is still demand, which should help to maintain housing construction.

Overall, it is likely that sales will remain higher than the period between 2008 and 2015, where they were consistently lower than the long-term average, but it would not be surprising to see them stay below or near the long-term average for some time.

Housing Starts

In April 2009, U.S. housing starts fell to the lowest point since the Census Bureau began tracking these data in 1959. U.S. housing starts picked up in 2011 and continued to rise, largely because of increases in multifamily starts. Single-family starts were more or less flat after the recession through 2012, but rose slowly through most of 2019 (Figure 14)[8].

Figure 14: Housing Starts

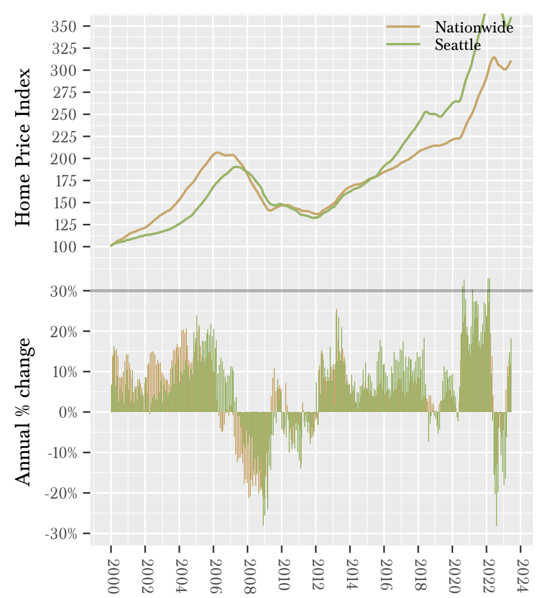


Total residential housing starts hit 1.6 million (SAAR) in February 2020 before collapsing in April to 0.9 million. This was from both single-family starts, which fell from 1.0 million starts to 0.7 million, and multifamily, which fell from 0.5 million to 0.2 million.

Again, as with sales, April 2020 was the nadir and April 2022 was the post-2008 apex. Total starts climbed back quickly and averaged 1.6 million in 2021 and 2022, while single family starts averaged 1.1 million in 2021 and 1.0 million in 2022.

Two things are particularly notable about housing starts since they began falling from April 2022. First, even though there has been a significant drop in starts, they are still higher than any point between 2007 and mid-2019. Second, it's primarily single-family starts that have dropped so significantly. multifamily starts have been more stable, likely because rents are still quite high and those are typically built for the rental market, though they too have fallen in the last three months. This will likely have a more substantial affect on lumber demand because single-family housing uses more lumber per unit than multifamily.

Figure 15: Case-Shiller Existing Home Price Index



Housing Prices

U.S. housing experienced six unprecedented years of falling or flat prices following the 2008 recession. House prices started rising again only in 2012 as economic and employment indicators continued

[8] Single-family starts are discussed specifically because it uses more lumber than multifamily construction. So the change in single-family starts has more of an impact on lumber demand and prices than a change in multifamily starts.

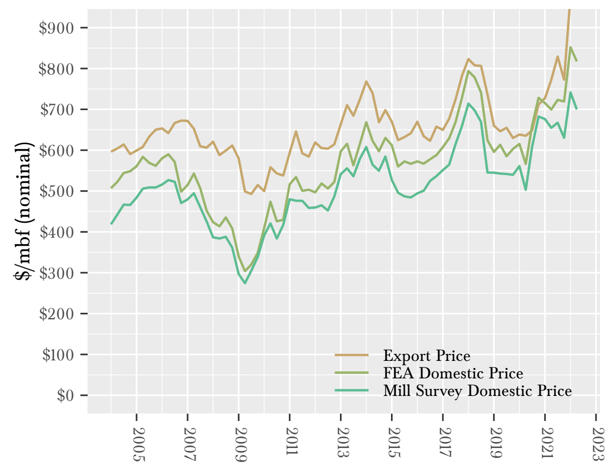
to improve. Figure 15 charts the seasonally adjusted S&P/Case-Shiller Home Price Index for the 20-city composite, which estimates national existing home price trends, as well as the Index for Seattle.

Although the pandemic initially stalled national price growth, the Case-Shiller ended 2020 with 10 percent December-December price growth. Locally, for Seattle, price growth was 13 percent. Since then, prices have increased even faster. In March 2022, the 12-month prices nationwide were 21 percent higher, and Seattle prices were *28* percent higher.

However, May 2022 was the peak. The Seattle Case-Shiller index fell from 414 in May to 360 in December 2022, a 13 percent decrease, while nationally the index declined by three percent. In July, both the National and Seattle Case-Shiller started increasing again.

The high, and increasing prices, should continue to incentivise housing construction, supporting starts and lumber demand.

Figure 16: Log Export Prices



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.

Export Markets

Although federal law prohibits export of logs from public lands west of the 108th meridian, log exports can 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, pushing up domestic prices. However, changes in export prices do not necessarily influence domestic prices in a one-to-one relationship.

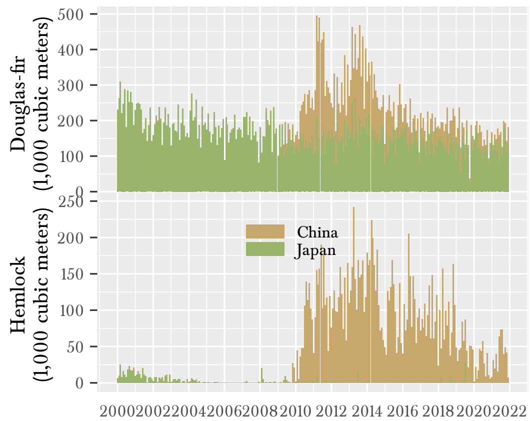
Export prices are almost always higher than domestic prices, a difference that is referred to as the "export premium" (Figure 16). The export premium is primarily due to the characteristics of the export markets, which can include a demand for higher-quality wood, a high value placed on long-term contracts,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

The primary markets for logs and lumber from Washington are China and Japan. Japan primarily imports Douglas-fir and has been relatively consistent, averaging 1.8 million m^3 per year since 2009[9]. China primarily imports hemlock, but it has been much more variable in its demand.

After entering the market meaningfully in 2010, demand from China was a major support for log and lumber prices in Washington (Figure 17). That started waning 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 a 25 percent Russian tariff on log exports was reduced.

[9] Trade data is from the U.S. International Trade Commission Dataweb at `https://dataweb.usitc.gov/`

Figure 17: Log Export Volume



Surprisingly, export volume to Japan in actually increased in 2020 and 2021 after having declined every year in the previous six, but this was still 30 percent lower than the peak exports of 2,199 m^3 2014. Exports to China also increased slightly in 2021, but were down 77 percent from their peak in 2013.

As a result of the Russian invasion of Ukraine, sanctions were placed on Russia that limit its international trade. Russia supplies around 12 percent of the world's export logs. Although much of this is sold to China, the reduction of timber on the world market appears to have pushed up export prices (Figure 16).

Price Outlook

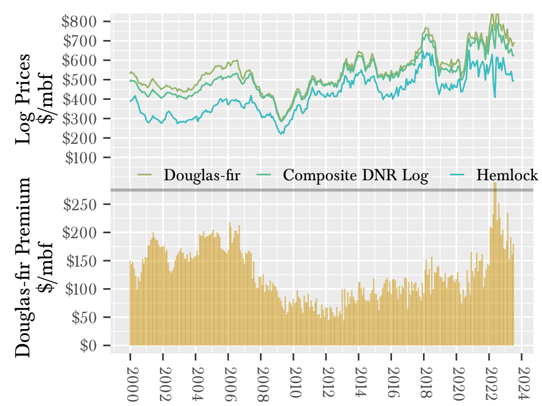
Lumber Prices

Lumber prices have been exceptionally volatile the past two years (Figure 11). In 2021, prices peaked at around $1,600/mbf in May then plummeted to $414/mbf in August (West Coast standard or better 2x4, Douglas-fir/Hemlock). Prices rebounded over the next several months to peak at $1,400/mbf in March 2022. However, after that they plummeted, dropping from $1,056/mbf in May to $638/mbf in June. Prices continued to decrease until December, but have stayed between $370/mbf and $440/mbf since. For the last five months, prices have averaged $405/mbf, slightly above the $400/mbf average for several years prior to 2019. Prices are expected to slowly increase starting in the latter half of the year.

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 11.

Figure 18: DNR Composite Log Prices



Log prices also bottomed in April 2020 and had recovered by August 2020, though they have obviously not reached the same extremes as lumber prices. Timber harvesters and mills often have an inventory of standing timber to draw from, so they don't always need to bid up new logs.

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 11). 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, a correction is likely to occur. Overall, recent stumpage prices are roughly in line with what we would expect given log prices — barring July 2023 prices, which was composed of lower-value sales and typically has some of the lowest stumpage prices of the season even in the best of years.

Although log and lumber prices bottomed out in April 2020, DNR stumpage prices fell through May 2020. Since then, DNR timber auctions had average stumpages of $396/mbf for FY 21, $427/mbf for FY 22, and $390/mbf for FY 23. August 2023 prices were very high, $414/mbf, bringing up the average for FY 24 to $370/mbf thus far.

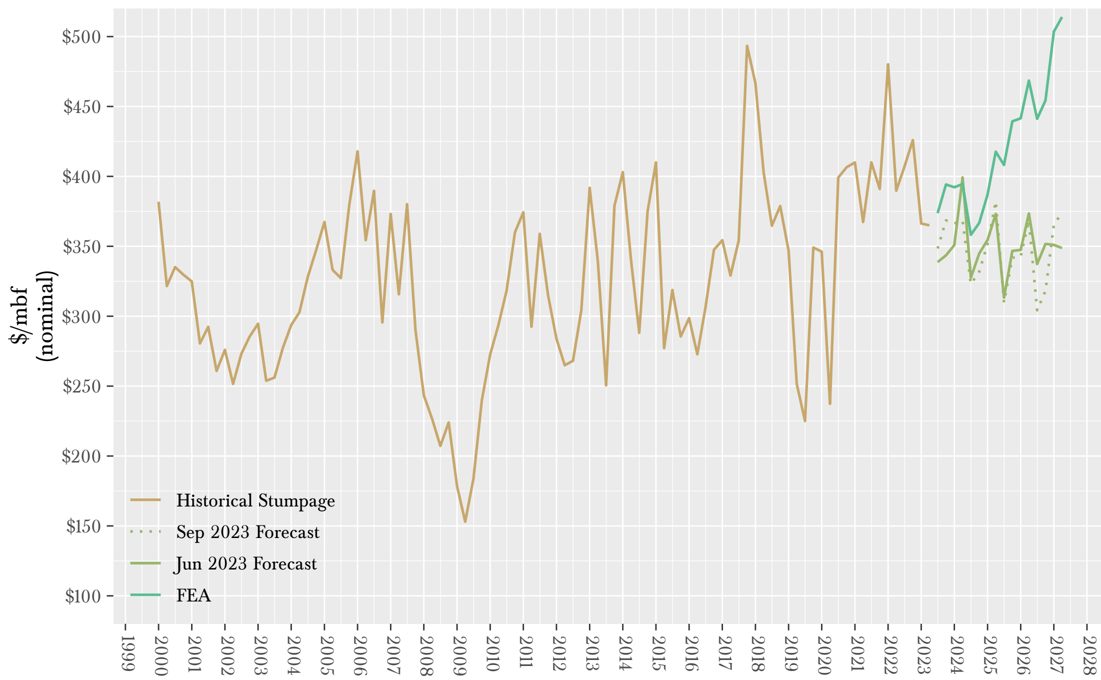
As always, these prices also depend heavily upon the characteristics of the sales, particularly the type and quality of the wood, the type of logging, and the costs associated with road-building and maintenance. Right now, sales prices may also be more heavily influenced by the ready availability of the sales — that is, whether purchasers can begin harvesting soon or whether they have to do a lot of preparatory work.

DNR Stumpage Price Outlook

DNR currently contracts with a forest economics consulting firm that provides 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 its price forecasts, we arrive at a stumpage price outlook (Figure 19, note that the FEA "forecast" series reflects the species and class characteristics of typical DNR timber; the original series were West Coast averages and are not shown).

It is important to note that these are nominal price expectations.

Figure 19: DNR Timber Stumpage Price



DNR Revenue Forecast

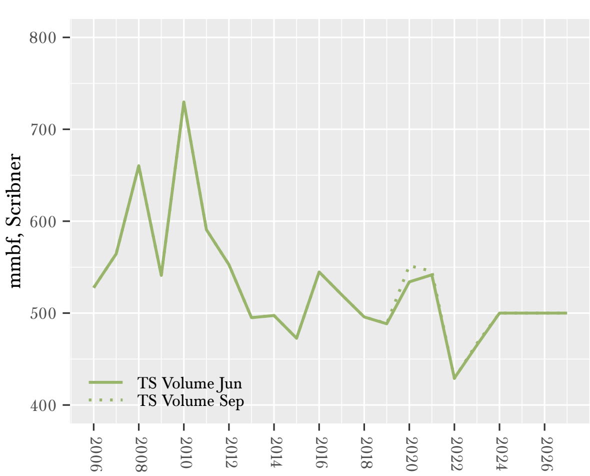
This Revenue Forecast includes revenue generated from timber sales on trust uplands, leases on trust uplands, and leases on aquatic lands. It also forecasts revenues to individual funds, including DNR management funds, beneficiary current funds, and beneficiary permanent funds. Caveats about the uncertainty 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 2019 needed to be harvested between three months and three years from the date of sale, with most being about two years in length. The purchaser determines the actual timing of harvest within the terms of the contract, which is likely based on perceptions of market conditions. As a result, timber revenues to beneficiaries and DNR management funds lag behind sales.

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.

Figure 20: Forecast Timber Sales Volume



Timber Sales Volume

The sales volume for FY 22 was 430 mmbf, a significant decrease from the 530 mmbf planned at the beginning of the fiscal year. As noted in the previous forecasts, in the middle of the fiscal year, the proposal to limit DNR timber harvests to only stands less than 120 years old stalled many planned sales and required review of many sales that had already been prepared, delaying the preparation of other sales. Additionally, severe winter weather delayed some sales planning in December 2021 and January 2022, while staffing constraints in some regions also affected sales planning.

The sales volume forecast for FY 23 was also decreased near the end of the fiscal year, to 465 mmbf – a significant decrease from the previously planned 530 mmbf and the previously forecast 500 mmbf. This was apparently due to some internal policy decisions and an increase in community opposition to some sales.

Currently, there is no expectation that the timber sales program will be able to recoup the shortfall in the FY 23 sales to add these the future years.

It is possible that future forecast volumes will be reduced due to the by the Department's Carbon Project, which has plans to remove 10,000 acres of forest land from the planned harvest schedule and instead generate revenue through carbon offsets. However, the current 500 mmbf forecast in outlying years is typically quite conservative, so it is also possible that the new program will have no meaningful effect on the actual volume sold or harvested.

Figure 21: Forecast Timber Removal Volume

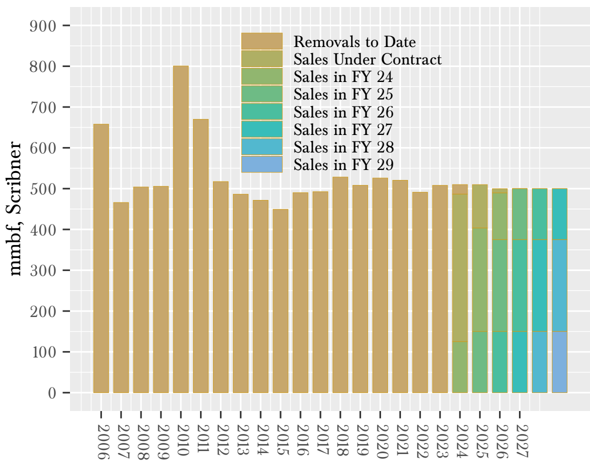
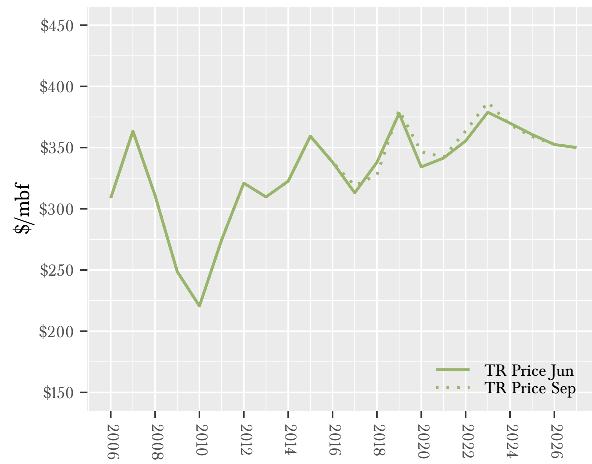


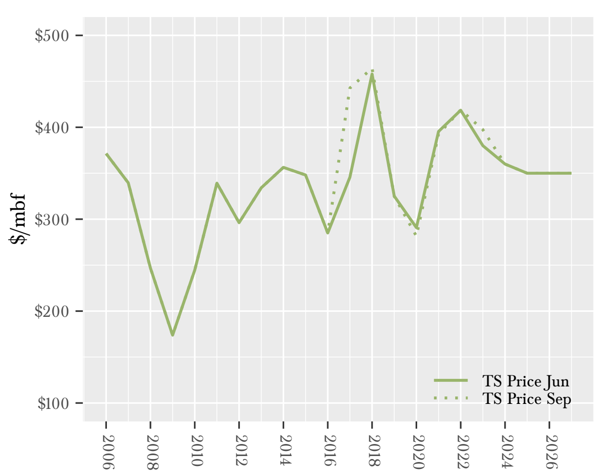
Figure 23: Forecast Timber Removal Price



Timber Removal Volume

The removal volume for all years are unchanged.

Figure 22: Forecast Timber Sales Price



Timber Sales Prices

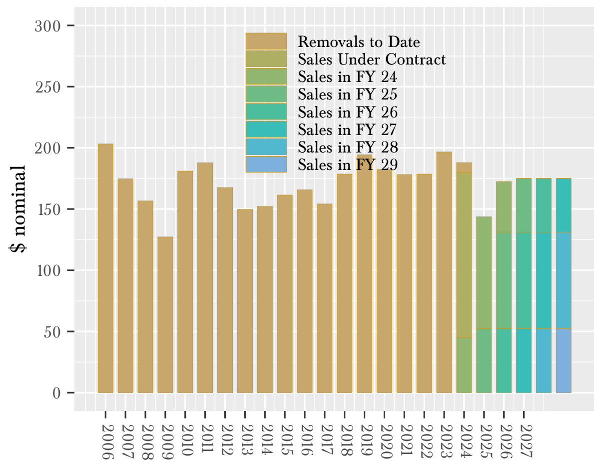
The price results of monthly DNR timber sales can be quite volatile (Figure 11). As discussed in the stumpage price outlook, the DNR sales price forecast is informed by West Coast log and stumpage price estimates from a forest economics consulting firm.

The forecast timber sales prices are unchanged at $360/mbf for FY 24. This is in-line with the average sales price from January to June 2023. Outlying years' forecast prices are unchanged at the long-term average of $350/mbf.

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 auctioned timber removed in each time period (Figure 23). Removal prices have only slight changes in some forecast years.

Figure 24: Forecast Timber Removal Value

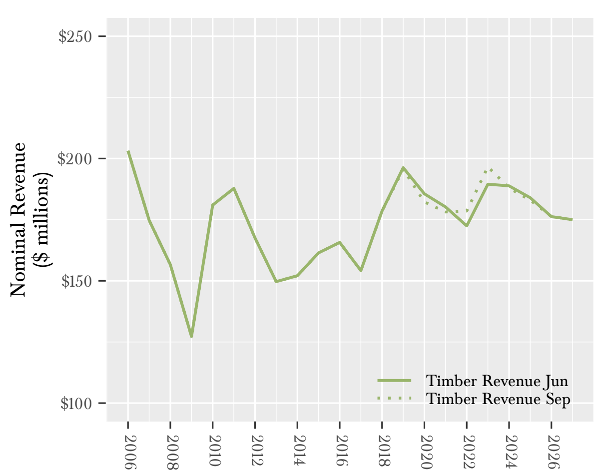


Timber Removal Revenue

Figure 24 shows projected annual timber removal revenues, broken down by the fiscal year in which the timber was sold. Revenue estimates reflect all of the changes described above.

Forecast timber revenues for the 2023-25 biennium are $371 million — around $1.9 million lower than previously forecast. Forecast revenues for the 2025-27 biennium are essentially unchanged at $351 million.

Figure 25: Forecast Timber Removal Revenue

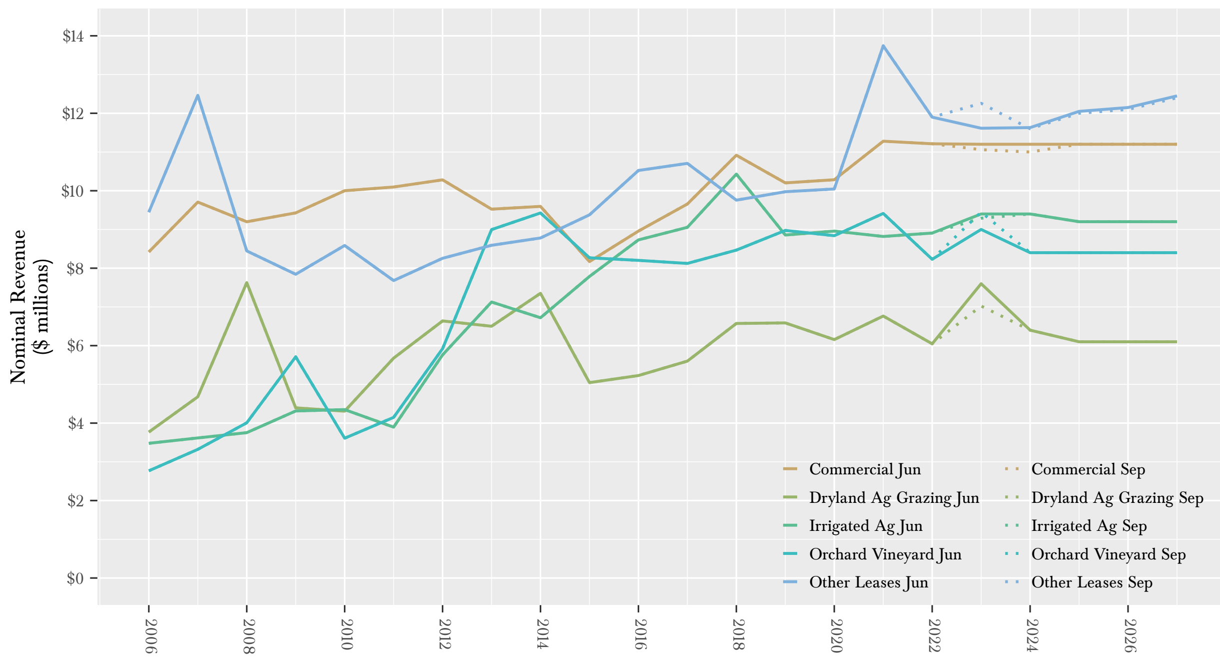


Upland Lease Revenues

Upland lease revenues are generated primarily from leases and the sale of valuable materials other than timber on state trust lands (Figure 26).

Forecast uplands revenue for FY 24 is decreased slightly due to lower expectations for commercial and other revenue. Outlying years' forecast revenue is unchanged.

Figure 26: Forecast Upland Lease Revenue

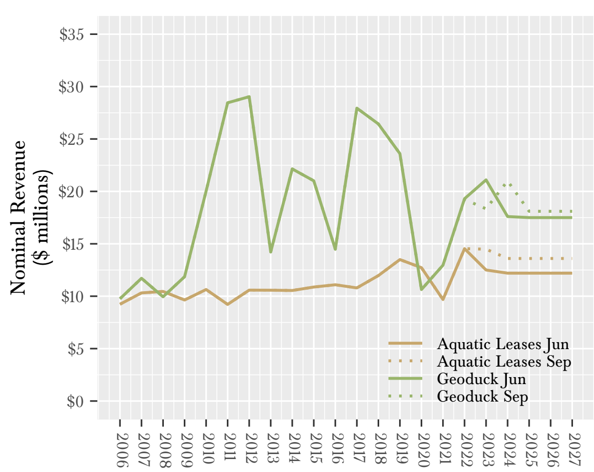


Aquatic Lands Revenues

Aquatic lands revenues are generated from leases on aquatic lands and from sales of geoduck. In the past, on average, leases have accounted for one-third of the revenue and geoduck sales accounted for the remainder. However, prices for geoduck plummeted in the beginning of FY 20, so that it accounted for less than half of the aquatic lands revenue that year. Geoduck prices have since recovered and geoduck revenue are now forecast to account for between 55 and 60 percent of aquatic revenue.

The aquatic lease revenue forecast is increased in all years (Figure 27). This is due to much higher than expected revenue in water-dependent and non-water-dependent rents. It is unclear why revenue increased so much, but it appears likely that it is due to increases from both lease reassessments and from high inflation, leading to larger-than-normal rent escalation. This suggests that we should see this higher level of revenue in the future.

Figure 27: Aquatic Lands Revenues



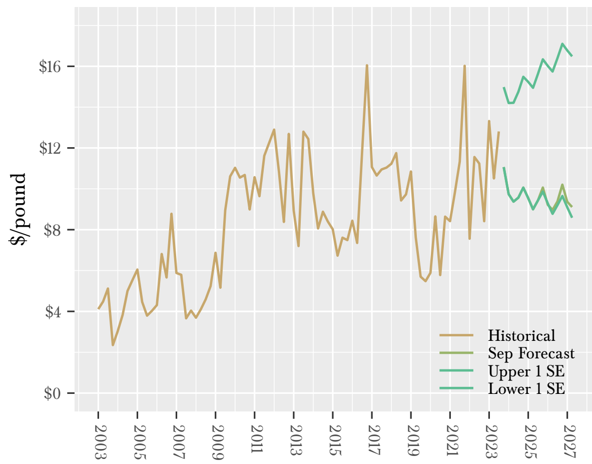
The geoduck forecast revenue for FY 23 was increased to $21.1 million in June, but ended up at $18 million. This was simply because the bonus bids from the March auction were expected to become revenue in FY 23, but didn't. This bonus bid revenue is shifted to FY 24, which, with a small forecast price increase, increases that fiscal year's revenue forecast to $21 million. Outlying years' revenue forecast is increased slightly due to an increase in the forecast price.

Prices for outlying years are unchanged.

There are, as always, potentially significant downside risks to geoduck revenues, even in the near term and in addition to the pandemic, that are important to consider but difficult to forecast:

- China's economy appears to be slowing meaningfully.
- Harvests (and therefore revenues) could be deferred or lost if geoduck beds are closed due to occurrence of paralytic shellfish poison.
- Harvests will be slowed or delayed if there is an injury or death of a diver.
- Early in 2021, heavy rains overwhelmed sewage treatment plants in the Puget Sound, spilling untreated sewage into the sound and closing geoduck tracts for several weeks. Although program staff were able to offer alternative harvest from different tracts, this type of risk will continue as the effects of climate change grow more severe.
- A recent Washington Department of Fish and Wildlife survey of closed South Puget Sound geoduck tracts showing declining recovery rates and evidence of active poaching, suggesting that future commercial harvest levels may be further reduced.

Figure 28: Geoduck Auction Prices



Total Revenues from All Sources

The forecast revenue for the 2023-25 biennium is increased to $531 million, and the forecast revenue for the 2023-25 biennium is increased to $509 million. (Figure 29).

Figure 29: Total Revenues

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 FY 23 by trust, and relative historical timber prices by DNR region by trust; and
- The volumes of timber by trust for FYs 23-25 based on output of the sustainable harvest model and relative historical timber prices by DNR region by trust.

Because a single timber sale can be worth more than $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 Forecast assumes that the Legislature and Board of Natural Resources will continue to approve the Resource Management Cost Account management deduction at 31 percent and the Forest Development Account management deduction at 25 percent.