Department of Natural Resources

Economic & Revenue Forecast

Fiscal Year 2021, Second Quarter
November 2020

Forecast Summary

Coronavirus pandemic Overshadowing all of the normal constituent parts of the forecast are the uncertainties and risks associated with the COVID-19 pandemic and the economic disruption it continues to cause. Although recent vaccine announcements based on initial results are very promising, showing that at least one is 90 percent effective at seven days after the second dose, and suggest that there will be at least two very effective vaccines, both of those vaccines still need to complete their phase 3 trial and data needs to be submitted to regulators. Additionally, there are still questions about distribution, given that at least one of them must be transported at -75°C, and questions about how long immunity will last.

While the vaccines are excellent news, the U.S. and much of Europe are experiencing a tremendous increase in the number of COVID cases. As of the forecast writing, U.S. hospitalizations have reached a record high, more than doubling since September, and lockdowns are being announced across Europe and the United Kingdom.

The novel coronavirus pandemic has caused economic mayhem. Initially, it created the steepest and most sudden drop in employment and economic activity in U.S. history as the virus spread through the country and led almost every state to initiate some type of stay-at-home or social-distancing order, closing schools and many businesses. Since then, the U.S. economy has seen a large rebound, though a full recovery is likely to take much longer and will probably not happen without better control of the virus.

Thus far, the U.S. has had a relatively poor public health record in response to the pandemic compared to other developed countries, with the one of the highest numbers of per capita deaths and infections rates (though the economic comparison is unclear yet). The country has no national test-trace-isolate plan, which experts believe is necessary for effective containment. However, even if it did have a national plan to trace contacts, much of the testing available is too slow to be useful for most testing and tracing (with waiting times of a week or more) and too uncertain to provide a good metric for quarantining decisions. Additionally, outbreaks are often too big for contact tracing to hope to be effective, and many people don't have the resources to effectively quarantine if they've been exposed. Finally, there are reports of people being uncooperative with contact tracing officials, further undermining the efficacy of their work.

The lack of an effective national strategy to contain COVID-19 is important because it presents an risk to the current nascent economic recovery from the pandemic. There is evidence that the local and national lockdowns were only a small contributor to the collapse of economic activity in March and April, with one study finding that legal restrictions on movement accounted for slightly over a tenth of the drop in activity—the vast majority of the change was due to individual choices to change behavior. Intuitively, this is a fairly reasonable finding. When people are scared of getting gravely ill if they go out, people will go out less. A sustained recovery is unlikely without public confidence that the virus is under control, regardless of whether or not stay-at-home orders are in place. Even states that have reopened fully have seen only a partial return of jobs.

The current surge in both the number of infections and the rate of growth of new infections will likely slow the recovery for at least the next couple of months and potentially push the economy back into a recession. This is a potentially large downside risk for this forecast for FY 21.

Already, the economic damage of the virus has been extraordinary, causing a recession characterized by the sharpest drop in quarterly GDP ever measured (-9.0 percent, or -31.4 percent real SAAR) and the sharpest-ever increase in national unemployment (from 3.5 percent in February to 14.7 percent in April).

However, the rebound has also been extraordinary, with the unemployment rate falling to 6.9 percent in October and preliminary Q3 GDP growth of 33.1 percent (SAAR). This leaves Q3 GDP about 3 percent lower than it was at the end of 2019. As noted by a pair of prominent economists, "This rebound should not be confused with a recovery."

Even with a strong rebound in GDP, the U.S. and global economies are not expected to recover to January 2020 levels until mid-2021 at the earliest, and many things could make the recovery take much longer. Additionally, the recovery has been uneven, with wide differences in output growth between industries and between employment and income recovery by industry.

It is important to emphasize that the rebound in economic activity happened on the back of an enormous fiscal stimulus and accommodating monetary policy. Congress passed the $2 trillion CARES Act and the Federal Reserve dropped interest rates to essentially zero and, for the first time, promised to buy corporate debt as well as expanding U.S. Treasuries purchases.

The CARES Act had one-time payments to each person in the U.S., additional payments to weekly unemployment recipients, and extended unemployment benefits. The additional unemployment payments, in particular, were generous enough that many people were able to entirely replace their wages or even increase their income. This meant that although people were losing work, household balance sheets weren't necessarily falling. Indeed, personal saving actually increased in the early months of the pandemic, so people had money to spend when the virus was better under control and the economy opened up in late summer.

While the Federal Reserve activity is ongoing, the additional unemployment benefits of the CARES Act expired at the end of July. U.S. Bureau of Economic Analysis work indicates that the CARES Act unemployment programs were 5.5 percent of personal income in July. As expected, the expiration of the additional unemployment benefits at the end of July caused a fairly sharp decrease, 2.5 percent, in personal income in August. This drop has the potential to undermine spending and the current recovery in the near future, though personal saving in previous months may help to offset this.

Almost every forecast that we have seen is based upon the assumption that there will be some additional stimulus package—even the most recent forecast from the FOMC on September 16. Unfortunately, it appears that with the improvements to the unemployment rate and the result of the federal elections that there is much less motivation to pass another stimulus. Given the contentious political environment, we do not expect another stimulus package.

Lumber and Log Prices. Through March 2020, lumber prices had been climbing and peaked at $478/mbf. From there prices tumbled to $363/mbf in May. However, since May, prices have rebounded dramatically, to peak at $1,000/mbf in September. In October, prices fell back to $847/mbf—still higher in real terms than any other point since 2000.

After peaking in February at $570/mbf, prices for the "typical" DNR log fell to $500/mbf in May. Log prices have rebounded to $711/mbf in October, higher than has been seen since the spike in prices in 2018.

Early in the pandemic, we, and others, expected the pandemic to undermine house prices and demand, and, consequently, the demand for lumber. This widely shared expectation resulted in slower production at mills, furloughs, layoffs, and some mill closures. However, it appears that the very low interest rates have spurred housing demand and starts, and remodeling and renovation demand has also spiked during stay-at-home orders. The result has been a sharp drop in supply while there is strong demand, making lumber prices rocket up and pushing up log prices. Prices are expected to pull back further in the remaining months of Q4 as mills are able to bring back production, before increasing again in early 2021.

Timber Sales Volume. DNR plans to offer around 560 mmbf for sale in FY 21. In the last forecast, we refrained from increasing the predicted sales volume because of uncertainty around the pandemic and the potential numbers of no-bid contracts. However, given the consistent strength of lumber prices, and increasing log prices, as well at the demand seen at sales to date, we are increasing our sales volume forecast to 520 mmbf for FY 21. Forecast sales volumes in future years are unchanged.

Timber Sales Prices. The average prices for sales

in the beginning of the FY 20 were extremely low, averaging only $164/mbf in the first two months. Sales prices recovered through early 2020, but then fell as the effects of the pandemic took hold, ending FY 20 with an average price of $291/mbf. The first four timber sales of FY 21 had much stronger prices than expected, averaging $405/mbf. We are increasing the sales price forecast for FY 21 to $340/mbf (from $300/mbf in the June forecast and $320 in September one) due to the both the strong log and lumber prices that we've seen and their continued strong outlook. For now, forecast prices in outlying years are unchanged.

Timber Removal Volume and Prices. The removal volume forecast is unchanged in all years.

The average price of timber harvested to date in FY 21 has been higher than expected, largely coming from contracts with higher-value timber. However, there is still a large amount of timber due to expire this fiscal year that also has high prices. This, combined with the expectation that some of the timber sold to date will be harvested in this fiscal year, has motivated us to increase the forecast average removal price for FY 21 by $15/mbf to $325.

Removal prices in outlying years are also increased due to the higher expectations for FY 21 sales prices.

Timber Revenue. Forecast timber revenue in FY 21 are increased by $8 million to $165 million. FYs 22 and 23 are also increased, by $6 million and $3 million respectively.

Timber revenues for the 2019-2021 biennium are forecast be $347 million, an $8 million increase, while revenues for the 2021-2023 biennium are increased by $9 million to $345 million.

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.

The non-timber uplands revenue forecasts are increased slightly in FY 21 due to lease renewals in communications increasing revenue to date and likely through the remainder of the fiscal year.

The aquatic lease revenue forecast for FY 21 is decreased slightly due to weaker-than-expected revenue from non-water-dependent leases.

The forecast geoduck revenue has been slightly decreased for FY 21 but increased in FY 22 due to updated sales volume expectations. This is a similar reason for the changes in FYs 24 and 25. The geoduck revenue forecast is based on an assumed harvest volume of 85 percent of sales through the first half of CY 2021.

Aside from the COVID-19 pandemic, there remains a trade war between the U.S. and China, with high tariffs on geoduck. These are expected to continue at least through the beginning of CY 2021, limiting Chinese consumption and continuing to push Chinese consumers toward other luxury seafood.

Total Revenues. Forecast revenues for the 2019-2021 Biennium (FYs 20 and 21) are increased by 2.8 percent ($13 million) to $473 million. Revenues for the 2021-2023 Biennium are increased by 1.1 percent ($5 million) to $472 million.

Other notes to the Forecast. In addition to the economy-wide impacts of COVID-19, a number of sources of uncertainty may affect DNR revenue specifically, and the overall economic activity more broadly. These include: legal challenges to the sustainable harvest volume and marbled murrelet conservation strategy; uncertainty about the type and quality of stumpage DNR is able to bring to market more than six months out; the ongoing trade war and political tension with China directly affecting timber and agricultural exports and prices; and uncertainty about the stability of the current high housing starts level.

While the sales volume estimates are based on the best available internal planning data, they are subject to adjustments due to ongoing operational and policy issues.

Since the beginning of 2018, the U.S. and China have been engaged in an escalating trade dispute. Directly relevant to DNR revenues are a 5 percent

tariff on geoduck, wheat, and softwood logs. Prior to the pandemic, the tariffs on geoduck were 25 percent and were a significant driver of the drop in geoduck prices in late 2019. The log tariffs and the slowdown in housing starts were the major contributors to the lower domestic price of logs through late 2019.

Although exports to China have dropped by more than 70 percent since 2014, it remains a meaningful export market for Washington logs. Demand is expected to continue to decrease in the coming years, even aside from the immediate impact of the coronavirus pandemic.

In addition to the coronavirus and the trade tensions discussed above, other things could undermine Chinese demand, such as continued loss of Pacific Northwest market share to international and Southeastern U.S. competitors.

As always in the geoduck fisheries, PSP closures create uncertainty around harvest volumes as well.

Table 1: November 2020 Forecast by Source (millions of dollars)

Timber Sales		FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25
Volume (mmbf)		496	488	534	520	500	500	500	500
	Change			-	20	-	-	-	-
	% Change			0%	4%	0%	0%	0%	0%
Price ($/mbf)		458	325	291	340	340	340	340	340
	Change			$ -	$ 20	$ -	$ -	$ -	$ -
	% Change			0%	6%	0%	0%	0%	0%
Value of Timber Sales		**227.1**	**158.8**	**155.3**	**176.8**	**170.0**	**170.0**	**170.0**	**170.0**
	Change			$ -	$ 16.8	$ -	$ -	$ -	$ -
	% Change			0%	11%	0%	0%	0%	0%
Timber Removals									
Volume (mmbf)		528	502	527	510	520	520	510	500
	Change			-	0	(0)	0	(0)	-
	% Change			0%	0%	0%	0%	0%	0%
Price ($/mbf)		338	385	345	325	327	337	340	340
	Change			-	14.8	12.4	5.4	0.6	-
	% Change			0%	5%	4%	2%	0%	0%
Timber Revenue		**178.6**	**193.3**	**181.7**	**165.5**	**170.2**	**175.1**	**173.3**	**170.0**
	Change			-	7.6	6.4	2.9	0.3	-
	% Change			0%	5%	4%	2%	0%	0%
Upland Leases									
Irrigated Agriculture		10.4	8.9	9.0	9.0	9.0	9.0	9.0	9.0
	Change			-	-	-	-	-	-
	% Change			0%	0%	0%	0%	0%	0%
Orchard/Vineyard		8.5	9.0	8.8	8.2	8.2	8.2	8.2	8.2
	Change			-	-	-	-	-	-
	% Change			0%	0%	0%	0%	0%	0%
Dryland Ag/Grazing		6.6	6.6	6.2	5.7	6.0	6.0	6.0	6.0
	Change			-	-	-	-	-	-
	% Change			0%	0%	0%	0%	0%	0%
Commercial		10.9	10.2	10.3	10.4	10.8	10.8	10.8	10.8
	Change			-	-	-	-	-	-
	% Change			0%	0%	0%	0%	0%	0%
Other Leases		9.8	10.0	10.0	10.4	10.1	10.2	10.2	10.3
	Change			-	0.2	-	-	0.1	0.1
	% Change			0%	2%	0%	0%	1%	1%
Total Upland Leases		**46.1**	**44.6**	**44.3**	**43.7**	**44.1**	**44.2**	**44.2**	**44.3**
	Change			-	0.2	-	-	0.1	0.1
	% Change			0%	0%	0%	0%	0%	0%
Aquatic Lands									
Aquatic Leases		12.0	13.5	12.7	11.7	12.4	12.4	12.4	12.4
	Change			-	(0.2)	-	-	-	-
	% Change			0%	-2%	0%	0%	0%	0%
Geoduck		26.4	23.6	10.6	10.3	11.5	12.7	14.5	14.8
	Change			-	(0.2)	0.5	-	1.6	(1.9)
	% Change			0%	-2%	5%	0%	12%	-11%
Aquatic Lands Revenue		**38.4**	**37.1**	**23.4**	**22.0**	**23.9**	**25.1**	**26.9**	**27.2**
	Change			-	(0.4)	0.5	-	1.6	(1.9)
	% Change			0%	-2%	2%	0%	6%	-7%
Total All Sources		**263.1**	**275.0**	**249.4**	**231.2**	**238.1**	**244.4**	**244.3**	**241.5**
	Change			-	7.4	6.9	2.9	2.0	(1.8)
	% Change			0%	3%	3%	1%	1%	-1%

Table 2: November 2020 Forecast by Fund (millions of dollars)

Key DNR Operating Funds		FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25
041	RMCA - Uplands	40.6	39.9	33.5	33.7	37.5	39.5	39.6	39.1
	Change			-	(0.0)	0.8	0.8	0.5	0.5
	% Change			0%	0%	2%	2%	1%	1%
041	RMCA - Aquatic Lands	17.6	16.7	9.9	9.2	10.1	10.7	11.6	11.7
	Change			-	(0.2)	0.3	-	0.8	(0.9)
	% Change			0%	-2%	3%	0%	7%	-7%
014	FDA	22.1	25.6	28.3	22.2	21.2	21.4	21.2	20.8
	Change			-	1.9	0.7	(0.1)	(0.4)	(0.5)
	% Change			0%	10%	3%	-1%	-2%	-2%
21Q	Forest Health Revolving	4.4	6.5	7.9	11.5	10.0	8.9	8.2	8.0
				-	1.7	1.1	0.4	0.1	-
				0%	17%	13%	5%	1%	0%
Total DNR Key Operating Funds		**84.7**	**88.7**	**79.7**	**76.7**	**78.8**	**80.5**	**80.6**	**79.6**
	Change		-	-	3.4	2.9	1.1	1.0	(0.9)
	% Change			0%	5%	4%	1%	1%	-1%
Current Funds									
113	Common School Construction	62.6	64.2	59.5	54.6	61.0	65.1	65.5	64.8
	Change			-	0.4	1.2	1.6	1.2	1.0
	% Change			0%	1%	2%	2%	2%	2%
999	Forest Board Counties	59.6	69.5	68.7	54.4	52.3	52.6	51.9	51.0
	Change			-	4.5	1.9	(0.2)	(1.1)	(1.1)
	% Change			0%	9%	4%	0%	-2%	-2%
001	General Fund	2.1	1.9	4.7	4.4	3.7	3.5	3.4	3.3
	Change			-	0.2	0.0	(0.1)	(0.1)	(0.1)
	% Change			0%	6%	1%	-1%	-3%	-2%
348	University Bond Retirement	3.2	1.3	0.6	2.0	1.8	2.0	2.0	1.9
	Change			-	0.0	(0.0)	0.1	0.1	0.1
	% Change			0%	0%	0%	6%	6%	6%
347	WSU Bond Retirement	1.6	1.4	1.9	1.7	1.7	1.7	1.7	1.7
	Change			-	0.0	-	-	0.0	0.0
	% Change			0%	1%	0%	0%	1%	1%
042	CEP&RI	5.3	2.7	3.6	1.9	3.3	4.0	4.1	4.1
	Change			-	(0.0)	0.1	0.1	0.1	0.1
	% Change			0%	-2%	2%	3%	2%	2%
036	Capitol Building Construction	6.2	9.8	4.4	7.6	8.1	7.7	7.5	7.3
	Change			-	0.0	0.4	0.0	(0.1)	(0.1)
	% Change			0%	1%	5%	0%	-2%	-2%
061/3/5/6	Normal (CWU, EWU, WWU, TESC) School	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
	Change			-	-	-	-	-	-
	% Change			0%	0%	0%	0%	0%	0%
Other Funds		1.1	1.2	1.1	0.7	0.2	0.2	0.1	0.1
	Change			-	0.1	0.1	0.0	(0.0)	(0.0)
	% Change			0%	19%	42%	11%	-3%	-2%
Total Current Funds		**141.7**	**152.1**	**144.7**	**127.4**	**132.3**	**136.9**	**136.4**	**134.5**
	Change			-	5.2	3.7	1.6	0.1	(0.1)
	% Change			0%	4%	3%	1%	0%	0%

(Continued)

Table 3: November 2020 Forecast by Fund (millions of dollars), cont'd

Aquatic Lands Enhancement Account			FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25
02R			20.8	20.4	13.5	12.8	13.8	14.4	15.3	15.5
		Change			-	(0.2)	0.3	-	0.8	(0.9)
		% Change			0%	-2%	2%	0%	6%	-6%
Permanent Funds										
	601	Agricultural College Permanent	4.2	4.1	5.4	5.8	4.8	4.3	3.9	3.8
		Change			-	(0.6)	0.1	0.2	0.2	0.2
		% Change			0%	-9%	1%	5%	4%	5%
	604	Normal School Permanent	4.1	2.9	2.6	2.7	2.7	2.7	2.7	2.6
		Change			-	(0.1)	0.0	0.1	0.0	0.0
		% Change			0%	-4%	1%	2%	2%	2%
	605	Common School Permanent	0.8	0.2	0.2	0.3	0.3	0.3	0.3	0.3
		Change			-	-	-	-	-	-
		% Change			0%	0%	0%	0%	0%	0%
	606	Scientific Permanent	7.0	5.4	3.1	5.0	4.8	4.7	4.6	4.5
		Change			-	(0.3)	0.0	(0.0)	(0.1)	(0.1)
		% Change			0%	-5%	1%	-1%	-2%	-1%
	607	University Permanent	0.3	0.7	0.1	0.4	0.5	0.5	0.5	0.5
		Change			-	(0.1)	0.0	(0.0)	(0.0)	(0.0)
		% Change			0%	-12%	4%	-1%	-2%	-2%
Total Permanent Funds			**16.5**	**13.3**	**11.4**	**14.3**	**13.2**	**12.6**	**12.0**	**11.8**
		Change			-	(1.0)	0.1	0.2	0.1	0.1
		% Change			0%	-7%	1%	2%	1%	1%
Total All Funds			**263.7**	**274.4**	**249.4**	**231.2**	**238.1**	**244.4**	**244.3**	**241.5**
		Change			-	7.4	6.9	2.9	2.0	(1.8)
		% Change			0%	3%	3%	1%	1%	-1%

Figure 1: Timber Forecast Charts

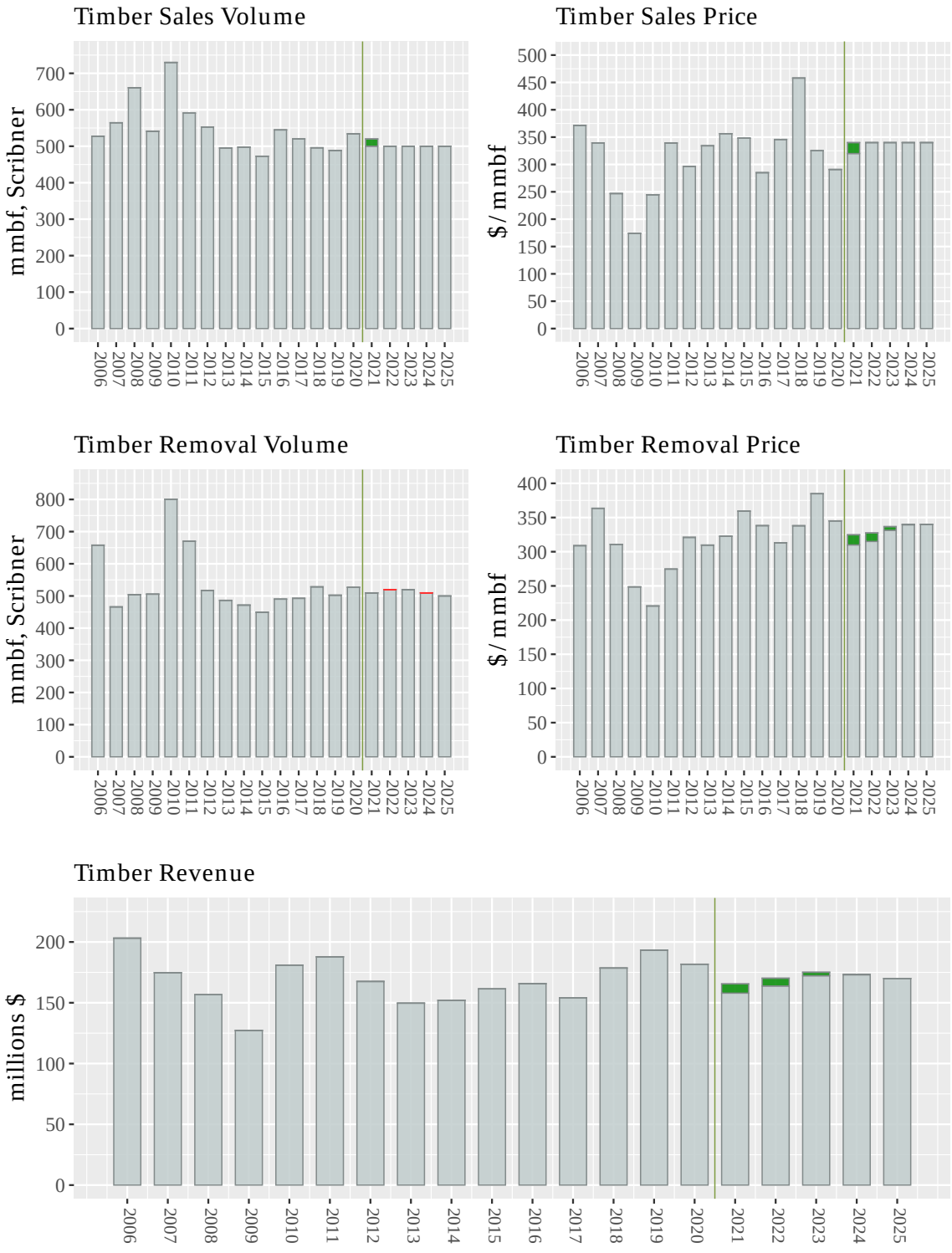


Figure 2: Other Uplands Forecast Charts

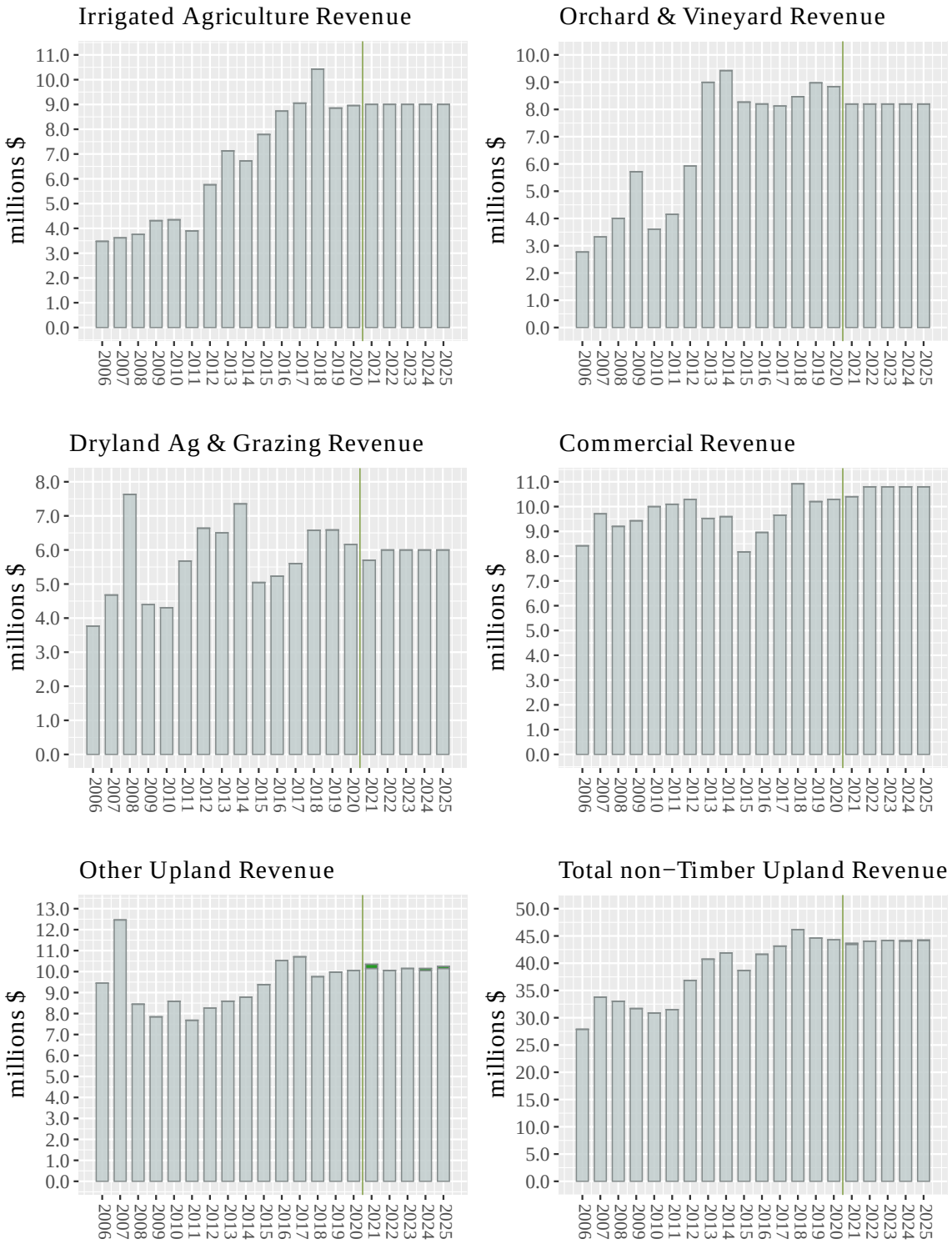
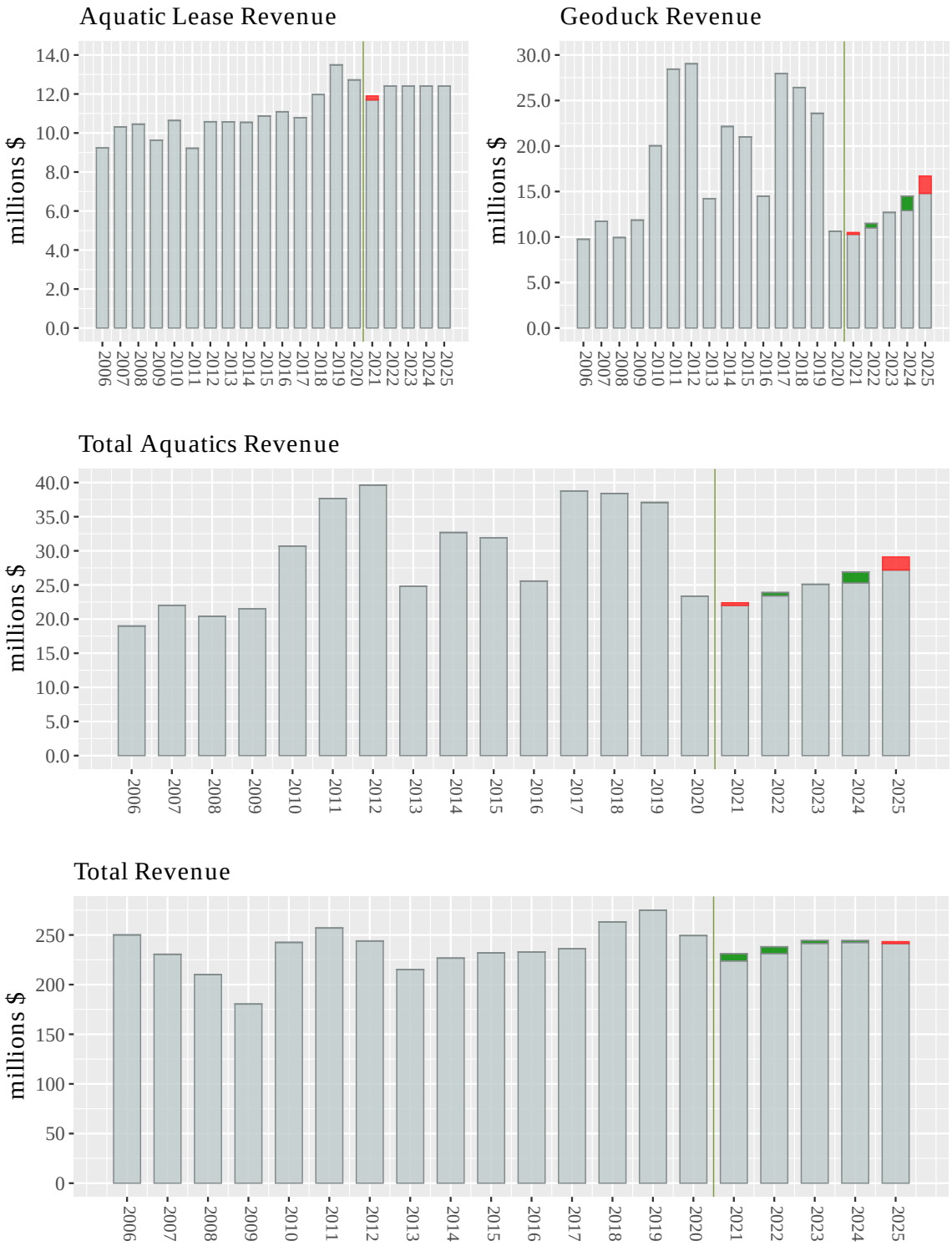


Figure 3: Aquatics and Total Forecast Charts



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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 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 2021 through 2025. Fiscal years for Washington State government begin July 1 and end June 30. For example, the current fiscal year, Fiscal Year 2021, runs from July 1, 2020, through June 30, 2021.

The baseline date (the point that designates the transition from "actuals" to predictions) for DNR revenues in this Forecast is October 1, 2020. 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 August 2020. 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)
February 2021	January 1, 2021	February 15, 2021
June 2021	May 1, 2021	June 15, 2021
September 2021	August 1, 2021	September 15, 2021
November 2021	October 1, 2021	November 15, 2021

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 also go to DNR staff who contributed to the Forecast: Koshare Eagle, Tom Heller, Patrick Ferguson, Pat Ryan, Kathryn Mink, Michael Kearney, Linda Farr, and Michelle McLain. 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.

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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.

COVID-19 Pandemic

Overshadowing all of the normal constituent parts of the forecast are the uncertainties and risks associated with the COVID-19 pandemic and the economic disruption it continues to cause. Although recent announcements based on initial results are very promising, showing that at lease one vaccine is 90 percent effective at seven days after the second dose, and suggest that there will be at least two very effective vaccines, both of those vaccines still need to complete their phase 3 trial and data needs to be submitted to regulators. Additionally, there are still questions about distribution, given that at least one of them must be transported at -75°C, and questions about how long immunity will last.

In January 2020, the World Health Organization (WHO) confirmed that a novel coronavirus had been isolated in a hospital patient in China. This happened in the lead-up to the Lunar New Year, one of the largest holidays in China, where many millions of people travel and gather with their families to celebrate. After many more people were confirmed to have the disease and a number died, the Chinese government canceled a number of public New Year celebrations.

The rapid spread of the disease, as well as its apparent contagiousness and deadliness, led quickly to the lockdown of essentially the whole of China by the end of February. Many international airlines suspended service, and Russia and Hong Kong closed their land borders. On January 30, the WHO declared the outbreak a public health emergency and encouraged the international community to help address it and protect against the spread of the virus.

As of the drafting of the February Forecast, the novel coronavirus had infected at least 17,000 people and killed more than 150 across the world, and China had just quarantined more than 50 million people. It had appeared that the spread of the virus has slowed and was no longer growing exponentially. The February forecast was based on the assumption that that China would begin returning to normal in March and that given the terrible outbreak in China, countries around the world would rally to contain the disease and the novel coronavirus outbreak would be short, though we did recognize the possibility that the disease became a pandemic. This was optimistic.

Since the February forecast, the novel coronavirus has become a pandemic and, according to data collected by The Economist, one of the world's leading causes of death this year. As of November 16, there were almost 55 million confirmed cases around the world (almost double the 28 million confirmed through September 10) and more than 1.3 million deaths, with more than 11 million cases and almost 250,000 deaths in the U.S. These data are known to be underestimates because of difficulties with testing the virus and with collecting the data. There are outbreaks in nearly every country, and it appears that even countries that had seemed to successfully halt their outbreaks, such as New Zealand, have to deal with the new flare-ups. Many countries have at least partially reopened their economies, but many are also dealing with new or resurgent outbreaks. Currently, the European Union is seeing a significant increase in cases.

The novel coronavirus pandemic has caused economic mayhem. Initially, it created the steepest and most sudden drop in employment and economic activity in US history as the virus spread through the country and led almost every state to initiate some type of stay-at-home or social-distancing order, closing schools and many businesses. Since then, the U.S. economy has seen a large rebound, though a full recovery is likely to take much longer and will probably not happen without better control of the virus.

Thus far, the U.S. has had a relatively poor public health record in response to the pandemic compared to other developed countries, with the one of the highest numbers of per-capita deaths and infec-

tion rates (though the economic comparison is unclear yet). The country has no national test-trace-isolate plan, which experts believe is necessary for effective containment. However, even if the U.S. did have an national plan to trace contacts, much of the testing available is too slow to be useful for most testing and tracing (with waiting times of a week or more), outbreaks are often too big for contact tracing to hope to be effective, and many people don't have the resources to effectively quarantine if they've been exposed. Additionally, there are reports of people being uncooperative with contact tracing officials, further undermining the efficacy of their work.

The lack of an effective national strategy to contain COVID-19 is important because it presents an enormous risk to the current nascent economic recovery from the pandemic. There is evidence that the local and national lockdowns were only a small contributor to the collapse of economic activity in March and April, with one study finding that legal restrictions on movement accounted for slightly over a tenth of the drop in activity—the vast majority of the change was due to individual choices to change behavior. Intuitively, this is a reasonable finding. If people are scared of getting gravely ill if they go out, people will go out less. A sustained recovery is unlikely without public confidence that the virus is under control, regardless of whether or not stay-at-home orders are in place. Even states that have reopened fully have seen only a partial return of jobs.

Having said that, a large number of people within the U.S. do not believe the virus exists, or believe (against evidence) that it is simply a cold or flu. In areas where more of these people live, it is possible that there will be less change in individual behavior and less decline in economic activity, at least for a while. Thus far, the pattern appears to be that if a population doesn't take the disease seriously, disregarding precautions like social distancing or wearing face masks, then there are large outbreaks that compel either a change in behavior or the enacting of some sort of rules.

The current surge in both the number of infections and the rate of growth of new infections will likely slow the economic recovery for at least the next couple of months and potentially push the economy back into a recession. This is a potentially large downside risk for this forecast for FY 21.

In addition to the real health and economic problems that the pandemic has caused, the suddenness of the changes have increased the difficulty of economic modeling. Broadly, economic models rely on historical data to try to forecast or understand how the future will look. And most economic data that feed into these models is delayed by at least a month, and often longer. The suddenness and severity of the coronavirus impacts mean that economic models are operating well outside of their historical bounds. This causes "out of sample" or "generalization" errors—the current data is just so far outside of the normal bounds that the models become ever more inaccurate.

These difficulties with economic modeling mean that it is even more difficult than normal to predict where the economy will be, even in the near future. Additionally, the economic and public health outcome of the virus depend on both unknowns about the virus itself and the policy response to it (including vaccine distribution). However, we do know that the impact has been serious and that the coronavirus will most likely continue to be a major concern across the world and will seriously limit economic activity for some time to come.

The economic damage of the virus has been extraordinary, causing a recession characterized by the sharpest drop in quarterly GDP ever measured (-9.6 percent, or -33.3 percent real SAAR) and the sharpest ever increase in national unemployment (from 3.5 percent in February to 14.7 percent in April).

However, the rebound has also been extraordinary, with the unemployment rate falling to 6.9 percent in October and preliminary Q3 GDP growth of 33.1 percent (SAAR). As noted by a pair of prominent economists, "This rebound should not be confused with a recovery." Even with a strong rebound in GDP, the U.S. and global economies are not expected to recover to January 2020 levels until mid-2021 at the earliest, and many things could make the recovery take much longer. Additionally, the

recovery has been uneven, with wide differences in output growth between industries and between employment and income recovery by industry.

It is important to emphasize that the rebound in economic activity happened on the back of an enormous fiscal stimulus and accommodating monetary policy. Congress passed the $2 trillion CARES Act, and the Federal Reserve dropped interest rates to essentially zero and, for the first time, promised to buy corporate debt as well as expanding U.S. Treasuries purchases.

The CARES Act had one-time payments to each person in the U.S., additional payments to weekly unemployment recipients, and extended unemployment benefits. The additional unemployment payments, in particular, were generous enough that many people were able to entirely replace their wages or even increase their income. This meant that although people were losing work, household balance sheets weren't necessarily falling. Indeed, personal saving actually increased in the early months of the pandemic, so people had money to spend when the virus was better under control and the economy opened up.

While the Federal Reserve activity is ongoing, the additional unemployment benefits of the CARES Act expired at the end of July. U.S. Bureau of Economic Analysis work indicates that the CARES Act unemployment programs were 5.5 percent of personal income in July. As expected, this expiration caused a fairly sharp decrease, 2.5 percent, in personal income in August. This drop has the potential to undermine spending and the current recovery in the near future, though personal saving in previous months may help to offset this.

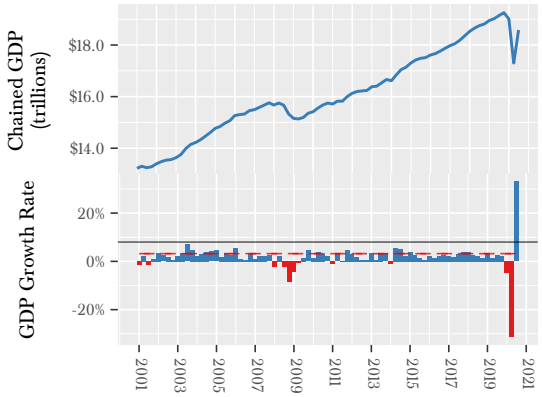
Almost every forecast that we have seen is based upon the assumption that there will be some additional stimulus package—even the most recent forecast from the FOMC on September 16. Unfortunately, it appears that with the improvements to the unemployment rate and the result of the federal elections that there is much less motivation to pass another stimulus. Given the contentious political environment, we do not expect another stimulus package.

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.

Figure 4: U.S. Gross Domestic Product

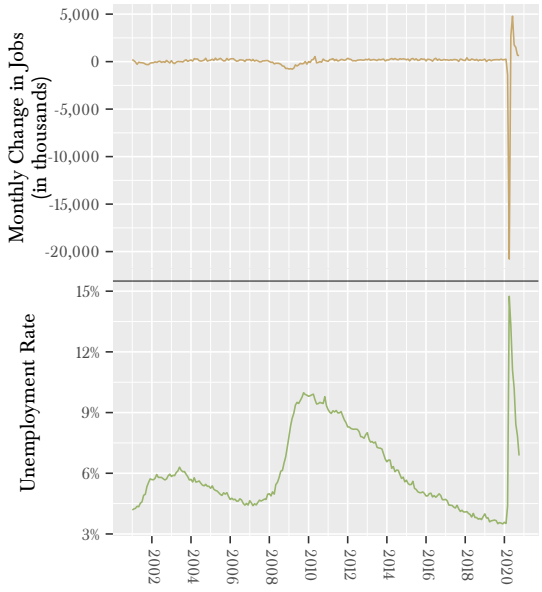


The COVID-19 pandemic caused the sharpest quarterly decline in history, first -0.86 percent in Q1 and then a staggering -9.62 percent in Q2 (-33.3 percent SAAR). However, GDP has rebounded with a the preliminary growth estimate of 33.1 (SAAR) percent in Q3. While this is a large rebound, it leaves real Q3 GDP 2.9 percent lower than 2019 Q4 GDP (Figure 4).

Typically, GDP growth rebounds after a recession, spiking to well above the historical average. Continuing to see the rebound growth rate is unrealistic, but it is unclear what GDP will look like in the near term. Current high-frequency forecasts, such as the Atlanta Fed's GDPNow and the New York Fed's Nowcast, predict Q4 GDP growth of between 2.8-3.5 percent (SAAR). However, even these are based on near-term economic activity, which will

undoubtedly be affected by the current resurgence of COVID-19 across the country.

Figure 5: Unemployment Rate and Monthly Change in Jobs



It is possible that the current resurgence and a lack of stimulus at the federal level will seriously undermine the economic recovery in the next year. Many economists and financial analysts are expecting another round of stimulus because the economic recovery was seen as very fragile even before the resurgence of the virus. With the resurgence of the virus, the economy could be in deep trouble. However, many political analysts see a divided government, with Republican control of the Senate and Democratic control of the House and Presidency, as being less likely to deliver the needed stimulus. Having said that, in the short-term, there currently there are two open seats in Georgia that will decide control of the Senate. These seats will be decided in a runoff election in early January and may provide the impetus for each party to pass a stimulus.

Without a stimulus, near-term economic growth will undoubtedly suffer, likely pulling the U.S. back into a recession. In a worst-case scenario, another recession would undermine broad confidence in the U.S. economy, leading to slow growth for the foreseeable future. However, this is unlikely to be the case. Once the vaccine is rolled out and people are confident going to public places again, it's likely the U.S. will see strong GDP growth for a couple of years, which will outweigh the slow short-term growth.

The coronavirus pandemic has upended previous GDP growth forecasts for the next few years and introduced significant uncertainty. The FOMC projects that GDP will fall by between 3.0 and 4.0 percent in 2020, with a median estimate of -3.7 percent, and grow by between 3.6 and 4.7 percent in 2021, with a median estimate of 4.0 percent. This is a much better outlook than the June forecast, when the median growth forecast for 2020 was -6.5 percent. These growth rates in 2021 would be the highest annual GDP growth since before the Great Recession and would leave GDP at about what it was at the end of 2019.

Employment and Wages

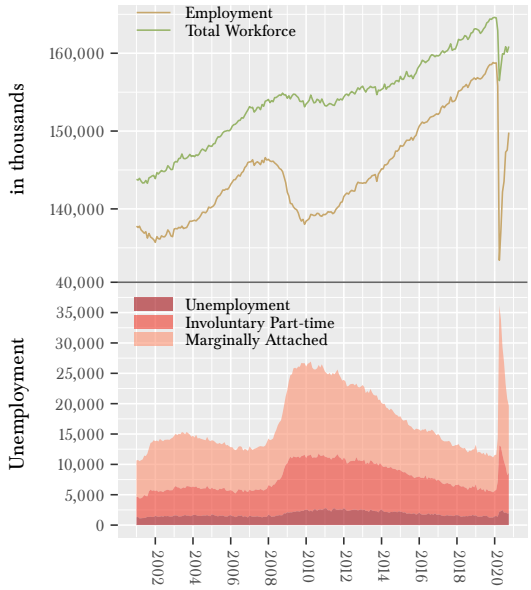
The labor market is the driving force behind consumption, which typically constitutes about 70 percent of GDP and naturally extends to the demand for housing, the major driver of U.S. timber demand. The U.S. headline unemployment rate measures the number of people looking for work as a percentage of the number of people in the labor force. It had been trending downward since peaking at 10 percent in 2010 and was 3.5 percent in February, one of its lowest points since 1969 (Figure 5).

With the shutdown of the economy, the unemployment rate shot up to 14.7 percent in April, the highest it has been since the Great Depression. However, it has rebounded sharply to 6.9 percent in October, which is still very high historically but also a dramatic improvement. Additionally, the labor force participation rate—that is, the percentage of the working age population that is in the labor force—decreased substantially from 63.4 percent in February to 60.2 percent in April. It, too, has rebounded to 61.7 percent.

Overall, this means that, despite the rebound, there

are around 10 million fewer jobs in October than in February and about 4 million fewer people in the labor force (that is, employed or looking for work).

Figure 6: Employment and Unemployment



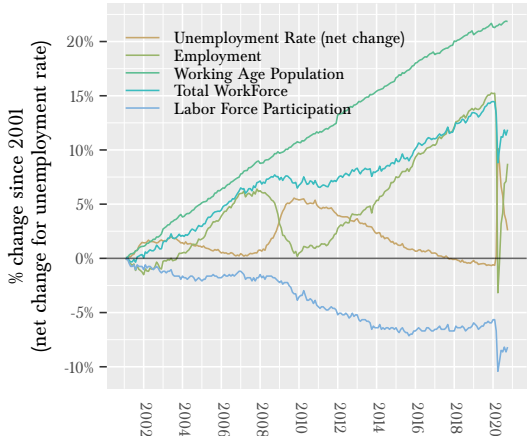
It appears that the speed of job re-growth has slowed considerably, dropping from a high of 4.7 million new (or re-created) jobs in June to 638,000 in October. While that 638,000 jobs is much higher than the average 202,000 per month since 2013, it would take 16 months for the U.S to return to February's employment at that rate. It is unlikely that jobs will continue to be "created" at that rate. Currently, many of these jobs are not new, but just re-activated from earlier layoffs, so many of the easy job gains have likely already happened. Given that many states are dealing with a surge in infections and beginning to implement shutdowns (in some form), it is likely that the job growth will soon go negative.

Additionally, the number of long-term (27 weeks or longer) unemployed has ballooned from a low of 939,000 in April, to 3.5 million in August.

Another way to get insight into the unemployment situation is to look at continued unemployment claims. This is a measure of the number of people who have continued to file unemployment insurance claims after their initial claim. During the Great Recession continued claims peaked at 6.6 million in 2009. The most recent week's estimate on November 12, 2020, is continued claims of 6.8 million. That is only slightly higher than the peak in the Great Recession, but is well below the recent peak of 24.9 million in May 2020.

The U-6 is an alternative measure of unemployment that includes involuntarily part-time employment (underemployment) and marginally attached workers, who are not included in the headline unemployment rate but who, nevertheless, are likely to be looking for work and would benefit from better job prospects. The U-6 has also ballooned since February, increasing from 7.0 percent to 22.8 percent in April. Since then it has fallen to 12.1 percent in October (Figure 6).

Figure 7: Labor Market Indicators



Inflation

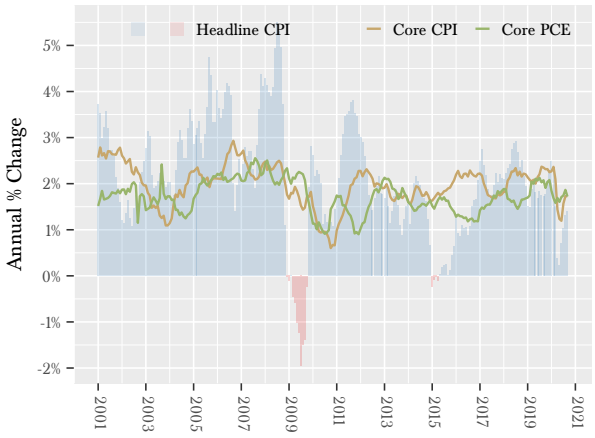
Aside from a short period in 2012, core inflation has been below the FOMC's target since the recession in 2008. Similarly to GDP forecasts, inflation forecasts have been consistently too high, with each year predicted to break the cycle of weak inflation, only to disappoint as the year progresses (Figure 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. This measure shows long-term inflation at or below the 2.0 percent target since September 2008. Core PCE growth averaged between 1.4 and 1.7 percent from 2015-2017, rose to average 1.9 percent in 2018 and fell back to average 1.5 percent in 2019.

Inflation is expected to be very low for 2020, between 1.1 and 1.3 percent, while inflation from 2021 is expected to remain under the 2.0 percent FOMC target.

In a fairly striking policy change, the FOMC announced on September 16 that they 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 is a marked departure from policy in the last 10 years, when there were a number of (sometimes contentious) interest rate increases, even though inflation was well below 2 percent.

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. 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 in the housing and auto markets. In normal times, a decrease in interest rates will expand investment, employment, wages, and consumer credit. The opposite of all of this is also true—decreasing or low interest rates can help drive economic expansion.

From December 2008 to December 2015, the Federal Reserve held the federal funds rate in the 0.0-0.25 percent range. To keep rates that low for that long was unprecedented and reflected the immense damage done by the Great Recession. 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 around 2.0 percent inflation.

Beginning in December 2015, the FOMC gradually raised interest rates from 0.0-0.25 percent range to 2.25-2.5 percent range by the end of 2018. Its notable that these increases were made based on progress in the recovery of employment and inflation, and a strong economic growth outlook, rather than employment or inflation that had reached any threshold. Given this history, it is a significant change that the FOMC has backed away from this policy, promising to keep rates very low until the *average* inflation is around 2 percent.

As a response to the economic threat of the novel coronavirus pandemic, the FOMC held a special meeting in March and dropped the federal funds rate to 0.1 percent. In addition to the new policy, the FOMC outlook released on September 16 is extraordinary, showing that their median projections are for a 0.1 percent federal funds rate until *2022* at least.

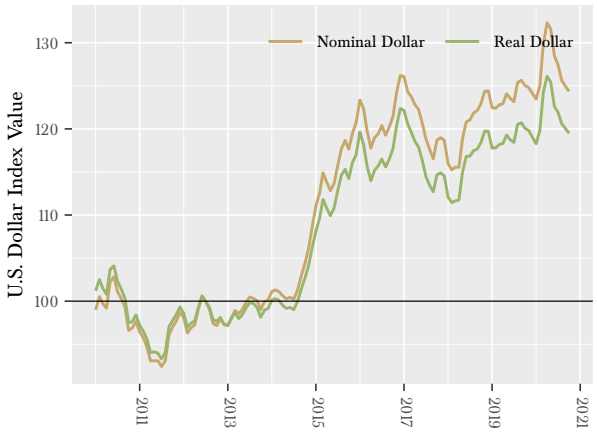
The U.S. Dollar and Foreign Trade

The trade-weighted U.S. dollar index climbed dramatically from 2014 through late 2016. Through 2015 and 2016, this was largely due to the relative strength of the U.S. economy, which, although fairly weak, was growing faster than most other advanced

countries. Although the value of the U.S. dollar was below its 2015 peak for most of 2016, the results of the U.S. presidential election pushed the exchange rate well above its previous high. From mid-2017 to May 2018, the dollar dropped back, but then increased above its earlier 2016 high. Between February and April, 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). Since April, it has fallen back somewhat, but is still higher than any time since before 2010.

A rising 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. 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 9: Trade-Weighted U.S. Dollar Index

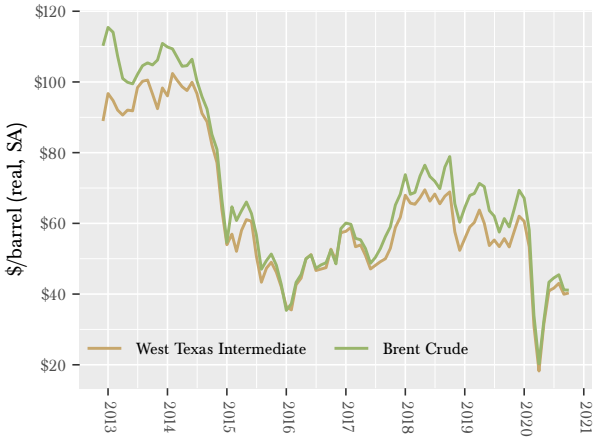


Foreign trade and access to export markets is normally important for DNR revenues. Chinese demand for timber and lumber was a major support for lumber prices after 2010, even though DNR timber cannot be exported directly. Additionally, much of the soft white wheat produced in Washington is exported to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

Prior to the COVID-19 pandemic, there were ongoing trade tensions between the U.S. and China. Although a "Phase One" trade deal had been signed before the pandemic to deescalate the trade war, there weren't actually any apparent changes to tariffs. So, in addition to the pandemic and high dollar pushing down export demand, the policies of the current U.S. administration and the trade war are likely to continue to suppress foreign demand. Currently, China is the main target of U.S. tariffs, and it has imposed a number of tariffs on U.S. goods in response. Of the products relevant to DNR revenue, softwood logs are subject to a 5 percent tariff. Geoduck, wheat, and many orchard/vineyard agricultural products (such as apples) are also subject to a 5 percent tariff, apparently due to the pandemic. Prior to the pandemic, they were taxed with a 25 percent tariff.

It is unclear how the incoming U.S. administration will approach the trade war.

Figure 10: Crude Oil Prices



Petroleum

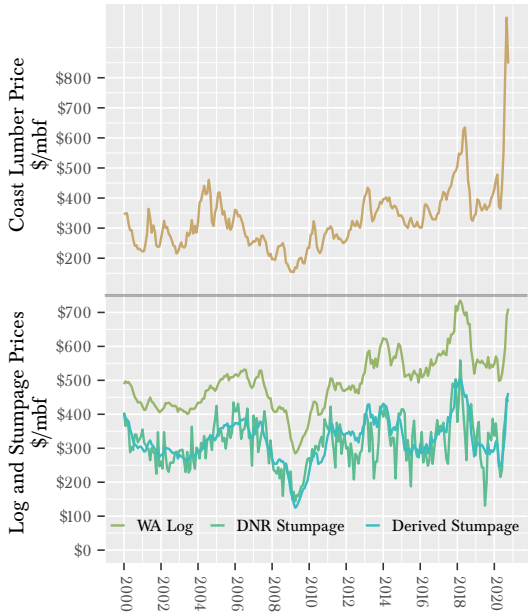
Broadly, a drop in oil prices acts like a tax cut for consumers and can encourage consumption. Additionally, all other things being equal, lower petroleum prices will decrease diesel fuel prices and will make transportation-sensitive industries—such as Pacific Northwest logging and agriculture—more competitive in international markets.

Crude oil and its derivatives strongly affect production, transportation, and consumption in the world and U.S. domestic economies. As with everything else, the coronavirus pandemic has had a major impact on oil prices, even sending the spot prices negative for a short time (Figure 10). This should help support economic growth, but again, much hinges on the virus and how it is dealt with across the globe.

Wood Markets

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

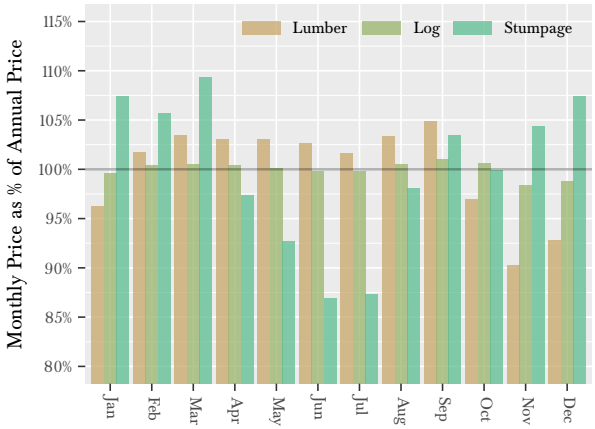
Figure 11: Lumber, Log, and Stumpage Prices in Washington



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 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. 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.

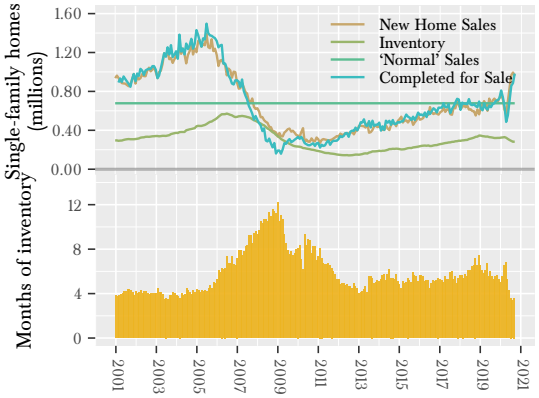
The 2007 crash in the housing market and the following recession drastically reduced demand for new housing, which undermined the total demand for lumber. Since the 2009-11 trough, an increase in housing starts has driven an increase in lumber demand, though not to nearly the extent of the peak. Prolonged growth in starts is essential for a meaningful increase in the demand for lumber.

As with almost every other part of the economy, the coronavirus pandemic has created a lot of uncertainty in the housing market. Since the initial collapse in activity, both starts and new home sales have risen significantly—largely driven by strong household balance sheets and record-low mortgage rates, which dropped to 2.95 percent in September.

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 (Figure 13). New home sales increased from 440,000 (SAAR) in 2014 to an average of 616,000 in 2017, still well below the long-term (1963-2010) "normal" rate of 678,000 sales per year. In 2018, new home sales averaged 651,000 (SAAR) through May, before dropping meaningfully to average 593,000 for June-December. From November 2019 through January 2020, new home sales rose steeply, to peak at 774,000, the highest it had been since the recession.

Figure 13: New Single-Family Home Sales



From January through April, new single-family home sales fell precipitously to 570,000. However, April was the bottom—since then, sales have grown beyond their January highs to a peak of 994,000 in August, before falling back to 959,000 in September.

Based on the rebound, the continued resiliency of the market, very low interest rates for the foreseeable future, solid household balance sheets, and strong demand, new home sales are expected to remain high for several years.

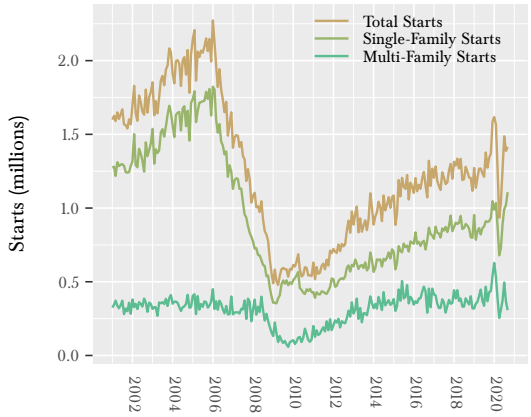
Housing Starts

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 multi-family starts. Single-family starts were more or less flat after the recession through 2012, but have been rising slowly since (Figure 14). Starts picked up meaningfully in the last quarter of 2019 to average 1.3 million (SAAR), above the 1.25 million average for 2018. Although this was well above the 2012 average of 0.78 million (SAAR), it is still well below the pre-recession long-term average of 1.6 million.

The boom in home sales has coincided with a boom in housing starts, which had reached a post-Great Recession high in January, but then fell dramatically through April. Since April, starts across the U.S. have rebounded strongly, to around 6 percent below the January peak in seasonally adjusted terms. However, starts on the West Coast have not increased nearly as much and are still about 25 percent below their January peak—at about the same level as the average starts in 2019.

Like sales, expectations for starts for the foreseeable future have been increased based on the current rebound, very low interest rates, and underlying demand.

Figure 14: Housing Starts

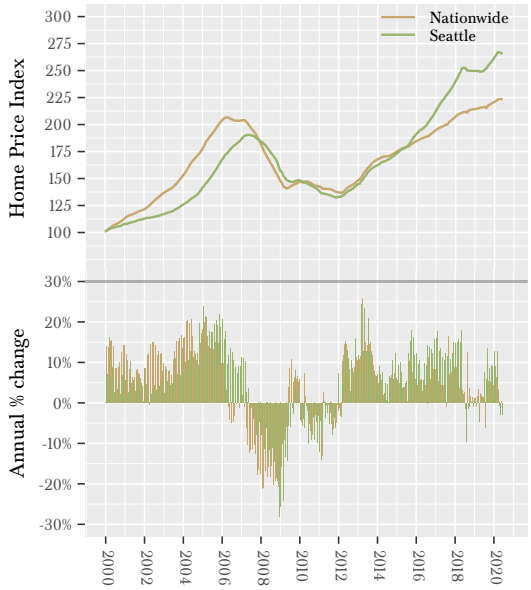


Housing Prices

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 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.

Nationally, after increasing in most months since bottoming out in January 2012, the Case-Shiller 20-city composite price index growth slowed significantly from May 2018 to late 2019. Seattle house prices had been growing much faster than national prices, doubling from its low in February 2012 to July 2018, while nationally house prices increased by 62 percent. From late 2019, the index started growing strongly again.

Figure 15: Case-Shiller Existing Home Price Index



Although it seems that the pandemic has pulled prices down a little bit, the effect has been muted overall. The Case-Shiller index growth stalled a little in June, but appears to be picking up in the August numbers.

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, thereby raising all 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 which is referred to as

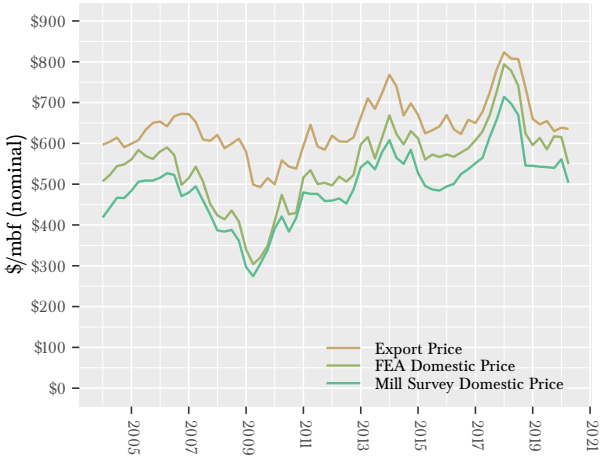
the "export premium" (Figure 16). The export premium is primarily due to the characteristics of the export markets, which can include a demand for higher-quality wood, a high value placed on long-term contracts, and high transaction costs.

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.

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. China primarily imports hemlock, but has been much more variable in its demand.

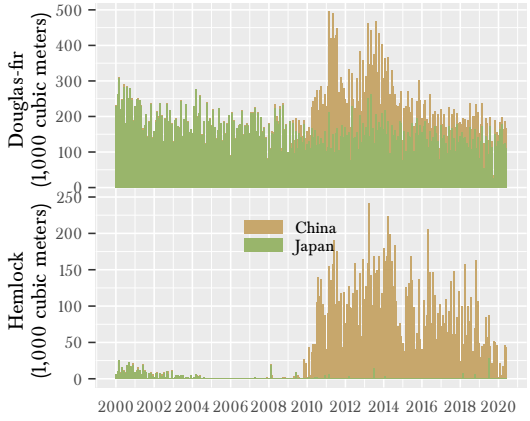
After entering the market meaningfully in 2010, demand from China was a major support for log and lumber prices in Washington (Figure 17). That started waning in late 2014 as China's economic health wavered, the U.S. dollar appreciated while the value of the euro and ruble dropped (making U.S. timber comparatively more costly), and a 25 percent Russian tariff on log exports was reduced.

Figure 16: Log Export Prices



Surprisingly, exports to Japan in the first four months of the year were actually around 20 percent higher than the first four months of 2019. As we've been expecting, it looks like exports are falling, particularly to China, as they are out-competed by local demand due to robust housing starts.

Figure 17: Log Export Volume



Price Outlook

Lumber Prices

As shown in Figure 11, lumber prices started increasing rapidly in late 2017. In June 2018, prices hit $635/mbf, higher in real terms than any since 2000. However, from June 2018, prices dropped dramatically to a low of $324/mbf in November 2018—a 47 percent drop. Prices through October 2019 made a modest recovery to average $371/mbf, before jumping to $411/mbf in December 2019.

Lumber prices continued to recover through the beginning of 2020, but fell when the pandemic began. However, April appears to have been the bottom of the market, and prices have shot up due to constrained supply, from mill closures and furloughs, and strong demand, due to strong housing starts, and remodeling and renovation activity. Prices hit $1,000/mbf in September, but fell back to $847 in October—still much higher in real terms than they've been since before 2000.

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.

Log prices appear to have bottomed in April and by August had already recovered to higher than they were in January. Prices are not likely to see the same extreme increases that lumber has because timber harvesters and mills often have an inventory of standing timber to draw from so they don't always need to bid up prices. Prices are expected to fall back a bit from their current highs in Q4 2020, before growing quickly in early 2021.

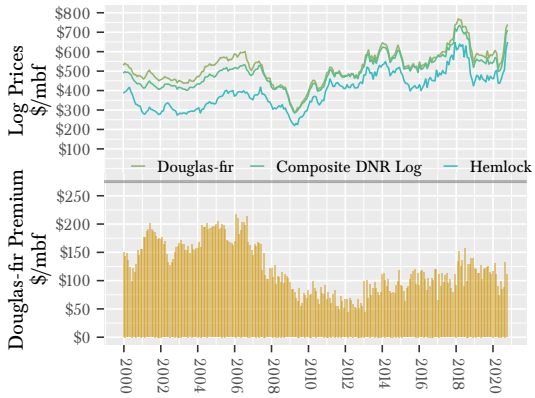
Stumpage Prices

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. Currently, stumpage prices are roughly in line with log prices—both having rebounded from the fall in Q2. While log and lumber prices bottomed out in April, DNR stumpage prices fell through May, to a low average auction price of $215/mbf. However, they rebounded earlier than expected, jumping to $347 in July, which typically has the lowest auction prices of a year.

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.

Figure 18: DNR Composite Log Prices

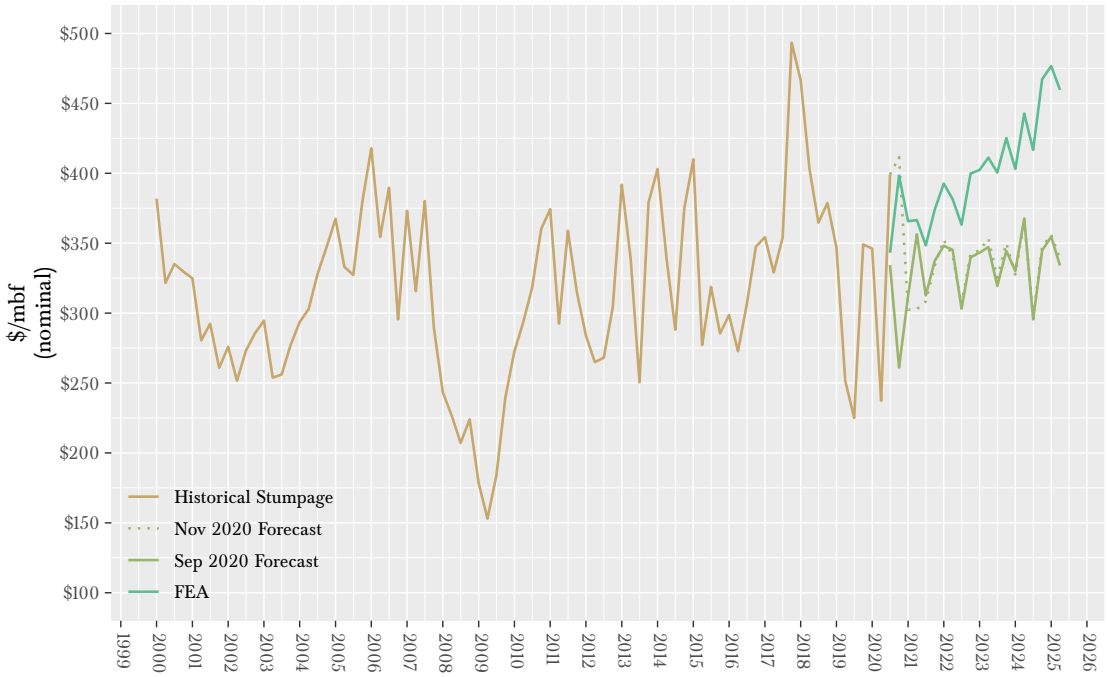


DNR Stumpage Price Outlook

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

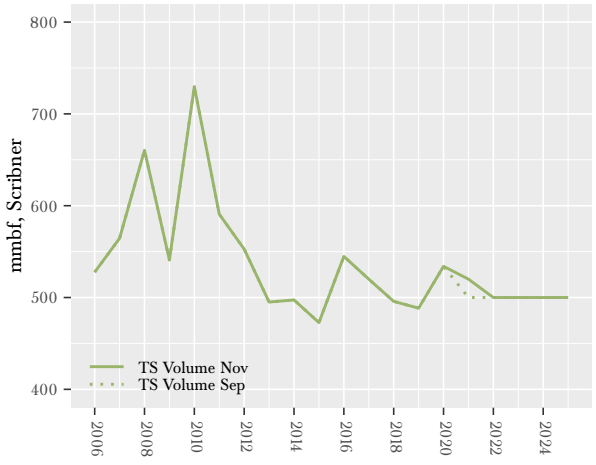
This Revenue Forecast includes revenue generated from timber sales on trust uplands, leases on trust uplands, and leases on aquatic lands. It also forecasts revenues to individual funds, including DNR management funds, beneficiary current funds, and beneficiary permanent funds. Caveats about the uncertainty 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 around two years. 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

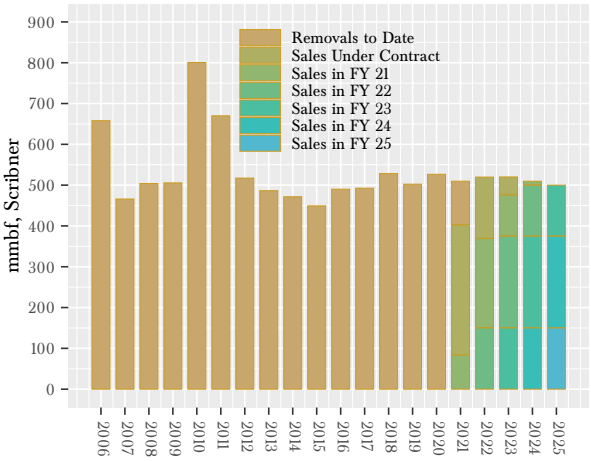


Timber Sales Volume

The sales volume forecast for FY 21 is increased to 520 mmbf based on strong demand and DNR planned sales (Figure 20). DNR plans to offer roughly 560 mmbf for sale, including some remaining sales that had been planned for FYs 19 and 20. However, there are always sales that receive no bids, and it is not unusual to have sales contested or withdrawn. The sales volume forecast in outlying years in unchanged.

FY 15 was the first year of the new sustainable harvest decade (FY 15 through FY 24) for Western Washington, though the new Sustainable Harvest Calculation wasn't officially adopted until December 2019. However, multiple lawsuits have been filed that put the status of the new sustainable harvest estimates into question. Without certainty on the sustainable harvest limit, annual Westside sales volumes forecasts are unchanged at 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 22-25.

Figure 21: Forecast Timber Removal Volume



Timber Removal Volume

The FY 20 removal volume was 527 mmbf, 17 mmbf higher than we forecast in June (Figure 21). The FY 21 volume harvest forecast is unchanged—harvest activity to date is in line with the current

510 mmbf forecast. Removal volumes in outlying years are also unchanged.

Figure 22: Forecast Timber Sales Price

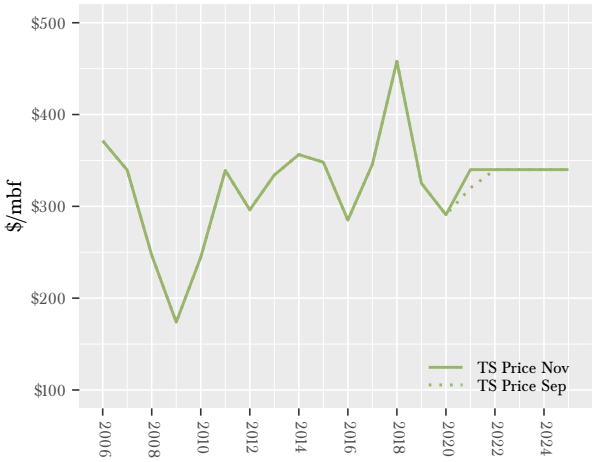
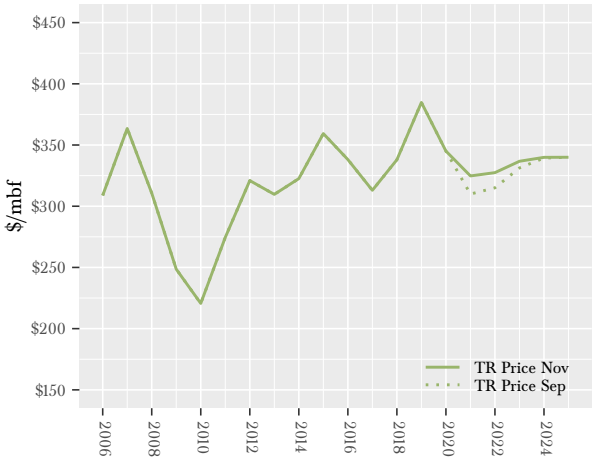


Figure 23: Forecast Timber Removal Price



Timber Sales Prices

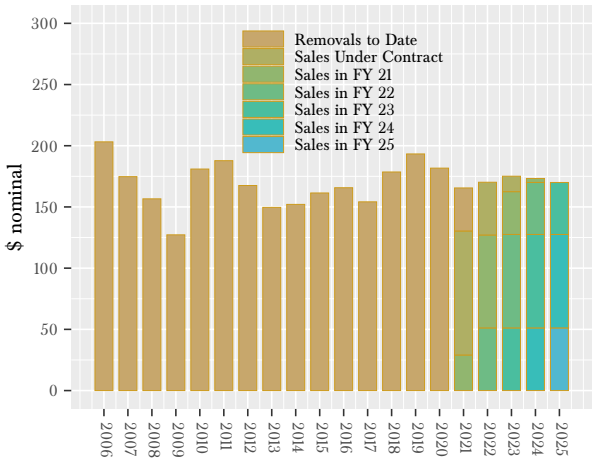
The price results of monthly DNR timber sales are quite volatile (Figure 11). As discussed in the stumpage price outlook, the DNR sales price (stumpage) forecast is informed by West Coast log and stumpage price estimates from a forest economics consulting firm. The sales price forecast for FY 21 are increased by $20/mbf due to increased demand expectations and consistently high auction prices.

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).

The expected increase in FY 21 sales prices, a high average removal price for harvests to date and an increase in the value of timber inventory expiring in FY 21—it appears that harvesters have been harvesting higher-value timber expiring in FY 22 and beyond—have increased removal price expectations through FY 24.

Figure 24: Forecast Timber Removal Value

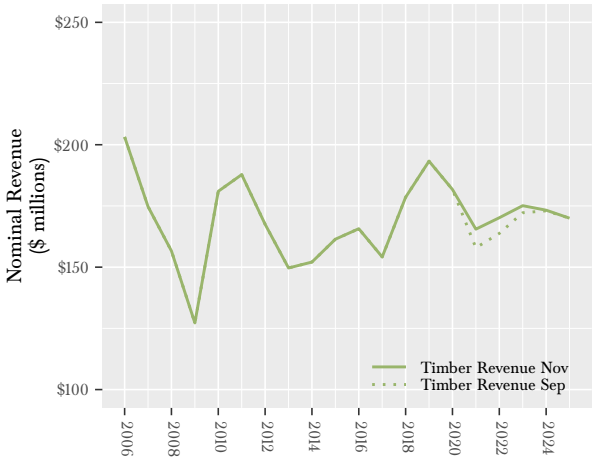


Timber Removal Revenue

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 revenues for the 2019-21 biennium are increased to $347 million (+$8 million) and revenues for the 2021-23 biennium are increased to $345 million (+$9 million).

Figure 25: Forecast Timber Removal Revenue

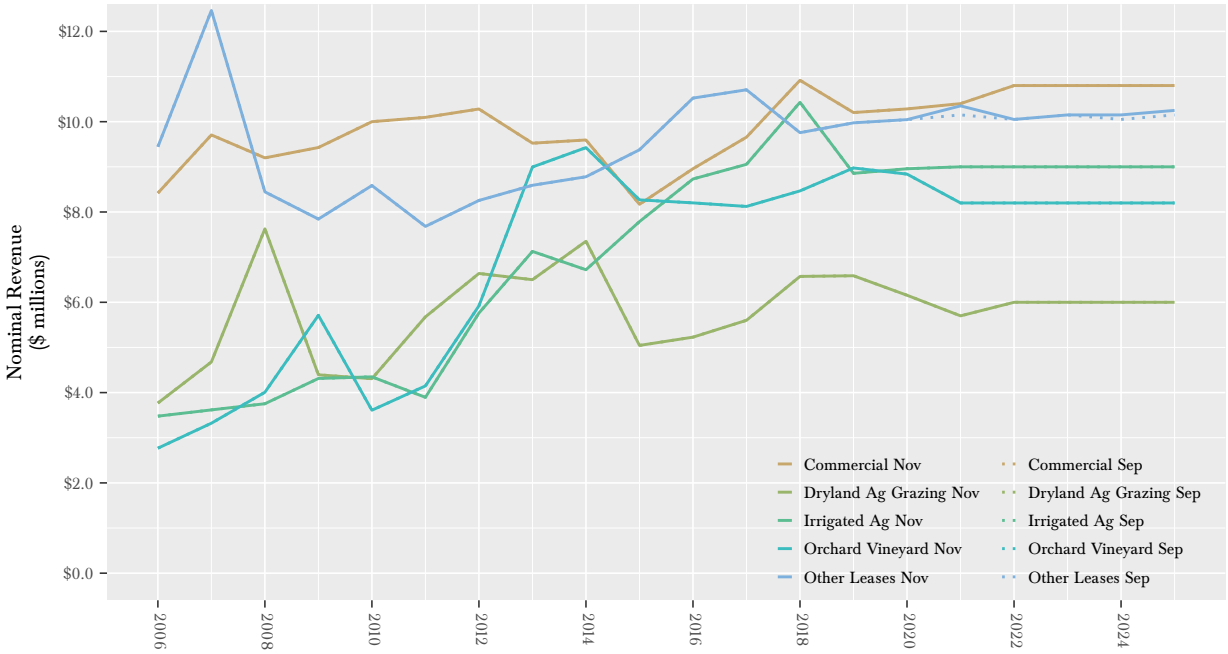


Upland Lease Revenues

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

Only the communication lease revenue forecast is increased slightly in FY 21 due to higher-than-expected revenue from lease renewals with back-rent payments. There are also slight increases in FYs 24 and 25 to correct for an error in the previous forecast.

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 and geoduck sales account for the remainder. However, prices for geoduck have plummeted since the beginning of the fiscal year, so we are now forecasting geoduck to make up less than half of the aquatic lands revenue.

The aquatic lease revenue forecast is decreased by $0.2 million in FY 21 due to lower than expected to-date revenue in non-water-dependent rents (Figure 27).

By late 2019, geoduck prices had already fallen substantially because of the slowdown in Chinese economic growth and the impact of the trade war. After the lockdown in China due to COVID-19, harvest of geoduck destined for China basically stopped, leaving only about 10 percent of the normal daily harvest—which is bound for other international locations or for domestic consumption.

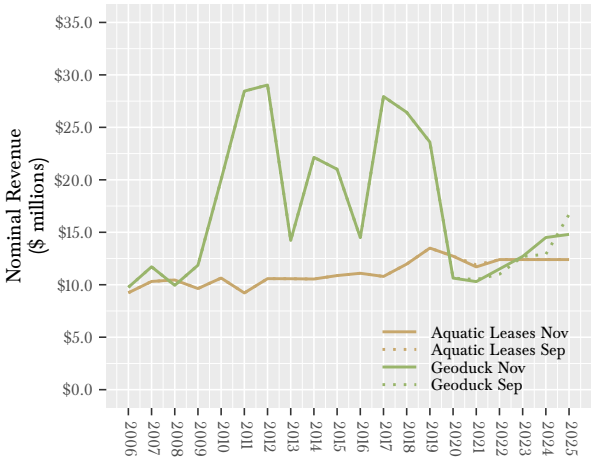
Previously, we had assumed that harvest volumes would recover reasonably quickly to the roughly 95 percent of sales volume that we typically see. However, they have lagged for much longer, and the ongoing pandemic and trade tensions have compelled us to revise our assumptions.

Having said that, prices have held up better than we had feared. The April auction offered indemnification for purchasers if they did not harvest all of their contracted pounds—which led to a surprising $8.98/lb. average price (Figure 28). However, the June auction had an average price of $8.46/lb. and, importantly, did not offer a blanket indemnification. Prices for the July and September auction have been much less exciting at $5.05/lb. and $6.11/lb., respectively.

Forecast geoduck revenue is decreased slightly in FY 21 and increased in FY 22 due to changes in sales volume timing expectations. In outlying years, the geoduck forecast is altered in FYs 24 and 25 due to changes in harvest volume timing assumptions.

Aside from the COVID-19 pandemic, there remains a trade war between the U.S. and China, with high tariffs on geoduck, and ongoing economic difficulties in both countries. These are expected to continue at least through the middle of 2021, limiting Chinese consumption and continuing to push Chinese consumers toward other luxury seafood.

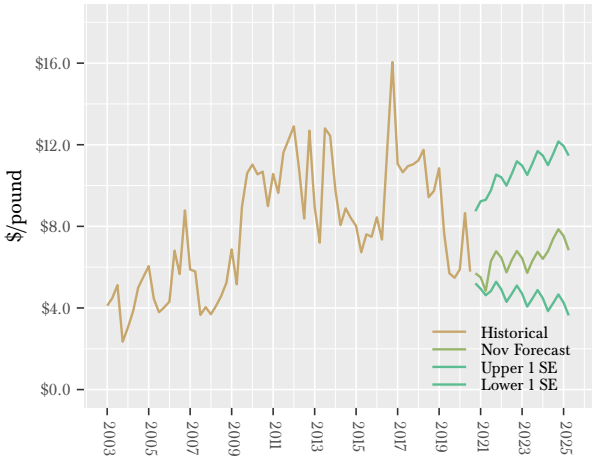
Figure 27: Aquatic Lands Revenues



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:

- Harvests (and therefore revenues) could be deferred or lost if geoduck beds are closed due to occurrence of paralytic shellfish poison.
- Furloughs at the Washington State Department of Health have delayed PSP and arsenic analyses and have led to lost fishing days in the past couple of months. It is unclear if these will continue or how disruptive they will be.
- In light of recent Washington Department of Fish and Wildlife surveys of closed South Puget Sound geoduck tracts showing declining recovery rates, and evidence of active poaching, future commercial harvest levels may be further reduced.

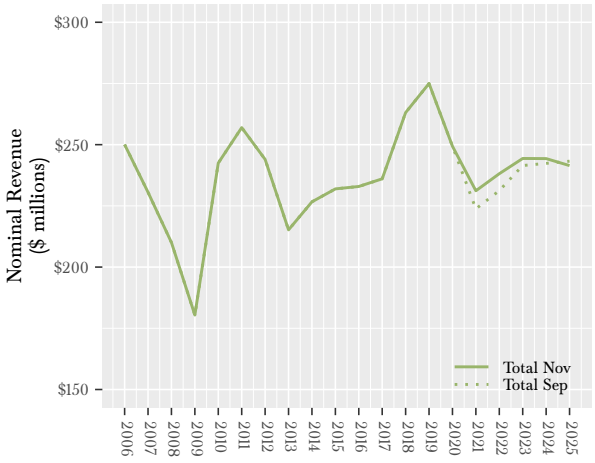
Figure 28: Geoduck Auction Prices



Total Revenues from All Sources

Forecast revenues for the 2019-2021 Biennium (FYs 20 and 21) are increased by 1.6 percent ($7 million) to $481 million, and revenues for the 2021-2023 biennium are increased by 2.1 percent ($10 million) to $483 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 FYs 21 by trust, and relative historical timber prices by DNR region by trust; and
- The volumes of timber by trust for FYs 22-25 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 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 Account (FDA). In biennial budget bills, the Legislature has authorized a deduction of up to 30 percent to RMCA since July 1, 2005. In 2015, they began authorizing an RMCA deduction of up to 31 percent.

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 all forecast years. This assumes that the Legislature will continue to approve RMCA deductions of up to 31 percent.

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

	FY 21	FY 22	FY 23	FY 24	FY 25
FDA	25	25	25	25	25
RMCA	31	31	31	31	31