Oregon Board of Forestry – Virtual Public Special Meeting

Thursday, December 14, 2023

The special meeting will be streamed live on the department's YouTube channel. Public comment will not be taken during this special meeting. Access to the special meeting will be made available electronically and online, to view the Board of Forestry meeting, click on the link, https://www.youtube.com/c/OregonDepartmentofForestry

Prior meetings' audio and this meeting's written material are available on the web at www.oregon.gov/odf/board.

Action and Information

2 p.m. **Special meeting commences with meeting protocols and roll call**

2:05 p.m. **State Forests Management Plan Presentation** .....Mike Wilson and Tod Haren
The Department's State Forests Division will present results from the modeled analysis of the draft Western Oregon State Forests Management Plan. This is an information item.

3:25 p.m. **Board and Forest Trust Land Advisory Committee Engagement** .....Board Members and .....FTLAC Chair John Sweet and Vice-Chair Erin Skaar
The Forest Trust Lands Advisory Committee (FTLAC) is invited to participate in the Board discussion, moderated by an external contractor. The Board may conclude the meeting with closing comments. This is an information item.

4:30 p.m. **Special meeting adjourns**

The times listed on the agenda are approximate. At the discretion of the chair, the time and order of agenda items—may change to maintain the meeting flow. To provide the broadest range of services, lead-time is needed to make the necessary arrangements. If special materials, services, or assistance is required, such as a sign language interpreter, assistive listening device, or large print material, please contact our Public Affairs Office at least 72 hours before the meeting via telephone at 503-945-7200 or fax at 503-945-7212.

Agenda Item No.:	1
Work Plan:	State Forests Work Plan
Topic:	State Forests Management
Presentation Title:	State Forests Management Plan Modeling
Date of Presentation:	December 14, 2023
Contact Information:	Mike Wilson, State Forests Division Chief (503) 945-7351 Michael.Wilson@odf.oregon.gov Tod Haren, Forest Resource Analyst (503) 945-7370 Tod.H.Haren@odf.oregon.gov

CONTEXT

State Forest lands are required to be managed for the Greatest Permanent Value (GPV) to the state (Oregon Revised Statutes 530.050, Oregon Administrative Rule (OAR) 629-035-0010(2)). The Board has defined GPV to mean healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits to the people of Oregon (OAR 629-035-0020). Forest Management Plans provide the overarching management direction for State Forests that allow for the achievement of GPV. These plans are developed pursuant to OAR and are adopted by the Board of Forestry to codify the Board's finding that management direction meets Greatest Permanent Value (OAR 629-035-0030).

FMP Development

In October 2020, the Board of Forestry (Board) directed the Division to develop a draft Western Oregon State Forests Management Plan (FMP) that would use the draft Western Oregon State Forests Habitat Conservation Plan (HCP) as its mechanism for compliance with the federal Endangered Species Act (ESA). The FMP, which was presented to the Board in September 2023, provides an overall high-level forest management approach and goals and strategies for a broad spectrum of forest resources. The HCP provides biological goals and objectives for 17 covered species to ensure compliance with the federal Endangered Species Act. The HCP establishes specific conservation actions and management standards, a monitoring and adaptive management framework, and specific thresholds for changed circumstances that provide assurances for the covered species and covered forest management activities. The draft FMP is needed to articulate the complete integrated forest management approach for state forest lands in western Oregon. Together, the FMP, HCP, and other policies guide Implementation Plans, which specify management activity targets to be accomplished over a planning horizon of approximately 10 years.

BACKGROUND

The Division commissioned a Comparative Analysis (CA) using high-level modeled outcomes to assist the Board of Forestry (BOF) in deciding whether it was in the best interest of the state to continue to pursue a Habitat Conservation Plan (HCP) and enter the National Environmental Policy Act (NEPA) process in 2020. The CA modeled a comparison between: 1) continued implementation of the current FMP using take avoidance, 2) continued use of take avoidance using a potential new FMP, and 3) with implementation of an HCP (which would also require development of a new FMP). The

modeled outcomes were intended for the purpose of comparing the relative differences between the three management scenarios, not for setting harvest levels.

Following the Board direction to move forward with the draft HCP in 2020, the Division has continued work on the draft HCP and the draft FMP. This work included improving the input data and methodology for the forest planning model. Substantial differences exist between the modeling for the CA and the current modeling effort for the FMP (Attachment 1), including the type of model used, growth and yield estimates, updated forest inventory, updated silvicultural prescriptions, and others. One of the most significant changes is the update to the growth and yield tables. In 2020, staff review of the model identified some issues with the rate and culmination of growth in forest stands; however, as the purpose of the modeling was to provide a relative comparison between different approaches for ESA compliance and forest management to evaluate whether the Division should continue to pursue the HCP and not to set harvest levels, no adjustments were made to the yield tables due to lack of time and capacity.

In 2022, the Division produced revised district Implementation Plans to allow for fiscal year 2024 and 2025 (and potentially 2026) Annual Operations Plans that could accommodate the transition from: 1) take avoidance to an HCP, and 2) the current FMP to a new FMP. A different forest activity model was used to provide more spatially explicit outcomes for harvest units, but the same growth and yield inputs from the CA were used. As a result of review by field staff, overall volume estimates were adjusted downward. The Division also developed a plan to improve calibrations to growth and yield to provide more accurate results.

The model results presented here benefit from improvements made to the growth and yield tables from a collaboration with forestry consultant Mason, Bruce and Girard (MBG). The Division and MBG developed empirical volume yield curves using data from USFS Forest Inventory Assessment (FIA) plots and the Division's Stand Level Inventory (SLI) measured stands. The resulting yield curves were used as a guide for adjusting FVS projections. These calibrated yield tables were then reviewed by ODF field staff, who indicated the projected yields were much more accurate. These improved growth and yield tables are used for modeling for the scenarios presented here for the draft FMP with draft HCP.

Western Oregon State Forests Management Plan Modeling

The analysis presented here considers a 150-year planning timeframe for all ODF managed lands in western Oregon, including both Board of Forestry and Common School Forest lands. It does not include any ODF managed lands in eastern Oregon. The modeling used two geographic scales: 1) each State Forests management district individually, and 2) larger, multi-district regions consisting of a north coast region (Astoria, Tillamook, and Forest Grove districts), Willamette region (North Cascade and West Oregon districts), and a southern Oregon region (Western Lane District). The analysis also considered two approaches for temporal harvest flow (i.e., the timing of harvest over the planning timeframe) – use of non-declining even-flow and use of a limited departure from even-flow. The limited departure was applied using an objective of maximizing net present value and was implemented only at the scale of larger geographic regions. Non-declining even-flow was modeled at both the district and regional scales and applied to three

objectives: 1) maximizing timber harvest volume, 2) maximizing timber harvest volume with an extended rotation age, and 3) maximizing net present value. This combination of geographic scale, temporal harvest flow and objectives resulted in seven scenarios that were implemented using Patchworks (https://spatial.ca), a spatially explicit forest planning model that allows for the integration and weighting of multiple objectives.

The modeling report provides analysis for important economic and environmental outcomes associated with the management of these lands under the FMP. Estimates are provided for harvest volumes and revenues, as well as forest stand metrics such as age, carbon storage and forest structure across the landscape. Forest structure metrics are further used to estimate habitat suitability for three of the covered species under the draft HCP (northern spotted owl, marbled murrelet, and red tree vole). Harvest volumes and revenues will be further developed into a more robust socio-economic report. The Division has contracted with ECONorthwest to produce this report, which is anticipated to be complete in the spring of 2024.

RECOMMENDATION

Information only.

NEXT STEPS

Over the next several months, the Division will:

1. Continue working with the Board to revise the FMP per Board direction.
2. Provide a more detailed socioeconomic analysis of the scenario outcomes.
3. Revise the draft Adaptive Management Plan and performance measures in response to feedback and to maintain alignment with the draft FMP and draft HCP.

Provided that the HCP policy work is on schedule, the FMP will be brought back to the Board to begin the process of adopting the FMP in 2024.

ATTACHMENT

1. Oregon Department of Forestry, Forest Management Plan Modeled Outputs, Dec. 2023

Oregon Department of Forestry Forest Management Plan

Modeled Outputs

December 13, 2023

Introduction and Background

Comparative Analysis & Yield Table Calibration

In 2020 the State Forests Division (Division) commissioned a Comparative Analysis using high-level modeled outcomes to assist the Board of Forestry (BOF) in deciding whether it was in the best interest of the state to continue to pursue a Habitat Conservation Plan and enter the National Environmental Policy Act (NEPA) process. The comparative analysis evaluated the modeled outcomes and tradeoffs expected between three different management scenarios. The scenarios included implementation of:

1. the current 2010 Northwest and Southwest Oregon State Forest Management Plans and an associated take avoidance approach to Endangered Species Act (ESA) compliance;
2. the 2018 draft revised Forest Management Plan and an associated take avoidance approach to ESA compliance; and
3. the draft Habitat Conservation Plan.

The high-level modeled outcomes used in the comparative analysis were intended for the purpose of comparing the relative differences between these three management scenarios based on several metrics including habitat quantity and quality, harvest volume, carbon, recreation, and financial metrics. This analysis was presented to the BOF in October 2020 and was used to inform the BOF's decision to direct the Division to move forward with the draft Habitat Conservation Plan and to develop a new Western Oregon State Forest Management Plan that is compatible with the draft Habitat Conservation Plan. Based on this direction the Division has been working for the past 3 years on supporting the NEPA process for the draft Habitat Conservation Plan and developing the 2023 draft Western Oregon State Forest Management Plan. This work included updating inputs to the model including inventory, silviculture prescriptions, reforestation zones, updated data (operationally limited areas, harvest units, roads, recent thinnings, etc.), and growth and yield tables.

Figures 1 and 2 compare the modeled volume outcome from the 2020 Comparative Analysis draft Habitat Conservation Plan run to the recently completed modeled volume outcome from Scenario 4 of the 2023 draft Western Oregon State Forest Management Plan with draft Habitat Conservation Plan. Scenario 4 is intended to emulate the 2020 Comparative Analysis draft Habitat Conservation Plan model run using updated inventory, growth and yield data and a more spatially explicit model.

Figure 1. Comparative Analysis Draft Habitat Conservation Plan Modeled Outcomes

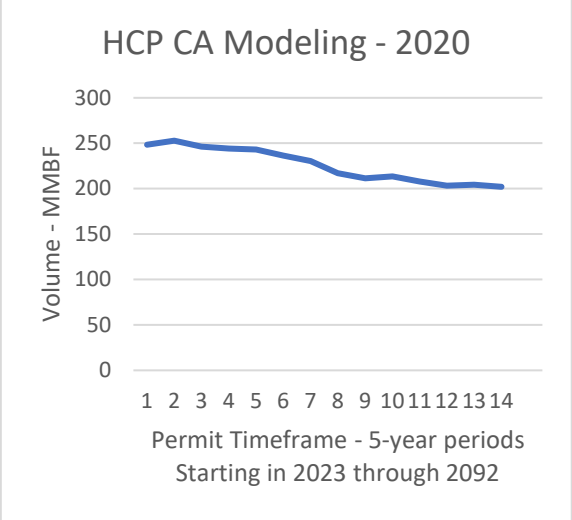
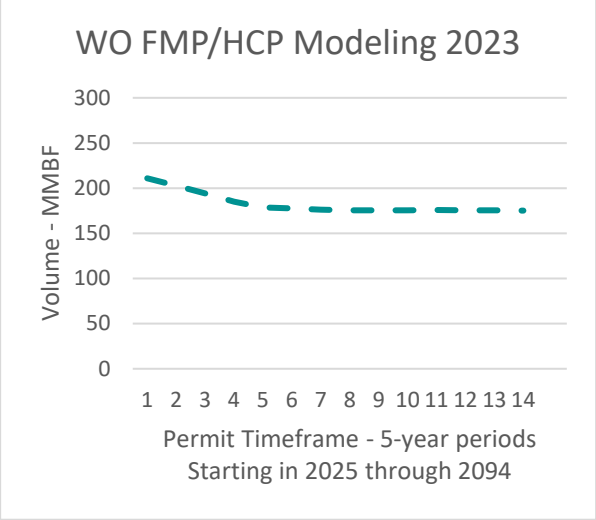


Figure 2. 2023 Western Oregon Forest Management Plan with draft Habitat Conservation Plan Modeled Outcomes



As illustrated above, the two forest models yield notably different volume outcomes due to variations in their modeling processes and updated information.

Differences in the modeling processes include:

Draft Habitat Conservation Plan Comparative Analysis	**2023 Western Oregon Forest Management Plan with draft Habitat Conservation Plan – Scenario 4**
• Linear programing model (2020) • 2017 inventory • Habitat Conservation Area: allowable hardwood harvest of 200 acres/year for the first 6 periods • Habitat Conservation Area: 2 thinnings allowed in each stand up to age 90 for first 6 periods (model outputs averaged 386 acres/year across the permit area) • Target age class outside Habitat Conservation Areas excluding Riparian Conservation Areas • Pre Labor Day Fires	• Spatially explicit model (2023) • 2021 inventory • Habitat Conservation Area: allowable hardwood harvest of 500 acres/year for the first 6 periods • Habitat Conservation Area: allows thinning 1,500 acres/year across the permit area for first 6 periods (model outputs averaged of 556 acres/year across the permit area) • Target NSO dispersal habitat outside Habitat Conservation Areas including Riparian Conservation Areas • The Labor Day Fires caused high to moderate severity damage to roughly 2% of the planning area, affecting 13,000 acres in the North Cascade District

- Ending inventory target of minimum ending inventory: 20,000 bdft/ac on operable acres
- Geographic harvest allocation where 75% of harvest volume came from the North Coast georegion, 15% came from the Valley georegion and 10% came from the Southern Oregon georegion.

- Non-declining inventory after 100 years on operable acres
- No geographic harvest allocation

- Updated silvicultural prescriptions and reforestation zones
- Updated data (operationally limited areas, harvest units, roads, recent thinnings, etc.)
- Updated Costs
- Updated Growth and Yield Tables

The primary distinction between the models is the update of the growth and yield tables, which forecast the productivity and volume of a forest stand at various ages, considering factors like species, density, and site conditions. These tables are generated using the Forest Vegetation Simulator (FVS), the growth model for forest inventory updates and modeling. Like most forest growth models, FVS typically predicts high yields, and calibration to reflect local conditions is necessary. The 2020 Comparative Analysis noted that modeled yields are often quite variable, compared to actual growth and mortality in forest stands across the landscape, which makes it difficult to predict actual long-term harvest volumes; however, the comparison was intended to be relative among the scenarios presented, and these inaccuracies would apply to all scenarios. No adjustments were made to the yield tables due to lack of time and capacity. Additionally, the effects of climate change, disturbance or other stochastic events were not modeled, and are also not modeled in this current work. The only adjustments made to the 2020 Comparative Analysis was to eliminate harvest areas less than 10 acres in size from the volume outputs, to help compensate for the lack of spatially explicit results in the linear programming model.

In 2022, the Division began revising Implementation Plans, as several districts' Implementation Plans were expiring, and all Implementation Plans needed to be revised to incorporate transition strategies in anticipation of the completion of the draft Habitat Conservation Plan process and issuance of incidental take permits, and while work on the 2023 draft Western Oregon State Forest Management Plan continued. Based on the observations during the comparative analysis modeling work, calibration of the yield tables was started for the revised Implementation Plan modeling project. Due to time constraints and multiple concurrent projects, this calibration consisted of limited adjustments by species (e.g., SDI Max, basal area growth, and SNC growth). During field review, it was noted that the modeled volume outcomes were again too high. Since these outputs were being used to set actual harvest objectives, a post-modeling reduction of the volumes was made utilizing actual local timber sale harvest volume information from similar forest stands and

the knowledge of the local district foresters to establish the annual harvest volume range for each district.

In 2023, the Division contracted forestry consultant Mason, Bruce and Girard (MBG) to collaborate on enhancing the accuracy of growth and yield projections using their forest biometrics and modeling expertise. MBG collaborated with the Division's Forest Analyst to create empirical volume yield curves using USFS Forest Inventory Assessment (FIA) plots and Division's Stand Level Inventory (SLI) data. These curves guided adjustments to FVS projections, with region-specific calibrations (coast, Cascades, southwest Oregon) and specific adjustments for the Tillamook District to account for growth impacts of Swiss needle cast, management history, and unique geography. The updated yield tables were well-received internally, aligning closer to actual forest volumes in respective districts, except for discrepancies in stands over 100 years old and alder stands. Further adjustments were made for older stands and alder stands that had been sprayed during the 1970s in parts of Tillamook District. Time constraints prevented a complete calibration of alder trees across the plan area.

This process of calibration and review resulted in using the improved yield tables in modeling the different scenarios for the 2023 draft Western Oregon State Forest Management Plan with the draft Habitat Conservation Plan that is described in this report.

Scope of the Modeling – 2023 draft Western Oregon State Forest Management Plan with Draft Habitat Conservation Plan

This new modeling analysis relies on the outputs of a spatially-explicit policy level forest management harvest model. The forest management model emulates how the forest would be managed. It projects harvest volumes, revenues, and forest stand metrics across the landscape based on the 2021 version of the Division's Stand Level Inventory and a series of model rules or parameters related to harvest objectives, planning unit scale, and acres available for harvest. Forest stand metric outputs are used to further estimate habitat suitability for three of the species covered under the draft Habitat Conservation Plan, habitat components for native wildlife generally, and carbon sequestration and storage.

Timeframe. The analysis considers a 150-year planning timeframe (2025-2174) under all scenarios. This is approximately equivalent to the 70-year permit term for the draft Habitat Conservation Plan with an additional 80-year time period, which ensures sustainable harvest through the harvest rotation following the permit term. The analysis assumes consistent forest management (e.g., spatial and temporal flow of harvest) and constraints (e.g., draft Habitat Conservation Plan conservation actions) throughout the timeframe.

Geography. The analysis covers Board of Forestry lands and Common School Forest lands managed by ODF in western Oregon, including those in all six districts from Astoria in the north to lands managed by the Western Lane District to the south. It does not include lands in

the Klamath-Lake district in eastern Oregon. The included land is referred to as the "plan area."

Scale. Geographic scale determines the area used to control harvest objectives. Setting a geographic scale for model objectives provides an opportunity to address concerns about equity, revenue distribution, and regional impacts to habitat (outside the context of the draft Habitat Conservation Plan). Two scales were used for the 2023 draft Western Oregon State Forest Management Plan modeling:

1) Georegion scale. State forests in the plan area are grouped into three geographic regions, North Coast – Astoria, Forest Grove, and Tillamook Districts; Valley – North Cascade and West Oregon Districts; Southern – Western Lane District (includes Veneta, Coos and Southwest Oregon units).
2) District scale. State forests are organized by the field office or district out of which they are managed.

Harvest Flow. Harvest flow is the timing and amount of harvest over time within a geographic area. Flow considers the predictability and sustainability of harvest. The analysis considered two harvest flow scenarios:

1) Even-flow. Level of harvest that can be sustained during the modeled timeframe without ever declining. Overall harvest is limited by available inventory and growth over time, but is stable, allowing for a more predictable implementation.
2) Departure: This is a departure from even-flow to achieve a balance across forest age classes and respect habitat constraints while pursuing the highest net value timber product harvest. Near-term harvest volume may be higher, but declines over time until inventory regrows to allow for future harvest. In this specific scenario, two additional constraints were applied to the departure scenario: 1) the volume was not allowed to fluctuate more than 5% between the five-year modeling periods, and 2) volume could not be more than 10% different from the 100-year average volume. These two constraints were used to keep the rate of departure somewhat more manageable from the standpoint of ODF's ability to implement such a scenario.

Methods, Assumptions and Uncertainties for the Analysis

Scenarios. This analysis defines and models differences in outcomes across four scenarios. The primary purpose of this analysis is to show a range of outputs possible under the 2023 draft Western Oregon State Forest Management Plan with the draft Habitat Conservation Plan.

The four scenarios that were modeled across the plan area are:[1]

1) Scenario 1: maximize volume with an even-flow;
2) Scenario 2: maximize volume with an even-flow, constrained by longer rotations (average harvest age of 100 years);
3) Scenario 3: maximize net present value using a discount rate of 4% with an even flow; and
4) Scenario 4: maximize net present value using a discount rate of 3% allowing for departure.

Key Assumptions and Uncertainties. Uncertainties are inherent in modeling due to the assumptions that must be made based on the best available data, the quality of the inputs used, and the fact that parameters change over time. While model outputs may be a useful tool to aid in decision making, they are not an exact number that can be counted on in perpetuity, but merely an estimate of what could be accomplished under a certain set of stagnant assumptions. This is why harvest modeling is redone in conjunction with the Implementation Plan cycle. Modeling may also be run when changes to inputs or assumptions are large enough to change Implementation Plan objectives, for example after large disturbance events or perhaps a change in management standards as determined through monitoring and adaptive management.

Key assumptions and uncertainties with this model are:

- The model is assumed to be correctly specified and that there are no logic errors, or errors of omission or commission.
- Assumes no further additional constraints in the Forest Management Plan outside of the draft Habitat Conservation Plan.
- Timber prices and costs are assumed to stay constant in a real sense (inflation adjusted) and reflect the most recent prices available by district (from 2022).
- Division staff based their estimates of harvest costs on expected costs per thousand board feet (MBF) by district.
- Summed future costs and benefits are time discounted using a real (inflation-adjusted) discount rate. Data in charts over time do not include discounting.
- Assumptions used in the model for the different scenarios may be wrong.
- The model doesn't consider effects from climate change, pests, pathogens, drought, or disturbance. While these are not modeled at this time, the draft FMP strategies are intended to provide the flexibility necessary to consider these effects in implementation planning.
- Assumes that future growth trends will be consistent with recent growth observations.
- The growth model doesn't factor in future ingrowth of trees naturally seeding into a stand or gains from using improved seed or improved silviculture.

[1] The plan area is the Board of Forestry Lands (BOFL) and the Common School Forest Lands (CSFL) in Western Oregon. It does not include lands in the Klamath-Lake district or in eastern Oregon, nor does it include the CSFL in Douglas and Coos counties that are part of the Elliott State Forest.

- Future growth is uncertain as it is derived from a model. There is still additional calibration work to do in the future and outcomes will change as inventory data improves.
- Some districts noted projected volumes per acre are still high for harvests associated with current stands. While replacement stands are anticipated to have higher yields than current stands, the degree to which they match predictions of yield tables are unknown.
- Actual available acres are one of the larger uncertainties. Some constrained acres may be specifically mapped out such as campgrounds, while others such as stream buffers were estimated using a terrain model to predict location, size, fish use and duration. Districts noted during MSR that additional reductions in available acres will likely come from wetlands, small rock outcroppings, inner gorge areas, the difference between modeled stream buffers and the buffers resulting from actual stream locations and conditions in the field, stream-associated wetlands, steep slopes and small acres left inaccessible due to buffers as some examples.
- The Division is continually working to improve the forest inventory by increasing the percentage of forest that is measured and improving the technology and techniques that are used. Approximately 60% of stocked forest stands are measured in the Stand Level Inventory. The inventory relies on imputation, matching unmeasured stands with measured stands that most closely resemble them, to estimate the values of the non-measured stands. The State Forests Division is developing a lidar-based inventory that will replace Stand Level Inventory when completed. The Division is in the process of developing a raster-based estimate of forest biometrics across most of state forest ownership using lidar data collected since 2020. This improved inventory could change future modeled outputs.
- Updates to inventory and growth and yield tables may change inventory metrics that are used to calculate habitat suitability indices for covered species. While this does not create much uncertainty around ingrowth of total suitable habitat generally, it may affect interpretation around the quality of habitat. Biological interpretation of habitat suitability indices may change thresholds based on monitoring and adaptive management.
- Changing markets, pond values, logging costs, reforestation costs and project costs affect volumes harvested and resulting revenue.
- The model assumes that 2 green trees per acre are retained in each harvested unit, but due to different policies, additional green trees could be retained due to scenic areas, domestic water point of diversions, supplemental trees for snags, unstable slopes, nest trees, and old growth patches as examples.
- Assume that adjacent regeneration units can be scheduled annually with at least a 5 year gap between adjacent units.
- Changes in politics (e.g., a new governor or a new board) could result in new management direction.

Relative differences across scenarios are likely to affect only a subset of actions the Division engages in while fulfilling its mission. The analysis focuses on those actions that may result in changes in conservation, timber harvest, revenue, and carbon storage. Results and analyses are based on actual empirical data and detailed forest modeling, complemented where necessary with the expert judgement of the project team and input from Division staff.

Metrics. To do this analysis, Division staff and the project team reviewed all identifiable categories of potential differences in effects among the four scenarios.

Table 1. Metrics for Analysis

Variable	Units of Measure
Economic	
Area Available for Harvest	Acres
Annual Harvest Volume	MMBF (million board-feet)
Annual Timber Revenue	Dollars
Timber Management Costs	Dollars
Timber Inventory	MMBF (million board-feet)
Environmental	
Quality and Quantity of Terrestrial Habitat (Covered Species)	Acres of suitable habitat
Quality and Quantity of Non-Covered Species Habitat	Acres by stand age and qualitative metrics
Carbon Storage	C tons (tons of carbon) In live trees & in harvested wood products

Economic Outcomes

HARVEST VOLUME

The four scenarios involve differences in timber management and harvest approaches outside of the Habitat Conservation Areas.

The overarching management objective for inside the Habitat Conservation Areas is to increase the quality and quantity of habitat for terrestrial covered species. Habitat restoration and improvement goals and objectives inside the Habitat Conservation Areas are the same across all four scenarios. Harvest volume is not an objective within the Habitat Conservation Areas, but rather a byproduct of habitat restoration or improvement activities. Silvicultural prescriptions for habitat restoration and improvement within the Habitat Conservation Areas will be site specific, while prescriptions in the model are generic. The Conservation Fund will be utilized to fund certain restoration activities and improvements while other funding sources for some of these activities that can't pay for themselves are being investigated. Given these factors, the amount of volume that may be harvested from inside the Habitat Conservation Areas is uncertain and will be reported separately from volume outside the Habitat Conservation Areas. Division harvest and revenue goals will be based upon harvest volumes outside of Habitat Conservation Areas. All tables and figures for volume and revenue for the remainder of this report are only for outside of the Habitat Conservation Areas unless otherwise indicated.

The total average annual harvest volume produced by the four scenarios ranges from 168 to 187.3 million board feet. Most of the scenarios were run with an even flow of harvest volume except for Scenario 4 which was run with a departure. Even flow was chosen as it represents a sustainable and predictable flow of harvest to meet Greatest Permanent Value. However, it does constrain the model so that the difference between the harvest levels achievable across the different scenarios is minimal.

Table 2. Summary of 70-year Average Annual Harvest Volume (mmbf) by Scenario and Scale.

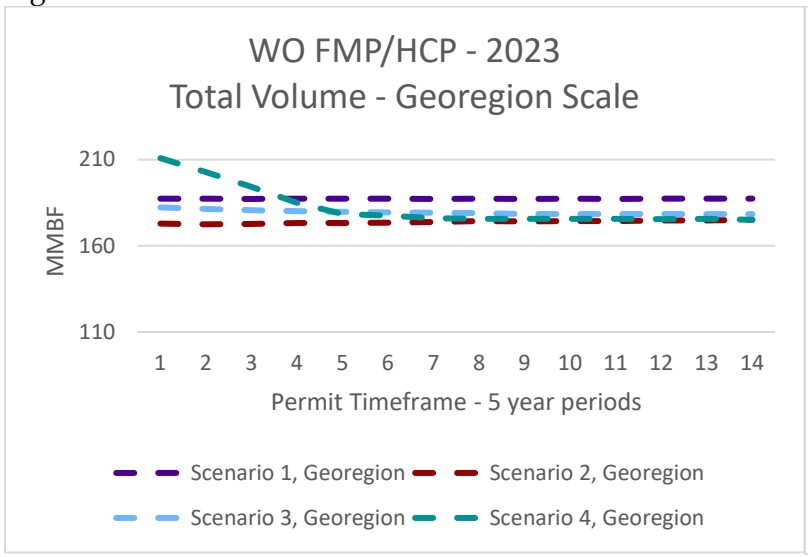
	Georegion Scale				District Scale		
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3
Total Average Annual Harvest Volume (Inside and Outside of Habitat Conservation Areas)[1]	187.3	173.8	179.5	182	185	172.3	168
Common School Lands Annual Harvest[1]	5.9	5.8	6.4	6.2	5.7	5.4	6
Board of Forestry Lands Annual Harvest[1]	181.4	167.8	173.2	176.3	179.4	166.9	162.3
Average Annual Harvest Volume Outside Habitat Conservation Areas[2]	149.8	133.5	143.8	152.2	149.7	132	134
Inside Habitat Conservation Areas[2]	37.5	39.5	36.9	39.4	35.2	39.7	34.2
Average Rotation Age (years)	80	92[3]	77	76	80	92[3]	75

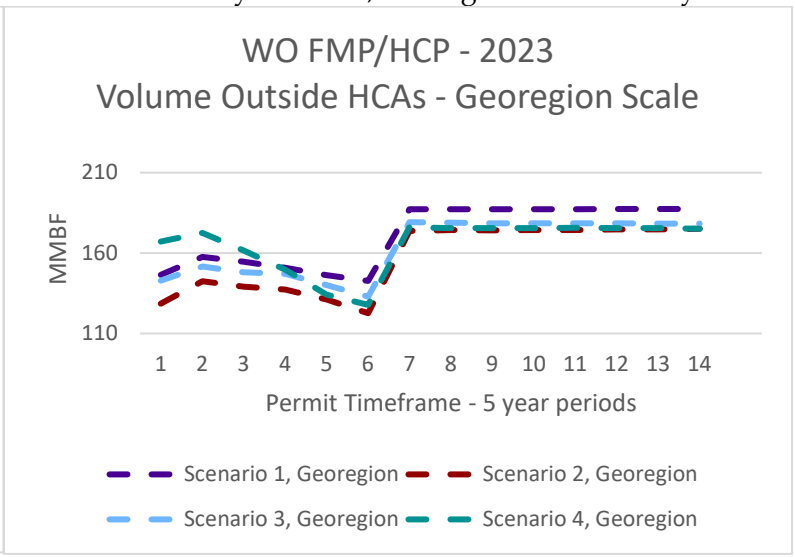
[1] Total average volumes are achieved from harvest units inside and outside of Habitat Conservation Areas for the first 30 years and outside of the Habitat Conservation Areas for the remainder of the permit term.

[2] This is the average volume calculated over 30 years as the draft Habitat Conservation Plan allows for management within the Habitat Conservation Areas for the first 30 years of the permit term. After 30 years the average annual harvest volume outside the Habitat Conservation Areas will increase to the total average annual harvest volume.

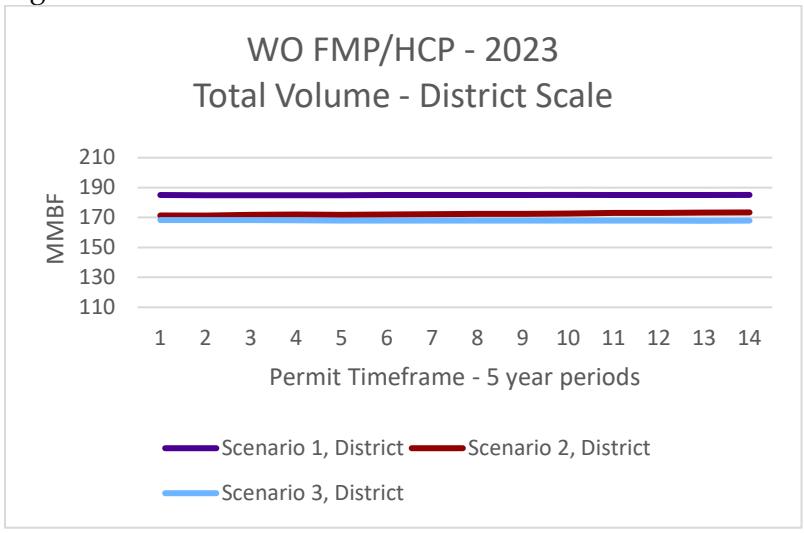
[3] The target age for the 150-year model was 100 years which averaged 92 years across the 70-year permit term.

Figures 3 & 4. Total Volume and volume Outside Habitat Conservation Areas by Scenario, Georegion Scale and 5-year time periods.





Figures 5 & 6. Total Volume and Volume Outside Habitat Conservation Areas by Scenario, District Scale and 5-year time periods.



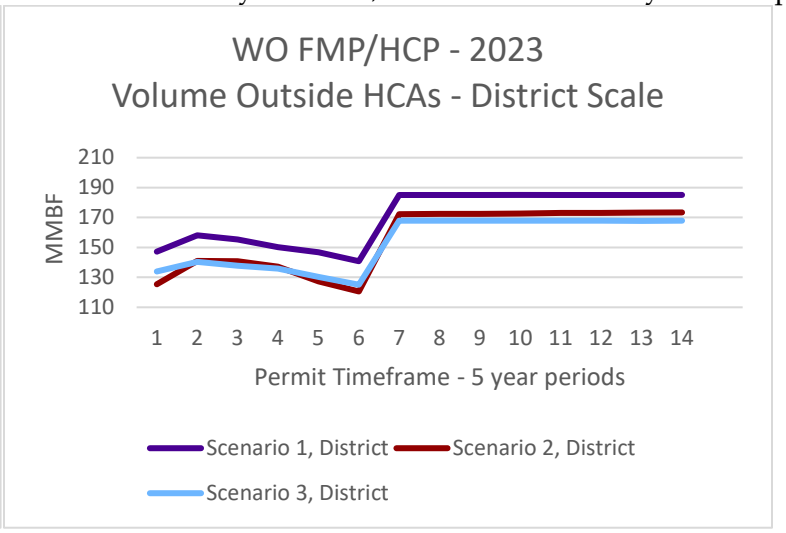


Table 3. 70-year Average Annual Total Volume (MMBF) by Scenario, Scale and County

	Georegion Scale				District Scale		
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3
Total County Volume[1]	181.4	167.8	173.2	176.3	179.4	166.9	162.3
Benton	3.8	3.1	3.5	3.2	3.3	3	2.8
Clackamas.	1.7	1.5	1.7	1.9	1.7	1.5	1.7
Clatsop	47.9	44.4	45.2	45.6	49.1	44.5	44.5
Columbia	4	3.9	3.8	3.8	4.5	4.2	3.5
Coos	1.4	1.5	1.5	1.4	1.4	1.5	1.5
Curry	–	–	–	–	–	–	–
Douglas	1.5	1.4	1.3	1.4	1.5	1.4	1.3
Jackson	–	–	–	–	–	–	–
Josephine	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Lane	8.5	8.2	8.5	9.3	8.5	8.2	8.5
Lincoln	8.3	7.2	7.5	7.4	7.5	6.5	6.4
Linn	7.7	7.3	7.6	8	8.3	7.2	7.8
Marion	3.5	3	3.5	3.6	3.7	3	3.5
Polk	2.6	2.4	2.6	2.6	2.6	2.2	2.4
Tillamook	74.2	69.1	69.8	72.2	69.7	67.1	62.6
Washington	16	14.5	16.4	15.6	17.3	16.3	15.5
Yamhill	–	–	–	–	–	–	–

[1] Total County volume is for Board of Forestry Lands only.

Figures of volume by period for each county by scenario and scale are available in Appendix A.

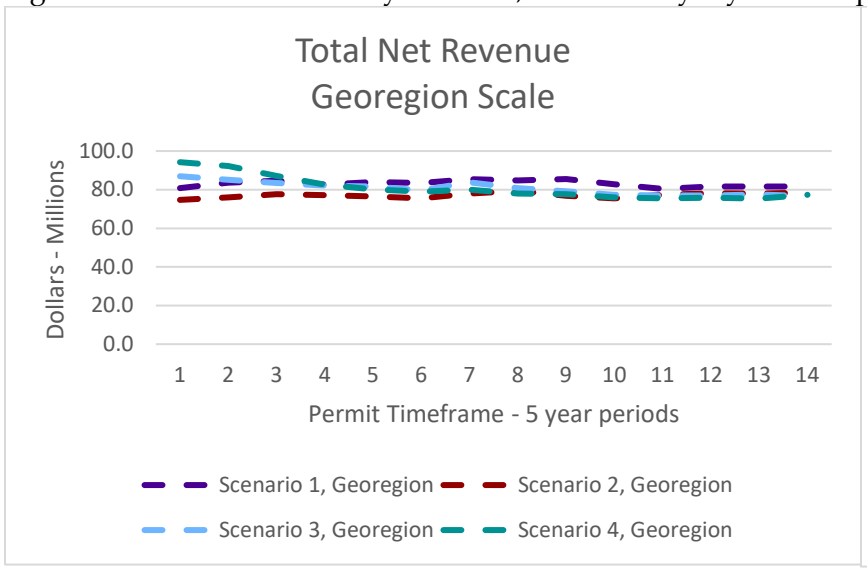
NET REVENUE

Total net revenue in the model includes both Board of Forestry and Common School lands and is calculated by removing logging costs, road maintenance and transportation costs from the pond value which is an estimate calculated using a 10-year average of pond values calculated in 2022. Due to limitations in the modeling, road construction and in-unit spur costs are not included in the net revenue calculation and the stumpage. This resulted in an average range of stumpages from $442 - $450 per mbf across the scenarios. The total net revenue does not remove reforestation costs as those are removed from the State Forest (Forest Development Fund and Common School Land) share of the net revenue. Each year 63.75 percent of the total net annual harvest revenue from Board of Forestry lands is distributed to the counties and is shown in Table 4. The remaining 36.25 percent of the total net annual harvest revenue from Board of Forestry lands is distributed to the State Forest Division Forest Development Fund. Net revenue for Common School Lands and the Forest Development Fund is the same as the total net revenue calculation described above with the additional removal of reforestation costs.

Table 4. Summary of 70-year Average Annual Net Revenue by Scenario and Scale (Dollars – Millions)

	Georegion Scale				District Scale		
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3
Volume (mmbf)	187.3	173.8	179.5	182	185	172.3	168
Total Net Revenue	$83.1	$77.1	$80.6	$80.8	$82.6	$76.9	$75.6
County Net Revenue	$51.5	$47.7	$49.8	$49.9	$51.2	$47.7	$46.7
Common School Land Net Revenue[3]	$2.2	$2.2	$2.5	$2.4	$2.1	$2.0	$2.3
Forest Development Fund Net Revenue	$27.1	$25.5	$26.1	$26.2	$27.0	$25.5	$24.5

Figures 7 & 8. Net Revenue by Scenario, Scale and by 5-year time periods



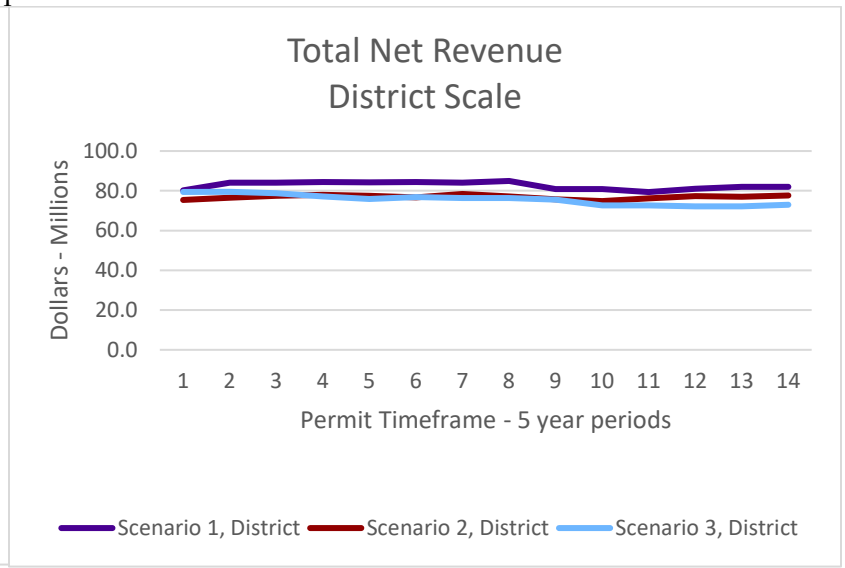


Table 5. 70-year Average Annual Net Revenue by Scenario, Scale and County (Dollars – Millions)

	Georegion Scale				District Scale		
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3
Benton	$1.2	$0.9	$1.1	$1.0	$1.0	$0.9	$0.8
Clackamas	$0.6	$0.5	$0.6	$0.6	$0.6	$0.5	$0.6
Clatsop	$14.8	$13.7	$13.9	$14.0	$15.1	$13.6	$13.7
Columbia	$1.2	$1.2	$1.2	$1.2	$1.4	$1.3	$1.1
Coos	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3
Curry	-	-	-	-	-	-	-
Douglas	$0.2	$0.3	$0.2	$0.3	$0.2	$0.3	$0.2
Jackson	-	-	-	-	-	-	-
Josephine	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1
Lane	$2.6	$2.5	$2.6	$2.8	$2.6	$2.5	$2.6
Lincoln	$2.3	$2.0	$2.1	$2.1	$2.1	$1.8	$1.8
Linn	$2.3	$2.2	$2.3	$2.4	$2.5	$2.2	$2.4
Marion	$1.1	$1.0	$1.1	$1.1	$1.2	$0.9	$1.1
Polk	$0.8	$0.7	$0.7	$0.7	$0.7	$0.6	$0.7
Tillamook	$19.2	$18.0	$18.5	$18.6	$18.2	$17.7	$16.5
Washington	$4.9	$4.4	$5.0	$4.7	$5.3	$4.9	$4.7
Yamhill	-	-	-	-	-	-	-

Figures of revenue by period for each county by scenario and scale are available in Appendix A.

Environmental Outcomes

Factors Influencing Conservation Outcomes

Constraints on Harvest. Constraints on harvest within Habitat Conservation Areas and riparian areas are the same under all modeled scenarios and scales. As such, model outcomes are similar from inside the HCA and are not broken out by scenario.

Habitat Quality and Quantity – draft Habitat Conservation Plan - Covered Species

TERRESTRIAL SPECIES

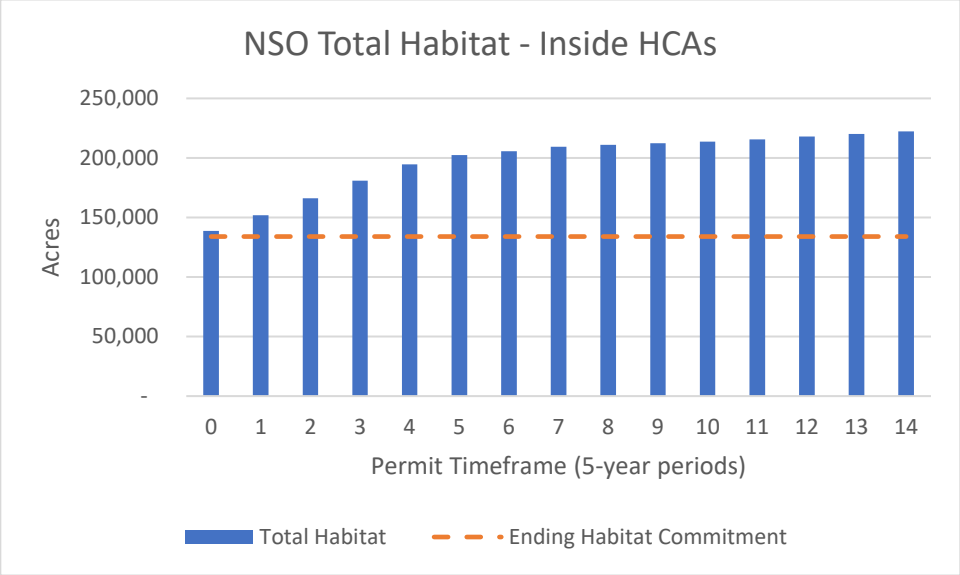
Species Habitat Outcomes

The three species for which habitat is quantified are all strongly associated with late-seral conifer forests. As such, the HSIs include parameters that characterize attributes of late-seral forests, particularly those that provide key habitat features, such as old trees used by marbled murrelets, northern spotted owls, and red tree voles for nesting. By linking the HSIs to the SLI and the forest management model, habitat suitability can be assessed at any point during the draft Habitat Conservation Plan permit term. Suitable habitat growth and harvest are both accounted for in the forest management model, allowing ODF to estimate the overall potential gain in quality and quantity of habitat. This process ensures that habitat commitments in the draft Habitat Conservation Plan can be achieved. At the time of finalizing this report, the Division is still working on the delineation between highly suitable and suitable habitat, due to changes in forest metrics in the recalibrated growth and yield tables. Total modeled habitat quantity is shown below.

Comparison of Scenarios for Conservation Objectives

Northern spotted owls occur in all districts across the 2023 draft Western Oregon State Forest Management Plan area. The draft Habitat Conservation Plan biological goals and objectives for northern spotted owls, within Habitat Conservation Areas, are: 1) conserve and maintain at least 15,000 acres of existing nesting and roosting habitat; 2) conserve, maintain, and enhance at least 73,000 acres of foraging habitat; 3) increase the quantity of nesting and roosting habitat by 69,000 acres (for a total of 84,000 acres) by the end of the permit term, while maintaining 50,000 acres of foraging habitat within the Habitat Conservation Areas. Total nesting, roosting, and foraging habitat at the end of the permit term shall be 134,000 acres.

Figure 9. Acres of Total Habitat Over Time for Northern Spotted Owl inside the Habitat Conservation Areas.



Another draft Habitat Conservation Plan objective for northern spotted owls is to maintain at least 40% of the permit area outside of Habitat Conservation Areas as dispersal habitat to allow diffuse movement across a permeable landscape. The draft Habitat Conservation Plan defines dispersal habitat as stands of trees averaging 11 inches in diameter at breast height or greater, having at least 40% canopy closure. This 40% objective is measured at two different geographic areas for all scenarios and scales: 1) the north coast that includes the Astoria, Tillamook and Forest Grove districts, and 2) areas included in the West Oregon, North Cascade and Western Lane districts. The figures below show how the scenarios at both the district and georegion scales meet this commitment.

Figure 10. Percent of Dispersal Habitat Over Time for Northern Spotted Owl outside the Habitat Conservation Areas by Scenario, District Scale and 5-year periods.

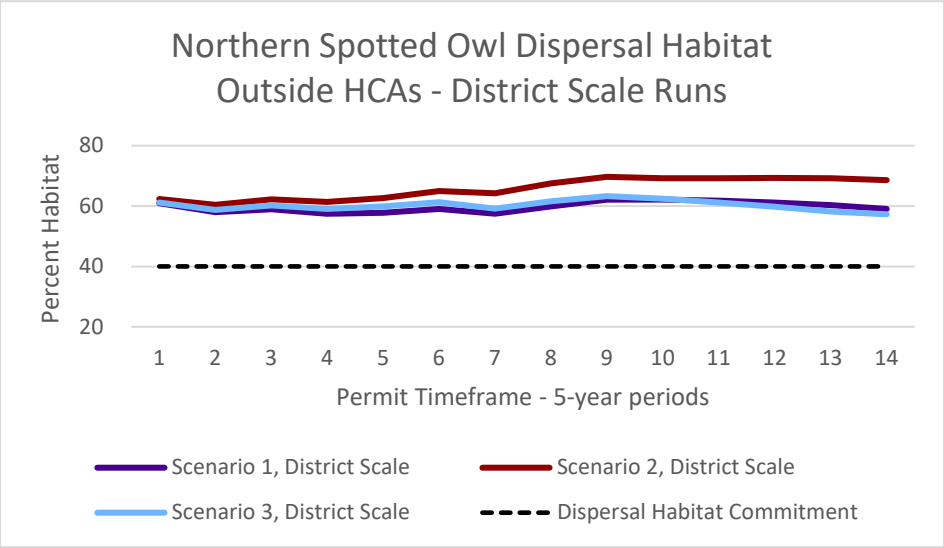
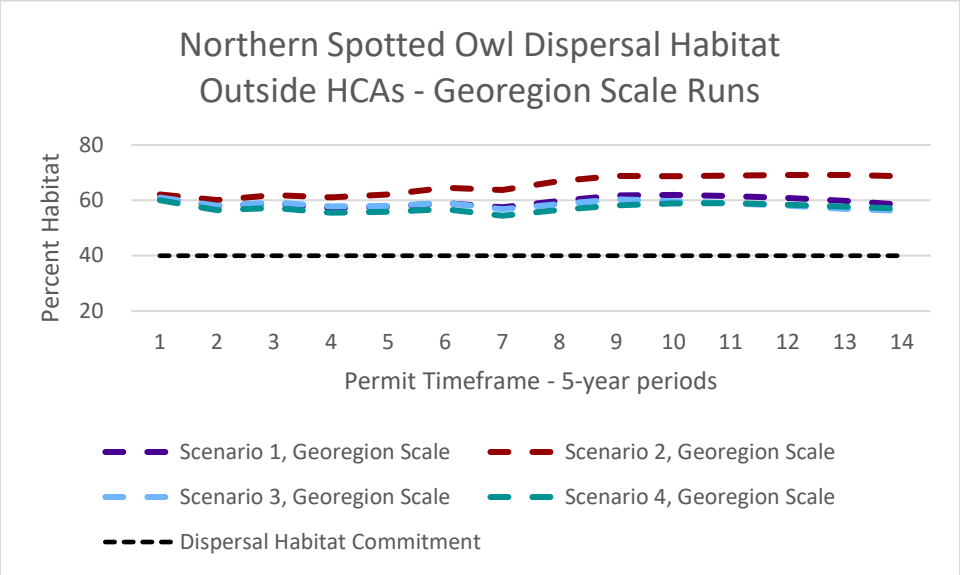
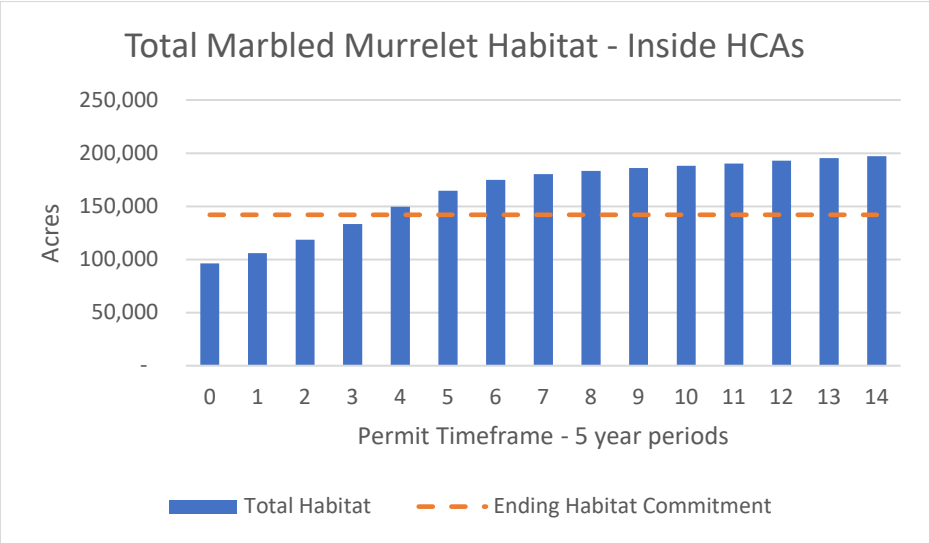


Figure 11. Percent of Dispersal Habitat Over Time for Northern Spotted Owl outside the Habitat Conservation Areas by Scenario, Georegion Scale and 5-year periods.



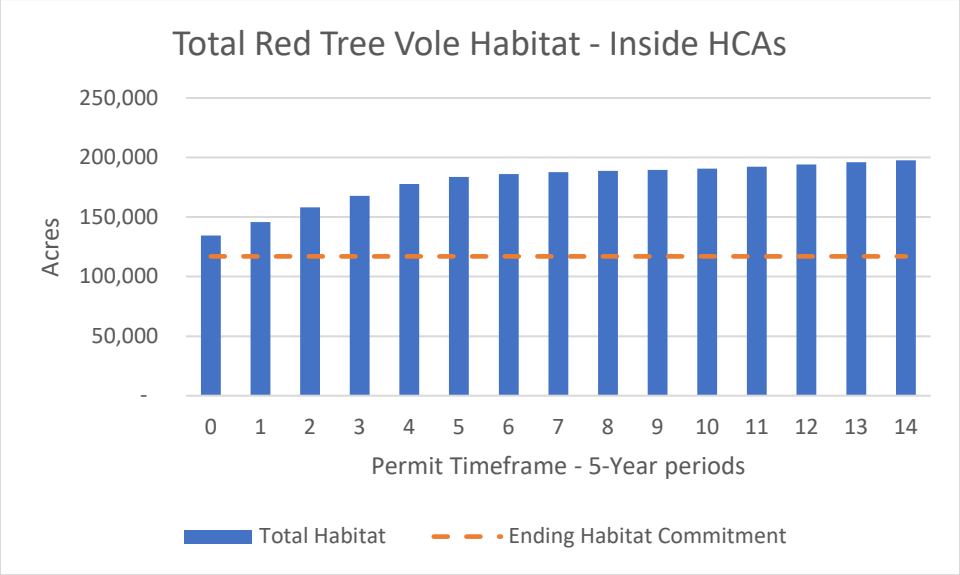
Marbled Murrelets are found across the plan area with the exception of the North Cascade District and the majority of the Southwest Unit -Western Lane District. The draft Habitat Conservation Plan biological goals and objectives for Marbled Murrelets within Habitat Conservation Areas, are: 1) conserve, maintain, and enhance at least 62,000 acres of existing suitable habitat and 1,000 acres of existing highly suitable habitat including locations where occupancy has been previously documented, and 2) increase the amount of habitat by at least 45,000 acres of suitable habitat and 34,000 acres of highly suitable habitat in locations that minimize patch edge/interior habitat ratios. This amounts to a total of 107,000 acres of suitable habitat and 35,000 acres of highly suitable habitat conserved by the end of the permit term.

Figure 12. Acres of Total Habitat Over Time for Marbled Murrelets inside the Habitat Conservation Areas



Red Tree voles occur in the Astoria, Tillamook, Forest Grove, West Oregon Districts and also the portion of the Veneta Unit -Western Lane District north of the Siuslaw River. The draft Habitat Conservation Plan biological goals and objectives for Red Tree Voles within Habitat Conservation Areas are: 1) conserve, maintain, and enhance at least 48,000 acres of suitable habitat and 5,000 acres of highly suitable habitat, including areas where occupancy has been previously documented, and 2) increase the amount of suitable habitat by 30,000 acres and highly suitable habitat by 34,000 acres. This amounts to a total of 78,000 acres of suitable habitat and 39,000 acres of highly suitable habitat by the end of the permit term.

Figure 13. Acres of Total Habitat Over Time for Red Tree Voles inside the Habitat Conservation Areas



AQUATIC SPECIES

The Riparian Conservation Areas are designed to support and protect the ecological process that address the limiting factors and the Biological Goals and Objectives for covered aquatic species. They were built using the best available data, including current and historic occurrence data, SLI, LiDAR, and habitat models. Constraints on harvest within riparian areas are the same under all scenarios, no commercial harvest is allowed.

Habitat Quality and Quantity – Non-Covered Species

TERRESTRIAL SPECIES

Forest age distribution is used as a proxy to assess the presence and quantity of a diverse range of habitats within the permit area, represented by area of forest stands at different ages over time. For example, terrestrial species that favor an open canopy for grazing and forage (e.g. ungulates) would favor young forest conditions.

The figures below provide a snapshot of average stand ages at the beginning (2025–2039) and end (2080–2095) of the plan period, respectively, inside and outside Habitat Conservation Areas.

Figure 14. Average Forest Stand Age Class Distribution Inside and Outside Habitat Conservation Areas by scenario at the district scale, 2025–2039

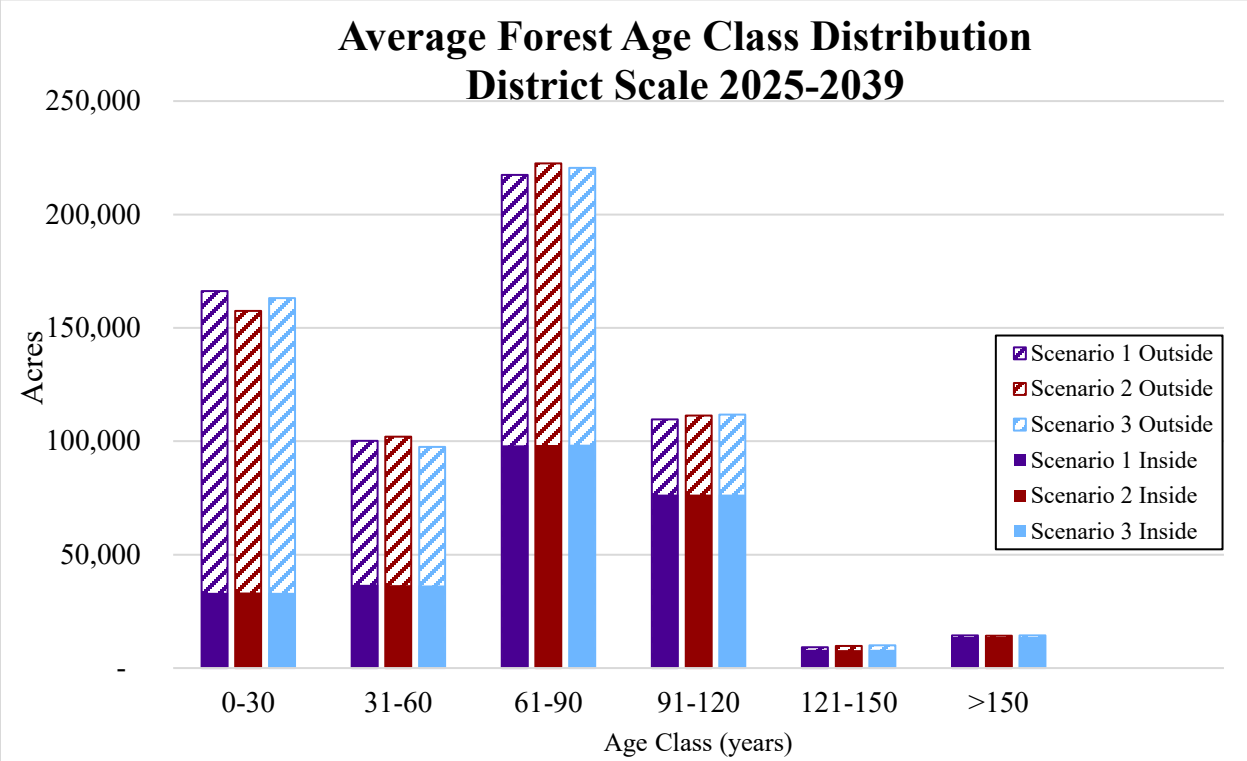


Figure 15. Average Forest Stand Age Class Distribution Inside and Outside Habitat Conservation Areas by scenario at the georegion scale, 2025–2039

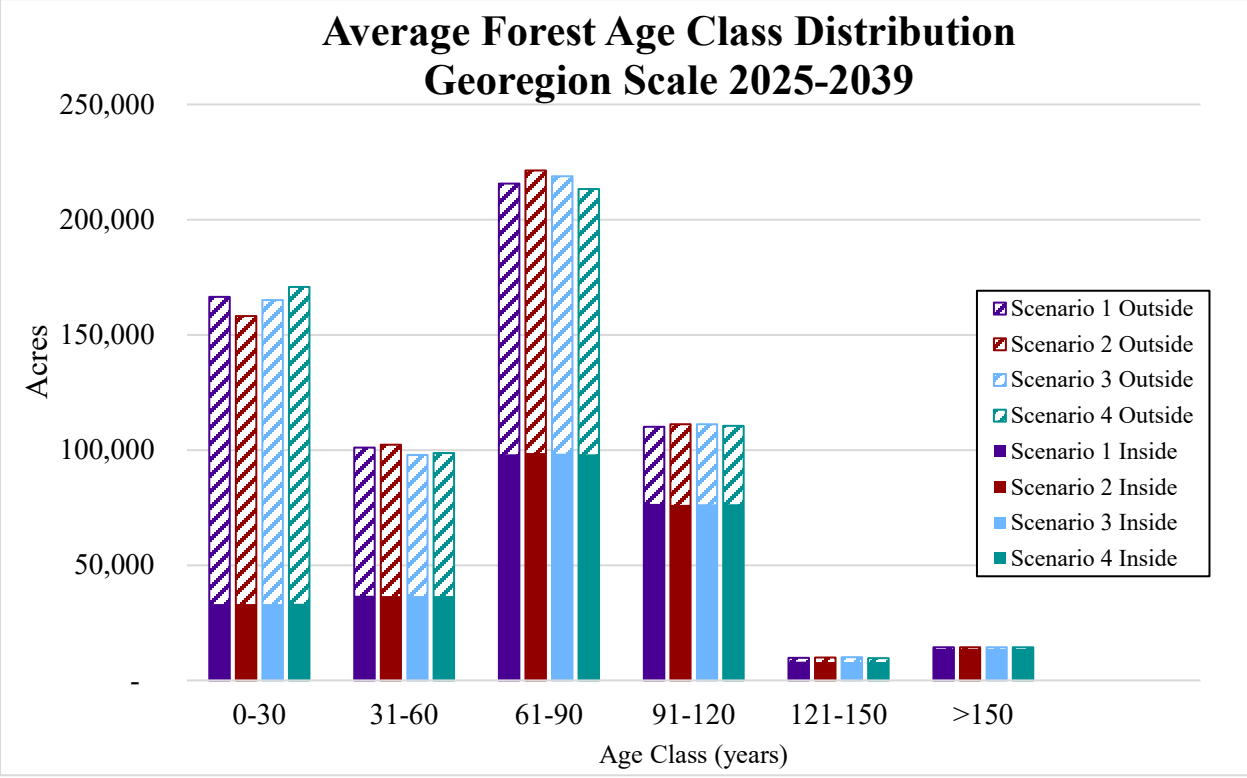


Figure 16. Average Forest Stand Age Class Distribution Inside and Outside Habitat Conservation Areas by scenario at the district scale, 2080–2094

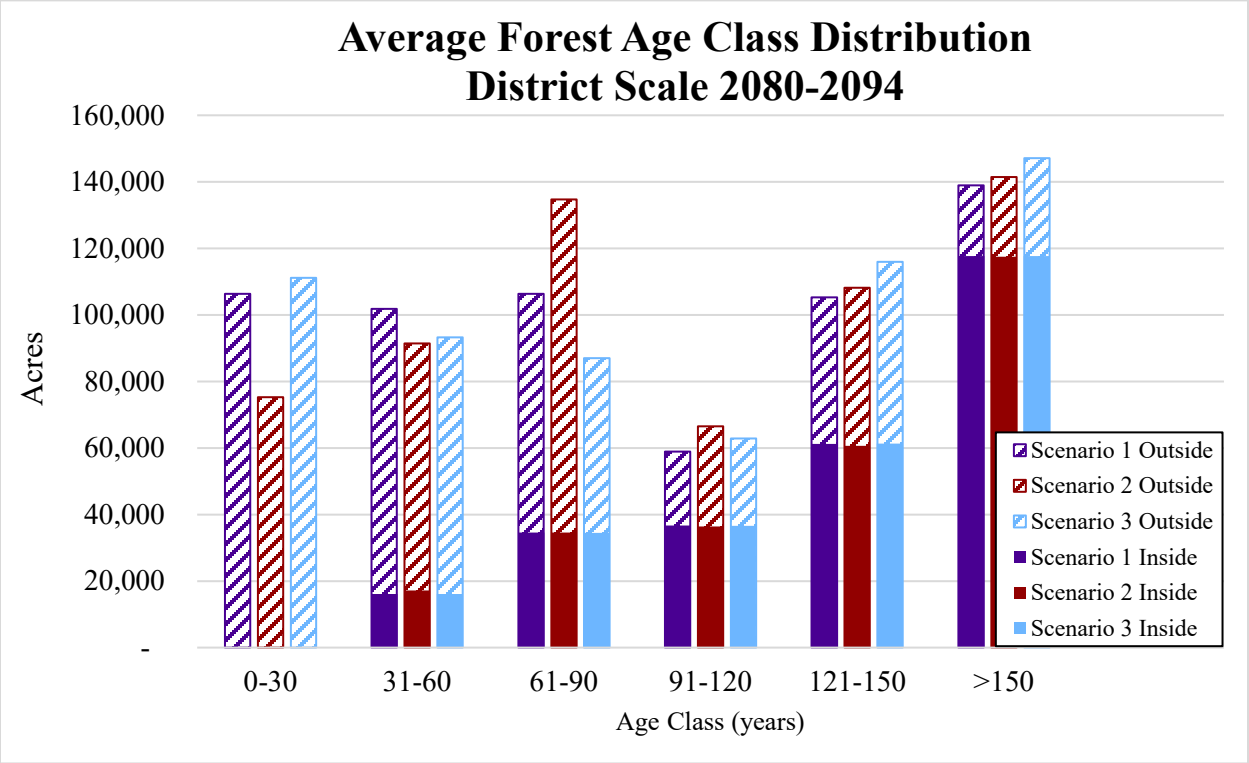
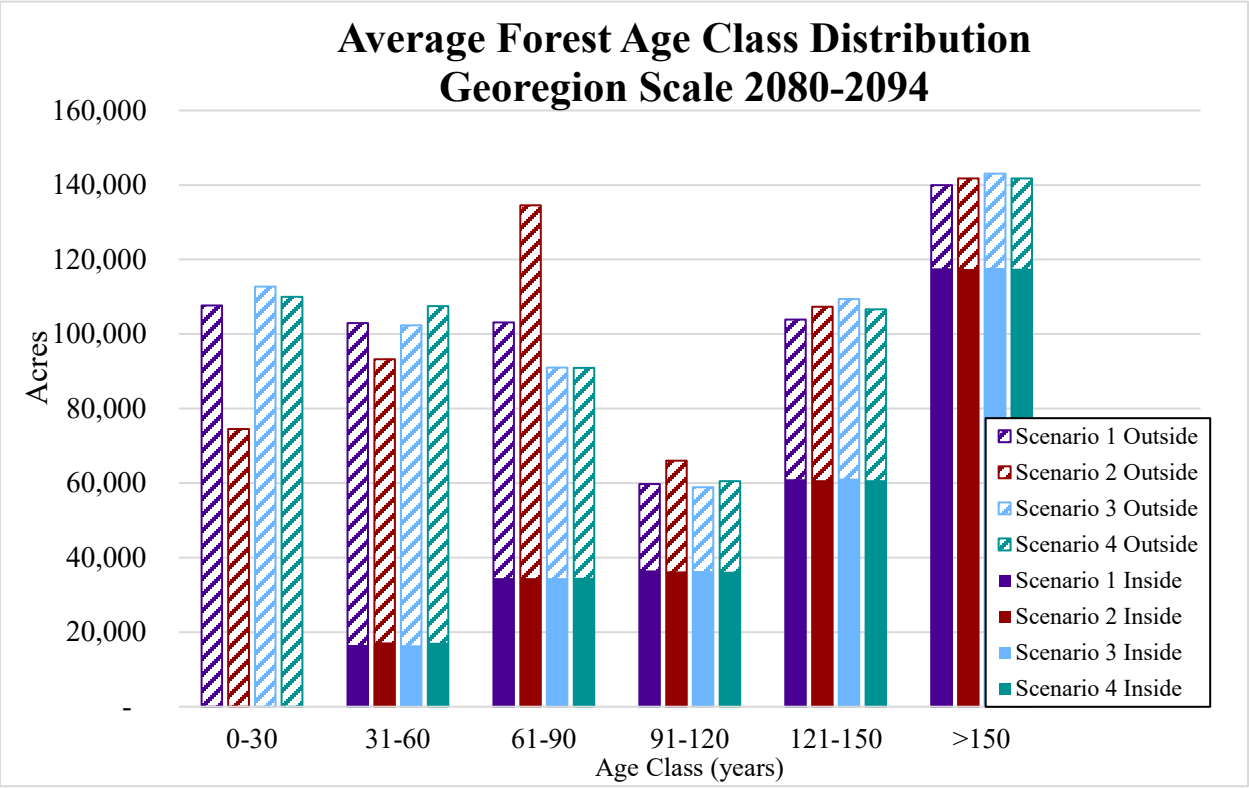


Figure 17. Average Forest Stand Age Class Distribution Inside and Outside Habitat Conservation Areas by scenario at the georegion scale, 2080–2094



Carbon Storage

This analysis included consideration of carbon storage volume outcomes across the four scenarios. Carbon storage is accounted for in two categories that include harvested wood products and forest carbon which is the combination of above ground biomass and below ground carbon that is stored in roots.

Tree harvest removes carbon from forests in the form of logs. However, the carbon in those logs is emitted to the atmosphere at different rates depending on how the wood and bark are used, so the tracking of the fate of forest carbon in various harvested wood products becomes an important part of forest carbon accounting. Some portions of harvested trees remain in the forest, moving between forest ecosystem carbon pools and decay slowly along with other dead tissue (e.g., branches and foliage) or are disposed of through in-forest burning with immediate carbon and other greenhouse gas emissions. Other parts become stored in short-lived or long-lived products (e.g., paper and house frames, respectively), converted into other bioproducts, or burned to supply industrial or residential energy and/or heat.

Carbon storage is reported by the weight of carbon (tons) within forest carbon and harvested wood products. In order to model carbon storage, forest carbon estimates are derived from the FVS fire and fuels carbon reports while harvest wood product end use ratios and product half-lives are derived from the Oregon Harvested Wood Products Carbon Inventory report (Morgan et al 2021).

Figure 18. Tons of Carbon Stored in the forest and in harvested wood products by Scenario, District Scale and model period.

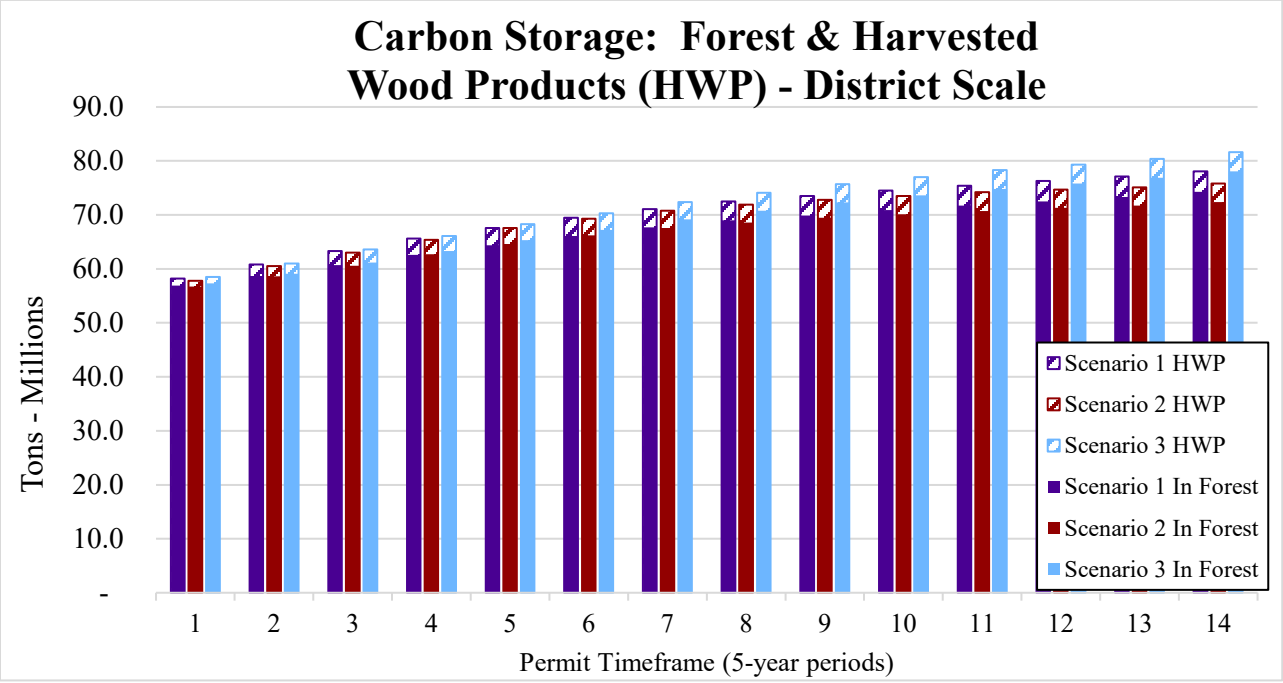
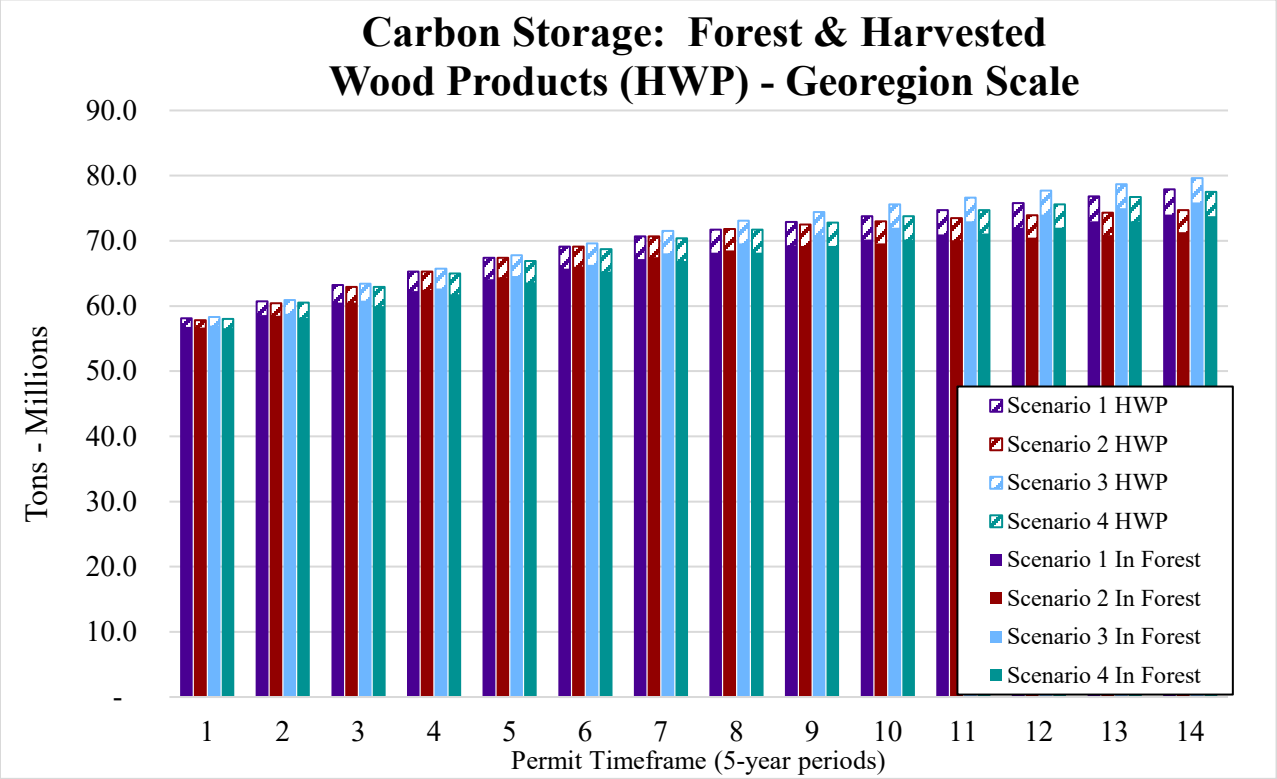


Figure 19. Tons of Carbon Stored in the forest and in harvested wood products by Scenario, Georegion Scale and model period.



Social Outcomes

Recreation outcomes were not found to be substantially affected in terms of differences across the four scenarios. However, all model scenarios indicate there would be visual impacts to a number of high use, popular areas such as Browns Camp, Jones Creek, Black Rock, Santiam Horse Camp and the Tillamook Forest Center due to anticipated increased pace and scale of harvesting in some recreation areas are outside of Habitat Conservation Areas. Likely high-use trails will see noticeable visual impacts adjacent to trail systems. Efforts to mitigate the effects of increased harvest around popular recreation areas will be addressed more explicitly during implementation planning.

Outdoor recreation and cultural values across the management scenarios will be discussed in forthcoming Socioeconomic Report that will be presented to the Board next spring.

Appendix A

BENTON COUNTY

Figure A1. Benton County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

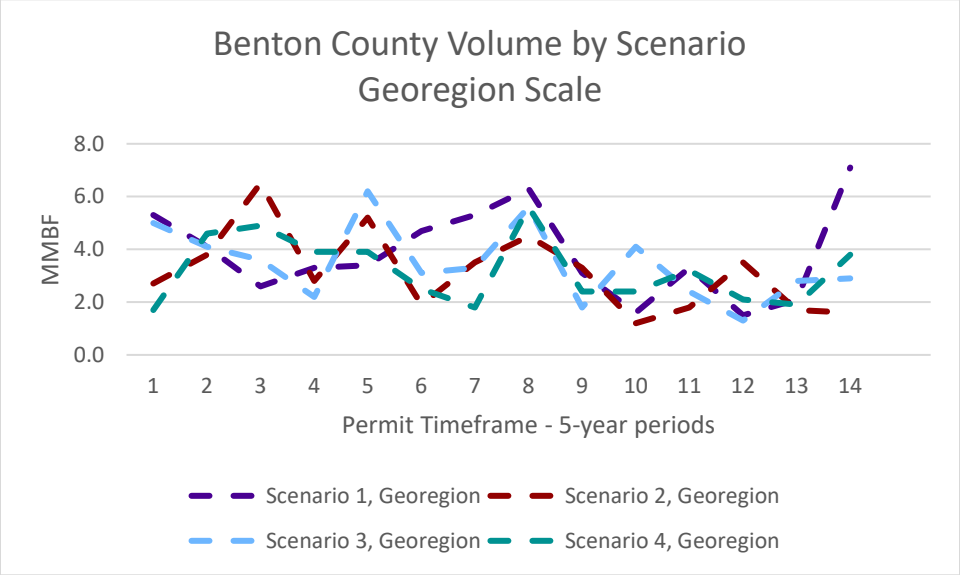


Figure A2. Benton County Average Annual Volume by Scenario, District Scale for each 5-year time period.

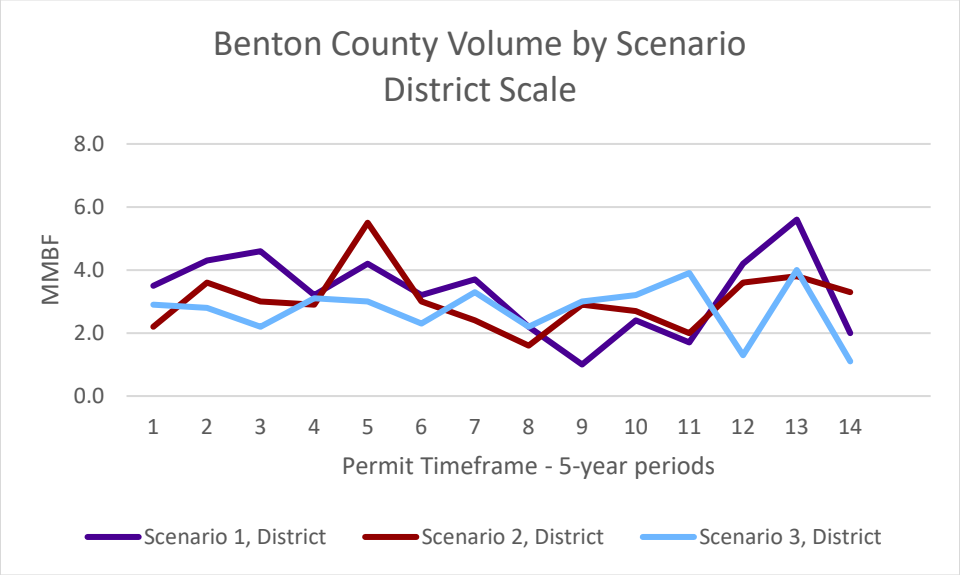


Figure A3. Benton County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

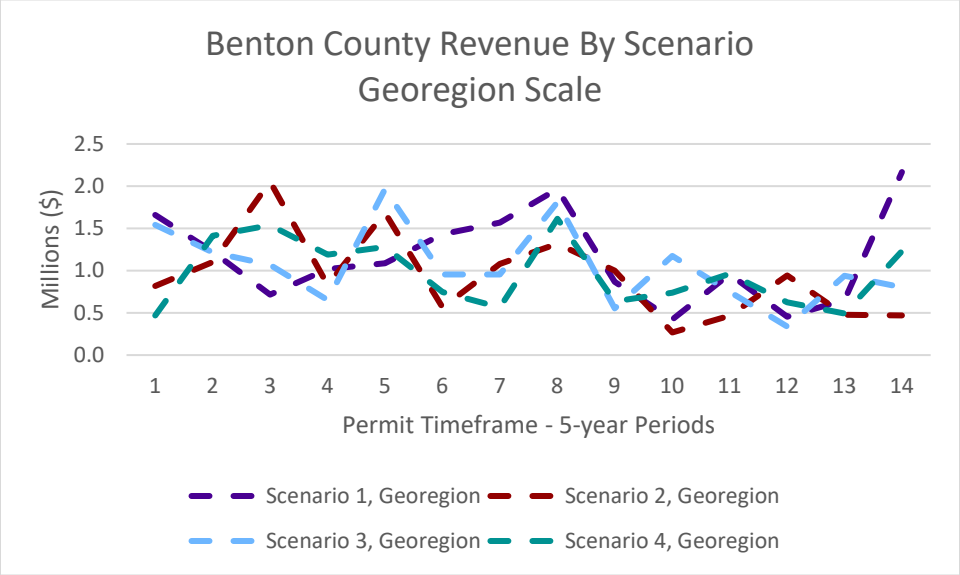


Figure A4. Benton County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

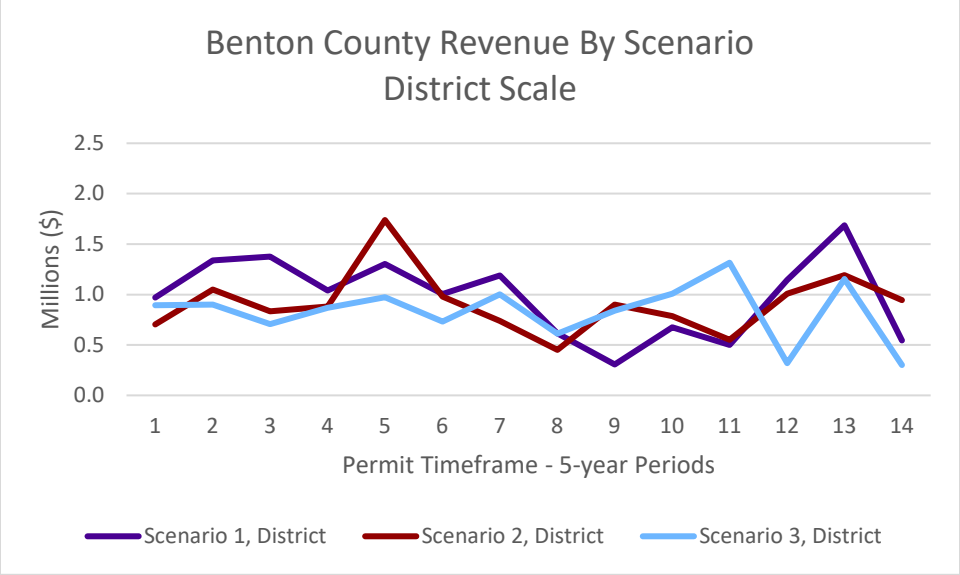


Figure A5. Clackamas County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

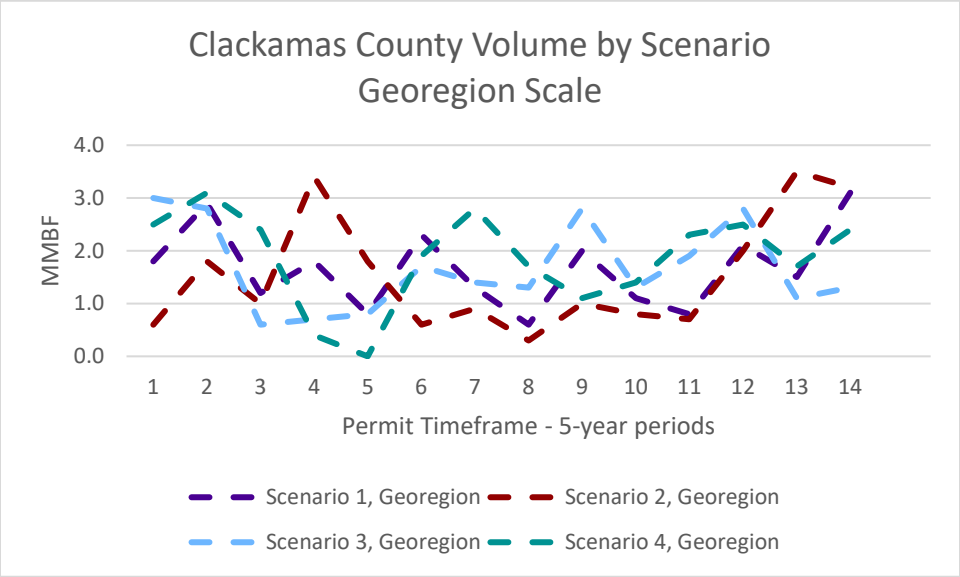


Figure A6. Clackamas County Average Annual Volume by Scenario, District Scale for each 5-year time period.

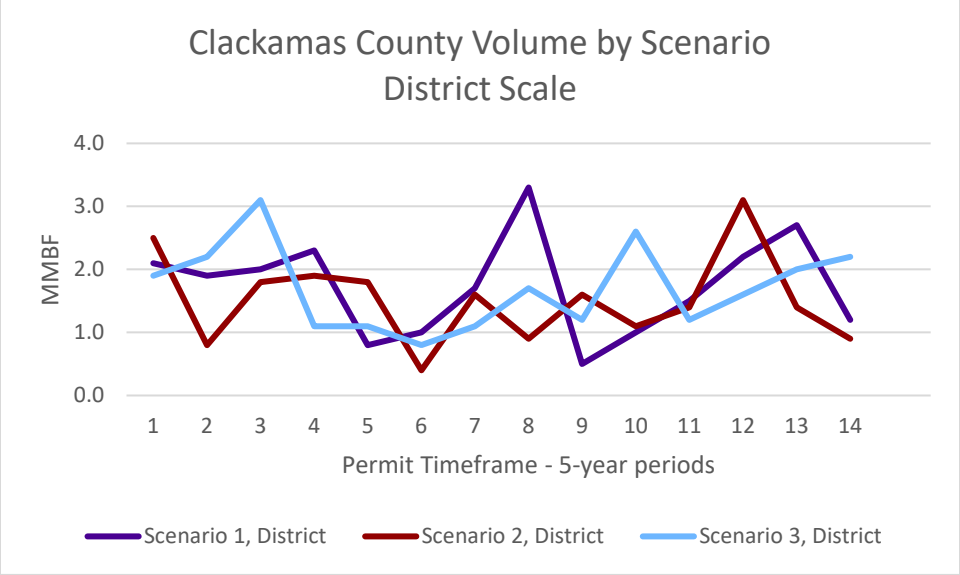


Figure A7. Clackamas County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

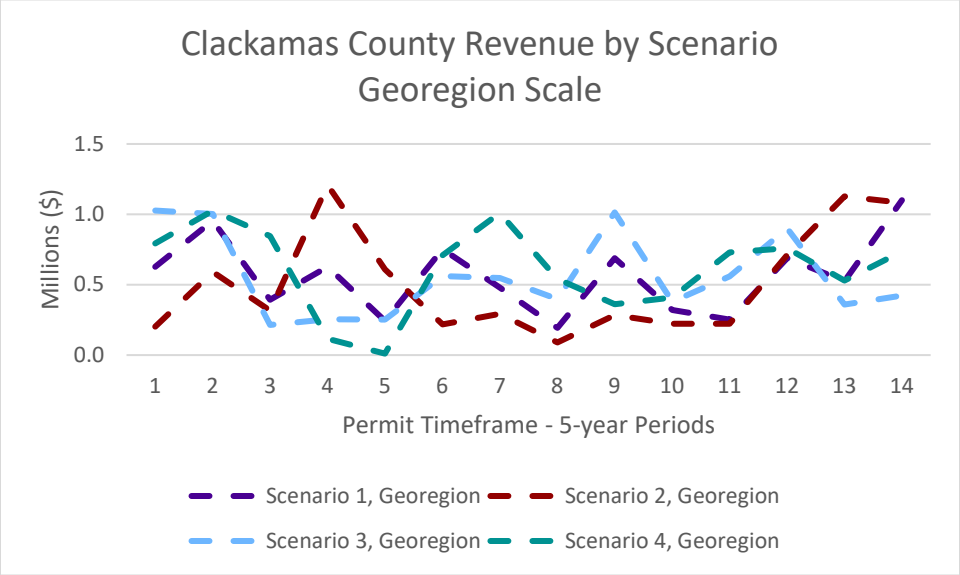
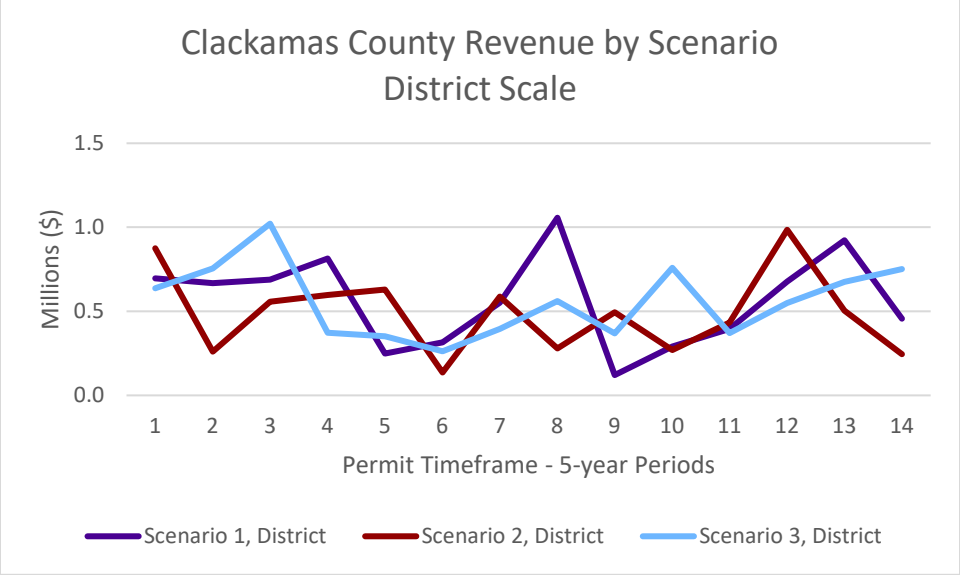


Figure A8. Clackamas County Annual Average Revenue by Scenario, District Scale for each 5-year time period.



CLATSOP COUNTY

Figure A9. Clatsop County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

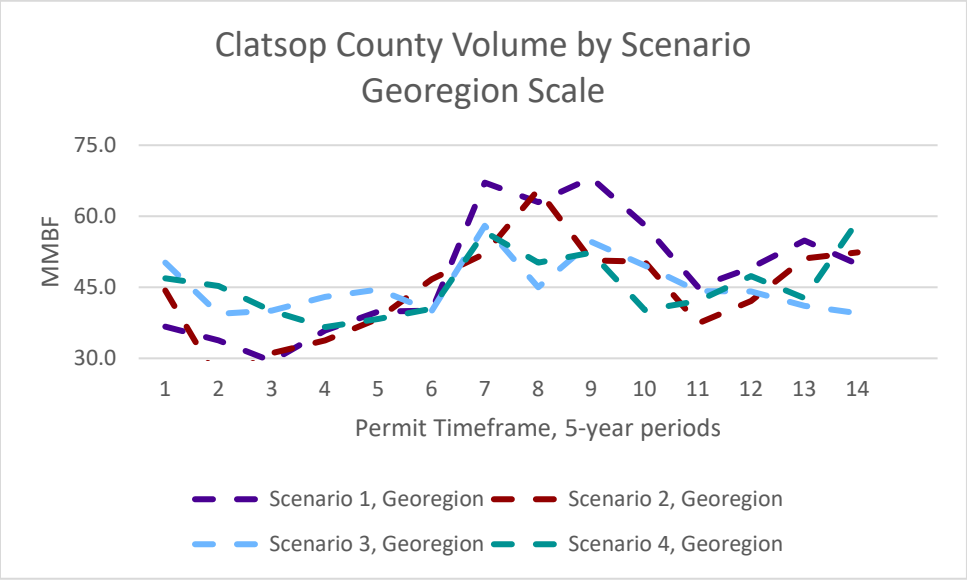


Figure A10. Clatsop County Average Annual Volume by Scenario, District Scale for each 5-year time period.

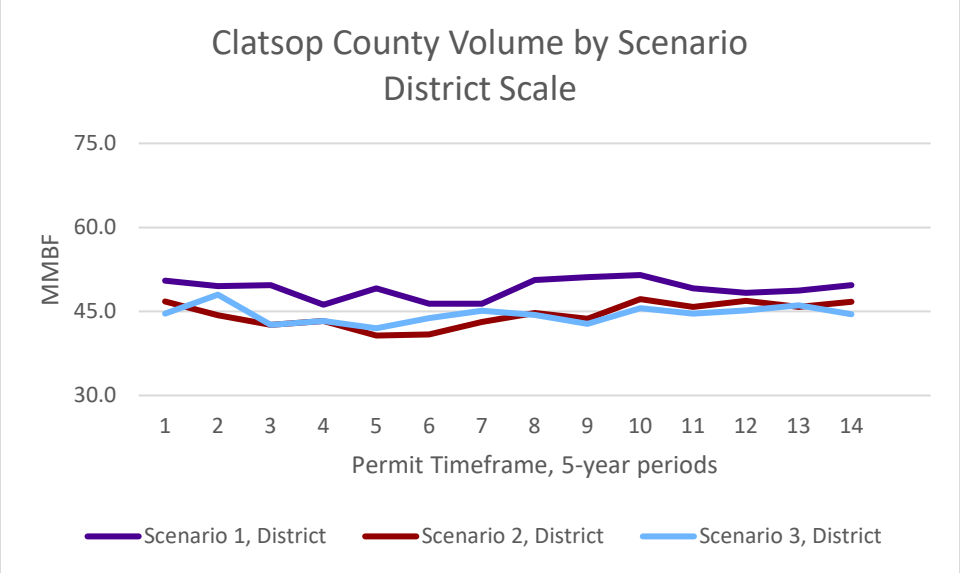


Figure A11. Clatsop County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

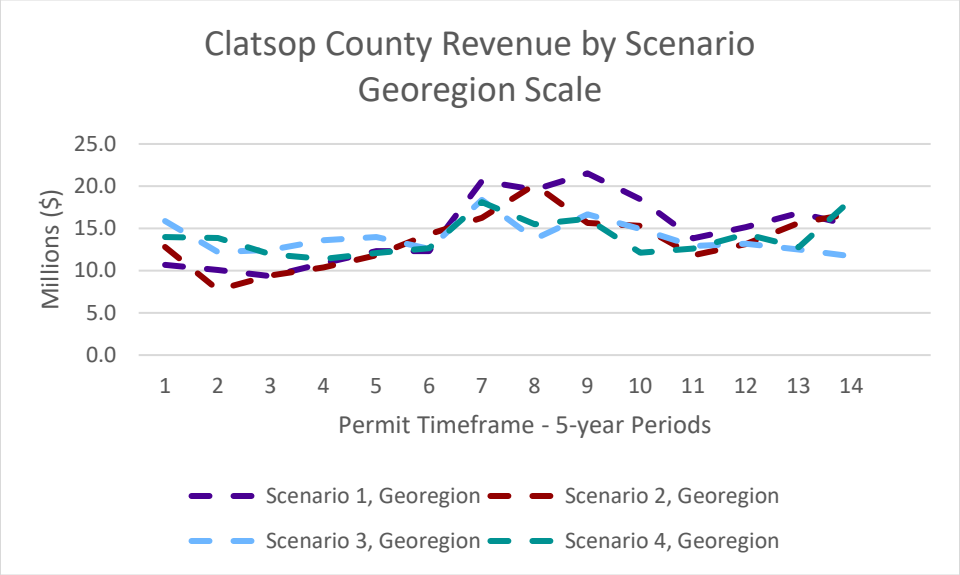


Figure A12. Clatsop County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

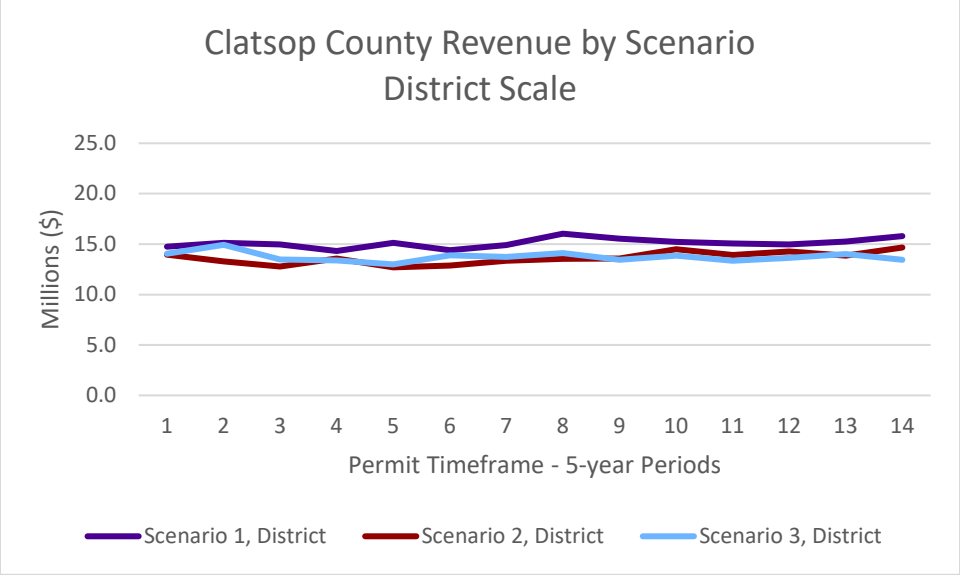


Figure A13. Columbia County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

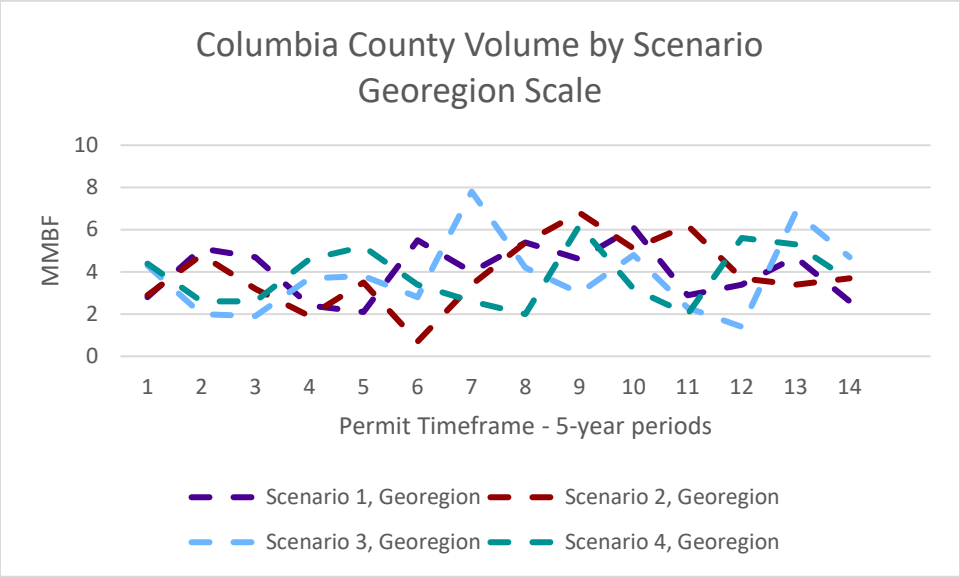


Figure A14. Columbia County Average Annual Volume by Scenario, District Scale for each 5-year time period.

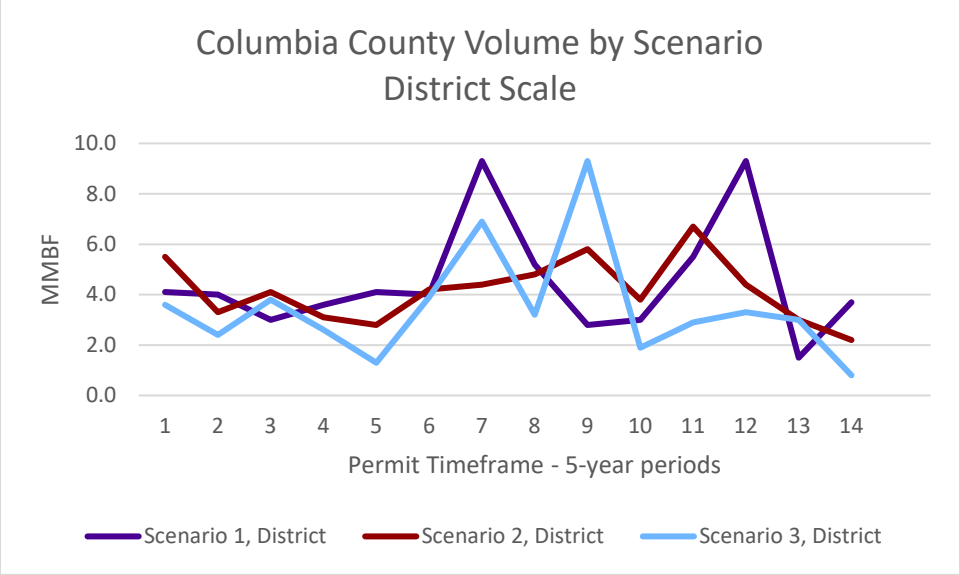


Figure A14. Columbia County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

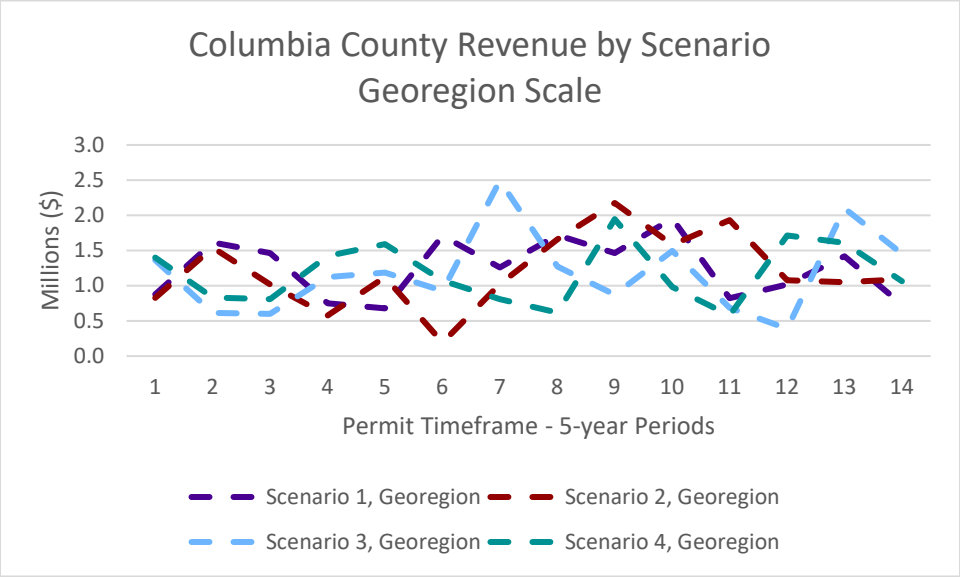
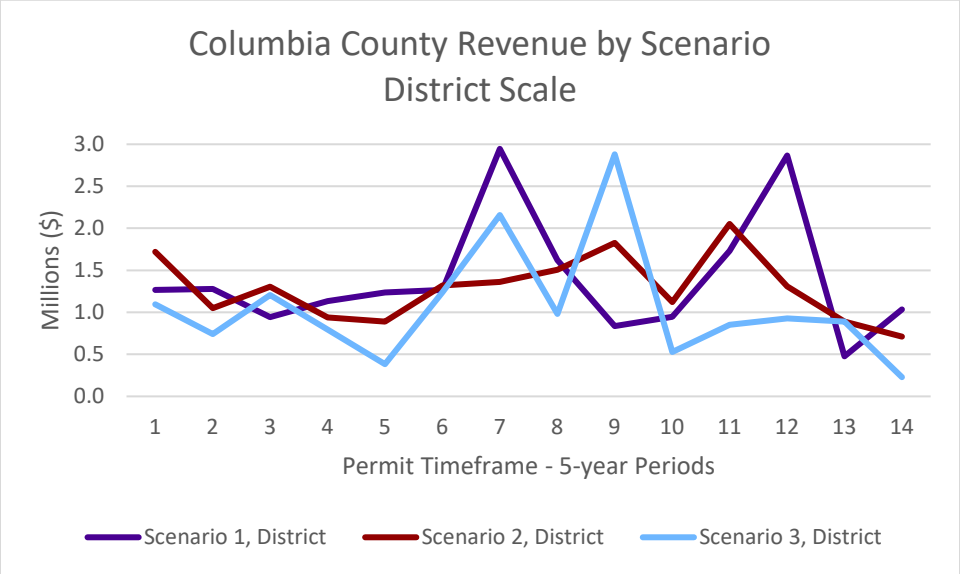


Figure A15. Columbia County Average Annual Revenue by Scenario, District Scale for each 5-year time period.



COOS COUNTY

Figure A16. Coos County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

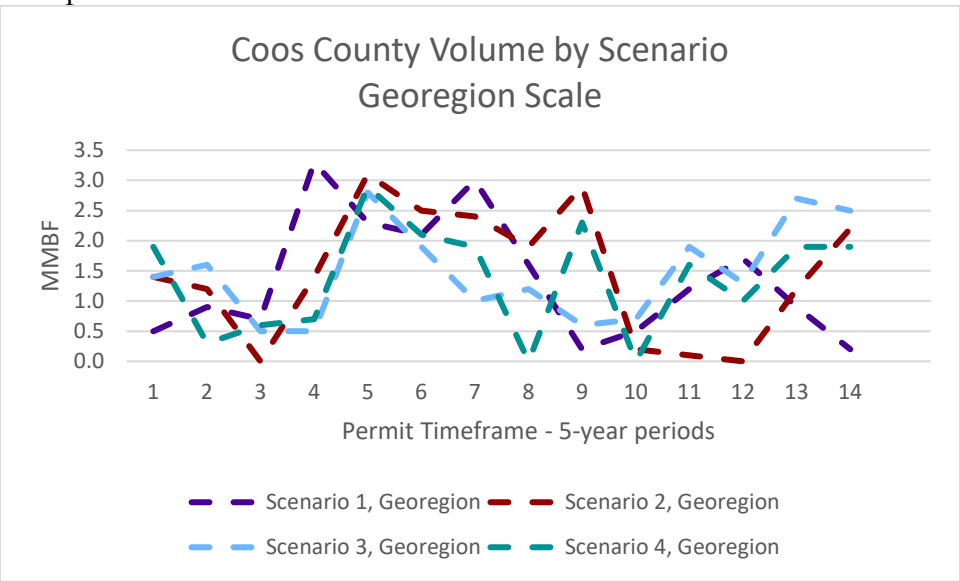


Figure A17. Coos County Average Annual Volume by Scenario, District Scale for each 5-year time period.

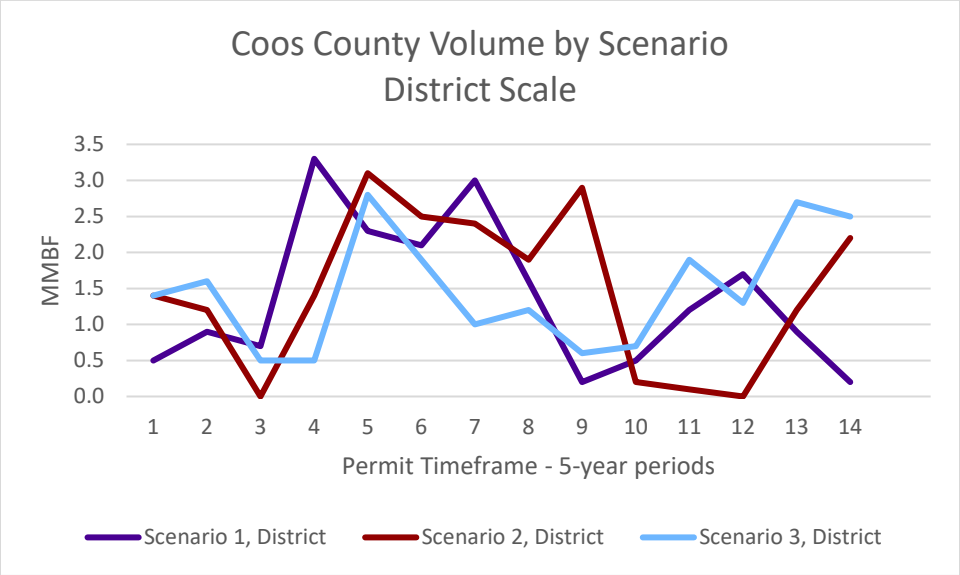


Figure A18. Coos County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

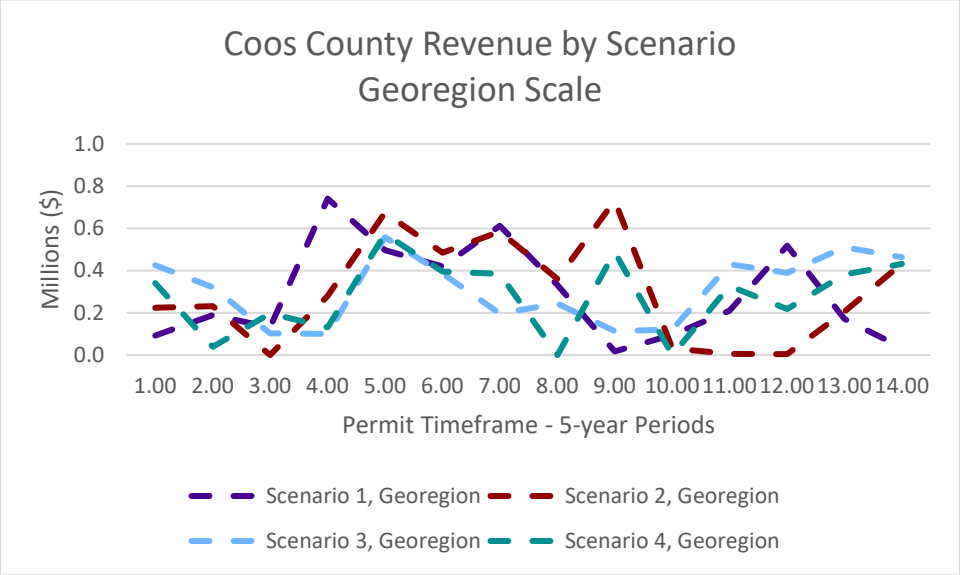
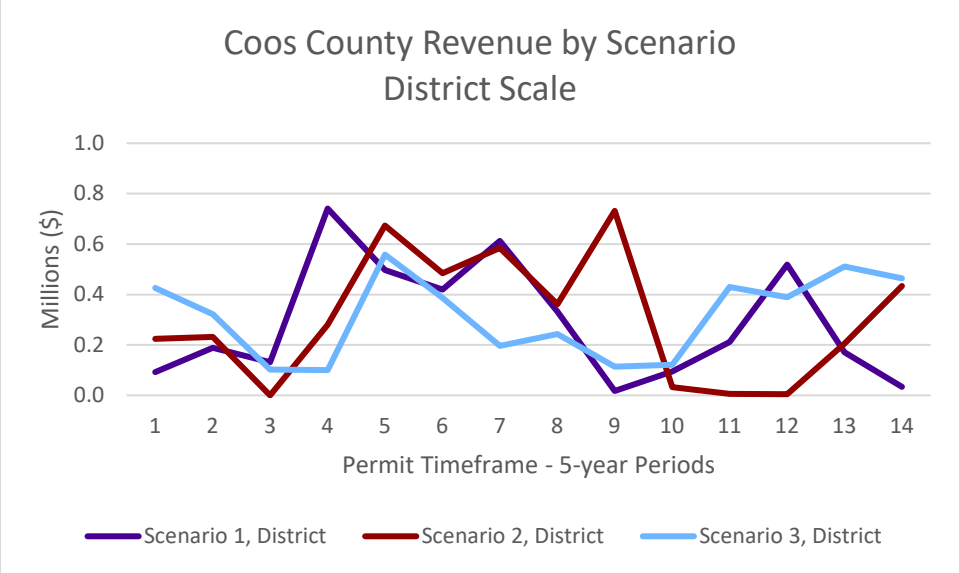


Figure A19. Coos County Average Annual Revenue by Scenario, District Scale for each 5-year time period.



DOUGLAS COUNTY

Figure A20. Douglas County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

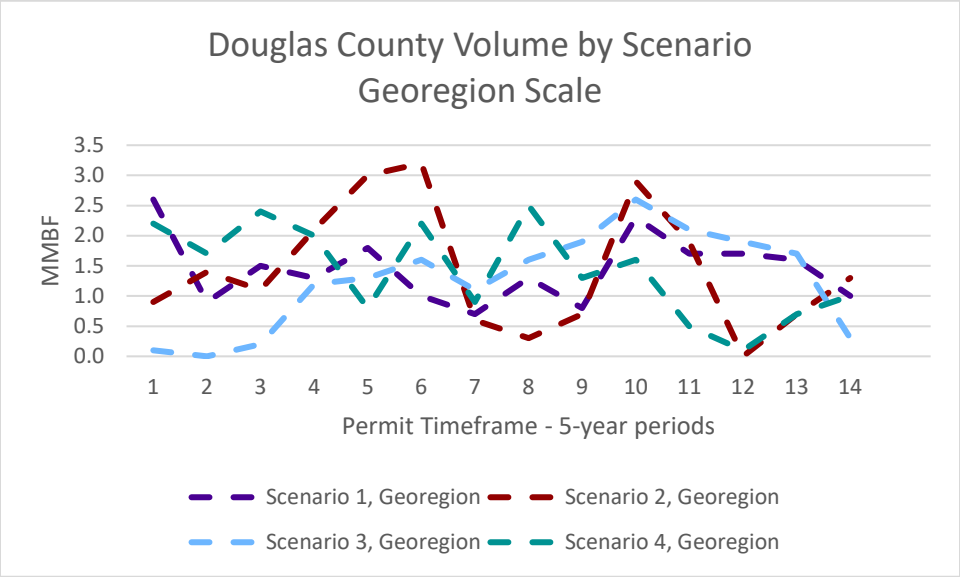


Figure 21. Douglas County Average Annual Volume by Scenario, District Scale for each 5-year time period.

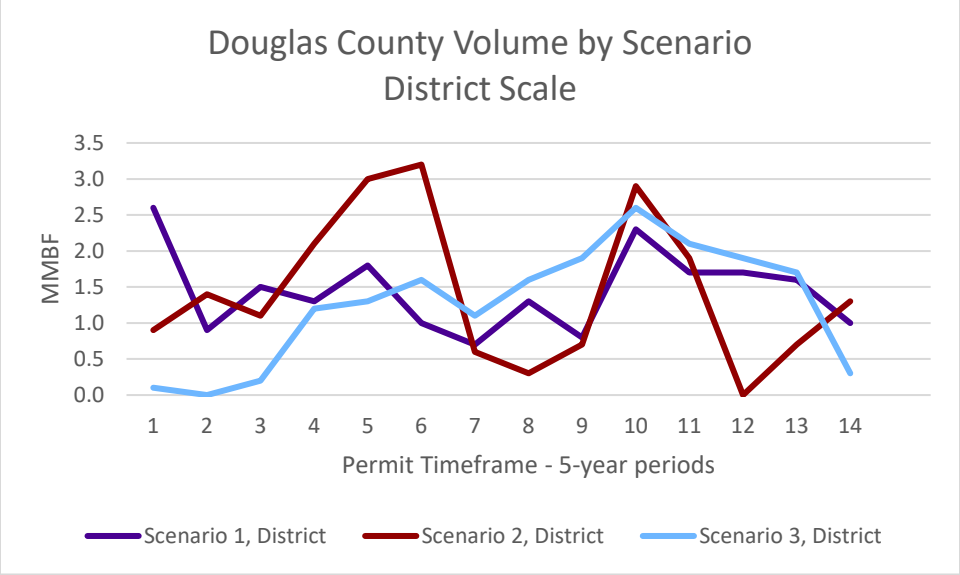


Figure A22. Douglas County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

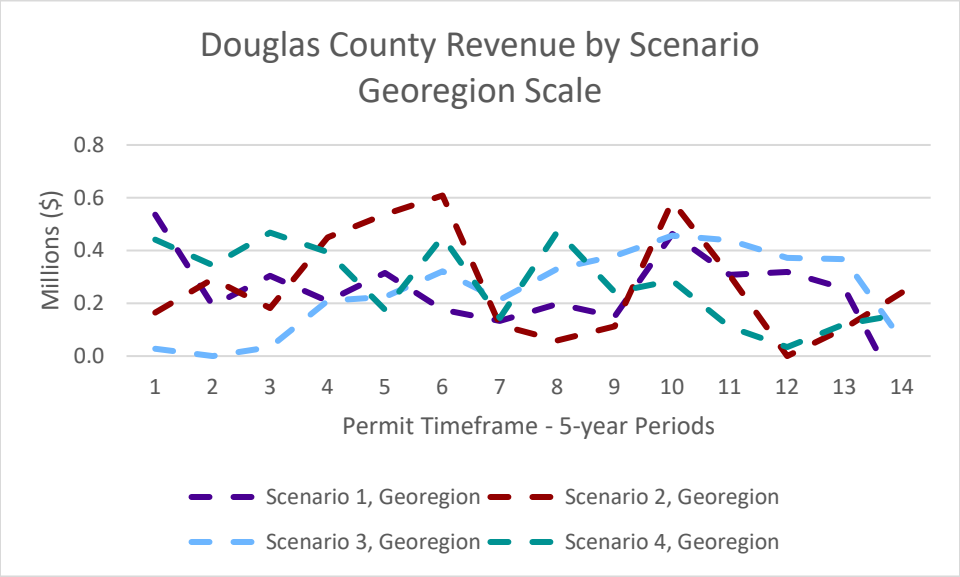


Figure 23. Douglas County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

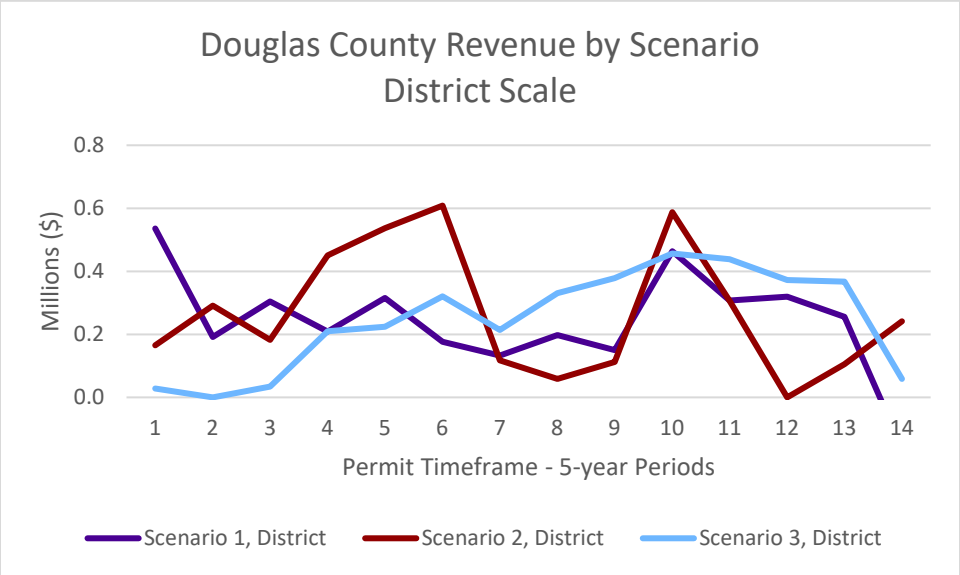


Figure 24. Josephine County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

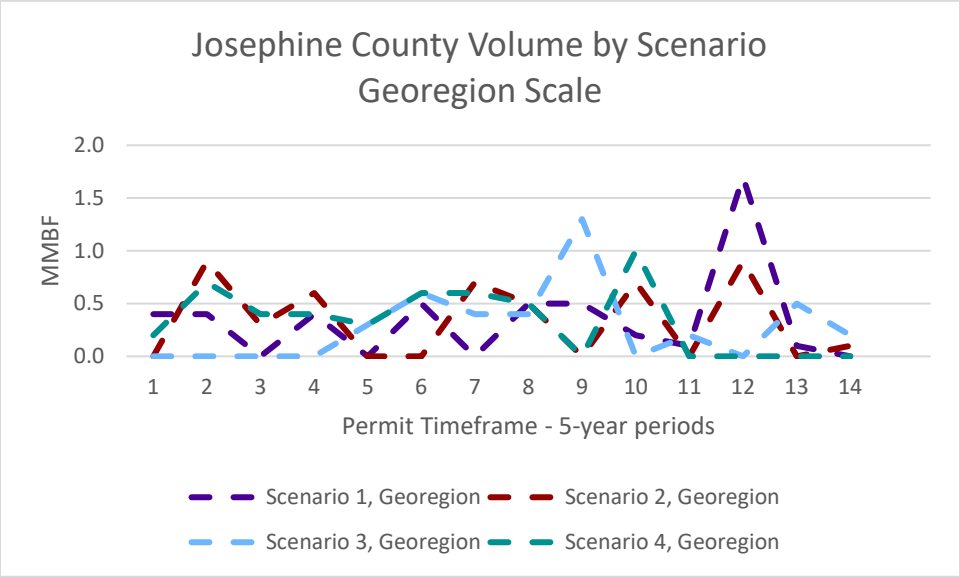


Figure 25. Josephine County Average Annual Volume by Scenario, District Scale for each 5-year time period.

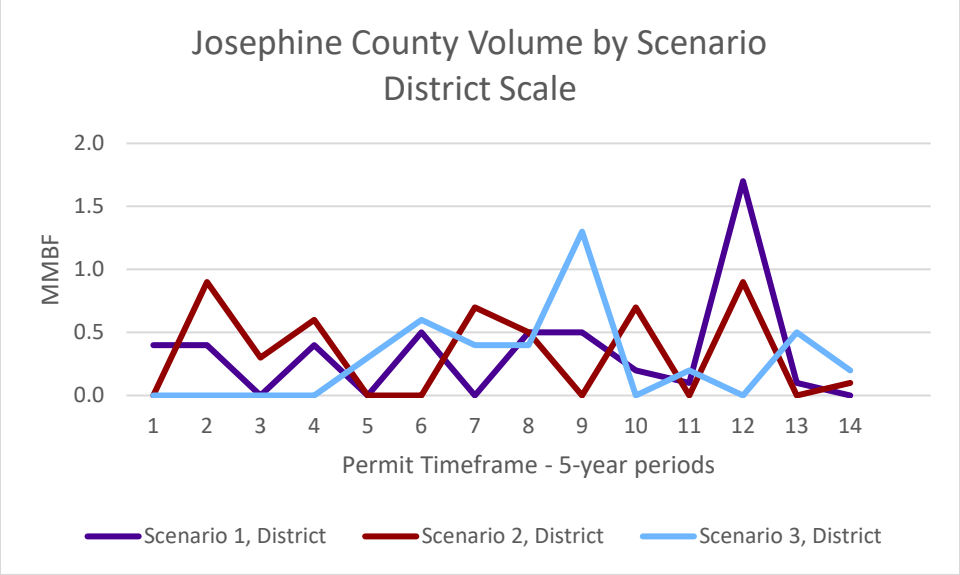


Figure 26. Josephine County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

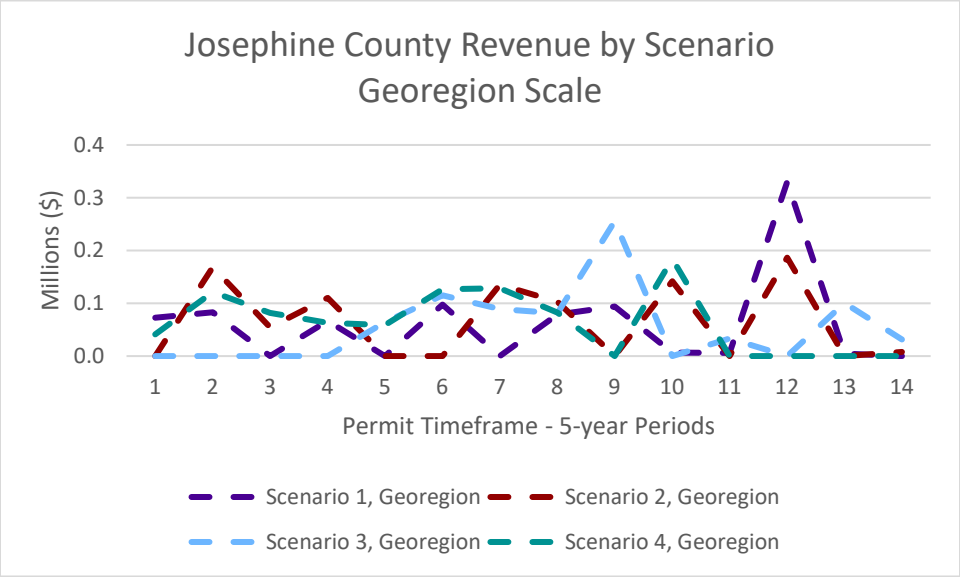


Figure 27. Josephine County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

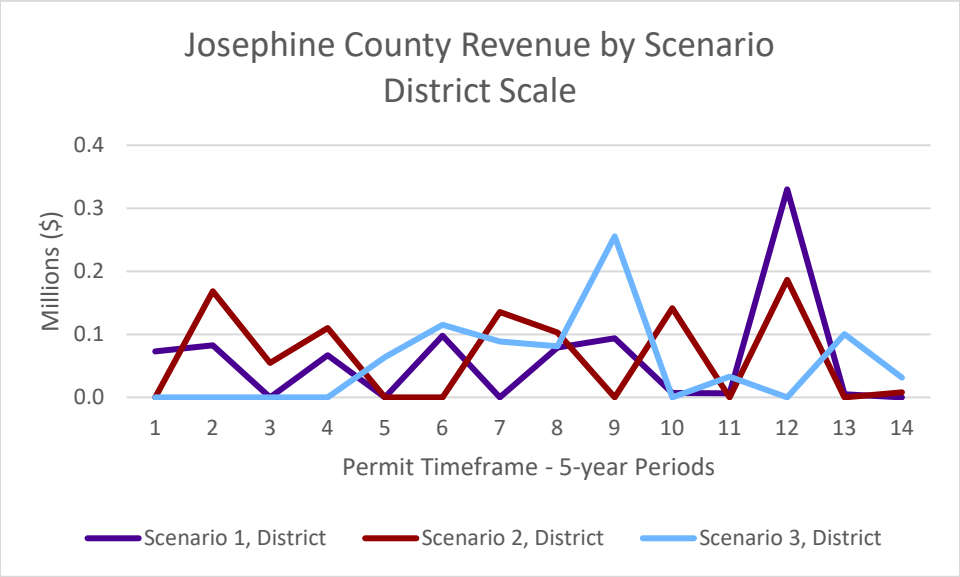


Figure 28. Lane County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

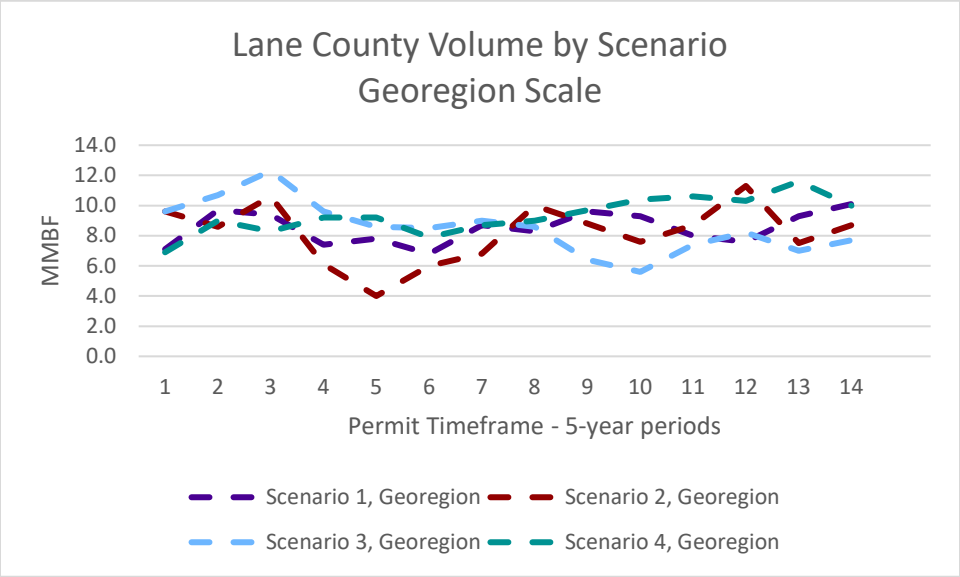


Figure 29. Lane County Average Annual Volume by Scenario, District Scale for each 5-year time period.

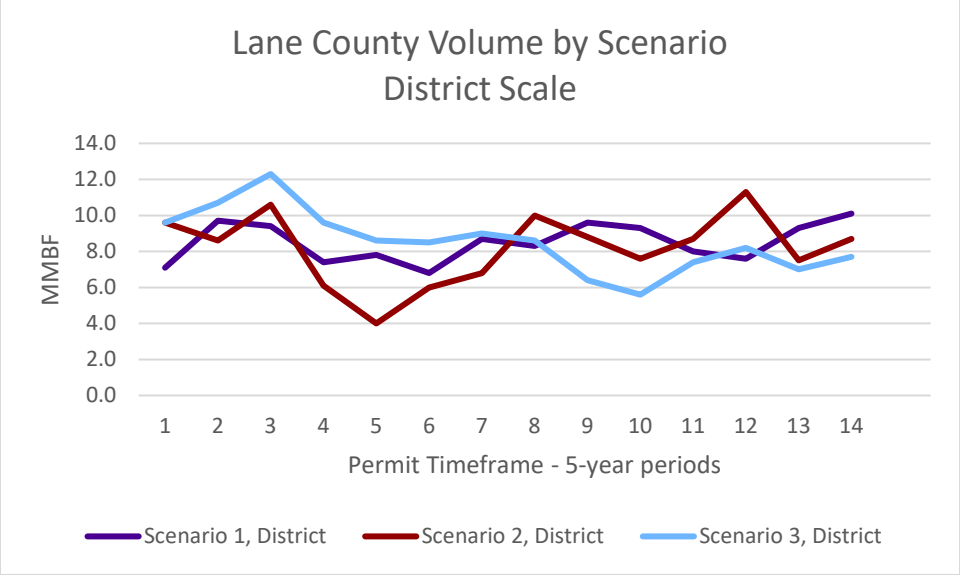


Figure 30. Lane County Annual Average Revenue by Scenario, Georegion Scale for each 5-year time period.

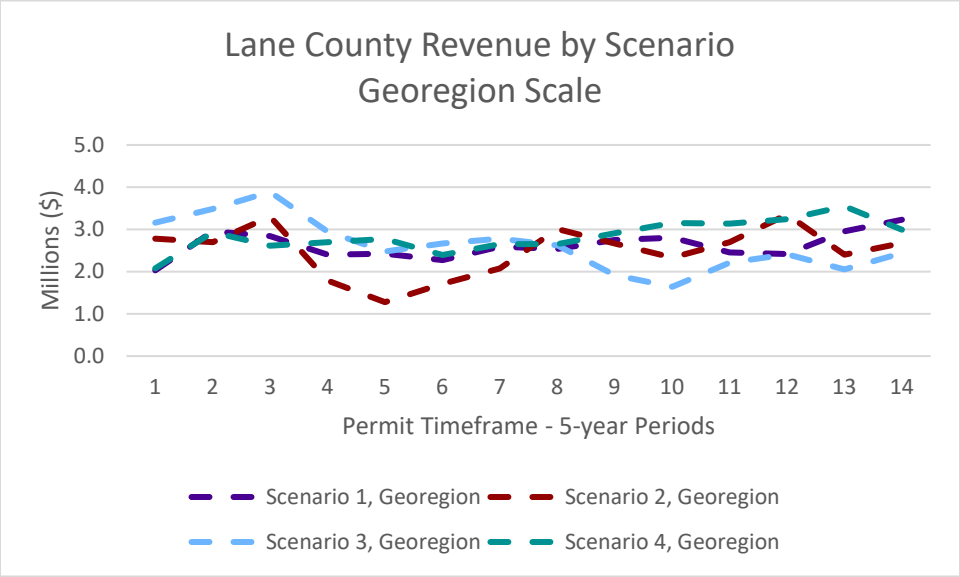
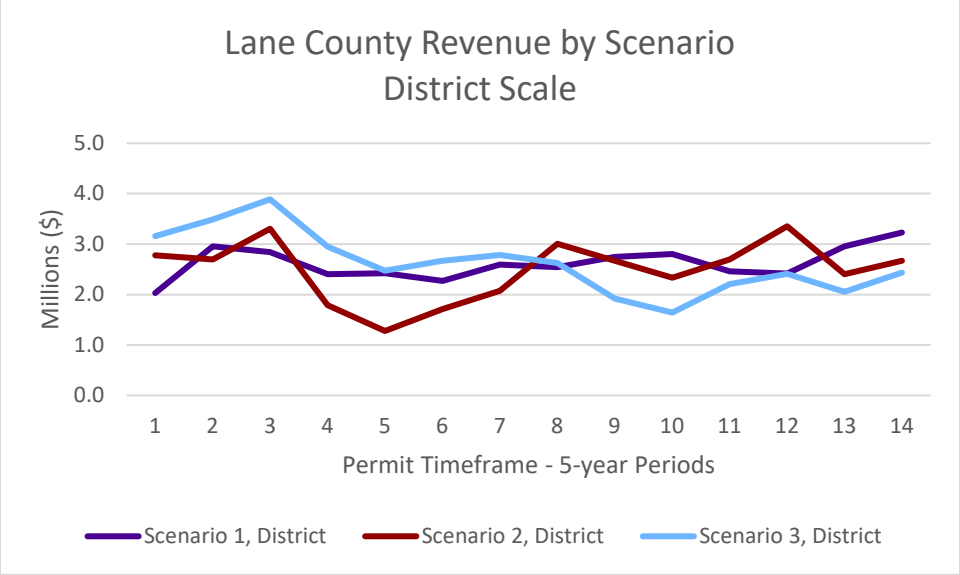


Figure 31. Lane County Average Annual Revenue by Scenario, District Scale for each 5-year time period.



LINCOLN COUNTY

Figure 32. Lincoln County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

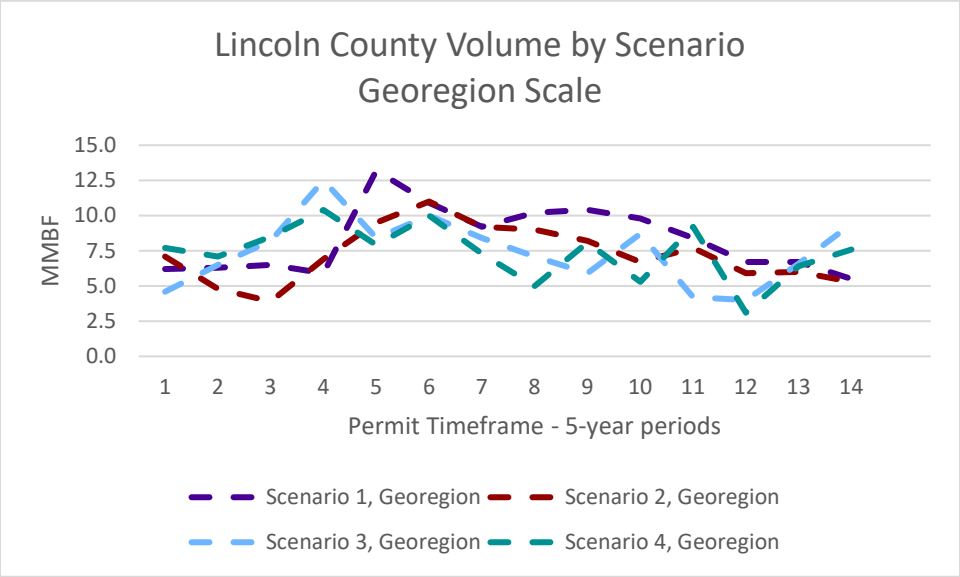


Figure 33. Lincoln County Average Annual Volume by Scenario, District Scale for each 5-year time period.

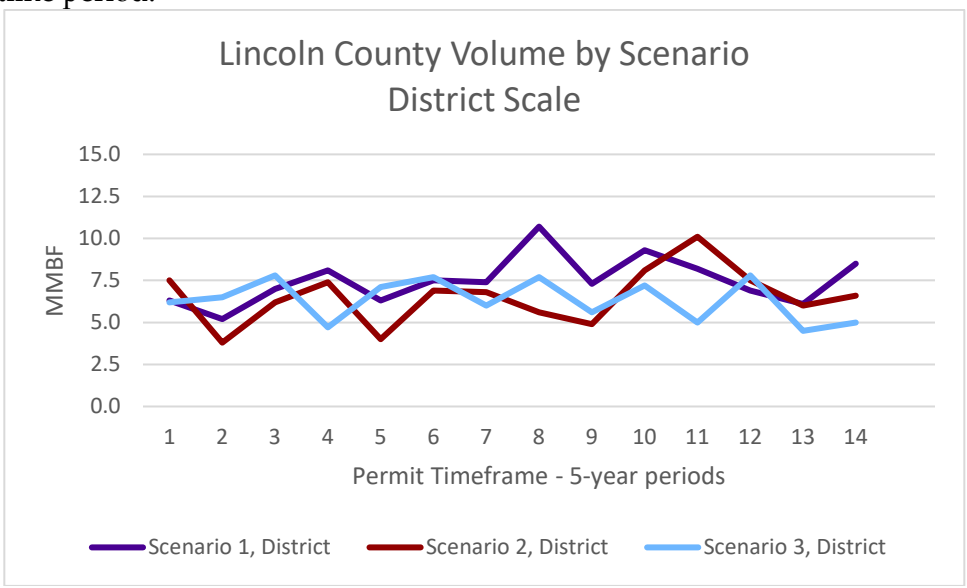


Figure 34. Lincoln County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

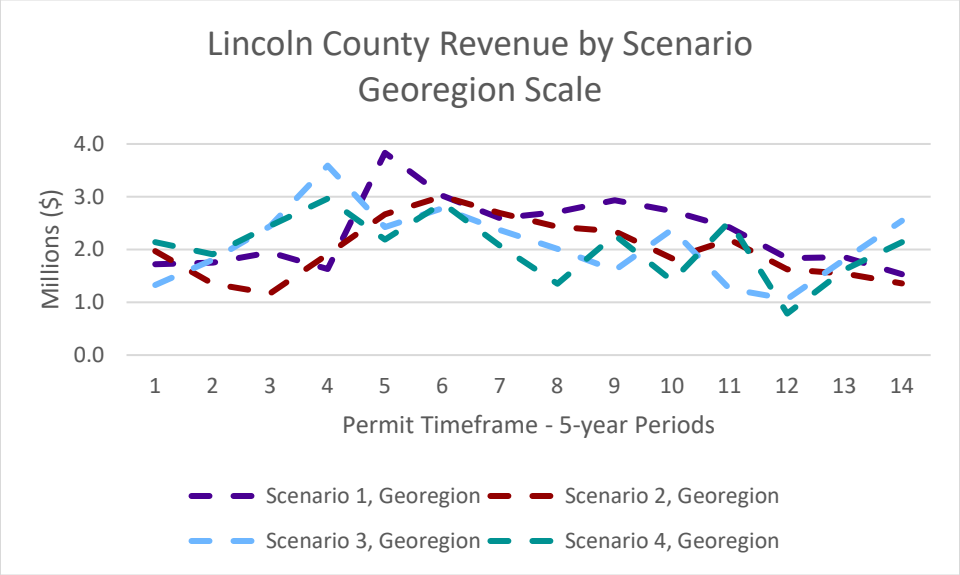


Figure 35. Lincoln County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

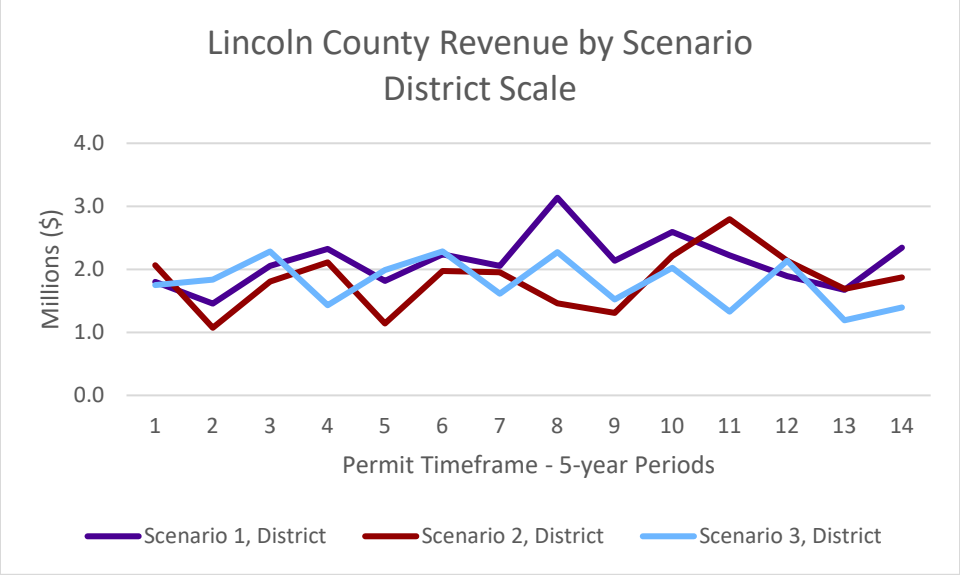


Figure 36. Linn County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

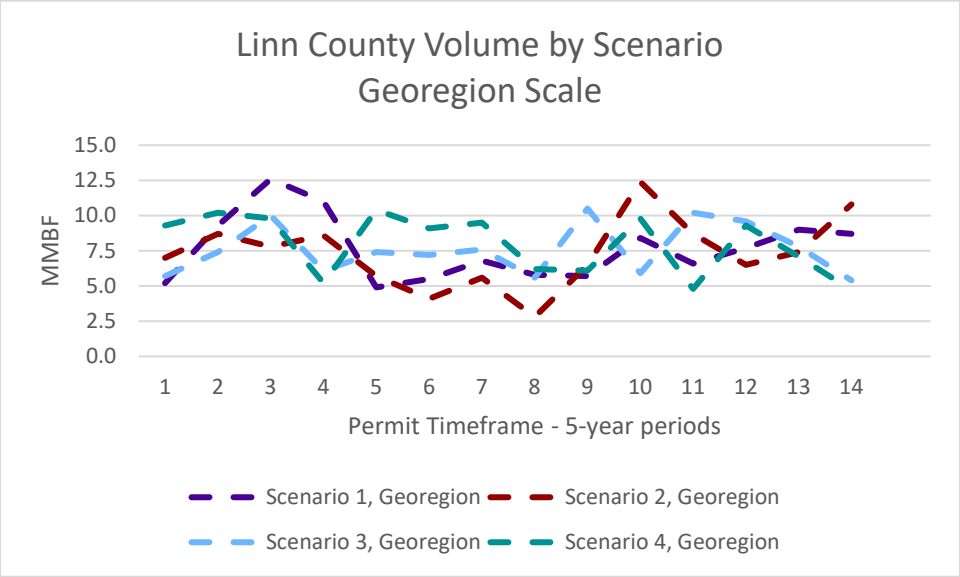


Figure 37. Linn County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

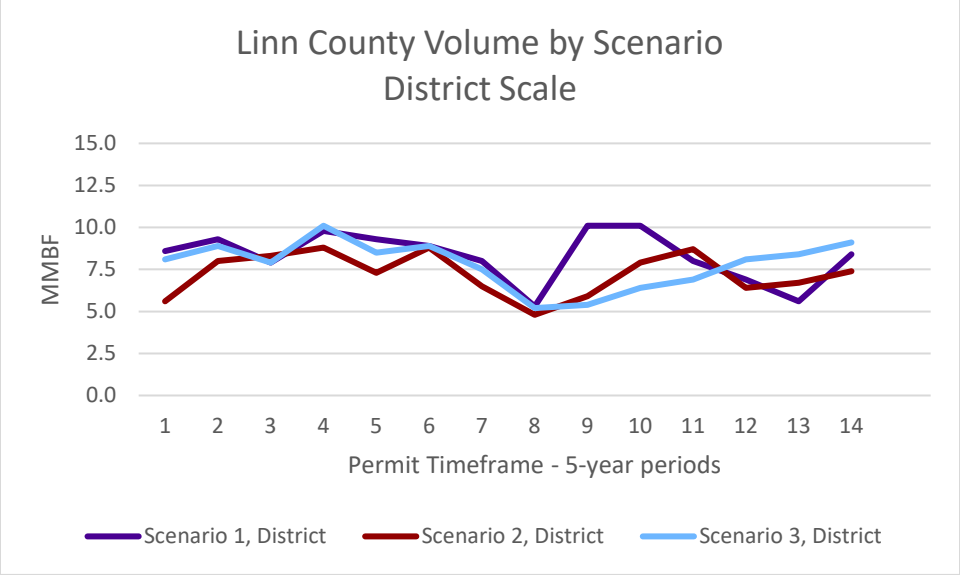


Figure 38. Linn County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

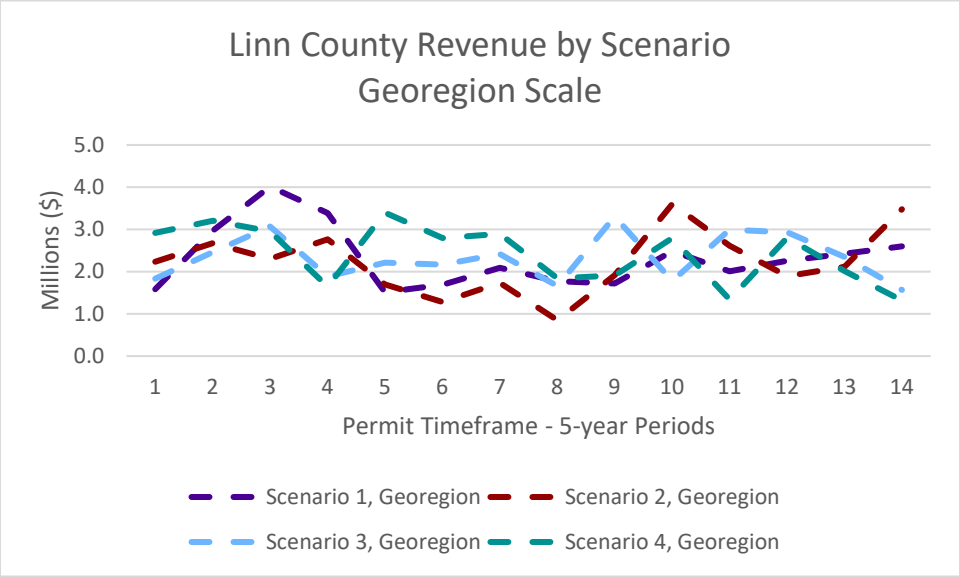


Figure 39. Linn County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

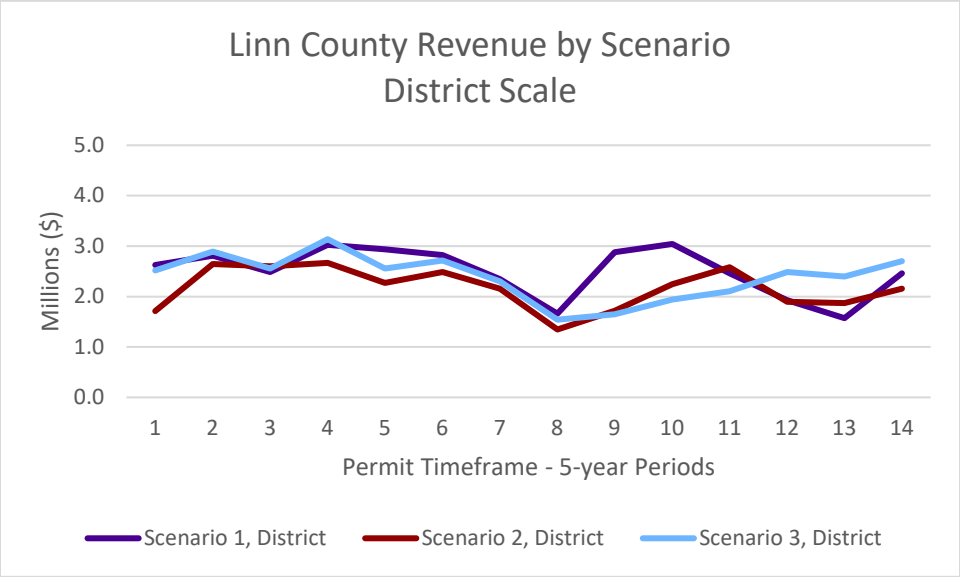


Figure 40. Marion County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

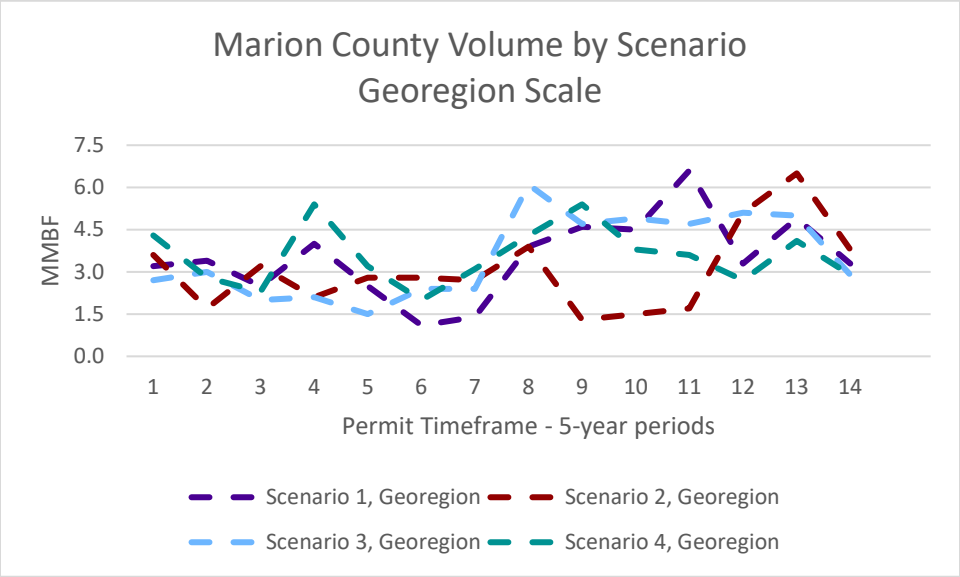


Figure 41. Marion County Average Annual Volume by Scenario, District Scale for each 5-year time period.

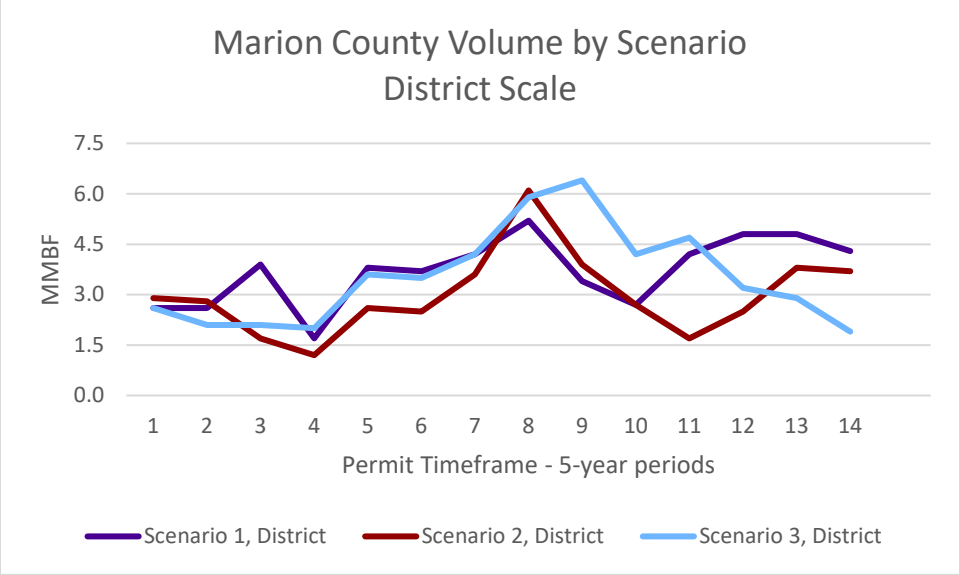


Figure 42. Marion County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

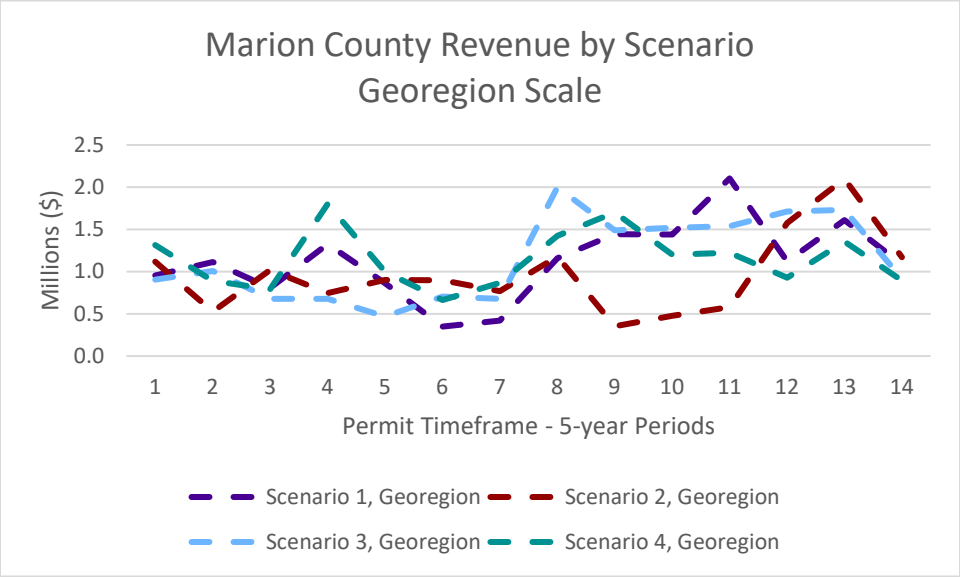


Figure 43. Marion County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

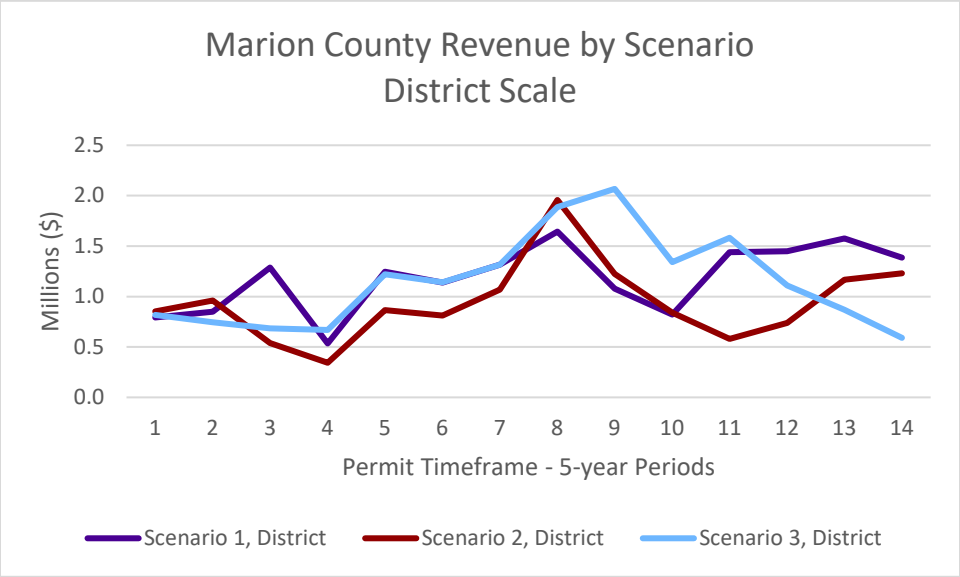


Figure 44. Polk County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

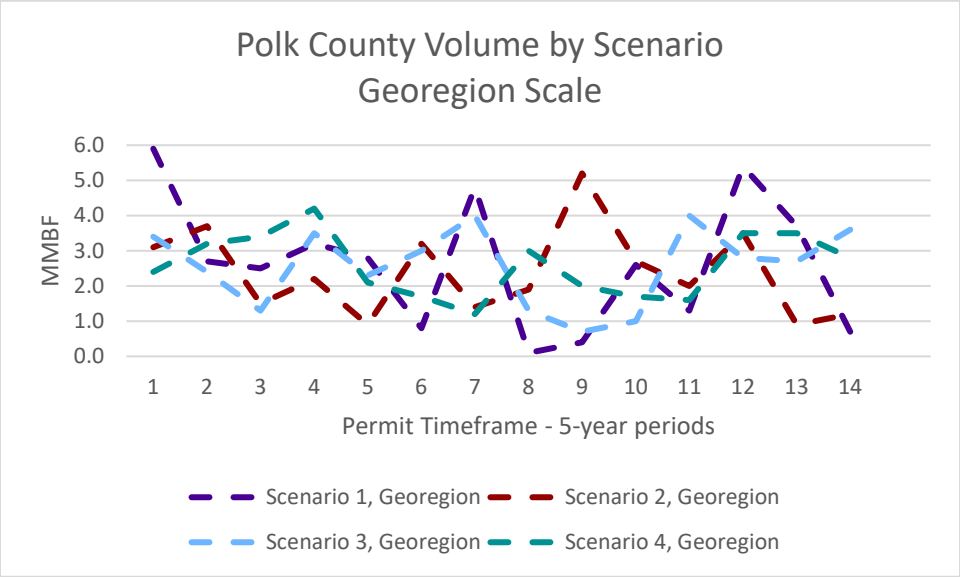


Figure 45. Polk County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

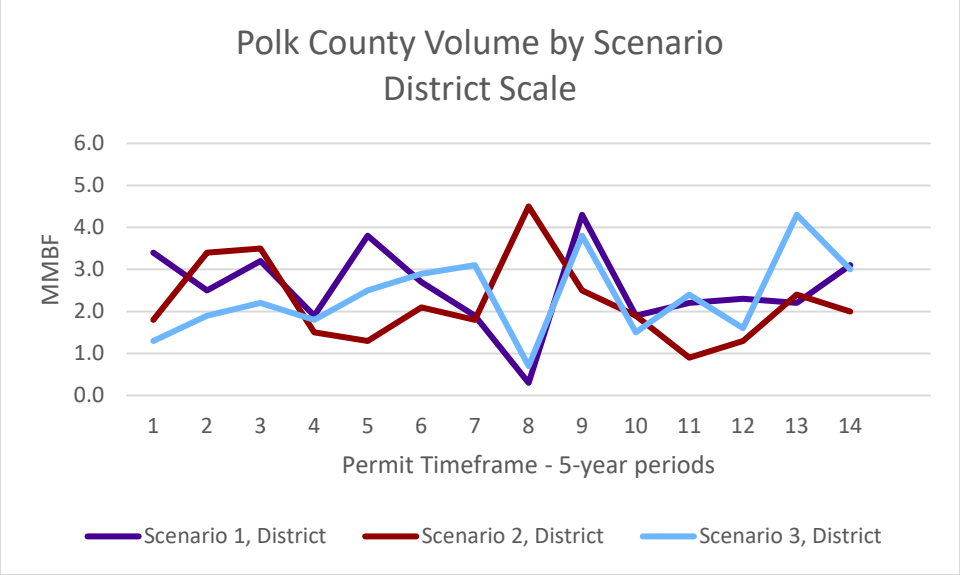


Figure 46. Polk County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

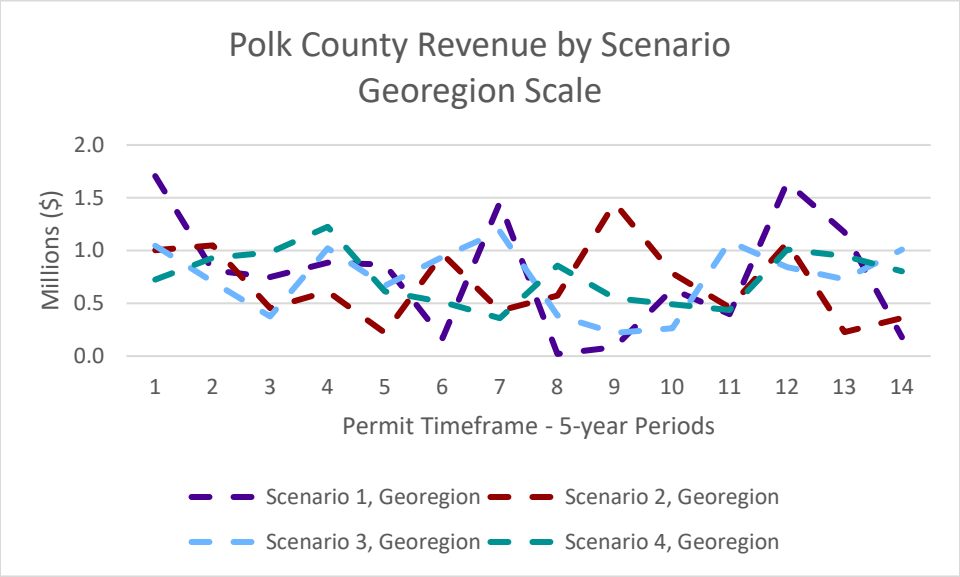


Figure 47. Polk County Average Annual Revenue by Scenario, Georegion Scale for each 5 year time period.

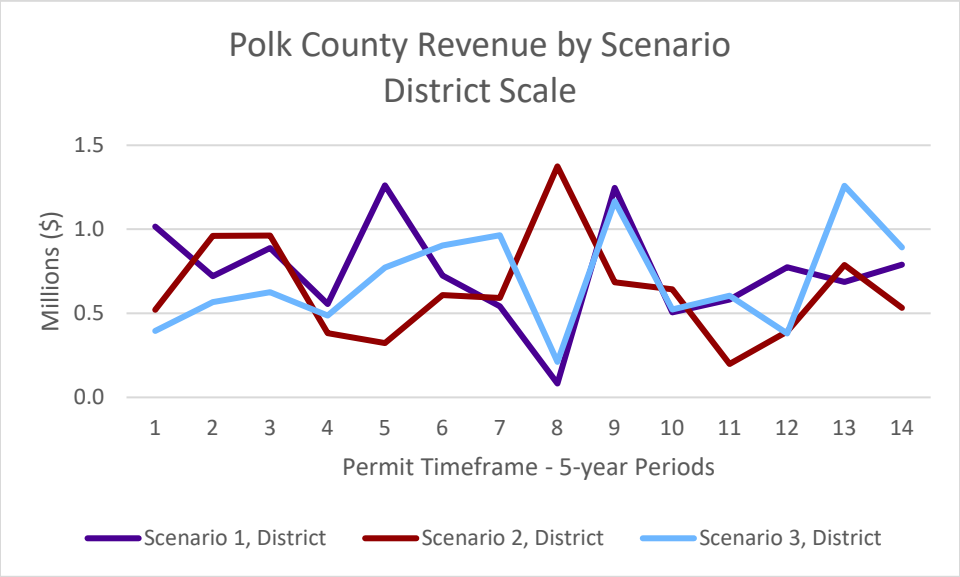


Figure 48. Tillamook County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

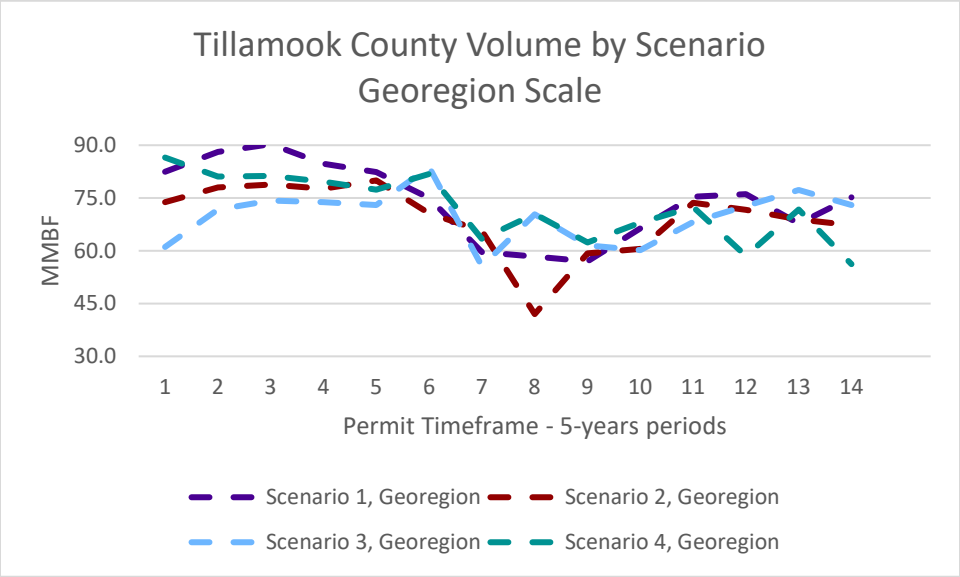


Figure 49. Tillamook County Average Annual Volume by Scenario, District Scale for each 5-year time period.

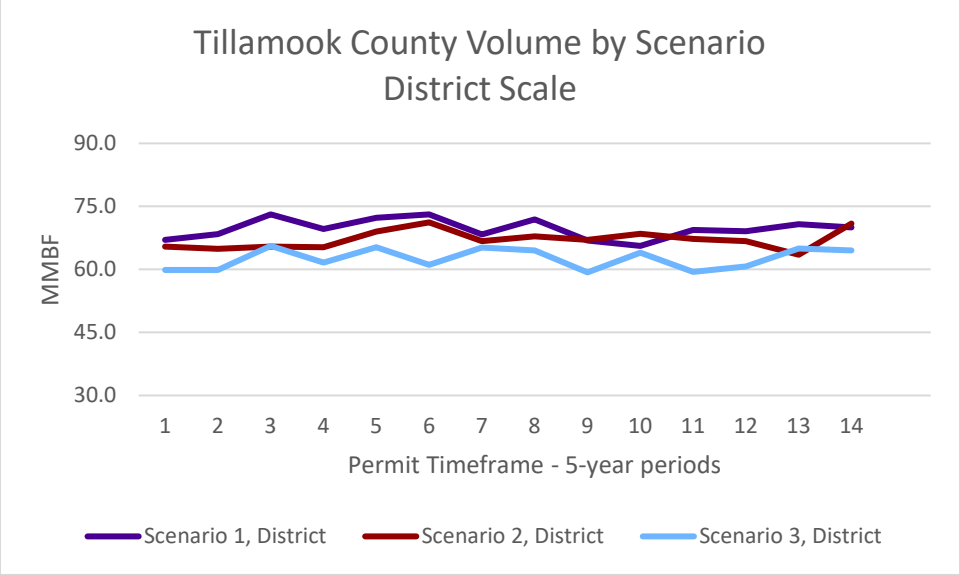


Figure 50. Tillamook County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

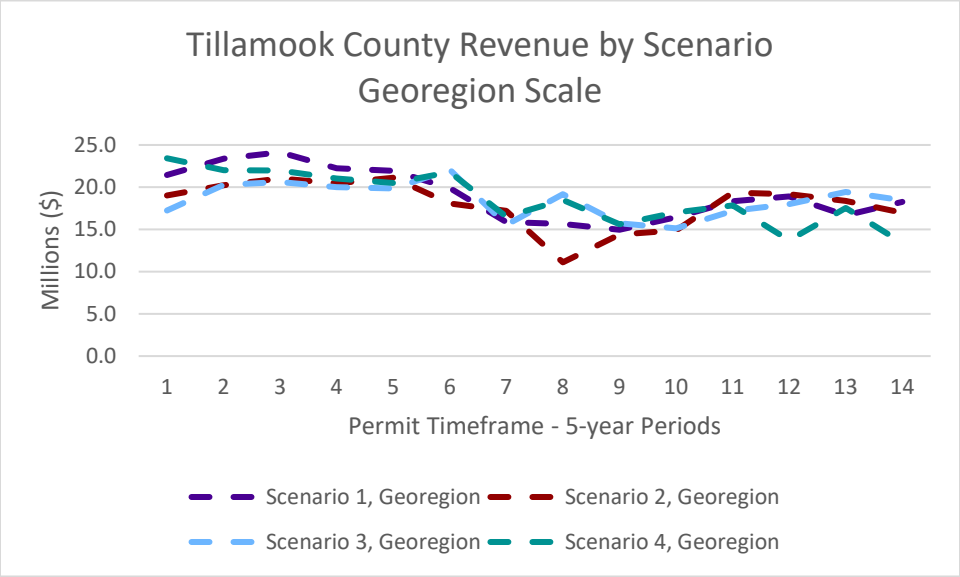


Figure 51. Tillamook County Average Annual Revenue by Scenario, District Scale for each 5-year time period.

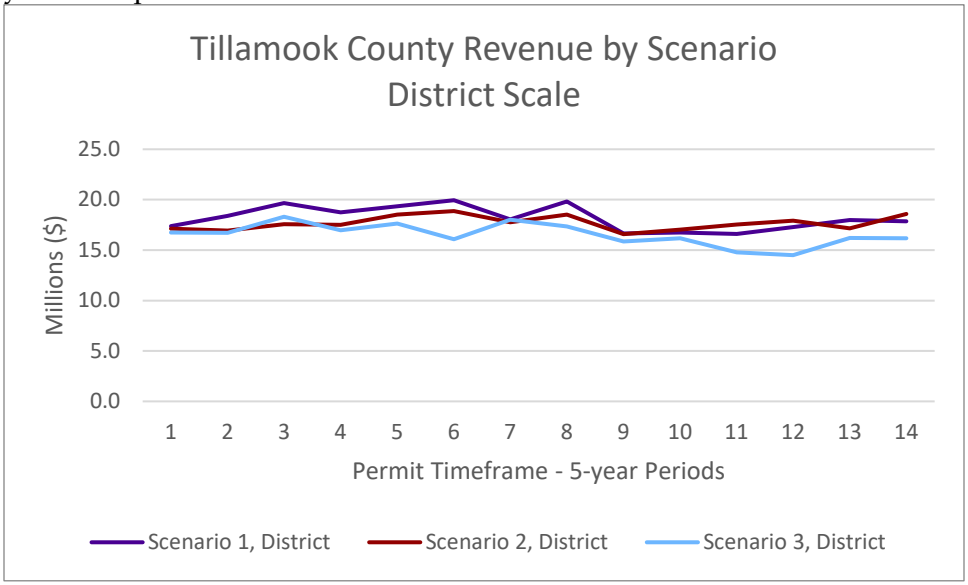


Figure 52. Washington County Average Annual Volume by Scenario, Georegion Scale for each 5-year time period.

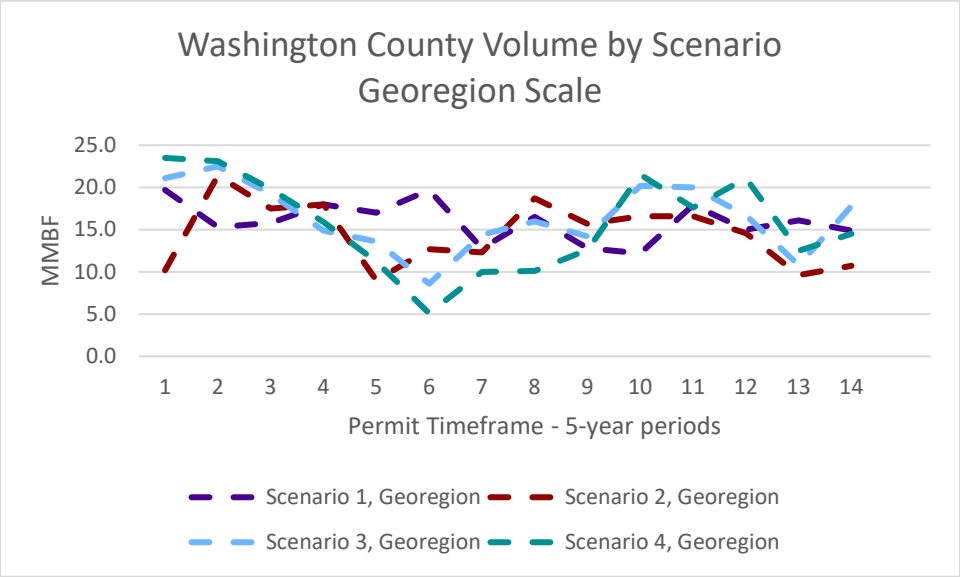


Figure 53. Washington County Average Annual Volume by Scenario, District Scale for each 5-year time period.

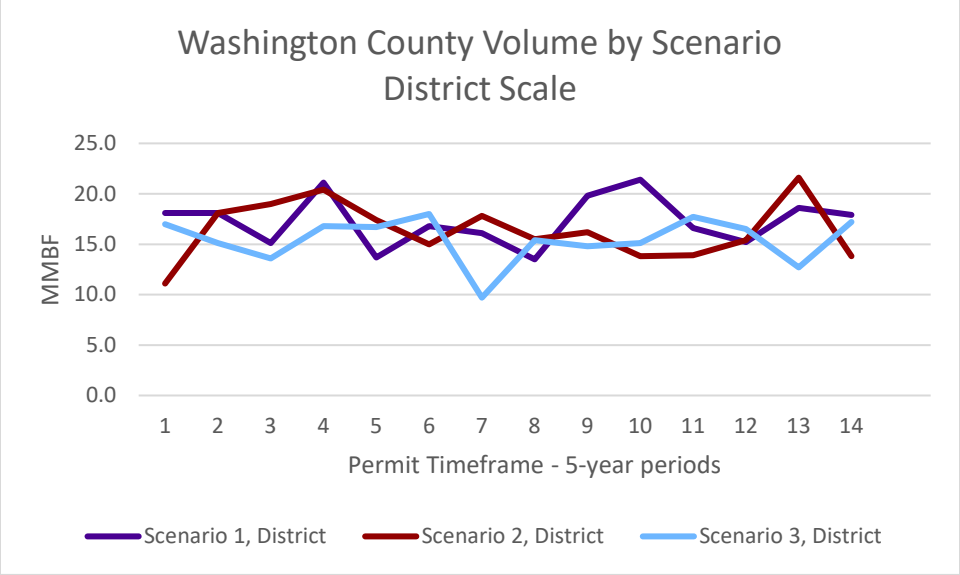


Figure 54. Washington County Average Annual Revenue by Scenario, Georegion Scale for each 5-year time period.

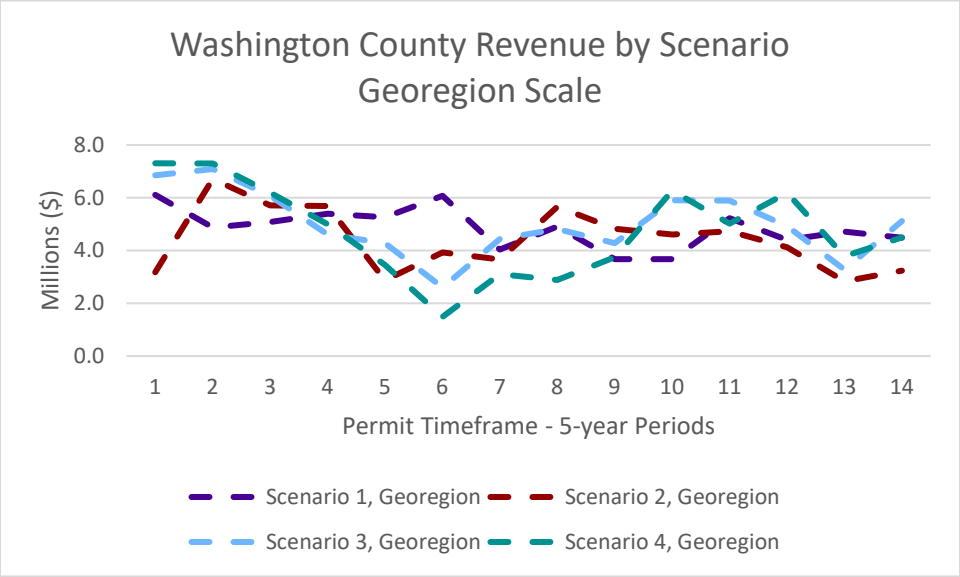
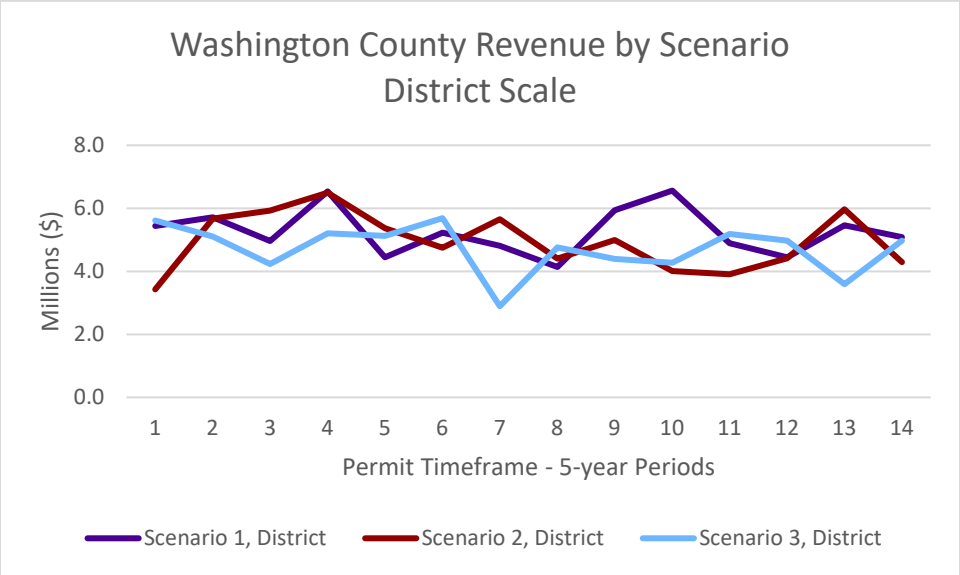


Figure 55. Washington County Average Annual Revenue by Scenario, District Scale for each 5-year time period.



Discussion Topics and Questions

Board of Forestry Special Meeting: Board and FTLAC Engagement

Thursday, December 14, 2023 | 3:25 PM – 4:30 PM

Desired Outcomes and Purpose

- To develop a common understanding of the modeling process, underlying data and results, utility and limitations.
- To allow time for the FTLAC to inform the Board as it considers options for moving forward with the FMP under the HCP, and to ask questions to help FTLAC members inform their testimony.
- To continue building a relationship between the FTLAC and the Board and consider how best to collaborate moving forward.

Agenda Items and Discussion Questions

Opening and Framing (5 min)

- Purpose of discussion and framing
- Opening remarks

Reflection on modeling results (35 min)

Round robin to hear from all members for two minutes each on the following two questions.

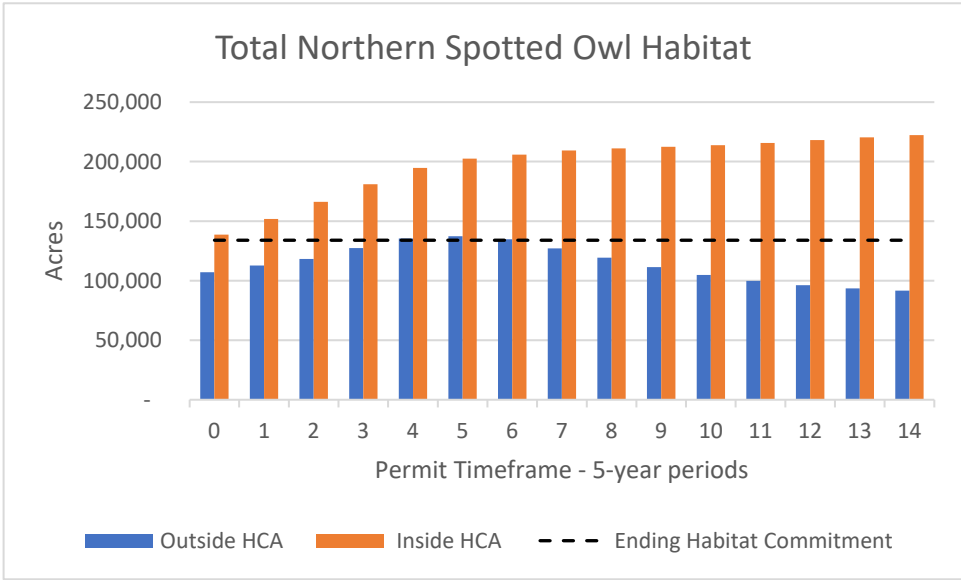
- Do you have any clarifying questions about the modeling results?
    - Specifically, do you have any questions about the assumptions made or why/how staff came to any of the results in the modeling?
- Are there any benefits or concerns that you would like to discuss related to the modeling results?

Open discussion with FTLAC on the questions above and responses from round robin.

FTLAC and County Engagement on FMP (25 min)

- The FMP with an HCP is a mechanism to mitigate legal risk and garner public support for the management of state forests. What is your perception of these risks?
- As the Board considers the modeling results and how to move forward with the draft FMP and draft HCP, how do you envision the counties collaborating with ODF, the Board, and stakeholders to find solutions that allow the agency to manage the public forest in the context of Greatest Permanent Value?
- Looking forward to FMP and HCP implementation, how can the Board and ODF support the counties in actions outside of the FMP to mitigate any potential impacts to the counties and local communities?

FTLAC Questions on Modeling Scenarios	
List of questions that have been sent in:	**Response or Work Required and Timing**
Can the following scenario be run: Can even flow apply only to lands outside HCAs, and within HCAs harvest equal to the maximum acres allowed under the HCP in order to maximize forest health treatments within HCAs?	While running the different scenarios, a cursory model run was done for the North Coast georegion scale, maximum volume scenario, to look at just this question. Initial results showed even flow volume outcomes that were about 3% lower compared to the reported run. This cursory run did not include any harvest from within HCAs. We did not pursue this as a full scenario since the difference was minor.
You mentioned during the FTLAC meeting that the modeling was trying to solve the "Tillamook Problem." Can you be more clear on what the "Tillamook Problem" is and what the financial impact is for Tillamook County and its Special Districts?	Tillamook has unique forest conditions and growth limitations on existing stands due to Swiss Needle Cast infection, sprayed alder, fire history, off-site seed etc. This is coupled with high access and logging cost from difficult road construction and long logging yarding distances on steep long slopes. These challenges on average produce lower net revenues per acre than you will see on other districts.
Do all modeling scenarios generate enough income for ODF to implement the harvests within the given scenario?	No, none of them do long term, but that is a larger revenue model issue that needs structural changes with or without this HCP. For context based on average stumpage values over the last decade, ODF would have to harvest around 289 mmbf annually to fund the current level of State Forests management. That would also require that no additional FTE are required to achieve those harvest levels.

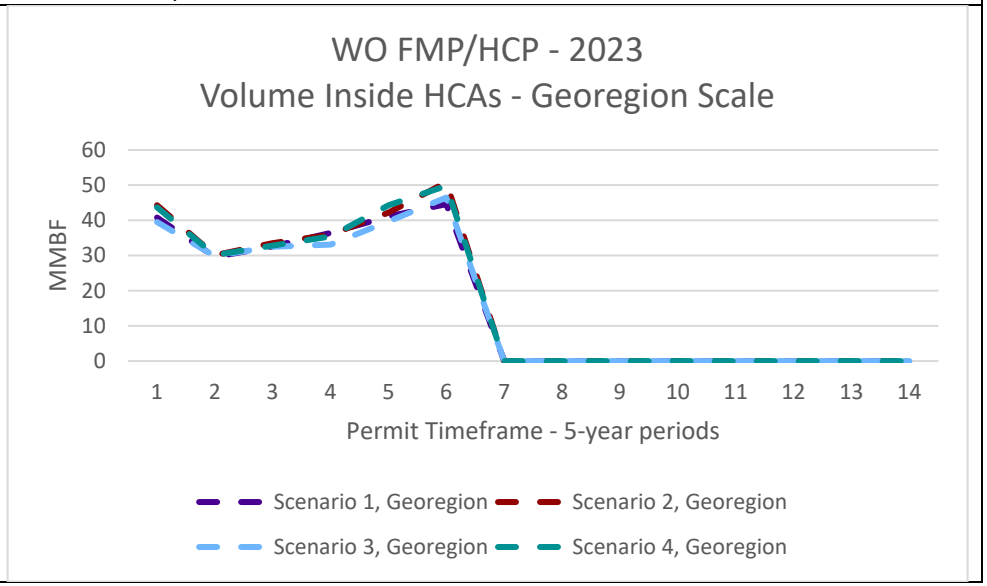
Can you provide a graph of owl habitat outside the HCAs similar to the graph provided inside the HCAs?	 This is the projected NSO suitable habitat for the georegion scale maximum volume scenario. Other scenarios are similar with some deviation outside of HCAs.
What other certainty does this plan provide other than ESA certainty for the covered species?	While the principal purpose of the HCP is to provide for management certainty relative to the covered species, the scope of the HCP is expected to provide for many of the other native fish and wildlife species that use forests with the same habitat components. This ancillary benefit will help fulfill overall GPV goals.
What's the floor? What volume can the counties budget around?	The FMP modeling presents a reasonable range of potential harvest, but there is no floor established in the FMP. Performance measures under development for the FMP include timber harvest volumes and will form a basis for conversations with the Board. During implementation planning, ODF will work with our FTLAC partners as part of establishing more specific management objectives, including timber harvest. A key factor in budgeting, for both ODF and the counties, is the fluctuation in timber prices over time, which is outside of ODF and county control.

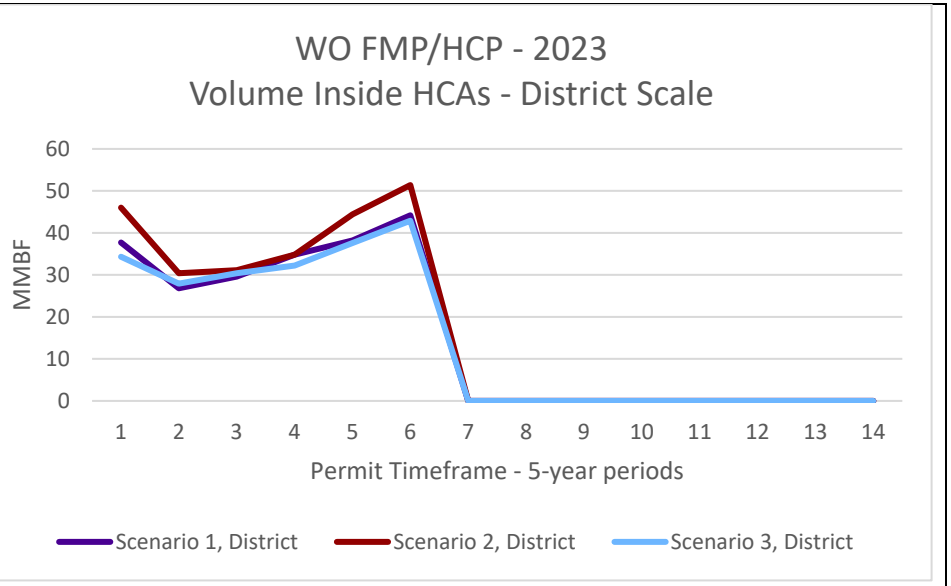
<table>
<tr>
<td>When do you expect to have an updated inventory? Are any district inventories complete?</td>
<td>Our current Stand Level Inventory (2021) revision is complete, and available upon request.

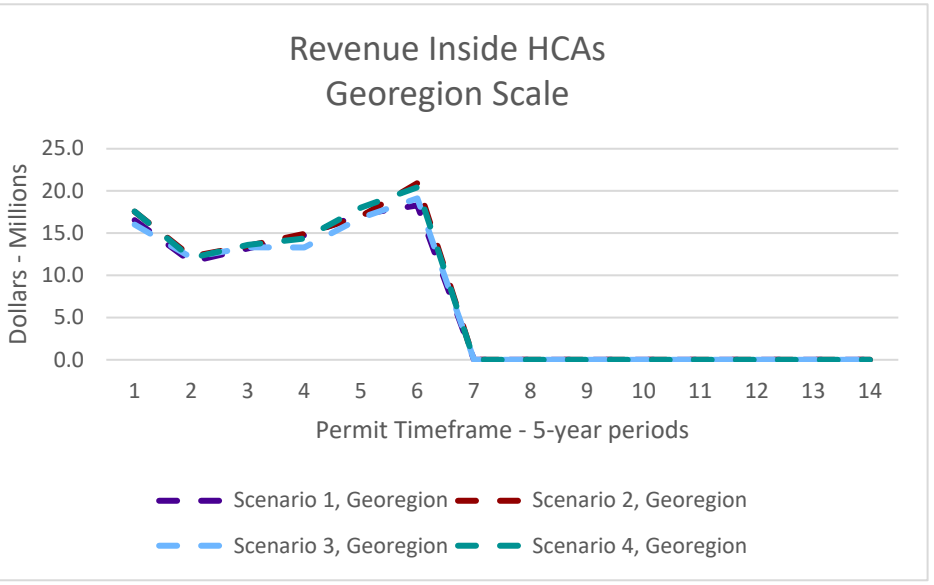
We are also making progress on our Enhanced Forest Inventory
1. We have an initial set of lidar products for the majority of contiguous ownership for Astoria, Tillamook and Forest Grove Districts and the southern half of West Oregon District lidar acquisitions. Supplemental plots were completed summer and fall 2022 and work is ongoing for the species prediction modeling that will be included in the final inventory across all districts.
2. We are still awaiting two more data packages for the northern half of West Oregon District and Western Lane District lidar. Once received, these will be modeled jointly. We anticipate our contractor will have supplemental plots completed in the spring of 2024. We expect the earliest those data will available is fall of 2024.
3. We are collaborating with the USFS Region 6 biometrics team, BLM, and FIA to model the Beachie Creek-Lionshead acquisition. This presents a great opportunity to leverage the joint FIA dataset across ownerships to create a cross-jurisdictional set of inventory products. We are hoping to have inventory projects from that collaboration in spring or summer of 2024.
4. Finalizing and publishing the EFI inventory will likely occur in 2025.</td>
</tr>
<tr>
<td>What % of acres of each district has had owl occurrence data?</td>
<td>The Biological Goals and Objectives for terrestrial species apply to the HCAs, with the exception of NSO dispersal habitat which applies outside HCAs (but includes RCAs).
<table>
<tr><th>District</th><th>Acres in Owl Sites[1]</th><th>Other District Acres</th><th>Total District Acres</th><th>% District in Owl Sites</th></tr>
<tr><td>Astoria</td><td>54,997</td><td>81,858</td><td>136,855</td><td>40.2</td></tr>
<tr><td>Tillamook</td><td>56,160</td><td>194,430</td><td>250,589</td><td>22.4</td></tr>
<tr><td>Forest Grove</td><td>31,193</td><td>83,817</td><td>115,009</td><td>27.1</td></tr>
<tr><td>Western Lane</td><td>23,614</td><td>1,642</td><td>25,257</td><td>93.5</td></tr>
</table>
</td>
</tr>
</table>

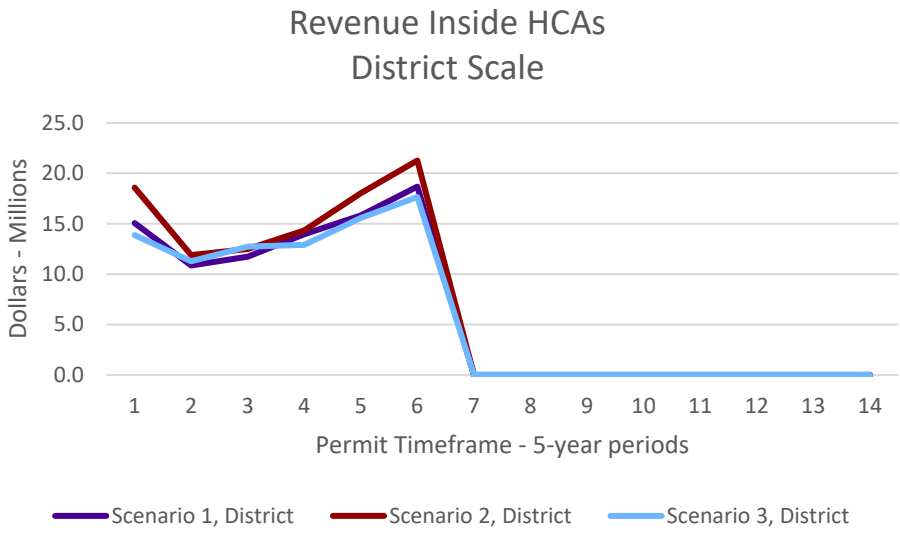
West Oregon	8,812	27,800	36,613	24.1
Coos	9,706	1,280	10,986	88.3
SW	15,172	1,621	16,793	90.3
North Cascade	30,059	17,417	47,476	63.3
Total	229,713	409,865	639,578	35.9

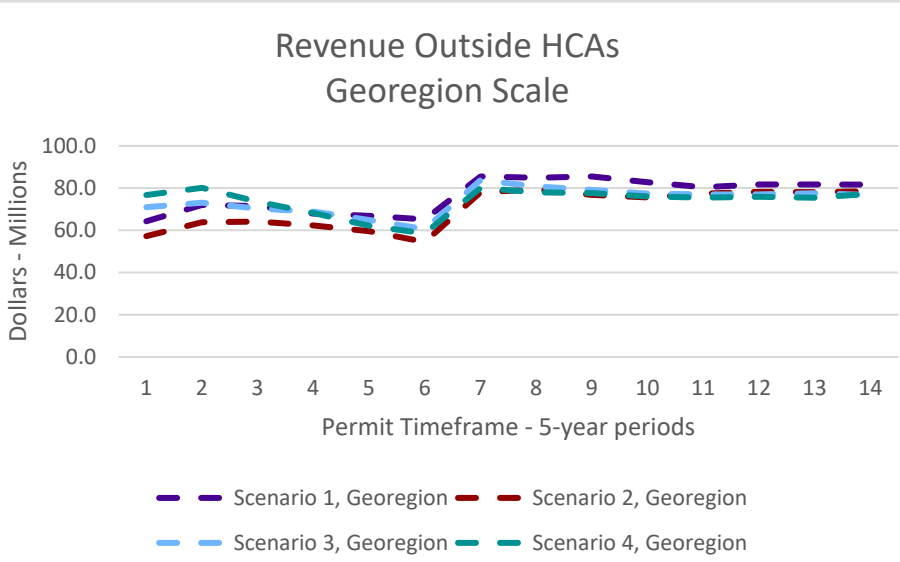
[1] Includes all owl sites (active and historic) since surveys began in the early 90's.

Do the habitat goals count both inside and outside the HCAs?	The Biological Goals and Objectives for terrestrial species apply to the HCAs, with the exception of NSO dispersal habitat which applies outside HCAs (but includes RCAs).
Of the yearly volume amounts, could you provide a graph of how much of that volume is HCAs. How much revenue will be HCA volume?	


WO FMP/HCP - 2023
Volume Inside HCAs - District Scale
MMBF
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Permit Timeframe - 5-year periods
Scenario 1, District
Scenario 2, District
Scenario 3, District


Revenue Inside HCAs
Georegion Scale
Dollars - Millions
25.0
20.0
15.0
10.0
5.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Permit Timeframe - 5-year periods
Scenario 1, Georegion
Scenario 2, Georegion
Scenario 3, Georegion
Scenario 4, Georegion


Revenue Inside HCAs
District Scale
Dollars - Millions
25.0
20.0
15.0
10.0
5.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Permit Timeframe - 5-year periods
Scenario 1, District
Scenario 2, District
Scenario 3, District


Revenue Outside HCAs
Georegion Scale
Dollars - Millions
100.0
80.0
60.0
40.0
20.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Permit Timeframe - 5-year periods
Scenario 1, Georegion
Scenario 2, Georegion
Scenario 3, Georegion
Scenario 4, Georegion

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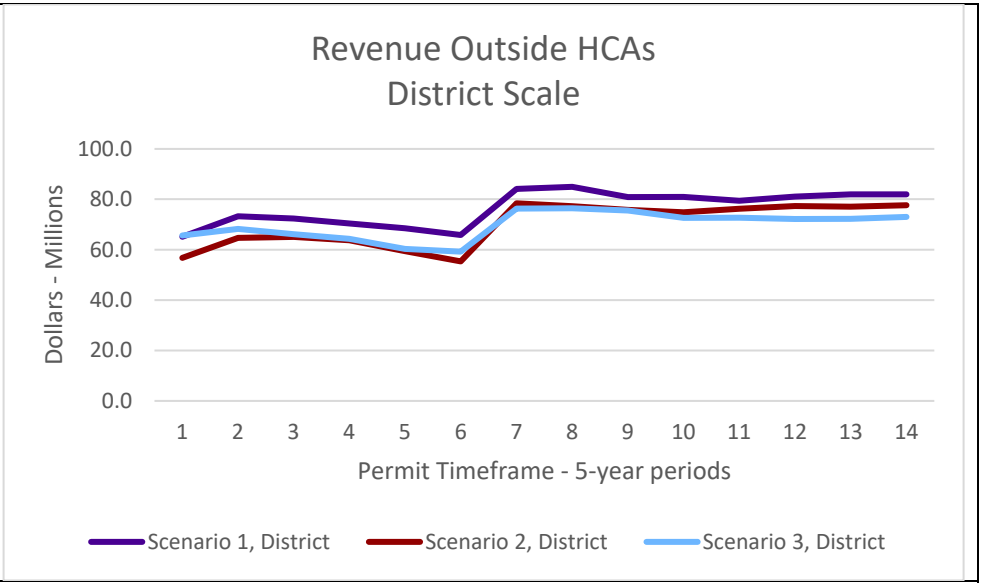
<tr><td></td><td> 
</td></tr>
<tr><td>How much on average is road construction. What are the project costs broken down by district?</td><td>
<table>
<tr><th></th><th colspan="3">Project Work Costs</th></tr>
<tr><th>District</th><th>FY 23</th><th>5 Year Avg</th><th>8 Year Avg</th></tr>
<tr><td>51 - Tillamook District</td><td>$2,664,359</td><td>$3,301,634</td><td>$3,212,742</td></tr>
<tr><td>52 - Astoria District</td><td>$2,809,303</td><td>$2,775,137</td><td>$3,093,287</td></tr>
<tr><td>53 - Forest Grove District</td><td>$3,070,887</td><td>$2,539,979</td><td>$2,200,198</td></tr>
<tr><td>55 - West Oregon District</td><td>$365,614</td><td>$300,453</td><td>$265,328</td></tr>
<tr><td>58N - North Cascade District</td><td>$573,090</td><td>$929,999</td><td>$984,569</td></tr>
<tr><td>71 - SW Oregon Unit</td><td></td><td>$27,689</td><td>$32,649</td></tr>
<tr><td>74 - Coos Unit</td><td></td><td>$2,065</td><td>$8,098</td></tr>
<tr><td>78 - West Lane District</td><td>$493,633</td><td>$566,026</td><td>$439,429</td></tr>
<tr><td>TOTAL</td><td>$9,976,887</td><td>$10,589,807</td><td>$10,305,317</td></tr>
</table>
</td></tr>
<tr><td>Can we count on HCA harvest levels?</td><td>Yes, although there is some uncertainty over the actual volumes. Since volume coming from HCAs will be a by-product of habitat enhancement, it is more difficult to model. The model did not accomplish all of the acres that will be accomplished under the HCP, and the volume per acre resulting from those</td></tr>
</table>

	activities will be variable, based on prescription. Additional work will occur during Implementation Plan modeling to provide additional confidence around HCA harvest levels.
The Board of Forestry Agenda implies that the IP and AOP have to be redone to coincide with this modeling data. What do you anticipate the new IP harvest level to be in the 2026-2028 biennium, and will it be higher than today?	We need to finish work on the draft WO FMP and have the HCP with ITPs to do IP modeling to know this answer. Until we have that full body of work completed the specific future harvest levels will not be known. We expect that harvest levels will be similar to current IP levels into FY26 – FY28 if this work hasn't been completed.
Whose responsibility is it to report the habitat numbers?	ODF is responsible for reporting habitat numbers, based on habitat criteria agreed upon with USFWS. ODF will be analyzing the habitat suitability metrics in light of the yield table calibrations to determine how the habitat outcomes have changed or not, compared to the draft HCP effects analysis. While ODF and USFWS will come to agreement on any needed calibrations to the habitat criteria that will be used, the USFWS is responsible for the Biological Opinions that include the assessment of incidental take and mitigation associated with the harvest and ingrowth of habitat over the HCP permit term.
In previous meetings it was mentioned that model solution reviews would be conducted by district offices. Please provide the emails and any attachments that the districts sent in response to this new modeling data.	The Calibration Run model solution reviews were a series of meetings that were held to go over model results. This information was summarized and sent to the districts after the meeting. Those notes are added below. The Scenarios model solution reviews were conducted individually by each district and meetings were held with recreation staff and staff biologists. Their feedback has been added below.

Summary of District input to the Calibration Run and response

The Calibration Run is the where the calibrated yields are first used in the modeling and an initial look at how the rules/constraints are working and the resulting outputs. (district input is in bold, response is bullet following)

Items adjusted within the modeling:

- **Volume/Acre on stands 120+ is too high.**
    - An additional calibration was completed for older stands which brings them into better alignment with the empirical yield curves. After this calibration, there are still outliers both above and below the curves. Additional calibration for these older stands will be investigated with future modeling efforts.
- **Volume for sprayed alder in Tillamook is too high.**
    - Using a GIS layer from Tillamook, Stand IDs were identified that might contain sprayed alder. These stands were reviewed by Colleen and Kate prior to being submitted to Tod. An additional volume deduction was applied to the alder to the yield tables of these stands, so any stands imputed to measured stands outside the list did not receive the adjustment. This brought the volume for sprayed alder to 15 MBF/acre or less.
- **The model was thinning older stands some of which had been previously thinned and would be considered final harvest candidates.**
    - The model has been limited to 1 thin between the ages of 35-55 years outside of the HCAs.
- **The model was removing too much volume/acre during thinning.**
    - Short term FMP Modeling solution: Thinning regimes that removed more than 60% of the standing basal area have been excluded.
    - Longer term solution: The current set of thinning prescriptions use residual density targets they result in an unreasonable thinning volume. All silvicultural prescriptions within the model should be reviewed and updated prior to IP Modeling.
- **In some instances, the model was carrying out thinnings where too little volume was being removed in younger stands.**
    - Thinnings must harvest >= 6000 bf/ac to be implemented by the model.

<u>Items not adjusted in the model that will be addressed in the BOF Report:</u>

- **The model is harvesting trees older than 120 years. If this can't be done during FMP implementation, then the volume can't be achieved.**
    - Messaging will be included in the BOF Report and BOF presentation that any additional constraints applied to how the FMP is implemented including placing an age limit on harvest will lower the volume achievable.
- **The model is not removing enough for net acres.**
    - Describe the limitations of net acre removal in the model versus on the ground "reality" in the Report.
- **What work will be done inside HCAs is still uncertain and the volume from HCAs shouldn't be included in the total volume achievable for the FMP.**
    - A description will be included in the report that goals/objectives Inside HCAs are for habitat restoration and improvement, not volume. Volume inside HCAs will be reported separately from outside the HCAs.
- **Describe limitations/uncertainty around the inventory within the NC burn.**
    - This will be added to the Report

Items not addressed:

- **Volume for non-sprayed alder across districts is too high**.
    - No change for FMP Modeling.
    - All alder need a limit for senescence. This was an oversight in the growth modeling that will be corrected for the IPs, or the next time yields are produced.
- **Districts would like to look at the Logging Costs prior to the Scenarios being run.**
    - As the Logging Costs would not have been updated prior to the Scenario Runs (these were updated by input provided by the districts last spring), this was a low priority on the list of things to do. Unfortunately, we ran out of time during the 3 days to make adjustments to the model after the calibration run. Districts can look at the logging costs during the Scenario review. If things are off, we will put a discussion in the report describing errors or updates needed for future modeling efforts.

Summary of District, Recreation, and Biologist review and input to the Scenario Runs

What is the impact to your current district workforce to achieve the volumes in the Georegion scenarios?

- West Oregon:
    - Would need 1 additional forester to handle the increase in volume. This may not be enough to fully implement the volume targets as it would increase sale layout, admin and reforestation. Go from 9-10 currently up to 19.4 MMBF, a 94% increase.
- Western Lane:
    - No changes necessary to workforce for scenarios 1-3. If Scenario 4 was implemented, would need 1 extra person.
- North Cascade:
    - Not a lot of variance in the Georegion runs. No change in staff needed. Don't see much ability to leave the district to assist another.
- Tillamook: Increased volume equals
    - Increased road improvement/maintenance and potential impacts to resources
    - Meeting green up across operations may be difficult for the number of acres needed to meet the volume. Would likely have issues implementing this harvest level and maintaining social license to operate.
    - Shift in harvest to the west of the district, so shift in species to hemlock, spruce & cedar. Need to make sure Seed Orchard is prepared for the shift, especially higher demand for spruce seed.
    - Increase of 15-20 MMBF in first 4 periods. Would need to add 2 NRS2's, 4 NRS1's and 1-2 FMT's
    - Flow to work is crucial to meet volume if additional staffing is not added. Discussions with AT/FG indicate a shift in Marketing District Boundaries may be a wise alternative to strictly flow to work.
- Forest Grove:
    - Not as variable as other districts. Pretty steady volume.

    - Current workforce is sufficient for the volume reduction.
    - If volume increases, would likely need assistance for sale layout due to the additional steps needed to implement HCP & new FPA rules.
    - May be able to assist TL with sales in the Lyda/Archers/Ben Smith area as needed
- Astoria:
    - All geo-region runs would have a significant impact on our staff and are not feasible.

How does the work force you have today need to change to achieve the volumes in the District Run scenarios?

- West Oregon:
    - At 14 MMBF/yr, would need to add 1 additional forester to implement.
- Western Lane:
    - same as above
- North Cascade:
    - No change in staff needed.
- Tillamook:
    - Harvest levels increases slightly from current workloads. Suggest additional 4 NRS1's
    - Significant drop in regen acres after HCA management period. (drop from 200-300 acres)
- Forest Grove:
    - Same as above
    - Logging Plans should be developed earlier in the AOP process to assist the Roads Unit in solidifying roads plans as the Coho Settlement, HCP and FPA rules leave little wiggle room for adjustment once approved by specialists through the planning process.
- Astoria:
    - Our current work force is aligned to achieve the volumes and new monitoring requirements under the District Max Even Flow and the District Max NPV Even Flow scenarios. The decreased volume would be offset by the additional staff time required to lay out units to the HCP requirements and maintain compliance monitoring efforts.

On average, how does the volume look?

- West Oregon:
    - Thinning volume per acre looks good.
    - Regen volume per acre is too high. Common for the district is 40 to low 50's. There are quite a few stands between 80-100. The maximum volume per acre should be 65 mbf/acre.
    - If doing post processing adjustments, would lower the regen volume by 35% to account for these issues.

- Western Lane:
    - Total volume looks achievable for Scenarios 1-3. Scenario 4 would be challenging, not sure if it would be sustainable.
    - Regen volume per acre is 5% too high. Thinning volume per acre is 25% too high.
    - Worried that Scenario 2 is overestimating total volume due to higher than expected volume in our older stands.
    - Still thinning older stands. Inside & Outside HCAs. (outside during extended rotation run) Outside HCA rule violation.
- North Cascade:
    - Volume averages between 10.5-14 and this number seems ok after calibration. However, since the calibration run, the model is thinning a lot of older stands (90+) inside the HCAs. Thought this was going to be an infrequent thing. This is most likely accounting for a lot of the volume and throwing off the total volume number.
- Tillamook:
    - volume per acre still seems too high. Average is 25 mbf/ac. Model is closer to 46mbf/ac over the 70 years
- Forest Grove:
    - Volumes look reasonable compared to past runs
    - Volumes inside HCAs might be too high, unless treatments can include patch cut opportunities to go with moderate thinning prescriptions.
- Astoria:
    - Thinning volume per acre is too high (30%)
    - Thinning older stands outside HCAs, rule violation

On average, how do the Costs look?

- All: Thinning stumpage is too high! It shouldn't be more than regen.
    - This makes NPV runs unusable
    - Haul costs are suspect as well. Two similar and adjacent stands have very different log haul costs. (AT)
- Tillamook: Costs look low. $/MBF AOP average is $400. Some selected stands will require extensive project work, lowering stumpage.

Watch Outs/Red Flags

- Tillamook:
    - Increased volumes would flood logging sides/road builders – the workload is already higher than contractors have time for.
    - Higher volumes means increasing operations adjacent to recreation areas, trails, viewsheds (highways & others)
    - Prescriptions inside HCAs (acres, volumes, revenue, stumpage)
- Forest Grove: Not as significant of an increase in volume as one would expect in Georegions.
- Astoria:

- Geo-region runs inhibit our ability to support our local rural economies and public services by reducing a predictable timber supply. This also affects the local workers and infrastructure relying on this supply, as well as our own staff.
- Annual harvest acres include a disproportionate amount of thinning on the Astoria district and targets 45 to 50-year-old stands. They also include large amounts of thinning in the HCA. All other districts target 75 to 85-year-old stands. The Astoria District max NPV even flow is heavily skewed to the younger stands of 45 to 50 years old. The Geo-region extended rotation obtains a lot of volume from partial cuts, approximately 50% of the acres harvested throughout the periods. The Geo-region max even flow for the Astoria District is skewed as well to the 45 to 50-year-old stands. This raises concerns of targeting this level of the age class large harvest of 45 to 50-year-old stands which are not a large portion of the district acres.
- In general, there are significant concerns regarding workforce impact, volume accuracy, cost discrepancies, and the rule violations in the model's results. The reliance on partial cuts and the skewed distribution of harvesting age classes raise red flags. Additionally, the geo-region runs pose challenges to local and social resources, indicating a need for careful consideration and adjustments in the scenarios to ensure trust and community support.
- The District emphasizes that the model's use of outdated inventory raises additional concerns, especially for decisions involving a 70-year commitment, especially when there is a newer inventory available.

Social Resources

- Forest Grove: increasing public use on the district means that there will be impacts to social resources regardless of steps taken to mitigate.
- North Cascade: Nothing any more than the usual managing for greatest permanent value and at least 1 side of the 3-legged stool will have concerns.
- Astoria: Maintaining economic certainty is key in supporting our social resources and maintaining trust in the community. All geo-region runs would have a huge impact on Clatsop County and our staff. Therefore, all the geo-region runs are a huge red flag.

Recreation Review

- Some districts most of the campgrounds/recreation areas are within HCAs (North Cascade). Others it's mixed (Forest Grove)
- Concerns around the facilities. Wind damage from adjacent clearcuts, thinnings.
- Would like to create site specific plans for harvests around recreation sites that address user experience, safety issues.
- Trails are impacted. Will need to work on how to keep trails open or move around the users.
- At the Implementation level, it is imperative to have hard conversations of working around established facilities. Recreation needs to have a voice around the established facilities. Trails not as much. There needs to be thoughtful implementation. May lose some harvest revenue in order to protect monetary investments in facilities.

- Protection of visual resources. Will need to be considered however it can be on non-motorized trails. Case by case of buffering or leave tree strategies especially high-profile trails outside of HCAs. Social license to manage.
- Rehabbing post sale especially with road building is a large impact to trails/facilities. Impacts of temporary closures. Impacts costs/investments to trails and other infrastructure.

Biologists Review

- Lots of thinning of the first period, but then the acres drop off.
- No rules around northern spotted owl circles within HCAs only rules around acres & HSI frequencies.
- Thinning VPA seems high.
- Thinning stands older than expected.
- Thinning prescriptions aren't realistic. Just moderate thinning, however it should even out over time (variable density, patch cuts, etc)
- Northern spotted owl cores are being thinned?
- HCA: over estimating volume per acre but underestimating acres that could be thinned under the HCP
- May only need to present northern spotted owl habitat numbers to the public.
- Model seems improved from the past and seems to present what we would expect to happen.

Summary of Response to Field, Recreation and Biologist input to Scenario Runs

<u>Here's how the district input was used:</u>

- The pond values were fixed. This also fixed the issue of thinning stumpage being higher that regeneration stumpage.
- Moved maintenance costs under logging costs as this is calculated as a $/MBF versus $/MBF/mile as it was being calculated when it was under hauling costs.
- Fixed Forest Grove hauling issue
- Fixed a road segment in Southwest. Freeway was coded as mainline.
- Added Thinning age cap of 55 inside HCAs as a stand in for HSI thresholds
- Changed the discount rate from 4% to 3% for Scenario 4 -NPV with Departure to emulate what was done with the HCP Comparative Analysis run.
- Adjusted Reforestation Costs per John Walter.
- Updated logging costs by using the Producer's Price Index for logging industry (national prices). This put the numbers in line with the district input received.

    - Based off the Logging Cost Update report prepared by Jared Christian from 2014 inflated to 2023
- Updated the small non-fish culverts, spur costs per input district input.
    - Spur construction cost/station
        - Gentle: increased from $600 to $1000
        - Moderate: increased from $750 to $1000
        - Updated Small Non-Fish culvert cost from $2,500 to $10,000
- There is more work to do to update the road and reforestation costs. Work groups including field and staff specialists will be pulled together prior to Implementation Plan modeling to get these updated.
- Volumes while better after the yield table calibration are still too high.
    - Instead of presenting a range of volume, it was decided to report the modeling outputs with a description of how these numbers will change over time. The modeling report attempts to walk the reader at a high level through the efforts to calibrate and adjust the yield tables and identifies issues that still need work in the future such as older stands and alder. In addition, there is a discussion on inherent uncertainty around modeling and the assumptions used, including a list of known uncertainties that effect the model outputs such future growth uncertainty, net acres, etc.