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Preliminary CBA and SBEIS for the Proposed Type Np Buffer Rule

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FOR: WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, FOREST PRACTICES BOARD

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Presentation Overview

1. Background, Framework, Key Findings
2. Estimated Change in Np Buffer Acres
3. Incremental Costs
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5. Regional Economic Impacts
6. Summary and CBA Determinations
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Source: WDFW

1. Background, Framework, and Key Findings

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Background and Objectives

Objective of the Rule	Improve temperature protections for Type Np streams in western Washington to achieve compliance with water pollution control laws and meet overall performance goals of the Forest Practices HCP.
Objectives of Cost-Benefit Analysis (CBA) under RCW 34.05.328 and Rulemaking Process	"Determine probable benefits of the rule are greater than its probable costs, taking into account both the **qualitative and quantitative** benefits and costs and the specific directives of the statute being implemented."
Objectives of Small Business Economic Impact Analysis (SBEIS) under RCW 19.85.040	• More than minor costs? • Are costs disproportionately incurred by small businesses? • What are steps taken to reduce the costs of the rule to small businesses?

Analysis Framework

Meets the legal standard of identifying and comparing "probable" costs and benefits:

- Is the effect probable?
- If probable, is the magnitude of the effect major, minor, or negligible? Includes qualitative and quantitative effects.

Focus on incremental effects:

- Incremental impacts are triggered by the rule. We quantify incremental effects by comparing two scenarios: the world with the rule and the world without the rule (i.e., the "baseline").
- The baseline reflects buffering on Np streams absent the rule (i.e., under the current rule).

Geographic scope and scale:

- Landscape level analysis presented by ecoregion in western Washington

Timeframe:

- 45-years (aligns with harvest rotations in western Washington)

Discount rate:

- 2% and 4.5% discount rates employed, where needed

Uncertainty:

- Quantitative and qualitative considerations
- Ranges for quantified benefits
- Assessment of sources of uncertainty and effects on results
- Sensitivity analysis around key parameters and assumptions

Effect Categories in Report

SOCIAL WELFARE
Incremental Costs

- Decreased forestland values
- Increased forest harvest costs

CHANGES IN ECONOMIC ACTIVITY
Regional Economic Impacts

- Loss of job-years
- Loss of wages
- Loss of revenue
- Loss of forest excise tax

SOCIAL WELFARE
Incremental Benefits

- Reduced risk of water temperature increases
- Improved wildlife habitat quality
- Increased carbon sequestration
- Tribal cultural values

EFFECTS DETERMINED NOT PROBABLE

- Increased land use change outside of proposed buffers
- Increased administrative and rule implementation costs to landowners
- Avoided costs associated with lost assurances
- Avoided costs associated with listing salamanders

Overview of Key Findings

The analysis finds that the probable benefits of the proposed rule are likely greater than the probable costs.

- The analysis constitutes a landscape scale analysis. The relative costs and benefits of the rule likely differ at individual sites.
- Analysis accounts for key uncertainties, for example total extent of Type Np stream in Western Washington.

Costs are incurred by timber landowners and the timber industry, while benefits (water quality, ecological gains) are broadly experienced by the public.

- This overarching finding does not undermine the finding that the rule does generate major economic costs to a specific population for the public benefit.
- Because the burden of costs is not evenly shared, the Forest Practices Board may consider cost mitigation options for landowners.

2. Changes in Np Buffers Attributable to the Rule

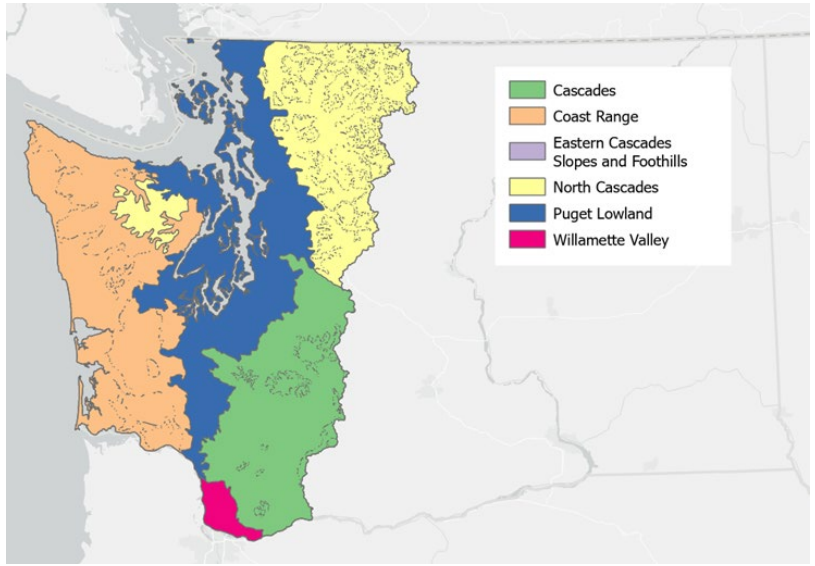
General Approach

We rely on Four Peaks modeled data as a starting point to predict changes in Np buffer extent across western Washington

Four Peaks Synthetic Stream Network

263 miles of Type Np stream across 150 sample sites

Applicable Np Streams in Western Washington



Also compared key characteristics of Four Peaks Np streams with characteristics of Np streams throughout the region: 1) bankfull width, 2) length, 3) basin size and harvest intensity

Increase in Np Buffer Acres: *Methods*

STEP 1
Identify universe of Np streams in western Washington

We use WC Hydro and several outside sources to correct for data limitations

WC Hydro

Study to determine which Nu streams in WC Hydro are Np streams

Ecology expertise on underreporting of Np streams in WC Hydro

Data identifying baseline harvest restrictions

STEP 2
Calculate the change in buffer acres within the Four Peaks sample

We estimate the change by ecoregion and "rule scenario"

GIS data from Four Peaks

STEP 3
Assign probabilities to each "rule scenario"

This allows us to aggregate across ways that the rule could play out on the ground

DNR analysis of FPAs and Western Washington Ecology Basins data

STEP 4
Scale Four Peaks findings to all of western Washington

We estimate the total change in buffered forestland at the ecoregion level

GIS data from Four Peaks

Results from Step 1

Low end scenario:
- Relevant forestland regulated by Forest Practices rules not subject to other harvest restrictions
- 42% of Nu are Np

High end scenario:
- All relevant forestland regulated by Forest Practices rules
- 94% of Nu are Np

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Example Application of Four Peaks Data

For illustrative purposes, this example only considers the "no cut" portion of the buffers for the Cascades ecoregion specifically and within the high-end scenario.

Four Peaks "option"	[A] Four Peaks: Change in No Cut Acres Relative to Baseline	[B] Option "Weight"	[C] Four Peaks: Total Increase in Buffer Acres Attributable to the Rule	[D] Portion of WC Hydro in Four Peaks Sample	[E] All Western WA: Total Increase in Buffer Acres Attributable to the Rule [C]/[D]
Option 1A	170	49.75%	**174**	0.28% (35.4 / 12,725)	**62,000**
Option 1B	177	49.75%			
Option 2	219	0.50%			

Increase in Np Buffer Acres: *Results*

	Low-end	High-end
Total Np stream miles affected (Step 1)	19,000 stream miles	44,000 stream miles
Total change in buffer acres*	69,000 acres	180,000 acres
Average change in buffer acres per stream mile	3.7 acres/mile	4.0 acres/mile

** Partial harvest acres treated as ½ acres when summing.*

- To put total change in buffer acres in context:
  - 0.8% to 2.2% of all private and municipal forestland (8.2 million acres).
  - 1.1% to 2.9% of non-Federal and non-tribal Forest Practices HCP land (6.1 million).
- Results are virtually identical when assuming all landowners select Option 1B (no cut), i.e., no landowners select Option 1A (partial management), outside of Option 2.
- Our high-level findings are insensitive to the extent of Np stream miles in western Washington.
- We also present all quantified results per Np stream mile for additional perspective.

3. Incremental Costs

Decreased Forestland Values: *Methods*

STEP 1
Calculate market value of forestland

We use historical transactions from western Washington from recent years

Transaction level data from timberland appraisers, Atterbury Consultants

STEP 2
Quantify changes in forestland values per acre due to harvest restrictions

No cut buffers have a residual value of $100/acre; partial-cut buffers are valued at half the market value of harvestable land

Expert guidance from Atterbury Consultants

STEP 3
Calculate total reduction in land values attributable to the rule

We assign market value reductions per acre to all acres affected by the rule

IEc analysis using Four Peaks data, etc.

Low end scenario:
- Low end new buffer acres
- Market value per acre sold: $4,700

High end scenario:
- High end new buffer acres
- Market value per harvestable acre: $6,000

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Decreased Forestland Values: *Results*

	Low-end	High-end
Total present value (all acres)	$320 million	$1.0 billion
Total present value (per stream mile)	$17,000	$23,000
Annualized (2% discount rate)	$11 million	$35 million
Annualized (4.5% discount rate)	$17 million	$54 million

- **Major probable cost** of the rule incurred by forestland owners.
- Market values incorporate private discount rates. Once effects are placed in time, our analysis then applies a social discount rate, consistent with best practices in social welfare analysis (e.g., USEPA 2024).
  - Land value reductions occur the first year of the rule and are therefore not discounted, so the discount rate does not influence the magnitude of present value costs.
  - Discount rate assumptions do factor into annualization calculations.

Increased Forest Harvest Costs: *Methods*

STEP 1
Determine the portion of Np miles where cable harvest is likely to become more costly

We identify areas where slopes are greater than 35 percent within rule scenario 2 specifically

Four Peaks Synthetic Stream Network

1m LiDAR terrain elevation data

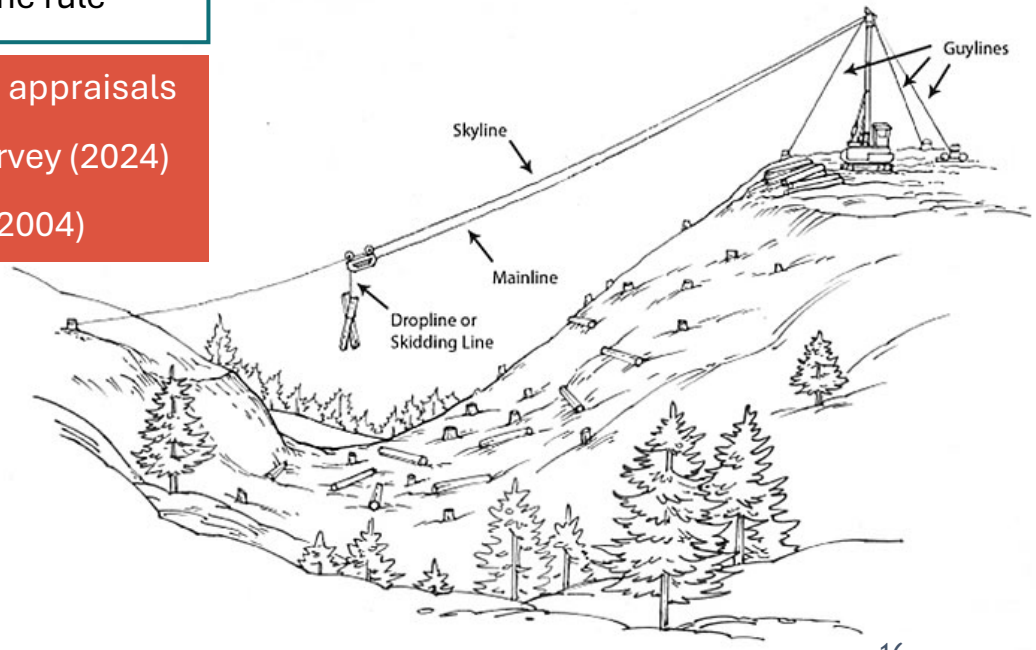
STEP 2
Quantify changes in cable harvest costs

We separately consider areas where buffers become wider and longer on account of the rule

Atterbury costs used in appraisals

WA DOR landowner survey (2024)

Schiess and Krogstad (2004)



Source: USDA Forest Service

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Increased Forest Harvest Costs: *Results*

- Based on the sample data, up to 16 percent of stream miles may experience increase in cable harvest costs.
- Minor increase in cable harvest costs among buffers that widen.
  - On the order of tens of dollars per Mbf
- Moderate increase in cable harvest costs among stream miles with new buffer requirements (i.e., not buffer requirements in baseline).
  - On the order of hundreds of dollars per Mbf
- While individual landowners may experience significant harvest cost increases, in aggregate we identify that increases in cable harvest costs are a **minor probable cost** of the rule.

4. Incremental Benefits

Reduced Risk of Stream Temperature Increases

- **Moderate to major probable benefit** of the rule.
- Significant existing evidence on effectiveness of the rule at reducing risk of stream temperature increases:
  1. Hard Rock Study (McIntyre et al. 2021)
  2. Soft Rock Study (Ehinger et al. 2021)
  3. Type N Prescription Work Group literature review and findings (Barnowe-Meyer et al. 2021)
  4. Forest Practices Board acceptance of the majority report (2022)
  5. Ecology's Water Quality Program Manager testimony (2023)

Source: WDFW

Values Associated with Maintaining Stream Temperatures

- Economics literature demonstrates that people value improvements in water quality, regardless of whether they directly use the resource and the size of changes, e.g.:
  - **Vossler et al. (2023):** Non-use sources are "important" component of the value people hold for water quality improvements
  - **Lupi et al. (2023):** Disaggregates sources of value for wildlife, water contact, and recreational fishing
  - **Von Haefen et al. (2023):** Respondents valued small improvements in ecosystem conditions and at the same level as use-focused dimensions

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Improved Wildlife Habitat Quality

Effectiveness of buffers at improving instream habitat via the 5 riparian functions

Effectiveness of buffers at protecting and conserving species

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Effectiveness of Buffers at Improving Instream Habitat: *Results*

Five Riparian Functions	Probable Changes in Function Attributable to the Rule
Shade and temperature	Probable reduction in risk (benefit) of stream temperature increases
Nutrient/leaf litter	Probable increase (benefit) in leaf litter in areas with new buffers
Erosion control and sedimentation	Probable short-term minor decrease in sedimentation (benefit), but current forest practices minimize sedimentation
Discharge	Probable short-term minor benefit to discharge with possible negative (costs) summer baseflow impacts
Woody debris	Probable increase (benefit) in wood recruitment and instream wood load

Effectiveness of Buffers at Protecting and Conserving Species: *Results*

Terrestrial riparian wildlife *(mammals, birds, invertebrates)*

Moderate to major probable benefit of the rule.

- 85 percent of terrestrial vertebrate species in WA depend on riparian habitats for sustaining life functions (e.g., nesting, foraging, shelter).
- Mild microclimate in riparian buffers also provides relief from hot and cold temperatures.
- 67,000 to 170,000 additional acres with no-cut harvest restrictions, preserving connectivity of habitat.
- Used several data sources to identify species with overlapping ranges in Np areas and expert judgement to identify likelihood of occurrence in Np areas.
- Moderate end of range reflects the fact that riparian forests within headwater streams at higher elevations are likely not the most biodiverse.

Example species with moderate to high likelihood of occurrence in Np areas:
Bobcat, black bear, western screech owl, Rufous hummingbird, mayfly, dragonfly

Effectiveness of Buffers at Protecting and Conserving Species: *Results*

Stream-associated amphibians

Minor to moderate probable benefit of the rule.

- Particularly sensitive to temperatures and certain to be present in Np buffers.
- Species also benefit from general improvements in habitat afforded by rule (e.g., breeding sites, shelter, food).
- 19,000 to 44,000 Np stream miles with additional harvest restrictions in buffers.
- Range reflects different levels of effects in existing research.
- Used several data sources to identify species with overlapping ranges in Np areas and expert judgement to identify likelihood of occurrence in Np areas.

Example species with moderate to high likelihood of occurrence in Np areas:
Coast tailed frog, Cascade torrent salamander, Olympic torrent salamander

Effectiveness of Buffers at Protecting and Conserving Species: *Results*

Fish downstream of Np streams

Negligible to minor probable benefit of the rule.

- Fish downstream of Np streams with additional protections may benefit from delivery of organic matter, macroinvertebrates, nutrients, and cooler water.
- Benefits do not persist far downstream, therefore few fish likely to benefit.
- Range reflects limited empirical data on effects to fish.
- Used several data sources to identify species with overlapping ranges in Np areas and expert judgement to identify likelihood of occurrence in Np areas
- Given potential negligible effects, this effect category does not materially factor into the weighing of costs and benefits.

Example species with moderate to high likelihood of occurrence "close to" Np areas: cutthroat trout, sculpin

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Values Associated with Protecting Species Habitat

- No existing economic valuation studies perfectly match the context of the Np buffer rule.
- Species types that benefit most from the rule are underrepresented in the valuation literature.
- We reference these studies to provide perspective on the existing research focused on the values that Washington households hold for the protection of species habitat and to demonstrate the **Washington households hold positive values for riparian habitat conservation**.

Species Group	Representative Study	Species	Valuation Context	Sampled Households	Average Annual WTP Per HH
Amphibians, large game, mollusks, rodents	None				
Birds	Hagen et al. (1992)	Northern spotted owl	Preserve old growth forest in PNW	U.S. households	$180.70
Invertebrates, insects	Diffendorfer et al. (2014)	Monarch butterfly	Unspecified program to conserve habitat	U.S. households	$41.61 (one-time)
Predators	Van Eeden et al. (2021)	Gray wolf	Non-lethal strategy to maintain populations	WA households	$93.48

Increased Carbon Sequestration: *Methods*

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Develop scenarios related to stand age	Forecast stand age over 45 years	Calculate carbon sequestration rates per acre per year by age	Calculate total potential carbon sequestration change	Consider what portion of carbon sequestration change is displaced globally
With rule assumes typical harvest rotations in west WA	We apply data on current stand age and project into the future	We use a USDA-Forest Service Tool appropriate for landscape level analysis	Difference between with and without rule applied to all affected acres	Range given inconsistencies in literature on displaced carbon (i.e., leakage)
	Gradient nearest neighbor data from the LEMMA project	USDA tool and discussions with tool authors	IEc analysis using Four Peaks data, etc.	Murray et al. 2004, Nepal et al. 2013 Pan et al. 2020

Low end scenario:
- Low end new buffer acres
- 90% leakage rate (10% of change experienced)

High end scenario:
- High end new buffer acres
- 40% leakage rate (60% of change experienced)

Increased Carbon Sequestration: *Results*

	Low-end	High-end
Total increase in carbon sequestration over 45 years (Mt CO_2)	220,000	3,300,000
Average increase in carbon sequestration per stream mile (t CO_2)	12	74

- **Negligible to minor probable benefit** of the rule.
- While specific land management practices can result in net carbon benefits, the extent to which those practices and conditions occur in western Washington is uncertain.
- To put total change in carbon sequestration in context:
  - 2 to 10 percent change in sequestration relative to the baseline (i.e., active timber harvest rotation)
  - 0.005 to 0.07 percent of total annual emissions in the state
- Given potential for negligible effects, this effect category does not materially influence the weighing of costs and benefits.

Tribal Cultural Values

- Washington state tribes and indigenous communities value the natural environment as an interconnected and inseparable system where all components play a critical role.
- This holistic understanding emphasizes the vital role of riparian buffers in maintaining ecological health.
- Tribes generally do not support the concept of monetizing the value of natural resources.
- We acknowledge tribal cultural values as **probable benefits** of the rule although do not rank them as major, moderate, or minor.
- We welcome additional information and perspectives that are important for decision-makers to understand regarding the effects of the proposed rule on different tribes.

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Other Perspectives on Benefits of Riparian Buffers

The available literature uniformly finds that people hold a **positive willingness to pay (WTP) for riparian buffers**.

Study	Context	Site	Average Annual WTP Per HH
Trenholm et al. (2013)	**Increase forested riparian buffer from 30 to 60m on private woodlots (~29,000 acres)**	**Canaan-Washademoak watershed (southern New Brunswick, Canada)**	**$7.85 - $31.14**
Holland and Johnston (2017)	Restore natural vegetation on up to 500 acres of degraded riparian land by enhancing development setbacks 100 ft	Merriland, Branch Brook, and Little River watershed (southern Maine)	$8.51 - $27.96
Lewis et al. (2017)	Establish 100-ft riparian zone along over 50 miles of stream banks	Clear Creek watershed (northwest Arkansas)	$97.93
Holmes et al. (2004)	Implement BMPs at construction sites and along private roads; establish riparian buffers along 6 miles of the river	Little Tennessee River watershed (western North Carolina)	$53.85
Weber and Stewart (2009)	Re-establish native tree dominance along up to 17 miles of riparian area	Middle Rio Grande (Albuquerque, New Mexico)	$83.03
Blaine and Smith (2006)	Preserve riparian lands throughout the upper watershed through conservation easements	Upper Grand River watershed (northeast Ohio)	$43.67

Other Perspectives on Benefits of Riparian Buffers

- We provide perspective on the potential order of magnitude of these benefits by referencing the low-end findings from Trenholm et al. (2013) and considering the magnitude of this benefit if applied to Washington state households (3.02 million).
- Annual benefits based on the source study findings would be approximately $24 million.
- Over the 10-year period considered in the study, total present value benefits of $210 million (2% discount rate) or $190 million (4.5% discount rate). Note, our analysis has a 45-year timeframe.
- Not a measure of the benefits of the proposed rule.
- Not additive with other categories of benefits.
- However, provides perspective that existing empirical research finds these benefits may be on the order of **tens of millions of dollars per year**.

5. Regional Economic Impacts

Timber Harvest Losses (Mbf/Year): *Methods*

STEP 1
Calculate average annual timber harvest rate

We use recent data from FIA and DNR to estimate a bf/acre/year

Average harvest rate per "available" western Washington acre of 325 bf/acre/year

STEP 2
Apply a harvest rate to all affected buffer areas

Apply findings to all acres affected by rule

IEc analysis using Four Peaks data, etc.

STEP 3
Consider the potential for compensating harvest elsewhere in region

We apply a range given uncertainty

Murray et al. 2004

Newer evidence suggesting less potential to displace harvest in region

Low end scenario:
- Low end new buffer acres
- 57% of harvest lost from region (43% displaced)

High end scenario:
- High end new buffer acres
- All harvest lost from region (no displacement)

Regional Economic Impacts: *Methods*

STEP 1
Calculate "rates" of impact per MMbf at the county level

As calculated from Mason, Bruce & Girard (2022)

STEP 2
Assign county level information to ecoregions

Based on share of working forestland from Atterbury data

STEP 3
Apply "rates" to annual reduction in timber harvest

See previous slide

Rates per 1 MMbf

- 14 direct job/years
- 36 total job/years
- $900,000 direct wages
- $1.9 million total wages
- $360,000 stumpage sales
- $11.9 million revenue
- $20,000 stumpage taxes

Low end scenario:
- Low end new buffer acres
- 57% of harvest lost from region (43% displaced)

High end scenario:
- High end new buffer acres
- All harvest lost from region (no displacement)

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Regional Economic Impacts: *Results*

Represents as low as 0.5% and as high as 2.5% annual loss in each category.

	Total impacts		Impacts per stream mile	
	Low-end	High-end	Low-end	High-end
Reduction in timber harvest (Mbf/year)	12,600	57,100	0.68	1.3
Reduction in direct job-years	153	709	Not reported	
Reduction in total job-years	392	1,816	0.02	0.04
Reduction in stumpage sales (per year)*	$5.1 million	$23 million	Not reported	
Reduction in total revenue (per year)	$143 million	$662 million	$7,700	$15,000
Reduction in stumpage taxes (per year)	$0.3 million	$1.2 million	$16	$27

** Reported in SBEIS.*

6. CBA Summary and Determinations

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Summary of Probable Costs and Benefits of the Proposed Np Buffer Rule

Incremental costs	Incremental benefits
Major costs • Decreased forestland values **Minor costs** • Increased forest harvest operating costs	**Moderate to major benefits** • Reduced risk of stream temperature increases • Improved habitat conditions for terrestrial riparian wildlife **Minor to moderate benefits** • Improved habitat conditions for stream-associated amphibians **Additional benefits** • Tribal cultural values **Negligible to minor benefits** • Improved habitat conditions for fish downstream of Np streams • Increased carbon sequestration

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CBA Determinations

- **The probable benefits of the rule likely outweigh the probable costs.**
- Total loss of forestland value is major, on the order of $320 million to $1.0 billion.
  - In annualized terms, $11 million to $35 million (2% discount rate) or $17 million to $54 million (4.5% discount rate).
- We focus our weighing on whether the combined benefits likely exceed these major costs.
  - Rule necessary to meet state water quality standards, and people value small improvements in water quality even beyond any direct use.
  - Rule provides habitat protections to many species, and the economics literature shows that Washington households value the protection and conservation of wildlife.
  - Economics literature demonstrates that the broader benefits of additional riparian protections may be on the order of tens of millions of dollars per year across all Washington households.
  - Tribes and indigenous communities value the natural environment as an interconnected and inseparable system.
- The weighing of costs and benefits is not materially affected by the total number of Np stream miles affected; results generally scalable per stream mile.

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Distributional Effects

	Population size	Effect of rule
Forestland owners	• 23,000 SFLs • 11,000 other private landowners • 440 government landowners	• Decreased forestland values • Increased forest harvest costs • Lost timber harvest revenue
Employees in industries connected with harvest industry	• 100,000	• Lost job opportunities
Western Washington county governments	• 20 counties	• Lost tax revenue
Washington households and tribes	• 3.02 million households, including • 29 federally recognized tribes	• Values associated with water quality improvements, species and habitat conservation

- SFLs own forestland that abuts 11 percent of Np stream miles and may experience land value losses on the order of $35 million to $110 million the first year the rule goes into effect.
- Given the distribution, decision makers may consider mitigation strategies to alleviate the financial costs, particular to small businesses and SFLs.

Cost Mitigation Options

Forest Riparian Easement Program (FREP)

- Compensates SFLs for the loss of revenue associated with lost timber harvest in riparian areas
- Uncertain whether available funding will increase to offset the costs of expanded Np buffer requirements

Other potential cost mitigation strategies (from RCW 19.85.030)

- Reducing, modifying, or eliminating substantive regulatory requirements
- Simplifying, reducing, or eliminating recordkeeping or recording requirements
- Reducing the frequency of inspections
- Delaying compliance timetables
- Reducing of modifying fine schedules for noncompliance
- Any other mitigation techniques including those suggested by small businesses or small business advocates

7. Impacts on Small Businesses (SBEIS)

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Summary Findings

- Proposed rule regulates forestland owners, a subset of which are businesses.
- **Proposed rule likely to result in more than minor costs to businesses**, stemming from limitations on timber harvest in riparian forest.
- Affected businesses are generally all small businesses in timber-related sectors, therefore the **rule disproportionately affects small businesses**.
- In accordance with RCW 19.85.040, we identify steps taken to reduce the costs of the rule and opportunities to mitigate costs to small businesses.
- The SBEIS also requires 1) a discussion of how small businesses were involved in the development of the rule and 2) an assessment of impacts on jobs, which we draw from the Regional Economic Impacts section of the CBA.

NAICS code – Industry name	Total Number of Businesses in Washington	Percent that are Small Businesses	Minor Cost Threshold (Based on Annual Revenue)
113110 – Timber tract ops	19	100%	$5,537
113210 – Forest nurseries	25	100%	$5,740
113310 – Logging	767	99%	$6,970

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Industrial Economics, Inc.
www.indecon.com

Haley & Aldrich
www.haleyaldrich.com

Additional Material

Effects Determined Not Probable

1. **Increased land use change outside of the proposed buffers:** Four Peaks (2024) identifies a low risk that rule would result in more development conversation based on evidence from existing Forest Practices rules and the availability of programs to help SFLs
2. **Increased administrative and rule implementation costs to landowners:** Current rule requires similar effort to interpret and operationalize.
3. **Avoided costs associated with lost assurances:** The CBA does not speculate on the likelihood that Ecology will withdraw assurances if Np rule upgrades are not adopted.
4. **Avoided costs associated with listing salamanders:** Because the Cascade and Columbia torrent salamanders are covered species under the Forest Practices HCP, the rule does not result in cost savings associated with ESA listing. Our analysis identifies a minor to moderate benefit of the rule to these species. The extent to which these effects would result in an avoided listing is significantly uncertain enough that do we not identify this as a probable benefit of the rule.

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Summary of Effects Per Np Stream Mile

	Low-end	High-end
Acres with harvest exclusions	3.7	4.0
Decreased forestland values	$17,000	$23,000
Increased forest harvest operating costs	16 percent of Np stream mile will experience increased costs	
Average per stream mile (t CO_2)	12	74
Reduction in timber harvest (Mbf/year)	0.68	1.3
Reduction in total job-years	0.02	0.04
Reduction in total revenue (million/year)	$7,700	$15,000
Reduction in stumpage taxes (million/year)	$16	$27