ARCH CAPE DOMESTIC WATER SUPPLY DISTRICT
MINUTES

20 August 2021

A ZOOM video teleconference meeting was held in light of Covid-19. A quorum was present

Water Board:	Dan Seifer, President Debra Birkby, Vice-President & Treasurer Jay Blake, Nadia Gardner Linda Murray
Sanitary Board:	Chris Anderson (non-voting)
Public:	
Staff:	Phil Chick, District Manager Steve Hill

Mr. Dan Seifer opened the meeting at 6:45pm. He said that it may be recorded. Mr. Seifer added that this virtual meeting was being conducted in accordance with State of Oregon guidelines issued for the corona virus. Those needing technical assistance should contact Mr. Chick at 503-739-2348.

Public Comments: None.

Agenda: Ms. Gardner moved acceptance of the agenda which was seconded by Mr. Blake. All in favor. Motion carried.

Consent Agenda: Mr. Blake moved approval of the consent agenda which was seconded by Ms. Gardner. All in favor. Motion carried.

Old Business:

Arch Cape Forest: (Information)

Forest Finance Plan, Release Draft for Public Comment Period: (Action) Ms. Birkby moved publication of the ACF Draft Finance Plan which was seconded by Mr. Blake. All in favor. Motion carried. Posting to occur on the ACF website, the Arch Cape utility website and on Facebook.

Forest Management Plan, Release Draft for Public Comment Period: (Action) Mr. Blake moved publication of the ACF Draft Management Plan for public comment which was seconded by

Ms. Birkby. All in favor. Motion carried. To be posted on the ACF website, the Arch Cape utility website and on Facebook.

Maul Foster Phase I Environmental Site Assessment Proposal: (Action) Mr. Blake moved execution of the Maul Foster Phase I Environmental Site Assessment which was seconded by Ms. Birkby. A question was raised on why these dollars would be spent if we didn't know that we were buying the property to which conducting appropriate due diligence was answered. All in favor. Motion carried.

Covid-19 Emergency – Accounts Receivable Report: (Information) A discussion ensued on whether to resume live meetings. There was a consensus to go back to Zoom virtual meetings for the present.

Mr. Hill reported Accounts Receivable to be strong.

New Business:

IT at the Fire Hall: (Action) Ms. Murray moved the expenditure of $600.00 for a TV with stand to match the Arch Cape Sanitary Districts earlier action which was seconded by Mr. Blake. All in favor. Motion carried.

Administrative Support Succession Planning: (Information) Ms. Murray moved to add Ms. Tindall to the succession plan discussions which was seconded by Ms. Gardner. All in favor. Motion carried.

Reports:

District Managers Report and Correspondence for Action: (attached) Mr. Chick said he would be out next week camping with his family from August 23 – 27.

Treasurers Report: Balances on hand in the Columbia Bank checking account are $40,976 and in the Local Government Investment Pool of $248,180. Accounts were balanced through May.

Board of Directors' Comments and Reports: Mr. Blake said that he didn't care for Friday board meetings which was concurred in by Ms. Gardner. There was a general agreement to consider a new regular board meeting time.

September Agenda Items: (Information) ACF financing draft plan, ACF management draft plan and outreach.

Public Comment: None.

The meeting was adjourned by Mr. Dan Seifer at 7:07 pm.

Respectfully submitted,

Steve Hill

Attest _____
Mr. Dan Seifer, President

Arch Cape Forest Briefing

August 20,2021

Arch Cape Finance Committee:

Clark Binkley	Debra Birkby	Bill Campbell
Phil Chick	Ben Dair	Rick Gardner
Steve Hill	Ben Hayes	Dan Seifer
Darr Tindall		

Arch Cape Water District Finance Committee

Purpose:

To provide an update to the Work Session on the work of the ACWD Finance Committee. Specifically, the evaluation of scenarios for financing the ACF (Arch Cape Forest) project.

Agenda:

Assumptions

- Forest purchase
- Revenue Opportunities (including logging)
- Forest Operating costs

Forest operations scenarios

Financial summary

Financial Plan Update –Assumptions

Forest Purchase

- Purchase Price: $5.35 million
- Funding:
  - $3.5 million – FLP Grant (requires $1.167 matching*1)
  - $ .50 million – Private donations (currently $ .15 million)
  - $ .25 million – Clatsop County
  - $1.10 million - State of Oregon Legislature*2

- *1 - Matching to be provided by NCLC land transaction
- *2 – State of Oregon Legislature (Total expectation: $ 2.0 million)
  - Funds are Federal ARPA – to be committed by 12/31/2024 & spent by 12/31/2026.
  - Spending restrictions, if any, unknown
  - Funds use priority
    - Purchasing Property - $1.10 million
    - One time post-purchase activity (e.g. deferred road maintenance, Timber Stand Improvements, etc.) - $ 900,000
    - Initial logging costs –if/ as available

Financial Plan Update –Assumptions
Forest Operations

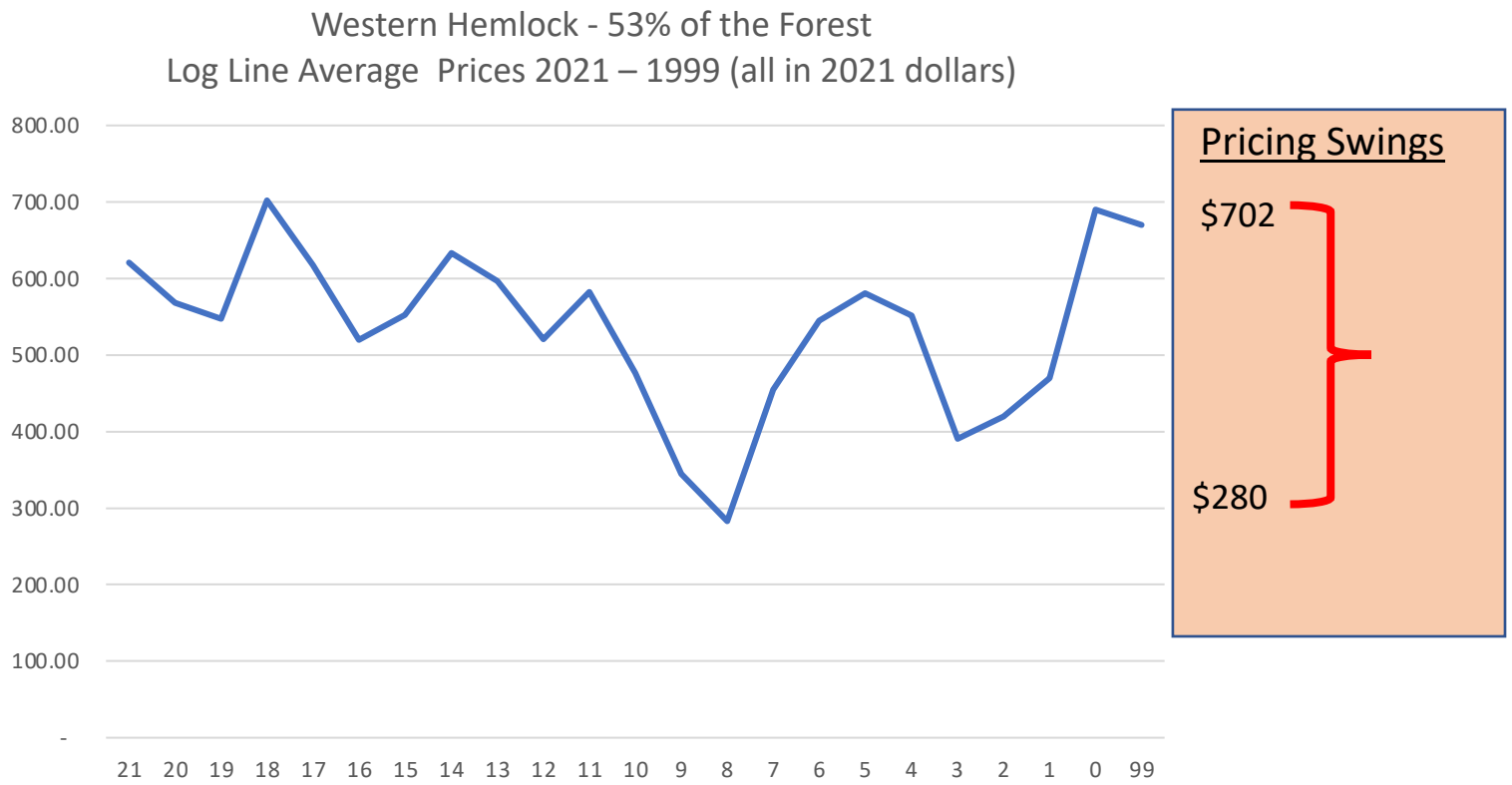
Revenue:

- $900,000 ARPA funds (balance of $ 2M Oregon Legislature funding) applied to offset One-Time Expenses and Logging Costs for 1st Harvest
- $68,000 / yr tax levy for years 1-10 ($. 40 per $ 1,000 property value)
- No ongoing private donations included
- Timber Harvest Revenue: Base pricing set using Log Line data & escalates at 2 % per year

Costs:

- Timber Harvest Costs (factored into net revenue): Best Estimate by Ben H and escalates 2% per year
- One time operations Costs: Best Estimate by Ben H and Dan S.
- Ongoing Operations Costs: Projected by various sources, escalates 2% per year

Timber Pricing Volatility
1999-2021

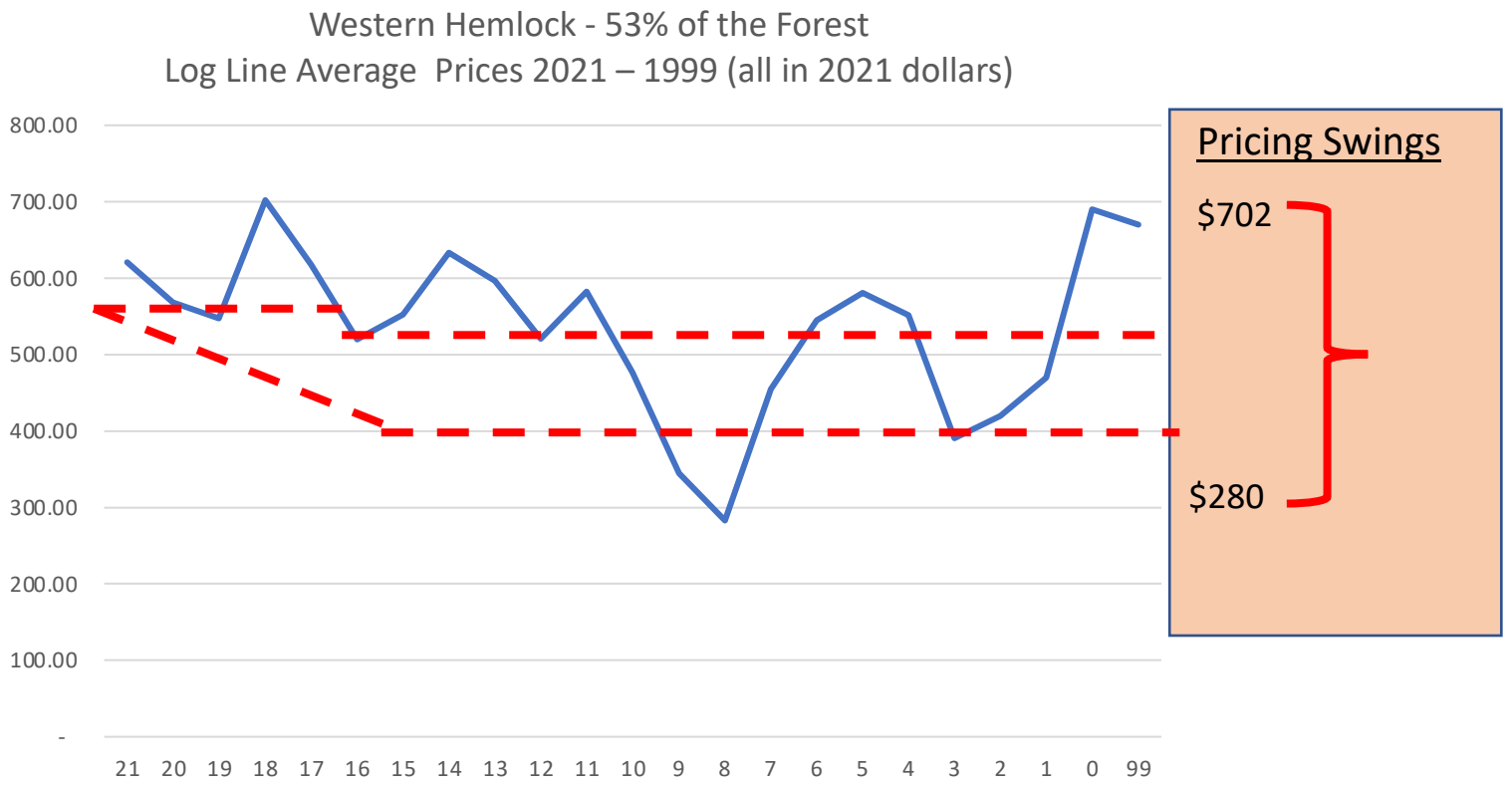


Log pricing relatively flat …. High year over year volatility

Determining Future Pricing Assumptions from Historical Data
1999-2021

Base Case $552 / $505

Risk Case $552 / $397



Current log pricing higher than historic average

Pricing Assumptions To Be Used in Scenarios

	Base Case		Risk Case	
	years 0-5	years 6-43	years 0-5	years 6-43 (Stnd Dev.)
DF #3	$ 692	$ 669	Gradual Decline	$ 520
WW #3	$ 552	$ 505		$ 397
RA	$ 505	$ 505		$ 397
SS	$ 394	$ 394		$ 275
RC	$ 1,235	$ 1,235		$ 989
SF	$ 552	$ 505		$ 397

The mill prices above are discounted by $15

The prices inflate 2% per year

Assume near term pricing transitioning to average pricing over time

Financial Plan Update –Assumptions
Forest Operations

Revenue:

- $900,000 ARPA funds (balance of $ 2M Oregon Legislature funding) applied to offset One-Time Expenses and Logging Costs for 1st Harvest
- $59,000 / yr tax levy for years 1-10 ($. 35 per $ 1,000 property value)
- No ongoing private donations included
- Timber Harvest Revenue: Base pricing set using Log Line data & escalates at 2 % per year

Costs:

- Timber Harvest Costs (factored into net revenue): Best Estimate by Ben H and escalates 2% per year
- One time operations Costs: Best Estimate by Ben H and Dan S. (vary by scenario)
- On-going Operations Costs: Projected by various sources, escalates 2% per year. (vary by scenario)

Revenue & Cost projected through 2065 …. The analysis covers 43 years

Scenarios

Baseline

	10 Harvests	6 Harvests	2 Harvests	No Harvest
Harvest Years	2022, 2024, 2029, 2034, 2039, 2045, 2050, 2055, 2060, 2065	2024,2026, 2050, 2055, 2060, 2065	2 very light harvests 2024, 2026	No harvesting
Type of Logging	Ground and Cable Logging	Ground and Cable Logging	Only Ground Logging	
Deferred Road Maintenance Work on 8.9 Miles of the Mainline	Heavy	Heavy	Moderate	Light
Decommission Roads	2.92 miles	2.92 miles	2.92 miles	4.49 miles
Ongoing Road Maintenance	12.7 miles	12.7 miles	6.26 miles	5.62 miles
Mgmt Planning	• Minor Update every 5 years • Major Revision every 10	• Minor Update every 5 years • Major Revision every 10	Major Revision every 10	Revision every 10
Inventory	Update every 5 years	Update every 5 years	Update every 10 years	

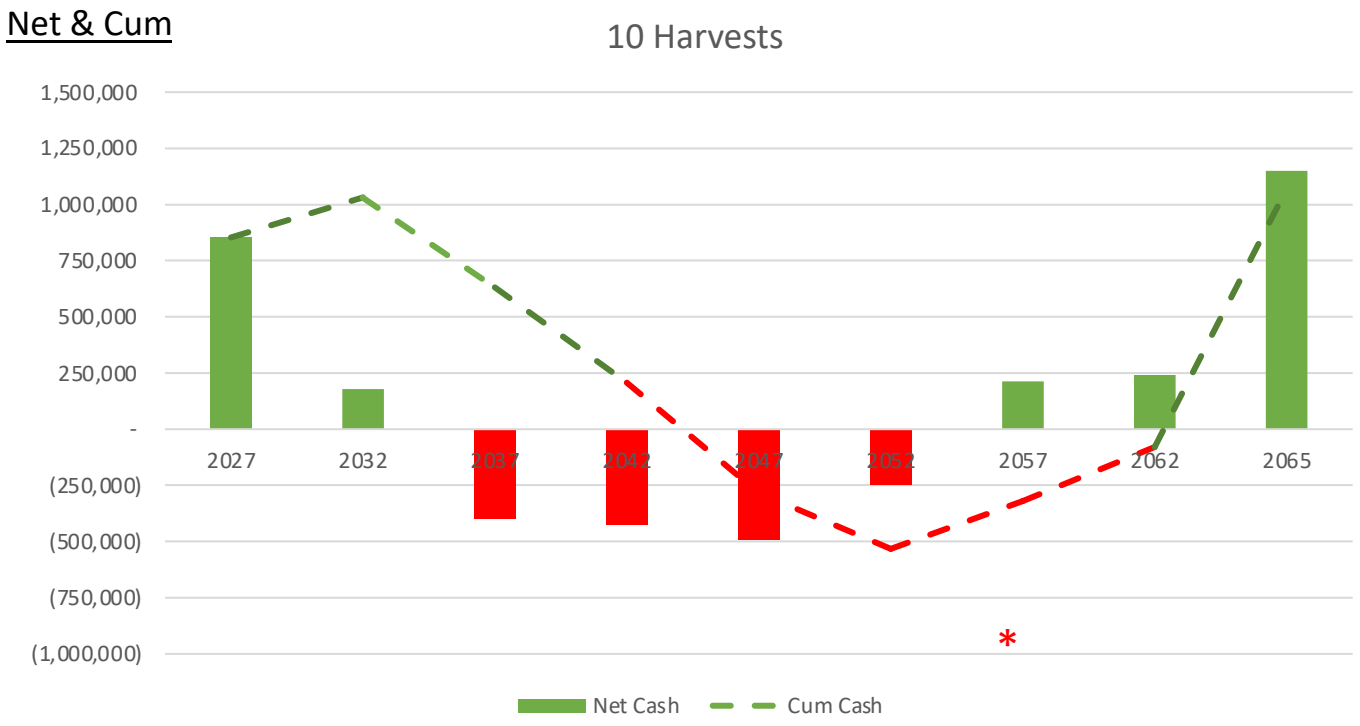
Activities & Costs by Scenario

	10 Harvests	6 Harvests	2 Harvests	No Harvest
One Time Expense				
Best Estimate Amount				
Federal Audit (FLP)	$5,000	$ 5,000	$ 5,000	$ 5,000
Implementation Planning,& Sys Develpment	$100,000	$ 100,000	$ 100,000	$ 100,000
Certification - Initial	$10,000	$ 10,000	$ 10,000	
Deferred Road Maintenance	$150,000	$ 150,000	$ 100,000	$ 75,000
Timber Stand Improvement - Young & Old	$226,478	$226,478	$226,478	$226,478
Signage - 2 signs	$500	$ 500	$ 500	$ 500
Building 2 fire command/control centers	$7,000	$ 7,000	$ 7,000	$ 7,000
Decommissioning Roads	$73,000	$ 73,000	$ 73,000	$ 112,750
Annualized Operating Expenses - Infrastructure (in 2021 dollars)				
Audit, Admin, Legal, Insurance, ODF Patrol	$12,649	$12,649	$11,353	$11,172
Forester	$12,969	$12,969	$12,969	$6,485
Propery Management	$12,969	$12,969	$12,969	$12,969
Roads Maintenance	$25,400	$25,400	$12,520	$11,246
Certification	$1,200	$1,200	$164	$0
Management Planning	$2,727	$2,727	$1,818	$1,364
Inventory	$2,727	$2,727	$1,818	$0
Invasive Plant Mitigation	$2,000	$2,000	$0	$0
TOTAL	$ 72,641	$ 72,641	$ 53,611	$ 43,236

Objective: Find consensus scenario with optimal implementation approach and refine costs for that scenario

10 Harvest (Baseline): Harvest roughly every 5 years

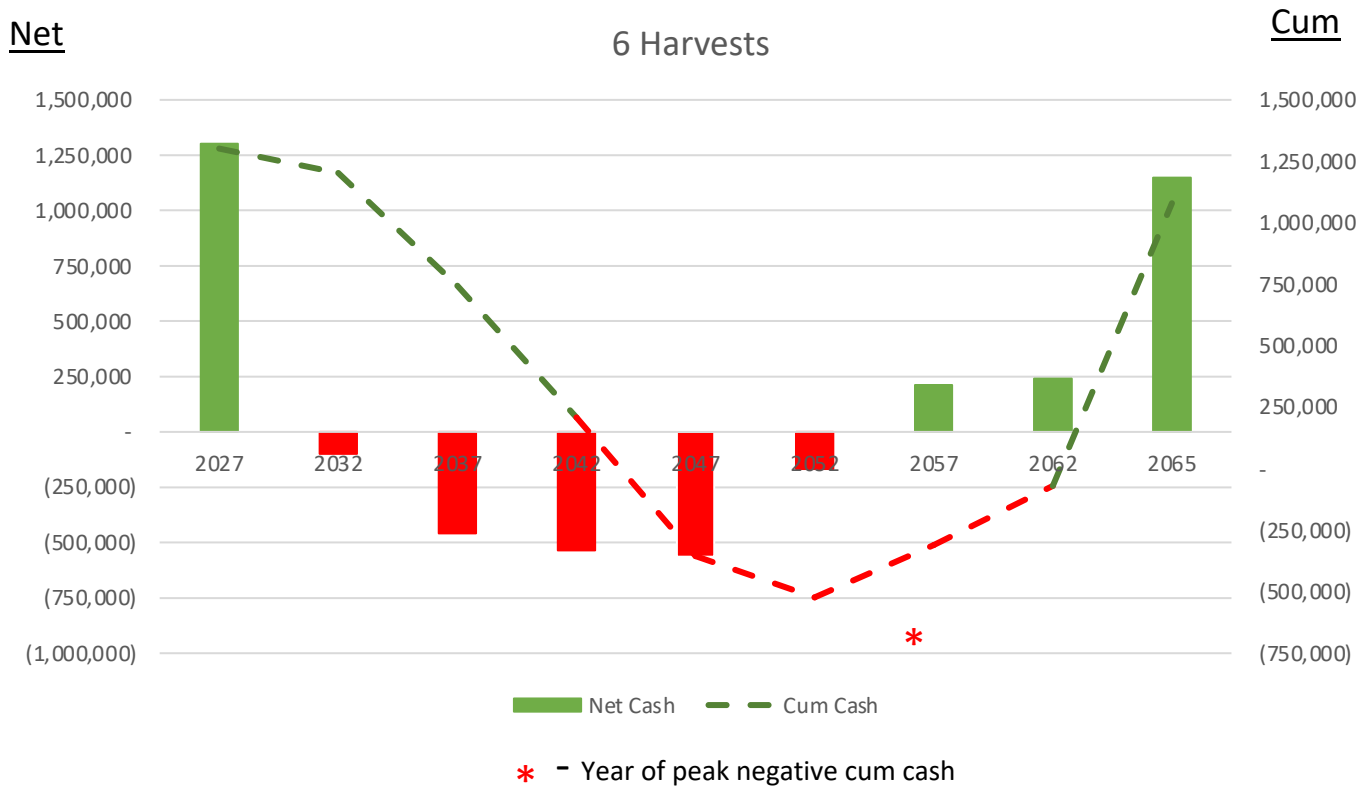
- 6,781 Board Feet in 5 harvests over 18 years
- 14,404 Board Feet in 5 harvests over 20 years



* - Year of peak negative cum cash

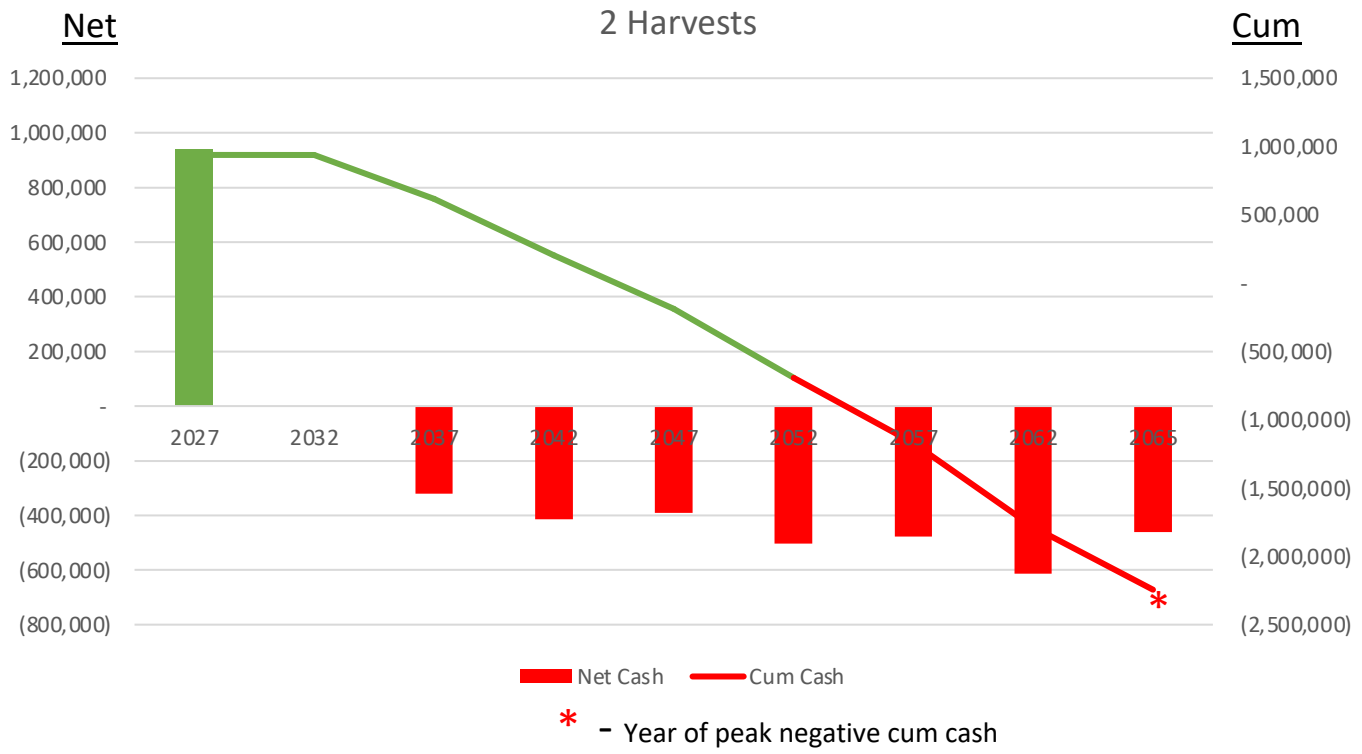
6 Harvest: **2** Near term heavy harvest …. Hibernate for 25 years

- 6,542 Board Feet in 2 harvests over 3 years
- 14,404 Board Feet in 4 harvests over 15 years

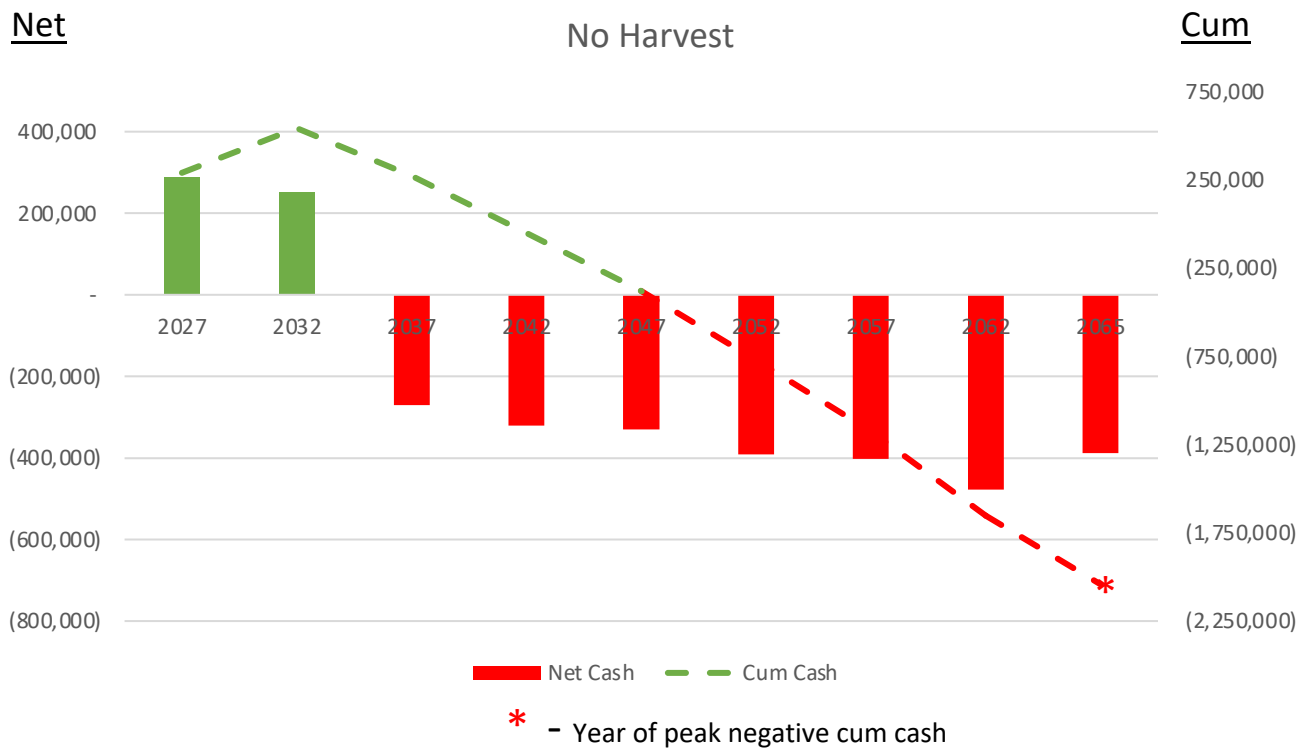


2 Harvest: Light Harvest near term …. No future harvests

2,425 Board Feet in 2 harvests over 4 years



No Harvest: Minimize on going operational costs



Note: $521,228 in ARPA funds and $350,000 in Donations

Financial Summary

	10 Harvests	6 Harvests	2 Harvests	No Harvest
Total Net Revenue (including APRA / Donation adjustment & Tax Levy)	$6,228,450	$6,238,167	$1,561,686	$1,030,000
Average Annual Operating Cost (in 2021 dollars)	$72,641	$72,641	$53,611	$43,235
Peak Negative Cash	-($909,757) Year 33 - 2054	-($900,039) Year 33 - 2054	-($2,244,071) Year 44 - 2065	-($2,042,240) Year 44 - 2065
Cumulative Cash at year 44	$1,069,887	$1,079,605	-($2,244,071)	-($2,042,240)

Recommendations

1. Have the community select a harvest scenario as the basis for the Financial Plan

2. For the selected scenario, relook at the activities/cost with a focus on finding the optimal balance of appropriate skill sets and bottom line
   - Use/augment “in-house” staff
   - Contract for services
   - Partner to take advantage of scale, e.g. NCLC, Lewis & Clark

Arch Cape Forest Management Plan

DRAFT

SPRINGBOARD FORESTRY

Springboard Forestry LLC
30151 NW Timber Road
Timber, OR 97144

August 2021

ABOUT THIS MULTI-RESOURCE MANAGEMENT PLAN

The organization and contents of this multi-resource management plan reflect the vision, goals and objectives of the Arch Cape Domestic Water Supply District Board of Directors and the Arch Cape Forest, Forest Management Advisory Committee. In addition, this plan has been structured to satisfy the requirements of the United Stated Department of Agriculture (USDA) Forest Service Forest Legacy and Community Forest funding programs, the State of Oregon's Forest Management Planning standards, and the standards for Forest Stewardship Council Certification.

Separate sections within this plan focus on five goals established by the advisory committee: water quality and quantity, affordability, community connection, forest ecology, and habitat. Each of these sections includes the following:

- Background on the current status and conditions of the Arch Cape Forest relating to that goal.
- Objectives for achieving or maintaining the forest in relation to the goal.
- Strategies, actions and tools relating to that goal.
- Monitoring and performance measures that will indicate accomplishment of various objectives.
- Stakeholder input from the Forest Management Advisory Committee.

Many topics cut across multiple goals. These topics, such as road management and silviculture, appear in multiple goal sections with associated relevant policies and practices.

ACKNOWLEDGMENTS

Arch Cape:

Domestic Water Supply District Board of Directors
Dan Seifer
Debra Birkby
Lauren Ahlgren
Linda Murray
Nadia Gardner
Jay Blake

Sanitary District Board of Directors
Darr Tindall
Debra Birkby
Chris Anderson
Carl Matson
Bill Campbell
Jay Blake

Domestic Water Supply District Staff
Phil Chick
Matt Gardner
Steve Hill

Arch Cape Forest:

Forest Management Advisory Committee
Charlotte Blakesley
Patricia Noonan
Bob Cerelli
Dale Moseby
David Dougherty
Larry Crawshaw
Melissa Reich

Finance Committee
Dan Seifer
Debra Birkby
Steve Hill
Phil Chick
Rick Gardner
Clark Binkley

Additional Support:

Ben Dair Rothfuss, Sustainable Northwest

Amy Singh, ODF, Forest Legacy Program

Scott Stewart, National Forest Legacy Program and Community Forest Program Manager

Janelle Geddes, (Forest Legacy, Forest Stewardship, Community Forest)

Candice Polisky. Community Forest Program)

This Multi-Resource Plan was written and designed by Springboard Forestry.

Ben Hayes – plan author
Oliver J. Curtis – plan design, cartography and editing

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CONTENTS

SECTIONS

INTRODUCTION

In 2016 the Arch Cape Domestic Water Supply District, (referred to herein as "the District") began to explore the acquisition of 1,441 acres in and surrounding the Arch Cape drinking water intakes on Shark and Asbury Creeks . The District has previously engaged in management decisions on the watershed when Stimson owned the property. The effort to create this community forest represents one of the largest recent acquisitions of forest for municipal drinking water protection in Oregon. When completed, this project and the neighboring North Coast Land Conservancy Rainforest Reserve will protect in perpetuity approximately 5,000 acres for water, wildlife, and recreation. Forest management will reflect community input while undertaking projects that maintain or improve the ecological capacity of the forest to provide reliable quantities of high-quality source water. In addition, forest stewardship will help to protect both forest health and water affordability for the foreseeable future.

Beginning in 2016, when Ecotrust Forest Management purchased the Arch Cape Forest from Stimson Lumber, the Board and Staff of the District began pursuing the acquisition of their source watershed and the development of a Community Forest. This forest is the immediate backdrop for the coastal community of Arch Cape and located directly east of Hwy 101. The drinking water catchment area (referred to as the drinking watershed) for the

WATER QUALITY AND TREATMENT

The water filtration system uses a Toray PVDF hollow fiber membrane. These systems rely on source water with low turbidity and nutrients for efficient, low-cost water treatment. Without high-quality source water, water filtration will cost more. Turbidity and suspended nutrients can result from floods, soil disturbance, and road runoff. Suspended organic material also creates a risk of process byproducts (discussed in further sections). Good forest stewardship decreases source water turbidity and nutrients, which in turn decreases the cost of water filtration.

INTRODUCTION

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community of Arch Cape covers the central portion of the property, while the remainder provides an important recreational, economic, and aesthetic resource.

BACKGROUND

The Arch Cape Forest builds on a regional effort by community and non-profit groups to establish community forests. These projects range from Eastern Oregon to Northwest Washington and all points in between. Community Forests also include everything from state- and non-profit owned forests to municipal watersheds. The common thread between these community forests is local buy-in and involvement in acquisition, planning, and management activities.

The Arch Cape Forest has been led, planned, and executed by a dedicated group of staff and volunteers. This includes but is not limited to the boards of the Water Supply and Sanitary Districts, the Finance Committee, the Forest Management Advisory Committee, and countless other volunteers. In addition, staff

INTRODUCTION


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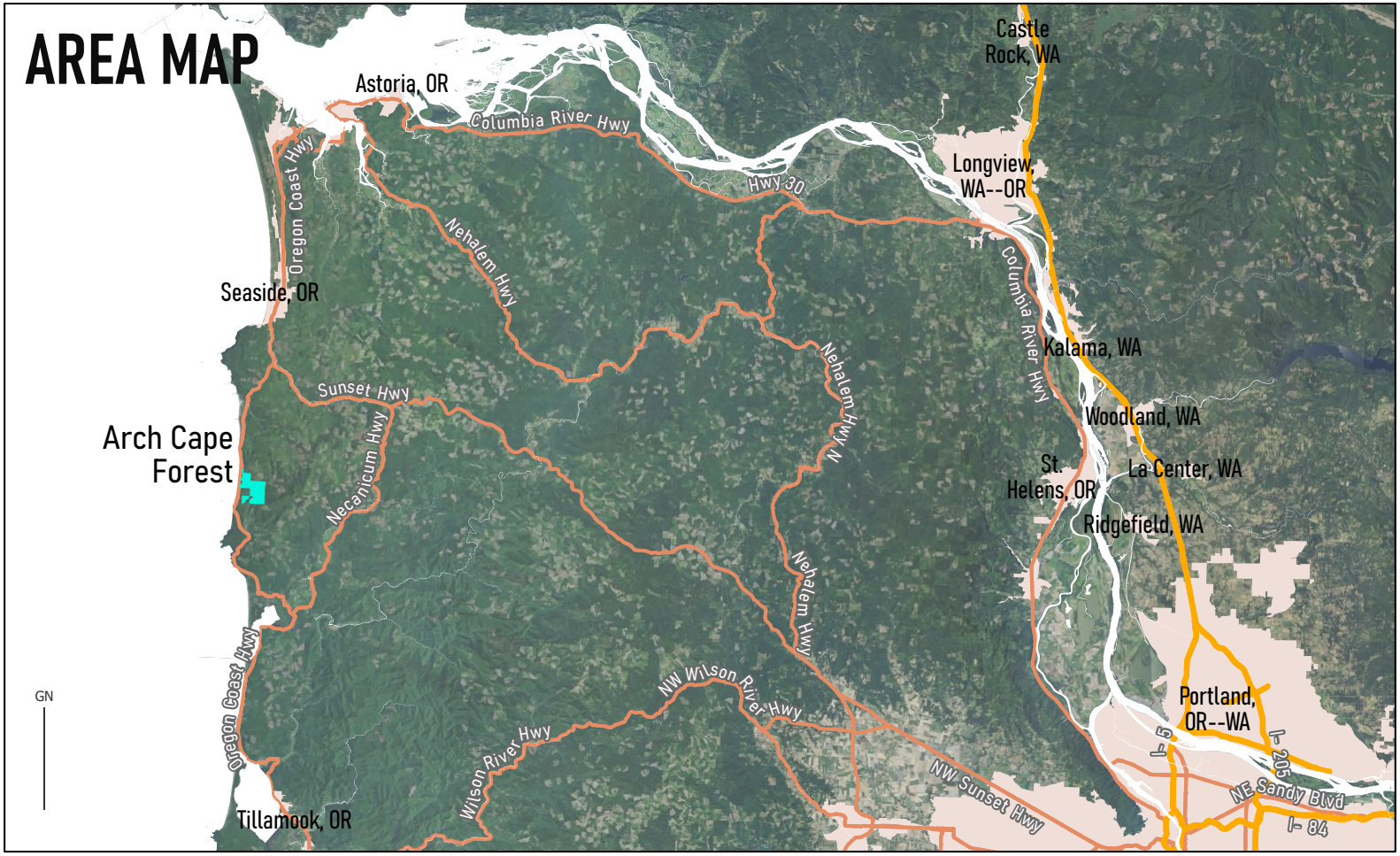
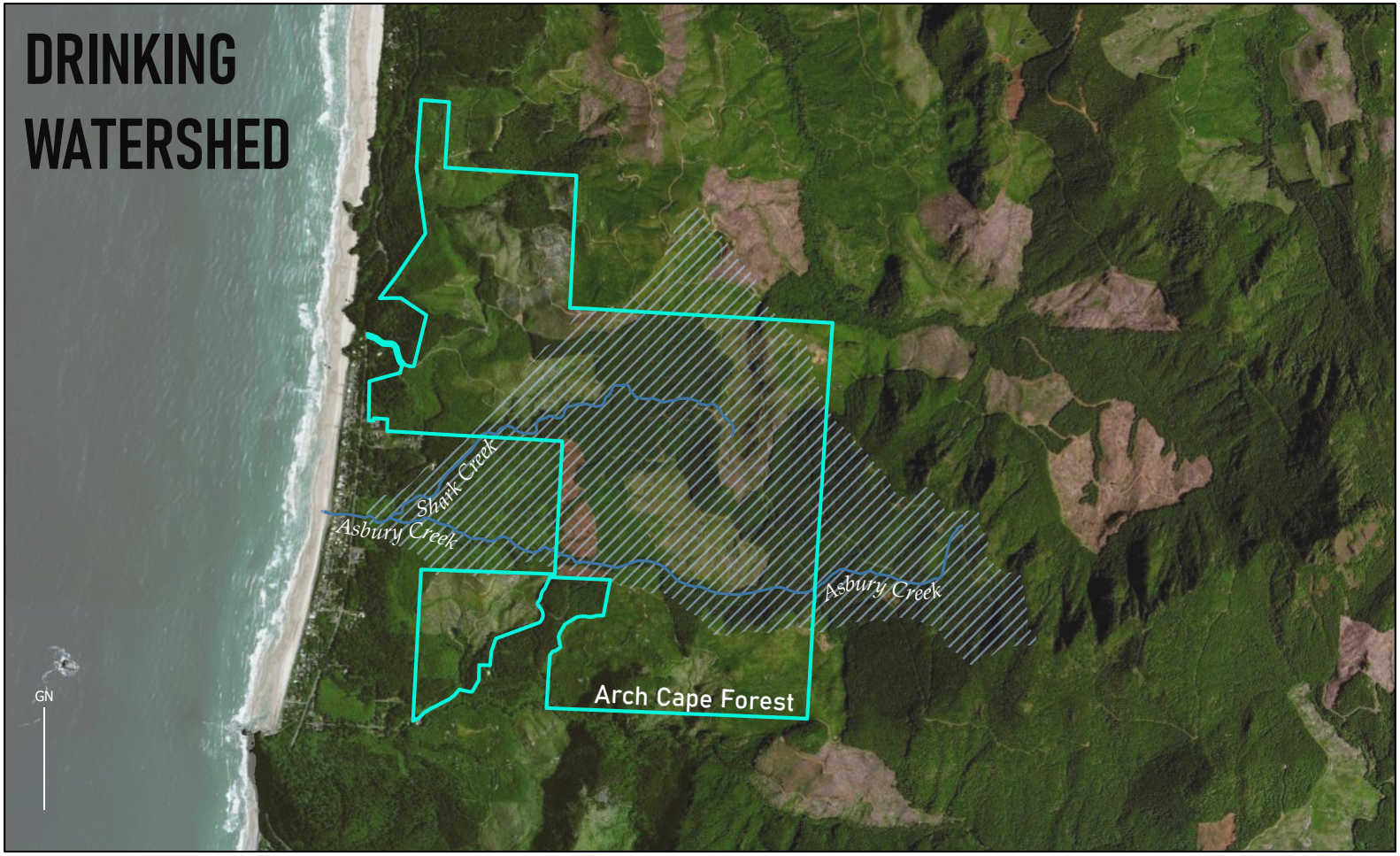
from the Oregon Department of Forestry and United States Forest Service have played instrumental roles in assisting the forest. Other important partners include the staff of the North Coast Land Conservancy, which owns (confirm date of sale) the surrounding Rainforest Reserve, and volunteer legal counsel that assisted the District during acquisition.

The District Board directed staff and volunteers to develop a plan for the property that balances excellent watershed protection with active forest management. This plan will be in effect for the initial ten years of forest ownership, through 2031, subject to revisions as the forest and circumstances change.

INTRODUCTION



INTRODUCTION



PLAN PURPOSE

SECTION 1

This multi-resource management plan provides District staff, volunteers, and consultants with guidance and policies for the ongoing stewardship of the Arch Cape Forest. Th plan lays out a proposed framework for management, beginning with goals and objectives, describing existing resources, and proposing implementation and monitoring activities. This framework is intended to guide the responsible long-term stewardship of the Arch Cape Forest.

As a result of the timing of this plan prior to closing and non-disclosure agreements (NDAs) in place with Ecotrust Forest Management (EFM), the current property owner, this plan does not provide any inventory of the forest, other property details subject to the NDA, or detailed proposals for management activities. Forest inventory and periodic operating plans will be added to this plan as future appendices. Operating plans will play a key role in all future forest management activities including harvest, road maintenance, recreation, invasive plant treatment, and thinning activities.

TYPES OF MANAGEMENT PLANS

Strategic plans: provide big-picture goals, objectives, means of achieving them, and systems for monitoring accomplishments. They can exist for any organizations of any size or type.

Operational plans: determine actions, timelines, and responsibilities for a fixed timeframe and fixed resource. Annual or bi-annual operating plans commonly exist for forest operations.

Technical plans: typically relate to an individual resource but often draw from a larger body quantitative research or professional experience.

What type of plan is this? The Arch Cape Forest Multi-Resource plan is primarily a strategic plan with significant technical components. Periodic operating plans will be developed based on the strategy and technical approaches outlined. Many of the forestry sections combine technical data and research with the goals and objectives agreed upon by the Forest Management Advisory Committee.

PLAN PURPOSE

SECTION 1

The advisory committee and consultants evaluated a wide range of management decisions and, in the following pages, lay out a framework based on broadly agreed upon goals and objectives. The advisors and consultants believe that the plan laid out in this document is the most likely to find widespread support in the Arch Cape community. This path is specific but allows sufficient flexibility to adapt to community needs and local conditions.

This plan should also be seen as a living document. The goals and conditions of the Arch Cape Forest and community differ from any other forest in the region. Every management action, even the decision to do nothing, provides a learning opportunity that can influence future decisions. Through active monitoring and adaptive management, the Arch Cape Forest will receive the best stewardship possible.

VISION STATEMENT

Our vision is to provide clean, safe, and affordable drinking water to Arch Cape residents and visitors, through the creation of a working community-owned forest to sustain the rich character and beauty of Oregon's coastal rainforest for generations.

GOALS

The Forest Management Advisory Committee for the Arch Cape Forest and consulting team began the process of drafting a multi-resource management plan by workshopping a set of goals. These goals were generated directly from the Vision Statement. These goals underly a set of four objectives. In turn, the four objectives support policies. Many of the policies cut across multiple goals and objectives. Each policy is described in the following sections and then associated with goals.

The goals of the Arch Cape Forest are, in ranked order:

1. Provide reliable quantities of high-quality drinking water
2. Retain affordable water
3. Engage the community in the forest
4. Retain natural forest structure and aesthetics
5. Provide intact terrestrial and aquatic wildlife habitat

OBJECTIVES

Four objectives support the Arch Cape Forest goals and vision statement. Each of these objectives cut across goals. In ranked order, they are:

The Arch Cape Forest will...

1. Protect and enhance the watershed, watershed resilience, and source water quality and quantity.
2. Protects the affordability of drinking water, which may include active timber harvest.
3. Connect with the local community.
4. Retain natural forest structure and species diversity.

POLICIES

In order to achieve the Arch Cape Forest vision, goals and objectives, the Advisory Committee considered a set of nine broad policies related to future forest management decisions. These policies create a framework for determining operational plans and financial feasibility. The proposed policies align with the finance plan developed by the Finance Committee and the board of the District over the course of 2020 and 2021. These policies also meet or exceed the requirements of the Oregon Forest Practices Act and Forest Stewardship Council Pacific Standard.

The policies include specific requirements and tolerances related to:

- Stream Buffers
- Harvest Levels
- Opening Size
- Tree Retention
- Road Maintenance
- Chemical Use
- Invasive Species
- High Conservation Value Forest / Steep Slopes

GOVERNANCE

SECTION 2

The board of the District holds ultimate decision-making responsibility for the Arch Cape Forest. The Board has financial responsibility for Arch Cape Forest Operating Budget. A new 3-member Arch Cape Forest Advisory Committee will have responsibility for working within that Budget to determine an optimum approach for executing the budget (e.g. staff, consultant, vendors, partnerships) and working with staff / consultants / vendors / partners to execute the operating plan.

Following acquisition, a new 3-member Arch Cape Forest Advisory will recommend periodic (5-year) operating plans to the District board and will work with managers and consultants to execute operating plans. Eventual decision making and approval of operating plans requires approval from the District board.

The District Board has overall responsibility for the management of the Arch Cape Forest. The Arch Cape Forest will be established as a separate, distinct business unit. As such, the Arch Cape Forest will maintain separate financial controls and reporting. These will include business unit specific long-range operating & financial plans, annual budgets, bank accounts, and financial reporting (e.g., balance sheet, income statement, and cash flow statement). Both Arch Cape Forest and the existing Water business units will report to the District Board of Directors. Both business units will follow Board approved policies in accordance with State of Oregon law & Special District guidelines.

MANAGEMENT SCHEDULE

Quarterly: Advisory Committee meeting with property manager and forester

Annual: Advisory Committee update to District Board and community

5-year: Minor update to multi-resource management plan, approved by District Board

10-year: Major updates to multi-resource management plan, approved by District Board

GOVERNANCE

SECTION 2

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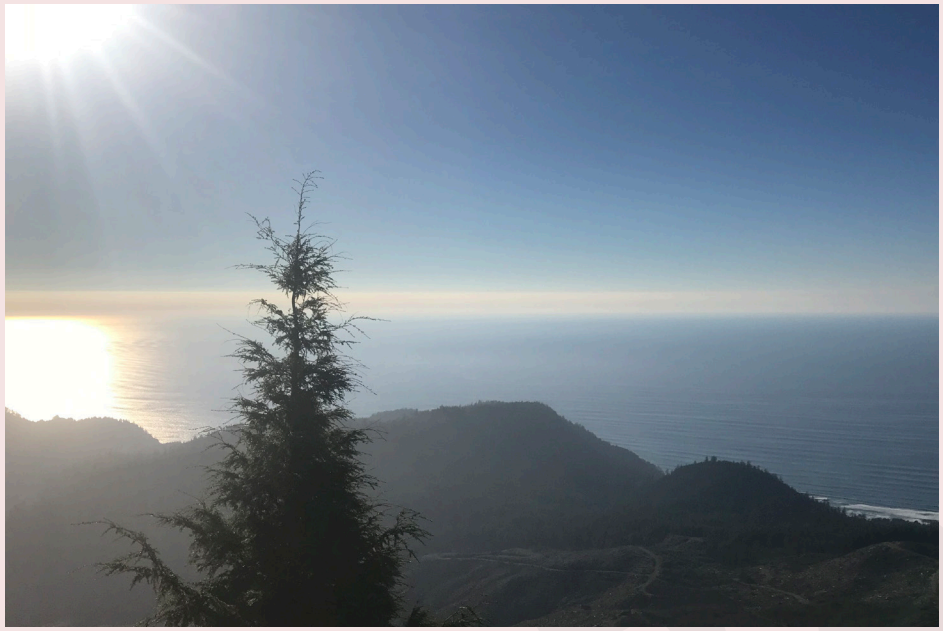
The 3-member advisory committee will be made up of individuals with professional experience in conservation, forestry, academia, watershed management, or business operations. The advisory committee members will be nominated by members of the District Board and appointed by the District Board chair for 3-year terms. The 3-year terms align such that board positions do not turn over in years with major plan updates.

The Arch Cape Forest will have separate accounting and management from general District operations. The Advisory Committee will oversee both a property manager and a consulting forester. The property manager is responsible for public relations, reporting, contracts, and other day-to-day operations. The property management capacity could be provided through the District's existing staff, through a contracted manager, or through partnership with other regional organizations. The forester will provide specific consulting related to forest and road stewardship, monitoring, and planning, working in partnership with the property manager.

The property management responsibilities include contract administration, board and advisory committee administration, bookkeeping, grant applications, administration and reporting, as well as public engagement.

GOALS AND OBJECTIVES

SECTION 3



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The following sections describe a set of goals and associated policies for the Arch Cape Forest. These goals and policies provide a framework for how the forest and watershed will be managed. The goals are listed in order of importance and reflect the underlying motivations for acquisition of the Arch Cape Forest. Each goal cuts across a number of policies, which are accordingly associated with and described in multiple goal sections.

While some goals may be aspirational, policies are intended for direct application across all management practices. These goals and practices were developed as part of the 2021 management planning process with the Forest Management Advisory Committee for the Arch Cape Forest. For more details on monitoring and community engagement see page XXXXX. Also note, this multi-resource management plan does not include recreational uses at this stage. A separate recreation plan is being developed through the National Park Service Planning Framework process and will be included as an appendix.

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WATER QUALITY AND QUANTITY

The Arch Cape Forest includes 58% of the Arch Cape drinking watershed. This designation encompasses any area that would naturally drain into Shark or Asbury Creeks upstream of the water intakes. All perennial and seasonal streams and creeks that provide source water lie within the property. A combination of steep slopes, erodible soils, roads, and past management practices have created high water treatment costs because of high turbidity in source water. Continued exposure of the source water poses a significant long-term risk to water quality.

All management practices will first and foremost protect and improve source water quality and quantity, at present and into the future. This includes impacts from sediment, nutrients, temperature, large scale disturbances (e.g., pest outbreaks), and human impacts. In addition, the overall forest structure and stand composition has dramatic long-term impacts on low and peak flow conditions, which are increasingly important with unpredictable weather events and climate change.

SEDIMENT

Sediment and in-stream nutrients are a primary driver of water treatment costs. High turbidity can necessitate installation of additional filtering systems or drive up the intensity of existing treatment. Sediment comes from a variety of sources, the most common being erosion within existing stream channels, extension of stream channels through the road ditch and drainage network, erosion from soil disturbance associated with logging, and mass wasting events or landslides.

Erosion within existing streams takes place primarily as streams incise. In the Northern Oregon Coast Range, this can occur due to shifts in geomorphological conditions such as the removal of woody debris from a stream or from a shift in flow patterns like a large flood. In the former case, efforts to place wood in a stream can halt or even reverse incision, causing the stream channel to aggrade and store sediment. Much of the Oregon Coast Range saw significant removal of woody debris in the 1940s – 1980s, largely with the goal of improving fish habitat. Instead, this led to dramatic incision in many coastal streams, including on those within the Arch Cape Forest. In the ensuing 40 years, natural and artificial in-stream woody structures have caused channels to aggrade. In general, however, Asbury, Shark and other creeks on the property are dramatically incised and do not appear to be aggrading back to a historic stream channel.

Incision and sediment transport, leading to turbidity in source water, also results from high peaks flows or other shifts in stream flow patterns. Widespread logging across the property over the past century shifted stream flow patterns. At the landscape scale, mature and complex forests serve as a sponge, storing water during wet periods and slowly releasing it during dry periods. Young forests, in contrast, lack this ability. Instead, young forests use large quantities of water quickly, because they do not have the same water storage capacity. This distinction between older and younger forests has important implications on source water quality. In general, low flows are lower and peak flows higher in a young forest than in older and more complex forests. The

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result of widespread logging across the Arch Cape Forest was probably an increase in peak flows, which would have had the secondary impact of increased soil erosion.

Soil erosion is both constant, and occurs irrespective of exogenous forces; however, human activities have the potential to dramatically increase the erosion process. A good example is absence or presence of a road and its current maintenance condition. This is because roads intercept water that is moving along the forest floor, often as subsurface flow, and convert it to surface flow, either in a ditch or on the road surface itself. Road ditches can extend a stream network by as much as 50%. This additional stream network increases the potential for erosion and decreases the ability of the forest floor to filter out sediment.

Road surfaces are also a primary source of fine sediments that remain suspended in the water column. These fine sediments are often the most costly and problematic for source water treatment systems as they can both clog systems and create disinfectant byproduct issues (for more details see nutrients section).

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Poorly maintained roads and ditches can create significant water quality issues and are a primary management concern for the Arch Cape Forest. A well built and maintained road network decreases erosion, while poor maintenance both increases erosion and contributes to fine sediment runoff.

Any form of soil disturbance, particularly those that expose mineral soil, can create sediment issues. Primary examples of this are logging and post-logging erosion, as well as any mass wasting event. All land management activities have an impact on water quality and run along a spectrum from minimal impact to catastrophic impact. Land managers attempt to minimize any negative impacts of erosion. This can be achieved most effectively by selecting appropriate forest management treatments or stewardship projects, executing them with experienced operators, and planning post-treatment mitigation. In addition, policies such as stream buffers, steep slope / high landslide risk harvest restrictions, and equipment limitations can provide broad protection from soil disturbance.

NUTRIENTS

Suspended nutrients in source water create significant issues within the treatment and water distribution system. Nutrients that pass through ultra filtration react with chlorine in the water system to create disinfectant byproducts, the most common of which are haloacetic acid (HAA) and trihalomethanes (THM or TTHM- total trihalomethanes): chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

HAA and THM are the result of gaseous chlorine or liquid sodium hypochlorite water treatment. The chlorine reacts with organic material in the water to create HAA and THM.

The source of the organic material, tannic acid, is typically the result leaf litter that falls near streams and decomposing cedar and hemlock root mass in or around streams or wetlands. As these organic materials decompose, they release tannic acid into the water. That tannic acid is not fully filtered out through typical filtering processes and accordingly reacts when gaseous chlorine is added to the water.

CHEMICALS

Call out box for chemicals.

TEMPERATURE

While the Arch Cape water system does not utilize reservoirs or other pre-filtration large storage capacity, stream temperature may still impact water treatment costs. Colder water generally carries fewer nutrients and is easier and cheaper to treat. Shade and stream bed structure directly impact temperature. Streams with sufficient shade and stream channel structure that supports hyporheic flow provide colder water than exposed streams with eroded channels. Hyporheic flow is the water that flows beneath the surface of the stream channel through rocks, gravel and other substrate. An incised stream will often have less hyporheic flow and, accordingly, warmer summertime water.

Windthrow

DISTURBANCE AND RESILIENCE

The Oregon Coast Range has a long history of large-scale disturbance including fire, pest and pathogen outbreaks, landslides, and windthrow. These types of disturbance often have immediate and severe impacts on water quality. These impacts can range from large sediment pulses to long changes shifts in hydrological patterns.

Large scale disturbances, by their very nature, create challenges for management during and following the event. The primary management approach for disturbance is to cultivate and develop appropriately scaled resilience, such that the watershed still provides the maximum ecological function during and following the event. Managers accomplish this through ecological heterogeneity, primarily in the forms of species diversity and structural complexity on a stand level and managing for a mosaic of stand types across the landscape. Fire ignition, a significant issue for disturbance, is discussed in greater detail under the “human impacts” section.

The scale of ecological disturbance is anticipated to increase with climate change, while the predictability of these events will decrease. Examples of disturbances that are likely to affect the Arch Cape Forest include extreme weather events with wind and/or rain, pathogen outbreaks such as Spruce budworm or Hemlock looper, and wildfire.

Similar to how a financial investor selects different investment types in order to create portfolio diversity, a forest manager focused on resilience will manage towards a more diverse and complex forest. Pests and pathogens typically only attack certain species, various tree species and ages have differing susceptibility to windthrow, and a diverse forest stands will respond differently to the large stand-replacing fire historically present in the Oregon Coast Range. For the financial investor, some investments will continue to yield whether or not others fail. For a forest manager, some species of trees and stand types will continue to provide high quality water filtration when others are unable to do so. This resilience is key to managing for long-term water quality in a drinking watershed.

The present stands on the Arch Cape Forest display significant spatial heterogeneity but relatively low species diversity or structural complexity on a stand level. Over time, active management can select for increased species diversity and complexity. An example of this management is pre-commercial thinning that selects trees to increase diversity. In older stands, variable retention harvests can increase spatial complexity while creating a multi-strata stand. This type of stand displays the characteristics of resilience. Over time, management interventions will create a forest more capable of providing high quality drinking water despite the challenges of climate change and pre-existing ecological disturbance risk.

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HUMAN IMPACTS

Humans are the primary exogenous force acting on the Arch Cape Forest. From forest management decisions to recreational activities, human actions have and will continue to shape this landscape. Human impacts can be positive and negative in terms of water quality. Positive impacts would include invasive species treatments and resilience-oriented forest management decisions. Negative impacts are far more varied and include fire ignition, erosion, and source water contamination. This section focuses on the three latter issues.

While fire ignition is not fully tracked, anecdotally and from conversations with the Oregon State University fire resilience extension staff, most fire ignitions in the Oregon Coast Range are human-caused. Typically, fires start because of both a poor understanding of fire propagation risk and careless behavior or a combination of the two. The easiest way to limit human-caused fire ignition is to exclude humans from a landscape. This human exclusion has

become an annual occurrence, with most private forestland owners closing all public access during periods of high fire risk. Other measures can be taken including limitations on vehicle and power-driven machinery use, campfire bans, smoking bans, limitations on slash burning, and improved signage and public education. Fires in Northwest Oregon have historically been large and stand replacing with relatively long (over 100 years) return intervals. More recently, a number of fires on and around the subject property have ignited due to slash burning. Improved slash treatment practices are mandatory for fire management, including considerations of chipping, small piles, and an outright ban on slash burning on the property. This again would be in-line with comparable watersheds on the coast that do not burn slash.

Erosion is another primary concern for source water and can occur from human uses of a property. One of the most common is through poor trail building practices or illegal trails. Active monitoring of trails and intentional planning of recreational uses is important for avoiding unintended impacts. Trails should be carefully planned and located away from running water on any steep slope areas where increased erosion risk exists. Motorized use trails present the most severe erosion risk. As with the construction of road networks, trails create additional surface runoff and present a risk of fine sediment, which will remain suspended in the water column through most source water intake systems. Any trail with exposed mineral soil must be planned in accordance with best management practices with erosion taken into consideration. Source water contamination due to human actions remains relatively rare but can have enormous impacts on source water and filtration.

Another concern on the Oregon coast is water contamination risk associated with hunting and recreational use. Numerous examples exist of wounded animals dying in or near source water. If not immediately located and removed, these carcasses will cause significant issues. Careless hunters cleaning animal parts or tools in source water can also present a real, although significant smaller risk. This risk must be balanced with erosion


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and stand establishment risks presented by an overpopulation of elk. Elk can habituate themselves to wallows in low-gradient streams and wetlands. In turn, these wallows create significant sediment pulses downstream. Elk also actively browse most conifer species with the exception of Sitka spruce, causing challenges for stand establishment post-harvest in areas with increased elk presence. Active hunting through a managed program can limit elk issues including erosion and tree browse. A program such as this should include active hunter education and follow-up to mitigate human-caused source water contamination risk. In addition to hunting risk, all recreational uses bring the risk of human waste, including bodily waste, in and around water sources. Evaluation of human waste risk and a plan for human management should be included in any recreation planning.

WATER AFFORDABILITY AND WORKING FORESTRY

Active management of the Arch Cape Forest could play a key role in property acquisition and the significant ongoing stewardship costs associated with forest ownership. In turn, timber sale revenue and cost management will long-term impacts on water affordability. While not all management activities generate revenue, most planned harvests will generate significant financial returns. These funds can then support the upfront acquisition cost as well as long-term property maintenance. In most cases these ongoing maintenance costs have tandem benefits of protecting or improving source water quality while also paying living wages to local contractors to complete the work.

The Arch Cape Forest has an important legacy as a working forest that provides social and economic benefits throughout the community. Active forest management, also referred to as “working forestry”, including silviculture, maintenance, and harvest, supports a range of employment opportunities while also improving the affordability of drinking water in Arch Cape. The harvested logs, which are restricted from export, support well paid jobs in local sawmills. The fiber goes on to supply the construction industry throughout the Pacific Northwest and harvest taxes provide financial support for a range of programs. For almost a century, Oregon has held position as the top US lumber producing state and active management of properties such as the Arch Cape Forest helps to support this.

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Managing the Arch Cape Forest as a sustainable working forest creates a public example of how active management, source water protection, and long-term climate resilience can work together. As described in the "Disturbance and Resilience" section, active harvesting is an important tool for increasing species diversity and structural complexity in the forest. A strong legacy of active management has created a pre-existing mosaic of stand ages and compositions across the property. Ongoing management will continue to increase diversity and watershed scale resilience to disturbances and increased climate change risk.

COMMUNITY CONNECTION

The Arch Cape Forest provides not only the aesthetic backdrop for the community of Arch Cape but also supports recreational uses, sport and subsistence hunting and gathering, and a strong community sense of place. In addition, the purchase of the forest creates an opportunity for ongoing forestry research and education.

As a result of common practice over the past century, the Arch Cape Forest property has remained open to public access. With significant transitions among private landowners, public access is no longer a given and some landowners have begun charging for any access. A significant risk exists that without public purchase, the Arch Cape Forest could be closed to public access and some areas of the property planned for development.

Recreational and community property use will be addressed in a separate recreation plan. The plan will outline current property use including but not limited to hiking and running, wildlife viewing, photography, bicycling, hunting, gathering, equestrian use, education, and research. The Arch Cape Forest is an ecologically and socially unique forest and thoughtful evaluation of community property use is essential. The recreation plan will be incorporated into future revisions of this multi-resource plan and included as an appendix in the initial plan adoption.

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FOREST ECOLOGY

Oregon's coastal forests sit at the far southern extent of a coastal rainforest type that extends north to Alaska's Prince William Sound. The Arch Cape Forest and neighboring Rainforest Reserve are particularly unique in that they span from creek-bottom Western red cedar stands to mid-elevation Pacific silver fir, Douglas fir, Sitka spruce and Western hemlock, to high elevation Western hemlock / Sitka spruce forest. In addition, the topography and rocky geology present challenges to timber harvest that have allowed some stands to grow far beyond a traditional commercial rotation of 40-70 years. This unique example of plant succession and coastal rainforest has significance in terms of both forest ecology and forest function.

The Arch Cape Forest exists along a stark elevation gradient with highly varied levels of soil productivity, slope and aspect. These different sites support dramatically different forest types. Plant communities on the Arch Cape Forest and Rainforest Reserve provide an excellent example of plant succession from

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young stands that have yet to reach a point of competitive exclusion to old stands that have begun to create gap openings, allowing for establishment of new cohorts of young trees and plants. In addition to the notable tree diversity across elevational bands, herbaceous plants and shrubs display a unique diversity within a relatively small area.

Furthermore, the Arch Cape Forest provides a prime example of forest functional characteristics. While almost none of the Arch Cape Forest would be considered virgin forest, some older areas of the forest have functional characteristics similar to an old forest type. This is the result of active windthrow and other natural disturbance that creates gap openings and increases structural complexity. While these characteristics are more pronounced on the neighboring Rainforest Reserve, stand dynamics on the Arch Cape Forest continue towards a complex forest with old forest function. The result of this is a forest with a high capacity to store and filter water, relatively high ecological resilience in the face of disturbance and climate change, and relatively high potential to store carbon. Many

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of these functional characteristics will continue to grow as the age-class distribution across the forest normalizes. At present, the age-class distribution tends towards many young stands, some old stands, and very few stands in between. With the normalization of this distribution, the forest will continue to grow in its importance for forest function.

Active management as planned for the Arch Cape Forest is designed to mimic natural ecological processes and accelerate the forest's ability to provide essential ecosystem service functions. The policies relating to harvest, stream protection and invasive species all strive to support natural forest ecological process while also planning for a future with greater variability and severity in terms of disturbance risk.

HABITAT

The Arch Cape Forest provides important habitat to a wide range of species as a result of location, proximity to protected forests, and forest ecology. Species present on the property include Roosevelt elk, white-tail Deer, Coho and steelhead salmon, numerous bird species, and a multitude of insects, fungi, and other organisms. These communities could not exist without the important habitat provided by the Arch Cape Forest. Continued stewardship and management will serve to support and improve habitat values across the forest.

As described in the preceding section, the Arch Cape Forest exists at the southern edge of a coastal rainforest type that extends over 2,000 miles north. Many of the species found on the Arch Cape Forest are the same as those found in British Columbia or Southeast and South-central Alaska. In addition, the forest is home to other species more commonly found to the south in coastal Douglas fir and Redwood forests, or to the east in the Coast Range forests of Northwest Oregon. This location at the ecological edge of four distinct habitat types (coastal Western hemlock, coastal Douglas fir, coast-range mixed fir, and marine), supports the relatively high species diversity on the Arch Cape Forest.

The forest is surrounded to the North by large areas of institutional forestland managed by Greenwood Resources and State of Oregon forestland, on the second side by the protected Rainforest Reserve, on the third side by Oswald West State Park, and on the fourth by the relatively narrow community of Arch Cape with the Pacific Ocean beyond. This combination of surrounding forests creates unique connectivity and a clear connection to both saltwater marine habitat as well as freshwater creeks and streams. In addition, the 18 square mile Cape Falcon Marine Reserve lies just to the west. These areas provide important protected land and ocean connectivity, supporting habitat, ecological processes, and the wildlife that depend on them. Of particular note is the Marbled murrelet, which have identified nest sites both in State forestland to the north and Oswald West State Park to the south.


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Finally, the mosaic of forest stand characteristics and relatively intact forest ecological processes present on the Arch Cape Forest currently support important habitat with the potential for dramatically increased future habitat quality. Steep slopes and large riparian buffers have created barriers to harvest, resulting in reserve areas across the subject property. Over time, continue plant succession patterns will create habitat that is unique on the Northern Oregon Coast.


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MANAGEMENT POLICIES

SECTION 4

The following section includes a set of management policies intended to support and ensure the goals and objectives described in the preceding section. These policies are intended as the minimum level of watershed protection intended, and all efforts to provide greater protection for source water and other goals will be considered. Each section begins with a description of the policy question. An outline of policy function follows. Then, the section concludes with the Arch Cape Forest policy adopted for the specific resource issue.

- Definition
- Purpose
- Policy

Management policies range from written in stone, to flexible policies intended for revision. In as many cases as possible, the policies are simple, easy to understand, and effective for implementation. The purpose of each policy provides additional details on how and why the policy protects source water, and potential areas for further strengthening of the policy.

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STREAM BUFFERS

STREAM BUFFER DEFINITION:

Stream buffers represent the first line of defense in stream protection. Technical terms for stream buffers include riparian management zones (RMZs) or riparian areas. Buffers are typically measured in feet of distance from bank full width of a stream, with various activities allowed in “inner” versus “outer” buffers. Inner buffers typically allow no logging while outer buffers require a specific basal area retention and / or equipment limitations for ground-based logging. Both state laws and forest management certifications specify both where buffers should be applied, and how large buffers must be. Oregon’s system relies on the size of the stream as well as fish presence. Streams can be identified through a statewide streams geodatabase administered by the Oregon Department of Forestry, although streams not listed in the database also require survey and protections.

STREAM BUFFER PURPOSE:

Stream protections provide a range of water quality, ecological, and resilience benefits. Water filters through intact riparian vegetation, removing sediment and decreasing the velocity of rainfall– runoff patterns. The protection also decreases the potential of sediment mobilization, particularly from exposed mineral soil in the riparian area. This filtration and limits on soil disturbance are most important immediately adjacent to the stream channel, however the full extent of a riparian buffer has been shown to decrease sediment transport and provide filtration. The decreased runoff velocity is particularly important for decreasing peak flow events and retaining soil moisture in order to maintain base flows. While less of an immediate concern for water filtration, the long-term impacts are significant and there are direct benefits of increased buffer widths.

In addition to filtration, stream buffers provide shade and have the potential of increasing hyporheic flow. Both shade and hyporheic flow serve to cool warm water or maintain already cold-water temperatures. This has habitat benefits but also can dramatically influence filtration costs. While the Arch Cape water system does not rely on large reservoirs or storage systems, warm water may still present issues in terms of nutrient load and algae. As a general rule, colder water tends to decrease both filtration costs and the need to add chlorine to filtered water through the transmission system.

Finally, stream buffers benefit natural forest structure and species diversity, as well as wildlife habitat. The presence of increased species diversity and structural complexity surrounding streams creates greater system resilience. In practice this means that a specific disturbance, whether endogenous or exogenous, has a decreased probability of fully replacing a stand of trees. Instead, the riparian areas may be retained post disturbance, or some component or species of the riparian area may survive. This was exhibited during

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the 2020 fires in western Oregon when some riparian areas with older, more complex, and moister forest types exhibited lower mortality levels than surrounding even-age plantation forests.

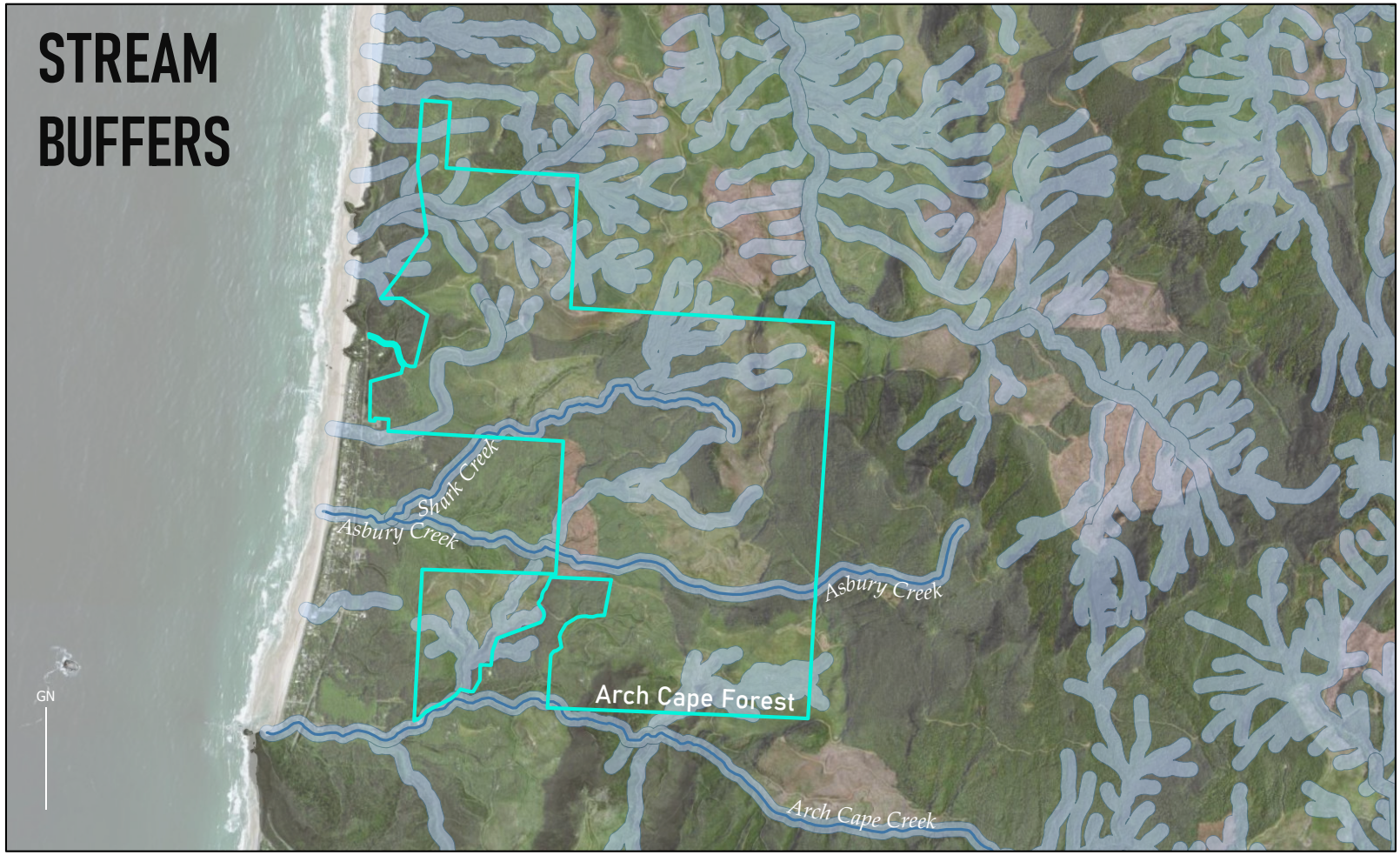
STREAM BUFFER POLICY:

The Arch Cape Forest riparian buffers are designed to comply with both the Oregon Forest Practices Act (OFPA) and the Forest Stewardship Council (FSC) certification. In addition, on type D (domestic source water) all perennial streams will receive a 150 ft. no-harvest zone in absolute (non-averaged) horizontal distance. The total riparian management zone on type D perennial streams will be 150 ft. or comply with the FSC or OFPA standards, whichever provides a higher level of protection.

Non type-D streams, ponds and wetlands must comply with the higher of FSC or OFPA standards. Seasonal streams will be treated as a small non-fish streams (Type N) under OFPA standards.

These standards and additional protections have been designed based on the risk presented by soil disturbance in the inner buffer zone, as well as the benefits provided by increased species diversity and forest structural complexity afforded by thinning in the outer zone. These standards also align with similar domestic drinking watersheds in the Pacific Northwest and align with rainfall runoff modeling completed for the Arch Cape Forest.

STREAM BUFFERS



HARVEST LEVELS

HARVEST LEVEL DEFINITION:

The specific harvest level on a property indicates the proportion of overall forest growth subject to harvest over an extended period of time. If the annual timber growth on the subject property is X, the harvest level could be greater than X, which over time would deplete the inventory, or less than X, which would create a long-term increase in inventory. Harvest level may also vary depending on ecological disturbances such as wind damage or pest / pathogen outbreak. A standard approach to harvest level is "sustained yield" where harvest level equals growth on an averaged basis, creating a steady flow of logs from a property and stabilizing both inventory and age distribution.

HARVEST LEVEL PURPOSE:

The harvest level over an extended period will determine the overall stocking and composition of a forest ownership. In the case of the Arch Cape Forest, historically high harvest levels led to an uneven age distribution and relatively low inventory on operable acreage. Large proportions of the commercial forest acreage are in a very young age class, and in a 50+ age class. Very little of the property is between 10 and 50 years of age.

HARVEST LEVEL POLICY:

The Arch Cape Forest will be managed with harvest equal to or lower than growth across commercial forest acres. To comply with this, spatial analysis has been used to remove non-commercial acreage and stream buffers (approximately 33% of the total acreage). The remaining 67% of the property will be harvested at a rate of approximately 3% of current standing inventory, with the rate updated to reflect a normalization of age distribution over the initial 20 years of ownership.

Due to the extremely uneven age distribution, harvest in the first 20 years may exceed growth in terms of scribner board foot log volume due to the low board foot conversion of young timber.

OPENING SIZE

OPENING SIZE DEFINITION:

Forest harvest activities generally occur for a specific "unit" of land. That unit may be a stand, but it could also constitute part of a stand or span across multiple stands. For any overstory removal type harvest, various restrictions exist to limit the maximum size of opening created. These harvest size restrictions apply to both clearcuts and other overstory removals, however thinning units may be larger. In addition, harvest may not occur on adjacent units until one has healthy growing seedlings and a specific distance is required between non-adjacent units.

The Oregon Forest Practices Act stipulates a maximum opening size of 120 acres. The Forest Stewardship Council standard caps total opening size to 60 acres with the average across an ownership not to exceed 40 acres. The Forest Stewardship Council also requires a graduated level of tree retention such that a 40-acre harvest unit appears more akin to a variable retention harvest than a true clearcut.

OPENING SIZE PURPOSE:

Opening size plays a critical role in determining the overall mosaic of future forest stand characteristics. Opening size also helps to define forest structure under FSC requirements as a result of the graduated tree retention requirements. Later sections provide a details description of retention requirements.

Historically, smaller opening size was seen as a positive in terms of watershed protection and forest ecology. Current research indicates that the importance of harvest prescription (e.g., clearcut versus variable retention, versus thinning) can have greater importance than unit size. For variable retention and thinning activities, large units provide both efficiency benefits and create larger-scale structural complexity than small units. Large harvest units can also create aesthetic issues, especially when visible from major roads.

OPENING SIZE POLICY:

The Arch Cape Forest will comply with both Oregon Forest Practices Act and Forest Stewardship Requirements for openings size. This means that no openings will exceed 60 acres and an average not to exceed 40 acres. Harvest units may be larger than 60 acres but only for treatments that do not create large openings (e.g., thinning or variable retention with high levels of retention and unit-bisecting stream buffers).

Unit and opening size are unlikely to present an efficiency or operational challenge issue for the Arch Cape Forest due to the average stand size. In addition, streams and riparian areas bisect many logical harvest units, resulting in natural division of possible openings and large areas of retention (upwards of 50% in most stands).

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TREE RETENTION

TREE RETENTION DEFINITION:

Any harvest type removes trees, but almost all harvests also leave trees behind. These trees are "retained" and represent some proportion of the pre-harvest forest condition. Tree retention ranges from large proportions of the healthiest trees, for instance in a thinning treatment, to no tree retention in a small patch cut. Tree retention requirements exist for live trees, snags, and woody debris. Retention may also be dispersed or clumped, with clumping often occurring around stream buffers. Retention is often specified as representative of trees in the stand pre-harvest, meaning that a forester cannot only leave small or less valuable trees. In addition to standard retention, foresters often select wildlife trees based on unique, habitat-friendly tree characteristics such as broken tops, large scaffold branches, or other form.

TREE RETENTION PURPOSE:

Tree retention creates the long-term legacy of forest structure. In a thinning treatment, the retained trees may retain even-age monoculture characteristics in a stand. On the other extreme a variable retention harvest will often leave a diverse mix of species and tree sizes in clumped and / or dispersed retention. This level of retention creates high levels of structural complexity and species diversity with a multi-strata stand. Over the long-term this type of retention can also create natural regeneration. These aspects, over time, increase the ecological resilience of the forest in the face of disturbances such as wind, fire and pathogen outbreak.

Harvest with high levels of tree retention is also generally more expensive to complete than clearcuts and present some risk in terms of regeneration, especially if managers rely on natural regeneration. Retention creates an operational obstacle and increases the difficulty of yarding logs. The difficulty mandates hiring experienced loggers willing to work around retention without creating damage. Loggers


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often charge more based on the difficulty of the work. This is particularly the case with thinning, which may be quite expensive due to the high value of the retention trees and the additional cost of appropriate equipment.

TREE RETENTION POLICY:

The Arch Cape Forest will comply with the requirements of both the Oregon Forest Practices Act and Forest Stewardship Council certification. This mandates a graduated level of retention based on opening size, with the maximum retention reached at 40 acres overall harvest unit size as shown in the below table.

Retention must serve to increase stand diversity through tree selection. Retention may be clumped, dispersed, or a combination of both. The high windthrow risk present on the Arch Cape Forest will mandate a majority of retention in linear clumps oriented in-line with prevailing storm winds. Retention areas will also be located around streams, adding to the existing riparian buffers to provide further protection in areas with windthrow or erosion risk.

ROAD MAINTENANCE

ROAD MAINTENANCE DEFINITION:

Road maintenance includes all activities associated with the road network, as well as the prioritization and monitoring of roads. At a basic level, scheduled maintenance includes vegetative control (brushing or herbicide application), grading and possibly rolling, addition of crushed rock as necessary, cleaning of cross-drain structures, and replacement or addition of drainage infrastructure as needed.

Road maintenance relies on an iterative prioritization of needs and uses. Mainline roads require maintenance in addition to what smaller spur roads may require. Small spurs may simply be allowed to re-grow while roads with drainage issues may require decommissioning. Decommissioning ranges from relatively minor excavation to complete re-grading and revegetation of abandoned road surfaces.

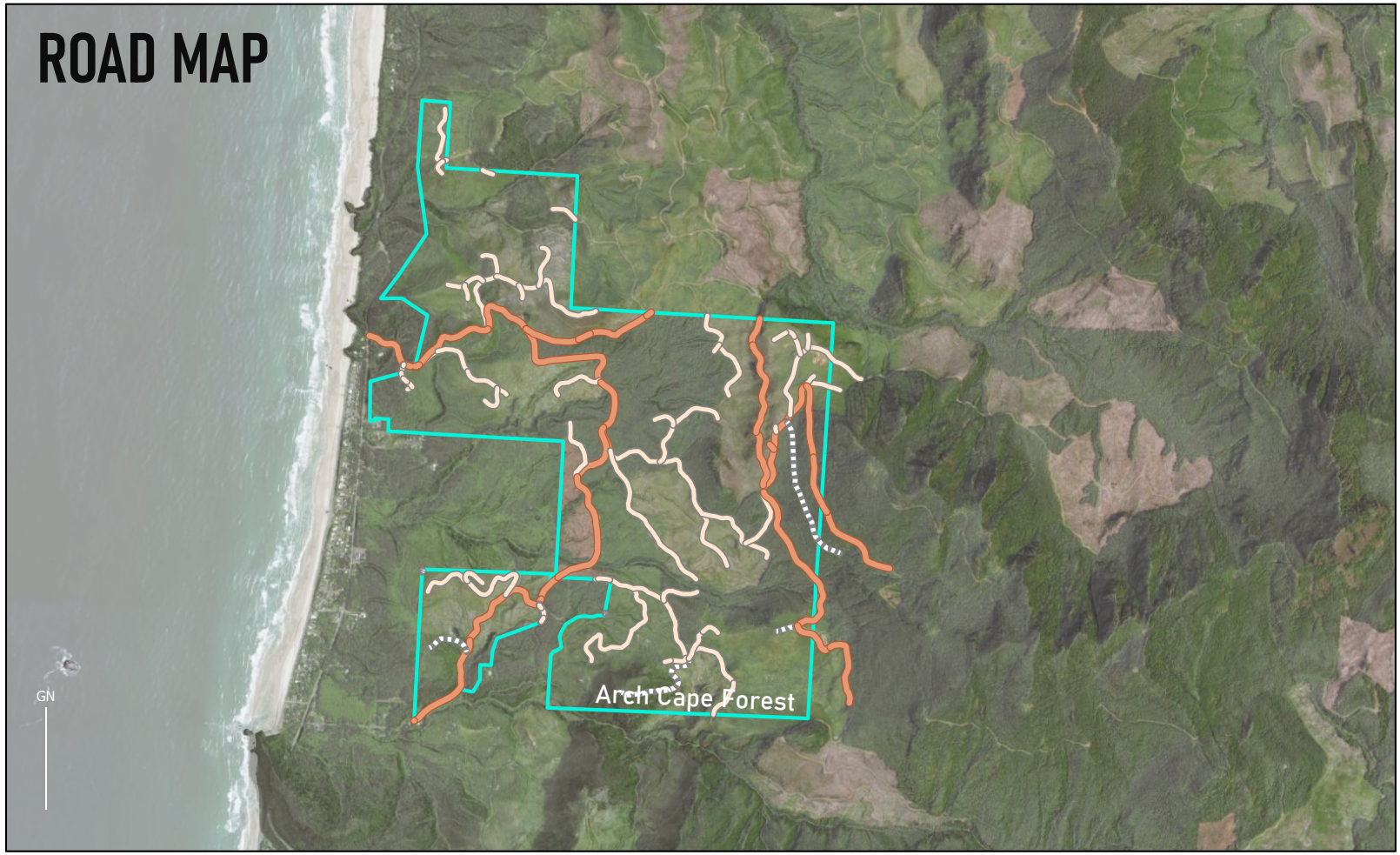
ROAD MAINTENANCE PURPOSE:

A forest road network provides essential access throughout a property for a multitude of tasks. These range from harvest activities to fire suppression, monitoring, forest health treatments, and recreation. A well-maintained road network improves the feasibility of harvest activities while decreasing the risk of high-cost repairs or road damage.

Road maintenance is also critical to source water management for two primary reasons: 1) to decrease the risk of catastrophic failure events and associated erosion issues and 2) to minimize the fine sediment mobilization in runoff from road surfaces. These issues are critical to the quality of source water and accordingly the cost of water treatment.

1. Catastrophic Failure Risk: Road systems both run parallel to streams and perpendicular to streams at existing crossings. . Roads additionally interrupt sub-surface runoff and transfer it to surface runoff in roadside ditches. This concentration of water combined with active erosion in and around streams creates a significant risk of catastrophic road failure. This could be as minor as a blocked culvert overtopping the road surface or as significant as a landslide or major slump. These events are almost always attributable to either poor initial road design or a lack of maintenance. Regular maintenance and monitoring protect against the risk of catastrophic failure. Catastrophic failure presents a source water risk in terms of large quantities of mobilized sediment, although they often occur as a short pulse and larger particles may settle out if the failure is sufficiently far from intakes.
2. Fine Sediment Mobilization: While catastrophic road failure events are noticeable and usually fixable, fine sediment mobilization from road surfaces are an ever present and significant cause of source water contamination and increased filtration costs. Roads, particularly when heavily used, generate fine sediment and concentrate it in roadside ditches. These ditches contribute the fine sediment directly to streams. Fine sediment remains suspended in the water column through the stream and source water intakes, creating significant water filtration issues. Any logging activity will generate increased sediment through any road system. Accordingly, a challenge exists in building and maintaining a road system with minimal risk from fine sediment.

ROAD MAP


GN
Arch Cape Forest
0
¼
½
¾
1
Miles
Arch Cape Forest Boundary
Roads
Mainline
Secondary
Spur

ROAD MAINTENANCE POLICY:

The Arch Cape Forest will have a perpetual ownership responsibility of maintaining and monitoring a significant road network. The overall strategy will focus on minimizing risk of catastrophic failure and fine sediment mobilization while prioritizing mainline roads.

An up-to-date map of roads and inventory of condition is critical to prioritizing maintenance activities. Smaller or less frequently used roads will either require decommissioning or be abandoned. Mainline and essential spurs will be maintained on a scheduled basis with repairs as needed. The road prioritization must be done in cooperation with other users including neighbors, government agencies, and local fire officials.

Road maintenance will focus on updating roads to current watershed best management practices. These practices focus on transferring water to the downhill side of all roads while minimizing the potential or water concentrating in roadside ditches. Strategies include out-sloping roads where possible, frequent cross drains, and disconnecting culverts from active stream channels. Natural forest understory vegetation provides the best sediment filter available for forest roads.

In addition to planning for and maintaining the road system, logging schedules will focus on dry-season operations and close monitoring of truck traffic and road conditions. Active log hauling was found to increase fine sediment contribution 7.5x from background levels in a regional study, while infrequent use by non-hauling vehicles contributes only 0.9% as much sediment as during logging. As a result, logging only during dry seasons and monitoring roads is critical for source water quality.

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INVASIVE SPECIES

INVASIVE SPECIES DEFINITION:

While the Arch Cape Forest is home to a wide range of healthy native flora and fauna, a number of non-native species also grow across the property. These non-natives include relatively minor species as well as aggressively invasive species. These include Himalayan blackberry, Cutleaf blackberry, Scotch broom, English Holly, English Ivy, tansey ragwork, and three species of knotweed.

INVASIVE SPECIES PURPOSE:

Invasive plants present a competitive challenge to native vegetation. This includes significant risk from knotweed, blackberry and Scotch broom, which can overwhelm all native species and create a monoculture thicket. By competing aggressively for light and moisture, these invasive species will either kill native species that occupy a site or preclude the establishment of native plant communities.

Invasive species can create challenges for working forestry and for source water. In order to grow a healthy forest, native trees, primarily conifers, must outcompete any invasive species present on a site during stand establishment. If a risk exists of failure to establish a forest, foresters typically consider mechanical and chemical treatment of invasive at significant expense. Many commercial forest managers proactively broadcast treat harvest units in order to decrease the risk of invasive and to decrease competition from invasive and native herbaceous plants.

Invasive species also present a range of risks source water. Some of these species, such as Reed canary grass, change stream channel patterns and present erosion risk either in the stream channel or from cutbanks. Others may establish along riparian corridors and outcompete native vegetation. These plants can increase overall evapotranspiration, decreasing overall soil moisture. Over time, this condition

will lead to decreased base flow and less reliable summertime source water.

INVASIVE SPECIES POLICY:

The Arch Cape Forest has active but minor invasive species issues. The primary species are Himalayan blackberry and Scotch broom. Himalayan blackberry concentrates along roads and abandoned landings while Scotch broom is dispersed across recent harvest units.

Arch Cape Forest will work with partners to utilize the best available science and treatments for the management of invasive species. Invasive species are an inevitable component of ecosystems on the Oregon Coast, but forest managers will strive to manage for native species and diverse ecological communities.

The most viable and permanent treatment for most sun-loving invasive species is shade. The establishment of mature stand structure across the property and, where possible, retaining a component of overstory trees through harvest rotations, has the potential of shading out most invasive species.

Tansy ragwort caterpillar (cinnabar moth)

FOREST CHEMICAL USE

FOREST CHEMICALS DEFINITION:

Forest chemicals include herbicides, pesticides, and fertilizers. A wide range of products exist and are applied through a variety of methods. Broadcast application covers an entire unit with the selected chemical either through aerial application, mechanized application, or manual application. Spot or roadside applications typically utilize manual (backpack) application or vehicle mounted sprayers. Increasingly, drone application has and will continue to become widespread and allow for more targeted spot herbicide application.

The most common forms of chemical use in coastal Oregon forests are broadcast and spot herbicide application. These applications are either focused on decreasing herbaceous competition or treatment for specific invasive species issues. Pesticide use is rare and fertilizer application varies between landowners. Fertilizer use is extremely rare on public lands.

FOREST CHEMICALS PURPOSE:

Forest chemical treatments generally focus on three forest stewardship goals.

1. Controlling plant competition during regeneration in order to improve seedling survival and growth.
2. Treatment of invasive species that pose a risk of spread or competition with native plants.
3. Maintenance of road systems in order to control grass, invasive plants, and brush. Road spraying allows for less frequent brushing and retains rock surfaces.

Each of the above options exists along a spectrum from intensive application to light application and include a range of application methods. Goals 1 and 2 apply specifically post-harvest in order to control the regeneration and establishment of a new stand. Alternatives to herbicide application exist for most circumstances, including options of manual vegetation control (slashing or saw treatment), and pro-active silvicultural

strategies beginning before any harvest takes place. In addition, roadside mowing provides a viable method of maintaining roads without herbicide.

Some extreme circumstances, such as widespread Scotch broom, exist with few alternatives to herbicide treatment. These circumstances do not currently exist on the Arch Cape Forest and efforts will be taken to avoid future invasive species issues.

FOREST CHEMICALS POLICY:

The Arch Cape Forest will not use any herbicide, pesticide, or fertilizer for any type of treatment. The Arch Cape Forest will proactively with neighbors to establish agreements for herbicide use adjacent to or within the watershed. In addition, operating plans will include roadside mowing and manual treatment as needed post-harvest.

The Arch Cape Forest acknowledges the possible necessity of herbicide use for treatment of invasive species, particularly Scotch broom and knotweed, as well as the challenges of herbicide use in and surrounding a domestic drinking watershed. Any exception to the ban on herbicide use requires unanimous board and advisory committee support.

HIGH CONSERVATION VALUE FOREST

HIGH CONSERVATION VALUE FOREST DEFINITION:

The Forest Stewardship Council and other conservation non-governmental organizations provide guidance for the identification of high conservation forest. The standard methodology identifies six criteria: 1) species diversity, 2) landscape level ecosystems, 3) ecosystems and habitats, 4) critical ecosystem services, 5) community needs and 6) cultural values. The HCV methodology then relies on a standards adaptive management framework for identifying a value, assessing the value, developing management plan, plan implementation, monitoring, and adaptive long-term management. At a tangible property scale, this process includes a range of discovery tasks to determine high conservation value forest, incorporation into existing or new plans, followed by long-term iterative management, monitoring, and adaptation with the goal of providing an additional level of protection for the underlying conservation value.

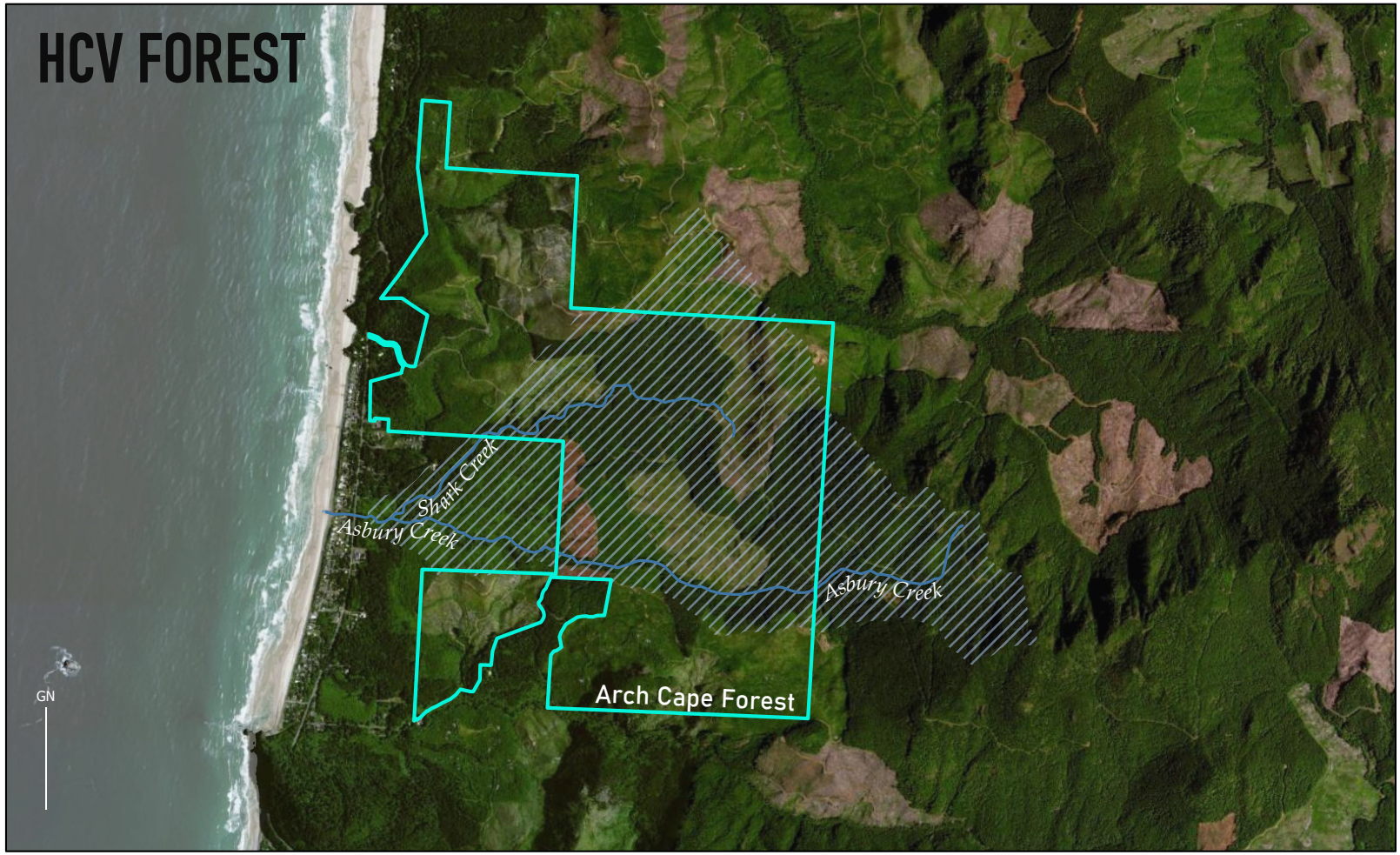
HIGH CONSERVATION VALUE FOREST PURPOSE:

High Conservation Value Forest provide protection for unique values, such as drinking water, as well as an additional layer of decision-making oversight for ecologically unique landscapes. In the case of a drinking watershed, designation as High Conservation Value draws attention to the importance of the landscape in providing reliable quantities of clean, safe drinking water. Other areas that will receive an additional level of scrutiny include forests with unique tree species or legacy areas of old growth forest.

HIGH CONSERVATION VALUE FOREST POLICY:

The Arch Cape Forest will identify High Conservation Value forests within the larger forest, including but not limited to areas that provide drinking source water. Areas identified as High Conservation Value will be evaluated for management on a case-by-case basis with increased stakeholder review and input. Active harvesting and forest management may continue within the High Conservation Value forest areas based on the standard approval

process with the Forest Advisory Committee and District board. Due to the high proportion of forest identified as High Conservation Value, no slash pile or controlled burning will be permitted on the Arch Cape Forest. Instead, small slash piles will be allowed to naturally decompose, both decreasing the rate of carbon emitted from slash and reducing fire ignition risk. Areas of high conservation value forest will be subject to frequent (bi-monthly) monitoring by District staff or contracted property managers / volunteers, and adaptive management across all high conservation value areas.


HCV FOREST
Shark Creek
Asbury Creek
Asbury Creek
Arch Cape Forest
GN
0
¼
½
¾
1
Miles
Arch Cape Forest Boundary
Drinking Watershed

STEEP SLOPES

STEEP SLOPES DEFINITION:

The Arch Cape Forest exists along a gradient from low-angle stands at the bottom of the property to extremely steep and cliffy stands on the southeast corner of the ownership. Many of these slopes are considered steep and / or are categorized as high landslide risk.

STEEP SLOPES PURPOSE:

Steep slopes present an increased risk of erosion, particularly as a result of mass soil movement or landslides. Steep slopes also increase the difficulty of completing harvest activities with significant tree retention. The underlying cost of logging on steeps slopes is at minimum 50% more expensive than traditional, non-cable logging, and often far more expensive.

Many of the steep slopes in the Arch Cape Forest contain the oldest and most mature forest stands with the highest timber volume per acre. This is the result of logistical challenges associated with timber harvest.

STEEP SLOPES POLICY:

The Arch Cape Forest will limit operations to slopes less than 70%, with a policy of avoiding harvest whenever economically feasible on slopes > 35%. When harvest does occur on slopes >35%, operations will remove the minimum volume possible with large clumped and dispersed retention areas.

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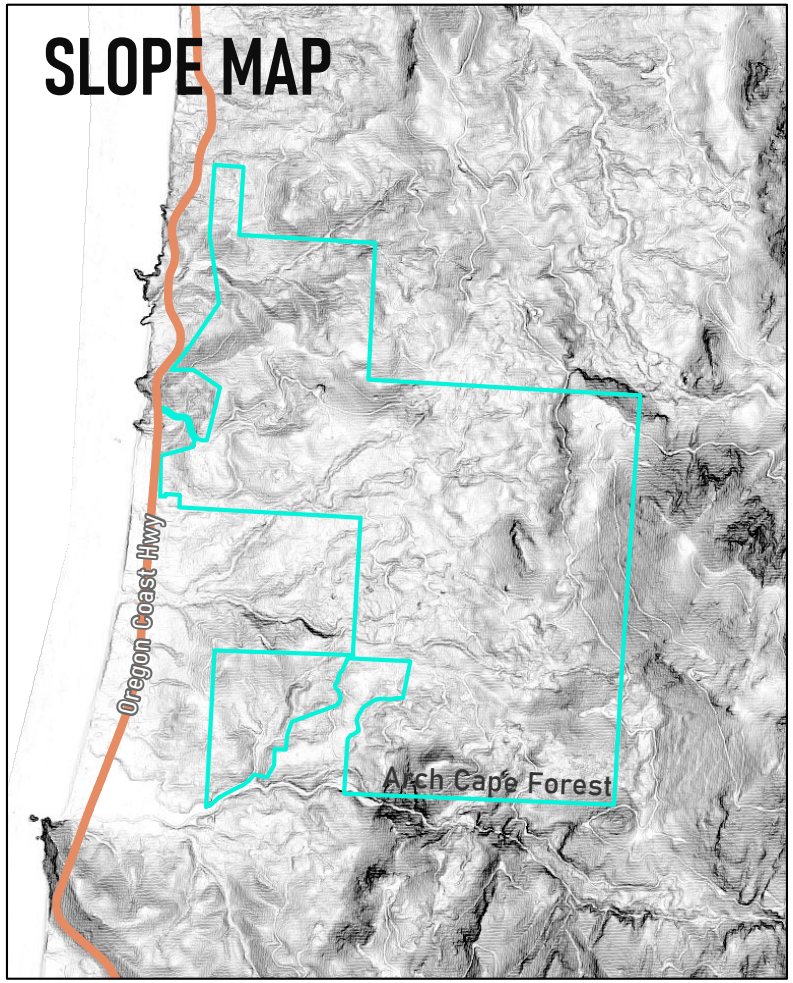
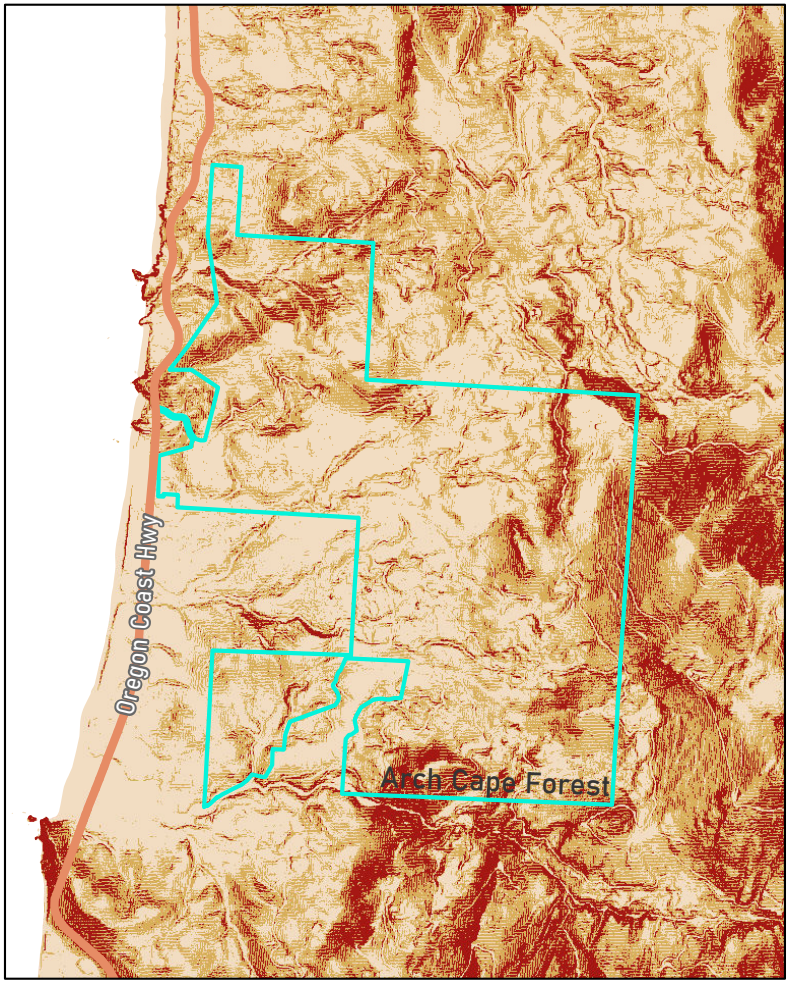
SLOPE MAP





Slope

High

Low

Miles

0 ¼ ½ ¾ 1

Slope Classes

≤35% (Ground)

≤70% (Cable)

>70% (Steep)

MANAGEMENT POLICIES

SECTION 4

RESOURCES

SECTION 5

HISTORICAL BACKGROUND

SOCIAL AND ECONOMIC CONTEXT

PHYSICAL SETTING

FOREST ECOLOGY

NON-FOREST ATTRIBUTES

UNIQUE RESOURCES

FOREST INVENTORY

Manager Report August 20th, 2021

WATER DISTRICT:

The Water plant distributed 1.9 million gallons to town in July.

We ran a mid-month meter reading at Cannon View Park's request to try to determine a possible leak in CVP's system.

Staff replaced 6 meters in Arch Cape and 2 in Cannon View Park that had antennas that stopped transmitting. We continue to watch this closely. The meters are still in a pro-rated phase of warranty, but continue to have antennas that are dying.

Cannon Beach Fire is still working on the network system details for the fire hall meeting room. Marc Reckmann will send me the information for the Districts to purchase the TV and stand once they have the other details figured out.

A new water service was installed at 79908 Anvil Rock Rd. in August

Shark Creek intake had annual sediment removal done by Bob McEwan Construction this week.

The Spruce Ridge development on Marshall Ln. will be having utilities installed starting this month. Bob McEwan Construction is the contractor. Approximately 570 feet of 8" water main will be installed, as well as one hydrant and 7 water services.

EFM will be going back to do some work where the culvert was removed on Shark Creek last summer. There is a small portion where some bank erosion has occurred, most likely in one of the heavy rain events this winter, and poses a risk of sedimentation in the stream. This area was identified in their most recent FSC audit, as an area to be addressed. Pacific Forest Management will be doing the work later this month and will provide notice to staff. Old fill material that was part of the original road will be removed and the bank will be stabilized.

Computer Support and Services is doing some IT upgrades at the Water and Wastewater Plants for network security.

MONTHLY LOG : ARCH CAPE WATER & SANITARY DISTRICTS

July 2021

Total Hours	**352.00**	**151.75**	**200.25**
Percentage Split		**43%**	**57%**
Total Accounts	639	294	345
Percentage Split		46%	54%