Elliott State Forest Research Advisory Committee
November 8, 2019

Advisory Committee Website: https://www.oregon.gov/dsl/land/pages/elliott.aspx

Advisory Committee Members present: Steve Andringa, Bob Salinger, Paul Beck, Chris Boice, Jen Clark, Melissa Cribbins, Eric Farm, Geoff Huntington, Mike Kennedy, Ken McCall, Mark Stern, Bob Sallinger, Keith Tymchuk, Vicki Walker, and Bob Van Dyk.

Department of State Lands and Oregon State University Staff: Meliah Masiba, Robert Underwood, Ali Hasen, Ken Armstrong, Jennah Stillman, and Bill Ryan.

Oregon Consensus Facilitation Team: Peter Harkema and Amy Delahanty

Action Items

Action Item	Who	Date
Circulate draft November 8 meeting summary to AC members for review and comment.	OC	Completed.
Bring back any primary concerns, or requests from AC member's respective constituencies regarding an Elliott State Research Forest.	Advisory Committee members	November 21st.
Circulate updated draft guiding principles document (with governance principles) for AC member review	OSU	As soon as possible.

Welcome, Agenda Review and Process Overview
Facilitator Peter Harkema welcomed the group then invited members to do a round of introductions. He then reviewed the agenda topics with the group, which were 1.) review of small group feedback on governance considerations regarding ownership and governance and provide any additional input; 2.) review of revised Elliott guiding principles; 3.) discuss and strive to agree on an approach for presenting to the Land Board in December.; 4.) discuss in greater detail OSU's modeling and research design; and 5.) review next steps.

General Updates
Department of State Lands
Department of State Lands Director, Vicki Walker, thanked Advisory Committee members for their engagement at last month's Advisory Committee meeting in Coos Bay and their participation during

the field tour of the Elliott. She felt the tour went well and reflected on some of the input and discussions from Advisory Committee members. The following additional updates were shared with the group:

- DSL and OSU hosted a public meeting on October 23rd in Coos Bay. Director Walker shared the meeting was well attended and was appreciative of the public and interested stakeholder's input and feedback.
- DSL and OSU will continue to engage the public and interested stakeholders throughout the process, in addition to continued formal consultation with the tribes.
- Director Walker requested that each Advisory Committee member reach out to their constituencies and bring back comments regarding what they are hearing, primary concerns, and/or requests that they would like to see on the Elliott.
    - **ACTION ITEM**: Advisory Committee members share any feedback they are hearing from their constituencies regarding primary concerns, or requests they would like to see on the Elliott.

There was a question regarding the role of the Advisory Committee moving forward. Director Walker stated the Land Board will provide its direction in December but shared that at a minimum, she will propose the Advisory Committee continue for a few more months to discuss the remaining topics and issues. One Advisory Committee member stated that there are many unanswered questions, but that the group is participating, is enthusiastic, and would like the opportunity to finish out some of the remaining work. There was then a question about public participation during the meetings. Geoff Huntington (OSU) shared he has been impressed by the public meetings and noted the meetings have been less about "casting a vote" and more directed towards an information exchange. Peter emphasized the public meetings are a space for individuals to hear what the Committee has been discussing. He said there would continue to be lots of energy around what will be happening on the Elliott, and asked members to bring back what they have been hearing back to the Committee on an ongoing basis, including at the November 21st meeting.

OSU

Geoff Huntington stated that at the last meeting, OSU made a decision to share the modeling numbers with the Committee. He highlighted the model is a good tool, but is still a work in progress. Geoff stated the harvest volumes shared with the Committee was being translated by some as a management option OSU was going to pursue. He emphasized the modeling numbers and harvest projections is not a management plan. There were no questions or comments from Committee members.

Governance and Governance Discussion

Peter shared a small work group of Advisory Committee members convened to analyze ownership and governance options and identify outstanding questions and areas of uncertainty. They developed a draft document for the group to react to and discuss (*see draft governance considerations for additional details).* Ken McCall shared that the group spoke about accountability, transparency, representation,

decision-making, and the related mechanisms that may achieve them. Ken highlighted the following points:

- It's important to have clearly defined pathways for public input, comment, and/or questions;
- Information should be made available to the public/local communities;
- Documenting decisions and having those available is important;
- Clear and defined pathways for when there is a grievance; and
- Conservation easements can provide certainty and accountability.

There was acknowledgement from the workgroup that pursuing the private carbon protocol offers a significant monetary opportunity. As such, the workgroup felt it was important to further explore what can and cannot be done under a private carbon protocol, and discuss governance considerations further. Following this, there was a robust discussion among the Advisory Committee about additional governance characteristics and considerations. Comments included, but were not limited to, the following:

- Once the accountability tools are solidified, that sets the structure for how any one grievance can go.
    - Knowing what California requires would be helpful. Some people will have grievances and it will be helpful to know how/where to direct them.
    - There is a certain amount of public trust in this process. If there is not a clear and transparent way for the public to voice potential grievances then they will go to other outlets.
- There is a need for a strong communication component to this. There's transparency in information sharing if someone asks, but there's also a proactive component as well.
- Removal of management from OSU may be a concern for some, as it would be viewed as a big step away from where several groups hoped where Elliott discussions would wind up. Some noted that if the group advises to move this direction then it will require a good justification and to ensure the money is real.
    - Others noted that the language really matters - suggesting that participation in the private carbon market could be misinterpreted by some to draw conclusions about unrelated topics like public access.
- It's critical for any governance consideration, to point out this is a research forest. The HCP will guide some policy and process. We need to make sure the governance statement includes those things to be clear and upfront.
- There should be an oversight board to help hold OSU accountable, not to direct OSU about the research charter.
- We need a strong commitment to proactive communication. An Elliott State Research Forest may change how the public can use the land at any given time, and there will be some growing pains.

Guiding Principles

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Geoff Huntington reviewed the draft guiding principles document with the group (*circulated as a pre read prior to the meeting*). He noted the document is intended to be a distillation of what OSU has heard throughout the Advisory Committee process, including feedback shared during Committee meetings and stakeholder conversations. The draft principles will be used by the University to address the public values the Land Board expressed for the Elliott, as well as the broad interests from the public and stakeholders. Geoff stated once reviewed and approved by University leadership, the guiding principles could become a set of priorities used in the crafting of an OSU proposal and associated components. Advisory Committee members were then invited to share comments, or ask questions. Below is a summary of the discussion:

- Do the values in concert with one another, conflict?
    - General consensus among the Committee was the values complemented one another.
- The governance considerations (articulated by the small work group of Advisory Committee members who produced them along with additional input from the group) should be included somewhere in the guiding principles document. The governance needs to live somewhere and not just be reflected in the structures.
- Remove "working forest."
- Concern with a recreation management plan. There was a suggestion to remove the word "management" as local recreation use has been unhindered for an extended period.
- Concern that traditional ecological uses of the Elliott may be in conflict with potential future uses e.g. Carbon. Suggestion to include both traditional and potential economic values.

Geoff shared that OSU will try to incorporate the Committee's feedback and circulate the draft final document within the University. Dr. Katy Kavanagh shared the Exploratory Committee will go back and try to make sure the design is incorporating and touching on the articulated principles. Peter then asked the group whether they would like to see an updated draft version of the document prior to the University's review. Several members agreed they would like to see the updated document.

- **ACTION ITEM**: OSU to circulate the most updated draft guiding principles that includes governance for the group's review.

Land Board Presentations and Advisory Committee Next Steps

Director Walker stated the next Land Board meeting is December 10th. Director Walker shared during her remarks she will provide a synopsis of the work done to-date, including Advisory Committee purpose and process, ongoing tribal consultations, public meetings, status of the HCP, and other stakeholder outreach. OSU will speak to the Research Charter and vision for an Elliott State Research Forest and Troy Rahmig (ICF) will present in more detail about the status of the HCP and. Following the presentations, Director Walker seeks the Land Board's direction to continue work on the exploration of a research forest, including the discussions around decoupling and governance. DSL and OSU anticipate input and insight from the Advisory Committee as part of the 2020 process.

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Following this, Advisory Committee members were asked whether they wanted to craft a collective statement on behalf of the group, speak as a panel, or individually reflect their own views. **The group agreed** to draft a collective statement that would be shared at the Land Board meeting. It was suggested that if others would like to make an additional comment, they can speak for their interests or organization during the public comment period. There were then several comments from Advisory Committee members related to 1.) a desire for Director Walker to share information about the various interests represented on the Advisory Committee and the amount of time put into serving on the Committee; 2.) concern the Land Board will change course away from pursuing OSU and an Elliott State Research Forest; and 3.) whether OSU will be putting in money to buy the forest.

Peter acknowledged the Committee members have spent significant time, energy and effort to get to where they are now. The Committee has moved through whether an OSU Elliott State research forest could work, to how it could work. He stated that between now and the next meeting if members have major concerns, it's important to share that with the group.

OSU Modeling and Research Design

Geoff shared following the last Advisory Committee meeting, members provided input and asked questions related to the results from OSU financial and carbon modeling; extensive and intensive treatments; habitat benefits of the research design; how the research design is being received by the federal agencies; and general questions and inquiries being discussed in the research. Rather than providing those responses individually, the presentations were designed to answer those questions in the group and take the opportunity to address any remaining questions or concerns.

OSU Modeling

Tom Tuchmann (US Forest Capital), John Sessions (OSU), and Mark Rasmussen (Mason, Bruce & Girard, Inc.), presented the context and assumptions behind the summary report numbers of the financial and carbon modeling for an Elliott State Research Forest. (*See PPT for additional details.)* The group addressed the following questions during their presentation:

- Why 24 million board feet in Scenario B?
- Why was extensive applied to fewer acres in Scenario A?
- What happens to the 100 year old stands in Scenario B?
- What are the extensive and intensive management prescriptions?
- Why is extensive harvest more volume per acre?

During the presentation there were questions and comments related to assumptions in site prep for extensive and intensive areas, herbicide use, and clarifications about the 100 year old stands in Scenario B.

Research Design

Dr. Katy Kavanagh provided additional details to the group regarding what is and isn't extensive forestry. Katy shared the goal of extensive stand management is to have more balance in objectives relative to intensive. Extensive management is managing for diverse forest characteristics to meet a broad set of objectives and ecosystem services. She stated this could be done by balancing retention of structural complexity while ensuring conditions exist to ensure regeneration and sustainability of the complex forest structure. She then presented extensive management key factors; what is not considered extensive management; and principles underlying silvicultural activities in ecological forestry. Comments and questions from Committee members were related to early seral habitat, 90 year age stands and the range of harvest under extensive treatment. (*See PPT for additional details.)*

Aquatic Strategy & HCP Terrestrial Strategy

Dr. Gordie Reeves provided additional information regarding the aquatic components of the HCP. Gordie presented information about potential benefits to the at-risk species from the research design; wood recruitment potential; and discussed remaining next steps in the modeling. Gretchen Engbring (OSU) then summarized OSUs approach to Marbled Murrelet and Northern Spotted Owl in the HCP. (*See PPT presentation for additional details.*)

Research on the Elliott

Dr. Katy Kavanagh and Dr. Gordie Reeves discussed the various types of research questions that could be investigated on the Elliott. Katy briefly reviewed example research questions under social and recreational ecology, aquatics, forest practices and management, terrestrial, climate change and carbon, and other potential research areas. One Committee member wondered if there was a way to research changes in recreational use over time. Peter encouraged Advisory Committee members and others to bring forward any research questions that would be most relevant to your interests. (*See PPT presentation for additional details.*)

Next Steps

Peter thanked Advisory Committee members for their participation. He stated the next meeting will be held on November 21st at Oregon State University.

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Behind the Summary Report Numbers OSU College of Forestry Financial and Carbon Modeling for the Elliott State Research Forest

November 8, 2019

US Forest Capital

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Disclaimer

- The information provided herein is supplied to Oregon State University and is in no way warranted or guaranteed. Specifically, no representations are expressed or implied with respect to the use of land, including, but not limited to, development potential, timber marketability, harvestability, volume, quality, acreage or access and carbon project registration and sales. It is the prospective users obligation to evaluate any and all environmental and regulatory constraints relating to the use of the property and the harvest therefrom. Receipt of this presentation and the information herein shall not be deemed to constitute an offer to sell or the solicitation of an offer to buy any security.

- This analysis does not reflect a proposed management plan for the Elliot State Forest, rather it is a coarse screen estimate of potential forest and carbon management scenarios and their potential outputs.

Draft Analysis

- This presentation represents the modeling team's best efforts to analyze conservation and financial outcomes associated with assumptions and data provided by OSU.
- Such assumptions do not reflect any management decisions by OSU. As such the results of this analysis should be viewed as preliminary as well and subject to change based on future decisions by OSU.

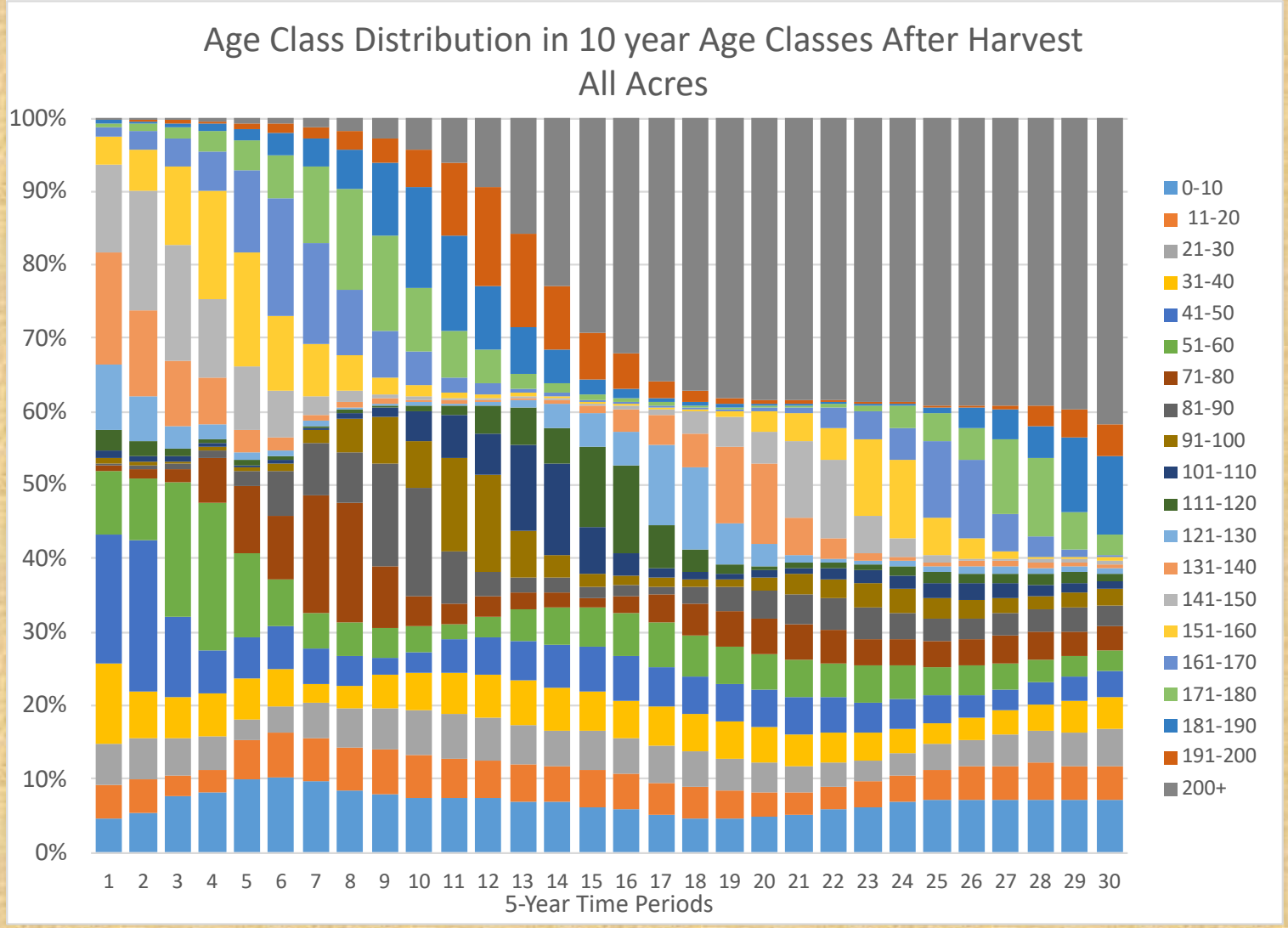
Why 24 mmbf in Scenario B

- The modeling team was not provided a timber target
- Harvest volumes resulted from the Experimental Design's management regimes and prescriptions
- OSU's assumptions & results were not compared w/ODF
- Harvest volumes result from a combination of:
  - Higher financial investment
  - Higher per/acre productivity associated with site prep, improved tree stock, thinning, etc.
  - Growth during a period of lower harvest levels by ODF during 2009-2019

Why Extensive Applied to Fewer Acres in Scenario A

- Experimental Design allocated younger stands to Intensive and intermediate/older stands to Extensive
- Scenario A prohibited harvest in stands > 100 years which excluded many Extensive stands from harvest
- Therefore, limited amount of stands available for Extensive harvest and model "choose" stands that could be harvested Intensively
- Could be distributed more evenly with modified Experimental Design

Scenario B
What Happens to 100 year old stands



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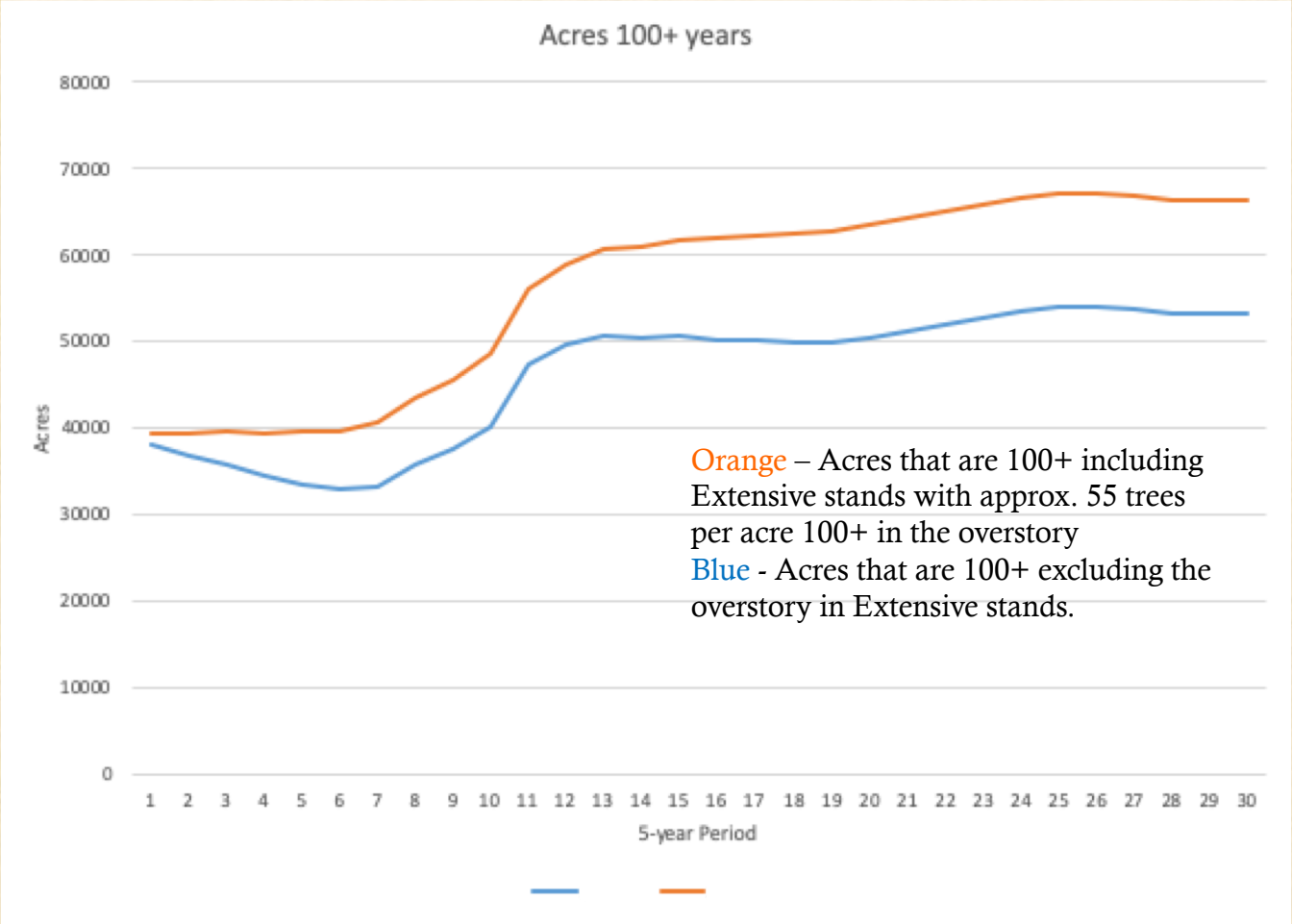
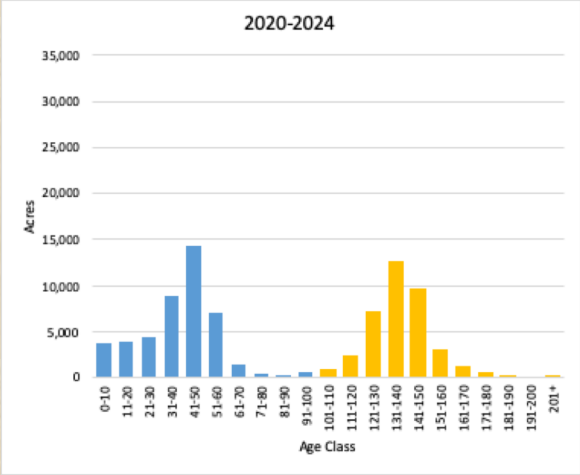
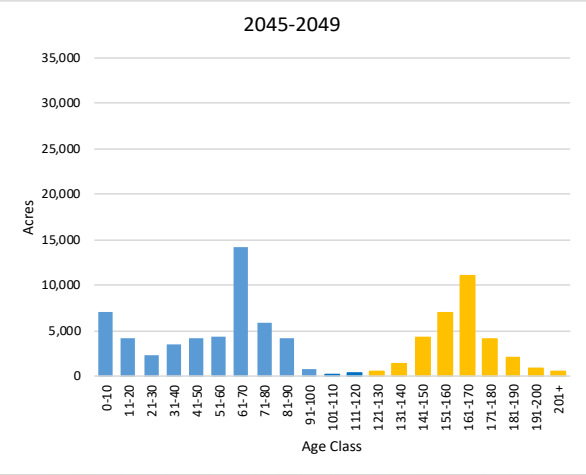
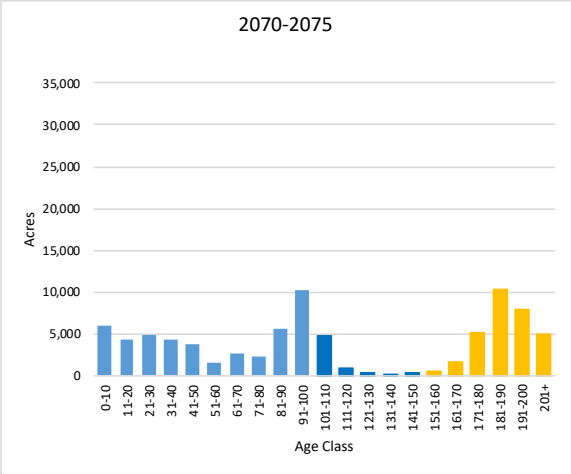
Scenario B
Acres of 100+ Stands (over 150 years)
Extensive Overstory/Understory

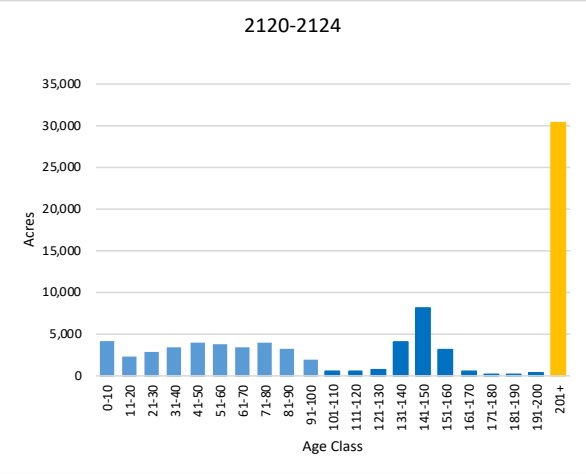


Scenario B
Age Class Distribution Evolution









Extensive & Intensive Management Prescriptions

Extensive

- Commercial Thinning to RD 40
  - Typical Commercial Thin will make the residual stand more windfirm.
  - Produces at least 10 Mbf/acre, thin across diameter classes
  - Existing Stands - 70+
- Retention type final harvest to RD 20

  Average of residual stand:
  - 55 trees/acre
  - Averaging 17" avg. diameter
  - 86 square feet basal area
  - 16.7 Mbf/acre retained volume
  - Min Harvest Age - 90+
- Plant under the residual stand after harvest
  - Some site prep, veg control, animal control
  - Growth on new trees will be suppressed by legacy trees

Intensive

- Commercial Thinning to RD 40
  - Typical CT to capture volume early and to improve spacing.
  - Produces at least 10 Mbf/acre, thin across diameter classes
- Even-aged final harvest
  - Clearcut, with FPA leave trees
  - Min Harvest Age – Existing stands = 40+ and Future Stands = 60+
- Intensive, high-yield plantation practices
  - Site prep
  - Improved seedlings
  - Two veg control treatments
  - Animal control

RD- Residual Density, a measure of stocking relative to full stocking. RD 20 means 20% of full stocking

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Why Does Extensive Harvest More Volume/Acre?

- In the MRW, Younger stands were dedicated to Intensive silviculture
- In the MRW, mid and older age stands were dedicated to Extensive
  - A portion of the harvest in these stands were older trees with higher volumes per acre.
  - This result holds notwithstanding that:
    - These stands were not clearcut
    - Assumed a diversity of diameters were harvested, and,
    - Residual stand retained a Residual Density of 20% of full stocking

Research on the Elliott

K Kavanagh DSL Advisory Committee 11-8-19

Research on the Elliott

- There are many research questions that can be addressed along the journey to an Elliott State Research Forest.
- In fact, the process we are in right now is researchable.
- The ‘how’ of many of the things we do are important research questions.
  - New technologies for monitoring birds that goes beyond snapshots
  - Testing and monitoring extensive silvicultural techniques-give people tested options beyond reserves and clear cuts.
  - Develop yield tables for extensive silvicultural systems for wood and other ecosystem services.

Types of research

- Inquiry that “points out the problem”
- Inquiry that illuminates mechanisms and thus robust decisions.
  - Understand processes; validation or testing and understanding mechanisms
  - Make predictions under novel conditions
  - Models often serve as a framework to help us study interactions, take a shot at predictions and conceptualize solutions.

SOCIAL & RECREATIONAL ECOLOGY

- How do we monitor and manage human access to forested landscapes across large spatial and temporal scales?
- How do different management practices influence the social capitol of stakeholder groups?
- How do we incorporate traditional ecological knowledge into the research, education, and outreach objectives for the ESRF?
- How do recreationists perceptions of management practices change in relation to the share vs. space continuum?
- What are the types, levels, and extent of recreation-related impacts across the ESRF and the share vs. spare continuum?

AQUATIC

- Developing an intrinsic potential model from LIDAR to evaluate habitat conditions for coho salmon under different scenarios of forest management
- Stream temperature network instrumentation to evaluate downstream effects of forest management
- Environmental DNA to asses aquatic biodiversity across working forests
- Mapping connectivity of aquatic systems at the Elliott State Research Forest
- How forest structure created by regeneration management and natural disturbances affect streams. Within streams, exploring wood input and wood movement, aquatic biogeochemistry and the resident and anadromous fish in this catchment system.
- How does timber harvest or fire influence how water storage and transit times change within a catchment? Is it sensitive? Is there a gradient considering a range of management activities?

FOREST PRACTICES & MANAGEMENT

- Alternate road surfacing systems: operational performance, environmental impact, cost, sensitivity to fire.
- Worker hazard recognition and risk assessment in complex silviculture systems.
- Managing forest operations to minimize energy consumption; comparing new ground based steep slope harvesting systems to traditional cable systems.
- What is the most successful set of extensive forestry techniques to maintain key ecosystem components?
- What are the silvicultural practices that obtain desired ecosystem attributes?

FOREST PRACTICES & MANAGEMENT

- How does the gradient of potential management activities affect both hydrologic and geomorphic processes (flow of groundwater, water temperature, landslides, debris flows, windthrow)?
- How does the frequency and magnitude of landslides change in managed and unmanaged terrain? How does this compare under baseline conditions or extreme events? The Elliott is a perfect testing ground due to its relatively homogeneous geology.
- Access places pre-harvest and we could study organismal response to harvest and how harvest might impact dispersal of organisms that have sub-stand home ranges.

TERRESTRIAL

- How does edge density/ distance to edge influence MAMU occupancy rates and nest success?
- Does mature fragment size influence occupancy and nest success? We have one massive patch that will be aging over time (35,000 acres to the west), and then a gradient in patch sizes in the east (not sure of range but say 5 – 300 ha).
- Overall, does a “land sharing” or “land sparing” or various intermediate treatments best conserve MAMU populations?”
- Bioacoustic monitoring with auto-recognition of marbled murrelet, to lead to terrestrial monitoring network. By automating extractions of bird syllables to recognize species by vocalization, Songmeters can collect audio data for monitoring in diverse and expansive terrains.
- A study looking at nest success in response to forest thinning, which will help answer some of the questions around thinning that’s taking place on USFS lands
- Does edge contrast matter (mature forest to intensive management versus mature forest to ‘ecological forestry’) The prediction here that the latter might be worse because of the early seral shrub diversity, which should result in more nest predators. Forest carnivore habitat and populations (martens plus) – we can look at prey base dynamics at small scales but can only model and monitor larger-scale population dynamics and movement patterns of the carnivores.

CLIMATE CHANGE & CARBON

- Interdependence of carbon sequestration and biodiversity across regions.
- Ecosystem modeling of forest carbon and water stocks and fluxes (with ED2 and/or FATES-HYDRO), to examine questions like the impacts of harvesting on carbon stocks and fluxes.
- Does terrain and fog in this rugged ecosystem provide hydroclimatological heterogeneity that contributes important biophysical refugia and environmental buffering to this system, i.e., locations experiencing less exposure to climate change/climate extremes, climate variability
- Assisted migration of genotypes and species that may be better suited for future climates

Potential Research Areas

The thematic areas are intended to describe nested sets of research activities, including short-term studies of specific research questions that are compatible with the research design

- **Biodiversity, Including, but not limited to, at-risk species:** As the Elliott contains a number of at-risk species, research needs to address the most pressing of issues associated with sustaining and enhancing terrestrial and aquatic species in the context of managed forested landscapes.
- **Global Change Adaptation** Forest and ecosystem health related to global change impacts; research to identify potential suite of management approaches to help mitigate impacts with a goal of forest resiliency and reduced vulnerability.
- **Natural and Human caused Disturbance:** The Elliott has and will continue to be the site of significant disturbances – whether natural or human caused. Research conducted on the forest will be tailored to account for this important opportunity.
- **Forest Structure:** Research will explore biodiversity and ecosystem services associated with advanced structure forests. Research will explore management options that provide for a variety of stand structures, including late-successional conditions, and associated range of biodiversity, wood products and ecosystem services

Potential Research Areas

- **Water Quantity and Quality in Relation to Forest Management:** The Elliott provides excellent opportunities to develop better scientific understanding of the effects and biological response of natural and human-caused disturbances in forest landscapes on water quality and quantity.
- **Landscape and Scale Issues:** Opportunities to investigate the role of adjacency (source-sink relationship), fragmentation, and connectivity.
- **Harvest systems:** Complex stand management on steep slopes.
- **Recreation:** Opportunities for studies on existing and future prospects and impacts.
- **Traditional knowledge in forest ecosystems:** consultation and contributions of native people in sustaining our forests.

Marbled Murrelets

NWFP Synthesis*	Our Murrelet Strategy
"Maintaining and increasing the area and cohesion (creating larger blocks) of suitable nesting-habitat area"	• CRW provides contiguous 30,481 acres • Allocation of treatments to acres/stands intended to minimize fragmentation and negative edge effects
"Because it can take many decades for murrelet nesting habitat to develop, protection of existing habitat for the next several decades will continue to be key to minimizing habitat losses"	• Starting point is identifying 15,708 acres of Marbled Murrelet Management Acres (4,619-CRW / 11,089-MRW) • No clearcutting in stands over 60 years of age • Mature stands preferenced for inclusion in MRW reserves, which are intended to make up ~27% of the MRW
"Restoration of old-forest/murrelet nesting habitat in reserves may be accelerated by active management toward that end"	• Limited early intervention in CRW and MRW reserves focused on restoration and enhancing conservation values in prior plantation areas
"Future management and design of reserves will benefit from accounting for climate change, including increased risks to murrelet nesting habitat from fire and other natural disturbances."	• Natural processes in CRW and MRW reserves would be unmanaged and allowed to create disturbances and seral stages (with the exception of fire)
"Nest depredation seems to be a major limiting factor on murrelet populations, and nesting habitat configuration may affect predation risk"	• In discussion • Minimize fragmentation and negative edge effects; preference protection of stands with adequate canopy cover

Oregon State University

*Spies, T.A.; Stine, P.A.; Gravenmier, R.; Long, J.W.; Reilly, M.J., tech. coords. 2018. Synthesis of science to inform land management within the Northwest Forest Plan area. Gen. Tech. Rep. PNW-GTR-966. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Northern Spotted Owls

NWFP Synthesis*	Our Owl Strategy
"Studies suggest that spotted owls select for abundant, structurally diverse closed-canopy forest with diffuse late-seral forest edge at the territory scale, and relatively lower fragmentation in nesting areas"	• CRW provides contiguous 30,481 acres • Allocation of treatments to acres/stands intended to minimize fragmentation and negative edge effects
"Dugger et al. (2005) found that owl territories with the greatest fitness potential were characterized by >50 percent old-forest habitat within a 412-ac (167-ha) circle centered on used nest locations"	• 25 nest sites (10 CRW, 15 MRW) with 0.5-mile buffer around each within which a minimum of 250 acres of nesting, roosting and foraging habitat would be retained • No clearcutting in stands over 60 years of age • Mature stands preferenced for inclusion in MRW reserves
"The focus of silvicultural treatments in moist forests of the western Cascades and Coast Ranges… has been an attempt to accelerate development of old-forest conditions in plantations or younger closed-canopy stands"	• Limited early intervention in CRW and MRW reserves focused on restoration and enhancing conservation values in prior plantation areas
"Disturbance events can reduce the suitability of forests used by spotted owls for several decades by creating open canopy conditions and reducing structural complexity."	• Natural processes in CRW and MRW reserves would be unmanaged and allowed to create disturbances and seral stages (with the exception of fire)
"Species recovery will require protections for old forest and management actions focused on reducing the threat from barred owls"	• In discussion

Oregon State University

*Spies, T.A.; Stine, P.A.; Gravenmier, R.; Long, J.W.; Reilly, M.J., tech. coords. 2018. Synthesis of science to inform land management within the Northwest Forest Plan area. Gen. Tech. Rep. PNW-GTR-966. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Certainty

1. Protection of existing habitat and management of potential habitat would be described in the HCP, either as part of the proposed project (Research Forest) or as part of the HCP mitigation requirements
   - Since the HCP results in permits with USFWS and NMFS, there is certainty that it will remain in place over time
2. The research design will be held constant for 100-200 years+, which also provides certainty
3. In addition to research, there will be a monitoring program (described in the HCP) that tracks the compliance and effectiveness of the conservation program over time
   - The monitoring program will tell us whether the assumptions we have made about habitat protection, habitat enhancement, and species response are being realized over time
   - If they are not, an adaptive management program will be in place to make adjustments to keep the conservation program on track
   - These reports are typically provided annually to the USFWS and NMFS, often with deeper dives at 5-10 year intervals

Characteristics of Suitable Habitat for Spotted Owls

Table 4-1—General descriptions of forest cover type classes used to estimate the amount of suitable forest available for nesting and roosting by spotted owls.

Cover type class	General description
Unsuitable	Younger forests or older forests with higher basal area of pine or high-elevation tree species or more open canopies. Usually smaller than average tree diameters, and lacking the presence of residual large trees and multiple canopy layers.
Marginal	Usually mid-seral forests, but can also be older forests lacking large-diameter trees, having simpler stand structure, or primarily composed of pine or high-elevation tree species.
Suitable	Forest stands older than 125 years of age, except in the California redwoods, where younger stands are used. Average tree diameters are usually above 20 inches (50 cm) d.b.h., with the presence of at least a few large trees exceeding 30 inches (75 cm) d.b.h. Canopy cover is usually greater than 60 percent, and the stand has multiple canopy layers.
Highly suitable	Typically forests 150 and 200 years of age or older. Average tree diameters often in excess of 30 inches (75 cm) d.b.h. except in drier portions of the range, where tree ages and sizes are typically smaller (e.g., 120 years and 24 inches). Canopy cover is usually in excess of 70 percent, and the stand has multiple canopy layers with high diversity of tree sizes.

d.b.h. = diameter at breast height.
Source: Davis et al. 2016.

Oregon State University

*Spies, T.A.; Stine, P.A.; Gravenmier, R.; Long, J.W.; Reilly, M.J., tech. coords. 2018. Synthesis of science to inform land management within the Northwest Forest Plan area. Gen. Tech. Rep. PNW-GTR-966. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Characteristics of Suitable Habitat for Marbled Murrelets

- "Although murrelet nesting habitat characteristics may differ throughout the range of the species, some general habitat attributes are characteristic throughout its listed range, including the presence of **nesting platforms**, adequate **canopy cover** over the nest, **larger patch** size of mature forest, and being within **commuting distance** to the marine environment" (Binford et al. 1975, Hamer and Nelson 1995, Nelson 1997, McShane et al. 2004, Ralph et al. 1995b).
- "Since 1996, research has confirmed that the presence of platforms is considered the most important characteristic of murrelet nesting habitat"
- "Overall, nest trees in Washington, Oregon and northern California have been greater than 19 inches (48 cm) diameter at breast height (dbh) and greater than 98 ft (30 m) tall… Northwestern forests and trees typically require 200-250 years to attain the attributes necessary to support murrelet nesting, although characteristics of nesting habitat sometimes develop in younger western hemlock forests with dwarf mistletoe."
- Marbled murrelets are reported to nest disproportionately on lower slopes and near streams. The recovery plan for the murrelet (USFWS 1997) states, "With respect to slope, eighty percent of nests in the Pacific Northwest were located on the lower one-third or middle one-third of the slope."

Oregon State University

*Spies, T.A.; Stine, P.A.; Gravenmier, R.; Long, J.W.; Reilly, M.J., tech. coords. 2018. Synthesis of science to inform land management within the Northwest Forest Plan area. Gen. Tech. Rep. PNW-GTR-966. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Extensive
-What it is;
- What it is not

K. Kavanagh 11-8-2019

Photo credit Laura Hardin simulated variable retention harvest from the EFM book

Silviculture

- "Silviculture carries the implication of active rather than passive human participation in the initiation and development of forest ecosystems. This has probably never been more appropriate than in the 21st century where humankind has altered so many of the fundamental conditions under which forest ecosystems have evolved."

  pg 92. Franklin, Johnson and Johnson, Ecological Forest Management.

From Ecological Forest Management; principles underlying silvicultural activities in ecological forestry

- Continuity of forest structure, function and biota between pre-and post-harvest systems.
- Creation and maintenance of structural complexity and biological richness including spatial heterogeneity at multiple spatial scales
- Silvicultural practices at times that reflect ecological processes
- Planning and implementing silvicultural activities in the context of plans developed at larger (landscape) spatial scales.
- Emphasize silvicultural activities that are expected to reduce risks to important forest values and to increase future societal options in the management and use of the forest.

Extensive

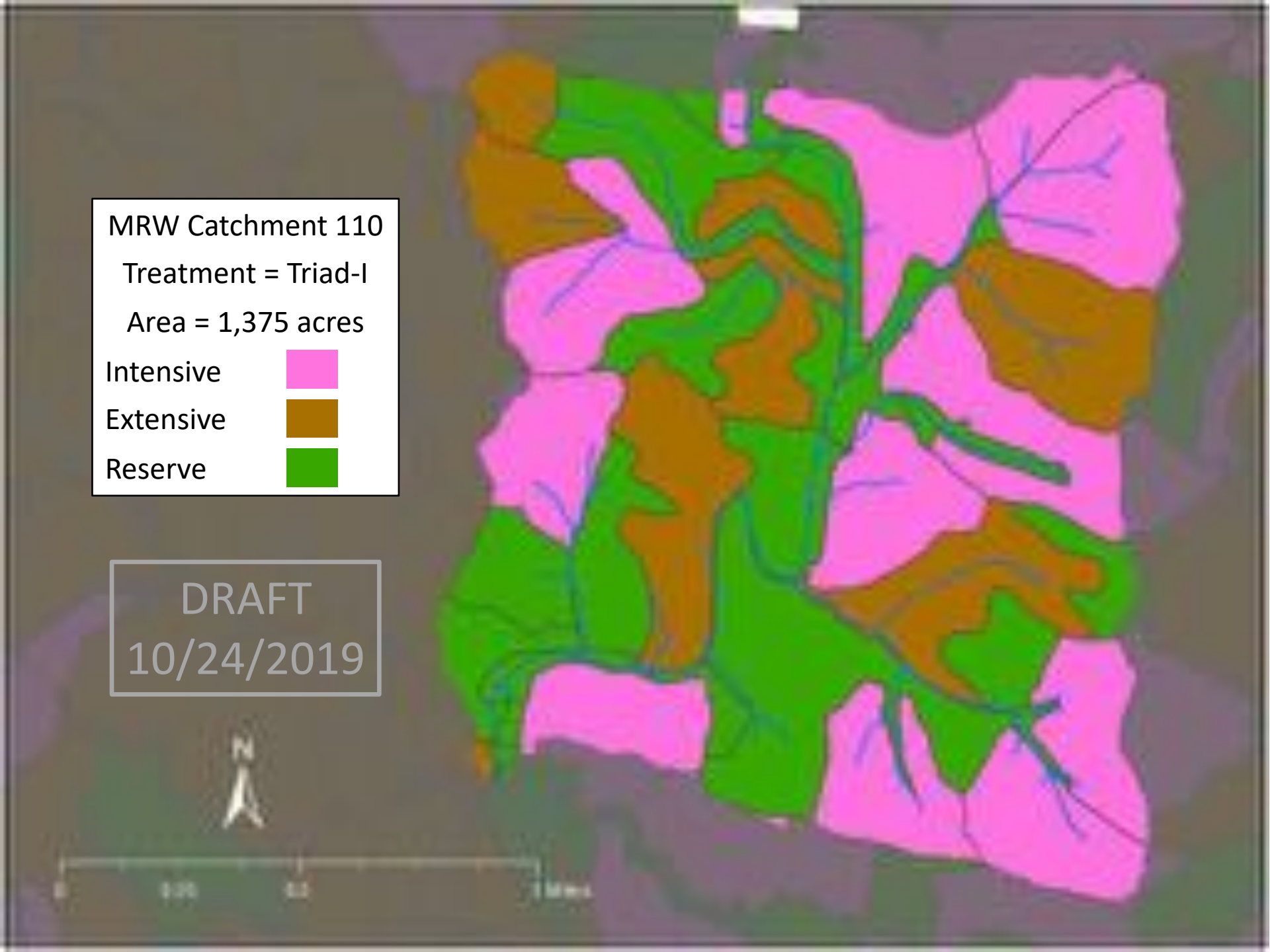
- **The goal of extensive stand management** is to have more balance in objectives relative to intensive. Managing for diverse forest characteristics to meet a broad set of objectives and ecosystem services. This would be done by balancing retention of structural complexity while ensuring conditions exist to ensure regeneration and sustainability of the complex forest structure.

Extensive Management-key factors

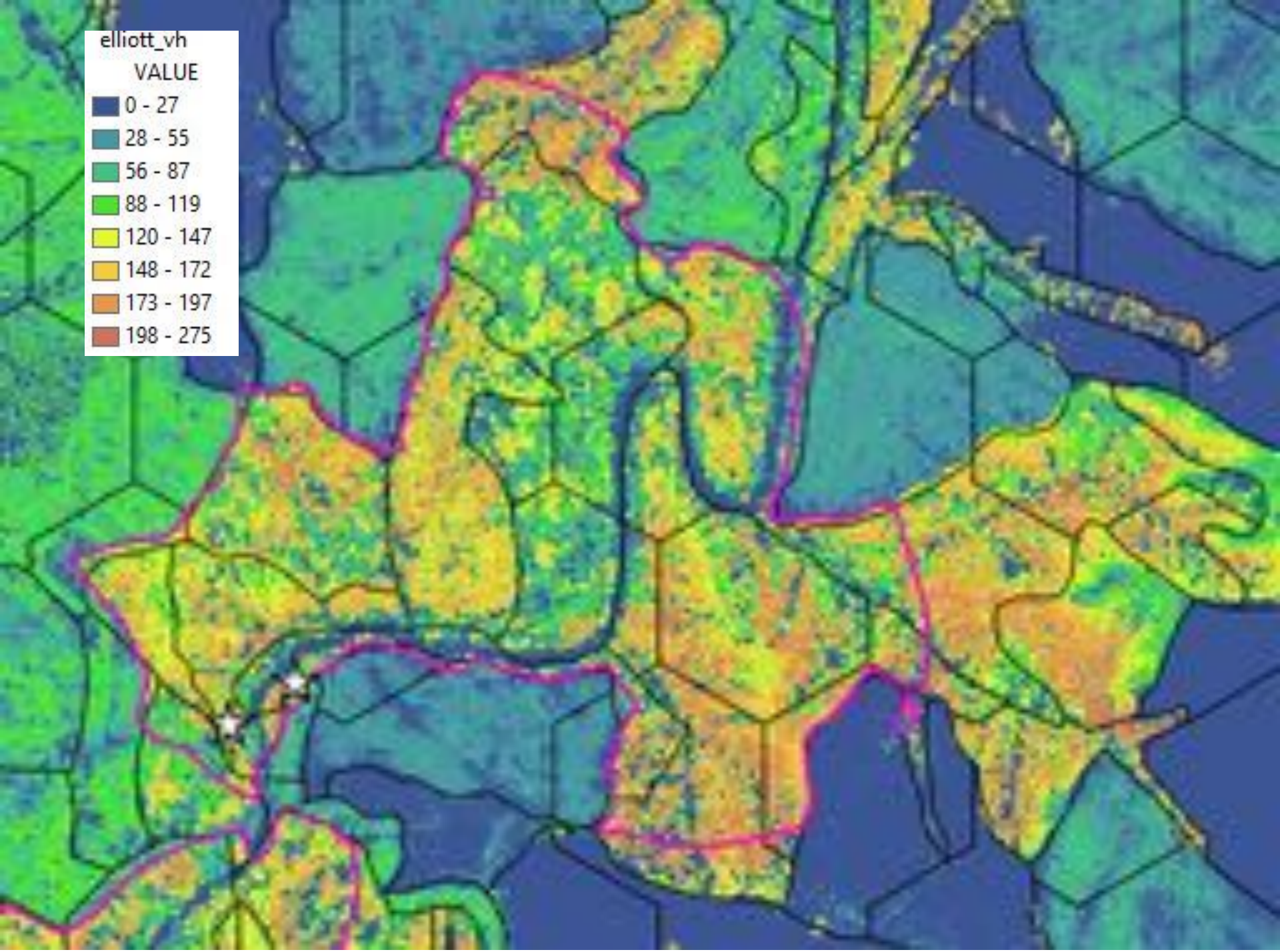
- Frequent inventory and monitoring needed to make decisions
- A single type of Extensive does not have the ability to provide all potential services.
- Sustainability
  - Maintaining tree species diversity
  - Maintaining size class diversity
  - Growth increment
  - Young cohort vulnerable

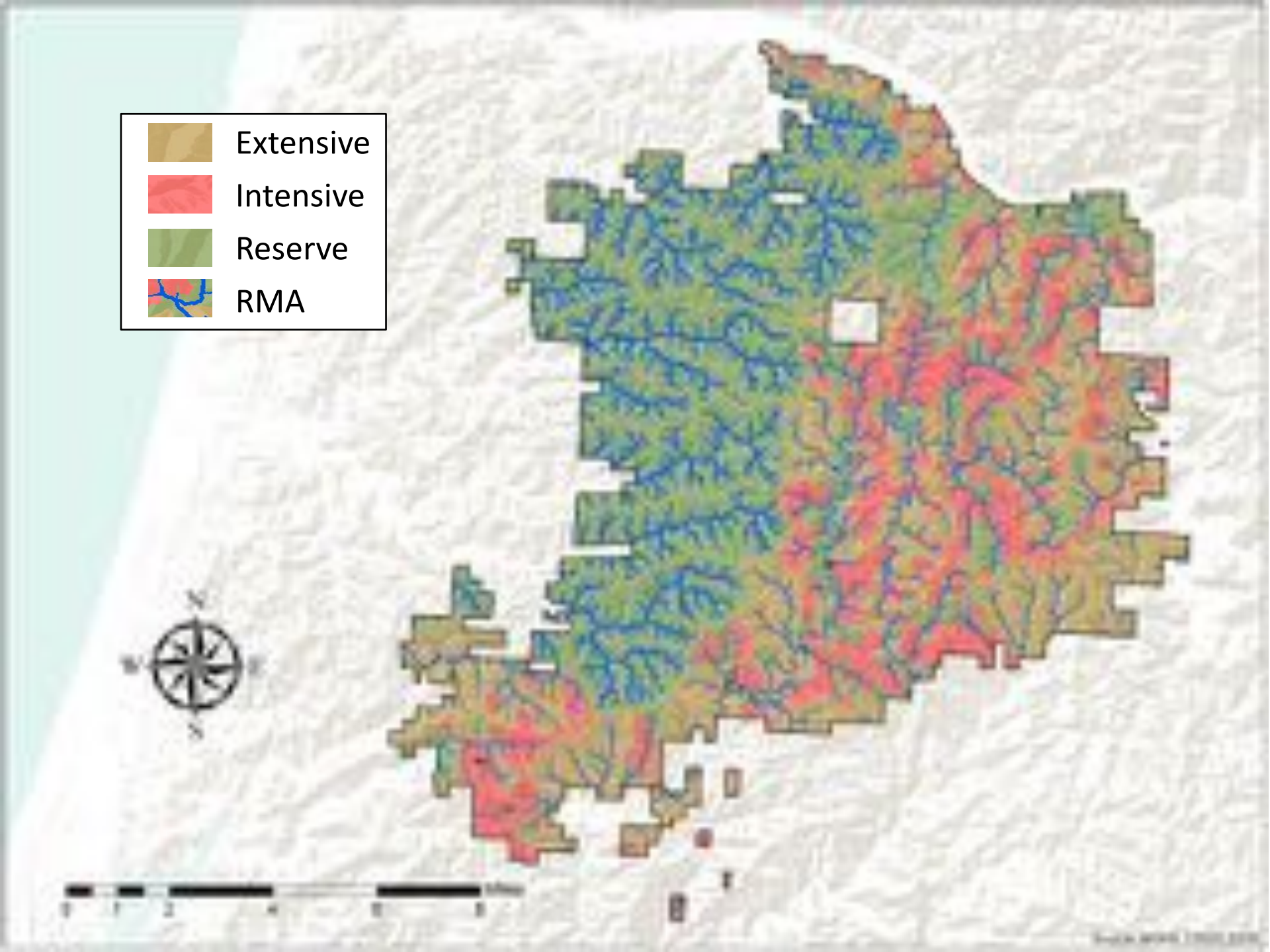
Not Extensive

- Even-age clearcut
- A selective harvest with no provision for regeneration
- Only interested in merchantable volume.
- No silvicultural system exists
- No monitoring of stand attributes
- No landscape level plan

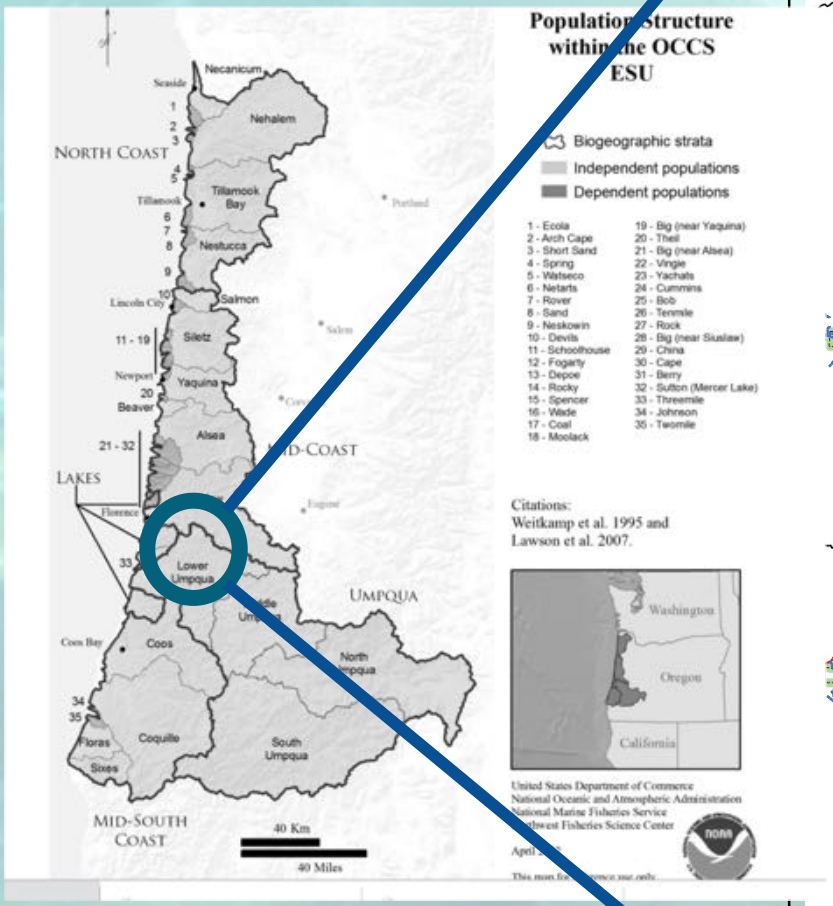

MRW Catchment 110
Treatment = Triad-I
Area = 1,375 acres
Intensive
Extensive
Reserve
DRAFT
10/24/2019
N

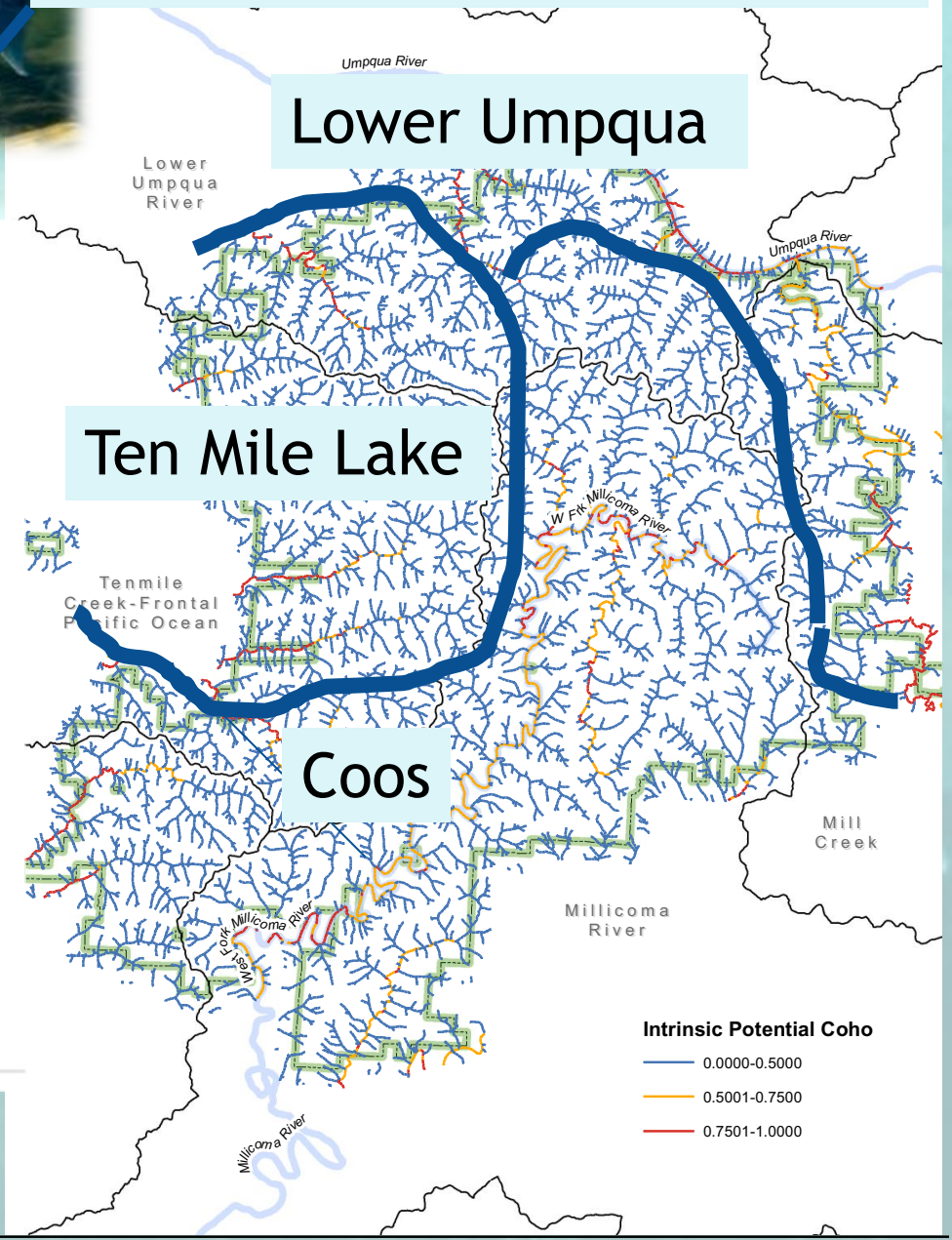
Google


elliott_vh
VALUE
0 - 27
28 - 55
56 - 87
88 - 119
120 - 147
148 - 172
173 - 197
198 - 275

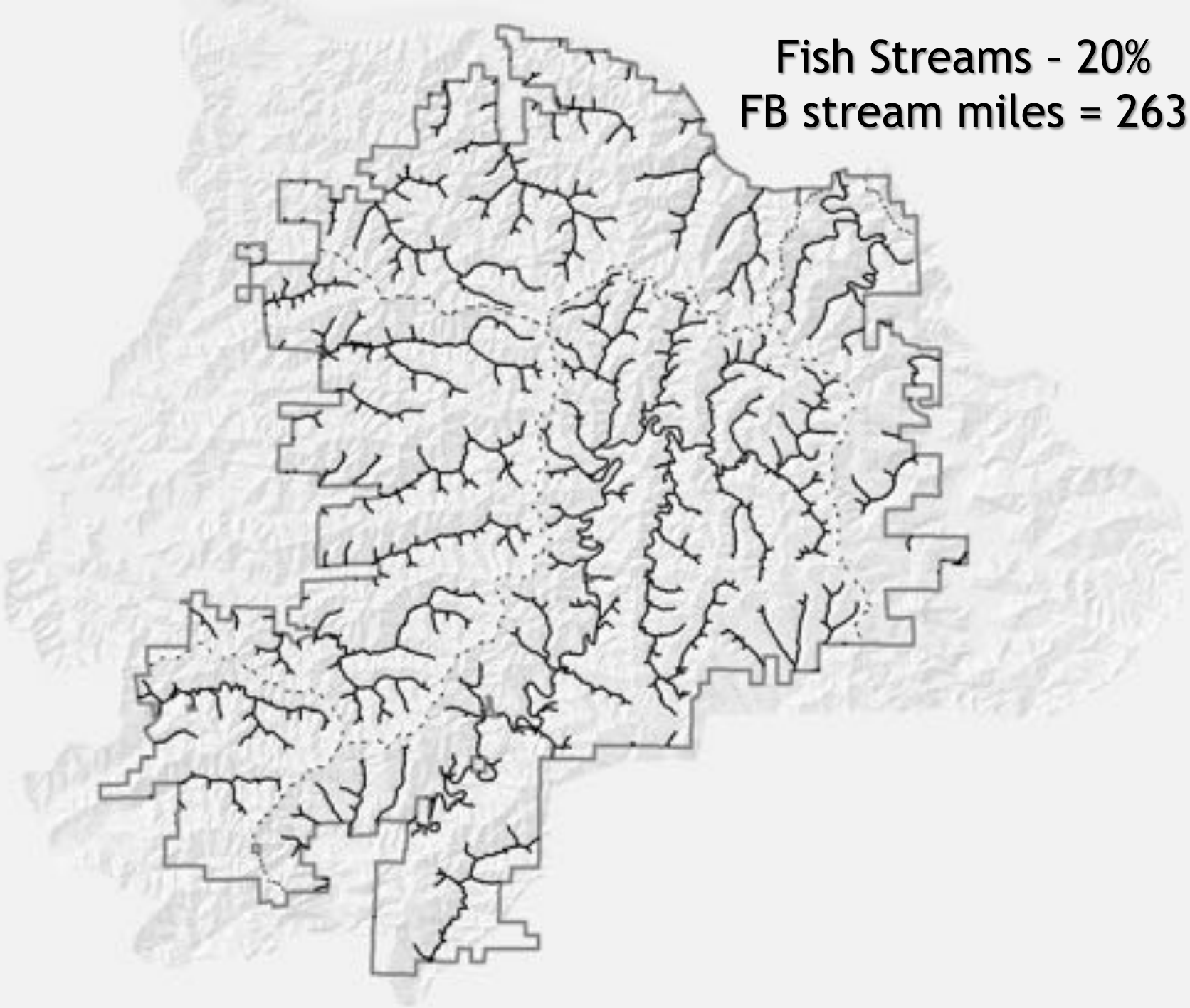

Extensive
Intensive
Reserve
RMA

Independent Populations

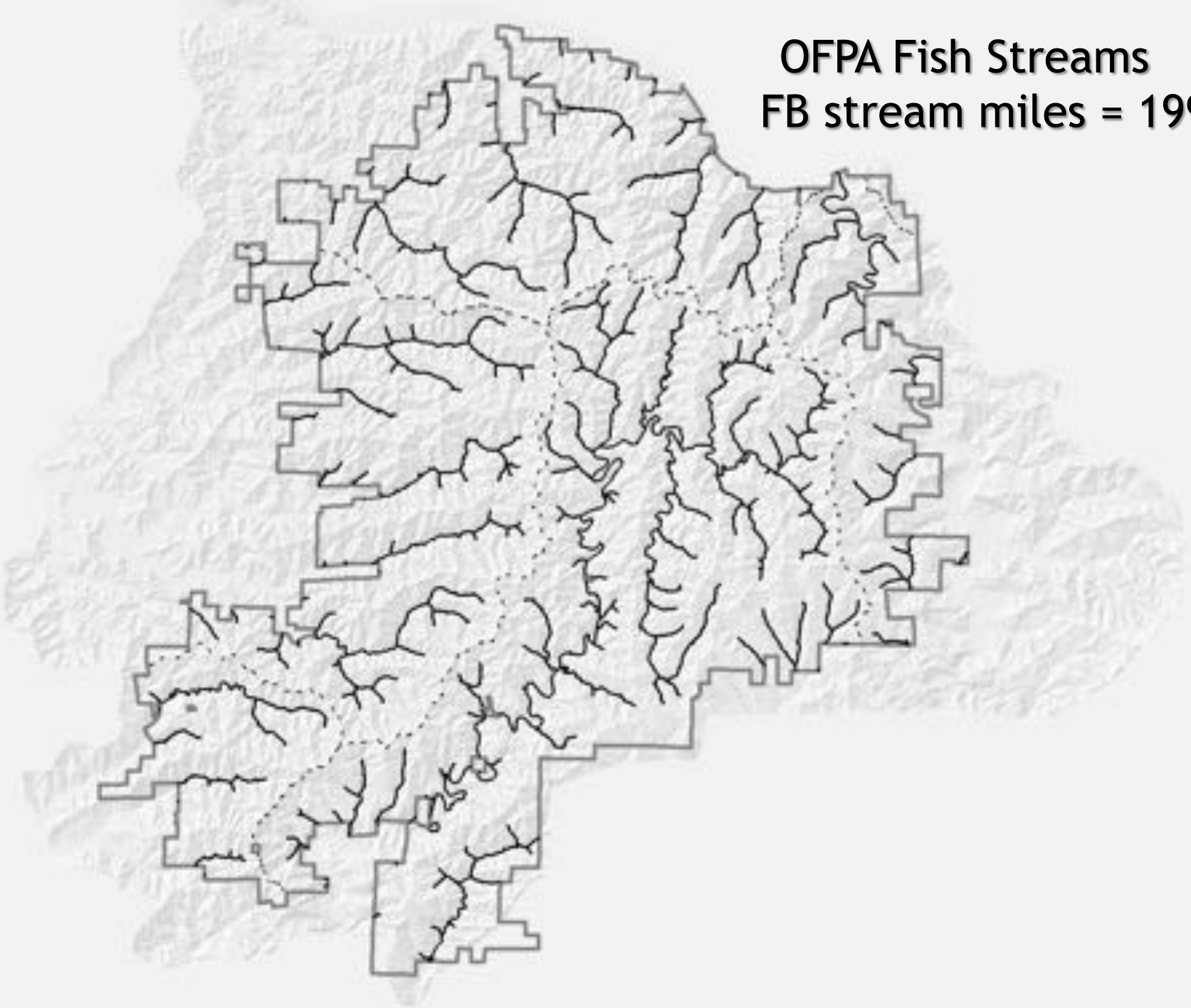




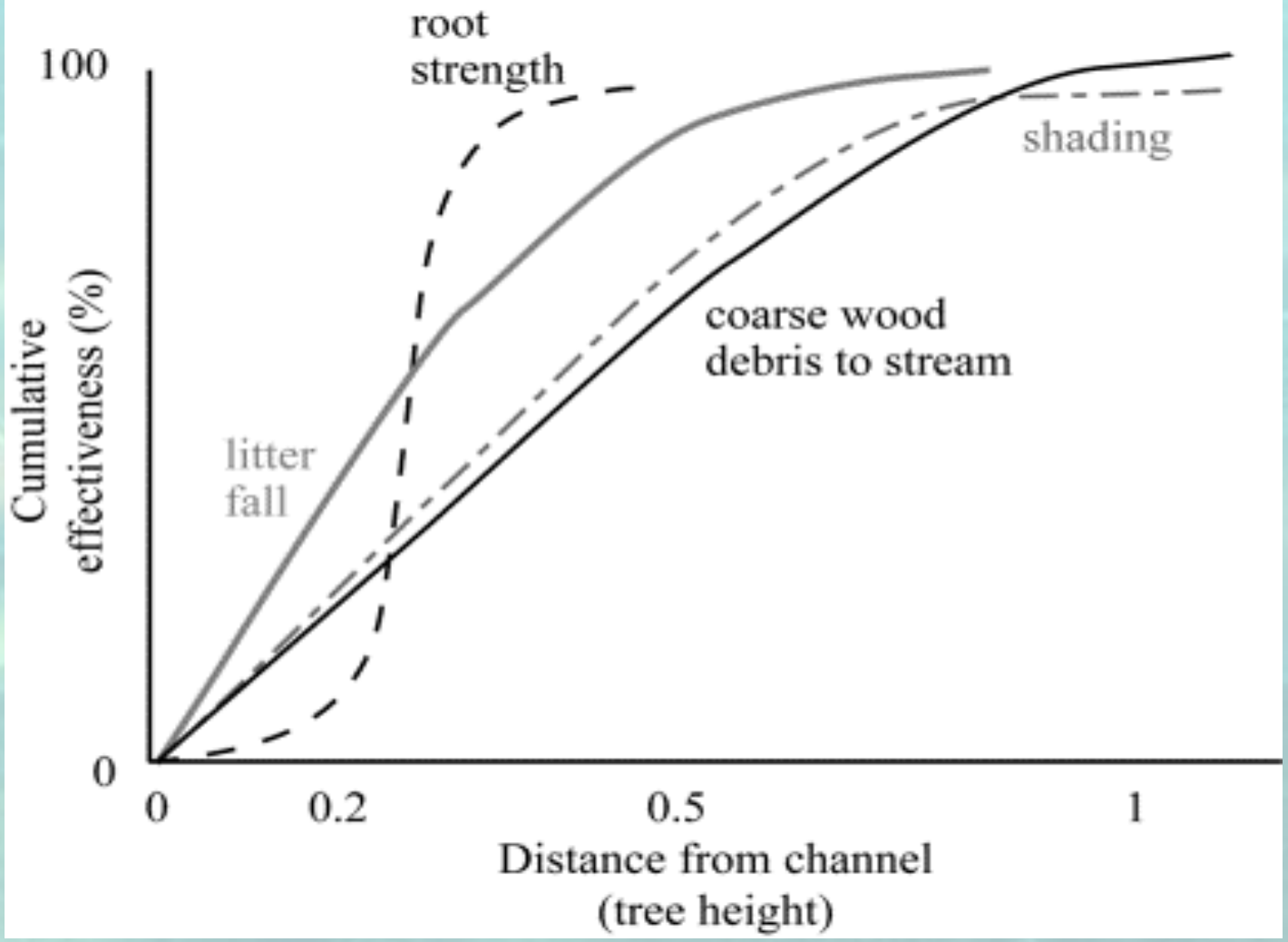
Fish Streams – 20%
FB stream miles = 263



OFPA Fish Streams
FB stream miles = 199

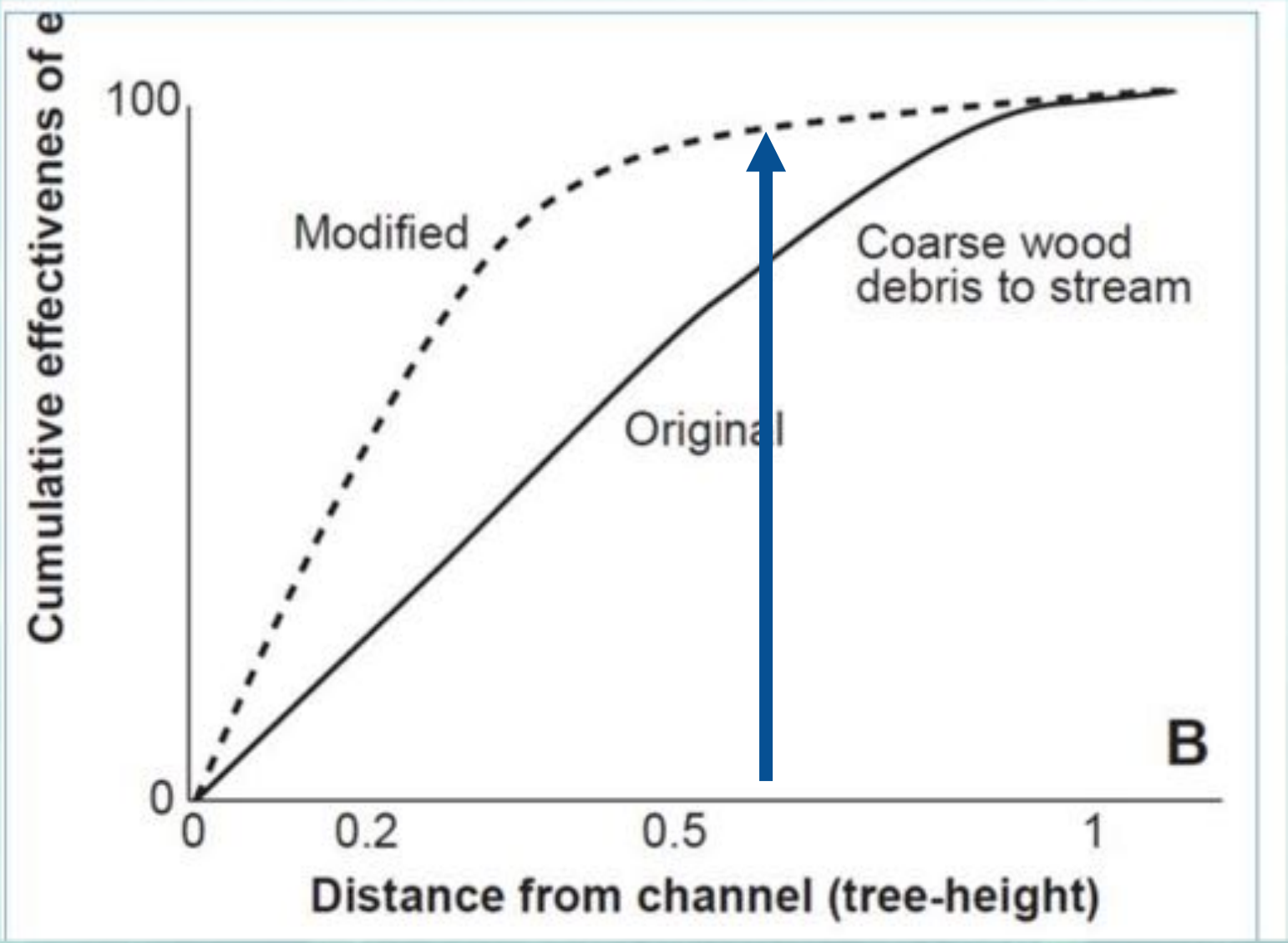


Maintaining riparian ecological functions

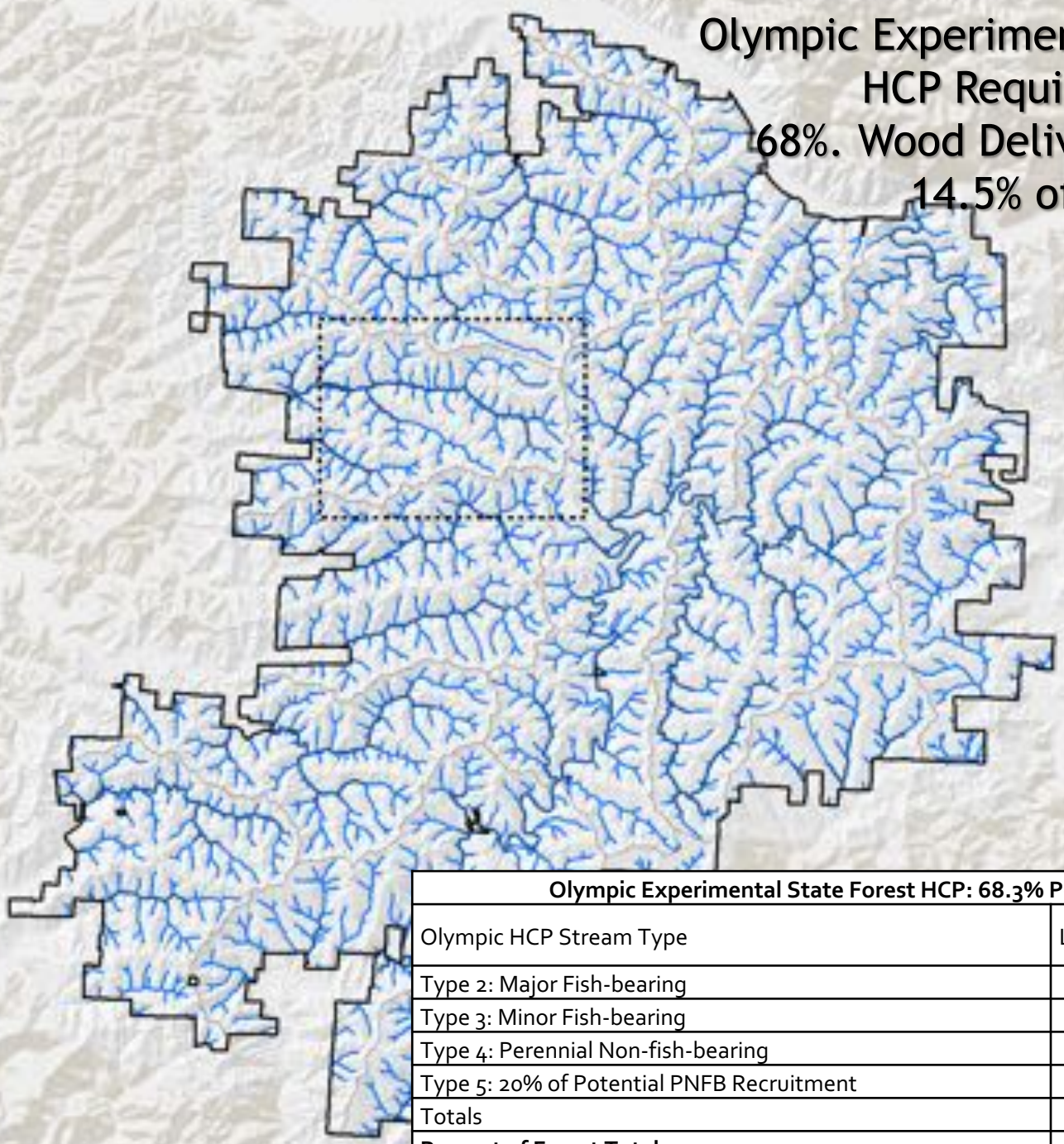


FEMAT (1993)

Wood Recruitment

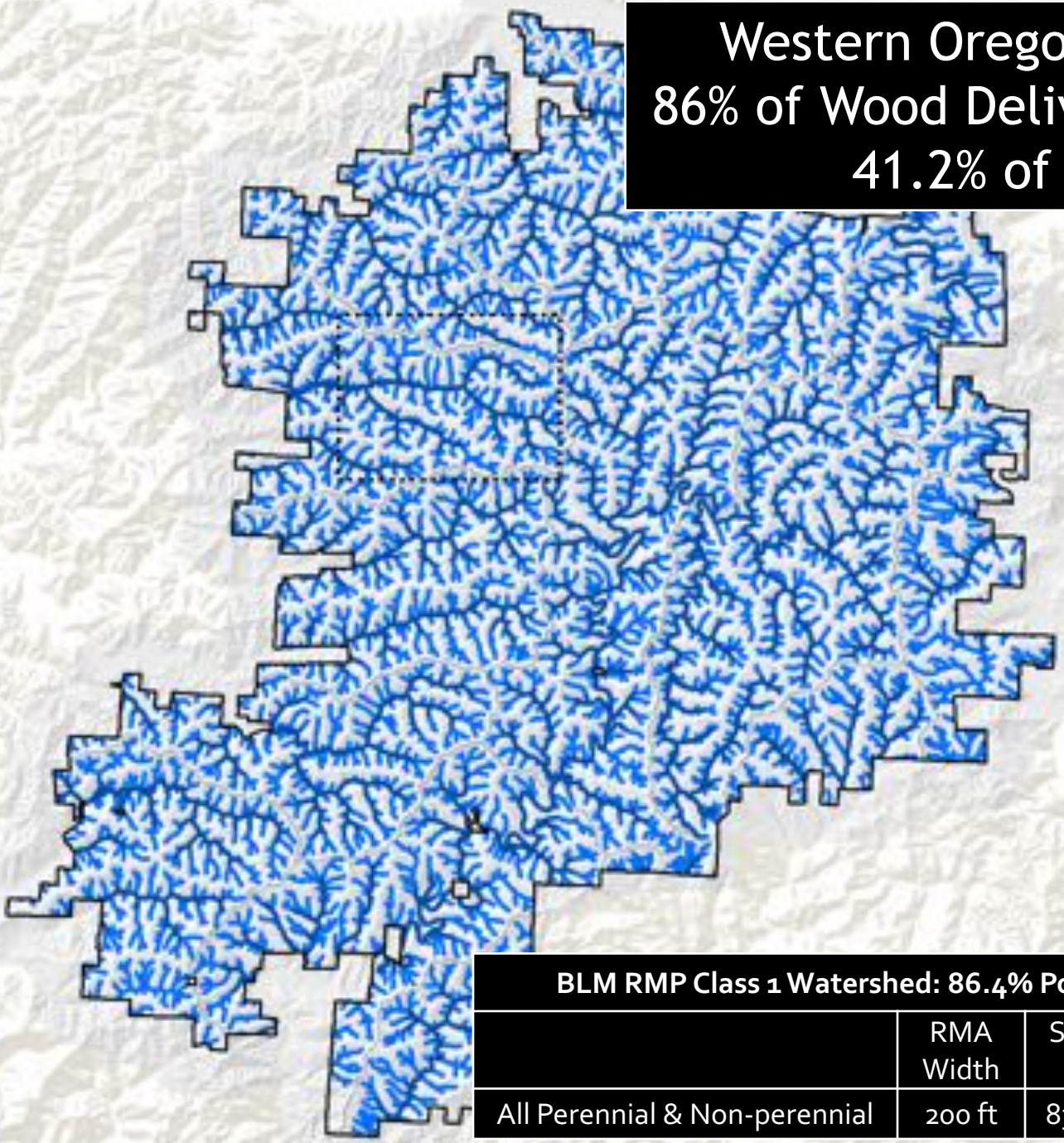


Olympic Experimental State Forest HCP Requirements 68%. Wood Delivery Potential 14.5% of Area



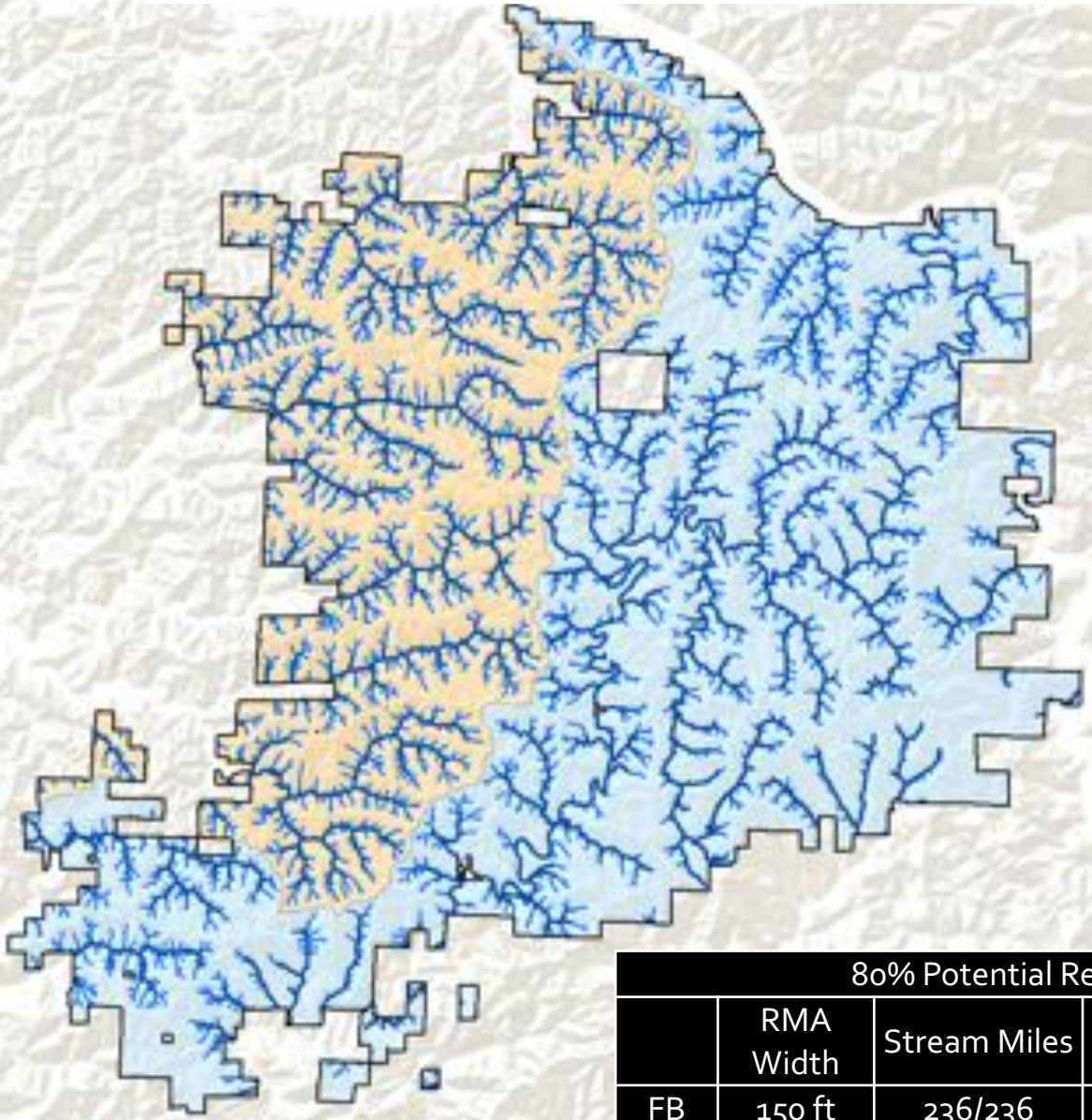
Olympic Experimental State Forest HCP: 68.3% Potential Recruitment			
Olympic HCP Stream Type	Length (mi)	Buffer Width	Acres
Type 2: Major Fish-bearing	132/263	120 feet	3,791
Type 3: Minor Fish-bearing	131/263	100 feet	3,048
Type 4: Perennial Non-fish-bearing	265/265	100 feet	6,274
Type 5: 20% of Potential PNFB Recruitment	68/1820	25 feet	308
Totals	596/2348		13,420
Percent of Forest Total			**14.5%**

Western Oregon BLM RMP
86% of Wood Delivery Potential
41.2% of Area



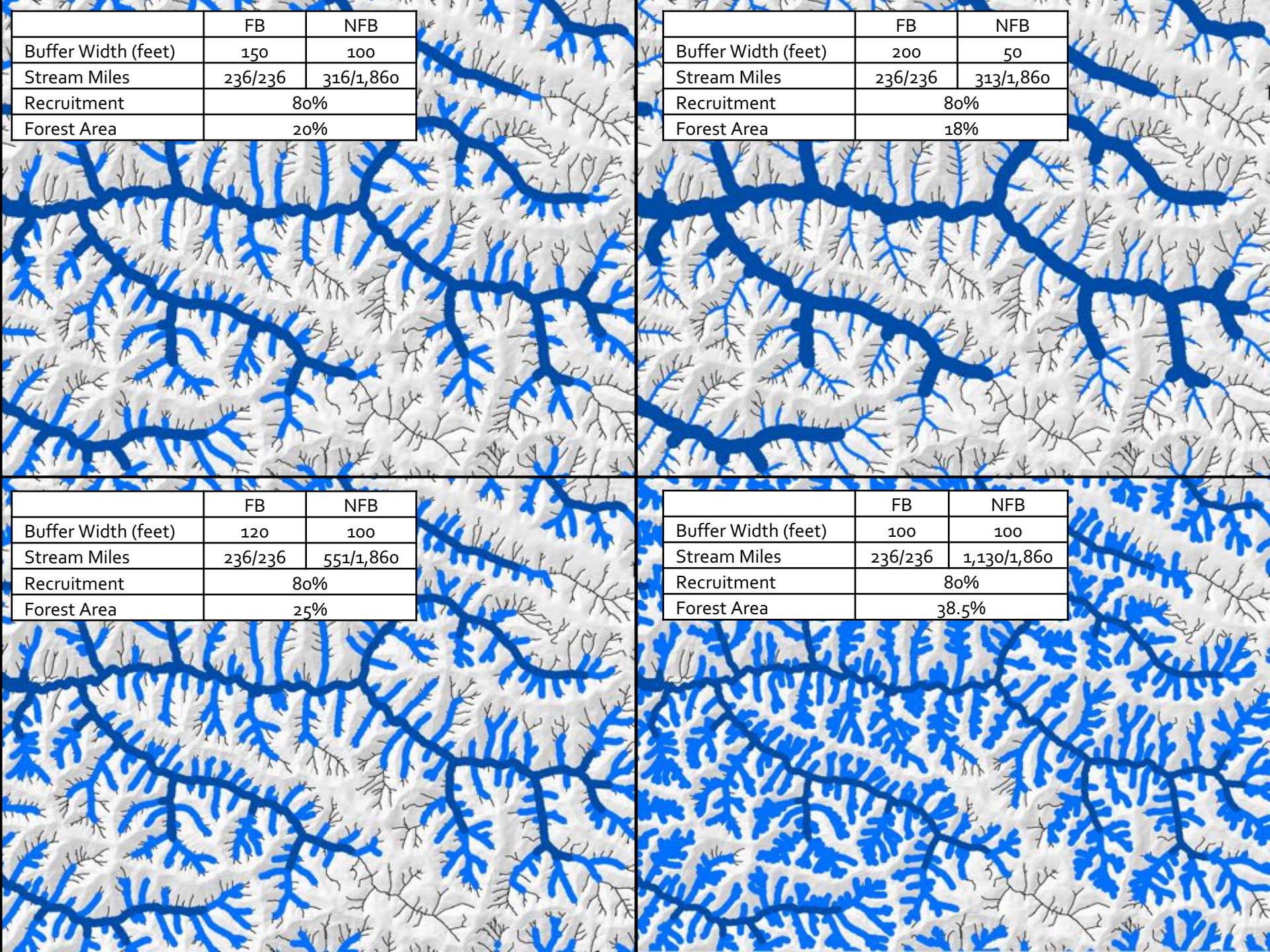
BLM RMP Class 1 Watershed: 86.4% Potential Recruitment				
	RMA Width	Stream Miles	RMA Acres	Percent of Forest
All Perennial & Non-perennial	200 ft	836/836	38,134	

80% of Potential Wood Delivery



80% Potential Recruitment					
	RMA Width	Stream Miles	RMA Acres	Percent of Forest	
FB	150 ft	236/236	8,378	10%	20%
NFB	100 ft	316/1,860	8,305	10%	

Sources: ESRI, USGS, NOAA



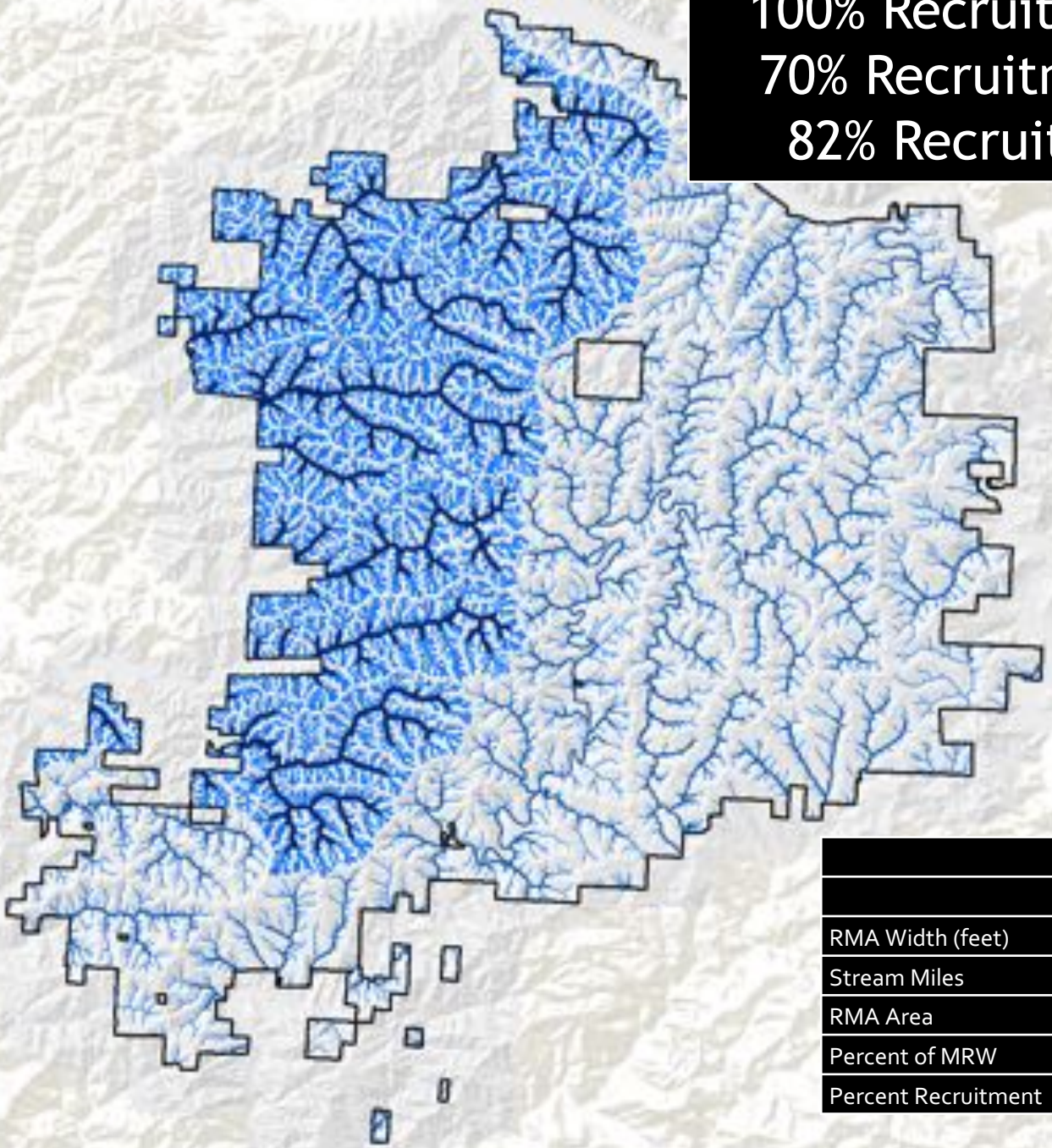
	FB	NFB
Buffer Width (feet)	150	100
Stream Miles	236/236	316/1,860
Recruitment	80%	
Forest Area	20%	

	FB	NFB
Buffer Width (feet)	200	50
Stream Miles	236/236	313/1,860
Recruitment	80%	
Forest Area	18%	

	FB	NFB
Buffer Width (feet)	120	100
Stream Miles	236/236	551/1,860
Recruitment	80%	
Forest Area	25%	

	FB	NFB
Buffer Width (feet)	100	100
Stream Miles	236/236	1,130/1,860
Recruitment	80%	
Forest Area	38.5%	

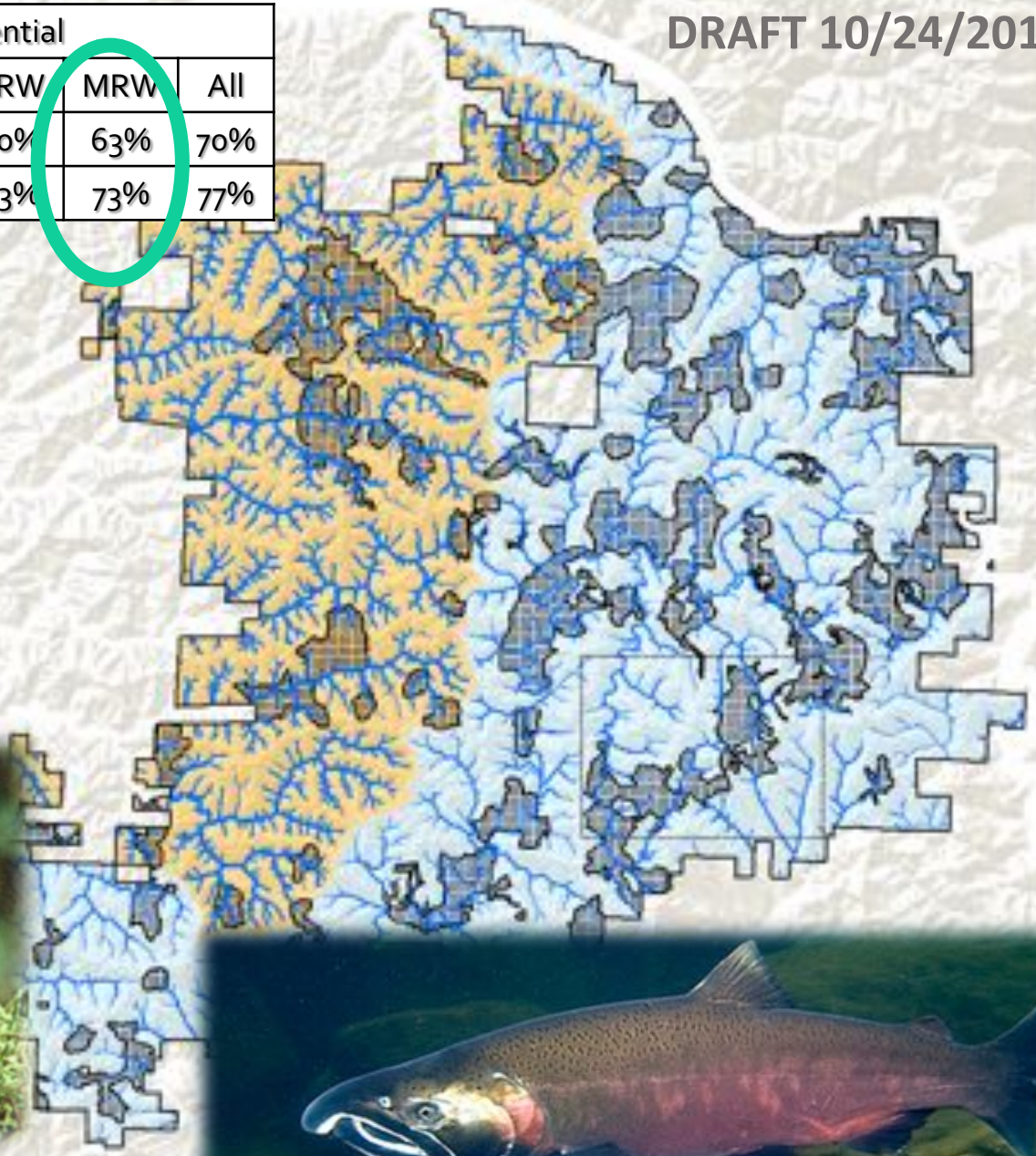
100% Recruitment in CRW
70% Recruitment in MRW
82% Recruitment Total



	MRW		
	FB	WNFB	PNFB
RMA Width (feet)	100	50	50
Stream Miles	153	220	98
RMA Area	7,613 acres		
Percent of MRW	14.60%		
Percent Recruitment	70%		

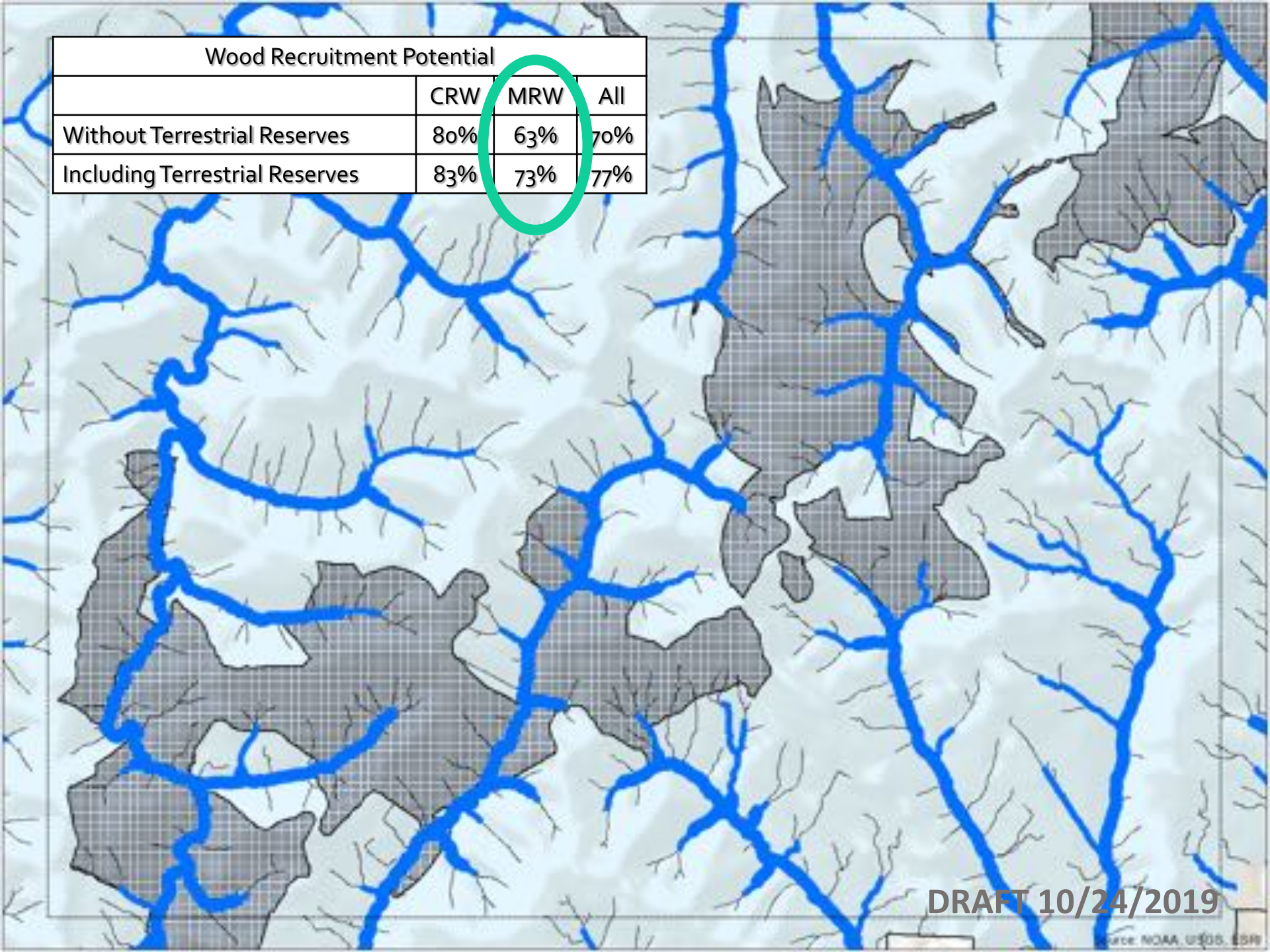
DRAFT 10/24/2019

Wood Recruitment Potential			
	CRW	MRW	All
Without Terrestrial Reserves	80%	63%	70%
Including Terrestrial Reserves	83%	73%	77%

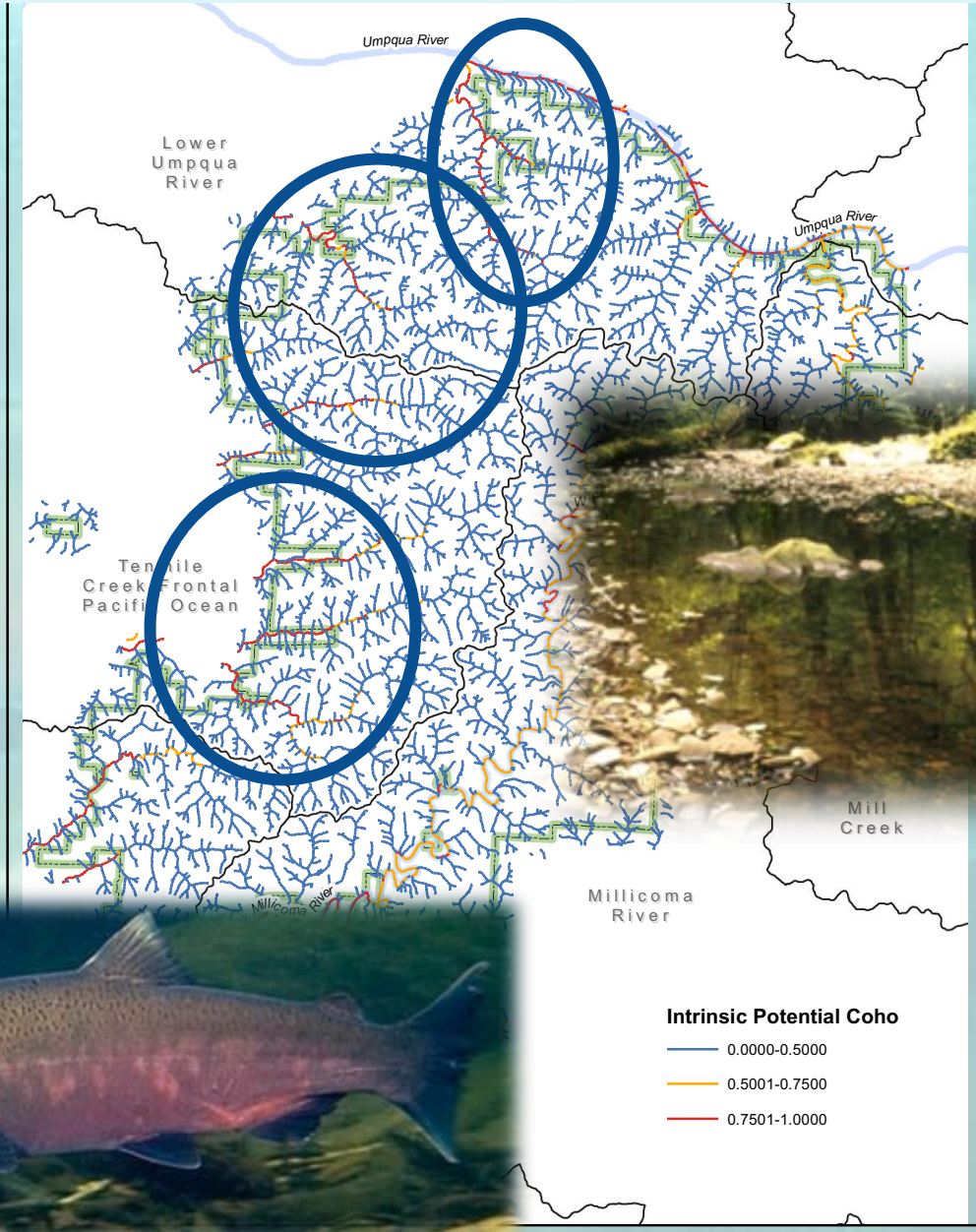


Source: NOAA, USGS, ESRI

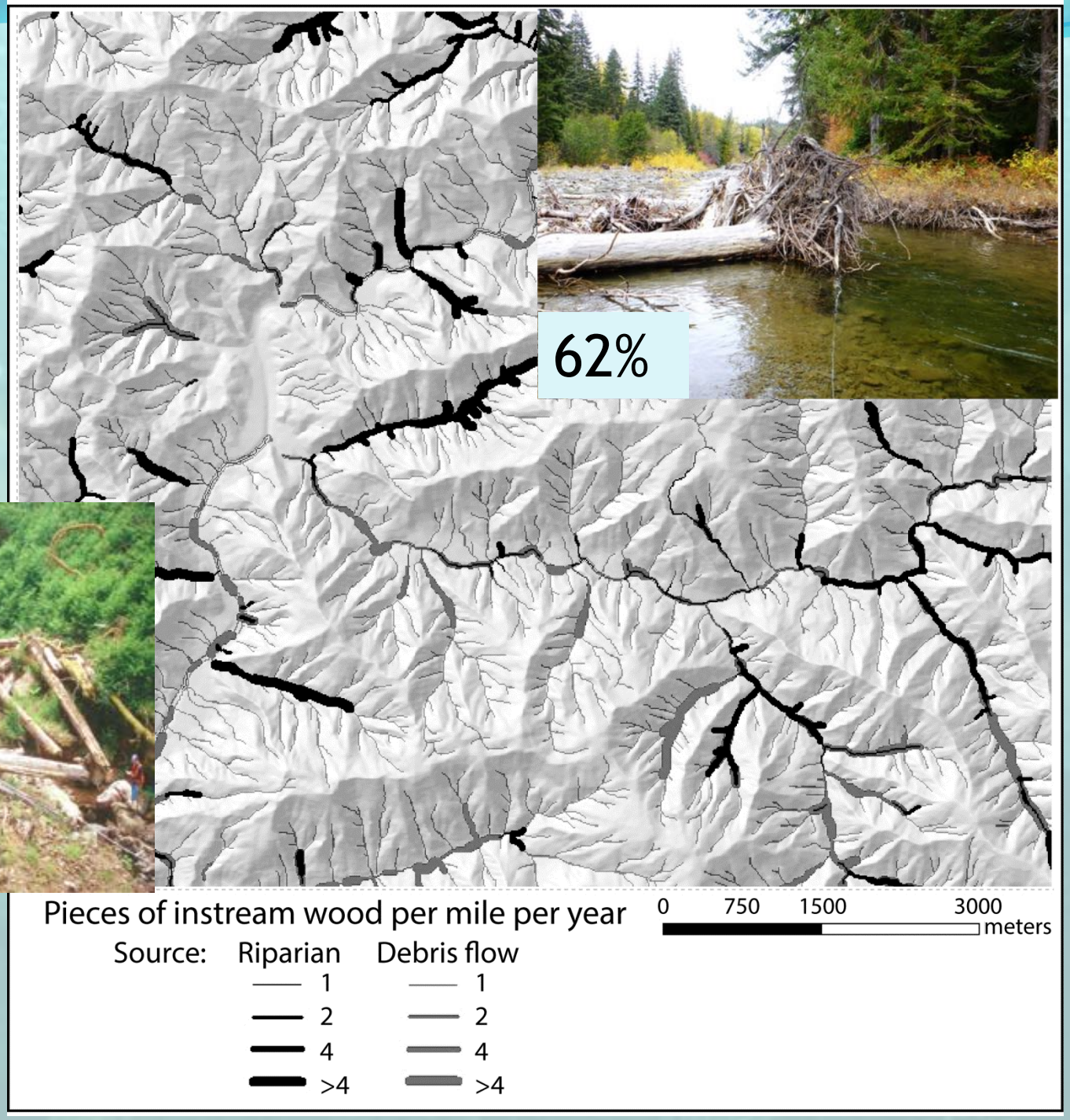
Wood Recruitment Potential			
	CRW	MRW	All
Without Terrestrial Reserves	80%	63%	70%
Including Terrestrial Reserves	83%	73%	77%



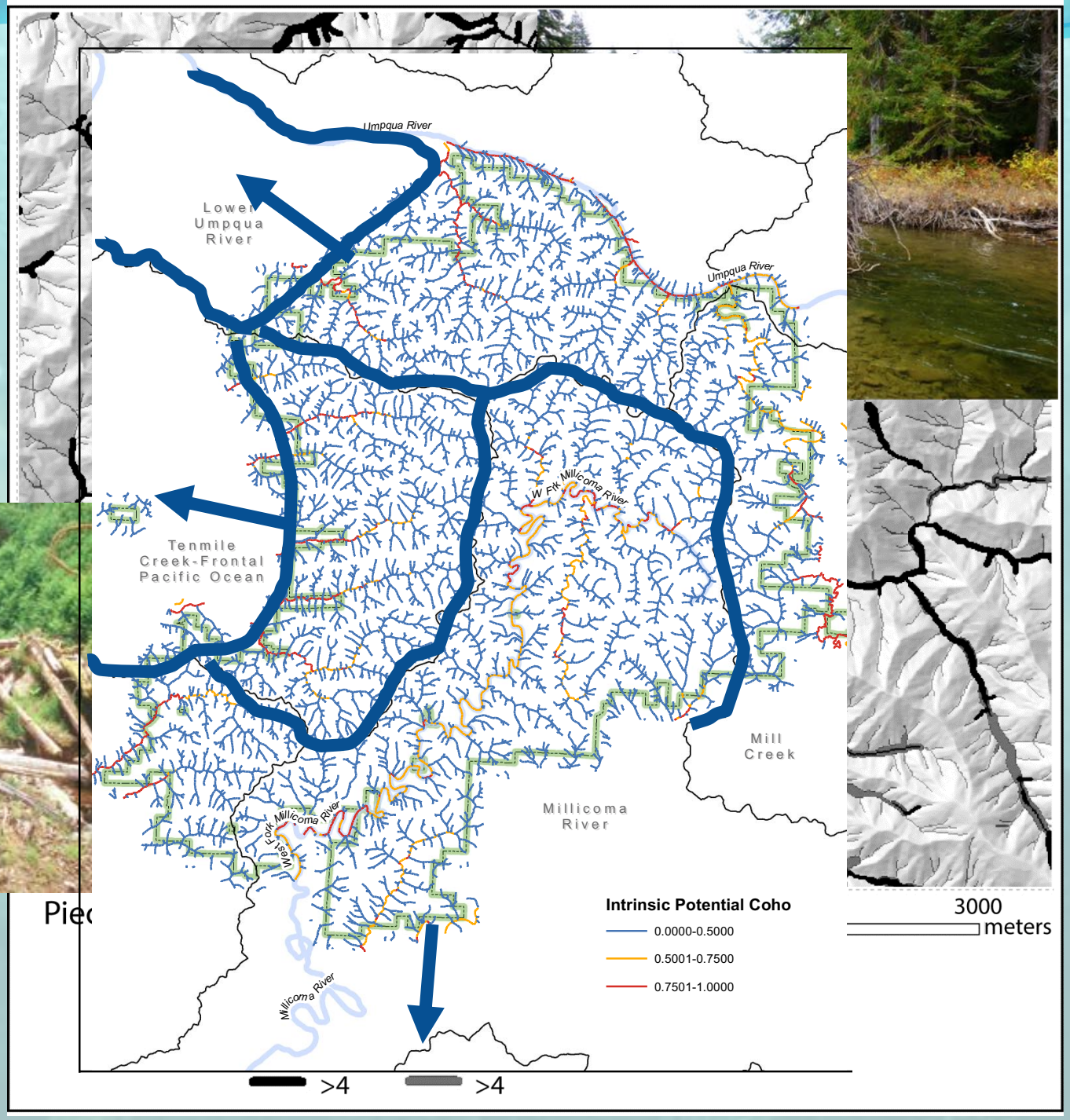
Reaches of High Intrinsic Potential



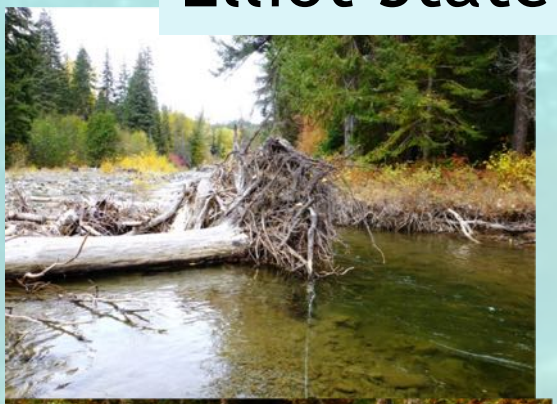
Large Wood Input

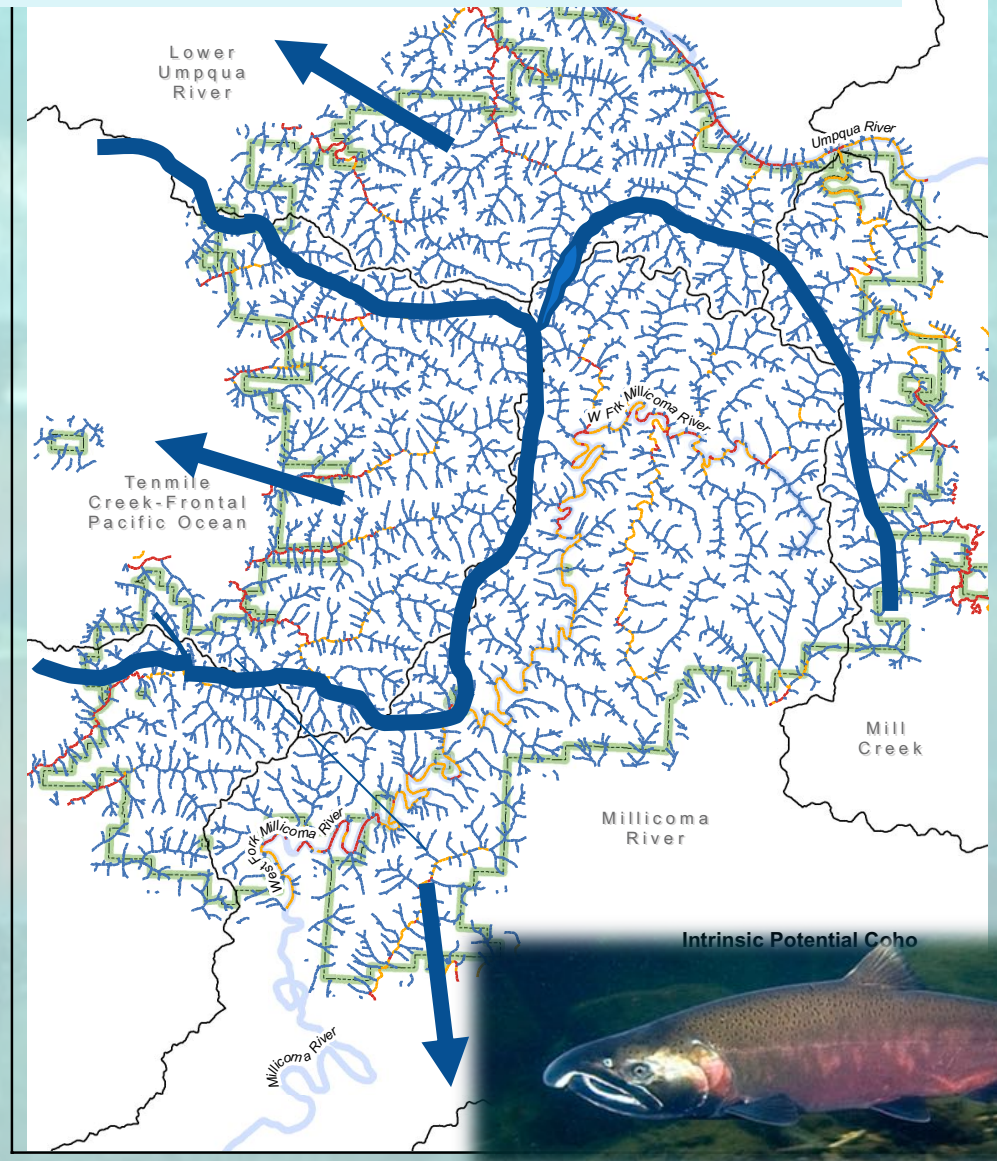


Large Wood Input

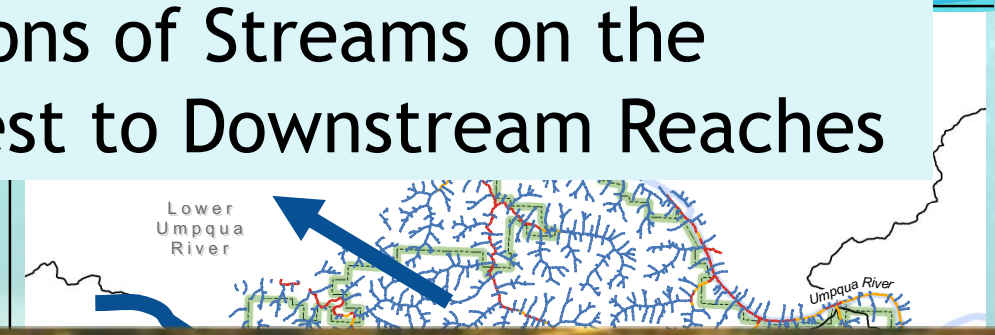


Contributions of Streams on the Elliot State Forest to Downstream Reaches

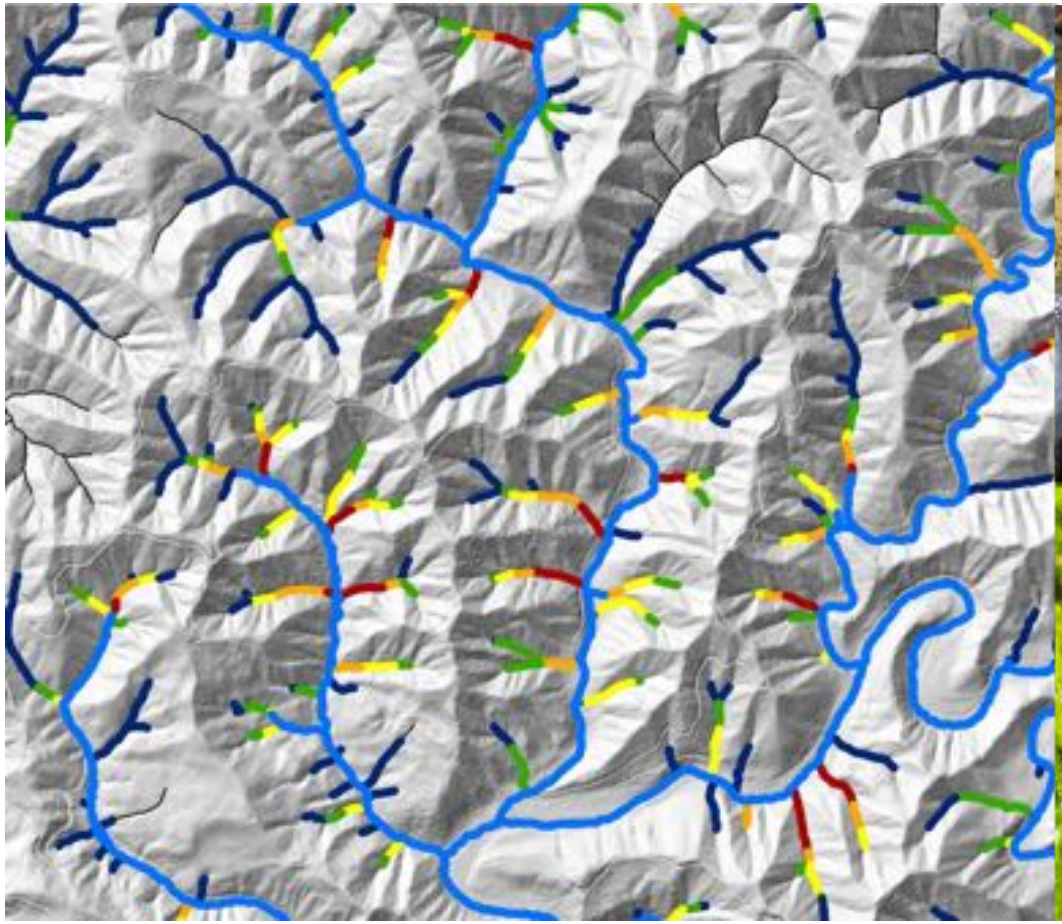




Contributions of Streams on the Elliot State Forest to Downstream Reaches

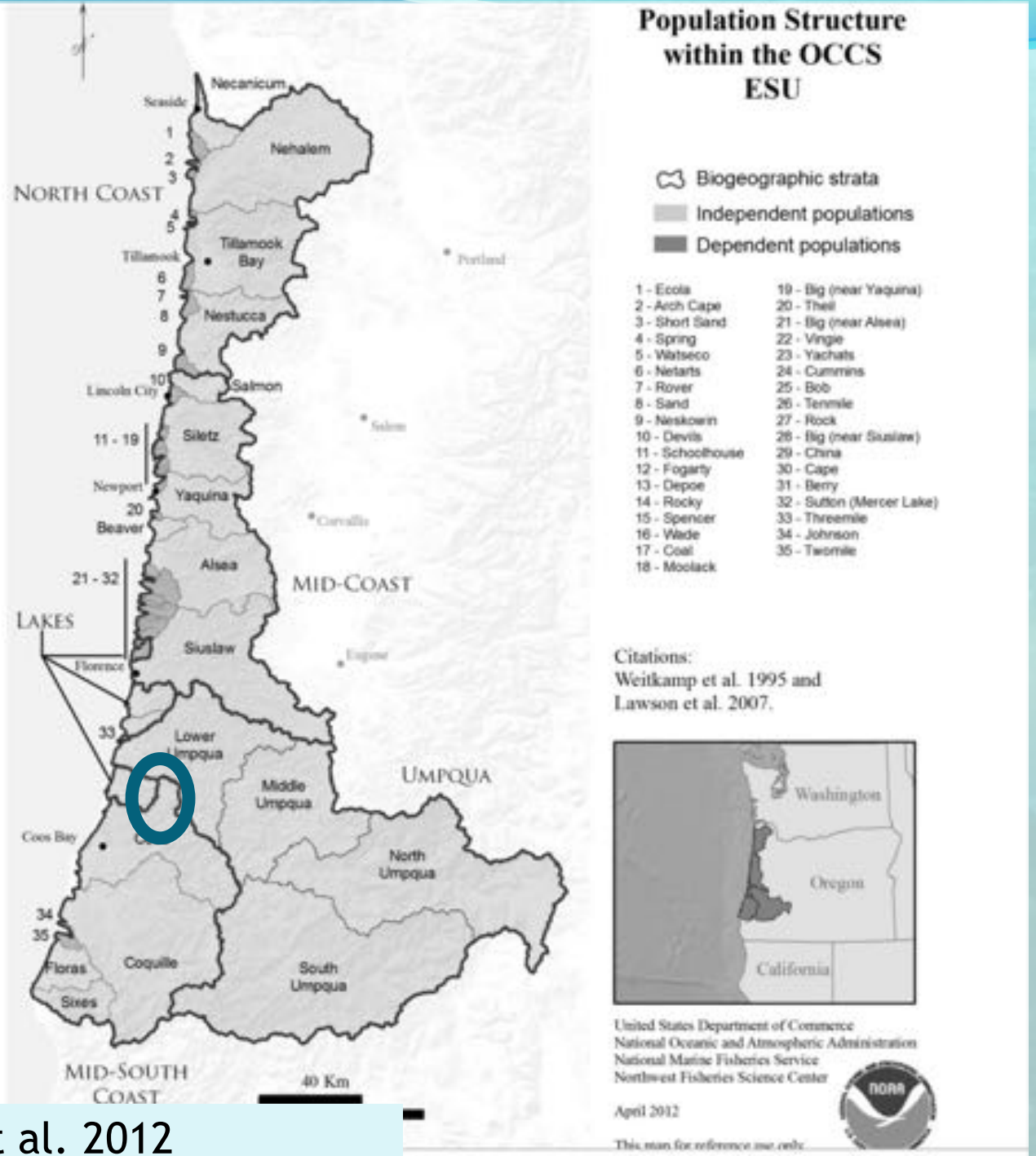


Ecological Importance of Non-fish Bearing Streams

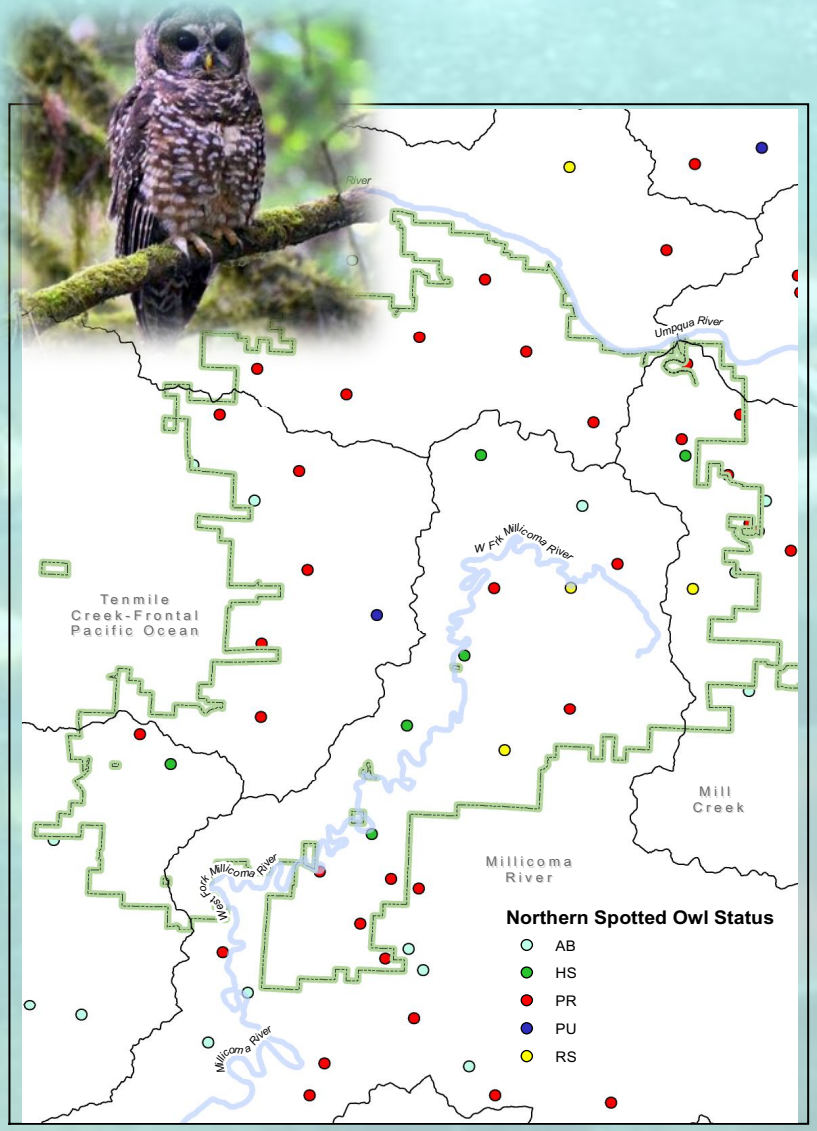


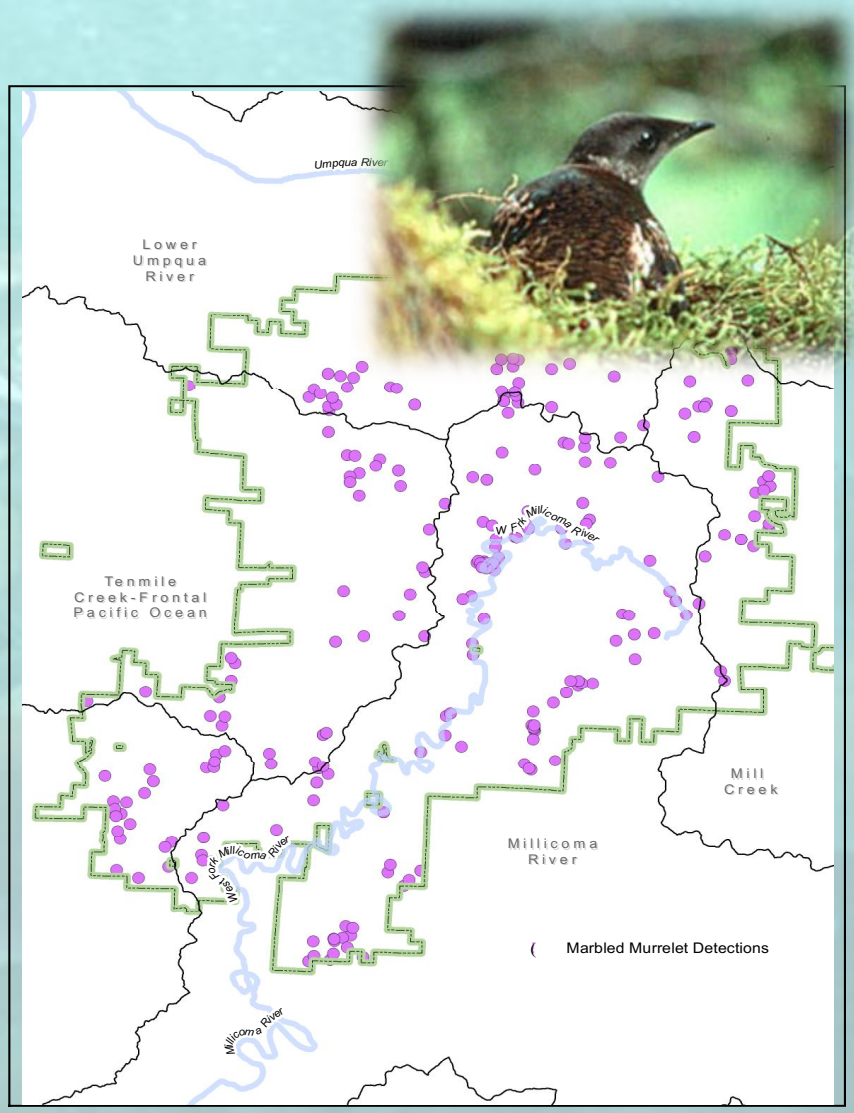
0% 25% 50% 75% 100%

Proportion Recruitment from NonFish

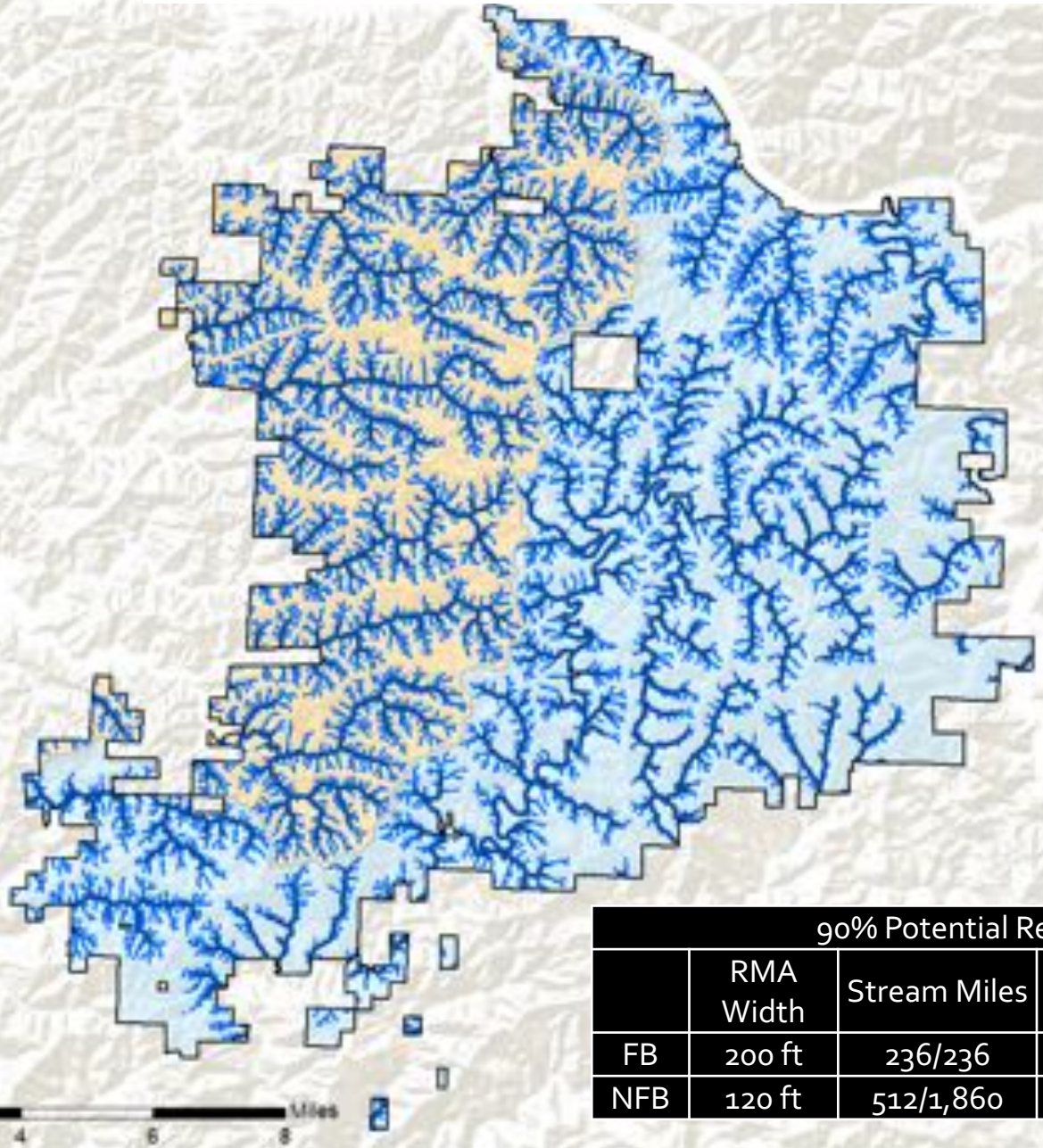


From: Stout et al. 2012


Umpqua River
W Fk Millicoma River
Tenmile
Creek-Frontal
Pacific Ocean
Mill
Creek
Millicoma
River
West Fork Millicoma River
Millicoma River
Northern Spotted Owl Status
AB
HS
PR
PU
RS

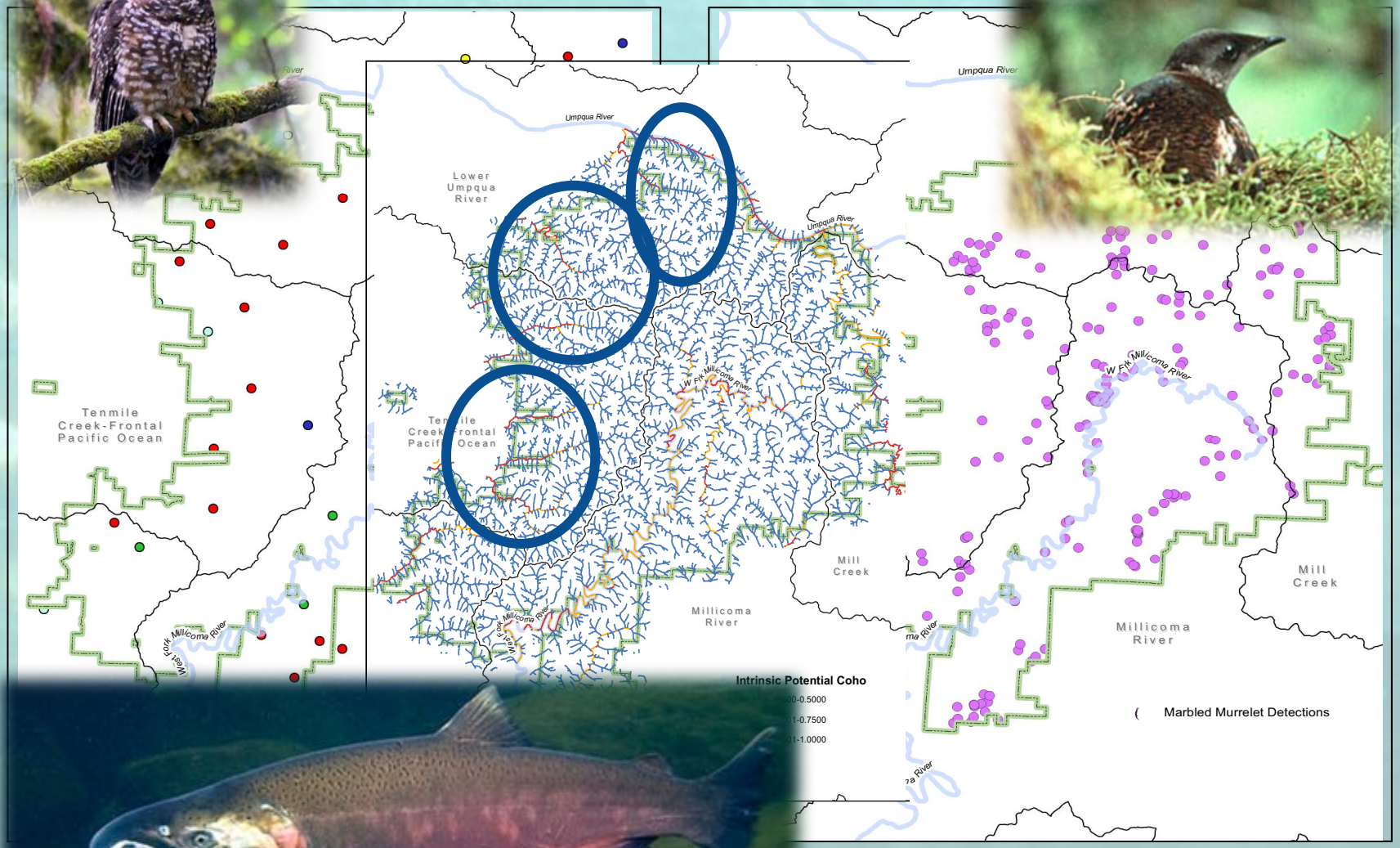

Umpqua River
Lower
Umpqua
River
W Fk Millicoma River
Tenmile
Creek-Frontal
Pacific Ocean
Mill
Creek
Millicoma
River
West Fork Millicoma River
Millicoma River
(Marbled Murrelet Detections

90% of Potential Wood Delivery

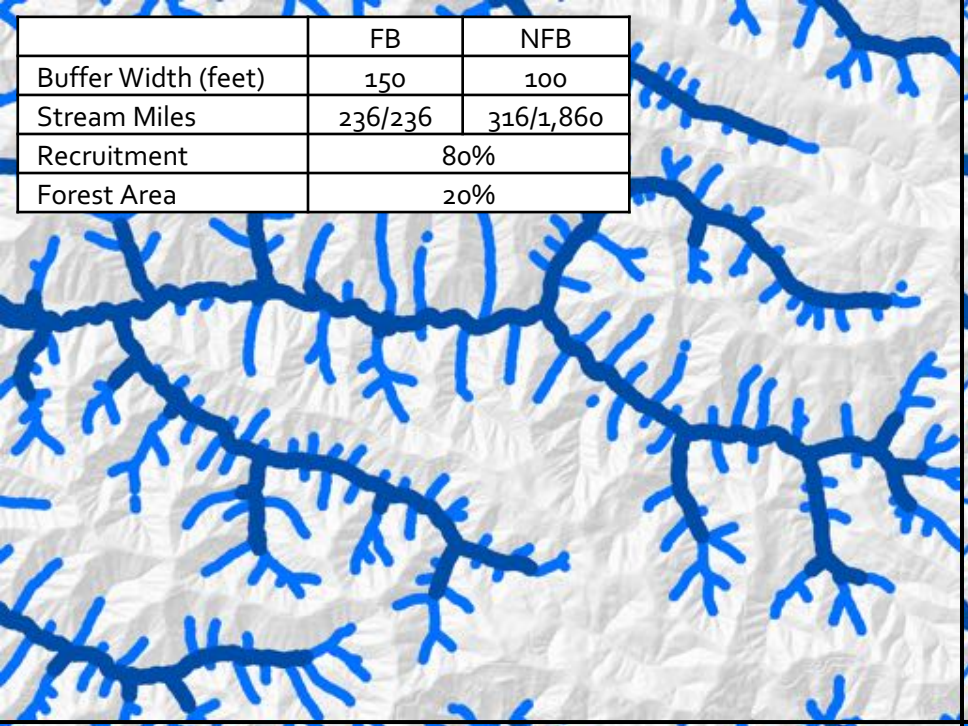


90% Potential Recruitment					
	RMA Width	Stream Miles	RMA Acres	Percent of Forest	
FB	200 ft	236/236	11,082	13%	33%
NFB	120 ft	512/1,860	15,607	20%	

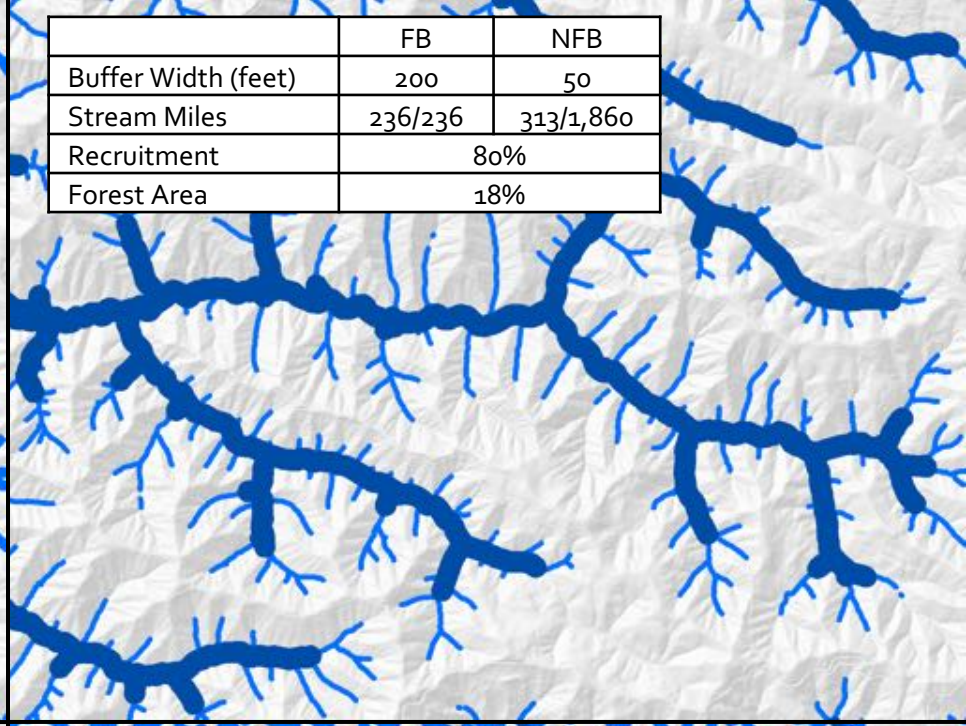
Sources: ESRI, USGS, NOAA


Umpqua River
Lower Umpqua River
Tenmile Creek-Frontal Pacific Ocean
Mill Creek
Millicoma River
W Fk Millicoma River
West Fork Millicoma River
Intrinsic Potential Coho
Marbled Murrelet Detections

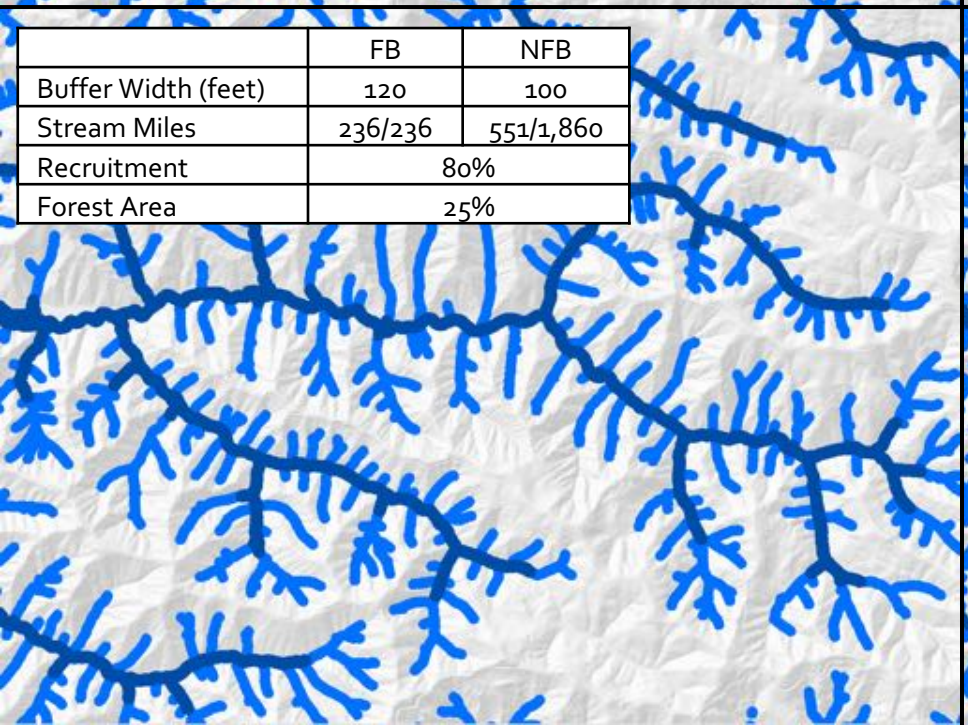
Conservation Emphasis
Multiple Objectives
Source: NOAA, USGS, ESRI



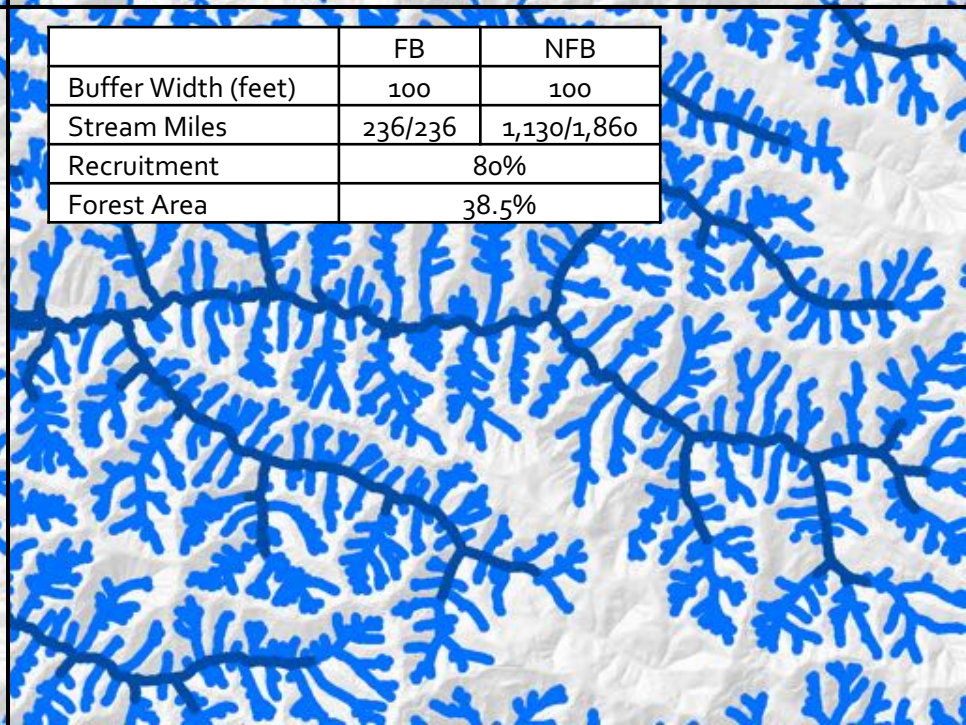
	FB	NFB
Buffer Width (feet)	150	100
Stream Miles	236/236	316/1,860
Recruitment	80%	
Forest Area	20%	

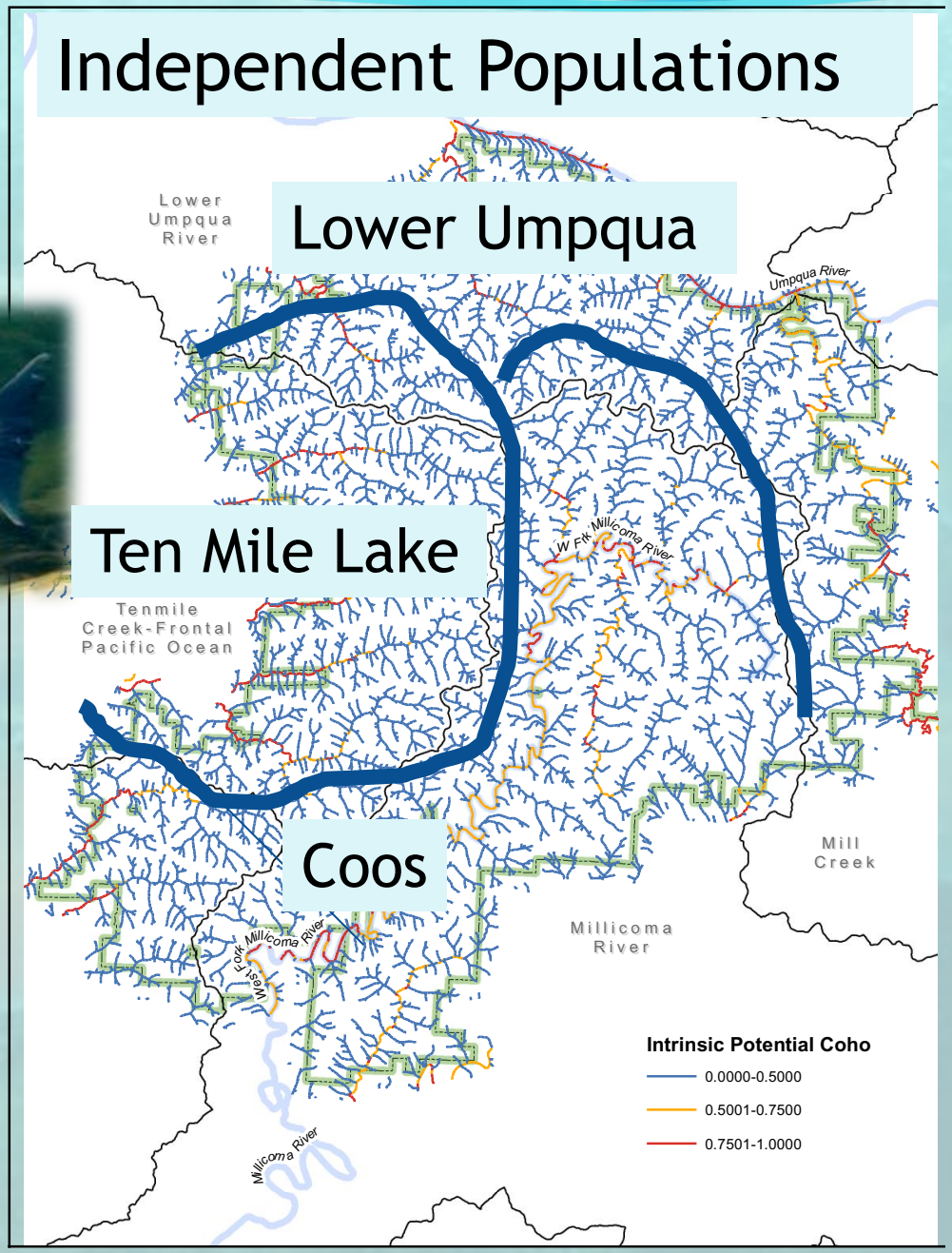


	FB	NFB
Buffer Width (feet)	200	50
Stream Miles	236/236	313/1,860
Recruitment	80%	
Forest Area	18%	



	FB	NFB
Buffer Width (feet)	120	100
Stream Miles	236/236	551/1,860
Recruitment	80%	
Forest Area	25%	



	FB	NFB
Buffer Width (feet)	100	100
Stream Miles	236/236	1,130/1,860
Recruitment	80%	
Forest Area	38.5%	

Independent Populations