



Oregon State
University

Institute for Natural Resources

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Independent Research & Science Team (IRST) Meeting

Date and Time: 9 January 2024, 9:00am-4:00pm

Location: ON-LINE ONLY

Meeting Link: <https://oregonstate.zoom.us/j/95292398098?pwd=ck5hNmpxY3FHatlyRkxKRXJ0aDQxZz09;>

Password: 456293; Meeting ID: 952 9239 8098; Phone Dial-In Information: +1 971 247 1195 US (Portland)

Agenda

TIME	ITEM	MATERIALS
9:00am–9:10am	Welcome and Introductions – <i>IRST Chair/Facilitator</i>	Document 1: 9 Jan 2024 Agenda
9:10am–9:40am	<u>Presentation:</u> Habitat Conservation Plan – <i>Jennifer Weikel, ODF HCP Lead</i>	
9:40am–10:10am	<u>Presentation:</u> Overview Adaptive Management Program – <i>Terry Frueh, ODF Adaptive Management Program Coordinator</i>	
10:10am–11:10am	<u>Presentation:</u> Private Forest Accord Overview – <i>Private Forest Accord authors Adrian Miller (Weyerhaeuser) and Sean Stevens (Oregon Wild)</i>	
11:10am–11:20am	Break	
11:20am–NOON	<u>Work Session:</u> IRST Charter	Document 2: IRST Draft Charter
NOON–1:00pm	LUNCH	
1:00pm–2:00pm	<u>Work Session:</u> Best available science (BAS) standards	Document 3: BAS Summary (29 Dec 23) Document 4: IRST BAS Definition
2:00pm–3:30pm	Introduction to the Research Question Packets - Topical Areas <ul style="list-style-type: none"> ● Roads ● Eastern Oregon steep slopes ● Amphibians 	Document 5: Terms Document 6: Research Topics - PFA Report Document 7: Road Questions Pkg. v9
3:30pm–3:45pm	Public Comment	
3:45pm–4:00pm	Questions/Closing Remarks	

At the discretion of IRST INR staff, the order and duration of the agenda items may change to maintain meeting flow. The meetings are open to the public to attend online or in-person. Meeting information materials can be found on the [IRST meetings webpage](#). Public comments will be accepted near the end of the meeting. Accommodation requests related to a disability should be made at least 48 hours before the meeting. The point of contact is irst-contact@oregonstate.edu.



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Document 2

Independent Research and Science Team Charter

WORKING DRAFT (6 Jan 2024)

NOTE ABOUT THE DRAFT: **black font** = text that was reviewed at the 5 January meeting and major changes were not suggested; **blue font** = suggested wording based on the 5 January meeting discussion about the charter.

This charter is the operating procedures of the Independent Research and Science Team, approved on _____.

ARTICLE I. GENERAL PROVISIONS

Section 1: Name.

The Independent Research and Science Team (IRST)

Section 2: Purpose.

The purpose of the Oregon Department of Forestry's Adaptive Management Program rules is to provide science-based recommendations and technical information to assist the Board of Forestry in determining when it is necessary or advisable to adjust rules, guidance, and training programs to achieve the biological goals and objectives. Within the framework of legislation providing for the Oregon Department of Forestry Adaptive Management Program, the Independent Research and Science Team (IRST) is a group of scientists appointed by Oregon Board of Forestry to provide science-based recommendations and technical information to assist them in determining when it is necessary or advisable to adjust rules, guidance, and training programs to achieve the biological goals and objectives. The Institute for Natural Resources (INR) was selected as the housing agency for IRST and provides staff support.

Section 3: Value Statement.

The IRST is committed to working collaboratively with a common purpose of supporting the Adaptive Management Program, striving for scientific excellence using the best available science and an objective approach, considering and incorporating diverse ideas and perspectives, and executing its role in the Adaptive Management Program as defined in OAR 629-503-0000.

Section 3: Ground Rules.

IRST members and IRST meeting participants will engage in actions that promote productive meetings and will encourage the active participation of each individual member. Examples of these actions are:

1. Come to meetings fully prepared.
2. Speak to inform, listen to understand, and appreciate and value diverse perspectives.
3. State positions clearly.

4. Abstain from hidden agendas.
5. Create opportunities for each individual to be heard.
6. Help others move tangent issues to appropriate venues by scheduling a time to discuss these issues later.
7. Practice sound meeting management.
8. Embrace public meetings and public records laws and full transparency.
9. Respect discussion leaders.
10. Be trusting and trustworthy.

Section 4: Long-term Effectiveness of the IRST.

The long-term effectiveness of the IRST is dependent upon succession management, onboarding of new IRST members, and consistent review and updating of the IRST charter. For more detailed information about these strategies, refer to the designated charter articles and sections noted below.

ARTICLE II. MEMBERS, AUTHORITY, AND RESPONSIBILITIES

Section 1: Members.

The initial members of the IRST were nominated by the AMPC and appointed by the Oregon Board of Forestry. Subsequent changes in membership will be initiated by the IRST and appointed by the Oregon Board of Forestry, as described in the AMP statute and rules and further refined in the sections below. Proxies for IRST members are not allowed for conducting IRST business, including attending meetings and voting.

Section 2: Responsibilities and Expectations.

The IRST and the Housing Agency is responsible for working with the Adaptive Management Program Committee to refine research questions, drafting requests for proposals to address research questions, recommending proposals for funding, administering proposals selected, preparing summaries of the results of funded research, and drafting and maintaining the IRST charter. It is expected that IRST members prepare for and attend all scheduled meetings, be timely and responsive with communications, actively participate in productive exchanges, work collegially to produce quality deliverables in a timely manner, and ensure the fairness and transparency of the process, including openly acknowledging any potential conflicts of interest. The members of the IRST are not expected to represent their organizations, rather members make decisions and vote on matters according to their professional expertise and reasoned judgments.

Section 3: Chairperson.

The chairperson has the usual duties and powers of a presiding officer, including but not limited to setting meeting agendas, leading meetings, maintaining order at the meeting, ensuring the conventions of the meeting are being followed, ensuring fairness and equality at the meeting, and represent the group to the public. Meeting responsibilities may be shared with or delegated to the Housing Agency staff and/or a hired facilitator. The chair serves for 12 months.

Section 4: Chair-elect.

The chair-elect has duties and powers of the chair during the chair's absence, disability, or disqualification, or during any vacancy in the position of chair, and such other powers or duties assigned by the chair or the members of the IRST. The chair-elect is elected at the election of a new chair and participates in meetings with the chair as appropriate for fulfilling these duties. The chair-elect serves for 12 months then assumes the chair position.

Section 5: Subcommittees.

Ad hoc subcommittees may be formed by the IRST to help the IRST fulfill its mission. The IRST will define a clear purpose, desired outcome and focus, and estimated tenure of each ad hoc subcommittee. The IRST may recommend the type of expertise required of participants in the subcommittee. Ad hoc subcommittee participants will be scientists and practitioners qualified in the scientific discipline that the IRST is intended to address. Ad hoc subcommittees will disband upon IRST determination.

ARTICLE III. MEMBER NOMINATIONS, ELECTIONS, AND EXTERNAL EXPERTISE

Section 1: Term of Office.

Each member serves a four-year term. A member's term may be renewed upon a two-thirds vote of the rest of the IRST and then ratification by the Board of Forestry.

Section 2: Representation.

As per Senate Bill 1501, representation on the IRST must include, at all times, at least one voting member that represents the following: a public institution, the timber industry, and a nongovernmental organization that promotes the conservation of freshwater aquatic habitat.

Section 3: Nomination and Election Procedure.

As per Oregon Laws 2022, Chapter 33, Section 38(6), new IRST members may be nominated if there is a vacancy on the team, or if the team determines that a new scientific or technical discipline must be represented on the team in order for the team to perform its research duties.

Any member may broach the topic of adding additional team members to the IRST at any meeting or by email to the Housing Agency between meetings. The member should describe the rationale for the addition. The topic will then be added to the agenda of a subsequent meeting, allowing members to consider the rationale and identify possible candidates. Members should consult possible candidates and obtain their permission before nominating them. The Housing Agency will compile a list of candidates and their background information and share this with the IRST as part of the pre-meeting materials. The IRST will then vote on whether to add a new member, and if affirmed, vote on whether to include each candidate on the list to be sent to the Board of Forestry.

- (a) The team shall submit a list of candidates to the board;
- (b) The board may appoint one or more of the candidates as voting members of the team;
- (c) If the board does not select one or more voting members from the list of candidates, the team shall submit a new list of candidates to the board until such time as the board appoints one or more candidates as voting members of the team.

Section 4: Onboarding Process.

Onboarding new IRST members will consist of:

- meeting with the Housing Agency staff and IRST chair and chair-elect for orientation to the IRST—discussing and providing up-to-date background materials and obtaining a clear understanding of the ground rules and value statement of the IRST;
- connecting with Adaptive Management Program Coordinator for topics related to participation grants;
- taking the State of Oregon board and commission training;
- meeting the members of the IRST; and,
- giving a presentation about oneself at an IRST meeting.

Section 6: Resignation and Removal.

Resignation: Any IRST member may resign by delivering a written resignation to the IRST chair, the Housing Agency, and the Board of Forestry. The resignation shall be effective upon receipt unless it is specified to be effective at some later time.

Removal: A two-thirds vote of the other IRST members, or a majority vote of the **Board of Forestry**, may remove an IRST member before the end of their term **for violation of IRST ground rules or its value statement. Any IRST member that is voted to be removed from the IRST may appeal the decision to the Board of Forestry.**

Section 7: Vacancies.

If an IRST member resigns or is removed, the remaining IRST members may vote on whether to fill the position. The position will be filled following the nomination procedure described in Article III Section 3 of this charter.

Section 8: Succession.

At the direction of the IRST, and to ensure the ongoing commitment of the IRST, the Housing Agency will assist in succession planning by identifying key areas and positions critical to the success of the IRST, identifying and/or forecasting the capabilities (skills, knowledge, and experience require) needed for the areas and positions, conducting an inventory of current expertise and conduct gap analysis, and identifying interested candidates and assessing them against the capabilities.

Section 9: External Expertise.

IRST members can consult, consistent with Oregon Public Records and Public Meeting Laws, external subject matter expertise to inform the IRST about a particular subject area. Obtaining external expertise may also use the subcommittee procedures described in Article II Section 5 of this charter.

ARTICLE IV. MEETINGS

Section 1: Oregon Public Meetings Law.

All IRST meetings shall be conducted as public meetings consistent with Oregon Public Meetings Law.

Section 2: Meeting Management.

The majority of the voting IRST members must be present in order to have a quorum for a meeting. Meetings are managed by the IRST chair. The IRST chair starts and adjourns the meeting, ensures that the meeting follows the agenda, introduces the agenda topic presenters, and guides the discussions. When many members want to speak on the same topic, the chair recognizes the speakers in order and prevents interruptions. The chair ensures that everyone present has an equal opportunity to participate in the conversation. The IRST will provide time for public testimony at meetings unless the chairperson determines that doing so would be detrimental to the conduct of the IRST's business.

Action items, issues, and proposals are presented or reviewed consistent with the agenda distributed before the meeting (unless a change in the agenda is agreed to at the start of the meeting). The presenters elaborate on the facts as necessary and answer any clarification questions that members ask. The group then discusses issues and identifies concerns. Individuals expressing concerns are responsible for working productively with the group to resolve them. The chair formally calls for [vote] on the decision/action being discussed and reads the specific language that will record the decision/action. The chair may delegate all or part of the management of the meeting to a facilitator, the chair-elect, or the Housing Agency.

Section 3: Voting.

SB 1501 Section 38(8)(b) provides that the IRST “shall make substantial decisions by a vote of at least two-thirds of the team members.” Because the IRST statutes do not establish how many members make a quorum, the general rule in ORS 174.130 requires that any actions of the IRST can only be exercised if a majority of the members are in agreement on the issue. This is a “majority of members” and not a “majority of quorum.” This position is supported by the language in Section 38(8)(b) which requires a vote of “at least two-thirds of the team members” (not “two-thirds of the quorum”).

Section 3: Substantial Decision.

Substantial decisions are generally those described in statutes and rules, deliverables, issues with financial implications, and other matters that the IRST deems substantive to warrant official votes. Examples of substantial decisions include:

- Adoption of and changes to the IRST charter
- Timeframe to complete research question scoping
- Research question scoping (literature review, need, budget, scope of work)
- Final Request for Proposal selection
- Final research/summary reports for the AMPC or Board of Forestry
- Election of chair and chair-elect
- Removal of IRST members
- Nomination of new IRST members

The above list is not exclusive. If an IRST member makes a motion for a vote and it is seconded, the decision is a substantial decision. Results of substantial decisions will be maintained in a database on the IRST website and communicated to IRST members via email.

Examples of non-substantial decisions include setting the agenda for an IRST meeting, engaging external expertise, and soliciting external experts that will receive an honorarium or funding.

Section 4: Cancelling Meetings.

IRST meetings may be cancelled with 24-hour notice. Cancellations will be posted on the IRST website and via email to IRST members.

ARTICLE VI. REVIEW AND UPDATING THE CHARTER

Section 1: Review and Update.

The charter shall be reviewed annually and as suggested by an IRST member at any time.

Section 2. Amendments.

The charter may be amended, in whole or in part, by at least two-thirds vote of the members, provided that the substance of any proposed change must be stated in the notice of the meeting at which such action is to be taken.

Document 3

The Use of Best Available Science in Adaptive Forest Management and Environmental Conservation: An Overview

DRAFT 29 December 2023

Jeff Behan, INR

A key initial task for the IRST is to develop standards for *best available science* (BAS) for the adaptive management program. Among other provisions, the Oregon Forest Practice (FPA) rules stipulate that these standards shall include *types of sources* of BAS, and *a process for determining what BAS is* including an assessment of study quality and relevance. In support of IRST work on this task, background information on identification and assessment of BAS is compiled below. This compilation is intended to complement a template document for the IRST to use in laying out the BAS standards, which will be provided at the January 5 IRST meeting.

The federal Endangered Species Act (ESA), Clean Water Act (CWA) and other statutes require identification and use of “best available science” (BAS) but rarely specify what BAS means or provide guidance on identifying and applying it (Lowell et al. 2016). The use of BAS is broadly supported in principle, so scholars and land management agencies have since worked to clarify what BAS is and is not, and how to integrate it into decision making and management. Because science knowledge is constantly being revised, BAS and adaptive management approaches are often used together, as with the state of Washington’s Cooperative Monitoring, Evaluation, and Research (CMER) Committee charged with implementing the state’s forest practices adaptive management program and envisioned for the similarly structured Oregon AMPC and IRST. In support of this vision, key definitions and findings from the resulting body of literature on identification and use of BAS in adaptive natural resource management are summarized below.

Defining “science”

Science has been defined as the systematic enterprise of gathering knowledge about the world and organizing and condensing that knowledge into testable laws and theories (Gleick et al. 2010). Generally accepted hallmarks of “good” science include clearly-state objectives, inquiry grounded in hypothesis testing using standardized, well-documented, replicable methods; objectivity; use of analytical models; statistically rigorous analysis of results; disclosure of uncertainties and data limitations; and peer-review. Science may also be defined as knowledge derived from processes that utilize these practices (e.g., National Research Council 2004) or more broadly as a way of knowing where what is defined as knowledge is based on a mix of observation, intuition, experimentation, hypothesis testing, analysis, and prediction (Sullivan et al. 2006). Thus, while there are differences in how science is perceived by different people, the

term is broadly understood to encompass both a body of organized *knowledge* and also an evidence-based, model and theory-building *process* that continually extends, refines, and revises that knowledge (NRC 2012). While both aspects are important, BAS mandates focus primarily on the knowledge derived from science processes. To clarify this, some BAS policy guidance refers to best available science *information* (BASI, USFS 2012; Esch et al. 2018).

Defining “science information”

Scientific research and information have been categorized in several ways. A basic distinction is that between *quantitative* and *qualitative* research. In general, quantitative research seeks to understand the causal or correlational relationship between variables through testing hypotheses, whereas qualitative research seeks to understand a phenomenon within a real-world context through observation and interviews. Both types of research yield valuable information. The AMPC and IRST may focus primarily on quantitative research and science information related to forest and stream ecology and forest management. However, qualitative (e.g., observational) scientific evidence and expert knowledge may complement quantitative information and, in some cases, may constitute the entirety of available evidence. Also, a degree of qualitative interpretation of study results is often inherent to forest ecology research, where there are usually at least some uncontrolled and potentially interacting variables.

In the context of fisheries ecology, Bisbal et al. (2002) categorize: 1) *scientific information*, which emerges from observation, identification, description, and testing of explanatory hypotheses about fundamental principles that govern cause-and-effect relationships; 2) *suggestive information*, including empirical data, outputs from modelling or simulations, monitoring data, and estimates that are gathered using scientific methods and 3), *supplementary information*, primarily expert knowledge gained through personal experience, training, research, and skill development, legitimized by factors such as educational and experiential background, accomplishments, publication record and reputation among peers (Charnley et al. 2017). Because all three types fall under the science umbrella, “scientific” information may be more accurately referred to as “research” information.

Science information may also be arrayed on a continuum from *emergent* to *established*. Established information is uncontroversial, taken for granted factual knowledge such as the notion that salmon are fish. Emergent information is that for which there is supporting evidence of varying strength, which relates to the degree of reliability and uncertainty associated with it. Emergent information may be supported by strong scientific evidence and therefore quite reliable, but is still open to further validation, revision and potential for controversy. Over time, science information initially characterized as emergent may become more widely accepted and established, with decreasing uncertainty as the evidence base becomes more robust.

Lastly, there are different scientific disciplines that are potentially relevant to the work of the IRST, e.g. geotechnical studies on physical processes, and biological studies on biotic processes,

both of which affect stream ecology but vary substantially in research parameters, analysis, and interpretive methods. These methodological differences may, in turn, affect the criteria used and how they are applied to assess the technical merit and relevance of studies in each discipline.

What constitutes scientific evidence in forest ecology?

INR (2005) paraphrased Maurer (2004) and Scheiner (2004) on this topic, as follows:

“All sciences, but ecology in particular, rely on a range of types of data or empirical observations. Those observations may occur as part of a designed experiment, or as part of a survey of the natural world. This is not a simple dichotomy, but a continuum. At one end are experiments in which all extraneous factors are held constant, as far as possible, and the scientist varies one or more factors of interest in a controlled fashion. At the other end are observational surveys with no manipulation. Intermediate are field experiments in which some factors are manipulated, some are controlled, and others vary naturally. All observations coming from this range of situations are potentially important in understanding ecosystem processes and function, and all contribute to the evidence base.

In other words, scientific evidence in ecology comes from a spectrum of experimental and observational data. Use and interpretation of statistics depends on whether the type of science being done is primarily observational (inductive) or experimental (deductive). Some statistical methods can be useful in one kind of inquiry but not in another. Other methods can be used in either type of science but require different assumptions and imply different things about the data depending on whether an investigation is primarily inductive or deductive.

Thus, sweeping generalizations about the appropriateness of any particular method of statistical inference over others are unwarranted, and laboratory experiments do not necessarily carry greater weight than field experiments. Laboratory experiments are more powerful for exploring the mechanistic bases of ecological processes, but field experiments have greater potential to be generalizable because, by incorporating more potentially interacting species, they can encompass a greater ecological scale.

All types of data play a role. The weight given to a particular piece of evidence should not depend on the type of observation but on the match between the observation and the question being asked. Evidence can include observations made prior to questions being asked and do not have to be made by a scientist. Scientific decisions in ecology are based on the bringing together of different, even disparate kinds of evidence.” (INR 2005, p. 55.)

Sources of science information

Sources of science information include:

- **Peer-reviewed literature** in scientific journals and books where different scientists contribute individual chapters is readily available, often online and in a standardized format, and is considered most reliable mainly because it has undergone peer review.
- **Gray literature** may include reports of surveys, experimental or long-term historical data along with changes in protocols, meta-data, knowledge syntheses, and the progress and findings of monitoring efforts. Such literature may be reviewed internally, e.g. by other agency scientists, but typically does not contain significantly new findings that would require broader or more independent review. Much of this science information is quite accessible. A good example is USFS General Technical Reports (GTRs).

Theses and dissertations are another type of gray literature. Graduate student research findings often subsequently appear in peer-reviewed science journals but for various reasons may also not be published in such a venue. In those cases, the original thesis or dissertation may be the only source of unique and otherwise unavailable science information. As of 2023, many scientific theses and dissertations are available via electronic databases such as OSU Scholars Archive, University of Oregon Scholars' Bank, and University of Washington ResearchWorks Archive. Additional effort is often needed to assess the veracity of science information from unpublished theses and dissertations that have not been subjected to science journal peer-review.

- **Expert opinion** supplied by professional experts such as university and government scientists, can be highly reliable, especially when it is based on the experience of multiple experts who collectively function as peer reviewers. Expert opinion may be the only science knowledge available for some crucial issues or local areas. Questions and judgments about the status and restoration of impacted ecosystems and recovery of imperiled species are often based largely on expert opinion.
- **Anecdotal evidence** is essentially a short narrative about a personal experience. In natural resource and environmental management, anecdotal evidence often emerges through public comments on government reports (e.g. a draft EIS), at agency meetings, through newspaper or popular journal coverage, or through letters sent to agencies or the media. It may reflect Indigenous Knowledge that is not generally available to the public but passed on from one generation to the next within various local communities. Scientists often put much less credence in this type of information because it can be difficult to access, verify, and review even when generated by the scientific community itself. However, especially when there is a paucity of other types of information, anecdotal evidence can still provide useful guidance. (Sullivan et al. 2006.)

The 2015 USFS Planning Directives for implementing the 2012 Planning Rule allow for a wide range of types of evidence to be used to meet BAS intent, including peer-reviewed publications, scientific assessments, expert opinion, observational data, and unpublished data from government agencies, academia, or public surveys.

Systematic review

A systematic review is rigorous, transparent, reproducible process for assessing scientific and technical information that focuses tightly on a specific question, or small set of questions, which frame decisions about what evidence is relevant to the review, and what is not. When a systematic review is available, or can feasibly be conducted, it may serve as a highly useful “package” of BAS (Esch et al. 2018, Burnett et al. 2008, INR 2005). But systematic reviews are dependent on available and existing research, so this assessment approach is not possible for all management issues. Where sufficient research does exist, conducting a systematic literature review usually requires a high level of expertise and a significant investment of resources and time. Options for limiting the time and resources necessary to conduct a systematic review include tightly focused review questions and stringent study inclusion criteria (e.g. limited geographic or temporal extent, peer-reviewed studies only), or using only a subset of systematic review methods, e.g., a documented literature search strategy.

Availability of science information

“Available” science typically refers to that which already exists when a process to gather and use it is initiated. The information should be useful without further data collection, modification, or validation but may need additional synthesis or interpretation to place it in an appropriate form or context. Available science may also include any additional scientific information that can feasibly be generated during the assessment or decision-making process. Inherent in the concept of available science is that it is physically and conceptually accessible to the user. (Charnley et al. 2017; USFS 2015).

What is “best” available science?

After being introduced into federal statute via the ESA and CWA, the concept of “best available science” rapidly gained popularity in environmental law and policy (Bisbal 2002). Similar BAS provisions were enacted at state-level agencies, and staff across these jurisdictions then worked to clarify and operationalize its use. The crux of this revolves around parsing the available information then determining, in a documented, defensible manner, what science is “best”.

Definitions of BAS vary among agencies and academics, but most emphasize *accuracy*, *reliability*, and *relevance* (Esch et al. 2018, USFS 2015):

- **Accurate** scientific information estimates, identifies, or describes the true condition of its subject matter. This may be a measurement of specific conditions, a description of operating behaviors (physical, biological, social, or economic), or an estimation of trends. Statistically accurate information is near to the true value of its subject, quantitatively unbiased, and free of error in its methods. The extent to which scientific information is accurate depends on the relationship of the scientific findings to supportable evidence that identifies the relative accuracy or uncertainty of those

findings. The accuracy of scientific information can be more easily evaluated if reliable statistical or other scientific methods have been used to establish the accuracy or uncertainty of any relevant findings.

- **Reliability** reflects how appropriately scientific methods have been applied and how consistent resulting information is with established scientific principles. Scientific information is more reliable if it results from an appropriate study design and well-developed scientific methods, clearly described. Assumptions, analytical techniques, and conclusions should be well referenced with citations to relevant, credible literature, and other pertinent existing information. Conclusions should be based on reasonable assumptions supported by other studies and consistent with general theory underlying those assumptions or are logically and reasonably derived from data presented. Any gaps in information and inconsistencies with other pertinent scientific information should be adequately explained. Scientific information that describes statistical or other scientific methods used to determine both its accuracy and uncertainty are considered more reliable. Quantitative analysis that has known (and quantifiable) rates of errors and results improves this reliability. An accuracy assessment of the data supports the reliability of the quantitative analysis.
- **Relevant** information is that which pertains to the issues under consideration at the appropriate temporal and spatial scales. Both accurate and reliable science need to be assessed for applicability to the question at hand. This includes the ability to transfer results to a management question from different systems, species, or geographies or via different methodologies.

Thus, what constitutes “best” science is usually *context specific*. While accuracy and reliability are determined by the scientific research approach, determining what science is “best” depends in part on the question or intent, the geographic area or ecosystem being considered, the data available, any knowledge gaps, and if there is controversy or debate within the scientific community on a particular subject. Guidance in the 2012 USFS forest planning rule states that:

“In some circumstances, the BASI would be that which is developed using the scientific method, which includes clearly stated questions, well-designed investigations and logically analyzed results, documented clearly and subjected to peer review. However, in other circumstances the BASI for the matter under consideration may be information from analyses of data obtained from a local area, or studies to address a specific question in one area. In other circumstances, the BASI also could be the result of expert opinion, panel consensus, or observations, as long as the responsible official has a reasonable basis for relying on that scientific information as the best available. (77 FR 21192 [April 9, 2012].)”

The default standard for “best” scientific evidence is generally taken to be that published in top tier, peer-reviewed science journals. Scientific evidence quality “hierarchies” generally rank peer-reviewed science first, often with sub-categories based on methods and statistical rigor,

followed by “gray” literature of various types, then expert opinion and finally, anecdotal evidence. In the real world, peer-reviewed science information may be limited, unavailable, or tangentially relevant due to limits on inferences that can be made beyond the research context. Weighing “best” science in forest management and ecology appears to usually require a balance of methodological considerations, availability of local information, and some sort of holistic or heuristic assessment of situational relevance.

BAS and the Washington state Cooperative Monitoring, Evaluation, and Research Committee

The state of Washington’s Growth Management Act requires counties and cities to use BAS when developing policies and development regulations to protect critical areas, especially measures necessary to preserve or enhance anadromous fisheries (WAC Chapter 365-195, Sections 900-925). Under this directive, Washington’s *Cooperative Monitoring, Evaluation, and Research* (CMER) Committee has refined procedures to identify, acquire and apply BAS as a key component in a monitoring and research program formed to implement recommendations in the state’s Forests and Fish Report. Because Oregon’s IRST and AMPC are modeled upon the CMER, details on assessing BAS for that program are provided below.

For the CMER, BAS is described as *“relevant science from all credible sources including peer-reviewed government and university research, other published studies, and CMER research products. Applicable historic information, privately produced technical reports, and unpublished data may have value and are considered as long as they can be assessed for accuracy and credibility.”*

Table 1: Sources and characteristics of BAS. From WAC 365-195-905: Criteria for determining which information is the "best available science."

SOURCES OF SCIENTIFIC INFORMATION	CHARACTERISTICS					
	Peer review	Methods	Logical conclusions & reasonable inferences	Quantitative analysis	Context	References
A. Research. Research data collected and analyzed as part of a controlled experiment (or other appropriate methodology) to test a specific hypothesis.	X	X	X	X	X	X
B. Monitoring. Monitoring data collected periodically over time to determine a resource trend or evaluate a management program.		X	X	Y	X	X
C. Inventory. Inventory data collected from an entire population or population segment (e.g., individuals in a plant or animal species) or an entire ecosystem or ecosystem segment (e.g., the species in a particular wetland).		X	X	Y	X	X

D. Survey. Survey data collected from a statistical sample from a population or ecosystem.		X	X	Y	X	X
E. Modeling. Mathematical or symbolic simulation or representation of a natural system. Models generally are used to understand and explain occurrences that cannot be directly observed.	X	X	X	X	X	X
F. Assessment. Inspection and evaluation of site-specific information by a qualified scientific expert. An assessment may or may not involve collection of new data.		X	X		X	X
G. Synthesis. A comprehensive review and explanation of pertinent literature and other relevant existing knowledge by a qualified scientific expert.	X	X	X		X	X
H. Expert Opinion. Statement of a qualified scientific expert based on his or her best professional judgment and experience in the pertinent scientific discipline. The opinion may or may not be based on site-specific information.			X		X	X

X = characteristic must be present for information derived to be considered scientifically valid and reliable

Y = presence of characteristic strengthens scientific validity and reliability of information derived, but is not essential to ensure scientific validity and reliability

Including and assessing “gray” literature

The CMER also addressed issues associated with assessing the scientific relevance and technical merit of non-peer reviewed scientific information. This “gray” literature produced by government agencies, professional organizations, research centers, universities, public agencies, special interest groups, corporations and NGOs includes technical reports, academic theses, government documents, conference proceedings, and other publications that may not have been independently assessed for quality and technical rigor. Because gray literature can encompass specific, local, contextual, targeted information that is otherwise unavailable, assessing it for accuracy and credibility is a key issue when defining and collating BAS.

CMER (Hotvedt et al. 2013) found that gray literature such as doctoral theses and conference proceedings can be valuable sources of scientific information. Advantages include quicker access to results, and more details regarding methods and analysis compared to peer-reviewed publications. The CMER recommended that all credible sources and types of scientific information should be used in CMER’s research and monitoring program and processes, including gray literature, as long as it can be evaluated for accuracy and credibility and is available to CMER and the general public.

The CMER report provided a list of factors to consider when evaluating non-peer-reviewed literature for potential inclusion in a synthesis of BAS and appropriate use in decision-making:

- Relevance to the primary literature review or study question;
- Adherence to scientific method;

- Degree to which study is original work (e.g., not literature review, overviews);
- Prospective or experimental vs. retrospective;
- Appropriateness of study design to the research question;
- Degree of bias: in study design, data collection, review of data, analysis, interpretation, and publication;
- Timing of measurements after an activity occurred;
- Number of years of follow up;
- Statistical issues (e.g., adequately powered to detect an effect and adjustments for confounding factors);
- Quality of reporting;
- Generalizability (e.g., strength of inferences);
- Level of peer review; and,
- Publication type/status (e.g., national/international scientific journal, federal and state agency peer-reviewed technical reports (e.g., USDA Forest Service, USGS), proprietary studies, university cooperative extension reports, consultant's reports, and so forth).

Assessing the “quality” of scientific information

Decisions regarding inclusion and weighting of a particular set of research findings or other information when synthesizing “best” science hinge on the *quality* of that scientific evidence. The weight implicitly or explicitly assigned to individual studies or “packets” of evidence for their quality, and the integration of those evaluations into a documented, defensible, holistic assessment, is where the rubber meets the road when implementing BAS mandates.

Scientific information “quality” is generally taken to be comprised of a combination of its technical merit, and applicability (relevance) to the location and science question(s) at hand. The CMER laid out some guidance for elements that should be assessed when evaluating the quality of scientific information: its source; spatial scale; temporal scale; and also adherence to the scientific process, i.e., study design; methods; data; quantitative analysis; context; references; logical conclusions and reasonable inferences; and peer review.

The general goal of assessing the quality of a study is to establish how reliable its findings are based on methodological rigor, and the strength of linkages between study results and conclusions drawn from them. A fundamental, complementary consideration is the degree to which the findings are relevant to a particular setting or area of interest. Aspects of this include the degree of alignment between the questions or hypotheses addressed in the study and the science questions or issues for which BAS is being compiled, and also the extent to which the effects observed in a study are applicable outside of the study area (e.g., generalizability), such as strength of inferences. Quality also relates to the extent to which a study design is likely to prevent systematic error, or bias.

Although no single definition of study “quality” exists, absent an ability to independently review the quality of a study, one basic parameter for quality is the level of expected rigor of scientific

review, based on different sources of information, which are commonly viewed as reflecting different levels of rigor, quality and respectability:

1. Peer-reviewed literature,
2. Gray literature,
3. Expert opinion (i.e., opinion and broadly held beliefs), and
4. Anecdotal evidence (e.g., personal observations and beliefs).

Building on this notion of ranking different types of science information in hierarchical fashion, the CMER noted that keying in on study designs is a further, more refined step for assessing quality. For example, a hierarchy of study designs might be based on the following, in general order of quality:

1. Experimental studies (i.e., randomized control trials),
2. Quasi-experimental studies (i.e., studies without randomization),
3. Controlled observational studies,
4. Cohort studies,
5. Case control studies,
6. Observational studies without control groups, and
7. Expert opinion based on theory, laboratory research, or consensus.

The CMER also noted a similar hierarchy of study designs used by Burnett et al. (2008) in a pilot test of systematic review methods commissioned by ODF:

1. Replicated sampling, replicated controls, sampling before and after treatment;
2. Unreplicated, controlled, sampling before and after treatment;
3. Unreplicated, uncontrolled, sampling before and after treatment; OR Unreplicated, controlled, sampling after treatment;
4. Unreplicated, uncontrolled, sampling after treatment; and
5. Unreplicated, uncontrolled, anecdotal observation after treatment.

The CMER (Hotvedt et al. 2013) recommended that references for a synthesis of BAS should be selected based on relevance, availability, and quality, with preference given to peer-reviewed publications that are widely available and referenced in the area of scientific inquiry of interest. Gray literature (e.g., internal reports, papers presented at conferences, articles in preparation) can be acceptable and may provide unique and valuable information but should be treated as unpublished and given additional scrutiny for quality (accuracy and credibility). Regardless of source, authors of CMER reports should be able to provide, or direct access to, literature referenced in a study design or report if requested during a CMER review process. The CMER (Hotvedt et al. 2013) also recommended the use of hierarchical ranking of science information quality. However, a hierarchical approach is not sufficient for assessing all aspects of relevance, such as alignment between study hypotheses and science questions for which BAS is being compiled, or scope of inference and generalizability beyond the study area.

References cited

- Burnett, K.M., Giannico, G.R. and Behan, J. 2008. A pilot test of systematic review techniques: evaluating whether wood placements in streams of the Pacific northwest affect salmon abundance, growth, survival, or habitat complexity. Institute for Natural Resources, Oregon State University.
- Esch, B.E., Waltz, A.E., Wasserman, T.N. and Kalies, E.L. 2018. Using best available science information: Determining best and available. *Journal of Forestry*, 116(5), pp.473-480.
- Gleick, P.H., Adams, R.M., Amasino, R.M., Anders, E., Anderson, D.J., Anderson, W.W., Anselin, L.E., Arroyo, M.K., Asfaw, B., Ayala, F.J. and Bax, A. 2010. Climate change and the integrity of science. *Science*, 328(5979), pp.689-690.
- Hotvedt, J., Hayes, M., Hicks, M., Kroll, A., Lingley, L., Martin, D., Mendoza, C., Sturhan, N. 2013. Use of Non-CMER Science in the Forest Practices Adaptive Management Program. Washington Cooperative Monitoring, Evaluation, and Research Committee (CMER).
- INR (Institute for Natural Resources). 2005. Applying systematic evidence reviews in Oregon forest policy: Opportunities and challenges. Behan, J., Crawford, S. and Kleiner, E. preparers. Institute for Natural Resources, Oregon State University.
- Lowell, N. and Kelly, R.P., 2016. Evaluating agency use of “best available science” under the United States Endangered Species Act. *Biological Conservation*, 196, pp.53-59.
- Maurer, B. 2004. Chapter 2: Models of scientific inquiry and statistical practice: Implications for the structure of scientific knowledge in Taper, M. and Lele, S. (eds.) *The Nature of Scientific Evidence: statistical, philosophical, and empirical considerations*. University of Chicago Press.
- NRC (National Research Council). 2012. *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. National Academies Press.
- Ryan, C.M., Cervený, L.K., Robinson, T.L. and Blahna, D.J., 2018. Implementing the 2012 forest planning rule: Best available scientific information in forest planning assessments. *Forest Science*, 64(2), pp.159-169.
- Scheiner, S. 2004. Chapter 3: Experiments, observations, and other kinds of evidence in Taper, M. and Lele, S. (eds.) *The Nature of Scientific Evidence: statistical, philosophical, and empirical considerations*. University of Chicago Press.
- Sullivan, P.J., Acheson, J., Angermeier, P.L., Faast, T., Flemma, J., Jones, C.M., Knudsen, E.E., Minello, T.J., Secor, D.H., Wunderlich, R. and Zanetell, B.A. 2006. Defining and implementing best available science for fisheries and environmental science, policy, and management. *Fisheries*, 31(9), p.460.
- USDA (United States Department of Agriculture) Forest Service. 2015. *Forest Service Handbook*.



Document 4

IRST DEFINITION OF “BEST AVAILABLE SCIENCE”

WORKING DRAFT (6 Jan 2024)

Prescribed in the forest practice rules:

- (1) The IRST shall develop **standards for best available science** for the adaptive management program that include:
 - (a) Types of sources of best available science;
 - (b) Process for determining what is best available science based on criteria set by the IRST, including an assessment of study quality and relevance;
 - (c) Testable hypotheses as a crucial element for successful research;
 - (d) A peer review process that is transparent and addresses both study designs and study reports. The IRST shall not grant anonymity to authors, handling editors, or peer-reviewers before January 1, 2028. After January 1, 2028, the IRST may modify the anonymity requirements to peer reviewers by a substantial decision of the IRST; and
 - (e) Other elements the IRST determines are necessary.
- (2) The IRST may update the best available science standards developed pursuant to section (4) of this rule.

IRST Definition

NOTES ABOUT THE DRAFT

We need to address the elements in the rules above (they don't make for a good outline but are woven into this draft)

You can see the outline in MS Word using View, Navigation Pane

It's current organized in 4 sections: Introduction, Defining BAS, Process for applying BAS, Peer review (may want to fold this into Process section)

We've just used a bulleted format at this point, so it's easy to add/delete/move ideas; we can massage it into narrative text in the next draft

black font = wording from the rules; **black font italic** = information from ODF; **blue font** = suggested wording, example from another source; **blue font italic** = INR staff; **green font** = IRST members; [] = comments in brackets

Introduction

- *The purpose of the IRST is to provide science-based recommendations and technical information to assist the Adaptive Management Program (AMP) and Board of Forestry in determining when it is necessary or advisable to adjust rules, guidance, and training programs to achieve the biological goals and objectives.*
- *One of IRST's initial required tasks is the development of standards for best available science for the AMP.*

- *In this context, BAS encompasses both the identification and use of existing scientific results as well as a process for how new research will be developed to address AMP questions.*
- The identification and use of existing scientific results, as well as a process for how new research is developed both rely on methods for defining and assessing science quality.

Defining and assessing science quality [rules (b) – criteria]

- Emphasis should be on quality and relevance of information, with quality being judged on the basis of study design, acceptable practices (e.g., field measurements, analysis), etc.
- Acknowledging uncertainty in the scientific process by project is also important for critiquing results based on how they attempt to minimize this and what the inferences will be.
- That there are no conflicts of interest, or that the study was not influenced by the potential for economic or other gain by the researchers and/or funders.
- The American Fisheries Society has a helpful report on this topic. Link: <https://fisheries.org/policy-media/science-guidelines/defining-and-implementing-best-available-science-for-fisheries-and-environmental-science-policy-and-management/>. The aspects included in this report under the Science and Scientific Process are relevant components of a definition. Table 1 in the report may also be helpful in identifying best available science for the IRST, which will often be at the regional scale. However, the ability to do that work will depend on whether the base knowledge from lab experiments or field sites has been conducted.
 - Clear statement of the scope and objective of the study, and definition of the problem;
 - A conceptual model, which is a framework for characterizing systems, stating assumptions, making predictions, and testing hypotheses;
 - Clear references and acknowledgement of previous work by others and the author(s);
 - Detailed description/documentation of methods;
 - Appropriate experimental design and a standardized method for collecting data;
 - Statistical rigor and sound logic for analysis and interpretation;
 - Applies current research techniques, including whatever chemical, physical and/or statistical parameters/data are appropriate to the subject/study;
 - Clear statements of findings, including questions left unresolved, and questions for further investigation;
 - Peer review (I'd add by experts in the topic areas);
 - Publication in what would be considered a reputable journal or other venue, including thesis/dissertation;
 - Completed recently;
 - Funding source(s) with no conflicts of interests in the subject at hand.
- Washington Cooperative Monitoring, Evaluation, and Research (CMER) Committee identified eleven best available science elements including: a) scientific information source; b) spatial scale; c) temporal scale; d) study design; e) methods; f) data; g) quantitative analysis; h) context; i) references; j) logical conclusions and reasonable inferences; and k) peer review.
- I believe we have an obligation to examine the definition of best available science that also acknowledges a very western-centric bias towards science. I would like to determine ways to include indigenous knowledge or other forms of knowing, and not be “gate keepers” of information that should be considered and included. I've recently learned a lot from Mateen Hessami, and he may be a good resource for the IRST learning more about how to connect and include indigenous knowledge into scientific process. Here are two of his recent publications on related topics: <https://doi.org/10.1139/facets-2020-0088>; <https://www.cclmportal.ca/sites/default/files/2023-06/Braiding%20Indigenous%20Rights%20and%20Endangered%20Species%20Law.pdf>

Testable hypotheses as a crucial element for successful research [rules (c)]

- this is part of the process of developing some forms of best available science (e.g, research manuscripts and findings), but may not be relevant for things like monitoring products (that seek trends rather than hypothesis testing analysis), or data products.

Types of sources of best available science [rules (a)]

- I believe we should view this broadly, so as to capture all relevant information for our decision-making. If we define this too narrowly, we run the risk of missing key information from unpublished research or monitoring results, or “grey” literature.
- how we will consider gray literature that may not have been peer reviewed (do we review it ourselves or with experts?) and expert opinion will be considered is important too.
- Sullivan et al. (2006) categorize and discuss the following sources of science information: peer-reviewed literature, gray literature, expert opinion, anecdotal evidence
- WA CMER identified BAS is considered to be relevant science from all credible sources including peer-reviewed government and university research, other published studies, and CMER research products. Applicable historic information, privately produced technical reports, and unpublished data may have value and are considered as long as they can be assessed for accuracy and credibility. CMER is responsible for understanding available scientific information that is applicable to the questions at hand, selecting the best and most relevant information and synthesizing it into reports for the Policy Committee and the Board.

Process for determining what is best available science based on criteria set by the IRST, including an assessment of study quality and relevance [rules (b)]

- *[Is this really separate from the Defining process above? One approach would be to describe how we operationalize the criteria in the “Defining” section above.]*
- *[Not sure if it makes sense to try to say how we’ll apply BAS to the various tasks or if we should just say we’ll apply BAS to the following tasks and just list them. The core IRST tasks/steps are listed below.]*

Refining of research questions/topics

- *IRST will use the BAS principles above in working with the AMPC to refine the research questions.*
- A “research question” implies to me that there is need for science discovery and the addition of new knowledge. Sometimes, research questions are not “researchable”, meaning we either do not yet have the technology or baseline fundamental understanding to be able to answer the question (e.g., “Where did life come from?”). Fundamentally, a research question requires a testable hypothesis, with data collection and analysis that is transparent and could be repeated by another researcher.
- This could be any question requiring technical information to answer. Usually supported by testable hypothesis.
- I would define a research question as something clear, specific, and concise that aims to build understanding of the unknown or uncertain. It would often aim to understand the influence of specific factors on an outcome, for example.
- A problem that arises from gaps in previous studies and can be explicitly defined, with an expected outcome/answer that advances understanding of a specific subject. Generally proposed by a qualified researcher in the field.
- A specific question stated as a hypothesis or a knowledge gap that can be addressed by a designed study, field survey, modeling, literature review, or another means of scientific inquiry. In this context, research questions would relate predominantly to species, processes, or management effectiveness.

Review of available literature

- *As part of the RFP development process IRST will review the available literature and apply the BAS criteria described above*

Preparation of RFPs

- *RFP development will build upon the refined research questions and the review of BAS in the available literature*

Selection of research to fund

- *Is there a formal review process for study designs (this is a large step and hurdle in federal research, so jumps out to me here). Study designs seem like they would be a requirement of outside parties who are selected to do a specific applied project but may not be necessary for the IRST on everything.*

Reporting to AMPC/BoF

- *For each funded project, the proposer or the IRST must prepare a summary report shall be written for a lay audience, which includes a number of BAS aspects as described in rule 629-603-0200(6)(g)*

Peer Review

The new rules require (d) A peer review process that is transparent and addresses both study designs and study reports. The IRST shall not grant anonymity to authors, handling editors, or peer-reviewers before January 1, 2028. After January 1, 2028, the IRST may modify the anonymity requirements to peer reviewers by a substantial decision of the IRST

- *[May want to fold this into Process section. I've left it separate for now just because there may be quite a bit to figure out on this topic.]*
- *IRST anticipates that core team members will provide the majority of science assessment and review in conducting the research development steps described above. However, the use of outside expertise may be useful in certain steps and for certain topics.*
- *[The rules call for a peer review process – does this imply using peer reviewers outside of the IRST?]*
- *[The rules call out peer review for study designs and study reports, so perhaps we should describe a peer review process for those two steps (but this is a fairly significant lift, especially if the reviewer(s) have to be named).]*
 - *Example texts:*
 - *As part of the RFP process, the IRST will solicit peer review of submitted proposal study designs. The IRST will solicit a peer review from one or more external reviewers with expertise relevant to the study topic and/or study design.*
 - *After submission of a completed research report to the IRST, the IRST will solicit a peer review from one or more external reviewers with expertise relevant to the study topic. The external peer review will be included with the materials the IRST submits to the AMPC and Board of Forestry.*
- *[Does “transparent” mean that all RFP responses and reviews must be made public? Could be a barrier for some, releasing their research ideas and potentially sensitive financial info (e.g. salaries)]*
 - *Here's a link to Oregon law: <https://www.doj.state.or.us/oregon-department-of-justice/public-records/attorney-generals-public-records-and-meetings-manual/appendix-a/#q22>*
 - *It sounds like submitted proposals will be available via public records requests after the winner has been chosen, with some exceptions for personal info & trade secrets*
- *Open peer review has at least 3 different aspects: Open identities, Open reports, and Open participation.*
 - *[The rules appear to mandate open identities, but to what extent might we want open reports or participation?]*

Document 5

Differentiating “Research Topics”, “Research Questions”, and “Research Agenda”

This document is by Terry Frueh, AMPC Coordinator. It was distributed to the AMPC for an AMPC meeting.

Given there was some confusion regarding these concepts, the following should provide clarity on these terms in the context of the Adaptive Management Program rules.

Research Topics

Research topics are a broad research theme either in rule (the three in OAR 629-603-0100(7)) or raised by an AMPC member for consideration to conduct research. Research topics will regularly be prioritized for: 1) focusing on in the near term; and, 2) a “parking lot” to regularly revisit (e.g., annually or biennially) to assess if sufficient resources are available to address them in your prioritized order.

Example Research Topic: (raised by an AMPC member [hopefully this accurately captured what was said]) – “The impacts of timber harvest along non-fish streams on downstream, fish-bearing streams.”

Research Questions

Research questions are policy questions that the AMPC deems important to research, can be implemented in a research project, and are refinements of research topics. **Note**: rules require specific elements when sending these questions to the IRST:

“OAR 629-603-0200(3) Step 1: The AMPC shall develop preliminary research question(s).

(a) The AMPC shall succinctly specify preliminary research questions that include the following:

- (A) The type of research and monitoring per OAR 629-603-0100(1)(a) or (b);*
- (B) The rule, biological goals and objectives, or other issue being studied;*
- (C) The objective of the research;*
- (D) A brief description of the context of the research question; and*
- (E) Other information the AMPC deems necessary for the IRST’s work per section (4) of this rule.”*

Example Research Questions using the example Research Topic above:

1. *In western Oregon, how do forest practices [cite rules] along Type Np streams affect stream temperature of downstream Type F streams?*

2. *Do forest practices [cite rules] along debris flow traversal areas of Type Np and Ns streams supply sufficient large wood to Type F streams? How is this delivery of large wood likely to change over the next century?*

Note: These are the research questions, and the elements in OAR 629-603-0200(3)(a) would need to be fleshed out [with ODF's help]. Also note that the IRST will refine the research questions per OAR 629-603-0200(4)(b), and confirm they still meet the AMPC's intent.

Per OAR 629-603-0200(4), the IRST will develop proposals about each research question AMPC sends to them. These proposals will help the AMPC develop a complete research agenda. For example: "To answer question 1, it will take 3 years, about \$400,000-500,000, with 20-25 field sites in a Before-After-Control-Impact study design, and produce results with a fairly high degree of certainty." The IRST's proposal would have a lot more substance as outlined in OAR 629-603-0200(4)(c) and may have multiple proposals for how to address a given question.

Research Agenda

A research agenda is developed with information from the proposals that the IRST sends the AMPC per OAR 629-603-0200(4). The Research Agenda is specified in rule:

"OAR 629-603-0200(5) Step 3: The AMPC shall develop a research agenda.

(a) The AMPC shall develop a multi-year research agenda that includes:

- (A) Prioritized research projects;*
- (B) Key milestones for each research project;*
- (C) A timeline for progress on research projects; and,*
- (D) A comprehensive IRST budget, including annual budget for each year of each project."*

This research agenda, once approved by the Board, gets implemented by the IRST using Request for Proposals and subsequent contracts per OAR 629-603-0200(6).

Document 6

Research Topics in PFA Report

28 December 2023

NOTE: Emphasis in bold italic added by INR.

Forest Practice Rules

OAR 62-603-0100(8) identifies 3 research topics.

The following topics shall be prioritized in the initial phase of the adaptive management program:

- (a) Literature review for eastern Oregon steep slopes;
- (b) Requirements of baseline and trend monitoring of road rules; and
- (c) Amphibians.

PFA Report Excerpts

[Private Forest Accord Report 2022 \(stakeholders\).docx](#)

CHAPTER 3: Timber Harvest on Steep Slopes

3.3.6 Slopes Modeling

The Authors agree that the approach to identify Designated Sediment Source Areas should undergo a scientific review before application.

3.3.8 Timber Harvest on Steep Slopes in Eastern Oregon

The Private Forest Accord does not prescribe new management measures for landslide initiation zones or debris flow traversal channels in Eastern Oregon. The Authors agree that Eastern Oregon's unique geologies and climates likely mean that these processes are different in magnitude, frequency, and impact on the covered species, when compared to Western Oregon. Similarly, the impact of timber harvesting on these processes is potentially different in Eastern Oregon. In light of this uncertainty, the Authors agree that the Adaptive Management Program shall, beginning no later than January 1, 2024, examine the scientific literature on the ***impacts that hillslope processes have on the covered species in Eastern Oregon. The primary focus will be on upslope initiated shallow rapid slides and how timber harvesting may impact these in Eastern Oregon environments. A secondary and more limited focus is whether other hillslope processes that likely affect covered species are changed by forest practices.***

Findings of the Adaptive Management Program on these topics will be presented to the Board of Forestry. These findings should focus primarily on the importance of shallow rapid landslides in Eastern Oregon to habitat for the covered species and the potential modification of these processes by forest practices or lack thereof. The report on this primary topic may or may not include recommendations as to desirability and relative importance of potential management measures. In addition, the report should convey whether the secondary review of literature on the effect of forest practices on other

hillslope processes merits more thorough consideration by the Adaptive Management Program in light of scientific literature on the connection of these processes to covered species.

CHAPTER 4: Roads

4.3.10 Development of Monitoring Requirements

The Independent Research Science Team (IRST) created under the PFA shall design and oversee baseline and trend monitoring for hydrologic disconnection. Compliance monitoring will be conducted through the Department's process.

1. Baseline and Trend Monitoring for Hydrologic Disconnection: *The methodology for the monitoring shall be based off of Dube et al. (2010) and Martin (2009). The purpose of the monitoring for hydrologic disconnection is to establish a baseline and to monitor and report the change in hydrologic connectivity over time as the FRIA is implemented.* The overarching goal is to ensure that all forest roads and landings shall be hydrologically disconnected to the maximum extent feasible from waters of the state. The Adaptive Management Program Committee shall use the results of the baseline and trend monitoring to develop regional goals consistent with that monitoring. All hydrologic connectivity data should be public and shared as it becomes available to help focus goals, identify accomplishments, and inform statewide learning.

CHAPTER 7: Amphibians Conservation

7.3.4 Adaptive Management

Uncertainty exists around amphibian population characteristics, distribution, productivity, survival, and abundance. A robust effectiveness monitoring plan as part of an adaptive management program will be used to better understand the relationship between forest management and covered amphibian species. To support this program, it is recommended that \$1.5 million be initially applied to research through the first funding cycle of the adaptive management program to better understand *how riparian and unstable slope protections of at least the current and proposed rules for private forestland impact persistence of populations.* The Authors agree that the \$1.5 million will be used to fund an initial study and that ongoing research over appropriate intervals of time beyond this initial study will be necessary to understand research outcomes over long periods of time. *The priority species for monitoring will be the Columbia and Southern torrent salamanders.* With consideration to funding constraints and other priorities, this research could also include other species covered by the HCP. Additionally, it could include Cascade torrent salamanders, which are not covered by the HCP.

Preliminary Research Questions for the research topic: Requirements of baseline and trend monitoring of road rules

Note: This document is the version live-edited by the AMPC at their Nov. 30, 2023 meeting. It is not an official, finalized version.

Purpose of this document

This document provides the following Adaptive Management Program elements from the Adaptive Management Program Committee (AMPC) regarding forest roads research:

- A. The preliminary research questions they developed; and,
- B. Contextual information for these questions, as required in rule¹. This information clarifies the basis for these questions, and what additional information the AMPC would like to see from the Independent Research and Science Team (IRST).

These elements will guide the IRST in developing scoping proposal(s) to answer these preliminary research questions.

Dear Members of the IRST,

We are pleased that you have agreed to participate on the IRST.

The AMPC appreciates your using this document to guide your work in the next step of the Adaptive Management Program, which includes your completing the following items per rules:

1. In consultation with the AMPC, refining these preliminary research questions into finalized research questions². The intent is for these finalized research questions to be able to be addressed via studies. Additionally, the AMPC requests feedback from the IRST on the level of detail in this entire document so that subsequent preliminary research question packages are more helpful for the IRST.
2. Developing a scoping proposal(s) for how to address the finalized research questions. The proposal(s) need(s) to include^{3,4}:
 - a. A literature review that specifies the need for or the type of monitoring, research, commissioned studies, or other means of scientific inquiry necessary to answer the finalized research question mentioned in #1;
 - b. A preliminary estimate of the budget for each year of the research, and a timeline to complete the research project with specific deliverables; and,
 - c. A preliminary description of research project requirements, scope of work including an estimate of the timeline and key milestones, and an estimate of the degree to which knowledge may be improved if the research proposal is implemented.

~~Please write this scoping proposal such that an educated non-scientist can understand it.~~

Additionally, please use the associated contextual information (detailed in section B, below) to guide your efforts.

Commented [TF1]: These are verbatim from rule (other than tweaks to have consistent internal references within this document)

¹ Oregon Administrative Rule (OAR) 629-603-0200(3)(a)

² Per OAR 629-603-0200(4)(b)

³ Per OAR 629-603-0200(4)(c)

⁴ Per OAR 629-603-0200(4)(d)

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~~Note that the IRST is not required to write more than one scoping proposal, but the AMPC would appreciate your developing at least two scoping proposals per research question so they can have more robust decision making in developing the research agenda (see below). These proposals should span a range of study rigor, expense, and time, while defensibly answering the questions. If you complete multiple proposals, please compare their respective costs vs. knowledge benefits⁴.~~

~~4.3. Within 45 days of receiving this document, please provide an estimate of the time you will need to complete #1 and 2⁵.~~

Commented [FT*O2]: This is not required in rule, but is good practice to request it

Next steps after IRST scoping proposals: Research agenda, implementation, recommendations

In summary, the next steps in the Adaptive Management Program process are:

- I. The AMPC completes preliminary research questions for the other two AMPC priority research topics (amphibians and eastern Oregon steep slopes), likely in early 2024.
- II. The IRST will complete similar scoping proposals (outlined above) for these questions.
- III. The AMPC will consider all of these scoping proposals in developing a complete research agenda⁶.
- IV. The IRST will implement the research agenda⁷, then report to this work to Oregon Board of Forestry (Board) and the AMPC⁸. The AMPC will make recommendations to the Board for Board decisions⁹.

Closing

Since this is the first time the AMPC has completed this stage of the AMP process, we welcome your feedback on how to improve the framing of the information and associated communications.

The AMPC looks forward to working with you, both in the long term, and on this particular scoping proposal. If you have any questions, please reach out to Oregon Department of Forestry's Adaptive Management Program Coordinator, W. Terry Frueh at Terry.Frueh@ODF.Oregon.gov or 503.871.2699.

Sincerely,
Members of the AMPC

⁴ Per OAR 629-603-0200(4)(d)

⁵ Per OAR 629-603-0200(4)(a)

⁶ OAR 629-603-0200(5)

⁷ OAR 629-603-0200(6)

⁸ OAR 629-603-0200(7)

⁹ OAR 629-603-0200(8)

A. Preliminary research questions

These preliminary research questions were approved by the AMPC as a substantial decision at their October 23, 2023 meeting.

1. Baseline Report.
 - a. What are the baseline levels of hydrologic connectivity¹⁰ of roads prior to the implementation of the Oregon Forest Practices Act (OFPA) road rules¹¹ effective Jan 1, 2024?
 - b. How do these levels vary based on landowner type and East/West region?
 - c. What other factors or variables within the regulatory framework of the FPA might be relevant?
2. Trend Monitoring. What are the trends in these levels of hydrologic connectivity of roads over 5-year intervals? These trends should be assessed for the same variables in question 1.
3. Determination of rule effectiveness. In the long term, to what extent are road rules associated with hydrologic disconnection effective at achieving biological goals and objectives?

B. Preliminary Research Question Package: Contextual information

The remainder of this document provides contextual information that details the context for the preliminary research questions, as required by rule¹². The following are organized per the elements in this rule.

B.1 The type of research¹³

AMPC response: This research is of type OAR 629-603-0100(1)(a): “Conduct effectiveness monitoring by assessing the degree to which the rules facilitating particular forest conditions and ecological processes achieve the biological goals and objectives. This assessment may include evaluation of cumulative effects.”

B.2 The rule, biological goals and objectives (BGOs), or other issue being studied¹⁴

AMPC response:

Note that the most recent version of the BGOs is in the Dec. 2022 draft HCP. The BGOs will be finalized within the HCP due Dec. 31, 2027. The ~~relevant~~ BGOs are listed below with those applicable to these questions highlighted:

“Overarching Goal: Forest practices that support the survival and recovery of the covered species by providing clean, cool, connected, and complex habitats.

Goal 1: Provide clean water and substrate for the covered species.

- o **Objective 1.1** - Forest practices near streams minimize sediment delivery.

¹⁰ Note: “hydrologic connectivity” is not defined in rule. This term refers to the degree to which a road is hydrologically connected to a stream, where as the definition in rule (“hydrologic disconnection” [OAR 629-600-0100(71)]) focuses on the *process* for removing this connectivity.

¹¹ For the FPA rules effective starting Jan. 1, 2024.

¹² OAR 629-603-0200 (3)(a)

¹³ OAR 629-603-0200(3)(a)(A)

¹⁴ OAR 629-603-0200(3)(a)(B)

- o **Objective 1.2** – Slope Retention Areas reduce episodic sediment delivery to fish-bearing streams.
- o **Objective 1.3** – Road runoff directly to streams is minimized.
- o **Objective 1.4** – Roads are not a significant source of episodic sediment delivery to streams.

Add Goal 2 and associated objectives

Goal 3: Stream network connectivity satisfies freshwater habitat needs for covered species.

- o **Objective 3.1** – Road crossings on fish-bearing streams are passable by the covered fish species.
- o **Objective 3.2** – Forest practices maintain the hydrologic continuity of stream-associated wetlands and stream-adjacent seeps and springs to stream habitats.
- o **Objective 3.3** – Timber harvest maintains stream-associated connectivity in riparian areas along non-fish streams sufficient to support covered amphibians.

Goal 4: Riparian areas function to support complex habitats for the covered species.

- o **Objective 4.1** – Mature, complex riparian forests are fostered in no-harvest zones of RMAs.
- o **Objective 4.2** – Forest practices within tree retention areas of RMAs promote delivery of large wood.
- o **Objective 4.3** – Designated Debris Flow Traversal Areas function to deliver large wood to fish-bearing streams.
- o **Objective 4.4** – Forest practices maintain stream-associated wetlands and stream-adjacent seep and spring habitat for amphibians.”

The rules being studied are listed in Appendix 1.

B.3 The objective of the research¹⁵

AMPC response:

1. To assess the current (baseline) status and trend of roads being that are hydrologically connected to streams, and how those vary with practice, region, landowner type, and other relevant strata.
2. Determine the effectiveness of the hydrologic disconnection practices associated with the PFA rules as of January 1, 2024 relevant rules in achieving the biological goals and objectives at minimizing hydrologic connectivity. road rules associated with hydrologic disconnection at achieving biological goals and objectives.

B.4 A brief description of the context of the research question¹⁶

AMPC response: The following direction was provided in the PFA Report (p. 67) and provides the foundation for these research questions:

¹⁵ OAR 629-603-0200(3)(a)(C)

¹⁶ OAR 629-603-0200(3)(a)(D)

“4.3.5 Hydrologic Connectivity in Forest Practice Rules (FPR) Revisions and Proposed Inventory Processes

Hydrologic connectivity occurs where road and ditch runoff is delivered to the natural stream channel system. Roads can generate overland flow due to the relatively impermeable surface of the road prism and can also intercept interflow at cutslopes, effectively converting subsurface flows to surface flows. When these surface flows have a continuous flow path between the road prism and a natural stream channel, hydrologic connectivity occurs (Furniss et al., 2000, pp. 5-6). As Furniss et al. describe, “a hydrologically connected road becomes part of the stream network” (pp. 5-6).

Hydrologically connected roads can deliver increased runoff, sediment, and chemicals associated with roads, such as spills or oils generated on the road surface or cutslope. At the watershed scale, connections between roads and streams can also alter the drainage density of the watershed and change runoff frequency and magnitude (See Furniss et al., 2000; Weaver et al., 2015).

The Authors agree that the goal of disconnecting roads and streams is to minimize sediment delivery, hydrologic change, and risk of road pollutants entering waters of the state.

4.3.10 Development of Monitoring Requirements

The Independent Research Science Team (IRST) created under the PFA shall design and oversee baseline and trend monitoring for hydrologic disconnection. Compliance monitoring will be conducted through the Department’s process.

1. Baseline and Trend Monitoring for Hydrologic Disconnection: The methodology for the monitoring shall be based off of Dube et al. (2010) and Martin (2009). The purpose of the monitoring for hydrologic disconnection is to establish a baseline and to monitor and report the change in hydrologic connectivity over time as the FRIA is implemented. The overarching goal is to ensure that all forest roads and landings shall be hydrologically disconnected to the maximum extent feasible from waters of the state. The Adaptive Management Program Committee shall use the results of the baseline and trend monitoring to develop regional goals consistent with that monitoring. All hydrologic connectivity data should be public and shared as it becomes available to help focus goals, identify accomplishments, and inform statewide learning.”

B.5 Other information the AMPC deems necessary for the IRST’s work¹⁷

AMPC Response:

1. It is essential to maintain the role of the regulatory framework (the OFPA) throughout the design and implementation of studies, including the following considerations:

¹⁷ OAR 629-603-0200(3)(a)(E)

- a. There are two stratum classifications:
 - A. FPA regions, of which there are two - East and West of the Cascade Mountains.
 - B. Landowner classifications in the FPA (of which there are two, each with a different regulatory framework for roads) – 1) small forestland owners (RCA); 2) ~~everyone else~~ large forestland owners (FRIA).
 - b. Assessments should differentiate Type F, SSBT, and N streams, but the design need not be stratified by stream type. Additional attributes listed in Dube et al. (2010) should also be considered.
- ~~2. Research should consider the following aspects of practices for disconnecting roads from streams:~~
- ~~• The relative frequency of use of the practices;~~
 - ~~• The aspects that go into determining their site specificity; and,~~
 - ~~• The relative efficacy and risks of the practices.~~
- ~~6-2. _____ The AMPC wants to know how metrics of interest (e.g. sediment delivery from roads) compares with background levels, and when thresholds of negative impacts to covered species have been crossed, including an assessment of both likelihood and magnitude of those impacts.~~
- ~~7. For assessing trends, the AMPC would like reporting to occur at intervals of 2-5 years rather than waiting for a single 20-year report.~~
- ~~8-3. _____ Ideally, the baseline would be for the effective date for the road rules (Jan. 1, 2024); however, the AMPC recognizes that it will take time to refine and scope the research questions, decide on the research agenda, develop and then award the RFP.~~
- ~~9-4. _____ Research should focus include on collecting field data, rather than on purely model-based assessments.~~
- ~~10-5. _____ When assessing effectiveness of practices rules, it would be helpful to understand results both individually practices and their cumulatively results.~~
- ~~11-6. _____ This entire research question package would be very complex, long, and expensive to implement as a single research project. Thus, the AMPC would appreciate the IRST dividing up this research question package into discrete projects and developing scoping proposals (per OAR 629-603-0200(4)) for each one.~~

Appendix 1. Road rules relevant for this research question package

Note: many of these rules become effective January 1, 2024.

OAR 629-625-0300 Road design

~~(3) The department shall publish Forest Practices Technical Guidance that explains how to avoid and prevent potential impacts to fish, wildlife, habitat resources, and waters of the state, in support of the following rules:~~

~~(g) OAR 629-625-0330(1) to explain how to implement rules to hydrologically disconnect forest roads and landings from waters of the state.~~

OAR 629-625-0320 Water Crossing Structures;

~~(10) Construction of Water Crossings. In the construction of water crossings, operators shall do the following:~~

~~(b) — Runoff, Erosion and Sediment. Operators shall control runoff, erosion, and sediment through the following actions:~~

~~(A) Include a site-specific erosion and sediment control plan as part of a written plan prior to beginning work. This plan must include, but is not limited to:~~

~~(i) A site plan with a description of the methods of erosion or sediment control;~~

~~(ii) Methods for confining, removing, and disposing of excess construction materials; and~~

~~(iii) — Measures to disconnect road surface and ditch water from all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals.~~

OAR 629-625-0330 Drainage

~~(1) All active, inactive, and vacated forest roads and landings shall be hydrologically disconnected to the maximum extent practicable from waters of the state to minimize sediment delivery from road runoff and reduce the potential for hydrological changes that alter the magnitude and frequency of runoff. Operators shall locate drainage structures based on the priority listed below. When there is a conflict between the requirements of sections (2) through (7) of this rule, the lowest numbered section takes precedence and the operator shall not implement the later numbered and conflicting section.~~

~~(2) Operator shall not install cross-drains and ditch-relief culverts in a way that causes stream diversion.~~

~~(3) Operators shall not concentrate road drainage water into headwalls, slide areas, high landslide hazard locations, or steep erodible fillslopes.~~

~~(4) Operators shall not divert water from stream channels into roadside ditches.~~

~~(5) Operators shall install drainage structures at approaches to stream crossings to divert road runoff from entering the stream. If placement of a single drainage structure cannot be placed in a location where it can effectively limit sediment from entering the stream, then additional drainage structures, road surfacing, controlling haul, or other site-specific measures shall be employed so that the drainage structure immediately prior to the crossing will effectively limit sediment from entering the stream. Operators may also use best management practices to manage sediment at the outflow of the drainage structure nearest to the crossing.~~

~~(6) Operators shall provide drainage when roads cross or expose springs, seeps, or wet areas.~~

~~(7) Operators shall provide a drainage system that minimizes the development of gully erosion of the road prism or slopes below the road using grade reversals, surface sloping, ditches, culverts, waterbars, or any combination thereof. For new road construction, operators shall use outsloping to the maximum extent practicable when site-specific conditions allow for its safe and effective use.~~

~~OAR 629-625-0600 Road Maintenance~~

~~(1) The purpose of this rule is to protect water quality and ensure hydrologic disconnection of roads from waters of the state to the maximum extent practicable by timely maintenance of all active and inactive roads. Road surface must be maintained as necessary to:~~

- ~~(a) Minimize erosion of the surface and the subgrade;~~
- ~~(b) Minimize direct delivery of surface water to waters of the state;~~
- ~~(c) Minimize sediment entry to waters of the state;~~
- ~~(d) Direct any groundwater that is captured by the road surface onto stable portions of the forest floor;~~
- ~~(e) Ensure properly functioning and durable drainage features; and~~
- ~~(f) For existing roads with inboard ditch, avoid overcleaning of ditchlines.~~

~~Note: OAR 629-600-0100(71) "Hydrologic disconnection" means the removal of direct routes of drainage or overland flow of road runoff to waters of the state.~~

~~629-625-0900 Forest Road Inventory and Assessment~~

~~(1) The purpose of the Forest Road Inventory and Assessment (FRIA) is to reduce chronic and catastrophic sediment entry to waters of the state and to ensure passage for covered species during all mobile life history stages by identifying existing roads not meeting the forest practice rules and bring those roads into compliance with the forest practice rules.~~

~~(2) OAR 629-625-0900 does not apply to small forestland owners, as defined in OAR 629-600-0100. Small forestland owners shall submit a road condition assessment when they submit a notification of operation for a timber harvest that will use a road to haul timber, as described in OAR 629-625-0920.~~

~~(3) The department shall publish Forest Practices Technical Guidance for compliance with the Forest Road Inventory and Assessment process to avoid and prevent potential impacts to fish, wildlife, habitat resources, and waters of the state.~~

~~(4) The Forest Road Inventory and Assessment rules apply to segments of roads located on a large forest landowners' property, excluding roads that are owned or controlled by a government entity, including, but not limited to, the United States, and federally recognized Indian Tribes. For the purposes of this section, both ownership and control mean any right, interest, or agreement that precludes the large forest landowner from being able to conduct road work without prior authorization.~~

~~(5) Pre-inventory. Landowners shall submit a pre-inventory of high conservation value sites on each road management block to the State Forester no later than January 1, 2025.~~

~~(a) Landowners shall include high conservation value sites in the pre-inventory that address the following sites:~~

- ~~(A) — Areas of known chronic sedimentation. Consideration will be given to areas where log hauling will occur during the 5-year inventory phase.~~
- ~~(B) — Fish passage barriers known to be of significant concern. Priorities will be based on locations where fish passage would provide the greatest benefit to native migratory fish consistent with OAR 635-412-0015 and other criteria as determined by the Department of Fish and Wildlife in consultation with the department and consistent with the Oregon Fish Passage Barrier Data Standard developed by the Department of Fish and Wildlife Fish Screening and Passage Program.~~
- ~~(C) — Ongoing stream diversions at stream crossings and areas with stream diversion potential.~~
- ~~(D) — Areas of known hydrologic connectivity.~~
- ~~(b) — From the list of high conservation value sites identified, landowners shall prioritize projects on high conservation value sites within the pre-inventory submission that:
 - ~~(A) — Remove fish passage barriers consistent with Department of Fish and Wildlife requirements;~~
 - ~~(B) — Minimize the potential for sediment delivery to waters of the state;~~
 - ~~(C) — Minimize stream diversions at water crossings;~~
 - ~~(D) — Minimize hydrologic connectivity between roads and waters of the state; and~~
 - ~~(E) — Meet other relevant criteria as determined by the department in consultation with other state and federal agencies.~~~~
- ~~(c) — Landowners shall meet with the department and Department of Fish and Wildlife to review the pre-inventory list no later than January 1, 2026.
 - ~~(A) — The department shall meet with the Department of Fish and Wildlife to review the list and coordinate to ensure that high conservation value sites are prioritized based on habitat values, road conditions, sediment delivery to waters of the state, hydrologic connectivity, and fish passage in alignment with the barrier assessment and inventory prioritization under the Department of Fish and Wildlife Fish Passage Program.~~
 - ~~(B) — The department and the Department of Fish and Wildlife may propose additional projects to the pre-inventory list if they believe that high conservation value sites have not been addressed.~~
 - ~~(C) — The department shall coordinate with the Department of Fish and Wildlife to ensure that information collected in the pre-inventory process is standardized and is in a format consistent with the Oregon Fish Passage Barrier Data Standard.~~~~
- ~~(d) — Landowners shall address prioritized pre-inventory projects after review from the department and Department of Fish and Wildlife beginning no sooner than January 1, 2026, and no later than January 1, 2029.~~
- ~~(e) — Landowners shall report annually to the department and Department of Fish and Wildlife on the status and completion of pre-inventory projects through January 1, 2029.~~

- ~~(6) Landowners shall submit an initial inventory of all active, inactive, and known vacated or abandoned roads no later than January 1, 2029.~~
- ~~(a) The initial inventory shall include three documents:~~
- ~~(A) Paper or electronic maps showing the roads within each road management block;~~
- ~~(B) A work matrix documenting actions necessary to bring all roads into compliance with the forest practice rules. The document shall include prioritization of work; and~~
- ~~(C) A Forest Road Inventory and Assessment initial inventory plan describing how the landowner intends to bring the road network into compliance no later than January 1, 2044. The plan shall include:~~
- ~~(i) Actions likely to be addressed in the upcoming year;~~
- ~~(ii) A general description of how work will occur during the Forest Roads Inventory and Assessment period; and~~
- ~~(iii) A description of how the landowner is prioritizing work with the goal of optimizing environmental benefits.~~
- ~~(D) At minimum, the FRIA initial inventory submission shall include:~~
- ~~(i) The location and length of active roads, inactive roads, and vacated roads within each road management block.~~
- ~~(ii) The location of streams within the road management block, classified as:~~
- ~~(I) Fish;~~
- ~~(II) Non-fish;~~
- ~~(III) SSBT;~~
- ~~(IV) Fish presence unknown; or~~
- ~~(V) Streams that are 303(d) listed shall be depicted as such in addition to fish use designation.~~
- ~~(iii) Known or potential road-related fish passage barriers. Data collected shall be consistent with the Oregon Fish Passage Barrier Data Standard in consultation with Department of Fish and Wildlife.~~
- ~~(iv) Prioritization of known or potential road-related fish passage barriers. Prioritization of fish passage barriers shall be done in a manner consistent with the Department of Fish and Wildlife Fish Passage Program.~~
- ~~(v) The location and status of all water-crossing culverts including:~~
- ~~(I) Date of installation, if known; and~~
- ~~(II) Assessment of culvert material used.~~
- ~~(vi) Each water-crossing culvert shall be classified as one of the following:~~
- ~~(I) A fully functioning culvert in a Type F or Type SSBT stream;~~
- ~~(II) A fully functioning culvert in a Type N or Type D stream;~~
- ~~(III) A culvert with imminent risk of failure;~~

- ~~(IV) — A culvert with minimum risks to public resources; or~~
- ~~(V) — Undetermined status. Culverts with undetermined status must be prioritized for improvement. The status may be changed as more detailed information is gathered.~~

- ~~(b) — The FRIA initial inventory submission shall identify each road segment as:
 - ~~(A) — Meeting the forest practice rules;~~
 - ~~(B) — Not meeting the forest practice rules;~~
 - ~~(C) — Vacated in compliance with OAR 629-625-0650; or~~
 - ~~(D) — Abandoned.~~~~

~~(7) — In the year following submitting the initial inventory but no later than January 1, 2029, landowners shall submit annual inventory reports and plans until January 1, 2044, which shall include:~~

- ~~(a) — Updates to the maps required by OAR 629-625-0900(6)(a)(A) reflecting:
 - ~~(A) — Work accomplished during the prior year;~~
 - ~~(B) — Additional information discovered; and~~
 - ~~(C) — Potential changes in prioritizations.~~~~

- ~~(b) — Update to the work matrix required by OAR 629-625-0900(6)(a)(B) showing:
 - ~~(A) — Improvements completed;~~
 - ~~(B) — Work to be completed;~~
 - ~~(C) — Additional information discovered; and~~
 - ~~(D) — Changes in prioritization.~~~~

- ~~(c) — Update to the annual plan required by OAR 629-625-0900(6)(a)(C) reflecting:
 - ~~(A) — Work conducted in the prior year;~~
 - ~~(B) — Work likely to be completed in the upcoming year; and~~
 - ~~(C) — General plan to complete all necessary work no later than the January 1, 2044.~~~~

~~(8) — The documents required by OAR 629-625-0900(7) must contain all the following:~~

- ~~(a) — Total length of forest roads improved, including as a subset, length improved by compliance with OAR 629-625-0330(1) Drainage.~~
- ~~(b) — Total length of forest roads still requiring improvement.~~
- ~~(c) — Total length of forest roads planned for improvement in the upcoming year.~~
- ~~(d) — Total length of forest roads vacated.~~
- ~~(e) — Total length of forest roads planned to be vacated in the upcoming year.~~
- ~~(f) — Number of fish barriers brought into compliance with OAR 629-625-0320 Water Crossing Structures.~~
- ~~(g) — Number of fish barriers to be improved in the upcoming year.~~
- ~~(h) — Certification by the landowner that they remain on track for completing required improvements no later than January 1, 2044.~~

~~(9) — Landowners shall improve all road segments identified in the initial inventory as not meeting the forest practice rules so that those segments either meet the Forest Practice Administrative Rules or are vacated no later than January 1, 2044.~~

~~(10) — For culverts that meet the definition of pre-existing culverts, landowners shall:~~

- ~~(a) — Inspect them every five years when the installation date is not known; and~~

- ~~(b) — Maintain them to end of service life or until they no longer meet the definition of pre-existing culverts.~~
- ~~(11) — For culverts that do not meet the definition of pre-existing culverts, landowners shall:
 - ~~(a) — Prioritize them for improvement during the initial inventory;~~
 - ~~(b) — Bring them into compliance with Forest Practice Rules no later than January 1, 2044; or~~
 - ~~(c) — For culverts not meeting the definition of pre-existing, consult with the Department of Fish and Wildlife to assign them a status of low priority and maintain them to the end of their service life when they meet the following criteria:
 - ~~(A) — The culvert is partially functioning to provide fish passage and the cost of repair or replacement is disproportionate to the benefits of the repair or replacement; or~~
 - ~~(B) — The culvert provides valuable wetland or pond habitat.~~~~~~
- ~~(12) — For culverts meeting the definition of having imminent risk of failure, landowners shall repair or replace the culvert as soon as practicable but no later than two years after having been identified.~~

~~629-625-0910 State-led Abandoned Roads Inventory~~

- ~~(1) — The department in consultation with the U.S. Environmental Protection Agency shall lead a cooperative effort to identify abandoned roads. The purpose of this effort is to identify abandoned roads and bring them into compliance with the forest practice rules to reduce the potential of abandoned roads to produce chronic sediment and increase the risks of mass wasting and stream diversions.~~
- ~~(2) — After identifying abandoned roads, the department and cooperators shall identify abandoned roads with a high level of risk to waters of the state or infrastructure. The State Forester shall provide the results of the inventory to landowners no later than January 1, 2026. The department shall use the following criteria listed in order of importance to identify risk levels:
 - ~~(a) — Ongoing stream diversion at stream crossings.~~
 - ~~(b) — Diversion potential at stream crossings.~~
 - ~~(c) — Likelihood of hydrologic connectivity.~~
 - ~~(d) — Comparative risk of chronic sediment produced.~~
 - ~~(e) — Risk of contribution to mass wasting.~~
 - ~~(f) — Other criteria as determined by the department in consultation with other state and federal agencies.~~~~
- ~~(3) — Following the identification of high-risk abandoned road segments, the department in coordination with landowners shall identify high-priority abandoned road segments from the list of high-risk locations. Considerations for designating a segment as high priority shall include:
 - ~~(a) — Importance of the HUC-6 watershed to recovering salmonids;~~
 - ~~(b) — Number of stream crossings based on full-densified stream network;~~
 - ~~(c) — Cost of improvements in comparison to the benefits; and~~~~

- ~~(d) — Other criteria as determined by the department in consultation with other state and federal agencies.~~
- ~~(4) — Landowners shall complete a field verification of all high-priority abandoned road segments identified in section (3).~~
 - ~~(a) — The department, Department of Environmental Quality, and Department of Fish and Wildlife shall, when necessary, review landowner verifications of high-priority sites and improvement plans.~~
 - ~~(b) — Landowners shall include the following information in their field verification of high-priority abandoned road segments:
 - ~~(A) — Confirmation that the high-priority site is on an abandoned road.~~
 - ~~(B) — Determination whether the segment is diverting the stream or has diversion potential.~~
 - ~~(C) — Determination regarding whether the segment is actively contributing sediment or has a high risk of contributing significant quantities of sediment to waters of the state. Indicators of risk of contributing significant quantities of sediment may include:
 - ~~(i) — A sediment deposit reaching the high-water line of a defined channel of a flood-prone area;~~
 - ~~(ii) — A channel that extends from a road drainage structure outlet to the high-water line of a defined channel or a flood-prone area;~~
 - ~~(iii) — Evidence of surface flow between the drainage structure outlet and a defined channel or a flood-prone area;~~
 - ~~(iv) — Turbid water reaching all typed waters, lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals during runoff events;~~
 - ~~(v) — Evidence of direct sediment entry into a watercourse or a flood-prone area from road surfaces or drainage structures and facilities (e.g., ponded sediment, sediment deposits, delivery of turbid runoff from drainage structures during rainfall events);~~
 - ~~(vi) — Gullies or other evidence of erosion on road surfaces or below the outlets of road drainage facilities or structures, including ditch drain (relief) culverts, with transport or a high likelihood of transport to a watercourse;~~
 - ~~(vii) — Native surfaced roads exhibiting erosion;~~
 - ~~(viii) — Native surfaced roads composed of erodible soil types (e.g., granitic soils);~~
 - ~~(ix) — Rilled, gullied, or rutted road approaches to crossings;~~
 - ~~(x) — Existing ditch drain (relief) culverts or other road drainage structures with decreased capacity due to damage or impairment (e.g., crushed or bent inlets, flattened dips due to road grading);~~
 - ~~(xi) — Decreased structural integrity of ditch drain (relief) culverts, waterbreaks, or other road drainage structures (e.g., excessive pipe corrosion, breached water breaks, or rutted road segments);~~~~~~

~~(xii) Ditch scour or downcutting resulting from excessively long undrained ditches with infrequent ditch drain (relief) culverts or other outlet structures or facilities. This condition can also result from design inadequacies (e.g., spacing not altered for steep ditch gradient), inadequate erosion prevention practices (e.g., lack of armoring), or ditches in areas of erodible soils.~~

~~(D) Analysis of net benefit for waters of the state to improve the abandoned road segment.~~

~~(E) Determination regarding practicability of alternatives to improve the abandoned road segment and address the following risks:~~

~~(i) Ongoing stream diversions at stream crossings;~~

~~(ii) Diversion potential at stream crossings;~~

~~(iii) Likelihood of hydrologic connectivity;~~

~~(iv) Comparative risk of chronic sediment produced; and~~

~~(v) Risk of contribution to mass wasting.~~

~~(F) The alternatives may include vacating the segment, no action, and any other reasonable alternative. Landowners shall propose the most practicable alternative as part of the annual report.~~

~~(5) Landowners shall add the verified high-priority abandoned road segments to the Forest Roads Inventory and Assessment initial inventory.~~

~~(6) Landowners shall improve the abandoned road segment as part of the Forest Roads Inventory and Assessment process when, in consultation with the department, the following criteria are met:~~

~~(a) The high-priority location is an abandoned road;~~

~~(b) The high-priority location is actively contributing or has high risk of contributing significant quantities of sediment to waters of the state;~~

~~(c) The improvements would be a net benefit to waters of the state; and~~

~~(d) Improvements are practicable.~~

~~629-625-0920 Road Condition Assessment~~

~~(1) The purpose of this rule is to ensure that roads used for harvest and owned by small forestland owners, as defined by OAR 629-600-0100, comply with the standards of the forest practice rules.~~

~~(2) The requirements of the Forest Road Inventory and Assessment program described in OAR 629-625-0900 do not apply to small forestland owners.~~

~~(3) When a small forestland owner submits a notification including the harvest of timber using the department's reporting and notification system, they shall complete the department road condition assessment. Notifications for activities other than timber harvest shall not require completion of a road condition assessment. The small forestland owner is encouraged to complete the road condition assessment for all roads in their parcel without a planned timber harvest.~~

~~(4) The road condition assessment shall include all roads in the parcel owned by the small forestland owner where the harvest will take place, including the following descriptions:~~

- ~~(a) — The road condition that contributes to active or potential delivery of sediment to waters of the state;~~
- ~~(b) — Water crossing's locations and the status of compliance with the forest practice rules;~~
- ~~(c) — Potential fish passage barriers on Type F and Type SSBT streams;~~
- ~~(d) — Abandoned roads; and~~
- ~~(e) — Roads with a perched fill that present a significant hazard to fish-bearing streams.~~
- ~~(5) — The department, in consultation with the Department of Fish and Wildlife, shall review eligibility for state grants to improve the road conditions described in section (4)(c), (d), and (e) of this rule.~~
- ~~(6) — The small forestland owners are not required to undertake the following road improvements projects, without funding by the State of Oregon:
 - ~~(a) — Replacement of culverts for Type F and Type SSBT streams;~~
 - ~~(b) — Repair of abandoned roads; or~~
 - ~~(c) — Reconstructing, vacating, or relocating roads with a perched fill that present a significant hazard to fish-bearing streams.~~~~
- ~~(7) — If the State of Oregon, under the small forestland investment in stream habitat program described in OAR 629-607-0300, fails to fund an eligible and approved road improvement project for a small forestland owner, the non-implementation of those projects shall not prevent the small forestland owner from using the road for any purpose, except for the following conditions:
 - ~~(a) — The road is actively delivering sediment to waters of the state; or~~
 - ~~(b) — The road has one or more culverts with an imminent risk of failure, as defined in OAR 629-600-0100.~~~~
- ~~(8) — If the road condition assessment identifies necessary road repairs, other than the road conditions in section (7)(a) and (b) of this rule, there shall be no time limit in which the small forestland owner must complete those repairs, though the obligation to improve roads when used for harvest remains.~~