DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE COMMISSIONER OF PUBLIC LANDS
1111 WASHINGTON ST SE
MAIL STOP 47037
OLYMPIA, WA 98504-7037

360-902-1300
WWW.DNR.WA.GOV

To: Terra Rentz, Chair, Forest Health Advisory Committee (FHAC)
Allen Lebovitz, Chair, Wildland Fire Advisory Committee (WFAC)

CC: Alex Smith, Deputy Supervisor Forest Resilience, Regulations, and Aquatic Resources
Jen Watkins, Forest Resilience Division Manager
Russ Lane, Wildland Fire Management Division Manager
Loren Torgerson, Wildland Fire Policy Advisor
FHAC and WFAC Committee Members

From: George Geissler, State Forester and Deputy Supervisor Wildland Fire Management

Date: March 6, 2023

Subject: Joint Workgroup Task Order for the Pacific Northwest Region Quantitative Wildfire Risk Assessment update, prioritized relative ranking of Highly Values Resources and Assets

Attached: PNW Quantitative Wildfire Risk Assessment Briefing

Title: Joint Workgroup on the Pacific Northwest Region Quantitative Wildfire Risk Assessment update, prioritized relative ranking of Highly Values Resources and Assets

Requested By: George Geissler, State Forester Deputy Supervisor Wildfire Management

Task Leaders: Terra Rentz, Chair FHAC; Allen Lebovitz, Chair WFAC

1. **Intent:** The intent of this task is to engage the Wildland Fire Advisory Committee (WFAC) and the Forest Health Advisory Committee (FHAC) to provide recommendations to the State Forester for prioritizing relative rankings of "highly valued resources or assets (HVRAs)" for the Pacific Northwest Region "Quantitative Wildfire Risk Assessment (QWRA)" update.

2. **Overview:** QWRAs are designed to provide natural resource and fire managers, community planners, emergency response professionals and others with data and analytics they need to make risk-informed decisions. Outputs from the PNW QWRA have been used in active fire response across the region, in community wildfire protection plans, and to inform landscape scale fuel treatment strategies among many other applications. The previous PNW Quantitative Wildfire Risk Assessment was released in 2018. The updated assessment is expected to be released before June 2023.

   Since the first PNW QWRA was released in 2018, landscapes in Oregon and Washington have changed significantly. The primary reason for updating the assessment is to capture the effect those changes might have on risk across the region. A second reason for the update is to take advantage of improvements in fire modelling and related data. Advancements in data and technology will yield more refined estimates of fire behavior and risk.

   Stakeholders can contribute to the update process by helping map the resources and assets for which wildfire risk is evaluated. There are innumerous values which could be affected by wildfire, the goal of the QWRA is to focus on the most important values which are termed HVRAs. In the current assessment the identified HVRAs include: people and property, infrastructure, drinking water supply, timber, grazing, agriculture, ecological integrity, wildlife and recreation.

The final component of the quantitative risk assessment framework is to weigh calculated risk to an HVRA, by its relative importance. Relative importance weights are used to combine individual risk of each HVRA into a single risk map that represents risk to all HVRAs. Relative importance recognizes that there are different levels of importance for the HVRAs. Relative importance schemes should reflect management priorities articulated in policy and management plans.

The 2023 update will use one weighting scheme that reflects the relative importance agreement between federal and state agencies involved in the update. The weighting scheme will be applied to produce a final risk map for Oregon and Washington. Achieving agreement on a relative importance scheme will occur at a state and federal agency leaders in a meeting this spring. This meeting will include a representative from Washington Department of Natural Resources leadership.

The Washington State Forester, as representative for WDNR, is seeking recommendations from WFAC and FHAC for developing the relative importance weighting of the HVRAs.

3. **Background:** See PNW Quantitative Wildfire Risk Assessment Briefing

4. **Purpose:** The purpose is to employ the expertise, knowledge and connections of the WFAC and FHAC to consider prioritizing relative rankings of HVRAs for the Pacific Northwest Region QWRA update and provide recommendations to the State Forester.

5. **Task description:**
    A. Review, discuss and develop a relative ranking and weighting of importance for the HVRAs being used in the 2023 PNW QWRA update.

    B. Provide justification for the recommended HVRA ranking and weighting.

    C. If relevant, document and identify any new information or data sources that could help inform future HVRA mapping.

6. **Assigned to:** For consideration by the full WFAC and FHAC, with specific elements of the task and first draft deliverables to be completed by the assigned Joint Workgroup. The entre WFAC and FHAC shall be included in making key decisions and approval of final products.

7. **Joint Workgroup Composition and Expectations:** The JW should be comprised of an equal number of members of both the FHAC and WFAC, with initial solicitation occurring at the March 16th joint special session of WFAC/FHAC. Requests to participate are due no later than March 23, 2023 and shall be submitted to the chair of each respective committee. Primary JW staff support will be provided by DNR Senior Fire Scientist, Ana Barros.

    The JW shall convene as needed between March 27th and April 28th, with a final report to be completed by May 1st, to be presented to the full Committees at the regularly scheduled FHAC meeting on May 16 and WFAC meeting on May 18, 2023.

8. **Products to be generated:** A report providing analysis and recommendations on the identified topics.

9. **Final Disposition:** The report is to be delivered to George Geissler for presentation to the Pacific Northwest Region QWRA update meeting.

PNW Quantitative Wildfire Risk Assessment

Assigning relative importance in the 2023 update

Ana Barros | ana.barros@dnr.wa.gov

Introduction and background

This is a working document meant to support the engagement of the Forest Health Advisory Committee and the Wildfire Advisory Committee in developing a weighting scheme for the 2023 update of the Pacific Northwest Quantitative Wildfire Risk Assessment (hereafter, QWRA).

The QWRA was first released in 2018 and is being updated to account for landscape changes due to fire and treatments, better data and science and stakeholder feedback collected over the past five years. Oregon State University is leading the update in coordination with U.S. Forest Service, Washington Dept. of Natural Resources, Oregon Dept. of Forestry, and other state and federal land management agencies.

A quantitative wildfire risk assessment evaluates wildfire risk to a specific set of highly valued resources and assets (HVRAs) that are regionally relevant and for which adequate spatial data exists. The QWRA is a suite of products that includes fire behavior products, maps of the spatial distribution of the HVRAs, and risk to individual HVRA that can be used to address specific risk management questions. The QWRA also includes a risk map that integrates risk to individual HVRAs into a single risk map. Different programs within Washington Department of Natural Resources use risk products in different ways. For example, the 20-year Forest Health Strategic Plan for Eastern Washington uses risk to people and property, infrastructure, timber, forests and sources of drinking water to prioritize the location of forest health treatments in eastern WA. Other risk product applications outside of our agency include the development of CWWPs, FEMA grant proposals and prioritization of federal fires.

The QWRA update has three main components. Members of the Committees will be asked to provide a recommendation on relative importance, which is the third and final component of the quantitative wildfire risk assessment framework. A brief description of the other two components is provided below.

The first component of the QWRA update was to produce new fire behavior simulations that reflect fuels on a 2022 landscape. The wildfires and treatments that happened in the years following the last QWRA have changed the way fire will occur (and burn) in burned and treated areas as well as in their vicinity. New fire behavior simulations account for changes in expected fire occurrence and behavior on the 2022 landscape. All modeling outputs were completed in 2022 by the country's lead in fire modeling, Pyrologix LLC in Missoula, MT.

The second component of the QWRA process is to map the HVRAs on the landscape and develop response functions for each HVRA. The 2018 QWRA evaluated risk for six HVRAs and for the 2023 update the proposal is increase the list of HVRAs to nine, possibly ten (Table 1). The spatial data associated with each HVRA is available for review online[1]. The proposed list of HVRAs and data sources is the product of extensive collaboration with stakeholders and partners.

Mapping for the majority of HVRA's is being finalized, and the response function workshop took place in Vancouver, WA, in March. The purpose of the workshop is to quantify the effect of fire on each HVRA. The

[1] *https://storymaps.arcgis.com/stories/1afdb7850dcf48e99a9f79c2f60182f4*

quantitative risk assessment framework relies on expert judgment to quantify the relationship between HVRA value and fire intensity. Response functions indicate the relative percent change in value expected for a given HVRA at a given fire intensity level (Table 2). Importantly, response functions can be used to quantify both the adverse (i.e., negative response function values) and beneficial (i.e., positive response function values) impacts of wildfire.

Table 1. Summary of proposed changes to changes in the updated QWRA compared to the version released in 2018. The technical team has an ongoing discussion regarding including Late Successional Reserves as a stand-alone HVRA. Late Successional Reserve forests are currently embedded in the Ecological Integrity HVRA.

HVRA	Included in 2018?	Level of update	Description of changes
People and Property	Yes	Major	Previous QWRA evaluated risk to only residential structures, but updated QWRA will include residential and non-residential structures. Social vulnerability to be included as variable that influences susceptibility.
Infrastructure	Yes	Minor	Datasets updated. Some energy production and storage sites added to list of sub-HVRAs. Historical structures, sawmills, and recreation sites omitted.
Drinking Water	Yes	Major	Extent of watersheds reduced in Washington. 'Distance to intake' and 'population served' omitted as characteristics that influence relative importance.
Timber	Yes	Minor	Size class data updated. Private non-industrial ownership added as sub-HVRA
Grazing	No	New	Completely new HVRA
Agriculture	No	New	Completely new HVRA
Ecological Integrity	Yes	Major	Forest vegetation assessed in much the same way, but with updated data. New rangeland sub-HVRAs and methodologies added.
Wildlife	Yes	Minor	Similar methods with updated datasets. Refined extent and characterization of northern spotted owl. Removed Lahontan cutthroat trout.
Recreation	No	New	Similar methods, but taken out from under the Infrastructure HVRA and placed in its own HVRA.

Table 2. A hypothetical, simplified response function framework for two different HVRAs adapted from (Scott et al., 2013).

	Flame Length Class					
	FIL 1	**FIL 2**	**FIL 3**	**FIL 4**	**FIL 5**	**FIL 6**
HVRA	*0 - 2′*	*2 - 4′*	*4 - 6′*	*6 – 8’*	*8 - 12′*	*>12′*
Infrastructure	-50	-60	-70	-80	-90	-100
Habitat	60	40	20	-20	-40	-80

The third component of the quantitative risk assessment framework is to weigh the calculated risk to an HVRA, by its relative importance. Relative importance weights are used to combine the individual risk of each HVRA into a single risk map that represents risk to *all HVRAs* included in the assessment. Relative importance recognizes that there are different levels of importance for the HVRAs. Relative importance schemes should reflect management priorities articulated in policy and management plans. Table 3 shows relative importance assigned to each HVRA in the 2018 Pacific Northwest Quantitative Risk Assessment as well as in other risk assessments to illustrate the variability in HVRAs and relative importance schemes.

The 2023 update will use one weighting scheme that reflects the relative importance agreement between federal and state agencies involved in the update. The weighting scheme will be applied to produce a final risk map for Oregon and Washington. The proposed process to achieve agreement on a relative importance scheme is to convene state and federal agency leaders in a meeting this spring. This meeting will include a representative from Washington Department of Natural Resources leadership.

Table 3. Relative importance schemes used in past quantitative risk assessments.

Risk assessment	HVRAs included in assessment	Relative importance
2018 Pacific Northwest Quantitative Risk Assessment	People and Property	33%
	Infrastructure	18%
	Watersheds	18%
	Timber	12%
	Wildlife	10%
	Vegetation Condition	9%
California	People and Property	60%
	Water	20%
	Infrastructure	20%
Colorado	People and Property	53%
	Infrastructure	32%
	Water	10%
	Vegetation	5%
Chugach National Forest	People and Property	69%
	Infrastructure	14%
	Water	11%
	Carbon	6%
	People and Property	48%

Eastern Region Forests	Infrastructure	26%
	Timber	13%
	Water	10%
	Vegetation	3.20%
	Recreation	0.30%
San Juan National Forest	WUI	21%
	Infrastructure	19%
	Drinking Water	17%
	Water Condition	13%
	Threatened and endangered species habitat	11%
	Cultural sites	9%
	Limited habitat	6%
	Timber	4%
Rio Grande National Forest	WUI	44%
	Infrastructure	10%
	Lynx Selected Habitat	9%
	Aquatic Life Habitat	2%
	Critical Watersheds	18%
	Vegetation	11%
	Timber	6%
Northern Region	People and Property	22%
	Watershed resources	22%
	Aquatic habitat	14%
	T&E terrestrial habitat	11%
	Timber	8%
	Vegetation structure	8%
	Important vegetation	6%
	Infrastructure	6%
	Recreation infrastructure	3%

Request to the Committees

The relative importance scheme that the DNR advocates for in the upcoming QWRA meeting should be informed by a discussion involving the FHAC and WFAC. Ideally, the product of that discussion would include a recommendation of relative importance weights (or range of weights) for the HVRAs included in the 2023 update and a rationale for the recommendation.