

Proposed Issues and Preliminary Strategies for Discussion  
Forestry Preparation and Adaptation Work Group

<p><b><u>Proposed Issues</u></b> <i>(Each issue may have distinct aspects at varying spatial, temporal, or biotic organizational scales, including differences between eastern &amp; western Washington.)</i></p>	<p><b><u>Potential Strategies</u></b></p>
<p><u>Forest Health and Fire Effects in Current Stands</u></p> <ul style="list-style-type: none"> <li>• Changes in insect and disease patterns               <ul style="list-style-type: none"> <li>- Over-wintering</li> <li>- Speeding up life-cycles</li> <li>- Range expansion</li> <li>- Altered predator-prey relationships</li> </ul> </li> <li>• Moisture stress and temperature-induced increases in tree vulnerability to insects and disease (and to fire).</li> <li>• Changing fuel conditions, due to insect and disease mortality.</li> <li>• “Uncharacteristic” (outside the natural range of variability; ecologically atypical) size, severity (# trees killed), or frequency of fires.</li> <li>• Lengthened fire seasons.</li> <li>• Carbon emissions from uncharacteristic fires.</li> <li>• Cost of suppression of uncharacteristic fires.</li> <li>• Stand-level ecological response to conditions created by major disturbance events, in the context of changing climate, including stand-level resilience.</li> </ul>	<ul style="list-style-type: none"> <li>• Major need for thinning in unhealthy, overcrowded forests</li> <li>• 2007 Forest Health legislation</li> <li>• Pilot projects and information dissemination</li> <li>• Seed banks and nurseries for reforestation after fires</li> <li>• Regulatory and institutional flexibility</li> </ul>

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<p><u>Species' Physiology, Ecology, and Distribution</u></p> <ul style="list-style-type: none"> <li>• Changes in the health, survival, and reproductive success of individual plant and animal species.</li> <li>• Changes to the range of individual species, including currently "exotic" species, especially where triggered by climate-related disturbance events.</li> <li>• Changes in ecological relationships among species, including invasive species, due to any of the above.</li> <li>• Effects on intra-specific genetic variability as a result of any of the above.</li> <li>• Species-level resilience to climate change, including disturbance events.</li> <li>• <i>(Also see Habitat)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Need system of gene pool reserves</li> </ul>
<p><u>Timber Management and Economics</u></p> <ul style="list-style-type: none"> <li>• Growth and yield models may become outdated.</li> <li>• Management (silvicultural) guidelines may become outdated.</li> <li>• Changing economics of species based on prevalence, range, and productivity.</li> <li>• Reforestation needs may change.</li> <li>• Excess supply of thinned material, and lack of available processing infrastructure.</li> <li>• Landowner harvest decisions and investor decisions, in relation to perceived climate change-related risk, in a global context.</li> <li>• Practices of neighboring or other landowners.</li> </ul>	<ul style="list-style-type: none"> <li>• New models</li> <li>• New silvicultural guidelines</li> <li>• Changed management of seed orchards and nurseries</li> <li>• Flexibility in processing infrastructure</li> </ul>

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<p style="text-align: center;"><u>Habitat</u></p> <ul style="list-style-type: none"><li>• <i>(Also see Species issues.)</i></li><li>• Degradation or change in key habitat factors for important animal species, including legally protected species, as a result of climate change directly, forest health, hydrologic effects including those related to forest roads, fire or other disturbances, exotic and/or invasive species, or other ecological effects.</li><li>• Institutional and regulatory (lack of) flexibility to deal appropriately with habitat issues in a timely way.</li></ul>	<ul style="list-style-type: none"><li>• None mentioned</li></ul>
<p style="text-align: center;"><u>Protected Areas</u></p> <ul style="list-style-type: none"><li>• Sustainability of ecosystem services of protected areas may be compromised.</li><li>• The ecological connectivity function of protected area networks may be affected.</li><li>• A broad range of socio-cultural values and benefits of protected areas may be positively or negatively affected, including non-timber and/or culturally significant plant, mineral or other resources, public access and recreation, education, and aesthetics</li><li>• <i>(Note: These same individual issues may also be a concern for other resource lands, whether or not legally protected.)</i></li></ul>	<ul style="list-style-type: none"><li>• None mentioned</li></ul>

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<p style="text-align: center;"><u>Temporal and Spatial Scale</u></p> <ul style="list-style-type: none"> <li>• Non-gradual major effects</li> <li>• Landscape-scale effects</li> <li>• Distinct effects in Eastern and Western Washington</li> </ul>	<ul style="list-style-type: none"> <li>• Disaster response preparedness</li> <li>• Multi-landowner coordinated response across landscapes</li> <li>• Improved large scale information gathering (e.g. LIDAR)</li> <li>• Develop key indicators and triggers and increase monitoring</li> </ul>
<p style="text-align: center;"><u>Forest Hydrologic Effects (Proposed)</u></p> <ul style="list-style-type: none"> <li>▪ Effects of altered precipitation and temperature patterns on snow accumulation and snowmelt.</li> <li>▪ Effect on soil moisture and water-stress for plants, including resulting effects on vulnerability to insects and disease attacks, and on fuel moisture level.</li> <li>▪ Effects on runoff and streamflow timing and level, including effects of altered disturbance patterns.</li> <li>▪ Effects on soil erosion and mass wasting.</li> <li>▪ Effects of high and low streamflow on in-stream and riparian habitat, forest road systems and other infrastructure, restoration projects, and public recreation opportunities.</li> </ul>	
<p><u>Unknowns</u></p> <ul style="list-style-type: none"> <li>• Likely rates of change</li> <li>• Variability in climate pattern and in disturbance mechanisms.</li> <li>• Seasonal timing of hydrological effects.</li> <li>• Effects of CO<sub>2</sub> enrichment on productivity, water</li> </ul>	<ul style="list-style-type: none"> <li>• Targeted research</li> </ul>

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<p>use efficiency, etc.</p> <ul style="list-style-type: none"><li>• Uncertainty about the positive or negative consequences of changes to species distribution.</li></ul>	
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