WHITE PAPER

USDA Forest Service Pacific Northwest Region Umatilla National Forest

WHITE PAPER F14-SO-WP-SILV-11

Blue Mountains Vegetation Chronology[1]

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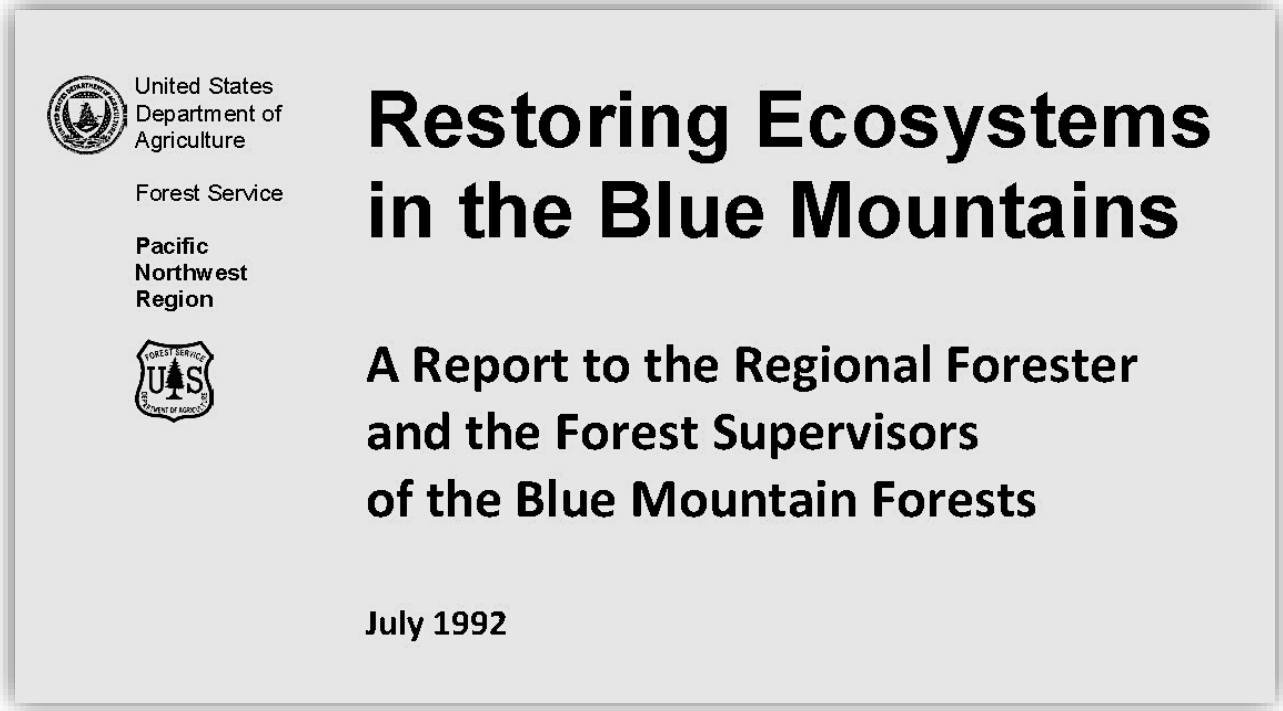
Initial Version: **JUNE 2004**
Most Recent Revision: **DECEMBER 2016**



[1] White papers are internal reports; they receive only limited review. Viewpoints expressed in this paper are those of the author – they may not represent positions of USDA Forest Service.

INTRODUCTION

Late 1980s and early 1990s in Pacific Northwest Region of USDA Forest Service (FS) was an interesting and exciting period for forest policy and natural resources management. This period saw creation of two enduring policies: Northwest Forest Plan for westside national forests and Eastside Screens for eastside national forests.

On the west side of Pacific Northwest Region, external (non-FS) concerns focused primarily on forest management and how it affected old-growth forests and their availability as habitat for northern spotted owl and marbled murrelet bird species.

On the east side of the Region, external issues tended to focus on declining forest health, largely resulting from vegetation changes caused by long-standing policies of fire exclusion, livestock grazing, and selective timber harvest, along with timber harvest's role on diminishing numbers of large-diameter trees, especially ponderosa pines.

[Powell's (1994) report examining budworm-caused vegetation changes for the Malheur National Forest describes 'forest health' issues from an early-1990s, forest-health perspective. A journal paper examining effectiveness of budworm spray projects on the Malheur NF was also produced then (Torgersen et al. 1995).]

On the east side of the Pacific Northwest Region, broad-scale assessment efforts occurred, including a Gast Report (Blue Mountains Forest Health Report), Caraher Report, Everett Report, and Interior Columbia Basin Ecosystem Management Project.

The pace of 1990s assessment efforts was amazing, with multiple assessments occurring simultaneously in some instances, and they generated impressive science-based information – this valuable information continues to make substantial contributions to natural resource management in the interior Pacific Northwest.

This white paper provides a chronology of 1990s vegetation assessment efforts affecting the Blue Mountains. Many products resulting from the assessments (generally research reports) are still used, and cited, in planning documents and environmental assessments today. The References section describes most of the published products.

Date	Event
April 1991	**Blue Mountains Forest Health Report.** Publication of a "Blue Mountains Forest Health Report: New Perspectives in Forest Health" (Gast et al. 1991). This report, often referred to as the Gast Report, describes deteriorating forest health conditions for Malheur, Umatilla, and Wallowa-Whitman national forests in northeastern Oregon and southeastern Washington. In September 1990, Bill Gast, Deputy Forest Supervisor of Wallowa-Whitman National Forest, was appointed chair of a committee charged with developing a Blue Mountains Forest Health Implementation Plan.

Date	Event
Fall 1991	**Interim Operating Guidelines for Protection of Fish and Wildlife Habitats.** In early 1990s, timber management programs on Malheur, Umatilla, and Wallowa-Whitman national forests were being adjusted in response to broad-scale insect and disease impacts, including those described above in a Blue Mountains Forest Health Report (Gast et al. 1991). As a decade-long outbreak of western spruce budworm continued, effects of which are described in a report by Powell (1994), timber management projects on Blue Mountains national forests were transitioning from a 'green' program emphasizing treatments in live forests, to a salvage program emphasizing removal of dead and dying trees. As budworm-salvage timber sales were being prepared and offered, it was soon realized that the magnitude of budworm impacts was so great that complete removal of dead and dying timber would result in Forest Plan standards for fish and wildlife habitat not being met. In response to this realization, Blue Mountains forest supervisors chartered a task force consisting of Forest Service specialists from all three national forests, along with representatives from the northeast and southeast regions of Oregon Department of Fish and Wildlife. The 23-person task force worked for more than 6 months, eventually producing Interim Operating Guidelines for Protection of Fish and Wildlife Habitats, with Emphasis on Timber Management Operations Planned in Response to Forest Health Problems in the Blue Mountains. *The interim operating guidelines are provided in this document as appendix 1*.
May 1992	**Eastside Forests Scientific Society Panel.** Seven bipartisan members of U.S. House of Representatives approach six scientific societies (American Fisheries Society, American Ornithologists' Union, Ecological Society of America, Sierra Biodiversity Institute, Society for Conservation Biology, The Wildlife Society) and ask them to "initiate a review and report on the eastside forests of Oregon and Washington." The societies form what became known as an Eastside Forests Scientific Society Panel. Panel's charge was to review status of eastside forests and report their findings – a final report was issued in August 1994.
1992-1995	**Forest Health Science Reports.** A series of general technical reports describing Blue Mountains forest health issues were produced and published by Pacific Northwest Research Station. Citations for this series of 6 reports, called "Forest Health in the Blue Mountains: Science Perspectives," is provided in a References section (see a "Forest Health Science Perspectives" section).
June 4, 1992	**Ecosystem Management and Clearcutting Memorandum.** Chief F. Dale Robertson issued a Washington Office (WO) memorandum announcing that USDA Forest Service would begin using a new approach called 'ecosystem management' for future management of national forests and national grasslands (Robertson 1992). Attachment 2 of this

Date	Event
	memo stated that the Forest Service would reduce clearcutting on national forest system lands, and make greater use of individual-tree selection, group selection, shelterwood, seed tree, and other regeneration cutting methods. The WO's expectation was that clearcutting on NFS lands would be reduced by as much as 70 percent. Attachment 3 of the memo stated that clearcutting would no longer be allowed as a standard practice, and that it could only be used under one of the seven circumstances described in the attachment.
July 1992	**Caraher Report.** A document called "Restoring Ecosystems in the Blue Mountains: A Report to the Regional Forester and the Forest Supervisors of the Blue Mountains" was published (Caraher and others 1992). This report, often referred to as the Caraher Report, was prepared by a panel of resource scientists who assessed nine criteria (early seral, late seral park-like, late seral tolerant multistory, high density low vigor ponderosa pine, high density low vigor lodgepole pine, available fuels, juniper-grasslands, riparian shrub cover, streambank stability) for every river basin in the Blue Mountains. Caraher report was probably the first example in Pacific Northwest of how to use a concept called historical range of variability (HRV). Northern Region of the Forest Service initially developed an HRV concept for their Sustaining Ecological Systems (SES) process (USDA Forest Service 1992); Caraher panel used HRV and other SES principles for a Blue Mountains restoration assessment.
October 1992	**NFJD Restoration Project.** A "Forest Health Restoration" strategy pertaining to North Fork John Day River basin was released (USDA Forest Service 1992). Based on Caraher Report and SES processes described above (July 1992 item), this document identified restoration opportunities for North Fork John Day River basin. This restoration assessment was described in a Journal of Forestry article (Shlisky 1994).
January 1993	**Blue Mountains Ecosystem Restoration Strategy.** Forest Supervisors of Ochoco, Malheur, Umatilla, and Wallowa-Whitman national forests presented a "Blue Mountains Ecosystem Restoration Strategy" to Pacific Northwest Region's Regional Forester. It identified a broad range of restoration needs by using a process like one employed by Caraher and others (1992); needs totaled $191,000,000. This proposal was designed to be a specially funded, 3-year supplemental program to use prescribed fire on 355,000 acres, thin 101,000 acres, reforest 90,000 acres, harvest 180,000 acres, close and obliterate 3,270 miles of road, reconstruct 1,580 miles of road, rehabilitate 1,290 miles of stream, produce about 700 million board feet of timber commodities, and create 1,840 new jobs in forest restoration (Lucas 1993, Schmidt and others 1993). When added to the four Forests' normal budgets for these activities, overall program costs would have approached $250,000,000.

Date	Event
	Note: Although current FS employees smile (or snicker) when they hear about four Blue Mountains national forests submitting a restoration package totaling 191 million dollars to the Washington Office, as though such a large request had any legitimate chance of being funded (or even being considered), it clearly demonstrates that early-1990s Forest employees were well aware that substantial backlogs of unmet need had developed in timber stand improvement, prescribed fire, reforestation, and road restoration program areas.
March 30, 1993	**NRDC Old-Growth Petition.** A petition prepared by Natural Resources Defense Council (NRDC) was delivered to Regional Forester John Lowe; it sought to halt timber harvest (logging) in old-growth forests on national forests of eastern Oregon and eastern Washington. Premise of petition was that existing habitat for old-growth-dependent wildlife species was not being adequately protected by the eastside's timber sale program, as it was being implemented at that time.
April 2, 1993	**Clinton Forest Summit.** President Bill Clinton fulfilled a campaign promise by convening a forest conference in Portland, Oregon. This 'summit' event was designed to address gridlock over management of Pacific Northwest federal forestlands, and resulting effects on communities and a regional economy. The President, Vice President Al Gore, numerous cabinet members, and other presidential advisors heard many regional interests and perspectives. As the conference closed, President Clinton committed to prepare a plan, within 60 days, to address problems discussed during the summit. Note: Earle Rother, public affairs officer for Umatilla NF at the time, served on a team of FS employees who assisted with this Forest Conference in Portland.
April 1993	**Everett Report.** Release of an "Eastside Forest Ecosystem Health Assessment" (often referred to as Everett Report after team leader Dr. Richard Everett). The assessment was prepared in response to a May 1992 request from U.S. House Speaker Tom Foley (D-Washington) and U.S. Senator Mark Hatfield (R-Oregon) for a scientific evaluation of effects of Forest Service management practices on sustainability of forest ecosystems in eastern Oregon and eastern Washington. More than 100 scientists worked for over a year on the assessment; Pacific Northwest Research Station published assessment findings as general technical reports in 1994 and 1995 (see 'Everett Report' section in References).
June 1993	**Region 6 Forest Health Assessment.** A report, "A First Approximation of Ecosystem Health, National Forest Lands, Pacific Northwest Region" (USDA Forest Service 1993), was released; it described many forest health problems affecting eastside forests. This report was designed to provide baseline data supporting an ecosystem-based strategy for Oregon and Washington.

Date	Event
July 1, 1993	**Eastside Strategy.** President Clinton includes this statement in a charter establishing the Northwest Forest Plan initiative: "management of eastside forests will need to focus on restoring the health of forest ecosystems impacted by poor management practices of the past…The president is directing the Forest Service to develop a scientifically sound and ecosystem-based strategy for management of eastside forests. This strategy should be based on the forest health study recently completed by agency scientists as well as other studies." This direction eventually resulted in an Interior Columbia Basin Ecosystem Management Project (ICBEMP). An ICBEMP study area, covering slightly more than 145 million acres, was one of the largest broad-scale assessment and planning efforts ever attempted for the United States.
August 18, 1993	**Eastside Screens.** Release of an "Interim Approach for Sale Preparation, Eastside Forests." This interim direction, generally known as the Eastside Screens, established timber-sale 'screens' pertaining to riparian habitat, late/old forest structure and old-growth dependent wildlife habitat. Eastside Screens, issued in response to an NRDC petition dated March 30, 1993 (see item for this date), were designed to incorporate findings from an Eastside Forest Health Assessment directed by Richard Everett. Blue Mountain national forests began issuing policy guidance to ensure consistent implementation of an "ecosystem" screen (Johnson 1993). White paper F14-SO-WP-SILV-53, *Eastside Screens Chronology*, provides a detailed history for the Screens and how they evolved.
September 19, 1993	**Screens Lawsuit.** Prairie Wood Products files suit (Prairie Wood Products v. Espy, 936288 TC (D. Or.); Judge Hogan) to challenge Eastside Screens ("the screening process") as based on 10 specific contentions related to apparent violations of NFMA, NEPA, and other acts and agency regulations. Specifically, Prairie Wood Products contended that the 'screening process' was: 1) inconsistent with forest plans; 2) violates plan amendment requirements; 3) increases threat of fire, insects, and disease; 4) re-designates suitable timberlands; 5) violates riparian area regulations; 6) was developed without interdisciplinary analysis; 7) was developed without public participation; 8) disregarded specific vegetation and site conditions; 9) failed to comply with mandatory procedure for formulating standards; and 10) is an arbitrary and capricious agency action.
January 21, 1994	**ICBEMP Charter.** Chief of USDA Forest Service (FS) and Director of USDI Bureau of Land Management (BLM) signed a charter to establish an Interior Columbia Basin Ecosystem Management Project (ICBEMP), with headquarters in Walla Walla, Washington. This project resulted in broad-scale and mid-scale ecosystem assessments covering more than 145 million acres, of which more than 75 million are federal lands administered by FS and BLM in seven western states. Many science reports

Date	Event
	were produced by ICBEMP (see ICBEMP Science Reports subsection in References section).
March 1994	**PACFISH EA.** An environmental assessment is issued for "Implementation of interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California" (USDA Forest Service; USDI Bureau of Land Management 1994). This interim direction was designed to "arrest the degradation and begin the restoration of aquatic habitat and riparian areas on lands administered by the Forest Service and BLM; it applies to watersheds outside the range of the northern spotted owl that provide habitat for Pacific salmon, steelhead, and sea-run cutthroat trout."
May 20, 1994	**RF Forest Plan Amendment #1.** Regional Forester John Lowe signs a Decision Notice for Regional Forester's Forest Plan Amendment #1, which amended all Forest Plans for Eastside national forests to include Eastside Screens as new standards and guidelines. Timber sales offered after the effective date of this amendment must be found to be consistent with the amended Forest Plan for each eastside National Forest. Note that RF Forest Plan Amendment #1 is Amendment #8 to Umatilla National Forest Land and Resource Management Plan.
August 1994	**Scientific Society Panel Report.** An Eastside Forests Scientific Society Panel released a report called "Interim Protection for Late-Successional Forests, Fisheries, and Watersheds" (Henjum et al. 1994). U.S. Congress chartered this panel in May 1992 to "initiate a review and report on the eastside forests of Oregon and Washington" (see May 1992 item). This report provides interim recommendations for preventing further degradation of remaining resources until more comprehensive data are gathered and a protection and restoration plan could be developed. Note: In a strategy similar to one used with a Beschta Report (see March 1995 item), commenters representing environmental organizations routinely reference (and quote from) this Scientific Society Panel Report in their response to environmental analysis documents concerning timber sales and other forest management projects.
October 19, 1994	**Screens Lawsuit Decision.** In Prairie Wood Products v. Espy case, the Court issues an order enjoining Forest Service from applying Eastside Screens to any remaining 1993 timber sales until it complies with Forest Plan amendment and public participation requirements.
October 1994	**RF Screens Review.** Regional Forester John Lowe charters a team to review implementation of the Eastside Screens interim direction. Many internal (US Forest Service) concerns related to the Screens' impact on managing insect- or disease-affected stands.

Date	Event
Late 1994	**Inland West Forest Health Report.** American Forests and other organizations published a book called "Assessing Forest Ecosystem Health in the Inland West" (Sampson and Adams 1994, Sampson et al. 1994). It was designed to assess ecosystem health for much of the interior Pacific Northwest, including the Blue Mountains.
March 1995	**Beschta Report.** An original Beschta Report (Beschta et al. 1995), "Wildfire and Salvage Logging: Recommendations for Ecologically Sound Post-fire Salvage Logging and Other Post-fire Treatments," was commissioned by Pacific Rivers Council. Produced as a typewritten, mimeographed report, it was apparently not peer-reviewed or published in a credible scientific outlet (such as a journal). The Beschta report, circulated widely within an environmental activist community, was mentioned frequently by commenters during public scoping or in response to timber-sale environmental documents, including EAs and EISs. A salvage project proposed during late 1990s or early 2000s, in any western USFS region, was ultimately required to respond to this report. Beschta report commenters advocated that natural recovery of burned landscapes, involving little or no human intervention, was an optimal policy for public forests, and one supported by other relevant literature. A group of US Forest Service research scientists were asked to review the Beschta report; they concluded it was biased toward a custodial (passive management) approach, and that it is generally accepted in the science community that limiting post-fire management to just a single approach (whether custodial or commodity) is inappropriate because forest sites encompass a wide range of variability, and variability points to a need for site-specific plans addressing salvage situations on a case-by-case basis (Everett 1995). Note: A revised version of Beschta Report (Beschta et al. 2004) was published in a scientific journal (Conservation Biology). Since this version was peer reviewed and is available from a credible science source, it is considered to have more scientific standing than the original report.
March 14, 1995	**Screens Revisions.** An interdisciplinary team is tasked with analyzing a revision to Eastside Screens. The revision's proposed action was to modify the ecosystem screen's forest structure classification, which is used when making an historical range of variability determination. A revised structural classification was based on an updated (and expanded) classification prepared for Interior Columbia Basin Ecosystem Management Project (ICBEMP); it was published in a journal, Western Journal of Applied Forestry (O'Hara et al. 1996). White paper F14-SO-WP-SILV-53, *Eastside Screens Chronology*, provides a detailed history for the Screens, including how, and why, they were revised.

Date	Event
June 12, 1995	**RF Forest Plan Amendment #2.** Regional Forester John Lowe signs a Decision Notice for "Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales" (Regional Forester's Forest Plan Amendment #2), which amended all eastside Forest Plans to include revised Eastside Screens as standards and guidelines (USDA Forest Service 1995). Note that RF Forest Plan Amendment #2 is Amendment #11 to Umatilla National Forest Land and Resource Management Plan. Umatilla NF issued policy guidance to ensure consistent implementation of a revised ecosystem screen by Forest personnel (Blackwood 1998, Powell 1998). White paper F14-SO-WP-SILV-53, *Eastside Screens Chronology*, provides a detailed history for the Screens, including how they were used to amend the Forest Plan (for Umatilla and all Eastside national forests).
April-June 1995	**Oregon Governor's Forest Science Panel.** A 10-member Eastside Forest Science Panel is convened by Oregon Governor Kitzhaber; they are asked to review timber harvest practices in eastern Oregon. The panel tours Blue Mountain areas in early April of 1995; they release a report called "Forest health and timber harvest on national forests in the Blue Mountains of Oregon: a report to Governor Kitzhaber" on June 15, 1995 (Johnson and others 1995). Governor Kitzhaber appoints an Eastside Forest Advisory Panel in April 1995; it consists of 9 citizens from central and eastern Oregon (original chairman was Dave Cash, editor of East Oregonian newspaper in Pendleton).
July 1995	**Salvage Rider/Rescissions Act.** As described above for Beschta Report (March 1995), an activity involving harvesting of merchantable timber following forest fires on federal lands, a practice commonly referred to as 'salvage logging,' has been controversial, both in public and scientific arenas (Beschta Report item describes how USFS research scientists were asked to respond to criticism of salvage logging from a group of university scientists, led by Bob Beschta at Oregon State University). Senator Slade Gorton (R.-Wash.), reacting to pressure from constituents in timber-dependent communities (especially in eastern Washington), attached 'salvage timber rider' legislation to a Fiscal Year 1995 Rescissions Act. Gorton's salvage rider was designed to expedite preparation and award of salvage timber sales following an impactful 1994 fire season throughout the western US. Gorton's salvage rider was included in Public Law 104-19: "An act making emergency supplemental appropriations for additional disaster assistance, for anti-terrorism initiatives, for assistance in the recovery from the tragedy that occurred at Oklahoma City, and making rescissions for the fiscal year ending September 30, 1995, and for other purposes." The rider's stated objective was to promote forest health and restore timber jobs in rural communities of the Pacific Northwest (Gorton and Hays 1996). All Blue Mountains national forests had salvage rider sales before the authority expired on 9/30/1997.

Date	Event
	[Note: Interesting history about this salvage rider is provided in a journal article from Environmental Law, and authored by Senator Gorton and a member of his staff – see Gorton and Kays 1996. The same issue of Environmental Law includes a counterpoint article authored by Michael Axline, a professor of law at University of Oregon School of Law. Axline's perspective provides a good example of the vitriol surrounding salvage logging, and a glimmer of why Gorton's salvage rider came to function as a 'lightning rod' for anti-salvage adherents (see Axline 1996).]
June 1997	**Oregon Governor's Forest Health Strategy.** Oregon Governor Kitzhaber releases a document called "Proposed Eastside Forest Health Strategy." This document describes an 11-point strategy for restoring eastern Oregon forests, watersheds and communities. It was released again in April 2001 by Kitzhaber, Regional Forester Harv Forsgren, and BLM Oregon state director Elaine Zielinski (Kitzhaber et al. 2001). Note: Governor Kitzhaber's interest in managing and restoring forests of eastern Oregon was sustained throughout his terms in office. On June 5, 2001, he sent a letter to Pacific Northwest Regional Forester Forsgren, and Oregon's State Forester Jim Brown, asking that they cooperate in completing an assessment of quality, quantity, and economic value of timber likely to result from active forest restoration management for Blue Mountains of eastern Oregon. A team of managers and scientists was assembled from US Forest Service, Oregon State University, and Oregon Department of Forestry to complete analyses requested by Governor Kitzhaber. Preliminary results were presented to the Governor in November 2002; final results were published in a FS general technical report in July 2008 (Rainville et al. 2008).

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This remainder of this References section provides literature citations organized by section, and each section pertains to a topic or activity discussed in this white paper. Everett Report publications, Forest Health Science Perspectives (reports, a book, and journal papers), Forest Health and Productivity journal papers, and an extensive section dealing with Interior Columbia Basin Ecosystem Management Project are included in the following sections.

Google Scholar's opening page has a simple statement below a query box: "Stand on the Shoulders of Giants." I couldn't agree more! And I hope new practitioners to the Blue Mountains who are perhaps being exposed for the first time to science products described in this white paper quickly develop a sense of standing on the shoulders of giants who have gone before them.

And what is amazing, truly amazing, is that much of the work described here was produced in a single decade of concerted effort – 1990s (although some works were not published formally until early 2000s). I commend the research scientists who produced this outstanding, and outstandingly useful, work, and results of their efforts are still applicable, valid, and pertinent.

EASTSIDE FOREST ECOSYSTEM HEALTH ASSESSMENT (EVERETT REPORT)

As described earlier, Everett Report was quite influential – it formed an important 'foundation' for ICBEMP, which followed closely on its heels, and it shaped policy for Pacific Northwest Region of USDA Forest Service because a Regional Forester's Forest Plan amendment, the Eastside Screens, was based largely on Everett Report science. This section has a sampling (not all) of the science works resulting from an Eastside Forest Ecosystem Health Assessment.

Agee, J.K. 1994. Fire and weather disturbances in terrestrial ecosystems of the eastern Cascades. Gen. Tech. Rep. PNW-GTR-320. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 52 p. http://www.treesearch.fs.fed.us/pubs/6225

Bormann, B.T.; Brookes, M.H.; Ford, E.D.; Klester, A.R.; Oliver, C.D.; Weigand, J.F. 1994. Volume V: a framework for sustainable ecosystem management. Gen. Tech. Rep. PNW-GTR-331. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 61 p. https://www.fs.usda.gov/treesearch/pubs/7080

Everett, R.; Hessburg, P.; Jensen, M.; Bormann, B. 1994. Volume 1: executive summary. Gen. Tech. Rep. PNW-GTR-317. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 61 p. https://www.fs.usda.gov/treesearch/pubs/47091

Everett, R.L. 1994. Volume 4: restoration of stressed sites, and processes. Gen. Tech. Rep. PNW-GTR-330. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 123 p. https://www.fs.usda.gov/treesearch/pubs/6939

Harvey, A.E.; Geist, J.M.; McDonald, G.I.; Jurgensen, M.F.; Cochran, P.H.; Zabowski, D.; Meurisse, R.T. 1994. Biotic and abiotic processes in eastside ecosystems: the effects of management on soil properties, processes, and productivity. Gen. Tech. Rep. PNW-GTR-323. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 71 p. https://www.fs.usda.gov/treesearch/pubs/6286

Hessburg, P.F.; Mitchell, R.G.; Filip, G.M. 1994. Historical and current roles of insects and pathogens in eastern Oregon and Washington forested landscapes. Gen. Tech. Rep. PNW-GTR-327. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 72 p. http://www.treesearch.fs.fed.us/pubs/6390

Huff, M.H.; Ottmar, R.D.; Alvarado, E.; Everett, R.L.; Vihnanek, R.E.; Lehmkuhl, J.F.; Hessburg, P.F. 1995. Historical and current forest landscapes in eastern Oregon and Washington; part II: linking vegetation characteristics to potential fire behavior and related smoke production. Gen. Tech. Rep. PNW-GTR-355. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 43 p. http://www.treesearch.fs.fed.us/pubs/3063

Irwin, L.L.; Cook, J.G.; Riggs, R.A.; Skovlin, J.M. 1994. Effects of long-term grazing by big game and livestock in the Blue Mountains forest ecosystems. Gen. Tech. Rep. PNW-GTR-325. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 49 p. https://www.fs.usda.gov/treesearch/pubs/6330

Jensen, M.E.; Bourgeron, P.S. 1994. Volume II; ecosystem management: principles and applications. Gen. Tech. Rep. PNW-GTR-318. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 376 p. https://www.fs.usda.gov/treesearch/pubs/6223

Johnson, C.G., Jr.; Clausnitzer, R.R.; Mehringer, P.J., Jr.; Oliver, C.D. 1994. Biotic and abiotic processes of eastside ecosystems: the effects of management on plant and community ecology, and on stand and landscape vegetation dynamics. Gen. Tech. Rep. PNW-GTR-322. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 66 p. http://www.treesearch.fs.fed.us/pubs/6252

Lehmkuhl, J.F.; Hessburg, P.F.; Everett, R.L.; Huff, M.H.; Ottmar, R.D. 1994. Historical and current forest landscapes of eastern Oregon and Washington; part I: vegetation pattern and insect and disease hazards. Gen. Tech. Rep. PNW-GTR-328. Portland, OR: USDA Forest

Service, Pacific Northwest Research Station. 88 p. http://www.treesearch.fs.fed.us/pubs/6407

Marcot, B.G.; Wisdom, M.J.; Li, H.W.; Castillo, G.C. 1994. Managing for featured, threatened, endangered, and sensitive species and unique habitats for ecosystem sustainability. Gen. Tech. Rep. PNW-GTR-329. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 39 p. https://www.fs.usda.gov/treesearch/pubs/6406

McIntosh, B.A.; Sedell, J.R.; Smith, J.E.; Wissmar, R.C.; Clarke, S.E.; Reeves, G.H.; Brown, L.A. 1994. Management history of eastside ecosystems: changes in fish habitat over 50 years, 1935 to 1992. Gen. Tech. Rep. PNW-GTR-321. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 55 p. http://www.treesearch.fs.fed.us/pubs/6232

Oliver, C.D.; Irwin, L.L.; Knapp, W.H. 1994. Eastside forest management practices: historical overview, extent of their applications, and their effects on sustainability of ecosystems. Gen. Tech. Rep. PNW-GTR-324. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 73 p. http://www.treesearch.fs.fed.us/pubs/6294

Robbins, W.G.; Wolf, D.W. 1994. Landscape and the intermontane northwest: an environmental history. Gen. Tech. Rep. PNW-GTR-319. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 32 p. http://www.treesearch.fs.fed.us/pubs/6224

Wissmar, R.C.; Smith, J.E.; McIntosh, B.A.; Li, H.W.; Reeves, G.H.; Sedell, J.R. 1994. Ecological health of river basins in forested regions of eastern Washington and Oregon. Gen. Tech. Rep. PNW-GTR-326. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 65 p. http://www.treesearch.fs.fed.us/pubs/6371

FOREST HEALTH SCIENCE PERSPECTIVES

This section begins with six general technical reports published by the Pacific Northwest Research Station as a series called “Forest Health Science Perspectives.”

Johnson, C.G., Jr. 1994. Forest health in the Blue Mountains: a plant ecologist’s perspective on ecosystem processes and biological diversity. Gen. Tech. Rep. PNW-GTR-339. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 24 p. http://www.treesearch.fs.fed.us/pubs/5104

Mutch, R.W.; Arno, S.F.; Brown, J.K.; Carlson, C.E.; Ottmar, R.D.; Peterson, J.L. 1993. Forest health in the Blue Mountains: a management strategy for fire-adapted ecosystems. Gen. Tech. Rep. PNW-GTR-310. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 14 p. http://www.treesearch.fs.fed.us/pubs/9056

Quigley, T.M. 1992. Forest health in the Blue Mountains: social and economic perspectives. Gen. Tech. Rep. PNW-GTR-296. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 9 p. http://www.treesearch.fs.fed.us/pubs/9033

Starr, G.L.; Quigley, T.M. 1992. Forest health in the Blue Mountains public forums: April-June, 1991. Portland, OR: USDA Forest Service, Pacific Northwest Region, Blue Mountains Natural Resources Institute. 88 p. Forest_health_in_the_Blue_Mountains

Tanaka, J.A.; Starr, G.L.; Quigley, T.M. 1995. Strategies and recommendations for addressing forest health issues in the Blue Mountains of Oregon and Washington. Gen. Tech. Rep.

PNW-GTR-350. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 18 p. http://www.treesearch.fs.fed.us/pubs/8970

Wickman, B.E. 1992. Forest health in the Blue Mountains: the influence of insects and disease. Gen. Tech. Rep. PNW-GTR-295. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 15 p. http://www.treesearch.fs.fed.us/pubs/9032

Below, I also included a set of forest health resources published in two formats – as chapters from a book entitled "Assessing Forest Ecosystem Health in the Inland West" (Sampson and Adams 1994), and as journal papers from issues 1-2 and 3-4 of volume 2 of the Journal of Sustainable Forestry.

Aplet, G.H. 1994. Beyond even- vs. uneven-aged management: toward a cohort-based silviculture. Journal of Sustainable Forestry. 2(3-4): 423-433. doi:10.1300/J091v02n03_12

Blatner, K.A.; Keegan, C.E.; O'Laughlin, J.; Adams, D.L. 1994. Forest health management policy: A case study in southwestern Idaho. Journal of Sustainable Forestry. 2(3-4): 317-337. doi:10.1300/J091v02n03_07

Bourgeron, P.S.; Humphries, H.C.; Jensen, M.E. 1994. Landscape characterization: A framework for ecological assessment at regional and local scales. Journal of Sustainable Forestry. 2(3-4): 267-281. doi:10.1300/J091v02n03_03

Covington, W.W.; Moore, M.M. 1994. Postsettlement changes in natural fire regimes and forest structure: ecological restoration of old-growth ponderosa pine forests. Journal of Sustainable Forestry. 2(1-2): 153-181. doi:10.1300/J091v02n01_07

Covington, W.W.; Everett, R.L.; Steele, R.; Irwin, L.L.; Daer, T.A.; Auclair, A.N.D. 1994. Historical and anticipated changes in forest ecosystems of the inland west of the United States. Journal of Sustainable Forestry. 2(1-2): 13-63. doi:10.1300/J091v02n01_02

Erickson, J.R.; Toweill, D.E. 1994. Forest health and wildlife habitat management on the Boise National Forest, Idaho. Journal of Sustainable Forestry. 2(3-4): 389-409. doi:10.1300/J091v02n03_10

Everett, R.L.; Hessburg, P.F.; Lillybridge, T.R. 1994. Emphasis areas as an alternative to buffer zones and reserved areas in the conservation of biodiversity and ecosystem processes. Journal of Sustainable Forestry. 2(3-4): 283-292. doi:10.1300/J091v02n03_04

Ferguson, D.E. 1994. Advance regeneration in the inland west: considerations for individual tree and forest health. Journal of Sustainable Forestry. 2(3-4): 411-422. doi:10.1300/J091v02n03_11

Graham, R.T. 1994. Silviculture, fire and ecosystem management. Journal of Sustainable Forestry. 2(3-4): 339-351. doi:10.1300/J091v02n03_08

Harvey, A.E. 1994. Integrated roles for insects, diseases and decomposers in fire dominated forests of the inland western United States. Journal of Sustainable Forestry. 2(1-2): 211-220. doi:10.1300/J091v02n01_10

Haufler, J.B. 1994. An ecological framework for planning for forest health. Journal of Sustainable Forestry. 2(3-4): 307-316. doi:10.1300/J091v02n03_06

Irwin, L.L. 1994. A process for improving wildlife habitat models for assessing forest ecosystem

health. Journal of Sustainable Forestry. 2(3-4): 293-306. doi:10.1300/J091v02n03_05

Mandzak, J.M.; Moore, J.A. 1994. The role of nutrition in the health of inland western forests. Journal of Sustainable Forestry. 2(1-2): 191-210. doi:10.1300/J091v02n01_09

McKetta, C.; Blatner, K.A.; Graham, R.T.; Erickson, J.; Hamilton, S.S. 1994. Human dimensions of forest health choices. Journal of Sustainable Forestry. 2(1-2): 135-149. doi:10.1300/J091v02n01_06

Morgan, P.; Aplet, G.H.; Haufler, J.B.; Humphries, H.C.; Moore, M.M.; Wilson, W.D. 1994. Historical range of variability: A useful tool for evaluating ecosystem change. Journal of Sustainable Forestry. 2(1-2): 87-111. doi:10.1300/J091v02n01_04

O'Laughlin, J.; Livingston, R.L.; Thier, R.; Thornton, J.P.; Toweill, D.E.; Morelan, L. 1994. Defining and measuring forest health. Journal of Sustainable Forestry. 2(1-2): 65-85. doi:10.1300/J091v02n01_03

Oliver, C.D.; Harrington, C.; Bickford, M.; Gara, R.; Knapp, W.; Lightner, G.; Hicks, L. 1994a. Maintaining and creating old growth structural features in previously disturbed stands typical of the eastern Washington Cascades. Journal of Sustainable Forestry. 2(3-4): 353-387. doi:10.1300/J091v02n03_09

Oliver, C.D.; Ferguson, D.E.; Harvey, A.E.; Malany, H.S.; Mandzak, J.M.; Mutch, R.W. 1994b. Managing ecosystems for forest health: an approach and the effects on uses and values. Journal of Sustainable Forestry. 2(1-2): 113-133. doi:10.1300/J091v02n01_05

Sampson, R.N.; Adams, D.L., eds. 1994. Assessing forest ecosystem health in the inland west. Binghamton, NY: Food Products Press (Haworth Press). 461 p. isbn:1-56022-052-X

Sampson, R.N.; Adams, D.L.; Hamilton, S.S.; Mealey, S.P.; Steele, R.; Van De Graaff, D. 1994. Assessing forest ecosystem health in the inland West. Journal of Sustainable Forestry. 2(1-2): 3-10. doi:10.1300/J091v02n01_01

Steele, R. 1994. The role of succession in forest health. Journal of Sustainable Forestry. 2(1-2): 183-190. doi:10.1300/J091v02n01_08

FOREST HEALTH AND PRODUCTIVITY IN EASTERN OREGON AND WASHINGTON

These papers are contained in a special issue of Northwest Science entitled "Special Issue on Forest Health and Productivity in Eastern Oregon and Washington" (volume 75, Special Issue, pages 1-251; 2001). The special issue is a set of 25 journal papers reviewing the state of knowledge about disturbance processes in eastern Oregon and Washington, related management practices, and effects on key management issues. All 25 papers are cited in this section.

Bull, E.L.; Wales, B.C. 2001. Effects of disturbance on amphibians of conservation concern in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 174-179. http://hdl.handle.net/2376/994

Bull, E.L.; Wales, B.C. 2001. Effects of disturbance on birds of conservation concern in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 166-173. http://hdl.handle.net/2376/993

Bull, E.L.; Aubry, K.B.; Wales, B.C. 2001. Effects of disturbance on forest carnivores of con-

servation concern in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 180-184. http://hdl.handle.net/2376/995

Croft, L.K. 2001. Rare plants of eastern Oregon and Washington. Northwest Science. 75(Special Issue): 149-156. http://hdl.handle.net/2376/991

Ferguson, S.A. 2001. Climatic variability in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 62-69. http://hdl.handle.net/2376/982

Hall, T.E.; Bigler-Cole, H. 2001. Sociocultural factors and forest health management. Northwest Science. 75(Special Issue): 208-233. http://hdl.handle.net/2376/998

Harrod, R.J. 2001. The effect of invasive and noxious plants on land management in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 85-90. http://hdl.handle.net/2376/985

Hayes, J.L.; Daterman, G.E. 2001. Bark beetles (Scolytidae) in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 21-30. http://hdl.handle.net/2376/977

Hayes, J.L.; Ragenovich, I. 2001. Non-native invasive forest insects of eastern Oregon and Washington. Northwest Science. 75(Special Issue): 77-84. http://hdl.handle.net/2376/984

Haynes, R.; Fight, R.; Lowell, E.; Stevens, J.; Barbour, J. 2001. Economic aspects of thinning and harvest for forest health improvement in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 199-207. http://hdl.handle.net/2376/997

Hemstrom, M.A. 2001. Vegetative patterns, disturbances, and forest health in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 91-109. http://hdl.handle.net/2376/986

Howell, P.J. 2001. Effects of disturbance and management of forest health on fish and fish habitat in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 157-165. http://hdl.handle.net/2376/992

Kelsey, R.G. 2001. Chemical indicators of stress in trees: their ecological significance and implication for forestry in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 70-76. http://hdl.handle.net/2376/983

Kie, J.G.; Lehmkuhl, J.F. 2001. Herbivory by wild and domestic ungulates in the intermountain west. Northwest Science. 75(Special Issue): 55-61. http://hdl.handle.net/2376/981

LaBonte, J.R.; Scott, D.W.; McIver, J.D.; Hayes, J.L. 2001. Threatened, endangered, and sensitive insects in eastern Oregon and Washington forests and adjacent lands. Northwest Science. 75(Special Issue): 185-198. http://hdl.handle.net/2376/996

Niwa, C.G.; Peck, R.W.; Torgersen, T.R. 2001. Soil, litter, and coarse woody debris habitats for arthropods in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 141-148. http://hdl.handle.net/2376/990

Ottmar, R.D.; Sandberg, D.V. 2001. Wildland fire in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 46-54. http://hdl.handle.net/2376/980

Parks, C.G.; Flanagan, P.T. 2001. Dwarf mistletoes (*Arceuthobium* spp.), rust diseases, and stem decays in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 31-37. http://hdl.handle.net/2376/978

Quigley, T.M.; Hayes, J.L.; Starr, L.; Daterman, G.E. 2001. Improving forest health and productivity in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 234-251. http://hdl.handle.net/2376/999

Starr, L.; Hayes, J.L.; Quigley, T.M.; Daterman, G.E.; Brown, S. 2001. A framework for addressing forest health and productivity in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 1-10. http://hdl.handle.net/2376/975

Thies, W.G. 2001. Root diseases in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 38-45. http://hdl.handle.net/2376/979

Torgersen, T.R. 2001. Defoliators in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 11-20. http://hdl.handle.net/2376/976

Wales, B.C. 2001. The management of insects, diseases, fire, and grazing and implications for terrestrial vertebrates using riparian habitats in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 119-127. http://hdl.handle.net/2376/988

Wondzell, S.M. 2001. The influence of forest health and protection treatments on erosion and stream sedimentation in forested watersheds of eastern Oregon and Washington. Northwest Science. 75(Special Issue): 128-140. http://hdl.handle.net/2376/989

Youngblood, A. 2001. Old-growth forest structure in eastern Oregon and Washington. Northwest Science. 75(Special Issue): 110-118. http://hdl.handle.net/2376/987

INTERIOR COLUMBIA BASIN ECOSYSTEM MANAGEMENT PROJECT (ICBEMP)

ICBEMP created an impressive body of published science literature. This section focuses primarily on reports published by FS research stations because they are available in digital form from Treesearch (http://www.treesearch.fs.fed.us/).

Readers of this white paper should also be aware that many journal papers resulted from ICBEMP – a good example is a Special Issue of Forest Ecology and Management entitled “The Science Basis for Ecosystem Management in the Interior Columbia River Basin” (Forest Ecology and Management, volume 153, issues 1-3, pages 1-200; 2001). This special issue of FEM contains 12 journal papers, and they are cited below.

An entire issue of the Journal of Forestry also featured ICBEMP science – it was focused on “Eastside forests and fish: Proposals for the interior Columbia River basin” (volume 96, issue 10, October 1998). This is how Journal of Forestry introduced its ICBEMP issue of October 1998:

“The decline of native salmonids in the Pacific Northwest – sockeye salmon are now an endangered species in the Snake River tributaries – has spawned an ambitious effort by the Forest Service to restore the region’s fish habitat and forest health without compromising the sustainability of its human communities.

But even as the scientists of the Interior Columbia Basin Ecosystem Management Project are preparing their final recommendations, politicians are wrangling over its funding. Both the House and the Senate versions of the fiscal year 1999 budget prohibit further spending on the project, and the president has promised to veto the bill if the prohibition remains.

Whether one considers ecosystem management a folly or the future of forestry, it is worthwhile to read how the scientists managed the data for managing the ecosystem. Countervailing comments from SAF's regional affiliates and a Perspective debunking the entire idea round out our coverage of the issue."

Citations for journal papers from the Journal of Forestry special issue are also included in this section.

This section of the white paper provides a sampling (certainly not all!) of the prodigious amount of research resulting from ICBEMP.

Black, A.E.; Morgan, P.; Hessburg, P.F. 2003. Social and biophysical correlates of change in forest landscapes of the interior Columbia basin, USA. Ecological Applications. 13(1): 51-67. doi:10.1890/1051-0761(2003)013[0051:SABCOC]2.0.CO;2

Bunting, S.C.; Kingery, J.L.; Hemstrom, M.A.; Schroeder, M.A.; Gravenmier, R.A.; Hann, W.J. 2002. Altered rangeland ecosystems in the interior Columbia Basin. Gen. Tech. Rep. PNW-GTR-553. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 71 p. https://www.fs.usda.gov/treesearch/pubs/4821

Crone, L.K.; Haynes, R.W. 1999. Revised estimates for direct-effect recreational jobs in the interior Columbia River basin. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 29 p. https://www.fs.usda.gov/treesearch/pubs/2957

Crone, L.K.; Haynes, R.W. 2001. Socioeconomic evaluation of broad-scale land management strategies. Forest Ecology and Management. 153(1-3): 147-160. doi:10.1016/S0378-1127(01)00458-3

Fluharty, D.L. 2000. Characterization and assessment of economic systems in the interior Columbia basin: Fisheries. Gen. Tech. Rep. PNW-GTR-451. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 114 p. https://www.fs.usda.gov/treesearch/pubs/2989

Galliano, S.J.; Loeffler, G.M. 1999. Place assessment: How people define ecosystems. Gen. Tech. Rep. PNW-GTR-462. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 31 p. https://www.fs.usda.gov/treesearch/pubs/2980

Galliano, S.J.; Loeffler, G.M. 2000. Scenery assessment: Scenic beauty at the ecoregion scale. Gen. Tech. Rep. PNW-GTR-472. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 20 p. https://www.fs.usda.gov/treesearch/pubs/2970

Graham, R.T.; Quigley, T.M.; Gravenmier, R. 2000. An integrated ecosystem assessment of the interior Columbia basin. Environmental Monitoring and Assessment. 64(1): 31-40. doi:10.1023/A:1006482232447

Hann, W.J.; Jones, J.L.; Keane, R.E.; Hessburg, P.L.; Gravenmier, R.A. 1998. Landscape dynamics. Journal of Forestry. 96(10): 10-15. doi:10.1093/jof/96.10.10

Hann, W.J.; Hemstrom, M.A.; Haynes, R.W.; Clifford, J.L.; Gravenmier, R.A. 2001. Costs and effectiveness of multi-scale integrated management. Forest Ecology and Management. 153(1-3): 127-145. doi:10.1016/S0378-1127(01)00457-1

Hann, W.J.; Wisdom, M.J.; Rowland, M.M. 2003. Disturbance departure and fragmentation of natural systems in the interior Columbia basin. Res. Pap. PNW-RP-545. Portland, OR:

USDA Forest Service, Pacific Northwest Research Station. 19 p. https://www.fs.usda.gov/treesearch/pubs/5283

Harris, C.C.; McLaughlin, W.J.; Brown, G. 1998. Rural communities in the interior Columbia basin: How resilient are they? Journal of Forestry. 96(3): 11-15. doi:10.1093/jof/96.3.11

Harris, C.C.; McLaughlin, W.; Brown, G.; Becker, D.R. 2000. Rural communities in the inland northwest: an assessment of small communities in the interior and upper Columbia River basins. Gen. Tech. Rep. PNW-GTR-477. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 120 p. https://www.fs.usda.gov/treesearch/pubs/2965

Haynes, R.W.; Quigley, T.M. 2001. Broad-scale consequences of land management: Columbia basin example. Forest Ecology and Management. 153(1-3): 179-188. doi:10.1016/S0378-1127(01)00460-1

Haynes, R.W.; Graham, R.T.; Quigley, T.M. 1996a. A framework for ecosystem management in the interior Columbia basin and portions of the Klamath and Great basins. Gen. Tech. Rep. PNW-GTR-374. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 68 p. http://www.treesearch.fs.fed.us/pubs/3060

Haynes, R.; McCool, S.; Horne, A.; Birchfield, J. 1996b. Natural resource management and community well-being. Wildlife Society Bulletin. 24(2): 222-226. http://www.jstor.org/stable/3783110

Haynes, R.W.; Graham, R.T.; Quigley, T.M. 1998a. A framework for ecosystem management in the interior Columbia Basin. Journal of Forestry. 96(10): 4-9. doi:10.1093/jof/96.10.4

Haynes, R.W.; Reyna, N.E.; Allen, S.D. 1998b. Social and economic systems. Journal of Forestry. 96(10): 28-32. doi:10.1093/jof/96.10.28

Haynes, R.W.; Quigley, T.M.; Clifford, J.L.; Gravenmier, R.A. 2001. Science and ecosystem management in the interior Columbia basin. Forest Ecology and Management. 153(1-3): 3-14. doi:10.1016/S0378-1127(01)00450-9

Haynes, R.; Quigley, T.; Spies, T.; Clifford, J., eds. 2001. Special issue: The science basis for ecosystem management in the interior Columbia River basin. Forest Ecology and Management. 153(1-3): 1-200. issn:0378-1127

Hemstrom, M.A.; Korol, J.J.; Hann, W.J. 2001. Trends in terrestrial plant communities and landscape health indicate the effects of alternative management strategies in the interior Columbia River basin. Forest Ecology and Management. 153(1-3): 105-125. doi:10.1016/S0378-1127(01)00456-X

Hessburg, P.F.; Smith, B.G. 1999. Management implications of recent changes in spatial patterns of interior northwest forests. Transactions of the 64th North American Wildlife and Natural Resources Conference. Washington, DC: Wildlife Management Institute: 55-78. http://www.fs.fed.us/pnw/pubs/journals/pnw_1999_hessburg001.pdf

Hessburg, P.F.; Smith, B.G.; Kreiter, S.D.; Miller, C.A.; Salter, R.B.; McNicholl, C.H.; Hann, W.J. 1999. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klamath and Great basins. Part 1: linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. Gen. Tech. Rep. PNW-GTR-458. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.

357 p. http://www.treesearch.fs.fed.us/pubs/29638

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APPENDIX 1:

INTERIM OPERATING GUIDELINES for Protection of Fish and Wildlife Habitats with Emphasis on Timber Management Operations Planned in Response to Forest Health Problems in the Blue Mountains

Introduction:

National forests of the Blue Mountains are currently experiencing large-scale insect and disease infestations. The attacks have created large stands of dead and dying trees. In response to this large-scale pest epidemic, timber programs on the Umatilla, Wallowa-Whitman, and Malheur National Forests are being adjusted to focus on salvage of these dead and dying trees, and to try to control the spread of the infestations.

This epidemic has had a substantial effect on the existing condition of wildlife habitats, timber growth and yield, visual resources, fire hazards, and other resources. In some cases, this change is of a magnitude that timber harvest prescriptions to deal with insect and disease problems would result in not meeting Forest Plan standards while managing toward Desired Future Conditions.

A Regional task force has been established and charged with the task of developing a set of operating guidelines for dealing with this insect and disease situation. These guidelines should be available in the spring of 1991, but timber sale planning is ongoing and there is a concern about how to proceed until Regional guidelines are completed.

Purpose:

At the direction of Mark Boche, Forest Supervisor, an ad hoc group was formed to develop a set of interim fish and wildlife guidelines for the Malheur National Forest, in coordination with the Oregon Department of Fish and Wildlife (ODFW). This group was expanded to include the Umatilla and Wallowa-Whitman National Forests along with representatives from the Northeast and Southeast Regions of ODFW.

The guidelines are to be utilized until completion of the Blue Mountain Forest Health Implementation Project recommendations and further direction from the Regional Forester, anticipated before the end of 1991. On or before January 1, 1992 the guidelines will be revisited, and a determination made as to their continued use.

It is highly desirable that ODFW be involved in specific IDT input on a project by project basis, especially where departure from fish and wildlife standards is anticipated. Realizing both the importance and the challenge Oregon Department of Fish and Wildlife (ODFW) faces in providing input to timber sales dealing with Forest health problems, these guidelines reflect a collective list of considerations for use in lieu of specific input to individual sale areas.

It should be emphasized that standards and guidelines contained in Forest Plans are to be followed to the greatest extent possible, i.e., unless desired future condition cannot be met. Where

integrated project analysis determines a need to drop below a standard, a Plan amendment is required. Interim guidelines provide a variety of options to consider in preparing an amendment as well as project alternative development and mitigation.

Some guidelines provide more of one habitat component to compensate for the lack of another, i.e., reduced road density in the absence of adequate cover. The guidelines are not intended to act as standards but, rather, offer a variety of habitat considerations, the specifics of which should be tailored to particular analysis areas by interdisciplinary teams.

The guidelines are intended to complement an emphasis toward achieving Management Area goals and Desired Future Conditions while utilizing all opportunities to meet equally important short-term habitat needs. This will undoubtedly involve risk analysis in deferring or altering treatment prescriptions within certain stands to meet short term needs. This places great importance on the quality of interaction between silviculturist, biologist, entomologist, and other resource specialists to balance these needs as effectively as possible. Prioritizing habitat and stand treatment needs based on stand health conditions should be an integral part of the IDT process.

Treatments should focus on salvage of dead and dying trees, and those higher priority green stands in which overall health and vigor is at high risk of keeping them from maintaining/reaching DFC. Analysis should be done on as large a geographic area as possible to provide the greatest flexibility to focus on treatment and deferment priorities relative to short- and long-term resource needs and goals. Such analysis might typically focus on epidemic insect and disease levels and defer the amount of preventive treatment to assist in cover retention. A risk analysis matrix and site-specific habitat information (including habitat priorities/objectives/DFC) should be common tools to integrated project planning.

Concerns:

A number of major concerns were raised by the group regarding epidemic health problems and subsequent timber harvest activities. A brief list of concerns pertaining to habitat attributes follow:

1. High existing and potential open road densities associated with timber harvest activities and the effectiveness of road and area closures.
2. Reduction of satisfactory cover (thermal) due to natural stand mortality or timber harvest, including amount, size, and distribution of cover blocks.
3. Maintenance of marginal cover (hiding) due to insect infestations and precommercial thinning (similar amount, size, and distribution concern).
4. Loss of cover adjacent to unique habitat features, such as rock outcrops, cliffs, meadows, springs, and mountain-mahogany stands.
5. Conversion of unhealthy mixed conifer stands to ponderosa pine, in response to insect and disease problems. (This strategy may be inconsistent with desired future conditions for other resource values and site potential.)
6. Loss of grouse winter roost cover.
7. Loss of accipiter nest groves.

8. Impact of conifer mortality and harvest in riparian areas.
9. Loss of potential wildlife trees (future snags) and reduced longevity of existing snags created by insect and disease agents.

GUIDELINES

The following operating guides are provided for use in project analysis in mitigating impacts of timber sales in conjunction with forest health problems. These are listed by habitat attribute.

Big Game Cover:

1. Provide for adequate cover adjacent to open roads to reduce sight distances and disturbance to wildlife. A variety of methods should be considered in meeting a balance of short and long term cover needs, including retention of unharvested strips or blocks (esp. stands dominated by nonhost trees), reduced spacing between leave trees, and retention and/or development of trees in which lower crowns are close to the ground, serving as effective hiding cover. In many areas, road closures may be the most desirable means of reducing disturbance.

2. Delay precommercial/commercial thinning of stands, as a preventative measure, where the health risk is lower. (Maintain as much existing marginal cover as possible until healthy thinned/regenerated stands can provide this habitat component.) Stand selection should be based on a risk assessment of existing conditions over a wide area and the realization that not all stands need to be treated at one time.

3. Where thinning is applied, it should emphasize multiple entries over time. (To provide some cover at all times, while treating the I&D problems associated with overstocking.) Interdisciplinary analysis should recognize associated tradeoffs to multiple entries, including increased disturbance to wildlife and the site itself (tree and ground vegetation damage; compacted soils) as well as economic considerations. Strategies should emphasize the least site/stand disturbance possible to minimize associated cumulative impacts, including increased susceptibility to insect and disease agents.

4. Where created openings exceed Plan standards, design harvest units to minimize opening width (600-1,200 ft) and provide for adequate cover dispersion on a subwatershed basis. Strive to meet cover standards on a watershed basis.

5. Where regeneration harvest is needed, retain as many trees as possible to provide for cover screening effect, snag, and down log needs, while successfully regenerating the stand. This may include forgoing worthless tree removal, whip-felling, and prescribed burning in 2 to 5 acre blocks that meet hiding cover needs within the regeneration harvest unit, depending on the size and shape of the unit and the stand and habitat conditions surrounding the unit.

6. In existing stands that do not meet cover, or snag/future snag requirements, underplant with fast growing commercial species (e.g. lodgepole), noncommercial species (e.g. willow, as-

pen, alder, juniper, cottonwood, and shrubs) or a mix of species suitable to the site. (Emphasizes development of cover and snag replacement in the shortest time possible.) It is desirable that underplanted species be compatible with longer-term desired future conditions.

7. Analysis of stand treatment priorities should be an interdisciplinary effort to achieve short-term and long-term desired future conditions for resources on a subwatershed basis. Harvest prescriptions should emphasize salvage of dead trees and high risk stands most likely to succumb to epidemic levels of insect and disease activities. Avoid harvesting lower priority stands to provide for short term habitat needs, regardless of the economic viability of the sale (harvesting green trees to improve cost/benefit ratio).

8. Place salvage emphasis on stands without a manageable understory; or stands with a manageable understory where it can be protected. (Maintain what cover is being provided by the understory.) Provide for reestablishment of early-seral tree species to serve as cover as soon as possible.

9. Salvage operations should not increase the size of natural (5 acres and greater) or man-made openings by more than 33%.

10. In extreme cases, consider use of dead trees and down woody material as hiding cover (screening) when live vegetation is not available. Biologists should assist in identifying location of cover blocks to ensure maximum effectiveness. Analysis should include a recognition that this tactic will eventually lead to a heavy fuel loading, limiting access and contributing to a future catastrophic fire.

11. Fertilize regenerated stands to accelerate reestablishment of cover. This should be used carefully as it may be undesirable in some circumstances, such as riparian areas. Timing is also important to accomplish the desired vegetation response and avoid increased competition with herbaceous species.

12. Initiate tree planting within one year after harvest to accelerate reestablishment of cover. Effective animal damage measures should be included to avoid planting failures and suppressed growth rates. Deer and elk can have a significant impact on seedlings in the absence of other vegetation as forage.

Road/Access Management:

1. Strive to meet road densities specified in the Forest Plan/ROD within a sale area, or a larger logical boundary (subwatershed/watershed) which includes the sale area. Where cover does not meet Forest Plan standards, consider more stringent access restrictions to compensate for a lack of cover. Lower road densities should be emphasized within cover-deficient areas of the overall analysis area in achieving the larger analysis area road density goals.

   Use a combination of physical closures, legal orders (CFR), and seasonal closures to achieve desired open road density. It should be recognized that road closures provide one of the more effective means of minimizing disturbance to wildlife in areas where cover is limited, while moving stands toward desired future conditions for the area.

2. Avoid new permanent road construction for salvage operations. Interdisciplinary analysis may indicate a need for a long-term road to access large undeveloped areas for management in conjunction with the Forest Plan; however, local roads for actual salvage operations should be temporary. Minimize new road construction and utilize administrative/physical closures, including ripping and seeding of temporary roads.

3. Cooperate with ODFW (including cost-sharing) in permanent obliteration of local roads to achieve access management goals.

4. Close roads as soon as purchaser finishes a unit. This may involve use of gates to facilitate post sale activities while restricting access to others. Gating of newly constructed temporary roads as they are developed is encouraged to minimize established use of these roads and associated disturbance. Road design can play a key role in accomplishing road management and overall area objectives.

5. Utilize seasonal closures and/or restrictions, such as for hunting seasons, winter range, or calving/fawning areas, to minimize disturbance.

Forage:

1. Locate forage enhancement projects (burning, planting, fertilization) in close proximity to residual cover, with emphasis on winter range.

2. The following species are recommended for use in conjunction with native species on disturbed soil areas. Select seed mixes appropriate to specific plant associations and other vegetation management goals.
   a. small burnette @ 2 lb/ac
   b. orchard grass @ 3 lb/ac
   c. dutch white clover @ 1 lb/ac
   d. birdsfoot trefoil @ 1/2 lb/ac

3. Evaluate grazing use; adjust systems where needed to provide forage quantity and quality sufficient for wildlife needs.

Riparian:

1. Avoid salvaging/harvesting in riparian areas, unless identified as needed to maintain or achieve desired future conditions. (Dead trees are important standing, as snags, and to provide some cover and shade; and down as hiding cover, stream shading, instream woody material, and as feeding areas.) State and Forest Service biologists should, together, determine specific riparian areas to be entered and the associated desired future conditions.

2. Emphasize reforesting riparian areas, using all available funding sources.

3. On forested sites, where live conifer cover is limited (generally less than 30%), use seeding, planting, and protection of grass and shrub vegetation, including adjustment of forage utilization, to provide channel stability and cover. (Lack of conifer cover makes shrubs and grasses more important for channel stability and fish habitat. Also, the potential for providing more channel stability and cover with deciduous woody vegetation and grasses are greater in more open conifer stands.) Vegetation enhancement should address increased potential for attracting livestock and wildlife to riparian areas and associated detrimental effects that could result.

4. Aggressively revegetate riparian areas along roadsides. (To reestablish shade, sediment filter, channel stability, and screening cover for deer and elk).

Non-Game, Other:

1. Where possible, retain large diameter (>20" dbh) dead and green ponderosa pine and western larch trees for pileated woodpecker roosting/feeding trees.

2. Avoid salvage in areas with less than 8 dead/dying trees (>12"dbh) per acre.

3. In large catastrophic health problem areas, manage snag and green tree replacements at higher levels (100% level desirable) to compensate for reduced snag longevity associated with insect and disease induced mortality, limited future snag recruitment opportunities, and windthrow. Clumps are preferred to individuals.

4. Limit extent of YUM yarding, leaving as much large wood in the unit as possible (at least 4 down logs per acre, 10" diameter small end by 16 ft. long). Fuel loading and reforestation site prep needs should be considered to ensure integrated objectives for the area are met.

5. Special Habitats (rims, hardwoods, rock outcrops, etc.): Emphasize cover retention immediately adjacent to special habitats. Buffer widths should be determined by State and/or Forest Service biologists on a site-specific basis. Widths may extend up to 300 feet in certain cases.

6. Complete a watershed cumulative effects analysis if 30% or more of a subwatershed is in an age class of less than ten years. Do analysis on subwatershed basis, or group of subwatersheds (5-10,000 acres total).

7. Timber salvage and thinning for forest health should be prohibited in Management Areas not scheduled for harvest in the Forest Plan, e.g., old growth, wilderness, scenic areas, and research natural areas. (Refer to respective Forest Plans.) It is recognized that some level of management is desirable in some areas to maintain health and longevity of these stands in concert with desired conditions of the management area. Further guidance is anticipated, pending direction from the Regional Forester (Recommendations of the Blue Mountain Forest Health Implementation Project).

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APPENDIX 2: SILVICULTURE WHITE PAPERS

White papers are internal reports, and they are produced with a consistent formatting and numbering scheme – all papers dealing with Silviculture, for example, are placed in a silviculture series (Silv) and numbered sequentially. Generally, white papers receive only limited review and, in some instances pertaining to highly technical or narrowly focused topics, the papers may receive no technical peer review at all. For papers that receive no review, the viewpoints and perspectives expressed in the paper are those of the author only, and do not necessarily represent agency positions of the Umatilla National Forest or the USDA Forest Service.

Large or important papers, such as two papers discussing active management considerations for dry and moist forests (white papers Silv-4 and Silv-7, respectively), receive extensive review comparable to what would occur for a research station general technical report (but they don't receive blind peer review, a process often used for journal articles).

White papers are designed to address a variety of objectives:

(1) They guide how a methodology, model, or procedure is used by practitioners on the Umatilla National Forest (to ensure consistency from one unit, or project, to another).
(2) Papers are often prepared to address ongoing and recurring needs; some papers have existed for more than 20 years and still receive high use, indicating that the need (or issue) has long standing – an example is white paper #1 describing the Forest's big-tree program, which has operated continuously for 25 years.
(3) Papers are sometimes prepared to address emerging or controversial issues, such as management of moist forests, elk thermal cover, or aspen forest in the Blue Mountains. These papers help establish a foundation of relevant literature, concepts, and principles that continuously evolve as an issue matures, and hence they may experience many iterations through time. [But also note that some papers have not changed since their initial development, in which case they reflect historical concepts or procedures.]
(4) Papers synthesize science viewed as particularly relevant to geographical and management contexts for the Umatilla National Forest. This is considered to be the Forest's self-selected 'best available science' (BAS), realizing that non-agency commenters would generally have a different conception of what constitutes BAS – like beauty, BAS is in the eye of the beholder.
(5) The objective of some papers is to locate and summarize the science germane to a particular topic or issue, including obscure sources such as master's theses or Ph.D. dissertations. In other instances, a paper may be designed to wade through an overwhelming amount of published science (dry-forest management), and then synthesize sources viewed as being most relevant to a local context.
(6) White papers function as a citable literature source for methodologies, models, and procedures used during environmental analysis – by citing a white paper, specialist reports can include less verbiage describing analytical databases, techniques, and so forth, some of which change little (if at all) from one planning effort to another.
(7) White papers are often used to describe how a map, database, or other product was developed. In this situation, the white paper functions as a 'user's guide' for the new product. Examples include papers dealing with historical products: (a) historical fire extents for the Tucannon watershed (WP Silv-21); (b) an 1880s map developed from General Land Office survey notes (WP Silv-41); and (c) a

description of historical mapping sources (24 separate items) available from the Forest's history website (WP Silv-23).

The following papers are available from the Forest's website: Silviculture White Papers

Paper #	Title
1	Big tree program
2	Description of composite vegetation database
3	Range of variation recommendations for dry, moist, and cold forests
4	Active management of Blue Mountains dry forests: Silvicultural considerations
5	Site productivity estimates for upland forest plant associations of Blue and Ochoco Mountains
6	Blue Mountains fire regimes
7	Active management of Blue Mountains moist forests: Silvicultural considerations
8	Keys for identifying forest series and plant associations of Blue and Ochoco Mountains
9	Is elk thermal cover ecologically sustainable?
10	A stage is a stage is a stage…or is it? Successional stages, structural stages, seral stages
11	Blue Mountains vegetation chronology
12	Calculated values of basal area and board-foot timber volume for existing (known) values of canopy cover
13	Created opening, minimum stocking, and reforestation standards from Umatilla National Forest Land and Resource Management Plan
14	Description of EVG-PI database
15	Determining green-tree replacements for snags: A process paper
16	Douglas-fir tussock moth: A briefing paper
17	Fact sheet: Forest Service trust funds
18	Fire regime condition class queries
19	Forest health notes for an Interior Columbia Basin Ecosystem Management Project field trip on July 30, 1998 (handout)
20	Height-diameter equations for tree species of Blue and Wallowa Mountains
21	Historical fires in headwaters portion of Tucannon River watershed
22	Range of variation recommendations for insect and disease susceptibility
23	Historical vegetation mapping
24	How to measure a big tree
25	Important Blue Mountains insects and diseases
26	Is this stand overstocked? An environmental education activity
27	Mechanized timber harvest: Some ecosystem management considerations
28	Common plants of south-central Blue Mountains (Malheur National Forest)
29	Potential natural vegetation of Umatilla National Forest
30	Potential vegetation mapping chronology
31	Probability of tree mortality as related to fire-caused crown scorch
32	Review of "Integrated scientific assessment for ecosystem management in the interior Columbia basin, and portions of the Klamath and Great basins" – Forest vegetation
33	Silviculture facts

Paper #	Title
34	Silvicultural activities: description and terminology
35	Site potential tree height estimates for Pomeroy and Walla Walla Ranger Districts
36	Stand density protocol for mid-scale assessments
37	Stand density thresholds as related to crown-fire susceptibility
38	Umatilla National Forest Land and Resource Management Plan: Forestry direction
39	Updates of maximum stand density index and site index for Blue Mountains variant of Forest Vegetation Simulator
40	Competing vegetation analysis for southern portion of Tower Fire area
41	Using General Land Office survey notes to characterize historical vegetation conditions for Umatilla National Forest
42	Life history traits for common Blue Mountains conifer trees
43	Timber volume reductions associated with green-tree snag replacements
44	Density management field exercise
45	Climate change and carbon sequestration: Vegetation management considerations
46	Knutson-Vandenberg (K-V) program
47	Active management of quaking aspen plant communities in northern Blue Mountains: Regeneration ecology and silvicultural considerations
48	Tower Fire…then and now. Using camera points to monitor postfire recovery
49	How to prepare a silvicultural prescription for uneven-aged management
50	Stand density conditions for Umatilla National Forest: A range of variation analysis
51	Restoration opportunities for upland forest environments of Umatilla National Forest
52	New perspectives in riparian management: Why might we want to consider active management for certain portions of riparian habitat conservation areas?
53	Eastside Screens chronology
54	Using mathematics in forestry: An environmental education activity
55	Silviculture certification: Tips, tools, and trip-ups
56	Vegetation polygon mapping and classification standards: Malheur, Umatilla, and Wallowa-Whitman National Forests
57	State of vegetation databases for Malheur, Umatilla, and Wallowa-Whitman National Forests
58	Seral status for tree species of Blue and Ochoco Mountains

REVISION HISTORY

March 2014: The first version of this white paper was prepared in June 2004. Minor formatting and editing changes were made, including adding a white-paper header and assigning a white-paper number. An appendix describing the white paper system was added, including a list of available white papers.

December 2016: minor editing changes were made, and an Introduction section was added.