WHITE PAPER

USDA Forest Service Pacific Northwest Region Umatilla National Forest

WHITE PAPER F14-SO-WP-SILV-19

Forest Health Notes for an ICBEMP Field Trip[1]

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HISTORICAL CONTEXT

These notes were developed as hand-out material for a forest health field trip conducted by Interior Columbia Basin Ecosystem Management Project (ICBEMP) in July 1998. ICBEMP began in January 1994 when Chief of USDA Forest Service (FS) and Director of USDI Bureau of Land Management (BLM) signed a charter; it directed that an ecosystem-based strategy be developed for management of FS and BLM lands within the project area.

ICBEMP project area includes U.S. portion of interior Columbia River basin east of the crest of Cascade Mountains in Oregon, Washington, Idaho, and western Montana, along with adjacent parts of Wyoming, Nevada, California, and Utah (some adjoining area includes portions of Klamath and Great Basins). It contains over 145 million acres, about 76 million acres of which are federal lands administered by FS and BLM. When it was conducted, it was the largest assessment of its kind in the world (Quigley and Cole 1997).

ICBEMP included two teams – a management team tasked with preparing environmental impact statements to amend land management plans directing federal activities in a multi-state ICBEMP area (EIS team), and a science integration team to provide credible information to managers about current conditions, risks, and opportunities in the Basin (SIT team). Natural resource managers use ICBEMP science information to help make decisions.

During their deliberations, EIS and SIT teams held numerous briefings to acquaint themselves with issues and concerns influencing land management in the Basin. Often, these 'discovery' activities involved field trips to interact with federal managers in a field setting. This white paper provides notes distributed to participants during a July 1998 field trip to discuss forest health issues on Umatilla National Forest in Blue Mountains of northeastern Oregon.

[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

"Biological reality has nothing to say about morality, values, or beauty; nature is what it is, nothing more." **Heinrich**

Forest health has been defined in many ways. A popular definition is: *forest health is a condition of forest ecosystems that sustains their complexity while providing for human needs* (from O'Laughlin and others 1994).

Some folks are uncomfortable with this definition because it contains a human component – the "providing for human needs" aspect. I believe this portion of the definition is valuable because it provides *context* for evaluating forest health, i.e., *are changes in forest ecosystems affecting society's capability to achieve objectives established for a landscape?* Inherent in this concept is a realization that societal objectives vary from one landscape to another, so any determination of forest health may also need to vary from one area to another.

Another aspect of forest health that is bothersome to some individuals is use of the term 'health.' Although 'forest health' helps with communication because people can easily draw an analogy to human health, it is widely recognized that using human health as a metaphor for forest or ecosystem health is invalid (Wicklum and Davies 1995).

In humans, determining health is relatively simple because vital signs or indicators (blood pressure, temperature, heart rate, etc.) are well known, and they vary only slightly around a predictable value determined by readings taken from many individuals. However, defining an optimal condition for an ecosystem is not possible and, although structural components of an ecosystem are interconnected, an ecosystem itself does not rely on individual components to function. For example, if all trees in an ecosystem were eliminated, the original ecosystem type would no longer exist, but an ecosystem would still continue to function – it would just be dominated by something other than trees (Wicklum and Davies 1995).

"We must not disturb the hierarchical balance of nature and the food chain. The earth has a natural system of interacting homeostatic mechanisms similar to the human body's. If one system is diseased, then other systems develop abnormalities in function." **Helen Caldicott, *If you love this planet: a plan to heal the earth*, 1992**

Caldicott's quote exemplifies a notion that nature can retain its inherent balance more or less indefinitely if only humans could avoid disturbing it. This balance-of-nature idea, which is still pervasive in the popular press, is based on belief that a normal condition of ecosystems is a state of homeostasis or equilibrium – a forest grows to a mature, climax stage that becomes its naturally permanent condition. Few ecologists support this philosophy any longer.

"By the 1950s, scientists were realizing that natural systems are not nearly so balanced or predictable as the Clementsian climax would have us believe and that Clement's habit of talking about ecosystems as if they were organisms – holistic, organically integrated, with a life cycle much like that of a living animal or plant – was far more metaphorical than real."
William Cronon, *Uncommon ground; rethinking the human place in nature*, 1996

EASTSIDE OREGON AND WASHINGTON ASSESSMENTS

For at least several decades, forest health has been a concern for North Fork John Day River Basin, particularly when Blue Mountain forests sustained substantial levels of damage from wildfire, insects, and diseases. A chronology of recent assessments examining forest health for this basin[2], and for other areas of eastern Oregon and eastern Washington, include these efforts:

- April 1991 – Publication of "Blue Mountains Forest Health Report: New Perspectives in Forest Health" (often referred to as Gast Report). This report documents deteriorating forest health in northeastern Oregon and southeastern Washington (Gast et al. 1991).
- July 1992 – Publication of a report called "Restoring Ecosystems in the Blue Mountains: A Report to the Regional Forester and the Forest Supervisors of the Blue Mountains" (often referred to as Caraher Report). This report was prepared by a panel of resource specialists who assessed forest ecosystem health for every river basin occurring in the Blue Mountains (Caraher et al. 1992).
- October 1992 – Release of a "Forest Health Restoration Project" strategy pertaining to North Fork John Day River basin. Based on the Caraher process, this document analyzed specific restoration opportunities for North Fork John Day river basin (Shlisky 1994a, 1994b).
- January 1993 – Publication of a "Blue Mountains Ecosystem Restoration Strategy," which identified a broad range of restoration projects totaling over $100,000,000.
- April 1993 – Release of an "Eastside Forest Ecosystem Health Assessment" (often referred to as Everett Report). Pacific Northwest Research Station published findings as a series of general technical reports in 1994 (Lehmkuhl et al. 1994 is an example).
- June 1993 – A report called "A First Approximation of Ecosystem Health, National Forest Lands, Pacific Northwest Region" was released; it summarized many forest health problems affecting eastside national forests (Lowe 1993).
- August 1993 – Release of an "Interim Approach for Sale Preparation, Eastside Forests" (generally known as Eastside Screens). This interim process established three screens relating to riparian habitat, late/old forest structure, and old-growth dependent wildlife habitat. The screens were revised in 1995 (USDA Forest Service 1995).
- August 1994 – Report entitled "Interim Protection for Late-Successional Forests, Fisheries, and Watersheds" was released by an Eastside Forests Scientific Society Panel. This panel was chartered by Congress to "initiate a review and report on the eastside forests of Oregon and Washington" (Henjum et al. 1994).
- Late 1994 – Publication of "Assessing Forest Ecosystem Health in the Inland West," which describes a scientific workshop sponsored by American Forests and other organizations. It was designed to assess ecosystem health for the Interior West, including a Blue Mountains ecoregion (Sampson and Adams 1994).

It is also interesting that a recent survey conducted by Oregon State University found that most residents living in the Blue Mountains perceive their forests to be unhealthy (Shindler and Reed 1996).

[2] A white paper describes this vegetation chronology in more detail – see White Paper F14-SO-WP-Silv-11, Blue Mountains vegetation chronology.

It is clear from a forest health definition given above that healthy forests contain insects, pathogens, parasites, and tree-killing disturbance agents, but the number and type of dead trees they create should occur at levels approximating historical ranges and not interfere with perpetuation of sustainable ecological conditions.

Historical information in general, and the historical range of variability (HRV) specifically, can be useful tools when deciding if current conditions are 'healthy' or not.

[***Additional background and context about historical information and HRV***: After Eastside Screens were released in August 1993, which established requirements for using an historical range of variability analytical technique for vegetation planning and assessment, Umatilla NF vegetation managers began assembling historical documents, maps, and photographs as sources for characterizing historical (reference) conditions.

The Umatilla NF sent three employees to the National Archives (College Park, Maryland) to locate and copy historical materials pertaining to Blue Mountains national forests; those Archives materials are documented in three primary sources:

1. "Historical References About Vegetation Conditions: A Bibliography With Abstracts" (Powell 1999).
2. "Historical Vegetation Mapping," white paper F14-SO-WP-Silv-23 (Powell 2019).
3. "Historical Reference Material," a website: https://www.fs.usda.gov/detail/umatilla/learning/history-culture/?cid=stelprdb5200838]

HISTORICAL FOREST HEALTH ACCOUNTS

Quotes provided in this section suggest that ecosystem changes caused by insects, fires, diseases, and other disturbance agents are not a recent or necessarily unusual phenomenon, although depending on the disturbance process being considered, the scale at which it currently operates may be one or more orders of magnitude greater than historically.

"It is believed that there is everywhere throughout lodgepole pine stands, an incipient infestation of mountain pine beetle, and that when it breaks out in one place, checking it here will not prevent its spread elsewhere, if conditions are favorable for a general infestation." **J.F. Pernot, *Insect control policy for District 6*, 1913**

"To ride through the lodgepole forests in the vicinity of Porcupine Ranger Station that were infested in 1909-10 gives one the impression of an eastern hardwood forest in the dead of winter. The lodgepole all stands dead and bare, with here and there an occasional green tree of other species, such as larch, fir, etc."

Kan Smith, *Report of present condition of insect infestation on the Whitman NF, Oregon*, 1912

"White fir in this region is very poor and should be considered a weed. If merchantable, heavy marking should be the rule, especially on the yellow pine areas. Trees of this species over 16 inches D.B.H. are seldom sound because of the heavy attacks of Indian paint fungus which gain access to the tree through frost cracks and fire scars."

T.J. Starker, *Instructions for marking timber in yellow pine region, Pacific Northwest District*, 1916

"Mistletoe, it is thought, is on the increase. It is killing many Douglas-fir. Nearly every large or medium-sized Douglas-fir will often be found to be infested with this disease, on certain north slopes."

George A. Bright, *The extensive reconnaissance report of the Wenaha NF*, 1914

"One of the first and most essential facts about forest fires is their commonness. Year by year they spread over vast stretches of country, and every spring and every fall accounts of their ravages are brought to public attention. Few forest regions escape, and by far the greater part of the whole forest area of the United States bears the marks of fire. *Yet the forests have not disappeared*. They have suffered enormously, and their losses from this cause increase rather than diminish as time goes on, but *the forests are still standing in more or less health* and value over great areas that have been burned over tens of hundreds of times."

Gifford Pinchot, *Address to Congress*, 1899

"Forests, like nations, endure only at the expense of a constant succession of births and deaths among the individuals which compose them."

Gifford Pinchot, *Address to Congress*, 1899

"It is obvious that the present policy of attempting complete protection of ponderosa pine stands from fire raises several very important problems. How, for instance, will the composition of the reproduction be controlled? If ponderosa pine is desired on

vast areas how, unless fire is employed, can other species such as white fir be prevented from monopolizing the ground? On the other hand, if it is decided to permit such species as white fir to come in under mature ponderosa pine, how much of the public's money are foresters justified in spending in trying to keep fire out?"

Weaver, *Fire as an ecological and silvicultural factor in the pine region of the Pacific Slope*, 1943

"Hands off management shows good taste but poor insight. The hope of the future lies not in curbing the influence of human occupancy – it is already too late for that – but in creating a better understanding of the extent of that influence and a new ethic for its governance." **Aldo Leopold, *Game management*, 1933**

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APPENDIX: 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

December 2016: First version of this white paper was prepared in July 1998 as handout material for a forest health field trip sponsored by Interior Columbia Basin Ecosystem Management Project.

For the December 2016 revision, minor formatting and editing changes were made, including adding a white-paper header and assigning a white-paper number. An appendix was added describing the silviculture white paper system, including a list of available white papers. A short Historical Context section was also added.