WHITE PAPER

USDA Forest Service Pacific Northwest Region Umatilla National Forest

WHITE PAPER F14-SO-WP-SILV-57

State of Vegetation Databases for Malheur, Umatilla, and Wallowa-Whitman National Forests[1]

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BACKGROUND

On June 30, 1999, 2.6 million acres in the Blue Mountains of northeastern Oregon and southeastern Washington were selected as a National Demonstration Area to accelerate forest and watershed restoration at a landscape level, while also contributing to economic and social health of local communities. This 2.6-million-acre area was designated as the Blue Mountains Demonstration Area.

Before restoration activities could begin within Blue Mountains Demonstration Area (BMDA), a prioritization process was implemented to ensure that limited dollars and personnel would be directed to those watersheds that had the greatest potential to show improvement in overall watershed health.

A ranking process was based on assessments of current vegetative, biological, and physical status or 'integrity' of forested and rangeland ecosystems, as well as risks and opportunities available to maintain or improve current watershed conditions. Large portions of these assessments were based on current vegetative condition and their potential to support large disturbance events such as wildfire, insects, and disease, which could degrade watershed health.

During the ranking process, it quickly became clear that assessments based on vegetative data from the Wallowa-Whitman, Umatilla, and Malheur National Forests were at differing levels of detail and that seamless comparisons were not possible, except at the broadest of scales.

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

In addition, Forest Plan revision is scheduled to begin in fiscal year 2004 and Blue Mountain national forests decided to work together at a Provincial scale. A need to integrate information across space and time requires compatible data sets. With less than three years before FP revision begins, questions raised previously about quality of our vegetation databases and our ability to seamlessly merge and compare data across all three Forest boundaries have now become even more urgent.

Several attempts have been made to achieve a consistent approach for a provincial Forest Plan Revision process. Vegetation information data cannot be collected collaboratively, nor shared among users, unless definitions and assumptions supporting the information are consistent and agreed upon. Small task groups have convened numerous times in the past to resolve specific vegetation coding and definition issues and have struggled to reach a critical, but elusive, goal – consistency.

Countless hours of discussion, compromise, and effort on the part of many tri-Forest individuals through the years resulted in frustration and no final resolution on many consistency issues. Irreconcilable differences of opinion, or in vegetation classification philosophy, or just the lack of a decision maker with appropriate authority to make a 'final call' and allow the process to move forward – all of these factors limited our ability to reach a common consensus.

As a direct result of a short-term need in the BMDA to do landscape analysis and watershed restoration across a vast area with multiple ownerships – federal, state, private, tribal, and municipal lands, and with a long-term need to do Forest Plan revision on a large, provincial basis, a small, tri-forest Vegetation Database (Veg DB) Team has once again been assembled.

Dave Powell, UMA Forest Silviculturist, Ray Smith, MAL Forest Analyst, Katie Countryman, WAW Forest Analyst, and Victoria Rockwell, WAW Forest Silviculturist have served as the core members of this Veg DB Team, along with periodic input and assistance from Ed Pugh, UMA Forest Planning Staff, Lyle Powers, MAL Forest Planning Team Leader, Dee Hines, WAW Forest Planning Staff, Alan Ager, UMA Forest Analyst, Bill McArthur, MAL Forest Silviculturist, Gene Yates, MAL Forest Botanist, and Bob Rainville, BMDA Coordinator.

This Veg DB Team was chartered to describe current status of vegetation information for the Malheur, Umatilla, and Wallowa-Whitman National Forests, and to recommend to the three Forest Supervisors how to resolve existing vegetation data gaps within, and inconsistencies across, three Blue Mountain national forests.

Veg DB Team believes this latest effort to resolve vegetation data issues will be successful, and attribute this confident expectation to a unified commitment by the three Forest Supervisors to make a decision and resolve any professional differences that previously prevented agreement (see tri-forest letter about Unified Vegetation Databases, dated March 7, 2001, signed by all three Forest Supervisors, and provided at end of this document as appendix 1).

[Note: Silviculturists and other vegetation specialists are involved in collection and interpretation of vegetation information, including stand examinations and photo-interpretation surveys. They also work with storage and maintenance of vegetation data in GIS and database environments. In addition to this white paper, these papers deal with various aspects of vegetation information and its management:
Silv-2: Description of composite vegetation database
Silv-11: Blue Mountains vegetation chronology
Silv-14: Description of EVG-PI database
Silv-23: Historical vegetation mapping
Silv-30: Potential vegetation mapping chronology
Silv-56: Vegetation polygon mapping and classification standards: Malheur, Umatilla, and Wallowa-Whitman National Forests
These white papers are available from a website: Silv White Papers]

CURRENT STATUS

All three Forests have a vegetation layer in GIS with mapped polygons that separate forested stands from non-forested, non-vegetated, and riparian stands. Additional work of various degrees is needed to better refine riparian and non-forested polygons for all three Forests. In general, the Wallowa-Whitman has non-forested polygons mapped to a minimum of 2 acres in size and forested polygons down to 5 acres. Both the Umatilla and Malheur are currently mapping non-forested polygons down to 1 acre and forested polygons down to 2 acres.

There are some exceptions to these minimum polygon sizes regarding timbered stringers, where minimum widths have been used historically, and for some unique vegetative features, such as aspen or cottonwood, where individual points or small clumps of individuals are mapped and attributed.

The Malheur NF has not populated polygons on their vegetation layer with any summarized stand data currently. Vegetation data does exist on an individual project basis in the form of old stand exams, environmental assessment documents, or recently completed watershed analysis for approximately 50% of the Forest. It was estimated that it would take one person per district at least one year to track down this data, conduct a minimal accuracy check, and then input the information into a database. Once completed, the Malheur NF would still only have 50% of its area characterized by using data up to 15 years old.

The Umatilla and Wallowa-Whitman NFs have an existing vegetation database (EVG) containing summarized information for each polygon present on their respective vegetation layers. EVG was created and originally populated between 1989 and 1991 on both the Umatilla and Wallowa-Whitman NFs. Both Forests used two primary data sources to characterize vegetation and populate EVG – interpretation of aerial photography, and field-based stand exams.

Most stand exams used to populate EVG were conducted during 1980s and early 1990s, and the data is now twenty years old in many cases. When considering the

significance of vegetation changes occurring since the early 1980s and caused by wildfires, insect outbreaks, management activities and other disturbance events, there is real concern about the value of some of this older data.

On the Wallowa-Whitman NF, there have been periodic updates of data in EVG, however, these updates have not been consistent on all ranger districts and many polygons have never been updated, re-interpreted, or re-examined since 1989. There is a significant portion of the Wallowa-Whitman NF (excluding Eagle Cap Wilderness, Hells Canyon National Recreation Area, and portions of Pine Ranger District) now covered with more recent aerial photography from flights conducted in 1997, 1999, and 2000. A full-scale reinterpretation of these recent photos, however, has not been completed to-date.

In late 1999, the Umatilla NF decided to go with 100% photo interpretation for their EVG database. South half of Umatilla NF was just recently re-interpreted by using more current photo flights from 1995 and 1997. For north half of the Umatilla NF, Wenaha-Tucannon Wilderness is under contract to be re-interpreted in FY2001 by using the 1997 photo flight. Remaining portion of north half will be flown in FY2001 and is currently under contract.

Aside from small, localized photo flights, and specific flights following major wildfires, Malheur NF has not had an updated flight with full Forest coverage since 1989.

The following table summarizes similarities and differences between vegetation information currently available for Wallowa-Whitman, Umatilla, and Malheur National Forests.

	Malheur NF	**Umatilla NF**	**Wallowa-Whitman NF**
VEGETATION LAYER:			
Vegetation layer exists	Yes	Yes	Yes
Forested polygons delineated	Yes	Yes	Yes
Non-forested polygons delineated	Some	Yes	Yes
Non-veg polygons delineated	Some	Yes	Yes
Riparian polygons delineated	Yes	No	No
Minimum size of forested polygons	2 acres	2 acres	5 acres
Minimum size of non-forested polygons	1 acre	1 acre	2 acres
Ecoclass/PNV layer exists	Yes	Yes	Yes
Ecoclass/PNV layer complete/current	No	No	No
DEM layer exists	Yes	Yes	Yes
VEGETATION DATABASE:			
Veg Database (EVG) exists	No	Yes	Yes
EVG created/originally populated	Never	1989-1991	1989-1991

	Malheur NF	Umatilla NF	Wallowa-Whitman NF
Data sources used	None	100% - PI	63% - PI 27% - Exams
Percent of Forest updated with current information within last 5 years	0%	50%	15%
Last time Forest had 100% photo coverage with one aerial photography flight	1989	1987/88	1987/88
Most recent photo flights	1998	1995/97	1997/99/00
Percent of Forest coverage from photography flights taken between 1995 – 2000	5%	50%	70%

DESIRED DATA SET

According to Webster's dictionary, consistency is "…an agreement or logical relation of parts that affords comprehension or recognition; compatibility or agreement among successive acts, ideas, or events; conforming to the same principles or course of action."

A consistent data set for all three Blue Mountains Forests will improve a prioritization process of watershed restoration work within the BMDA for the short-term, and will provide for seamless analysis and the best possible information for Forest Plan revision for the Blue Mountains Province in the longer-term.

Aside from significant vegetation data gaps existing across the Forests, there are also inconsistencies in what type of data is collected and stored. Data is currently used in a variety of formats, collected in a variety of protocols, and manipulated by using a variety of database systems. Consistency is key.

To coordinate datasets successfully, all three Forests must agree to map vegetation, and to collect and populate vegetation information data, by using a core set of data parameters with the same definitions and codes.

Historically, the Wallowa-Whitman and Umatilla NFs have relied on two primary data sources to characterize vegetation – interpretation of aerial photography and field-based stand examinations. Since photo interpreted (PI) data is remotely sensed and has limitations with respect to the type and range of vegetation attributes that can be determined, it is often considered to be a relatively low-resolution data source.

PI data is cost effective when compared with stand exams or other field surveys, and it is useful for analysis of vegetation trends at national forest or geographical province (ecoregion) scales.

Stand exams are on-the-ground surveys where a series of temporary plots are established in a randomized or grid pattern across a sample area; vegetation characteristics such as tree species, tree density, tree diameter, and tree height are measured on each plot and then summarized to derive an average condition for a polygon

(stand).

Stand exams can provide site specific plant association information, numbers, species, size classes, and distribution of down, woody material, snags, and understory vegetation, as well as numerous other resource attributes and measurements. Since individual trees are measured to specific tolerances, and measurements are then summarized to statistically represent a sampled area (polygon), stand exams are considered to be a high-resolution data source.

Remote-sensed satellite imagery is a low-resolution data source that has sparked interest for its potential to provide low-cost vegetation information. It is currently valued for its ability to provide change detection over time across large landscapes, and it could be used to strategically identify areas requiring more intensive photo interpretation or field surveys to update existing vegetation data information.

With a need to analyze vegetation structure, which is highly dependent on vertical layers, it is questionable whether currently available satellite technology can adequately provide a baseline vegetation dataset, considering its lack of resolution and inability to detect vertical layers with acceptable reliability.

Between 1994 and 1998, Current Vegetation Survey (CVS) plots were installed across all three Blue Mountains NFs, replacing the previous Continuous Forest Inventory (CFI) plot system that had not been remeasured since 1979. Normally, plot data from these inventory and monitoring systems are stratified, and then used for broad assessments such as forest planning.

CVS plots were installed on a 1.7-mile grid in commercial forest types, and on a 3.4-mile grid for wilderness and non-forest areas. Forest tree volumes and other calculated or derived information from these plots can be applied to similarly stratified polygons of mapped vegetation, thereby providing a spatial component for calculated or derived information. If a vegetation map does not exist, however, this information would have no spatial component.

An expansion factor for each 1.7-mile grid plot is 1,850 acres, and total acres by stratum would be applied to a national forest. If enough plots are available in each stratum for a smaller area, a subbasin or watershed for instance, those plots could be used to calculate or derive information for application to a smaller area.

Given that CVS plots expand to characterize such large areas, and lack anything but the broadest spatial component, it is doubtful that there would be enough plots in each stratum to have much validity for planning purposes at a mid-scale or project level. CVS plots are no substitute for a detailed vegetation map.

In order to proceed with recommendations on how to achieve inter-Forest consistency, the Veg DB Team made preliminary assumptions about a data source to use, and basic mandatory minimum fields needed to populate our vegetation information databases.

Assumption #1

Recommended data source will be ***photo interpretation***;

Assumption #2

The **mandatory minimum database fields** to be populated will be:

Fields from **Photo Interpretation**

- *Number of live **VERTICAL CANOPY LAYERS**;*
- ***SPECIES** by layer;*
- ***SIZE CLASS** by layer;*
- ***CANOPY CLOSURE** – by layer and for total stand;*
- ***SNAGS** – number by size class (<12", 12-21", >21") for total stand;*

Fields that can be **DERIVED** from five basic photo interpreted fields

- ***Structure***
- ***Cover Type***
- ***Fire Regime***
- ***Fire Condition Class***
- ***Fuel Model***
- ***UPEST (insect and disease) ranking***
- ***Other derived characteristics** whose definitions may change over time*

Fields **CALCULATED** or **EXTRACTED** from other existing data sources

• *Stand **Slope***	Digital Elevation Model (DEM)
• *Stand **Aspect***	DEM
• *Stand **Elevation***	DEM
• ***Ecoclass***	Ecoclass layer (PNV)
• ***Potential Vegetation Group** (PVG)*	Ecoclass layer (PNV)
• ***Mid-scale Vegetation Group** (Plant Association Group (**PAG**), Potential Vegetation Type (**PVT**), or Biophysical environment)*	Ecoclass layer (PNV)

Assumption #3

Database parameters will use existing EVG definitions and codes as a start point. Existing definitions and codes will be reviewed and agreed upon for consistency by two separate tri-forest teams, a Forested Vegetation Team for forested polygons, and a Nonforested Vegetation Team for nonforested, rangeland, and riparian polygons. Team membership will include silviculturists, botanists, ecologists, range managers, fuels specialists, and hydrologists.

Recommended changes to existing EVG definitions and codes will be described in formal proposals to a tri-forest GIS group responsible for (1) maintaining a current working copy of a GIS Data Dictionary, and (2) incorporating any approved changes.

RESOURCES NEEDED

Field-based surveys, or stand exams, across all forested polygons would be an ideal data scenario for supporting large-scale analysis, in addition to meeting fine-scale project level planning needs. Unfortunately, the cost for this scenario, at approximately $15-20 per plot and an average of 10 plots per 40-acre stand, would be astronomical across such a large land base.

And, the deadline for when we would need to complete these stand exams, and then populate or update our vegetation databases to meet a Forest Plan revision schedule, which is less than three years, is entirely unrealistic.

Recognizing that current satellite imagery technology cannot provide adequate detail to determine vertical canopy structure, an extremely important component in vegetation analysis today, and that stand exams are not feasible in terms of cost and time on such a broad scale, the Veg DB Team's recommendation is that photo interpretation is a viable compromise.

When considering overall cost, time requirements, and resolution needs related to landscape-scale analysis, including provincial Forest Planning and watershed analysis (and to a lesser degree for project-level planning purposes), photo interpretation seems to be the best alternative.

Some argue that in order to properly characterize vegetation for Forest Planning purposes, all lands included in an analysis area should be characterized from one distinct aerial photography flight. The cost of flying the entire Malheur, Umatilla, and Wallowa-Whitman National Forests under one photo flight is estimated at approximately $500,000 – based on six million National Forest administered acres, at $50 per square mile. This estimate does not include private, state, or other federal agency lands within or immediately adjacent to administrative Forest boundaries.

As more emphasis is placed on analysis, management, and accountability at the watershed scale, it is not unreasonable to expect that a total land base to be flown could increase to nearly nine or ten million acres if all watersheds included in a National Forest administrative boundary are inventoried to their full extent to include all land ownerships in a watershed. A flight of that magnitude would easily increase the acquisition cost of aerial photography to nearly $800,000.

In addition to acquiring the photography, another $1,500,000 would be required for photo interpretation, field validation, Potential Natural Vegetation (PNV) mapping, and database population for six million acres of National Forest lands. An approximate cost of $2,500,000 would be required for an expanded ten million acre multiple-ownership land base.

It is estimated that one complete aerial photo flight, and corresponding photo interpretation (and associated database costs) across all three Blue Mountains National Forests, could range between $2 and $3.5 million.

As described earlier, both the Wallowa-Whitman and Umatilla National Forests had recent photo flights in the past 5 years, and these flights cover significant portions of their total land base. To acquire an aerial photography flight for the entire Blue Mountains Province during the same year would be extremely costly and may not even be contractually possible due to the large acreages involved.

Consensus of the Veg DB Team is that photo flights acquired since 1995 are acceptable for short-term BMDA needs, as well as imminent Forest Plan revision.

Since the Malheur NF does not have much of its land base covered with recent photography, a full photo flight is recommended for that area. In addition, portions of the Wallowa-Whitman NF that have not been covered by new photography in the last 5 years (Eagle Cap Wilderness, Hells Canyon NRA, and portions of Pine Ranger District) should also be flown.

A full photo interpretation will be needed once the Malheur photo flight has been completed, along with portions of the Wallowa-Whitman NF not currently covered by a recent photo flight. Based on a change detection flight to determine where significant vegetation changes have occurred since the early 1990s, the Wallowa-Whitman NF will need to have additional photo interpretation completed by using existing photography flown in 1997, 1999, and 2000.

Since initial creation and population of vegetation data for the EVG database, various degrees of updating, based on post-activity surveys or to reflect post-fire changes, has been conducted by Wallowa-Whitman ranger districts over the years, but not consistently.

A significant portion of La Grande Ranger District was re-interpreted in FY 2001 through a collaborative effort between BMDA and PNW Research Station. The La Grande district could use that effort to update outdated information in their EVG database. Considering partial updates that have been occurring periodically, an entire Forest re-interpretation is not anticipated for Wallowa-Whitman NF.

Umatilla NF will soon have full aerial photo coverage from recent photography taken in 1995, 1997, and a 2001 flight currently under contract. Photo interpretation has been completed for the entire south half of the Forest, and it will be completed in FY 2001 for Wenaha-Tucannon Wilderness portion of the north half.

All that remains to complete an Umatilla NF update of EVG is photo interpretation for remainder of the north half (outside of Wenaha-Tucannon Wilderness) by using photography being acquired in FY 2001, along with completion of PNV mapping. Both the Malheur and Wallowa-Whitman NFs will need to complete PNV mapping prior to Forest Plan revision.

Personnel available for assignment to such a large photo acquisition and interpretation project, as is being recommended for the Province, do not exist within current organizations on the three Forests. There will be a need, however, for overall co-

ordination, contract preparation and administration, quality assurance, and monitoring to ensure that data standards and timelines are met.

Logistics for one complete aerial photo flight across all three Forests, followed by either stand exams or a broad-scale photo interpretation project, is unrealistic in terms of costs and timelines to meet short-term needs within BMDA, and longer-term needs for province-wide Forest Plan revision.

A tabular chart, presented below, illustrates more realistic and achievable costs for reaching province-wide consistency by making full use of recent photo flights and other ongoing updating efforts.

	MAL NF	UMA NF	WAW NF	TRI-FOREST
AERIAL PHOTOGRAPHY NEEDS				
Within BMDA…				
Photo Flight coverage (in acres)	*410,000*	*0*	*450,000*	*860,000*
Estimated Cost (@ $50 per square mile)	*$32,000*	*$0*	*$35,000*	*$67,000*
Additional Photo sets	*$4,700*	*$0*	*$5,300*	*$10,000*
Change Detection Flight (@ $600 per scene)	*$0*	*$0*	*$1,200*	*$1,200*
Subtotal within BMDA	*$36,700*	*$0*	*$41,500*	*$78,200*
Outside BMDA…				
Photo Flight coverage (in acres)	*2,969,200*	*0*	*250,000*	*3,219,200*
Estimated cost (@ $50 per square mile)	*$232,000*	*$0*	*$19,500*	*$251,500*
Additional Photo sets	*$34,300*	*$0*	*$3,000*	*$37,300*
Change Detection Flight (@ $600 per scene)	*$0*	*$0*	*$2,400*	*$2,400*
Subtotal outside BMDA	*$266,300*	*$0*	*$24,900*	*$291,200*
TOTAL AERIAL PHOTOGRAPHY NEEDS	***$303,000***	***$0***	***$66,400***	***$369,400***
PHOTO INTERPRETATION (PI) NEEDS				
Within BMDA…				
New Photo flight coverage (in acres)	*280,000*	*0*	*450,000*	*730,000*
Existing Photo flight coverage (in acres)	*0*	*186,000*	*150,000*	*336,000*
Estimated Cost (@ $0.15 per acre)	*$42,000*	*$27,900*	*$90,000*	*$159,900*
Field Validation (@ slightly less than $0.01 per acre)	*$2,500*	*$2,900*	*$6,000*	*$11,400*
Subtotal within BMDA	*$44,500*	*$30,800*	*$96,000*	*$171,300*
Outside BMDA…				
New Photo flight coverage (in acres)	*1,428,870*	*0*	*250,000*	*1,678,870*
Existing Photo flight coverage	*0*	*364,500*	*500,000*	*864,500*
Estimated Cost (@ $0.15 per acre)	*$214,331*	*$54,675*	*$112,500*	*$381,506*
Field Validation (@ slightly less than $0.01 per acre)	*$11,500*	*$3,100*	*$6,000*	*$20,600*
Subtotal outside BMDA	*$225,831*	*$57,775*	*$118,500*	*$402,106*
TOTAL PHOTO INTERPRETATION NEEDS	***$270,331***	***$88,575***	***$214,500***	***$573,406***
PNV MAPPING NEEDS				
Within BMDA…				
PNV Mapping and Classification (@ $0.20 per acre)	*$13,000*	*$14,000*	*$30,000*	*$57,000*
Outside BMDA…				
PNV Mapping and Classification (@ $0.20 per acre)	*$37,000*	*$36,000*	*$50,000*	*$123,000*
TOTAL PNV MAPPING NEEDS	***$50,000***	***$50,000***	***$80,000***	***$180,000***

	MAL NF	UMA NF	WAW NF	TRI-FOREST
ADDITIONAL PERSONNEL NEEDS				
Person years needed	*2*	*0.5*	*2*	*4.5*
Estimated cost (based on salary of $38,000 per year)	*$76,000*	*$19,000*	*$76,000*	*$171,000*
Vehicle Cost (FOR/mileage/use @ $5,000 per year)	*$10,000*	*$2,500*	*$10,000*	*$22,500*
TOTAL ADDITIONAL PERSONNEL NEEDS	***$86,000***	***$21,500***	***$86,000***	***$193,500***
Subtotal within BMDA	***$137,200***	***$55,550***	***$210,500***	***$403,250***
Subtotal outside BMDA	***$572,131***	***$104,525***	***$236,400***	***$913,056***
TOTAL NEEDS	***$709,331***	***$160,075***	***$446,900***	***$1,316,306***

Much of the current data is outdated, and large data gaps exist over significant portions of the tri-Forest provincial land base. There are inconsistencies in codes and definitions being used to characterize vegetation information among the Forests. It is recognized that establishment of a unified and consistent vegetation database among Blue Mountains Forests is vital to effectiveness of both short-term and long-term planning efforts within our Province.

Based on information presented in this white paper, a Veg DB Team offers the following recommendations regarding establishment and maintenance of a consistent vegetation database for three national forests of the Blue Mountains Province.

- Adopt photo interpretation as a primary data source to populate our vegetation databases.
- Adopt mandatory minimum database fields, as described on page 7 in the DESIRED DATA SET section of this document.
- As a start point, adopt EVG database definitions and codes to review and agree upon.
- Meet existing contract commitments on the Malheur NF to complete a full aerial photography flight and photo interpretation prior to initiation of Forest Plan revision in FY 2004.
- Complete aerial photo coverage and photo interpretation on those portions of Wallowa-Whitman NF not included in recent photo flights conducted in 1997, 1999, and 2000.
- Obtain change detection scenes for Wallowa-Whitman NF, and determine where significant vegetation changes have occurred since the most recent photo flights were acquired.
- Use recent photo flights from 1997, 1999, and 2000 to re-interpret and update Wallowa-Whitman NF polygons with significant vegetation changes identified by a change-detection analysis, as described above.
- Complete photo interpretation for north half of the Umatilla NF by using a recent photo flight from 1997, plus a new flight currently under contract (to be flown in 2001).

- To meet short-term BMDA needs, utilize any mid-year FY 2001 dollars allocated to BMDA to help fund photo flights and photo interpretation on the Malheur, Wallowa-Whitman, and Umatilla NFs, in that order of priority.
- Request and allocate BMDA funds in FY 2002 to support vegetation database updating activities (photo interpretation, PNV mapping, etc.) within BMDA, to the fullest extent possible, to meet Forest Plan revision needs for FY 2004.
- To meet longer-term needs for Forest Plan revision, and beyond the limits of funding and priorities within BMDA, identify completion of photo flights, photo interpretation, PNV mapping, and EVG database updates as high priority for all three Blue Mountain Forests.
- Request specific funding in the next outyear budgeting cycle that is commensurate with the urgency and need to complete database updates and consistency activities by initiation of Forest Plan revision in FY 2004.
- Charter a Forested Vegetation Task Group to complete a review for consistency of, and agreement to, definitions and codes relating to forested polygons and their respective vegetation information. Develop a task-group recommendation for the Area Ecologist's review by August 31, 2001.
- Charter a Nonforested Vegetation Task Group to complete a review for consistency of, and agreement to, definitions and codes relating to rangelands and nonforested polygons and their respective vegetation information. Develop a recommendation for the Area Ecologist's review by August 31, 2001.
- Direct the Area Ecologist to review two task groups' recommendations, as described above, and provide a decision recommendation for three Blue Mountain Forest Supervisors by October 1, 2001.
- In order to maintain consistency across the Province, document major agreements and decisions pertaining to vegetation information with a tri-Forest letter signed by all three Blue Mountain Forest Supervisors.
- Unless major changes in vegetation information definitions and codes are needed, break out of the constant recycling of data information issues and move forward from a point of signed agreements into implementation.

APPENDIX 1: UNIFIED VEGETATION DATABASE MEMO, AND TRI-FOREST AGREEMENT

File Code: 2000 **Date:** March 7, 2001
Route To:

Subject: Unified Vegetation Database

To: Malheur FLT
Umatilla FLT
Wallowa-Whitman FLT

Establishment of a unified vegetative database among three national forests within the Blue Mountains is vital to effectiveness of long-term planning within our Province.

By signing the attached agreement, we demonstrate our determination to work together to establish and maintain a consistent vegetation database.

Based on this agreement, we will ask our staff to identify and prioritize needed work. We expect our staffs to define parameters, definitions, codes and structure that are consistent between Forests and with NRIS.

When professional differences prevent agreement, we expect a summary of positions (concerns and needs) and alternatives. We will make decisions needed to achieve a common path. We want agreement on a framework to be completed by June 1, 2001.

/s/Bonnie J. Wood	***/s/Jeff D. Blackwood***	***/s/John C Schuyler***
BONNIE J. WOOD	JEFF D. BLACKWOOD	KARYN L. WOOD
Forest Supervisor	Forest Supervisor	Forest Supervisor
Malheur NF	Umatilla NF	Wallowa-Whitman NF

AGREEMENT BETWEEN MALHEUR, UMATILLA, AND WALLOWA-WHITMAN NATIONAL FORESTS TO ESTABLISH A UNIFIED AND CONSISTENT VEGETATION DATABASE FOR THE BLUE MOUNTAINS
March 7, 2001

The Blue Mountain Forests agree to:

1. Define a vegetation data set comprised of parameters, definitions/codes, and structure that is consistent between Forests and with NRIS direction.

2. Adopt photo interpretation as a primary data source for mid-term planning (over the next 3 to 5 years).

3. Complete an ongoing Landsat effort on Malheur NF in 2001 to provide short-term stand typing. As part of this effort, Malheur NF will evaluate utility of the procedure for future use. Malheur NF will use the same parameters and definitions as agreed to in #1. They will also evaluate new technologies as they become available.

4. Consider Landsat technology for use in gathering information where needs are less rigorous and when funding will not support photo interpretation technology. Landsat may be useful as a tool to detect vegetation changes and identify where updated vegetation information is needed.

5. Place an immediate priority on getting the Malheur NF consistent with the other two Blue Mountains national forests.

6. Consult, and reach consensus, with all three Blue Mountains national forests before pursuing any changes to this agreement.

/s/Bonnie J. Wood	***/s/Jeff D. Blackwood***	***/s/John C. Schuyler***
BONNIE J. WOOD	JEFF D. BLACKWOOD	KARYN L. WOOD
Forest Supervisor	Forest Supervisor	Forest Supervisor
Malheur NF	Umatilla NF	Wallowa-Whitman NF

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 Tu-

cannon 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

Paper #	Title
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
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 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: This revision implemented the new white-paper template format, and minor formatting and editing changes were made throughout the document.