(FEC Provisional Approval 26 September 2006)

Appendix 3

Conservation and Restoration Strategy for Native Prairie and Oak Habitats

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The McDonald-Dunn Forest has numerous remnants of prairie, savanna, and oak woodland scattered across its landscape. These dwindling legacies of earlier climatic conditions and land use practices still provide important ecological functions and cultural values. Part of our collective heritage, they form a historical link to the past. Active management to maintain and restore these resources is part of the mission of the College Forests, and relates to most of the seven goals stated in the Forest Management Plan. Further, active management is essential to fulfilling our educational mission by providing critical opportunities for teaching, research and demonstration.

Efforts to restore prairie and oak habitats within the Willamette Valley are accelerating in response to their long and steady decline. Quick action is needed to maintain these habitats and the wildlife they support. But these efforts are severely hampered by the lack of scientific information and practical experience in restoration and conservation. Too often, restoration projects do not include the study and monitoring needed to provide vital information on the impacts or effectiveness of restoration practices. Without that, they cannot effectively inform or direct future actions. The College of Forestry, as part the foremost natural resources research and education institution in Oregon, will take a leading role in developing and disseminating the new knowledge needed for effective adaptive management of these resources.

Creating and disseminating new knowledge needed for the Adaptive Management of legacy habitats is integral to all steps of this Strategy for conserving and restoring savanna and prairies legacies in McDonald-Dunn Forest. The strategy has two steps: first, focus on ***retaining and conserving*** *the most at-risk and highest value components of ecological and cultural diversity across the Forest. Key initial activities include identification and release of legacy savanna oak trees and the delineation and protection of areas of high-quality remnant prairies. The second step involves more intensive projects to* ***improve and restore*** *broader ecological and/or cultural functions of oak savannas and prairie habitats at specific sites designated for this purpose.*

The College of Forestry is an important stakeholder in efforts to maintain and restore oak savannas and prairie habitats. Through this Strategy, OSU College of Forestry intends to:

1) *conserve and then begin to restore the ecological functions and cultural values of some of the remnant prairie, savanna and oak habitats in McDonald-Dunn Forest;*
2) *incorporate research, teaching, and demonstration opportunities with the restoration activities; and*

3) *Establish collaborative partnerships with Benton County, State of Oregon, US Fish and Wildlife Service, Confederated Tribes of Grande Ronde, Confederated Tribes of Siletz, and others to most effectively accomplish 1 & 2.*

Background

The Willamette Valley, including the area now called McDonald-Dunn Forest, has for thousands of years been home to the Native American Kalapuya people. A combination of climate forces and human management of the landscape, primarily through fire, produced a landscape dominated by large areas of prairies and oak savannas. These conditions were very important to the Kalapuya and provided many resources supporting their culture, including staple foods such as camas bulbs and acorns. This was a cultural landscape, shaped by the frequent burning of prairies and savannas by local Kalapuya.

When European-American settlers first arrived in the Willamette Valley, the lower elevations of the McDonald-Dunn area were grassy with some scattered oaks. Traditional fire management of prairies and oak savannas stopped following settlement. Without the regular use of fire, natural succession proceeded unchecked and the prairies and savannas began to fill in and become forests of conifers and/or hardwoods such as Douglas-fir (*Pseudotsuga menziesii*) and bigleaf maple *(Acer macrophyllum)* or Oregon ash (*Fraxinus latifolia*. Consequently, many formerly common species of wildlife, insects, and plants dependent on prairie and oak habitats have become rare.

The few areas of native prairie, savanna trees, and oak woodlands that remain in McDonald-Dunn Forest are pieces of a larger network of habitat, as well as a link to the past. For example, one small meadow provides refuge and habitat for some rare species including Kincaid's lupine (*Lupinus sulphureus* ssp *kincaidii*) and Fender's blue butterfly (*Icaricia icarioides fenderi)*. Other prairie remnants are known to have supported large populations of the rare Taylor's checkerspot butterfly (*Euphydryas editha taylori*). Maintaining and restoring remnant prairie or savanna habitat structure and communities, and improving their connectivity across a larger landscape has become a focus for county, state, and federal agencies. OSU College of Forestry is establishing collaborative partnerships with Benton County, State of Oregon, US Fish and Wildlife Service, Confederated Tribes of Grand Ronde and Confederated Tribes of Siletz to help do this.

Strategy for Oaks and Prairies in McDonald-Dunn Forest

The *Conservation and Restoration Strategy for Native Prairie and Oak Habitats* uses something of a triage approach that focuses first on conserving the best of the remaining structural and compositional legacies of prairies and savannas. Conserving

open-grown oak trees and fragments of native prairie communities are a pressing priority, as they are rapidly being lost to natural processes and invading weeds and once gone, will be very difficult to replace. Retaining these "at risk" legacies of savannas, oak woodlands and native prairies across the Forest landscape is an essential first step for long-term restoration. The second step of the strategy is to build upon these and other components with more intensive and comprehensive restoration of remnant prairie or savanna areas within McDonald-Dunn Forest and improve or restore important ecological functions and processes of these habitats. Concurrent with both steps is development of a structure to manage the restoration projects, while facilitating research, teaching, and outreach activities. This strategic approach maximizes future ecological, cultural, and educational benefits and opportunities. Steps include:

1. Retain and conserve what we have
College of Forestry commits funds and staff effort to conserve "at risk" components of historical habitats across the landscape of McDonald-Dunn Forest.

a. Conserve open-grown oaks (savanna legacies) being lost to conifer competition.
b. Preserve high-quality remnant prairie "biological hot-spots" within larger remnant prairie areas, before they are lost to competing weeds.
c. Retain selected stand-grown oaks or other hardwoods in the Forest.
d. Create an account where capital generated by one set of restoration activities can be held and applied to others.

2. Improve what we can
College of Forestry creates partnerships and seeks external funding for restoration of low quality prairie and savanna areas that need improvement.

a. Interrupt succession in designated prairie and savanna areas.
b. Restore ecological functions of low quality remnant prairie and savannas areas by controlling invasive species, and augmenting native species.
c. Long term management and replacement of savanna structure trees

1. Retain and Conserve What We Have

In the first step of the strategy, priority is given to conserving two important legacies that require quick action to identify and conserve: Open-grown oaks and high-quality native prairie ("biological hot-spots"). It also takes advantage of opportunities to conserve some stand-grown oaks and other hardwoods for the ecological services they provide.

Many of the large, formerly open-grown oak trees on the Forest are now being overtopped by competing conifers and are dieing. Open prairie areas have in many cases been reduced to small islands. Within these remaining open areas, encroaching

woody plants and invasive herbaceous weeds are squeezing the surviving pockets of high-quality prairie communities. Both of these practically-irreplaceable legacy components will soon be lost if no action is taken. To allow this would be to forfeit future benefits and options for the College, including site-oriented restoration. Conserving these valuable and hard to replace habitat remnants is fairly straightforward. Much can be accomplished with the knowledge we currently have. A third legacy, of lower priority, but also slow to replace once lost, are stand-grown oak and other hardwood trees that have important wildlife value.

Conserving Open-grown Oaks

Old, open-grown oak trees are pieces of an earlier landscape that would be extremely slow and difficult to replace. Conserving these legacies of historical savannas is a high priority that deserves urgent action. Many legacy oaks in McDonald-Dunn Forest have already died and most of the remaining savanna trees will soon be lost to overtopping conifers if not released by removing small patches of conifers around each.

Retaining and conserving some of our remaining Oregon white oak (*Quercus garryana)*, is a critical part of this strategy. Oak can be found in many sites and situations around McDonald-Dunn Forest such as in or around the edges of remnant prairie areas or embedded within the conifer-dominated forest. Some of the older oak trees were alive while the Kalapuya people still burned the savannas.

Oak trees provide a number of important ecological services, which can help enhance diversity in larger forest ecosystems. Structurally, oaks (alive or dead) are an important source of cavity sites for birds (e.g., pileated woodpeckers) and small mammals (e.g., western gray squirrel), as well as structure for many epiphytes (e.g., lichens, mosses, and ferns). Oak acorns are an important food source for many animals. Other foods in oak habitats (such as insects associated with epiphytes or mistletoe berries) may also be significant for wildlife. Oak trees also provide many cultural resources for Native Americans. Animals associated with oaks, such as the acorn woodpecker, have cultural uses and significance, as do acorns themselves. The presence of open-grown oaks tells the history of the relationship of native people to this landscape.

Management Actions

1. Identify remaining live, open-grown trees in McDonald-Dunn Forest, record and mark location on map.
2. Assess trees (vigor, proximity to other oaks or meadows) and situation (Forest Management Theme, slope, proximity to upcoming forest operations). Rank trees or clusters of trees by priority, and select for retention in scheduled forest operations or separate release treatments.
3. Assess informational needs and design appropriate plans for study and monitoring, linked to interpretation and education (formal and non-formal).

4. Work with Timber Harvest Manager to design oak release harvests, removing overtopping conifers, during normal thinnings or special harvests. Consider pre-operational treatment of invasive species.
5. Monitor and design future management actions as needed to maintain opening and control weeds.

Preserve High-Quality Remnant Prairie "Biological Hot-spots"

Preserving significant remaining areas of high-quality prairie remnants is a high priority that urgently requires action. Once lost, these areas of high native species diversity will be extremely difficult or impossible to fully replace or reconstruct. Many of these legacy communities are threatened by encroaching trees and invasive plant species. The strategy calls for protecting sections of high-quality prairie remnants from encroaching trees and weeds, with attendant monitoring, education and research.

Remnants of native prairies can still be found in McDonald-Dunn Forest as grassy islands in a rising sea of forest. These remnants are legacies of earlier climatic conditions and indigenous land-management practices in the Willamette Valley. They provide historical links to the past. The larger prairie remnants include: Carson Prairie and Forest Peak Prairie in the North Zone; and Butterfly Meadows, Jackson Place and the Oak Creek Prairie Complex in the South Zone.

These prairie remnants provide a number of important ecological services that can help enhance biological diversity in larger forest ecosystems. They are important structural components in McDonald-Dunn Forest, providing habitat to a suite of animals that utilize edges or need open habitats or herbaceous plant communities. Also, some of these prairie areas have places still rich in native plants, making them a compositional legacy of the herbaceous prairie community, and important sites of diversity for many plants and animals. Remnant prairies may also have strong cultural value as sites once managed by Kalapuya people for plants such as camas (*Camassia quamash*) and tarweed (*Madia* spp.). Some prairies in McDonald-Dunn Forest also have identified archeological sites.

The strategy makes a distinction in approach to managing remnant prairie areas. Much of the structurally open remnants are occupied or dominated by non-native species, and would be considered "low quality remnant prairies." Within some of these remnant prairie areas are patches of "higher quality remnant prairies" rich in native species which require a different management approach.

Learning how to protect, restore and enhance native biological diversity in working forest landscapes is a much needed and very fertile area of research and education. Prairie community conservation and restoration provides an excellent opportunity for OSU College of Forestry to collaborate with OSU Department of Botany and Plant

Pathology, as well as other groups to investigate both ecological functions (including mycorrhizal and pollinator relationships), and test restoration practices and responses.

Management Actions

1. Identify, delineate and rank high-quality remnant prairie area "biological hot-spots" within larger remnant prairie areas. Will be done in collaboration with Benton County Habitat Conservation Plan project team, faculty and students in CoF and Department of Botany.
2. Assess informational needs and design appropriate plans for study and monitoring, linked to interpretation and education (formal and non-formal).
3. Work with partners such as the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz, COF students and staff, and local schools to protect these biological hot-spots from encroachment by highly invasive and competitive species. This involves establishing perimeter buffers and spot treatments to remove weeds (using physical, mechanical or chemical controls, as appropriate).
4. Seed disturbed areas with native plant species to discourage re-occupation by invasive species.
5. Monitor and design future management actions as needed to maintain.

This process is consistent with current COF management policies and actions at Butterfly meadows – a high-quality remnant prairie with several sensitive species. Management there includes buffering the perimeter of the meadow from rapidly invading species, and spot treating for invasive plant populations already within the meadow. The difference is that we will identify and treat small areas of high-quality remnant prairies in this manner, while within larger areas of low quality prairie.

<u>Retain Selected Stand-grown Oaks or Other Hardwoods</u>

Retaining stand-grown trees, although not a high priority, is a rapidly retreating opportunity. The strategy does not call for special actions for release, but simply for greater retention of selected stand-grown oak, or other hardwoods during forest thinning or final harvest operations. Good opportunities for retention include areas adjacent to riparian areas and stand edges.

In contrast to the open-grown oaks, stand-grown oaks are typically younger, narrow crowned trees established in a post fire landscape. They are generally part of mixed forest stands in McDonald-Dunn. Retaining some of these oaks throughout the forest management cycle could make significant contributions towards providing important habitat functions (such as: mast production and nesting cavities) in exchange for rather small impacts on confer production. Likewise some other hardwoods such as madrone (*Arbutus menziesii)* or bitter cherry (*Prunus emarginata*) provide ecological functions such as nesting cavities and food for birds, and mammals. Madrone also has cultural (medicinal) value for some people. A unique, madrone-dominated stand in the Soap

Creek area will be retained as an example of stand diversity and to support research, teaching and outreach uses that are currently taking place there.

Management Actions

1. Survey for living oaks as part of each pre sale operation.
2. Assess, rank and mark suitable trees (vigor, proximity to other trees, riparian areas of unit edges) favoring small stands or clusters, during pre-sale operations.
3. Assess informational needs and design appropriate plans for study and monitoring, linked to interpretation and education (formal and non-formal).
4. Work with Timber Harvest Manager to design harvest with leave-trees.

Create an Account for Oak and Prairie Restoration

Some restoration activities, such as release of savanna oaks from overtopping conifer trees will provide significant revenue. Others, such as controlling weeds invading high-quality prairie areas represent a significant expense. Every effort will be made by the Working Group to get the optimal return in ecological function, cultural value and educational opportunities through grants and in-kind contributions of our collaborators. By earmarking and holding funds generated in one restoration activity for use in another, the College of Forestry makes a significant commitment to providing funding in a timely and predictable way and a powerful tool for the working group to use in seeking external funding. By matching these resources to Federal funding, the College can dramatically extend the impact of its investment for restoration work.

2. Improve what we can

In the second step of the strategy, the College will undertake more intensive and comprehensive restorations of remnant prairie and savanna habitat areas. This will be done in a series of projects that may look more like people generally expect in a restoration project: wholesale removal of encroaching trees and shrubs, removing non-native species from an area, then planting native grasses and forbs. This type of restoration is an important step towards restoring and maintaining ecological and cultural functions over time. This step will also deliver additional opportunities for research, education and demonstration for the University and local communities. Likely candidate areas for such work include familiar named places such as Carson Prairie, Jackson Place or Oak Creek Meadows as well as some less familiar areas. A likely reality is that once intensive work begins at one of these sites, such a project will tie up many of the resources available for restoration activities for a number of years. This is particularly true of efforts to restore the herbaceous communities of low quality prairie areas, which are often costly, difficult and experimental. The results are often uncertain and slow in coming. And the challenge is greater in areas already overrun by invasive grasses such as false brome (*Brachypodium sylvaticum*). Therefore, the College will not begin this valuable but challenging phase of restoration work in earnest until other at-risk assets have been conserved. It is also very important to select among

candidate sites very carefully to achieve optimal returns on investment. Those decisions are best made in the future when the time for such work is near. Thus, this has not been done as part of this strategy.

The second phase of the strategy involves two major types of action: interruption of succession to woody plant communities and restoration of low quality remnant prairie areas to communities of higher native composition and improved ecological functions and cultural value. Both would be part of prairie or savanna projects. The two types of actions will be coordinated, but not necessarily simultaneous. Tree and brush removal may best be done as part of other forest operations in the area, and will be done as opportunity arises. Comprehensive projects will require and begin with development of detailed, site specific restoration plans.

Interrupt Succession in Designated Prairie and Savanna Areas

Remnant prairie areas are important structural components in McDonald-Dunn Forest, providing habitat to a suite of animals that utilize edges or need open habitats or herbaceous plant communities. Forest succession is well underway in many of these areas with both conifer and hardwood trees encroaching on the edges as well as becoming established across the open areas.

Although a large portion of the Forest's remnant prairie areas are low quality (with low native composition), they still provide structural diversity and landscape-level ecological functions with opportunities for cultural contributions. Some of the larger prairie areas are high-use recreation areas, and have high educational and outreach value, as well as research relevance.

Management Actions

1. Designate remnant prairie or savanna areas to be maintained as structurally open areas. Work with Timber Harvest Manager, College Staff and partners such as the Confederated Tribes of Grand Ronde and the Confederated Tribes of Siletz to plan and execute removal of encroaching trees and brush.
2. Merchantable trees may be taken as part of timber sales in adjacent unit, or could be separate sales. Treatments of small trees and shrubs may include herbicides, girdling, cutting or grinding as appropriate.
3. Seed disturbed areas with native plant species to discourage occupation by invasive species.
4. Monitor and design future management actions as needed to maintain desired ecological conditions.

Restore Ecological Functions of Low-Quality Remnant Prairie and Savannas Areas

Restoring low quality prairie areas (dominated by non-native species) to higher quality prairie communities is an important but lower-order priority. The strategy puts these

activities behind more time-sensitive conservation of remaining high-quality remnant prairie areas. This applies to areas without trees as well as those in which trees will be managed to create a savanna structure.

Management Actions:

1. Work within the University and with partners such as the County, US Fish and Wildlife Service, Confederated Tribes of Grand Ronde and the Confederated Tribes of Siletz to plan and execute restoration of low quality remnant prairie areas jeopardized by encroaching trees and brush.
2. Remove and control non-native dominated herbaceous plant communities (with plants such as false brome or tall fescue) for one or more years using herbicides or tillage, as appropriate.
3. Establish mixtures of native grass and forb species by direct seeding and or transplanting. Consider introduction of sensitive plants and associated invertebrates.
4. Intensively manage weeds as natives become established.
5. Monitor and design future management actions as needed to maintain.

Long-term Management and Replacement of Savanna-structure Trees

The strategy gives clear guidance to conserving existing legacy savanna trees through release harvests. Some of these are adjacent to existing prairie remnants and are likely to be included within the future boundaries of designated prairie/savanna areas. Many of these trees are old and have long been suppressed. Maintaining long-term structural and functional objectives requires not only that existing trees be conserved, but that the sites are managed to maintain some of the existing trees and allow for future recruitment of oak reproduction (and other appropriate species such as Willamette Valley ponderosa pine) to create mixed-age populations of savanna trees. Managers will be given latitude to take advantage of opportunities as they arise, while monitoring and deciding the need for future management activities.

Research, Teaching, Outreach Activities in Oak/Prairie Restoration Sites

Creating and disseminating new knowledge needed for Adaptive Management of prairie, savanna, and oak habitats in the Willamette Valley is an integral component in all steps of the strategy for conserving and restoring savanna and prairie legacies in McDonald-Dunn Forest. Essential to the strategy is the development of a structure to design and manage restoration activities while integrating appropriate forms of research, teaching (formal and non-formal), and demonstration.

The Oak and Prairie Working Group will work with the College Forests staff to provide the direction and management needed to execute the Strategy. The Working Group will develop task forces to collect relevant information, assess gaps in knowledge and

study opportunities to develop appropriately detailed restoration management plans for the specific actions required by the Strategy. The task forces' activities will be overseen by the Working Group's steering committee to ensure continuity with the McDonald-Dunn Forest Plan, and seeking compatibility of sometimes competing restoration and educational objectives.

The Working Group will communicate with the University community through the College and university Communications and with the local community to explain the processes outlined in this Strategy and invite the involvement through all stages, of the faculty and students from the College of Forestry, other units in OSU and institutions in the local community to provide a robust process of discovery, learning and outreach.

Conclusion

The *Conservation and Restoration Strategy for Native Prairie and Oak Habitats* is designed to allow the College of Forestry to optimize the future research, educational, cultural and ecological opportunities and benefits that come from the remnant oak savanna or prairie communities in the McDonald-Dunn forest. It implements the McDonald-Dunn Forest Plan by: providing research, teaching, and demonstration opportunities (Forest Plan goal 1), sustaining oak and prairie ecosystem services (Forest Plan goal 3), and perpetuating cultural heritage vegetation (Forest Plan goal 4).