

Klickitat Wildlife Area
Forest Management Plan

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PURPOSE

The purpose of this Forest Management Plan is to discuss forest management strategy specific to the Klickitat Wildlife Area. This will be accomplished by using information, policies and procedures consistent with the statewide WDFW Forest Management Plan. The statewide plan describes agency forest types, management issues associated with them and criteria for identifying suitable active management areas. This document focuses on site specific-information related to identifying forest management needs and priority habitats found on the Klickitat Wildlife Area.

GOALS

The goals of this forest management plan are to:

- Describe the procedure for developing an assessment of the timbered portion of the wildlife area
- Describe forest types found in the timbered portion of the wildlife area
- Describe current successional classes found on the timbered portion of the wildlife area
- Describe current disturbance regime (wildfire suppression and timber management practices) and historic fire return intervals found on the timbered portion of the wildlife area
- Describe current ecological integrity ratings and the departure from historic stand conditions found on the timbered portion of the wildlife area
- Describe threats and the potential for further decline in ecological integrity ratings on the timbered portion of the wildlife area
- Describe the urban interface dynamic and how that will influence the management strategy on the timbered portion of the wildlife area
- Describe the desired future condition of the timbered portion of the wildlife area and how active management can be used to achieve that goal
- Describe the procedure for identifying stands (assessment process) suitable for active management given operational and economic constraints
- Describe the procedure for proceeding with suitable projects

FOREST ASSESSMENT

Current forest assessment data for the wildlife area is limited to initial assessments completed by forester Jim White a few years ago. GIS analysis indicates that there are approximately 10,965 timbered acres found on 5 units of the Klickitat Wildlife Area. The majority of those timbered acres are found in the Soda Springs Unit. Figures 1-A and 1-B show the location of the units and the general distribution of forested acreage on the wildlife area. The Goldendale Hatchery and Swale Creek units, comprising approximately 8 acres of deciduous riparian forest, have been excluded from the assessment. This initial assessment is only intended to identify timbered acreage and potential timber management needs on the wildlife area.

The next step in the assessment process will be to create stands or management units using various criteria including ecological integrity ratings, species composition, age distribution, stocking levels, presence of streams and/or wetlands, operability and accessibility. In most cases, the stand polygons will be based upon several of those criteria. Once stands have been created, they will be further subdivided into one of three categories including:

- a. Forest Areas That Don't Currently Need Treatment
 - i. In good shape and assumed to stay good
 - ii. Degraded but naturally recovering
 - iii. Re-assess periodically for changes in stand condition
- b. Forest Areas That Need Treatment and Can Be Treated
 - i. Periodic actions in perpetuity
 - ii. One time intervention
 - iii. Re-assess periodically for changes in stand condition
- c. Forest Areas That May Need Treatment But Can't Currently Be Treated
 - i. Timber rights not owned (DNR Leases an existing GIS layer)
 - ii. Deed restrictions (WLA managers will need to tell us)
 - iii. Priority species restrictions (Owl circles, goshawk nests, etc.)
 - iv. Roadless area
 - v. Steep Slope
 - vi. Unstable slopes (DNR maps + known)
 - vii. Stream or wetland buffers (where preclude manageable units)
 - viii. Poor growing site
 - ix. Re-assess periodically for changes in stand condition

More intensive “walk through” assessments will be completed on those stands expected to have a low to moderate ecological integrity rating that can and need treatment. However, those stands that need treatment and currently can’t be treated will also be looked at to verify the initial assessment. It is important to realize that the three categories described above may change over time.

After walk through assessments have been completed, those stands that need treatment and can be treated will be considered as possible candidates for active timber management. These stands will be compiled into timber stand improvement projects. The purpose of these projects will be to improve stand conditions and ecological integrity ratings. As projects are developed and put into an action plan, assessment plots will be used to get a better idea of stand characteristics and develop a draft silvicultural prescription. Those areas that need treatment and can be treated will be the primary focus of this forest management plan.

An integral part of the entire inventory process will be to work closely with wildlife area staff from the initial stand delineation phase through the field verification stage.

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Figure 1-A Soda Springs Unit

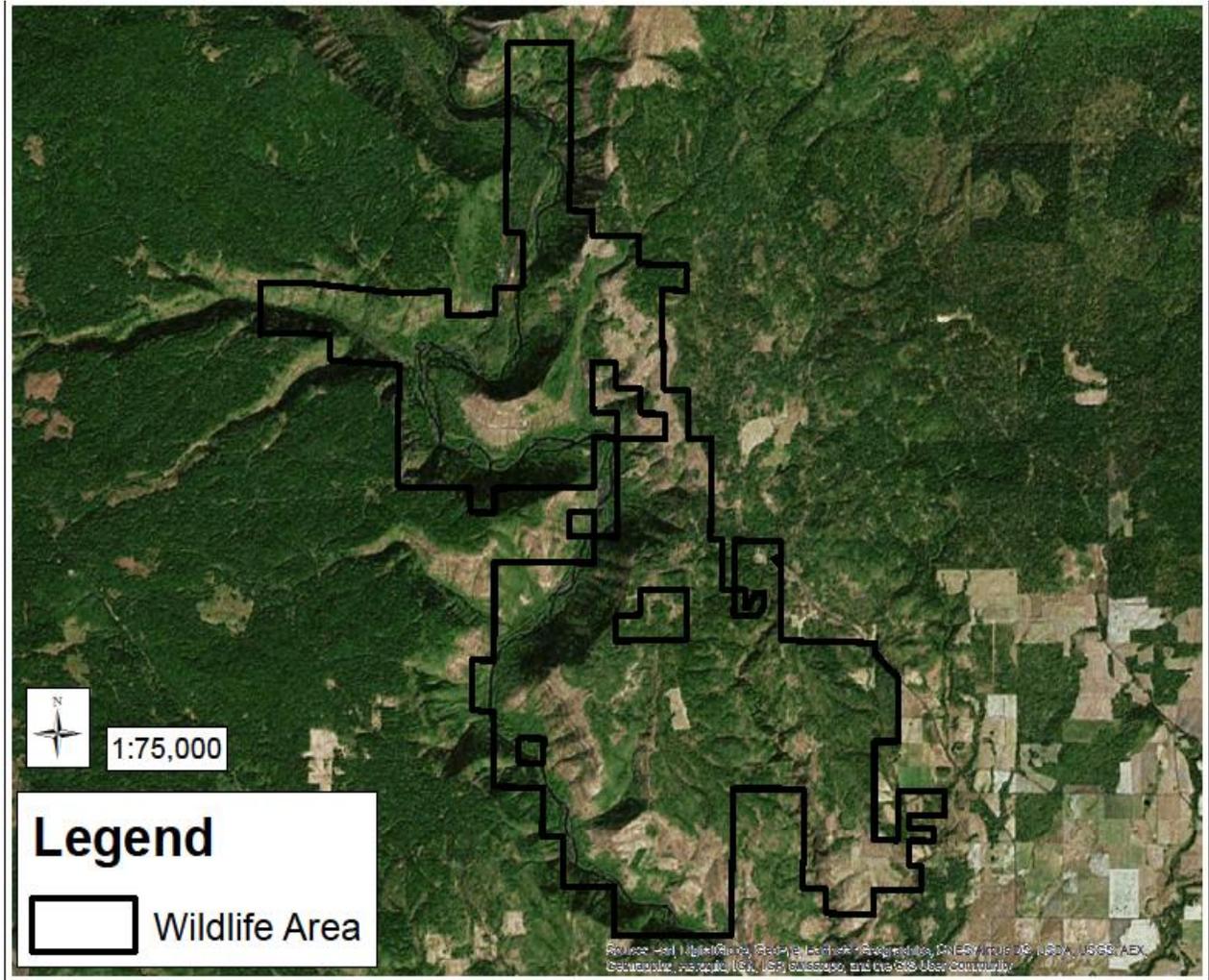
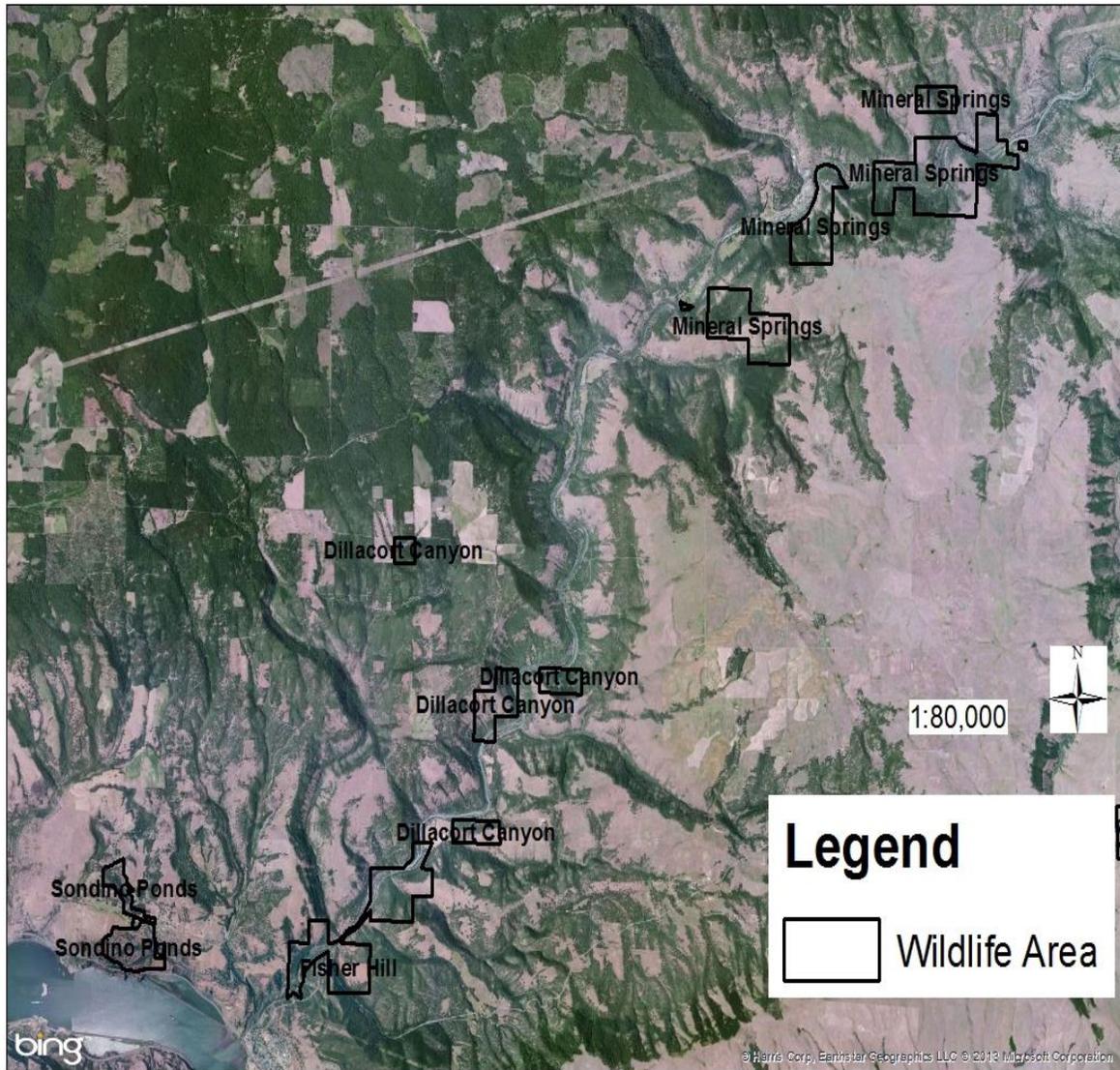


Figure 1-B Mineral Springs, Dillacort Canyon, Sondino Ponds and Fisher Hill Units.



FOREST TYPES

Figures 2-A and 2-B show the distribution of forest types based on data downloaded from the Landscape Fire and Resource Management Planning Tools (LANDFIRE) web site. LANDFIRE is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior. LANDFIRE provides landscape scale geo-spatial products to support cross-boundary planning, management, and operations.

A total of 5 distinct forest types can be found on the KWA. It is unique in the fact that it is the only wildlife area with extensive oak woodlands. These oak woodlands are interspersed with dry type conifer forests predominately stocked with Douglas-fir and Ponderosa pine.

Figure 2-A Forest Type Distributions on the Soda Springs Unit.

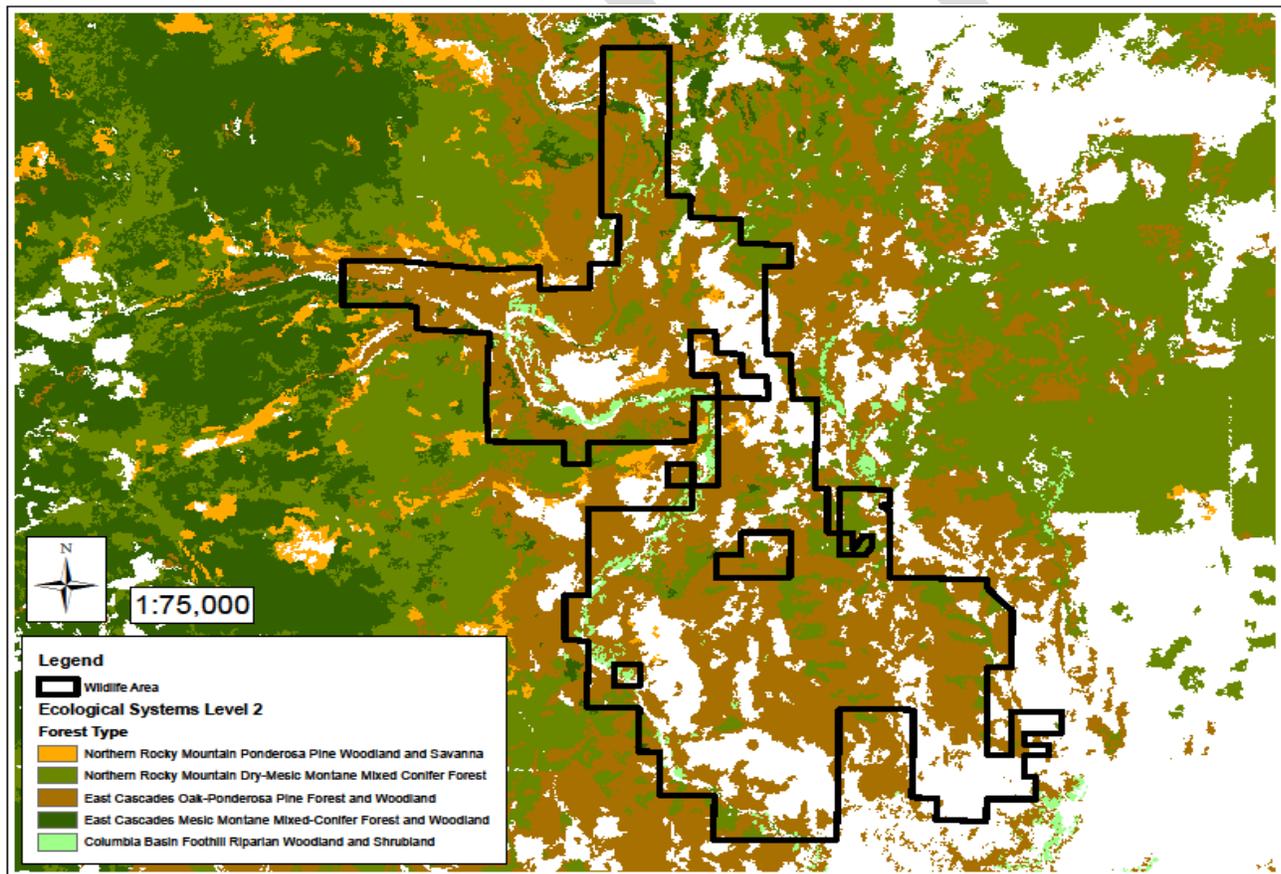
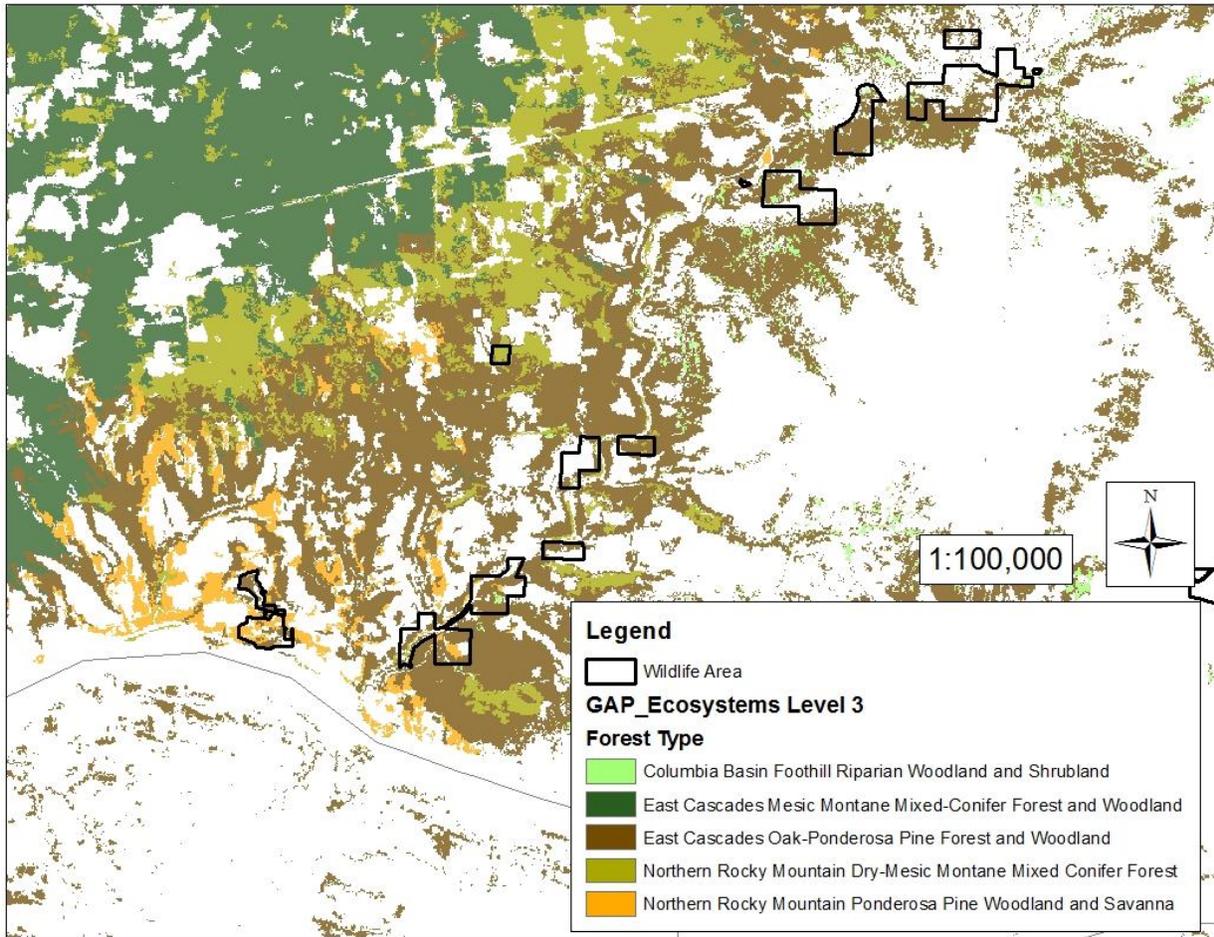


Figure 2-B Forest Distributions on the Mineral Springs, Dillacort Canyon, Sondino Pond and Fisher Hill Units.



Succession Classes

Successional classes on the wildlife area have been dramatically altered. While all forest seral classes are represented in the wildlife area, the proportions of each are not consistent with historic conditions. Aggressive fire suppression (and to some degree past logging practices) have greatly reduced the timber acres in a late seral open forest stand condition. Historically, approximately 1/3 to 1/2 of coniferous forests in the KWA were considered to be in this stand condition.

Active timber management activities can be used to increase the proportion of forested acreage into a late seral stand condition. Without active timber management (thinning and prescribed fire), it is unlikely that we will ever achieve historic stand conditions. Most likely, there will be a continued decline in forest health and ecological integrity ratings.

Disturbance Processes

Historically, wildfire was a prominent disturbance factor in maintaining forests on the wildlife area. These fires were very common in most of the forest types found throughout Eastern Washington with a fire return interval between 10 and 30 years. Frequent, low intensity fires helped to maintain a high proportion of open, late seral forest stands with large diameter trees. In the last century, aggressive wildfire suppression tactics and “high grade” timber harvests have resulted in densely overstocked stands with an overabundance of fuels.

The departure from a fire-dependent, no active management landscape to a strategy of aggressive wildfire suppression has resulted in declining forest ecological integrity ratings. This in turn has made the wildlife area much more susceptible to large scale insect outbreaks, pathogens and stand replacement wildfires. Bark beetle attacks, approaching epidemic proportions in areas, have resulted in significant mortality of ponderosa pine over the last 15 years. Pockets of standing snags, prevalent on the landscape after a significant bark beetle attack, have dramatically increased the fuel load on the wildlife area that could increase the risk of a stand replacement fire.

Ecological Class Ratings

One of the consequences of changing disturbance processes has been a moderate to high departure from historic condition classes. As such, most stands (particularly in the Soda Springs Unit) have low to moderate ecological integrity ratings. These lower ecological integrity ratings are due in large part to aggressive wildfire suppression tactics and past “high grade” logging activity. Those stands with a low to moderate ecological integrity rating will be good candidates for stand manipulation. In other words, those stands will be categorized as stands that would benefit from active management including thinning and prescribed fire.

Threats to Ecological Integrity

Historically, low intensity fires and active timber management kept stocking levels in check and created complex forest mosaics with a high proportion of fire-dependent, open stands. This mosaic included oak woodlands that are recognized as a priority habitat considered essential to the threatened western gray squirrel. Oak woodlands are dependent on frequent, low intensity fires that prevent oaks from being over topped and killed by conifers.

Without frequent fire or some other disturbance (including active timber management), forest stands gradually become overstocked and suppressed. Growth rates of suppressed trees decline dramatically. This in turn makes the stand more susceptible to large scale insect and/or disease outbreaks on an epidemic scale (See Figure 3).

Overstocked conditions can result in multiple canopy layers of trees. Ponderosa pine and Douglas-fir can seed into the understory of mature stands that will create an understory canopy layer over time. Frequent low-intensity fires would kill most of those trees, but fire exclusion has allowed them to become established and grow. The resulting understory canopy creates “ladder fuels” that can facilitate the ability of a ground fire developing into a crown fire. This in turn makes the stand more prone to intense wildfires that can quickly burn out of control.

Figure 3 Pockets of dead trees from bark beetle outbreaks.



Left unchecked by active management or fire, mortality from bark beetles will dramatically increase. A forest health model indicates that a large proportion of the timbered acreage within and directly adjacent to the Soda Springs Unit will see a substantial increase in bark beetle activity. Bark beetles feed on the cambium layer under the bark of ponderosa pine. If enough beetle hits are incurred, eventual mortality of the host tree is possible when the tree is girdled, causing stand conditions shown in Figure 6. Many of those dead trees end up on the ground within 3 years after mortality occurs.

Increased mortality from bark beetles could increase the risk of a stand replacement fire on the Soda Springs Unit. This type of fire could alter the structural diversity on the unit, resulting in even lower ecological integrity ratings. These intense fires could also result in widespread top-killing of large oak trees, known to be an important food source for western gray squirrels and other oak woodland species. Insect mortality in the southern units of the wildlife area is not anticipated to be as much of a threat.

Bark beetles are native to the area and an important part of the ecosystem. Endemic populations, which result in scattered snags on the landscape, provide an overall benefit to wildlife habitat. Increased beetle activity and mortality can occur from weather events such as drought or mild winters. However, over-stocked stands are probably most likely to create conditions that could result in an epidemic bark beetle outbreak. Active timber management and prescribed fire can reduce stocking levels and the threat of an epidemic bark beetle outbreak.

URBAN INTERFACE CONSIDERATIONS

Proximity of structures to the wildlife area, particularly along the eastern flank of the Soda Springs Unit, will be an important factor in determining stand management strategies. This will include the continued use of shaded fuel breaks and lower stocking levels within 500' of existing structures. Figures 4-A and 4-B show the location existing structures adjacent to the wildlife area.

Figure 4-A Structure locations adjacent to the Soda Springs Unit

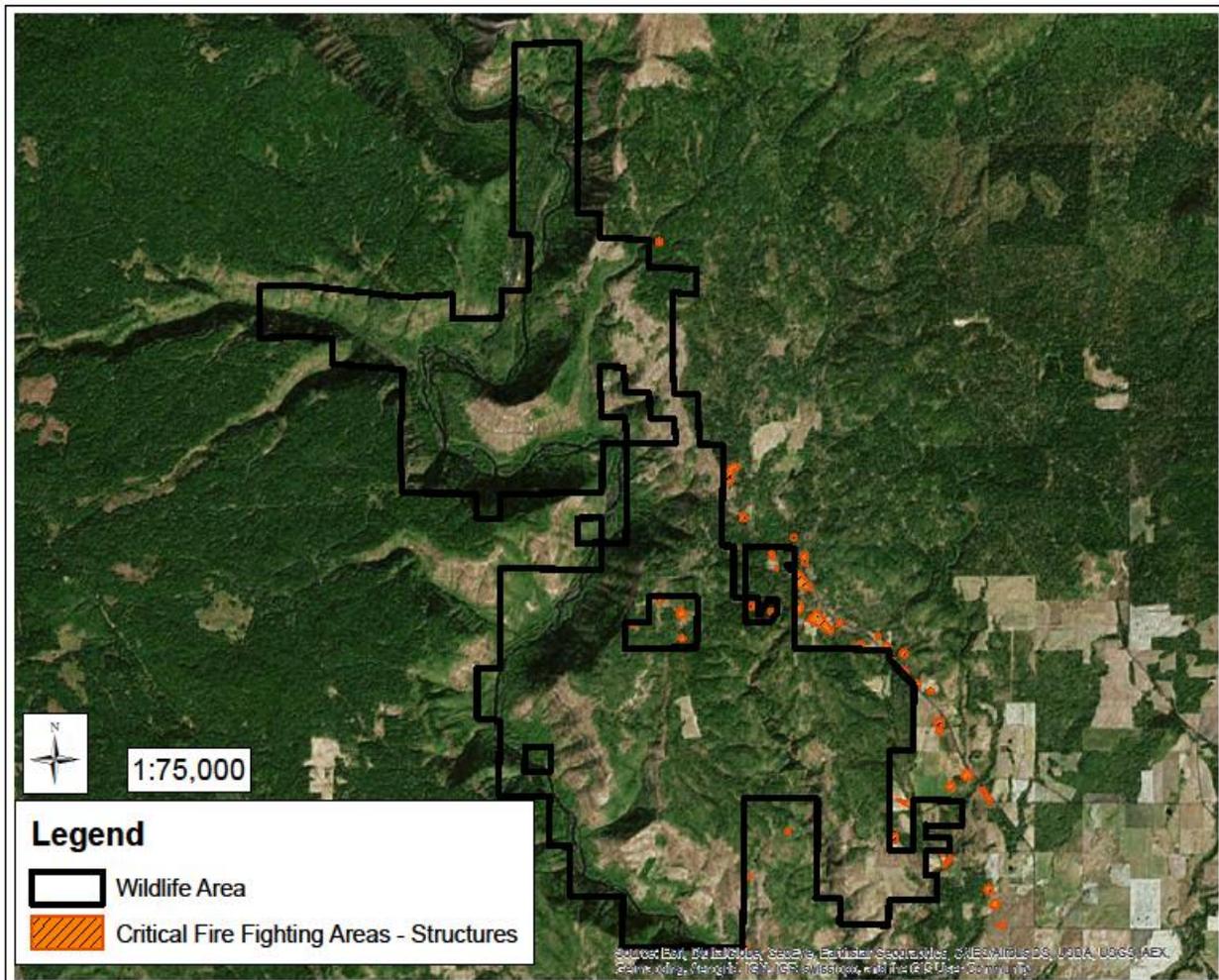
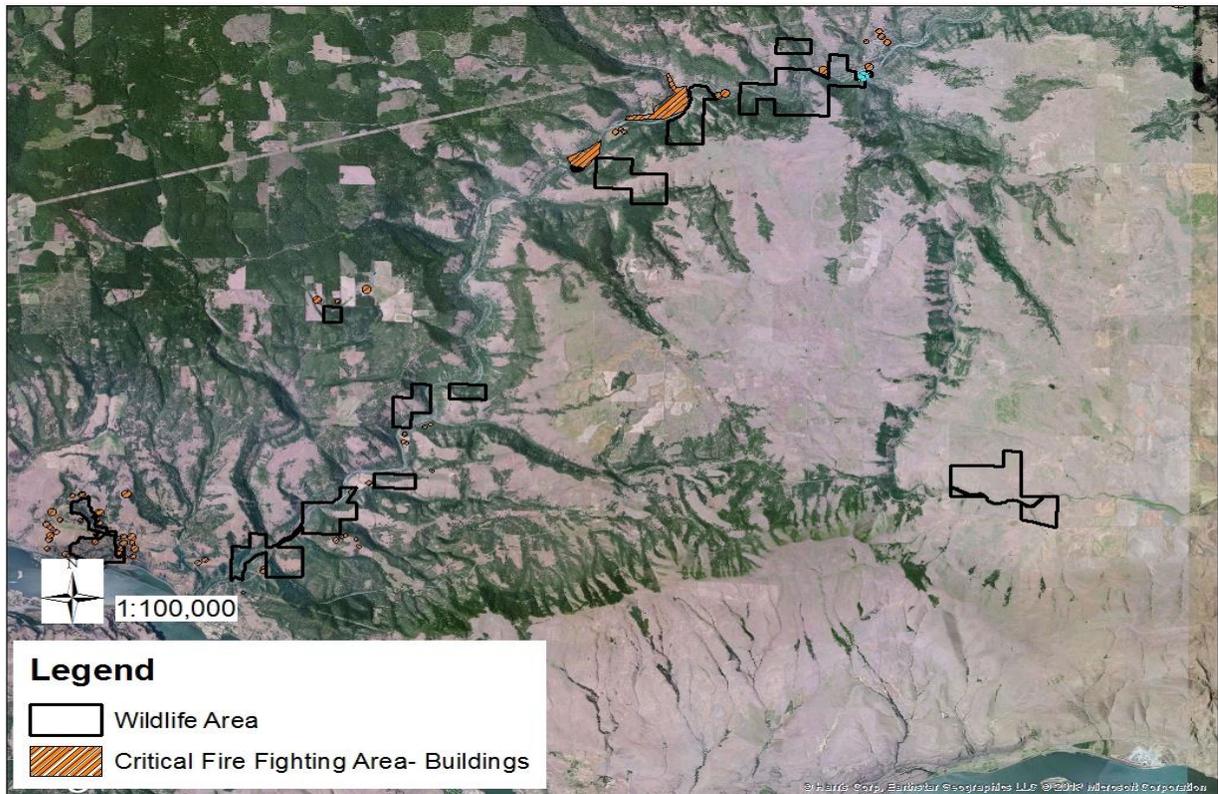


Figure 4-B Structure locations adjacent to Mineral Springs, Dillacort Canyon, Sondino Pond and Fisher Hill Units.



FOREST MANAGEMENT OBJECTIVES

The primary objectives on forested portions of the wildlife area will be to restore stands to historic stand conditions and improve overall ecological integrity ratings. Active management, using a variety of techniques, will be used to meet those objectives. Management activities will be consistent with WDFW's mission and forest management strategy. Strategies that will be used include shaded fuel breaks, commercial thinning, pre-commercial thinning, slashing, and prescribed fire. A combination of management strategies, completed over several years, will be required to restore stands to their historic range of variability.

Ecological Integrity

To the extent feasible, forests will be actively managed to restore them to historic ranges of variability in accordance with WDFW's Statewide Forest Management Plan. The presumption being that returning stands to their historic range of variability (in regard to species composition, stocking levels, stand structure, fuel loads and disturbance regimes) provides the greatest overall benefit for wildlife habitat and society. Returning these stands to a condition that is much closer to the historic range of variability will require a combination of pre-commercial thinning, commercial thinning, slashing, planting and prescribed fire. Social and economic constraints will play a key role in deciding which treatment methods are appropriate for a particular stand.

Urban Interface Management Strategy

Areas that are directly adjacent to homes and other structures (urban interface) will require a somewhat different management strategy. Shaded fuel breaks and more aggressive commercial thinning strategies will be necessary to reduce the threat of wildfire in these areas. In many cases, this more aggressive approach will be consistent with ultimate goal of achieving a desired future condition similar to the historic range of variability. The difference being that instead of achieving that goal in 2 entries over a 20 year period, the desired future condition of 20 to 25 trees per acre may be achieved in the first entry.

Suitable Management Areas and Potential Projects

Preliminary assessments of the wildlife area indicate that nearly all of the timbered portion of the Soda Springs Unit meets WDFW criteria for active timber management. However, there are many factors that may currently preclude active management including lack of access, operational constraints, habitat constraints, social constraints and economic constraints. Most of these forests were historically dependent upon frequent fires to maintain desirable stand conditions. However, it is unlikely that fire will be allowed to fully function as it did historically. Active forest management practices and prescribed fire (where feasible) are necessary tools to restore and maintain higher ecological integrity ratings. In most cases, active forest management is a necessary step to reduce fuel loads prior to developing a prescribed fire prescription.

Table 1 Forest Acres and Management Needs by Unit.

UNIT	FORESTED ACRES*	FOREST MANAGEMENT ACTIVITIES	MANAGEMENT ACRES*
Soda Springs	9,715	Approximately half of the timbered acreage may currently be suitable for active management. Actual acreage will be determined through the assessment process.	4,500
Mineral Springs	573	No active management necessary. Mature forest, insects not a significant problem, low moisture keeps conifers from displacing oak.	0
Fisher Hill	327	No active management necessary. Oak woodlands with little, if any, conifer encroachment.	0
Dillacort Canyon	180	No active management necessary. Oak woodlands with little, if any, conifer encroachment.	0
Sondino Ponds	163	No active management necessary, other than occasional conifer removal.	0
Goldendale Hatchery	4	No need for active forest management. Riparian forest.	0
Swale Creek	4	No need for active forest management. Riparian forest.	0
TOTAL	10,966		4,500

*Acreage estimates based upon GIS analysis. These numbers will change after completing the assessment and field verification process.

Forests on the Mineral Springs, Fisher Hill, Dillacort Canyon and Sondino Ponds units would all benefit from prescribed fire. These units historically experienced frequent, low-intensity fires. However, actual treatment of these units is unlikely given social and economic constraints. There may be opportunity to do some mechanical treatments, including shaded fuel breaks, in these units.

Shaded Fuel Breaks

Approximately 100 acres of shaded fuel breaks have already been completed along well traveled roads and high fire risk urban interface property lines in the Soda Springs Unit. These projects have reduced the threat of a fast moving wildfire spreading from the wildlife area to adjacent private ownerships or vice-versa. These projects are a good first step in breaking up the fuel load and reducing the size and severity of wildfires. Follow up treatments in adjacent uplands will further reduce the wildfire threat.

Shaded fuel breaks will continue to be an important management tool in those areas that are adjacent to private property and within close proximity to structures. This will happen as funding and support staff is available. Active management of surrounding uplands will reduce the need for additional shaded fuel breaks.

Western Gray Squirrel Management Guidelines

Western gray squirrel habitat has been identified as a priority habitat by the agency. Management guidelines for western gray squirrel habitat will be an integral part of any project with western gray squirrel presence. The following guidelines, as found in the *Management Recommendations for Washington's Priority Habitat and Species: Western Gray Squirrel*, will be used to develop prescriptions for stands in squirrel habitat areas.

Primary Gray Squirrel Habitat

In areas deemed as primary habitat, the following stand characteristics will be maintained:

- 75% or more conifer, 25% or less deciduous
- multi-layered and well-connected canopy (45-75 % canopy cover)
- At least 12 large conifers >16" dbh per 8 acres, preferably Ponderosa Pine, alternatively Douglas-fir;
- < 10% cover of native shrubs; and
- 50-80% ground cover of forest litter and/or moss.

Intensive use of primary habitat by Western Gray Squirrels makes its protection a high priority. Retaining uncut patches of primary habitat provides suitable nest sites and helps maintain important resources that are sensitive to disturbance (e.g., truffles). Primary habitat may be identifiable by a concentration of stick nests. Where knowledge of nest locations is lacking or inadequate, a survey of the site should be carried out to identify potential nest locations.

Disturbance of primary habitat should be limited to carefully-planned, small-scale habitat enhancement activities. Although intensive work within primary habitat is not recommended, a long-term hands-off approach may also be inappropriate, especially in dry forests or where fire suppression has increased wildfire risk. In these areas, enhancement and periodic maintenance is probably needed as long as it is carefully planned and carried out. Such activities should be limited to the removal of fine fuels (e.g., saplings, dense shrub cover, debris, invasive plants) through mechanical means or prescribed fire outside the breeding and nesting season.

Because primary habitat appears to be limiting at the landscape scale, the guideline of retaining at least 2 patches greater than 6 acres per 50 acres of potential (primary and secondary) squirrel habitat will be followed in areas identified as squirrel habitat.

Secondary Gray Squirrel Habitat

In areas deemed as secondary habitat, the following stand characteristics will be maintained:

- moderate canopy cover (26-75%) dominated by conifer where feasible;
- At least 12 large diameter (>16 in dbh) trees per 8 acres for food. These large trees should be dominated by conifer but also can consist of a mix of mast-producing species (in order of preference: Ponderosa pine, Douglas-fir, Oregon White Oak, Big Leaf Maple, and Oregon Ash);
- a diversity of large-seeded mast-producing tree species for food;
- a mix of age classes to ensure large trees are available for nesting and foraging; young trees contribute to canopy complexity and forest stand recruitment;
- <30% shrub cover

Gray Squirrel Breeding, Nesting, and Denning Requirements

The largest trees (>16" dbh) in the stand are potential nest/den trees and should be retained wherever possible within primary and secondary habitat. Large trees that connect with at least three surrounding tree crowns (<39" span), or that contain potential cavities, broken tops, and broken major limbs are prime candidates for retention. Nest trees located in primary habitat should be protected by a clearly-marked, permanent year-round 50' radius buffer, if possible, to guard the nest tree from harm and to retain escape routes.

Retaining more than one potential cavity tree >16" dbh for each 12 acres of primary habitat and for each 37 acres of secondary habitat increases the likelihood that female Western Gray Squirrels can locate a suitable cavity for denning. Clusters of nests should be buffered and protected as a larger patch of protected forest.

In addition to the year-round buffers, seasonal buffers should be reserved around known nest trees to reduce the exposure of pregnant females and newly weaned young to potentially harmful activities. From March 1 to August 31, logging activities that may disrupt access to mates or young should not occur within 400' of a nest. This distance is the approximate radius of occupied primary habitat in Klickitat County. Since activities producing sudden and irregular noise may impact squirrels when adults are rearing their young, such activities should be carefully timed to avoid disturbances during this sensitive period. For that reason, all active management activities within designated squirrel habitat will be restricted to the fall and winter from September 1 through February 28.

Western Gray Squirrel Forest Management Guidelines

Forestry in Western Gray Squirrel habitat that neglects to consider the needs of this species can greatly impact local populations. However, carefully planned forestry can have minimal impacts when the habitat needs of Western Gray Squirrels are accommodated. Forestry projects in squirrel habitat should promote healthy stands by protecting and enhancing key primary and secondary habitat features. Retaining habitat diversity (e.g., variable tree density, small canopy gaps, densely forested patches), rather than creating stand uniformity, is important to maintaining squirrel habitat. Although protecting nest sites is important, it is equally important not to focus habitat conservation solely on stands where nests are known to occur. Instead, forest management plans should also account for the needs of squirrels when planning the harvest of unoccupied stands that have the characteristics of primary and secondary habitat.

Variable-density thinning is the most appropriate method of timber harvest in Western Gray Squirrel habitat. This strategy should include the retention of more densely forested "skip" patches; enhancement of tree growth through thinning and by establishing small gaps; and the retention or creation of variable herbaceous, shrub, and tree canopy cover within a stand. Areas best suited for skip patches will have clusters of nests and/or characteristics of primary habitat. Maintaining adequate primary habitat is critical to the continued use of sites by Western Gray Squirrels. Prior to conducting a forest practice, areas of characteristic primary habitat should be identified. These areas should then be designated as limited-entry patches (primarily for fine fuel removal) within harvest units and should be managed to meet the needs of Western Gray Squirrels.

A western gray squirrel management strategy is being developed for the Soda Springs Phase 1 Thinning Project. Following is a summary of that marking strategy and the buffer area surrounding those trees:

- The nest tree shall be marked with orange paint with one complete band at eye level and one butt mark at the base of the tree on the downhill side. The unique nest tree identification number shall be marked in orange paint below the eye level mark on the uphill side of the tree.
- All trees within a 25' radius of the nest tree shall be retained as leave trees.
- A thinning from below, removing excess suppressed trees in the 6" to 10" DBH class, will be conducted in the zone between a 25' radius and 50' radius of the nest tree.
- Moving away from the 50' radius squirrel management buffer, those trees providing connectivity to other nest trees (primarily large open grown trees) will be selected to leave in addition to the trees already being left as part of the upland thinning strategy.

Snag Management Guidelines

Snags, sometimes referred to as Wildlife Reserve Trees (WRT's), provide critical habitat to a wide variety of cavity nesting birds and small mammals. Forest management strategy for the agency requires the retention of all snags unless they pose a threat to public safety (recreational users, contractors, etc.) or infrastructure (buildings, utility lines, etc.). State forest practices rules require the retention of at least 2 WRT's per acre for all activities requiring a forest practice application. However, it is the policy of this agency to leave all snags wherever feasible.

Most of the forested portion of the Klickitat Wildlife Area has an abundance of snags. Additional live trees with characteristics for snag recruitment (cavities, multiple tops, etc.) are designated to leave during the layout process on all forest improvement projects. Another strategy for immediate snag creation (in snag deficient areas) is to designate trees (at least 10 inches dbh) for topping by the contractor. Those trees, marked with 2 orange bands at eye level, will be at least 10 feet tall (or as high as the operator can safely reach with the harvester).

Oregon White Oak Management Guidelines

Unlike many other threatened habitat types, Washington oak habitat is transitional and requires active management. To mitigate for land practices that have left oak habitats degraded, oak enhancement measures or should consider alternatives to land management activities that are not conducive to oak woodland perpetuation. The following recommendations, found in *Management Recommendations for Washington's Priority Habitats: Oregon White Oak Woodlands* are made with the goal of restoring and enhancing oak habitat.

Thinning of oak stands will be considered, where appropriate, to enhance growth rates and vigor of the stand. Thinning should target the removal of trees in dense, even-aged oak stands. Carefully selected individual trees should be pruned or removed where over-shading threatens younger oaks and oak regeneration. Thinning should be employed with the goal of improving age-class and successional diversity. This practice should not result in the spatial decline of oaks. In oak woodland stands, 25% to 50% canopy cover will be maintained. In oak savannas (stands with <25% total canopy cover), the oak component will be maintained at 50% of the canopy cover (where possible). Very old or large oaks should not be removed. Thinning small diameter trees and release of large diameter trees will enhance acorn production.

Low-intensity, prescribed burns conducted on a regular basis (approximately 5-year intervals) are encouraged to exclude Douglas-fir encroachment, stimulate vigorous sprouting, and contribute to multi-aged stands. Maintenance fires should be conducted at more frequent intervals (every 3 to 5 years) in those areas with serious Douglas-fir encroachment and high fuel loads. Less frequent maintenance fires (every 5 to 10 years) are recommended in those areas where oak sapling growth success is critical or in areas where fuel loading is not a problem.

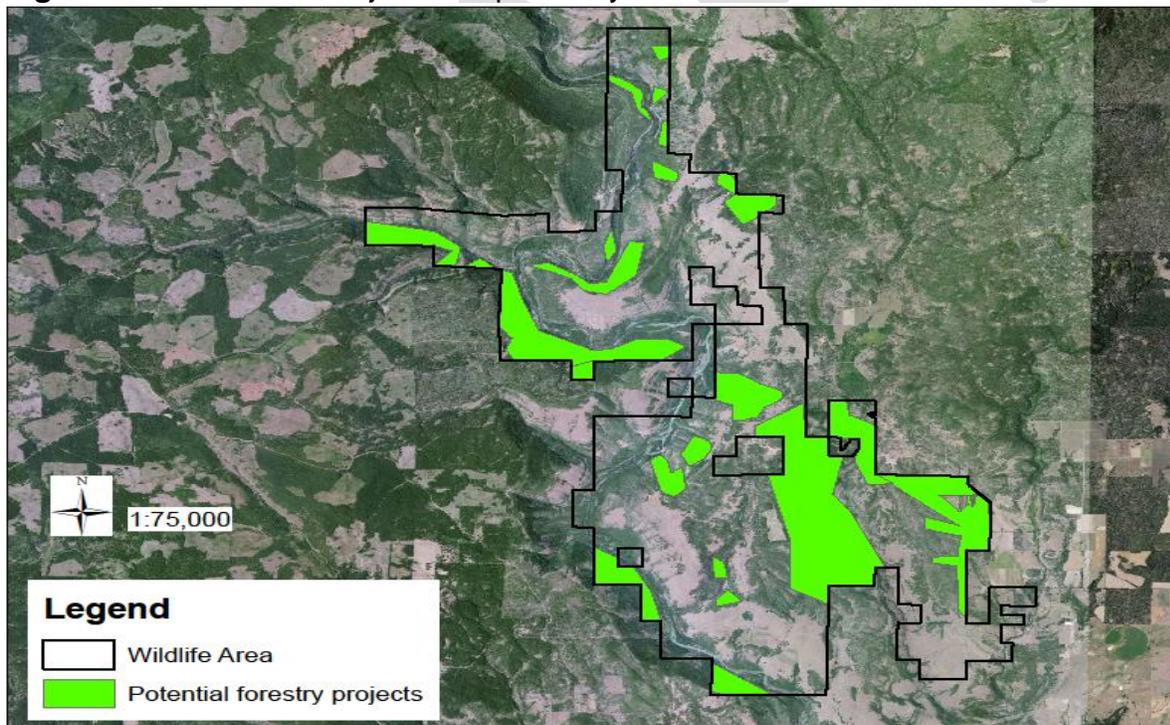
Fire has been an integral component of oak ecology. Oaks, beyond the sapling stage, are highly resistant to fire. Fire targets herbaceous ground cover and Douglas-fir, the latter of which typically encroaches on and impedes oak regeneration. Ponderosa pine is a fire-resistant conifer species found throughout the wildlife area. Generally speaking, ponderosa pine stands are not negatively affected by low-intensity fires. Vigorous restoration, including the use of prescribed fire, may be appropriate in areas with severe Douglas-fir encroachment. (2)

Potential Forest Management Projects

The Klickitat Wildlife Area has an over-abundance of mid-seral closed forests and some late-seral closed forests. These forest types are highly vulnerable to insects and/or wildfire. Forested areas, where operationally and economically feasible, should be commercially thinned to begin the process of restoring open forest structure throughout the unit. Pre-commercial thinning projects, shaded fuel breaks and prescribed fire will also be an integral part of the long term forest management strategy where active management is appropriate and feasible. Projects will be designed to maintain or enhance habitat for western gray squirrels and oak woodlands, taking into account other factors including urban interface considerations.

As stated above, the first part of the process is to complete an assessment of potential stands. This assessment has been started on the Soda Springs Unit by Jim White. Figure 5 shows the location of those assessment areas.

Figure 5 Assessment Project Completed by Jim White



Stand Assessment & Project Identification Process

- Identify potential Forest Management Units (FMU's), expected to have a low to moderate ecological integrity rating, using GIS and local knowledge
 - Create polygons in GIS
 - Have polygons reviewed by Wildlife Area Manager (or their designee)
 - Modify or edit polygons after getting feedback from wildlife area staff
- Categorize those FMU's into one of 3 management categories
 - Forest Areas That Don't Currently Need Treatment
 - Forest Areas That Need Treatment and Can Be Treated
 - Forest Areas That May Need Treatment But Can't Currently Be Treated
- Field verify potential FMU's (walk through) to make sure that the initial assessment is correct
 - Complete a walk through assessment of polygons , including an ecological integrity rating score sheet
 - Look for operational constraints such as access, topography, RMZ buffers and wetland buffers that could limit or preclude active management
 - Can enough units be assembled into a viable restoration project?
- After the walk through assessment, complete a more thorough pre-project inventory of FMU's (if necessary), including plots, to use in project development
 - Cruise of merchantable trees (6" + dbh)
 - Cruise of non-merchantable trees (<6" dbh)
 - Notes on forest health issues (bark beetles, root rot, etc.)
- After doing a walk through assessment and inventory (if necessary) of viable project FMU's, develop a project map and draft prescription for the District Team for review and comments
- If the District Team approves of the project, proceed with
 - Request for western gray squirrel nest survey (spring of proposed project year)
 - Cultural resources survey request
 - ESA consultation process (section 7)
 - Meeting with prescribed fire team lead (if necessary) to decide how to incorporate prescribed fire and/or slash treatments into the final prescription
 - Development of a final prescription after getting feedback from District Team
 - Submitting the proposed project to Wildlife Program staff for presentation to Wildlife Commission
- Begin layout process
 - Type streams and wetlands using Forest Practices protocols
 - Layout project unit boundaries
 - Layout RMZ and WMZ buffers
 - Mark trees according to guidelines set forth in the final prescription
 - Cruise cut and leave trees

- Concurrently, begin paperwork process including preparation of
 - FPA
 - SEPA
 - Logging RFP and Contract
 - Log sort advertisements and contracts
- Schedule a pre-operational gray squirrel survey
- Schedule/advertise sale in the fall after gray squirrel nesting season and hunting season(s)
- Throughout the process and for the first few years after the initial treatment, assess the potential and need for follow up treatments including
 - Weed assessments and treatment as necessary
 - Prescribed fire
 - Slashing
 - Pre-commercial thinning
 - Tree or shrub planting
 - Next commercial entry
- Develop a monitoring plan to determine the impact of the treatment on squirrel populations.
- Continue to conduct surveys and use management strategies to maintain the historic range of variability as much as possible.

Project Timeline

TASK	COMPLETED BY	DAYS REQUIRED*	DATE
Identify FMU's	Lead Forester	2	
Field Verification of Proposed FMU's	Lead Forester	2	Summer before sale date
Prescription Inventory of FMU's	Lead Forester	2	Summer or fall before sale date
Develop Project Map & Preliminary Prescription	Lead Forester	2	Summer or fall before sale date
Present project to District Team	Lead Forester & District Team	1	Winter before sale date
Western Gray Squirrel Survey	Lead Forester & Habitat Staff	10 acres/day	Spring before sale date
Cultural Resources Survey	Lead Forester & Archaeological Staff	20 acres/day	Spring before Sale date
Section 7 Consultation	Forester	1	Spring/summer before sale date
Prescribed Fire Consultation	Forester & PF Lead	2	Spring/summer before sale date
Develop Final Prescription	Forester	1	Spring/summer Before sale date
Submit Proposal to Wildlife Commission	Forester & Wildlife Staff	2	Spring/summer before sale date
Type Streams & Wetlands	Foresters & Klickitat Staff	Variable	Spring/summer before sale date
Unit Boundary Layout	Foresters & Klickitat Staff	Variable	Spring/summer before sale date
RMZ/WMZ Layout	Foresters & Klickitat Staff	Variable	Spring/summer before sale date
Mark Trees	Foresters & Klickitat Staff	Variable	Spring/summer before sale date
Timber Cruise	Foresters & Klickitat Staff	Variable	Spring/summer Before sale date
Complete Paperwork	Lead Forester	5	Spring/summer Before sale date
Schedule/Advertise Sale	Lead Forester & Klickitat Manager	1	Spring/summer Before sale date
Western Gray Squirrel Survey	Lead Forester & Habitat Staff	Variable	Fall of sale date
Begin Mechanical Operations	Lead Forester & Contractor	Variable	Fall after hunting seasons
Assess Follow Up Treatment Needs	Lead Forester & Klickitat Manager	1	Every Spring
Western Gray Squirrel Survey	Habitat Staff	Variable	Every Spring**

***Estimate based upon typical restoration project**

****Every year until project is deemed successful and then as needed**

SUMMARY

The objective, over time, is to restore timbered portions of the Klickitat Wildlife Area to historic stand conditions using a combination of strategies including commercial thinning, slashing, pre-commercial thinning, prescribed fire and tree planting. Most stands will require at least 2 commercial entries before stocking levels are back within the historic range of variability. After achieving that objective, regular maintenance activities, using all of the tools described above, will be required to maintain those desired stand conditions and high ecological integrity scores. The over-arching umbrella for all active forest management activities will be to maintain or improve agency defined priority habitats for Oregon white oak and western gray squirrel habitat. This will all be accomplished using policies and procedures found in the WDFW Statewide Forest Management Plan and the Klickitat Forest Management Plan.

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References

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