



# Southwestern Crown of the Continent Prioritization Framework

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## FOREWARD BY THE U.S. FOREST SERVICE

The U.S. Forest Service has the opportunity to work collaboratively to take the prioritization framework and the steps within it to inform where future projects may occur and what treatments and restoration may be desired. It is the responsibility of the U.S. Forest Service to develop projects, provide for public comment, and make project level decisions. Before project selection, refinement of desired conditions and goals, treatment objectives, and decisions are made; local knowledge, site-specific data, and further understanding and validation of ground conditions will be needed. The framework provides an understanding of where integrated opportunities exist, but does not replace the need for more comprehensive refinement at the site-specific scale as projects are being developed for bringing into NEPA. In addition, other considerations are needed to determine the feasibility of a project and treatments such as wildlife habitat needs and past actions. Due to other social needs, resource or agency priorities, timing considerations, and funding; project areas may be located outside of where recommended in this framework or integrated differently as determined by public comments and agency decision makers. The assessment and framework can be a starting point for these discussions, particularly in collaboration, as the U.S. Forest Service determines how funds and projects will unfold through the life of the CFLRP.

## 1.0 INTRODUCTION

The Collaborative Forest Landscape Restoration Program (CFLRP) is designed to provide up to 10 years of funding to selected initiatives that will implement a landscape strategy to address the risk of uncharacteristic wildfire, restore ecosystems to pre-fire suppression conditions, improve fish and wildlife habitat, improve watersheds, and reduce invasive species. As such, it provides a tremendous opportunity to look collaboratively at a landscape and ask what can be accomplished relative to the CFLRP objectives over a 10 year timeframe. While actual project selection and decisions are the responsibility of the U.S. Forest Service, building a collaborative vision of what can be accomplished and where it might occur provides an understanding and shared direction for stakeholders and participants in the collaborative. To assist in developing such a vision, the Ecosystem Management Research Institute (EMRI) conducted a landscape assessment for the Southwest Crown of the Continent (SW Crown) project, a selected CFLRP landscape, and then used this assessment as a basis for making recommendations on where various objectives of CFLRP might be met within the overall project area. Specifically, this work produced the following:

- A landscape assessment based on information and analysis developed from available data to assess the current condition of the landscape compared to historical reference conditions.
- A prioritization framework that uses available information and data to help direct actions and available resources to best meet CFLRP objectives.

The landscape assessment was completed as the first product of this initiative (Mehl et al. 2012). The second product, this report, summarizes the prioritization framework that uses the results of the landscape assessment to identify potential project sites to meet CFLRP objectives. It should be noted that while various potential locations are identified, many of these locations were identified using remotely sensed information that has varying levels of accuracy, and that actual selection of project sites must include on-the-ground validation as well as additional considerations that may increase or decrease the feasibility of conducting a project at a specific identified location.

While the SW Crown project utilizes a collaboration that includes federal, state, and private organizations and individuals, the actual project outputs should be accomplished on U.S. Forest Service lands by three Ranger Districts; the Swan Lake Ranger District, Seeley Lake Ranger District, and Lincoln Ranger District. These Ranger Districts have limited personnel and budgets so projects must be planned carefully to protect valuable resources while delivering maximum benefits to stakeholders including the SW Crown collaborative. The Ranger Districts are responsible for ensuring all activities are in compliance with existing regulations and forest plans (USDA Forest Service 1985, 1986a,b). In addition, there are many on-going district-level programs that may require careful consideration of the best mechanisms to integrate with the objectives of CFLRP. The SW Crown project is particularly challenging in this regard as there are multiple constraints such as budget, time, and inter-dependent components, while there are also high expectations from the collaborative and public for achieving the goals

identified by the project. For this reason, a prioritization framework is needed that incorporates the best available science to support the objectives of CFLRP and SW Crown project while facilitating coordination with on-going district-level programs and projects and ensuring that the most important objectives of the SW Crown project are recommended to the U.S. Forest Service. It is also important that the full collaborative is made aware when existing or unforeseen constraints may interfere with achieving SW Crown project objectives to avoid conflicting expectations during the life of the project.

To effectively prioritize potential projects, the US Forest Service considers Forest Plan direction, existing and future risk to resources of value, existing conditions compared to the desired conditions, benefits to the collaboration, costs, and implementation feasibility. Incorporating the results of the science-based landscape assessment into the prioritization framework provides the foundation for evaluating existing and future risk to resources of value and expected benefits. The following sections summarize how the results of the landscape assessment were considered by the SW Crown collaborative and the three Ranger Districts to determine and develop prioritization goals for the project.

## 1.1 OBJECTIVES

This prioritization framework focused on three primary objectives of both the CFLRP program and SW Crown project: fuels mitigation, forest restoration, and watershed improvement. CFLRP identified additional objectives not included in this framework such as reducing uncharacteristic wildfire behavior at landscape scales, reducing invasive species, and maximizing use of biomass. Improvement of wildlife habitat is also a CFLRP objective. This is considered to be addressed in this prioritization through a coarse filter approach (Haufler et al. 1996), where wildlife habitat for all native species is addressed by maintaining representation of the native ecosystems that historically supported the biodiversity of this landscape. Additionally, emphasis areas for Canada lynx, grizzly bear, and big game winter areas should also be considered at the site level in assessing locations for priority treatment or identifying constraints on management actions. Finally, acceptable management and treatment opportunities must conform to the guidelines of the existing forest plan for each of the three Ranger Districts.

## 2.0 PRIORITIZATION FRAMEWORK

Table 1 lists the steps used in this prioritization framework.

Table 1. Steps used in a SW Crown project prioritization framework.

**Step 1. Set CFLRP prioritization goals.**

- A. Fuels: Treat 80% of high risk areas on Forest Service lands and include associated moderate risk areas.
- B. Terrestrial restoration: Restore 10% of the estimated mean historical amounts of areas influenced by non-lethal and mixed severity A fire regimes.
- C. Watersheds: Improve status of bull trout and westslope cutthroat trout in a designated number of watersheds.

**Step 2. Establish initial desired fuel mitigation, forest restoration, and watershed condition outcomes.**

- A. Fuels: Reduce fuels within the WUI to specified conditions for: 1) areas close to structures and escape routes, and 2) areas further from structures and escape routes.
- B. Terrestrial restoration: Restore stands to identified pre-fire suppression/historical species compositions, structures, and patterns for each ecological site, as described in the landscape assessment.
- C. Watershed: Restore selected watersheds to sustain viable populations of bull trout and westslope cutthroat trout.

**Step 3. Identify potential management opportunity areas**

- A. Fuels: Identify likely high risk areas from CWPP and fuel assessment maps.
- B. Terrestrial restoration: Identify areas likely to have existing conditions that can produce the restoration compositions and structures identified in step 2 following treatment(s).
- C. Watershed: Identify watersheds that have existing ecological value that can be maintained and restored with a reasonable level of treatment.

**Step 4. Look for integration opportunities**

- A. Fuel and terrestrial restoration: Identify areas where both fuel mitigation and terrestrial restoration goals overlap.
- B. Watershed and terrestrial restoration: Identify watersheds where both forest and aquatic ecosystems can be moved toward a restored condition.

**Step 5. Locate specific treatment sites.**

- A. Fuels: Confirm fire risk status of stands and assess additional constraints including forest plan designations, access limitations, wildlife considerations, etc.
- B. Terrestrial restoration: Confirm presence of existing conditions that would produce post-treatment species compositions, structures, and patterns as specified in Step 2, and assess additional constraints.
- C. Watersheds: Conduct finer scale analysis of road or other watershed conditions to confirm restoration opportunities and assess additional constraints.

**Step 6. Identify specific treatments and locations.**

- A. Fuels: Identify specific treatments to convert existing conditions to desired fuel status.
- B. Terrestrial restoration: Identify specific treatments to convert existing conditions to the specified restoration conditions. For mixed severity restoration, evaluate overall treatment area for vegetation or terrain features that may help guide spatial patterns.
- C. Watershed: Identify specific locations for road decommissioning, road improvements, culvert replacement, invasive species control, or other treatments.

**Step 7. Incorporate monitoring based on an effective and appropriate sampling design while also considering opportunities for adaptive management.**

### 3.0 PRIORITIZATION RESULTS

Presentation of the prioritization results will include information on existing U.S. Forest Service project planning through use of analysis area boundaries within the SW Crown project area. The analysis area boundaries have been or are currently being developed through the NEPA process, and are then used as an overlay with identified potential treatment opportunities identified using information developed by the landscape assessment. Because of the length of time required by the NEPA process for Forest Service project development, each of the Districts has already considered general project locations for a number of years into the future using these analysis areas. The three Ranger District boundaries and existing analysis areas are provided in Figure 1. Each analysis area can then be evaluated by the appropriate Ranger District for opportunities to contribute to the goals for terrestrial ecological restoration, fuels mitigation, and watershed restoration.

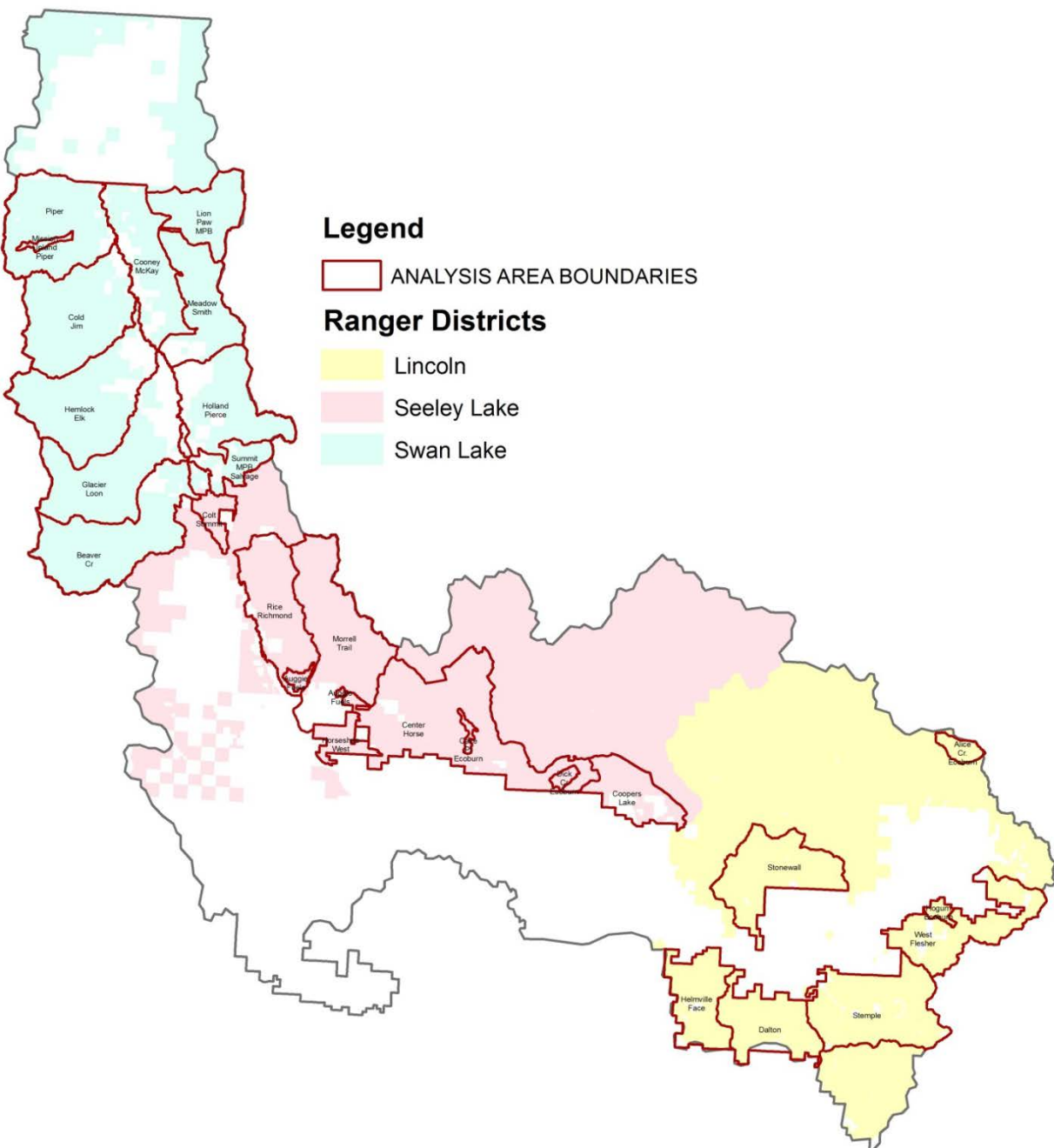


Figure 1. Location of US Forest Service Ranger Districts and analysis areas in the SW Crown project area.



### 3.1 FUEL MITIGATION

#### 3.1.1 FUEL MITIGATION GOALS

The landscape assessment identified existing information from local and regional fire plans and assessments to map and quantify the high risk fuel conditions in the Wildland Urban Interface of the SW Crown project area. This information is summarized in Table 2 by total acres and the number of acres representing an 80% goal for treatment occurring on U.S. Forest Service lands and other non-federal lands. In addition, this information is provided for each of three Ranger Districts. The 80% total of 29,617 acres is slightly greater than the 27,000 acres identified in the SW Crown proposal for project outputs. These results indicate that the Swan Lake Ranger District has 17.4% of the high risk fuels, the Seeley Lake Range District has 35.6%, and the Lincoln Ranger District has 46.1%. It should again be noted that these numbers are based on best available information, which in this case is derived from Landfire maps, and may contain some classification errors that will likely require on-the-ground verification of actual conditions.

Additionally, review of the mapped high fire risk data for the SW Crown project revealed that some areas identified as high risk are likely untreatable because of other existing constraints such as being located in riparian areas or buffers, access limitations, etc. In some cases, the appropriateness of some identified high risk sites was also questioned. However, these mapped locations represent a starting point for further ground surveys to identify priority areas for fuel mitigation. Where high risk areas are identified, additional moderate risk areas surrounding the high risk areas are also likely to be treated to ensure both short and longer-term safety benefits and to facilitate cost and implementation feasibility at the project level.

Table 2. The number and percentage of high risk fuel acres in the SW Crown project area by U.S. Forest Service and non-federal ownership, as well as the distribution by U.S. Forest Service Ranger Districts. The total number of high risk acres is used to calculate an 80% treatment goal within the wildland urban interface.

	ALL ACRES	80% TARGET ACRES	%
<b>U.S. Forest Service</b>	37021	29617	41.6%
Swan Lake RD	6451	5161	7.3%
Seeley Lake RD	13181	10545	14.8%
Lincoln RD	17050	13640	19.2%
<b>Other Non-Federal</b>	51953	41562	58.4%
<b>TOTAL</b>	<b>88974</b>	<b>71179</b>	

### 3.1.2 FUEL MITIGATION - DESIRED OUTCOMES

Fuel mitigation is designed to reduce the probability of high severity fire that could result in loss of property and natural resources as well as threaten the lives and safety of firefighters and residents. Areas of high and moderate risk fuels have been previously described and mapped through the Community Wildfire Protection Plans (Seeley-Swan Fuels Task Force 2008) and Blackfoot Watershed Fuels Assessment (Blackfoot Challenge 2008) work that overlaps with the SWCC project area. High and moderate risk fuels represent those locations that have high and moderate fuel hazard ratings as further modified by slopes and the density of nearby structures or priority escape routes. The three Ranger Districts considered fuel mitigation objectives and developed the following generalized desired conditions based on distance to residences or escape routes (Table 3).

Table 3. Desired outcome conditions for fuel mitigation depending on distance to values at risk and existing vegetation conditions. NL refers to the non-lethal fire regime and MSA refers to the mixed severity A fire regime (See Mehl et al. 2012 for a description of fire regimes).

DISTANCE TO RESIDENCE/ ESCAPE ROUTE	PRIMARY OBJECTIVE	TREES >15" dbh	ECOLOGICAL SITES	
			WARM DRY & WARM MOIST	COOL DRY & COOL MOIST
<120' (30 m)	Fuel reduction to move a crown fire to ground while maintaining or developing large trees	Present	Fuel mitigation priority with restoration sometimes compatible (NL)	Fuel mitigation priority with restoration sometimes compatible (MSA)
	Spacing of fuels a key consideration	Absent	Fuel mitigation priority	Fuel mitigation priority
>120' (30 m) to 1.5 miles**	Fuel reduction to reduce crown fires and limit large fire growth while maintaining or developing large trees	Present	Restoration (NL) & fuel mitigation compatible	Fuel mitigation & restoration usually compatible  Pattern very important
	Patterns key	Absent	Pattern important, including age class diversity and fuel loading patchiness.	Fuel mitigation & restoration sometimes compatible  Special consideration for dead LP may apply.

\* >15" DBH is the largest dbh category used in VMAP. VMAP was used in the landscape assessment to determine today's vegetation structure for much of the SW Crown project area.

\*\* 1.5 miles was used for this discussion. The Wildland Urban Interface (WUI) defined in the Community Wildfire Protection Plans will be used by the US Forest Service in project level planning.

### 3.1.3 FUEL MITIGATION OPPORTUNITIES

Figure 2 displays the locations of high and moderate risk fire areas on U.S. Forest Service lands within the SW Crown project area, as well as existing Ranger District analysis areas. The sources of the risk designations were identified and described in the landscape assessment (Mehl et al. 2012).

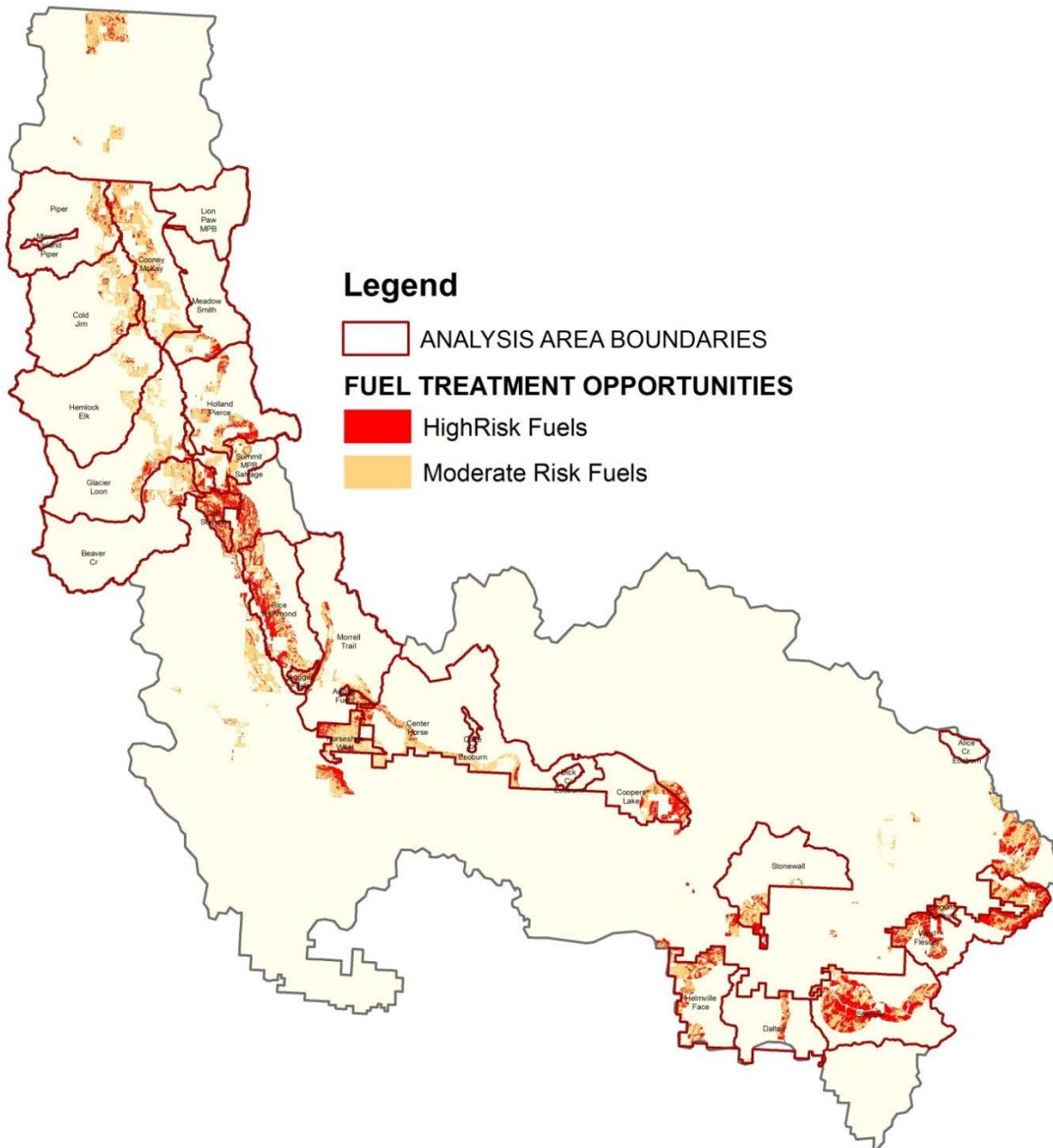


Figure 2. High and moderate risk fuels mapped for the SW Crown project area and their distribution relative to existing US Forest Service analysis areas.

## 3.2 TERRESTRIAL ECOLOGICAL RESTORATION

### 3.2.1 RESTORATION GOALS

The landscape assessment identified and quantified that the most significant changes to native ecosystem diversity have occurred in forest structures, species compositions, and patterns associated with the historically common non-lethal and mixed-severity fire regimes. In particular, the pre-fire suppression old growth condition characterized in the landscape assessment as the low severity fire late seral forest condition which were historically common native ecosystems in this landscape occur in greatly reduced amounts today. Further, where these residual late seral structures and species composition remain in the landscape, fire suppression activities have facilitated their in-growth by high densities of younger trees that now put the stand at risk of high severity fire and competition for water and nutrients which may continue to reduce opportunities for restoring these historically important native conditions in this landscape. In fact, recent wildfires have demonstrated that these residual structures continue to be at high risk from stand replacing fire and require immediate protection where they still occur. Restoring the historical fire regimes and forest conditions in these high risk native ecosystems should be a high priority for land managers and is highly compatible with many of the objectives identified for the SW Crown project. Specifically, objectives identified in the SW Crown proposal include:

- Restore forest structure processes and resiliency, promote diversity, establish a mosaic pattern consistent with the mixed-severity fire regime that mimics historical and native landscape conditions, maximize retention of large trees, reintroduce low-severity and low-intensity fire on sites that historically burned in this manner to establish open stands consistent with historical conditions.
- Treatments outside of the WUI will be vegetative restoration projects intended to maximize retention of large trees while maintaining and restoring pre-fire suppression old growth conditions and a mosaic of size class distribution, and improving resiliency.

To accomplish these stated restoration objectives while also addressing the findings of the landscape assessment, the SW Crown collaborative has identified a recommended initial goal of restoring 10% of the mean historical range of variability (HRV) for the non-lethal and mixed-severity A fire regimes, using the coarse-filter framework. This strategy emphasizes providing representation of sufficient amounts of functionally similar ecosystems relative to what occurred historically across the SW Crown landscape. Table 4 identifies the number of acres needed to meet the 10% mean HRV for representation of native forest ecosystems by fire regime and ecological site for all lands within the project area, and for U.S. Forest Service lands only. For the purposes of the SW Crown project, the 45,680 acres identified for restoration on US Forest Service lands are believed to be feasible within the 10-year project time frame and are very close to the 46,000 acres estimated for restoration outputs in the 2010 SW Crown proposal. While similar priorities for restoration are recommended for lands outside the U.S. Forest Service land base in the project area, they are not part of the scope of the SW Crown project.

Table 4. The number of acres representing 10% of the mean historical range of variability (HRV) for the non-lethal and mixed-severity A fire regimes by ecological site, for all landowners within the SW Crown project area and for US Forest Service lands only.

FIRE REGIME*	10% HRV	Warm-Dry	Warm-Moist	Mod Warm- Dry	Mod Warm- Moist	Cool-Dry	Cool-Moist	Cold-Dry	Cold-Moist	TOTAL
NL	ALL LANDS	23284	19479	0	0	0	0	0	0	42763
	USFS	12183	7416	0	0	0	0	0	0	19599
MS-A	ALL LANDS	2907	2374	1155	3431	8849	5768	8180	674	33337
	USFS	1521	904	644	2031	7520	4728	8067	667	26082

\*NL = Non-lethal Fire Regime (mfri<25 yrs.); MS-A = Mixed-severity A Fire Regime (mfri>25 and <50 yrs.)

The acres identified for representation of 10% mean HRV can be further quantified for each of the three Ranger Districts. Table 5 identifies the number of acres representing the 10% mean HRV relative to the total acres of each ecological site occurring within each of the Ranger Districts. The resulting totals indicate the Seeley Lake, Lincoln, and Swan Ranger District would attempt to contribute approximately 17,735 acres (39%), 14,186 acres (31%), 13,759 acres (30%), respectively, toward the goal of 45,680 acres of U.S. Forest Service lands in the overall project area. In addition, Table 5 identifies the mean number of acres of low and high severity fire conditions for each ecological site that would be needed to restore fire regime patterns and structural conditions to meet the objectives for representation of historical conditions.

### 3.2.2 ECOLOGICAL RESTORATION - DESIRED OUTCOMES

CFLRP identified as a component of each approved project's landscape strategy to "fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health and retaining the large trees contributing to old growth structure." As part of the landscape assessment (Mehl et al. 2012), the pre-fire suppression old growth conditions were described for each of the 9 ecological sites (habitat type groupings) occurring in the SW Crown project area. Any restoration efforts in the SW Crown should have as a goal the return of a specific site to these pre-fire suppression conditions. However, other considerations and constraints may require some modifications to this primary goal. In particular, climate change considerations may result in a change in the desired conditions for a site based on predicted future fire regimes or the ability of a site to sustain the conditions that were present under historical climate regimes. Additional constraints imposed by forest plans or listed species requirements may complicate restoration efforts and require some modifications. Describing and documenting these constraints will be helpful to future planning efforts.

Most of the native ecosystems have either become in-grown with additional densities of trees or now lack the spatial heterogeneity (for mixed severity fire regimes) that existed under historical fire regimes. Forest structures, as indicated in the landscape assessment have been changed by a number of factors with past logging and fire suppression having the greatest influence. Identifying the remaining areas that still retain the late seral structural components and restoring them to representative conditions of pre-fire suppression old growth conditions while also protecting them from further loss to wildfire could be a priority for CFLRP projects.

### 3.2.3 ECOLOGICAL RESTORATION OPPORTUNITIES

As indicated above, where forest structures and compositions still exist within the SW Crown landscape that would allow for the restoration of pre-fire suppression old growth conditions as influenced by the non-lethal and mixed-severity A fire regimes, these should be considered high priority areas for restoration. Areas that retain appropriate forest structures that allow them to be restored in the short term to their desired conditions should be identified and mapped. To assist in this regard, today's conditions as mapped for the landscape assessment (Mehl et al. 2012) were further analyzed to identify where a minimum of 8 fire tolerant (determined using species) trees per acre greater than or equal to

Table 5. The number of acres representing 10% of the mean historical range of variability (HRV) for the non-lethal and mixed-severity A fire regimes by ecological site and by USFS Ranger District. Acres are also summarized within each fire regime by expected fire severity patterns of low and high fire severity, with low fire severity usually resulting in a fire-maintained, late seral condition and high severity fire resulting in patches of early seral conditions.

FIRE REGIME <sup>a</sup>	FIRE SEVERITY PATTERNS <sup>b</sup>	Warm-Dry	Warm-Moist	Mod Warm-Dry	Mod Warm-Moist	Cool-Dry	Cool-Moist	Cold-Dry	Cold-Moist	TOTAL
<b>Swan Lake RD</b>		<b>1211</b>	<b>3575</b>	<b>644</b>	<b>2031</b>	<b>1354</b>	<b>1723</b>	<b>2690</b>	<b>531</b>	<b>13759</b>
<b>NL</b>	LFS - Late Seral (95%)	1023	3028	0	0	0	0	0	0	4051
	HFS - Early Seral (5%)	54	159	0	0	0	0	0	0	213
<b>MS-A</b>	LFS - Late Seral (70%)	94	272	451	1421	948	1206	1883	372	6647
	HFS - Early Seral (30%)	40	116	193	610	406	517	807	159	2848
<b>Seeley Lake RD</b>		<b>4885</b>	<b>3889</b>	<b>0</b>	<b>0</b>	<b>2663</b>	<b>1570</b>	<b>4634</b>	<b>94</b>	<b>17735</b>
<b>NL</b>	LFS - Late Seral (95%)	4126	3294	0	0	0	0	0	0	7420
	HFS - Early Seral (5%)	217	173	0	0	0	0	0	0	390
<b>MS-A</b>	LFS - Late Seral (70%)	379	295	0	0	1864	1099	3244	66	6947
	HFS - Early Seral (30%)	163	127	0	0	799	471	1390	28	2978
<b>Lincoln RD</b>		<b>7607</b>	<b>855</b>	<b>0</b>	<b>0</b>	<b>3503</b>	<b>1436</b>	<b>743</b>	<b>42</b>	<b>14186</b>
<b>NL</b>	LFS - Late Seral (95%)	6425	724	0	0	0	0	0	0	7149
	HFS - Early Seral (5%)	338	38	0	0	0	0	0	0	376
<b>MS-A</b>	LFS - Late Seral (70%)	591	65	0	0	2452	1005	520	29	4662
	HFS - Early Seral (30%)	253	28	0	0	1051	431	223	13	1999
<b>USFS Total Acres</b>		<b>13,703</b>	<b>8,319</b>	<b>644</b>	<b>2,031</b>	<b>7,520</b>	<b>4,729</b>	<b>8,067</b>	<b>667</b>	<b>45,680</b>

<sup>a</sup>NL = Non-lethal Fire Regime (mfri<25 yrs.); MS-A = Mixed-severity A Fire Regime (mfri>25 and <50 yrs.)

<sup>b</sup>LFS= Low Fire Severity conditions; HFS = High Fire Severity conditions



15" dbh may still remain in this landscape that could facilitate restoration of these priority structures and species compositions. The mapped information on potential priority structures were further overlaid with mapped ecological sites to identify where these conditions could potentially restore the non-lethal versus mixed-severity A fire regime. Figure 3 identifies these conditions relative to the existing analysis areas in the SW crown project area. It is important to note, however, that additional restoration opportunities are believed to exist in this landscape but that are masked in the mapping data used, particularly where VMAP data was the source, by a predominance of in-grown trees (see the Landscape Assessment for a discussion of this topic). Thus, the priority areas for restoration identified in Figure 3 should be viewed as a coarse scale tool to look for restoration opportunities but should not be considered to have correctly identified all potential restoration opportunities in this landscape. Project level analysis will determine site specific restoration opportunities.

### 3.3 WATERSHED RESTORATION

#### 3.3.1 WATERSHED RESTORATION GOALS

Watershed restoration was addressed as outputs in the SW Crown proposal in terms of miles of road decommissioning or improvements, culvert replacements, and other specific treatments. While each of these may improve conditions at a location, their net benefit to the condition of a larger watershed is less certain and quantifiable. Prioritizing watershed improvements in the SW Crown landscape differs from terrestrial restoration in that instead of a coarse filter approach designed to restore specific native ecosystems, watershed restoration was based on a fine filter or species approach designed to maintain or improve conditions for bull trout and westslope cutthroat trout. Watersheds were rated for their current value to these two species as well as their level of impact based on an index of road disruption (Mehl et al. 2012). While indices of road disruption have been statistically shown to correlate with overall levels of watershed impacts, the actual condition of a watershed may be different than indicated by this index. However, for initial prioritization purposes, the fish values and road disruption index were assumed to identify possible opportunities for management actions within watersheds. The fish value and road disruption maps were included in the landscape assessment along with the final watershed restoration opportunities map developed from this base information. The total number of acres representing each of the five watershed categories for the entire SW Crown project area is listed in Table 6, and the number of acres representing each watershed category within analysis areas of the three Ranger District is listed in Table 7.

The goals for watershed restoration are not presented as a defined number or size of watersheds within the project area that should be treated under the CRLRP project. Rather, the goal will be to use the information provided by the landscape assessment to identify opportunities for watershed improvements and then to conduct more site specific investigations within potential priority watersheds of appropriate treatments to maximize benefits to bull trout and cutthroat trout populations.



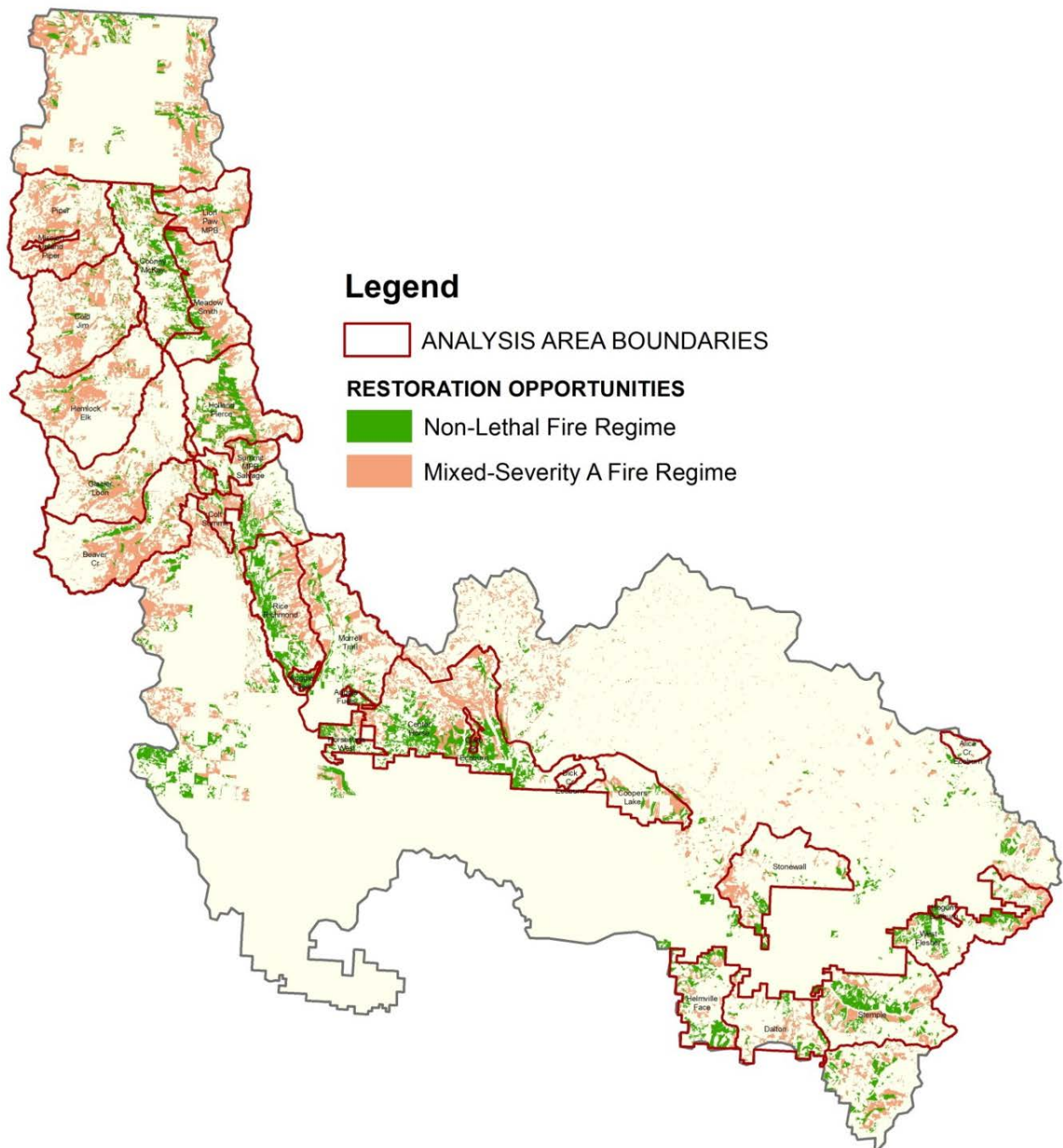


Figure 3. The location of forest ecological restoration opportunities for the non-lethal and mixed-severity A fire regimes relative to the US Forest Service analysis areas in the SW Crown project area.

Table 6. The number of acres representing each of the 5 watershed categories for the SW Crown project area.

WATERSHED STATUS	ACRES	% of Area
<b>Maintain</b>	629,294	43.0%
<b>Restore 1</b>	63,199	4.3%
<b>Restore 2</b>	318,866	21.9%
<b>Restore 3</b>	148,986	10.2%
<b>Defer</b>	301,738	20.6%

Table 7. The number of Forest Service acres representing the 5 watershed categories within analysis areas of each of the 3 Ranger Districts for the SW Crown project area.

Watershed Status	Ranger District		
	Swan Lake	Seeley Lake	Lincoln
<b>Maintain</b>	127,108	38,794	45,458
<b>Restore 1</b>	1,847	22,527	2,754
<b>Restore 2</b>	47,910	35,735	22,715
<b>Restore 3</b>	400	16,414	17,634
<b>Defer</b>	51,818	8,901	20,226

### 3.3.2 WATERSHED RESTORATION - DESIRED OUTCOMES

The prioritization framework should be used to help indicate which watersheds should receive an additional level of analysis first, and where CFLRP funding may provide the best benefits in terms of maintaining or restoring the status of bull trout and westslope cutthroat trout. Because the index of road disruption is a coarse scale assessment of impacts, additional analysis is required within a watershed to determine what specifically is needed at the site level to help maintain or restore watershed condition and benefit the targeted fish populations. Finer scale analyses of road locations and ratings of likely inputs to streams would help identify which roads or road segments merit the most attention. Similarly, analysis of road crossings would identify where culvert replacements would provide the most benefit or which crossings currently support adequate conditions.

### 3.3.3 WATERSHED RESTORATION OPPORTUNITIES

Sixth code HUC's were identified that had the greatest number of sub-watersheds with a designation of maintain or restore 1. These were grouped together to represent those areas with the greatest potential for maintaining viable bull trout and westslope cutthroat trout populations. Restore 2 and Restore 3 categories were grouped as the next level of potential priority, as these watersheds had lower existing status of the two species and additional levels of disruption. Defer watersheds were those with the least existing ecological values in terms of the two species and the largest amount of disruption, meaning that restoration efforts in these watershed would require the greatest amount of treatment effort and potentially result in the least increase in population viability status for the two species. The

various groupings of watersheds were then examined for their location within Forest Service analysis areas. It should be noted that in the Swan Lake Ranger District, presence of high levels of invasive fish species were considered to be a greater threat to bull trout and westslope cutthroat trout than road disruption. In this District, management is planned to address the impacts of invasive species as a first priority, while addressing problems with road disruption is a secondary priority. It should also be noted that in the Lincoln Ranger District, impacts from old mining operations have had a large impact on some watersheds. These impacts were not included in the road disruption index used in the watershed evaluations.

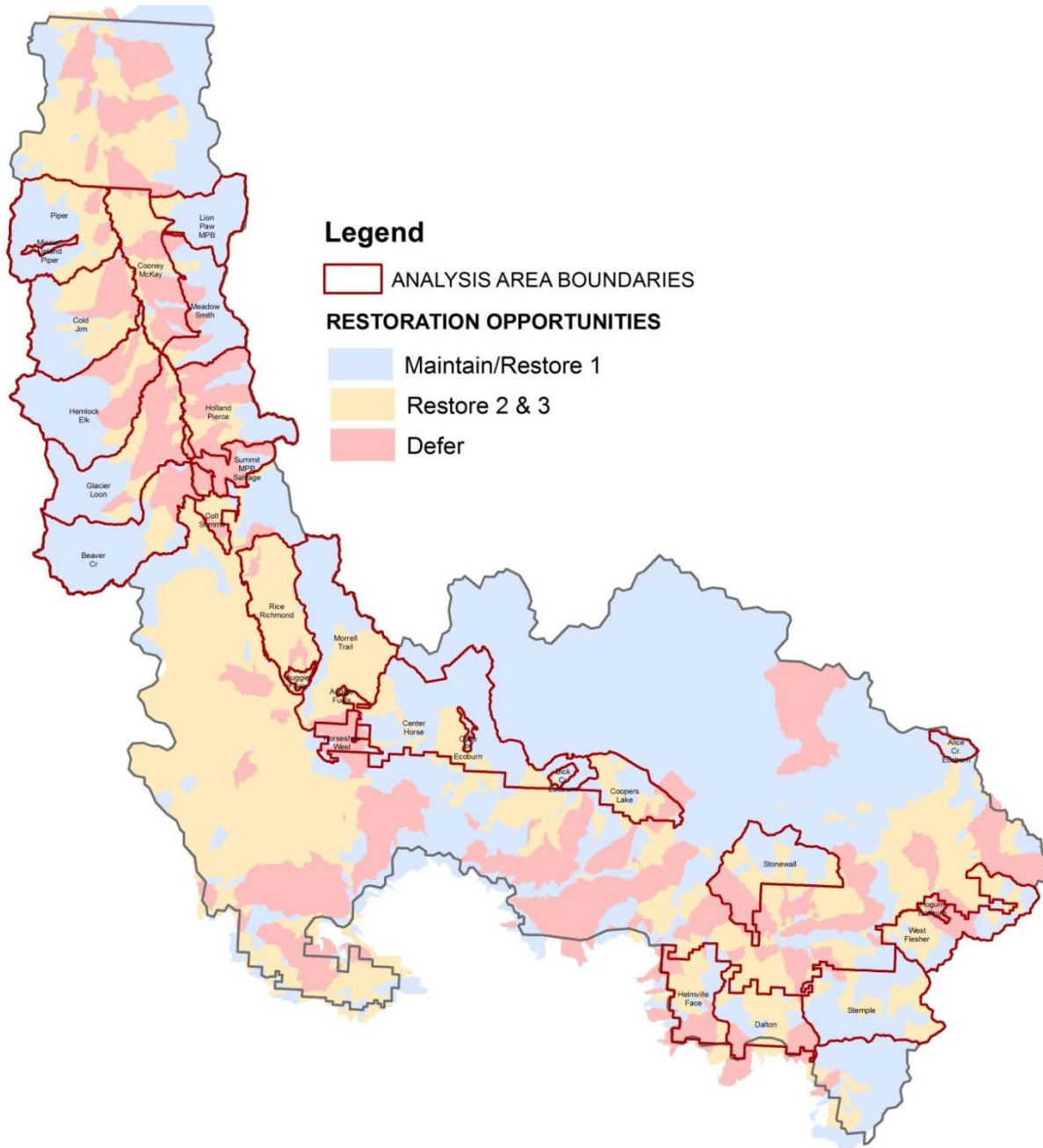


Figure 4. Watershed restoration opportunities for the SW Crown project area

## 4.0 INTEGRATION OF CFLRP OBJECTIVES

Based on the integration of the above information on fuel treatment and restoration opportunities, an assessment of possible priority areas for the SW Crown project can be developed. For example, Tables 8, 9, and 10 identify the number of acres representing opportunities for fuel mitigation, forest restoration, and watershed restoration for each of the Swan Lake, Seeley Lake, and Lincoln Ranger Districts, respectively, by analysis area. As discussed previously, because of the length of time involved in the NEPA process for Forest Service projects, each of the Districts has already identified analysis areas and considered general project locations for a number of years into the future. As demonstrated in these tables, each analysis area can then be evaluated for its inclusion of potential priority areas for fuels, terrestrial restoration, and watershed improvements.

Prioritization of fuel mitigation focuses on the high risk areas within the WUI with a secondary objective of treating associated moderate risk conditions. However, where stands within the WUI have a high fire risk but are more than 120' from structures or escape routes and have compositions and structures that allow for restoration to desired conditions on appropriate ecological sites, treatments can accomplish both the fuel mitigation and restoration objectives. Such areas should be among the highest priorities for CFLRP actions, as they can address both needs on the same area. Other resources and constraints would be considered at the project level.

An additional priority is the integration of terrestrial restoration and watershed restoration objectives, although this can present a challenge. Terrestrial restoration is frequently enhanced by the ability to access a site from roads, and where possible to use mechanical thinning to restore a stand to its desired conditions. Yet, the presence of roads and use of mechanical equipment can potentially impact watershed quality through an increase in sediment delivered to streams. Watershed restoration, as assumed in the landscape assessment, has a primary focus on addressing problems created in the past from poorly sited, constructed, or maintained roads. Activities such as road decommissioning are often designed to improve watershed condition, but may further limit the access to forest stands that are a priority for terrestrial restoration. True ecological integration of both terrestrial forest restoration and watershed restoration may ultimately result in watersheds that are properly functioning and supplying clean water and sustainable populations of native fish, while also supporting forests that are consistent with desired compositions and structures. When fires do occur under these conditions, ideally they would exhibit patterns and intensities characteristic of historical fire regimes. From this standpoint, it is desirable to address both watershed improvement and forest and fuel mitigation needs within the same watershed. An additional advantage of this approach is that it allows for greater opportunities for "stewardship" projects, where all of the management needs in the watershed can be considered and addressed at one time. This further contributes to considerable efficiencies in conducting assessments, providing cost-effective implementation of treatments, and coordinated monitoring.

Table 8. Number of acres representing fuel treatment and forest restoration opportunities by analysis area and watershed status for the Swan Lake Ranger District.

Analysis Area/ Watershed Status	WARM-DRY		WARM-MOIST		MOD WARM-DRY		MOD WARM-MOIST		COOL-DRY		COOL-MOIST		COLD-DRY	COLD-MOIST	TOTAL
	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	RESTORE	RESTORE	
Beaver Cr															
MAINTAIN/RESTORE 1	9	189	10	802					2	1863	3	3906	773	193	7750
RESTORE 2&3	11	95	3	93					1	608	17	638	58	15	1540
DEFER	17	60	8	101					116	218	100	668			1289
Cold Jim															
MAINTAIN/RESTORE 1		91		185		85		186		1577		1412	616	95	4247
RESTORE 2&3	2	188	1	414	4	667	5	1499		703		679	26	2	4190
DEFER	1	60	4	210	7	258	17	1390		42		39			2029
Cooney McKay															
MAINTAIN/RESTORE 1	0	11	1	457	1	41	1	189							700
RESTORE 2&3	31	142	122	1912	22	172	91	1248							3740
DEFER	7	80	46	2372	10	67	39	721							3341
Glacier Loon															
MAINTAIN/RESTORE 1	0	81	0	411					0	1076	4	2259	564	116	4512
RESTORE 2&3	26	101	7	157		0		11	17	396	14	892	17	2	1637
DEFER	7	23	4	173	3	1			54	162	104	1165	18	8	
Hemlock Elk															
MAINTAIN/RESTORE 1		85		490		2		59		2201		2583	913	137	6470
RESTORE 2&3		4	0	49	0	4	5	399	0	1	3	15			480
DEFER	0	41	1	99	0	182	10	1326	2	148	9	360	1	0	2179
Holland Pierce															
MAINTAIN/RESTORE 1	51	397	7	489	6	91	39	120	42	733	2	240	413	90	2721
RESTORE 2&3	1	254	12	910	6	156	12	694	0	5	0	0			2050
DEFER	53	659	135	1696	13	191	8	749	58	640	63	483	255	25	5030
Lion Paw MPB															
MAINTAIN/RESTORE 1		259		443		106		216		2136		1305	874	197	5536
RESTORE 2&3		92		251		10		84		209		167	127	12	952
MeadowSmith															
MAINTAIN/RESTORE 1	7	347	64	533	12	105	21	104	13	1366	4	1064	1129	363	5131
RESTORE 2&3		59	4	115		14	1	20		159		92	92	3	560
DEFER	8	402	9	1456	0	25	0	64	0	449		432	187	34	3066
MissionUplandPiper															
MAINTAIN/RESTORE 1		30		93		1		20		165		119	20		448
Piper															
MAINTAIN/RESTORE 1		62		159		235		420		2421		2254	696	189	6436
RESTORE 2&3	17	162	6	214	18	619	49	1386		500		524	47	10	3551
DEFER	27	32	15	33	42	126	34	240							548
Summit MPB Salvage															
MAINTAIN/RESTORE 1	13	93	7	249					0	198	3	220	24	1	806
RESTORE 2&3	0	0	0	5		0		1	0	0	0	9			15
DEFER	29	122	138	515	2	17	0	55	28	287	102	679	146	21	2141
Total	318	4221	606	15086	145	3175	332	11200	333	18263	430	22200	6995	1514	83096



Table 9. Number of acres representing fuel treatment and forest restoration opportunities by analysis area and watershed status for the Seeley Lake Ranger District.

Analysis Area/ Watershed Status	HOT-DRY		WARM-DRY		WARM-MOIST		COOL-DRY		COOL-MOIST		COLD-DRY	COLD-MOIST	TOTAL
	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	RESTORE	RESTORE	
Auggie Fuels													
MAINTAIN/RESTORE 1						1							1
RESTORE 2&3			7	29	45	705	4	43	1				834
DEFER			5	4	10	121							140
Cave Pt Ecoburn													
MAINTAIN/RESTORE 1				206				204		22			432
RESTORE 2&3				95				4		50	31		180
Center Horse													
MAINTAIN/RESTORE 1			106	4917	43	2372	66	3477	5	2376	1271		14632
RESTORE 2&3			187	2448	17	854	65	1670	2	186	252		5681
DEFER			9	21		1	54	45	25	21			176
Colt Summit													
MAINTAIN/RESTORE 1					23	4	52	17	88	3			187
RESTORE 2&3			85	70	136	234	143	91	647	264			1669
DEFER			1	2	16	3	35	16	311	153			536
Coopers Lake													
MAINTAIN/RESTORE 1			150	153		54	4	169	14	66	18		629
RESTORE 2&3			135	171	8	7	79	435	67	168	22		1091
DEFER			233	128	6	14	242	64	140	341			1169
Dick Cr Ecoburn													
MAINTAIN/RESTORE 1				5		5							9
Horseshoe West													
MAINTAIN/RESTORE 1		3	41	63	40	142		5		1			295
RESTORE 2&3				1	2			31					34
DEFER	12	12	184	704	71	259	125	183	48	215			1813
Morrell Trail													
MAINTAIN/RESTORE 1				127	75	1412		1058	24	2405	720	149	5971
RESTORE 2&3			76	731	1	373	53	1051	8	466	346		3105
DEFER				6			3	3	1	2			15
Rice Richmond													
MAINTAIN/RESTORE 1					1	40		4		91			136
RESTORE 2&3			688	1379	410	2124	139	3060	72	1434			9307
DEFER			33	65	29	723	5	97					953
Total			1939	11325	934	9449	1071	11726	1455	8264	2660	149	48996

Table 10. Number of acres representing fuel treatment and forest restoration opportunities by analysis area and watershed status for the Lincoln Ranger District.

Analysis Area/ Watershed Status	WARM-DRY		WARM-MOIST		COOL-DRY		COOL-MOIST		COLD-DRY	TOTAL
	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	FUELS	RESTORE	RESTORE	
Alice Cr. Ecoburn										
MAINTAIN/RESTORE 1		59				36		2	29	126
RESTORE 2&3		2				41				43
Dalton										
MAINTAIN/RESTORE 1		9	10	160		152		483		814
RESTORE 2&3	5	124	126	265	44	414	119	506		1603
DEFER		798				408		79		1286
Helmville Face										
MAINTAIN/RESTORE 1	72	398	2	12		0	49	319		853
RESTORE 2&3	297	1013	7	0		225	98	440		2079
DEFER	249	1107	6	163	7	0	35	143		1710
Hogum Ecoburn										
MAINTAIN/RESTORE 1	30		0							30
RESTORE 2&3	130	7	63							199
DEFER	117	22	10							149
Stemple										
MAINTAIN/RESTORE 1	1056	1355	166	168	1396	429	32	80		4682
RESTORE 2&3	378	1526	31	10	1265	1010	28	149		4397
DEFER	8	25	2	2	160	96				292
Stonewall										
MAINTAIN/RESTORE 1	1	58	7	46		142		67		321
RESTORE 2&3	45	330	21	46	13	281	1	299		1036
DEFER	357	372	75	193	78	1631		81		2786
West Flesher										
MAINTAIN/RESTORE 1	655	309	22	7	1206	258				2456
RESTORE 2&3	1694	679	88	5	592	164	38	4		3264
DEFER	268	125	13		36	34		7		483
Grand Total	5360	8318	648	1077	4797	5322	399	2659	29	28608

## 5.0 IDENTIFICATION OF SPECIFIC TREATMENT LOCATIONS

This project has identified a framework for use in prioritizing areas for treatments to meet the objectives of the CFLRP program and SW Crown project (Table 1). Goals are established for the overall project in terms of fuel mitigation, terrestrial forest restoration, and watershed improvement. Desired outcomes resulting from treatments are specified for fuel zones, ecological restoration within each ecological site, and watershed improvements. Opportunity areas to achieve these goals and desired outcomes have been identified and mapped using existing data sources. The actual location of treatment sites and specific treatments to be applied may be determined within each specific Forest Service analysis area. Selection of appropriate treatments may be based on which types of treatment can best achieve desired outcomes while also factoring in considerations of the management guidelines of the current forest plan for each District, additional constraints such as presence of riparian areas or habitat of listed species, production of wood or biomass products, and overall costs. Determining specific treatments for restoring mixed severity conditions should also consider landscape features to produce the desired treatment outcomes. For example stands with appropriate existing conditions can be managed to produce the low severity fire conditions post-treatment. Surrounding areas can be assessed based on terrain, aspect, and clues to historical conditions such as presence of large stumps to help determine appropriate spatial patterns for a mixed severity fire condition. Step 2 in the planning process identifies these types of considerations for each ecological site. Once sites for treatments are identified, the specific treatments to be used can be selected. These treatments should be designed to move the existing conditions of the site to or towards the identified desired restoration conditions for that site. Appropriate treatments can be applied, and can be monitored in an adaptive management design to determine the effectiveness of each treatment in achieving restoration goals.

## 6.0 ADDITIONAL CONSIDERATIONS

Once specific treatment locations are identified, additional project-level considerations would be evaluated. Additional maps that could aid in these site-level evaluations include wildlife habitat and movement corridors, road locations, slopes >35%, riparian areas, and forest plan management units. For example, in the Swan Valley, grizzly bear management zones, while not limiting where activities can occur, add time constraints as to which year management can occur within a subunit. All of these factors complicate the identification of treatment locations and the kinds of treatments that can be applied to each site. However, the identification of opportunity areas using the prioritization framework will provide a starting point to conduct project-level evaluations with a higher likelihood of having the desired outcomes as previously described for fuels, forest restoration, or watershed improvement.

A final consideration for identifying future project priorities and possible locations is to identify likely treatments that may be used to achieve the desired outcomes, and to establish an appropriate monitoring design based on these treatments. There are far too many complexities in landscape conditions, configurations, and management constraints to monitor all projects and possible treatments.



It is therefore important to develop a sampling design around a selected set of treatments that can be appropriately replicated across ecological sites and conditions. The prioritization framework helps identify key stratification factors for a monitoring design, helps identify the likely types of treatments that may be applied, and provides some guidance for the spatial distribution of these treatments. While the specific sites and treatments may be located during the project development process, the overall monitoring framework can be incorporated into this planning.

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