

## SYNTHESIS AND RECOMMENDATIONS

In this step of the analysis, multiple resource issues were combined and integrated to develop a holistic set of recommendations. This chapter is organized according to the five issues and attendant key questions that were presented in Chapter II. The watershed analysis up to this point has captured the key components of the resources or the key processes that are important to understand in order to answer the key questions for each of the issues. This step in the process synthesizes and organizes that information by issue.

The six issues critical to the future management of this analysis area that were identified are:

- Protection or enhancement of wildlife habitat
- Protection or enhancement of water quality.
- Protection or enhancement of grassy bald habitat.
- Protection or enhancement of fisheries and aquatic species habitat.
- Prevention and control of invasive non-native species.
- Management of fire hazard and risk.

The analysis team considered the Issues and Key Questions and looked at them holistically with regard to all resources. Opportunities to address priorities at the same time or in concert were identified (Map 14: Combined Opportunities). Some priorities could be funded by other projects, such as funding fish barrier improvement and wildlife habitat with thinning restoration project revenue. Other projects could occur independently. This synthesis is described below.

### *ISSUE 1: PROTECTION OR ENHANCEMENT OF WILDLIFE HABITAT*

#### *Terrestrial Vegetation and Wildlife*

The percent of seral types on the landscape is within the range of historic range of variability. However, the spatial distribution of these seral stages may not be consistent. Approximately 28 percent of the National Forest system lands and City of Corvallis lands are in the early to mid seral stage. About 71 percent would be considered mature or late-seral.

Patch sizes of 100 to 10,000 acres are fragmented with small patches of early to mid seral plantations. Stands that fragment 100 to 10,000 acre patches of late seral habitat are considered priority stands for wildlife restoration management opportunities.

Management opportunities to maintain or enhance wildlife populations dependant on 100 to 10,000 acre size patches are a priority, including the northern spotted owl, would include thinning to accelerate late-successional habitat and decommissioning roads which fragment the habitat (Map 12: Wildlife Restoration Priorities). Management of plantations other than those identified as priority stands also would be beneficial to wildlife species by providing stand diversity.

#### **Recommendations**

Regional Ecosystem Office guidelines for silvicultural treatments in both precommercial and commercial age classes emphasize the need to maintain diversity in meeting LSR objectives, including leaving some areas untreated. This is particularly important when determining



the primary need for treatment within LSR or riparian reserves and to evaluate the future outcome of the stand.

Although the majority of the analysis area is in Late-Successional Reserve, forest management must still be pursued if long-term objectives are to be met and the attainment of those objectives accelerated to the degree possible.

The Late-Successional Reserve Assessment, Oregon Coast Province, Southern Portion (RO267, RO268) (1997) determined that the high density and predominant monoculture of trees in the managed plantations on federal land identified several options that are appropriate and desirable to accelerate the attainment of late-successional characteristics. These include:

- thinning to control density and accelerate desirable forest stand characteristics
- underplanting with shade tolerant species
- selecting for both species and structural diversity
- developing prescriptions that are ecologically based i.e. working within the successional pathways of different environments
- creation or maintenance of snags and coarse woody debris (CWD) to meet objectives

The difference between the current conditions and desired future conditions drive the potential management activities that may facilitate meeting the objectives of a given area.

An important aspect to enhancing conditions for terrestrial wildlife species in the Marys River watershed is the management and protection of late seral conifer dominant forests. Man’s influence has reduced the patch size and amount of interior mature conifer forest and overall diversity of the landscape due to regeneration harvest. Where plantations occur, the stocking levels are much greater than natural forest development and have far fewer tree and shrub species in the understory. The primary objectives of enhancement actions are to recover patch size of mature late seral forests, adjust stocking levels to promote stand development on a trajectory closer to old growth scenarios, diversify tree and understory plant species, and increase the complexity of stands through coarse woody debris management.

Table 6 summarizes recommendations and considerations related to management of the Marys River watershed for the terrestrial wildlife resources.

Table 6: Management Recommendations for Terrestrial Wildlife Resources

What	Why	Comments
<i>Terrestrial Projects on National Forest</i>		
Thin upland stands to a minimum 40 percent crown cover (hemlock and mixed conifer stand may carry a higher density). Vary spacing.	Enhance forest diversity and complexity. Ease edge-effect, increase connectivity between older forest stands that result in greater interior forest habitats. Increase wind-firmness.	Prioritize important habitat for T&E <sup>1</sup> species and younger stands along roads that connect existing older forests. Highest priority along the ridges accessed by roads 3405, the 117 spur off of 3409 and 3409. Consider risk of blowdown, especially adjacent to large openings.

<sup>1</sup> Threatened and Endangered Species  
*Marys River Watershed Analysis*

What	Why	Comments
Precommercial thinning (wide spacing/ 50 tpa) of young stands to promote late seral forest conditions.	Place acres on a trajectory to grow into marbled murrelet habitat with wide spacing of trees.	The best murrelet habitat today grew in very widely spaced conditions at a very young age. This treatment would duplicate those conditions.
Plant trees, enhance coarse woody debris levels, increase forage base and encourage natural regeneration.	Restore diversity and complexity, especially in riparian areas for non-game species and provide winter forage species for big game.	Consider role of red alder vs. conifers within riparian areas, use coarse woody debris standards for pieces/acre, and take advantage of naturally occurring understory for forage production.
Manual release and brushing.	Control unwanted vegetation.	Aggressive brush invades disturbed areas or areas where conifers are widely spaced.

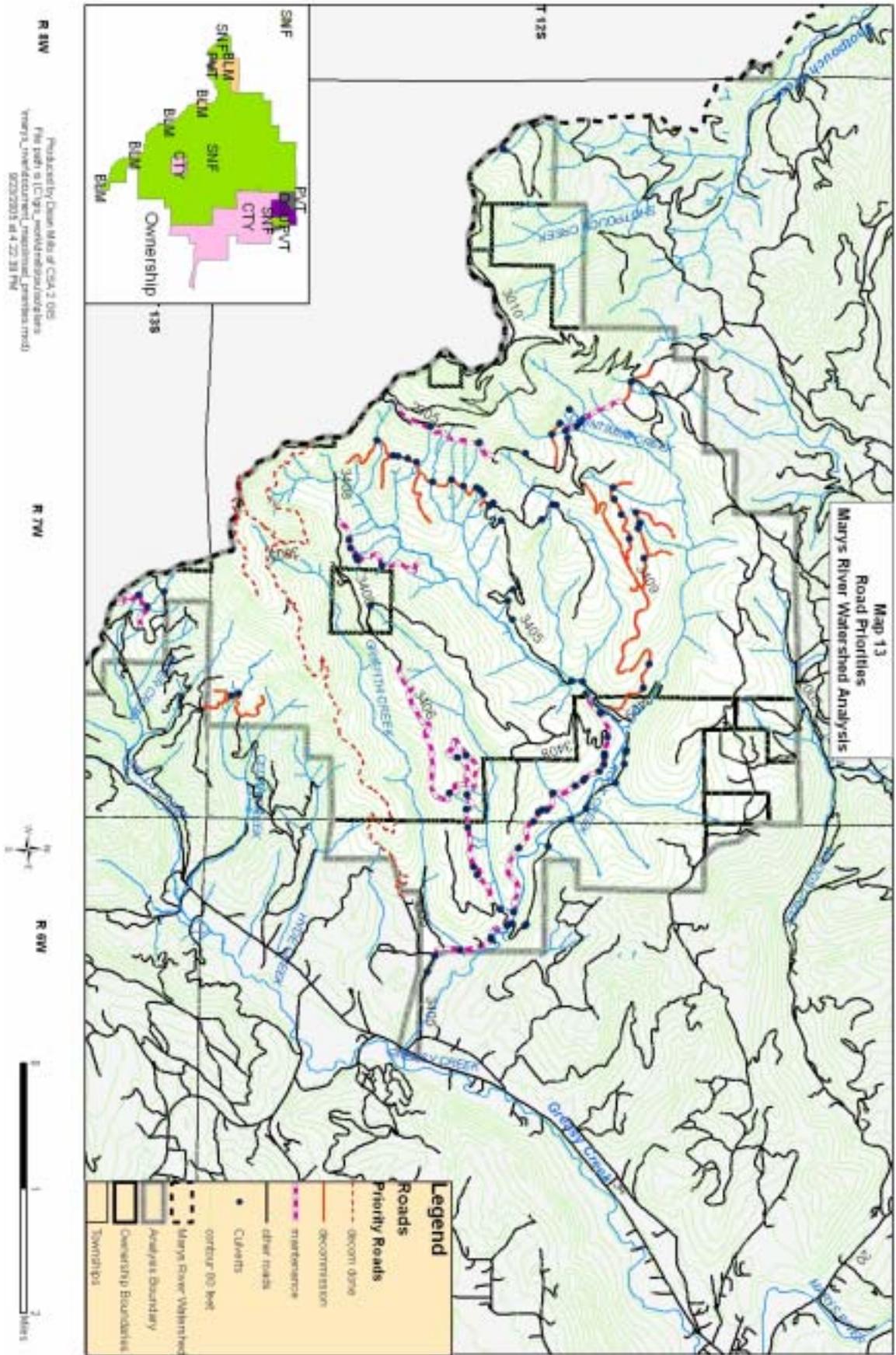
### *TERRESTRIAL HABITAT AND ROAD MANAGEMENT*

Road decommissioning and maintenance have been identified for some roads as a high priority. Wildlife restoration of some stands has been identified as a high priority. By blending these two priorities, it becomes evident that a number of plantations adjacent to roads identified for decommissioning are not high priority for wildlife restoration. However, if the roads are decommissioned without managing those plantations, it would be either a more costly operation requiring aerial logging or an opportunity lost. Additionally, managing only the stands adjacent to roads identified for decommissioning would forego some of the wildlife restoration that has been identified as high priority. At the same time, there are areas where the two priorities overlap.

Blending these two issues together identifies that the highest priority would be to manage all the plantations adjacent to roads identified for decommissioning and to manage all the wildlife restoration plantations identified as a high priority (Map 14: Combined Opportunities).

### *ISSUE 2: PROTECTION OR ENHANCEMENT OF WATER QUALITY, WITH AN EMPHASIS ON ROAD MANAGEMENT*

Current road management priorities focus the limited maintenance and reconstruction funds on Key forest roads identified in the 2003 Forest Roads Analysis (Map 13: Road Priorities). The Marys Peak Road, which is mostly outside the watershed, and the Woods Creek road are the only roads currently identified as Key roads. Both of those have been reconstructed since 1970. The older road system within the municipal watershed has received very little maintenance and no reconstruction since implementation of the Northwest Forest plan. In 1994 most of the roads within the municipal watershed were heavily water barred in recognition of expected lack of maintenance. Roads 3405, 3406, 3408 and 3005 were not water barred. Road 3005 has been decommissioned, leaving only 3405, 3406 and 3408 receiving very limited maintenance and periodic patrol by City of Corvallis public works employees. The remaining roads have essentially been untouched since 1994, some are not



currently drivable due to earth beam closures, fallen trees, brush and in one case a failed metal culvert and fill wash out. This lack of maintenance and access raises the priority to stabilize roads not expected to be used for long time periods.

Management opportunities identify roads to be decommissioned or receive maintenance. Decommissioning would include removing culverts, water bar and/or out slope road beds, stabilize fills and cut slopes to reduce the risk of sedimentation due to road failure. Maintenance would include ditch line and culvert maintenance, surface balding, brushing and addition of new surfacing or culverts as needed. Additional details in Appendix B.

**Recommendations**

The following roads listed for decommissioning are prioritized for treatment to remove culverts, water bar and/or out slope road beds, stabilize fills and cut slopes to reduce the risk of sedimentation due to road failure. Roads listed for maintenance are prioritized for need of ditch line and culvert maintenance, surface blading, brushing and addition of new surfacing or culverts as needed. Additional details are in Appendix B as road logs.

Table 7: Roads Listed for Decommissioning or Maintenance

Road Number	Approximate Miles	Treatment listed by priority
3405113 and associated spurs	2.0	Decommission
2005115	0.3	Decommission
Non system road accessed via Starker Forests lands in Section 36	0.5	Decommission
3409. 3409115 and 3409116	5.2	Decommission
2005114	0.5	Decommission
Culvert at mile point 1.2 off Marys Peak Road 3000	Single Culvert	Decommission
2005 in the vicinity of Bluff springs and Chintimini Creek	2.5	Maintain, replace culverts as needed
3405 in the segment paralleling Rock Creek	3.5	Maintain, replace culverts as needed
3406 above the Middle Fork of Rock Creek	2.0	Maintain, replace culverts as needed
3408116	1.3	Maintain, replace culverts as needed
3000111, headwaters of Wells Creek	0.5	Maintain, replace culverts as needed

### *ISSUE 3: PROTECTION OR ENHANCEMENT OF GRASSY BALD AND MEADOW HABITAT*

The grassy balds priorities can be accomplished independently of other priorities. However, plantation restoration thinning can generate funding through trust funds or stewardship receipts for these projects.

With respect to invasive plants and noxious weeds all ground disturbing activities proposed within the watershed must be integrated with the prevention or elimination of invasive plants and noxious weeds.

Fire risk in the meadow, though the hazard and the risk are low, all projects that may increase the hazard or the risk to wildfire should minimize that hazard and risk.

#### **Recommendations**

Management recommendations to prevent further encroachment into Marys Peak grassy bald habitat include the following:

- Prevent further loss of grassy bald habitat. Stabilize ecotones. Restore meadow habitat where feasible.
- Prioritize ecotones to reduce tree encroachment, based on scenic, recreation, and ecological values as well as operational constraints.
- Minimize ground disturbance in the grassy balds that would accelerate tree establishment or invasion by non-natives. This may address road, facilities, and trail maintenance.
- Eliminate tree islands within the meadows that alter wind and snow patterns, understory vegetation and litter layer, while providing seed sources.
- Experiment with techniques for ecotone maintenance, for example: clipping seedlings, removing saplings, pruning branches of edge trees, or using prescribed fire.
- Experiment with techniques for recovery of native meadow vegetation after trees in islands or along edges is removed.
- Survey and address any long-term impacts of earlier trail or temporary road systems (e.g. in Trek meadow) that pose continued threats to desired meadow condition.
- Survey periodically for invasive species in or near the Scenic-Botanical Area.
- Access suitability of Marys Peak meadows for establishing a population of silverspot butterflies. Survey the extent and abundance of *Viola adunca* in meadow communities on Marys Peak and evaluate management such as mowing that could be anticipated for maintaining butterfly habitat against overall meadow management goals.
- Maintain noble fir-western hemlock forest so that noble fir continues to dominate, and Douglas fir does not become well-established in the stands above 3500' elevation.

### *ISSUE 4: PROTECTION OR ENHANCEMENT OF FISHERIES AND AQUATIC SPECIES HABITAT*

Management opportunities to enhance fish and aquatic habitat include improving fish passage at five barriers that prevent upstream fish movement into the upper reaches of the watershed. Two of these barriers are water intakes for the City of Corvallis. The other three are culverts that prevent fish passage. Restoration of fish passage at the North Fork Reservoir dam should be considered a long-term objective. Additional opportunities to enhance fish and aquatic habitat include stand management to control stocking levels within the Riparian Reserves to the topographical break of the inner gorge to accelerate the development of large diameter trees adjacent to streams. See Table 8 for fish passage improvement priorities.

Table 8: Corvallis Watershed Area of the Marys River Watershed, Priority Improvements for Fish Passage.

Priority ranking	Road	Culvert	GIS layer culvert number	Condition of Culvert	Bankful width	Culvert Width	Drop at outlet	Stream gradient above culvert	Miles of Habitat upstream	Comments
1	3405	South Fork Rock Creek Intake Weir						1%	1.5 miles of good habitat, 0.6 miles of fair habitat	The weir has a marginal fish ladder that is difficult for fish passage.
2	3405	Griffith Creek Weir		Good	17	5 ft	0	3%	2.0 miles of good habitat	Weir is 5.5' high with no fish passage.
3	3405	Middle Fork Rock Creek		Good	14	5 ft	4.5	1.50%	1.7 miles of good habitat, .6 miles of fair habitat	Cobble/gravel stream bottom. Found 1 fish above the culvert. Large scour pool at outlet, where the stream turns sharply to the right (looking downstream).
4	3405	Connection Creek (2 culverts side by side)	3041	2 pipes are side-by-side, One pipe is completely filled with sediment.	12	3 ft	1		0.8 miles of good habitat	
5		Griffith Creek culvert on Road 3405	3090	Good	17		1	1.00%	2.6 miles of good habitat	The inlet has a large, steel-beam, arrow-shaped trash rack. There is a large pool at the outlet, no drop.

### **Recommendations**

Fish habitat restoration recommendations are listed by major tributaries:

#### *North Fork Rock Creek*

No fish habitat restoration recommendations. Restoration of fish passage at North Fork Reservoir dam should be a long-term objective.

#### *South Fork Rock Creek and tributaries*

- Improve fish passage at the South Fork water diversion structure by improving upstream fish access to the lower steps in the fish ladder. This structure is a partial migration barrier to steelhead and resident cutthroat trout impairing access to 3.4 miles of occupied fish habitat.
- Replace the culvert at Road 3405 and road/stream crossing on unnamed tributary south of Connection Creek with a stream simulation structure to restore access to 0.7 mile of occupied fish habitat.

### *Middle Fork Rock Creek*

- Replace the culvert at road/stream crossing Road 3405 with a stream simulation structure. The existing stream crossing structure is impairing upstream anadromous and resident fish access to 1.9 miles of occupied fish habitat.

### *Griffith Creek*

- Improve fish passage at the water diversion structure at River mile 1.2 restoring anadromous and resident fish access to 2.8 miles of occupied fish habitat.

The fish and aquatic habitat priorities can be accomplished independently of other priorities. However, plantation restoration thinning can generate funding through trust funds or stewardship receipts for these projects.

## *ISSUE 5 PREVENTION AND CONTROL OF INVASIVE NON-NATIVE PLANT SPECIES*

A number of non-native plants are known to occur in the Marys Peak area and are likely present in the Watershed. The degree to which management efforts should be directed at control and possibly eradication of these species vary greatly. Creeping bentgrass (*Agrostis alba* var. *alba*), colonial bentgrass (*Agrostis tenuis*), oxeye daisy (*Chrysanthemum leucanthemum*), cats-ear (*Hypochaeris radicata*) and sheep sorrel (*Rumex acetosella*) have naturalized and are very prevalent. Attempts to control or eradicate these species from anything but a very small area would be futile. False brome (*Brachypodium sylvaticum*), on the other hand, is a more recent arrival to the Watershed, has proven to be extremely invasive, and is adapted to growing in partial light conditions under a forest canopy. Without aggressive intervention, the potential exists for native forest understory communities to be converted to false brome. Some species may be well established elsewhere, but still at relatively low levels within the Watershed and efforts should be made at control. These species include meadow knapweed (*Centaurea pratensis*), Himalaya blackberry (*Rubus discolor*) and Dalmatian toadflax (*Linaria dalmatica*).

### **Recommendations**

Management of invasive plant species should focus on prevention; limit ground disturbance to the extent possible and avoid the introduction of seed and plant parts through erosion control materials, seeding mixes or on equipment and control; use all the tools available to control and, if possible, eradicate all new invaders and any invasive species that pose a serious risk to native vegetative communities within the Watershed.

Road decommissioning and stand treatment must consider the presence of invasives or noxious weeds and develop a strategy for treatment. Research is needed to understand the spread of false brome in vegetation types and elevations.

## *ISSUE 6: MANAGEMENT OF FIRE HAZARD AND RISK*

Fire hazard and risk is very low within the analysis area. From a fire management perspective the exclusion of human presence through road closures aids in the elimination of unwanted fire ignitions. On the other hand, elimination of roads reduces access for fire control vehicles, personnel and equipment. The consequences of road elimination would generally be minor due to the infrequency of fire ignitions. Thinning of stands to wide crown spacing where tree crowns are spaced 20 feet or more apart would reduce crown fire spread under normal weather conditions. Slash created from thinning activities poses a hazard for three or four years after thinning unless it is treated. Due to low ignition risk slash is generally left to decompose except along main roads and wildland-urban interface boundaries.

### ***Recommendations***

Management opportunities to manage for fire risk and hazard are essentially in place. Most of the watershed is closed to the public, eliminating the most probable cause of fires. An additional management opportunity is fire hazard reduction adjacent to Connors Camp through thinning and disposing of the slash. Forest Roads 3405, 3406 and 3408 provide sufficient access.

### ***RECREATION OPPORTUNITIES AND RECOMMENDATIONS***

Unauthorized recreation use, such as: user created trails and Off Road Vehicle use, has the potential to compromise the ecosystem and increase the fire risk. Additional signing and continued enforcement is recommended.

Overstocked young stand of trees adjacent to Connor's Camp presents a fire hazard and risk.

### ***Recommendations***

- thinning and treating of slash.

### ***PARTNERSHIPS***

The opportunity for partnerships with the Marys River Watershed Council, the City of Corvallis, the Salem District Bureau of Land Management, Oregon State University, private land owners and others to manage the landscape may exist.

### ***Recommendations***

- investigating partnership opportunities.

### ***COMBINED OPPORTUNITIES***

The analysis team considered the Issues and Key Questions and looked at them holistically with regard to all resources. Opportunities to address priorities at the same time or in concert were identified (Map 14: Combined Opportunities).

