VI. RECOMMENDATIONS

VI. A. General Recommendation by Resource Area

VI. A. 1. Soils/Geology

The physical attributes of the Wall Analysis Area were analyzed in response to questions about the relative sensitivity of the area to resource management activities, mainly ground disturbing, and about the sustainability of upland vegetation in response to timber harvesting activities and roading. As applicable, answers to these questions are followed by brief management advisories including: Level 1 heads Up **(L1HU)** -- subwatersheds whose attributes indicate extra consideration is advisable in developing suitable management strategies because of high sensitivity rating; Level 2 Heads-Up **(L2HU)** -- subwatersheds where ground-based harvest entry is more likely to increase detrimental soil conditions beyond standards and would require post-harvest rehabilitation; Management Alert **(MA)** -- subwatersheds where existing conditions indicate the highest area (%) where past harvest has likely resulted in detrimental soil conditions that exceed standards; where treatment is advised or excessive road densities should be addressed. Advisories also include general comments where management actions or projects are indicated by the conditions found.

The following subwatershed specific recommendations were incorporated into the "Integrated Subwatershed Specific Recommendations" (Section VI. B.):

-- Road rehabilitation priorities are higher for SWS's 24B, 24C, 24E and 26B

-- Increase subsoiling to reduce soil compaction, aid hydrologic function, and improve establishment and growth of tree regeneration (SWS 25B highest priority, followed by SWS's 24D, and 26F). On Figure 15 (Section VII. M.) is a broad guide to locations where 40 percent is likely detrimentally compacted and needs treatment, and soils generally meet criteria for acceptable results. On site verification of conditions is necessary and monitoring of results is desirable. The on-site review of compacted conditions should look for slope limitations and other possible logistical limitations. (Include Fig. 15 in Projects section)

-- Shallow soil revegetation/rehabilitation is needed (coordinate w/ botany and range) in SWS's 24A, 24F, 25A, 26A, 26B

-- Investigate opportunities to subsoil in feller-buncher logged lodgepole areas; there are likely opportunities to remove compaction and improve tree growth, plus there may be a double opportunity to improve growth if mechanical thinning is compatible with ground conditions.

Monitoring

-- To help define temperature potentials -- There is limited data available on groundwater (springs) temperature; Heppner District has a good start on such monitoring and those efforts should be continued and expanded, even to get supplemental point-in-time observations at critical dates of the hydrologic timetable. (SWS's with higher groundwater temperatures will be harder to keep below the guidelines for fish-bearing waters.)

-- Monitoring the effects of prescribed landscape burning should include changes in composition of ground cover vegetation and the amount of soil erosion cover - stratify monitoring efforts by PAG's - (coordinate with soils, botany and range).

VI. A. 2. Aquatic/Riparian Habitat

Recommended Amendments to the Forest Plan

a. Recommended Change of Riparian Management Objective:

PACFISH (appendix C page 3) allows for modifications of Riparian Management Objectives based on local geology, topography, climate, and potential vegetation (generally in the context of a watershed analysis). Given that even after years of riparian logging and grazing, the majority of stream reaches in the Wall Creek drainage still contain more than 30 pieces of large wood per mile, it seems clear that the Wall Creek watersheds are capable of producing at least this quantity. Since more large woody debris would improve fish habitat, a recommendation to upgrade the RMO seems in order. Based on the data available, 30 pieces of large wood per mile should be an easily reached objective over the long term and 40 would be appropriate as an average for a subwatershed. The standard eastside PACFISH dimensions of 12 inch minimum diameter and 35 ft. minimum length would be appropriate for this wood.

b. Fishing access goals:

The Umatilla National Forest Land and Resource Management Plan (the Forest Plan) states on page 4-8, third paragraph, that "The opportunity to catch fish will have increased" based partly upon "better access from roads." Given the effects of roads upon stream channels and aquatic habitats, plans to construct more roads in or leading to riparian areas does not seem wise. At present and in the foreseeable future, it seems much more likely that best management practices will continue to include reducing the amount of roaded area on the Forest, especially in riparian areas. The Heppner Ranger District has already begun closing and obliterating some roads. It seems appropriate at this point to recommend deletion of the phrase "better access from roads" from page 4 - 8, paragraph three of the Forest Plan.

Specific recommendations:

1) Reference and refuge reaches.
Some of the Wall Creek RHCA's have been identified as important wildlife travel/migration routes (Boula, 1995, pers. comm.). Among these narrow strips of land are several which have also been singled out as aquatic habitat reference reaches or refuge areas. These are: Little Wilson Creek and Upper Skookum Creek (stream survey reach 5, from about T6S, R27E, S3, 1/16SE, 1/4SE to headwater springs). Because of their dual function, these RHCA's merit special protection, including somewhat wider RHCA's.

2) Middle Skookum Creek from about ½ mile below the confluence with Hog Creek to the mouth of Alder Creek has water that is nearer to PACFISH RMO's than most other reaches and appears to have good potential for restoration. This reach might merit special management consideration as both a wildlife travel/migration corridors and restorable aquatic habitat.

3) Additionally, the upper part of reach one and the lower part of reach two of Swale Creek, although containing very warm water, has cooler water both above and below. This stream would be a good candidate for special restoration efforts to improve stream shade, maintain late season flow and decrease width/depth ratios.

4) Alder Creek also has some of the coolest water in the Wall Creek watersheds and with a little protection and/or restoration could probably meet PACFISH RMO's for temperature. It also would be a good place to focus restoration efforts.

5) Very recently, large adult trout (11 inches in length) which are thought to be redbands (Mullner, 1995. pers. comm.) were found in Upper Porter Creek (upstream of highway 207). These were found well upstream of previously known extent of fish in Porter Creek. If these fish are redband trout, it would be well to provide some special protection and or restoration for this stream segment.

In most of the above cases (items 1 - 5), restoration should include measures to increase shade, stabilize stream banks, increase fish cover and reduce management introduced sediment. These would have to be long term projects and might include activities such as planting of over-story, mid-story and under-story species in areas where they are deficient and giving them protection from excessive grazing so they can provide streambank stabilization, fish cover and shade to the stream.

6) New allotment management plans (AMP's) for the Tamarack-Monument and Hardman allotments have recently been prepared. These plans address some of the recommendations given above. The new AMP's should result in less degradation of the riparian areas than past management practices. Enforcement and monitoring of the new management plans will be very important to ensure their thorough implementation and to evaluate their effectiveness in achieving RMO's.

7) The Tamarack-Monument and Hardman allotments cover only part of the Wall Creek watersheds. Continuing degradation of aquatic and riparian habitat in the remaining part of the watershed will not be arrested unless livestock management in that portion is also addressed without delay.

8) If streams and riparian areas outside of the Tamarack/Monument and Hardman allotments are to recover to the point of meeting PACFISH RMO's, livestock access to streams must be further limited. Fencing is one method of accomplishing this. For fencing to be effective, it must be regularly inspected and maintained. If budgets, personnel and priorities are not directed towards inspection and maintenance, fences will prove expensive but not effective.

9) Obliterating and blocking some roads may help, as livestock use some old roads along and leading to streams which are no longer drivable by motor vehicles.

10) In areas in which there are large numbers of dead trees 100 or more feet from the stream because of the recent budworm infestation, it may be feasible to fall some of them in ways which limit access to the stream, perhaps by blocking roads and trails. Since cattle are capable of circumventing many such obstructions, this would not be a panacea, but might be an effective use of some budworm killed trees in some cases. In most cases trees which are near to and leaning towards the stream should be left to fall on their own.

11) Since stock ponds that trap headwater springs can contribute to increased stream temperatures, it would be appropriate to re-evaluate livestock water developments. Consider replacing some stock ponds with troughs located outside of the riparian area and which could be fitted with float valves or overflow return devices so that water not consumed by livestock could be reserved for instream uses?

12) The number and distribution of water developments (stock ponds) might also be re-evaluated. During a quick tour of the area late this summer, it appeared that in some areas water developments were common and close together. Data on the distribution and numbers of water developments were not available at this writing. Cattle were commonly observed using the streams, but seldom (actually never) the water developments.

13) The increase in stream temperature caused by Bull Prairie Lake might be minimized by drawing water for the outflow from the bottom rather than the surface of the lake. It appears that the dam was constructed with provisions for drawing water from the bottom of the lake. It may be feasible to do so for the purpose of water temperature control. If this is possible it could help to keep temperatures cooler well downstream. District personnel believe that sediment delivered to the lake by Wilson Creek and Bull Creek has significantly reduced the water depth in the lake and there has been some discussion of dredging the lake to deepen it. Deepening the lake would probably also increase its cool water storage capacity and in conjunction with drawing of water from the deeper portions, could help maintain a cooler water supply to Wilson Creek downstream of the dam. Dredging operations during a time when water was not flowing over the spillway (or by briefly lowering the water level prior to initiating dredging operations) should not cause sedimentation problems.

14) Access and travel management plans for the Heppner district include closing some roads. Many are already officially closed. This is an important step towards reducing the sediment introduction into streams. Because of the topography of the Heppner Ranger District, some officially closed roads are still easily accessible to four wheel drive vehicles and are reportedly used by motor vehicles. Where possible, more effective road closures would, over the long term, further reduce the sediment load to streams.

15) Both open and closed (but not obliterated) roads must be well maintained in order to avoid production of sediment which could be damaging to stream habitat. Heppner District personnel have documented locations of specific road repairs needed. Implementation of these repairs will help prevent further degradation of streams.

16) Cool water production and sediment trapping:
The northern parts of subwatersheds 26B, 26C and 26D contain the headwaters of Bear, Alder, Skookum and Swale creeks. This area is a cool, high elevation environment with good potential for production of cool water. There are a number of meadows in this area which are used as cattle pasture. The banks and substrate of these streams are composed almost entirely of very fine (sand/silt size) particles and are easily broken down by trampling. Although some of these streams seem stable and well vegetated, others appear to be eroding their banks at an accelerated rate. Some have been downcut or are in the process of downcutting. A cattle exclosure has been constructed on part of one of these streams (upper Dry Swale Creek). This should help with reestablishment of vegetation and perhaps sediment trapping to help aggrade the stream channel.

Cool Water production for the downstream environment could be enhanced by any management activities which maintain a higher water table in these meadows later into the summer season. A possible method of accomplishing this and also reversing downcutting might be re-introduction of beavers to the area. Dams constructed by beavers could trap sediment, aggrade the channel and detain cool water at the higher elevations for augmentation of late season stream flows. This could help mitigate one of the most serious habitat deficiencies (late season high stream temperatures and low flows) of streams in the Wall Creek system. Alternatively,

judicious installation of log weirs/dams in conjunction with more restriction of cattle access might serve a similar function. Even simple introduction of large wood to the stream channel could help, especially if done in conjunction with restriction of cattle access.

VI. A. 3. Watershed

Many appropriate actions for management of the Wall watershed to improve watershed conditions have and are being implemented on the National Forest. These include changes to livestock grazing allotment plans, delineating riparian buffers in timber sales, minimum standard road construction, and habitat improvement projects. These measures have and will continue to provide for improvement of conditions. Establishing the effectiveness of these and other measures, and identifying reasonable goals are still, however, important matters for investigation. Given the limits of a physical system challenged by a harsh climate, the residual effects of past management, improvement in the physical components of Wall Creek will continue to be slow. For example, stream channels respond over time frames of 100's of years, with the effects of the last major storm event, probably 1964 or 1974, still evident. Given the current status of water quality, which is defined broadly as including the chemical, physical, biological, and habitat condition of streams in the Wall watershed, additional measures to improve conditions are warranted.

Collectively, the best available technologies for control of nonpoint source pollution are called Best Management Practices, or BMP's. They are the most practical and effective means for prevention or reduction of pollution to levels compatible with water quality goals (MacDonald, 1991). These include administrative decisions, preventative measures, and restorative actions. The process is not complete until monitoring establishes BMP effectiveness. Some specific recommendations have been compiled by subwatershed and are included in the Wall Ecosystem Assessment. The strategy of the Ecosystem Assessment was to interweave issues, and prioritize recommendations by subwatershed. The following are intended to augment those recommendations.

Watershed Inventories

For non fish-bearing streams, generally Class IV streams, begin **integrated riparian-stream channel surveys** using interdisciplinary teams and existing vegetation and channel classification systems. Apply findings in project planning (silvicultural, range, fisheries, recreation, etc.) and as part of watershed restoration project design. Initiate **coordinated watershed restoration inventories** by priority watershed, to identify restoration needs and develop projects.

Monitoring

Maintain temperature recording thermographs on key tributaries in Wall Creek. Analyze years of record for variability and trend. Assess the effectiveness of livestock exclosures. Assess the effectiveness of instream structures. Develop an interdisciplinary team to write a study plan for the South End Hydro study, based on findings from the Wall Ecosystem Analysis.

Coordination

Participate in the NFJD Basin Council. Communicate the results of this analysis, and management actions that may result, internally and externally.

Restoration

Restoration planning must be placed in context of the North Fork subbasin which has high priority for restoration in the state of Oregon. Improvements in Wall Creek would be consistent within this larger framework. The Water Quality Limited status of The North Fork John Day River, and the existing condition of Wall Creek further warrants the development of a comprehensive watershed restoration plan for Wall Creek. Elements of the plan should include the following as general guidelines, following additional recommendations provided in the Wall Ecosystem analysis report.

Roads - reduce road densities in priority subwatersheds, remove streamside roads, improve crossings (armor fords or replace with bridges or culverts), "upgrade" roads for the future: move towards low maintenance roads that disperse surface flow, minimize road erosion.

Riparian areas and stream channels - maintain riparian exclosures, plant appropriate species such as Torrent sedge (*Carex nudata*) in lower Wilson Creek, lower Wall Creek, and lower Little Wall. Evaluate ponds for alternative watering systems. Evaluate Bull Prairie reservoir for alternative discharge through base outlet.

VI. A. 4. Forest Vegetation - example treatments by PAG

The general objective of the recommendations made in this report is to change the vegetative composition of the stands within the Wall watershed toward a sustainable ecological landscape with less departure from natural ecosystem composition, structure, and function. Specifically, if there is departure between the two, opportunities exist to generate the appropriate composition and structural classes to fill the deficit classes. These opportunities could move an existing stand into another structural/species matrix that is currently deficit for that particular DCPAG, or accelerate the growth of earlier structure classes to fill voids in the later ones. There are many choices to be made, each has different effects, costs, and ecologicial returns. From the HRV classification standpoint, possible opportunities may include any of the following:

1. Change species composition of an existing stand such that it "fits" into the correct species composition successional pathway for that site. This type of prescription could, for instance, remove ABGR that is invading a PIPO PAG site. This prescription may include a light underburn for the early structural stage, a precommercial thin for the early/mid structural stage, and a commercial thin for the later structural stages.

2. "Grow" more stands within specific PAG's to correct deficit structural stages. In contrast to the above, this would be an investment that would not be realized until the structural stage advances into a currently deficit category.

3. Maintain/improve the health of existing stands. This type of prescription might involve prescribed burning. It would assist in accomplishing changes in species composition, or reduce fuel loading to lower the risk of catastrophic fire.

Some example treatments would include: 1) Remove fir on ponderosa pine sites to reduce the component of fir and provide conditions for pine regeneration; 2) Thin from below to promote growth of later structural stages; 3) Selective overstory removal to promote understory growth; and 4) Burn for stocking control to preserve existing composition/structure classes. Specific prescriptions for each of the DCPAG's are included in the "HRV Report", Section VII. R., p. 18.

VI. A. 5. Fire, Fuels, Insects, Disease

Each subwatershed in the Wall Watershed Analysis Area was evaluated and placed in a ranking of high, moderate, or low as a priority for fuel treatment needs. This was accomplished by estimating the number of acres in each fuel treatment priority divided by the number of acres of Forest Service managed lands in each subwatershed. The number of acres treated by prescribed fire was also considered in developing the ranking. The following subwatershed specific recommendations were incorporated into the "Integrated Restoration Recommendations by SWS (Section VI).

The following subwatersheds are considered to have a high need for fuel treatment in order to mitigate large fire potential.

- 26C (Alder/Upper Skookum) – Seventy-five percent priority 1 acres, sixteen percent priority 2 acres.
- 26D (Swale) – Thirty-nine percent priority 1 acres, thirty-three percent priority 2 acres.
- 24B (Middle Big Wall) -- Twenty-one percent priority 1 and sixty-seven percent priority 2 acres. Forty-six percent of the area has been underburned.

The following subwatersheds are considered to have a moderate need for fuel treatment and or reintroduction of fire.

- 24C (Upper Big Wall) – Sixteen percent priority 1 and seventy-eight percent priority 2 acres. Thirty-seven percent of the area has been underburned.
- 26B (Bear) – Fourteen percent priority 1 and sixty percent priority 2 acres. No prescribed fire use.
- 26F (Hog) – Thirteen percent priority 1 and seventy-seven percent priority 2 acres. Forty-six percent of the area has been underburned.
- 24E (Upper Wilson) – Seven percent priority 1 and seventy-one percent priority 2 acres.
- 24A (Lower Big Wall) – Seven percent priority 1 and seventy-six percent priority 2 acres. Thirty-four percent of the area has been underburned.
- 25B (Upper Little Wall) – Eighty-two percent of the area is priority 2 and only six percent has been underburned.
- 26A (Lower Skookum) – Six percent priority 1 and eighty percent priority 2 acres. Thirty-four percent of the area has been underburned.

The following subwatersheds are considered to have lower priority for treatment than the previous areas, however, if opportunities arise fuel treatment is still very desirable.

- 24F (Lower Wilson) – Twelve percent of the area is priority 1 and fifty-eight percent is priority 2. Forty-four percent has been underburned.
- 25A (Lower Little Wall) – Eighty-six percent of the area is priority 2 and thirty-seven percent has been underburned.
- 24D (Porter) – Seven percent is priority 1 and forty-three percent is priority 2.
- 24G (Indian) -- Four percent in priority 1 and eighty-five percent is in priority 2. In this subwatershed the grand fir has not encroached into the pine as much as in other subwatersheds.
- 25C (Bacon) -- Ninety-two percent is priority 2 and fifty-eight percent has been underburned.
- 23C (Fern) – All private land. Little if any opportunity for fire hazard reduction.

General Recommendations

Budworm damaged stands

Traditional timber harvest and fuel treatment methods will provide a very limited benefit to the Alder/Upper Skookum and the Swale subwatersheds. In these watersheds, spruce budworm damage is very extensive. Small harvest units will do little to reduce the potential for fire spread except in those areas that are actually treated. Fires can easily spread around or go beyond treated areas by spotting. There will also be an increased risk of prescribed fire escapes in the harvest units due to the high fuel loading outside the harvest areas. If the units are not large and are not treated effectively, fire will undoubtedly spread around the treated areas anyway. The concept of a fuel break system is not likely to be effective unless the fuels breaks are very wide (in excess of 500 feet). A patchwork of large (greater than 40 ac.) units tied in with natural breaks and/or previous harvest areas could be designed. There will, of course, be an increased risk of fire resulting from the prescribed fire use. Larger units can help to reduce the perimeter requiring holding and thus reduce the potential for escape (if the same number of acres are treated). The lodgepole pine grouping is less extensive (except in the upper northeast corner) and can be treated much like the cool grand fir in this area.

Riparian Buffers

Riparian areas and buffers pose a difficult problem for the management of fire and fuels. Generally these areas are very productive sites and generate higher fuel loadings than areas adjoining them. They are also more moist so generally do not support frequent light underburning. They pose a problem not unlike the cool grand fir PAG in that they tend to burn less frequently and more intensely. This happens during dryer than normal fire seasons. When this occurs, the impact to the riparian zone can be considerable. These areas also provide a network that connects many of the other plant associations and as such can be the wick that carries fire even through otherwise treated areas. This is especially true in the Wall watershed where many of the drainage's are oriented with the prevailing wind.

If light harvests and treatments are not feasible, another alternative is to allow fire to play a more natural role in these systems as part of activities on the uplands. For example, while treating a harvest unit near a riparian zone, a buffer fire could be allowed to burn back from the harvested area into riparian buffer. This minimizes the need for control lines paralleling the stream and could allow for a mosaic to develop in the buffer along the stream. Low intensity fires generally cause minimal damage to live vegetation, especially those conducted in the spring when the soil and duff is still damp. During the spring generally only the 3-inch or smaller fuels should be available for burning, which should leave large logs and other debris within the buffers. Since we are developing a mosaic, it is important that enough of the riparian area is treated so that fire will have difficulty moving up or down the stream. A prescription should call for flame lengths less than 4 feet in height and those less than 2 feet would be preferable.

Specific Priorities for Fuel Treatment:

Priority 1 Fire Hazard Reduction Areas:

In developing priorities for treatment, the plant groupings and the budworm damage level was used. The stands with the highest need of treatment to reduce fire hazard are stands which have sustained high budworm rating regardless of plant association. These stands show the highest

potential for large stand replacement wildfires and will remain in that condition until they burn or are treated. These areas are the most prone to fires that could significantly impact vegetation, soils and watershed conditions. Treatments must be sensitive to the soils. Treatment should include reduction of some dead and downed material as well as stocking level control. With the existing high fuel loading, significant damage could occur to the soil if burning prescriptions are not well planned and implemented. A preferred method would be to use some utilization scheme to reduce fuel loading prior to treatment by fire. Planting of the native shrub and tree species would speed the re-establishment.

Areas classed in the ponderosa pine PAG that show some level of budworm damage: These are stands of ponderosa pine with an existing component of grand fir. These areas historically had frequent low intensity fires. The potential for frequent high intensity fire now exists. Treat by using fire after timber utilization where practical and economic. The fire intolerant species will be damaged or reduced in stocking by the use of fire, however, the surviving ponderosa pine should provide for a seed source for regeneration. This will help develop a multi-aged stand while reducing the risk of destructive fire. Periodic burning on a 15-year cycle will help maintain the stand.

Priority 2 Fire Hazard Reduction Areas:

Ponderosa PAG that have little or no fir or that have fir and little or no budworm damage, have a moderate need for treatment: These stands have not progressed as far as those identified in priority 1. Generally underburning can be used effectively. Underburning can provide for natural thinning of the pine while removing fir and young juniper while regenerating grasses, forbes and other native species. Shelterwood removal of the grand fir, with a shelter of ponderosa pine retained, followed by underburning is the preferred treatment.

Stands of warm grand fir that have been impacted by the budworm at a low level: These sites were once dominated by ponderosa pine and will be subject to more intense fires if allowed to move to a fir-dominated stand. Focus should be on the removal of down and dead as well as stocking level control and reduction of shade tolerant species. In these stands, utilization of the fir, if possible, should take place first followed by well planned and carefully implemented underburning. These stands have not had significant fuel buildup yet, thus low intensity burning is possible. Fir can be reduced or eliminated over time and ponderosa pine returned to a dominate role. Fire potential over time will be reduced.

Juniper encroachment into ponderosa stands, warm grand fir and the grass steppes is a major problem in this watershed. As mentioned earlier, once established, juniper resists wildfire and treatment by prescribed fire. Reduction of juniper encroachment has been identified as a priority from an ecological need, as opposed to a concern of fire risk. Juniper greatly alters the vegetation once it becomes established. In young stands (up to 6 feet in height) prescribed fire can be used very effectively to control stocking levels. Prescriptions will generally call for a sufficient amount of cured grass in order to carry the fire and reduce costs. This may require restriction in grazing the year prior to treatment. It may be necessary to slash (cut down) some juniper in order to provide fuel to kill the remaining juniper. Cutting and burning the following spring has also proven effective where the risk of escape is high. Fire wood programs have also proven effective in some areas as a means of controlling stocking of larger juniper trees.

VI. A. 6. Botanical - Juniper, Restoration Plants

Integration

Several issues related to vegetation and floristic biodiversity have been identified as a result of Watershed Team integration.

Plant Ecological Issue #1: Juniper Encroachment

Western Juniper, *Juniperus occidentalis*, encroachment is occurring into plant association groups that would not ordinarily support that species. The juniper encroachment problem is most severe in the Steppe Plant Association Group, next most severe in the Ponderosa Pine Plant Association Group, and next most severe in the Warm Grand Fir Plant Association Group. There are many possible explanations for juniper encroachment but all of them seem related either directly or indirectly to fire suppression. A map is provided (Figure 1 of Section VII. U.) which was re-constructed from on-the-ground experience and which shows areas of the Wall Creek Watershed in which juniper encroachment is considered to be problematic (from a botanical perspective).

The normal (i.e., natural) habitat of Western Juniper is crevices in rimrock associated with basaltic fracture zones. This habitat occupies approximately 4,686 acres of the Wall Creek Watershed (polygons 1 through 9 on the map provided). Areas in which unusually large populations of Western Juniper have been encountered during sensitive plant surveys are shown in polygons 10 through 20 on the Juniper encroachment map. The approximate area of the "encroached juniper" is 6,696 acres.

The most plausible explanation of juniper encroachment, particularly into the warmer and drier plant association groups, is **fire suppression**.

Grazing has contributed to a reduction in severity of fires by reducing fuel loads (grasses), particularly in the steppe plant association group.

Continued juniper encroachment will probably result in a diminished floristic biodiversity of the steppe plant association group since many of these species are shade intolerant. The juniper encroachment problem exacerbates the larger issue of diminished habitat for native species. Reintroduction of fire into the Wall Creek Ecosystem may provide an effective means of resolving this ecological problem.

Plant Ecological Issue #2: Stabilization of Highly-Erodible Shallow Soils

The issue of highly erodible soils on steep slopes presents a rare opportunity for the District and the Agency to use a formerly-listed sensitive plant species, the transparent milkvetch (*Astragalus diaphanus diaphanus*), in restoration activities that will stabilize such soils. The roots of this annual to biennial member of the Pea Family (Fabaceae) harbor Nitrogen-fixing microorganisms. Because of this symbiotic relationship, this species could be used as a "workhorse" plant species to simultaneously enrich and stabilize the thin soils of the Upper Big Wall (24C), Middle Big Wall (24B); Lower Wilson (24F), Lower Big Wall (24A), Indian (24G), and Lower Little Wall (25A) subwatersheds. The northernmost geographic distribution of this species is apparently reached within the southern subwatersheds of the Wall Creek Watershed. A map showing the areas (zone) in which the Transparent Milkvetch could be used to stabilize thin, highly-erodible soils on steep slopes is provided in Figure 2 (page 22 of the Floristic Biodiversity Report).

Plant Ecological Issue #3: Increasing "At Risk" Willow Species and Using Them in Riparian Restoration

There are other opportunities to increase populations of the willow species that were on the final list of "at risk" species in the Wall Creek Watershed. Guidelines for exact placement of willow transplants to ensure greatest probability of success are dependent upon microsite conditions. In general, willows prefer an open canopy a low stream gradient, and a relatively broad floodplain. This combination of environmental factors occurs on the **lower reaches** of almost all of the stream courses in the Wall Creek System. The use of willows to stabilize streambanks and to reduce water temperatures is one of many ways in which native plant species can be put to "work" in resolving environmental problems. **The Heppner Ranger District is already working to increase and protect riparian shrub species. Riparian restoration efforts along the main stem of Wall Creek are evidenced by significant regeneration of severely hedged plants.** Figure 3 (of the Floristic Biodiversity Report) shows streams with suitable microsite profiles for successful willow regeneration. The "willow" zone continues off the map to the middle reaches of Swale Creek.

Plant Ecological Issue #4: Suitable Vegetation for Stream Channel Stabilization

The use of another "workhorse" native plant species to achieve streambank stabilization in low-gradient streams below approximately 3,200 feet in the Wall Creek system is proposed. **Torrent Sedge (*Carex nudata*)** is an important species of the waterways of the Wall Creek Watershed and the North Fork John Day River Watershed System. This species can be multiplied by removing plugs from the centers of parental clumps. These plugs can be "increased" in a nursery or transplanted directly to a new location. They can also be stored for short durations under cool temperatures to allow removal and reintroduction. Depending upon the timing of the transplanting operations, leaves may or may not be pruned to reduce transpiration stress. This sedge is most effective in gravelly soils at the edge of a **permanent** stream channel. Figure 4 (of the Floristice Biodiversity Report) shows streams with microsite potential and suitable elevation for using the Torrent Sedge in riparian restoration and rehabilitation.

VI. A. 7. Old Growth/RHCA Network

Riparian Management Recommendations:

PACFISH S&G's call for no timber harvest or firewood cutting in RHCAs except for salvage from catastrophic events, for example insect damage, such as the spruce budworm infestation that has occurred in some riparian areas in the NE portion of the Wall watershed. The S&G's also call for silvicultural practices in RHCAs to meet riparian management objectives. The key criteria for the appropriateness of salvage and silvicultural activities in RHCAs is to be consistent with meeting riparian management goals, to be undertaken in areas where risks of effects that are counter to achieving riparian management goals are minimal, to have clear advantages over other alternatives (i.e., riparian recovery through natural processes), and to be treated as experimental until there is evidence to support their effectiveness. An experimental approach requires that activities be carefully designed and monitored, and that they be undertaken on a small scale until their effectiveness can be determined. It should also be acknowledged that catastrophic events, such as fire, insect outbreaks, and blowdown from windthrow, are natural processes that also have beneficial ecological functions (e.g., creating snags, input of large woody debris to streams).

In the Wall watershed, consideration of existing conditions suggest that salvage would be most appropriate in riparian areas where fir has encroached into fire-resistant community types, and additional culture of conifer and perhaps hardwood species may be needed in RHCAs where past timber harvest activities have altered the vegetative composition. Analysis of proximity of harvest units to streams can be used to identify potential areas for these treatments.

Data from utilization surveys and livestock exclosures indicate that hardwood growth and recruitment has been suppressed from grazing by both livestock and big game. Fish and other riparian-dependent species evolved with deer and elk, but the present high big game levels may be slowing riparian recovery under current degraded conditions, and the combined impacts of large numbers of big game and livestock has been substantial in some locations. Protection of specific, known problem areas, via game-proof fencing, may be an appropriate restoration approach in the short term. Restoration attempts should include monitoring: a relatively simple technique for assessing the relative levels of damage attributable to livestock or wild ungulates would be to place video cameras in unfenced areas adjacent to fenced areas.

The risk of possible impacts of wildfires to streams must be weighed against the risks associated with possible impacts and uncertainties of treatments to reduce fire potential. This situation is complicated by high stream temperatures, the precarious status of some species, and the resulting reduced resiliency of those species and their habitats to buffer the effects of some disturbances like fire. The conclusion of this analysis was that the risk of potential detrimental effects to riparian management objectives of harvest treatment alternatives outweigh the risks of potential intense fire activity impacts to riparian areas.

A sizeable portion of the Wall Analysis Area has been subject to prescribed underburning over the last decade. Additional underburning is recommended. Fisheries and watershed mitigation requirements for these burns should include: 1. use of natural fire breaks, roads, and blacklines and avoidance of tractor-created firelines to minimize soil disturbance and sedimentation; 2. limiting underburning in RHCAs to ponderosa pine community types on class 4 streams and the outer zone of the RHCA (i.e., > 150 ft. from the stream) for Class 1-3 streams; and 3. other wet habitats (e.g., ponds and springs) should be protected with no-burn buffers.

Old Growth Management and Restoration

Past manipulation of old growth stands in the Wall drainage has resulted in reduced viability and increased vulnerability to drought, insects, disease and wildfire. The likelihood of intense fire is high in some areas (blocks 9 and 11), while in others, the proportion and distribution of existing old growth is insufficient to provide long-term suitable habitat. In many blocks, current plant community composition is inconsistent with the area's HRV. Restoration needs and opportunities in the old growth blocks were prioritized based on a step-wise series of ecological and silvicultural considerations (see Specialist Report V for details).

Three network blocks were chosen as examples of how silvicultural treatments might be implemented to enhance the sustainability of existing old growth, and speed development of "new" old growth. Details of those prescriptions are found in Section VII. W.

VI. B. Integrated Subwatershed Specific Recommendations

General Concerns/Recommendations:

Concerns:

Concern about accuracy of data dictionary layer, particularly noted to be inconsistent for CABGR, JUOC, PICO.

Apparently regeneration problems contribute to high percentage of very early forest structure and low proportion of early structure.

Reliability of data in general, was a concern. In particular the GIS "dd layer" as used for identifying Plant Association Groups.

Road closure and obliteration within RHCA was not a primary issue in development of the district Access and Travel Management Plan (7/92), thus additional road closures and rehabilitation have been proposed.

Recommendations:

ALL RECOMMENDED RESTORATION TREATMENTS NEED FIELD VALIDATION.

In some areas, stock pond developments seem excessively dense. Since these ponds often contribute to higher water temperature, we recommend this be evaluated with objective of reducing ponds that contribute to elevated water temperature (refer to fish report, needs coordination with presuppression planning).

Review ATM plan against recently mapped roads within RHCA, identify road closure, obliteration, or improvement needs for SWS. (Note: a cursory effort in this regard was conducted by the ecosystem analysis team and some recommendations have been identified by SWS. Road obliteration recommendations from the Hardman and Tamarack/Monument AMS/AMP lists were reviewed and highest priority roads were identified. Priority identified roads should all be reviewed for compliance with PACFISH standards RF 1-5.

The following concerns and recommendations are a synthesis of information from individual specialist reports and the resource attribute matrix. The recommended restoration treatment priority order by SWS is: 26c, 26b, 26d, 25c, 26f, 25b, 24b, 26a, 24a, 24f, 24d, 24g, 24c, 25a, 24e. Note that SWS 26c, 26f, 26a, 24a, 25a, and 24e (in that order) are also highest concern for protection of high value water quality and vertebrate biodiversity values.

Table 26. Synthesis ranking of subwatershed level of concern by major resource category.

Resources Category	SWSs w/Low Concern	SWSs w/Moderate Concern	SWSs w/High Concern Poor Condition	SWS w/High Concern Good Condition
Hydrologic Functions and Processes		25a; 24e	24a, b, c, d, f, g; 25b, c; 26b, d	26a, c, f
Fish Habitat	24e	24f; 25a, c; 26a, b, c, d, f	24a, b, c, d, g; 25b	
Forest Vegetation Sustain	25a; 24c, e	26a; 24a, b, d, f, g	26b, c, d, f; 25b, c	
Fire Hazard Reduction	24g, d, f; 25a, c	24a, c, e; 25b; 26a, b, f	24b; 26c, d	
Juniper Encroachment	24e; 26c, d	24 b, c, d, g; 26b	24a, f; 25a, b, c; 26a, f	
Botanical Biodiversity	24d; 25a, b; 26b, c, d, e, f	24b, c, e, g; 25c	24a, f; 26a	
Vertebrate Biodiversity	24b, c	24d, e, g; 26d	24f; 25b, c; 26a, b, c, f	24a; 25a
Old Growth Habitat	24b, c	24d, e, g; 26d	24a, f; 25a, b, c; 26a, b, c, f	

Table 27. Summary of SWS Concern Levels by Major Issue

Issue	SWS w/Low Concern	SWS w/Mod Concern	SWS w/High Concern
Veg Sustainability	24c, e; 25a	24a, b, d, f, g; 26a	25c; 26b, c, d, f; 25b
Fish/Water	24e	24e; 25a; 26a, b	24a, b, c, d, f, g; 25b, c; 26a, c, d, f
Terrestrial Biodiversity	24b, c	24d, e, g; 26d	24a, f; 25a, b, c; 26a, b, c, f

26A LOWER SKOOKUM

Concerns:

VS	Highest percentage of very shallow soils of all SWSs.
VS/TBV	HRV - low in late/old, high in middle structure,
WQF	Although lower third of SWS is roadless, stream survey indicates cattle impacts to riparian area are still a concern.
WQF/VS	High concern for overall potential erosion from steep slopes and very shallow soils that have limited erosion cover.

Recommendations:

TBB	Maintain Skookum grazing exclosure long term, to protect unique vegetation reference condition.
TBB/VS	Use *Astragalus* for restoration of erodible sites (shallow soils with low veg cover).
TBB/VS	Lower third of SWS concern for juniper encroachment (treat by underburn) reference K.Urban juniper encroachment map.
TBV/WQF	Retain roadless area character to maintain value as bull elk security area, multiple value of old growth block 8.
VS/TBV	Recommend promote development of late/old structure from middle for stands north of roadless area, within old growth block #8.
WQF/TBB	Opportunity to plant at risk willow species for stream restoration in lower third of SWS.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

26B BEAR CREEK

Concerns:

VS	Only SWS outside HRV for all structure stages.
VS	Extremely low for late/old structure, high proportion of very early.
WQF	Relatively low road density within RHCA implies much of the cause of poor fish habitat conditions is due to livestock or old logging which is not indicated from current road data.
WQF	Highest upland road density in Wall Analysis Area, disproportionate to acres of past harvest,

Recommendations:

TBB/VS	Good opportunity to treat and control juniper by underburning, before it gets too big to control, within lower two-thirds of SWS.
VS/TBV	Highest priority treatment of middle structure accelerate development of late/old should be within old growth network (block 10).
WQF	Controlling cattle access to creek should be high priority (example: as an inexpensive alternative to fencing, dropping wood adjacent to creek to block roads and livestock trails could be done to reduce cattle access).
WQF	Good opportunity for upland road rehabilitation following timber harvest. Obliterate and rehab Road 2200-128.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

26C ALDER/UPPER SKOOKUM CR.

Concerns:

TBV	East Fk. Alder, ODF&W concern for elk security.
WQF/TBB	Protection of high elevation wet meadows.
WQF	High level of sediment in streams in this SWS even though riparian road density is relatively low; geology and soils have inherently high erodibility.
WQF	NW portion of SWS (within old growth block #9) - has sizable representation of unstable geology.
WQF	Grazing - RHCA protection needed from livestock (observed impacts include problems of bank stability, width/depth ratio; sediment contribution and loss of riparian vegetation.
WQF	Livestock damage is retarding achievement of PACFISH riparian management objectives.
WQF	Seventh highest SWS for ECA/Roads.
WQF	Along Road 2107, down cutting has lowered water table of wet meadows; since these sites are of highest value for retaining cold water for later summer release, protection from grazing should be prioritized here.

Recommendations:

VS	Recommend underburning PPine and Juniper PAGs after fuel reduction effort in NE and after Hydro Study Plan is developed. (southern most portion of SWS)
VS	Recommend addressing HRV (PAG) and fuel concern in NE 1/3 of SWS - (area between old growth blocks 9 & 11 and outside connective corridors). Any harvest of dead trees within connective corridor 9/11 should be consistent with RHCA direction and old growth network objectives (see Section VII. R., Table 10).
VS	Limiting harvest treatment blocks to 40 acres and less is not recommended outside of old growth/RHCA network as this would have limited value in reducing fuel risk.
VS/TBV	Vegetation Sustainability Objective - Highest priority to move WABGR toward seral. – CABGR - manage toward seral species (use appropriate seral species for the PAG - avoid "universal P-Pine"). CABGR climax is highly valued for wildlife habitat, management toward seral species should be near the low end of HRV. Lodgepole - lowest priority for treatment of the PAGs in this area.
WQF/VS	No treatment of forest vegetation recommended within old growth block #9 until development of hydrology study plan is completed.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

WQF Modify grazing practices to enable movement toward attainment of PACFISH RMO (std. GM-1).

WQF Priority roads for obliteration (review and field check against PACFISH std. RF 1-5), 2107-040 from 042 junction and 042, 043. No additional road building. Obliterate Roads 2100-132, 090 (from M.P. 49 to Sec. 17).

WQF/TBV Reintroduce, establish beaver population where habitat allows.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

26D SWALE

Concerns:

WQF	High elevation meadows, unique habitat and valuable for cold water storage.
TBV	North 1/3 of SWS has a high concern for bull elk security, thus lower priority for forest vegetation treatment.
VS	Late/old structure for the SWS within HRV, too much very early, too much middle structure.
WQF	Lower Swale riparian in better condition than Upper. Roadless condition likely reason (cows were observed in RHCA within roadless area).
WQF	Third highest SWS for ECA/roads.

Recommendations:

WQF	Protect high elevation meadows.
TBV/VS	Within OG network recommend managing mid structure toward late/old particularly within middle third of SWS (north of Skookum Roadless Area)
VS/WQF	Opportunity to increase willow (use at risk species, refer to Botanical Biodiversity Report) in lower third of SWS; after providing protection from livestock, plant and protect willow.
VS	Lower half of SWS PAGs that would benefit from underburn (high priority for this treatment).
WQF	Need to obliterate roads within RHCA in middle and upper portions of SWS.
TBV	Only C2 land allocation of mature old growth lodgepole in Wall A.A. - retain as wildlife habitat uniqueness.
WQF	Highest priority road for closure or review of PACFISH standards within the SWS is: 2100-070.
WQF	Review Road 2100-090 for possible closure (not recommended in ATM Plan) or at least reduction of impacts to Swale Creek. Check compliance with PACFISH standard RF 1-5.
WQF	Reintroduce, encourage beaver into northern portion of SWS.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

26F HOG

Concerns:

TBB/VS	Juniper encroachment.
VS	High departure of HRV species composition and structure stage, early middle only structure within HRV.
WQF	High in unstable geology, related to poor stream substrate condition.
WQF	Sixth highest in ECA/roads.
VS/WQF	Low in late/old structure, what's left is in RHCA, needs to be left there.

Recommendations:

TBB/VS	Underburning in lower half of SWS for juniper encroachment and PPine protection.
VS/TBV	High priority relative to Wall, for moving middle structure toward late/old.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

25A LOWER LITTLE WALL

Concerns:

TBB	Juniper encroachment beyond normal habitat.
TBV	Key winter range for elk and mule deer, thermal cover limiting (added advantage of light underburning would be forage improvement on big game winter range).
TQF	Pool frequency not as good as data indicates since pools identified from survey were predominantly recently developed structure (concern about longevity of constructed pools).
VS	500+ acres of existing potential detrimental soil condition.
VS	One of highest SWS for steep slopes and very shallow soils.
VS	Outside HRV on early, early middle, and middle structure stages; too much middle, not enough early or early middle.
WQF	Lower portion of SWS, high road density within RHCA, and total road miles in RHCA, **highest of all** in Wall SWSs.
WQF	Gullying problems within Lovelett Creek.

Recommendations:

TBB/WQF	Opportunities to use: 1) Willows in suitable microsites; 2) Astragalus in suitable microsites to stabilize erodible soils; and 3) Torrence sedge in suitable microsites.
TBB/VS	Continue underburning - juniper encroachment priority within steppe, then PPine.
TBV/WQF	No harvest entry into roadless area.
VS	Moderate priority for forest vegetation structure treatment, low priority for species composition.
WQF	Plant willows and fir for short and long-term shade and wood recruitment.
WQF	Review Roads 2202-019, 023, 027 for needs to rehab and meet PACFISH standards.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

25B UPPER LITTLE WALL

Concerns:

VS	Second highest percentage of very shallow soils (27%)
VS	High concern for HRV departure, very low in late/old structure.
VS	Highest percent detrimental soil condition (third of SWS), compaction beyond standard (high juniper encroachment)
WQF	Highest SWS for overall RHCA road density, over 30 percent of Class I and II RHCA stream miles have roads.
WQF	Second highest SWS for ECA/roads.
WQF	Mass wasting concern noted in stream survey (reach 3).
WQF	Headwaters - blow out of last rehab effort, still major concern for stream stabilization (T.7S., R.27E., Sec. 4 NW1/4, Grant Co.)

Recommendations:

TBB/VS	Need selective pretreatment of old juniper particularly within steppe communities.
VS/TBV	One of highest priority SWS for moving middle structure ("way over"") to late/old structure, priority should be within old growth block 6.
WQF/TBB	Opportunities in lower third of SWS for stabilizing stream channels with torrent sedge and highly erodible soils with Astragalus species.
WQF	Consider cable system for mid story removal of middle structure from under old trees; minimize soil damage; repair past damage.
WQF	Obliterate roads within RHCA, Road 2122-085. Rehab to PACFISH standards Roads 2122-040 and 080.
WQF/VS	Highest priority SWS to treat existing detrimental compaction (1300+ ac. Reference M.Geist report).

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

25C BACON CREEK

Concerns:

TBX	South end of SWS, high value for bull elk security within old growth block #7.
VS	Large acreage of juniper encroachment into PPine (K.U. map).
VS	WABGR - too much middle structure, not enough late/old.
VS	HRV - Very low in late/old, very high middle, very low on early, very high on early and mid structure.
WQF	High riparian road density (7th highest Class I and Class II in Wall A.A.). Third highest overall for RHCA road.
WQF	One of the most heavily livestock damaged creeks in the analysis area. Streambank damage, low in pools, sediment.
WQF	High road density on uplands as well as riparian.

Recommendations:

TBB	Pretreatment of mature juniper (up to 50-70%) needed in some areas. (See Fire/Fuels report)
VS	Treat for departure from HRV (species composition and structure)
VS	High priority treatment of WABGR and PPine (150 ac.) to seral.
VS/TBB	Continue underburning in WABGR, Juniper, PPine, grass steppe.
VS/TBV	Within old growth network, treatment should be moved from middle structure toward late/old, outside old growth network would be appropriate to move middle structure toward early/very early within guidance of timber sale screens.
WQF	Closed and rehabilitate riparian roads. This will have dual benefit of reducing access to streams by livestock (recommend obliterate or block roads to restrict cow access).
WQF	Highest priority road to be reviewed for rehabilitation (PACFISH RF standard compliance) include 2202-090 and 080.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24A LOWER BIG WALL

Concerns:

TBB	Large vulnerable populations of Washington monkeyflower.
VS	Moderate priority for underburning.
VS	Highest percent of area with potential to incur mass failures.
VS	Road 23 contributing sediment and stream temperature problems.
WQF/TBV	Little Wilson portion of SWS high value as fish and wildlife habitat refugia.
VS/WQF	High combination of steep slopes and very shallow soils - ties to riparian stability need.
WQF	Water temperature is main concern but Little Wilson is in relatively good shape.
	SWS overall moderately outside HRV, high in middle structure.

Recommendations:

TBB/WQF	Opportunity to use torrent sedge in appropriate micro sites for stream channel stabilization. (Floristic Biodiversity Report)
TBB/WQF	Opportunity to use *Astragalus* species to restore highly erodible, shallow soils.
TBB/WQF	Opportunity to increase population of (at risk) willows within riparian exclosure.
VS	Recommend no timber harvest on Little Wilson portion of SWS.
VS/TBB	Recommend no harvest entry within old growth blocks at this time.
VS/WQF	Grazing management emphasis.
WQF	Protect Little Wilson Creek, high value as refugia habitat.
WQF	In order to comply with PACFISH standards, relocate Road 23 and follow with stream restoration.
WQF/VS	Minimize road construction due to slope stability concerns.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24B MIDDLE BIG WALL

Concerns:

WQF Data indicates 90+% of area logged at least once, thus high probability of additional harvest entry exceeding standards for detrimental soil condition.

WQF High total road density, third highest RHCA road - density in Wall Analysis Area for Class I & II streams.

WQF High road density on Class IV (eighth highest SWS for overall RHCA road density, but fourth highest for Class IV streams).

Recommendations:

VS Good opportunity to underburn ponderosa pine PAG, south aspect to Willow Spring Creek.

VS Late/old structure is within HRV, recommend management of portions of middle structure toward early, and very early EM structure (regen harvest opportunity within PPine PAG north of old growth block #3, outside of RHCA).

VS/TBB Within old growth block #3 treatment of middle structure WABGR toward late/old PPine.

WQF/TBB Use *Astragalus* species to restore highly erodible soils in Willow Spring Creek.

WQF Livestock exclosure has been breached, resulting in recent damage to regenerating alder, remove cows and repair exclosure fence.

WQF Opportunity to used dead trees to restrict livestock access to Happy Jack and Dark Canyon Creeks to improve fish habitat. Retain shade as first objective.

WQF Highest priority roads for obliteration are: 2300-112 and 2309-040 (selected from Tamarack Monument road obliteration list, in RHCA).

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24C UPPER BIG WALL CREEK

Concerns:

VS One of highest probability SWS for creating more detrimental soil condition (soils impacts map) with new logging entry.

WQF Riparian concerns in S. Fk. Wall Creek due to grazing, new Tamarack Monument AMP should help.

WQF Fish habitat condition one of highest concern SWS.

WQF Recognize it will be a long time before grazing management improvements recently initiated (T/M AMP) result in substantial improvement of RHCA condition.

WQF Across all stream classes, fourth highest RHCA road density in Wall Analysis Area.

WQF Active gullying occurring on some riparian roads, i.e., Road 2402-060, Keating Creek gullies..

Recommendations:

VS Low priority for Forest vegetation treatment in the near future, no further harvest in near future.

VS Recommend underburn of S aspect to S. Fk. Big Wall (note the general recommendations for burning in RHCA from Fuel/Fire Report).

VS Good SWS to use *Astragalus* for soil stabilization (see Botanical Biodiversity report)

WQF/VS Aspen, alder, and yew good species to use for shade development since willow not appropriate due to stream gradient.

WQF Recommend the following roads for highest priority for obliteration (selected from Tamarack Monument Road obliteration list). These roads have been identified because they parallel streams within RHCA and in some cases have parallel roads on both sides of stream: 2402-020, 030, 070, 080 and 2300-060 and have accelerated erosion rates. Fix gullying problem on Road 2402-060.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24D PORTER

Concerns:

VS	High priority for silviculture exam (existing species composition) due to departure from HRV (early structure is only one outside HRV)
VS	Low priority relative to spruce budworm.
VS	One of higher percentage existing detrimental soil conditions for treatment.
VS	Low priority for fuel treatment.
WQF	Redband trout recently identified (sensitive species).
WQF	Large portion of stream on private land, thus no (stream survey) information available.

Recommendation:

WQF	Stream layer needs updated, several miles recently identified as Class II that are currently mapped as Class III.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24E UPPER WILSON

Concerns:

TVB	Wildlife and Floristic Biodiversity could be adversely affected by proposed dredging of Bull Prairie Reservoir.
TBB	Noxious weeds tansy ragwort has been introduced from recreational traffic.
TBB	Northern most population of Washington Monkeyflower within Wall A.A.
VS	The only SWS with only one structural stage within HRV (i.e., very early).
WQF	ECA/roads are fifth highest SWS in Wall, also fourth highest SWS for total road density.
WQF	Second highest SWS for road density within RHCA.
WQF	Upper portion of SWS has high percentage of John Day geology related to substrate problems noted in stream survey (sediment production high).
WQF	Exotic fish (brook trout) species, planted in Bull Prairie Lake have migrated up and down stream, which could hybridize with redband (sensitive) trout.
WQF	Bull Prairie Reservoir contributing to water temperature problem, however, also has positive influence as sediment trap.
WQF	Consistency between recreation use (plan) and PACFISH standards.

Recommendations:

TBB/TBV	Increase aspen in appropriate microsites.
VS	Lowest priority for harvest treatment regarding HRV structure.
VS	Moderate to low priority for harvest treatment regarding species composition.
WQF	Road rehabilitation for non-mainline roads in RHCA and on uplands.
WQF	Review options to change flow pattern from Bull Prairie Reservoir; outflow from bottom of reservoir (cool water outflow) by seasonal adjustment of drain pipe.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24F LOWER WILSON

Concerns:

TBB	Noxious weed explosion of hound's tongue.
TBB	Vulnerable, non-riparian populations of Washington Monkeyflower.
VS	Late/old structure low, high middle structure.
VS	High probability of adding to detrimental soil conditions.
VS	Higher percentage of steep slopes and very shallow soils, relative to other SWS.
VS	Moderate departure HRV.
VS/WQF	High previous harvest, three-fourths of acres have had one entry (99% of area has had timber harvest).
WQF	Riparian road density fifth Class I & II and sixth total.
WQF	Shade problems on streams.

Recommendations:

TBB	Monitor grazing impact on Washington Monkeyflower.
TBB	Eliminate use of non-native species in seeding prescription.
TBB	Opportunity to use willows, *Astragalus*, and torrent sedge in appropriate microsite (southern third of SWS).
WQF/TBB	Recommend planting alder within exclosure and beyond in middle third of SWS.
VS	Manage portion of middle structure to very early and portion (within old growth block #1) toward late/old.
WQF	Update stream class map, recent findings of steelhead spawning well up into mapped Class III portion.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue

24G INDIAN

Concerns:

TBB	Moderate juniper encroachment problem.
TBB	Vulnerability of Washington Monkeyflower populations to grazing and seeding prescriptions with non-native grasses.
TBB/TBV	Small remnant aspen stands in poor condition.
VS	High priority regarding HRV departure (outside all structures except very early), low on late/old, early; high on middle.
VS	Overall this SWS is a low priority for harvest entry regarding WABGR.
VS	Higher concern for adding to detrimental soil conditions - 99 percent had timber sale activity; 86 percent had only 1 timber sale
WQF	Second highest Class I & II roads in RHCA.
WQF	Grazing impacts on Class I stream, potential to protect cool water of Indian Creek.
WQF	Fourth highest for ECA/roads.

Recommendations:

TBB	Seed with natives.
VS	Opportunities to use *Astragalus* species in stabilizing erodible soils.
VS/TBB	Moderate priority for underburning for species composition.
WQF	Monitor impacts of grazing to riparian habitat.
WQF	Priority roads for obliteration and rehabilitation #2400-224 and 199 (on Indian Creek within RHCA).
WQF	Use Little Wilson as model for riparian vegetation restoration.

* Existing species composition is appropriate for "PAG".
* Inconsistent information from fuel report, seems to be due to assumption (incorrect in this SWS) that WABGR PAG has PSME/ABGR on it. In this case, predominant existing condition is seral species currently on site.

TBB = Terrestrial Biodiversity Botanical Issue
TBV = Terrestrial Biodiversity Vertebrates Issue
VS = Vegetation Sustainability Issue
WQF = Water Quality and Fish Issue