**BEFORE THE OFFICE OF THE REGIONAL FORESTER**
**REGION ONE – USDA FOREST SERVICE**
**Appeals Deciding Officer**

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| **SWAN VIEW COALITION** | ) | |
| Appellant | ) | |
| | ) | **NOTICE OF APPEAL** |
| v. | ) | **PURSUANT TO** |
| | ) | **36 CFR 215** |
| **CHIP WEBER** | ) | |
| **FLATHEAD FOREST SUPERVISOR** | ) | |
| Responsible Official | ) | |

**DECISION APPEALED:**
Griffin Creek Resource Management Project Decision Notice and Finding of No Significant Impact (hereafter Project, DN and FONSI)
Chip Weber, Flathead Forest Supervisor, September 25, 2012

**APPELLANT:**
Swan View Coalition
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406-755-1379
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October 26, 2012
Keith Hammer — Date
Chair

Swan View Coalition is a non-profit conservation organization dedicated to conserving water quality and quiet, secure habitats for fish, wildlife and people on the Flathead National Forest and greater Flathead River Basin. Our members use these areas for recreation, employment, wildlife viewing, photography, research, education, aesthetic enjoyment, spiritual rejuvenation, and other activities. We submitted comments on the Griffin Creek Resource Management Project EA and remain concerned that the Project and DN/FONSI will harm water quality, fish, wildlife, and our members' interests.

We incorporate by reference the appeal submitted by Friends of the Wild Swan in this matter and our 1/13/12 letter commenting on the EA.

## RELIEF REQUESTED

Rescind the DN and FONSI for the reasons stated below and prepare an adequate Environmental Impact Statement that addresses the deficiencies raised in this appeal. Redo the 2012 Griffin Creek Travel Analysis to adequately assess the short- and long-term costs of building and maintaining a minimum road system that is truly sustainable in light of realistic budget expectations and all standards, goals and objectives for the maintenance of water quality, fish, wildlife, and other resources.

## STATEMENT OF REASONS

**Executive Summary:**

The EA and DN cite the Griffin Creek Travel Analysis (TA), yet the Project Purpose and Need does not include any statement about moving the Project area towards the minimum road system (MRS) required by the Travel Management Rule (36 CFR 212.5). This although the TA, at 1, states "the Griffin Creek Resource Management project . . . will begin the environmental analysis under the National Environmental Policy Act." The EA is inadequate and an EIS is required that puts the Project within the context of what is needed to arrive at the MRS and sustain it, including the amount of appropriated and other funds necessary.

In our comments on the EA we noted initial Forest Plan Revision documents in 2004 found "The Flathead National Forest needs $6.2 million each year to maintain its road system, but receives less than $1 million." The Project, however, reneges on prior road decommissioning decisions and will instead increase the road system in the Project area, while losing money on the Project and without identifying how much money is needed to build and maintain the road system it (and perhaps future projects) would establish.

Indeed, the EA at 3-343 states "The purpose and need statement for this project [is] not to generate a positive revenue to the federal treasury," while both the EA and the TA find that appropriated funds are needed to maintain the road system and implement Best Management Practices (BMPs) necessary to limit damage to resources from roads.

How much money is needed to fully maintain the road system, keep current on implementing all BMPs, monitoring BMPs to insure they are effective, and where will that money come from? The EA, DN and TA are silent on this issue, other than to "acknowledge there will be future costs associated with permanent road maintenance" and admit the "Forest Service does not track which roads meet or do not meet BMP standards." (DN at C-3 and C-26).

Similarly, the Forest Service does not apparently know or care to what degree the road system is interrupting subsurface water flow needed for the "annual recharge of streams" through upwelling. Although alarms are raised about the area's "geomorphic integrity" through the Forest's application of the Inland West Watershed Reconnaissance, the DN simply dismisses the Forest's use of the Reconnaissance as too general while simultaneously failing to provide a better means of quantifying the problem (DN at C-38)!

In short, the EA and DN argue that BMPs applied to permanent roads solve all problems and remove the need for any road decommissioning in the area – while also admitting it does not have the funds to meet all BMPs and does not bother to track where roads do and do not meet BMPs. Similarly, the EA and DN argue motorized access on roads is needed to treat invasive weeds – while simultaneously arguing that roads open to motorized use are the main vector for the spread of those very same weeds!

The Project and the TA were developed as though in a vacuum where fiscal responsibility and reality do not apply. In failing to identify and work towards a fiscally and environmentally responsible MRS, both the TA and Project are left wanting, are arbitrary and capricious, and are in violation of laws and regulations we detail below.

**A. The Travel Analysis, EA and DN/FONSI Violate the NEPA and Travel Planning Regulations**

1. Directives for conducting and implementing the TA make it clear that, while the TA itself is not a NEPA process, subsequent projects in the TA area must provide adequate NEPA to identify the MRS by "the end of FY 2015." (See the 3/29/12 Travel Management Directive from Deputy Chief Leslie Weldon).

2. "Use the travel analysis report to develop proposed actions to identify the MRS. . . Proposed actions and alternatives are subject to environmental analysis under NEPA." (Id.)

3. "The administrative unit must analyze the proposed action and alternatives in terms of whether, per 36 CFR 212.5(b)(1), the resulting road system is needed to [among other things] Reflect long-term funding expectations [and] Ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance." (Id.)

4. "The resulting decision identifies the MRS and unneeded roads for each subwatershed or larger scale. The NEPA analysis for each subwatershed must consider adjacent subwatersheds for connected actions and cumulative effects." (Id.).

5. The DN relies on the TA to support the decision to build roads and not decommission roads in the Griffin Creek watershed: "I chose to build over 11 miles of permanent road, and just over 4 miles of temporary road . . . In addition, the travel analysis process demonstrated a need for future management access. . . Additional information regarding the road network in the analysis area can be found in the Roads Analysis (Exhibit M-1)." (DN at 16 and 29; "Roads Analysis"

is a misnomer because Exhibit M-1 is the Travel Analysis and is properly referenced as such elsewhere in the DN).

6. The TA, at 5, clearly states "This travel analysis is to be completed with the Griffin Creek Resource Management Project Environmental Assessment (EA) analysis."

7. The TA, at 24 and 25, several times defers to the "next NEPA analysis" for the consideration and decision on whether to retain several roads in the MRS, including roads scheduled for decommissioning and "non-system historic roads."

8. The TA, in Footnote 1 of Appendix D, even notes a number of roads as "Identified in Griffin Proposed Action as a temporary road over historic template."

9. The Griffin Creek Project is undeniably the first NEPA project to utilize the TA in its intended area and the DN clearly acknowledges "The minimum or 'right size' road network results from [the] Griffin Creek Travel Analysis." (DN at C-27). Hence the Project EA must, among other things:

a. Include as a part of its Purpose and Need its function as the first NEPA process to consider and identify the MSR.

b. Include a thorough discussion of all recommendations in the TA as reasonably foreseeable actions and connected actions proposed to arrive at the MSR – as well as all other actions needed to arrive at the MSR.

c. Include a broad range of alternatives for determining the MSR.

d. Adequately consider adjacent subwatersheds for connected actions and cumulative effects (for example, the Sheppard Creek and Logan Creek watersheds adjacent to the Project Area, which are listed as "Functioning at Risk" under the Watershed Condition Framework classification (WCF) – though both Squaw Meadows Creek subwatersheds within the Project Area are also rated as "Functioning at Risk" in the WCF). The EA, at 3-122 and elsewhere, instead limits the cumulative effects area to Griffin Creek drainage alone and expressly excludes the neighboring Sheppard Creek and Logan Creek, which also join downstream with Griffin Creek.

e. "[A]ddress public safety and efficiency of operations in an environmentally sensitive manner within the current and anticipated funding levels [as] directed in the FSM 7710 Travel Planning."

10. The EA and DN/FONSI do none of the above, nor does the TA, in violation of the NEPA, Travel Planning regulations and other laws detailed below.

**B. Neither the EA, DN/FONSI nor TA provide an adequate assessment of the funding needed to maintain and manage the current road and trail system, the Project system or the MRS, in violation of the NEPA, Travel Planning regulations, and the Administrative Procedures Act.**

1. Nowhere does the EA, DN/FONSI or TA disclose the funding needed to maintain the current road system, Project sytem or MSR in either the Griffin Creek area or across the Flathead National Forest.

2. Initial Forest Plan Revision documents in 2004, however, found "The Flathead National Forest needs $6.2 million each year to maintain its road system, but receives less than $1 million." (USFS Western Montana Planning Zone; Analysis of the Management Situation; Draft Version 1; 2/23/2004; page 4-2).

3. The TA, at 10, finds "Appropriated funding has not been adequate to accomplish much of the continuing backlog of deferred maintenance and annual maintenance needed to meet minimum safety and water quality standards. Timber sale receipts are helpful in providing funding to meet BMPs on road associated with timber sales but meeting BMPs on other roads is dependent on finding the appropriated funds to accomplish the work." But the TA fails to quantify how much funding is needed, how much has been received in the past, and how much can reasonably be expected in the future – for either the current road system, Project road system or MRS.

4. Moreover, the TA at 15 and elsewhere, finds "Although BMPs are proven practices that reduce the effects of roads to the watershed, it is not a static condition. Maintaining BMP standards for roads requires ongoing maintenance."

5. The DN, at C-3, states "We acknowledge there will be future costs associated with permanent road maintenance." But the TA fails to quantify how much funding is needed, how much has been received in the past, and how much can reasonably be expected in the future – for either the current road system, Project road system or MRS.

6. The EA makes it quite clear that the Project will not provide adequate funding to build and fully maintain either the current road system, Project road system, or MRS. The EA finds that all its action alternatives have a NEGATIVE Present Net Value of between $1 million and $1.5 million, with the largest loss coinciding with the greatest mileage of permanent road construction in Alt. D! The EA concludes "The purpose and need statement for this project [is] not to generate a positive revenue to the federal treasury." (EA at 3-343).

7. Neither the EA, DN/FONSI nor TA provide an adequate assessment of the funding needed to maintain and manage the current road and trail system, the Project system or the MRS. This renders the entire analyses arbitrary, capricious, and an abuse of agency discretion - in violation of the NEPA, Travel Planning regulations, Administrative Procedures Act, and other laws detailed below.

**C. The EA, DN/FONSI and TA, in failing to plan for and implement an affordable and sustainable MRS, also fail to provide for the full implementation of all measures needed to minimize adverse impacts on resources. The laws this violates include but are not necessarily limited to the NEPA, National Forest Management Act, Endangered Species Act, Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, Clean Air Act, and Migratory Bird Treaty Act.**

1. BMPs must be fully implemented to comply with Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, and the Clean Water Act. Yet:

2. The TA at 15 and elsewhere, finds "Although BMPs are proven practices that reduce the effects of roads to the watershed, it is not a static condition. Maintaining BMP standards for roads requires ongoing maintenance."

3. The TA, at 10, finds "Appropriated funding has not been adequate to accomplish much of the continuing backlog of deferred maintenance and annual maintenance needed to meet minimum safety and water quality standards. Timber sale receipts are helpful in providing funding to meet BMPs on road associated with timber sales but meeting BMPs on other roads is dependent on finding the appropriated funds to accomplish the work."

4. The EA makes it quite clear that the Project will not provide adequate funding to build and fully maintain either the current road system, Project road system, or MRS. The EA finds that all its action alternatives have a NEGATIVE Present Net Value of between $1 million and $1.5 million, with the largest loss coinciding with the greatest mileage of permanent road construction in Alt. D! The EA concludes "The purpose and need statement for this project [is] not to generate a positive revenue to the federal treasury." (EA at 3-343).

5. The DN acknowledges "there will be future costs associated with permanent road maintenance" and admits the "Forest Service does not track which roads meet or do not meet BMP standards." (DN at C-3 and C-26).

6. Nor does the Forest Service in general, or the EA in particular, adequately monitor and demonstrate quantitatively that BMPs are indeed effective, in spite of claims that they are.

7. Even with the question of BMP effectiveness set aside, however, it is clear the EA, DN/FONSI and TA fail to identify and secure funding needed to provide for the timely, orderly and continual application of BMPs to all roads in either the current system, Project system or MRS. Nor do they in the alternative arrive at a smaller MRS to which all BMPs can be fully applied continually under current funding levels.

8. The failure to either provide adequate funding to fully maintain the road and road closure system, or to reduce the system to a size that is adequately funded,

also results in unmitigated impacts to other forest resources including but not limited to terrestrial wildlife such as elk, species dependent on old forests and snags out of reach of firewood cutters, and threatened species such as lynx and grizzly bear. And the EA fails miserably to describe the effects of inadequate funding and road maintenance on these and other resources.

9. The laws this violates include but are not necessarily limited to the NEPA, National Forest Management Act, Endangered Species Act, Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, Clean Air Act, and Migratory Bird Treaty Act.

**D. Watershed Condition Framework**

1. Although implementation of the agency's Watershed Condition Framework was launched, in part, by Deputy Chief Joel Holtrop's 10/20/10 directive, the EA some 14 months later does not even mention the Watershed Condition Framework (WCF).

2. In response to our comments on the EA, the DN is elusive if not outright dishonest. In Responses #82 and #108, pages C-27 and C-37, the DN states:

"The Watershed Condition Framework is a new national program being applied on two priority watersheds on the Flathead National Forest. The Griffin Creek drainage is currently not prioritized for application of framework principles at this time.

The WCF proposes to improve the way the Forest Service approaches watershed restoration by targeting the implementation of integrated suites of activities in those watersheds that have been identified as priorities for restoration. . . The Framework does not preclude the construction of permanent roads, either within or outside of priority watersheds."

3. Firstly, by overemphasizing the term "priority," the DN attempts to dismiss concerns over the Griffin Creek watershed because it is not currently subject to a Watershed Restoration Action Plan (WRAP) - as are two others on the Forest; the neighboring Sheppard Creek and the distant Beaver Creek in the southernmost reaches of the Swan Valley.

4. Secondly, the EA and DN fail to even mention that 2 of the 3 sub-watersheds that make up the larger Griffin Creek watershed, Project area and TA area are currently listed as "Functioning at Risk" in the WCF!

5. The WCF Watershed Condition Class Table lists three sub-watersheds comprising the larger Griffin Creek watershed area. Two of them are listed by the same name though it is clear on related WCF maps they are distinct and adjacent to one another and the Upper Griffin sub-watershed.

6. The WCF Table lists the following conditions for the three sub-watersheds for a few of the determining factors and the overall determination of the watershed condition:

| | **Squaw Meadows** | **Upper Griffin** | **Squaw Meadows** |
|---|---|---|---|
| Overall Condition | Functioning at Risk | Functioning Properly | Functioning at Risk |
| Aquatic Biota | Poor | Good | Poor |
| Riparian Wetland Veg | Fair | Poor | Fair |
| Water Quality | Fair | Good | Fair |
| Invasive Species | Fair | Fair | Fair |
| Fire Effects & Regime | Good | Good | Good |
| Forest Cover | Good | Good | Good |
| Forest Health | Good | Good | Good |

7. NEPA, NFMA and other laws require that the WCF and its findings be included in the NEPA Project analysis. The abbreviated table above casts serious doubt on EA findings concerning the health of the Griffin Creek watershed, especially in terms of aquatics and invasive species. And, if the larger watershed is "good" in terms of forest cover, forest health and fire regime, why does the Project focus so heavily on "improving forest stand conditions" and "reducing hazardous fuels to varying degrees across the landscape?"

8. The EA and DN/FONSI fail absolutely to assess the Project within the context of the WCF. They fail to even mention that the two Squaw Meadows sub-watersheds are determined to be "Functioning at Risk" and hence will need to have a WRAP developed. Nor do the EA and DN/FONSI explain why the Squaw Meadows sub-watershed are not receiving a high enough priority to already have a WRAP. Nor do they explain how the Project serves to restore the watershed nor how the Project instead runs counter to restoration and perhaps a future WRAP. An EIS is needed to assure that the Griffin Creek watershed is fully assessed in light of the WCF, cumulative effects that include neighboring and downstream watersheds that are also "Functioning at Risk" per the WCF, and to insure all activities in the watershed are indeed part of an integrated restoration effort.

9. The directives for the TAP and WCF each reference the other and state "The intent is for each process to inform the other so that they can be integrated and updated with new information or where conditions change." (See for example the 3/29/12 Travel Management Directive from Deputy Chief Leslie Weldon).

10. We cannot find, however, where the 2012 Griffin Creek TA report so much as mentions the WCF.

11. As described above, the EA, DN/FONSI and TA are fatally flawed. The laws this violates include but are not necessarily limited to the NEPA, National Forest Management Act, Endangered Species Act, Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, Clean Air Act, and Migratory Bird Treaty Act.

**E. Interruption of Subsurface Water Flow**

1. In response to public comment, the DN at C-37 states "We agree the subsurface hydrology of a hillside can be altered when a permanent road is constructed. However, modern road construction techniques and design have substantially reduced the impacts to subsurface water movement, primarily through the incorporation of large numbers of cross-drains over or under the road surface. Strategically placed ditch-relief culverts and drain dips have substantially reduced the effect of altered water movement on areas downslope of new roads."

2. Spreading once-subsurface water over the hillside so it doesn't transport sediment directly to a stream, however, is not the same thing as returning that water subsurface so that it again upwells in the streambed and serves to recharge it and flush clean its gravels often used for spawning fish. The EA is fatally flawed in continually derailing the issue of interrupted subsurface flow into a discussion of sediment instead.

3. Nowhere does the EA adequately quantify the disruption of subsurface flow through road construction and persistence, no matter how temporary or long-term. To the degree that it does, the EA dismisses its own Inland West Watershed Reconnaissance without substituting a better quantitative assessment. Anecdotal observations simply don't cut the mustard, especially within the context of a continual sidestep into a discussion of sediment instead.

4. The DN, at B-3, similarly fails to even monitor subsurface flow or its interruption.

5. The EA's dismissal of prior, scheduled and future road decommissioning in favor of permanent roads is similarly flawed and based on no quantitative data.

6. The EA and DN/FONSI also fail to explain why newly built temporary roads would be re-contoured while temporary roads built on historic templates would not be re-contoured. (DN at A-12). Is this not an admission that re-contouring is the only credible attempt to return subsurface flow to the subsurface and an acknowledgement that road templates that remain after blocking or minimal "decommissioning" indeed continue to bleed subsurface flow onto the hillside and should be included in total road density?

7. The TA, at 15, finds "Road cuts can intercept and capture both subsurface and surface runoff, which can affect groundwater and annual recharge of streams," but also fails to provide any quantification of the problem and instead dismisses it in recommending new roads and less road decommissioning in Griffin Creek.

8. The EA, DN/FONSI and TA also fail to explain clearly why some roads should be placed into Intermittent Stored Service (ISS) rather than Maintenance Level 1,

other than to claim this would help decrease "open motorized road and trail densities and total motorized access route densities." (TA at 4).

9. The DN, at C-24, does argue "The majority of funds used to maintain the existing road network are spent on Maintenance Level 3, 4 and 5 roads, not Level 1 roads. Is ISS then simply a means to leave road templates on the landscape with no maintenance whatsoever while pretending they have no impacts on hydrology, wildlife, invasive weeds, and other resources affected by total road densities?

10. The EA and DN/FONSI and TA are replete with admissions that many, many roads are simply either gated or bermed shut to cut down on needed maintenance and maintenance costs - as though this takes care of all impacts to the environment, which it does not (TA at 12). And the DN will construct even more roads and simply berm them shut rather than re-contour roads to best address impacts to watershed hydrology and other resources (DN at A-9).

11. The EA and DN/FONSI and TA lack scientific integrity and pursue the same old tired path of trying to keep too large a road system on the landscape. We urge the Forest Service to visit the following web page for a discussion of how road re-contouring can greatly shorten the watershed recovery timeline: http://y2y.net/our-work/updates-from-the-field/ground-breaking-research-in-road-restoration . We also incorporate this and Rebecca Lloyd's pending research papers into the Administrative Record for this appeal and Project.

12. As described above, the EA, DN/FONSI and TA are fatally flawed. The laws this violates include but are not necessarily limited to the NEPA, National Forest Management Act, Endangered Species Act, Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, Clean Air Act, and Migratory Bird Treaty Act.

**F. Invasive Weeds**

1. We rely primarily on our comments on the EA to support our argument about invasive weeds, but we include here more discussion.

2. The TA finds "The most common vector of [invasive weed] spread is human activity involving the motorized use of roads and trails . . . Almost every road, open and closed, in the Griffin Creek Project Area is infested with invasive species. The majority of the roads that are open to general traffic are treated for weeds annually. The historical roads are not accessible and not treated for weeds. Since all roads have a high risk of being infested or already are infested and the Forest Service generally does not make road management decisions related to invasive species, weeds were not included in the decision matrix." Well, that ought to fix the problem!

3. Moreover, the Project will reopen roads closed for good reason in areas infested with tansy ragwort. This is unnecessarily risky and will also harm elk by reducing elk security habitat.

4. The above facts somehow lead to a Project that will increase roads and weeds, in spite of the DN's unfounded claim that it will comply with the NFMA requirement that "Soil, slope, or other watershed conditions will not be irreversibly damaged." (DN at 26). Soil, slopes and a watershed riddled with invasive weeds violates the NFMA - and the Project and TA will make the matter worse, in violation of the NEPA, NFMA, Endangered Species Act, Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone Regulations, Clean Air Act, and Migratory Bird Treaty Act.

**G. Epilogue**

1. It is worth noting that Deputy Chief Joel Holtrop's 11/10/10 directive launching the Travel Analysis Process included the premise and finding that "this process points to a smaller road system."

2. While Deputy Chief Leslie Weldon's subsequent 3/29/12 directive removed these words, the agency cannot escape the fact that its road system is too large, too expensive, environmentally damaging, and needs to be reduced.

3. Indeed, Chief Mike Dombeck in 1998 stated the Forest Service road system was overbuilt and under-funded. With a $10 billion backlog in needed road maintenance, Dombeck stated "Only about 40% of forest roads are maintained to the safety and environmental standards to which they were designed." (Dombeck press release; 1/22/98).

4. The TA, at 14, perhaps understates the matter when it admits "Many time, the road system that is optimal for logging efficiency conflicts with other resource management objectives . . ." Then it goes on pretending all effects can be fully mitigated while proposing a MRS that is optimal for logging efficiency. The EA and DN/FONSI follow suit.

5. Our comments on the EA included a number of citations to research and other sources demonstrating watershed restoration requires fewer roads, not fewer trees. We have since provided a couple letters of comments on other Forest projects and we include them with this appeal because they provide a more complete list of citations (5/1/12 and 6/18/12 comments on the Beaver, Cold Jim and Glacier Loon projects). We also incorporate by reference all of the sources cited in this appeal and the above mentioned letters of comment.

6. The EA, DN/FONSI and TA have stood common sense and the entire process on its head in arguing that it intends to arrive at its "minimum road system" by building more roads and removing none.

May 1, 2012

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|---|---|
| Rich Kehr | Chip Weber |
| Swan Lake District Ranger | Flathead Forest Supervisor |
| 200 Ranger Station Road | 650 Wolf Pack Way |
| Bigfork, MT 59911 | Kalispell, MT 59901 |

Dear Rich and Chip;

This letter is written on behalf of Friends of the Wild Swan and Swan View Coalition. We ask that you include it in the public comment records for the Glacier Loon, Cold Jim, and Beaver Creek projects.

The public is currently being asked to participate in three "collaborative" projects in the Swan Valley. The Glacier Loon, Cold Jim and Beaver Creek projects are located in three adjacent watersheds.

For the first two projects the Forest Service has defined the "purpose and need" very narrowly and prior to involving the public. As we have already learned from our involvement in those projects, the agency's reliance on the narrow purpose and need statements has essentially precluded the inclusion of necessary watershed restoration and road reclamation work.

While the Glacier Loon and Cold Jim projects are being flown under the "collaborative" banner, we find them instead little more than agency efforts to develop a booster club for its fuels reduction logging plans. We find the agency's refusal to include significant road reclamation and watershed restoration work in these two projects and their impaired watersheds to be less than genuine collaboration.

The Beaver Creek Project is in the initial development process. The Flathead National Forest announced it is already considering "restoration" activities such as road decommissioning, rehabilitation of stream habitat and critical wetlands, hazardous fuel reductions, vegetation treatments to improve forest health and resilience to disturbance, restoration of old growth conditions and other actions consistent with the Flathead Forest Plan and the Forest Landscape Restoration Act of 2009.

We wish in this letter to remind the agency of the incredible damage it has already done in Beaver Creek and to the Swan-Clearwater Divide grizzly bear and lynx travel corridor. We urge you to focus this project on road reclamation as the primary means to accomplish needed restoration to the watershed and wildlife corridor, rather than continue the mantra of more logging being the cure for all problems.

Though already designated a grizzly bear travel corridor in the then-new Forest Plan, the Flathead spent $421,000 of "hard" tax payer money in 1985 to build 16 miles of new road in the Sunset Beaver area when its proposed timber sale of the same name failed to receive a single bid in 1984. Moreover, it its zeal to build more roads, the Flathead built one of these roads right on across the Mission Mountain Wilderness boundary and into the Wilderness! This was discovered in 1987 and the Flathead subsequently had to remove the "Wilderness" portion of its new road. Moreover, it then found its environmental documents were inadequate to move forward with the Sunset Beaver timber sale for which the roads were intended in the first place! (See "A Tale of Two Subsidies," available in PDF at http://www.swanview.org/home/articles/reports-documents/a_tale_of_two_subsidies/115 ).

Friends of the Wild Swan and Swan View Coalition believe that there is plenty of damage to the Beaver Creek area from roads and past logging. As will be detailed in this letter, roads remove native vegetation, spread noxious weeds, erode sediment into streams, reduce security for wildlife habitat, damage soils, and are barriers to native fish migration. Logging depletes old-growth forest habitat, damages soils and fragments wildlife habitat.

We oppose building any more roads in the Beaver Creek area, no matter how temporary, and oppose the notion of "improving" old growth forests by logging or thinning within or adjacent to them. We urge you instead to develop a "purpose and need" for Beaver Creek that recognizes road reclamation as the primary means to restore watershed function and reestablish wildlife connectivity. The rationale for our recommendation follows and is based largely in research conducted or collected by the Forest Service itself.

We are also including scientific research and recommendations for maintaining and restoring old-growth forest habitat without logging, as well as scientific research for bull trout/native fish, lynx and soils. We ask that you incorporate this information into your analysis.

**Scientific Findings on Roads and Roadless Lands**

Virtually without exception, science is finding that ecological integrity remains highest in areas that remain unroaded and unmanaged and is lowest in areas that have been roaded and managed. As the density of roads increases, aquatic integrity and wildlife security decreases, while the risk of catastrophic wildfire and the occurrence of exotic weeds increases. The simplest and most cost-effective thing the Forest Service can do to maintain and restore aquatic and ecosystem integrity is to stop building roads and to obliterate in an environmentally sound manner as many roads as possible. This conclusion is supported by the following:

"Areas that are more highly roaded actually have a higher potential for catastrophic wildfires than inventoried roadless areas. Other national assessments have arrived at the same conclusions. [] The fire occurrence data revealed the following key points:

- Nationally, the average size of a large wildfire is greater on NFS lands outside of an inventoried roadless area;

- Nationally, the average size of a large wildland fire started by humans is greater on land outside of inventoried roadless areas;

- Regardless of the cause, a wildland fire ignition was nearly 2 times as likely to occur outside of an inventoried roadless area;

- A human ignited wildland fire is nearly 4 times as likely to occur outside of an inventoried roadless area." (Forest Service Roadless Area Conservation DEIS, page 3-157; hereafter USFS 2000).

"The U.S. Fish and Wildlife Service [] found that bull trout are exceptionally sensitive to the direct, indirect, and cumulative effects of roads. Dunham and Rieman [] demonstrated that disturbance from roads was associated with reduced bull trout occurrence. They concluded that conservation of bull trout should involve protection of larger, less fragmented, and less disturbed (lower road density) habitats to maintain important strongholds and sources for naturally recolonizing areas where populations have been lost." (USFS 2000, page 3-82, parenthesis in original).

"Hitt and Frissell [] showed that over 65% of waters that were rated as having high aquatic biological integrity were found within wilderness-containing subwatersheds. [] Trombulak and Frissell [] concluded that [] the presence of roads in an area is associated with negative effects for both terrestrial and aquatic ecosystems including changes in species composition and population size." (USFS 2000, pages 3-80-81).

"High integrity [forests] contain the greatest proportion of high forest, aquatic, and hydrologic integrity of all [] are dominated by wilderness and roadless areas [and] are the least altered by management. [] Low integrity [forests have] likely been altered by past management [] are extensively roaded and have little wilderness." (USFS 1996a, pages 108, 115 and 116).

"Much of this [overly dense forest] condition occurs in areas of high road density where the large, shade-intolerant, insect-, disease- and fire-resistant species have been harvested over the past 20 to 30 years. [] Fires in unroaded areas are not as severe as in the roaded areas because of less surface fuel, and after fires at least some of the large trees survive to produce seed that regenerates the area. Many of the fires in the unroaded areas produce a forest structure that is consistent with the fire regime, while the fires in the roaded areas commonly produce a forest structure that is not in sync with the fire regime. [] In general, the effects of wildfires in these areas are much lower and do not result in the chronic sediment delivery hazards exhibited in areas that have been roaded." (USFS 1997a, pages 281-282).

"Increasing road density is correlated with declining aquatic habitat conditions and aquatic integrity [] An intensive review of the literature concludes that increases in sedimentation [of streams] are unavoidable even using the most cautious roading methods." (USFS 1996b, page 105).

"This study suggests the general trend for the entire Columbia River basin is toward a loss in pool habitat on managed lands and stable or improving conditions on unmanaged lands." (McIntosh et al 1994).

"The data suggest that unmanaged systems may be more structurally intact (i.e., coarse woody debris, habitat diversity, riparian vegetation), allowing a positive interaction with the stream processes (i.e., peak flows, sediment routing) that shape and maintain high-quality fish habitat over time." (McIntosh et al 1994).

"Although precise, quantifiable relationships between long-term trends in fish abundance and land-use practices are difficult to obtain (Bisson et al. 1992), the body of literature concludes that land-use practices cause the simplification of fish habitat []." (McIntosh et al 1994).

"Land management activities that contributed to the forest health problem (i.e., selective harvest and fire suppression) have had an equal or greater effect on aquatic ecosystems. If we are to restore and maintain high quality fish habitat, then protecting and restoring aquatic and terrestrial ecosystems is essential." (McIntosh et al 1994).

"Native fishes are most typically extirpated from waters that have been heavily modified by human activity, where native fish assemblages have already been depleted, disrupted, or stressed []." (Moyle et al 1996).

"Restoration should be focused where minimal investment can maintain the greatest area of high-quality habitat and diverse aquatic biota. Few completely roadless, large watersheds remain in the Pacific Northwest, but those that continue relatively undisturbed are critical in sustaining sensitive native species and important ecosystem processes (Sedell, et. al 1990; Moyle and Sato 1991; Williams 1991; McIntosh et al. 1994; Frissell and Bayles 1996). With few exceptions, even the least disturbed basins have a road network and history of logging or other human disturbance that greatly magnifies the risk of deteriorating riverine habitats in the watershed." (Frissell undated).

"[A]llocate all unroaded areas greater than 1,000 acres as Strongholds for the production of clean water, aquatic and riparian-dependent species. Many unroaded areas are isolated, relatively small, and most are not protected from road construction and subsequent timber harvest, even in steep areas. Thus, immediate protection through allocation of the unroaded areas to the production of clean water, aquatic and riparian-dependent resources is necessary to prevent degradation of this high quality habitat and should not be postponed." (USFWS et al 1995).

"Because of fire suppression, timber harvest, roads, and white pine blister rust, the moist forest PVG has experienced great changes since settlement of the project area by Euroamericans. Vast amounts of old forest have converted to mid seral stages." (USFS/BLM 2000, page 4-58).

"Old forests have declined substantially in the dry forest PVG []. In general, forests showing the most change are those that have been roaded and harvested. Large trees, snags, and coarse woody debris are all below historical levels in these areas." (USFS/BLM 2000, page 4-65).

"High road densities and their locations within watersheds are typically correlated with areas of higher watershed sensitivity to erosion and sediment transport to streams. Road density also is correlated with the distribution and spread of exotic annual grasses, noxious weeds, and other exotic plants. Furthermore, high road densities are correlated with areas that have few large snags and few large trees that are resistant to both fire and infestation of insects and disease. Lastly, high road densities are correlated with areas that have relatively high risk of fire occurrence (from human caused fires), high hazard ground fuels, and high tree mortality." (USFS 1996b, page 85, parenthesis in original).

In simpler terms, the Forest Service has found that there is no way to build an environmentally benign road and that roads and logging have caused greater damage to forest ecosystems than has the suppression of wildfire alone. These findings indicate that roadless areas in general will take adequate care of themselves if left alone and unmanaged, and that concerted reductions in road densities in already roaded areas are absolutely necessary.

Indeed, other studies conducted by the Forest Service indicate that efforts to "manage" our way out of the problem are likely to make things worse. By "expanding our efforts in timber harvests to minimize the risks of large fire, we risk expanding what are well established negative effects on streams and native salmonids. [] The perpetuation or expansion of existing road networks and other activities might well erode the ability of [fish] populations to respond to the effects of large scale storms and other disturbances that we clearly cannot change." (Reiman et al 1997).

"Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity. If not accompanied by adequate reduction of fuels, logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest". (USFS 1996c, pages 4-61-72).

"Logged areas generally showed a strong association with increased rate of spread and flame length, thereby suggesting that tree harvesting could affect the potential fire behavior within landscapes...As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. Even though these hazards diminish over time, their influence on fire behavior can linger for up to 30 years in dry forest ecosystems of eastern Oregon and Washington". (Huff et al 1995).

The answer, therefore, is not to try managing our way out of this situation with more roads and timber harvest/management. In summary:

• Roads have adverse effects on aquatic ecosystems. They facilitate timber sales which can reduce riparian cover, increase water temperatures, decrease recruitment of coarse woody debris, and disrupt the hydrologic regime of watersheds by changing the timing and quantity of runoff. Roads themselves disrupt hydrologic processes by intercepting and diverting flow and contributing fine sediment into the stream channels which clogs spawning gravels. High water temperatures and fine sediment degrade native fish spawning habitat.

According to the U.S. Forest Service 82% of all bull trout populations and stream segments range-wide are threatened by degraded habitat conditions. Roads and forest management are a major factor in the decline of native fish species on public lands in the Northern Rockies and Pacific Northwest.

• An open road density (ORD) of one mile per square mile of land reduces elk habitat effectiveness to only 60% of potential. When ORD increases to six miles per square mile, habitat effectiveness for elk decreases to less than 20%. (Lyon 1984).

• Black bears in southern Appalachia begin avoiding Forest Service roads when the density exceeds 0.8 miles per square mile. (Brody 1984). Grizzly bears use habitats less than expected when ORD exceeds one mile per square mile and total road density (TRD) exceeds two miles per square mile. (Mace and Manley 1993). Open roads contribute to grizzly bear mortality by poaching and, especially during the black bear hunting season, by mistaken killing. (Holland 1985).

• Roads have a similar, devastating effect on wolves. Studies show that wolves fail to survive in areas where ORD exceeds 0.93 miles per square mile. (Thiel 1985).

• Sediment from roads, both open and closed, damages the environment. In northwest Montana, for instance, 80-90% of the sediment produced by logging and road construction generally is attributable to the road (USFS 1985). The Flathead National Forest estimates that, on one of its most pervasive and sensitive land types, one mile of road produces 98 tons of sediment, 80% of which reaches the stream bed (USFS undated).

In addition, the Forest Service estimates that only a 10% increase in fine sediment deposition in spawning gravel decreases the spawning success of bull trout by 50%. (USFS 1986). A road cut across a hillside intercepts subsurface water flow and runs it down ditches and through culverts. There it is joined by sediment-laden runoff from the roadbed and cut banks before running into a stream. Hence, subsurface water which would have once welled up from below a stream to clean bull trout spawning gravels now carries sediment from the road and land surface and deposits it onto the spawning gravels, where it smothers the eggs and fry.

## Old Growth Forests

Old-growth forest habitat is a diminishing resource on public lands due to many factors. Maintaining existing old-growth stands and providing for recruitment of future old growth is necessary to provide for the viability of old-growth associated wildlife species. While not perfect, the Old-Growth Forest Types of the Northern Region (Green et al, 1992) is probably the best reference available for these forests and should be used as a guide to determine old-growth forest habitat.

We strongly caution though that the minimum characteristics in Green et al, are not the recommended standards, but merely the starting point by which to determine whether a stand is classified as old growth. It is NOT to be used to "manage" old growth down to these minimum characteristics. Also, it is important to note that old-growth attributes such as decadence, large trees, old trees, snags, canopy structure, coarse woody debris, etc. are critical components of old-growth forest habitat. Stands that may not have the minimum number of large trees but contain these other important attributes should be considered "recruitment" or future old-growth and allowed to progress towards meeting the Green et al definition.

Old-growth stands function best as habitat when they are connected to other stands. Connectivity can be achieved by corridors of actual old growth or by suitable closed-canopy or mature condition of the matrix between old-growth stands (Thomas, et al. 1990, Bennett, 1999). Stands designated as future old growth that are presently mature may be suitable (Pfister, et al 2000). Linkages, should whenever possible, contain a large fraction of interior forest (i.e., 100 meters from a high contrast edge, Bennett 1999).

Interior old growth habitat (>100 meters from edge of an opening or stand of lesser age or a road) is the most important component of old-growth habitat (Baker and Knight 2000). In general larger stands are more effective as habitat than smaller stands (Pfister 2000). Fragmentation of existing patches of old growth by roads, timber harvesting or other created openings will decrease effectiveness of the patch as habitat due to the reduction in amount of interior old-growth conditions (Baker and Knight 2000).

Stands that met the Green et al definition of old growth but are burned in a forest fire do not cease to provide a valuable function to wildlife and the forest ecosystem and should not be salvage logged. This burned old growth may function differently but it is still important habitat because burned snags stand much longer than beetle-killed trees, and the fact that it burned does not change its age and age is a primary factor in old growth habitat (Pers. comm. R. McClelland).

## Management Recommendations to Protect Old Growth

To protect remaining old growth, provide for recruitment of future old growth, and link these currently small and isolated patches, we suggest the following management standards.

• Use the Old-Growth Forest Types of the Northern Region as a first step in identifying old growth stands.

• All existing old growth must be preserved. The Forest Service must calculate how much old growth there is on a watershed (i.e., approximately 10,000 acres) and forest-wide basis. The recruitment of future old growth must be at least double the current area of existing old growth to achieve at least 33% old growth/recruitment old growth in each watershed. Recruitment old growth must be allowed to progress towards the old growth conditions described above. Recruitment old growth is subject to the same protections as designated current old growth.

• Designate the existing old growth and future old growth, map it and connect these stands with linkages as described above.

• Place longer-rotation or less intensive uses adjacent to designated old growth, so that a lower-intensity managed zone serves as a buffer for the old-growth system (Noss and Cooperrider 1994). Avoid placing high intensity land uses (e.g. clearcuts, roads) next to designated old growth (Pfister 2000).

• Integrate future recruitment old growth into the network. Where otherwise equivalent replacement stands exist, choose those adjacent to designated old growth as future old growth.

• No logging should take place in old growth stands. Under limited and extraordinary circumstances some thinning of sapling and pole-sized timber less than 6 inches in diameter may be appropriate but only in ponderosa pine habitat type, without using heavy equipment, and when there are no adverse effects to old-growth dependent, management indicator, sensitive, threatened or endangered species.

**Native Fish and Water Quality**

The best available scientific information on bull trout supports the following specific, numeric and measurable standards for protection of the Primary Constituent Elements of bull trout habitat. Protecting these PCEs in all watersheds will provide benefits for westslope cutthroat trout and other native aquatic species.

Clean- The bull trout is virtually synonymous with water quality. Bull trout require very clean water and favor streams with upwelling groundwater for spawning (Fraley & Shepard 1989; Baxter & Hauer 2000). Of the many threatened and endangered fish species, bull trout are the most sensitive to changes in water quality, particularly from fine sediments generated by logging and grazing activities. Fine sediments can smother spawning beds and degrade other habitat components. A key determinant is the level of fine sediment ≤ 6.35 mm (Weaver & Fraley 1991) and protecting upwelling groundwater. Protection of critical habitat includes standards to maintain and improve water quality and control lethal sediments. For example, fine sediments < 6.4 mm in diameter must be limited to less than 20% in spawning habitat (Espinosa 1996) and standards must be developed to maintain groundwater.

Cold- Bull trout also require colder water than other native fish. Rieman & McIntyre (1993) reported that researchers recognize temperature more consistently than any other factor influencing bull trout distribution (see also, Pratt 1992). Habitat protection efforts must seek to maintain or reacquire natural cold water conditions. Specifically, stream temperatures in current and historic spawning, rearing and migratory corridor habitats should not exceed 6-8 C for spawning, with the optimum for incubation from 2-4 C (McPhail & Murray 1979); 10-12 C for rearing habitat, with 7-8 C being optimal (Goetz 1989); migratory stream corridors should be 12 C or less.

Complex- Critical habitat for bull trout isn't just a set of places, but rather a complex arrangement of environmental conditions. Noting that "watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear," in its 1998 listing rule the Service listed the habitat components: "water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors." Implicit in this list of habitat requirements is the understanding that habitat critical to bull trout viability consists of a specific set of physical conditions in addition to particular places. For example, the Service explained that "[m]aintaining bull trout habitat requires stream channel and flow stability." And further explained that "[a]ll life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders and pools." Bull trout not only need clean, cold water, they need places to rest, hide, feed and travel.

Intact forests, which provide bank stability, shade and woody debris for formation and maintenance of pool habitat, are essential. Climate change will have implications for species such as bull trout because they require cold, clean water. Isaak et al (2010) state: "Riparian vegetation, for example, strongly affects near stream microclimates and minimizing near-stream disturbances associated with grazing, roadbuilding and timber harvest, or facilitating rapid vegetative recovery after these disturbances, could help buffer many streams from additional warming."

Climate change will also increase rain on snow events resulting in stream scour. Shelburg et al's (2010) study of bull trout redd scour emphasized the importance of habitat heterogeneity and refugia availability in sustaining salmonid populations at multiple spatial scales. Loss of complex fluvial spawning habitat such as large woody debris contributes to redd scour after rain on snow events. They conclude: "Processes that form complex habitat in association with LWD may partially mitigate against unfavorable discharge regimes, water and sediment yield alterations due to land-use, or future climate change."

Espinosa (1996) recommends that all streams should average ≥ 90% bank stability and that cobble embeddedness in summer rearing habitat should be < 30% and < 25% in winter rearing habitats. Additional indices include channel morphology including large woody debris, pool frequency, volume and residual pool volumes.

The Flathead Lake Biological Station has been studying the aquatic environment in the Crown of the Continent ecosystem for decades. Hauer et al (2007) found that:

> "Streams of watersheds with logging have increased nutrient loading, first as SRP and NO3, which is rapidly taken up by stream periphyton. This leads to increased algal growth that is directly correlated with the quantity of logging within the watershed. The increased periphyton increases particulate organic matter in transport as the algal biomass is sloughed into the stream. We observed this as increased TP and TN in logged watershed streams. Other studies in the CCE have shown that increased sediment loading and an incorporation of fines into spawning gravel, especially during the summer and fall base flow period, has a dramatic effect on the success of spawning by bull trout (Salvelinus confluentus). Experiments have shown that as the percentage of fines increases from 20% to 40% there is >80% decrease in successful fry emergence."

Hauer, et al. (1999) also found that bull trout streams in wilderness habitats had consistent ratios of large to small and attached to unattached large woody debris. However, bull trout streams in watersheds with logging activity had substantial variation in these ratios. They identified logging as creating the most substantive change in stream habitats.

> "The implications of this study for forest managers are twofold: (i) with riparian logging comes increased unpredictability in the frequency of size, attachment, and stability of the LWD and (ii) maintaining the appropriate ratios of size frequency, orientation, and bank attachment, as well as rate of delivery, storage, and transport of LWD to streams, is essential to maintaining historic LWD characteristics and dynamics. Our data suggest that exclusion of logging from riparian zones may be necessary to maintain natural stream morphology and habitat features. Likewise, careful upland management is also necessary to prevent cumulative effects that result in altered water flow regimes and sediment delivery regimes. While not specifically evaluated in this study, in general, it appears that patterns of upland logging space and time may have cumulative effects that could additionally alter the balance of LWD delivery, storage, and transport in fluvial systems. These issues will be critical for forest managers attempting to prevent future detrimental environmental change or setting restoration goals for degraded bull trout spawning streams.

Wherever possible, critical habitat protection should extend to the entire hydrologic watershed. Frissell (1999) reported complex interactions between near-surface groundwater and surface waters in bull trout streams, suggesting a more comprehensive approach to watershed protection. Baxter and Hauer (2000) reported that geomorphology and hyporheic groundwater exchange have a strong influence on bull trout redd locations.

Connected- The sciences of conservation biology and conservation genetics show that bull trout have naturally occurred throughout the Northern Rockies and Pacific Northwest in a system of connected watersheds comprising migratory meta-populations of bull trout (Rieman & McIntyre 1993). Blockages to historic migration routes, both physical and thermal, must be addressed to provide access to spawning streams and protect the genetic integrity of the bull trout. Historically occupied, but currently unoccupied habitat must be protected and reoccupied to reconnect bull trout populations throughout their range.

In addition to these standards, roadless and low road density watersheds deserve special protection measures. Numerous scientific studies and reviews have consistently reported that bull trout strong populations, presence and biomass are inversely related to road densities (Huntington 1995; Quigley, et al. 1996; Rieman, et al. 1997). Bader (2000) found that 78% of bull trout "strong populations" were in roadless area with most of the remainder directly downstream from roadless area. Quigley, et al. (1996) reported that roadless and wilderness areas can provide "strong anchors" for salmonid recovery. In recognition of this strong body of scientific evidence, the U.S. Fish & Wildlife Service (1998) recommended that remaining roadless areas within bull trout range be maintained in roadless condition.

**Lynx**

The Fish and Wildlife Service designated critical habitat for lynx that includes the Flathead National Forest. They determined the physical and biological features that are the primary constituent elements (PCEs) laid out in the appropriate quantity and spatial arrangement that are necessary for the conservation of the species.

These include, but are not limited to:

1. Space for individual and population growth and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, and rearing (or development) of offspring; and
5. Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Squires, et al. (2010) studied den selection in western Montana. They found that lynx denned in preexisting sheltered spaces created by downed logs (62%), root-wads from wind-thrown trees (19%), boulder fields (10%), slash piles (6%) and live trees (4%). Lynx overwhelmingly prefer preexisting sheltered spaces created by downed logs in mature forests.

Squires also found that lynx generally denned in mature spruce-fir forests with high horizontal cover and abundant coarse woody debris. Eighty percent of dens were in mature forest stands and 13% in mid seral regenerating stands; young regenerating (5%) and thinned (either naturally sparse or mechanically thinned) stands with discontinuous canopies (2%) were seldom used. Maintaining mature and mid-seral regenerating spruce-fir forests with high horizontal cover and abundant woody debris would be most valuable for denning when located in drainages or in concave, drainage-like basins. Management actions that alter spruce-fir forests to a condition that is sparsely stocked (e.g. mechanically thinned) and with low canopy closure (<50%) would create forest conditions that are poorly suitable for denning.

Squires (2006) results also indicate that lynx preferentially forage in spruce-fir forests with high horizontal cover, abundant hares, deep snow, and large-diameter trees during winter. The high horizontal cover found in multistory forest stands is a major factor affecting winter hare densities. Lynx tend to avoid sparse, open forests and forest stands dominated by small-diameter trees during the winter.

They also sampled vegetative characteristics at kill sites and compared these to other locations along lynx travel routes. Lynx killed prey in areas of even higher horizontal cover than they generally encountered along their snow-tracks.

During winter, lynx preferentially foraged in mature, multilayer forests with Engelmann spruce (Picea engelmannii) and subalpine fir (Abies lasiocarpa) in the overstory and midstory. Forests used during winter were composed of larger diameter trees with higher horizontal cover, more abundant snowshoe hares (Lepus americanus), and deeper snow compared to random availability; multilayer, spruce–fir forests provided high horizontal cover with tree branching that touched the snow surface. During winter, lynx killed prey at sites with higher horizontal cover than that along foraging paths. Lynx were insensitive to snow depth or penetrability in determining where they killed prey. During summer, lynx broadened their resource use to select younger forests with high horizontal cover, abundant total shrubs, abundant small-diameter trees, and dense saplings, especially spruce–fir saplings. Based on multivariate logistic-regression models, resource selection occurred primarily at a fine spatial scale as was consistent with a sight-hunting predator in dense forests. However, univariate comparisons of patch-level metrics indicated that lynx selected homogenous spruce–fir patches, and avoided recent clear-cuts or other open patches. Given that lynx in Montana exhibit seasonal differences in resource selection, we encourage managers to maintain habitat mosaics. Because winter habitat may be most limiting for lynx, these mosaics should include abundant multistory, mature spruce–fir forests with high horizontal cover that are spatially well-distributed.

Montana is near the southern extent of the lynx's current North American distribution. Here, boreal forests are fragmented into patches of suitable habitat at higher elevations, separated by valleys of open grasslands and dry forest types. Southern lynx populations tend to be small and relatively isolated. Therefore, movement and connectivity among groups is particularly important to maintain persistent populations and to recolonize unoccupied habitat.

The Northern Rockies Lynx Management Direction has designated the Swan-Clearwater divide as a linkage corridor for lynx movement.  It is imperative that adequate cover is maintained to facilitate lynx migration.

**Soils**

Soils are the foundation of terrestrial life. Forest productivity is directly tied to soil conditions. Soil takes thousands of years to develop and is not 'renewable' on a human time scale. Soil is an ecosystem in itself that must be healthy in order to provide for healthy forests, grasslands, and aquatic systems. Actions impacting such complex systems are prone to unintended consequences. Given the life-support role soils play, special care and prudence are essential.

The National Forest Management Act (NFMA) prohibits “irreversible damage” to soils as well as “substantial and permanent impairment of productivity of land”. Loss of soil (erosion) and displacement clearly cause “irreversible damage” and “permanent impairment of productivity of land”. Loss of coarse woody debris causes soil damage that can last a century or more. Soil compaction negatively impacts soil productivity, overland flow, erosion, stream sedimentation, and late season flows. Soil compaction from logging can persist 50 – 80 years. (ICBEMP, Assessment of Ecosystem Components, 1997)

Avoiding soil damage is the only option; full restoration of soil damage is not generally possible. Compacted soils are not completely mechanically restorable. Mechanized decompaction is only partially effective at decompacting and can compound problems by mixing rock and mineral soil with topsoil resulting in long term reduced productivity. Replacing eroded or displaced soil is problematic. Artificial coarse woody debris replacement is not practical over large areas such as burned clearcuts.

Timber harvest practices including road building, log skidding and slash disposal have caused most soil damage on forest lands.

Nutrient recycling is a critical function of soils that historically has been damaged by treatments that negatively affect the amounts, types, and distribution of organic matter retained on site. (Graham, R. T., 1990) Many years of piling and windrowing of slash using dozer blades has removed not only the litter plus duff layers but also the thin layer of organic rich mineral soil (A horizon) from large acreages of forested lands. (McBride, personal communication) Guidelines for retaining adequate coarse woody debris should be developed based on the site potential and be within the historic range of variability for the fire regime of the site. Coarse woody debris needs to be maintained at natural levels in the interface zone, with exception granted immediately around structures and residences. (Harvey, 1987).

Control of livestock concentration, especially in sensitive riparian areas is essential to maintaining soil porosity and bulk density. The moist soils in these areas become compacted by concentrations of cattle in only a few days. (Warren, S.D., 1986; BNF soil monitoring reports) Gentle upland ridge tops and swales are other “gathering places” for cattle that require special efforts to control their distribution to protect soils from detrimental compaction.

The process of nutrient cycling on the forest lands is primarily effected through fire; this recycling is key to forest and grassland ecosystem health. Therefore, the use of fire when treating vegetation should be in accordance with the natural fire regime for the site, and organic matter left on site should be within the natural historic range of variability for the site type. (Fischer, W. C., 1987)

Mycorrhizal fungi are an essential component of productive soil. (Amaranthus, M. P., 1996) Most regeneration failures may be due to problems with mycorrhizae. Monitoring mycorrhizae needs to be part of soil condition assessments. Mycorrhizae are very temperature sensitive, so soil temperatures need to be monitored.

Monitoring of detrimental soil disturbances needs to include: compaction, displacement, rutting, severe burning, erosion, loss of surface organic matter (especially coarse woody debris), soil mass movement, soil temperature, and damage to micro-biological components of soil (especially mycorrhizal fungi).

Given that monitoring has demonstrated an extensive legacy of soil damage, it is time to include that information in watershed health assessments. There needs to be an inventory of where these highly damaged soils occur and the extent to which they are damaged. The Forest Plan needs to quantify the acreages by watershed and do cumulative effects analysis, including the road systems to understand the full impact management has had on watershed health.

We have provided you with scientific research and ask that you incorporate this information into your analysis.

Sincerely,

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PS – Lists of literature cited, by topics discussed above, begin on the following page.

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June 18, 2012

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Dear Rich and Chip;

This letter is written on behalf of Friends of the Wild Swan and Swan View Coalition. It supplements our May 1 letter that we asked you to include in the public comment records for the Glacier Loon, Cold Jim, and Beaver Creek projects. Please do the same with this letter.

We inadvertently omitted from our May 1 letter two cites to Fish and Wildlife Service documents. These documents indicate that, in order to reduce total road densities, roads must be decommissioned with stream-bearing culverts removed – that the roads cannot be simply gated, bermed shut, or put into a lesser "storage" maintenance level:

*"Reduction of total miles of forest roads is an important component of watershed restoration. . . Many miles of roads must be 'put to bed', by pulling culverts, resloping road beds, pulling fill and replanting."* (U.S. Fish and Wildlife Service. 1998. Bull Trout Interim Conservation Guidance. 12/9/98.)

*"Rehabilitation of road-miles cannot be accomplished alone by gating, berming, or otherwise blocking the entrance to a road permanently or temporarily, or seasonally closing roads, but will require obliteration, recontouring, and revegetating."* (U.S. Fish and Wildlife Service Regions 1 and 6. 1998. Biological Opinion for the Effects to Bull Trout from Continued Implementation of Land and Resource Management Plans and Resource Management Plans as Amended by the Interim Strategy for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada (INFISH), and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). 8/14/98.)

Sincerely,

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