



United States
Department of
Agriculture
Forest Service



Final Environmental Assessment

Gray Butte Sidehill Antenna Application

September 2007



Photo: Gray Butte from Hwy. 97 north of Bend

Crooked River National Grassland
administered by the
Ochoco National Forest
Jefferson County, Oregon

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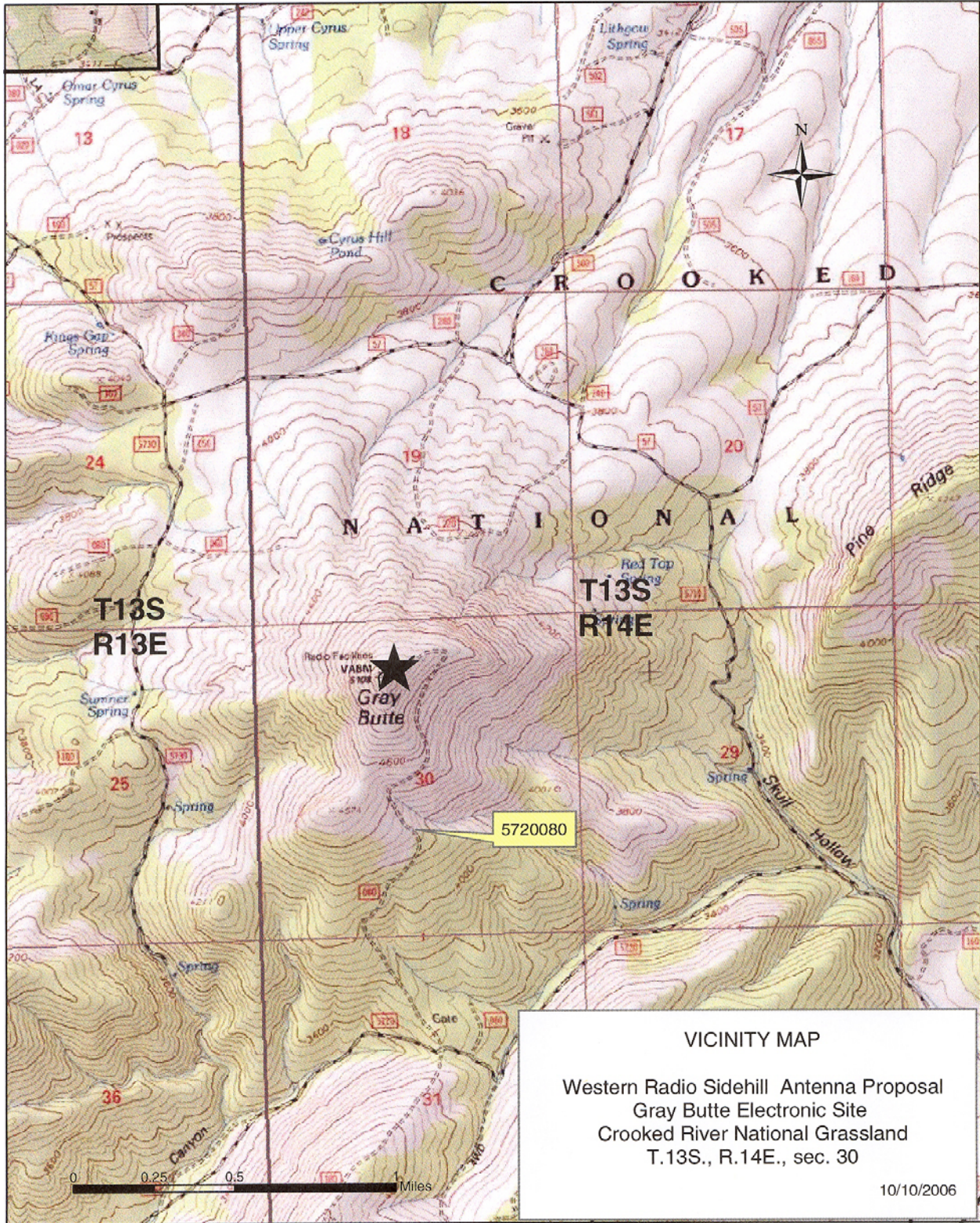
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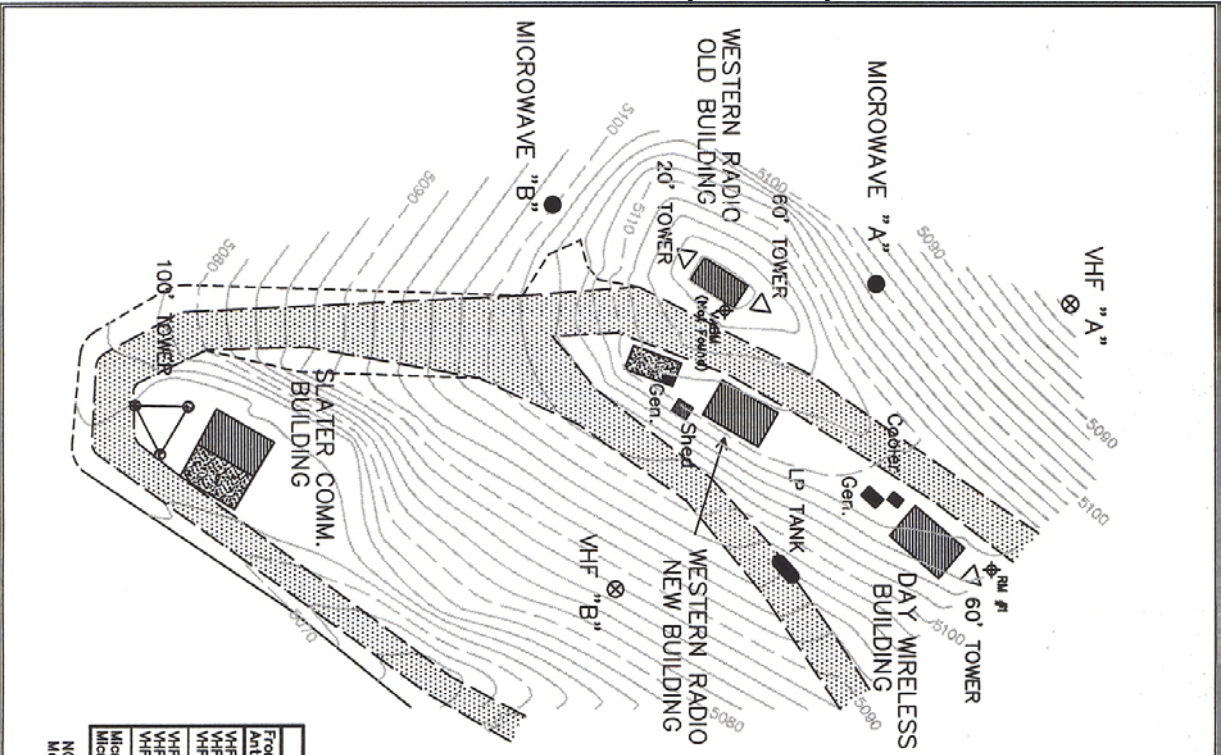
CHAPTER 1 - INTRODUCTION

The Ochoco National Forest has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives.

Vicinity Map



Sidehill Antenna Proposal Map



GRAY BUTTE ELECTRONIC SITE
 Nikon DTM-350 Total Station Site Survey
 Surveyed 03/12/07 By P. De Santis, L. Sharp and B. Kurtz
 TerraModel Plot 03/13/07 By P. De Santis
 Sidehill Antenna Proposal

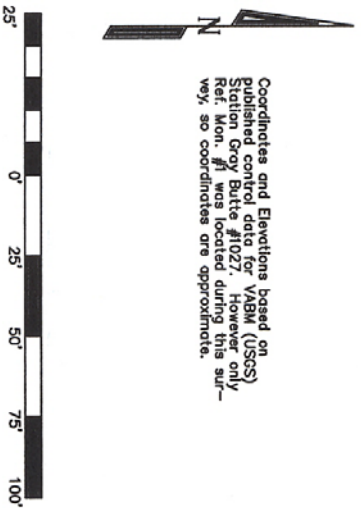
DISTANCE TABLE

From Proposed Antenna	To Existing Tower	Hertz Dist.
VHF "A"	Day Wireless	90.1'
VHF "A"	Slater Comm. W. Radio 60'	283.9'
VHF "A"	W. Radio 60'	95.1'
VHF "B"	Day Wireless	110.3'
VHF "B"	Slater Comm. W. Radio 50'	150.0'
VHF "B"	W. Radio 20'	36.3'
Microwave "A"	W. Radio 20'	44.5'

NOTE: Distances Are Horizontal Feet Measured To Center of Existing Towers

LEGEND

- USGS Monument
- Existing Tower
- Proposed Microwave Antenna
- Proposed VHF Antenna
- Existing Buildings/Structures
- Concrete Pad
- Approx. Roadbed
- 2-Foot Intermediate Contour Line
- 10-Foot Index Contour Line
- Shoulder of Road



Coordinates and Elevations based on published control data for NAD83 (USGS). Station 5080.00 was located during this survey, so coordinates are approximate.

TECHNICAL TERMS



Monopole towers -are structures consisting of a single tubular pole that supports antennas.

PHOTO 1: Example of a monopole tower

Lattice towers -are structures to support antenna, consisting of crossed metal braces that usually form a 3-sided tower with a triangular base, or sometimes a 4 sided tower. Superior in supporting heavier loads, or when taller towers are needed.

PHOTO 2:
Western Radio's
20 ft. and 60 ft.
lattice towers

with 6 ft. solid,
"dish" microwave
antennas



Interference (radio frequency interference): is an unwanted disturbance caused in a radio receiver or other electrical circuit by electromagnetic radiation emitted from an external source. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit. Signals emitting at similar frequencies have a higher potential to cause interference.

Mhz (Megahertz): One million cycles/second. This is a radio frequency unit of measure

Microwave: Microwaves transmit at high frequencies, are unidirectional and do not usually cause interference problems. Microwave antennas can be solid dishes, such as commonly used in home satellite systems, or grid (open) style dishes. In this EA, the microwave antennas are being used for a cellular communications system.

Omnidirectional: Involving all directions; receiving or sending radio waves equally well in all directions. These types of antenna systems have a higher potential to create interference, because of this characteristic.

VHF: (Very High Frequency) This is the band of radio frequencies falling between 30-300 mhz. Typical communication uses in these frequencies are FM radio, television, and short distance terrestrial communication. In this EA, the VHF antennas are used for a two-way mobile radio system.

Background

Gray Butte is an existing electronic site designated in the Crooked River National Grassland Land and Resource Management Plan (LRMP). It is located within section 30, T.13S., R.14E., Willamette Meridian, approximately 15 air miles northwest of Prineville, Oregon, and is 5,118 ft. in elevation.

Although the site is designated at 80 acres, the electronic facilities are clustered in a small area near and at the top of the Butte.

The first special use permit was issued in 1967 for the site. Currently, there are 3 facility owners at the site, Western Radio Services (Western Radio), Slater Communications and Electronics (Slater Communications) and Day Wireless Systems (Day Wireless), each with their own building and tower (Western Radio has 2 towers). All 3 have communication site leases from the USDA Forest Service.

The lessees provide a variety of communication services and facilities. There are broadcast translators at the site, which rebroadcast or amplify signals to provide local radio and TV station uses. The lessees provide facilities needed by businesses that provide wireless internet and cellular telephone services. Lastly, they provide facilities for businesses and government agencies, such as logging companies and law enforcement entities, to facilitate internal communications.

In March of 2006, Western Radio submitted a revised application proposing to also relocate a microwave system and install a total of four new monopole type towers.

Additional details and manufacturer specifications were provided with this application. Supplemental information related to the need for the towers, and clarified map locations was received in August 2006. This EA analyzes this March 2006 application, as supplemented.

Purpose and Need for Action

This Environmental Assessment (EA) addresses the sidehill antenna application submitted by Western Radio Services (Western Radio) on March 17, 2006.

The purpose of this project is to respond to Western Radio's sidehill antenna application. Western Radio has both VHF transmit and receive antennas on the same 60- ft. tower that operate at similar frequencies. Western Radio would like to relocate the transmit antennas to sidehill locations in order to increase the physical separation between the transmit and receive antennas, thereby reducing or eliminating the interference Western Radio states is occurring.

Western Radio is proposing to install four larger microwave antennas ("dishes") on new towers because Western Radio states the existing towers cannot support the larger microwave dish sizes.

The project area is a designated electronic site in the Crooked River National Grassland's Land and Resource Management Plan 1989 (LRMP). Low-power electronic equipment, such as radio and television relay stations are emphasized. Forest Service objectives in management include authorizing communication uses that meet LRMP objectives, providing a safe and high quality communications environment, and contributing to the telecommunications needs of the American public. (Forest Service Handbook 2709.11, Chapter 90, 90.2.)

Proposed Action

The Forest Service proposed action (See Chapter 2, Alternative 2 for more detail) is to approve Western Radio's sidehill application submitted on March 17, 2006:

The two 158.7 mhz VHF antennas mounted on Western Radio's existing 60- ft. lattice tower would be relocated to two sidehill locations further downhill, mounted on two new 15- ft. monopole towers.

The existing three microwave antennas mounted on Western Radio's 20 ft. lattice tower would be replaced with three 6- ft. solid microwave antennas, mounted on two new 20- ft. monopole towers located at sidehill locations. A fourth microwave dish to serve Warm Springs, although already installed and operating on Western Radio's existing tower, would also be approved to be mounted on the new 20- ft. monopole towers.

See the Sidehill Antenna Proposal Map on p. 5.

The application is not consistent with the LRMP or the Gray Butte Electronic Site Management Plan (Site Plan), because the LRMP and Site Plan only allow three towers. Because of this, the proposed action would also require a LRMP amendment and a subsequent Site Plan revision:

The Forest Service would amend the LRMP MA-G15 to delete the limitation of the site to three buildings and three towers. Guidelines, if any, on the number and kind of facilities will be located in the Site Plan, not the LRMP. The Site Plan would need to be revised to allow the additional towers, and solid style microwave dishes.

Decision To Be Made _____

Based on the analysis documented in this environmental assessment, the Forest Supervisor will decide:

- Whether the sidehill application should be approved as submitted, modified, or denied?
- What project design criteria and monitoring, if any, should be required as part of approving a proposal?
- Whether the LRMP should be amended to allow the additional towers.

Management Direction _____

The Crooked River National Grassland Land and Resource Management Plan (LRMP), 1989, and the Gray Butte Electronic Site Management Plan (Site Plan), 1989, as amended in 1992 and 1996, direct management of this project area.

LRMP direction

The project area is located within MA (management area) G15-Gray Butte Electronic Site, which emphasizes management of the site for low-power-output electronic equipment and transmitters which do not exceed 150 watts.

Management direction for MA-G15 allows three buildings and three towers. Currently, there are four towers (one 20- ft., two 60- ft., and one 100- ft.), although the 20- ft. tower has also been referred to as a “microwave support stand” in the past, and has not been counted as a tower in the context of existing and past Site Plans.

Pertinent Standards and Guidelines:

- On-site cultural resource interpretation and enhancement will not be done at the Electronic Site. (LRMP p. 4-64)
- The visual quality objective for the Electronic Site is partial retention (LRMP p. 4-104)
- The access road will be closed to public use year-round; allow only administrative and permittee use. (LRMP p. 4-113)

Electronic Site Management Plan

The current Site Plan allows only 3 buildings and 3 towers. It allows “point to point (i.e. microwave) antennas mounted on the [existing] towers, or ground mounted above elevation 5080.”

The existing Site Plan also requires that new or replacement microwave equipment shall be grid type. (p.11-Table 2 Minimum Standards for Structures and Equipment item # 7)

Public Involvement _____

The application was listed in the Forest Schedule of Proposed Actions in 2006 and 2007 editions. In October of 2006, scoping letters were sent to 191 individuals and groups, including the three facility owners at the site, and The Confederated Tribes of the Warm Springs Reservation, the Burns Paiute Tribe, Confederated Tribes of the Umatilla Reservation, and the Klamath Tribes. A short newspaper article describing the application proposal was published by the Madras Pioneer on November 1, 2006.

Based on the scoping comments, potential alternatives to the proposal were considered. As a result of these considerations, a December 2006 letter was sent to the three 3 facility owners asking them for additional input.

The following comments were received:

Slater Communications has no issues with the microwave antenna component of the proposal, but is concerned that the relocation of the VHF antennas closer to their own tower will result in interference problems, since they also have equipment close to the 158.7 mhz frequency. They do not support amending the LRMP to allow more buildings or higher output powers. They commented that the 60- ft. vertical separation already provided on Western Radio’s existing tower is more effective in providing isolation than the increased horizontal separation that is being proposed. Slater Communications question whether such similar frequencies closely located at Gray Butte can successfully operate, and suggests that Western Radio change their transmitter frequency.

Day Wireless has no issues with the microwave antenna component of the proposal, but is also concerned about the VHF antennas being moved closer to their facility.

Western Radio replied to our December letter requesting additional input on potential alternatives, stating that increasing the height of the existing 60- ft. tower would not provide the additional VHF separation required, nor would it add the extra capacity to support the microwave antennas. They believe that the height of the 60- ft. tower can be increased to 100 ft. by adding sections, without having to replace the tower. The existing cement base foundation would support the taller tower.

The *Blue Mountain Biodiversity Project* is concerned about the effects of electromagnetic radiation on birds and their migration.

The *Sierra Club* is concerned about the effects of towers and signals on avian species, and the additional areas of disturbance.

The *Confederated Tribes of the Warm Springs Reservation* supports documenting the archaeological site history and submitting the site as Not Eligible to the State Historic Preservation Office. They would like to see the archaeological site protected by retaining the cement slab that lies over it.

They suggested completing a traditional oral history of Gray Butte by working with the tribal elders, and adding it to the documentation of the site. The oral history was completed in April of 2007.

Issues

Interdisciplinary team (IDT) meetings, one on one discussions with specialists, field visits, and comments provided by the public helped identify three significant issues:

Tower Separation/Isolation/Purpose & Need The relocation of the two VHF antennas closer to the other two owner's towers has the potential to create interference to their radio communications, some of which also use similar frequencies.

An internal issue is whether the relocation of the VHF antennas would meet the purpose of reducing interference (by increasing isolation) experienced by Western Radio.

Analysis factor: The VHF monopole tower distances to the other two owner's facilities will be measured for each alternative, and an estimate of the change in attenuation, otherwise known as isolation, will be made. The amount of isolation has a direct correlation to potential interference. Everything else being equal, the longer the distance, and the greater the attenuation, there is less potential for creating interference. In addition, the change in attenuation of Western Radio's VHF antennas will be estimated for each alternative.

Visual Quality: Gray Butte is a prominent peak from a number of viewpoints, including Highways 97 and 26, Smith Rocks State Park, and the Gray Butte trail. New facilities may not blend well with the existing landscape, degrading the visual quality.

Analysis factors: The alternatives will be evaluated for how well they blend into the landscape, from the perspective of casual visitors and activity-based recreationists.

Full Utilization of Existing Facilities: Only the top of Gray Butte allows omnidirectional antenna systems. The existing facilities are concentrated at or near the top

of the butte, which has limited physical space for additional towers or other facilities. Existing facilities should be fully utilized before new development is authorized. Additional facilities can create more physically crowded conditions for all users, and increase interference at the site. In addition, one of the 1989 Site Plan objectives is to maximize utilization of the site, (p.3- II # 3) and one Forest Service policy goal of site planning is to maximize the efficient use of each site (FSH 2709.11, 92)

Analysis Factors: The size and physical impact of new facilities will be evaluated for each alternative.

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the project, and includes a comparison chart.

Alternatives Considered in Detail

Alternative 1 (No Action) _____

This is the no action alternative, and is required by law.

The application would be denied. The two new VHF sidehill located towers would be denied, as would the two new microwave towers.

Western Radio could continue to operate the VHF and microwave system under the terms of their existing lease. They would have the option, without needing Forest Service approval, to use additional equipment such as filters, isolators, and combiners, to reduce interference problems, or they could apply to the Federal Communications Commission for a frequency change.

No LRMP amendment would be proposed. VHF antennas would not be allowed on Western Radio's existing 20 ft. tower.

Alternative 2 (Proposed Action) _____

The proposed action would approve Western Radio Services March 17, 2006 application, which includes:

The existing two 158.7 mhz VHF transmit antennas mounted on Western Radio's existing 60- ft. lattice tower would be relocated to two sidehill locations further downhill, mounted on two new 15- ft. monopole towers. One new tower would be approximately 95 ft. north of the existing 60- ft. tower, and the new other tower would be 99 ft. southeast.

The existing 3 microwave dish antennas mounted on Western Radio's 20 ft. lattice tower would be replaced with four 6- ft. solid microwave antennas, mounted on 2 two new 20- ft. monopole towers located at sidehill locations. VHF antennas would not be allowed on the 2 two new 20- ft. monopole towers. One new tower is an estimated 60 ft. north of the existing 20 ft. lattice tower, and the other new tower would be about 45 ft. south. **Note:** Western Radio has already temporarily modified its microwave system, so there are now four 6- ft. solid microwave dish antennas located on his existing towers. Selection of this alternative would allow these 6- ft. microwave dish antennas to be installed on new monopole towers. While the applicant described these towers at about 20 ft. from his existing towers, survey of the staked locations indicates a distance of 45 – 60 ft. The existing 20-foot tower would also remain, without restriction on antenna types¹.

Installation description: Both the 15 ft. and 20 ft. towers would be anchored to buried cement base foundations that are approximately 4 ft. x 4 ft. x 4 ft. in size. Excavation to a depth of 4 ft., less in rock, would be completed for these bases.

Transmission lines that carry radio signals from the antennas to Western Radio's new building, where the associated radio equipment is located, will be buried to a depth of 6 inches. The cables associated with the three new towers located west of the access road (labeled VHF A, Microwave A and B on the map) will be routed to the closest Western Radio existing tower, and then join the existing buried conduit line which crosses the access road to Western Radio's new building. The cables associated with the most easterly new tower (labeled VHF B on the map) will be routed directly to Western Radio's new building.

An electric jack hammer and hand tools will be utilized to install the new towers and bury the transmission lines.

The application is not consistent with the LRMP or the Gray Butte Electronic Site Management Plan (Site Plan). Because of this, the proposed action would also require a LRMP amendment and a subsequent Site Plan revision. The LRMP would be amended to remove references to the number of buildings and towers. The Site Plan would be amended to reflect the changes in the number of towers, to allow solid microwave dishes, and to acknowledge the existence and use of the existing 20-foot tower without restrictions on antenna (allowing both microwave and non-microwave) type.

¹Historically, the Forest Service has viewed this structure as only to be used to support microwave dish antennas, not VHF antennas. However, Western Radio has used the structure to support both. Under Alternatives 2, 3, and 4, this structure would be considered part of Western Radio's permitted uses, and no restrictions regarding its' use (microwave or VHF), would be applied.

Alternative 3

The VHF antenna component of the application would be denied.

The microwave component of the application would be approved, as described in Alternative 2.

The existing 20-foot tower would be approved, as described in Alternative 2.

The LRMP and Site Plan would be amended as in Alternative 2.

Alternative 4

The VHF antenna component of the application would be denied. The height of the existing 60 ft. lattice tower would be allowed to be increased to 100 ft., to allow for additional antenna separation. The increased height would be obtained by adding tower segments, and no replacement tower would be allowed.

The microwave component of the application would be denied. The applicant would not be allowed to construct two 20-ft. monopole towers.

The existing 20-foot tower would be approved, as described in Alternative 2.

Western Radio would continue to operate its existing microwave system of three 6- ft. antennas, and a new fourth 6-ft. dish, all mounted on the existing two towers. The LRMP would be amended to remove references to the number of buildings and towers. The Site Plan would be amended to reflect the increased tower height, to allow solid microwave dishes, and to acknowledge the existence and use of the existing 20-foot tower.

Alternatives Eliminated From Detailed Study

A primary reason for proposing the two new microwave monopole towers is that the applicant has stated the existing 20- ft. tower cannot support the four larger dishes being proposed.

An alternative was discussed to replace the existing 20- ft. tower with a structurally stronger tower of the same height, using the same location. This option was not further analyzed because it would require that the cell site, which is owned by U.S. Cellular and serves as a hub networking communications for a number of local towns, would either be out of service while the replacement project occurred (which could be weeks if a deeper and larger cement base foundation was needed), or a temporary tower would be necessary, which would entail additional excavation, and eventual removal. In addition, there is an archaeological site in the area, underneath a cement foundation, and the

Confederated Tribes of the Warm Springs Reservation has asked that we protect the site by minimizing disturbance.

Project Design Criteria

Alternatives 2 and 3 would result in two to four new towers. There will be ground disturbance from installation of the new towers, and burying the associated transmission lines. Equipment will be brought to the site. Alternative 4 would add sections to an existing tower, and specialized equipment will be brought to the site.

The following project design criteria should be included in any authorization to proceed with the installations, although some, as noted, do not pertain to all alternatives.

Visual Quality

1. Rehabilitate impacted areas after completion of construction, to help reduce textural, soil or color contrast.
2. Keep new antenna mass to 6 ft. in diameter or smaller (grid or solid style dishes are acceptable).
3. Reduce reflection of sunlight onto new electronic facilities through the use of light absorbing paint and non-reflective materials. Utilization of flat paint in dark colors such as black, green or gray, or non-reflective cloth covers is recommended.

Fisheries

4. The access road to the project area, (5720080) is a native surface road. Conduct installation activities when this road is dry, and not wet or muddy, to minimize sediment transport and erosion towards streams.

Weed Prevention

5. A copy of the map showing known existing noxious weed infestations along associated travel routes will be provided to the lessee.
6. Areas of high disturbance including construction sites and road right-of-ways will be monitored for noxious weed infestation periodically through the life of the project.
7. All equipment to be operated within the project area will be cleaned in a manner sufficient to prevent noxious weed propagules from being carried onto the project area. This requirement does not apply to passenger vehicles or other equipment operated exclusively on roads. Cleaning will occur off of National Grassland administered lands. Cleaning will be inspected and approved by the administrator of the lease.
8. If road maintenance activities are required within infested portions of existing roads, the road maintenance equipment will be cleaned prior to moving out of the infested area.

9. Road rock source pits/quarries will be inspected for noxious weed infestations prior to use. Rock source material contaminated with high priority weed propagules will not be utilized, or pit use will be managed to ensure contaminated materials are not transported and deposited in other locations.

10. Areas of bare/disturbed soil (including but not limited to: construction sites, and equipment staging areas) will be seeded. The seed mix to be used will include at least one grass species which: grows readily in the absence of the A soil horizon, and is moderately to strongly rhizomatous. In addition, the seed mix will include one fast germinating annual grass species to provide immediate (relatively) ground cover. Seed application rates will be high (20-30 lbs/acre pure live seed basis) to compensate for the broadcast method of application, and to generate vegetative densities adequate to provide deterrence to noxious weed invasion. Note: This would not apply to Alternative 4, since no new areas of bare/disturbed soil are expected.

The Forest Service will provide a specific seed mix recommendation to the lessee.

11. Seed will be certified weed free (all states noxious weed certification). Note: This would not apply to Alternative 4, since no new areas of bare/disturbed soil are expected.

12. The lessee will be provided with weed identification material so that they can be better able to recognize the presence of noxious and invasive plants.

13. If new noxious weed infestations do occur within the project areas, a noxious weed site inventory will be completed, and an early treatment strategy will be employed under the Forest's anticipated early detection, rapid response protocol.

14. Soil disturbing activities will be avoided during periods of heavy rain or wet soils to minimize soil disturbance.

15. Personnel will be responsible to ensure that all hand tools, clothing and personal protective equipment are free of noxious weed propagules prior to entering the project area.

Cultural Resources

16. Complete a traditional oral history of Gray Butte by working with the tribal elders, and adding it to the documentation of the site

17. Protect the archaeological site by retaining the cement foundation (under Western Radio's old building) that lies over it. In addition, no buried cable or electric lines would be allowed within 15 feet of the foundation, as measured from the center of Western Radio's old building.

Public Safety

18. According to radio specialist calculations, the microwave antennas have the potential to emit levels of radio frequency radiation above FCC guidelines, due to the

concentration of energy in a narrow beam. The microwave antennas should be mounted such as their lower edge is more than 7 ft. from ground level. If this is not feasible, actual field measurements of radio frequency radiation will be required. If levels exceed FCC guidelines, a plan to protect public safety will be submitted by the applicant.

Monitoring _____

Monitoring activities would be conducted as part of the special use management of the site, and would focus on the following:

Equipment cleaning prior to entry onto the project site.

Observations of new noxious weed infestations.

Ensure the project activity is timed to avoid wet periods.

Monitoring of reseeding efforts.

Review the final microwave antenna mounted heights, to ensure radio frequency exposure is limited, or mitigation is required.

Review plans for burying cables lines prior to installation, to ensure that the 15 ft. “no disturbance” zone is not impacted.

Alternative Comparison _____

The following table displays the features of each alternative.

Table 1. Comparison of Alternatives Features

Alt. components	Alt. 1	Alt. 2 (proposed action)	Alt. 3	Alt. 4
VHF antennas on two new 15 ft. towers	Deny	Approve	Deny	Deny; approve increasing existing 60 ft. tower to 100 ft.
Microwave antennas on two new 20 ft. towers	Deny	Approve	Approve	Deny
Amend LRMP to delete restriction of 3 towers and 3 buildings	No	Yes	Yes	Yes
VHF antennas allowed on existing 20-foot tower	No	Yes	Yes	Yes
Project design criteria	None	All listed in EA	All listed in EA	All listed in EA except Weed # 10,11

Table 2. Comparison of Effects

Resource	Alt. 1	Alt. 2 (proposed action)	Alt. 3	Alt. 4
Tower Separation/Isolation (VHF) to other Lessees	No change Existing Distance from Western Radio 60 ft. tower to: Slater: 190 ft. Day: 107 ft.	Reduction of separation: Resulting Distance from VHF towers to: Slater: 151-284 ft. Day: 90 – 110 ft.	No change	No change
Predicted Isolation to other Lessees	No change	Slater: VHF A-would result in added isolation VHF B-would result in decreased isolation Day: VHF A-would result in decreased isolation VHF B-would result in increased isolation	No change	No change
Meets VHF Purpose and Need	No change	Increased horizontal distance/likely reduced isolation because vertical separation is more effective than horizontal separation	No change	Increased vertical distance/ likely improvement in isolation
Visual Quality: --- casual visitors, such as campers and travelers/Scenic views	No change to existing scenic condition; 2 towers do not dominate or are highly visible. 100-foot tower, visible and distinguishable	Slight alteration (improvement) to scenic condition; new towers would not dominate or be highly visible, microwave dishes off the skyline	Slight alteration (improvement), new towers would not dominate or be highly visible, microwave dishes off the skyline	The 100 ft. tower would be more dominant due to height above other towers at skyline.
--- activity-based recreationists, such as bicyclists	No change; existing towers do not dominate nor are highly visible	No effect; new towers would not be evident	No effect: new towers would not be evident	The increased tower height is not expected to be highly evident

Resource	Alt. 1	Alt. 2 (proposed action)	Alt. 3	Alt. 4
Full Utilization of Existing Facilities	No change	Maximum new facilities on site -4	Fewer new facilities -2	No new facilities while increasing capacity
Wildlife				
--Migratory birds: tower collisions	No increase risk Minimal Risk – * meets FWS guidelines	Minimal Risk – * meets FWS guidelines	Minimal Risk – * meets FWS guidelines	Minimal Risk- * meets FWS guidelines
--Raptors	No change No effect-no raptor nests w/in 2 miles	No effect-no raptor nests w/in 2 miles	No effect-no raptor nests w/in 2 miles	No effect-no raptor nest w/in 2 miles
PETS**				
--Canada Lynx	No Effect	No Effect	No Effect	No Effect
--N. Bald Eagle	No Effect	No Effect	No Effect	No Effect
--Peregrine Falcon	No Impact	No Impact	No Impact	No Impact
--Bufflehead	No Impact	MIIH***	MIIH***	MIIH***
--California Wolverine	No Impact	No Impact	No Impact	No Impact
--Gray Flycatcher	No Impact	MIIH	MIIH	MIIH
--Great. Sage Grouse	No Impact	No Impact	No Impact	No Impact
--Pygmy Rabbit	No Impact	No Impact	No Impact	No Impact
--Tricolored Blackbird	No Impact	No Impact	No Impact	No Impact
--Upland Sandpiper	No Impact	No Impact	No Impact	No Impact
Weed Prevention				
--risk of weed spread potential, based on # of towers, length of cable lines to bury	No change – existing vehicle use causes the most risk	Moderate increase in risk due to 4 new towers	Some increase in risk due to two new towers	No change –
Fisheries				
PETS** Aquatic Species				
--Bull Trout critical habitat	NAA+	NAA+	NAA+	NAA+
--Mid-Columbia R. steelhead trout critical habitat	NAA+	NAA+	NAA+	NAA+
--Mid-Columbia R. spring-run Chinook salmon EFH++	NAA+	NAA+	NAA+	NAA+

<p>--Columbia spotted frog</p> <p>--Redband trout, Bull trout, Mid-Columbia R. steelhead trout, Malheur mottled sculpin, Mid-Columbia R. spring-run chinook salmon, Westslope cutthroat trout</p>	<p>MIIH***</p> <p>No Impact or No Effect</p>	<p>MIIH***</p> <p>No Impact or No Effect</p>	<p>MIIH***</p> <p>No Impact or No Effect</p>	<p>MIIH***</p> <p>No Impact or No Effect</p>
<p>Botany</p> <p>No proposed, threatened, or endangered species</p> <p>--effects to sensitive species:</p>	<p>No Impact</p>	<p>No Impact</p>	<p>No Impact</p>	<p>No Impact</p>

* U.S. Fish and Wildlife Service (FWS) tower guidelines to minimize collisions between birds and towers: a) towers should be less than 200 ft. above ground level, b) towers should be unlit, and c) towers should avoid guy wires. These guidelines are met with all alternatives.

**** PETS: Proposed, Threatened, Endangered, and Sensitive Species:**

Determination for Sensitive Species:

***MIIH May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species

Determination for designated critical habitat and EFH:

+ NAA No adverse affect

++ Essential Fish Habitat

More information regarding the effects presented in table two can be found in the draft specialist reports. These reports are available for review upon request.

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

This chapter describes the components and scope of the human environment that may be affected by the implementation of the alternatives. It then describes the potential effects (direct, indirect and cumulative) of implementing each alternative, and describes the scientific and analytical basis for comparing the effects of alternatives.

Direct effects are defined as those effects which are caused by the action and occur at the same time and place as the action. Indirect effects are those effects which are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable. Cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. (40CFR 1508.7 – 1508.8)

Past, Present and Reasonably Foreseeable Future Actions _____

In analyzing potential cumulative effects of the project, the following past, present and foreseeable future actions are known to have occurred, or are predicted to occur.

The Skull Hollow prescribed burn in 2002 manipulated vegetation through a low intensity fire.

Other activities which have contributed to the existing resource conditions within the project area include: livestock grazing (and range improvements such as water developments and fences), road construction and maintenance, past western juniper treatments and recreational activities including unauthorized offroad motorized vehicle travel.

Present and reasonably foreseeable future actions occurring within the project area include: agency inventory and monitoring, road maintenance, and grazing within the Cyrus and Lonestone Allotments.

The area is used for a variety of recreational activities such as camping, horseback riding, bicycling, driving for pleasure, and hiking. It is expected that use would continue at current or slightly increasing levels.

TOWER SEPARATION/ISOLATION/PURPOSE AND NEED – ISSUE 1

The July 24, 2007 Radio Tech Report, and additional memos and conversation notes, located in the analysis file, are incorporated by reference and contain additional information.

The relocation of the two VHF antennas to sidehill locations closer to the other two owner's towers has the potential to create interference to their radio communications, some of which also use similar frequencies.

Will relocating the VHF antennas to sidehill locations, thereby increasing the horizontal distance, meet the purpose and need of reducing interference between Western Radio's receive and transmit antennas?

Analysis factors: The VHF monopole tower distances to the other two owner's facilities will be measured, and an estimate of the change in attenuation, otherwise known as isolation, will be made using distance and characteristics of high performing radios. The amount of isolation has a direct correlation to potential interference. Everything else being equal, the longer the physical distance, and the greater the attenuation, there is less potential for creating interference. In addition, the change in attenuation of Western Radio's antennas due to the alternatives will also be estimated.

The following analysis addresses the VHF component of the proposal. The microwave component of the proposed action is discussed separately.

Background

There are a couple of ways transmitters can cause interference to receivers. One is the impact of the transmitter's fundamental frequency upon nearby receivers. The other is when the transmitter's harmonics or combinations with other transmitters produce emissions on a receiver's frequency. The latter is almost always dealt with through the use of electronic filter and/or isolation circuits such as those specified in the "Minimum Site Standards for the Gray Butte Electronic Site" document. Since the Gray Butte site users are already implementing this technology, the following analysis will focus upon the former interference issue, the transmitter's fundamental frequency.

For a receiver to continue operating at a given performance level when a transmitter activates, there must be a certain amount of attenuation of the transmitter's signal before it arrives at the receiver. The attenuation is sometimes referred to as isolation. The amount of isolation necessary increases as the transmitter and receiver frequency differences decrease. The closer the receiver and transmitter are located physically, the less isolation there is, and higher potential for interference.

The minimum amount of isolation necessary at a given frequency difference varies slightly from one model of radio to another. The two most common sources of this information are the radio manufacturers, and the manufacturers of filters that provide attenuation. The filter manufacturer's data of course must be more conservative since it needs to account for all models of radios, including those with low performance. The information is usually in the form of a graph, and is referred to as a duplex operation curve.

A predominate unit of measure in radio frequency design is the dB (decibel). It is a logarithmic scale. Extreme ratios between signals can be depicted with manageable

numbers, and figures can be combined with normal addition and subtraction. A duplex operation curve gives the isolation in dB necessary to prevent greater than 1 dB degradation to the receiver's performance. 1 dB is about where the degradation becomes noticeable to the user. For instance, if you've ever been talking on a cell phone and one moment the signal is good and the next it's not so good, you've experienced greater than 1 dB of degradation.

Assumptions: The make/model of proposal's radio equipment is unknown; therefore, the specific duplex operation curve graph information is not available. For this analysis, a typical top performance radio, the GE/Ericsson Mastr II was used. The Minimum Site Standards for Gray Butte Electronic Site indicates that only top performing radios are allowed. This model's performance would be typical of all radios listed as example equipment.

In addition, detailed information of all other communication equipment at the site, such as antenna types and manufacturers, filters, transmission lines, antenna azimuths, and combining systems was not available. As a result, a theoretical installation of the proposal, and resulting effects, is presented.

Affected Environment

There are currently four towers at the Gray Butte Communication Site. The two 158.7 MHz VHF antennas proposed for relocation are currently mounted on Western Radio's 60 ft. tower. This tower is approximately 105 ft. from the Day Wireless tower. The Day Wireless tower supports the County of Jefferson's antennas, which receive on 159.075 MHz.

Western Radio's 60 ft. tower is approximately 190 ft. from the Slater Communications and Electronics tower. This tower supports a Western Forestry Communications antenna which receives on 159.525 MHz, and a Redmond School District antenna which receives on 157.575 MHz.

Western Radio's 60 ft. tower currently supports antennas that transmit at 158.7 MHz, and receive antennas at 158.64, 158.61, and 158.55 MHz. Western Radio states that there is interference between these close frequencies. During a site visit last fall, the other two leaseholders stated that there is sometimes interference at the 157 frequency band.

Alternative 1

Direct and Indirect effects

Purpose and Need:

The applicant is attempting to address interference their 158.700 MHz (megahertz) transmitter is causing to among others, their own 158.640 MHz receiver. These two

frequencies are spaced a mere 60 kHz (kilohertz) apart spectrally, which is inherently problematic due to the closeness in frequencies.

From the GE/Ericsson Mastr II duplex operation curve, the attenuation necessary for frequencies spaced 60 kHz apart, when adjusted for the licensed transmitter effective radiated power of 22 watts, is 72 dB of attenuation.

A combination of attenuating factors is necessary, which together will total a minimum 72 dB of attenuation. The 72 dB of attenuation must exist between the transmitter's output and the receiver's input. The attenuation must be effective at the operating frequencies.

Antennas may exhibit gain by focusing and intensifying the signal in certain directions, as compared to the standard reference dipole antenna. If any of this gain is in effect between the transmitter and receiver, then an equal amount of additional attenuation is necessary. Any gain introduced by amplification in the transmission lines will likewise require an equal amount of additional attenuation.

We do not have the details about the existing antennas, filters, and transmission lines, so a theoretical installation and attenuation calculation will be presented. The "Minimum Site Standards for the Gray Butte Electronic Site" specifies that the frequencies we are discussing are required to use antenna combining techniques.

Conventional design for antenna combining systems in these frequency bands places the receive antenna at the top of the tower, and the transmit antenna at the bottom of the tower. This maximizes the isolation between antennas and therefore the attenuation between transmitters and receivers. The isolation is maximized because the antennas used exhibit minimum signal response straight up and straight down. A tower 60 feet tall on the top of Gray Butte should be able to provide at least 40 feet of distance between the end tips of the two antennas. This distance of 40 vertical feet between antennas produces an estimated 60 dB of isolation. The exact value can only be determined through actual field measurements but the equation below is useful in making preliminary estimations.

$$\text{Isolation (in dB)} = 28 + 40 \text{ Log } (v/\lambda)$$

Where, v = vertical tip-to-tip separation between antennas
 λ = wavelength, in same units

The 60 dB of isolation between antennas applies directly to the 72 dB of necessary attenuation for Western Radio's system to work correctly (no interference). This leaves a remaining 12 dB of attenuation necessary to prevent a greater than 1 dB of degradation to the receiver.

Normally the additional attenuation necessary beyond that provided by the placement of the antennas is created through proper application of appropriate filters in the

transmission line, and to a very small extent the attenuation imposed by the transmission line itself. In this case though the close spacing, 60 kHz, of the frequencies is beyond the limits of any filters the Forest Service radio specialist is aware of. The best filters that were found offer effectiveness starting at 70 kHz, although further research with filter manufacturers may discover more effective filters.

In summary, due to the closeness of frequencies between transmit and receive frequencies in the 158 MHz range, there is most likely some existing signal degradation. There is not enough vertical separation offered on Western Radio's existing 60 ft. tower, even in combination with existing filters the Forest Service is aware of, to offer the amount of attenuation needed to prevent a greater than 1 dB of degradation to the receiver. As a result, any existing signal degradation (interference) between Western Radio's and transmit communications in the 158 MHz range would continue.

These effects assume that Western Radio does not apply for and receive a frequency change through the Federal Communications Commission, remove this transmitter from the site, or install additional filters effective at providing additional attenuation.

Effects on other facility owners:

Any existing interference between Western Radio's and other facility owner's communications in the 157-158 range would continue. The other facility owners state they experience occasional interference in the 157 MHz frequency. If this is due to the presence of Western Radio's transmitter, it would continue.

Cumulative Effects

There are no cumulative effects.

Alternative 2

Direct and Indirect effects

Purpose and Need

The horizontal distances between the proposed transmit antenna locations and the existing receive antenna location are approximately 100 feet. This places the antennas well outside the vertical isolation effect. The estimated isolation is determined from the formula below, applicable to horizontally spaced antennas. Approximately 42 dB of isolation is to be expected from unity gain dipole antennas located 100 feet apart horizontally.

Isolation between Dipoles (in dB) = $18 + 20 \text{ Log } (h/\lambda)$

Where, h = horizontal separation between antennas
 λ = wavelength, in same units

The antenna patterns and gain now affect the formula. The transmit antennas proposed are directional, yet they do not specify which directions they are to point. It is probable

that the locations they have chosen are such that the antennas would point away from the receive antenna. The antenna's specifications give a front to back ratio of 14 dB. If the transmit antennas do point away from the receive antenna, the 14 dB would add to the 42 dB already provided by the distance.

It is unknown which antennas are the receive antennas. The dimensions of the antennas on the applicant's tower indicate the gain of the receive antenna could be as much as 6 dB. This has a negative effect on the formula, and would counteract some of the isolation.

42 dB plus 14 dB minus 6 dB equals 50 dB of isolation. This leaves a remaining 22 dB of attenuation necessary to prevent a greater than 1 dB of degradation to the receiver.

If the above assumptions and estimations are correct, Alternative 2 would create a situation approximately 10 dB less effective than if they made the most effective utilization of their existing 60 feet tall tower. This alternative would result in a higher potential to cause interference/signal degradation within Western Radio's antennas, and would not meet the purpose and need for action.

A horizontal distance of 1,500 feet, not 100 feet, would be necessary to achieve adequate attenuation.

Effects on other facility owners:

Potential interference changes were calculated in the same manner as effects of alternatives on Western Radio's communications. The analysis is based on receive frequencies listed on radio licenses listed on the Federal Communications Commission (FCC) website. However, all of the receivers are not known at the site.

Western Radio's proposed sidehill locations (labeled VHF A and B on the proposal map) will in some cases, move their transmitters closer to other facility owner receivers, which may increase interference to them; and in other cases, moves them further away, which may decrease interference. For example:

The County of Jefferson, which is on the Day Wireless tower, receives 159.075 MHz. This is a spacing of 375 kHz. The necessary attenuation is 64 dB. The Jefferson County antenna distance would decrease from approximately 105 to 90 feet at VHF A, and increase from approximately 105 to 110 feet at VHF B. The distance isolation would decrease by 1dB at vhf A, and increase by 1/2 dB at vhf B. The proposal is to use directional antennas. The azimuths are unspecified, however if they point away from the Day Wireless tower an overall improvement up to the antenna's 14 dB front to back ratio could also be realized. This could result in an overall improvement of up to 13 dB. Some attenuation provided by filtering would remain necessary.

Western Forestry Communications, which is on the Slater Communications tower, receives 159.525 MHz. This is a spacing of 825 kHz. The necessary attenuation is 59 dB. The Redmond School District 2J is also located on the Slater Communications

tower, and receives 157.575 MHz. This is a spacing of 1.125 MHz. The necessary attenuation is 50 dB. The Western Forestry and Redmond School District distance would increase from approximately 190 to 284 feet at VHFA, and decrease from approximately 190 to 151 feet at VHFB. The distance isolation would increase by 3 dB at VHF A, and decrease by 2 dB at VHF B. The antenna at VHF A is probably intended to be pointing away so the overall improvement may benefit from the directionality also, and could be up to 17 dB. The situation at VHF B is not an improvement though. The VHF B antenna does not appear intended to point away from the Slater tower. The exact azimuth is not known, however one would estimate its intended direction would cause its forward gain to be in effect in the Slater direction. The necessary attenuation would increase by up to 2 dB. The 2 dB of additional attenuation could readily be obtained from cavity filters given the frequency spacing in this case. There may be existing filters already in place as part of the antenna combining systems capable of providing the necessary attenuation.

In summary, in some cases, interference potential would decrease for some users of the facility owners, due to a Western Radio's transmitter being relocated further than the existing condition. However, in some cases, interference potential is increased, due to a decrease in distance. With additional filters, this may be mitigated.

Cumulative Effects

There are no cumulative effects.

Alternative 3

Direct and Indirect Effects:

Purpose and Need & Effects on other Facility Owners:

This alternative would deny authorizing the relocation of the two VHF antennas to sidehill locations. The effects would be the same as Alternative 1, for both Western Radio and other facility owners.

Cumulative Effects:

There are no cumulative effects.

Alternative 4

Direct and Indirect Effects:

Purpose and Need

This alternative would deny the VHF sidehill locations, but would authorize adding an additional 40 ft. to Western Radio's 60 ft. tower, for a total maximum height of 100 ft.

This alternative would increase the vertical spacing between receive and transmit antennas by an additional 40 feet. Western Radio's current set up provides for 60dB of attenuation and he needs approximately 72dB of attenuation to reduce

interference/signal degradation. Although results are less predictable as distance increases, the formula estimates that an additional 40 feet of vertical spacing between the antennas should provide the necessary 12 dB of additional attenuation. Note the precautionary comments below.

The question posed by Alternative 4 is: would increasing the applicant's tower height an additional 40 feet to an overall height of 100 feet provide the necessary 12 dB of additional isolation? As was done earlier in the document to determine if the existing tower provided enough isolation with its vertical antenna separation of 40 feet, we again use the vertical isolation formula to estimate the isolation provided by 40 additional feet for a total of 80 feet of separation between the antenna tips. Again, the formula is:

$$\text{Isolation (in dB)} = 28 + 40 \text{ Log } (v / \lambda)$$

Where, v = vertical tip-to-tip separation between antennas
 λ = wavelength, in same units

The formulas used here for estimations are industry standard and are the basis for engineering tools used in this field. One such tool based upon these formulas is Radio Frequency Systems' CELcalc program available at <http://www.rfsworld.com/index.php?p=93&l=1&>

We already determined the estimated necessary isolation to be 72 dB, from the GE/Ericsson Mastr II duplex operation curves.

To fill in the variables of the formula for vertical isolation, we need to determine the wavelength for the given frequency. The wavelength is the distance the radio wave travels in one wave cycle. All radio waves travel at the same speed of approximately 300 million meters per second, therefore the time period of one wave cycle multiplied by this speed provides the wave length. The time period is equal to 1/frequency, or in this case $1/158.7 \text{ MHz} = 0.0063 \mu\text{Sec}$. The wavelength is therefore $0.0063 \mu\text{Sec} \times 300 \text{ million meters} = 1.89 \text{ meters} = 6.2 \text{ feet}$. The estimated vertical isolation is $28 + 40 \text{ Log } (80/6.2) = 72 \text{ dB}$.

The estimated isolation provided by Increasing the tower height by 40 feet is just adequate to fulfill the requirement of 72 dB. This is just an estimate though, and actual isolation results will differ. The actual isolation may fall short of the estimate. With no margin for estimate error, this alternative may fail to perform adequately. A more precise analysis based upon the actual equipment involved in this proposal would be necessary to determine if an adequate margin exists.

It should be noted that isolation greater than 70 dB can be difficult to obtain from antennas vertically spaced on the same tower, irregardless of spacing distance. Engineering designs should not incorporate estimates greater than 70 dB for vertical spacing, unless based upon actual measurements taken directly from the existing installation.

Effects on other facility owners:

Same as alternative 1 and 3

Predicting potential interference effects to other users is dependent on where the VHF transmit antenna would be located on this taller tower, and is unknown. Industry convention places transmitter antenna at the bottom of a tower, and receive antenna at the top.

Assuming this is the current arrangement of Western Radio's VHF antenna, and will be the future arrangement with a 100 ft. tower, there would be no change in effects to other users. This is because both the vertical and horizontal spacing of the transmit antenna, in relationship to the locations of Day Wireless and Slater Systems antennas, would not change.

TWO NEW MICROWAVE MONOPOLES – PURPOSE & NEED

The existing three microwave antennas mounted on Western Radio's 20 ft. lattice tower would be replaced with three 6- ft. solid microwave antennas, mounted on two new 20- ft. monopole towers located at sidehill locations. A fourth microwave dish to serve Warm Springs would also be approved to be mounted on the new 20- ft. monopole towers.

The proponent did not provide a structural analysis study indicating that the existing towers could not support four 6 ft. microwave dishes. However, professional experience of the Forest Service radio frequency manager, who has been involved with numerous communication sites and systems indicated that similar size microwave dishes are typically supported on "beefier" towers than what the proponent has. We will assume that mounting additional larger and heavier dishes on the existing 20-foot tower would increase the potential for structural failure of the towers or antennas, over the long term. As a result, under Alternatives 1 and 4 there is a higher potential for communication disruptions than under Alternatives 2 and 3.

For Alternative 4, the proponent provided comments to our draft EA which indicated that a modified tower (raising the height to 100 ft while keeping the existing cement foundation) may not survive the weather conditions, which would increase the potential for communication disruptions.

**VHF ANTENNAS ALLOWED ON EXISTING 20-FOOT TOWER
PURPOSE AND NEED**

Currently, VHF antennas are not allowed on Western Radio's 20-foot tower. Historically, Western Radio has disagreed with the Forest Service regarding the appropriate uses on this tower. Western Radio currently uses this tower for both microwave and VHF antennas. All action alternatives permit the use of VHF antennas

on this tower, for the following reasons: 1) Allowing a lessee more flexibility to utilize their towers provides for better utilization of the existing site facilities, 2) the Forest Service has not identified any technical reason to restrict non-microwave antennas on this tower, 3) the other two lessees at the site have not provided comments on the draft EA which included this proposal² and 4) there are provisions in the Site Plan to address site issues, such as interference, which could arise due to a new use on the 20 ft. tower.

Because this tower has been used for VHF antennas, no additional impact to the other facility owners is expected. If, in the future, Western Radio plans to add additional VHF antennas, coordination with the other users will be mandated through the terms of the Gray Butte Site Management Plan.

VISUAL QUALITY - ISSUE 2

The May 22, 2007 Landscape and Scenery Management Report, located in the analysis file, is incorporated by reference and contains additional information.

Gray Butte is a prominent peak from a number of viewpoints, including Highways 97 and 26, Smith Rocks State Park, and the Gray Butte trail. New facilities may not blend well with the existing landscape, degrading the visual quality.

Analysis factors: The alternatives will be evaluated for how well they blend into the landscape, from the perspective of casual visitors and travelers in the area, as well as activity-based recreationists, such as bicyclists. Visual quality impacts to recreation-based visitors are discussed separately.

Management Direction

Scenic Resources

The USDA Forest Service established a Handbook for Scenery Management System (SMS--USDA FS 1995) use to protect and enhance scenic resources which may be diminished by human activities, such as vegetation management, recreation and/or administrative facility development. The analysis will take into consideration the balance between Social (human) and Ecological (natural) needs within the analysis area.

This Scenery Management System (SMS) will be used in conjunction with the Crooked River Grassland Land and Resource Management Plan (LRMP 1989).

² Slater Communications 11/9/2006 letter did comment that Western Radio's 2nd tower should be removed, because each entity was allowed a single tower. However, a review of Western Radio's first special use permit, 1978, indicate he has been authorized two towers (one being labeled "microwave"), and there is no direction in the 1981 or 1989 Site Plans about removal of this microwave tower.

The Forest Service implementing regulations, currently establish a variety of **Scenic Quality Standards** (SQO's for Scenic Views--MA-9). These standards include:

- Natural Appearing Landscape with High Scenic Integrity Level (formerly Retention, MA-9, SV-1),
- Slightly Altered Landscape with Medium Scenic Integrity Level (formerly Partial Retention, MA-9, SV-2),
- Altered Landscape with Low Scenic Integrity Level (formerly Modification or General Forest, MA-8, GFO) within the Foreground as well as in the Middleground landscape.

The current LRMP direction for the Gray Butte Electronic Site (MA-G15) is partial retention, which corresponds to a Slightly Altered Landscape with Medium Scenic Integrity.

Landscape Character Goal

To provide forest visitors with high quality scenery that represents the natural character of Central Oregon.

Scenic Views Standards and Guidelines

Utility developments may be located within Scenic Views corridors or allocation areas, if facilities or associated improvements are located, designed, and maintained to blend with the characteristic landscape (**LRMP MA G15**).

Local Communities & Electronic Sites

Central Oregon is dotted with numerous hills and buttes that are designated as electronic communication site allocation areas. The closer we are to a populated area, such as Madras, Prineville, Redmond, Terrebonne, Sisters, Bend, or Sunriver, the more electronic communication sites there are to serve the population. Many of these sites or facilities are very close to town and are highly visible. People have learned to accept and live with these towers and antennas.

Affected Environment: Landscape Character and Scenic Conditions

Gray Butte electronic site is situated on a relatively high-open wind swept peak with very little vegetation cover, beside the various grass and low shrub species found here. While the site is designated as 80 acres in total area, only the very top of the mountain is used for actual electronic communication facilities, which afford omni-directional antenna systems, and make it easier for construction/installation.

This is a relatively visible butte, which can be seen from just about every direction. This is a landscape being viewed and seen mostly as Middle ground landscape area (1/2-4 miles) or Background landscape area (4 miles and beyond).

Within the Gray Butte Electronic Site Project area, Highway 97 and Highway 26 are the two primary access, travel, and sensitive scenic corridors. Highway 97 is a high vehicular traffic use access and travel corridor between the City of Redmond and Terrebonne to the south and the City of Madras to the north. Highway 26, which is also a relatively important/sensitive access and travel corridor between the City of Madras to the north and the City of Prineville to the south, is another sensitive scenic corridor that bypasses Gray Butte Electronic Site.

Other less sensitive travel corridors included secondary access and travel management roads and recreation trails and associated trailheads within the immediate vicinity of Gray Butte Electronic Site.

The primarily and sensitive scenic views (stationary viewer's locations) include: the City of Prineville, the City of Redmond, the City of Madras, The City of Terrebonne, Smith Rock State Park, Peter Skene Ogden State Park, and Hay Stack Reservoir, and Rim Rock Springs Trailhead, as seen from Middleground landscape area (1/2 -4 miles) and Background landscape area (4 miles and beyond).

Existing Condition

Based on field analysis data, the existing 100 ft. lattice tower and associated antennas belonging to Slater Systems can be visible and distinguishable from various viewers' locations around Gray Butte Electronic Site, particularly during a bright sunny day. During a cloudy day, it takes a discerning eye to make out the butte's highest electronic tower profile.

The other existing smaller and shorter electronic towers and associated antennas are not expected to be distinguishable to the casual travelers and visitors to the area. They are currently considered to be subordinated to and blended well with the existing landscape character, as seen from Middle ground landscape area (1/2 – 4 miles) and Background landscape area (4 miles and beyond). They appear to blend in well with the rest of the existing landscape as view from sensitive viewer's locations, such as the City of Prineville, the City of Redmond, the City of Madras, The City of Terrebonne, Smith Rock State Park, Peter Skene Ogden State Park, Haystack Reservoir, and Rim Rock Springs Trailhead; and sensitive access and travel corridors, such as Highway 97 and Highway 26 scenic corridors.

The visual scaring of the landscape, brought on by the electronic equipment installation some years ago, is well healed with well established groundcover and shrub components.

Summary: In general, due to relative far away distance between a viewer’s location and Gray Butte Electronic Site, the visibility of existing electronic towers (and their associated facilities) to a casual visitor or traveler is rated between low and moderate visibility. The existing electronic facilities are currently considered to be subordinated to and blended well with the existing landscape character.

Table. 3 Visibility Rating (As Seen From Viewpoints Toward Gray Butte Electronic Site)

North	N. East	East	S. East	South	S. West	West	N. West
Madras, Hay Stack Reservoir, Hills and Open Grassland	Rim Rock Springs Trailhead, Highway 26, Gray Butte TH	Highway 26, Open Grassland	City of Prineville, Skull Hollow, Lone Pine Road	Open Grassland, Lone Pine Road	Redmond, Terrebonne, Smith Rock SP, Peter Skene Ogden SP	Highway 97, Henderson Flat TH, and Open Grassland	Haystack Reservoir, Madras
Low Visibility	Low to Moderate Visibility	Low Visibility	Low to Moderate Visibility	Low to Moderate Visibility	Low to Moderate Visibility	Low to Moderate Visibility	Low to Moderate Visibility

Effects of Alternatives

Basic Assumption:

The effect on scenic resources brought on by the proposed management activities would be most evident to the visiting public and casual observers within the foreground landscape area (0-1/2 mile from access and travel corridors, such as Hwy 97 and Hwy 26) and Middleground landscape area (1/2-4 miles) as seen from a sensitive viewer’s location, such as the City of Prineville, the City of Redmond, the City of Madras, the City of Terrebonne, Smith Rock State Park, Peter Skene Ogden State Park, and Haystack Reservoir, and Rim Rock Springs Trailhead.

Alternative 1

The existing 100 ft. lattice tower and associated antennas belonging to Slater Systems can still be visible and distinguishable from various viewers’ locations around Gray Butte Electronic Site, particularly during a bright sunny day. During a cloudy day, it takes a discerning eye to make out the butte’s highest electronic tower profile. Other existing smaller and shorter electronic towers (and associated antennas), due to their low profiles, are not expected to be distinguishable to the casual travelers and visitors to the area.

Under this alternative, the area’s existing landscape character, scenic integrity level, and scenic quality would remain essentially the same. The directions for Scenic Views (MA-9) within the Gray Butte Electronic Site, a designated electronic communication site

under the Crooked River National Grassland allocation, would be expected to fully meet existing standards and guidelines for scenic views, as established under LRMP (Forest Plan) allocation for utilities development.

Alternative 2

Under this alternative, the effect on landscape character, scenic integrity level, and scenic quality, brought on by the proposed management activities on Gray Butte Electronic Site, is expected to slightly alter existing scenic condition. The proposed 20 ft. monopole towers (and associated dishes and antennas) to be located on the hill side are expected to subordinate to and blend well with the surrounding landscape, as viewed by the casual travelers and visitors to the area.. These electronic towers are not expected to dominate the landscape or be highly visible or even distinguishable from the various viewer's locations around Gray Butte Electronic Site, particularly during a cloudy day. It would take a discerning eye to make out these electronic towers' profile, due to their low profiles and blending well into the hill side.

Additionally, the proposed relocation of existing electronic equipment, which include four 6-foot solid microwave dishes, on the existing 20 ft. and 60 ft. lattice tower, is expected to slightly help improve the area's scenic quality.

Under this alternative, the directions for Scenic Views (MA-G15) within the Gray Butte Electronic Site, a designated electronic communication site under the Crooked River National Grassland allocation, is expected to meet standards and guidelines for scenic views, as established under LRMP (Forest Plan) allocation for utilities development.

Alternative 3

Under this alternative, the effect on landscape character, scenic integrity level, and scenic quality, brought on by the proposed management activities on Gray Butte Electronic Site, is expected to slightly alter existing scenic condition. The two 20 ft. monopole towers (and associated dishes) to be located on the hill side are expected to subordinate to and blend well with the surrounding landscape, as viewed by the casual travelers and visitors to the area.. These electronic towers are not expected to dominate the landscape or highly visible or even distinguishable from the various viewer's locations around Gray Butte Electronic Site, particularly during a cloudy day. It would take a discerning eye to make out these electronic towers' profile, due to their low profiles and blending well into the hill side.

Additionally, the proposed removal of existing electronic equipment, which include four 6-foot solid microwave dishes on the 20 ft. and 60 ft. lattice tower, is expected to slightly help improve the area's scenic quality.

As in the other alternatives the directions for Scenic Views (MA-G15) within the Gray Butte Electronic Site, a designated electronic communication site under the Crooked River National Grassland allocation is expected to meet standards and guidelines for scenic views, as established under LRMP (Forest Plan) allocation for utilities development.

Alternative 4

This alternative would increase the height of the existing Western Radio tower from 60 feet to a maximum of 100 feet. There would not be any new monopoles added to the side hill of Gray Butte and there would not be any ground disturbance.

Although the footprint of this tower structure would be far less than the existing 100-foot tower on the site, increasing its' height would result in this tower being more dominant and rise above the other towers on the horizon.. This is because it currently sits on top of the butte whereas the existing 100-foot tower sits downslope from the top. This difference in height may capture the casual travelers and visitors to the area more so than if all towers were of equal heights.

The effect on landscape character, scenic integrity level, and scenic quality, brought on by the increase in tower height is expected to slightly alter existing scenic condition. Although this increase in tower height will make the tower more visible, it is expected to meet the directions for Scenic Views (MA-G15).

Visual Quality Effects to Recreationists

The Febraury 27,2007 recreation report, located in the analysis file, is incorporated by reference and contains additional information.

Affected Environment

Crooked River National Grassland is a haven for recreationists due to its close proximity to cities and its year-round access. The Grassland offers opportunities for mountain biking, hiking, horseback riding, rock climbing, driving for pleasure, camping, picnicking, and fishing.

With an elevation of 5118 feet, Gray Butte is visible from trails, roads, and developed and dispersed camp sites on the Grassland. Gray Butte Trail # 852 is 6.5 miles long and skirts around the northern, western, and southern sides of Gray Butte. The elevation of Gray Butte Trail ranges from 3300 feet to 4400 feet. The trailhead is located on the north side of Gray Butte off of Forest Road 57 near McCoin Orchard. The trail can also be accessed from Smith Rock State Park by following the Burma Road.

Ridge Rider Trail # 854 is composed of 2 loop trails (10 miles and 25 miles) that occupy the Grassland between Highways 26 and 97. Its elevation ranges from 2900 feet to 4200 feet. The Ridge Rider and Gray Butte trails share a segment of trail on the southern side of Gray Butte.

Both of these trails are highly used by horseback riders, mountain bikers, and hikers. Motorized use is prohibited.

Alternative 1

Under this No action alternative, the existing electronic facilities would remain the same. The visual quality of Gray Butte would remain unchanged. The existing towers and buildings would still be visible from the trails, roads, and camp sites.

Alternative 2

Four new 15 to 20 ft. monopole towers would be authorized in this alternative. The new monopole towers, along with the dishes and antennas, would be located on the northern and southern side hills of Gray Butte. Due to the location, the towers would blend in with the hillside and would not change the appearance of the Gray Butte sky line.

The primary activities on Gray Butte Trail and Ridge Rider Trail, horseback riding and mountain biking, are generally more activity-based. This means that more emphasis is placed on the activity itself, rather than solely on scenery or wildlife viewing. There would be little impact to the visuals from a trail user standpoint because the users are focused mainly on the activity. Unless stopped or just 'strolling' on the trail, the new towers and facilities probably would not be obvious. From the trails, only 1 tower at a time would be evident, depending on what side of Gray Butte they are on. If visitors have been in the vicinity around Gray Butte before, they would already be accustomed to seeing electrical towers and facilities on top and would not be able to distinguish between the new towers and the existing towers; therefore, the new proposal should not greatly affect the quality of visuals to the horizon. Short-term impacts to the visuals may include some disturbed ground immediately following the new construction of the side hill towers. This is not expected to be highly visible, given the amount of disturbance and the distance from any viewpoint. Additionally, the proposed removal of existing electronic equipments, which includes four 6-foot solid microwave dishes on the 20 and 60 ft. lattice tower, which are on the skyline, is expected to slightly help improve the area's scenic quality.

Alternative 3

This alternative would allow two new 20-foot monopole towers, along with the dishes and antennas, would be located on the northern and southern side hills of Gray Butte. Due to the location, the towers would blend in with the hillside and would not change the appearance of the Gray Butte sky line. Additionally, the proposed removal of existing electronic equipments, which includes four 6-foot solid microwave dishes on the 20 and 60 ft. lattice tower, which are on the skyline, is expected to slightly help improve the area's scenic quality.

The primary activities on Gray Butte Trail and Ridge Rider Trail, horseback riding and mountain biking, are generally more activity-based. This means that more emphasis is placed on the activity itself, rather than solely on scenery or wildlife viewing. There would be little impact to the visuals from a trail user standpoint because the users are focused mainly on the activity. Unless stopped or just 'strolling' on the trail, the new towers and facilities probably would not even be obvious. From the trails, only 1 tower at a time would be evident, depending on what side of Gray Butte they are on. If visitors

have been in the vicinity around Gray Butte before, they would already be accustomed to seeing electrical towers and facilities on top and would not be able to distinguish between the new towers and the existing towers; therefore, the new proposal should not greatly affect the quality of visuals to the horizon. Short term impacts to the visuals may include disturbed ground immediately following the new construction of the side hill towers. This is not expected to be highly visible, given the amount of disturbance and the distance from any viewpoint.

Alternative 4

Alternative 4 includes increasing the height of the existing Western Radio tower from 60 feet to 100 feet. No new monopoles would be added to the side hill of Gray Butte and there would not be any ground disturbance. Recreation users would not be affected by the height increase. The skyline of Gray Butte is already dotted with towers and the increased height of the tower would not be evident to the activity-based recreationist.

Increasing the height of the tower, however, may lead to that tower being more dominant and rise above the other towers on the horizon. This difference in height may capture the casual visitor's attention more so than if all towers were among equal heights.

FULL UTILIZATION OF EXISTING FACILITIES - ISSUE 3

Only the top of Gray Butte allows omni-directional antenna systems. The existing facilities of Western Radio and Day Wireless are concentrated at the top of the butte, which has limited physical space for additional towers or other facilities. To reduce potential interference with the other lessees, Slater Systems facilities were located almost 200 ft. below the top.

Existing facilities should be fully utilized before new development is authorized. Additional facilities can create more physically crowded conditions for all users. With everything else being equal, the closer facilities are placed to one another, the higher the potential there is to create unintentional signal mixing and degraded conditions, whether from electronic circuits or from metal equipment, such as poorly bonded joints, screws, bolts and wire connectors.

The other facility owners expressed concern that the VHF antennas, located so far from the proponent's existing facilities, would spread interference through the site.

One of the 1989 Site Plan objectives is to maximize utilization of the site, (p.3- II # 3) and one Forest Service policy goal of site planning is to maximize the efficient use of each site (FSH 2709.11, 92)

Analysis Factors: The physical impact and number of new facilities will be evaluated for each alternative, as well as facility utilization.

Direct and Indirect Effects

Alternative 1

No new facilities are proposed, which would result in no changes to utilization of the site. However, this is the only alternative of the four which would limit Western Radio's existing 20 ft. tower to microwave systems only. This would result in less lessee flexibility to arrange or add antenna systems, and may limit the full utilization of Western radio's existing facilities. However, although VHF antennas are not allowed on Western Radio's 20-foot tower, historically, Western Radio has disagreed with the Forest Service regarding the appropriate uses on this tower. Western Radio uses this tower for both microwave and VHF antennas. As a result, little decrease in actual flexibility or utilization is expected.

Alternative 2

This alternative authorizes four new towers. They would all be located below the top of the Butte, so would not physically crowd the existing facilities. This alternative would result in more unoccupied space (less than full utilization) on the 60 ft. tower, while adding two additional VHF towers that do not improve communication systems.

This alternative would authorize any type of antennas on the proponent's existing 20 ft. tower, which would result in more flexibility and potentially higher utilization.

Alternative 3

This alternative authorizes two new microwave towers. Again, they would be located off the very top of the Butte, so would not physically crowd the existing facilities. The VHF towers would not be approved.

Overall, this alternative would result in full utilization of the proponent's facilities, while not authorizing new towers that do not improve communication systems.

As in alternative 2, this alternative would authorize any type of antennas on the proponent's existing 20 ft. tower, which would result in more flexibility and potentially higher utilization.

Alternative 4

This alternative authorizes increasing the 60 ft. tower to 100 ft. in height, while denying any new towers. There would be no increased physical crowding to the existing facilities.

This alternative would not increase the footprint of the communication site, while increasing utilization and capacity.

Overall, this alternative would result in full utilization of the proponent's facilities, while not authorizing new towers that do not improve communication systems.

As in alternative 2, this alternative would authorize any type of antennas on the proponent's existing 20 ft. tower, which would result in more flexibility and potentially higher utilization over Alternative 1. The increase in tower height should make up for any decrease in flexibility and potential utilization of not allowing the additional towers.

NOXIOUS WEEDS

The February 21, 2007 Invasive Plant Species report, located in the Sidehill Antenna analysis file, is incorporated by reference and contains additional information.

Noxious weeds are aggressive, non-native plants capable of degrading environmental quality. The introduction and spread of noxious weeds can reduce the diversity and abundance of native vegetation, forage, diversity and quality of wildlife habitat, increase erosion, and decrease water quality (USDA/USDI 2000). Plants are designated "noxious" by the Secretary of Agriculture or state agencies.

Management Direction

In October 2004, Forests in Region 6 were directed to develop local invasive plant prevention practices. The *Deschutes and Ochoco National Forests and Crooked River National Grassland, Invasive Plant Prevention Practices* were developed using the *Guide to Invasive Plant Prevention Practices* (July 12, 2001).

These practices are a product of Forest Plan direction that was established with the *Pacific Northwest Region Preventing and Managing Invasive Plants Record of Decision* (October 2005). When the R-6 Invasive Plant Species FEIS ROD came out in October 2005, it amended R-6 Forest Plans and contained 23 Standards related to prevention and treatment of invasive plants. Additional direction for the management of invasive plants is contained in Forest Service Manual, Section 2080.

The invasive plant prevention practices are intended to:

- minimize the introduction of invasive plants.
- minimize conditions that favor the establishment or spread of invasive plants.
- facilitate the integration of invasive plant management practices into resource programs.

Design criteria that address these objectives are contained in the Project Design Criteria section of Chapter 2.

Affected Environment

Currently the occurrence of many low priority invasive plant species, such as morning-glory (*Ipomoea*), cheat grass (*Bromus tectorum*) and bull thistle (*Cirsium vulgare*) is so extensive that these species are not generally independently inventoried as the task would be astronomical in proportion. Therefore, during the analysis of all projects it is generally assumed that low priority invasive plants do occur within or adjacent to all sites.

There are currently no inventoried invasive plant infestations within the project area although there are 15 invasive plant infestations in relative close proximity to the project area or along the primary access routes, including the areas of Lone Pine/Skull Hollow roads, Lithgow Springs, Scales Corral, McCoin Orchard, and the Ridge Rider trail. These inventoried invasive plant infestations consist of three high priority invasive plant species: spotted knapweed (*Centaurea maculosa*), canada thistle (*Cirsium arvense*) and medusahead (*Taeniatherum caput-medusae*). High priority invasive plant species are rated as such because they are; invasive, persistent (in our habitats), and prolific reproducers. They displace desirable vegetation, and presently occur in infestations at scales which are feasible to treat because of their small size.

While field reconnaissance was conducted along the primary access route and within the project area, the adjacent areas have not been fully inventoried for invasive plant infestations. It is anticipated that many more infestations actually occur than are inventoried. No other high priority invasive plant species have been inventoried in the area.

Project Risk Assessment

Direct and Indirect Effects Introduction

Disturbance (whether management induced or not) of soil and vegetation creates habitat, and often, a vector of dispersal, for invasive plants. Many infestations currently occur within relatively close proximity to the activity areas under analysis. Dry forests and juniper woodlands representative of the types in which the project occurs are particularly susceptible to invasive plant infestation (Interior Columbia Basin Ecosystem Management Project Draft Environmental Impact Statement, Vol. 1, Chapter 2, page 69). Invasive plant infestation and expansion has the potential to profoundly alter ecosystem functions and processes (Interior Columbia Basin Ecosystem Management Project, PNW-GTR-405, Vol. II, page 784-785).

The effect relative to invasive plant spread and establishment due to the land management activities under analysis correspond to a combination of four disturbance factors:

- Type/intensity of activity (intensity).
- Proximity to a propagule source and vectors for propagule dispersal (risk of exposure).
- Size of area effected (extent).
- Exposure duration, or the time that elapses until restoration is effective, from disturbance to vegetative recovery to preactivity conditions (duration).

Regardless of the alternative selected existing infestations will be treated in accordance with Ochoco National Forest protocol.

The effects of the following land management activities will be considered within this analysis:

- Tower construction
- Vehicle use

Project effects will be a compilation of each of the land management activities direct, indirect, and cumulative effects relative to the four factors described previously.

Due to the proximity of infestations, spotted knapweed (*Centaurea maculosa*), canada thistle (*Cirsium arvense*) and medusahead (*Taeniatherum caput-medusae*) are the primary weed species of concern. However, the potential for the presentation and establishment of any of the high priority invasive plant species is considerable. Due to the mobility of our current populace, invasive plant species propagules can be transported great distances. Some other invasive plant species which occur within a relatively short transport radius would include: dalmation toadflax (*Linaria dalmatica*), russian knapweed (*Centaurea repens*), leafy spurge (*Euphorbia esula*) and yellow star thistle (*Centaurea solstitialis*). The potential for these and various other invasive plant species to establish once propagules are introduced is high.

The effects of the project are determined by the effect of each land management activity in combination with the associated project design criteria. The following table provides a graphic representation of the project activities:

Table 4. Noxious Weed Risk Assessment

LAND MANAGEMENT ACTIVITY	INTENSITY	RISK OF EXPOSURE	EXTENT (Acres)	DURATION OF EXPOSURE
Tower construction	High	Moderate	< 1 acre	Short to Moderate (2-5 years)
Vehicle access	Low	Moderate	Road system	Long term (>10 years)

Activity Direct and Indirect Effects

- Tower Construction
 - The degree or intensity of ground disturbance associated with tower construction is high. Any time facility or infrastructure construction occurs all vegetation within the area of immediate construction is removed. Typically the extent of competing vegetation removal is some amount larger than the foundation or base of the constructed structure. Incorporation of the project design criteria will minimize the intensity of site disturbance.
 - The risk of exposure to noxious weed propagules during this activity is primarily associated with the transport of propagules on construction equipment and workers. This risk is minimized to a moderate level through the requirement for vehicle cleaning and inspection prior to entry onto Grassland administered lands.
 - The extent of disturbance is very small totaling less than 1 acre.
 - Vegetative recovery of the ground disturbance associated with tower construction is short to moderate (2-5 years), due to the intensity of disturbance and the dependence of revegetation success upon variable climatic factors.
- Vehicle access
 - It is estimated that there are three to four vehicle trips per month up to the site. This will continue under all alternatives. This activity, although low in intensity, because it is constant and longterm, presents a moderate risk. The risk of exposure to noxious weed propagules during this activity is primarily associated with the transport of propagules.

Alternative 1

Direct and Indirect Effects

Alternative 1, which proposes no new facilities, would not increase the existing risk level of introduction and spread of noxious weeds. New weed infestations are still likely to occur due to continuing vehicle use to access the communication site.

Alternative 2

Direct and Indirect Effects

This alternative would result in the highest increase in risk level of introduction and spread of noxious weeds, as compared with the other alternatives. This is because it would authorize the construction of four new towers, increasing the number and type of vehicles and equipment brought to the site, and resulting in new ground disturbance from accessing the tower sites, tower base construction, and burying new cable lines from the new towers to the lessee's radio building. The two VHF tower sites are located the longest distance away from the building, and would require more site disturbance than the two microwave towers. Cleaning of construction equipment and vehicles, and

seeding areas of intense disturbance would be required. It would result in an overall moderate increase in risk of introduction and spread of weeds.

Alternative 3

Direct and Indirect Effects

This alternative would result in an increase in risk level of introduction and spread of noxious weeds, but less than Alternative 2. It would authorize the construction of two new towers, increasing the number and type of vehicles and equipment brought to the site, and resulting in new ground disturbance from accessing the two sites, tower base construction, and burying cable lines from the two new towers to the lessee's radio building. These two tower locations are closer to the existing building than the VHF tower sites, so there would be less impact and disturbed ground as compared with Alternative 2. Cleaning of construction equipment and vehicles, and seeding areas of intense disturbance would be required.

Alternative 4

Direct and Indirect Effects

Alternative 4 proposes increasing the tower height of the lessee's existing 60 ft. tower, by adding additional segments. No changes to the existing cement foundation or tower base would be needed, and no new ground disturbance would be required. Because some construction equipment would be brought to the site to add the tower segments, this alternative would result in a slight increase in the risk level of introduction and spread of noxious weeds, but less than Alternative 2 and 3.

Past, Ongoing and Reasonably Foreseeable Future Actions

Recent Past Actions (Contributed to the current condition of the analysis area)

- Skull Hollow Prescribed Burn (2002)
- Vehicle fire and associated small wildfire (2005)

Ongoing Actions

- Livestock Grazing on the Cyrus and Lonestone Allotments (annually)
- Fence maintenance (annually)
- Road maintenance (occasionally)
- Recreation: camping, hiking, ATV use (annually).
- Full-size vehicle use on open roads (annually).

Foreseeable Future Actions

- Noxious Weed Treatments (annually with the implementation of the bi-forest EIS and ROD).

The Skull Hollow prescribed burn in 2002 manipulated vegetation through a lesser intensity fire, decreasing the resultant susceptibility of the plant associations to invasive plant infestation as compared to what would be expected from a higher intensity burn.

Other activities which have contributed to the existing resource conditions within the project area include: livestock grazing (and range improvements such as water developments and fences), road construction and maintenance, past western juniper treatments and recreational activities including unauthorized offroad motorized vehicle travel.

Present and reasonably foreseeable future actions occurring within the project area include: road maintenance, future wildfire suppression, and grazing within the Cyrus and Lonepine Allotments.

While past activities have shaped the existing condition of the analysis area in such a way as to make it susceptible to noxious weed infestation, spread and establishment, present and foreseeable future actions and activities are expected to provide a moderate to high risk of the introduction of noxious weed propagules.

Summary: Cumulatively it is expected that the entire project area, and to a lesser extent the entire subwatershed (extent):

- presents a high level of risk of the introduction of noxious weed propagules regardless of the implementation of this project or not.
- is expected to result in a similar probability of the infestation, spread and establishment of noxious weed species within the project area with or without project implementation.

Proposed, Endangered, Threatened and Sensitive (PETS) Plants

The September 15, 2006, Botanical Biological Evaluation, located in the Sidehill Antenna analysis file, is incorporated by reference and contains additional information.

The Endangered Species Act of 1973 (ESA) requires that all Federal agencies protect proposed, endangered, and threatened species and their habitats to aid population recovery. Forest Service policy is to manage sensitive species (FSM 2672.1) to provide long-term viable populations and prevent population and distribution declines that may lead to listing under ESA.

Pre-field Review: The pre-field review consisted of checking existing records for documented occurrences, determining probability of additional occurrences for any TES species, and if additional field surveys are needed. The pre-field review incorporated the following:

1. USFWS Endangered and Threatened Wildlife and Plant Species List;
2. Region 6 Sensitive Species List (2004);
3. Biological Evaluations and other District surveys and records;
4. Literature, aerial photos, and other information (see References).

No proposed, endangered, or threatened plant species are known or suspected in the geographic region that includes the Crooked River National Grassland, nor is essential habitat present for these species.

Further discussions in this section are limited to sensitive plant species.

Potential habitat: The pre-field review indicated that there is potential habitat for the following Region 6 sensitive species in the project area:

Carex stenophylla (C. duriuscula, C. eleocharis).

Habitat is not present for any other sensitive species documented or suspected on the Crooked River National Grassland.

Results of Field survey: A field survey was completed by botanist Mark Lesko in September 2006. The survey determined that no suitable habitat is present for any sensitive plant species known or suspected of occurring.

All Alternatives

Direct , Indirect and Cumulative Effects

No proposed, endangered, threatened or sensitive plant species or essential habitats are known from to occur in the project area. Therefore, no direct, indirect or cumulative effects are expected from any alternatives.

The project area has no suitable habitat for sensitive plant species. Therefore, the alternatives are expected to result in no impact to sensitive plant species.

Table 5. Effects to Sensitive Plants

Species	All Alternatives
<i>Achnatherum hendersonii</i>	NI
<i>Achnatherum wallowaensis</i>	NI
<i>Artemesia ludoviciana ssp. estesii</i>	NI
<i>Astragalus diaphanus var. diurnus</i>	NI
<i>Astragalus peckii</i>	NI
<i>Astragalus tegetarioides</i>	NI
<i>Botrychium ascendens</i>	NI
<i>Botrychium crenulatum</i>	NI
<i>Botrychium minganense</i>	NI
<i>Botrychium montanum</i>	NI
<i>Botrychium paradoxum</i>	NI
<i>Botrychium pinnatum</i>	NI
<i>Calochortus longebarbatus var. longebarbatus</i>	NI
<i>Calochortus longebarbatus var. peckii</i>	NI
<i>Camissonia pygmaea</i>	NI
<i>Carex backii</i>	NI
<i>Carex hystericina</i>	NI
<i>Carex interior</i>	NI

<i>Carex stenophylla</i> (<i>C. eleocharis</i>)	NI
<i>Cypripedium parviflorum</i>	NI
<i>Lomatium ochocense</i>	NI
<i>Mimulus evanescens</i>	NI
<i>Penstemon peckii</i>	NI
<i>Rorippa columbiae</i>	NI
<i>Thelypodium eucosmum</i>	NI
<i>Thelypodium howellii</i>	NI
<i>Dermatocarpon luridum</i> (<i>D. meiophyllizum</i>)	NI
<i>Scouleria marginata</i>	NI

NI = No Impact

Proposed, Endangered, Threatened and Sensitive (PETS) Aquatic Species

The September 20, 2006, Threatened, Endangered and Sensitive (Aquatic) Species report, located in the Sidehill Antenna analysis file, is incorporated by reference and contains additional information on PETS aquatic species.

Effects determinations are based on a pre-field review of existing data sources, habitat maps and aerial photographs, and review of scientific literature, as well as on the nature of the activity.

Pre-field Review

The pre-field review for this project consisted of checking existing records for documented occurrences, determining probability of additional occurrences for any listed threatened, endangered or sensitive species (TES), and determining if additional field surveys were needed.

No endangered aquatic species are known or expected to occur within the geographic area that includes the Crooked River National Grassland. Bull trout and the Mid-Columbia River steelhead trout, both are currently listed as a threatened species and critical habitat for bull trout does include National Grassland areas that are between the Deschutes and Metolius rivers. Steelhead trout cannot migrate above Round Butte Dam to access Crooked River habitat at this time. Bull trout only occur downstream of this project area in Lake Billy Chinook and in the Deschutes and Metolius rivers more than 10 miles away. Thus, the determination for Bull Trout and Mid-Columbia River steelhead is “no effect” for this project. Likewise, the determination for their designated critical habitat will be “no adverse affect”.

There are five aquatic species on the Regional Forester’s sensitive species list, which have been documented or are suspected to occur on the Crooked River National Grassland. Of those, only one sensitive aquatic species actually has potential or suitable habitat near the area of influence for this project and this species is *Rana luteiventris*, the Columbia spotted frog.

All other sensitive aquatic species on the R6 sensitive species list do not have habitat within the area of influence for this project, and therefore have a “no impact” determination and will not be further discussed in this document.

Essential Fish Habitat designations for Mid-Columbia River spring-run chinook salmon do not include this project area on the Crooked River National Grassland. No additional surveys for threatened, endangered or sensitive species were required or conducted for the proposed project. There is sufficient information in the district records and/or about the species and the project design to make effects determinations. Rationale on effects determinations for species with potential habitat in the area of this project are stated below in an “Effects” section.

Affected Environment:

The streams nearest the project area have intermittent flow from either springs and seeps or snowmelt and do not sustain fish populations (stream classes 3, 4 or 5). Tributaries near the project location contribute flow to the Crooked River via Skull Hollow Creek, which is also intermittent.

Columbia spotted frogs are strongly tied to aquatic systems and in general prefer sites which are wet year round but they will also move through upland areas to migrate between aquatic habitats during dispersal or for breeding purposes. During the breeding season, Columbia spotted frogs lay their eggs in masses in pools of shallow water between February and June depending on water temperatures. This species can tolerate fairly warm water, but as with all aquatic egg laying amphibians, egg development and survival can be affected by water chemistry or sedimentation.

Spotted frog surveys have not been conducted in the project area, however they have been documented at the Rimrock Springs Wildlife Management Area, only 5 miles north of the project area.

There is potential that spotted frogs may be present in or near the project area because there are seeps and springs in the drainage that occurs along the 5720 road where suitable habitat exists.

All Alternatives

Direct, Indirect Effects

The proposed project does not have the potential to create measurable downstream effects to springs or streams on the Crooked River National Grassland. Tower installations should occur when unimproved road surfaces are not wet or muddy because the Gray Butte road (5720-080) is comprised of native surface materials. There is no habitat for fish species in the project area, thus measurable downstream effects to fish are not expected.

During spotted frog migrations, which can occur between wet areas and upland habitat, there is a potential for loss or injury to individual frogs as vehicles travel to equipment installation sites and when ground disturbing activities occur related to pole installations. Under all alternatives there would be travel to the site for maintenance and to install electronic equipment. Although travel is expected to be light, about three trips per month, again, there is a potential loss or injury. Because of this, the determination for the Columbia spotted frog is “**May Impact Individuals or Habitat (MIIH)**”, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

Cumulative Effects

Cumulative effects are those that result from the impact of the proposed action, when added to other past, present, and reasonably foreseeable actions. Present and reasonably foreseeable activities in or near this project area include; livestock grazing, agricultural production and irrigation diversions, recreational use, road use and maintenance and vegetation management. Previous and reasonably foreseeable actions in combination with the proposed activity do not result in cumulative impacts in excess of the impacts described above for any of the species evaluated in this document.

Table 6. Effects to PETS Aquatic Species

Species	All Alternatives
Redband trout	NI
Bull trout	NE
Bull trout critical habitat	NAA
Mid-Columbia River steelhead trout	NE
Mid-Columbia River steelhead trout critical habitat	NAA
Malheur mottled sculpin	NI
Mid-Columbia River spring-run chinook salmon	NI
Mid-Columbia R. spring-run chinook salmon EFH	NAA
Westslope cutthroat trout	NI
Columbia spotted frog	MIIH

Determination for Federally Listed Species:

- NE no effect
- NLAA may affect - not likely to adversely affect
- LAA may affect – likely to adversely affect
- BE beneficial effect

Determination for Sensitive Species:

- NI no impact

- MIIH may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species
- WIFV* will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species
- BI beneficial impact

**Trigger for a Significant Action as defined by NEPA*

Determination for designated critical habitat and EFH:

- AA adverse affect
- NAA no adverse affect

<p>Proposed, Endangered, Threatened and Sensitive (PETS) Terrestrial Animals</p>

The March 2, 2007 Wildlife Report, located in the project analysis file, is incorporated by reference and contains additional information on PETS terrestrial animals, neotropical migratory birds, migratory birds and communication towers, raptors, antelope and mule deer, and management indicator species.

Management Direction

The Endangered Species Act of 1973 (ESA) requires that all Federal agencies protect threatened and endangered species and their habitats to aid population recovery. The U.S. Fish and Wildlife Service have responsibilities for maintaining Federal threatened and endangered lists for animals and plants. The U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration (Fisheries Division) share implementation and regulatory responsibilities for ensuring compliance with ESA. The Regional Forester has responsibility for designation of sensitive species as per Forest Service Manual, Section 2670. Forest Service policy for sensitive species is to manage these plants and animals to provide long term viable populations and prevent population and distribution declines that may lead to listing under ESA.

In 2007 the Deschutes and Ochoco National Forests and the Bureau of Land Management (BLM) Prineville Office updated the "Joint Aquatic and Terrestrial Programmatic Biological Assessment". The intent of this basin-wide programmatic approach was to consult on programs (not individual projects) as they relate to the proposed, endangered, or threatened species occurring within the action area.

"Project design criteria are used as sideboards and a filter...If the program activities meet all applicable Criteria, then the program activity should have either no effect to listed species or if there is an effect, the effect should not likely adversely affect a listed species...the Service concurs with the Deschutes, Ochoco, and BLM effects determination that the program activities, when consistent with all applicable Project Design Criteria, are not likely to adversely affect...bald eagle, or bull trout."
(Concurrence letter, USFWS 2003).

Existing Condition

Ten wildlife species are listed as potential, endangered, threatened, or sensitive on the Regional Forester's List for the Ochoco National Forest but only four have potential or existing habitat on the Grassland—the northern bald eagle, American peregrine falcon, gray flycatcher, and bufflehead. There are no species listed as "Proposed" on the CRNG. None of these ten species are listed as endangered under ESA.

There are two threatened species: northern bald eagle and Canada lynx. Only the bald eagle has potential habitat on the Grassland. Canada lynx will not be discussed further.

There are eight sensitive species: the American peregrine falcon, greater (formerly western) sage grouse, tricolored blackbird, gray flycatcher, pygmy rabbit, bufflehead, upland sandpiper, and the California wolverine.

There is no habitat and have been no sightings for the tri-colored blackbird, the upland sandpiper, or the California wolverine on the Grassland. The greater (formerly western) sage grouse was extirpated from the Grassland in the 1950s. There is no habitat within the project area for the pygmy rabbit. These species will not be discussed further.

Although there is no potential habitat for the northern bald eagle, American peregrine falcon, gray flycatcher, or bufflehead within the project area, these birds may migrate through this area and will be discussed.

Northern Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was recently removed from the Federal list of threatened species, and is now on the Sensitive Species list. It is considered a resident species. The Grassland is within the High Cascades Recovery Zone as described in the Bald Eagle Recovery Plan (USDI 1986). Bald eagles are usually associated with rivers, lakes, and marshes and require nearby tall trees or cliffs for nesting (Csuti et.al. 1997).

There is one known bald eagle nest on the Grassland, but it is west of the Deschutes River, over 10 miles away from the project area. There is one known nest on private land, approximately 5 miles away from the project area. Neither of these nests have a bald eagle management area (BEMA) or consideration area (BECA) associated with them.

Haystack Reservoir, Rimrock Springs Wildlife Management Area, and Lake Billy Chinook are the primary foraging sites for the local eagles. They also forage in dry upland sites on the Grassland for a variety of prey species (Zalunardo 2001). Gray Butte is not in the flight path from the known nest site to any of these foraging areas (Clowers 2002).

American Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon is a Region 6 sensitive species and is considered migratory. It was removed from the Endangered Species list on August 25, 1999. In December 2003

a monitoring plan was released, designed to ensure that American peregrine falcons continue to thrive without the protection of the Endangered Species Act.

Nest sites are usually large cliff faces in conjunction with riparian zones, overlooking a fairly open area with an ample food supply (Csuti et.al. 1997). There were nest sites identified on the Grassland in the 1960s; however, none were verified. The rimrock surrounding Lake Billy Chinook is the most likely area with suitable cliff faces for nesting (8-10 miles away from the project area). Grassland raptor surveys completed in 1992 showed no active peregrine falcon nests. There are no known recent peregrine falcon sites.

Gray Flycatcher (*Empidonax wrightii*)

The gray flycatcher is a Region 6 sensitive species. This bird is not covered under a conservation strategy and is considered migratory.

This species prefers areas with tall sagebrush, bitterbrush or mountain mahogany communities. They can occupy these communities within open forests of ponderosa and lodgepole pine. They also inhabit juniper woodlands with a well-developed sagebrush understory (Csuti et.al. 1997).

Gray flycatchers inhabit many areas of the Grassland. Surveys completed during the summer of 2003 found gray flycatchers nesting and foraging on the edge between juniper woodlands and openings with grass and shrubs. They seem to nest in the juniper and forage in the openings adjacent to their nests (Shunk 2003). This type of habitat does not exist in the project area.

Bufflehead (*Bucephala albeola*)

The bufflehead is a Region 6 sensitive species. This duck is not covered under a conservation strategy and is considered migratory.

The bufflehead nests near deep mountain lakes surrounded by open forested areas containing snags (Csuti et.al. 1997). Natural nesting sites are cavities in trees close to water. Aspens are the preferred nest tree, but it will also nest in ponderosa pine and Douglas fir (Marshall et al., 1992). In Oregon, breeding occurs primarily in the central Cascade Lakes region, more than 20 miles from the Grassland (Marshall et al. 1992).

Although none of these birds nest on the Grassland, The Crooked and Deschutes Rivers, Lake Billy Chinook, Haystack Reservoir, and Rimrock Springs are places migrating buffleheads stop to rest and forage during winter migration.

Direct/Indirect Effects

Northern Bald Eagle (*Haliaeetus leucocephalus*)

All Alternatives

There is one nesting pair of bald eagles in the general area of this project. For over four years these eagles have nested on Grizzly Mountain (Bureau of Land Management

land) and foraged on the Grassland. These birds fly from Grizzly Mountain northwest to either Haystack Reservoir, Rimrock Springs, or Willow Creek to forage (Clowers, 2002). They will also forage on private lands to the south east of Grizzly Mountain. The project site on Gray Butte is not on any of these flight lines. There have been no bald eagles killed at the existing site. The addition of these short, unlighted monopoles will not change the character of the area.

Although Alternative 4 would result in an increase in tower height up to 100 feet, as compared to the existing 60 feet, it is still well within the U.S. Fish and Wildlife Service tower construction guidelines. Therefore, although risk of collision may increase slightly, it has the same overall effect as the other alternatives. There are no effects anticipated to bald eagles from this project. **NO EFFECT**

American Peregrine Falcon (*Falco peregrinus*)

All Alternatives

There have been no sightings of peregrines in this project area nor is there any suitable habitat in the project area. Although Alternative 4 would result in an increase in tower height up to 100 feet, as compared to the existing 60 feet, it is still well within the U.S. Fish and Wildlife Service tower construction guidelines. Therefore, although risk of collision may increase slightly, it has the same overall effect as the other alternatives. This project will have **NO IMPACT** to peregrine falcons or their habitat on the Grassland.

Gray Flycatcher (*Empidonax wrightii*) and Bufflehead (*Bucephala albeola*)

Alternative 1

Although preferred habitat for either the gray flycatcher or the bufflehead does not exist in this project area, there is a chance that they may fly through this area during migration. The no action alternative will have **NO IMPACT**.

Alternatives 2, 3 and 4:

Although it is still possible for migratory birds to collide with the proposed towers/antennas, the risk would be minimized by following the interim U.S. Fish and Wildlife Service tower construction guidelines. The proposed project will follow these guidelines (see Appendix A). Although Alternative 4 would result in an increase in tower height up to 100 feet, as compared to the existing 60 feet, it is still well within the U.S. Fish and Wildlife Service tower construction guidelines. Therefore, although risk of collision may increase slightly, it has the same overall effect as the other alternatives. This project **“May Impact Individuals or Habitat, But Will Not Likely Contribute to A Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” (MIH)**.

Table 7. Effects to PETS Terrestrial Animals

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Canada Lynx	NE	NE	NE	NE
Northern Bald Eagle+	NE	NE	NE	NE
American Peregrine Falcon	NI	NI	NI	NI
Bufflehead	NI	MIIH	MIIH	MIIH
California Wolverine	NI	NI	NI	NI
Gray Flycatcher	NI	MIIH	MIIH	MIIH
Greater (formerly western) Sage Grouse,	NI	NI	NI	NI
Pygmy Rabbit	NI	NI	NI	NI
Tricolored Blackbird	NI	NI	NI	NI
Upland Sandpiper	NI	NI	NI	NI

Determination for Federally Listed Species:

- NE no effect
- NLAA may affect - not likely to adversely affect
- LAA may affect – likely to adversely affect
- BE beneficial effect

+ NOTE: The Northern Bald Eagle was recently removed as a Federally Listed Species, and is on the Sensitive Species list.

Determination for Sensitive Species:

- NI no impact
- MIIH may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species
- WIFV* will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species
- BI beneficial impact

* Trigger for a Significant Action as defined in NEPA

WILDLIFE

The March 2, 2007, Wildlife Report, located in the project analysis file, is incorporated by reference and contains additional information on wildlife.

This section describes the effects of the alternatives on neotropical migratory birds (focal species), raptors, big game (antelope and mule deer), and Management Indicator Species.

Neotropical Migratory Birds (Focal Species)

Forest Plan Management Direction (LRMP pg. 4-122) for species associated with various plant communities (including migratory birds) states: "Provide diversity by maintaining representative portions of all native plant associations and various successional stages represented in an area through time."

Existing Condition

The Grassland utilizes The Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Oregon and Washington (LCS), prepared in 2000 by Altman and Holmes for Oregon-Washington Partners-In-Flight to “take an active approach to conservation of land birds in the Columbia Plateau of eastern Oregon and Washington.”

According to the LCS, there are 23 focal species assumed to be found on the Grassland. These species were selected based on their conservation need or their degree of association with important habitat types historically occurring on the Grassland. Table 1 (below) displays the focal species and associated habitats (see LCS 2000). There are many other bird species that utilize/migrate through the Grassland.

Table 8. Columbia Plateau Focal Species and Their Associated Habitats

Focal Species	Habitat	Habitat Attribute
Grasshopper sparrow *	Steppe	Native bunchgrass cover
Loggerhead shrike	Steppe-Shrubland	Interspersion tall shrubs – openings
Burrowing owl *	Steppe-Shrubland	Burrows
Sharp-tailed grouse *	Steppe-Shrubland	Deciduous shrubs and trees
Greater Sage grouse *	Sagebrush	Large areas – diverse understory
Sage sparrow	Sagebrush	Large contiguous patches
Brewer’s sparrow	Sagebrush	Sagebrush cover
Sage thrasher	Sagebrush	Sagebrush height
Lark sparrow	Shrublands	Ecotone edges
Black-throated sparrow	Shrublands	Sparsely vegetated desert scrub
Ferruginous hawk	Juniper-Steppe	Scattered mature trees
Lewis’ woodpecker	Riparian Woodland	Large snags (cottonwood)
Bullock’s oriole	Riparian Woodland	Large canopy trees (cottonwood)
Yellow warbler **	Riparian Woodland	Subcanopy foliage
Yellow-breasted chat **	Riparian Woodland	Dense shrub layer
Yellow-billed cuckoo *	Riparian Woodland	Large, structurally diverse

Focal Species	Habitat	Habitat Attribute
		patches
Willow flycatcher **	Riparian Shrub	Dense shrub patches
Lazuli bunting **	Riparian Shrub	Shrub-herbaceous interspersion
Red-naped sapsucker **	Aspen	Large trees/snags with regeneration
Bobolink *	Agricultural Fields	Mesic conditions
Gray flycatcher	Juniper Woodland	Mature trees with regeneration
Prairie falcon	Cliffs and Rimrock	Undeveloped foraging areas
Virginia's warbler *	Mountain Mahogany	Large trees with regeneration

* does not currently occur on the Grassland ** habitat rare on the Grassland

There are no known sightings or habitat on the Grassland for the Virginia's warbler, grasshopper sparrow, bobolink, or the yellow-billed cuckoo. Sharp-tailed and sage grouse have been extirpated from the Grassland. There have been no sightings of burrowing owls on the Grassland since the early 1990s.

Habitat for riparian species such as the lazuli bunting, yellow warbler, yellow breasted chat, Bullock's oriole, willow flycatcher, and red-naped sapsucker is rare on the Grassland. There are small areas of cottonwood and aspen but not of adequate size to sustain large populations of riparian dependent species.

The gray flycatcher and the greater sage grouse will be discussed under the Proposed, Endangered, Threatened, and Sensitive (PETS) species section. The prairie falcon, burrowing owl, and ferruginous hawk will be discussed in the Raptor section.

Background: Migratory Birds and Communication Towers

There has been relatively little research on migratory birds and communication towers. In March of 2000, Paul Kerlinger, Ph.D. prepared Avian Mortality at Communication Towers: A Review of Recent Literature, Research, and Methodology. At this time he stated that there have been "few systematic or quantitative towerkill studies in the past 5 years..." At present are three main issues with bird collisions and towers: height, lighting, and guy wire usage. Although electromagnetic radiation has been brought up as an issue, from interviews Kerlinger conducted with bird migration experts, they feel that "the earth's magnetic field was likely to be much stronger than that of communication towers."

The U.S. Fish and Wildlife Service estimated "the number of migratory birds killed each year as a result of collisions with communication towers could range from 4 to 5 million". To minimize migratory bird collisions they are recommending the Federal Communication Commission (FCC) adopt the interim U.S. Fish and Wildlife Service tower construction guidelines. These guidelines are located within the wildlife report in the project analysis file. In November 2006, the FCC published a Notice of Proposed Rulemaking to do just that. The guidelines address the same three issues.

Height - Kerlinger cited unpublished work that suggested “towers less than 400-500 feet in height are not as dangerous to migrating songbirds, especially neotropical species, as towers greater than 500 feet in height.” The FCC Notice of Proposed Rulemaking states that the American Bird Conservancy, Forest Conservation Council, Humane Society, and the Defenders of Wildlife strongly supports that use of FWS guidelines...towers should be shorter than 200 feet AGL” (above ground level). The monopoles proposed in this project are less than 200 feet in height.

Lighting – The FCC Notice of Proposed Rulemaking also notes that “All other things being equal, taller towers with lights represent more of a hazard to birds than shorter, unlit towers.” Kerlinger found a lack of empirical evidence or studies but polled bird migration experts and they recommend strobe lights over all other types. There will be no lighting on the proposed 15 or 20 foot monopoles.

Guy Wires – Towers utilizing guy wires contribute to migratory bird loss according to the FCC Notice of Proposed Rulemaking. A study completed by Dr. Joelle Gehring in Michigan from spring 2005 – fall 2005, compared guyed and unguyed towers. She found 194 migratory bird carcasses at the guyed towers and only 14 at the unguyed towers. This supports anecdotal evidence that guy wires increase the chance of migratory bird deaths. None of the towers proposed in this project would utilize guy wires.

Direct/Indirect Effects:

Alternative 1: No increase risk of migratory birds colliding with towers.

Alternative 2 and 3

Although it is still possible for migratory birds to collide with the proposed poles/antennas, the risk would be minimized by following the interim U.S. Fish and Wildlife Service tower construction guidelines. The proposed project will follow these guidelines.

Alternative 4

Although this alternative would result in an increase in tower height up to 100 feet, as compared to the existing 60 feet, it is still well within the U.S. Fish and Wildlife Service tower construction guidelines. So, although risk of collision may increase slightly, it has the same overall effect as the other alternatives.

Raptors (Eagles, Owls, Hawks, And Falcons)

Forest Plan Management Direction for Raptors: (LRMP 1989 pg. 4-121,122) states that the Grassland:

- Protect active raptor nests from human disturbances until nesting, feeding, and fledging are completed. Provide protection of nest sites and nesting habitat sufficient for the species involved.

- Protect bald and golden eagle nesting and roosting sites as prescribed in the “Act for Protection of Bald and Golden Eagles” (Title 50 CFR, USC 668-668d).
- Protect hawk, falcon and owl nesting and roosting sites.

Existing Condition

There is a large raptor population on the Grassland including bald and golden eagles, many varieties of hawks, several owl species, and a few falcon species. The bald eagle will be discussed in the PETS section.

Raptor species nesting on the Grassland include: golden eagle, osprey, turkey vulture, red-tailed hawk, northern harrier, Swainson’s hawk, Cooper’s hawk, prairie falcon, kestrel, great horned owl, long eared owl, barn owl, and burrowing owl (Clowers, 1992). Burrowing owls however have not been seen on the Grassland since 1992. There are no known nesting ferruginous hawks on the Grassland, but they do migrate through.

Golden eagles utilize large trees within both the pine and juniper for nesting and roosting. Eagles on the Grassland also nest on cliff faces. Pine Ridge, Willow Creek, and Gray Butte are the only areas east of the Deschutes River with scattered ponderosa pine.

Direct/Indirect Effects

All alternatives

There are no known raptor nests on Gray Butte. The nearest known raptor nest to the project area is over 2 miles away. This project will not affect nesting raptors on the Grassland. The proposed project alternatives will not change the character of the Gray Butte Electronic site from its existing condition. There have been no known raptor kills in the last ten years from this site and none are expected from the implementation of this project.

Pronghorn (Antelope)

The Forest Plan Management Direction/Goals for Antelope (LRMP 1989, pg. 4-23) states that the Grassland “ Manage for optimum winter range conditions for pronghorn in conjunction with the Oregon Department of Fish and Wildlife.”

Existing Condition

Pronghorn (commonly known as antelope) are present across the Grassland throughout the year. The intensity of use varies seasonally. Some rutting and fawning occurs in the spring across the Grassland, particularly near wet areas, seeps, and springs. However, the winter season brings the highest pronghorn populations. Approximately 20 percent of the Grassland administered lands are designated as pronghorn winter range (MA-G1) (Table 3-42). There is no designated antelope winter range within the project area.

Direct/Indirect Effects

All Alternatives

This area is not within pronghorn winter range nor does it contain wet areas, seeps, and springs. There have been no sightings of pronghorn on top of Gray Butte. The project alternatives are not expected to negatively affect pronghorn or their habitats.

Mule Deer

Current Management Direction for mule deer on the Grassland focuses on the Metolius Deer Winter Range. The goal for this management area is (LRMP 1989, pg. 4-23-4) to produce high quality deer winter range habitat to support ODFW management objectives for the wintering deer population.

Existing Condition

Mule deer are present across the Grassland throughout the year. Rutting and fawning occur across the Grassland, particularly near the wet areas, seeps, and springs. The intensity of use varies seasonally, but is most intense during the winter season, especially on the west side of the Grassland in the area known as the Metolius Mule Deer Winter Range. There is no designated mule deer winter range within the project area.

Direct/Indirect Effects

All Alternatives

This area is not within designated mule deer winter range nor does it contain wet areas, seeps, and springs. Although mule deer can be found on top of Gray Butte, this area is not essential to their survival. Mule deer may temporarily avoid this area during construction but the alternatives are not expected to negatively affect them or their habitat in the long run.

Management Indicator Species

Forest Plan Management Direction for the Northern Flicker and Juniper Old Growth states that "On juniper dominated lands, maintain old growth juniper habitat comprising 40 acre units...generally no more than 5 miles apart (LRMP 1989, 4-119).

Existing Condition

The northern flicker (previously known as the common flicker) is the only management indicator species for the Grassland associated with old growth juniper.

The flicker, a generalist for feeding habitat, is the only primary cavity excavator of large juniper on the Grassland. Many secondary cavity nesters such as the mountain and western bluebirds, ash-throated flycatchers, and swallows depend on flickers to provide nesting cavities. Flickers can be found across the Grassland.

Direct/Indirect Effects

Alternative 1: No effects

Alternatives 2 and 3

Although it is still possible for migratory birds such as the flicker to collide with the proposed poles/antennas, the risk would be minimized by following the interim U.S. Fish and Wildlife Service tower construction guidelines. The proposed project will follow these guidelines.

Alternative 4

Although this alternative would result in an increase in tower height up to 100 feet, as compared to the existing 60 feet, it is still well within the U.S. Fish and Wildlife Service tower construction guidelines. So, although risk of collision may increase slightly, it has the same overall effect as the other alternatives.

Past, Ongoing, And Reasonably Foreseeable Future Actions

Recent Past Actions_(Contributed to the current condition of the analysis area)

- Skull Hollow Prescribed Burn (2002)
- Vehicle fire and associated small wildfire (2005)

Ongoing Actions

- Livestock Grazing on the Cyrus and Lonestone Allotments (annually)
- Fence maintenance (annually)
- Road maintenance (occasionally)
- Recreation: camping, hiking, ATV use (annually).
- Full-size vehicle use on open roads (annually).

Foreseeable Future Actions

- Noxious Weed Treatments (annually with the implementation of the bi-forest EIS and ROD).
- Other electronic site development

The addition of the action alternatives to the past, ongoing, and reasonably foreseeable future actions, listed above, will not affect any Grassland wildlife species to the point of losing viability in this area.

Water Quality

The March 20, 2007 Hydrology Report, located in the Sidehill Antenna analysis file, is incorporated by reference and contains additional information.

Sedimentation can potentially occur primarily from two sources: the normal vehicle use of roads in the area and from the ground disturbance created as part of constructing tower bases and burying transmission lines. Sediment entering a perennial or fish-bearing stream is a water quality concern.

Gray Butte is accessed by driving on the paved Lone Pine road, then northwest on the 5710 road for about 1 mile, then west on the 5720 road for about 1.5 miles, then north on the 5720-080 road about 2 miles to the communication site.

General precipitation in the area is 10-12 inches/year, and 12-14 inches at the top of Gray Butte. All of the access roads, other than Lone Pine Road, are native surface but have a fairly high rock content and are in relatively good condition. Observation indicates that streams in the planning area have a naturally high sediment load.

The closest perennial stream reach in the area is Skull Hollow Creek, which is perennial for about 200 yards, ending about ¼ miles north of the 5710/5720 junction. All other streams in the planning area are intermittent (stream Class IV). The 5710 road parallels Skull Hollow Creek and the 5720 road parallels an unnamed tributary to Skull Hollow Creek. There are three Class IV stream crossings on the lower portions of the access route, although there are no crossings higher up, of the 5720-080 road.

Direct and Indirect Effects

All Alternatives

There is a risk of sediment delivery to Skull Hollow Creek and its primary tributary both at stream crossings, and due to the proximity of the 5710 road to Skull Hollow Creek and the 5720 road to the unnamed tributary. Potential delivery would be highest from the start of the rainy season thru March. The lessees indicated that they and their tenants make an average of 3.5 round trips a month to the site. Based on the precipitation zone and the location of the fords, the stream crossings normally won't have flow during maintenance visits. If there is flow at the fords or overland flow off the roads during a maintenance visit, travel generated sediment can reach the stream channels, but based on the rock content of the road surface and the natural high sediment load in the creeks, travel should not produce a measurable increase in sediment load. Most sediment delivery is projected to come from channelization down the road tread during large storm events. Any increase would not be delivered to a perennial or fish bearing stream.

Gray Butte communication site is approximately 1/4 mile from the nearest stream channel and 1/2 mile from the Eden Spring, the nearest spring which is north of east from the Butte. The proposed ground disturbing activities at the tower site, as described in the alternatives, should not result in any sediment delivery to perennial or fish bearing streams, or affect water quality in the springs adjacent to Gray Butte.

CULTURAL RESOURCES

The June 19, 2007 Project Review for Heritage Resources, Western Radio Antennae Project – Gray Butte, located in the analysis file, is incorporated by reference and contains additional information on cultural resources.

The following background information was also obtained from the Feb. 26, 2007 Project Review for Heritage Resources, Gray Butte Lease Renewals, located in the Lease Renewals analysis file, also incorporated by reference.

Historical Setting

The Crooked River National Grassland shows evidence of a long history of aboriginal occupation. Lithic scatter sites are distributed throughout the area with a preference for main stem drainages, springs, ridges, saddles and in areas where root crops or resources are abundant. The Grassland is within the ceded land boundary of the Confederated Tribes of Warm Springs Reservation. Over time, both Columbia River and Northern Paiute groups occupied this region.

By the 1800's, early exploration opened Central Oregon to Anglo settlement. Cattle and sheep were first brought into this country, and most of the Grassland lands were homesteaded. A lack of surface water and drought conditions brought hard times to most of the early settlers. The landscape shows evidence of past occupation through rock fences, farmed parcels, corrals, spring developments, orchards, and collapsed structural remains. By 1935 the federal government purchased many failed homesteads, which now form the Crooked River National Grassland.

Affected Environment

Gray Butte sits at about 5118 ft. in elevation, is the highest peak on the Grassland, and has a commanding view in all directions. The vegetation consists of sagebrush along with juniper and a variety of grasses and forbs. There are exposed rock talus slopes below the margins of the summit. Traditional root crops including lomatium species and bitterroot have been observed in the shallow rocky soils on the summit and there is suitable habitat in the surrounding area.

Previous Surveys: A lithic scatter site 8 x 10 meters in size was recorded in 1980 at the summit of Gray Butte. It is located under and adjacent to the Western Radio Services building constructed in 1979. The site was determined eligible in 1990, although the evaluation noted that the integrity of the cultural site was in question.

Additional work at the communication site was done in 1992; no cultural materials were observed during this site visit.

The access road was relocated in 1996, and the Forest Archaeologist reported that no further cultural material was observed. There is little soil and no opportunity for subsurface deposits, and it was determined that the road work would have no effect on heritage resources.

Survey Results: In November of 2006, a field inspection of the previously recorded site and a review of past communication site improvements and impacts was made.

Evidence of the existing site was found. However, more than half of the site has been altered through time, weathering and the continued development of communication facilities over the years. The cement foundation of the building, the building itself and a buried power line trench, combined with vehicle access and use as a communication site has continued to affect the lithic scatter site. The site lacks surface and sub-surface integrity.

The site does not meet the criteria for eligibility to the National Register of Historic Places (NRHP), and the Archaeologist has recommended to the State Historic Preservation Office that the site be changed from eligible to not eligible. The Oregon SHPO office concurred.

Tribal Consultation

Consultation with the Confederated Tribes of the Warm Springs Reservation resulted in collecting oral history on the Gray Butte area, with interviews conducted by the Tribes. The Gray Butte area was a travel route and provided roots and camping areas.

The Tribes are supportive of the continued use and development of the Gray Butte Electronic Site. They would like the agency to protect the existing lithic scatter site and retain artifacts in their original location. To protect this site, the cement foundation of the old Western Radio building will remain intact. No buried cable or electronic lines are allowed within 15 ft. of this foundation, as measured from the center of Western Radio's old building.

All Alternatives

Direct, Indirect and Cumulative Effects

No historic properties will be affected in any alternatives. The Archaeologist has evaluated the existing cultural resource site to not be eligible for the NRHP.

The existing lithic scatter site will be protected.

CHAPTER 4 – PREPARERS, REVIEWERS, CONSULTATION AND SCOPING

The following Forest Service individuals were the interdisciplinary team for the project, and/or provided input, review and comments:

Paul Cuddy	ID Team Co-leader/Forest NEPA coordinator
Erica Ellison	Recreation Specialist

Steve Gibson	Noxious Weed Specialist
Terry Holtzapple	Archaeologist
Diana Hsieh	ID Team Co-leader/EA Writer/Lands Program Manager
Mark Lesko	Botanist
Brent McBeth	National Communication Site Specialist
Lonnie Murphy	Fisheries Biologist
James Seymour	Hydrologist
Steve Thompson	Radio Frequency Manager, Customer Service Area 3
Ronnie Yimsut	Landscape Architect

The project analysis file contains the mailing list of persons, agencies, and Indian Tribes that were informed about the project.

A copy of the draft May 2007 EA was sent to the following entities during the public comment period:

Blue Mountain Biodiversity Project
Confederated Tribes of the Warm Springs Indian Reservation
Day Wireless Systems
Oregon Department of Revenue
Sierra Club
Slater Communications and Electronics
Western Radio Services

Public and applicant comments on the draft EA:

Public comments were received from the Blue Mountain Biodiversity Project and Western Radio. However, comments from the Blue Mountain Biodiversity Project were submitted after the public comment period ended.

Western Radio provided a number of comments on the draft EA, most of which were “directed at errors and the misrepresentation of facts”. They provided specific comments on Alternative 4, emphasizing that it would not be an alternative to the sidehill locations requested. One cannot expect the modified tower to survive the weather conditions at Gray Butte without failure. A complete response to all of their comments is located in the analysis file.

Consistent with the Code of Federal Regulations 251.84(a), Forest Supervisor Jeff Walter and Crooked River National Grassland District Ranger Slater Turner, met with Western Radio to discuss the environmental analysis, prior to making a formal decision. The applicant did not raise any additional issues or analysis of effects. He did question why we would amend the LRMP or Site Plan to allow additional towers. He stated that he could live with Alternative 3, which was identified as the alternative tentatively selected. The rationale for a LRMP amendment and Site Plan revision was described in the draft EA, p.9.

CHAPTER 5 – REFERENCES

Radio frequency effects analysis references:

Thompson, S. 2007. Radio Tech Report, memos, conversation records.

Formulas were used to estimate isolation. They are available at:
<http://www.rfsworld.com/index.php?p=93&l=l&>

Public Health references:

Hsieh, D. 2007. Public Health at Communication Sites (Summary of OET Bulletins)

Office of Engineering & Technology (OET) Bulletin 56, August 1999. "Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields." Posted on FCC's website, www.fcc.gov/oet/rfsafety/

OET Bulletin 65, August 1997. "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields." Posted on FCC's website, www.fcc.gov/oet/rfsafety/

Thompson, S. 2007. Personal communication on VHF antenna service use and Table 2 of OET Bulletin 65.

Thompson used a number of website references to assist in assessing public health aspects (radio frequency radiation exposure) of Western Radio's proposal:

To determine what service Western Radio's transmitter is licensed in:
<http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=815>

To determine the ERP of WR's transmitter:
<http://wireless2.fcc.gov/UlsApp/UlsSearch/licenseFreqSum.jsp?licKey=815>

For a full list of the radio service codes and their titles go on-line here:
<http://wireless2.fcc.gov/helpfiles/licenseSearch/helpCodes.html>

WR's microwave licenses and the service they are authorized in can be viewed on-line here:
<http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=1004841>

Towers & Avian species effects references:

Kerlinger, Ph.D., P., 2000. Avian Mortality at Communication Towers: A Review of Recent Literature, Research, and Methodology.

U.S. Fish and Wildlife Service, 2000. "Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers." Letter from Director Jamie Rappaport Clark to Regional Directors.

Visual Quality references:

Yimsut, R. 2007. "Landscape and Scenery Management, Western Radio's Side Hill Antennas Project."