Chapter 4 Environmental Consequences

The following changes were made in Chapter 4 between the Draft and Final Environmental Impact Statement. Minor corrections, explanations and edits are not included in this list.

- Additional Project Design Criteria for the spotted owl and the marbled murrelet in the Environmental Consequences and Comparison of Alteratives sections.
- Additional information regarding air quality, including emissions fuel combustion is given in the Environmental Consequences and Comparison of Alternatives sections.
- A new section titled “Pipeline Safety and Fire Data” has been added to the Public Health and Safety section of this chapter

Introduction

This chapter describes aspects of the environment likely to be directly affected by the proposed action. Also described are anticipated direct and indirect effects from the proposed action under the alternatives, and the potential cumulative impacts, which form the scientific and analytical basis for the Comparison of Effects of the Alternatives.

Because the proposed action and alternatives analyzed are relatively precise in scope, the effects analysis also mirrors this precision, thus avoiding unfocused and speculative assessments. The impacts on Threatened and Endangered (T&E) species are described and submitted for informal consultation with the USFWS.

Key, Direct, Indirect and Cumulative Impacts

Table 8: Definition of Key, Direct, Indirect and Cumulative Impacts

Definition of Impacts Used in This Assessment
Key Effects: Elements identified from project assessment and public comments/scoping that would likely impact the human or natural environment if the proposed action is implemented.
Direct Effects: Those foreseeable impacts that will directly result from implementation of the proposed action.
Indirect Effects: Those foreseeable impacts that are likely to indirectly occur as a result of proposed action implementation.
Cumulative Effects: Those additive impacts from the incremental effects of a proposed action when placed in context with other past, present and reasonable foreseeable future actions (CEQ regulation, 40 CFR 1508.7).

The analysis for this EIS assesses all direct, indirect and cumulative impacts for all affected lands within the scope of the proposed action, regardless of ownership. For virtually all of the terrestrial species addressed here, the interactions between the indirect effects (noise disturbance) on federally managed lands and non-federal lands where construction-induced ground disturbance occurs, are expected to be very limited, because few species’ breeding and sheltering habitats occur in roads and powerline corridors. However, the aquatic ecosystem does contain some interactions between the direct effects (sediment and turbidity), ground-disturbing activities and potential impacts between federal and non-federal lands. The Aquatic Ecosystem Assessment (Appendix E) addresses these potential impacts in detail.

Categories of Key Effects: (1) Impacts on aquatic and riparian habitats and water quality; (2) Impacts on air pollution and soil productivity; (3) Impacts on terrestrial species and habitats, which includes Port-Orford-cedar, Noxious

Weeds, Special Status Species, Survey & Manage Species, T&E Species, as well as related CHUs; (4) Cultural resource-site protection (including Native American Religious Concerns); and (5) Economic impacts.

Proposed Action Effects Summation

The EPA recently published a final regulation for the Total Maximum Daily Load (TMDL) program under Section 303(d) of the Clean Water Act. There are water bodies within the NFP area that have been identified as not meeting applicable water quality standards. The federal land-managing agencies have developed an Aquatic Conservation Strategy (ACS) protocol to bring the water bodies into compliance with applicable standards. Watershed analysis recommendations, if followed, can maintain or improve protection of aquatic and riparian habitats in the short-term, while promoting long-term recovery goals. The proposed actions of the preferred alternative are consistent with watershed analysis recommendations (See Appendix E).

The individual species direct, indirect and cumulative effects analyses for birds, mammals, reptiles, amphibians, fish and vegetation (including bryophytes, fungi and lichens) addresses potential adverse impacts associated with the proposed action on both federal and non-federal lands. Because the proposed actions are limited to pre-disturbed non-habitat areas (roadways and powerlines) and use BMPs and PDCs throughout the proposed action for all affected watersheds (i.e., span six 5th fields), the direct, indirect and cumulative impacts are so small as to be negligible at the 5th field Hydrologic Unit Code (HUC). These six affected watersheds are listed and analyzed in Appendix E. The proposed action would provide both short and long-term beneficial impacts to the affected watersheds as well. Approximately 15 miles of gravel road would be paved, promoting long-term restoration to the sediment and turbidity baselines in 4 watersheds (Appendix E). Three culverts presently blocking fish passage in the East Fork Coquille Watershed would be replaced, providing upstream and downstream passage to anadromous fish and other aquatic wildlife, promoting immediate restoration benefits to the physical barrier baseline in the watershed.

Air quality may suffer some short-term direct localized (7th field) impacts wherever pipeline construction has heavy equipment operating. The Roseburg RMP/EIS (USDI 1995a) found that effects of dust from road use by heavy equipment were both localized and transitory. The long-term direct and cumulative effect of the proposed action is a reduction in sulfurous emissions from fossil and wood fuels utilized by industries and private residences within Coos County as users switch to natural gas from alternate fuels.

Negligible impacts to soil productivity from ground disturbance are anticipated at the watershed (5th field) scale. Most of the construction (approximately 65%) would likely occur within road fill on the CBW Road or other roads. The rest of the ground disturbance would be limited to powerline utility corridors, where normal maintenance regularly removes (disturbs) vegetation with mechanical and chemical applications. In the pipeline trench areas where soil is removed and backfilled after pipe placement, soil productivity in the utility corridors will likely be reduced permanently from compaction. In roadways, soil productivity should remain unchanged.

Cultural resource sites (including Native American Religious Concerns) have been surveyed for and identified. In construction areas where the potential for these sites exists, a certified archaeologist and tribal member will both be onsite to monitor this resource. No impacts are anticipated, because all cultural resources and Native American resource sites will be identified and avoided (See Appendix B).

The short-term and long-term direct, indirect and cumulative economic benefits of the proposed action are the primary reasons Coos County seeks to construct a natural gas pipeline.

For the details of these assessments, refer to the specific effects analysis sections later in this chapter.

Northwest Forest Plan (NFP) Implementation

Late-Successional Reserve Assessments are required before implementing actions in LSRs. Late-Successional Reserve Assessments have been developed for the BLM-Coos Bay District's LSR #261 containing CHU OR60 (northern spotted owl), and CHUs OR06-B and OR-06-D (marbled murrelet). Because of implemented PDCs, impacts to these listed species and their designated habitats are avoided. None of the proposed actions will affect or degrade any late-successional habitats in these CHUs/LSRs, nor will they slow habitat development in these CHUs/LSRs.

Watershed analysis is required in Key Watersheds and Riparian Reserves prior to determining how proposed management actions meet the ACS for maintaining or promoting long-term recovery. Watershed analysis was conducted

within the scope of the proposed action area. All proposed management actions in the proposed action meet the ACS (Appendix E), and would not retard attainment of ACS objectives.

Environment

Air Quality

Environmental Consequences and Comparison of Alternatives

Direct and Cumulative Effects

Because natural gas is the cleanest burning fossil fuel, it can help improve the quality of air, especially when used in place of other, more polluting energy sources. Natural gas combustion results in virtually no atmospheric emissions of sulfur dioxide or small particulate matter, and far lower emissions of carbon monoxide, reactive hydrocarbons, nitrogen oxides and carbon dioxide than combustion of other fossil fuels.

Natural gas is more environmentally attractive than other fossil fuels because it is composed chiefly of methane - a molecule made up of one carbon atom and four hydrogen atoms. When methane is burned completely, the principal products of combustion are carbon dioxide and water vapor.

In comparison, fuel oils, currently one of the primary energy sources used by industries in Coos County, have much more complicated molecular structures. They include a higher ratio of carbon, as well as various sulfur and nitrogen compounds; therefore do not burn as cleanly. Industrial fuel oil combustion also produces ash particles, which do not burn at all; however, they can be carried into the atmosphere. The largest heat users burn the cheapest fuel oil, #6 bunker fuel, a thick asphalt-like compound which must be heated to flow, and which is high in sulfur and other contaminants, including heavy metals.

Because natural gas burns cleanly, its use can be an effective means of reducing pollution. The combustion of natural gas produces virtually no sulfur dioxide and very little nitrogen oxide. Natural gas emits, on average, 0.00006 pounds of sulfur oxides per therm of fuel burned. (A therm is 100,000 BTU, or about 0.7 gallons of fuel oil.) In contrast, a typical bunker fuel emits up to 0.2 pounds of sulfur oxides per therm, which is approximately 3500 times higher than gas (www.epa.gov//ttn/chief/ap42).

The Clean Air Act Amendments of 1990 require plants to reduce their sulfur dioxide emissions by 10 million tons annually, and their nitrogen oxide emissions by 2 million tons annually. The following tables show the reduced emissions caused by converting a typical plant from #6 bunker fuel to natural gas. In the NW Natural system, an average-size industrial plant uses about 2 million therms of gas per year.

These benefits also extend to smaller residential and commercial customers converting to natural gas. Most users now heat with electricity, fuel oil, propane and wood. An average home would use about 800 therms per year of natural gas. Accompanying tables compare emissions from natural gas relative to fuels burned onsite. Natural gas results in lower emissions of particulates (soot), nitrogen and sulfur oxides (NOx and SOx), carbon dioxide and organic compounds. Approximately half of the electricity in the region is generated from fossil fuels, at an overall 30 percent thermal efficiency. Thus a therm of natural gas consumed onsite in Coos Bay will offset the consumption of 1.6 therms of oil, gas or coal in an offsite electric generating plant. Emissions are reduced proportionally.

Natural gas should make an immediate improvement in the existing and future air quality within Coos County.

Table 9: Metal Emissions from Fuel Combustion (lbs/thermal unit)

Element	#6 Bunker Fuel	Natural Gas[1]	Average Industry Yearly Reduction[2]
Arsenic	0.000009	<0.000001	18
Barium	0.000017	<0.000001	34
Beryllium	<0.000001	<0.000001	N/A
Cadmium	0.000003	<0.000001	5
Chromium	0.000006	<0.000001	11
Cobalt	0.000040	<0.000001	80
Copper	0.000012	<0.000001	23
Manganese	0.000020	<0.000001	40
Mercury	0.000001	<0.000001	2
Molybdenum	0.000005	<0.000001	10
Nickel	0.000563	<0.000001	1,127
Selenium	0.000005	<0.000001	9
Vanadium	0.000212	<0.000001	424
Zinc	0.000194	0.000003	382

Table 10: Airborne Emissions from Fuel Combustion (lbs/thermal unit)

Element	#6 Bunker Fuel	Natural Gas[1]	Average Industry Yearly Reduction[2]
Carbon Dioxide	16.2667	0.0082	(9,804)
Carbon Monoxide	0.0033	0.0001	409,749
Sulfur Oxides	0.2049	0.0186	25,412
Nitrous Oxides	0.0313	0.0002	28,427
Filterable Particulate Matter	0.0144	0.0011	(450)
Total Organic Compounds	0.0009	0.0002	882
Methane	0.0007	<0.000001	N/A
Benzene	<0.000001	0.000007	29
Formaldehyde	0.000022	<0.000001	2
Napthalene	0.000001	<0.000001	8
Toluene	0.000004	0.0082	(9,804)

[1]Annual use for average industrial customer on NW Natural system in Oregon.

[2]Figures are calculated per Emission Factors from EPA manual AP-42, “Compilation of Air Pollutant Emission Factors” AP-42, Fifth Edition, Volume 1 Chapter 1, Tables 1.3-1 and 1.4-1, et seq. {www.epa.gov//ttn/chief/ap42}

Natural Resources

Cultural Resources (Including Native American Religious Concerns)

Background

See Appendix B for background information regarding this resource. Recommendations given in Appendix B will be followed prior to and during construction.

Environmental Consequences and Comparison of Alternatives

Direct, Indirect and Cumulative Effects

No Action Alternative

No impacts.

Proposed Action

- **Direct Impacts:** Onsite monitoring by qualified archaeologists and designated tribal representatives will be present to monitor during construction, areas that historical records and field tests have identified as having potential cultural resources (see maps in Appendix B). All identified resource areas would be avoided (go around or directionally-drill underneath the area) by construction activities for the proposed action. Therefore, there are no anticipated potential direct impacts from pipeline construction. After construction, paving of approximately 15 miles of gravel road on the CBW Road will occur. If this is the case, a formal Determination of Eligibility document will be prepared for the CBW Road and submitted to the State Historic Preservation Office for evaluation prior to paving. If the CBW Road is determined to be eligible for the National Register for Historic Places, then a Determination of Effect would be prepared for the proposed alterations (paving) to the gravel portions of the CBW Road.
- **Indirect Impacts:** None
- **Cumulative Impacts:** None

Hwy 42 Alternative

- **Direct Impacts:** No anticipated impacts, as all construction would occur on paved roads.
- **Indirect Impacts:** None
- **Cumulative Impacts:** None

Soils

Refer to Appendix A for background information on soils.

Environmental Consequences and Comparison of Alternatives

Direct, Indirect and Cumulative Effects

No Action Alternative

No impacts.

Proposed Action

- **Direct Impacts:** The proposed action alternatives require placement of a pipeline in existing road grades and/or utility corridors. Any potential short-term risk of soil loss has been minimized or eliminated by the Erosion Control Plan (Appendix H) and the PDCs for culvert placement to be so small, as to be unmeasurable (i.e., negligible) at the watershed level of assessment (5th field HUC). In areas where ground-disturbing activities occurs outside of roadways, the proposed action may negatively impact soil productivity due to compaction and backfilling with soils containing less organics than the material removed for pipe placement. The total acres of potentially reduced soil productivity under the proposed action is approximately 56 acres (Table 11).

Table 11: Acreage of soil area impacted by watershed in the proposed action.

Watershed	Total Acres Impacted	Percent of Total Impact
Lower South Umpqua	5.6	10
Ollala-Lookingglass	25.3	45
East Fork Coquille	5.5	10
Lower Coos-Coos Bay	6.6	12
North Fork Coquille River	13.0	23
Middle Main Fork Coquille	0.0	0
Totals	56.0	100

The proposed action's watersheds listed in Appendix E are approximately 55,000 to over 100,000 acres in size. The few acres of potentially reduced soil productivity in each basin is so small that it would be unmeasurable (i.e., negligible). The Middle Main Fork Coquille Watershed has no construction area outside of roadways, therefore, there is no anticipated impact to its watershed soil productivity.

- **Indirect Impacts:** Potential changes in soil bulk density and drainage on the approximately 56 acres of impacted construction area.
- **Cumulative Impacts:** None

Hwy 42 Alternative

- **Direct Impacts:** No anticipated impacts, as all construction would occur on paved roads.
- **Indirect Impacts:** None
- **Cumulative Impacts:** None

Vegetation

Background

One of the goals of the management guidelines in the Roseburg RMP (USDI 1995a), Integrated Weed Control EA (USDI 1995b) and Coos Bay BLM RMP (USDI 1994) concerning noxious weeds, was to prevent the spread or infestation on BLM-managed lands. For Port-Orford-cedar (POC), a primary management objective is to limit the spread of the root pathogen *Phytophthora lateralis* (Pl), which causes rapid mortality to POC.

Because the proposed action requires ground-disturbance in existing utility corridors, some preventative PDCs will be implemented to avoid further spread of noxious weeds and Pl within the powerline ROWs.

Vegetation, Including T&E, Survey and Manage, Special Status, and Noxious Weeds

The proposed action corridor was surveyed in autumn of 2000 and spring/summer of 2001 for T&E, Special Status, Survey and Manage and noxious weed species. There is considerable man-made disturbance already occurring within it. The CBW Road sits on an average of five feet of fill dirt. In the powerline ROW, sub-climax vegetation predominates. All trees have been removed except in one draw on private property, where they will not interfere with powerlines. The powerline is serviced by access roads which are maintained by periodic bulldozing. In addition, there are dirt roads leading to the electrical towers leaving areas of exposed soil. Invasive weeds (including noxious weeds) are prevalent throughout this utility corridor. Because of the continuous intensive vegetation removal required by the County, BPA/PP&L management plans, little change in the sub-climax/disturbed vegetal regime is anticipated. Botanical field surveys found no presence of Threatened & Endangered, Special Status or Survey and Manage habitats or species (including bryophytes, lichens and fungi) in the pipeline construction corridor. Some noxious weeds, however, were found (Table 12).

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Table 12: Noxious Weeds in Utility Corridor

Common	Scientific
Bull thistle	*Cirsium vulgare*
Canada thistle	*Circium arvense*
Gorse	*Ulex europaeus*
Himalayan blackberry	*Rubis discolor*
Scotch broom	*Cytisus scoparius*
St. Johns Wort	*Hypericum perforatum*
Tansey ragwort	*Senecio jacobaea*

Himalayan blackberry, Scotch broom, St. Johns Wort and Bull thistle occur throughout the utility corridor, varying in abundance from dense to scattered. Gorse was found on private land adjacent to BLM (T28S, R11W Sect. 10, NW 1/4 NE 1/4). Tansy ragwort and Canada thistle occur in an adjacent riparian area on Reston Ridge.

The nearest plant of concern was the federally endangered Western lily (*Lilium occidentale*) located along the coastal strand which extends 4 miles inland near Bandon. Site surveys made for Oregon Natural Heritage tracking species in the vicinity of the proposed action corridor, listed only Cusick's Checker Mallow (*Sidalcea cusickii*), which was found in the Umpqua and Coquille Valleys in moist habitat.

Environmental Consequences and Comparison of Alternatives

No Action Alternative

- **Direct Impacts:** This alternative would have no direct impacts on the plant community in the proposed action area. No ground disturbance would occur under this alternative.
- **Indirect Impacts:** This alternative would have no indirect effects on the plant community in the proposed action area. No ground disturbance would occur under this alternative.
- **Cumulative Impacts:** This alternative would have no cumulative effects on the plant community in the proposed action area. No ground disturbance would occur under this alternative.

Proposed Action

- **Direct Impacts:** Because field surveys found no T&E, Special Status or Survey and Manage species (including bryophytes, lichens and fungi) or habitats in the proposed action area, the project would have no direct impact to these species.
- Bare soil would be temporarily exposed to possible invasion of noxious weeds. After ground disturbing activities, the bare soil areas on BLM property will be seeded and mulched with approved BLM-seed mixtures to enhance propagation of desirable plant species and minimize potential for weed encroachment. Private land areas would receive the same post-construction treatment, except that a state-approved seed mix for the Oregon Coast Range (Appendix H) will be used on those ownerships. There would be no impact to POC since none exist in the proposed action corridor. Prior to ground-disturbing activities, construction areas with noxious weeds that have not been sprayed as part of the County's CBW Road or BPA/PP&L corridor maintenance plans, will be treated mechanically. Post-construction treatment (mechanical or herbicides) of disturbed areas for noxious weeds will occur the following year in areas where noxious weeds have invaded disturbed ground from pipeline construction.
- Because of the treatments for noxious weeds and the ongoing disturbance in the CBW Road and utility corridors, no measurable direct impacts from noxious weeds is anticipated from the proposed action
- Temporary removal of grasses, weeds and small shrubs would occur in the proposed action from ground-disturbing activities. Until the vegetation regrows, the seeded plants will temporarily replace the sub-climax grasses, weeds and small shrubs now present in the 56 acres to be disturbed within the utility corridors.
- **Indirect Impacts:** Indirect effects would include the potential for long-term increased spread of noxious weeds in the project area which may displace native plant species habitats. There would be no indirect effects for T&E, Special Status or Survey and Manage species (including bryophytes, lichens and fungi), since none exist in the proposed action area.
- **Cumulative Impacts:** The cumulative effects would include the potential increase of noxious weeds in the powerline utility corridor area. There would be a temporary reduction in the amount of vegetation which protects the soil in the existing powerline ROW, thus increasing the risk of weed invasion. There would be no cumulative impacts for T&E, Special Status or Survey and Manage species (including bryophytes, lichens and fungi), since none exist within the proposed action area.

Hwy 42 Alternative

- **Direct Impacts:** This alternative would have no anticipated direct impact on the plant communities, including POC in the proposed action area, as ground disturbance would be limited to roadways.
- **Indirect Impacts:** This alternative would have no indirect effect on the plant communities in the proposed action area, as no ground disturbance outside of roadways were anticipated.
- **Cumulative Impacts:** This alternative would have no cumulative effect on the plant community in the proposed action area.

Floodplains

Direct, Indirect and Cumulative Effects

No Action Alternative

No impact.

Action Alternatives

Both corridors are adjacent to 100-year floodplains. Each corridor's adjacent area (2.2 miles for proposed action and 15.3 miles for Hwy 42 alternative) to the floodplain are on roadways that sit well above the floodplain on 5-10 feet of road fill. No anticipated impacts.

Wild and Scenic Rivers

All Alternatives

No Wild and Scenic Rivers exist in any alternative. No effect.

Wildlife

Federally Listed, Proposed or Candidate Species

This section discusses the potential effects to species listed as threatened or endangered, or proposed for listing, under the Endangered Species Act of 1973, as amended. It only discusses in detail those listed terrestrial species that have the potential to be affected by the proposed actions. Other listed, candidate and proposed species will not be affected by the proposed actions. Also see Appendix F for the USFWS Letter of Concurrence.

Northern Spotted Owl

Background

The management and recovery of northern spotted owls is an important consideration and received extensive attention to the Northwest Forest Plan Final Supplemental Environmental Impact Statement (FSEIS) (USDA, USDI 1994a, pp. 3&4; 211 through 245 and Appendices G, J1, J3). Late-Successional Reserve Assessments have been developed for the BLM-Coos Bay District's LSR #261 containing CHU OR60 (northern spotted owl), and CHUs OR06-B and OR-06-D (marbled murrelet). Because of implemented PDCs, impacts to these designated species and habitats are avoided. None of the proposed actions will affect or degrade any late-successional habitats in these CHUs/LSRs, nor will they slow habitat development in these CHUs/LSRs.

Detailed accounts of the taxonomy, ecology and reproductive characteristics of the spotted owl are found in the Status Reviews produced by the USFWS (USDI 1987, 1990a); the 1989 Status Review Supplement (USDI 1989); the Interagency Scientific Report (Thomas et al. 1990); and the final rule designating the spotted owl as a threatened species (USDI 1990b). There are approximately 5,608 pairs of northern spotted owls and resident singles (activity centers) and approximately 8.1 million acres of suitable habitat currently estimated across the range of the species (Holzman, USFWS, pers. comm. 1995). Recent demographic studies (Burnham et al. 1994) indicate that the population is declining. While such a decline is expected to continue as spotted owl sites with severely degraded habitat conditions become inactive, implementation of the NFP is expected to abate the decline by protecting all spotted owl sites within LSRs. The NFP will provide for the conservation of the species by allowing non-suitable, but capable habitat to regenerate within the LSRs to allow the population to increase and stabilize across its range. Preliminary results from a more recent (December 1998) meta-analysis of available demographic data for the period 1985-1998, though, found no evidence of a decline in reproduction or in the overall annual survival probability during the period of study (Forsman and Anthony 1999).

The 1990 Spotted Owl Status Review Committee stated that population size is primarily a function of the amount and distribution of available habitat (USDI 1990a). In developing a conservation strategy for late-successional and old-growth forest-associated species, the Departments of Interior and Agriculture developed a network of late-successional and old-growth habitat reserves across the Pacific Northwest. This network of Late-Successional Reserves is designed to conserve forest species closely associated with late-successional and old-growth forest habitat where habitat conditions are relatively intact and also provide for the regeneration of late-successional forest habitat where habitat is extremely limited and the reliant plant and wildlife populations are low.

On the Coos Bay District BLM, the early nesting season is considered March 1 through June 30. The intent in selecting 30 June is to insure that nearly all young northern spotted owls will have left the nest tree and be somewhat mobile by this date. We reviewed over 700 nesting status records for 1990-1994 on the District; 0.1 percent of the records indicated young owls were still in the nest tree by June 30 suggesting that this date is reasonable.

Environmental Consequences and Comparison of Alternatives

Direct and Cumulative Effects

All Alternatives

None of the alternatives have direct or cumulative impacts on the northern spotted owl, because they do not remove or degrade any suitable habitat for this species.

Indirect Effects

All Alternatives

The potential indirect impacts due to disturbance from equipment noise are avoided in the PDCs (listed below), which provide both seasonal and daily timing restrictions that would eliminate most, if not all, potential short-term (1-7 days) adverse indirect effects.

Habitat or Individuals

A. No habitat would be removed from proposed actions.

Disturbance

A. Work activities such as trenching, pipe-laying and re-paving, would not take place within 0.25-mile of any nest site or activity center of known pairs and resident singles between March 1st and June 30th.

B. This PDC may be waived in a particular year by the USFWS, if nesting or reproductive success surveys conducted according to the USFWS-endorsed survey guidelines reveal that northern spotted owls are non-nesting or that no young-of-the-year are present. Waivers are only valid until March 1st of the following year. Previously known sites and activity centers are assumed occupied unless surveys indicate otherwise.

C. No helicopter activities will occur during construction.

D. Blasting would not occur within 1 mile of suitable habitat March 1st to June 30th.

E. Blasting would not occur within 1 mile of known nest sites March 1st to September 30th.

F. A wildlife Biologist will monitor the above measures on-site.

Marbled Murrelet

Background

The management and recovery of marbled murrelets is an important consideration and received extensive attention to the Northwest Forest Plan Final SEIS (USDA, USDI 1994a, pp. 3&4; 245 through 249, and Appendices G and J2). Late-Successional Reserve Assessments have been developed for the BLM-Coos Bay District's LSR #261 containing CHU OR60 (northern spotted owl), and CHUs OR06-B and OR-06-D (marbled murrelet). Because of implemented PDCs, direct and cumulative impacts to these designated species and habitats are avoided. None of the proposed actions will affect or degrade any late-successional habitats in these CHUs/LSRs, nor will they slow habitat development in these CHUs/LSRs.

An account of the taxonomy, ecology, and reproductive characteristics of the marbled murrelet is found in Marshall 1988, USDI 1992b, USDI 1996, USDI 1994, USDA USDI 1994b, and USDI 1997. The U.S. Forest Service has published the Ecology and Conservation of the Marbled Murrelet, an up-to-date and comprehensive summary of the status of the species, which was peer reviewed by representatives of numerous wildlife and ecological societies (Ralph et al. 1995). This document makes several key points regarding the status of the marbled murrelet. Population trends are clearly downward. Ralph et al. (1995) and USDI (1997) suggested possible reasons for the decline include the species' dependence on older forests for nesting (forests which are now scarce and highly fragmented); its low reproductive rate; and adult mortality due to predation, capture in gill nets, and encounters with oil spills. The amount and distribution of the remaining suitable habitat is considered to be the most important determinant of the long-term population trend and further loss may severely hamper the stabilization and recovery of the species.

Most population estimates for marbled murrelets have been conducted using at-sea surveys and are subject to many sources of error, such as the methods of counting flying birds, environmental conditions, and observer ability (Ralph et al. 1995). These sources of error may also change with the season and location of the surveys.

Population estimates for the marbled murrelet in Oregon vary substantially. For example, Varoujean and Williams (1995) used aerial surveys conducted along the entire Oregon Coast in August and September 1993 to estimate that 6,600 marbled murrelets occur in Oregon. In a different study, Strong et al. (1995) used boat surveys to estimate that 15-20,000 marbled murrelets occur in Oregon; they caution that large numbers of non-breeding adults and low numbers of fledglings on the water may be due to a lack of suitable nesting habitat.

Population estimates for Washington and California are less variable. Spiech and Wahl (1995) concluded that marbled murrelet populations in Puget Sound are lower now than they were at the beginning of this century, and total estimates for Washington are about 5,500 marbled murrelets (Ralph et al. 1995). Ralph and Miller (1995) estimated the California population to be approximately 6,500 birds.

Beissinger (1995) constructed a demographic model of the marbled murrelet and concluded that the population may be declining at rates of 4-6 percent per year; but this estimate is limited by the possibility that the age-ratio data used in the model are reflective of a relatively temporary decline due to unusual ocean conditions (Ralph et al. 1995). Ralph et al. (1995) summarized some of the reasons for population estimate variability among researchers, including differences in methodology, assumptions, spatial coverage, and survey and model errors. Nevertheless, both Ralph et al. (1995) and USDI (1997) have concluded that the listed population appears to be in a long-term downward trend.

There are approximately 979 known marbled murrelet occupied sites within Washington, Oregon, and California (Holzman, USFWS, pers. comm. 1995). Total number of suitable habitat acres in these three states is unknown. Ralph et al. (1995) estimated there are 2,561,500 acres of suitable habitat for the marbled murrelet on Federal lands in the listed range of this species.

Environmental Consequences and Comparison of Alternatives

Direct and Cumulative Effects

All Alternatives

None of then alternatives have direct or cumulative impacts on the marbled murrelet, because they do not remove or degrade any suitable habitat for this species.

Indirect Effects

All Alternatives

The potential indirect impacts due to disturbance from equipment noise are addressed in the PDCs (listed below), which provide both seasonal and daily timing restrictions that would eliminate most, if not all, potential short-term (1-7 days) adverse indirect effects.

Disturbance

A. Daily timing of the project's "Moderately above ambient noise levels for less than 1 week" and related activities occurring within 0.25-mile of unsurveyed suitable habitat, shall be no earlier than 2 hours after sunrise and no later than 2 hours before sunset from April 1st to September 15th.

B. Daily timing of the project's "Moderately above ambient noise levels for less than 1 week" and related activities occurring within 0.25-mile of occupied habitat, shall be seasonally restricted from April 1st to August 5th.

C. Daily timing of the project's "Moderately above ambient noise levels for less than 1 week" and related activities occurring within 0.25-mile of occupied habitat, shall be no earlier than 2 hours after sunrise and no later than 2 hours before sunset from August 6th to September 15th.

D. No blasting will occur within 1 mile of occupied or unsurveyed suitable habitat April 1st to September 15th.

E. No helicopter activities will occur during construction.

F. A wildlife Biologist will monitor the above measures on-site.

Bald Eagle

Background

Breeding and wintering populations of the bald eagle occur throughout Southwest Oregon. Recovery efforts for Bald Eagles have allowed populations to increase to the extent that the species is now proposed for delisting in the lower 48 states (USFWS 1999).

The population in Oregon is listed as threatened. Its present status is a result of past and present destruction of habitat, a declining food base, environmental contaminants, disturbance, electrocution, and illegal harassment including, but not limited to shooting, and poisoning. Currently the primary threats to bald eagles are habitat degradation and, in some areas, environmental contaminants.

In the Pacific Northwest, bald eagles typically nest in multi-layered, coniferous stands with old-growth trees located within a mile of large bodies of water (USDI 1986). Availability of suitable trees for nesting and perching is critical for maintaining bald eagle populations. The Pacific Northwest is a key area for wintering bald eagles and supports over 25 percent of the wintering bald eagles in the lower 48 states (USDI 1986). Wintering sites are typically in the vicinity of concentrated food sources such as anadromous fish runs, and high concentrations of waterfowl or mammalian carrion.

A number of habitat features are desirable. Eagles need perch trees for hunting and resting. These trees typically provide an unobstructed view of the surrounding area and are usually near nests or feeding areas such as large rivers.

Environmental Consequences and Comparison of Alternatives

Direct and Cumulative Effects

All Alternatives

None of the alternatives would have direct or cumulative effects on bald eagles or bald eagle habitat management because no suitable habitat would be removed.

Indirect Effects

All Alternatives

The potential indirect impacts due to disturbance of resident bald eagle nests along these corridors from equipment noise are addressed in the PDCs (listed below), which provide both seasonal and daily timing restrictions that would eliminate most, if not all, potential adverse effects.

Disturbance

A. Work activities that cause disturbance would not take place within 1312 feet of active nests and roosts, or within 2625 feet line-of-sight from nests and roosts during periods of eagle use unless field surveys demonstrate that the nest or roosts are not being used during the normal season of use. For nests, the period of eagle use is January 1st to August 31st (or two weeks post-fledging). For roosts, the period of eagle use is November 15th to March 15th.

B. No helicopter activities will occur during construction.

BLM Special Status Species

Background

According to the definition in the BLM 6840 policy, a special status designation includes species that could easily become endangered or extinct in state. They are either restricted in range or have natural or human-caused threats to survival. Special Status species are not listed, proposed or candidate species, but are eligible for federal or state listing or candidate status. BLM Special Status Species are designated by the BLM State Director. BLM 6840 policy requires that any BLM action will not contribute to the need to list any of these species. (A list of these species is found in Appendix K1.) Noise disturbance is assessed out to 0.25-mile from all construction-related activities.

Environmental Consequences and Comparison of Alternatives

Direct and Cumulative Effects

All Alternatives

Both action alternatives would have no direct or cumulative effect on Special Status Species. No individuals or suitable habitat would be removed due to the proposed or Hwy 42 alternative actions.

Indirect Effects

All Alternatives

Vertebrates spending part of their life-history cycle adjacent to the proposed action corridor during active construction may be disturbed by short-term (1-7 days) ambient noise from heavy equipment used to lay pipe. There are no management requirements or PDCs for any special status species. Although no documented locations of special status vertebrates are known adjacent to the pipeline corridor, some minor disturbance potential is assumed, because adjacent suitable habitat has not been surveyed for special status species.

Some special status bats and birds that use the utility corridors for diurnal and nocturnal foraging, may be disturbed away from those areas where construction is active, to alternate foraging areas further from construction noise. The number of special status species individuals utilizing the powerline corridor for foraging has not been documented, and is unknown. Because construction is short-term (1-7 days) with moderate noise above ambient background levels, any indirect impacts to special status species from indirect noise effects would be negligible.

Survey and Manage Species

Survey and Manage species represent flora and fauna in the NFP area that are believed to be locally rare, with a limited habitat range requiring late-successional forests; some are endemic to western forests in southwestern Oregon. See Appendix K for list of these species. Noise disturbance is assessed out to 0.25-mile from all construction-related activities.

Environmental Consequences and Comparison of Alternatives

All Alternatives

- **Direct Impacts:** The proposed action would have no direct effects on Survey and Manage Species habitats or individuals.
- **Indirect Impacts:** Except for the possibility of noise disturbance affecting individual red tree voles in adjacent suitable habitat areas, the proposed action would have no other anticipated indirect impacts on Survey and Manage Species in the proposed action areas, as no ground-disturbing activities occur within their habitats. The number of red tree vole individuals utilizing habitat adjacent to the pipeline corridor for breeding, feeding

and sheltering has not been documented and is unknown. Because construction is short-term (1-7 days) with moderate noise above ambient background levels during the daytime only, any indirect impacts to nocturnal red tree voles from indirect noise effects would be negligible.

- **Cumulative Impacts:** None

Other Wildlife

Noise disturbance is assessed out to 0.25-mile from all construction-related activities.

Environmental Consequences and Comparison of Alternatives

No Action Alternative

No anticipated Direct, Indirect or Cumulative Impacts.

Proposed Action

- **Direct Impacts:** Birds that utilize small shrubs as part of their life-history cycle may temporarily lose some potential shrub habitat in the utility corridor in areas of ground disturbance from construction. Approximately 0.2-acre of conifer plantation trees on private land would be removed in the utility corridor (under the powerlines that span two hillsides). Although these trees are immature (25 years old) and densely packed (300 trees per acre), they do offer perches for flycatchers and other avian insect foragers that may use the powerline/utility corridor for feeding. Habitat loss from tree and shrub removal would be long-term impacts.
- **Indirect Impacts:** Short-term (1-7 days) noise disturbance from heavy equipment in the proposed action corridor during the active construction period may briefly impact individual diurnal mammals, herptofauna and birds that utilize powerline corridors or adjacent habitats for travel or foraging. Nocturnal use of the powerline ROWs (by owls, bats, etc.) would remain relatively unchanged and undisturbed, as no nighttime construction activity is anticipated.
- **Cumulative Impacts:** None

Hwy 42 Alternative

- **Direct Impacts:** None are anticipated, as no individuals or habitat would be removed.
- **Indirect Impacts:** Noise disturbance from heavy equipment in the Hwy 42 corridor during the active construction period may briefly impact individual mammals, herptofauna, and birds that utilize habitats adjacent to the highway. However, construction noise should not be measurably greater (i.e., negligible) than normal levels caused by highway traffic and should not add any measurable impacts.
- **Cumulative Impacts:** None

Aquatic Ecosystem

Background

The ACS is a habitat-based approach for restoration and maintenance of watersheds and the aquatic ecosystems contained within them on federally managed lands (USDA, USDI 1994a and USDA, USDI 1994b). When assessing discretionary federal actions (as in this document), analyses must include effects on the non-federal lands contained in the proposed actions. This is exactly what occurred. In fact, the emphasis of this document's assessment is on non-federal lands in the proposed action, because BLM-managed lands represent only 3.5 percent of the proposed action corridor. The foundation principle for maintaining and restoring aquatic habitats within the NFP area was avoidance

of species-specific strategies in the ACS objectives. The NFP Record of Decision emphasized this foundation strategy by stating:

> *"Any species-specific strategy aimed at defining explicit standards for habitat elements would be insufficient for protecting even the targeted species. The Aquatic Conservation Strategy must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats."* (USDA, USDI 1994b, p. B-9)

The components of the proposed action aquatic management plan (watershed analysis and watershed protection/restoration), provide the fundamental building blocks for protecting aquatic and riparian-dependent flora and fauna. Coupled with watershed analysis (Appendix E), other elements of the aquatic management plan (Appendix H) within the proposed action are designed to protect in the short-term and enhance in the long-term, water quality and aquatic/riparian habitats for those aquatic/riparian-dependent species throughout all federal and non-federal landholdings within the scope of the proposed action. The Coos Bay and Roseburg Districts' Watershed Analyses (containing the Hwy 42 and the proposed action's affected areas) give watershed baseline conditions that are used to assess impacts of the proposed actions on the aquatic ecosystem.

Environmental Consequences and Comparison of Alternatives

Following the ACS provides significant protection for aquatic and riparian-dependent flora and fauna, regardless of the alternative selected. All of the alternatives in this EIS are consistent with the ACS objectives (Appendix E), and the action alternatives contain specific measures to minimize risk to aquatic and riparian-dependent flora and fauna.

No Action Alternative

Under this alternative, there would be no impacts (including no potential beneficial impacts).

Hwy 42 Alternative

The Hwy 42 action alternative would contain the same protective measures for building a natural gas pipeline as the proposed action, which successfully minimizes potential adverse impacts to the aquatic ecosystem. The differences occur mainly in corridor length (the proposed action is the shortest) and in the number of streams/wetlands crossed (the proposed action has the least). (See Action Alternatives Route Summary Table 2, Chapter 2) Also, the Hwy 42 alternate route lacks the beneficial mitigation measures (adding cross-drains and paving) contained in the proposed action for enhancing the sedimentation and turbidity baseline habitat elements.

HABITAT ELEMENT	IMPACT
Sedimentation	Insignificant
Turbidity	Insignificant

Improvement in the physical barrier baseline would be achieved by replacing at least 2 deteriorating culverts that presently block fish passage.

Proposed Action

After assessing potential impacts in all six watershed analyses, the proposed action effects on baseline conditions of two habitat elements were identified for their potential insignificant impacts to the aquatic ecosystem. These two elements are sedimentation and turbidity. (Appendix E contains the specific assessments by watershed for each habitat element identified in their pertinent watershed analysis area.) The protective measures (Appendix H) contained in the proposed action's overall ECP, are specifically designed to avoid most adverse impacts to the two habitat elements (sedimentation and turbidity) identified as potentially impacted by pipeline construction. Furthermore, specific mitigation has been identified to restore the sedimentation, turbidity and physical barrier (fish passage) baselines. That is, the proposed action is designed to avoid adverse impacts to the aquatic ecosystem while providing substantive beneficial impacts.

HABITAT ELEMENT	IMPACT
Sedimentation	Insignificant
Turbidity	Insignificant

Improvement in the sedimentation and turbidity baselines would be achieved through paving approximately 15 miles of the CBW Road that is presently a gravel-dirt surface. This paving would be spread across 4 watersheds: East Fork Coquille - 10.3 miles, Middle Main Coquille - 1.9 miles, North Fork Coquille - 1.0 mile and Lower Coos/Coos Bay - 1.9 miles. Gravel-dirt roads have been identified as the major source of sediment and turbidity, and paving of approximately 15 miles would provide long-term benefits to these watersheds.

Improvement in the physical barrier baseline would be achieved by replacing 3 deteriorating culverts that presently block anadromous fish passage within the East Fork Coquille Watershed.

Summary of the Lower South Umpqua Watershed Road Corridor Stream Crossings

A total of 8 intermittent streams within the Lower South Umpqua Watershed would be affected by the proposed action (Table 13). All of the construction (trenching) in this watershed would occur when these streams are dry within the utility ROWs.

Table 13: Stream Description and Crossing Type on Utility Corridor within the Lower South Umpqua Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	5	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	3	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		8	0	0	0	0

Summary of the Olalla Creek/Lookingglass Creek Watershed Road Corridor Stream Crossings

A total of four streams within the Olalla Creek/Lookingglass Creek Watershed would be affected by the proposed action in the CBW Road. Two crossings occur within the roadbed of existing public roads, and two perennial streams would be crossed using the bag and flume method (Table 14).

Table 14: Stream Description and Crossing Type on Road Corridor within the Olalla Creek/ Lookingglass Creek Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	1	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	1	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	1
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	1
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**0**	**2**	**0**	**0**	**2**

Summary of the Olalla Creek/Lookingglass Creek Watershed Utility Corridor Stream Crossings

A total of thirty-nine streams within the Olalla Creek/Lookingglass Creek watershed would be crossed within existing utility corridors (Table 15). Thirty-one streams would crossed by the dry trench method, and eight streams would be crossed by the bag and flume method.

Table 15: Stream Description and Crossing Type on Utility Corridor within the Olalla Creek/ Lookingglass Creek Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	3	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	2	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	3	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	6	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	2	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	23	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**31**	**8**	**0**	**0**	**0**

Summary of the East Fork Coquille Watershed Road Corridor Stream Crossings

A total of 58 streams along the CBW Road in the East Fork Coquille Watershed would be affected by the proposed action (Table 16). Fifty-four crossings would occur above the streams within the roadbed of existing public roads; three crossings would be hung on bridges; and one crossing would be directionally-drilled below the stream.

Table 16: Stream Description and Crossing Type on Road Corridor within the East Fork Coquille Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	1	3
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	1	0	5
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	0	0	0	14
	15 - 30	0	0	0	2	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	3
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	3
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	0	0	0	0	26
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**0**	**0**	**1**	**3**	**54**

Summary of the East Fork Coquille Watershed Utility Corridor Stream Crossings

Only three streams would be crossed by the proposed action within the East Fork Coquille Watershed within utility ROW (Table 17). Two intermittent streams would be crossed by the dry trench method and one small perennial stream would be crossed by the bag and flume method.

Table 17: Stream Description and Crossing Type on Utility Corridor within the East Fork Coquille Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	1	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	2	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**2**	**1**	**0**	**0**	**0**

Summary of the North Fork Coquille Watershed Road Corridor Stream Crossings

A total of seven streams within the CBW Road in the North Fork Coquille Watershed would be affected by the proposed action. Six crossings occur within the roadbed of existing public roads (Table 18).

Table 18: Stream Description and Crossing Type on Road Corridor within the North Fork Coquille Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	0	1
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	1	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	5
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**0**	**0**	**1**	**0**	**6**

Summary of the North Fork Coquille Watershed Utility Corridor Stream Crossings

Eight stream crossings and one wetland would occur within the utility ROW (Table 19). One stream would be crossed by the dry trench method; six streams would be crossed by the bag and flume method; two stream crossings and one wetland would be directionally-drilled.

Table 19: Stream Description and Crossing Type on Utility Corridor within the North Fork Coquille Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Cross Culvert (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	1	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	1	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	4	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	1	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	1	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	1	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**1**	**5**	**3**	**0**	**0**

Summary of the Middle Main Coquille Watershed Road Corridor Stream Crossings

A total of 17 streams within the Middle Main Coquille Watershed would be affected by the proposed action. All of these crossings would occur above the stream within the roadbed of existing public road ROW (Table 20).

Table 20: Stream Description and Crossing Type on Road Corridor within the Middle Main Coquille Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Above Stream (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	0	0	11
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	6
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**0**	**0**	**0**	**0**	**17**

Summary of the Lower Coos River/Coos Bay Watershed Road Corridor Stream Crossings

A total of 29 streams within the CBW Road in the Lower Coos River/Lower Coos Bay Watershed would be affected by the proposed action. Crossings occur within the roadbed of existing public roads (Table 21).

Table 21: Stream Description and Crossing Type on Road Corridor within the Lower Coos River/ Coos Bay Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Above Stream (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	1	0	15
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	0	0	0	2
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	0	0	0	0	10
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	0	0	0	0	1
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	0	0	0	0	1
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**0**	**0**	**1**	**0**	**29**

Summary of the Lower Coos River/Coos Bay Watershed Utility Corridor Stream Crossings

Thirteen crossings, including one wetland within the Lower Coos River/Coos Bay Watershed would occur on existing utility ROW (Table 22). Six streams would be crossed using the dry trench method; two streams would be crossed using the bag and flume method; and five crossings would be directionally-drilled below the stream.

Table 22: Stream Description and Crossing Type on Utility Corridor within the Lower Coos River/ Coos Bay Watershed (5th field HUC)

Slope	Stream Width (feet)	Dry Streams	Bag & Flume	Directionally Drilled	Hang on Bridge	Above Stream (in road fill)
Gentle Perennial (< 2% rise)	0 - 15	0	0	* 2	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	1	0	0
Moderate Perennial (2 - 4% rise)	0 - 15	0	1	1	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Perennial (> 4% rise)	0 - 15	0	1	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Gentle Intermittent (< 2% rise)	0 - 15	2	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Moderate Intermittent (2 - 4% rise)	0 - 15	1	0	0	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
Steep Intermittent (> 4% rise)	0 - 15	3	0	1	0	0
	15 - 30	0	0	0	0	0
	> 30	0	0	0	0	0
TOTAL		**6**	**2**	**5**	**0**	**0**

* These crossings would occur approximately 200 feet outside of the existing utility corridor and would include 1 small wetland.

Reasonably Foreseeable Future Actions

Laterals to Coquille, Myrtle Point and possibly Bandon, OR, would be constructed in the future. These proposed laterals would start near the Fairview block-valve, and likely be placed within the roads or utility corridors to those cities from the CBW Road. Decisions relating to timing and placement of the laterals have not been finalized. Although construction and placement are not finalized, the anticipated design would still follow the PDCs and BMPs contained in the construction plans for the proposed action. The amount of disturbance from in-stream work and culvert placement would be determined by whether the laterals are placed in utility corridors or on road fill. The proposed laterals would be approximately 28 miles in total length. The present plans include construction and placement of 6-inch and 4-inch pipe. The amount of ground disturbance would be less than the mainline (proposed action), because smaller construction equipment and less ground area would be necessary.

NW Natural has announced plans to extend service to existing industrial users on the North Spit of Coos Bay. An 8 to 12-inch pipe would be placed under the road from Ocean Boulevard to Newmark Avenue to Empire. From there, the extension would be directionally-drilled under Coos Bay to a paved road on the North Spit. This distribution pipeline would likely be built concurrently with the Coos County Pipeline. Impacts to aquatic habitats will be avoided, as construction will be limited to paved areas in Coos Bay, and directionally-drilled under the bay itself. Portions of the North Spit are designated as an ACEC. All construction plans identified by NW Natural keep the North Spit Extension on utility corridors or road ROW, thus avoiding all potential impacts to the ACEC area.

Summary of Direct, Indirect and Cumulative Effects for the Alternatives

Both the Hwy 42 and proposed action alternatives include measures to minimize the risk of potential short-term sedimentation from construction, which can affect water quality and water-dependent flora and fauna at the site scale. Short-term potential sedimentation impacts have been anticipated, and adequate PDCs and BMPs are utilized to minimize these potential impacts (i.e., make negligible). None of the alternatives would affect the analysis or planned outcomes as developed in the NFP Final SEIS and as implemented through its Record of Decision (USDA, USDA 1994b). See Appendix E for all watershed baselines and the specific rationale behind the effects determinations. See Appendix H and the ODOT Erosion Control and Sediment Manual for specific aquatic system protection measures for the proposed action.

Direct Effects

1. **No Action:** Alternative: No negative or beneficial impacts anticipated.

2. **Proposed Action:** Negligible impacts from pipeline construction in each watershed (5th field HUC) may occur. Normal background sedimentation and turbidity present in the watersheds will receive no measurable impacts at the 5th field level. At the 7th field HUC (sub-subwatershed level), small, localized and transitory increases to sedimentation and turbidity will likely occur during active trenching of small perennial streams, and during the first significant autumn precipitation event. These impacts would likely be small and insignificant. Beneficial impacts from placement of new stream and cross-drain culverts and paving approximately 15 miles of gravel-dirt road (on the CBW Road), will likely improve watershed baseline conditions in the long-term for sedimentation and turbidity, with immediate improvement in the baseline for physical barriers (fish passage).

3. **Hwy 42 Alternative:** Negligible negative impacts from pipeline construction in each watershed (5th field HUC) may occur. Normal background sedimentation and turbidity present in the watersheds will receive no measurable impacts at the 5th field level. At the 7th field HUC (sub-subwatershed level), small, localized and transitory increases to sedimentation and turbidity will likely occur during active trenching of live streams, and during the first significant autumn precipitation event.

Indirect Effects

1. **No Action Alternative:** None.

2. **Proposed Action:** Negligible impacts to sedimentation and turbidity baselines and beneficial impacts to physical barrier baseline.

3. **Hwy 42 Alternative:** Negligible impacts to sedimentation and turbidity baselines and beneficial impacts to physical barrier baseline.

Cumulative Effects

1. **No Action Alternative:** No foreseeable incremental effects.

2. **Proposed Action:** Beneficial incremental effects anticipated for the aquatic ecosystem from reduced sedimentation from the CBW Road and improved access to habitat for fish.

3. **Hwy 42 Alternative:** Beneficial incremental effects anticipated for habitat access for fish.

There would be no direct or indirect effects to the Coos Bay Estuary due to the implementation of PDCs. Currently, there are no known new industries entering Coos Bay following construction of the proposed natural gas pipeline, however it is likely. Any potential impacts would be addressed by such industries.

Human Environment

Areas of Critical Environmental Concern (ACEC)

The North Spit of Coos Bay contains the only ACEC near the action alternatives. Both the Hwy 42 alternative and the proposed action would trigger NW Natural to develop a distribution system to the manufacturing facilities presently located on the North Spit. NW Natural's distribution system would be built under paved roads within Coos Bay and the North Spit. To access the North Spit manufacturing area, NW Natural would cross under the bay using the directionally-drill method (shown in Appendix J).

Environmental Consequences and Comparison of Alternatives

Direct, Indirect, and Cumulative Effects

All Alternatives, including No Action

None of the alternatives would affect the North Spit ACEC, as that area would be avoided. No impacts.

Socio-Economic

Background

In February 1999, ECONorthwest published a study forecasting the economic impacts of a new pipeline. This study also measured the impacts of the distribution system, the long-term benefits to manufacturing employment, and the effects the distribution system would have on government revenues. The report was prepared for Northwest Natural and distributed to the public. The 1999 study itself was a revision of an earlier report by ECONorthwest completed in 1997 for Northwest Natural Gas and Carbon Energy International. It discussed the impacts of a natural gas distribution system confined to the County's two largest cities - North Bend and Coos Bay.

Both the 1997 and the 1999 studies relied on rough cost estimates for the pipeline. The route, timing, and dimensions of the pipeline had not been determined at the time the impact studies were completed.

In this report, cost estimates provided by Coos County are used. As such, it is ECONorthwest's understanding that the pipeline construction cost estimates are more precise than those used in the 1999 and 1997 studies. Two scenarios suggested that the pipeline would cost approximately $34 million (proposed action) or $48 million (Hwy 42 alternative) depending on which route is chosen. Furthermore, these cost estimates reflected dollar values for the 2000 fiscal year.

This report shows the results of a model estimating the economic impacts on Coos County from the construction and operation of a natural gas pipeline. The economic impact model reports values in year 2000 dollars. IMPLAN expresses employment in terms of person-years of employment. A person-year equals enough hours of work to keep one person fully employed for one year. In actuality, two or more people may share those hours. An employment impact is a mixture of new jobs, some additional part time work and added hours of work for people who are already employed.

Environmental Consequences and Comparison of Alternatives

No Action Alternative

The anticipated beneficial impacts from the proposed action would not occur.

Action Alternatives

There are three kinds of economic impacts. They are direct, indirect, and induced. A direct impact occurs when a person who builds or operates a pipeline: 1) Buys local goods and services and 2) hires local labor. The money they use to do this is a direct impact. Their spending, in turn, causes indirect impacts because those who supply goods and services to the gas pipeline will make some purchases in Coos County. Total employment and income in the County goes up. That puts more purchasing power in the hands of Coos County citizens. They then will increase their local spending and savings. This causes an additional stimulus to the County's economy called an induced (i.e., cumulative) impact. Money spent locally by pipeline workers is included as an induced impact.

The economic modeling framework which best captures these direct, indirect, and induced effects is called Input-Output Modeling. Input-Output Models are mathematical representations of the economy which incorporate how different parts (or sectors) of the economy are linked. With an Input-Output Model, one can trace the effects of a change in one sector through the rest of the economy.

Because Input-Output Models generally are not available for state and regional economies, special techniques have been developed to estimate the necessary relationships using national data and county-level measures of economic activity. This planning framework is called IMPLAN (for IMpact Analysis for PLANing). ECONorthwest used the most current version, IMPLAN Professional 2.0, to estimate the impacts of the natural gas pipeline on Coos County.

IMPLAN was developed by the Forest Service of the US Department of Agriculture in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management of the US Department of the Interior to assist federal agencies in their land and resource management planning.

Pipeline Construction

ECONorthwest built an Input-Output Model for Coos County to estimate the economic impacts of the construction and operation of the natural gas pipeline on the County. This model was used to estimate economic impacts under two scenarios of construction costs. They are: 1) A $48 million proposal, which would follow, in part, a railroad ROW; and 2) a more direct path, which would result in a lower construction cost of $34 million.

Construction Cost Estimates

ECONorthwest estimated the cost breakdown of the pipeline construction along three major categories: Materials, labor and contractors, and ROW. In addition, those expenditures were divided according to where those dollars would likely be spent. Table 23 shows the construction spending estimates for a $48 million construction cost pipeline project.

Table 23: Pipeline Construction Spending for the $48 Million Scenario (in 2000 Dollars)

	Materials	Labor and Contractors	ROW	Total
Coos County	$1,436,000	$14,361,200	$9,800	$15,807,000
Elsewhere	5,744,500	26,328,800	119,700	32,193,000
Total	$7,180,500	$40,690,000	$129,500	$48,000,000

Table 24 provides the estimate for the direct pipeline route. Under this scenario the cost of building the pipeline is expected to total $34 million (proposed action estimate is closest to this).

Table 24: Pipeline Construction Spending for the $34 Million Scenario (in 2000 Dollars)

	Materials	Labor and Contractors	ROW	Total
Coos County	$1,017,200	$10,172,500	$6,900	$11,196,600
Elsewhere	4,069,000	18,649,600	84,800	22,803,400
Total	$5,086,200	$28,822,100	$91,700	$34,000,000

The pipeline construction project would have the greatest effect on the local economy if all of the expenditures were made in Coos County. However, Coos County lacks some of the resources needed for the specialized undertaking of constructing a natural gas pipeline. Consequently, a significant portion of the expenditures will go to contractors, labor, and manufacturers based outside of Coos County.

Parts of the project that use general skills will likely rely on local workers. Local contractors, for example, may perform the construction, restoration, and replanting of the pipeline ROW. Specialized work unique to pipeline construction will use non-local labor. However, this also can have a positive impact on the local economy. Consumption spending by these workers, many of whom will come from out-of-state, will benefit the Coos County economy. These non-local workers can be expected to spend a significant fraction of their pay (including their *per diems*) on consumption items within the Coos County, in addition to special lodging, food and drink, and other services associated with their temporary residence.

As shown in Table 23 and Table 24, ECONorthwest isolated spending that will occur wholly outside the County, and accordingly, they assumed this spending would generate no impacts on Coos County. For example, the purchases of pipe manufactured in California, or accounting services in Portland, OR, are not included in the estimate of direct spending, as these expenditures affect activity outside Coos County.

Economic Impact of the $48 Million Construction Scenario

The direct impacts of a $48 million natural gas pipeline construction project are shown in Table 25. These are divided into five categories, and these categories are used throughout this report.

Table 25: Direct Impact of $48 Million in Pipeline Construction on Coos County in Year 2000 Dollars and Person-Years of Employment

Direct Impact	
Output	$15,184,300
Employees' Income	$2,300,800
Proprietor's Income	$387,300
Other Income	$1,574,100
Employment	114.3

The first category, output, is the value of increased business activity in Coos County due to the construction. The IMPLAN model calculated that the construction of a $48 million pipeline would directly contribute nearly $15.2 million to the Coos County economy.

The next three categories measure the gains in local incomes. They are employees income, income going to proprietors (such as an independent construction contractor), and other property-type income such as rents received on properties, royalties from contracts, and corporate profits. ECONorthwest forecasts that the $48 million project will have the direct impact of adding $4,262,200 in income to Coos County.

The last impact category on Table 25 is employment. The construction project is projected to support directly over 114 person-years of employment for county residents.

Table 26 shows the total impact of the $48 million project on Coos County. Even though most of the materials and workforce necessary to complete the project will originate from outside the county, the project will still have an impressive positive impact on the economy. It will boost output in Coos County by $18,679,600 and support the equivalent of over 162 jobs for local residents.

Economic Impact of the $34 Million Construction Scenario

Table 27 shows the direct impacts of a $34 million natural gas pipeline construction project. The project would contribute nearly $10.8 million directly to the Coos County economy and over $3,019,000 in higher incomes to its residents. The project would be able to support the equivalent of over 80 full-time jobs for local workers.

Table 26: Direct, Indirect, Induced, and Total Economic Impacts on Coos County from $48 Million in Pipeline Construction Spending in Year 2000 Dollars and Person-Years of Employment

Impact	Output	Employee's Income	Proprietor's Income	Other Income	Jobs	Average Annual Wage
Direct	$15,184,300	$2,300,800	$387,300	$1,574,100	114.3	$23,500
Indirect	$1,602,600	$424,200	$119,900	$272,300	20.5	$26,600
Induced	$1,892,700	$565,900	$104,000	$397,100	28.2	$23,700
Total	$18,679,600	$3,290,900	$611,200	$2,243,500	162.9	$23,900

Table 27: Direct Impact of $34 Million in Pipeline Construction on Coos County in Year 2000 Dollars and Person-Years of Employment

Direct Impact	
Output	$10,755,500
Employees' Income	$1,629,700
Proprietor's Income	$274,300
Other Income	$1,115,000
Employment	80.9

Table 28: Direct, Indirect, Induced, and Total Economic Impacts on Coos County from $34 Million in Pipeline Construction Spending

Impact	Output	Employee's Income	Proprietor's Income	Other Income	Jobs	Average Annual Wage
Direct	$10,755,500	$l,029,700	$274,300	$1,115,000	80.9	$23,500
Indirect	$1,135,200	$300,500	$84,900	$192,900	14.5	$26,600
Induced	$1,340,700	$400,800	$73,700	$281,300	20.0	$23,700
Total	$13,231,400	$2,331,000	$432,900	$1,589,200	115.4	$23,900

Pipeline Operations

ECONorthwest used the IMPLAN model to estimate the annual economic impact on Coos County attributable to pipeline operating expenses. The expenses include the costs of on-site monitoring, inspection, maintenance, and repairs of the pipeline. Costs related to the distribution of gas, that is the delivery of natural gas from the pipeline to individual customers, are considered local utility functions and are not included in this analysis.

A) Operating Cost Estimate

The annual operating costs for modern natural gas transmission pipelines of the length and capacity needed for Coos County are low relative to the amounts of money needed for their construction. Unlike the construction phase, however, the economic impact of operating the pipeline will be a reoccurring benefit. Such benefits will continue for the life of the pipeline. A well maintained natural gas transmission pipeline could theoretically last indefinitely.

ECONorthwest estimates that the Coos County pipeline will require six, predominantly full-time equivalent workers. Employees of natural gas transmission pipeline systems are generally highly skilled and well compensated. The labor cost estimate, which appears in Table 29, is based on the Oregon statewide average for workers in the gas transmission industry. Most of their work must be done on-site; thus, approximately 75 percent of the spending on labor will accrue to Coos County. ECONorthwest estimates annual expenses for equipment and materials are expected to total $60,000, with 20 percent coming from within the county. However, actual annual expenses are expected to be $20,000 (pers. com. Coos County Commissioners).

Table 29: Annual Spending on Pipeline Operations (in 2000 Dollars)

	Equipment & Materials	Labor & Contractors	Total
Coos County	$12,000	$371,254	$383,254
Elsewhere	48,000	123,751	171,751
Total	$60,000	$495,005	$555,005

Annual spending for pipeline operations will total $550,005 a year. ECONorthwest anticipates $383,254 of the total will be spent within Coos County each year. Initially the number of operating personnel required for the pipeline will be half the projected work force that ECONorthwest has estimated. Therefore, the annual spending will more likely be $250,000 in the first few years of operation, rather than $555,005 as indicated in Table 29. For the purpose of this EIS, the projected annual spending in Coos County as the result of pipeline operations would more likely be $170,000 in the early years, rather than $383,254.

B) Economic Impact of the Pipeline Operations

The economic impacts from operating a well-run and properly maintained natural gas pipeline are relatively modest. Pipelines normally do not require extensive equipment replacements, nor further construction work. ECONorthwest estimated, through its use of a Coos County IMPLAN model, that $378,100 in direct economic output for the local economy would result every year that the pipeline operates. Table 30 is a list of the annual direct impacts. Much of it will be in the form of compensation for the estimated six employees who will be needed in Coos County to operate the pipeline.

As indicated above, the initial number of personnel required to operate the pipeline would be approximately one half of the projected work force that ECONorthwest indicated. Therefore, the annual spending would be approximately $236,800 in the first few years rather than the amount given in Table 30.

Table 30: Annual Direct Impact of Pipeline Operations Spending on Coos County in Year 2000 Dollars and Person-Years of Employment

Direct Impact	
Output	$378,100
Employees' Income	$372,200
Proprietor's Income	$9,600
Other Income	$40,200
Employment	6.0

The indirect and induced impacts from the pipelines operation will be largely due to the personal spending of the pipeline employees. In total, these "downstream" impacts will contribute $87,000 to total output, and that would be sufficient to support less than two more jobs in the County. Aggregate income in Coos County will be $468,800 higher every year throughout the operating life of the pipeline.

Table 31: Annual Direct, Indirect, Induced, and Total Economic Impacts on Coos County Because of Pipeline Operations Spending In Year 2000 Dollars and Person-Years of Employment

Impact	Output	Employee's Income	Proprietor's Income	Other Income	Jobs	Average Annual Wage
Direct	$378,100	$372,200	$9,600	$40,200	6.0	$63,100
Indirect	$39,800	$10,500	$3,000	$6,800	0.5	$26,800
Induced	$47,200	$14,100	$2,500	$9,900	0.7	$23,600
Total	$465,100	$396,800	$15,100	$56,900	7.2	$56,800

C) Economic Impacts of the Distribution System

Ultimately, most of the benefits to Coos County that will arise because of the pipeline's construction will come about from the operations of a distribution system (Table 31). A distribution system takes gas from the pipeline and delivers it to industrial, commercial, and residential consumers. An economic impact analysis of a distribution system is outside the scope of work for this report. Nonetheless, it is necessary to address the economic impacts such a system would have on the Coos County area, as distribution is an essential element in the overall plan to build a pipeline. This EIS does not speculate on the number or type of industries that might locate in Coos County because of the availability of natural gas. Northwest Natural has not included in their market forecast the number or type of industries, or volume usage that may be required by industries that may locate in Coos County in the future.

D) Static and Dynamic Efficiency Effects

A distribution system will stimulate the economy over the long run through what economist call static and dynamic efficiency effects.

Static efficiency occurs when a development (in this case distributing a low cost fuel to Coos County consumers) reduces the costs of living and doing business. By simply spending less money on their utility bills, local people and businesses will have more money to spend on other goods and services. The savings created by the introduction of natural gas will give residents, schools, businesses and others more disposable income. They will spend much of that extra income locally, stimulating the economy.

Lacking natural gas, the Coos Bay area currently depends on electricity, heating oil, propane, and wood for its fuel needs. In many circumstances, natural gas is more efficient and less expensive than electric, oil, or propane. For example, about half of all the households in the county use electric heating. A typical single family home would save $410 in annual utility bills by switching from electric to natural gas heat. The competitive advantage of natural gas is evident in Oregon communities where it is available. In urban areas about 60 percent of the homes use natural gas while in outlying areas about 40 percent utilize it.

Residents, commercial businesses and small industrial businesses in the Coos Bay area will save increasing amounts of money each year as the distribution system is built out and as new consumers convert to natural gas. ECONorthwest estimates that by the tenth year, consumers will save over $6.7 million a year. The static efficiency effect of these savings is sufficient to support nearly 50 jobs and nearly $1.9 million in additional personal, business, and other income within Coos County.

Dynamic efficiency effects are caused by a change that allows the local economy to expand in ways that would otherwise be impossible or unlikely without the change. Economists often use the term "production possibilities frontier" to describe the limits of what can be done given what is available locally.

For example, the introduction of natural gas may make it possible, or at minimum more practical, to build a metal fabricating plant or ammonia fertilizer factory in Coos County. However, Northwest Natural has not assumed that any such industries will locate in Coos County in making economic projections to justify the construction of its planned distribution system. Nor does this EIS make any speculative projections concerning the type, or types of industry that might locate in the county. New businesses, who otherwise would avoid Coos County because of the lack of natural gas, would now consider locating there. Existing businesses that currently depend on expensive propane fuel may be able to compete more effectively once they can switch to lower cost natural gas. This would allow them to expand their sales and payrolls. These are examples of dynamic efficiency. The frontier of what businesses can do in Coos County expands.

Forecasting the dynamic efficiency effect is problematic. While the economic development impact of natural gas would be great, determining the timing and extent of the impact is extremely difficult. ECONorthwest previously estimated that dynamic efficiencies would lead to over 1,500 new manufacturing jobs after ten years. This was based on a comparison between parts of Oregon with natural gas and those without. There is a strong relationship between the availability of natural gas and manufacturing employment. In turn, manufacturing jobs stimulate employment in other local economic sectors. Through the use of the IMPLAN model, ECONorthwest estimates that because of the dynamic efficiency effect, total employment in the Coos Bay area would be over 2,900 jobs higher ten years after natural gas is introduced.

It is instructive to compare the Coos Bay area with Newport, Oregon-a coastal city that shares many of the same characteristics as Coos Bay, except that it has natural gas. Table 32 shows the population growth rates from 1980 to 2000 for the Zip codes comprising the Coos Bay and Newport areas. While the Coos Bay area population has experienced decline or little growth, Newport and its neighboring community of Toledo have seen substantial population gains. The availability of natural gas was one of the reasons for this difference, although other factors also played major roles.

Table 32: Comparative Population Growth Rates 1980 - 2000

Zip Code	City Name	1980 Population	2000 Population	Percent Change
Coos Bay Area:				
97411	Bandon	6,275	6,329	0.9%
97420	Coos Bay	24,476	23,679	-3.3%
97423	Coquille	8,061	7,443	-7.7%
97458	Myrtle Point	5,845	5,506	-5.8%
97459	North Bend	16,021	15,489	-3.3%
Coos Bay Area Total		60,678	58,446	-3.7%
Newport Area:				
97365	Newport	8,624	10,956	27.0%
97391	Toledo	5,969	6,286	5.3%
Newport Area Total		14,593	17,242	18.2%

E) Adversely Affected Businesses

While Coos County businesses and consumers will benefit from the availability of natural gas, there is one segment of the local economy that will sustain setbacks large enough to have a notable effect on employment. That segment consists of propane and heating oil distributors. They will likely experience declining market shares and will reduce their employee counts as a result.

Consumers who now use propane for heating, drying, fireplaces, and cooking, in most cases will be able to readily switch to natural gas. Pricing and convenience advantages give natural gas a strong competitive advantage over propane. Heating oil, too, will lose customers to natural gas. However, the rate of substitution will be much slower because conversion costs are high and price advantages are less.

Other sectors that compete with natural gas will be adversely affected; however, the impact on employment will be far less consequential. There will be negative up and down stream effects caused by revenue and employment losses by propane and heating oil distributors. There will be revenue losses for businesses that transport and wholesale propane, heating oil and residual fuel oil. If any such business is heavily dependent on these fuels and local workers, the revenue loss could lead to job losses. Electricity demand will be affected as natural gas gradually replaces electric based heating, cooking and clothes drying. Natural gas, though, can only supplement and not replace electricity. Thus, its impact on electric utility employment will be negligible.

ECONorthwest expects that local propane and heating oil distributors will sustain the only marked reduction in employment over the long run. Table 33 is a list of the distributors who will be affected by the new natural gas distribution system. The list is from the American Business Directory database for the year 2000. The directory assigns an employment range for each listing. ECONorthwest averaged these ranges and arrived at an estimate that the nine propane and heating oil distributors employ 69 individuals.

Table 33: Propane and Heating Oil Distributors

Company	Address	City	Fuel
All Star Gas Inc.	425 Virginia Ave	North Bend	Propane
Bassett-Hyland Energy Co	425 W Lockhart Ave	Coos Bay	Heating Oil
Davis Oil Inc.	280 Newmark St.	North Bend	Heating Oil
Ferrellgas	1165 Newmark Ave # D	Coos Bay	Propane
Goddard Energy Co	2nd & Elmira	Bandon	Heating Oil
Graham Oil Co	1765 Sheridan Ave	North Bend	Heating Oil
Rons Oil Co	580 N Central St.	Coquille	Propane
Tyree Oil Inc.	2395 N Bayshore Dr.	Coos Bay	Heating Oil
Hodge Distributing Inc.	1893 Roseburg Rd.	Myrtle Point	Heating Oil

According to the 2000 Census data, Coos County has a population of 62,779. There are approximately 850 residents for each of the 69 propane and heating oil distributor employees. In the state of Oregon, using Claritas and American Business Directory data, ECONorthwest determined that the ratio is approximately 1,150 residents per distributor employee. The statewide ratio is higher because natural gas is widely available and distribution systems have been long in-place throughout most of Oregon. Therefore, propane and heating oil distributors need a higher population base to draw upon so that they may generate enough sales to support an employee.

ECONorthwest estimates that if the Coos County area were to mirror the highly competitive market characteristic of the rest of the state, it too would be able to only support one propane and heating oil distributor employee for every 1,150 residents. Given that statewide ratio and applying it to an approximate population base of 60,000, ECONorthwest estimates that the affected area would be able to sustain 51 propane and heating oil distributor employees over the long run. Thus, there is a projected eventual loss of 18 jobs in this sector.

Summary of Direct, Indirect and Cumulative Economic Effects for Action Alternatives

Construction of a natural gas pipeline will have a simulative impact on the Coos County economy of between $13.2 and $18.7 million depending on the route taken. The construction project will support the equivalent of 115 to 163 full-time jobs for local residents. From then on, pipeline operations spending will have an annual economic impact of $465,100 to Coos County. This is sufficient to sustain over seven full-time jobs with an average wage rate of $56,800.

The pipeline will deliver natural gas to a distribution system that will supply gas to homes and businesses. The economic impact of the distribution system will be great.

Clearly the area to be served with natural gas from the pipeline would be better off over the long run with natural gas than without. No one could easily argue that other areas of Oregon with natural gas and similar populations, such as Grants Pass, Albany, or Corvallis, would be better off without natural gas. If gas were taken away from those cities, one would expect businesses to move, factories to close, and jobs to be lost. Conversely, one can expect the major economic benefits over time once natural gas becomes available to Coos County.

ECONorthwest believes that there will be static efficiency benefits to the local economy that will steadily grow as natural gas consumption increases. These will be partly offset by losses in businesses that will find it difficult to compete against natural gas. The net impact, however, will be positive because consumers will enjoy much greater benefits in the form of lower energy costs. They will spend much of their savings locally.

Long-term, one expects to see dynamic efficiency effects that will lead to substantial increases in manufacturing employment. This will then stimulate employment in other sectors of the local economy. Predicting the net impact is difficult and requires some level of speculation. However, within ten years employment could increase by over 2,900 in the region because of the availability of natural gas.

Environmental Justice

Direct, Indirect and Cumulative Effects

All Alternatives, including No Action

Household Income (Variable 80) in Census Database C90STF3A was examined for each of ten geographic areas within Coos County, and cumulative frequency plots were constructed for the 25 income levels as compared to other portions of mid-Coquille basin, and just slightly lower than average income levels as compared to other geographic areas within Coos County.

Pipeline construction activities will have a similar affect upon all households residing in the vicinity of the construction zone. As documented elsewhere, construction activities may result in inconvenient travel delays or equipment noise. However, this analysis shows that low income populations will not be disproportionately affected because of the route choice. Therefore, Environmental Justice concerns will not be created by pipeline construction activities.

No minority or disadvantaged groups or communities are within or adjacent to the proposed action or Hwy 42 Alternative. No impact.

Public Health and Safety

Direct Effects

No Action Alternative

No anticipated impacts.

Proposed Action

Approximately 40 miles of pipeline construction would occur in roadways, creating short-term (1-7 days) delays for traffic. If individual vehicles, bicyclists, pedestrians, etc. fail to yield to flaggers and other warning signs, and enter active construction areas without supervision, injury potential from heavy equipment or falling into the pipeline ditch would exist. Spill containment kits on site of active construction will be required.

Hwy 42 Alternative

Approximately 80 miles of pipeline construction would occur in roadways, creating long-term (6 months) delays for traffic. If individual vehicles, bicyclists, pedestrians, etc. fail to yield to flaggers and other warning signs, and enter active construction areas without supervision, injury potential from heavy equipment or falling into the pipeline ditch would exist. Spill containment kits on site of active construction will be required.

Indirect Effects

No Action Alternative

No anticipated impacts.

Action Alternatives

Illegal use of explosives within or digging-up of soil containing the operational natural gas pipeline with heavy equipment such as a backhoe, could lead to physical injury to the participants in these activities.

Cumulative Effects

All Alternatives, including No Action

None

Waste (Solid or Hazardous)

Direct, Indirect and Cumulative Effects

No Action Alternative

No anticipated impacts.

Action Alternatives

No hazardous waste would be created by either action alternative. Each contractor will prepare and implement as necessary Spill Prevention and Control Countermeasure Plans (40 C.F.R. 112) for applicable equipment and their supplies. All solid waste from construction and/or construction crews will be removed offsite for disposal. Copies of the above will be maintained and made available on request by the pipeline construction contractor. Spill containment kits will be kept on site. No anticipated impacts.

Pipeline Safety and Fire Data

The US Department of Transportation, Research and Special Projects Administration, Office of Pipeline Safety is the Federal agency with jurisdiction over natural gas transmission pipelines, including the proposed Coos Pipeline. The gas pipeline safety regulations (49 CRF Part 192) were made effective for all gas transmission pipelines constructed after 1970. The OPUC has inspection and enforcement jurisdiction over the proposed action through US DOT.

Pipeline safety statistics have been recorded since 1984 and are publicly available through various sources. Separate statistics are maintained for gas transmission pipelines, for gas distribution systems, and for liquid pipelines.

Gas distribution systems are generally small diameter (2- to 4-inch) and low pressure (under 60 psi), and serve more than 50 percent of all homes and virtually 100 percent of major urban industries in the US.

Gas transmission lines also carry natural gas, are generally in more rural areas, are usually much larger in diameter (up to 42 inches) and are operated at much higher pressures (typically 500 to 1000 psi). There are gas transmission lines in every state of the US except Hawaii, as well as approximately 90 percent of the counties in the continental US.

The hazardous liquids transported by DOT pipelines can be crude oil, refined gasoline, jet fuel and diesel, fertilizer, propane or butane, petrochemicals like butylene, carbon dioxide, and others. Liquid pipelines are operated at higher pressures (typically 1800 psi) and if spilled result in a much different environmental and safety hazard than natural gas.

Natural Gas Transmission Pipeline Statistics

The Gas Research Institute commissioned a pipeline safety study in 2000 by Allegro Energy Group. The study analyzed DOT incident reports for gas transmission pipelines from 1985 through 1998. A reportable incident is defined as any pipeline release or failure which cause a human death or injury requiring hospitalization, or $50,000 in damage, including lost gas. This analysis reported the following for onshore gas transmission pipelines:

- 1 incident per year for every 6,300 miles of pipeline
- 1 fatality per year for every 200,000 miles of pipeline

As a response to an inquiry from BPA, Coos Pipeline advisors analyzed statistics for 8, 10 and 12-inch DOT pipelines. These sizes are the most common for regional supply and comprise approximately 27 percent of the 296,000 miles of U.S. gas transmission pipelines. Analyses conducted between 1984 and 2000 report the following:

- 82 reportable pipeline incidents

- 23 injuries, 2 deaths
- Average damage $106,000 for all reported incidents

Pipelines built after 1970 under DOT regulations represent approximately half of the total pipelines in this 16 year analysis, yet comprise proportionally fewer incidents:

- 17 percent of all incidents
- 10 injuries, no deaths
- $50,000 average damage

Note: 58 percent of these incidents were caused by external damage.

Pipelines in the Northwest

DOT statistics from 1984 to 2000 reported 12 incidents involving natural gas transmission pipelines in Oregon and Washington. No injuries or deaths were reported.

Of the 12 reportable incidents (Table 34), 10 involved pipelines built before DOT regulations. Six incidents were attributed to defective older pipe; there were no corrosion failures. The possibility of technology-related failures such as corrosion and construction defects have been virtually non existent since 1970. Other failures are attributed to third party damage (excavators), which account for nearly 70 percent of all incidents analyzed in this study.

Approximately 88 percent of all incidents occurred in unpopulated areas where the majority of pipelines are located. The route for the proposed action is presently classified as 97 percent in unpopulated areas. The portion of the proposed action corridor along the CBW Road is sparsely populated and is at less risk of excavation than the Hwy 42 Route that would pass through many urban areas.

Fire Risk and Fire Suppression

Of the 12 pipeline incidents in Oregon and Washington since 1984, there was minimal or no fire spread to adjacent forest. Total acreage burned was estimated by pipeline safety officials to be approximately 5 acres.

Based on pipeline statistics in Oregon and Washington, the operation of a gas pipeline in Coos County would not measurably add to the existing risk of forest fire or the present cost of fire suppression.

Table 34: DOT Statistics Involving Natural Gas Pipelines in Oregon and Washington (1984-2000)

Pipeline	Date of Incident	Cause of Incident	Pipeline Diameter (inches)	Date of Pipeline Construction
Cascade Natural Gas	10/86	Third party damage	8	1957
Williams NWPL	10/88	Third party damage	8	1957
Williams NWPL	05/90	Pipeline defect	4	1956
Williams NWPL	04/91	Third party damage	22	1956
Pacific Gas	04/94	Pipeline defect	42	1992
Williams NWPL	03/95	Earth movement	26	1956
Williams NWPL	02/97	Earth movement	26	1956
Williams NWPL	02/97	Earth movement	26	1956
Williams NWPL	01/98	Pipeline defect	10	1963
Pacific Gas	07/98	Pipeline defect	36	1970
Williams NWPL	01/99	Pipeline defect	22	1956
Williams NWPL	02/99	Earth movement	26	1956

Land Uses

Forestry

Direct, Indirect and Cumulative Effects

All Alternatives, including No Action

No impact.

Livestock Grazing

Direct, Indirect and Cumulative Effects

All Alternatives, including No Action

No impact.

Recreation

Direct and Cumulative Effects

All Alternatives, including No Action

No anticipated impacts.

Indirect Effects

No Action Alternative

No anticipated impacts.

Proposed Action

No anticipated impacts.

Hwy 42 Alternative

Long-term (6 months) delays of traffic may influence recreationists' activities and other optional travel to other areas within driving distance containing similar recreational opportunities.

Transportation

Direct Effects

No Action Alternative

No anticipated impacts.

Proposed Action

Approximately 40 miles of pipeline construction would occur in roadways, creating short-term (1-7 days) delays for local traffic in those construction areas. Approximately 40 houses are adjacent to the portions of the CBW Road in the proposed action. Some residents may also experience the temporary inconvenience of traffic interference, including reduced speeds and stopped traffic in construction zones, due to pipeline installation and repaving activities.

Hwy 42 Alternative

Approximately 80 miles of pipeline construction would occur in roadways, creating long-term (6 months) delays in a number of locations simultaneously for a State and U.S. highways with high traffic volumes. The urban areas of Coquille and Myrtle Point, as well as approximately 200 houses in rural areas, boarder this route. Since Hwy 42 is a major access route, highway upgrades (including relocation, widening and straightening) are very likely. The risk of contractor-induced damage to the pipeline, as well as pipeline relocation, is also a possibility.

Indirect Effects

No Action Alternative

No anticipated impacts.

Proposed Action

No anticipated impacts.

Hwy 42 Alternative

Long-term (6 months) delays of traffic may influence tourist activity and other optional travel to the Coos Bay - North Bend area for travelers whose only realistic travel option is the Hwy 42 corridor.

Cumulative Effects

All Alternatives, including No Action

No anticipated impacts.

Utility Corridors

Direct, Indirect and Cumulative Effects

All Alternatives, including No Action

Current utility corridor management, management plans, activities and uses would continue unchanged. No impact.

As required by Executive Order 13212, BLM has determined the proposed action and alternatives considered for this project will have a positive effect for natural gas energy transmission and no adverse impacts on energy resources such as exploration and development of oil and gas, or geothermal, or production from wind, solar, hydroelectric, or biomass energy resources. Location of the natural gas pipeline as proposed within the existing electronic transmission ROW will not have a negative effect on transmission of electricity to the southern Oregon coast.

Impacts Summary Table

Table 35: Impacts Summary

	No Action Alternatives	Proposed Action	Hwy 42 Alternative
Aquatic Ecosystems	No negative impacts. No beneficial impacts to sedimentation, turbidity or physical barriers (fish passage).	Negligible short-term impacts to sedimentation and turbidity baselines. Beneficial long-term impacts to sedimentation and turbidity baselines. Immediate beneficial impacts to physical barriers (fish passage).	Negligible short-term impacts to sedimentation and turbidity baselines. Immediate beneficial impacts to physical barriers (fish passage).
Air Quality	No negative impacts. No beneficial impacts from reduced fossil fuel pollution.	Negligible transitory, localized, short-term impacts in construction areas. Beneficial long-term impacts from reduced fossil fuel pollution.	Negligible transitory, localized, short-term impacts in construction areas. Beneficial long-term impacts from reduced fossil fuel pollution.
Soil Productivity	No negative impacts.	Approximately 56 acres of reduced soil productivity.	No negative impacts.
T&E Plants	No Effect.	No Effect.	No Effect.
Special Status Species	No Effect.	Short-term disturbance of individuals that utilize powerline corridor or adjacent habitats.	Short-term disturbance of individuals that utilize adjacent habitats.
Survey & Manage Species	No anticipated impacts.	Short-term disturbance to red tree vole individuals that utilize adjacent habitats.	Short-term disturbance to red tree vole individuals that utilize adjacent habitats.
Other Wildlife	No anticipated impacts.	Short-term disturbance of individuals that utilize powerline corridor or adjacent habitats.	Short-term indirect effects (disturbance) of individuals that utilize adjacent habitats. Direct effects on utility corridor species' habitats. (shrubs, weeds and grasses utilized by birds and rodents)
T&E Species:			
Spotted Owl	No Effect.	Disturbance impacts avoided from timing restrictions.	Disturbance impacts avoided from timing restrictions.

Table 35: Impacts Summary

	No Action Alternatives	Proposed Action	Hwy 42 Alternative
Marbled Murrelet	No Effect.	Disturbance impacts avoided from timing restrictions.	Disturbance impacts avoided from timing restrictions.
Bald Eagle, Columbian White-tailed deer, Western Snowy Plover, Brown Pelican	No Effect.	No Effect.	No Effect.
Floodplains	No impact.	No impact.	No impact.
Waste (Solid or Hazardous)	No impact.	No anticipated impacts.	No anticipated impacts.
Traffic Safety	No impact.	Short-term (1-7 days) impacts in low-traffic CBW Road.	Long-term (6 months) impacts in high-traffic Hwy 42.
Traffic Delays	No impact.	Short-term (1-7 days) impacts in low-traffic CBW Road.	Long-term (6 months) impacts in high-traffic Hwy 42.
Financial Costs	No impact.	Approximately $34 million.	Approximately $48 million.
Economic Benefits	Loss of direct, indirect and induced short and long-term beneficial impacts. Long-term increase in commercial and residential fuel costs. No increase in property tax assessments to fund pipeline construction bond.	Approximately $13 million direct, indirect and induced benefit from short-term investment (pipeline construction). Long-term increase in jobs available in Coos County after pipeline construction. Long-term reduction in commercial and residential fuel costs. Property tax increase averaging $19 per county resident.	Approximately $18 million direct, indirect and induced benefit from short-term investment (pipeline construction). Long-term increase in jobs available in Coos County after pipeline construction. Long-term reduction in commercial and residential fuel costs. Property tax increase averaging $62 per county resident.