

Part IV: Environmental Consequences

A. Introduction

Using the environmental conditions summarized in the preceding part as a baseline, this part evaluates the potential impacts of the alternatives proposed for this project according to the impact categories contained in the FHWA's Technical Advisory T 6640.8A. Other project specific impacts are also addressed in the following text. The impacts of the proposed action are discussed according to the same broad categories contained in Part III. The following sections describe the direct, indirect, and cumulative environmental effects of the proposed action.

B. Physical Environment

1. FARMLAND IMPACTS

Early Coordination - The SCS District Conservationist in Kalispell provided information about the project area soils and identified those soils associations that comprise locally important farmlands. Correspondence from the SCS about farmland (January 19, 1990) is included in Part VI of the EIS. **FIGURE III-1** in Part III shows the location of important farmlands in the corridor. The impacts of the proposed action on these protected farmlands must be addressed to ensure compliance with the Farmland Policy Protection Act (FPPA).

A Farmland Conversion Impact Rating Form (Form AD-1006) for the proposed action was processed in accordance with the FPPA. Since the Land Evaluation and Site Assessment scores on the form were less than 160 points, it was determined that the proposed action will convert farmland with low potential. Therefore, alternatives to avoid farmland impacts need not be evaluated. The completed form was not submitted to the SCS but is included in Part VI.

Direct Impacts - Based on the information provided by SCS and the right-of-way requirements for each of the build alternatives, the total areas of locally important farmland affected by the proposed action were calculated. Of importance to the FPPA are the areas of direct conversion of farmland. Direct conversions occur when farmland is lost to right-of-way. The acreages of farmland directly converted for each alternative is shown below.

ALTERNATIVE 1 - Direct Conversion = **39.2 Acres**

ALTERNATIVE 2 - Direct Conversion = **37.3 Acres**

ALTERNATIVE 3 - Direct Conversion = **34.1 Acres**

ALTERNATIVE 4 - Direct Conversion = **32.4 Acres**

ALTERNATIVE 5 - Direct Conversion = **0 Acres**

Note that the no-action alternative requires no direct farmland conversion. The total amount of farmland that would be directly converted by the narrowest and widest build alternatives varies by less than 6 acres.

Indirect Impacts - The FPPA considers indirect conversions of farmland to include the areas remaining in a tract of land partially taken for right-of-way which (1) would no longer be capable of being farmed due to access restrictions; or (2) would likely be converted to a non-farm use due to the accessibility of the

highway. Based on these considerations, the build alternatives would indirectly convert between 1.1 and 1.4 acres of farmland.

Cumulative Impacts - The proposed action together with the impacts of other ongoing and future development activities in Flathead County, such as the proposed improvement of U.S. Highway 93 between Somers and Whitefish, will continue to convert minor amounts of farmland to other uses. Over time, these conversions could represent a major loss of important farmland in the county.

2. IMPACTS ON GEOLOGIC FEATURES OF BADROCK CANYON

Direct Impacts - The proposed action would excavate part of a large rock outcrop located in Berne Memorial Park at the west end of Badrock Canyon. The outcrop consists of Precambrian rocks associated with the Grinnell Formation. The rock encountered at this location includes very hard green-gray, purple, and red-purple fractured argillite. Outcrops from 25 to 60 feet high exist in the area affected by the proposed action. The outcrop that must be excavated to improve the horizontal alignment of the highway is adjacent to the south side of US 2 at the extreme west end of the park. At its closest point, the base of the outcrop is less than 70 feet from the Flathead River.

The four-lane build alternatives would require excavating the outcrop for a distance of about 1,100 feet along the roadway. The height of the newly exposed rock cut for these alternatives would range from 25 to 150 feet along the area of excavation. Standard Sheet No. 110 in the *Road Design Manual* indicates that cut sections in rock may be designed to be as steep as the rock structure allows, but most rock cuts are designed to $\frac{1}{4}$:1 slopes. Using a $\frac{1}{4}$:1 maximum slope as a design guideline, an estimated 103,000 cubic yards of rock would have to be excavated from the outcrop to accommodate the four-lane build alternatives. Following excavation, the base of the new rock face would be about 120 feet from the Flathead River at its nearest point.

The two-lane build alternatives would require that the outcrop be excavated for a distance of some 900 feet along the new roadway. The height of the exposed rock cut for the two-lane alternatives would range from 30 to 140 feet in this area of excavation. Calculations show that building the two-lane alternatives would require the removal of about 82,500 cubic yards of rock from the outcrop. After the completion of the excavation necessary for the two-lane alternatives, the base of the new rock face would be 110 feet from the river at its nearest point.

A study of the geological conditions present in west outcrop in Badrock Canyon was completed during October, 1994. The geologists who prepared the study identified and mapped rock structures in the outcrop and evaluated the preliminary rock slope design prepared for the Draft EIS. As a result of the study, geologists indicated that vertical cut sections could be developed through portions of the outcrop. The amount of rock to be removed and the overall height of rock cuts could be reduced somewhat in areas where vertical cuts were used. The study also recommended that the shoulder of the road be designed to include a rockfall catchment ditch at the base of the excavated outcrop and that a rockfall protection barrier, like a "jersey" barrier rail. Further, geologists recommended that rock stabilization and protection measures like drilling horizontal drainage holes, removing loose rock to eliminate potential rockfall, and rock bolting be included in the design of the rock cut.

Usually, before rock can be excavated it must be broken into pieces small enough for efficient handling by available equipment. Blasting is commonly used to loosen rock so that it may be excavated or removed from its existing position. If the rock in Badrock Canyon is substantially fractured (rippable), large dozers could also be used for excavation. A more detailed geotechnical investigation of the outcrop would be completed during the design phase of the project to determine the rippability of the outcrop and to provide information necessary to develop a plan for

excavation.

Blasting is accomplished by discharging explosives that have been placed in holes drilled in the rock formation with rotary or percussion drills. The energy associated with an explosion is the result of the pressure produced in the gases formed by the explosive in the blast hole. An electric current is used to detonate explosive charges placed in a series of blast holes along the outcrop. Excavation of the outcrop would be accomplished through presplitting and production blasts.

Presplitting, a technique using drilling and blasting which breaks the rock along a relatively smooth surface along the final slope or wall face, would be used for excavating the outcrop in the Canyon. Holes are drilled along the desired final surface at regular spacings and loaded with dynamite. When the explosives are detonated ahead of the production blast, the webs between the holes will fracture, leaving a surface that serves as a barrier to shock waves from the subsequent blast. This virtually eliminates breakage beyond the already fractured surface.

Due to the height of the outcrop in Badrock Canyon, rock would be excavated incrementally from the top of the outcrop towards the base. This type of excavation is known as a multi-lift cut. Some 20 to 25 vertical feet of the outcrop would be presplit and excavated at a time. Rock broken through blasting would be removed from the initial excavation level so presplitting and production blasting for the subsequent lower level could be undertaken.

In blasting operations where multi-lift cuts are necessary, it is necessary to scale the wall and remove loose materials immediately after the blast. This action prevents loose rock from falling and injuring workers during excavation activities or occupants of vehicles passing by the cut after completion of the project. The time required for excavation of the outcrop would depend on the type and amount of equipment used and the labor force assigned to accomplish the work. Large earthmoving equipment and dozers could be expected to reduce the amount of time required to excavate the outcrop. The Geotechnical Section estimates that approximately 1,000 cubic yards of rock could be excavated each day by an experienced contractor with the proper equipment and labor force. Given this rate, between 80 and 100 days would be required to complete the excavation necessary for the build alternatives.

Various types of explosives including dynamite, TNT, and several forms of ammonium nitrate explosives are used to excavate rock. Ammonium nitrate explosives are often used for construction projects both above the surface and underground. ANFO, the most frequently used ammonium nitrate explosive, is made by blending about 1 gallon of diesel fuel with 100 pounds of ammonium nitrate fertilizer. The free-flowing mixture can be poured into vertical blast holes or placed in sealed plastic bags if used in wet holes. This blasting agent is commonly used due to safety, ease of storage and handling, bulk loading capabilities, and the relatively low cost compared to other high explosives. High explosives (like dynamite) rather than ANFO are generally used for presplitting.

The direct impacts of excavation on the visual resources of Badrock Canyon are discussed in the Visual Impacts section of Part IV.

Indirect Impacts - Blasting to excavate the west outcrop in Badrock Canyon would produce several indirect impacts including noise and vibration impacts, traffic delays during blasting and clean-up activities, and the loss of vegetation on portions of the outcrop where excavation would occur. These impacts are discussed further under the Construction Impacts section in Part IV.

Excavation could affect a spring that surfaces on the outcrop. Residual nitrates from the explosives used to excavate rock in Badrock Canyon have the potential to degrade surface waters in the project area. These impacts are discussed further in the Water Quality Impacts section of Part IV.

Cumulative Impacts - The excavation of the outcrop at the west entrance to Badrock Canyon would eliminate a substandard horizontal curve which restricts sight distance for motorists. The improved alignment of the new highway would be expected to provide safety benefits for facility users.

A geotechnical study of the west outcrop in Badrock Canyon done after the Draft EIS indicates that the present rock structure provides a hazardous rockfall potential for the existing road and for the proposed construction. The inclusion of rock stabilization measures in the design of the new rock cut and the removal of loose rocks (scaling) during construction would minimize or eliminate the potential for rockfall in this area. Other rock stabilization work or excavation on the upper cliffs of the west outcrop outside of the area disturbed by road construction may also be needed to reduce the potential for rockfall.

Mitigation - Measures to mitigate the potential water quality impacts, visual impacts of rock excavation, and construction impacts of blasting are discussed in subsequent sections of Part IV.

3. WATER QUALITY IMPACTS

Direct Impacts to Surface Waters - Highway reconstruction activities and the subsequent operation of the new facility could adversely affect the quality of surface waters in the project area unless preventative measure are taken. Degradation of surface water quality in the project area could potentially occur by means of physical or chemical pollution.

The major type of physical pollution from the construction or operation of highway facilities is the erosion of rock or soil particles and dissolved minerals and the subsequent transport of these materials by surface waters to downstream locations where the materials are deposited. This process, known as sedimentation, occurs naturally, however, the erosion of areas disturbed by the construction could contribute substantial quantities sediments to surface waters. Increased sediment loads may alter downstream deposition patterns, cause water temperatures to increase, cause the turbidity of the water to rise, increase the level of nutrients (nitrates and phosphorus), decrease the quality of existing fisheries, and promote the growth of algae.

Chemical pollution of water from highway sources could potentially occur from the following sources:

- herbicides used for weed control or fertilizers,
- mineral leachates from newly exposed slopes,
- toxic substances, heavy metals, oils and grease from the roadway surface,
- deicing chemicals, and
- accidental spills of hazardous materials.

Runoff from the highway may carry residues from these sources or from accidental spills into surface waters.

The degradation of surface waters due to the placement of fill materials directly into the Flathead River is the primary direct water quality impact associated with the proposed action. In this instance, placing fill into surface waters includes excavating areas below the ordinary high water mark and along the bank of the Flathead River in Badrock Canyon to construct a vertical retaining wall, placing fill in isolated wetlands, and excavating the river bed to construct piers for a new

bridge across the South Fork of the Flathead River west of Hungry Horse.

The potential impacts resulting from the activities associated with the proposed action were evaluated according to Section 404(b)(1) guidelines found in Title 40 or the Code of Federal Regulations (CFR), Part 230. These guidelines were developed by the Environmental Protection Agency (EPA) and the COE in response to policies expressed in the Clean Water Act. Fundamental to the guidelines is the rule that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge will not individually or collectively induce unacceptable adverse impacts on ecosystems of concern. Evaluating the impacts of placing fill material in the Flathead River system according to the 404(b)(1) guidelines is necessary to obtain a Section 404 permit for the proposed action.

A Draft Section 404(b)(1) Evaluation examining the effects of the proposed action according to the guidelines is presented in APPENDIX 14 of the Final EIS. Baseline water quality data and information on the aquatic ecosystem considered in the evaluation is presented in APPENDIX 5. Pertinent findings from the Draft Section 404 (b)(1) Evaluation are summarized below.

Substrate Impacts - The proposed reconstruction activities would not substantially change the physical, chemical, or biological characteristics of the native substrate. The construction of the retaining wall and bridge piers would place relatively inert materials (like concrete) in the Flathead River system and fill material to be placed in wetlands would be generated from locations within the project corridor. The discharge would remove only minor amounts of habitat for bottom-dwelling organisms since project activities would be confined to a narrow strip along the south river bank of the Flathead River in Badrock Canyon and to a limited number of areas within the channel of the South Fork of the Flathead River.

The proposed action would not adversely affect the elevation or slopes of the main stem of the Flathead River or the South Fork of the Flathead River.

Suspended Particulates/Turbidity - Modeling has shown that long-term suspended particulates and turbidity impacts would be minimal. Suspended solids levels in the Flathead River are predicted to increase by less than one part per billion for any build alternative. This increase would not be substantial.

During construction, short periods of increased sediment transport could occur due to runoff from cleared work areas during large precipitation events. If turbid conditions lasted long enough, elevated levels of suspended particulates could affect the biological productivity of fish and other subsurface life, however, no long lasting increases in turbidity levels and sedimentation rates are expected.

Water Characteristics - The proposed action would not substantially change water characteristics in the Flathead River. The concrete used in the retaining wall or fill materials placed in wetlands would not introduce nutrients or organic materials which would change the suitability of the Flathead River system for consumption and use by aquatic organisms or humans.

No changes in water chemistry or pH levels are predicted as a result of the proposed action.

Current Patterns and Circulation - The construction of a vertical retaining wall would not obstruct or change the direction of flow in the Flathead River through Badrock Canyon. The restriction caused by the retaining wall in Badrock Canyon would reduce the width of the river channel and cause a minor increase in flow velocities. The change in channel width produced by the vertical retaining wall would be considerably less than that imposed by a natural channel

constriction (Fisherman's Rock) located immediately downstream from the fill section. **Minor and localized changes in current patterns are likely in the vicinity of the retaining wall and bridge piers.**

The new bridge over the South Fork of the Flathead River would have one less pier than the existing structure. This would alter the current pattern in the South Fork by reducing the number of piers that obstruct flows in the river. Temporary obstructions to the flow in the South Fork of the Flathead River would occur during construction of the new bridge since the new piers and the piers for the existing bridge would be located within the river channel. This condition would be eliminated upon completion of the new bridge when the existing structure is removed.

Normal Water Fluctuations - Power generation at Hungry Horse Dam upstream from the project area causes drastic fluctuations in flows on the South Fork and affects the water level of the Flathead River. **The proposed construction of a vertical retaining wall and new bridge piers would not alter the daily or seasonal fluctuations of water levels in the Flathead River system.**

Salinity Gradients - The discharge of fill would not alter salinity gradients since inert aggregate would be used. Surface water quality could be directly affected by snow removal activities in areas of the corridor located immediately adjacent to the Flathead River.

Snow plowing could introduce pollutants, particularly road salts, directly into the river since no vegetation would be available to attenuate pollutants. The runoff model used to predict the effects of the proposed action on surface water quality does not directly consider snow removal. However, the results of modeling indicates that effects of pollutants plowed into the river during snow removal would be minimal. This conclusion can be made because the model assumed that all pollutants, including road salts, from the corridor would enter the Flathead River during a single precipitation event and would be diluted by river flows during the runoff period for the event. Since no substantial increases in pollutant concentrations were predicted for this unlikely occurrence, it follows that the minor amounts of pollutants that would be introduced to the river during snow plowing would not substantially affect water quality.

This conclusion is further supported by the few areas within the corridor where pollutants contained in snow could be plowed directly into the river. Slopes adjacent to US 2 in the areas near the river would be expected to retain some plowed snow. Pollutants in this snow would be gradually introduced to the river from these roadside areas through melting and would reduce direct impacts on water quality.

No special aquatic sites (**other than several isolated wetlands**) would be affected by the proposed highway reconstruction. None of the wetlands affected by the proposed action provide important water quality values for local surface waters. The impacts on wetlands are subsequently discussed in Part IV. **No municipal or private water supplies would be adversely affected by the proposed action.**

Indirect Impacts to Surface Waters - Surface water quality can be indirectly degraded by contaminated highway runoff. Stormwater runoff from the pavement surface contains organic and inorganic chemicals and often appreciable quantities of suspended solids. These materials are primarily derived from combustion products, vehicle and pavement wear, and highway maintenance activities (1). During precipitation events and snow melting, runoff is collected in roadside ditches and transported to receiving waters via natural drainage ways. Precipitation patterns affect the washoff of pollutants from the pavement surface and the quantity of highway runoff. **The increased width of the paved surface area of US 2 provided by the build alternatives would result in greater quantities of runoff, more rapid runoff, and in less infiltration during events when heavy precipitation or rapid snowmelt occurs.**

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Impacts to surface water resources were evaluated by modeling 16 runoff constituents and comparing the results with findings from similar highway corridors. The modeling procedure contained in *Constituents of Highway Runoff -- Volume III, Predictive Procedure for Determining Pollutant Characteristics in Highway Runoff* was used to predict and evaluate surface water quality impacts for each alternative (2). Modeling indicates that the adverse impacts to surface water quality would be negligible for all build alternatives because the pollutant levels in stormwater would be diluted and attenuated by vegetation and soils before reaching a receiving watercourse (3). The evaluation shows that pollutants contained in runoff from the highway would not substantially increase the concentrations of total solids, nutrients, chlorides, or heavy metals in the river. **TABLE IV-1 summarizes the results of a runoff water quality analysis completed for the proposed action.**

TABLE IV-1 SUMMARY OF RUNOFF WATER QUALITY ANALYSIS						
Constituent Examined	Amount of Constituent in Runoff From Road Surface in Highway Corridor (lbs)			Resulting Change in Constituent Concentration in River (mg/L)		
	1988	1992	Design Year	1988	1992	Design Year
Suspended Solids (SS)	78.7	100.8	166.2	0.00068	0.00087	0.0014
Volatile SS (VSS)	18.7	22.9	35.4	0.00016	0.00020	0.00031
Total Volatile Solids (TVS)	83.2	105.3	170.7	0.00072	0.00091	0.00148
Total Kjeldahl Nitrogen (TKN)	1.67	1.88	2.52	0.000014	0.000016	0.000020
Total Organic Carbon (TOC)	18.7	23.4	37.3	0.00016	0.00020	0.00032
Chemical Oxygen Demand (COD)	32.1	38.1	55.8	0.00028	0.00033	0.00048
Total Nitrogen (TN)	0.71	0.84	1.21	6.1×10^{-6}	7.2×10^{-6}	10.4×10^{-6}
Total Phosphate (TPO ₄)	0.53	0.68	1.12	4.6×10^{-6}	5.8×10^{-6}	9.7×10^{-6}
Chloride (Cl)	51.3	60.6	88.2	0.00044	0.00053	0.00076
Lead (Pb)	0.12	0.15	0.23	1.0×10^{-6}	1.2×10^{-6}	1.9×10^{-6}
Zinc (Zn)	0.09	0.10	0.15	7.8×10^{-7}	8.7×10^{-7}	1.3×10^{-6}
Iron (Fe)	3.44	4.41	7.27	0.00003	0.00004	0.00006
Copper (Cu)	0.035	0.041	0.055	3.0×10^{-7}	3.5×10^{-7}	4.7×10^{-7}
Cadmium (Cd)	0.021	0.024	0.032	1.8×10^{-7}	2.1×10^{-7}	2.8×10^{-7}
Chromium (Cr)	0.055	0.071	0.12	4.8×10^{-7}	6.1×10^{-7}	1.03×10^{-6}
Mercury (Hg)	0.015	0.013	0.011	1.3×10^{-7}	1.1×10^{-7}	0.95×10^{-7}

The water quality analysis in TABLE IV-1 identifies the amount of various constituents generated by vehicles within the 4.5 mile long corridor that may be present in runoff from the highway. Three years were examined including 1988 with an ADT of about 4,700 (originally modeled for the Draft EIS), 1992 with an ADT of 5,720, and the design year (2010) with a predicted ADT of 8,850. The table also summarizes the resulting change in the concentration of each constituent in the Flathead River if the highway runoff were diluted in a 50.3 hours of river flow, the calculated period of runoff from a 2-year 24-hour storm.

Highway facilities with ADTs of less than 30,000 have been found to have minimal impacts to receiving water ecology based on an FHWA document titled *Effects of Highways on Receiving Waters, Volume 1 - Executive Summary* (4). The document concludes that annual pollutant loads from highways are low relative to loads from entire watersheds (5). Based on this general conclusion for similar projects, the proposed action, with a projected design year ADT of 8,850 vehicles per day, should have minimal impacts on surface water quality.

The build alternatives will employ curbs and gutters and a piped storm drainage system to accommodate runoff in Columbia Heights. Stormwater collected by the system would create a point source discharge subject to regulation by the EPA and MDHES. The EPA allows such permits to be issued at the discretion of the state for point source discharges. MDHES has opted not to issue such permits for stormwater discharges and instead encourages water quality management through a set of published "Stormwater Runoff Guidelines" (6). Although no preliminary designs for the storm drainage system were prepared for the EIS, it was assumed that runoff collected from the system would be discharged into a detention basin rather than directly into surface waters. This would be consistent with the MDHES policy of non-degradation of surface waters.

Correspondence from the MDHES Water Quality Bureau (July 8, 1993) raised the concern that the proposed action could violate state nondegradation laws if substantial amounts of nitrogen from blasting compound residue enters surface or ground water. Agency concerns were based on the proposed placement of excavated rock from the outcrop in Badrock Canyon in the Flathead River and information showing that the use of explosives in surface coal mining operations caused increases in nitrate, nitrite, and ammonium in surface and ground water near some mine sites in Canada (7).

The principal concern for nitrogen in surface and ground water is that nearly all of it is ultimately oxidized to nitrate or used by the ecosystem to produce unwanted and excessive plant growth. This concern is relevant given recent information that indicates the waters of Flathead Lake are becoming enriched from polluting nutrients like phosphorus and nitrogen. These nutrients can contribute to cause algal "blooms" or encourage the proliferation of undesirable fish species in the Flathead River and Flathead Lake. Elevated nitrate levels in surface and groundwaters have been shown to be a cause of infantile methoglobinemia, a sometimes fatal disorder.

The biological productivity of most streams in the Flathead River system is low due to the absence of large amounts of soluble reactive phosphorus (SRP), biologically available phosphorus (BAP), ammonia, nitrates, and the scouring effect of suspended sediments on the stream bottom. Communities living on the substrate (algae, protozoa, bacteria, yeasts, and other organisms) under nutrient-deficient conditions will respond quickly to small ($\mu\text{g/L}$) changes in these nutrient concentrations. One $\mu\text{g/L}$ (microgram/liter) is roughly equivalent to a concentration of one part per billion.

A study of the potential for residual nitrogen (particularly nitrate) from blasting compounds to impact surface water in the project area was completed to address concerns expressed by

MDHES. The study examined three situations which could introduce residual nitrate to surface water including: 1) placement of rock containing residual nitrate directly into the Flathead River; 2) transport of nitrate bearing runoff from the excavated rock face to surface waters; and 3) transport of nitrate bearing water from piles of excavated rock stored in the project area to surface waters.

The study indicated that short-term water quality degradation could occur if excavated rock were placed directly into the Flathead River or if all nitrate bearing runoff percolating through a storage pile for excavated rock during a major precipitation event directly flowed into the Flathead River. The study also showed that changes in the level of nitrates in the Flathead River would be barely measurable for the other situations posed for the analysis.

Samples of Flathead River water taken at Columbia Falls indicate that nitrate levels naturally vary from 10 to 81 µg/L. These fluctuations vary throughout the year depending on the amount of flow in the river and the quantity of suspended sediments present in the water. Whether the predicted short-term increase in nitrate levels from the placement of excavated rock directly in the river represents a more adverse condition than that which occurs during periods when nitrate levels are "naturally" elevated must be considered by regulatory agencies.

The preferred alternative described in the Draft EIS would have placed excavated rock directly into the Flathead River to accommodate a change in the alignment of the highway. Following the review of comments on the Draft EIS, the preferred alternative for US 2 in Badrock Canyon was modified to include a vertical retaining wall instead of a riprap-faced embankment. This modification eliminates the need to place excavated rock in the river.

During their review of the Draft EIS, the MDHES Water Quality Bureau also expressed concern that highway construction could elevate phosphorus levels in the Flathead River. As with nitrates, the primary concern is the potential for this nutrient to contribute to the productivity of waters in the Flathead River and in Flathead Lake.

Water samples for the Flathead River at Columbia Falls shows that total phosphorus levels in the river vary from a minimum of 2.00 µg/L to a maximum of 151.00 µg/L, with a mean total phosphorus value of 17.31 µg/L. These levels change throughout the year depending upon the amount of flow and the amount of suspended sediments present in the river. Although phosphorus is present in the base rocks of the project area, most phosphorus is found in complex mineral constituents and does not readily dissolve into the river system. The erosion and transport of sediments containing phosphorus would be the primary way that this nutrient could be introduced to the river.

The most likely way that highway reconstruction could contribute to phosphorus levels in the Flathead River system is through erosion and transport of sediments from the project site. Phosphorus attached to sediments could be transported to the river by surface runoff over areas disturbed by construction or by runoff from the facility after the road is in use. The preferred alternative identified in the Draft EIS presented a situation in which fill materials with sediments containing phosphorus would be introduced directly into the river. The inclusion of a retaining wall in Badrock Canyon, as now proposed, would eliminate the direct introduction of sediments containing phosphorus to the river.

Direct Impacts to Groundwater - Groundwater hydrology would remain unaffected by the proposed alternatives since excavations would not expose or affect the groundwater table. All build alternatives are similar in their lack of direct impacts to the quality of local groundwater.

No EPA designated sole-source aquifers or wellhead protection areas **would** be impacted by the proposed action.

Indirect Impacts to Groundwater - Percolation of contaminated surface runoff water poses the primary indirect threat to groundwater. Since the runoff modeling predicted no adverse impacts to surface water quality in the Flathead River, it follows that no contamination **would** be present to reach the groundwater through river recharge.

All **build** alternatives **would** maintain the free-flowing spring and stone fountain at Berne Memorial Park in their present location. **A one-way traffic loop with controlled approaches to US 2 and a small parking area for users of the spring is proposed with the build alternatives.** Necessary grading and drainage provisions would be incorporated into the design of the area. A drawing of the proposed facilities at the spring are shown in **FIGURE IV-1**. This drawing attempts to illustrate the **proposed layout concept and access provisions for spring users** and is not meant to be the final design plan for this roadside area. **The final configuration for the traffic loop and parking area at the spring will be determined during the design of the project. The amount of space available for development between the new road and the spring will determine the number of parking spaces that can be provided and how traffic will circulate through the roadside area.**

Vibration effects from blasting during the excavation of the west outcrop in Badrock Canyon has the potential to affect the characteristics or the flows from the springs in Berne Memorial Park. Studies indicate that under normal blasting circumstances the likelihood for adverse effects on aquifers from blasting is remote, particularly if vibration levels produced by the blasts are below 2.0 inches per second (8). Blasting has been shown to actually increase the storage capacity of aquifers and improve the productivity of some water wells.

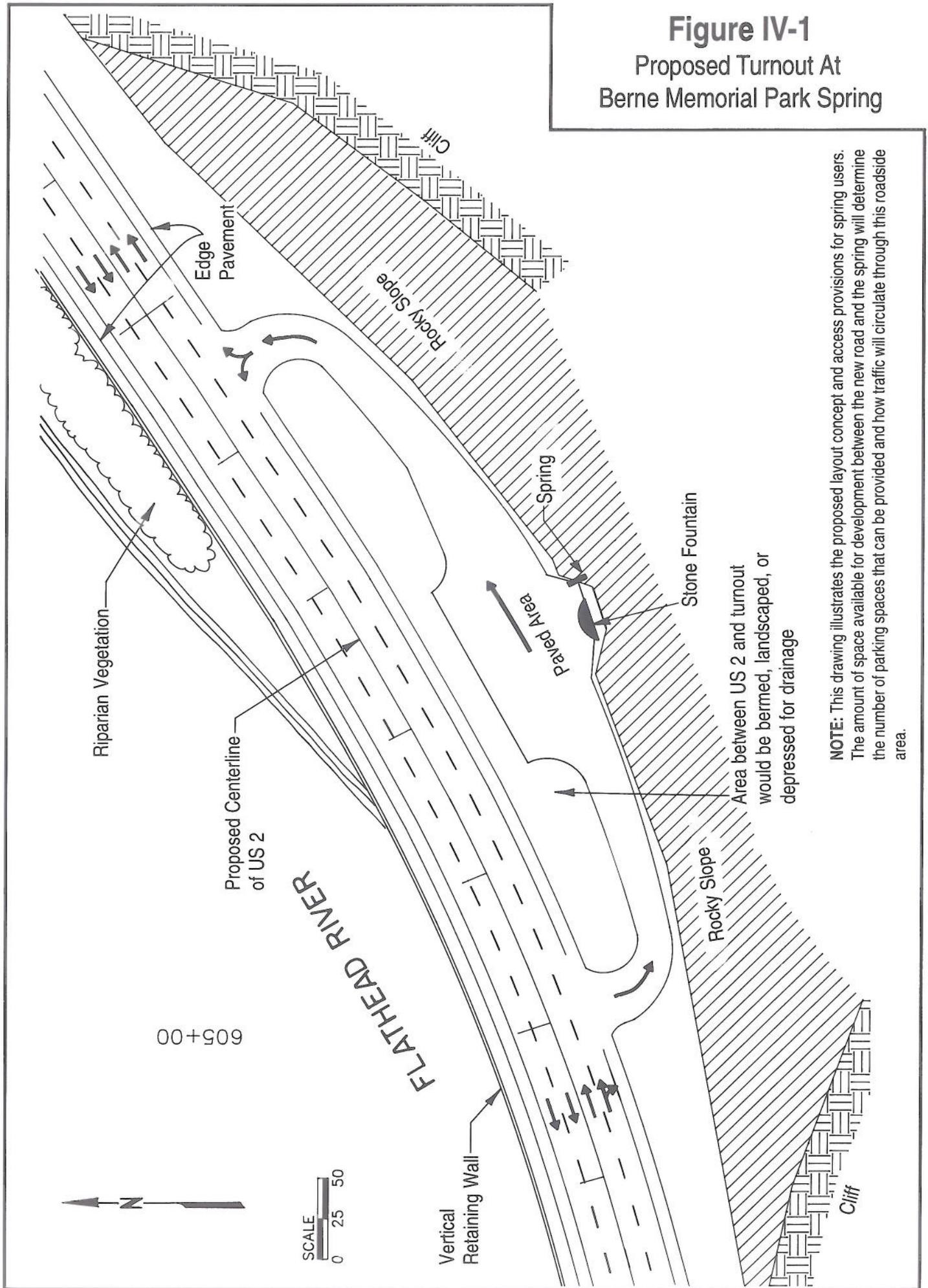
In Berne Memorial Park, a small spring surfaces above the west outcrop and seeps over the rock face. Excavation of the outcrop would not be expected to eliminate the source of water seeping over the exposed face of the rock cut. Excavation and blasting activities necessary to remove the outcrop would stop about 600 feet west of the free-flowing spring located near the stone fountain in Berne Memorial Park and are not expected to affect the flows of the spring.

Cumulative Impacts on Water Quality - The *Flathead Basin Commission 1991-1992 Biennial Report* indicates that researchers have found that the rapidly increasing human population of the region and associated development has undesirably affected the quality of waters and fisheries in the Flathead Basin (9).

The introduction of nutrients into the Flathead River system and ultimately to Flathead Lake represents the most notable concern for cumulative impacts on water quality. Nitrates and phosphorus attached to sediments could be transported from disturbed areas by surface runoff into local waters and contribute to increased biological productivity and decreased water quality in the river system and Flathead Lake. Studies have shown that activities associated with this project would not generate or introduce nutrients to local waters in quantities that would cause a substantial degradation of water quality. The MDHES Water Quality Bureau agreed with this conclusion in a letter dated March 23, 1994 contained in Part VI of the EIS. Measures implemented with the proposed action would control erosion and minimize or eliminate opportunities for sediments carrying nutrients to reach surface waters.

The impacts of the proposed action for other water quality parameters would be short-term or barely measurable. Since the proposed project would not substantially degrade local water quality, the contribution of this project to cumulative adverse impacts on the quality of surface or groundwaters in the region is minimal.

Figure IV-1
Proposed Turnout At
Berne Memorial Park Spring



NOTE: This drawing illustrates the proposed layout concept and access provisions for spring users. The amount of space available for development between the new road and the spring will determine the number of parking spaces that can be provided and how traffic will circulate through this roadside area.

Mitigation - Despite the predicted absence of surface water quality impacts, conformance to MDHES stormwater management guidelines is prudent for any alternative. The use of grassed waterways to convey highway runoff coupled with relatively long flow distances to the river will provide additional water quality protection.

Highway designers will use the *Highway Construction Standard Erosion Control Workplan* to identify Best Management Practices (BMPs) for control of erosion and sediment transport. The selection of BMPs will be based on the distance to surface water or wetlands, precipitation intensity, soil properties, slopes, and the presence of critical resources (like threatened or endangered species habitat, prime fisheries, cultural sites, and hazardous materials/wastes). APPENDIX 13 contains a description of appropriate BMPs based on a preliminary examination of soils, precipitation characteristics, and the presence of critical resources in the project area.

A Storm Water Erosion Control Plan, incorporating appropriate BMPs for the proposed construction project, will be developed and approved prior to the construction of the proposed project. The primary objective of the Storm Water Erosion Control Plan will be to minimize the erosion of disturbed areas and prevent the transport of sediments to wetlands or surface waters during the construction and post construction phases of the project. With the proper design, implementation, and followup actions, the BMPs will minimize erosion and the potential for sediments containing phosphorus to enter surface waters.

Nitrate losses from excavated rock to waters in the project area can be minimized by employing the following measures:

- Dewater the blasting area, if appropriate.
- Limit the time between blasting and loading holes.
- Increase the use of liners to retain ANFO within blast holes. This measure will help eliminate voids within the hole and prevent leaching by precipitation, groundwater, or moisture. Liners will maintain the proper amount of blasting agent within the hole to ensure a successful shot.
- Use "good housekeeping practices" by containing spills and employing appropriate methods to clean up spilled substances.
- Store explosive materials like ammonium nitrate well away from sources of water.
- Employ BMPs to retain water, reduce velocity, and promote revegetation. All of these practices create opportunities for oxidation and beneficial use by plants before nitrate carrying runoff could enter surface waters. The incorporation of BMPs will be done for this project in accordance with the *Highway Construction Standard Erosion Control Workplan*.
- Select a location for a temporary rock storage pile located away from surface waters and incorporate measures to retain runoff at the storage site.

The rock to be excavated in Badrock Canyon presents a good source of material for use in building the proposed highway. Rock containing nitrate residue generated through blasting could also be placed beneath the road at locations where groundwater would not contact the material. The material could also be crushed and used as aggregate for asphalt surfacing, if testing shows the rock is suitable for such use. Crushing the excess rock generated on the project and using the

material for road building is preferable to having to buy materials from other local sources.

Measures will be included to ensure that blasting does not produce vibration levels of sufficient magnitude to affect the springs in Berne Memorial Park. This can be accomplished through properly designed and controlled blasting and by monitoring the blasts with seismic recording instruments to measure the magnitude of blasting effects.

The installation of cofferdams and dewatering activities would be necessary to construct the vertical retaining wall in Badrock Canyon and the piers for the new bridge over the South Fork of the Flathead River. Materials excavated and water pumped from within the cofferdams would be transported to settling ponds to remove sediments. The placement of fill material will be subject to the issuance of a Section 404 permit by the Army Corps of Engineers. Part VI contains additional discussion of this permit requirement.

4. WILD AND SCENIC RIVER IMPACTS

Early Coordination - The Hungry Horse District Ranger was contacted about the Wild and Scenic River status of the Flathead River system near the project area. As a result of this coordination, it was determined that the existing highway passes through a small (0.84 acres) portion of the Flathead Recreational River Corridor as shown in **FIGURE III-4**.

The District Ranger also commented about the potential impacts on this Wild and Scenic River segment due to the proposed reconstruction of US 2. The District Ranger indicated that construction is unlikely to produce substantial impacts on the river values of the Middle Fork Recreational River Corridor (10). Copies of the District Ranger's letters (May 4, 1990 and March 12, 1991) have been included in Part VI of the EIS. A subsequent letter from the Acting Regional Forester (January 8, 1992) regarding the proposed action's possible effects on the Middle Fork Recreational River is also included in Part VI.

Comments received during the preparation of the EIS suggested that the Flathead Recreational River Corridor should be extended to include the reach of river that extends through Badrock Canyon. A river segment can be added to the Wild and Scenic Rivers System in two ways. Congress can designate a river directly or it can authorize the Departments of Agriculture or Interior to study a river for its potential inclusion. A new river segment can also be designated by the Secretary of the Interior upon application from the Governor of the State of Montana, if the river segment meets certain eligibility requirements. To date, there has been no action undertaken by federal agencies or the state to add this portion of the river to the Flathead Recreational River Corridor. This segment of the Flathead River has already been designated as a Recreational Waterway by the Montana Department of Fish, Wildlife & Parks.

As indicated in Part III, it is uncertain if an easement for US 2 exists on the 0.84 acres of land in the Recreational River Corridor affected by the proposed action. Plans for a previous improvement project on US 2 show the entire parcel of land to be within the existing highway right-of-way. Subsequent investigations have not produced an easement or deed for this property. If no easement exists for the highway, an application for an easement for the highway must be submitted to the USFS. Before such an easement can be granted, the USFS must prepare a Letter of Consent. This transfer of land would need to be completed prior to beginning construction on the proposed project.

The NPS is presently assisting eight agencies with management responsibilities for the Flathead River corridor in the development of the Flathead Multi-Objective River Corridor (MORC) Plan. The Flathead MORC Plan is a cooperative planning effort between Flathead County, the Flathead Basin Commission, the Flathead Regional Development Office, the Flathead Conservation District, the

Montana Department of State Lands, the Bureau of Reclamation, the COE, and the Flathead National Forest. The Plan covers the Flathead River corridor from the confluence of the South Fork and the main stem near Hungry Horse to the north shore of Flathead Lake.

The NPS is providing assistance to agencies participating in the Plan through the Rivers, Trails and Conservation Assistance Program, a non-regulatory federal program specifically established to help state and local governments and non-profit organizations develop their own plans for rivers, trails, and other resources. The goal of the Flathead MORC Plan is to recognize current and potential management concerns for the river corridor and recommend solutions as a group. The Plan could ultimately be adopted as part of the county master plan and regulatory structure for involved agencies. The planning process was initiated in early 1993 and is expected to be completed in two years.

Direct Impacts - If no easement exists for US 2, minor amounts of right-of-way must be acquired from the Middle Fork Recreational River Corridor to accommodate the build alternatives. The location of the centerline for the new highway would be slightly farther away from the river than that of the existing road. The no-action alternative would not change the location of the highway within the Middle Fork Recreational River Corridor.

The preliminary designs indicate that the construction limits for the proposed four-lane alternatives would extend some 20 feet towards the river (north) from the edge of the existing pavement. **Construction of the four-lane designs would affect 0.25 acres of the Recreational River Corridor.** The construction limits for the two-lane designs would be at or near the north edge of the existing pavement of US 2. **Construction of the two-lane designs would affect 0.11 acres of the Recreational River Corridor.**

Like the existing highway, the new facility would be visible from some portions of the Recreational River Corridor. Some vegetation adjacent to the existing highway in Badrock Canyon and near the South Fork Bridge would be cleared for construction of the build alternatives. However, a screen of cottonwood trees and conifers would remain between the Middle Fork Recreational River Corridor and the new highway for all build alternatives. The road's location above the river and the existing tree screen would make the new facility difficult to view from the Recreational River Corridor. The new bridge over the South Fork and its approaches would be visible from the River Corridor.

The proposed action would have no foreseeable adverse effects on the free-flowing nature, the setting, or the water quality of the Middle Fork Recreational River Corridor.

Publicly-owned waters of designated Wild and Scenic Rivers are protected under Section 4(f) of the Department of Transportation Act. Publicly-owned lands in the immediate proximity of such rivers may also be protected by Section 4(f) depending on the manner in which they are administered. Part V of this document considers the possible Section 4(f) impacts of the proposed action on the Middle Fork Recreational River and its management corridor.

Indirect Impacts - The development of a river access and interpretive site in conjunction with the proposed action would enhance the recreational use of the Middle Fork Recreational River. No developed site is currently available near Hungry Horse for floaters and fishermen to exit the Recreational River segment. The new river access site would also provide a safe area away from the highway for long-term vehicle parking.

Cumulative Impacts - No beneficial or adverse cumulative impacts on the Flathead Wild and Scenic River System are expected as a result of the proposed action.

5. FLOODPLAIN IMPACTS

Executive Order 11988, Floodplain Management, and FHWA floodplain regulations (23 CFR 650, Subpart A) require that the effects of the proposed action be evaluated to determine if any alternatives will encroach upon the base floodplain. The base floodplain is defined as the area covered by the base flood, a flood event which has a 1% chance of being equaled or exceeded in any given year. The base flood is also popularly known as the 100-year flood. However, there have been at least five "100-year" floods on the Flathead River in the last 96 years. FIGURE III-3 in Part III shows the floodplains in the project area delineated on the Flood Boundary and Floodway Maps provided by FEMA (11).

The proposed action would encroach on two identified floodplains of the Flathead River system. The first encroachment area would occur adjacent to Berne Memorial Park in Badrock Canyon. The second encroachment would occur at the site of a new four-lane bridge over the South Fork of the Flathead River. For the purposes of this EIS, these encroachments are identified as the Badrock Canyon and the South Fork Encroachments. **PHOTO PLATE 5** contains photographs of the areas where encroachments may occur.

Early Coordination - The DNRC, Floodplain Management Section was consulted about floodplain aspects of the proposed action. Correspondence from the agency (March 21, 1990) is included in Part VI of the EIS. The Regional Office of FEMA located in Denver, Colorado was contacted in April, 1989 and provided cross-section data for floodplains in the project area. This data was used in the development of a preliminary hydraulic study for the proposed action. The study is on file in Helena.

Direct Impacts of the Badrock Canyon Encroachment - The improved alignment of US 2 proposed by the build alternatives will require that a longitudinal fill be placed in the Flathead River upstream from Fisherman's Rock to accommodate the new roadway. Much of the area where this encroachment would occur is fill material placed in the river during previous road construction in Badrock Canyon.

To better understand the potential impacts of the Badrock Canyon encroachment, a **survey** was performed in November, 1990 to supplement floodplain data and river cross-sections obtained from FEMA. This work established **cross-sections of the river bed and its banks, using a minimum of 25 individual survey points, at three channel locations in the area of the proposed fill. The survey also was used to determine the elevation of the ordinary high water mark of the river.** The extent of the longitudinal encroachment varies slightly between the two-lane and four-lane road designs under consideration.

The preliminary designs for the build alternatives in the Draft EIS assumed that the new river bank created by the encroachment would be constructed with 2:1 slopes. Based on this design, the two-lane build alternatives would place some 5,500 cubic yards of fill below the ordinary high water mark of the river. The four-lane build alternatives identified in the Draft EIS would place approximately 8,300 cubic yards of fill below the ordinary high water mark. At the elevation of the ordinary high water mark, the proposed fill for the build alternatives would reduce the width of the river channel by 6 to 7% at the widest part of the encroachment.

Based on comments received on the Draft EIS, the build alternatives were modified to include approximately 2,100 lineal feet of vertical retaining wall along the Flathead River in Badrock Canyon to minimize the encroachment on the river. The inclusion of a vertical retaining wall would reduce the amount of fill placed below the ordinary high water mark for the four-lane build alternatives from 8,300 cubic yards to 1,350 cubic yards. Similarly, if a vertical retaining wall were incorporated with the two-lane build alternatives in Badrock Canyon, the amount of fill below the ordinary high water mark would be reduced from 5,500 cubic yards to less than 250 cubic yards. At the elevation of the ordinary high water mark, including a vertical retaining wall with the build alternatives would reduce

Photo Plate 5 - River Encroachments

- Photo 1 -** The proposed alignment improvements through Badrock Canyon will require the placement of fill along this bank of the Flathead River. Note that this river bank area opposite Berne Memorial Park was filled during previous improvements to US 2.
- Photo 2 -** The proposed longitudinal encroachment in Badrock Canyon will impact stands of cottonwood trees adjacent to the river.
- Photo 3 -** A new four-lane bridge over the South Fork of the Flathead west of Hungry Horse would be constructed with the proposed action. The structure would be built parallel to and slightly downstream from the existing bridge.
- Photo 4 -** This photograph shows the bed of the South Fork in the vicinity of the proposed new bridge. Note that water levels on the South Fork fluctuate significantly depending on power generation schedules at Hungry Horse Dam. Compare the river levels shown in Photos 3 and 4.

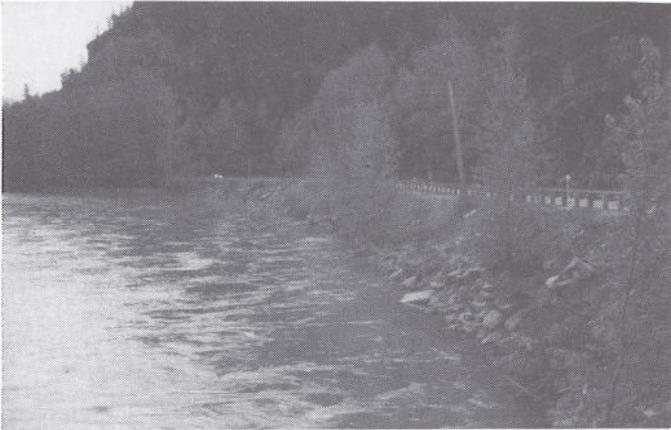


Photo 1



Photo 2



Photo 3



Photo 4

the width of the channel by no more than 3.5% at the widest part of the encroachment.

Although the build alternatives encroach on the Flathead River in Badrock Canyon, hydraulic calculations for three locations on the main stem of the Flathead River in the area of the encroachment show that these alternatives would reduce flood elevations by 0.03 to 0.06 feet or would not change the elevation of the base flood. This conclusion was based on preliminary highway designs through Badrock Canyon prepared for the Draft EIS that employed embankments with 2:1 fill slopes.

The inclusion of a vertical retaining wall in Badrock Canyon, as now proposed, would substantially reduce the encroachment on the river as compared to the build alternatives evaluated in the Draft EIS. Reducing the encroachment also decreases the potential for adverse hydraulic and floodplain effects. Therefore, it was concluded that incorporating a vertical retaining wall with the build alternatives would have negligible effects on the elevation of the base flood.

Floodplain regulations for the State of Montana and Flathead County permit only a six-inch (0.5 feet) increase in the elevation of the base flood. The floodplain impacts of the proposed action would not exceed these standards.

The minor reduction in channel width caused by the proposed encroachment may increase flow velocities slightly but the amount of flow in the river channel would remain the same as before the channel modification. The reduction in channel width due to the proposed encroachment at this location would be substantially less than that caused by the natural constriction at Fisherman's Rock for all build alternatives.

Indirect Impacts of the Badrock Canyon Encroachment - Several buildings associated with Flathead River Ranch are located upstream in the 100-year floodplain at the confluence of the South Fork and main stem of the Flathead River. These structures would be unaffected by the proposed action since base floodplain elevations would not substantially change. The proposed Badrock Canyon encroachment does not affect or encourage incompatible floodplain development.

The proposed encroachment would cause impacts to natural and beneficial floodplain values of the Flathead River in Badrock Canyon. The alignment modifications and the proposed construction of a vertical retaining wall would remove riparian vegetation from the base floodplain which provides habitat for bald eagles. The proposed action would also eliminate four non-contiguous wetlands along the Flathead River that were created during previous flood events. These wetlands consist of narrow depressions in the floodplain and possess beneficial values since they retain sediments during periods of flooding and capture contaminants in runoff from the nearby highway. The proposed action's effects on vegetation, wetlands, wildlife, including threatened and endangered species are discussed at detail in subsequent sections of Part IV.

Direct Impacts of the South Fork Encroachment - The build alternatives would construct a four-lane bridge over the South Fork of the Flathead River. The structure would be built on a new location slightly downstream from the existing bridge. New bridge piers would be erected in the floodplain of the South Fork.

The impacts on the base floodplain resulting from the transverse encroachment at the new South Fork bridge would be minor. The existing structure would be removed and the area it occupies reclaimed. The proposed structure would be wider than the existing bridge but the number of piers in the river would likely be reduced from four to three. This would not cause a substantial change from the floodplain conditions created by the existing structure. The proposed bridge opening would be as large, or larger than that of the existing structure and would maintain or improve the backwater characteristics of the river at this

location.

Indirect Impacts of the South Fork Encroachment - The indirect impacts of the proposed encroachment will be minor since no new flooding risks are expected due to the construction of the new bridge. Gravel-surfaced roads parallel the South Fork of the Flathead River but no residences or other important development exists upstream in the floodplain of the South Fork. Hungry Horse Dam, located five miles upstream, controls water flows to the extent possible during high water periods.

The specific floodplain impacts of constructing a new bridge over the South Fork will not be known until surface water profile computations are completed as part of the design activities for the new bridge. These computations will provide designers with base flood elevations at the crossing and will determine if the new bridge will cause existing floodplain boundaries to change. The design of the new bridge will be adjusted as necessary to ensure that new base flood elevations are kept within one-foot of the existing base flood elevation.

The proposed highway construction in the vicinity of the new crossing of the South Fork would place fill materials in a wetland area along the river that possesses beneficial floodplain values. The wetland area is similar to those affected in Badrock Canyon as it retains sediments during high water conditions. The affected wetland has a low to moderate importance as wildlife habitat.

Cumulative Impacts of Floodplain Encroachments - The proposed highway reconstruction would not produce cumulative impacts on floodplains of the Flathead River system.

Avoidance Alternatives - In accordance with Executive Order 11988, "Floodplain Management", measures to avoid floodplain encroachments were evaluated for the proposed action. Alignment alternatives considered for the proposed action are examined at length in Part II and in Part V of the EIS. Generally, alternate routes to avoid identified floodplains would produce other environmental impacts which are of equal or greater magnitude.

Minor alignment variations or design modifications through Badrock Canyon are possible but they would still impact floodplains in the project corridor. Alignment variations for US 2 through Badrock Canyon were examined for the Section 4(f) Evaluation prepared with the EIS. One alignment option, engineered to avoid or minimize impacts to Berne Memorial Park, required an unacceptable encroachment on the Flathead River. Other alignment options which avoided the river were unacceptable because of cost or increased environmental impacts. The proposed alignment modifications to US 2 attempt to balance the amount of encroachment with impacts to Berne Memorial Park and Badrock Canyon. **Ultimately, a determination was made that it was not practicable to realign the highway to avoid floodplain encroachments.**

Mitigation - The extent of the Badrock Canyon encroachment would be substantially reduced by constructing a vertical retaining wall along the Flathead River instead of a riprap-faced fill embankment as initially proposed in the Draft EIS. The beneficial effects of this action are described above.

The extreme fluctuations in the water level of the South Fork due to power generation has scoured small gravels used by fish from the river bed. **Immediately downstream of bridge piers, there is often a natural deposition of material from vortex action. This may be beneficial for fish by providing sheltered backwater areas and gravels necessary for fish habitat.**

Measures to mitigate impacts to wetlands located in the floodplain and to riparian vegetation which provides habitat for bald eagles is discussed in C. Biological Environment later in Part IV. Construction specifications and project monitoring will ensure that water quality and fisheries are protected. Further discussion of measures to protect water quality is included in the Construction Impacts section of

this Part.

The proposed development in the base floodplain will require a permit from Flathead County. Part VI includes further discussion of this permit requirement.

6. AIR QUALITY IMPACTS

Early Coordination - A letter from the MDHES, Air Quality Bureau (August 24, 1989) about the proposed action is included in Part VI. The agency did not identify any important air quality concerns about the proposed action. The EPA was also contacted in May, 1992 and supplied with a brief description of this project. A request for comments on air quality concerns or other aspects of the proposed action was made in the correspondence. The EPA indicated that comments on the proposed action would be withheld until the agency reviewed the entire Draft EIS. A copy of the EPA's response (May 21, 1992) is included in Part VI.

Comments on the Draft EIS received from the MDHES Air Quality Bureau (September 15, 1992) provided new information about the attainment/nonattainment status of the project area. The Air Quality Bureau indicated that due to violations of the PM-10 ambient air quality standard, Columbia Falls and lands surrounding the community were designated as a nonattainment area for PM-10 during November of 1990. As FIGURE III-5 shows, the project area is located outside the designated boundaries of the Columbia Falls PM-10 non-attainment area.

As a result of the nonattainment designation, the MDHES Air Quality Bureau and the Flathead City-County Health Department developed a PM-10 emission control plan for the area as a modification of the State Implementation Plan (SIP). The City of Columbia Falls has adopted six rules to control reentrained dust within the nonattainment area. These rules include (12):

- **Rule 501 (Material to be used on Roads and Parking Lots - Standard)** requires the use of sanding and chip seal material that has a durability as defined by the Montana Modified L.A. Abrasion test of less than or equal to 7 and a content of material smaller than 200 mesh, as determined by standard wet sieving methods, which does not exceed 3.0% oven dry weight. It is the responsibility of the person applying the material to have it tested and supply the data to the Flathead City-County Health Department.
- **Rule 505 (Street Sweeping and Flushing)** requires a prioritized street sweeping and flushing program that commences on the first working day after any streets become temporarily or permanently ice-free and temperatures are above 32 degrees Fahrenheit. The prioritized sweeping program is in effect from November through April.
- **Other Rules to Control Dust** require dust control measures be implemented for construction and demolition, paving of roads and parking lots, and land clearing. The construction and demolition rules require a permit which describes the project and contains a dust control plan using techniques to control and prevent the emission and/or airborne transmission of dust and dirt from the site.

These measures have been adopted by the City of Columbia Falls and are administered with the assistance of the Flathead City-County Health Department.

Direct Impacts - Two vehicle generated pollutants, CO and PM-10, are of primary concern for the proposed action. The following sections describe the direct effects of the proposed reconstruction

project on the generation of CO and PM-10 emissions.

CARBON MONOXIDE (CO) EMISSIONS

The proposed action would not produce CO levels that exceed federal or state ambient air quality standards for this pollutant. The basis for this conclusion are the results of a simplified CO analysis for the corridor and previous general analyses for similar projects on rural roadways that have shown that air quality standards would not be exceeded. The air quality impacts of the proposed action that may occur would be limited both in duration and locale. These impacts would occur with or without the proposed highway reconstruction activities.

TABLE IV-2 contains the results of the CO analysis for the proposed action based on current and design year (2010) conditions. The analysis is applicable to all alternatives since the results are listed for varying distances from the centerline of the road. The table also shows the 1-hour and 8-hour National Ambient Air Quality Standard (NAAQS) for carbon monoxide.

TABLE IV-2 PREDICTED CO CONCENTRATIONS FOR PROJECT CORRIDOR Parts per million (ppm)						
Year	Peak Hr. Traffic ¹	Receptor Distance ²	Predicted Peak 1-Hr CO Concentration ³	NAAQS 1-Hr. CO Standard	Montana 1-Hr. CO Standard	State & NAAQS 8-Hr. CO Std.
Current	1017 ¹	75'	1.4 @ 40 mph	35.0 1-Hr. Avg.	23.0 1-Hr. Avg.	9.0
		100'	1.3 @ 40 mph			
2010 ⁴	1627 ¹	75'	1.8 @ 20 mph 1.5 @ 40 mph 1.3 @ 55 mph			
		100'	1.6 @ 30 mph 1.4 @ 40 mph 1.2 @ 55 mph			

Notes:

¹ The peak hour traffic volume represents the highest number of vehicles recorded for the year at ATR Station A-60. The current volume shown in the table is the peak hour for 1990 at Station A-60. The CO analysis for current conditions was not updated since the peak hour traffic volume shown approximates the average peak hour traffic volume of 1,012 vehicles recorded at this station over the 1990-1992 period.

The peak hour in 1990 represented about 20% of the 1990 ADT. This relationship was assumed to exist through project life. Regression analysis was used to predict future traffic volumes.

² Distance from the highway centerline to receptor for all project alternatives.

³ Assumes the following: Background CO = 1 ppm; Composite Vehicle Emissions Factors from MOBILE 3 Model; Wind angle = 30° for corridor (northwest wind); Low altitude (less than 4,000 feet), average temperature (Nov.-Feb. of 20°F); meteorological Stability Class D; and Average travel speeds as shown.

⁴ Composite vehicle emissions factors from MOBILE 3 Model only developed to year 2005. The year 2005 factor was used to represent the design year. The factor was judged to be slightly conservative due to improvements in vehicle emissions that would likely occur between the years 2005 and 2010.

Based on the results of this analysis, it is evident that neither NAAQS or State 1-hour or 8-hour CO standards would be exceeded by the design year. The results also show no major differences between alternatives for predicted CO levels. However, minor air quality benefits would be anticipated for the four-lane alternatives because the two-lane alternatives may experience brief periods of congestion and reduced travel speeds by the design year. Even though CO is not a problem in the project area, all build alternatives would benefit air quality more than the no-action alternative.

PM-10 EMISSIONS

Studies have shown that dust from paved roads are a major source of particulate matter. Road dust consists primarily of common sand and soil, tracked or deposited on the road by vehicle traffic. Particulates are also emitted by vehicles from engine exhaust, wear of bearings and brake linings, and the abrasion of tires on the road surface. When traffic passes over the particulates that settle on the road surface, it is disturbed and suspended in the air in a process known as reentrainment.

The amount of PM-10 generated each day by vehicle traffic over this section of US 2 was estimated using emission factors based on 14 samples of road dust collected from US 2 in Columbia Falls during 1990, 1991, and 1992 (13). The MDHES Air Quality Bureau also provided PM-10 emission factors for US 2 calculated from procedures outlined by the EPA that considers the amount of silt loading on the road surface and base emission factors for paved roads as determined through national studies (14). Using an average emission factor calculated for conditions on US 2 in the Columbia Falls area and 1991 traffic volumes, it was determined that traffic within the project corridor presently generates a total of 727 pounds of PM-10 each day.

Calculations of PM-10 emissions were made for the build alternatives and the no-action alternative using projected traffic volumes for the year 2010. This analysis showed that vehicles on US 2 would emit about 1,194 pounds of PM-10 each day by the design year. This level of emissions would with or without highway improvements because the projected vehicle miles of travel in the corridor would be similar for all alternatives. Vehicle travel in the corridor would not cause violations of Federal and State PM-10 standards.

The analysis used to determine PM-10 emissions is on file in Helena.

Indirect Impacts - Increases in PM-10 levels will occur in the future as traffic volumes on US 2 in and out of the Columbia Falls nonattainment area grow. Increases in the vehicle miles of travel on US 2 will generally result in greater emissions of PM-10. While not a major concern in the project corridor, the proposed action has the potential to indirectly increase PM-10 emissions levels within Columbia Falls nonattainment for PM-10 due to its nearby location. PM-10 emissions from normal traffic within the project area would not substantially increase PM-10 levels or cause violations of Federal and State standards in the Columbia Falls nonattainment area.

Reentrained road dust from vehicle travel on paved surfaces subject to heavy carry-on and particulate emissions during construction activities could contribute to short-term increases in PM-10 emissions levels within the nonattainment area. PM-10 emissions would occur during land clearing, blasting, ground excavation, cut and fill operations, and paving activities. Maintaining normal traffic through construction zones on both paved and gravel-surfaced detours would also generate particulates.

Due to this concern, an analysis was performed to determine PM-10 emissions during the construction phase of the project and the potential effects on the Columbia Falls nonattainment area. Estimates of PM-10 emissions during construction were calculated for various activities based

on a recent EPA compilation of emissions factors (14). Particulate emissions were estimated for the following activities during the construction of the highway:

- Normal traffic on US 2 plus employee and light construction-related traffic within the corridor on paved/unpaved roads;
- Road construction activities by heavy equipment;
- Sand and gravel processing and the production of asphalt surfacing; and
- Open burning of slash.

During construction, normal traffic and light construction-related traffic (like employees trips to and from work) on paved roads would generate about 1,660 pounds of PM-10 each day the first construction season and some 828 pounds per day of PM-10 during the second construction season. Travel on unpaved gravel detours or temporary surfaces would be expected to generate between 4,700 to 9,100 pounds of PM-10 each day assuming chemical stabilizers are used to control dust.

Heavy equipment working on disturbed areas of the project would generate more than 510 pounds of PM-10 each day during periods of peak activity. PM-10 emissions from construction equipment powered by diesel engines would produce slightly more than 5 pounds of emissions each day.

Sand and gravel processing and the production of asphalt surfacing for the reconstruction of US 2 would produce more than 467 pounds and 38.5 lbs per day of PM-10, respectively, during the construction project. Although extensive open burning of debris cleared from the right-of-way is not anticipated, limited burning of such materials could generate about 25 pounds per day of PM-10 emissions during the construction of this proposed project.

Cumulative Impacts - No adverse cumulative impacts on the air quality of the project area or region are foreseen as a result of the proposed action. This project, together with previous improvements on US 2, will smooth out traffic flows and reduce stopping and idling times. These operational benefits would reduce vehicle emissions in the area to a minor extent.

Mitigation of Air Quality Impacts - Mitigating measures for the air quality impacts of the proposed action are focused on reducing PM-10 emissions during the construction phase of the project. This period has the greatest potential for producing increased PM-10 emissions due to normal corridor traffic and heavy equipment travel on unpaved surfaces, carry-on of material onto paved surfaces by vehicle tires, and earth-moving activities associated with highway construction.

Coordination with the MDHES Air Quality Bureau identified measures that can be incorporated into the project to reduce PM-10 emissions during the construction phase. The following mitigating measures will be included during the construction of the proposed action:

- Street sweeping will be done, as needed, at both ends of the project to reduce the impact of carry-on dirt from the project to paved streets within the nonattainment area boundaries.
- Unpaved detours will be watered and/or chemically stabilized so that the emissions are less than 20% opacity.

- If slash generated by right-of-way clearing is to be burned, it will be hand-piled or stacked with a brush blade and cured. Any open burning will be subject to restrictions of an open burning permit from the County, if one is required.
- Operators of gravel crushers and asphalt plants used for this project will be required to obtain an air quality permit from the MDHES Air Quality Bureau.

With the application of these mitigation procedures, it is unlikely that emissions of PM-10 during the construction phase of the project would be substantial enough to cause new violations or worsen the violations of PM-10 standards in the Columbia Falls nonattainment area. The MDHES Air Quality Bureau concurred with this conclusion in correspondence dated June 21, 1993.

7. NOISE IMPACTS

Five sites along the project corridor were selected as locations for noise monitoring. These monitoring sites included four residences at varying distances from the highway and Berne Memorial Park as shown in **FIGURE III-5** in Part III. Each of these receptors are Activity Category B according to the FHWA's Noise Abatement Criteria (NAC). **APPENDIX 7** contains a description of each category and acceptable noise levels associated with the NAC land uses or activities.

An impact would be considered substantial if noise levels increased more than 10 dBA over existing noise and/or if total noise levels increased enough to exceed the NAC for Category B at sensitive receptors.

Future highway traffic noise levels for each of the alternatives under consideration in the EIS were determined by the STAMINA 2.0 noise prediction model.

Direct Impacts - The results of the noise analysis are shown in **TABLE IV-3**. The table contains predicted values of $L_{eq}(h)$ for the two- and four-lane road designs and the no-action alternative. **The table shows that increases in noise levels will occur with or without the proposed action due to the annual growth in traffic volumes on this route.**

A separate analysis of predicted noise levels at varying distances from the highway centerline was also prepared to assess noise impacts in rural areas at distances of 75, 150, and 300 feet from the centerline of the highway. This general noise evaluation is appropriate for all alternatives and all rural locations along the highway where travel speeds are or will be 55 mph.

TABLE IV-3 shows that the predicted $L_{eq}(h)$ noise levels for current peak hour traffic is expected to be from 1 to 6 dBA above measured noise levels in the corridor. These predicted noise levels indicate that the NAC for Activity Category B (67 dBA) may already be exceeded during peak travel periods at all but one monitoring location.

The noise analysis also shows no appreciable difference in the predicted design year noise levels for the two-lane or four-lane road designs or the no-action alternative. The predicted values of $L_{eq}(h)$ shows that the NAC for Activity Category B will be equaled or exceeded at all monitoring locations by the design year (2010).

Noise impacts may occur at eight residences and one cabin located within 150 feet of the existing centerline of US 2 between Columbia Heights and the House of Mystery. The centerline for the reconstructed highway in this area would be in approximately the same location as that of the existing highway. Modeling showed that noise levels at these sites would increase by 4 to 5 DBA by the design year with the build alternatives and continued traffic growth on US 2. This increase

in noise would exceed the NAC for such uses but does not represent a "substantial" increase over current peak hour noise levels.

The calculations indicate that noise levels will increase substantially (more than 10 dBA) by the design year at Berne Memorial Park. Please note that noise levels at the roadside park are difficult to assess due to the rock cliffs that reflect traffic noise. Measured and predicted noise levels at the park must be increased by about 4 dBA to account for the sound reflected from the rock formations.

At the west edge of Hungry Horse, the centerline of the existing highway is about 105 feet from several residences located north of the highway. The centerline of the new highway would be some 5 feet closer to homes in this area than the existing centerline. As indicated above, noise modeling suggests that the NAC may be exceeded at locations within 150 feet of the existing centerline at travel speeds of 55 mph. Although it is possible that the NAC may be exceeded at these homesites in Hungry Horse, future noise levels are not likely to exceed 67 dBA or constitute a substantial increase over existing noise levels. This conclusion was made because the elevation of the new road relative to these residences would be somewhat lower than the existing highway and because speeds in this area would be 45 mph, not 55 mph. Both of these factors would be expected to result in lower noise levels than predicted by the model for residences in this location.

TABLE IV-3 PROJECT NOISE ANALYSIS - $L_{eq}(h)$ DBA NOISE LEVELS								
Site Number (See Fig. III-5)	Distance From Existing Centerline	Measured vs. Predicted Values		Current Peak Hour $L_{eq}(h)$	Predicted Noise Levels Year 2010 DHV ¹ for Alternatives			Remarks
		Measured	Predicted		Alt 1/2	Alt 3/4	Alt 5	
1	140' LT	60	61	62	67	67	67	House, Sta. 477+50 @ 40 mph
2	55' RT	65	64	69	74	74	73	House, Sta. 500+00
3	63' RT	68	67	69	73	73	73	House, Sta. 518+00
4	93' RT	65	66	67	71	71	71	House, Sta. 529+00
5	86' RT	65 ²	61	71 ²	--	--	76 ²	Park, Sta. 604+00
STAMINA 2.0 Predicted Sound Levels								
Travel Spd. 55 mph	75' LT/RT	---	---	68	72	72	72	Typical Rural Corridor
Travel Spd. 55 mph	150' LT/RT	---	---	65	69	69	69	Typical Rural Corridor
Travel Spd. 55 mph	300' LT/RT	---	---	62	66	66	66	Typical Rural Corridor
NOTES:								
¹ DHV (Design Hourly Volume) for projected year 2010 equal to predicted 30th highest hour of the year at ATR Station A-60.								
² Sound levels are estimated to increase by 4 dBA due to reflection from rock cliffs at Berne Memorial Park.								

Indirect Impacts - The noise impacts of the proposed action would not induce other impacts in the project area.

Cumulative Impacts - The proposed action would not produce any notable cumulative impacts in the project area or region.

Mitigation of Noise Impacts in the Vicinity of Monte Vista Drive - As indicated previously, noise levels exceeding 67 dBA (NAC for Category B uses) are projected for the design year at the eight homes and one cabin located within 150 feet of the existing/new centerline for US 2. The acquisition of new right-of-way for the proposed action would relocate residents from five of the nine affected residential properties and eliminate the possibility of noise impacts at these sites. The other residences are located near the intersection of US 2 and Monte Vista Drive. Relocations are not proposed in this area since the residences are located beyond the projected future right-of-way limits for US 2.

Since relocation is unlikely for the other residences that may experience noise impacts, noise abatement measures were considered at these sites. Noise abatement measures considered included noise walls, earth berms, vegetative screening, and changes in the location of the highway or its profile. The appropriateness of these noise abatement measures are discussed below.

Noise Barriers - Noise barriers are solid obstructions built between the highway and the residences along the roadway. Barriers can be formed from earth berms (mounds) along the road or from high vertical walls. Earth berms have a natural appearance and can be designed to blend with the environment. Noise walls can be constructed of different materials including concrete, wood, masonry, or metal. In order to be effective, walls must be high enough to break the line of noise transmission from the noise source (automobiles and trucks) and the noise receptor. Noise walls are usually limited to a maximum height of 25 feet for structural and aesthetic reasons and are typically used where space is limited between the highway and the receptor. Effective noise barriers can reduce noise levels by 10 to 15 decibels, decreasing the loudness of traffic noise by half. In order to gain a noticeable reduction in noise levels, the noise wall or earth berm must be continuous, and at least 10 feet tall.

Although walls may reduce the noise levels, the visual intrusiveness of the walls and the resulting safety hazards due to the proximity to the new highway were considered to be unacceptable impacts for the project area. A high wall located on either side of Monte Vista Drive close to its intersection with US 2 could limit views of approaching vehicles for motorists wishing to turn onto the highway. Further, a continuous noise wall could not be built between the highway and homes along the south side of the highway because Monte Vista Drive's intersects US 2 in the area between impacted residences.

The major problem with earth berms is the additional right-of-way required to construct them. In order to attain a berm 10 feet high with 3.5:1 side slopes, an additional 70 feet of right-of-way would be necessary. The construction of such a berm would require the removal of the four residences along the highway where noise abatement measures would benefit residents. For this reason, this noise abatement measure is not considered reasonable.

Vegetative Screening - This noise abatement measure is only effective if a continuous 20 to 30-foot-wide band of dense vegetation can be produced. Such vegetative screens may achieve a reduction in noise levels of some two or three decibels. This is not considered to be a feasible abatement measure in northwest Montana since dense vegetation does not

exist along the roadside and annual rainfall amounts are generally insufficient to sustain the growth of thick vegetative screens.

Modification or Control of the Noise Receiver - The modification of existing buildings with additional insulation or air conditioning can be an effective means of abating noise impacts. However, very few private-use buildings in the country have been noise insulated with Federal-aid highway funds. To date, highway funds have not been expended for this type of noise mitigation in Montana.

Changes in Highway Location - As indicated in Part II of the EIS, constructing US 2 on an alternate location through the project corridor is not reasonable for the proposed action. Varying the location of the centerline will not abate noise impacts since sensitive receptors are located on both sides of the roadway.

Changes in Highway Profile - Lowering the roadway can be an effective means of reducing noise levels. This measure is not practical in the vicinity of the US 2 and Monte Vista Drive intersection because it would increase the width of the area disturbed by construction and require the acquisition of more right-of-way. Residents of the four remaining homes where noise impacts are anticipated by the design year would have to be relocated. For this reason, lowering the highway is not a reasonable noise abatement measure.

For the reasons described above, none of the measures considered for the four residences near the US 2 and Monte Vista Drive intersection where impacts are anticipated in the future are considered to be reasonable or feasible forms of noise abatement.

Mitigation of Noise Impacts at Berne Memorial Park - Noise predictions for the monitoring location at Berne Memorial Park show that NAC may currently be exceeded during peak hours and would exceed the criteria by the design year even with the no-action alternative. The roadside location and the sound reflection produced by the rock cliffs contribute to the noise impacts at the park.

The following paragraphs describe why implementing noise abatement measures at Berne Memorial Park are not feasible or reasonable ways to mitigate noise impacts.

Traffic Management Measures - Prohibiting the use or restricting the times that certain vehicles can use US 2 is not reasonable because the route is the only continuous east-west route across northern Montana. Significant detours or delays would be required for vehicles that were restricted or prohibited from using this portion of US 2. Modifying speed limits through Berne Memorial Park would do little to abate noise impacts to park users. Noise predictions show that due to the proximity to the highway, NAC for Activity Category B would still be exceeded even if the speeds were reduced to 40 mph.

Alignment Modifications - Preliminary designs for all build alternatives have shown that it is not prudent to construct the highway on a new location. The horizontal and vertical alignments through Badrock Canyon can not be altered to produce a substantial noise reduction.

Noise Barriers - The use of noise barriers at Berne Memorial Park is not a reasonable noise abatement measure due to aesthetic, traffic safety, and engineering considerations. The construction of a noise barrier between the park and the highway would produce a visual impact because the barrier would eliminate views of the Flathead River.

Since noise barriers must be continuous to be effective, entrance and exit locations would be necessary at either end of the park. The horizontal curvature of US 2 and the barrier may restrict

the visibility of oncoming vehicles for traffic entering or leaving the park. This **would present** an unsafe traffic condition and **provide** the opportunity for numerous vehicle conflicts.

Creation of a Buffer Zone - There is not sufficient property available between the park and the highway to develop a buffer zone for noise reduction.

Little, other than relocating the facilities of the park to a site further from the highway, can be done to reduce noise impacts at Berne Memorial Park. The reasonableness and feasibility of this measure is examined in the Section 4(f) Evaluation that accompanies the EIS.

C. Biological Environment

1. VEGETATION IMPACTS

Twenty landtypes and/or vegetation communities were identified within the project corridor. FIGURE III-6 in Part III shows the location of the proposed road and the vegetation types that would be affected by the reconstruction of US 2.

Direct Impacts - The construction of any build alternative would remove varying amounts of vegetation and topsoil from areas needed for right-of-way. Little difference in impacts to vegetation exists between the build alternatives because right-of-way requirements and associated clearing activities for construction would be similar. **Total areas of new right-of-way needed for the alternatives vary by less than 10 acres.**

The proposed alignment follows the existing alignment of US 2 between Columbia Heights and the House of Mystery. The existing right-of-way corridor **would** generally be expanded by 10 to 40 feet on each side of the highway. **The most notable effects of the proposed highway expansion in this part of the corridor would be the removal of moderately dense forest growth on rural and suburban residential lands along the highway.**

More substantial impacts to vegetation would occur in areas between the House of Mystery and Hungry Horse where alignment **modifications would expand existing right-of-way corridors and new areas of right-of-way must be cleared.** Riparian vegetation (predominantly cottonwood, spruce, Douglas-fir, and paper birch) near Berne Memorial Park would be cleared to accommodate construction along and in the river. **Stands of Englemann spruce and lodgepole would be removed on the approaches to the new South Fork Bridge** west of Hungry Horse. The new alignment would cut new corridors through dense timber creating an appearance similar to that of the existing right-of-way corridor.

TABLE IV-4 summarizes the impacts of the build alternatives on each vegetation community or landtype within the project area. TABLE IV-4 identifies the total acreage of various vegetation communities or landtypes located within the new right-of-way for each build alternative and shows the total area of each community or landtype potentially disturbed by construction.

Based on the information in TABLE IV-4, construction of the two-lane alternatives (Alternatives 3 and 4) would disturb some 16 to 20% less area of new right-of-way than the four-lane designs (Alternatives 1 and 2). The table also indicates that relatively little difference exists in the impacts to vegetation for the alternatives under consideration. Other than near Berne Memorial Park, the overall impacts to vegetation in the project corridor are considered to be minor when the total vegetation in the area is considered. The impacts to vegetation are unavoidable for the build alternatives.

TABLE IV-4 IMPACTS OF BUILD ALTERNATIVES ON VEGETATION COMMUNITIES AND LANDTYPES								
Landtype/Community Affected	Acres in New Right-of-Way				Acres Disturbed by Construction			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 1	Alt. 2	Alt. 3	Alt. 4
W-1	0.27	0.22	0.22	0.24	0.18	0.14	0.14	0.17
W-2	1.12	1.12	0.85	0.85	0.84	0.84	0.50	0.50
W-3	0.66	0.66	0.66	0.66	0.00	0.00	0.00	0.00
W-7	3.91	3.91	3.91	3.91	1.46	1.46	1.10	1.10
R-7	4.61	4.61	4.05	4.05	2.12	2.12	1.41	1.41
R-8	3.01	3.01	2.64	2.64	1.59	1.59	1.06	1.06
R-9	1.88	1.88	1.63	1.63	0.86	0.86	0.53	0.53
R-10	0.91	0.91	0.91	0.91	0.07	0.07	0.07	0.07
F	16.98	15.81	14.99	14.19	12.66	12.37	9.85	9.37
R	20.82	19.54	19.12	18.38	17.30	15.47	14.63	12.92
U	26.26	26.05	25.89	25.91	18.18	17.87	17.69	17.53
D	7.89	7.91	7.32	7.38	7.45	7.36	7.38	7.38
B	5.90	5.90	5.17	5.17	3.00	3.00	2.01	2.01
E	4.65	4.65	4.65	4.65	3.53	3.53	3.53	3.53
G	20.41	20.41	18.15	18.15	16.67	16.67	13.86	13.86
Total Acres by Alternative	119.28	116.59	110.16	108.72	85.91	83.35	73.76	71.44

The proposed construction of replacement parkland and a new river access on a site near the House of Mystery would directly impact R, F, D, R-7, and W-7 communities or landtypes. The proposed construction of these facilities would disturb or remove a total of about 3.4 acres of these vegetation or landtypes.

Indirect Impacts - The removal of riparian vegetation (R-7 Type) near Berne Memorial Park would reduce the number of potential perching and roosting trees for bald eagles and would remove some of the trees between the highway and the river. The loss of vegetation due to right-of-way clearing would affect the visual qualities of some parts of the corridor. These impacts are discussed further in other sections of this Part.

Cumulative Impacts - The potential exists for spreading noxious weeds within the new right-of-way and on adjacent lands due to road construction activities. This would contribute to weed problems in the county and may adversely affect wildlife habitat in the project area.

Mitigation - During construction, much of the topsoil and vegetative cover would be stripped from the right-of-way due to excavation. The topsoil would be removed, stockpiled, and used to cover cut and fill areas for revegetation. The establishment of strict construction limits and the removal of only the vegetation

necessary during clearing will help minimize impacts.

The revegetation of disturbed right-of-way areas will be in accordance with **standard** construction specifications and will utilize plants of low palatability to avoid attracting wildlife to the roadside. Suggestions for appropriate species were listed on page 89 of the *Hungry Horse - West Glacier Final Environmental Impact/4(f) Statement*. The effectiveness of previous revegetation efforts along US 2 should be evaluated to determine if unpalatable species inhibit wildlife use of roadside areas between Hungry Horse and West Glacier.

Two locations east of the House of Mystery exist where proposed alignment changes would create large areas of abandoned highway right-of-way. The old pavement will be removed from these areas and the abandoned right-of-way will be revegetated with species like ponderosa pine and Engelmann spruce. Since these areas of dense tree cover may contain very little low- to mid-level canopy vegetation, transplanting shrubs like Wood's rose, red-osier dogwood, Rocky Mountain maple, or willow would provide some screening and security for wildlife. Transplanting these species on disturbed areas adjacent to the river would also benefit wildlife by providing screening and security cover.

Several options were identified for controlling and eventually eliminating the infestation of spotted knapweed that exists on the replacement parkland/river access site near the House of Mystery. Both interim and long-term management options for the parcel have been coordinated with staff of the USFS Hungry Horse Ranger District. Identified management options for the parcel range from herbicide applications to control local knapweed to the restoration of a desirable plant community through cultivation, reseeding, and post-seeding weed control. The most desirable management option depends upon the probable construction date for the project.

The Flathead County Weed District was also contacted about applying herbicide treatments on the property near the House of Mystery and for another State-owned parcel located south of US 2 and west of Berne Memorial Park. Arrangements were made with the Flathead County Weed District to apply herbicide treatments on these parcels during the summer of 1993.

The Hungry Horse District Ranger recommended that the **disturbed riparian** area near Berne Memorial Park be revegetated with cottonwood trees to help offset the loss of perching and roosting sites for eagles. Other measures to help mitigate the loss of riparian vegetation adjacent to the Flathead River are discussed in the threatened and endangered species impact discussions later in Part IV. It is possible that timber cleared from the proposed right-of-way through National Forest lands could be cut and sold producing revenue for the Flathead National Forest.

Impacts to Plant Species of Special Concern - Since no plants of special concern are known to occur in the project corridor or were observed during the field reconnaissance, the proposed action is not expected to impact such species. There is a potential for impacts to species of concern because suitable habitat exists for these plants in the general project area. However, neither the Montana Natural Heritage Program or the USFS have located such species in the project corridor. Construction of the highway, revegetation of disturbed right-of-way, and invasion of weedy species could remove potentially suitable habitat for species of concern.

2. WETLANDS IMPACTS

Early Coordination - Efforts were made during the preparation of the EIS to ensure that the COE and other involved agencies were kept informed of wetlands impacts associated with the proposed action and measures to mitigate likely impacts. The COE, USFWS, and the Montana FWP were provided opportunities to review and comment on the reports identifying and evaluating wetlands

affected by the proposed action during 1990 and in 1993. Options to mitigate wetlands impacts were initially discussed with the COE and the FWP at a meeting held on July 29, 1991. The wetlands impacts of the proposed action were also generally discussed in meetings with the EPA during December, 1992 and April, 1993.

During the preparation of the Final EIS, the COE (Omaha District and the Montana Regulatory Office) was provided with an opportunity to review and comment on the Draft 404(b)(1) Evaluation and the Only Practicable Alternative Wetlands Finding. The COE's comments have been incorporated into these documents which are presented in APPENDIX 14 and 15. The agency was also contacted during February, 1994 and asked for a preliminary indication of whether or not a 404 permit can be issued for the proposed action based on the information presented in the EIS.

Correspondence from the COE dated May 10, 1994, indicates that the information provided in the EIS is sufficient at this time for the COE to issue a 404 permit. The COE further stated that the decision to issue a permit would not be made until after the Final EIS is released and comments on the document have been received. The agency recommended that an application for a 404 permit should be submitted with the filing of the Final EIS. A copy of the COE's letter is contained in APPENDIX 15.

Direct Impacts - As indicated in Part III and shown in FIGURE III-6, the proposed highway reconstruction would affect jurisdictional wetlands located in Wetland Sites 2, 4, and 5 within the project area. The proposed action would impact wetland types W-1, W-2, and W-7 located in the new right-of-way of the proposed highway. In addition to the text below, impacts to affected wetlands are described in APPENDIX 14 which evaluates the proposed action according to the Section 404(b)(1) Guidelines.

TABLE IV-5 compares the direct impacts on these wetland sites for each of the build alternatives. Please note that the table identifies the amount of wetland within the new right-of-way and the amount of wetland that would be disturbed by construction.

Direct impacts resulting from the construction of the build alternatives include clearing, excavation, filling, and grading of portions to each wetland site. These activities would result in a loss of wetlands. The total maximum potential loss of wetlands (area within the new right-of-way) ranges from 5.35 acres to 5.58 acres. The probable area of each wetland site disturbed by the build alternatives would range from 1.43 acres to 1.88 acres. The extent of these impacts would be highest under Alternative 1 and lowest under Alternative 4.

A riparian community type (R-8), characterized by seeps and springs, exists at the western outcrop at Berne Memorial Park. The proposed highway reconstruction would directly impact this community by excavating the outcrop to eliminate a substandard horizontal curve. Although this riparian community would be directly impacted, it is not subject to jurisdiction under Section 404.

The proposed action would substantially increase the size of the exposed rock cut but is not expected to eliminate the seeps and spring that occur at this location. This conclusion was made since water surfacing on the cliff face moves through fractures in the rocks that form the outcrop. Waters surfacing above the outcrop would also continue to drain over the face of the cliff after construction. Further discussion of the impacts at this location is presented in the Visual Impacts section of this Part and in Part V.

A complete evaluation of the proposed action's effects on the functions and values based on the WET analysis is on file in Helena.

TABLE IV-5 IMPACTS OF BUILD ALTERNATIVES ON JURISDICTIONAL WETLANDS				
Wetland Site	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Wetland Site 2 (North)				
Acres in New Right-of-Way	0.27	0.22	0.22	0.24
Acres Disturbed by Construction	0.18	0.14	0.14	0.17
Wetland Site 2 (South)				
Acres in New Right-of-Way	0.22	0.20	0.20	0.22
Acres Disturbed by Construction	0.13	0.12	0.12	0.12
Wetland Site 4				
Acres in New Right-of-Way	0.90	0.90	0.65	0.65
Acres Disturbed by Construction	0.71	0.71	0.38	0.38
Wetland Site 5*				
Acres in New Right-of-Way	4.51	4.51	4.51	4.51
Acres Disturbed by Construction	1.15	1.15	1.03	1.03

* NOTE: Wetland Site 5 consists of 19 individual areas ranging in size from 0.2 acres to 2.6 acres.

IMPACTS AT WETLAND SITE 2

This site is comprised of type W-1 wetlands (areas having permanent standing water and rooted emergent vegetation like cattails) and W-2 wetlands (areas having seasonal or permanently high water tables and graminoid and herbaceous cover like redtop, reed canarygrass, bluejoint, and beaked sedge).

The effect of reconstruction on Site 2 would be a maximum loss of 0.49 acres. Widening the highway through this wetland would not substantially impact the identified functions and values of the wetland. The existing fill for US 2 previously impacted the wetland and restricts the flow between the north and south portions of the wetland. This wetland area has a low potential for waterfowl use but a moderate potential for wildlife values because it is associated with other wetland types and forested areas that provide good habitat interspersed for food and cover.

The overall functions of the wetland would not be altered with construction of the new highway provided a culvert or drainage way is provided between the two wetland areas associated with this site. The site would continue to provide localized benefits by collecting runoff.

IMPACTS AT WETLAND SITE 4

Wetland types at Site 4 affected by the proposed action are primarily W-2 wetlands (areas characterized by seasonal or permanent high water tables with graminoid and herbaceous cover) with other lesser amounts of W-3 (shrub cover) and W-1 (cattails) wetlands.

The build alternatives would result in a maximum loss of 0.90 acres and would eliminate more than half of this wetland area. Highway reconstruction would have notable impacts on the identified functions and values of this site, however, the functions the wetland provides are not considered to be critical for this area. The analysis indicated that this site has moderate breeding waterfowl potential and low to moderate wildlife values. Site 4 is associated with forested areas that provide

good habitat interspersion for food and cover for other wildlife.

IMPACTS AT WETLAND SITE 5

Affected wetlands associated with Site 5 are classified as W-7 wetlands. These wetlands are characterized by areas with seasonal or permanent high water tables subject to temporary flooding with a deciduous overstory of cottonwood and conifers and a dense shrub understory. These wetlands are found on the floodplain of the Flathead River.

As indicated in Part III of the EIS, nineteen individual, non-contiguous areas within the riparian community along the Flathead River comprise Site 5. Highway reconstruction would affect up to 0.61 acres of four small wetland areas that exist opposite Berne Memorial Park. The proposed action would fill all of these small wetlands. Reconstruction would also affect a maximum of 0.8 acres of a small wetland near the location of the new bridge over the South Fork. The proposed action would affect a portion of this wetland. Although the functions of these wetlands would be eliminated or drastically reduced by the proposed action, their loss is not considered critical because these sites serve only limited functions.

IMPACTS AT THE PROPOSED RIVER ACCESS SITE

Development of the proposed river access near the House of Mystery would affect two small wetlands. Construction of the boat ramp would eliminate less than 0.1 acres of wetland. This loss is not considered critical since the functions of the affected wetland would not be substantially impaired.

Indirect Impacts - Other impacts on wetlands may result from the operation and maintenance of the highway. Minor amounts of sediments from road sands that are inadvertently plowed into the Flathead River during the snow season and minor erosion of the roadside slopes (where they function as the streambank) during high spring flows could degrade surface water quality. The potential for water quality impacts due to chemical spills during construction or operation of the facility also exists.

Cumulative Impacts - The potential for spreading noxious weeds is high since robust weed populations already exist within and adjacent to the highway right-of-way. Invasion of wetlands by weeds is a particularly important concern. Purple loosestrife, which has an affinity for cattail habitat, has been identified in Montana and may be of concern in this area.

Avoidance Alternatives - In accordance with Executive Order 11990, "Protection of Wetlands" and the "Interagency Memorandum of Understanding: Management and Mitigation of Highway Construction Impacts to Wetlands in the State of Montana," options to avoid wetlands were examined. Alignment alternatives considered for the proposed action are discussed in Part II and in Part V of the EIS. Generally, alternate routes to avoid wetlands were eliminated from consideration because they would produce environmental impacts equal to or greater than those associated with the proposed action. Minor alignment variations or design modifications through Badrock Canyon are possible but they would still impact wetlands along the Flathead River.

Mitigation of Wetlands Impacts - All mitigation will comply with the provisions of the Interagency Memorandum of Understanding (MOU) on wetlands adopted by the Montana Interagency Wetlands Group in 1989. According to the MOU, after avoidance options, mitigation within the highway right-of-way including the enhancement of existing wetlands or the creation of new wetlands should be the first considerations for unavoidable impacts. Limited opportunities exist in the right-of-way corridor to enhance or create new wetlands due to the small acreage of existing wetlands, the mountainous terrain, and the land uses adjacent to the highway. Enhancement of existing **Sites 3 and 4 (shown on FIGURE III-6) offer the best**

opportunities for mitigating impacts to wetlands in the general project area.

The proposed highway would be constructed directly through an isolated wetland (identified as Site 4 in FIGURE III-6) located on private land south of US 2 between Berne Road and Badrock Canyon. This site contains Types W-2 and W-3 vegetation and is fed by a spring that surfaces on Columbia Mountain. An area immediately south of Site 4 appears to be a good candidate site for the development of a replacement wetland. Preliminary investigations of this site showed that it lies on an old river terrace where soils and subsurface materials are highly permeable. The construction of a replacement wetland in this area may require the use of a semi-permeable geotextile liner to retain the surface water that flows into the wetland. FIGURE IV-2 shows Site 4 and the possible replacement wetland area. The replacement area could be hydraulically linked to the portion of the existing wetland supporting W-3 vegetation so the site is not isolated from its water source. The ability to acquire private land to construct the replacement wetland and the feasibility of actually constructing a wetland at this location must be further evaluated if mitigation is proposed at this site.

Although Wetland Site 3 would not be impacted by the proposed highway reconstruction, a previously flooded area west of the site offers a potential location for a wetland enhancement project. FIGURE IV-3 shows the location of Wetland Site 3 and the area where the wetland could be expanded. Expanding the wetland would require that a connection once again be established between the existing pond and the once flooded area. A semi-permeable geotextile liner may be needed to maintain slow drainage at this location. The site offers a good opportunity to replace a number of communities, including Type W-7 vegetation. As with Site 4, the ability to acquire private land and design a wetland must be further investigated if it is determined that this location offers the best opportunity for mitigating wetlands impacts.

Sedimentation to wetlands and the Flathead River would be limited during construction by using erosion control BMPs like sediment basins and by temporarily stabilizing all exposed soil until revegetation is successful. Streambanks at the new bridge site would be stabilized with mulch or netting and shrub plantings. Sedimentation caused by erosion or road sands may be reduced or eliminated by designing less steep slopes that would ensure good vegetation recovery. Combined with a vigorous species mix, the slopes could be used to trap these materials. Detailed mitigation plans for the river crossing and the fill in the Flathead River will be prepared once design plans for the road and bridge have been developed.

The opportunity exists to establish a vegetative cover in the corridor that restricts the reentry of weedy species and actually improves habitat for wildlife. A vigorous stand of vegetation is one of the best defenses against weed invasion. Due to the wetland habitat in the right-of-way, the widespread use of herbicide is not recommended as a weed control measure. Spot spraying may be useful after vegetation has been reestablished in the corridor, however, because of the sensitivity of broadleaf plants to herbicides and groundwater considerations, a diligent hand-pulling program to remove weeds may be more appropriate.

Only Practicable Alternative Wetlands Finding - The Only Practicable Alternative Wetlands Finding has been included as APPENDIX 15 in the Final EIS. The Finding discusses opportunities to minimize impacts, to provide compensatory mitigation within and outside the highway right-of-way, and ways to provide mitigation outside the immediate project area.

Correspondence received from the COE on May 10, 1994 indicates that the appropriate documentation and evaluation of wetland areas, impacts to affected wetlands, alternatives to the use of wetlands, and mitigation has been conducted. A copy of the COE's letter is contained in APPENDIX 15.

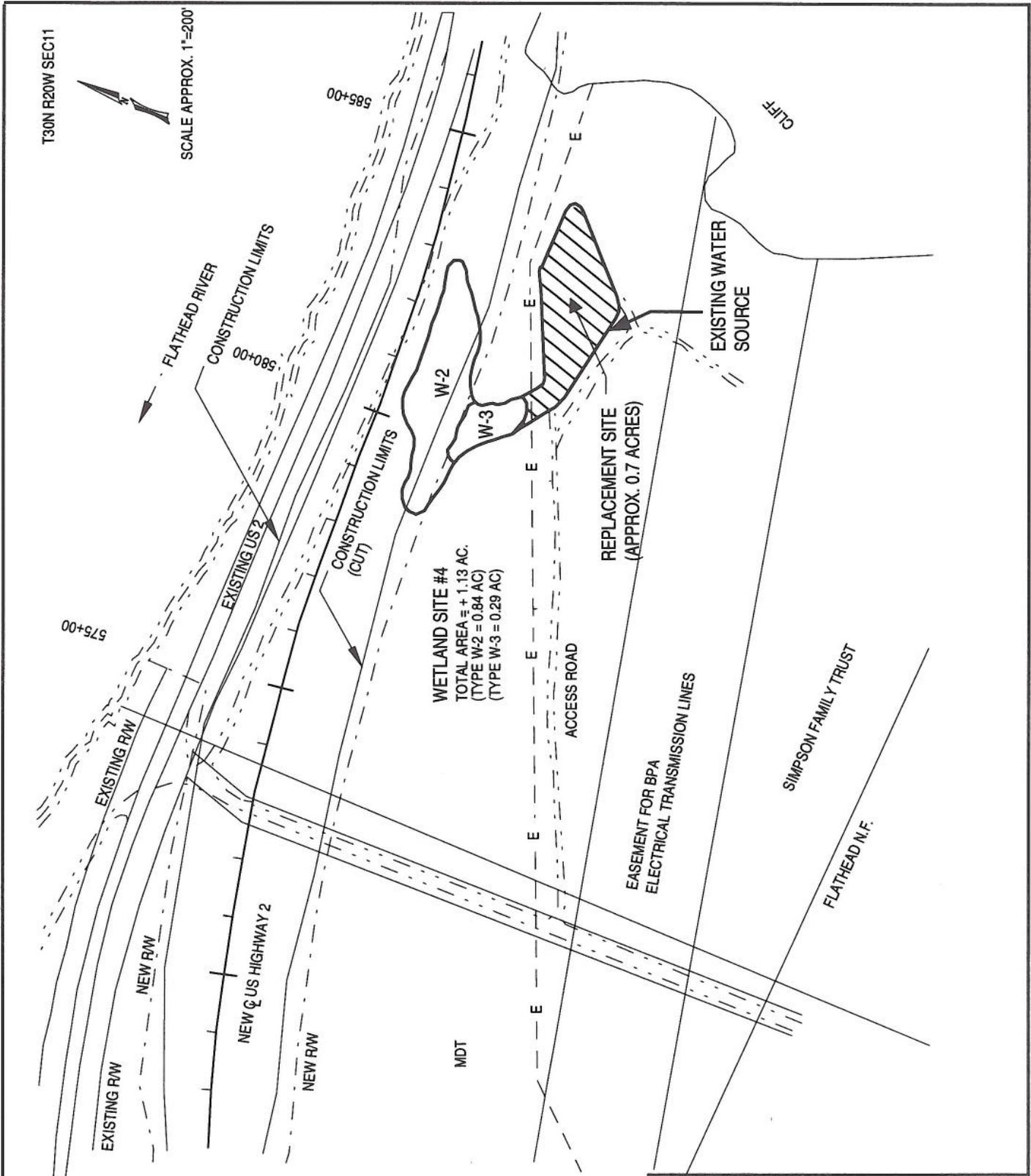


Figure IV-2
Replacement Wetland
Opportunity - Site 4

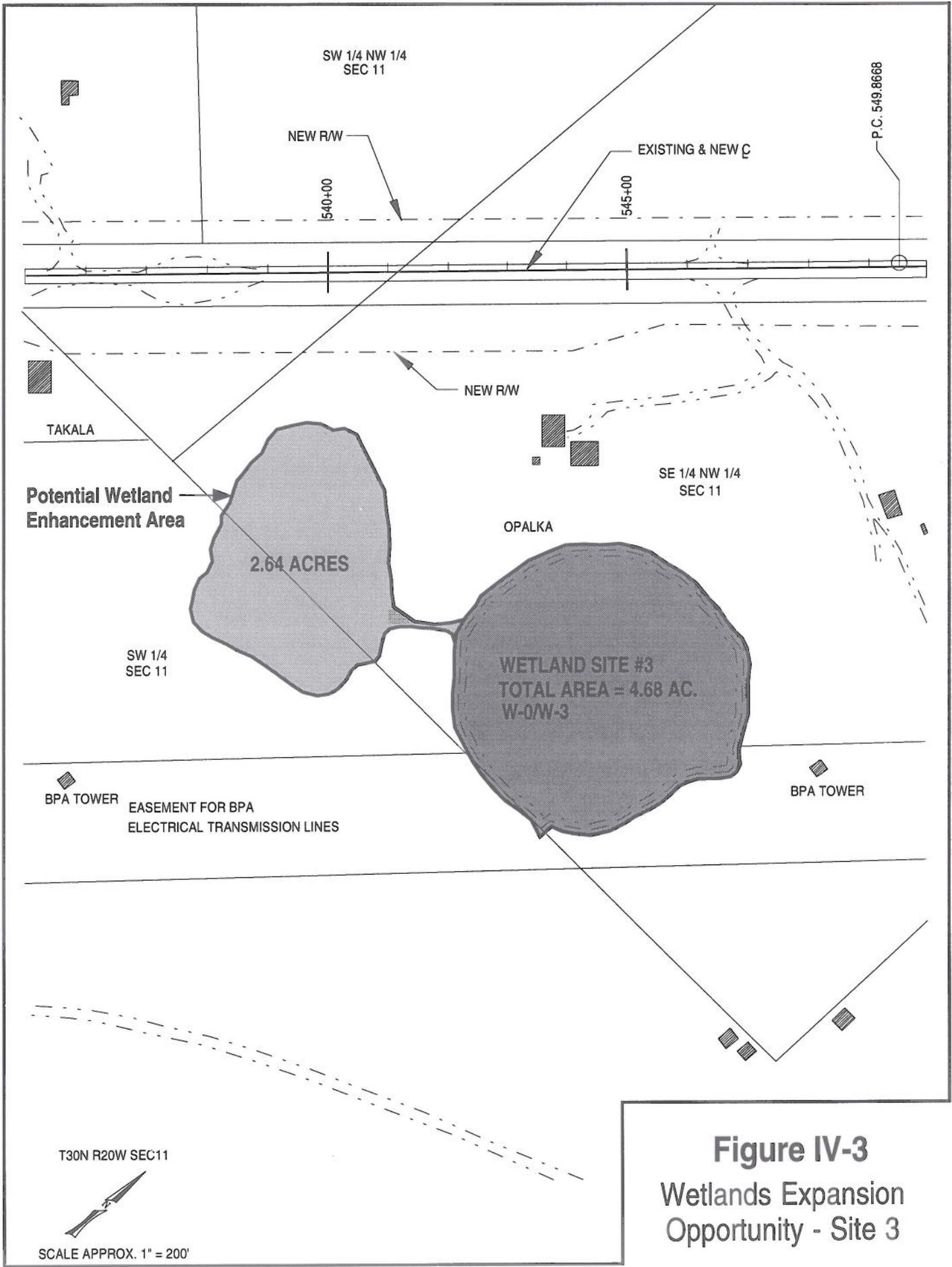


Figure IV-3
Wetlands Expansion
Opportunity - Site 3

3. WATER BODY MODIFICATION AND WILDLIFE IMPACTS

Impacts to Water Bodies - The proposed action's effects on water bodies in the project area were previously discussed in Part IV under the sections describing water quality impacts, Wild and Scenic River impacts, and floodplain impacts. The Section 4(f) Evaluation in Part V also examines impacts to water bodies.

Direct Impacts on Wildlife - The proposed action has the potential to produce the following direct impacts on wildlife:

- loss of habitat resulting in less forage and cover;
- displacement;
- highway mortalities during facility operation; and
- interruption of animal movements or migration patterns.

These impacts are discussed below for various wildlife species and fish likely to occur in the project corridor.

Direct Impacts to Reptiles and Amphibians - Direct impacts of the build alternatives on reptiles and amphibians would be limited to some construction-related fatalities (killed by heavy equipment), road-related fatalities, and possibly increased predation. All alternatives **would** provide a wider road and cleared right-of-way area, increasing the amount of time and distance animals are on the road. This **would** also increase the time they are exposed to predators such as raptors, skunks, or foxes.

The most important habitats for amphibians affected by the proposed action are the permanently or seasonally wet areas of the corridor. Reptiles could potentially use all habitats adjacent to the highway. All build alternatives would remove some habitat, but these **minor** losses **would** not have a major effect on local or regional reptile and amphibian populations.

Direct Impacts to Bird Species - Impacts to birds from the proposed action would be limited primarily to the loss of habitat. Between Columbia Heights and Badrock Canyon, there would be a minor loss of wetland habitat where the road crosses a cattail marsh. This loss is not considered to be important for local or regional populations of birds (such as rails or red-winged blackbirds), because the few birds which may be displaced should find acceptable habitat elsewhere in the corridor. The remaining habitat west of Badrock Canyon is marginal for birds due to suburban development and use as pasture and hayland. Some passerine bird species may nest in this habitat, but its loss would not have any major effect on local or regional populations.

The riparian habitat that would be lost to construction in and east of Badrock Canyon probably supplies nesting, roosting, and foraging habitat for various birds including grouse and raptors. Impacts to bald eagles and peregrine falcons are discussed in the Threatened or Endangered Species Impacts **section later** in this Part.

Other impacts to birds associated with the build alternatives would be from collisions with vehicles. More vehicle collisions with birds are expected due to higher traffic volumes and increased travel speeds. However, the wider road proposed for all build alternatives would increase the area for vehicles to maneuver and allow drivers to avoid birds on or adjacent to the road.

Direct Impacts to Small and Medium-sized Mammals - Some habitat for small mammals would be lost

due to construction, but this would not have a substantial effect on local or regional populations. The potential for mammal deaths due to vehicle collision would be increased for all build alternatives due to road widening, alignment improvements, increased travel speeds, and the projected increases in traffic volumes over the next twenty years.

Small mammals have been found to be reluctant to cross roads where the distance between forest margins was greater than 20 meters (66 feet) (15). Since the distance between forest cover presently exceeds this distance in many locations, widening the existing road would not create a greater barrier or risk to small mammals. Wide, divided highways may fragment gene pools in small mammal populations (15). This is unlikely to be a major concern for the proposed action since travel lanes would not be separated by a wide median.

The mid-sized mammals such as skunks, porcupines, and marmots would be more prone to deaths from increased traffic and travel speeds, especially when young animals are becoming mobile. However, these impacts would not adversely affect the local or regional populations of such species.

Direct Impacts to Predators and Furbearers - The most notable potential impact to these species represented by the build alternatives is the higher risk of highway-related mortalities. This is due to the increased distance between cover for animals crossing the wider roads associated with the build alternatives.

Few predatory or furbearing animals are seen between Columbia Heights and Hungry Horse, perhaps due to the level of human development and existing traffic volumes on US 2. Although all build alternatives would provide a wider facility than the existing highway, the action should not cause major adverse impacts to these species because they are seldom seen in the project area.

Direct Impacts to Ungulates - Scoping comments indicated that the proposed action will disrupt wildlife travel corridors for deer and elk through the project area. According to a biologist for the FWP, there is little daily or seasonal movement of animals between the Teakettle and Columbia Mountain areas (16). Consequently, US 2 has little existing impact on local ungulate populations. For this reason, the biologist felt that none of the reconstruction alternatives would substantially change the numbers of ungulates killed by vehicles.

Local residents and a USFS wildlife biologist indicate that a permanent population of white-tail deer reside in the pastures and haylands west of Badrock Canyon near the House of Mystery. These animals commonly cross US 2 to access the river or browse. Deer mortalities have resulted from these crossings of the highway and will continue to occur with or without the proposed action. The increased roadway width and larger cleared right-of-way associated with the build alternatives would provide more room for avoidance maneuvers and allow deer to be more easily seen along the highway.

Direct Impacts to Fish - Without the incorporation of erosion control measures, sediments transported by runoff from disturbed areas of the project site or from constituents of fill materials entering the Flathead River could adversely affect the local fishery. Sedimentation could increase silt in spawning gravels and rearing habitat, suffocate eggs or fry, and adversely affect habitat for aquatic life that is an important food source for fish.

Direct Impacts to Wildlife and Fish of Concern - Comments received on the Draft EIS suggest that the spring seeps in the outcrops at Berne Memorial Park in Badrock Canyon provide potential habitat for the Coeur d'Alene salamander. This species occurs at other locations in western Montana and may be found in spring seeps, waterfall spray zones, and along the streambanks of small cascading streams. Coeur d'Alene salamanders occur in wet, humid, and cool areas containing fractured bedrock and a dense overstory of trees. The outcrops at Berne Memorial Park

possess characteristics of habitat favored by Coeur d'Alene salamanders. Excavation of the western outcrop at the park would eliminate or alter some of these potential habitat conditions or cause mortalities, if Coeur d'Alene salamanders were present.

In response to comments on the Draft EIS and because no other studies have been done, potential habitat for Coeur d'Alene salamanders in Badrock Canyon was surveyed by zoologists. No Coeur d'Alene salamanders were found during three surveys of the drainages, talus slopes, and seeps and springs in the Berne Memorial Park area. Based on these surveys, zoologists concluded that the Coeur d'Alene salamander does not live in Badrock Canyon and would not be impacted by the proposed action.

Indirect Impacts on Wildlife and Fish - Revegetation of the disturbed right-of-way may attract animals to the roadside and increase the numbers of highway-related wildlife deaths. The lush growth on revegetated areas in the right-of-way may attract bears during the spring months. Ungulates may be attracted to revegetated areas during both winter and spring months (17).

If the numbers of road-killed small and large game animals increase with the construction of a new highway, more raptors may be attracted to the area and the potential for harm to these birds due to vehicle collisions may be increased. If **highway maintenance workers** or FWP personnel promptly remove all road-kills, this issue may not become important.

Cumulative Impacts on Wildlife and Fish - Over time, secondary development adjacent to US 2 would reduce the amount and quality of habitat for some species. Affected species would be displaced to more suitable habitat.

Mitigation - Careful selection of plant species used for revegetating disturbed areas of the right-of-way may help prevent wildlife from being attracted to the roadside. Plant species which are **not** highly palatable to ungulates or bears will be used for revegetating disturbed areas near the highway.

Efforts will be made to quantify the number of deer mortalities resulting from collisions with vehicles on US 2 between the House of Mystery and Badrock Canyon. These efforts will determine if the frequency of such incidents is higher at this location than at other road locations in the corridor. If appropriate, warning signs for this deer crossing area could be installed.

Highway designers will use the *Highway Construction Standard Erosion Control Work Plan* to identify measures to control erosion and sediment transport. The selection of these measures will be based on the distance to surface water or wetlands, precipitation intensity, soil properties, slopes, and the presence of critical resources (including prime fisheries). A Storm Water Erosion Control Plan, incorporating appropriate measures for the proposed construction project, will be developed and approved prior to the construction of the proposed project. The primary objective of the Storm Water Erosion Control Plan will be to minimize the erosion of disturbed areas and prevent the transport of sediments to wetlands or surface waters during the construction and post construction phases of the project.

All disturbed areas not occupied by project facilities will be promptly revegetated to stabilize soils and minimize erosion. Interim use of mulch or other erosion control practices may be necessary or recommended at certain locations along the project, such as at the new bridge location. These actions will minimize the potential for sediments to adversely affect fisheries in the project area.

Mitigating measures for impacts on threatened or endangered species are discussed in the following section.

4. THREATENED OR ENDANGERED SPECIES IMPACTS

Consultation with the USFWS - The USFWS was initially contacted to determine if any proposed or listed species or critical habitat exists in the project area. Because the agency identified the existence of four species in or near the project area and **the presence of important habitat for some species, it was necessary** to prepare a Biological Assessment identifying the potential effects of the proposed action on listed species and critical habitat.

Informal consultation was undertaken with the USFWS during the development of the Biological Assessment. These coordination efforts included contacting the agency to discuss the project on several occasions and providing the USFWS with an opportunity to review and comment on materials to be included in the Biological Assessment. At the conclusion of informal consultation activities, the Biological Assessment was submitted to the agency on October 28, 1991. A copy of the document is on file in Helena. The USFWS reviewed the Biological Assessment and issued a response (included in Part VI of the EIS) to the conclusions in the document on November 4, 1991.

Formal consultation regarding any listed species is necessary to complete the requirements of Section 7 of the Endangered Species Act if the proposed action may affect any listed species or critical habitat. In the agency's November 4, 1991 correspondence, the USFWS recommended that **formal consultation be initiated** regarding the proposed action's effects on bald eagles and habitat used by the species in Badrock Canyon. A written request to begin formal consultation was made to the USFWS on December 20, 1991 by the FHWA. A copy of this request is included in Part VI.

During formal consultation, the USFWS was provided with various project materials and meetings with the agency were held. The USFWS issued a Biological Opinion on March 24, 1992 (included in Part VI) to conclude the formal consultation process. **The Biological Opinion stated that the USFWS concurred with the determinations that the proposed action will not adversely affect the endangered gray wolf and peregrine falcon and the threatened grizzly bear. The Biological Opinion also indicated that the proposed highway reconstruction project is not likely to jeopardize the continued existence of the bald eagle.**

The paragraphs that follow summarize materials from the Biological Assessment and provide the results of USFWS consultation for listed species.

NORTHERN BALD EAGLE

Habitat and Use - The *Montana Bald Eagle Management Plan* (1986) indicates that the project area lies within Management Zone 7, the Upper Columbia Basin. This Management Zone includes all of Montana west of the Continental Divide, the Idaho Panhandle, and northeastern Washington. The Plan quantified existing numbers of eagles for the Zone and established population and habitat goals for the recovery of the species in the State. The Plan also established management guidelines for three categories of essential bald eagle habitat, currently occupied nesting habitat, potential nesting habitat, and migration/wintering habitat.

The habitat affected by the proposed action encompasses about 2.7 acres, and is located in the narrow (50-100 feet wide) band of vegetation between U.S. 2 and the Flathead River near Berne Memorial Park. According to the *Montana Bald Eagle Management Plan*, the riparian vegetation in the project area would be classified as winter/migration habitat. Bald eagles use mature cottonwoods and conifers in this riparian zone as hunting perches (16,17,18,19,20). This riparian vegetation also provides screening which allows eagles foraging opportunities on waterfowl and shoreline carrion (21).

Bald eagles migrate through the project corridor, typically arriving in late September and leaving in the

spring of the following year (22,23,24). Badrock Canyon is part of a "flight corridor" used by bald eagles traveling to and from the South Fork of the Flathead River and night roosts on the east face of Columbia Mountain during periods of migration (23). At least seven bald eagle roosts have been identified on the east side of Columbia Mountain (21).

No currently occupied nesting territories are known to occur along the Flathead River in the project area (16,17,18,25). The nearest known nesting sites are located along the east side of Hungry Horse Reservoir, at Lake McDonald in Glacier National Park, and at Cyclone Lake, in the drainage of the North Fork of the Flathead (26). The proposed action is not located within the zones generally designated as primary use areas (1/2 mile radius of nest) or home ranges (2 1/2 mile radius of nest) for eagles using these known sites.

Historically, great populations of bald eagles were attracted to the region to feed on large numbers of kokanee salmon that annually migrated up the Flathead River to spawn. The *Montana Bald Eagle Management Plan* stated that more than 1,000 eagles **once passed** through Glacier National Park each autumn, temporarily stopping to feed on kokanee salmon before continuing southward through western Montana. Peak daily counts at McDonald Creek in Glacier National Park exceeded 600 eagles during 1978 and 1981.

Since the mid-1980's, the number of eagles migrating to the upper Flathead River area declined dramatically due to the crash in migratory salmon populations caused by the introduction of a shrimp species to Flathead Lake (27,28,29). Historical count data for bald eagles at McDonald Creek clearly shows the rapid change in the use of the area by the species following the disruption of salmon migrations. Data from the National Park Service shows that the peak daily count of bald eagles at McDonald Creek was 520 in 1985 but had dropped to only 34 by 1988 (26).

In the project area, eagles typically preyed on kokanee at three spawning sites between the House of Mystery and Berne Memorial Park and at two sites near the confluence of the South and Middle Forks of the Flathead River (30). In early December of 1985, 41 bald eagles were observed between the House of Mystery and Hungry Horse Reservoir (21). No information on the distribution of bald eagles within this 6 mile-long corridor was provided with the December, 1985 peak count data.

Because of the important change in food sources for eagles that occurred, experts **were contacted** to determine the present use of Badrock Canyon by bald eagles. Experts indicated that fewer eagles forage in the Badrock Canyon area since the recent collapse of the kokanee salmon populations, however, casual observations indicate that eagles still continue to perch in the cottonwoods and spruce between US 2 and the river (21,26). No current estimates of the number of eagles that use habitat in Badrock Canyon were provided by those contacted during the preparation of the EIS.

The 1985 counts at McDonald Creek and along the Flathead River system between the House of Mystery and Hungry Horse Dam provide some indication of bald eagle distribution in the area. If such a relationship can be made, then the **low numbers of bald eagles** at McDonald Creek suggests that the riparian habitat between the House of Mystery and Hungry Horse Dam is used by only a few bald eagles.

Direct Effects - The proposed road construction would remove riparian **cottonwoods and conifers that serve as potential** perching sites and provide screening for eagles **foraging** along the river bank. This habitat generally **occurs in areas with Type R-7 vegetation and Type W-7 wetlands as shown on FIGURE III-6**. The Draft EIS indicated that **construction of the riprap-faced embankments along the Flathead River as initially proposed for the two-lane and four-lane build alternatives, would remove from 1.7 to 2.7 acres of the estimated 21.3 total acres of this riparian vegetation that exists between Berne Road and Hungry Horse.**

Comments on the Draft EIS required that design modifications be evaluated to determine if the encroachment on the Flathead River in Badrock Canyon could be reduced. Project investigations show that designs incorporating vertical retaining walls, steepened embankments, or structures would reduce the encroachment but would also still severely impact the affected riparian habitat in Badrock Canyon. However, the majority of the design modifications evaluated for US 2 in Badrock Canyon would impact the riparian vegetation less than the designs for the build alternatives proposed in the Draft EIS.

The preferred alternative for US 2 in Badrock Canyon now includes a vertical retaining wall to minimize encroachment on the Flathead River. A vertical, mechanically-stabilized earth retaining wall has been proposed for this area to minimize the amount of vegetation that must be removed from along the river bank to accommodate the new road. This type of retaining wall was preferred since much of the area disturbed by the construction of such a wall occurs behind the face of the wall. The vertical retaining wall would also allow for revegetation to occur to the face of the wall.

As Plate 2 of **FIGURE III-6** shows, the dense screen of riparian vegetation along the Flathead River is absent for some 3,000 feet east of Berne Road. This disruption in the tree screen is due to a change in terrain which naturally constricted the river channel and to previous road construction which placed fill in the river at the west end of Badrock Canyon. **Design studies have shown that a vertical retaining wall would leave an isolated 20-30 foot-wide band of vegetation between Project Stations 608+50 to 612+50 and remove other vegetation along the bank to Station 615+00, where the continuous band of riparian vegetation would resume.**

Comments received from several concerned wildlife biologists stated that the removal of these trees reduces potential foraging sites and may affect the flight paths of bald eagles (23,25,31). Further, the loss of this screening vegetation along the river may increase the distance at which eagles are flushed by human activity (21). **One expert felt that further removal of riparian vegetation would increase the severity of the previous destruction of riparian habitat in Badrock Canyon (21).**

If salmon populations remain low, the existing numbers of perching snags and trees are plentiful enough that removal of a few trees would have a minor effect on migratory eagles using this particular area (16,17,18). However, if kokanee populations reach their former levels and high seasonal use of the area by bald eagles eventually returns, the number of available perching sites along the river in Badrock Canyon increases substantially in importance.

The likelihood that kokanee populations will return to historic levels was discussed with fishery managers in the region. These experts indicated that recent restocking efforts in Flathead Lake are key to the restoration of the kokanee fishery in the Flathead River system (27,28). Experts were hesitant to speculate if kokanee populations will eventually return to former levels because more time is needed before the success of restocking programs can be evaluated.

Some experts are optimistic that Great Lakes whitefish, a species which also migrates upriver from Flathead Lake to spawn, may provide an alternate food source for migrating eagles. Whitefish populations in the Flathead River system are increasing and may ultimately reach a level that attracts a sizable bald eagle population (21,28). In the opinion of one expert, the elimination of remaining perch and screening vegetation in the project area would render the habitat unsuitable regardless of any improvement in the eagle's prey base (21).

The proposed action would directly affect minor areas of riparian vegetation at the site of proposed river access site near the House of Mystery and at the proposed crossing of the South Fork of the Flathead River immediately upstream of the existing bridge. The construction of a boat ramp at the proposed river access would require that an area of riparian vegetation approximately 40 feet by 80 feet be cleared to

accommodate the construction of the ramp. This construction would produce a 40 foot-wide disruption in the continuous screen of riparian shrub vegetation dominated by willows, red-osier dogwood, Rocky Mountain maple, and alder. Additionally, construction of a vehicle parking area and an access road to the boat ramp would require the clearing of an area some 50 feet by 300 feet from the same vegetation community. The total required clearing at this site is estimated to be 0.4 acres, the majority of which would be for the parking area and access road.

The impacts on riparian vegetation and bald eagles due to the proposed construction of the boat ramp would be minor. This vegetation type is common in the project area and the direct disruption in screening along the river would not be significant. The proposed parking area and road construction would disturb only the "highway side" of the existing screen riparian of vegetation and would maintain a band of vegetation approximately 80 feet wide between the parking area and the river. The type of vegetation (thinly branched shrubs of moderate height) present at this site would not appear to provide usable temporary perching sites for foraging bald eagles.

The proposed river access would increase human presence in this area of the project corridor significantly. The adverse effects of this increased human activity on bald eagles is not expected to be significant since the peak period of facility use (late spring and summer) would not coincide with the presence of eagles in the area. The **USFS**, the agency which would operate the facility, would not allow the ramp to be open year round. The facility would have a lockable barricade to formally limit public use and would be operated seasonally, like its river access site at West Glacier.

Minor amounts of riparian vegetation would also be cleared to accommodate the construction of a new bridge over the South Fork of the Flathead River and its approaches, immediately west of Hungry Horse. The new four-lane structure would be constructed parallel to and slightly downstream from the existing bridge. The riparian area affected by the proposed bridge construction is unvegetated within the floodplain of the South Fork and is bordered by a narrow (75-100 feet wide) stand of riparian cottonwood and conifers. Similar vegetation in Badrock Canyon is used as temporary perching sites by foraging bald eagles. General forest cover, consisting primarily of subalpine fir, exists adjacent to the riparian cottonwood and conifer habitat. Please refer to **Plate 3 of FIGURE III-6** in Part III for the location of these vegetation communities.

The construction of the approach to the new bridge over the South Fork would require the removal of 0.35 acres of riparian cottonwoods and conifers on the west side of the river, immediately north of the existing bridge. The stand of similar riparian vegetation on the east side of the river would not be disturbed by construction, **although other timber must be cleared on the east approach to the new bridge.** Removing this vegetation is not expected to **cause notable adverse effects on bald eagles** due to its proximity to the existing bridge.

Although kokanee spawning beds are known to exist nearby at the confluence of the South and Middle Forks of the Flathead, it is unlikely this section of river at the bridge site contains spawning grounds due to the daily fluctuations in water levels in the South Fork caused by power generation at Hungry Horse Dam. Therefore, the riparian vegetation affected by bridge construction would not be expected to be extensively used as perching sites by bald eagles. The vegetation does provide screening along a travel corridor used by migrating bald eagles.

Indirect Effects - The major indirect effect of the proposed action would be the potential for human-caused eagle mortalities due to the presence of the highway. Eagles could be injured or killed by collisions with moving vehicles if they chose to feed on carrion on or along US 2. Because the proposed action would reconstruct a new highway on essentially the same alignment as the existing one and because traffic would increase with or without the project, the potential for accidental deaths or injuries to bald eagles would not be substantially increased with an improved traffic facility.

Cumulative Effects - The continued fragmentation of habitat and loss of riparian vegetation due to logging and other development may eventually affect the eagle's ability to adequately use the prey base (25). The *Montana Bald Eagle Management Plan* emphasized that even though bald eagle populations have increased in recent years, the continued alteration and removal of suitable habitat due to human activities may affect the long-term success of recovery efforts in the State.

The habitat removed from the area would be a minor loss because the proposed action would affect about 10% or less of the Type R-7 riparian vegetation that exists between Berne Road and Hungry Horse. Given the current levels of habitat use in the area, sufficient perching opportunities along the Flathead River between the House of Mystery and Hungry Horse Dam will continue to exist with the proposed action.

Riparian habitat similar to that affected by the proposed action is abundant immediately upstream from the project area along river corridors. The a 54-mile long section of the Middle Fork of the Flathead River upstream from Hungry Horse to Bear Creek has been designated as a Recreational River Segment of the Flathead Wild and Scenic River System. In conjunction with this designation, the USFS identified a River Management Zone and administers lands within the Zone to preserve important river values. Management guidelines for the Zone generally protect riparian vegetation that contributes to important river values and wildlife habitat. Many acres of habitat similar to that affected by the proposed action exists within the River Management Zone.

Measures to Avoid or Reduce Adverse Impacts - In an effort to enhance habitat for bald eagles in the project area, abandoned highway right-of-way will be reclaimed and revegetated with ponderosa pine, Douglas-fir, spruce, and shrubs. Since the proposed alignment closely follows the present highway through the project area, limited opportunities exist for reclaiming large areas of abandoned right-of-way. Two locations where alignment changes would allow such revegetation efforts to be implemented exist between Berne Memorial Park and Hungry Horse. The proposed alignment would place the road further from the river and increase the depth of the tree screen in the area immediately east of Berne Memorial Park.

In addition to constructing a vertical retaining wall adjacent to the Flathead River in Badrock Canyon, other measures will be incorporated into the proposed action to minimize impacts on bald eagles and their habitat including:

- Scheduling construction activities east of Berne Road (from Milepost 140.2 to 142.7) for a time when eagles would not be displaced from hunting perches or roosts, typically mid-October through mid-March.
- Instructing maintenance personnel to promptly remove road-killed wildlife so bald eagles would not be attracted to the carrion on the highway and inadvertently injured by passing vehicles. Carrion would be disposed of in a proper manner.
- Consulting the USFWS and initiating a management plan if bald eagles establish a nest territory within one-half mile of the project area prior to construction. This will ensure that adverse impacts to the site or the eagles do not occur.
- Identifying and modifying existing powerlines or poles that pose an electrocution or collision threat to eagles. Any relocated electrical facilities would be designed to maximize the safety of raptors if such concerns are expressed by reviewing agencies.
- Contacting the Montana Bald Eagle Working Group for assistance in developing an interpretive exhibit sign about bald eagles in the Flathead River region. Such a sign would

be displayed at an appropriate location within the corridor. This presents an excellent opportunity to increase the public's awareness about habitat use, eagle behavior, and issues pertinent to recovery efforts for the species.

If kokanee populations return to their former levels, high numbers of eagles may again be attracted to the area during the salmon spawning run. In response to this situation, cottonwoods and/or other fast-growing saplings **could be planted** to eventually replace lost perching sites. It may be beneficial to implement such actions on the opposite (north) side of the river to shift eagle use away from the highway and potential conflicts with vehicles.

Conclusion - After reviewing materials assembled for the Biological Assessment, **it was concluded** that the proposed action **is not likely to adversely affect** bald eagles or habitat used by bald eagles. This conclusion was made because:

1. There are no bald eagle nesting sites in the project corridor.
2. Potential nesting territories for this region are fairly well-occupied. The presence and level of human activities in the project area is not a characteristic of suitable nesting habitat for bald eagles.
3. Bald eagle use of habitat in the Badrock Canyon area has decreased dramatically in recent years due a disruption in traditional food sources for wintering eagles. The possibility that kokanee salmon populations will return to former levels or that spawning whitefish will provide an abundant food source and again attract large numbers of bald eagles to the Flathead River is uncertain.
4. The cumulative effects of the proposed action on local and regional populations of bald eagles are expected to be minor. The proposed action will affect only 13% of the riparian cottonwood and conifer habitat that exists in project area between Berne road and Hungry Horse. Similar habitat is common in the Flathead region and can be found nearby along the South and Middle Forks of the Flathead River.
5. The affected band of vegetation has an average width of 50 to 75 feet and is directly adjacent to the highway. The highway and related noise and human activities at nearby Berne Memorial Park compromises the quality of this habitat.
6. Approximately 3,000 feet of bare or sparsely vegetated riverbank separates the affected habitat from other riparian vegetation at the west end of Badrock Canyon. The proposed action would not substantially reduce the amount of habitat available for seasonal use by bald eagles.
7. Viable conservation measures will be incorporated with the proposed action to enhance habitat or protect bald eagles.

The USFWS reviewed the Biological Assessment and disagreed with **the conclusion in the document** that the proposed action is not likely to adversely affect bald eagles. The USFWS recommended that formal consultation regarding bald eagles be initiated in its November 4, 1991 correspondence. Formal consultation was **initiated and subsequently** concluded on March 24, 1992 with the issuance of a "No Jeopardy" opinion by the USFWS. This Opinion, included **on pages VI-41 to VI-45** of the EIS, indicated that the proposed action is not likely to jeopardize the continued existence of bald eagles.

The Biological Opinion recommended that a study **be undertaken** to evaluate enhancement opportunities

and/or purchase riparian and riverine habitats within the project area. **As recommended by the USFWS, opportunities to acquire riparian and riverine habitat in the project area that serves as important habitat for bald eagles will be examined. Recognized experts on bald eagles and other interested agencies or groups (USFWS, USFS, Montana Bald Eagle Working Group, the FWP, and others as appropriate) will be contacted to identify enhancement opportunities and bald eagle habitat in the project area which may be desirable to protect. The status of lands possessing important riparian habitat and the ability to acquire such properties will be investigated as part of the study effort. This study would be completed prior to construction of the proposed action.**

PEREGRINE FALCON

Habitat and Use - Peregrine falcons have used the area near the proposed project only during seasonal migrations (17,18,25,32). No historical information exists that peregrines have nested in the vicinity of this project.

Direct Impacts - The proposed action would not disturb any essential habitat or disrupt any nesting sites used by peregrine falcons.

Indirect Impacts - No indirect impacts on peregrine falcons would result from the proposed action.

Cumulative Impacts - There would be no cumulative effects of the proposed action that would increase any impacts on local or regional populations of peregrine falcons.

Conclusion - Due to the lack of current and historical use of habitat in the vicinity of the project, the proposed action is **not likely to adversely affect** peregrine falcons. The USFWS concurred with this determination in its Biological Opinion (March 24, 1992) included in Part VI.

NORTHERN ROCKY MOUNTAIN GRAY WOLF

Habitat and Use - Wolves have occasionally been sighted in the upper Flathead River region, but there have been no documented sightings in the vicinity of the project (16,18,33,34). Habitat which provides an ungulate prey base and secure cover is important to wolves and is similar in many respects to that of grizzly bears (18,34,35). There is limited security cover of high quality for grizzlies (or wolves) immediately adjacent to the project area because of the existing level of development and human activity (16,34,36).

The USFS has designated Flathead National Forest lands between Columbia Heights and Badrock Canyon as a Zone 3 Management area (37). This designation applies to areas developed by man that have enough human activity to indicate that the presence of wolves is undesirable. The Badrock Canyon to Hungry Horse segment of the corridor is designated as Zone 2. These areas serve as buffers between high quality wolf habitat (Zone 1 areas further north and south of the project corridor) and areas that may be travel corridors or provide important habitat features. USFS gray wolf management zones are shown on **FIGURE IV-4**.

There is no existing information that suggests wolves presently use habitat adjoining the project area, either north of the highway on Teakettle Mountain or south of it on Columbia Mountain. Likewise, no information exists that indicates wolves cross the highway between these areas (16,18,33,34). Wolves are not known to den near the project area.

Direct Impacts - No direct impacts on wolves would occur due to the proposed action because habitat in the project area does not appear to be used by wolves. This is further supported by the lack of documented wolf sightings in the project area. The proposed action would not impact cover used by wolves for security or the ungulate prey base of the species. The high level of existing human development and activity in the corridor also inhibits the use of the project area by wolves.

Indirect Effects - No indirect impacts on wolves would occur as a result of the proposed action.

Cumulative Effects - The only cumulative effect on wolves that may occur is the eventual loss or degradation of habitat due to the continued development of rural lands along the highway.

Conclusion - Based on the above considerations and discussions with experts, it was concluded that the proposed action is **not likely to adversely affect** local or regional wolf populations. The USFWS concurred with this determination in its Biological Opinion (March 24, 1992) included in Part VI.

GRIZZLY BEAR

Habitat and Use - The *Grizzly Bear Recovery Plan, Second Draft (June 1992)*, states that recovery zones for the species are the areas contained in each grizzly bear ecosystem within which the population and habitat criteria for achievement of recovery will be measured. Each recovery zone is divided into areas designated as Bear Management Units (BMUs) which are used for habitat evaluation and population monitoring. According to detailed mapping of the NCDE recovery zone and associated BMUs, the project area lies within the Hungry Horse Bear Management Unit (38).

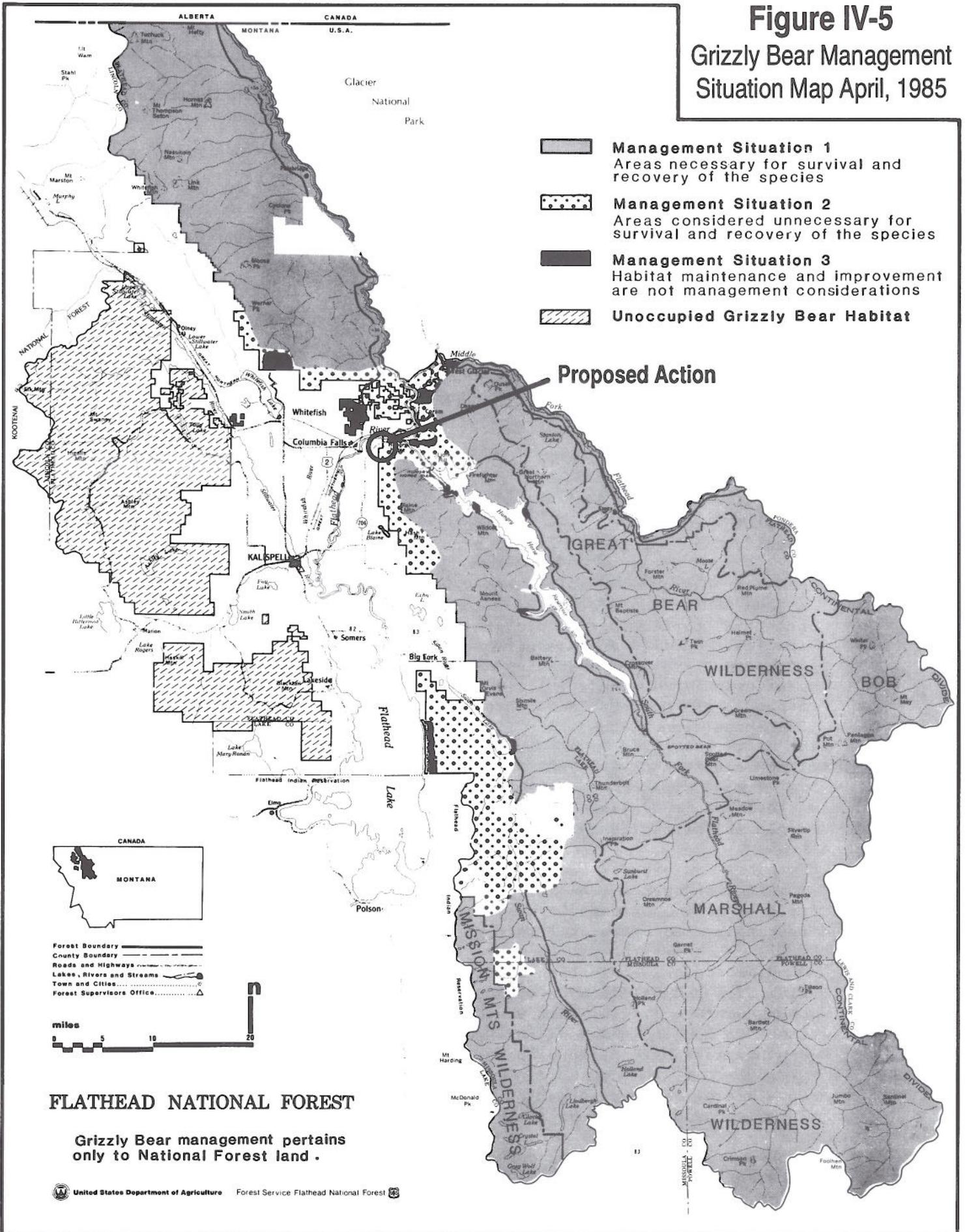
The discussion of Bear Management Units (BMUs) and the figure showing BMUs presented in the Draft EIS was based on mapping and other information obtained from the *Final Programmatic Environmental Impact Statement Summary, The Grizzly Bear in Northwestern Montana* prepared by the Montana FWP in March, 1986. This document referenced Grizzly BMUs, however, the term related to a state management situation which allowed limited harvests of the grizzly bear. The FWP's use of the term BMU is applied to grizzly bear ecosystems management in an entirely different context than that referenced in the *Grizzly Bear Recovery Plan*. Therefore, FIGURE 23 in the Draft EIS and references to the Whitefish BMU were deleted from the Final EIS.

Grizzly habitat has also been categorized by the USFS according to three Management Situations based on its quality and the distribution of bears within the NCDE (39). Grizzly Bear Management Situations are presented in FIGURE IV-5. The portion of the project corridor west of Badrock Canyon does not lie within grizzly bear habitat. The segment of US 2 that extends through Badrock Canyon to Hungry Horse is located in a Management Situation 2 area (38). This designation applies to areas "considered unnecessary for survival and recovery, although the status of such areas is subject to review and change according to demonstrated grizzly bear population and habitat needs." The USFS indicates that although these areas lack distinct grizzly population centers and highly suitable habitat does not generally occur, some grizzly habitat components exist and grizzlies may occasionally be present (39). The status of such areas is subject to review and change according to demonstrated grizzly population and habitat needs.

Management Situation 1 areas are located several miles north and south of the project corridor. These lands are necessary for the survival and recovery of the species. Although there is suitable habitat located in the Management Situation 1 lands north and south of the corridor, field studies conducted by FWP biologists show that these areas have not been utilized much by grizzlies (16,36).

There have been no sightings of grizzlies on or near the section of US 2 proposed for reconstruction. This lack of sightings does not suggest that the area is of little or no importance to grizzlies (16). These lands may be occasionally used by grizzlies, but are probably on the fringes of any grizzly home ranges (16,18,40,41). During the development of the EIS, the Coalition for Canyon Preservation provided wildlife observation forms indicating that grizzly bears have been sighted in the general area of US 2 between the House of Mystery and Hungry Horse. Bears may use a portion of the project area as a movement corridor between the Swan and Whitefish Ranges, although there is no evidence to verify such use (16,36).

Figure IV-5
Grizzly Bear Management
Situation Map April, 1985



Direct Impacts - Many animals, including grizzlies, depend on security or escape cover and are often reluctant to cross any large open expanse. Grizzly bears typically use fingers of vegetation as hiding places (cover) before crossing openings. The proposed action would widen the existing opening by removing potential cover from the right-of-way. Clearing would affect the vegetation most severely near Berne Memorial Park where trees between the river and the highway would be removed. Additional cover would be lost between the park and Hungry Horse.

The proposed action would not remove foraging or security cover that is important habitat to grizzly bears. If this area was known to be valuable for bears moving from a home range south of US 2 to important habitat north of the road, right-of-way clearing and corridor widening could adversely affect the bears. However, due to a lack of evidence showing that grizzlies use the Badrock Canyon to Hungry Horse area as a travel corridor, no disruptions of bear movements would be expected from the proposed action.

Indirect Impacts - Grizzlies may be attracted to the lush spring growth on revegetated areas of the right-of-way. If this occurs, conflicts between bears and vehicles may arise and the possibility of grizzly injuries or deaths would be increased. Since grizzly bears have not been sighted near or in the proposed construction area, the probability of vehicle-bear collisions should not increase with the improvement of US 2.

Cumulative Impacts - There are many timber sales, improvements, and developments occurring in the NCDE, which together compromise habitat needed for the security of grizzly bears. The additional impact from small projects within the NCDE is difficult to assess, but it is realized that every action adds to the cumulative effects on the species to some extent. The proposed action would not directly affect grizzlies, but would, on a low level, increase the cumulative effects on bears in the NCDE.

Measures to Avoid or Reduce Adverse Impacts - Impacts to existing vegetation along the highway and between the road and the river should be kept to a minimum. The new right-of-way should not be fenced and concrete median barriers that could restrict movements or trap bears on the highway should not be used (40,41).

The highway and the cleared right-of-way corridor should be kept as narrow as possible. Plants used for revegetating disturbed areas should be of low palatability so that bears and other wildlife will not be attracted to the roadside. Road-killed animals should be removed immediately to avoid attracting bears and other predators.

Conclusion - Based on a review of the literature pertinent to grizzly bears and from communications with biologists familiar with the project area, the proposed action is **not likely to adversely affect** grizzly bears or their habitat. The USFWS agreed with this determination in its Biological Opinion (March 24, 1992) included in Part VI.

5. IMPACTS TO ENVIRONMENTALLY SENSITIVE AREAS

The following paragraphs describe the effects of the proposed action on the environmentally sensitive areas shown in **FIGURE III-7** and discussed in Part III of the EIS.

Direct Impacts - The proposed action would **not directly** impacts on the UNESCO-designated Biosphere Reserve that includes Glacier National Park and Waterton Lakes National Park in Alberta, the Great Bear Wilderness and adjoining Wilderness Areas, **the Coram Experimental Forest, or the Mission Mountains Tribal Wilderness Area**. Two sensitive areas, the Northern Continental Divide Grizzly Bear Ecosystem (NCDE) and Badrock Canyon, **would** be directly affected by the proposed reconstruction of US 2.

As indicated earlier, the proposed action lies at the extreme western edge of the NCDE in the

Hungry Horse Grizzly Bear Management Unit. Only the Badrock Canyon to Hungry Horse segment of US 2 (approximately 2 miles) lies within the NCDE. The proposed highway reconstruction **would** directly affect the NCDE by removing vegetation from new right-of-way areas where the alignment of US 2 is improved. This vegetation is one of many habitat components that may be used by grizzly bears. The portion of the NCDE through which the highway passes is not critical habitat for grizzlies, but may occasionally support bears. The minor amounts of habitat lost to the build alternatives in this bear management unit is not important to grizzlies for foraging or cover. The impacts to grizzly bears in the NCDE was discussed in a previous section of Part IV.

The Final EIS/Section 4(f) Evaluation for the reconstruction of US 2 between Hungry Horse and West Glacier identified Badrock Canyon as an environmentally sensitive area. The summary of scoping comments contained in Part VI of the EIS shows that potential impacts on Badrock Canyon from highway reconstruction remains an important concern to the public. The proposed action's effects on Badrock Canyon **would** include visual impacts **due to the excavation of the rock outcrop at the west end of Berne Memorial Park**, removal of riparian vegetation, and impacts to **the features and use of Berne Memorial Park**. These impacts have been or will be discussed **elsewhere** in this Part and in the Section 4(f) Evaluation.

Indirect Impacts - The proposed reconstruction of US 2 **would** produce minor, indirect benefits for visitors to the Great Bear Wilderness and the Coram Experimental Forest by making a portion of the route used to access these areas safer and less congested. **The proposed action would have no indirect effect on the Mission Mountains Tribal Wilderness Area.**

Similarly, the proposed action **would improve access** to Glacier National Park by providing a safer roadway for visitors and NPS employees who commute from the Flathead Valley to West Glacier. This reconstruction effort **would** help to relieve traffic congestion and improve access along the route. Scoping comments by NPS employees stressed the need for a safe travel route to the park.

The project has the potential to produce more notable indirect impacts on Glacier National Park by affecting the appearance and development of lands along the primary access route to the park. The lands in the project area serve as a transition to environment of Glacier National Park and probably influence the initial impressions of the area for visitors. Continued development along the route to the park would detract from the unique natural qualities of the Glacier region.

The improved highway and access provisions could stimulate additional development on private lands between Columbia Heights and West Glacier. Although the *Flathead County Master Plan* and the *Columbia Falls Planning Jurisdiction Master Plan* contain policies which discourage new strip commercial areas along US 2, no land use controls have been enacted to regulate such developments in these rural areas. There are no major differences between alternatives in their potential to produce secondary development in the project corridor.

Secondary development along the highway **would** produce indirect impacts to the NCDE by reducing or degrading grizzly bear habitat.

The only major indirect impact on Badrock Canyon **would** be a change in its recreational use caused by relocating facilities from Berne Memorial Park to an alternate site near the House of Mystery. This action and its effects are discussed further in Part V of the EIS.

Cumulative Impacts - Human activities, including the reconstruction of US 2, timber harvest, residential and commercial development, rural subdivision, and recreational use have and will continue to have cumulative impacts that reduce the capacity for the grizzly bear. The existence of the current highway in Badrock Canyon is having effects, but effects will not substantially

increase due to the proposed improvement of the route.

D. Human Environment

1. LAND USE IMPACTS

Direct Impacts - Primary land uses in the project corridor **would** not change substantially due to the proposed improvement of US 2. Commercial uses will predominate and be enhanced by improved access in Columbia Heights. Residential and rural agricultural uses will continue along the corridor between Columbia Heights and the House of Mystery in the foreseeable future.

Indirect Impacts - The *Flathead County Master Plan* identified strip commercial development (similar to that in Columbia Heights) as a major planning issue. The Plan cites conflicts between through traffic and business traffic as a major cause of accidents and the need for highway improvements in such areas. Further, the Plan adopted policies that discourage strip commercial development in the county, including the area along US 2 in the project corridor.

The planned improvements would contribute to additional residential and commercial growth along the highway by providing improved facilities and access. There are no discernible differences between the build alternatives in the stimulation of secondary development in the project corridor. Lands along US 2 are not **presently** zoned, so only those activities that occur in the right-of-way or that require access from the highway can be controlled by MDT.

In response to a mandate to implement county-wide zoning from the Commissioners of Flathead County, the Canyon Citizen Initiated Zoning Group (CCIZG) was formed in June, 1992. The purpose of the CCIZG was to develop a growth management plan for the "Canyon" area (generally lands along US 2 between the House of Mystery west of Badrock Canyon and Marias Pass). The CCIZG, comprised of residents of communities and rural areas along this section of US 2, was concerned about unplanned growth and development-related problems in this part of Flathead County. The members of the CCIZG were interested in implementing zoning or other options to manage growth along this highway corridor.

As indicated earlier in this Part, the NPS is helping several local and state agencies and non-profit organizations undertake a planning study to recognize current and potential management concerns for the Flathead River and identify opportunities for conserving the river, developing trails, and managing other resources associated with the river corridor. The Flathead Multi-Objective River Corridor Plan could ultimately be adopted as part of the *Flathead County Master Plan*.

Cumulative Impacts - Over time, induced development along US Highways 2 and 93 and continuing residential and commercial growth in Flathead County may affect the quality of life for some residents and alter the perceptions of the Flathead region for visitors.

Mitigation - The acquisition of several large private landholdings in and around Badrock Canyon has been proposed in an attempt to control the development of incompatible land uses along US 2 between Berne Road and Hungry Horse. The proposed acquisition would provide the right-of-way necessary for the proposed action and place nearly all of Badrock Canyon in the public domain by transferring ownership of the lands to the Flathead National Forest. These intentions are consistent with the planning policies contained in the *Flathead County Master Plan* and would effectively control development between Berne Road and Hungry Horse.

Property owners were initially contacted about this proposed land acquisition in April, 1990. A Categorical Exclusion examining the effects of the proposed land acquisition was prepared and ultimately

approved by FHWA on September 4, 1990. Formal efforts to secure options or purchase private lands began shortly after the approval of the environmental document. To date, **none of the private lands in Badrock Canyon have been acquired. However, 38 acres of land surrounding the House of Mystery and a large parcel opposite the House of Mystery and west of Berne Road have been purchased.**

In late 1992, the CCIZG petitioned MDT and other interested agencies for funding and technical support to help the group prepare a growth management plan for the US 2 corridor. In April, 1993, MDT and other agencies agreed to contribute funding and other forms of assistance to this local planning initiative. Shortly after funding was secured, a consulting land use planner was hired to begin work on the plan. The Canyon Plan was developed during the remainder of 1993 and early 1994. Flathead County adopted The Canyon Plan as an amendment to its Master Plan in May, 1994.

2. RELOCATION IMPACTS

Direct Impacts - The relocation impacts of the proposed action were estimated from the preliminary right-of-way plans developed for each road design alternative. **A relocation plan based on the right-of-way requirements will be prepared for the selected build alternative.**

In addition to land acquisition for new right-of-way, the displacement of households and businesses from private lands next to the highway are the most notable direct impacts of highway construction. **Based on preliminary designs, the properties listed below in TABLE IV-6 would be affected by the preferred alternative.**

The properties in TABLE IV-6 are referenced to the right (south side of US 2) or left (north side of US 2) from proposed centerline stations established for this project. Existing structures, project stationing, and the existing and proposed right-of-way for US 2 are shown on the preliminary plan drawings in APPENDIX 4. These drawings show the relationship between existing structures and the construction limits and right-of-way requirements for the preferred alternative. Similar project stationing was used for the preliminary designs of other alternatives.

Note that "R/W Encroachments" referred to in TABLE IV-6 are locations where new construction would require a substantial amount of property adjacent to the identified use. The new road would not require relocations in these instances, but highway construction may affect the use of the property. Design modifications like adjustments to roadside slopes could lessen the encroachment of the highway on some adjacent properties. These right-of-way impacts would not vary substantially for any build alternative.

The proposed reconstruction at the west edge of Hungry Horse would be accomplished within the highway or street right-of-way that already exists on the north side of US 2. Construction permits may have to be obtained for some residential lots adjacent to 6th Street West in Hungry Horse where construction activities may cause minor disturbances to these properties. The proposed reconstruction in this area would not require the relocation of any residences or businesses in Hungry Horse.

Depending upon the build alternative examined, **between four and six residences would be displaced by the proposed highway reconstruction.** Residential displacements would directly affect some 10 to 20 residents of the project corridor. Displaced home owners will be eligible for relocation assistance for moving and replacement housing expenses. **Most of the residential displacements would occur east of Columbia Heights in the vicinity of Monte Vista Drive. The number of residential displacements could be reduced if the location for the new highway was shifted slightly to the north. The feasibility of this alignment shift will be examined during the design of the new road.**

Part IV: Environmental Consequences

TABLE IV-6 POTENTIAL RIGHT-OF-WAY IMPACTS AND RELOCATIONS FOR BUILD ALTERNATIVES		
Station	Property	Type of R/W Impact (Alternative Producing Impact)
466+50,RT	Weigh Station	Relocation (All Build Alts.)
467+10,LT	A&W Restaurant	R/W Abuts Building (All Build Alts.)
472+90,LT	Montana Earth Pottery	R/W Abuts Building (All Build Alts.)
483+50,LT	Flying Eagle Gallery	R/W Abuts Building (All Build Alts.)
492+00,LT	Old Time Photo Co.	Business Relocation (All Build Alts.)
494+00 to 500+00,LT	Grizzly Go-Carts & Batting Cages	R/W Encroachment (All Build Alts.) May Affect Use of Go-Cart Track
500+00,RT	House	Relocation (All Build Alts.)
505+00,RT	House Shed	R/W Encroachment (All Build Alts.) Relocation (All Build Alts.)
516+00,RT	House	Relocation (Alts. 1 and 2)
518+10,RT	House	Relocation (All Build Alts.)
523+50,RT	House Cabin	R/W Encroachment (All Build Alts.) Relocation (Alts. 1 and 2)
524+50,LT	House	R/W Encroachment (All Build Alts.)
527+00,RT	House Taxidermy Shop	Relocation (Alts. 1 and 2) R/W Encroachment (Alts. 3 and 4) Business Relocation (All Build Alts.)
529+00,RT	House	R/W Encroachment (All Build Alts.)
535+00,RT	Takala Wholesale Cars	R/W Encroachment (All Build Alts.)
537+60,RT	Shed	Relocation (All Build Alts.)

Two businesses would be directly affected by all build alternatives. A building at the **Old Time Photo Company** located at the east end of Columbia Heights and a home/taxidermy shop located near the intersection of US 2 and Monte Vista Drive would be affected by new highway construction. All build alternatives would displace the home/business. This displacement was considered above in the discussion of displaced households. The displacement effects on these businesses in its relocation plan will be **addressed further** if the proposed action advances to the design stage. Business owners affected by the project will be eligible for relocation assistance. **Information compiled by the Flathead Board of Realtors** indicated that 108 commercial properties, with asking prices between \$23,600 and \$2.6 million, were for sale in the County at the end of 1993 (42).

The existing weigh station in Columbia Heights would be abandoned instead of reconstructed with the new highway project. This decision was reached because the facility is located in a congested area and its operation causes conflicts to occur between through traffic on US 2 and trucks using the scales. The Project Analysis and Programming Engineer recommended that a GVW "B" site, a widened area adjacent to the roadway where portable scales can be periodically stationed, be developed within the limits of the proposed action. The Engineer's recommendation did not specify

an exact location for the GVW "B" site within the project area but indicated that it should be constructed on the north side of the road adjacent to the westbound travel lanes of the new facility.

There are no neighborhoods, public facilities, non-profit organizations, or special family groups that will be directly or indirectly affected by the proposed action.

Indirect Impacts - The build alternatives would acquire minor amounts of new right-of-way in the corridor from lands presently used as residential yards or commercial parking areas. These acquisitions would not displace affected households or businesses but would indirectly impact uses at each location. The new highway and traffic would have notable encroachment effects on two residences in the corridor. Some lands currently used as parking areas would be removed at eight businesses along US 2. These effects are similar for all build alternatives.

Cumulative Impacts - There are no cumulative effects foreseen as a result of the displacements required by the proposed action.

Characteristics of Displacees - The project area falls within two County Census Division established for the 1990 Census. Residents potentially displaced by the proposed action are located in the Badrock-Columbia Heights Census Division. Data from the 1990 Census identified specific characteristics of this affected population and showed that:

- Minorities account for about 1.3% of the population.
- About 8% of the residents were over the age of 65.
- The median household income was \$25,309.
- Some 11.3% of the families had incomes below the poverty level.
- 13.7% of the population (age 16 to 64) had a work disability.
- 1% of the residents (age 16 to 64) had a mobility limitation and 5.6% of the residents 65 years or older had a mobility limitation.
- The average household size was 2.9 persons.

Availability of Replacement Housing - In the absence of current data on housing occupancy, local realtors were interviewed to determine this characteristic. According to one local realtor, the vacancy rate for housing (approximately 5% in 1984) declined substantially by mid-1988. The vacancy rate for the most desirable rental units, two and three bedroom homes, was estimated to be near zero. A realtor for Columbia Falls firm stated that his agency has been turning away more than ten people per week looking for homes to rent (43). The 1990 Census indicated that the homeowner vacancy rates for the Badrock-Columbia Heights Division and the South Fork Division were 1.6% and 0.9%, respectively. Likewise, the rental vacancy rates for these Divisions were 13.5% and 22.9%, respectively, at the time of the last Census.

Since the Census, the population of Flathead County has continued to grow and the demand for housing and rentals is high. The demand for housing has driven up the market values for housing and the costs of rental housing. Information available from the Flathead Board of Realtors, Flathead Multiple Listing Service showed that more than 950 housing units were available within the county at the end of 1993. However, only about one-third of all the available housing units were listed at prices under \$100,000 (42). The market value for the homes potentially displaced by the proposed

action would be expected to be in this value range. Based on an examination of published real estate guides, there appears to be adequate opportunities for replacement housing for homeowners in the Columbia Falls area. Rental properties in the immediate vicinity of the project may be more difficult to locate.

Hotel, motel, camping space, and rental units for temporary housing are available in the Columbia Falls, Columbia Heights, and Hungry Horse areas.

Relocation Assistance - A Relocation Plan and actual appraisals of affected properties will be prepared if a final design for the proposed action is authorized. Construction will not begin before adequate housing has been provided for all displaced persons. Residents displaced by this project may be eligible for replacement housing payments. Displacees are not required to relocate to similar housing, but have other options depending upon their ownership status and length of occupancy at the time of acquisition. **A comparable replacement dwelling will be made available and displaced persons will be relocated** to their original ownership status if requested. In the remote case that housing is not available at the time of relocation, "housing of last resort" **will be found**.

The Relocation Assistance Program requires a 90-day notice to residents and landowners displaced by the proposed action. Supplemental housing payments, interest differential payments, moving expenses, replacement housing advisory assistance, and incidental expense payments will be available to each displacee. These payments are in addition to the compensation paid for new right-of-way. Rent supplement payments and advisory services are also available to qualified tenants displaced by the project.

If the displacee feels that the offered relocation assistance is inadequate, an appeal may be filed with the Director. **If an agreement with the landowner about the adequacy of compensation can not be reached**, a condemnation proceeding will be initiated to determine the adequacy of compensation. The acquisition and relocation program for the proposed action will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation assistance and other resources are available to all residential and business displacees without discrimination.

Relocation assistance **was discussed** and informational pamphlets about the program **were provided** at the public **scoping** meetings held during the preparation of the EIS. **Materials describing the relocation assistance available to displacees were made available during the combined design location hearing for the proposed reconstruction project.**

3. SOCIAL IMPACTS

Direct Impacts - The proposed action **would** have little impact on the population and social nature of the project area since only 10 to 20 people would be directly affected and the minority and/or disadvantaged population is extremely small. The proposed action **would** not cause direct changes to neighborhoods or community cohesion for project area residents. No social, handicapped, minority, or ethnic groups **would** be disproportionately benefitted or harmed by the proposed action.

The build alternatives would provide direct traffic safety benefits for users of US 2 between Columbia Heights and Hungry Horse. Each build alternative would improve the horizontal and vertical alignments of the highway and minimize or eliminate existing sight distance limitations. Several design features of the build alternatives, like limited access control and a median/left turn lane, would help eliminate traffic conflicts and relieve congestion. Wide paved shoulders would provide safer facilities for pedestrians or bicyclists on the highway.

The four-lane alternatives would provide additional safety benefits over the two-lane designs because

passing against traffic would not be required. The four-lane designs would also operate with less congestion and delay than the two-lane roads under consideration. The continuous median/left turn lane proposed with Alternative 1 would minimize potential conflicts between through and left turning traffic on US 2. All build alternatives would be substantially safer than the existing highway.

The public's use of two dispersed recreation areas, the Flathead Recreational Waterway and the Middle Fork Recreational River, would be directly enhanced by the provision of a new river access west of Badrock Canyon. This proposal and the impacts to Berne Memorial Park are discussed in the Section 4(f) Evaluation.

Indirect Impacts - The greatest indirect impact of the proposed action would be the potential for inducing growth due to the improved access and facilities provided by the project. Assuming that commercial access is improved and enhanced, strip commercial development associated with tourism could increase causing more people to move to the area. The proposed action has the potential to accelerate and concentrate growth in the project area, most notably in Hungry Horse. Currently, the conditions of US 2 deter many from commuting to and from Hungry Horse. Improving the road may attract more residents to the community if the commute is perceived to be safer.

Property values along the US 2 corridor may be indirectly affected by the proposed action. Several studies supplied by the FHWA were reviewed in an attempt to predict the change in property values resulting from the highway improvements. These analyses generally concluded that trying to predict changes in property values is extremely difficult and that no reliable prediction model for such impacts exists. However, some basic assumptions about property value impacts can be made for highway improvement projects. They are: 1) the greatest impact to property values in the area from locating a roadway has already occurred; 2) the improvements are both a result and a cause of development; and 3) as traffic increases along the road, commercial property values are likely to benefit and residential values to decline slightly.

The new highway would be more "urban" in Columbia Heights and may be more difficult for residents to cross than the existing road. This may tend to inhibit interaction between residents and/or access to uses located on opposite sides of US 2 in Columbia Heights.

The build alternatives would indirectly benefit School District 6 by improving the route used to transport students to local schools. Similarly, highway improvements may benefit the providers of police and fire protection in the project corridor by slightly reducing response times from Columbia Falls to emergencies along US 2.

Cumulative Impacts - The cumulative effects of secondary development in the **US 2 and US Highway 93 corridors in Flathead County** could create a demand for new public services or facilities.

4. ECONOMIC IMPACTS

Direct Impacts - The build alternatives would displace one home/business and require the removal of **buildings at the Old Time Photo Company**. Completion of the project would also remove portions of the parking lot areas serving several businesses located along US 2 in **Columbia Heights**. Property owners **would** be compensated for business and land losses and some may be afforded the opportunity to relocate businesses and parking to nearby vacant lands.

During the tourist season, traffic speeds and congestion inhibit left turns into businesses located along US 2 **(44)**. This congestion problem will become more severe in the future as traffic flows increase. The build alternatives **would** provide left turn lanes, curbing, and access control in Columbia Heights and make access to existing and future businesses located along US 2 easier and safer. Direct contributions to business growth and retail sales in the corridor **would** result from these improvements.

Indirect Impacts - By improving the safety, ease of access and the aesthetics of shopping areas along US 2, the proposed project would cause minor growth in the overall economy of Flathead County. Highway improvements would help attract additional customers to Flathead County businesses and contribute to growth in employment and income for county residents (44).

Reconstruction of US 2 would improve the safety and reduce the time required to travel between Columbia Heights, Hungry Horse, Glacier National Park, and other Flathead County population centers. These improvements may increase the willingness of area residents and tourists to commute to the cities for jobs, shopping, entertainment and other purposes. Businesses in the county's population centers would indirectly benefit from this increase in commerce.

The proposed action would produce a variety of positive and negative effects on the local economy of the project area. These indirect impacts are discussed below.

New Business Investment - Highway improvements would help to make the project corridor more attractive for new businesses. Flathead Valley tourist accommodations are already at capacity during summer months and the US 2 corridor between Kalispell and Glacier National Park is an attractive location for a major new motel (44). A new motel would benefit other businesses in the Columbia Heights-Hungry Horse area by increasing the numbers of overnight residents.

Disruption of Employment - Employees of any businesses displaced by the proposed action would sustain a period of unemployment while businesses are being relocated. A Relocation Plan that discusses the characteristics of each affected business and its part-time, full-time, or seasonal employees will be prepared. The Relocation Assistance Program will mitigate impacts on these employees.

Property Tax Effects - Highway reconstruction would remove small amounts of residential, commercial, and agricultural property from local tax bases. Reductions in taxable property would have minor short-term impacts on the overall tax bases of Flathead County and the Columbia Falls School districts. In the long-term, tax revenue losses would be offset by the property taxes to be paid by new development that could occur on lands adjacent to the highway project.

Miscellaneous Local Impacts - Flathead National Forest lands between Badrock Canyon and Hungry Horse contain quantities of marketable timber. Since new right-of-way must be acquired and cleared to construct the highway and a new bridge over the South Fork, this timber could be cut and sold. Revenues for the Flathead National Forest could be produced by this activity. The ownership of the land would be transferred for right-of-way upon completion of the timber cutting (45).

5. HISTORICAL AND ARCHAEOLOGICAL PRESERVATION

Direct Impacts - The cultural resources survey initially conducted for this proposed action identified 24FH419, the remains of the Freida Wilkes Herrig homesite, and 24FH420, a 1908 rock carving in the cliff in Badrock Canyon, as possible historic sites. Neither site was found to be on or eligible for the National Register of Historic Places. Therefore, it was determined that the proposed action will have no effect on properties on or eligible for the National Register. Concurrence from the SHPO that the proposed action will not affect historic properties was requested in correspondence (August 10, 1990) contained in Part VI of the EIS. SHPO's stamp of concurrence, dated August 20, 1990, is shown on page 2 of the letter. SHPO's concurrence requires no further action regarding these properties and assures compliance with Section 106 of the National Historic Preservation Act.

The development of replacement parkland and a river access for a site near the House of Mystery has

been proposed as mitigation for impacts to Berne Memorial Park. This proposal would require the acquisition of private lands adjacent to the highway for parkland and as additional right-of-way for the realignment of Berne Road. These private lands were not included in the initial cultural resources survey for the project area since they are located outside the proposed right-of-way corridor for the new highway. A supplemental cultural resources survey **was conducted** on lands adjacent to the House of Mystery and Berne Road in October, 1991.

The supplemental survey identified a historic property (24FH455), the remains of an early logging operation, in the wooded area adjacent to the Flathead River near the House of Mystery. This property was not recommended for inclusion in the National Register since testing at the site did not locate artifacts or identify the function of the area. Two other prehistoric cultural properties, identified as 24FH453 and 24FH454, were located during the survey but not recommended for inclusion in the National Register because of the presence of limited cultural materials or the degree of surface disturbance and modification. Testing was required at 24FH454 to provide an adequate assessment of the site's potential significance. SHPO concurred with this determination in agency correspondence dated October 25, 1991 contained in Part VI of the EIS.

A cultural resource survey of the remains of an historic road in Badrock Canyon, locally known as the "tote" road, was completed in May, 1994. The survey established the location of the remaining segment of the "tote" road, mapped important features, and documented the history and use of the of the property. Based on the survey, the Badrock Canyon "Tote" Road (24FH583) was found eligible for inclusion in the National Register. The proposed excavation of the outcrop at the west end of Badrock Canyon required by the build alternatives would eliminate up to 270 feet of the 2,100 foot-long segment of the "tote" road identified in the cultural resources survey. Construction of US 2 would also obliterate portions of a more modern dirt road and trail segment which accesses the west end of the old road. The impacted section of the historic road does not contain prominent features related to the construction and use of the road. In fact, the original route of the road is difficult to distinguish due to previous road construction and the movement of talus materials at the base of the west outcrop of the Canyon. The proposed action would not affect portions of the "tote" road located above the roadside turnout at Berne Memorial Park. Part V provides a detailed discussion of the impacts of the proposed action on this property.

The historical significance of the **bridge over the South Fork of the Flathead River west of Hungry Horse** was also evaluated for this EIS. The bridge, originally constructed in 1938, was not previously evaluated for its potential eligibility on the National Register of Historic Places nor was it recommended for inclusion in the Montana Historic Preservation Plan for Roads and Bridges. Because of the large number of similar bridges that remain in service on the state highway system and the widespread use of the structure's design, the South Fork Bridge has no particular qualities that would recommend it for inclusion in the Historic Preservation Plan. APPENDIX 12 contains an evaluation of the historical significance of the South Fork Bridge at Hungry Horse. SHPO concurred with **this** evaluation in agency correspondence dated December 17, 1991.

Montana's environmental statutes require that the effects of the proposed action on historic/archaeological sites be described in the EIS, regardless of their eligibility for the National Register. Consequently, the impacts to 24FH419, 24FH420, 24FH453, 24FH454, and 24FH455 are discussed below.

The reconstruction of US 2 following the improved horizontal alignment of the build alternatives will cause direct impacts to both historical properties. The impacts are unavoidable and necessary to provide a safety alignment and minimize sight distance limitations on US 2. The highway's new location will pass directly through 24FH419. The 1934 construction of the existing highway took the original Herrig homesite, then owned by Billy Berne, and left only remnants of outbuildings and other features. Subsequent disturbances to this site have been caused by the installation of a gas pipeline and electrical transmission lines. New

construction will contribute to impacts on the remaining features of the site. These impacts are not major because the information that the site could potentially yield is more readily available from other historical records.

The build alternatives will directly impact 24FH420 by removing the rock face containing the carving which states "LEO 1908." The impact on 24FH420 is not substantial because the person responsible for the carving and its actual date of completion can not be identified.

The construction of vehicle parking areas, access roads, and a boat ramp at the proposed replacement parkland and river access near the House of Mystery would disturb the surface of 24FH453. These impacts would be minor due to the extremely disturbed nature of the site. The location of the site on a gravel river terrace generally precludes the recovery of intact buried deposits to any great depth. Minor tree removal may occur from 24FH455 to allow construction of the boat ramp and vehicle maneuvering areas at the proposed river access site.

The proposed realignment of Berne Road would require that the road be reconstructed directly through 24FH454. The impacts of such reconstruction on the property would not be major since the site is disturbed and test excavations identified an extremely limited assemblage of cultural materials.

The proposed action would require the demolition of the existing South Fork Bridge at Hungry Horse following the construction of a new four-lane bridge. The loss of the South Fork Bridge is not a major impact since many bridges of similar design still remain in service in Montana. The South Fork Bridge is not unique in its design features and is not singularly important to understanding the history of bridge construction in Montana.

Indirect Impacts - The impacts of the proposed action on the identified cultural properties would not induce any other impacts.

Cumulative Impacts - No cumulative impacts are foreseen as a result of the project's effects on these cultural properties.

Mitigation - The Programmatic Agreement regarding historic roads and bridges in Montana requires that technical documentation of the history of roads and road construction and bridge building in the state be prepared. The Programmatic Agreement regarding historic roads and bridges also requires that a plan for preserving significant and representative road segments and bridge types be developed. A copy of the Programmatic Agreement regarding historic roads and bridges is included in APPENDIX 12.

In accordance with the Programmatic Agreement, histories of roads and bridges in Montana were recently published and made available in late 1993. The documents are titled *Roads to Romance: The Origins and Development of the Road and Trail System in Montana* by Marilyn Weiss, Archaeologist and *Monuments Above the Water: Montana's Historic Highway Bridges, 1860-1956* by Jon Axline, Environmental & Hazardous Waste Bureau. These documents have been distributed to agencies and individuals interested in the interpretation, preservation, and management of historic roads and bridges. These documents will also help involved agencies develop an Historic Preservation Plan for significant road segments and bridge types.

6. CONSIDERATIONS RELATING TO PEDESTRIANS AND BICYCLISTS

Proposed Pedestrian Facilities - All build alternatives include the provision of sidewalks at appropriate locations in Columbia Heights. Pedestrian crossing and necessary lighting or signalization provisions would be identified during the design of the proposed action. A detailed engineering study must be conducted

to evaluate the need for signalization and pedestrian crossing facilities. **The proposed action would also provide sidewalks between the new South Fork Bridge and the existing pedestrian facilities in Hungry Horse.**

Proposed Bicyclist Facilities - Scoping comments requested that a separated path for bicycles, pedestrians, and other modes be considered with the proposed action. Although this design feature would enhance the project, its justification is difficult. Current use and accident records do not suggest the need for a separate facility. High seasonal traffic volumes, travel speeds, and existing road conditions undoubtedly inhibit the use of US 2 by recreational bicyclists.

AASHTO's *Guide for Development of New Bicycle Facilities* (1981) indicates, that as a minimum, two-directional bicycle paths should have paved surfaces at least 8-feet wide with 2-foot wide graded areas on each side of the paved surface (45). AASHTO also indicates that a wide separation between the bicycle path and the edge of the adjacent highway is desirable and that physical barrier be used when the separation is less than 5 feet (45).

These guidelines indicate that a separate bicycle path constructed adjacent to the new highway would require at least 17 feet of additional construction area. This distance could be reduced slightly if a physical barrier between the path and highway were used. Previous discussions in this Part have indicated that the use of barriers may adversely affect wildlife movements in the corridor. Increasing the width of the area disturbed by construction to accommodate a bicycle path, particularly through the Berne Memorial Park area, would require additional excavation or river encroachment and may unduly increase the expense or environmental impact of the proposed action.

The incorporation of a separate path for bicyclists, pedestrians, and others through the project corridor poses several additional problems. Unless one-way paths are constructed on each side of the new highway, some users would be required to cross the highway at each end of the project. This creates the potential for conflicts with vehicles and may confuse users of the path. Bicycle tourists may be hesitant to use the path preferring instead to use the continuous shoulder of the highway.

For the reasons presented above, no separate bicycle facilities are proposed with any of the build alternatives. Bicycle traffic would be required to use the shoulder of the new highway. AASHTO guidelines state that shoulders used by bicyclists should be smooth, paved surfaces with minimum widths of 4 feet (45). All build alternatives would provide a paved shoulder that is 8 or 10 feet wide. The provision of wide shoulders is consistent with AASHTO's guidelines for roads which require bicycles and vehicles to share facilities.

Direct Impacts - The build alternatives would enhance pedestrian safety in Columbia Heights **and at the west edge of Hungry Horse** by providing sidewalks where no such facilities previously existed. The designs of the build alternatives offer safety benefits for bicyclists on US 2 by increasing the width of the usable shoulder area for riders.

Indirect Impacts - The increased width of US 2 in Columbia Heights and travel speeds may make the highway more difficult for pedestrians to cross. If traffic continues to grow on this route as expected and additional commercial development occurs in Columbia Heights, pedestrian crossings of the highway may become increasingly harder without special crossing facilities.

A safer facility for bicyclists may stimulate additional use by local recreational riders and commuters. No substantial increase in the numbers of long-distance bicycle tourists are expected as a result of this project.

Cumulative Impacts - No cumulative impacts on pedestrian or bicyclist use are anticipated.

7. JOINT DEVELOPMENT

The joint development measures included with this project are proposed as mitigation for the loss of facilities and recreational opportunities at Berne Memorial Park, a Section 4(f) property. As mitigation for these losses, **the following actions are proposed:**

- develop a new river access **with the USFS** to provide replacement parkland near the House of Mystery west of Badrock Canyon, and
- pursue the acquisition of private landholdings adjacent to US 2 in Badrock Canyon.

These measures are described in detail in the Section 4(f) Evaluation **contained in Part V of this document**. Both measures would enhance the quality of and opportunities for public recreation in the area. The impacts of the joint development measures associated with the project are discussed below.

Direct Impacts - The development of recreational facilities near the House of Mystery would directly alter travel patterns in the corridor. The river access site has the potential to become a major seasonal generator of traffic on US 2 because the facility would provide the public with relatively unrestricted access to the Flathead River where only limited access existed before. The USFS expects the new river access site to receive substantial use because it is a logical location for floaters on the Middle Fork Recreational River segment to leave the river and is easily accessed from US 2 (47). A **high-design** intersection at US 2 and Berne Road would be provided to ensure that conflicts between through and turning traffic are minimized at the new recreation site.

Indirect Impacts - The proposed acquisition of private lands and their transfer to the USFS would consolidate Flathead National Forest landholdings in the area. Public ownership of these lands would prohibit the development of incompatible land uses and provide a means of protecting visual resources in Badrock Canyon.

The new river access would indirectly benefit public safety by moving recreational uses away from US 2. Currently, river users occasionally park at Berne Memorial Park and cross the highway to access or leave the river. The proposed action would eliminate this condition by prohibiting long-term parking along US 2 and eliminating the need to cross the highway to access to the river.

Cumulative Impacts - The potential exists for commercial river outfitters based in the West Glacier area to use new access site as a take-out point for float trips through the Middle Fork Recreational River segment. The new access presents a logical place for these users **and others** to end float trips because the terrain of the Flathead River becomes less scenic downstream from Badrock Canyon. The proximity to US 2 would allow for easy shuttles of passengers and equipment back to West Glacier.

8. RECREATION IMPACTS

Direct Impacts - The new right-of-way necessary for the build alternatives **would** require the acquisition of minor amounts of property at **Grizzly Go-Carts and Batting Cages**, a privately-owned recreation site located east of Columbia Heights. The go-cart track at the facility may require slight modifications to accommodate highway construction through this area. **The impacts on this recreation site caused by construction of the selected build alternative, would be fully investigated during the preparation of right-of-way drawings and the development of a Relocation Plan.**

The proposed action would directly affect lands adjacent to the Flathead Recreational Waterway by removing some riparian vegetation and placing fill in the river in Badrock Canyon. These impacts were discussed at length in previous sections of Part IV. These actions would not adversely affect the

recreational use of the Flathead River system.

The proposed action would not directly affect any opportunities for dispersed recreation in the project area.

Indirect Impacts - The proposed action would indirectly benefit recreation use of the Flathead Recreational Waterway and the Middle Fork Recreational River segment by developing a new river access in the corridor. The effects of this action were described in the immediately preceding section of this Part. The proposed action would indirectly affect public and private recreation sites by improving the safety of the route used to access to these areas.

The proposed development of a new river access site on the Flathead River will be considered in the Flathead Multi-Objective River Corridor Plan currently being developed by several local and state agencies and non-profit groups with the assistance of the NPS. The Plan is being funded through the federal Rivers, Trails and Conservation Assistance program. The proposed action has been discussed with the NPS representatives assisting in the development of the river corridor plan.

Cumulative Impacts - As stated previously, the development of a new river access could stimulate use of the Flathead River by commercial outfitters. Expansion of the initial facilities or parking at the river access could be required if river use exceeds the expectations of the USFS.

9. VISUAL IMPACTS

Direct Impacts - All build alternatives would provide a wider pavement area and cleared right-of-way corridor for US 2, increasing the visual scale of the roadway in the Columbia Heights and Badrock Canyon landscape units. The four-lane designs of Alternatives 1 and 2 are generally 20 feet wider than the two-lane designs considered through much of the corridor and would increase the scale of the road more than Alternatives 3 and 4. The build alternatives would have a **minor** adverse effect on the quality of views from the road in the Columbia Heights landscape unit since the proposed alignment closely follows the existing highway. The installation of curbs and gutters and control of approaches would help unify the appearance of the Columbia Heights community.

All build alternatives would require rock excavation, remove varying amounts of riparian vegetation, and **shift the roadway toward** the Flathead River near Berne Memorial Park to improve its horizontal alignment. These actions would adversely affect the quality of views from the road in the Badrock Canyon landscape unit by decreasing the visual continuity of **both** treelines and landforms adjacent to the road. The differences between the visual effects produced by the build alternatives would be minor since each affects the features of Badrock Canyon similarly.

The most evident change in the appearance of the project area would occur at the extreme west end of Berne Memorial Park where an outcrop must be excavated to improve the alignment of US 2. It is notable that this outcrop was excavated during a previous road construction project. The proposed excavation associated with the four-lane alternatives would extend for some 650 feet and produce rock cuts varying in height from 40 to 150 feet. Rock excavation for the two-lane alternatives would produce a new rock face about 600 feet long with cuts ranging in height from 33 to 140 feet. Exposed cliff faces at this location presently range from 25 to 60 feet in height. Vegetation on the affected outcrop would be removed during excavation.

Geologists and engineers recently completed preliminary studies of the existing geologic conditions and the proposed construction through the west outcrop of Badrock Canyon. As a result of their work, it was recommended that vertical cut slopes be constructed in some areas of the new rock cut. The overall height of some new rock cuts and the amount of rock that must be excavated can

be reduced by incorporating vertical cuts into the design of roadside slopes.

PHOTO PLATE 6 shows the outcrop at the west end of Berne Memorial Park as it presently exists and as it would appear following excavation. Photo rendering techniques were used to illustrate the probable appearance of the outcrop area after construction.

The build alternatives would also remove varying amounts of riparian vegetation opposite Berne Memorial Park to accommodate a shift in the road's alignment. The extent of vegetation removal required for the build alternatives was previously described at length in Part II of the Final EIS. The amount of vegetation that would be removed to accommodate the new road does not vary substantially for the build alternatives.

PHOTO PLATE 7 illustrates the present appearance of US 2 and riparian vegetation in the vicinity of Berne Memorial Park. The photo plate also shows the likely appearance of this area following construction of the new roadway. As indicated by the photograph, the removal of riparian vegetation in this area would increase views of the Flathead River and distant mountains for east-bound highway users.

The build alternatives would produce only minor changes in the visual environment for users of the Middle Fork Recreational River segment of the Flathead Wild and Scenic River System. US 2 is generally not visible from the Recreational River due to screening by trees along the river and the road's position above the river. The build alternatives would clear some trees west of Hungry Horse but leave much of the tree screen in place. The new bridge over the South Fork at Hungry Horse would be slightly closer to and more visible from the Recreational River than the existing structure. These impacts would not substantially affect the important values associated with the Middle Fork Recreational River segment.

Indirect Impacts - The quality of views from the road and of the road would be decreased to the extent that traffic congestion and development along the highway increases.

Cumulative Impacts - Tourist perceptions of the area may be adversely affected if the route to Glacier National Park becomes a commercial strip.

Mitigation - The proposed alignment attempts to minimize impacts to the river and its environment and the amount of rock excavation in Badrock Canyon while balancing the need for alignment and capacity improvements. **The following measures will be implemented** to mitigate the potential adverse visual effects of the proposed action.

- Implementing limited access control to help minimize the number of approaches along US 2 and improve the appearance of the corridor.
- Pursuing the acquisition of private lands to control incompatible development and maintain the natural appearance of Badrock Canyon.
- Contacting the **NPS** and the USFS for recommendations of scenic enhancement measures that can be incorporated in the design of the new facility.
- Varying the tree line during right-of-way clearing to avoid creating a "tunnel effect" and to add interest where the road passes through dense timber.
- Establishing strict construction limits and employing selective tree cutting in areas adjacent to the Flathead River to preserve visual qualities and habitat for bald eagles and other wildlife.

Photo Plate 6 - Western Outcrop Before/After Excavation



Photo 1 - View of western outcrop in Berne Memorial Park where rock excavation is proposed to accommodate an improved alignment for US 2.

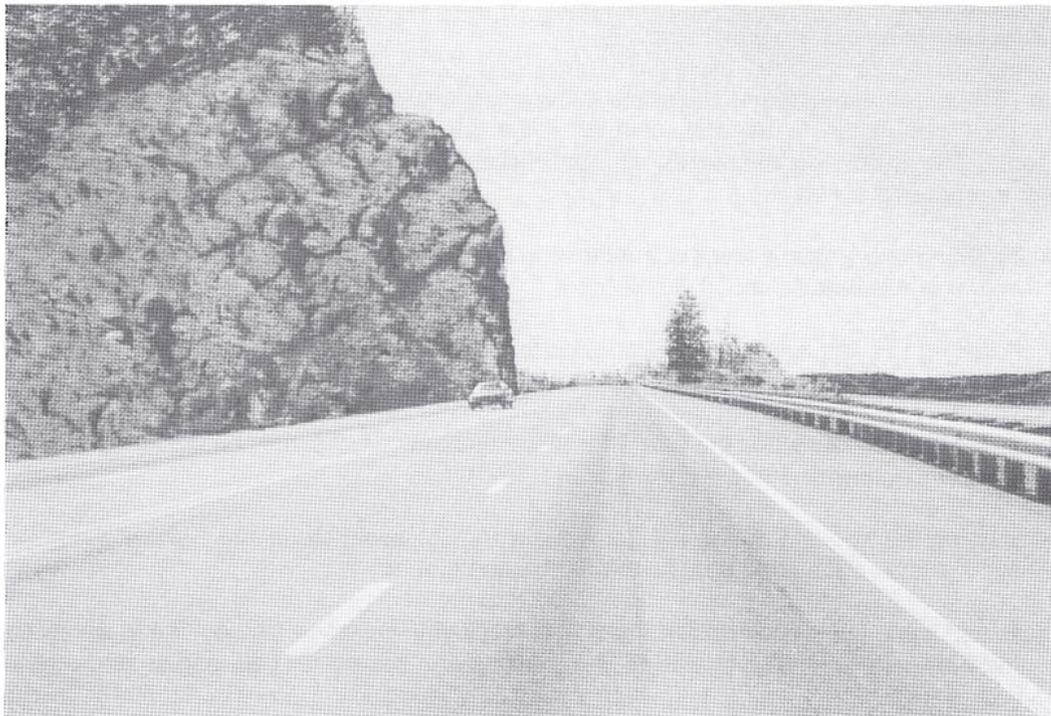


Photo 2 - Simulated view of the western outcrop following reconstruction of US 2 in Badrock Canyon.

Photo Plate 7 - Berne Memorial Park Area Before/After Highway Reconstruction



Photo 1 - View looking east from the roadside turnout at Berne Memorial Park in Badrock Canyon.



Photo 2 - Simulated view of the same area following reconstruction of US 2. Note that the extent of riparian vegetation between the road and the river would be reduced. Highway construction would not require excavation of the eastern outcrop at the park.

- Requiring prompt revegetation of areas disturbed by construction.
- Incorporating moderate cut slopes into the design, whenever possible, to enhance revegetation efforts.

Visual protection for the corridor is also possible through the following measures:

- **incorporating** scenic enhancement of the right-of-way;
- **acquiring** increased right-of-way limits;
- **controlling land uses**;
- **controlling outdoor advertising signs**; and
- **placing utilities underground**.

These controlling measures can be implemented to varying degrees along highway corridors. Generally speaking, only activities or actions within the highway right-of-way can be readily controlled by MDT. Other government entities (Flathead County and the USFS) are responsible for controlling activities on adjacent lands. These measures are discussed below.

Scenic Enhancement of the Right-of-Way - 23 U.S.C. 319 authorizes the acquisition of interests in and improvement of strips of land or water areas adjacent to Federal-aid highways necessary for the restoration, preservation, and enhancement of scenic beauty. **Scenic easements**, a legal right to use or control the property of another for scenic enhancement purposes, may be obtained for conservation purposes and development of roadside views and natural features. Scenic enhancement areas present ways to preserve existing vegetative screens, or restrict development adjacent to the highway.

Property can not be condemned by the State for scenic enhancement purposes. Therefore, a voluntary agreement with adjacent landowners is the only means of acquiring a scenic easement for the corridor. The success of implementing scenic easement program for the corridor depends primarily on the cooperation of landowners along the highway and the agency's ability to negotiate for such easements.

The acquisition of scenic easements, as proposed in the EIS for the reconstruction of US 2 between Hungry Horse and West Glacier, proved to be difficult. **Only 11 of the 39 scenic easements originally proposed in the final right-of-way plans for the reconstruction project were acquired.** The total area acquired for scenic easements was 18 acres.

The proposed acquisition of private lands in Badrock Canyon would serve the same objectives as obtaining scenic easements through this sensitive portion of the corridor. This action would preserve many of the natural features and roadside views in the Canyon and restrict development adjacent to the highway. The ownership and responsibility for managing the property's visual resources **would eventually be transferred** to the USFS. As a condition of **such a transfer, provisions would be included to ensure** these lands are protected from timber cutting and **incompatible** roadside development. The acquisition of scenic easements on private lands in Badrock Canyon could be pursued if efforts to obtain the properties are unsuccessful.

Acquisition of Increased Right-of-Way Limits - Acquisition of a wider right-of-way corridor in scenic locations may be a way to protect the visual resources of the project area. This option would

essentially be implemented by the proposal to acquire private lands in Badrock Canyon.

Land Use Controls - Land use controls can provide limited visual protection for the corridor by prohibiting certain land uses from locating along the highway. There are no land use controls, like zoning, for private properties adjacent to US 2. Flathead County has the sole authority to adopt and implement land use regulations.

Outdoor Advertising Control - Limited visual protection for the project corridor is possible through the enforcement of outdoor advertising controls. The Montana Outdoor Advertising Act (MCA 75-15-101 through 75-15-134) and the Administrative Rules of Montana (ARM 18.6.203 through 18.6.272) contain statutes regulating the size, placement, and lighting of advertising signs along Interstate and Primary highways. The District Office in Missoula has the review and permitting authority for new signing along US 2 in Flathead County.

Outdoor advertising regulations allow the agency to generally control the placement of signs along Primary roads only within 660 feet of the right-of-way and along both sides of the highway for 600 feet immediately adjacent to ongoing commercial or industrial activities. In unzoned, rural areas like the project corridor, certain signs **can not be** erected beyond 660 feet if they are intended to advertise and are visible from the highway. Within the project corridor, signs along US 2 can not be spaced closer than 300 feet nor can they be placed within 500 feet of a park or national forest boundary.

Little control **exists** over signs advertising activities conducted on the property upon which they are actually located, such as motel signs, service station signs or store signs. These "**on-premises**" signs do not require **state signing** permits but could be subject to local ordinances or regulations if Flathead County wished to impose such measures. **In late 1993, the Flathead County Commissioners implemented a measure which prohibits large off-site and/or billboard/painted bulletin signs in portions of the County not covered by a zoning ordinance. Flathead County's new sign ordinance does not control signs smaller than 32 square feet or signs erected by government agencies.**

Signs erected prior to the time that outdoor advertising laws went into effect are not subject to **highway** signing standards. However, if one of the signs has been removed or taken down, the replacement must conform to the requirements and a permit must be obtained. **The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) set aside monies for transportation enhancements including funds to control and remove nonconforming outdoor advertising signs.**

Placement of Utilities Underground - Visual enhancement of the corridor may be realized by relocating aerial utilities underground whenever possible. **A recommendation** or request that such utilities be buried **can be made**, however, the **State** would assume the entire cost of the relocation. Typically, utility companies determine the best method for relocating their facilities within the highway right-of-way and participate in the cost of such activities. It is unlikely that **all** aerial utilities could be placed underground in this proposed action due to a combination of technical considerations, terrain limitations, and the associated high costs of relocating these facilities.

To the extent possible, these measures will be employed to mitigate the adverse visual effects of the proposed project.

Mitigation for Cliff Excavation in Badrock Canyon - **The rock cut at the west end of Berne Memorial Park would be designed to produce a new cliff face that is visually compatible with other outcrops in the project area. "Rock sculpturing" techniques will be used to produce a rough textured cut**

surface which will reflect the existing terrain and accent natural fracture lines in the rock. This can be accomplished by:

- ripping rock wherever possible to expose rock cut faces;
- using seams, fractures, and joints to blast the cut;
- using staggered drill holes for explosives to avoid shear cut rock faces and exposed presplitting holes;
- drilling presplit holes 6-8 inches in front of rock joints in the vertical cuts to avoid blast hole half casts and conform to natural rock structures;
- designing rockfall benches along existing bedding slopes and avoiding uniform horizontal benchlines;
- minimizing disturbances to areas outside of prescribed work limits;
- providing appropriate transition areas at the top of rock cuts; and
- ensuring that all rock excavation is done by qualified rock contractors.

In addition to the excavation guidelines presented above, other measures can be incorporated into the design and construction of the new rock cut to help obtain a visually compatible cut slope on the west outcrop in Badrock Canyon. These measures are described below:

- The completion of additional geotechnical investigations of the west outcrop to refine the rock slope design and better understand rock mechanics in the outcrop.
- The provision of on-site geotechnical supervision during excavation of the outcrop to monitor and determine where presplit holes should be drilled to make the best use of the existing strong controlling joints and bedding planes.
- The newly exposed rock faces can be stained with commercially available products to give them a weathered appearance. This would not be done if such products are likely to produce adverse effects on surface or groundwaters. The potential environmental effects of such products will be investigated before they are recommended for use.
- Random plantings of vegetation on the rock face could be introduced to help reduce the scale of the new rock cut. The feasibility of such plantings will be considered during the final design of the project. Several species of shrubs (like dogwoods, Wood's rose, currents, and ocean spray) may be appropriate vegetation for planting on the rock face.

Key to the success of such planting is the presence of water on the cliff face. The existence of a spring on this rock outcrop increases the chance for a successful introduction of new plantings on the rock face.
- The rock cut will be designed to maintain existing drainages and seeps over the rock face. Horizontal drain holes will be drilled into the face of the new cut to control water pressures. Drainage through these holes is likely to form a "weeping" rock

face which would freeze during winter months.

- The heads of rock bolts used to stabilize blocks and slabs in the outcrop would be colored to match the rock.

E. Other Considerations

1. CONSTRUCTION IMPACTS ON THE PHYSICAL ENVIRONMENT

Construction impacts differ from those associated with the operation of the completed roadway since they are typically short-term and localized. The resource categories discussed in Part IV have been reviewed from a road construction perspective to determine likely impacts.

Because road and bridge construction activities are relatively standardized, similar construction projects served as the basis for identifying construction activities and their potential impacts on the physical environment. The construction activities for this project will include bridge construction, utility relocations, and road construction.

Direct Impacts of Construction - The direct impacts of construction activities in the corridor are listed below. These impacts are unavoidable and would occur with the construction of any build alternative.

- Alteration and redistribution of surface and subsurface materials.
- Short-term increases in the level of particulates (dust) caused by the operation of construction equipment. **The effects on the Columbia Falls nonattainment area due to normal and construction-related traffic, construction activities on disturbed areas, and materials handling and processing were discussed previously in this Part of the EIS.**
- Short-term noise impacts from construction equipment.
- Existing vegetation will be removed from the work area.
- Birds and wildlife species may be temporarily displaced by construction activities.

The extent of these impacts would vary somewhat by the size of the area disturbed by construction activities. The wider build alternatives would disturb more area than narrower road designs and therefore have a greater potential for producing construction impacts.

Blasting to excavate rock at the west entrance to Badrock Canyon could produce noise and vibration effects. Noise impacts, in the form of an airblast, could occur as a result of the blasting in Badrock Canyon. Airblast is an atmospheric pressure wave transmitted from the blast outward into the surrounding area. This pressure wave consists of audible sound and sound which can not be heard. Airblast is generated by the explosive gases being vented to the atmosphere as the rock ruptures, by stemming blowout, by displacement of the rock face, by displacement around the blast hole, and by ground vibrations. These may occur in various combinations for any given blast. Generally, when noise occurs, blast energy has been wasted. Therefore, the design and execution of blasts strive to minimize noise and vibration effects.

Noise and vibration would not be expected to produce damage to structures in the vicinity of the proposed blasting area. The nearest structure, the House of Mystery, located about 3,500 feet from the area where blasting would occur. The potential for vibration impacts to springs in Badrock Canyon was discussed previously in this Part.

Blasting could also produce flyrock which are rock fragments thrown from the blast site by the force of the explosion. The majority of flyrock problems are due to carelessness in design, loading, and execution of blasts. Flyrock can generally be controlled during the drilling and loading of explosives. In some instances, mats may be used to confine such material to the blast area. Properly designed blasts would minimize the potential for flyrock to be produced from the excavation activities in Badrock Canyon.

Indirect Impacts of Construction - The indirect impacts of construction on the physical environment of the project area are as follows:

- Potential degradation of surface waters due to sedimentation from disturbed areas.
- Potential degradation of groundwater due to percolation of contaminated surface waters.
- Local fisheries may be adversely affected if surface runoff from disturbed areas transports sediments to the Flathead River system.
- Safety hazards associated with the transport, storage, and handling of explosives that would be used for the excavation in Badrock Canyon.

Cumulative Impacts - The construction impacts of the proposed action would not produce any cumulative effects on the physical environment.

Mitigation - Provisions contained in the *Standard Specifications for Road and Bridge Construction* and construction inspection will ensure that the impacts associated with highway and bridge construction are minimized. Pertinent mitigation required by the *Standard Specifications* include:

- Replacing stockpiled topsoil and revegetating all disturbed areas to prevent surface erosion and sedimentation of surface waters.
- Applying water or chemicals to abate road dust and establishing speed restrictions through work zones to minimize wind erosion and air quality impacts.
- Submitting a blasting plan to the Project Engineer prior to beginning such activities.
- Employing all **BMPs** for erosion control for this project including the submission of a program for effective control of water pollution for approval by the Project Engineer.
- Minimizing potential noise impacts during construction by notifying the public of scheduled activities, requiring that construction equipment is in good operating condition, and restricting work hours in areas where residents may be disturbed.

Implementing BMPs for erosion control specifically designed for the proposed action would minimize the potential for erosion of disturbed areas and for adverse impacts from sediments being introduced to surface waters.

The Contractor may be required to employ a Blasting Consultant to design blasting plans and to be available during excavation of the west outcrop of Badrock Canyon. Geologists who examined the geotechnical conditions of the outcrop also recommended that the Contractor use a "test section" at the beginning of the rock excavation work to refine blasting techniques and assure rock control. A program for rock blast monitoring including video recording of each blast was recommended for this project. Special provisions for rock containment must also be incorporated

into the design plans for the rock excavation work. Rock containment devices are recommended to keep blasted and excavated materials within the construction limits.

2. ECONOMIC EFFECTS OF CONSTRUCTION

Construction Schedule - The scheduling of construction activities was investigated to help identify when the economic effects of the proposed action may be realized. The construction schedule was assumed to include three construction seasons and winter shutdowns (between mid-November and mid-April). The Draft EIS indicated that the proposed action could be ready for construction during 1995. Since the Draft EIS was published, funding for this highway project, as well as others in the State, has become less certain. The construction date for the proposed action is now estimated to be after the Year 2000. The availability of funding will ultimately determine when the project or portions of the project are constructed.

The major work tasks associated with the project could be scheduled as follows:

Construction of the new South Fork Bridge - Construction on the bridge could begin in the first construction season and be completed in about 12 full months. The old bridge would be removed at the end of the second construction season.

Utility Relocation - Utility relocation would be expected to occur in the first construction season and be completed prior to road construction in the second year of the project. Utility work would take approximately 6 months to complete.

Highway Reconstruction - Some start-up and mobilization for highway reconstruction could occur during the first construction season. However, actual road reconstruction could begin in the of spring of second construction season and would require 12 full months to complete. Cleanup activities would occur in the final construction season.

Direct Impacts - The reconstruction of US 2 would directly create jobs and income for construction workers. The work force needed to construct the proposed action would include carpenters, equipment operators, steel workers, cement finishers, truck drivers, welders, laborers, engineers and other supervisory personnel. TABLE IV-7 shows typical work force requirements for the proposed action.

TABLE IV-7 WORK FORCE REQUIREMENTS				
Task	Time Period	Minimum Work Force	Peak Work Force	Average Work Force
Bridge Construction	12 months	10	20	15
Utility Relocation	6 months	10	10	10
Road Construction	12 months	10	45	30

Several local contractors in the Flathead County area are capable of completing the road-building portion of the project (48). Bridge construction would most likely be let to a firm from outside Flathead County. Skilled and semi-skilled construction workers are available in the local labor force and would be expected to perform much of the construction work required for the project (49,50). During the construction period, the project would produce only minor increases in employment in Flathead County. Project construction would not substantially affect the county's unemployment rate.

The direct income effects of project construction would be similar for each of the alternatives. **Based on current income information**, construction worker wage and salary earnings for the build alternatives would range from \$1.8 to \$1.9 million. Contractors must comply with Equal Employment Opportunity (EEO) hiring requirements and are encouraged to use disadvantaged business enterprise (DBE) firms for performing construction activities whenever possible.

Indirect Impacts - Major materials and supplies necessary for highway and bridge construction include concrete, reinforcing steel, gravel, bituminous material, fuel, fabricated metal products, signs and paint. Depending on the build alternative constructed, material and costs are estimated to range from \$3.6 million to \$3.9 million. Much of the necessary construction materials (such as concrete, fuel, fill and base course materials) could be purchased in Flathead County.

Assuming 50 percent of these materials are purchased locally, the proposed construction would generate an estimated \$450,000 to \$480,000 in additional earnings for local material suppliers and their employees. Some businesses could expand their work forces to accommodate the increased sales or production of construction materials. Contractor purchases would be sufficient to create 5 to 10 temporary jobs in material supplier and contractor services businesses.

The secondary economic effects from the local expenditures of construction workers and material suppliers would also create jobs and income for Flathead area residents. The circulation of construction worker and material suppliers expenditures within the local economy would create additional income for Flathead area residents. Secondary income effects for the build alternatives are estimated to range from \$1.1 to \$1.2 million. These income effects would be distributed throughout the time of construction activities. The secondary income effects of the project would be sufficient to support 20 to 30 full-time and part-time jobs in local businesses and government **at the time of construction**.

Some businesses located near construction sites would benefit from expenditures made by construction workers. Food and beverage, fuel, and camper facility operators would most notably benefit from this trade. Temporary housing for construction workers is available at campgrounds and motels in Columbia Falls, Columbia Heights, and Hungry Horse.

The total income effects of building the proposed action would vary little between the build alternatives. The economic effects of construction a new bridge and highway are estimated to generate from \$3.3 million to \$3.6 million in total earnings for people living and working in Flathead County. This assumes that even if a non-local contractor was awarded the work, 60 percent of the workforce would be Flathead County residents (49).

Even though the Contractor must provide temporary access routes to businesses located along US 2, construction could make access more difficult and affect the willingness of potential customers to shop at businesses in construction zones. This impact would be most adverse if construction activities interfered with seasonal tourist trade (43).

Cumulative Impacts - The economic impacts of construction activities will not substantially contribute to other cumulative effects on the region.

3. TRAFFIC SAFETY DURING CONSTRUCTION

Direct Impacts - During the construction of the proposed action, short delays and temporary detours would be necessary but long-term disruption of traffic flows or alternate routing around the area would not be required.

The proposed construction between Columbia Heights and the House of Mystery generally follows the

existing alignment. Therefore, traffic must be routed to one side of the highway or right-of-way while work occurs on the other side. Rock excavation in Badrock Canyon would produce delays during and immediately after blasting while debris **blocking the road or posing danger to traffic** is cleared from road surfaces. Constructing the proposed bridge over the South Fork at a new location would enable the existing structure to remain in use during construction. **Traffic control would be used for all activities taking place within 30 feet of the road where travel is permitted.**

Indirect Impacts - The most notable indirect impact of the proposed action would be the inconvenience to motorists caused by construction delays. Motorists would be required to adjust their travel schedules to consider the length of possible delays. Some facility users may choose alternate travel routes to avoid construction sites.

Cumulative Impacts - No cumulative impacts are foreseen.

Mitigation - **The Contractor for the proposed action will be required** to schedule construction operations and provide traffic control in a manner that will assure:

- Adequate safety and convenience to motorists and pedestrians, and the safety of construction workers at all times.
- The progress of the project is advanced in a manner most beneficial to the public.
- Traffic control for all construction activities within 30 feet of the existing road.
- Traffic control conforms with all project specifications and plans and the *Manual on Uniform Traffic Control Devices* (MUTCD).
- Construction signing is removed or covered when the facility is returned to normal use.
- Work zone signing conforms with that shown on construction plans.

4. PERMITS FOR CONSTRUCTION

Based on coordination with regulatory agencies and the potential impacts identified for this proposed action, **eight** water-related permits or authorizations and **four other permits or licenses must be obtained** prior to construction. Permit requirements and other necessary authorizations for the proposed action are described in Part VI.

5. ENERGY

Direct Impacts - Direct energy impacts refer to the energy consumed by vehicles using the facility. If constructed, the operational energy consumed by the build alternatives would be less than those of the no-action alternative. All build alternatives would handle traffic with less congestion and delays and allow travel at slightly higher speeds than the existing highway. There are no substantial differences between the build alternatives in direct energy consumption.

Indirect Impacts - Indirect impacts include the energy expended during the construction and maintenance of the facility and from any changes in vehicle usage resulting from the proposed action. Due to the increased width of the road surfaces and wider construction zones, the four-lane alternatives would consume slightly more construction and maintenance energy than the two-lane road designs.

No **major** changes in vehicle usage is expected as a result of the proposed action. **However, the**

provision of a park-and-ride facility for commuters in Columbia Heights could reduce the number of vehicle trips on US 2 each day and result in slight decreases in fuel consumption by vehicles.

Cumulative Impacts - The proposed action has little if any potential for producing cumulative energy impacts.

6. HAZARDOUS WASTE SITE IMPACTS

Direct Impacts - Two gas stations/convenience stores are currently located adjacent to US 2 in Columbia Heights. Only one of the stations offers lubrication and oil change facilities and both are considered to be low risk land uses for hazardous waste contamination. The proposed action would require minor amounts of right-of-way from each property and should not disturb underground fuel storage tanks.

Indirect Impacts - The proposed action would indirectly impact the gas stations and other highway commercial uses during construction by temporarily disrupting or altering access to the facilities. If a hazardous waste site is discovered or hazardous materials spilled during construction, work will cease until the EPA, MDHES, and Flathead County authorities are consulted to determine the appropriate action.

Cumulative Impacts - The proposed action **would** not contribute to any cumulative impacts on known hazardous waste sites in Flathead County.

7. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section examines the tradeoffs between short-term environmental gains and long-term gains, or vice versa, and the degree to which the proposed action limits future options in the project area. The importance of considering both the short-term and long-term effects of the proposed action is to assess the cumulative impacts which may substantially reduce or enhance the environment for future residents.

Many of the short-term effects of the proposed action were discussed in the previous narrative describing the construction impacts of this project. Long-term effects of the proposed highway reconstruction include loss of land for right-of-way, secondary development induced by facility improvements, and improved traffic operations and safety in the corridor.

US 2 has been identified as an important traffic route and is included on the interim National Highway System. Completion of the proposed improvements on this segment of US 2 benefits Flathead County and the region.

Since the project follows essentially the same alignment as the present highway and the accessibility to adjacent lands will remain much the same, future development options for the corridor would not be limited by the proposed action. The proposed action would generally improve access within project corridor without disrupting the traditional travel patterns of local residents or seasonal visitors.

The project could serve to induce growth in this area of Flathead County, however, other overriding factors seem to control development trends in the corridor. First, current growth in Flathead County is generally occurring in areas outside of the highway corridor. Secondly, the lack of community services (water and sewer) and utilities outside of Columbia Heights will affect the pace of development in the corridor. The availability of community services is viewed as more important than improved transportation facilities in terms of dictating the pace of future development along this section of US 2.

The short-term effect of providing a safer and more efficient travel route would reduce the accident rate for the corridor and decrease travel times between Columbia Heights and Hungry Horse. The project's safety

improvements would minimize or eliminate current conditions that contribute to many injuries and deaths. Operational improvements would reduce energy consumption in the long-term by minimizing delays. Increased driver comfort and convenience would be a secondary effect of improved operations on the facility.

The proposed action would have a lasting effect on the visual quality of the area. Rock cliffs in Badrock Canyon would be excavated and some wooded areas adjacent to the river would be removed. This would alter the visual setting for some years and emphasize human encroachment on portions of the corridor. The degree of impact is tempered by the fact that similar actions were necessary to construct the existing highway through Badrock Canyon.

The short-term impacts to the recreational use of Berne Memorial Park would be offset by the development of replacement recreational facilities. This action would develop new long-term recreational opportunities for the public and would provide a much safer location for the public to access the Flathead River than at Berne Memorial Park.

8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed action involves a commitment of resources which constitute an irretrievable and irreversible loss. These commitments are discussed below.

Raw Materials - The commitment of capital resources, construction materials, and labor to this project are irreversible. Once the decision to build is made, the necessary commitment of materials and resources cannot be shifted to an alternate use. Quantities of sand, gravel, steel, concrete, and asphalt paving materials would be required to construct this project. Fuel would be consumed by the equipment needed to build the project, but an overall net savings in fuel consumption would be realized by the vehicles using the new highway and bridge.

These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon the continued availability of these resources. Some of these resources, such as the gravel and oil products used in the plant mix surfacing, may be recycled for further use and are not necessarily irretrievable.

Human Effort - The project also requires an irretrievable commitment of human resources to design, construct, and maintain the transportation facilities. Engineering costs are usually estimated as a proportion of the total construction cost of the project. An average factor of 10% of the construction cost was used to estimate engineering costs for the alternatives. The costs for design and construction engineering would **be more than \$920,000** for the proposed project. The total time required for a design team to complete plans for the new highway and bridge is estimated to be at least one year.

The on-site labor requirements for the reconstruction of US 2 and the South Fork bridge is estimated to average between 10 and 30 people for some 30 months. Maintenance records show that more than 1,000 labor hours are **typically spent each year** directly maintaining the existing highway. Maintenance requirements should remain similar for the new facility.

Land - Construction of the proposed action would commit between **40 and 49** additional acres of land to the highway corridor. The direct use of the land for highway purposes would remove land from residential, commercial, and agricultural uses or open space.

Land used in the construction of the project is considered an irretrievable commitment during the period of time that the land is used for a highway. However, if a greater need arises for use of the land or if the facility is no longer needed, the land can be converted to another use.

Economic Resources - The proposed action requires irreversible economic commitments. Considerable amounts of public funds have already been spent planning this project. Construction of the new highway and bridge would require a commitment of between **\$13.4 and \$14.5 million**. These expenditures of Federal and State funds represent a major and irreversible commitment to improve vehicular travel on US 2 for both local and regional users.

Wildlife and Fisheries Resources - The loss of wildlife habitat due to the construction of this project would be minor. The types of habitat displaced by construction are plentiful throughout the Flathead region. Approximately 40 acres of land would be lost that provides habitat for small mammals and birds. Revegetation of the right-of-way will replenish some lands for resumed habitation by such species. The proposed action would place fill material in and along the Flathead River through part of Badrock Canyon. The effects of this action on fisheries should be minimal.

Aesthetics - The construction of the project would cause an irretrievable and irreversible alteration to the visual nature of the corridor. The proposed action imposes man-made structures, excavation scars, and embankments on the natural setting. Excavations and embankments will be replanted, and in time, the corridor would again assume a natural appearance. A substantial part of the corridor would be reconstructed following the current alignment of US 2, thereby minimizing changes on the existing visual conditions. Rock excavation in Badrock Canyon would be apparent for much longer than excavation or embankment areas.

Cultural - Several homes and businesses would be displaced by the proposed action. The potential for prompt and successful relocations is high in this area. Relocation from friends and familiar surroundings would occur for displaced homeowners. No important historical or archaeological properties are affected by the proposed reconstruction of US 2.

The commitment of these resources is based on the concept that the residents of Flathead County, the State of Montana, and the region will benefit by the improvements to this important element of the transportation system. These benefits consist of increased highway capacity, improved traffic safety, and savings in travel time. The benefits are expected to outweigh the commitments of irretrievable resources.

F. Overview of Impacts by Alternative

TABLE IV-8 lists the impacts of each alternative to the physical, biological, and socio-economic environments of the project area. The table also indicates if each impact is a growth-inducing or growth-inhibiting factor. The table provides a simple "side-by-side" comparison of the impacts associated with each alternative. The tradeoffs between alternatives are discussed in the Summary at the beginning of the EIS.

TABLE IV-8: (page 1 of 8)
 COLUMBIA HEIGHTS-HUNGRY HORSE EIS
 SUMMARY OF ENVIRONMENTAL IMPACTS

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
1. FARMLAND IMPACTS					
• Affects Locally Important Farmland?	Yes	Yes	Yes	Yes	No
• Acres Directly Converted for RW	39.2	37.3	34.1	32.4	0
• Acres Indirectly Converted	1.4	1.4	1.2	1.1	0
• Overall Impact on Farmland	Build alternatives would convert "locally important" farmland, but farmland is of low potential.				
Will Impact Induce or Inhibit growth?	Highway and access improvements could induce additional development that would impact farmland.				
2. GEOLOGIC IMPACTS IN BADROCK CANYON					
• Geologic feature affected by construction	Blasting would be necessary to excavate the west outcrop at Berne Memorial Park				
• Amount of rock to be excavated	Approximately 103,000 cubic yards		Approximately 82,500 cubic yards		None
• Extent of new rock cut	Approximately 1,100 along roadway with rock face ranging from 25 to 150 feet in height		Approximately 900 along roadway with rock face ranging from 30 to 140 feet in height		Present outcrop has 25-60 foot cliffs
3. WATER QUALITY IMPACTS					
• Surface Water Impacts	No adverse impacts to surface water quality were predicted by runoff modeling. Pollutant loads reaching the river would be minimal. Erosion of disturbed areas would not be a substantial concern due to implementation of BMPs to minimize sediment transport from the project area. Potential for surface water quality impacts due to residual nitrates from the use of explosives is judged to be low.				
• Groundwater Impacts	No adverse impacts to ground water is expected because water table would not be affected. The spring/fountain at Berne Memorial Park would not be impacted but access to the spring would change. Blasting could cause temporary changes in production of springs in Badrock Canyon.				
• Affects EPA-designated sole-source Aquifers or Wellhead Protection Areas	No				
Will Impact Induce or Inhibit growth?	No	No	No	No	No

**TABLE IV-8 (Page 2 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
4. WILD & SCENIC RIVER IMPACTS					
• River Segment/Management Corridor Present	The highway corridor passes through about 0.84 acres of the Middle Fork Recreational River Corridor. Some uncertainty exists about whether or not an easement exists for US 2 through the Corridor.				
• Area Affected by Proposed Action	Construction would affect 0.25 acres of the River Management Corridor	Construction would affect 0.11 acres of the River Management Corridor			US 2 exists on 0.07 acres of Corridor
• Effects on qualities/values of the Wild & Scenic River System	Build alternatives would not adversely affect the visual, recreational, or high water quality values of the Recreational River segment. The new highway would not be any more visible from the river than the existing road.				
Will impact induce or inhibit growth?	No	No	No	No	No
5. FLOODPLAIN IMPACTS					
• Encroaches on 100-year Floodplain?	Yes, the alignment proposed for the build alternatives would encroach on the Flathead River in Badrock Canyon and South Fork of the Flathead River.				
• Extent of fill in Badrock Canyon	1,350 cubic yards below the ordinary high water mark to construct retaining wall	Less than 250 cubic yards below the ordinary high water mark to construct retaining wall			Not Applicable
• Location of Badrock Canyon Encroachment	Project Stations 600+00 to 608+00	Project Stations 603+00 to 608+00			Not Applicable
• Effects on Flathead River in Canyon	Build alternatives would reduce the width of the channel by no more than 3.5% at the elevation of the ordinary high water mark, but still substantially less than the natural downstream constriction caused by Fisherman's Rock.				
• Effects of South Fork Encroachment	Impacts would be minimal since new bridge would have one less pier and have a channel opening as large or larger than the existing bridge. Backwater conditions would be maintained or improved. Old bridge would be removed following construction.				
• NFIP 1-foot Standard Exceeded	No, modeling shows the build alternatives would have minimal effects on the elevation of the 100-year floodplain.				
Will impact induce or inhibit growth?	No	No	No	No	No

**TABLE IV-8 (Page 3 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
6. AIR QUALITY IMPACTS					
<ul style="list-style-type: none"> General Impacts of Proposed Action 	Simplified CO analyses show that neither 1-hour or 8-hour standards would be exceeded by the design year. Analyses show little differences between alternatives, but build alternatives would benefit air quality more than no-action.				
<ul style="list-style-type: none"> Impacts of PM-10 Emissions 	Vehicle use of the new highway would produce nearly 1,200 pounds of PM-10 emissions daily by the design year. Analyses have shown that PM-10 generated by construction activities and during the future operation of the new highway is not likely to contribute to violations of state and federal PM-10 standards in the Columbia Falls nonattainment area.				
Will impact induce or inhibit growth?	No	No	No	No	No
7. NOISE IMPACTS					
<ul style="list-style-type: none"> General Impacts of Proposed Action 	Increases in noise levels along the corridor will occur with or without the project due to the projected increases in traffic volumes and the proximity of some receptors to the highway.				
<ul style="list-style-type: none"> Predicted 2010 DHV L_{eq}(h) Noise Levels 	67-74 dBA		67-74 dBA		67-76 dBA
<ul style="list-style-type: none"> Exceeds NAC for Activity Category B (67dBA) 	Yes, NAC would generally be exceeded by the design year at rural locations within 150 feet of the new centerline. Several existing residences in the vicinity of Monte Vista Drive are located within 150 feet of the present road.				
<ul style="list-style-type: none"> Will Increase in Noise be "Substantial"? 	No	No	No	No	No
Will impact induce or inhibit growth?	No	No	No	No	No
8. VEGETATION IMPACTS					
<ul style="list-style-type: none"> General Impacts of Proposed Action 	The build alternatives would remove varying amounts of vegetation within the corridor. The most notable impact would occur in Badrock Canyon where riparian vegetation would be cleared to accommodate changes in the road's alignment and the construction of a retaining wall along the river. Moderately dense forest growth would be cleared on the approaches to the new bridge. Two-lane designs would disturb 16-20% less area than four-lane designs.				
<ul style="list-style-type: none"> Affects Plant Species of Special Concern 	No, but corridor contains habitat that could support such species.				

**TABLE IV-8 (Page 4 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
Will Impact Induce or Inhibit Growth?	No	No	No	No	No
9. WETLANDS IMPACTS					
• Wetland Types Affected	Varying amounts of Type W-1, W-2, and W-7 wetlands at 3 sites would be disturbed.				
• Acres of Jurisdictional Wetlands Disturbed by Proposed Action by Type	Type W-1 - 0.18 Type W-2 - 0.84 Type W-7 - 1.46 Total-- 2.44	Type W-1 - 0.14 Type W-2 - 0.84 Type W-7 - 1.46 Total-- 2.44	Type W-1 - 0.14 Type W-2 - 0.50 Type W-7 - 1.10 Total-- 1.74	Type W-1 - 0.17 Type W-2 - 0.50 Type W-7 - 1.10 Total-- 1.77	No effect
• Impact on wetlands values	Type W-7 wetlands contain riparian vegetation that serves as habitat for bald eagles. Wetland Sites 2 and 4 provide habitat for wildlife and waterfowl. None of the wetlands serve important flood control functions.				
Will Impact Induce or Inhibit Growth?	No	No	No	No	No
10. WILDLIFE IMPACTS					
• General Impacts of Proposed Action	The amount of habitat lost to highway construction would not be substantial for any species. Suitable habitat exists immediately adjacent to the corridor to offset any displacement of species that occurs. The proposed action would not substantially disrupt or alter the travel corridor used by white tail deer that reside in the area west of Badrock Canyon. These deer often cross the highway to access the river. No other wildlife travel corridors were identified. Highway mortalities for wildlife and not expected to change dramatically with the new road.				
• Impacts to Species of Special Concern	Adverse impacts to the bull trout or the westslope cutthroat trout are not likely. Habitat with characteristics favored by the Coeur d'Alene salamander exists in Badrock Canyon. Surveys by zoologists in 1993 and 1994 did not find any salamanders or amphibians. It was concluded that the species does not live in Badrock Canyon.				
Will Impact Induce or Inhibit Growth?	No	No	No	No	No
11. THREATENED OR ENDANGERED SPECIES IMPACTS					
• Species Potentially Affected	Northern bald eagle, peregrine falcon, Northern Rocky Mountain gray wolf, and the grizzly bear				

**TABLE IV-8 (Page 5 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
• Effects on the Bald Eagle	Trees that provide screening for eagles foraging along river or potential perching sites near Berne Memorial Park would be removed. This adverse effect is tempered somewhat by the fact that no nests exist in the corridor and the numbers of eagles have declined in recent years due to the collapse of the kokanee salmon population migrating upstream from Flathead Lake. The USFWS issued a "No Jeopardy" on March 24, 1992.				No additional effects
• Effects on the Peregrine Falcon	The build alternatives would have no effect on the species or its critical habitat. The USFWS concurred with this conclusion.				No additional effects
• Effects on the Gray Wolf	The build alternatives would not affect wolves because no sightings of the species have been reported and the project would not substantially alter the prey base used by wolves. The USFWS concurred with this conclusion.				No additional effects
• Effects on the Grizzly Bear	The build alternatives would have little effect on the species because no important used for foraging or security would be removed. Badrock Canyon is not an important travel corridor for grizzly bears. The USFWS concurred with this conclusion.				No additional effects
Will impact induce or inhibit growth?	No	No	No	No	No
12. IMPACTS TO ENVIRONMENTALLY SENSITIVE AREAS					
• General Impacts of Proposed Action	The build alternatives would have no direct impact on environmentally sensitive areas. The project would indirectly benefit visitors by providing a safer, more efficient access to the area. Badrock Canyon and NCDE impacts are discussed elsewhere in the Table and in Parts IV and V of the Final EIS.				No effect
Will impact induce or inhibit growth?	No	No	No	No	No
13. LAND USE IMPACTS					
• General Impacts of Proposed Action	The proposed action would not directly change the type and extent of land uses that exist in the corridor. The highway and access improvements proposed may indirectly stimulate further commercial development in the corridor and other areas along the route to Glacier National Park. MDT has little control over the development of lands outside its right-of-way.				No direct effect
Will impact induce or inhibit growth?	Highway and access improvements along with a growing population, increased visitation to Glacier National Park, and favorable development situations could stimulate growth.				Possibly inhibit growth

**TABLE IV-8 (Page 6 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
14. RELOCATION IMPACTS					
• Number of Households Displaced		The build alternatives would affect between four and six households in the corridor.			None
• Estimated Number of Residents Affected		An estimated 11 to 17 residents would potentially be displaced.			None
• Number of Commercial Displacements		One home/business and buildings the Old Time Photo Company would be impacted.			None
• Other Right-of-Way Impacts		Right-of-way acquisition associated with the build alternatives would encroach on some residences and businesses in the corridor causing a loss of parking areas or yards.			No effects
Will impact induce or inhibit growth?	No	No	No	No	No
15. SOCIAL IMPACTS					
• Affects Minority or Disadvantaged Population	No	No	No	No	No
• Affects Neighborhoods/Community Cohesion	No	No	No	No	No
• Other Social Impacts	The build alternatives would provide traffic safety benefits over the no action alternative. The new highway in Columbia Heights may be more difficult for local pedestrians to cross. Facilities for bicyclists and pedestrians would be improved over existing conditions.				
Will impact induce or inhibit growth?	Highway improvements have the potential to induce growth on lands adjacent to US 2.				
16. ECONOMIC IMPACTS					
• General Impacts of Proposed Action	The build alternatives would directly affect two businesses within the corridor and would remove parking areas from several others. Minor growth would be expected in the economy of Flathead County and the project area by making the corridor more attractive to business investment. Minor amounts of taxable property would be removed from the tax bases by right-of-way acquisition. Economic benefits would be realized during construction by increased local employment, purchases of construction materials and services, and by expenditures of workers.				
Will impact induce or inhibit growth?	Highway improvements when combined with other factors like improved access, a growing county population, and increasing tourism in the region could induce economic growth in the project corridor and Flathead County.				
	Possibly inhibit growth				

**TABLE IV-8 (Page 7 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
17. HISTORICAL AND ARCHAEOLOGICAL PRESERVATION					
• Affects Sites On or Eligible for National Register	No	No	No	No	No
• Impacts to Historic Sites	The new alignment would pass directly through the remains of 24FH419. Excavation of the western cliff at Berne Memorial Park would remove the rock carving associated with 24FH420. Construction at the replacement park/river access would disturb 24FH453 and 24FH454. Construction would impact up to 270 feet of the Badrock Canyon "Tole" Road (24FH583) at the west end of Berne Memorial Park. Access to the west end of the road would be eliminated. The proposed realignment of Berne Road would pass directly through 24FH455. Existing South Fork bridge would be removed. MDT determined that the structure is not important to understanding the history of bridge construction in Montana.				
• Impacts to Native American Cultural Sites	The build alternatives would not impact cultural sites of the Blackfeet, Salish, or Kootenai Tribes.				
Will Impact Induce or Inhibit growth?	No	No	No	No	No
18. RECREATIONAL IMPACTS					
• Developed Recreation Sites Affected	A minor amount of right-of-way would be acquired at the Hoot-Owl Ranch located east of Columbia Heights. Highway construction may require that a go-cart track be modified. Access and parking at Berne Memorial Park would be modified.				
• Disrupts Dispersed Recreation Opportunities	No	No	No	No	No
• Effects on the Flathead Recreational Waterway	The build alternatives would directly impact the Flathead Recreational Waterway by placing fill in the river and removing riparian vegetation along its banks. The use of the waterway would indirectly be enhanced by providing of a new river access in the corridor.				
Will Impact Induce or Inhibit growth?	Build alternatives have the potential to induce further recreational use of the Flathead River by providing a new river access in the corridor.				
19. VISUAL IMPACTS					
• Visual Resources Affected	The build alternatives would affect riparian vegetation, some dense forest cover, and the west cliff at park.				

**TABLE IV-8 (Page 8 of 8)
COLUMBIA HEIGHTS-HUNGRY HORSE EIS
SUMMARY OF ENVIRONMENTAL IMPACTS**

IMPACT/CONSIDERATION	ALTERNATIVE 1 (MDT Preferred)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5 (No-Action)
<ul style="list-style-type: none"> Extent Rock Excavation 	Would produce a new exposed rock face ranging from 25 to 150 feet in height for a distance of about 650 feet along the road.	Would produce a new exposed rock face ranging from 30 to 140 feet in height for a distance of about 600 feet.			No additional effects
<ul style="list-style-type: none"> Overall Impacts 	The visual impacts of the build alternatives would be similar. All build alternatives would increase the visual scale of the highway and would remove substantial amounts of vegetation between the river and the road near Berne Memorial Park.				None
Will Impact Induce or Inhibit growth?	No	No	No	No	No
20. IMPACTS TO HAZARDOUS WASTE SITES					
<ul style="list-style-type: none"> Hazardous Waste Sites Affected 	Two gas station/convenience stores are located in Columbia Heights, one has lubrication/oil change facilities.				
<ul style="list-style-type: none"> Extent of Impact 	The build alternatives would require minor amounts of property for right-of-way. No facilities (pumps or underground storage tanks) would be affected. Access to each site would be temporarily altered during construction.				
Will Impact Induce or Inhibit growth?	No	No	No	No	No
21. CONSTRUCTION IMPACTS					
<ul style="list-style-type: none"> General Impacts of Proposed Action 	These impacts on the environment are unavoidable and would occur with all build alternatives. The primary impacts would be the alteration of surface materials, short-term increases in dust and noise from equipment, and temporary displacement of wildlife from the construction zone. The erosion of disturbed areas and surface runoff could cause minor degradation of surface waters but will be controlled through the use of best management practices (BMPs) for erosion control identified during the design of the project. Motorists would experience temporary delays and short detours. Access to businesses and residences would be temporarily affected but maintained. Construction activities would benefit the local economy of the area. Blasting to excavate rock in Badrock Canyon could produce short-term noise and vibration effects.				
Will Impact Induce or Inhibit growth?	No	No	No	No	No

G. Summary of Mitigation and Environmental Commitments

The following paragraphs summarize the major mitigation measures discussed previously in this Part. These mitigative actions apply to all build alternatives if the same environmental impact (regardless of degree) applies to the individual alternatives.

1. MITIGATION FOR IMPACTS TO THE PHYSICAL ENVIRONMENT

- No mitigation is planned for the conversion of farmland to highway uses in the corridor.
- The placement of fill in the Flathead River near Berne Memorial Park and at the new bridge site on the South Fork of the Flathead will be subject to the provisions specified in the Section 404 permit for the proposed action.
- **The proposed action will incorporate a vertical retaining wall along the Flathead River in Badrock Canyon to minimize the encroachment on the Flathead River.**
- Curbs and gutters and a piped storm drainage system will be constructed to accommodate highway runoff in Columbia Heights. Runoff collected by the system will be discharged in a manner consistent with the MDHES policy of non-degradation of surface waters and conform to the agency's storm water management guidelines.
- The spring at Berne Memorial Park will be perpetuated at its present location, however, the access to the water source will be restructured to reduce conflicts between spring users and through traffic.
- No mitigation is planned for increased noise levels in the project corridor. Acquisition of right-of-way for the new highway will generally relocate the few residents near the road that would experience the adverse effects of increased noise levels.
- **Highway designers will use the Highway Construction Standard Erosion Control Work Plan to identify best management practices (BMPs) to control erosion and minimize the transport of sediments to surface waters.**
- **The following general measures will be employed to mitigate the potential adverse visual effects of the proposed action.**
 - ◆ **Implementing limited access control to help minimize the number of approaches along US 2 and improve the appearance of the corridor.**
 - ◆ **Pursuing the acquisition of private lands to control incompatible development and maintain the natural appearance of Badrock Canyon.**
 - ◆ **Contacting the National Park Service and the USFS for recommendations of scenic enhancement measures that can be incorporated in the design of the new facility.**
 - ◆ **Varying the tree line during right-of-way clearing to avoid creating a "tunnel effect" and to add interest where the road passes through dense timber.**
 - ◆ **Establishing strict construction limits and employing selective tree cutting in areas adjacent to the Flathead River to preserve visual qualities and**

habitat for bald eagles and other wildlife.

- ◆ Requiring prompt revegetation of areas disturbed by construction.
- The following measures will be incorporated into the design of the new rock cut in Badrock Canyon:
 - ◆ The completion of additional geotechnical investigations of the west outcrop to refine the rock slope design and better understand rock mechanics in the outcrop.
 - ◆ The provision of on-site geotechnical supervision during excavation of the outcrop to monitor and determine where presplit holes should be drilled to make the best use of the existing strong controlling joints and bedding planes.
 - ◆ "Rock sculpturing" techniques will be used to produce a rough textured cut surface which will reflect the existing terrain and accent natural fracture lines in the rock.
 - ◆ The newly exposed rock faces may be stained with commercially available products to give them a weathered appearance. This would not be done if such products are likely to produce adverse effects on surface or groundwaters. The potential environmental effects of such products will be investigated before they are recommended for use.
 - ◆ Random plantings of vegetation on the rock face could be introduced to reduce the scale of the new rock cut. The feasibility of such plantings will be considered during the final design of the project.
 - ◆ The rock cut will be designed to maintain existing drainages and seeps over the rock face. Horizontal drain holes will be drilled into the face of the new cut to control water pressures. Drainage through these holes is likely to form a "weeping" rock face which would freeze during winter months.
 - ◆ The heads of rock bolts used to stabilize blocks and slabs in the outcrop would be colored to match the rock.
- Blast hole liners to encase ANFO will be required in the excavation of the outcrop in Badrock Canyon. This measure will minimize the potential for spillage of ANFO on the surface of the outcrop and for undetonated explosives.
- Temporary rock storage piles will be located away from areas where precipitation leaching through excavated rock may transport residual nitrates to surface waters. Rock storage piles will be located above the water table to prevent impacts to groundwater. Measures to control runoff entering and leaving the area where rock is temporarily stored will be employed.
- The following measures will be employed during the construction of the proposed action to mitigate the potential for indirectly causing adverse effects on the Columbia Falls PM-10 nonattainment area:

- ◆ **Street sweeping will be done, as needed, at both ends of the project to reduce the impact of carry-on dirt from the project to paved streets within the nonattainment area boundaries.**
- ◆ **Unpaved detours will be watered and/or chemically stabilized so that the emissions are less than 20% opacity.**
- ◆ **If slash generated by right-of-way clearing is to be burned, it will be hand-piled or stacked with a brush blade and cured. Any open burning will be subject to restrictions of an open burning permit from the County, if one is required.**
- ◆ **Operators of gravel crushers and asphalt plants used for this project will be required to obtain an air quality permit from the MDHES Air Quality Bureau.**

2. MITIGATION FOR IMPACTS TO THE BIOLOGICAL ENVIRONMENT

- **Topsoil stripped from the right-of-way during construction will be stockpiled and used to cover cut and fill areas to facilitate revegetation.**
- **Impacts to wetlands in the project corridor will be mitigated based on the values and functions each area serves not solely on the acreages lost or adversely affected. Opportunities to develop a replacement wetland area and expand an existing wetland site have been identified.**
- **Potential sedimentation impacts will be avoided by strict adherence to standard construction practices and implementation of BMPs designed to minimize erosion and sediment transport to surface waters.**
- **Plant species used to revegetate disturbed areas adjacent to the highway will be selected to minimize its attractiveness to wildlife. Careful selection of such vegetation may help prevent animals from being attracted to the roadside.**
- **Efforts will be made to quantify the number of deer mortalities resulting from collisions with vehicles on US 2 between the House of Mystery and Badrock Canyon. These efforts will determine if the frequency of such incidents is higher at this location than at other road locations in the corridor. If appropriate, warning signs for this deer crossing area could be installed.**
- **Measures will be incorporated into the design and construction of the project to minimize impacts on bald eagles and their habitat including:**
 - ◆ **Limiting construction between mid-October and mid-March so eagles would not be displaced from hunting perches or roosts.**
 - ◆ **Consulting with the USFWS if eagles establish a nest territory within one-half mile of the project area prior to construction.**
 - ◆ **Modifying overhead powerlines that pose an electrocution or collision threat.**
 - ◆ **Contacting the Montana Bald Eagle Working Group for assistance in developing an interpretive exhibit about bald eagles in the Flathead region.**

- ◆ **Undertaking a study to identify riparian and riverine lands within the project area that constitute important habitat for bald eagles. The study will also examine the feasibility of acquiring such lands as a means of preserving important habitat for the species.**

3. MITIGATION FOR IMPACTS TO THE HUMAN ENVIRONMENT

- In an attempt to control the development of incompatible land uses from the Berne Road area to Hungry Horse, actions to acquire several large private landholdings **have already been initiated. To date, attempts to option or acquire about 100 acres of private land in Badrock Canyon have been unsuccessful. However, a 38 acre tract surrounding the House of Mystery and a parcel fronting US 2 and Berne Road, opposite the House of Mystery have already been acquired.**
- **Funding was contributed to the Canyon Citizen Initiated Zoning Group to help develop a growth management plan for lands adjoining the US 2 corridor from the House of Mystery to Marias Pass.**
- Right-of-way for the project **will** be purchased at fair market value. Residents and businesses affected by relocation **will** be provided assistance, as required by the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. Provisions of the Act **will** be carried out through the Relocation Assistance Program.
- **A detailed engineering study will be prepared** to evaluate the need for signalization and appropriate pedestrian crossing facilities in Columbia Heights.
- **Efforts will be made** to ensure that the construction schedule and activities minimize adverse effects on residents and businesses in the corridor. Access to businesses **will** be maintained throughout the construction period.
- Previously undiscovered historic or archeological resources discovered during construction **will** be protected by stopping construction in the vicinity until the resource can be evaluated for its significance.
- For impacts to Berne Memorial Park, the development of replacement parkland on a site adjacent to the Flathead River near the House of Mystery **is proposed.** The facility **will** be designed to provide safe, controlled approaches and structured parking areas for users of the facility. Exhibits from the existing roadside park **will** be relocated to the replacement area. A new public river access **will** be jointly developed with the USFS at this location.
- The USFS and the NPS **will be consulted** for scenic enhancement **ideas** that can be incorporated into the design of the project.
- If a hazardous waste site is discovered or a hazardous material is spilled during construction, work **will** cease until EPA, MDHES, and Flathead County residents are consulted to determine the appropriate action.

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