SUNNY BROOK COLONY IRRIGATION PROJECT
FINAL ENVIRONMENTAL ASSESSMENT

Prepared by

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

OCTOBER 2000

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Sunny Brook Colony Final EA

LIST OF ACRONYMS AND ABBREVIATIONS

Colony.....Sunny Brook Colony Inc.

cfs.....Cubic Feet per Second

DEQ.....Montana Department of Environmental Quality

DFWP.....Montana Department of Fish, Wildlife, and Parks

DNRC.....Montana Department of Natural Resources and Conservation

DO.....Dissolved Oxygen

EA.....Environmental Assessment

EIS.....Environmental Impact Statement

ET.....Evapotranspiration

MEPA.....Montana Environmental Policy Act

NEPA.....National Environmental Policy Act

NRCS.....Natural Resource Conservation Service

PCPI.....Per Capita Personal Income

Reclamation.....U.S. Bureau of Reclamation

TDS.....Total Dissolved Solids

TPI.....Total Personal Income

TSS.....Total Suspended Sediment

USGS.....U.S. Geological Survey

1.0 - PURPOSE AND NEED FOR ACTION

The Sunny Brook Colony Inc. has applied to the Montana Department of Natural Resources and Conservation (DNRC) for a water use permit to irrigate 957 acres of land with water from the Marias River. The Colony would irrigate crops of alfalfa, wheat and barley, and believes that the irrigation project would help make the colony an economically viable operation. This Environmental Assessment (EA) examines of the potential effects of the Colony's proposal. It has been prepared by DNRC to comply with the Montana Environmental Policy Act (MEPA).

If the potential impacts of the Colony's proposed project are determined by this EA to not be significant, or if any significant impacts found can be adequately mitigated, then the EA will be deemed the appropriate level of environmental review. If the impacts of the proposed project are found to be significant and can not be mitigated, then an environmental impact statement (EIS) will be required.

1.1 Project Location

The proposed project is located in Chouteau County, east of Highway 223, and just south of the Hill County line. The pump site would be in Section 6, Township 28 North, Range 9 East. Water would be pumped from the Marias River and piped about 1.5 miles to nine center pivot irrigation systems. Figure 1.1-1 is a project map.

1.2 Scope of Environmental Analysis

Public Involvement

A public scoping meeting was held at the Emergency Operation Center in Fort Benton on March 13, 2000 to discuss the project application and identify potential environmental issues and alternatives. DNRC representatives from Helena and Havre attended the meeting. Also, the public was given until April 15, 2000 to submit written comments regarding the proposal.

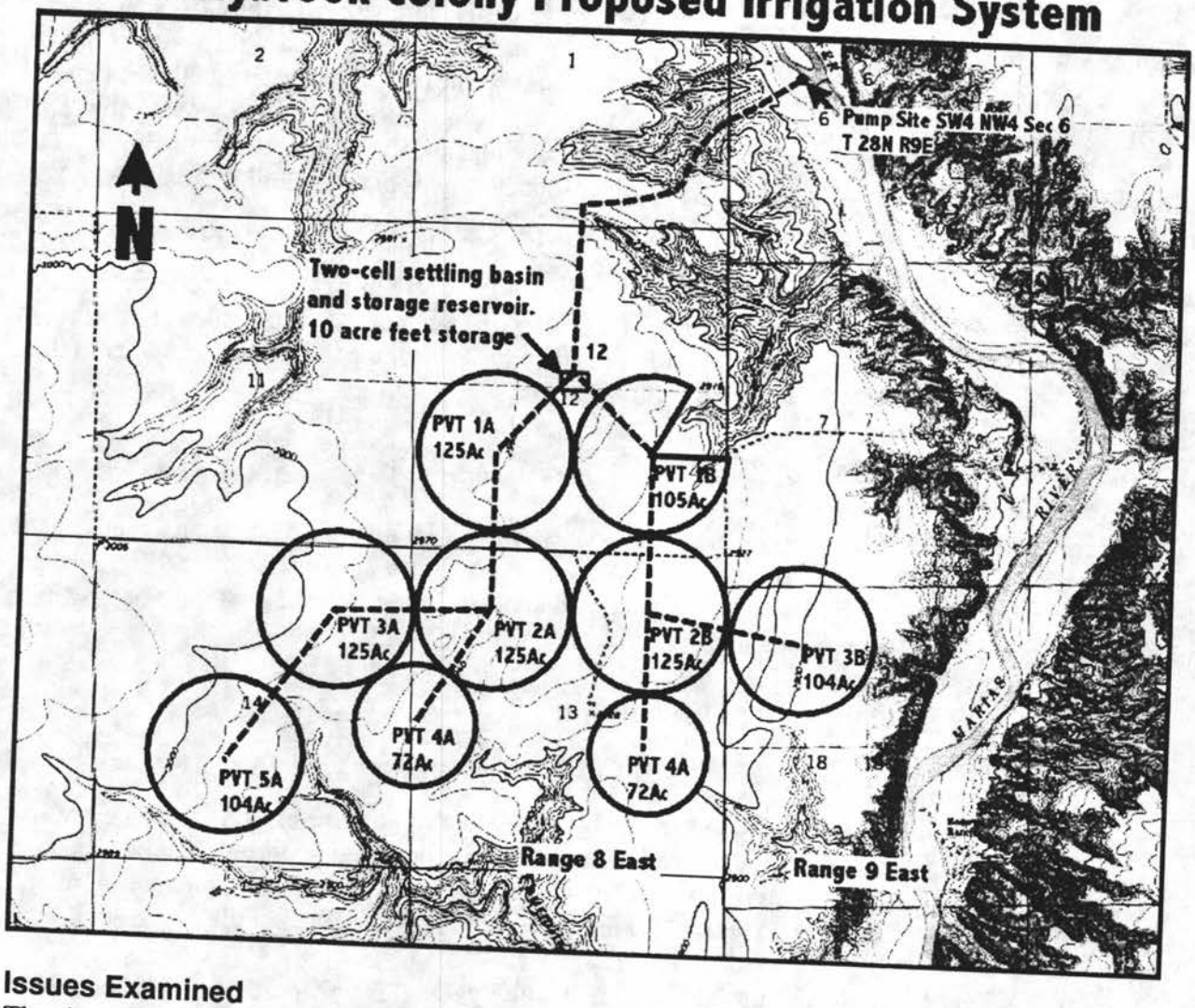
A draft EA for the proposed project was sent out by DNRC on August 15, 2000. DNRC representatives from Helena and Havre held a public meeting to receive comment on the draft EA on September 11, 2000 at the Emergency Operation Center in Fort Benton. A September 15, 2000 deadline was set for receiving written comments on the draft EA.

Agency Involvement

Other state and federal agencies have been contacted by DNRC to discuss the project and to identify potential environmental issues. Agency representatives from the Montana Department of Fish, Wildlife and Parks (DFWP), the Army Corps of Engineers (COE), the U.S. Fish and Wildlife Service (USFWS), and U.S. Bureau of Reclamation (Reclamation) were contacted.

Figure 1.1-1

Sunnybrook Colony Proposed Irrigation System



Issues Examined

The issues examined in this EA were identified by DNRC, other agencies, and through comments received from the public at the scoping meeting and during the written comment period. Listed below are potential project-related impacts examined in this document.

- Effects on existing water right holders including irrigators, rural water districts, and DFWP.
- Effect on fisheries.
- Effects on Threatened and Endangered Species, and Species of Special Concern such as the pallid sturgeon, paddlefish, blue sucker, and sauger.

- Effects of agricultural chemical uses, such as pesticides, herbicides, and fertilizers, on local ground and surface water quality due to irrigation water seepage and return flows.
- The potential creation of saline seeps.
- Effects on wetlands due to the installation of the pumping station, water distribution pipelines, center pivot sprinklers, and access roads.
- Effects on soil erosion due to project construction, and application of irrigation water to soils.
- Effects on wildlife.
- Effects on recreation
- Effects on the local economy and government services.
- Effects on historic and prehistoric cultural resources.
- Effects on vegetation and land use due to conversion from dry-land farming to irrigation.
- Cumulative effects of potential Tribal water developments, and development of State water reservations by conservation districts and state water use permits.

Contested Case Hearing and Decision Process

DNRC has issued legal notice of the Colony's application to other water right holders who have the potential to be affected by the proposed project. The notice gave the water right holders the opportunity to object to the Colony's application if they believe it could adversely affect their water rights. Some water right holders have objected and those objections have been ruled upon. A hearing on the correct and complete objections will be held on October 11. Water right holders who have submitted timely, correct and complete objections and the applicant will be able to participate in the hearing and each party will have the opportunity to call witnesses pertinent to the case. The objectors and applicant can present testimony and evidence during the hearing. It is likely that the EA will be submitted as evidence. After the contested case hearing, the hearings examiner reviews the evidence and presents a proposed order to grant or deny the application, or to grant it with conditions. Parties will have an opportunity to file exceptions to the hearings examiner's proposal. DNRC will then issue a final decision on the application after reviewing the hearings examiners findings and any exceptions filed on the matter.

DNRC Decision Criteria

In addition to requirements under MEPA, when deciding on a water-use permit DNRC, by statute, must consider the following Criteria:

1) whether water is physically available for the project;
2) whether water is legally available for the project;
3) whether prior appropriators may be adversely affected;

4) whether the proposed means of diversion are adequate;
5) whether the applicant has possessory interest in the property where the water is to be put to beneficial use; and
6) whether the water quality of a prior appropriator will be adversely affected.

1.3 Applicable Regulatory Requirements

Chouteau County Conservation District

- 310 Permit: Work on the Marias River pumping station would require authorization under the Montana Natural Streambed and Land Preservation Act (310 permit). The permit can be applied for through the conservation district.

Montana Department of Natural Resources and Conservation

- Water use permit: Appropriation of water in Montana requires a permit from the Water Rights Bureau.

- Floodplain Development Permit - This permit is required because the pumping station and portions of the supply pipeline would be located within the 100-year floodplain of the Marias River.

- State Lands Easement - Where the proposed pipeline would cross state-owned lands.

U.S. Fish and Wildlife Service

- Endangered Species Act: Compliance and Consultation

Montana Department of Fish, Wildlife and Parks (DFWP)

- Non-game and Endangered Species Conservation Act: 87-5-103(2): "Species or subspecies of wildlife indigenous to this state which may be found to be endangered within the state should be protected in order to maintain and to the extent possible enhance their numbers."

- The Natural Streambed and Land Preservation Act of 1975: 75-7-101 (310 permit) - DFWP works as a team with the conservation district to determine whether the project is reasonable, and whether there are alternative solutions that would reduce disturbance to the stream and effects on fish and aquatic habitat.

Montana Department of Environmental Quality (DEQ)

- 3A Authorization: Construction of the project pump station and related bank stabilization would likely increase suspended sediment and turbidity to levels above established standards under all of the action alternatives. Therefore, a short-term exemption from surface water quality standards (3A authorization) from the Montana DEQ would be needed before project construction could commence.

- MPDES Permit: If construction of the diversion system would require dewatering pumping, a Montana Pollutant Discharge Elimination System Permit (MPDES) would be required from DEQ.

- Storm Water Discharge: A Storm Water Discharge Permit, issued by DEQ, may be required during construction of the diversion station and during construction of pipelines under all of the action alternatives.

2.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes, in detail, the alternatives that were analyzed in this EA. This chapter also describes and summarizes how issues identified during the scoping process were used to develop alternatives to the proposed project.

2.1 Development of Alternatives

There are many possible variations or alternatives to any proposed action. However, the purpose of developing project alternatives is to address issues or potential problems raised by the proposed project. In addition to the No Action and the Proposed Project, two other alternatives, known as the *Minimum Flow Alternative* and *Tiber Inflow Alternative* has been developed to address the primary environmental issue raised by this project.

Primary Issue

The primary issue that has emerged through the agency and public scoping process is how the proposed project may affect Marias River flows and water rights. Some downstream irrigators are concerned that the project will reduce flows in the river to the extent that they will not be able to divert the water they need. The Loma rural water system is concerned that flow reductions could affect its system as well. DFWP holds a water reservation for flows for fish, wildlife, and recreation and is concerned about potential flow reductions. Recreational floaters are concerned about flow reductions as well. It is these concerns that have resulted in the inclusion of the *Minimum Flow Alternative* in this EA. The *Tiber Inflow Alternative* was included in response to a suggestion at the public meeting on the draft EA.

Other Relevant Issues

As identified in Chapter 1.0, other relevant issues are raised by the proposed project. These include potential effects to wetlands, soils, water quality and quantity, wildlife, saline seepage, cultural resources, and social and economic considerations. While these issues have not resulted in development of additional alternatives, the effect of each alternative on these individual resource areas is examined and compared in the succeeding chapters.

2.2 Description of Alternatives

Alternative 1 - No Action

The *No Action Alternative* serves as a baseline description for current conditions at the project site. Under *No Action*, the water permit application submitted by the Sunny Brook Colony would *not* be approved, and the project would not be developed. The current conditions at the project site may still be affected by further consumptive use development through Tribal reserved rights, and through state water reservations and water use permits. See Chapter 3.0 - *Affected Environment*, for a detailed profile of the current environmental situation in the project area. See Chapter 5.0 - *Cumulative Impacts*, for a description of other water developments that may occur in the Marias River watershed in the future.

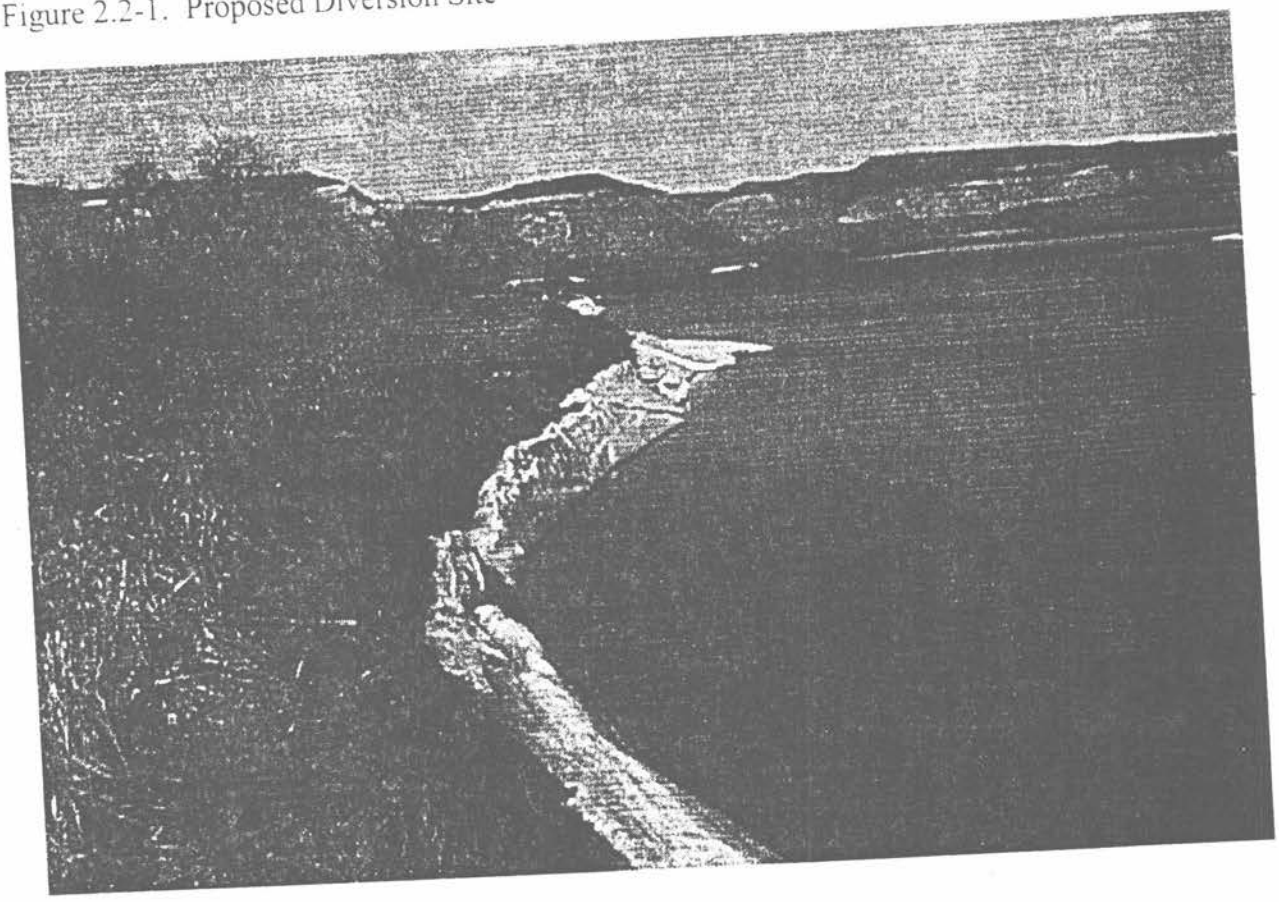
Currently, the proposed project acreage is used for dry-land farming by the Colony. The main crops are spring wheat and winter wheat. Production of these crops would likely continue under the *No Action Alternative*. Potential reductions to streamflows due to the proposed project would not occur under the *No Action Alternative*.

Effects related to development of the other project components, such as the water distribution system and irrigation pivots would not occur. No new jobs or economic opportunities would be created as a result of the conversion of dry-land acres to irrigated acres.

Alternative 2 - Proposed Project

The proposed project is to pump up to 2,622 acre-feet of water per year at a maximum rate of 16 cubic feet per second (cfs) from the Marias River. The applicant proposes to pump the water from the river with five 151 hp Cornell pumps. Figure 2.2-1 is a photograph of the proposed project pump site. A 24-inch diameter pipeline rated at 200 psi would be used to convey water from the river to a two-cell storage pit reservoir with a capacity of 10 acre-feet. From there, two secondary pumps would supply water to the center pivots. A Cornell 98 hp pump would provide water to the B pivots. A Cornell 44 hp pump would provide water to the A pivots (see figure 1.1-1). Pipeline diameters will gradually be reduced from 24-inch, to 15-inch, to 12-inch, and finally to 8-inch at the end of the pivots. The total length of pipeline would be about 5.5 miles, and the vertical lift about 300 feet. There would be nine center pivot sprinklers, which would irrigate 957 acres.

Figure 2.2-1. Proposed Diversion Site



Alternative 3 - Minimum Flow Alternative

This alternative was developed to address the issue of protecting and recognizing existing water rights and uses in the lower Marias River for irrigation and domestic uses, and fish, wildlife and recreation. All physical aspects of the project including the pumping station, pipelines, and pivots would remain as proposed. The difference would be that the Colony would not be permitted to pump water from the Marias River under a State water-use permit when flows dropped below cut-off levels. The cut-off levels would apply to flows measured at the U.S. Geological Survey (USGS) Marias River near Chester stream gaging station and would be as follows:

April - 580 cfs;
May - 610 cfs;
June - 630 cfs;
July - 660 cfs;
August - 640 cfs;
September - 610 cfs.

When measured flow rates are below these cut-off levels, the Colony would need to purchase stored water from Lake Elwell. This stored water possibly could be acquired through contract with Reclamation, or from another willing seller.

The intent of this alternative is to recognize existing water rights and uses by requiring the Colony to purchase stored water when flows in the lower Marias River are at or below the rate of 560 cfs--the desirable flow rate for fisheries and recreation. The cut-off flows listed above account for the effects of existing depletions in the river between Tiber Dam and Loma, which are added to the 560 cfs rate. An explanation of how the existing depletion in the lower Marias River were estimated can be found in Section 3.7 "*Existing Water Uses*". If a stream gaging station is someday established on the lower Marias River near Loma, the trigger flow would be 560 cfs at that gage for all months because the gage would provide a much more accurate estimate of the flow of the river at Loma.

This alternative has been developed for the purposes of this EA and does not guarantee that the Colony would be able to secure contract water from Reclamation or from any other party.

Alternative 4 - Tiber Inflow Alternative.

This alternative would allow the Colony to pump water from the Marias River under a State water-use permit, but only when Marias River **inflows** to Lake Elwell are above the rates listed for Alternative 3. This alternative was suggested at the September 11, 2000 draft EA public meeting in Fort Benton. The alternative would require the Colony to seek stored supplemental contract water to irrigate when inflows to Lake Elwell are insufficient to meet existing rights and uses below Tiber Dam. All physical aspects of the project including the pumping station, pipelines, and pivots would remain as proposed.

The cut-off flow rate are the same as those identified in Alternative 3, but would apply to flows measured at the U.S. Geological Survey (USGS) Marias River near Shelby stream gaging station upstream of Lake Elwell. To irrigate when flows at the Marias River near Shelby gaging station are below the cut-off rates, the Colony would need to purchase stored water from Lake Elwell. This stored water possibly could be acquired through contract with Reclamation, or from another willing seller.

As with Alternative 3, this alternative has been developed for the purposes of this EA and does not guarantee that the Colony would be able to secure contract water from Reclamation or any other party.

3.0 - AFFECTED ENVIRONMENT

To evaluate potential impacts resulting from the proposed project and the other alternatives described in Chapter 2.0, it is necessary to understand the current environmental condition of the project area. The concerns identified previously in Chapter 1.0 form the basis for the following descriptions.

3.1 Land Use and Vegetation

The Colony would irrigate higher benches west of the Marias River, and the main supply pipeline would climb about 300 feet out of the Marias River bottomlands. All lands that are proposed to be irrigated are presently farmed for crops. Primary crops grown in the project area are spring and winter wheat, grown in rotation with a season of fallow.

The pipeline route would cross pastureland in some locations. Typical rangeland vegetation in the project area includes native grasses such as western wheatgrass, little bluestem, green needlegrass, thick-spike wheatgrass and needle-and-thread, and introduced grasses such as smooth brome and Kentucky bluegrass; and shrubs and forbes. A search of the Montana Natural Heritage Program database identified no known sensitive plants occurring in the project area.

Noxious Weeds

Noxious weeds are undesirable plants that can infest cropland and have little or no value as forage for livestock and wildlife. Because most noxious weeds were introduced to this continent from elsewhere, they have few natural enemies here and therefore can spread rapidly and out-compete native plants if not controlled. Disturbed land, such as fallow fields, and corridors for roads, pipelines, and transmission lines, are particularly susceptible to weed infestations.

Land Ownership

The lands to be irrigated are 100 percent privately owned by the Colony. The diversion site and portions of the main pipeline routes traverse the private property of an adjacent landowner and state land. The adjacent landowner has indicated that he is willing to enter into an agreement with the Colony for an easement for the pumping station and pipeline. The main supply pipeline would cross state land on the east quarter of Section 1 T28N, R8E and an eighty acre parcel in southeast quarter of Section 6, T28N, R9E.

Transportation

State Highway 223 is the closest paved road to the project area. A county road provides direct access to the project area from Highway 223. This road generally receives light traffic. Existing access to the pumping station and portions of the project area are by unimproved roads. Access to the pumping station is down a steep road that would need to be improved to make it all-weather accessible.

3.2 Wetlands

A preliminary determination of wetlands within the project area was conducted using draft National Wetland Inventory maps for the area. No wetlands were identified on the lands proposed to be irrigated or along the proposed pipeline routes. The bottoms of several of the coulees adjacent to the project contain what are considered "temporarily flooded" wetlands. Also, the Marias River channel, in which the project pumping station would be located, is considered a riverine wetland.

3.3 Water Resources

Surface Water

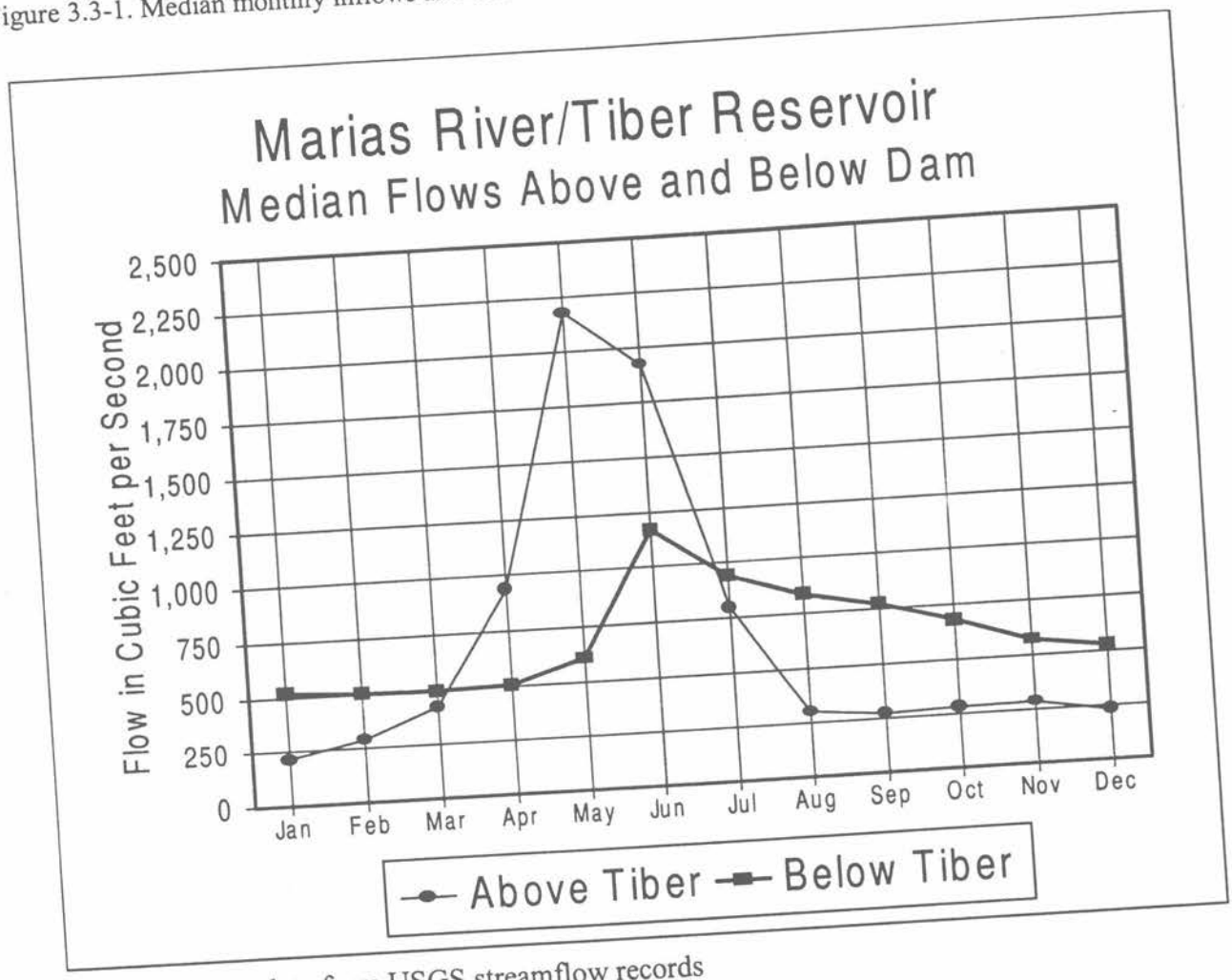
Streamflows near the project area are summarized as monthly percentile flows for the USGS streamflow gauge No. 06101500, *Marias River near Chester* in Table 3.3-1. Percentile streamflows are the flow rates that have been equaled or exceeded at a given frequency over the period of record. For example, during August, for the period of record 1980-1999, the Q80 (80th percentile) flow for the Marias River is 507 cfs and the Q20 (20th percentile) flow is 1,384 cfs. This means that the average monthly flow was greater than 507 cfs during 16 of the 20 Augusts (80 percent of the time) from 1980-1999. Similarly, only 4 of the 20 Augusts (20 percent) between those years had monthly average flows of 1,384 cfs or more. The Q80 and Q90 streamflows presented in Table 3.3-1 characterize streamflows during drier years. Conversely, the Q10 and Q20 streamflows are representative of those that would occur during wet years. Average conditions are represented by the Q50, (50th percentile), or median flow.

Table 3.3-1. Monthly Average and Percentile Streamflows in Cubic Feet per Second (cfs) for the Marias River near Chester (Based on 1980-1999 U.S. Geological Survey Streamflow Records)

Percentile	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	526	527	619	658	852	1,402	1,156	889	769	689	576	529
Q10	872	908	1,218	1,144	1,813	2,877	2,617	1,484	1,359	1,343	786	887
Q20	714	843	1,059	851	1,283	2,710	1,773	1,384	992	1,014	706	702
Q50	520	501	498	505	612	1,169	937	834	772	681	571	527
Q80	266	256	290	341	461	521	556	507	388	335	311	304
Q90	215	220	232	245	366	476	488	488	333	253	218	215
Highest	1,079	1,068	2,029	2,343	1,865	3,038	3,139	1,529	1,473	1,496	1,733	1,050
Lowest	210	204	216	241	355	446	420	391	332	209	187	194

At the public scoping meetings there were questions regarding the role of Tiber Dam in the control of streamflows at the proposed project site. The active storage capacity of Lake Elwell is 400,838 acre-feet. However, only about 268,000 acre-feet of this volume is available for uses such as irrigation because the rest already has been set aside for flood control. The 268,000 acre-feet volume is similar to the median (50^{th} percentile) annual inflow of the Marias River to the project of about 297,000 acre-feet. Water is generally stored in Lake Elwell during spring runoff when flows are highest. The stored water is then released when flows drop during the late summer, fall and winter. Figure 3.3-1 compares median Marias River inflows to Lake Elwell to median outflows. It is apparent that, without the reservoir, flows in the Marias River below Tiber Dam during the latter part of the irrigation season would frequently be much lower than they presently are. Conversely, flows would generally be higher during the early part of the irrigation season without Tiber Dam.

Figure 3.3-1. Median monthly inflows and outflows from Tiber Dam (based on 1980-1999 data).



Note: Based on data form USGS streamflow records

Another concern raised was the potential impacts that water diversions by the Colony from the Marias River could have on flow in the Wild and Scenic section of the Missouri River. Table 3.3-2 presents percentile flows for the Missouri River at Virgelle, which is near the upstream end of the Wild and Scenic section. During the irrigation season, the Marias River typically contributes about 5 to 12 percent of the flow of the Missouri River at Virgelle.

Table 3.3-2. Monthly Average and Percentile Streamflows in Cubic Feet per Second (cfs) for the Missouri River at Virgelle (Based on 1980-1999 U.S. Geological Survey Streamflow Records)

Percentile	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	7,114	7,347	7,648	8,344	12,050	16,197	10,324	6,907	6,507	6,485	6,652	6,709
Q10	8,239	9,996	10,761	10,619	19,068	30,897	17,759	8,961	11,003	8,655	9,266	8,556
Q20	8,203	8,754	8,896	9,693	15,177	26,510	17,203	8,822	8,259	8,184	8,109	7,606
Q50	7,349	7,325	7,476	8,133	12,171	14,873	10,129	6,816	6,046	6,308	6,274	6,938
Q80	5,842	5,823	5,891	6,514	8,798	6,012	5,164	4,936	4,879	4,848	4,908	5,586
Q90	4,960	5,757	5,295	5,289	6,483	4,987	4,211	4,248	4,230	4,360	4,340	4,632
Highest	8,790	10,055	13,029	14,993	20,372	32,180	17,949	11,950	11,397	9,867	9,511	8,697
Lowest	4,861	5,606	5,037	4,686	4,819	4,878	4,105	4,030	4,153	3,874	4,056	4,062

Water Quality

Water quality in the lower Marias River is generally fair to good. The Marias River is listed by DEQ as being in need of total maximum daily load (TMDL) development, but is listed as a low priority. Water quality concerns in the stream are due to moderate concentrations of suspended sediments and dissolved solids (TDS). The TMDL for the Marias River watershed is scheduled for completion by 2006.

The discussion that follows further describes the water quality in the study area with emphasis on those water quality parameters that are of concern. A general summary of relevant water quality data for the Marias River near Chester USGS gaging station (just below Tiber Dam) are contained in Table 3.3-3.

Table 3.3-3. Water quality Data summary for the Marias River near Chester.

PARAMETER	Median	Min	Max
Total Dissolved Solids (TDS)	380 mg/l	332 mg/l	495 mg/l
Electrical Conductivity (ECw)	.59 dS/m	.46 dS/m	.77 dS/m
Sodium Absorption Ration	1.1	1.0	1.5
Sodium (Na)	1.6 me/l (38mg/l)	1.3 me/l (31mg/l)	2.6 me/l(62mg/l)
Chloride (Cl)	.1 me/l (3.7mg/l)	.1 me/l (2.9mg/l)	.2 me/l (7.4mg/l)
PH	8.3	7.6	8.9
Water Temperature	54 F	32 F	72 F
Dissolved Oxygen (DO)	11.2 mg/l	8.7 mg/l	15 mg/l

mg/l = milligrams per liter
dS/m =deciSiemens per metre
me/l = milli-equivalents per liter

Source: USGS undated

Arsenic is a trace element that is a known carcinogen. Arsenic concentrations occurs in the Marias River in relatively low concentrations of about 1 to 2 micrograms per liter (or parts per billion) (DNRC 1991).

Suitability of Water for Irrigation

Table 3.3-4 contains guidelines for determining the suitability of water for irrigation. Based on these guidelines and the water quality data summary in Table 3.3-2, Marias River water is suitable for irrigation, with some minor restrictions. Examining the SAR in conjunction with the ECw reveals that using the water for irrigation could cause slight decreases in soil infiltration.

Table 3.3-4. Guidelines for Interpretations of Water Quality for Irrigation.

Potential Irrigation Problem			Units	None	Degree of Restriction on Use Slight to Moderate	Severe
Salinity (affects crop water availability)						
EC_w			dS/m	<0.7	0.7 – 3.0	>3.0
	(or)					
TDS			mg/l	<450	450 – 2000	>2000
Infiltration (affects infiltration rate of water into the soil. Evaluate using EC_w and SAR together)						
SAR =	0 – 3	and EC_w =		>0.7	0.7 – 0.2	<0.2
	3 – 6	=		>1.2	1.2 – 0.3	<0.3
	6 – 12	=		>1.9	1.9 – 0.5	<0.5
	12 – 20	=		>2.9	2.9 – 1.3	<1.3
	20 – 40	=		>5.0	5.0 – 2.9	<2.9
Specific Ion Toxicity (affects sensitive crops)						
Sodium (Na)						
Surface irrigation			SAR	<3	3 – 9	>9
Sprinkler irrigation			me/1	<3	>3	
Chloride (Cl)						
Surface irrigation			me/1	<4	4 – 10	>10
Sprinkler irrigation			me/1	<3	>3	
Boron (B)			mg/1	<0.7	0.7 – 3.0	>3
Miscellaneous Effects (affects susceptible crops)						
Nitrogen (NO3 – N)			mg/1	<5	5 – 10	>30
Bicarbonate (HCO3) (overhead sprinkling only)			me/1	<1.5	1.5 – 8.5	>8.5
pH					Normal Range 6.5 – 8.4	

1. ECW means electrical conductivity, a measure of the water salinity, reported in deciSiemens per metre at 25oC (dS/m) or in units millimhos per centimetre (mmho/cm). Both are equivalent.
2. TDS means total dissolved solids, reported in milligrams per litre (mg/1).
3. SAR means sodium absorption ratio. At a given SAR, infiltration rate increases as water salinity increases.

Source: Ayers and Westcot 1985

Stream Channel Form

In the vicinity of the proposed project, the Marias River meanders in a relatively narrow floodplain that is constricted between high bluffs. It is likely that operations of Tiber Dam, by

reducing peak spring flows, have altered characteristics of the stream channel and adjacent riparian zone. A recent study found a 98 % reduction in reproduction of cottonwood trees in the Marias River bottomlands downstream of Tiber Dam (Rood and Mahoney 1995). This decrease in cottonwood reproduction is likely related to a decrease in peak and overbank flows.

3.4 Ground Water

Direct information on the geology and groundwater resources beneath the project site is sparse. The information presented in this section draws heavily on work completed by the USGS (Swenson, 1957) for Lower Marias Irrigation Project. The study area for the Lower Marias project is located across the Marias River just north of the Colony's proposed project site.

The distribution and physical properties of the geologic units in north central Montana affect the availability, movement and quality of groundwater beneath the project site. Geologic units in project area are predominately shale, clay and sandstone, overlain by unconsolidated glacial till deposits of silt, sand and gravel (Table 3.4-1).

Hydrogeologic Units

Aquifers are rocks or unconsolidated deposits that contain sufficient saturated permeable material to yield useable quantities of water to wells and springs. Aquifer materials common in north central Montana are sandstone, coal beds and unconsolidated sand and gravel. Confining units (nonaquifers) are materials that are relatively impermeable, restrict the vertical movement of water between aquifers, and yield little or no water to wells or springs. Confining units include mudstone, shale, silty and clayey sandstone, and unconsolidated silt and clay beds and glacial till.

The Virgelle sandstone member of the Eagle sandstone is the most important aquifer in the project area. According to Swenson (1957), wells in the Virgelle discharge at least 10 gpm. The overlaying Clagget shale is almost impermeable to water and where present, acts as a confining unit. Very little is known about the water resource potential of the unconsolidated surficial deposits (glacial till) in the project area. Except where they fill buried valleys carved into the preglacial landscape, these deposits are generally thin and wells tapping them discharge only small amounts of water (Swenson, 1957).

Ground Water Flow and Ground Water Quality

The Montana Bureau of Mines and Geology Ground Water Information Center (GWIC) database indicates there are 2 wells within T28N; R8E Section 11ACD of the project area. The available information indicates both wells are 40 ft deep and have a static water level of 38 ft below the ground surface. Both wells appear to be used for stock and domestic purposes. The available information does not indicate which geologic formation the water is drawn from.

Table 3.4-1. Description of Geologic Units Underlying Sunnybrook Colony Irrigation Project.

Unit	Age	Thickness (ft)	Description
Unconsolidated Glacial Deposits	Quaternary	0 to 300	Unstratified deposits of clay, silt, sand and gravel. Stratified deposits of sand and gravel. Generally supple little water to wells. Water quality varies between good to highly mineralized
Claggett Shale	Upper Cretaceous	0 to 500	Marine shale containing thin layers of shaly sandstone in the upper part and thin beds of bentonite in the lower part. May yield only small amounts of highly mineralized water to wells.
Eagle Sandstone (Upper member)	Upper Cretaceous	100 to 175	Poorly cemented shaly sandstone and shale interbedded with carbonaceous shale and lignite. Yields small amounts of water to some wells.
Eagle Sandstone (Virgelle sandstone member)	Upper Cretaceous	35 to 100	Fine- to coarse-grained massive crossbedded sandstone. Wells tapping aquifer discharge at least 10 gpm. Water may be highly mineralized
Telegraph Creek Formation	Upper Cretaceous	100	Alternating fine-grained sandstone and marine shale. May yield very small amounts of highly mineralized water to wells.
Colorado Shale	Lower Cretaceous	1,800 to 2,200	Marine shale with numerous thin beds of bentonite. May yield very small amounts of highly mineralized water to wells.

Source: Swenson, 1957.

There is no direct information available on the direction of ground water movement in the deposits. However, it can be assumed that the potentiometric surface is a subdued representation of the land-surface topography and therefore, that the direction of groundwater flow is similar to that of surface runoff.

Water recharges the shallow ground water system in the unconsolidated surficial deposits from infiltration of precipitation and snowmelt. Deep percolation of irrigation water and leakage from the storage ponds will also contribute to shallow ground water recharge. If the Clagget shale underlies the surficial deposits at the project site, the impermeable nature of this unit will preclude recharge of the Virgelle sandstone from surficial infiltration.

Ground water in the Virgelle sandstone member of the Eagle sandstone is generally of poor quality. The mineral content of 13 samples from wells tapping this aquifer northeast of the

project site ranged from 1,830 to 7,360 ppm and averaged 3,550 ppm (Swenson, 1957). Groundwater in the unconsolidated glacial deposits is general of better quality than water from the Eagle sandstone. The mineral content of 10 samples from wells tapping theses deposits northeast of the project site ranged from 377 o 2,630 ppm and averaged 1,220 ppm (Swenson, 1957).

3.5 Soils

Soils within the project area are generally deep, moderately drained and have a high water holding capacity. The predominant soil texture is loam (82%) with lesser amounts of clay loam and silty clay loam. In general, the soils have moderate to slow permeabilities, and low to intermediate soil-leaching potentials. The soils have developed primarily on glacial till deposits. All 957 acres of the project soils are classified as High Erodable Lands by the NRCS. Wind erosion is the primary erosion hazard. Based on information provided by the NRCS in Fort Benton, ten different soil types would be directly affected by the proposed project (Table 3.5-1) Four of these soil types account for approximately 86% (829 acres) of the project soils.

Table 3.5-1. Sunny Brook Colony irrigation project soils information.

Soil Name	Soil Symbol	Soil Texture	Total Acres	Percent Total Acres	Highly Erodable Soils[1] (Y/N)	Permeability (in/hr)[2]	Available Water Capacity[2] (in/ft soil)	Soil Leaching Potential[2]	Features Affecting Irrigation
Evanston	37B	Loam	232.1	24.3	Yes	0.6 – 2.0	1.8 – 2.2	Intermediate	Erodes easily
Phillips	33A	Loam	221.8	23.2	Yes	0.06 – 0.2	1.7 – 2.1	Low	Erodes easily, percs slowly
Attewan	27B	Loam	219.6	22.9	Yes	0.6 – 2.0	0.9 – 1.1	Intermediate	Erodes easily, too sandy
Phillips – Elloam Complex	331B	Loam and clay loam	165.5	17.3	Yes	0.06 – 0.2	1.1 – 2.1	Low to very low	Erodes easily, percs slowly
Kevin – Hillon	441C	Clay loam	31.5	3.3	Yes	0.2 – 0.6	1.6 – 2.2	Low	Erodes easily, percs slowly
Ethridge	38B	Silty clay loam	29.4	3.1	Yes	0.06 – 0.2	1.7 – 2.2	Low	Erodes easily, percs slowly
Attewan – Tinsley Complex	272C	Loam and gravely sandy loam	26.1	2.7	Yes	0.6 – 2.0	0.2 – 1.1	Intermediate to high	Erodes easily, too sandy
Nishon	28	Clay loam	18.4	1.9	Yes	0.06 – 0.2	1.7 – 2.0	High[3]	Erodes easily, ponding, percs slowly
Assinniboine	39B	Loam	8	0.8	Yes	0.6 – 2.0	1.4 – 1.7	High	Erodes easily
Scobey	56A	Clay loam	5.1	0.5	Yes	0.2 – 0.6	1.8 – 2.2	Low	Erodes easily, percs slowly

1. Information provided by NRCS, Ft. Benton, MT.
2. Soil Survey of Chouteau County, MT. Information provided by NRCS, Ft. Benton, MT.
3. Water table may be within 24 inches of the surface during growing season.

3.6 Economics

Population

As is the case with most rural counties in Montana, the population of Chouteau County is decreasing in number and increasing in age. From 1970 to 1999, Chouteau County's population decreased from 6,473 to 5,066--the 33rd most populous of the state's 56 counties. The population decreased 22 percent at an average annual rate of -.82 percent. By comparison, the population of the state grew by 27 percent to 882,779 during the same period at an average annual rate of .80 percent.

The rate of natural increase decreased from .62 percent in the early 1970s to -.25 percent in 1999 and net migration averaged -33 in the 1990s. The percentage of the population over sixty five increased from 11 percent in 1970 to 19 percent in 1999. (U.S. Bureau of the Census, 2000)

Employment

In 1999, the unemployment rates for Chouteau County and Montana were 3.1 percent and 5.2 percent, respectively. Between 1989 and 1998, employment in the county increased 20 percent to 3,098. During the same period Montana's employment increased 27 percent to 543,333. In 1998, employment was split about evenly between wage and salary (1,639) and proprietors' (1,459) and proprietors' employment was split about evenly between farm proprietors (740) and nonfarm proprietors (719). Among industries, employment is highest in farming (996), services (490, the majority of which is in health care), local government (445), and retail trade (400). Between 1989 and 1998, farm employment decreased from 37 percent to 32 percent of total employment and government employment decreased from 20 percent to 17 percent of total employment. (U.S. Bureau of Economic Analysis, 2000)

Income

Total personal income (TPI) consists of earnings from labor and proprietors' income; dividends, interest, and rent; and transfer payments. Between 1988 and 1998, TPI grew from $71.1 million (1988 dollars) at an average annual rate of 4.3 percent to $108.4 million (1998 dollars). During the same period, TPI in the state and the nation grew at average annual rates of 5.7 percent and 5.6 percent, respectively. Chouteau County's 1998 TPI ranked 33rd in the state, accounting for .6 percent of the state total. In 1998, earnings were 44.6 percent of TPI, dividends, interest, and rent were 36.3 percent, and transfer payments were 19.1 percent. From 1988 to 1998, earnings increased on average 4.9 percent each year; dividends, interest, and rent increased on average 2.9 percent; and transfer payments increased on average 6.0 percent.

Earnings of persons employed in Chouteau County increased from $26.8 million (1988 dollars) in 1988 to $44.7 million (1998 dollars) in 1998, an average annual rate of growth of 5.2 percent. The industries providing the greatest contributions to earnings in 1998 were farming (27.8 percent), state and local government (24.5 percent), and services (11.5 percent). In 1988, the industries providing the greatest contributions to earnings were state and local government (26.5 percent), farming (23.0 percent), and retail trade (11.7 percent). Of the county's major industries in 1998, the slowest growing over the previous ten years was retail trade which increased at an

average annual rate of 2.3 percent. The fastest growing industry was wholesale trade which increased at an average annual rate of 11.8 percent.

In 1998, Chouteau County had a per capita personal income (PCPI) of $20,905, ranking 13th in the state at 98 percent of the state average, $21,229. In 1988, PCPI in Chouteau County was $12,546 (1988 dollars) and ranked 16th in the state. Between 1988 and 1998, the annual rate of growth of PCPI in Chouteau County averaged 5.2 percent. For the state and the nation during the same period, the annual rate of growth averaged 4.7 percent and 4.6 percent, respectively. (U.S. Bureau of Economic Analysis, 2000)

Taxation

The total taxable value of property in Chouteau County for the 1998 tax year was $27.92 million (1.4 percent of the state total). The taxable value of Class 3 agricultural land in the county was $10.27 million (7.2 percent of the state total) and ranked highest among Montana's counties. Chouteau County also ranked first for non-irrigated land ($8.93 million) and farm implements ($3.80 million). The taxable value of irrigated land in Chouteau County ranked 41st at $.056 million. For tax purposes, agricultural land is evaluated based on various factors such as crop and length of growing season. In 2000, the tax rate for each category of land is 3.627 percent. The average mill levy for Chouteau County currently is 331.30. The property tax per acre on the project land under its current dryland use is $2.84. The property tax per acre on irrigated acres in Chouteau County growing alfalfa--the use of the land assumed for the purposes of this analysis--is $2.747. The property tax per acre on grazing land is $.41. (Montana Department of Revenue, 2000)

Agricultural Sales

Cash receipts from agricultural marketing in Chouteau County in 1997 totaled $138.70 million and ranked first among Montana's counties. Total cash receipts for the state were $2,321 million. Cash receipts in Chouteau County included $16.07 million from livestock, $102.25 million from crops, and $20.37 million in government payments. Primary crops in the county are winter and spring wheat and barley. Total production expenses were estimated to be $120.43 million in 1997. Total farm labor and proprietors' income was estimated to be $12.42 million in 1998. (Montana Agricultural Statistics Service, 1999)

3.7 Existing Water Uses

Water Claims and Permits

A search of the DNRC water rights database indicates that there may be about 8,000 acres of land irrigated by existing users from the Marias River between Tiber Dam and Loma. This is reconfirmed by a DNRC, NRCS, and Reclamation conducted analysis that estimated irrigated acres for the Marias River and its tributaries below Tiber Dam were 8,600 acres during 1986 (DNRC, unpublished data).

Using the NRCS TR-21 computer program (NRCS, undated) DNRC estimates that consumptive use for irrigation in the area peaks at about .32 inches per day during the later part of July. Given

this, the maximum daily amount of irrigation water consumed on 8,000 acres would be about 213 af, which corresponds to a flow rate of about 108 cfs. Because no irrigation system is 100% efficient, to meet this demand diversion rates would need to be higher. On the other hand, all irrigators on the river may not be diverting at the same time, and a portion of the water they divert may eventually return to the river through surface and groundwater return flows.

To further investigate this question, DNRC measured and compared streamflows in the Marias River at Loma (just above the mouth of the Teton River) to corresponding flows at the USGS gage below Tiber Dam. On May 18, 2000, DNRC measured a flow of 644 cfs at Loma, which was 31 cfs lower than the recorded flow of 675 cfs at the upstream USGS gage. On July 17, 2000, DNRC measured a flow of 443 cfs at Loma: 96 cfs less than the flow of 539 cfs at the USGS gage. And on September 12, 2000 DNRC measured a flow at Loma of 464 cfs, which was 53 cfs less than the 517 cfs recorded at the USGS gage.

Based on the measured flows and number of irrigated acres, DNRC estimates that maximum existing depletions in the lower river are about 100 cfs during July. Depletion rates for other months were estimated by DNRC--using the May 18 and September 12 flow measurement and results from the TR-21 program--to be as follows:

April - 20 cfs
May - 50 cfs
June - 70 cfs
July - 100 cfs
August - 80 cfs
September - 50 cfs.

The Loma County Water and Sewer District has rights to divert up to about .6 cfs of water for domestic use from the Marias River at Loma.

Water Reservations

In 1989, the Hill, Liberty, Chouteau and Big Sandy conservation districts applied for reserved water in the vicinity of the proposed project. In fact, one project proposed by the Hill County Conservation District was immediately north of the Colony's proposed project. The four conservation district proposed to irrigate a total of 24,992 acres from the Marias River. Of this, water was only reserved for 1,178 acres--all in Liberty and Chouteau counties. The Hill and Big Sandy applications were denied in full by the Board of Natural Resources and Conservation. Although all the projects were found to have the potential to be economically feasible, their net public value was not positive when comparing the potential benefits to the potential costs when considering potential losses in hydropower and instream flow values and energy replacement costs.

Federal Reserved Water Rights

A Compact for flows in the Wild and Scenic Section of the Missouri River has been negotiated between the State of Montana Reserved Water Rights Compact Commission and Bureau of Land

Management. The compact allows for additional consumptive use development in the Missouri basin above the Wild and Scenic section. During the irrigation seasons, the amounts of new depletions allowed by the Compact are as follows:

April	185,000 acre-feet,
May	219,000 acre-feet,
June	62,000 acre-feet,
July	82,000 acre-feet,
August	66,000 acre-feet,
September	40,000 acre-feet.

3.8 Fisheries

The lower Marias River is a warm-water fishery that is rated as "high-value" by DFWP. The fish species that are found in the river near the proposed project are summarized in Table 3.8-1. Fish survey data indicate that numbers of some types of fish may be declining in the Marias River. Of particular concern are declines in the number of sauger which, along with shovelnose sturgeon, are the fish most sought after by anglers on the lower river. The Marias River is a critical spawning stream for sauger from the Missouri River and the number of spawning sauger have declined substantially in recent years (DFWP, 1998). Other fish from the Missouri River, such as the shovelnose sturgeon and blue sucker, also migrate up the Marias River to spawn. Higher flows are thought to trigger these spring migrations. The blue sucker, paddlefish, and sauger are listed by the State as species of special concern.

The lower Marias River may provide habitat for the pallid sturgeon, a federally listed endangered species. However, pallid sturgeon have not been found in the Marias River in recent years. Recent fish surveys also have not detected the presence of paddlefish in the lower river and it is possible that the operation of Tiber Dam--which have changed the flow patterns of the lower Marias River--may be responsible for the general absence of the pallid sturgeon and paddle fish in the lower river.

In 1985, DFWP applied for a water reservation in the Marias River. The purpose of the water reservation was to set aside a minimum river flow for fish, wildlife, and recreation. DFWP applied for 560 cfs of water to be monitored at the mouth of the river near Loma. However, the reservation DFWP was ultimately granted was limited to 488.5 cfs.

DFWP in cooperation with Reclamation and the Marias River Advisory Committee has developed recommended operating guidelines for fish, wildlife and recreation for Tiber Reservoir and the lower Marias River (DFWP, 1998). These guidelines include recommendations to restore a more natural high spring flow regime to the lower Marias River. High spring flow releases from Tiber Dam are recommended to be made between May 16 through July 10, and preferably during June. It is recommended that releases be increased daily during the period until a peak of between 2,000 to 5,000 cfs is reached, after which the flows should be gradually ramped down. Water supply forecasts would be used schedule these flow

releases and to determine how much water is availability for them each year. DFWP believes these flow releases would help trigger spawning by migratory fish from the Missouri River, and would provide for channel and riparian zone maintenance

Table 3.8-1. Fish Species that occur in the Marias River in the vicinity of the proposed project and their status.

Common name	Stream Use	Abundance
Bigmouth Buffalo	Primarily spawning and rearing	Common
Blue Sucker	Primarily spawning and rearing	Common
Brown Trout	Year-round resident	Uncommon
Burbot (Ling)	Year-round resident	Primarily spawning and rearing
Channel Catfish	Primarily spawning and rearing	Common
Carp	Year-round resident	Common
Emerald Shiner	Year-round resident	Uncommon
Fathead Minnow	Year-round resident	Uncommon
Flathead Chub	Year-round resident	Abundant
Freshwater Drum	Primarily spawning and rearing	Uncommon
Goldeye	Resident and spawning	Abundant
Lake Chub	Year-round resident	Rare
Longnose Dace	Year-round resident	Uncommon
Longnose Sucker	Year-round resident	Abundant
Mottled Sculpin	Year-round resident	Rare
Mountain Sucker	Unknown	Uncommon
Mountain Whitefish	Year-round resident	Abundant
Northern Pike	Resident and spawning	Uncommon
Paddlefish	Primarily spawning and rearing	Rare
Rainbow Trout	Year-round resident	Uncommon
River Carpsucker	Year-round resident	Common
Sauger	Resident and spawning	Common
Shovelnose Sturgeon	Primarily spawning and rearing	Common
Smallmouth Buffalo	Primarily spawning and rearing	Uncommon
Spottail Shiner	Year-round resident	Uncommon
Stonecat	Year-round resident	Common
Walleye	Resident and spawning	Common
Western Silvery/Plains Minnow	Year-round resident	Uncommon
White Sucker	Year-round resident	Common
Yellow Perch	Year-round resident	Uncommon

Source: Montana Rivers Information System

3.9 Wildlife

Wildlife species that may occur in the Marias river bottoms near the proposed project pump site include Canada geese, ducks, osprey, bald and golden eagles, prairie falcon, blue heron, mule and whitetail deer, beaver, and raccoons. The spiny softshell, an aquatic turtle, has been documented to occur in the lower Marias River and is a species of special concern in Montana. The uplands where the center pivots are proposed is potential habitat for prairie songbirds, raptors and game birds.

There is a stand of cottonwood trees along the river at the proposed pump site. Many of these trees are dead or are dying. Beavers are active in the area and have girdled some of the larger trees. The standing dead trees are potential roosting and nesting sites for raptors, although no raptor use was observed during a DNRC site visit during March, 2000.

3.10 Recreation and Aesthetics

The lower Marias River receives a moderate amount of fishing pressure and the pressure has been increasing in recent years (Table 3.11-1).

Table 3.11-1. Angling use data for the lower Marias River (mouth to Tiber Reservoir).

Year	Angler days per year
82	1,495
83	1,310
84	2,730
85	2,161
89	3,981
91	112
95	5,419
97	5,041

Source: Montana Rivers Information System

The Marias is an excellent river for floating and is becoming more popular with canoeist and rafters in recent years. The river corridor is relatively undeveloped and offers a primitive recreational experience. Recently, a Marias River working group has been established to address recreational issues regarding the river. Minimum flows for recreational floating have not been quantified, although a flow of 500 cfs has been suggested as a possible minimum (DFWP, 1998). Flows during the floating season are already often below 500 cfs in the lower river, which can make floating difficult.

The lower river and adjacent lands also are used by waterfowl, upland game bird, and big game hunters.

3.11 Cultural Resources

There are no recorded historical or archeological sites within the project area, but this is possibly due to the lack of any cultural resources inventory. Upland benches overlooking river valleys have a high potential of containing historical and archeological evidence of past use, and prehistoric sites have been identified on similar landscapes in the basin.

4.0 - ENVIRONMENTAL CONSEQUENCES

This chapter is organized by resource area in the same order as presented in Chapter 3.0, with the probable consequences of the four alternatives described for each resource area.

4.1 Land Use and Vegetation

Vegetation

A minor impact to vegetation would occur under the three action alternatives as a result of the temporary loss of range vegetation along the main water supply pipeline route. Disturbed areas along the pipeline route could become infested with weeds if not promptly reclaimed and seeded, preferably with native grasses. It is likely that herbicides would be used to control weeds. If care were not taken when applying the herbicides, native, non-target plants could be killed. These impacts would be minor to moderate under all of the action alternatives and would not occur under the No Action Alternative.

Land Use

With irrigation, cropping would change from primarily small grains under a crop-fallow rotation to a more continuous crop of alfalfa hay, wheat, barley, canola, and corn. Because all of the land to be irrigated is already cropped, the impacts of this conversion to irrigation on land use would be minor under the three action alternatives.

Required land preparation may require moving fences and establishing grassed waterways. The impact of these land preparation activities would be minor under the three action alternatives.

Some sections of the pipeline would cross lands that are not owned by the Colony. Easements would be required to cross these lands. Where the supply pipeline crosses state land, a land use license would be required from DNRC.

Power transmission lines

The Colony intends to use electrical power for the project. The nearest 3-phase power line is across the Marias river and about 4 miles east of the project. An existing single-phase power line crosses the river in Section 18, Township 28 North, Range 9 East, about 2 miles south of the proposed pump site. The Hill County Electric Cooperative would likely be the Colony's power supplier. The Coop has indicated that it would probably prefer to bring 3-phase power to the Colony by following existing power line right-of-ways, and by crossing the river at the existing single phase power line crossing (Hill County Electric Coop, personal communication). Using the existing right-of-way and river crossing would lessen this potential moderate land use impact.

4.2 Wetlands

Because the project pump station is located in an area that is considered a riparian/wetland, there is the potential for a minor disturbance to the riparian zone wetland under the three action alternatives. No other impacts to wetlands are likely, because none have been identified in the fields that are proposed to be irrigated. No impacts to wetlands would occur under the No Action Alternative.

4.3 Water Resources

Surface Water

The Sunny Brook Colony proposes to pump water from the Marias River at a maximum rate of 16 cubic feet per second (cfs). In Table 4.3-1, the rate of 16 cfs was divided by the Table 3.3-1 Marias River flows minus the estimated existing depletions in the lower river, and the resulting value multiplied by 100 to estimate percentage reductions to Marias River flows due to pumping by the Colony. This analysis indicates that during August of average years, the project would divert about 2 percent of the flow of the river. During a dry August (Q90 or driest year in ten), the project could divert up to about 4 percent of the flow of the river. The flow reductions would not always be as great as those listed in Table 4.3-1 because during much of the time, especially during the spring and fall, the Colony would not be diverting at the maximum rate applied for (see page 36 "Irrigation Water Use and Requirements"). The potential for these minor to moderate impacts to river flow would be greatest under the *Proposed Project Alternative*. Impacts to flows under the *Minimum Flow Alternative* and *Tiber Inflow Alternative* may be less, because the Colony would need to purchase contract water during times of lower flows. When planning its annual operations of Tiber Dam, Reclamation would be aware of the water requirements of the Colony and may be able to adjust its operations in order to better meet downstream flow targets.

Table 4.3-1. Estimated percent reductions to monthly average and percentile streamflows for the lower Marias River during the irrigation season due to a 16 cfs irrigation depletion.

Percentile	April	May	June	July	August	September
During Average Flows	3	2	1	2	2	2
Q10	1	1	1	1	1	1
Q20	2	1	1	1	1	2
Q50	3	3	1	2	2	2
Q80	5	4	4	4	4	5
Q90	7	5	4	4	4	6
During Highest Flows	1	1	1	1	1	1
During Lowest Flows	7	5	4	5	5	6

Irrigation withdrawals would also reduce the water level (stage) of the Marias River. Because the configuration of the Marias River channel varies, the reductions to stage would differ from location-to-location. To determine how pumping by the Colony may affect water levels, changes in stage with a 16 cfs reduction in discharge were examined by: (1) using a relationship between river stage and flow that had been developed for the discontinued USGS gage on the Marias River near Loma, and (2) examining notes from a recent DNRC discharge measurement on the Marias River, just above the mouth of the Teton River, at Loma. Based on this analysis, water level reductions of less than 1 inch could be expected on most areas of the lower Marias River under the three action alternatives, even during times of low flow.

Impacts to flows in the Missouri River below the mouth of the Marias River would be minor under all three action alternatives. This is because the proposed project diversion rate is small in comparison to the flow of the Missouri River. Table 4.3-2 shows that such reductions would be less than 1 percent, even during times of low flow.

Table 4.3-2. Percent reductions to monthly average and percentile streamflows during the irrigation season for the Missouri River near Virgelle due to a 16 cfs depletion.

Percentile	April	May	June	July	August	September
During Average Flows	0.2	0.1	0.1	0.2	0.2	0.2
Q10	0.2	0.1	0.1	0.1	0.2	0.1
Q20	0.2	0.1	0.1	0.1	0.2	0.2
Q50	0.2	0.1	0.1	0.2	0.2	0.3
Q80	0.2	0.2	0.3	0.3	0.3	0.3
Q90	0.3	0.2	0.3	0.4	0.4	0.4
During Highest Flows	0.1	0.1	0.0	0.1	0.1	0.1
During Lowest Flows	0.3	0.3	0.3	0.4	0.4	0.4

It is likely that some of the water diverted to the project lands will eventually return to the Marias River, via either surface or groundwater return flows. A maximum of about 25% of the diverted water may return, but is likely that, with proper water management, much less would. Any surface runoff from the sprinkler systems would return relatively quickly, probably via the coulees that bisect the project area. Groundwater returns would occur more gradually, but could also be intercepted and conveyed more quickly by the coulees. Return flows would offset some of the flow reductions caused by the project. However, it is likely that the return flow water would be of poorer quality than that in the river (see water quality section).

The approximate percentages of time State permit water would be available to the Colony under the *Minimum Flow Alternative* are summarized by month in Table 4-3.3. It is important to note that under the *Minimum Flow Alternative* during some years there would be no permit water available to the Colony. For the 20-year period of 1980 through 1999, during two of those years (1988 and 1992) flows in the Marias River would not have been sufficient for the Colony to divert water under the *Minimum Flow Alternative* during the entire irrigation season.

Under the *Tiber Inflow Alternatives* water through a state permit could be available to the Colony from April through mid July, but may not be available during those months when Tiber outflows drop below about 500 cfs without adversely affecting existing rights downstream of Tiber Dam. Under this alternative, water would seldom be available from late July through September (see Table 4-3.3).

Under *the Proposed Project Alternative*, the colony would not be able to legally divert water much of the time without adversely affecting the rights of senior users.

Table 4-3.3. Approximate percent of time water may be available to the Colony through a state water use permit under the *Minimum Flow* and *Tiber Inflow* alternatives.

Alternative	April	May	June	July	August	September
Minimum Flow	40%	50%	55%	70%	65%	65%
Tiber Inflow	85%	>95%	95%	60%	<5%	15%

Under the *No Action Alternative* impacts to surface water flows may still occur due to development of federal reserved water rights, and conservation water reservations. The potential impacts of these developments are discussed in the cumulative impact section.

Water Quality

Water quality impacts by the proposed project would occur if: (1) changes to the quality of water in the Marias River occurred; or (2) irrigation with Marias River water results in damage to soil productivity or the contamination of underlying groundwater aquifers. This section will discuss the first type of impact: potential changes to water quality in the Marias River. Effects on soil productivity and aquifers are discussed in the *Soils* and *Groundwater Impact* sections. No impacts to water quality would occur as a result of the proposed project under the *No Action*

Alternative, although water quality impacts could still occur due to other water development projects (see the Section 5.0, Cumulative Impacts).

Total Suspended Sediment

During construction of the water diversion system for the project, there would be short-term increases in total suspended sediment (TSS) in the Marias River under both of the action alternatives. However, the total amount of sediment that would be added to the Marias River during construction should be minor.

There is the potential for moderate long-term impacts from the project on suspended sediment concentrations in the Marias River under the three action alternatives. Because some of the clayey soils in the project area have low infiltration rates (see the soils section), applying water at relatively high rates could result in surface runoff. This runoff may flow down the coulees adjacent to the project and eventually to the Marias River. The surface runoff would pick-up sediment and also could contain nutrients, such as phosphorous and nitrogen.

Total Dissolved Solids

Irrigation return flow from the Sunny Brook Colony could be expected to have total dissolved solids (TDS) concentrations that are higher than that in the applied water. Under the three action alternatives, there is the potential that return flow could impact TDS concentrations in the Marias River. The impact would likely be minor because the return flows would only constitute a small percentage of the total flow of the river. For instance, if 25 percent of the 16 cfs peak diversion amount were to return to the river, it would amount to about 4 cfs. If TDS concentrations in the 4 cfs of return flows were elevated to 1,500 mg/l--about four times the median concentration of that in the diverted Marias River water--TDS concentrations in the river at a low flow of 500 cfs would only rise to 389 mg/l or about 2 percent. In comparison, the standard for TDS in public drinking water supplies is 500 mg/l. Further discussion of the potential for TDS impact can be found in the soils and groundwater sections of this EA.

Temperature and Dissolved Oxygen

Streamflow reductions due to project pumping could cause some minor and indirect impacts to water temperature and dissolved oxygen (DO) in the Marias River under the three action alternatives. Reducing flows could result in a slight increase in water temperature during times when the flow of the river is very low. Related small decreases in DO also could occur, because warmer water can hold less DO.

Arsenic

Arsenic concentrations in the Marias River are relatively low: in the range of 1 to 2 micrograms per liter. In contrast, arsenic occurs in relatively high concentrations (9 to 20 micrograms/liter or parts per billion) in the Missouri River near Virgelle (DNRC, 1991). By reducing dilution flows, consumption of water by the proposed project would contribute, in a small way, to increasing already high arsenic concentrations in the Missouri River.

Stream Channel Form

Impacts to stream channel form associated with the project pumping station would be minor under the three action alternatives because the pump site is on a relatively stable straight section of the Marias River.

High flows are important in maintaining river channel characteristics and spring peak flows in the lower Marias River are already much reduced by operations at Tiber Dam. By further reducing flows in the Marias River, the project would contribute, in a small way, to the continued degradation of the channel and associated riparian zone along the lower Marias River. This impact would occur under all three of the action alternatives. An even smaller relative impact to higher, channel-forming flows on the Missouri River would occur. These minor impacts would occur under the three action alternatives.

4.4 Ground Water

The leaching of agricultural chemicals (insecticides, herbicides, and fertilizers) will potentially affect ground water resources in saturated portions of the unconsolidated surficial deposits. The degree to which ground water is affected by the proposed project depends on the depth to ground water, permeability of the soils and aquifer materials, irrigation and agricultural chemical management practices, and the degradation characteristics of the chemicals used. It is assumed that the potential ground water impacts will be the same for each of the proposed project alternatives.

The unconsolidated surficial deposits serve as recharge areas and make aquifers within these deposits sensitive to sources of contamination. Once intercepted by the water table, contaminants will follow local flow paths and may either move downward to deeper parts of the aquifer or discharge to surface water resources through springs or seeps. Domestic and/or stock wells may be impacted if they intercept a contaminant flow path.

Pesticides that are expected to be used by the project producers are listed on Table 4.4-1. Seven of the chemicals listed have moderate to very high leaching potentials. These seven chemicals have the highest potential of impacting the ground water resource. To minimize potential negative impacts, producers will have to carefully manage their irrigation and chemical application practices. Over application of pesticides and fertilizers will increase the potential for these chemicals to impact ground water. The potential will be greatest in areas with highly permeable soils and a shallow water table. Application of irrigation water in excess of soil infiltration rates will promote the loss of agricultural chemicals through runoff, which may in turn impact nearby surface water resources.

Table 4.4-1. Chemical Leaching Potential for Sunny Brook Colony Irrigation Project.

Common Name	Active Ingredient	Half-life ($T_{1/2}$) (days)	Sorption Coefficient (K_{oc})	Solubility (S) (ppm)	Ground Water Ubiquity Score (GUS)	Leaching Potential
Sevin	Carbaryl	10	300	120	1.52	Low
Furadan	Carbofuron	50	22	351	4.52	Very High
Ambush	Permethrin	30	100,000	.006	-1.48	Extremely Low
Dimethoate	Dimethoate	7	20	39,800	2.28	Moderate
Warrior	lambda-chalothrin	30	180,000	.005	-1.85	Extremely Low
Fusilade DX	Fluazifop-p-butyl	15	5,700	2	0.29	Very Low
Dual*	Metolachlor	90	1,200	530	3.32	High
Poast*	Sethoxydim	5	100	4,390	1.40	Low
Banvil**	Dicamba	14	2	400,000	4.24	Very High
Curtail**	Clopyralid	40	6	300,000	5.16	Very High
Amber**	Triasulfuron	114	105	32 @ pH 5 815 @ pH 7 1,350 @ pH 9	4.07	Very High
2,4-D**	Acid Demethylamine salt Ester or oil soluble amine	10 10 10	20 20 100	890 796,000 100	2.70 2.70 2.70	Moderate Moderate Moderate

Source: Montana Dept of Agriculture

Notes:

1. GUS Values are calculated using the soil half-life and the sorption coefficient
2. Sorption Coefficient is unitless value
3. ppm = parts per million

* Herbicides that may be used on corn crops

** Herbicides that may be used on grain crops

In the project area, it is assumed that the unconsolidated glacial till deposits overlay the Clagget shale. Because the shale is almost impermeable, waterlogging of the soil is likely to result from unrestricted irrigation in areas where this formation is close to the surface. It is recommended that a network of water-level observation wells be installed and that the water level in these wells monitored on a regular basis.

4.5 Soils

Erosion

Soil erosion by both wind and water are potential concerns within the project area. As shown on Table 1.1 soils in the project area are classified as "highly erodable" by the NRCS office in Fort Benton, Montana.

Winds strong enough to cause some erosion occur almost every month in north central Montana. Mean wind speed for Great Falls--the closest station with historic wind data--between January and September is 10 – 15 miles per hour. Wind speeds of 50 miles per hour or more are

occasionally part of weather systems crossing Montana in fall and winter. Strong winds may also accompany thunderstorms during the summer.

Irrigation of the project soils will help to decrease wind erosion rates during the irrigation season on cultivated fields because wet soils are more resistant to erosion. In addition, irrigation enhances crop cover during the growing season and provides more protection from wind erosion than dryland crops.

To reduce the potential for soil erosion by water, it will be critical for the project sponsors to design an irrigation system whose application rate will not overwhelm the soil intake rate. In an effort to maximize irrigation efficiencies, it is assumed that the applicant will install a low-pressure sprinkler system. One of the drawbacks of a low-pressure system is the reduced radius of throw of the sprinkler head. This reduction significantly increases the systems instantaneous application rate due to the shorter application time for any point in the field. For typical low-pressure systems, instantaneous application rates may exceed 5 inches/hour toward the outer end of the lateral (Broner, 1995). Soils within the project area have initial cylinder intake rates that vary from a minimum of 0.1 inches/hour to a maximum of 4.0 inches/hour. The typical midpoint value for these soils is approximately 1.0 inches/hour. Therefore, excessive runoff and erosion will be an important management consideration for the proposed project.

Mitigation measures that can be used to reduce soil erosion include the use of booms on the last few spans of longer pivots to widen the area of application and lower the instantaneous application rate. Guns at the end of the laterals should not be used. Proper tillage practices to catch water at the point of where it hits the ground should also be used. Carefully planned and managed irrigation scheduling will help to minimize excess irrigation and water runoff. In addition, the irrigation system should be designed to be compatible with the predominant soil types in the project area.

Salinity

Irrigation in the semi-arid climate of the project area can lead to an increase in soil salinity, which may have a profound effect on crop yield and on long-term soil productivity. Yield reductions occur when salt concentrations in the root zone accumulate to such an extent that the crop is no longer able to extract enough water from the soil profile. Salinity effects are closely analogous to those of drought as both result in water stress and reduced growth.

Soil salinity increases as water-soluble salts present in the irrigation water become concentrated in the soil profile. The salt concentration increases as the crop removes most of the applied water from the soil to meet its evapotranspiration demand (ET) but leaves most of the salt behind to concentrate in a shrinking volume of soil water. At each irrigation, more salt is added with the applied water. A portion of the added salt must be leached from the root zone before the concentration affects crop yield. Leaching is accomplished by applying sufficient water in excess of the ET demands so that a portion percolates through and below the entire root zone carrying with it a portion of the accumulated salts. Over a period of time, salt removal by leaching must equal or exceed the salt additions from the applied water to prevent salt building up to a

damaging concentration. The amount of water, which must pass through the entire rooting depth in order to control salt build up is called the leaching requirement (LR). The amount of leaching required is dependent upon the irrigation water quality and the salinity tolerance of the crop grown.

As shown in Table 3.3-3 the medium and maximum salinity values for Marias River water near the project site are 0.59 dS/m and 0.77 dS/m respectively. According to Ayers & Westcot (1985), irrigation water with salinity values less than 0.7 dS/m can be used on most crops without restrictions.

To estimate the potential for deleterious levels of salt to build up in the root zone of the project soils, the leaching requirement for alfalfa was calculated. Alfalfa is moderately sensitive to soil salinity and is one of the least salt tolerant crops proposed to be grown at the project site. Alfalfa can tolerate a soil salinity (ECe) level of 3.4 dS/m with a 90% yield potential (Ayers & Westcot, 1985). Using the medium and maximum ECw values given in Table 3.3-3 the leaching requirements for alfalfa are 0.036 and 0.047 respectively. Thus, when irrigating alfalfa with Marias river water having an average salinity value (ECw) of 0.59 dS/m at least 3.6% of the applied water must percolate past the root zone in order to meet the leaching requirement. Given the leaching requirement values of 0.036 and 0.047, the annual depth of water needed to supply both ET and leaching requirement for alfalfa at the project site are 24 inches and 24.3 inches respectively. Precipitation, irrigation or a combination of the two can meet this requirement.

As discussed above, the leaching requirements for the proposed crops are relatively small making soil salinity relatively easy to manage. As long as the salt concentrations do not exceed crop tolerance levels for extended or critical periods of time, the leaching requirement can be met at any time. Leaching can be done at each irrigation, each alternate irrigation, seasonally or at longer intervals as necessary. Normal inefficiencies in irrigation water application may be enough to accomplish leaching. Early season rainfall may also help to meet a portion of the leaching requirement. Pre-planting or off-season irrigation may also be sufficient to accomplish leaching. Leaching at these times has the advantage of avoiding heavy water use during the crop season.

Although the leaching requirement for crops can be calculated the amount of leaching that is actually taking place in the field can only be estimated. Soil and crop monitoring should be employed by the project sponsors to determine the need for leaching. Since considerable variation may be expected from one cropping season to the next monitoring should stress long-term trend and changes in soil salinity.

Saline Seepage

In Chouteau County, the development of saline seeps is generally associated with crop-fallow rotation systems. Saline seeps may develop if groundwater recharge areas are left in summer fallow. Keeping the recharge areas under crops in order to control the amount of water infiltrating through the soil column has been successful in alleviating the development of saline seeps. The continuous crop rotation system planned by the project sponsors coupled with the

efficient use of irrigation water should minimize the potential for saline seeps to develop within the project area.

It is recommended that ground water monitoring wells be installed prior to the initiation of irrigation in order to collect baseline data on groundwater salinity. By monitoring changes in ground water salinity over time, the development of saline seeps could be predicted. Mitigation measures designed to prevent the development or growth of saline seeps could then be initiated before the seeps become a problem.

Soils Impacts Due to Converting Dryland Farming to Irrigated Agriculture

Several changes occur when dryland farming is replaced by irrigation. Wind erosion rates decrease during the irrigation season on cultivated fields because wet soils are more resistant to erosion. Irrigation enhances crop cover during the growing season and provides more protection from wind and water erosion than dryland crops. Irrigation also increases plant residues returned to the soil. Soil structure is improved, microbe populations benefit from the added food source, and nitrogen fertility is enhanced.

Soils Impacts Due to Pipeline and Service Road Construction

Pipeline and service road construction can reduce agricultural production by compacting soil and mixing soil layers. Mixing topsoil with subsoil reduces organic matter and nutrients available to plants, increases stoniness, and leaves higher concentrations of salts near the surface (Mutrie and Wishart, 1987). Compaction crushes the structure of the topsoil and reduces porosity, creating an impenetrable layer or hardpan. Soil disturbances would be greatest for pipelines with a diameter greater than 18 inches.

These adverse effects can be minimized with proper procedures. To eliminate mixing, soil can be double-lifted during trenching. With this technique, the topsoil is excavated, stored, and replaced separate from the subsoil. During construction, either the entire right-of-way could be cleared or just one side, including the trench and soil storage area. If the working site is not cleared, deep ripping may still be necessary to correct compaction caused by heavy vehicle traffic. Retaining stubble and plants would also help prevent compaction.

Erosion of streambanks and steep slopes also would occur during and after construction of the project pipeline. There is a high potential for erosion along about the first half mile of the main water pipeline route, where it would climb up the bluff and out of the Marias River valley. Soil erosion could be reduced with proper drainage, timely construction, and reclamation measures. These techniques are commonly used during pipeline construction. Proper drainage could be ensured by installing cross-ditch and berm structures and subdrains. Construction should be scheduled when streamflow is low and when the soil is dry to avoid rutting and compaction. Recontouring streambanks and slopes to their original configuration and planting native plants or cover crop species would decrease erosion. On highly erodable steep slopes, such as where the pipeline route climbs out of the river valley, soil mulch and mesh should be used to protect the slope.

Soil productivity would be lost on land converted to service roads. Improperly constructed and maintained service roads could also be subjected to increased erosion. Service roads constructed or maintained adjacent to streams or drainages could lead to increased sediment loads in the waterways. These impacts would be of greatest concern where the project service road would drop into the Marias River valley and could be reduced with proper road maintenance and installation of erosion control structures such as berms.

4.6 Economics

Population

Effects of No Action

As described in Chapter Three, the population of Chouteau County has declined steadily over the last three decades. Absent any changes in current trends, the county's population is likely to continue to decline along with other rural Montana counties. The soundness of local economic activities such as wheat production and other agricultural production as well as the growth of tourism and recreation and other activities will limit population declines. This analysis assumes that a colony of 100 persons will be established on the project site whether or not the proposed irrigation project proceeds.

Effects of Action Alternatives

The direct impact on the population of Chouteau County due to construction and operation of the proposed project would be minimal. The assumption of the inevitability of the colony's establishment suggests that the proposed project will have virtually no impact on the county's population. By increasing the viability of agricultural operations in the area, however, the proposed project may indirectly bolster the local economy and assist in retaining population in the project area.

Employment and Income

Effects of No Action

If neither of the action alternatives proceed, a continuation of recent employment trends could be expected. The recent trend, as described in Chapter Three, has generally been an increase in nonfarm employment as a proportion of overall employment.

Effects of Action Alternatives

Direct employment and income generated by the construction and operation of the project would be minimal. Because the colony is expected to be established whether or not the irrigation project proceeds and the land is likely to be put to productive agricultural use in either case, indirect employment and income impacts are considered to be minimal. Expenditures in the local goods and labor markets are assumed to be similar in either case.

Taxation

Effects of No Action

If neither of the alternatives proceeds, the taxable value of the proposed project acreage would remain unchanged, absent any changes in land use or tax policy.

Effects of Action Alternatives

The proposed project would result in the reclassification of 957 acres of dryland acreage to irrigated crop land growing alfalfa. The reclassification of the project would result in a decrease in property tax revenue derived from project acreage of $89 annually. No increase in demand for public services is foreseen as a result of development of the project.

Agricultural Sales

Effects of No Action

If neither of the alternatives proceeds, agricultural sales from the proposed project acreage would be subject to future market and growing conditions for crops that are possible to raise without irrigation. Conditions in this area are historically quite favorable for the production of dryland crops.

Effects of Action Alternatives

While the project land may produce various crops, the permit application assumed that alfalfa would be planted over the entire 957 acres. On land which currently produces approximately 15,950 bushels of winter and spring wheat annually, the project would yield approximately 2,900 tons of alfalfa. At $3.60 per bushel, the market value of wheat grown on the project land would be $57,420 annually. At $71 per ton, the market value of alfalfa grown on the project land would be $205,000--although, quite likely, the alfalfa would be used to raise livestock directly and not be sold on the market. Of course, the proposed project would also include labor, capital, and operations costs associated with irrigation. To the extent that the goods and services comprising these costs were obtained locally, the project would generate indirect activity in the local economy.

Irrigation Water Use and Requirements

The Colony proposes to irrigate 957 acres with center-pivot sprinkler irrigation systems. The crops would be a combination of alfalfa, wheat, barley, corn, and canola. There is no quantification of the specific acres of each crop. Because market demands and farming plans change with time, normally flow rates and volumes for applications for new water use permits are often based on the crop that will use the most water. This prevents the need for another application for additional water at a later date. When the permit is verified, the flow rate and volume can be adjusted lower, if the total permitted amount of water has not been used. Because alfalfa has a relatively high consumptive use, the flow rate and volume requested assumed that the entire 957 acres would be planted to alfalfa. All calculations were based on NRCS estimated monthly and seasonal consumptive use charts for the area to be irrigated. These charts have been developed from an empirical formula known as the "Blaney-Criddle Method".

No irrigation system is perfect. Even the best designed system with superb management practices cannot get 100% of the water that is diverted from the source to actually be used by the crop. The efficiency of an irrigation system is expressed in terms of the percentage of the water diverted that is effectively used by the crop. Flood irrigation systems typically have efficiencies ranging from under 40% to a maximum of 65-70%. Center-pivot systems are perhaps the most efficient of all sprinkler systems with efficiencies reaching as high as 90% or more. However, in Montana it seems the wind always blows. High winds on a hot day can cause a substantial portion of the water leaving a sprinkler nozzle to be evaporated before the water even hits the soil. On a windy day, even center-pivots may struggle to reach 60% efficiency. Therefore, when the DNRC calculates the volume of water needed to supply the crop with its required supply using a center-pivot, an average efficiency of 70% is assumed.

During a dry year, when precipitation is sparse--as it often is in North Central Montana--alfalfa will consume just less than 2 feet of water in a season. Assuming that only 70% of the water pumped is actually used by the plants, this requires a total of approximately 2.74 feet of water to be diverted each season. On 957 acres, this is a total of 2,622 acre-feet per year, which is the volume requested in the application.

On those hot July and August days, alfalfa will "drink" as much as 0.32 inches of water per day. In order to apply that much water in a 24-hour period and assuming as high as 80% efficiency, the irrigation system must be capable of supplying 7.5 gallons per minute (gpm) per acre irrigated. This converts to just under 7200 gpm (16 cfs) on 957 acres, which is the flow rate requested in the application.

Some crops use slightly less water than alfalfa and small grains use substantially less water. If part of the land to be irrigated was always going to be seeded to small grains, the total flow-rate and volume of water could be reduced accordingly. Also, if the soil structure is conducive to storing water, late fall irrigation after the plants are dormant could extend the required application time. This would lower the flow-rate required. If some water is stored within reach of the plants' roots, during those hot, dry summer days, the plants could tap some of the stored water. Under those circumstances, not all of the 0.32 inches of water that the plants need each day would have to be applied by the sprinkler. By utilizing late fall irrigation practices, the flow-rate could potentially be reduced to as low as 6.0 gpm and still meet the crop's needs. However, it must be noted that soil conditions and management practices must both be appropriate for such a plan to work. The total volume of water required by the plant would remain the same. Only if the annual precipitation increased, would the volume of water supplied by the irrigation system be reduced.

4.7 Existing Water Uses

Under the *Proposed Project Alternative*, there is a potential for adverse impacts to existing water users, because flows in the lower Marias River frequently are not high enough to satisfy all

existing rights. The burden of protecting a water right often falls on the senior users who, when their right is being encroached upon, must make "call" on the junior user. The highest potential for impact would be to DFWP which has a right to a minimum flow of 488.5 cfs in the lower river with a 1985 priority date. At times, DFWP may have to make "call" on the Colony to protect its instream flow right. Having another large water user on the river may increase the likelihood that DFWP would need to make a call.

Under the *Minimum Flow Alternative*, the potential for adverse impacts to existing water right holders would be minor because the Colony would only be able to divert direct flow water when streamflows are above the amount required by existing water rights below Tiber dam. Under the *Tiber Storage Alternative* there would still be the potential for adverse affect to DFWP's instream reservation during times when inflows to Lake Elwell are high, but corresponding outflows from Tiber Dam are below the DFWP reserved rate of 488.5 cfs.

Under all three of the action alternatives, impacts to municipal diversions by the Loma County Water and Sewer District would be minor because pumping by the Colony would result in water level reductions of less than .1 feet (see Section 4.3, Surface Water) at the District's intake at Loma. It also is unlikely that the project would have a noticeable affect on the quality of the water in the Marias River at the District's diversion (see Section 4.3, Water Quality).

Federal reserved rights for the Missouri Wild and Scenic River would not be affected under the two action alternatives because the volume requested is well within that allowed by the Compact that was negotiated between the State and the BLM. Water reservations that have been granted to the Chouteau and Liberty County conservation districts have a 1985 priority date so they would be senior to any water rights approved for the Colony.

DFWP has a water reservation for instream flows on the Missouri River between the mouth of the Marias River and mouth of the Judith River. This reservation is for 4,280 cfs and has a 1985 priority. Based on USGS gaging station records for the Missouri River at Virgelle, flows in this reach of the Missouri exceed these amounts over 95 percent of the time during April through June, and during about 90 percent of the time during July through August. Under the *Proposed Project Alternative* there is the potential for minor adverse impacts to DFWP's reservation during times of drought. The potential for impact would be much less under the *Minimum Flow* and *Tiber Storage* alternatives because the Colony would likely be limited to only contract releases during times of drought.

There have been some questions regarding whether the Colony would be able to use water on lands other than those which it has designated in its permit application. Water rights for irrigation are tied to the irrigated land; if the Colony were to receive a water right it would only be for the lands specified in the permit. The only way the Colony could irrigate other lands would be through a water right change application granted by DNRC. To change the place of use of its water right, the Colony would have to abandon an acre of irrigated land at the old location for each acre it planned to irrigate at the new location. Further, any change application submitted by

the Colony would be subject to similar procedures--including noticing and MEPA review--as that required for a new water permit application.

4.8 Fisheries

There are several potential types of impacts to fisheries that could occur under the action alternatives. A decrease in flows in the river would decrease the habitat available for fish. Earlier analysis by DFWP indicate that about 560 cfs of flow is the minimum desirable flow rate for fish habitat in the Marias River. The flow data presented in table 3.3-1. indicate that flows are already below this level at times during the irrigation season just below Tiber Dam. Existing irrigation and municipal withdrawals can reduce flows further in the lower portions of the river.

Impacts to fisheries under the *Proposed Project Alternative* would be minor to moderate. Flows that are at times already below desired levels would be further reduced by a moderate amount which would, in turn, decrease fish habitat. Because there have been recent decreases in the populations of some species of fish in the Marias River, such as the sauger, any further reductions in flows would be of concern.

Impacts to the river fishery resulting from flow reductions under the *Minimum Flow* and *Tiber Storage* alternatives would be minor to moderate as well. Under these alternatives the Colony would not be permitted to divert water under a State permit at times, but could pursue purchasing contract water from Lake Elwell storage. If contracts were secured, Reclamation would be aware of the pumping requirements for the project and may factor these in when developing its annual operating plans for Tiber Dam. This may offset fisheries impacts to some degree.

Under all the action alternatives there would be minor reductions to peak spring flows and associated minor impacts to fisheries. Recently, Tiber Dam operations have been modified to provide these peak spring flows for fisheries in the Marias River. Reductions to these spring peak releases due to a 16 cfs diversion by the Colony would be less than 1 percent.

Under the *Minimum Flow* and *Tiber Storage* Alternatives minor impacts would occur to fisheries on Tiber Reservoir because adding the project to the pool of those using contract water from Lake Elwell would increase the burden on the reservoir pool and could lead to reduced levels in Lake Elwell. These reductions in pool elevations would be minor. They would range from less than 0.1 feet, to a maximum of about 0.2 feet if it were assumed that all water for the project would need to be released from storage and that the reservoir was near the bottom of the active conservation pool.

Under all of the action alternatives, there is the potential for moderate impacts due to fish becoming entrained in the pumps at the diversion site. Screening the pumps would reduce these types of impacts. Most irrigation pumping systems are screened, but the screen-mesh size is generally not small enough to stop the entrainment of juvenile fish and eggs. An analysis for a proposed irrigation system on the lower Yellowstone River (DNRC 1999) found that a screening

system with a maximum opening size of 2.5 mm (0.1 inches) would be adequate to address most concerns regarding the impingement and entrainment of larvae fish and eggs. Screening the pump intakes also would address many concerns related to endangered species and fish species of special concern.

Impacts to fisheries may still occur under the No Action Alternative due to other potential water developments described in Section 5.0, Cumulative Impacts.

4.9 Wildlife

Under the three action alternatives, there will be short term impacts to wildlife during project construction. The greatest potential for impact would be in the riparian area near the proposed pump site. Such impacts would be less if construction were to occur during the fall or early spring (mid March-mid April). This would avoid the critical wintering and spring nesting and rearing periods for wildlife. No impacts to wildlife would occur under the No Action Alternative. No impacts to threatened or endangered species are expected as a result of the project.

The spiny softshell, an aquatic turtle, has been documented to occur in the lower Marias River and is a species of special concern in Montana. Screening pump intakes would minimize the chances that these turtles are injured or killed by the pumps.

Under the action alternatives, a new three-phase power line would need to be brought across the Marias River to provide power for the project. It is likely that the three-phase line would cross the river at the same location as an existing single-phase power line (see Section 4.1, *Land Use*). The power line crossing would present an additional obstacle to raptors, and waterfowl flying up and down the river corridor. Marking the power line with helical wraps or marker balls could reduce this type of impact. The markers should be placed where the line spans the river, and for one span behind the first poles on each side of the river. Markers also should be placed between spans where the power line would pass through the river bottomlands to service the pump site. Conductor spacing on the poles should be greater than 60 inches to prevent electrocution of raptors.

4.10 Recreation and Aesthetics

The applicant has not indicated what type of pumping system would be used. Any pumping system that would extend into the river channel, such as floating pumps, could be an obstacle to floaters. A signage warning system both upstream and downstream of the pumps could help boaters avoid them. There is the potential for this type of impact under all three of the action alternatives.

The impacts of flow reductions to fish habitat (see fisheries section) also would cause associated decreases in river angling opportunities. These impacts would be minor to moderate under the three action alternatives.

Flows of about 500 cfs have been suggested as a minimum level for recreational floating and flows in the lower river are already below this level at times. Under the *Proposed Project Alternative*, the reduction of flows by up to 16 cfs would cause a moderate impact to floaters. Under *Minimum Flow* and *Tiber Inflow* alternatives, minor to moderate impacts to flows would still occur, but the impacts may be lessened some because the flow requirements of the project would be known and may be considered by Reclamation when it sets releases rates from Tiber Dam.

Under the *Minimum Flow* and *Tiber Inflow* alternatives, minor impacts would occur to recreation on Tiber Reservoir. Reductions in stored water due to the project could reduce water levels in Lake Elwell. The impacts of such reductions would likely be minor on angling and recreation.

The current primitive nature of the river at the project pump site would be altered by the pumping stations and associated overhead power lines, service road, and signage. Noise from the pumps would also be heard for a distance upstream and downstream. This moderate impact would occur under the three action alternatives.

4.11 Cultural Resources

There is likelihood that cultural resources could be affected by the proposed project under the three action alternatives. The State Historic Preservation Office has recommended that a cultural resources inventory be conducted in order to determine whether or not such sites exist and if they will be impacted. Most of the proposed project is on private land where the decision to carry out a cultural resource survey of the project area would be at the discretion of the Colony, and the landowner who owns lands on the pipeline route. Where the pipeline route crosses state land, a cultural resources survey would probably be required, when construction plans are finalized and prior to construction. Mitigation of any discovered sites may be required by DNRC.

5.0 CUMULATIVE IMPACTS

The EA to this point has discussed impacts that could result from the Colony's proposed irrigation project by itself. This section will discuss impacts that may occur when the Colony's irrigation project is added cumulatively to other potential developments that may occur in the future. The effects of past and present water developments have been described in Chapter 3, *Affected Environment.*

Other Potential Water Developments

Chippewa Cree Tribe of the Rocky Boy's Reservation

A water compact between the State of Montana and the Chippewa Cree Tribe has been negotiated. The compact has been ratified by the Montana State Legislature and by the U.S. Congress. In regards to the Marias River drainage, the compact allocates 10,000 acre-feet of water per year from storage in Lake Elwell as part of the Tribal water right. The water can be

used for any beneficial purpose on or off of the reservation. None of this stored water has been put to use to date.

Blackfeet Tribe

The headwaters of the Marias River are in the Blackfeet Reservation. The Blackfeet Tribe has expressed interest in negotiating its federal reserved water rights with the State of Montana. The Blackfeet Tribe has claimed "all water arising upon, flowing by, through, or under the Reservation, necessary for purposes of the Reservation". The priority claimed is "from time immemorial based on the Tribe's aboriginal ownership of its Reservation lands". In 1997, the United States filed on the Tribe's behalf claims for present, historic and future irrigation from Cut Bank, Two Medicine/Badger and Birch Creek, all tributaries of the Marias River. These claims total approximately 1.2 million acre-feet and do not include non-Indian lands within the Blackfeet Irrigation project (Whiteing, 2000). Claims also have been made for storage water for the Blackfeet Irrigation Project (32,675 acre-feet), and for stockwater (517 acre-feet), municipal and domestic (56,025 acre-feet), and instream flows for various purposes. Other claims are made for wetlands and water bodies. Negotiations between the State and the Tribe are in the preliminary stages. When the Tribe's rights are eventually settled, it is clear that the Tribe will be entitled to a some amount of water with an early priority date. The effects of development of existing consumptive water uses by the Blackfeet Tribe are reflected in the streamflow records for the Marias River. Additional consumptive use development by the Tribe would decrease inflows to Tiber Reservoir, but DNRC can not estimate at this time how great these reductions would be and when they would begin to occur.

Conservation District Water Reservations

The Liberty and Chouteau county conservation districts have state water reservations with a 1985 priority date that would allow them to irrigate a total of 1,178 designated acres with water from the Marias River below Tiber Dam. The total maximum rate of withdrawal for these projects would be 20.3 cfs and the total annual water requirement would be 2,790 acre-feet. In addition, the Toole, Glacier, and Pondera county conservation districts have water reservations to irrigate a total of 2,018 acres in the Marias River basin above Tiber Dam. The sum of the maximum diversion rates for these projects is 31.2 cfs, and up to 3,887 acre-feet of water per year could be diverted. All of these proposed projects have water rights that are senior to those that the Colony could receive, but it is not certain when and if all these reservations will be developed.

Other Pending Permit Applications

DNRC recently received a water rights permit application to irrigate 626 acres with Marias River water. The amount requested is 1,715 acre-feet per year at a maximum rate of 7.8 cfs. The proposed pump site would be located in Section 19, Township 29 north, Range 8 east, about 8 river miles upstream from where the Colony proposes to pump. The proposal is to irrigate lands north of the river in Section 13, Township 29 north, Range 7 east.

Cumulative Impacts

The development of Tribal reserved water rights, state water reservations, and potential new permits eventually will further reduce Marias River flows and available storage in Lake Elwell. The level of impact will depend on how much of the water is eventually developed. Without considering potential reserved water rights for the Blackfeet Tribe--which have yet to be quantified--there is the potential for moderate impacts to flows and reservoir levels, and associated fisheries and recreational resources.

Probably the proposed future developments that have the greatest potential to cumulatively impact lower Marias River flows and associated resources would be the conservation district reservations below Tiber Dam, and the pending permit application. Together, these proposals account for a maximum diversion rate of about 28 cfs and, when the Colony's 16 cfs application is added, the combined total diversion rate could be about 44 cfs. It is unlikely that all the projects would be depleting the river by the full amount at any one time so, for analysis purposes, a combined depletion rate of three-quarters of the 44 cfs rate (33 cfs) will be assumed. Table 5.0-1 summarizes the estimated percent reductions to streamflows that would occur from a depletion of 33 cfs for the Marias River near Loma during wet, average, and dry years.

Table 5.0-1. Estimated percent reductions to monthly average and percentile streamflows for the lower Marias River during the irrigation season due to a 33 cfs cumulative irrigation depletion.

Percentile	April	May	June	July	August	September
During Average Flows	5	4	2	3	4	5
Q10	3	2	1	1	2	3
Q20	4	3	1	2	3	4
Q50	7	6	3	4	4	5
Q80	10	8	7	7	8	10
Q90	15	10	8	9	8	12
During Highest Flows	1	2	1	1	2	2
During Lowest Flows	15	11	9	10	11	12

Generally, these potential flow reduction could be characterized as minor during wet years, minor-to-moderate during average years, and moderate during dry years. Maximum flow reductions of about 10 percent could occur during July and August of dry years, when irrigation water use is at its peak. The depletion rates for the spring and fall are probably overstated in the table because it is unlikely that irrigators would apply water to their fields at peak rates during these low demand months. Potential impacts to fisheries and river based recreation--which are dependent on flows--would be minor to moderate as well.

Another result of cumulative development in the basin would be that, because many new developments would have senior water rights, there would be even less unapropriated water available to the Colony. Consumptive use development by the Tribes and upstream conservation districts, or export of water from the basin by the Tribes, would leave less Marias River water

available for storage in Tiber Reservoir. This would likely result in lower levels in Lake Elwell and associated impacts to reservoir-based recreation. Any releases of stored water for the Colony, as suggested under the *Minimum Flow* and *Tiber Inflow* alternatives, would add cumulatively to these impacts, which would probably be moderate without the Blackfeet claims.

Other Developments Associated with the Colony

The Sunny Brook Colony has not yet been constructed. Eventually it will be a farming community of about 100 people. Housing will be built along with buildings for meeting and farm equipment. The Colony also will have livestock. It intends to build the housing, livestock facilities, and irrigation project within the next 5 to 6 years. Currently, the Colony is dryland farming its property.

The Colony intends to meet its domestic water needs with two permitted water rights from the Marias River in Section 25, T28N, R8E: about 4 miles downstream of the point of diversion proposed for the irrigation project. The permits combined total 50 gallons per minute and 35 acre-feet per year. The Colony intends to construct a cistern on a hilltop above the Romain Ranch headquarters to supplement domestic water from the river.

The Colony intends to build and operate a 400 sow hog feeding operation east of the old Romain Ranch headquarters, on the west end of the property. The Colony intends to construct a berm around the operation to contain effluent. A permit from DEQ is required for concentrated animal feeding operations of over 1,000 hogs, but the Colony has yet to submit any application to DEQ. For feeding operations of between 300 and 1,000 animals, DEQ determines whether a permit is needed on a case-by-case basis based on a field assessment. In making this determination, DEQ considers whether the livestock operation has the potential to be a significant contributor of pollutants to surface or groundwater. If a permit were required, the Colony would have to develop a waste management plan and demonstrate that it could contain all animal waste, even during a severe storm event.

The greatest cumulative impacts of the Colony's plans would be a general increase in human activity in the area due to the planned increase in population and more intensive agricultural operation. Cumulative impacts also would include an additional minor decrease in Marias River flows due to the anticipated 50 gallon per minute (about 0.1 cfs) of domestic withdrawals. There is the potential for additional impacts to water quality in the Marias River due to the hog feeding operation, but the potential could be reduced with proper animal waste containment as could be required by DEQ.

Reclamation Water Marketing Study for Tiber Dam

The U.S. Bureau of Reclamation operates Tiber Dam and Lake Elwell. Reclamation generally stores higher spring flows in the reservoir for release later in the year when inflows to the reservoir have dropped (See Section 3.3, Water Resources). Reclamation has claimed a state water right to store this water. Water users have contracts with Reclamation for releases of stored water, or to pump it directly from the reservoir. Under the *Minimum Flow Alternative*, the

Colony would have to acquire a contract from Reclamation or another willing seller, to have its water requirements released from storage when flows in the lower Marias River drop below 560 cfs. The Tiber Inflow Alternative would require the Colony to acquire contract water if it wished to irrigate when inflows to Tiber drop below the cut-off rates.

Reclamation currently markets about 15,000 acre-feet of water per year from Lake Elwell. It also anticipates having to provide another 10,000 acre-feet per year for the Rocky Boy's reserved water right settlement, and 7,000 acre-feet per year for expanded rural water systems in north-central Montana. Reclamation is studying the effects of marketing water from Tiber Reservoir including current contracts, Rock Boys reserved water rights, and the north-central Montana rural water system. It also will assess 10,000 acre-feet per year of new irrigation development (Erger and Allbright, personal communication).

Reclamation is updating a water accounting model for the Marias River and Tiber Reservoir and preparing an environmental assessment to determine whether it can market the additional 10,000 acre-feet of water for irrigation, and to investigate what environmental impacts this could have. During this process, Reclamation may evaluate the availability of water for spring flushing and channel maintenance flows. Reclamation hopes to complete its analysis and its EA during the spring of 2001.

If the Colony were to pursue a supplemental water service contract with Reclamation, a land classification would be required. The classification would include an assessment of the irrigability of the land, including a determination of any irrigation restrictions. It also will require a cultural resources survey to comply with the National Historic Preservation Act, and an environmental assessment to comply with the National Environmental Policy Act (NEPA). The Colony would have to pay for the land classification and cultural resources survey.

6.0 – PREFERRED ALTERNATIVE AND RECOMMENDED MITIGATION MEASURES

6.1 Preferred Alternative

The preferred alternative is Alternative 3: *Minimum Flow Alternative.* This alternative is preferred because it would best recognize existing water rights, flows for river fisheries, existing water diversions, and recreational uses. A comparison of the impacts for the four alternatives can be found in table 6.1-1.

Table 6.1-1 Sunny Brook Colony Irrigation Project Impact Comparison Table

	ALTERNATIVE			
RESOURCE	**No Action**	**Proposed Project**	**Minimum Flow**	**Tiber Inflow**
Land Use	None	Minor	Minor	Minor
Vegetation	None	Minor	Minor	Minor
Wetlands	None	Minor	Minor	Minor
Surface Water Flows	None	Minor to Moderate	Minor to Moderate	Minor to Moderate
Water Quality	None	Minor to Moderate	Minor to Moderate	Minor to Moderate
Stream Channel Form	None	Minor	Minor	Minor
Ground Water	None	Minor	Minor	Minor
Soils	None	Moderate	Moderate	Moderate
Economic and Social Factors	None	Minor	Minor	Minor
Wildlife	None	Minor	Minor	Minor
Fisheries	None	Minor to Moderate	Minor to Moderate	Minor to Moderate
Cultural Resources	None	Unknown	Unknown	Unknown
Recreation	None	Minor to Moderate	Minor to Moderate	Minor to Moderate

6.2 Recommended Mitigation

This section contains mitigation measures that are being recommended as ways to offset potential minor to moderate impacts of the proposed project. When DNRC reaches of final decision on the Colony's permit application, it may incorporate some or all of these measures as conditions to a water right permit.

Surface Water

The Colony, local conservation districts, and other water users on the Maria River should work towards establishing a USGS stream gaging station on the lower river near Loma. The gage should be automated, so that users can look up the flow rate through the internet. Having such a station would allow the Colony to accurately determine when flows in the lower river have dropped to a level where pumping for the project would need to stop to protect prior appropriators, or when the Colony would need to purchase contract water.

Fisheries

A system for keeping fish from becoming entrained in the irrigation system should be implemented by the Colony. If pump intakes are placed directly in the river, a pump screening system should be used. It should include the following criteria: (1) the maximum screen opening size should not exceed 0.1 inches, (2) screen intake velocities should not exceed 0.5 feet per second, (3) the screens should contain an internal baffling system that balances intake velocities over the screen area, (4) the screens should be positioned as close to the surface as possible.

Water Quality

Irrigation return flows from the proposed project could seep into adjacent coulees and the water could eventually reach the Marias River. The Marias River is listed on the Montana 303(d) list as a water body in need of total maximum daily load (TMDL) development. The Colony should work with the local conservation district, DEQ, and DNRC to develop a water quality protection plan that includes implementation of agricultural best management practices (BMPs). The BMPs should be designed to minimize non-point source pollution through land and irrigation water management practices. BMPs should follow guidelines presented in the State of Montana Nonpoint Source Management Plan (DEQ, 1991).

An irrigation water management program would minimize off-site surface water runoff from project lands. Establishment of an AgriMet station in the area and an associated scientific irrigation-scheduling program by collaboration among Reclamation, the conservation districts, and NRCS, should be considered.

It is recommended that ground water monitoring wells be installed prior to the initiation of irrigation in order to collect baseline data on water levels and groundwater salinity. By monitoring changes in ground water salinity over time, the development of saline seeps could be predicted. Mitigation measures designed to prevent the development or growth of saline seeps could then be initiated before the seeps become a problem. Monitoring water levels would allow the Colony to assess irrigation application efficiency, and to reduce the potential for soil water logging due to over application of irrigation water. The well network should be monitored on a regular basis.

Erosion Control

There is a high potential for erosion along about the first half mile of the main water supply pipeline and road routes, where they climb up the bluff and out of the Marias River valley. Soil erosion should be reduced with proper drainage, timely construction, and reclamation measures. Proper drainage should be constructed along the pipeline route by installing cross-ditch and berm structures and subdrains. On the highly erodable steep slopes where the pipeline route climbs out of the river valley, soil mulch and mesh should be used to protect the slope. Where the project service road would drop into the Marias River valley, erosion control structures such as berms should be installed.

Construction of the pump site should be scheduled when streamflow are low and when the soil is dry to avoid rutting and compaction. Streambanks and slopes should be recontoured to their original configuration and seeded with native plants or cover crop species to decrease erosion.

Recreation

Boaters should be warned of any hazards associated with the project pump site. If the pumping station contains obstructions that extend out into the river, warning signs for floaters and boaters should be placed both upstream and downstream. The signs should be no smaller than 4 feet by 6 feet in size, positioned in a prominent location that is visible easily to boaters, white in background and red in lettering. The Colony also should be responsible for maintaining the signage.

Wildlife

A new three-phase power line would need to be brought in to service the project (see Section 4.1, *Land Use*). The power line crossing would present an additional obstacle to raptors, and waterfowl flying up and down the river corridor. Marking the power line with helical wraps or marker balls would reduce this type of impact. The markers should be placed where the line spans the river, and for one span between the first poles on each side of the river. Markers also should be placed between spans where the power line would pass through the river bottomlands to service the pump site. Conductor spacing on the poles should be greater than 60 inches to prevent electrocution of raptors.

6.3 Need for an EIS

Because no significant impacts were identified, DNRC believes this EA is sufficient to comply with MEPA and that an EIS is not required. This EA identifies the *Minimum Flow Alternative* as the preferred alternative, and suggests the mitigation measures outlined above be made conditions to the granting of a water use permit.

7.0 RESPONSES TO COMMENTS ON THE DRAFT EA

This Chapter contains responses to major substantive comments that were received on the draft EA. Some of the comments have been consolidated, clarified, or abbreviated, but the intent of the comments has been maintained. The responses also will point out where changes have been made to the EA text to address the comments. Some comments have suggested minor editorial changes, and these types of changes have generally been made without further discussion in this section.

Alternatives

Comment: An alternative should be added that requires the Colony to purchase contract water when inflows to Tiber drop below 500 cfs.

Response: An alternative similar to that suggested has been added (see Section 2.2) The impact discussions in Chapter 4 have also been modified to include assessments of this alternative.

Comment: It is somewhat confusing whether Alternative 3 includes the "contract water" element, or whether it only addresses the state water permit. If the former, one would assume this analysis would include assessment of the feasibility of contract water, and a description of how that water would be provided. Provision of contract water would be a federal action, not a state action, thus would require separate or complementary environmental review. If the latter – the state action only – then the document acknowledges that there is high question as to the sufficient availability of water for the purposes proposed. We suggest that if this alternative is recommended that it include the presumption that the permit would be issued conditioned upon the Colony obtaining contract water within a specific time period, and the permit is not valid until that occurs.

Response: The EA addresses the application for a state water right. It is acknowledges that water often would often not be available to the Colony without adversely affecting senior water users. Therefore, an alternative was developed that assumed contract water could be used to reduce the likelihood of impacts to senior water users. Based on its review of streamflow and reservoir storage data, DNRC believes that there is a reasonable likelihood that stored water is physically available for the proposed project. If the Colony wishes to pursue a supplemental contract for stored water, it will need to work with Reclamation who will make the final determination regarding stored water availability. It is likely that Reclamation will require additional environmental review of the irrigation project to comply with NEPA.

Alternative 3 does not presume that a permit would only be issued on condition of the Colony securing a water service contract. It simply states that the Colony would need to secure a contract if it wished to irrigate during times when flows in the river were below the specified cutoffs rates. Whether securing a supplemental water service contract should be made a condition of the permit is best left as a decision to be made during the hearing process.

Comment: What if the feds allow for a supplemental contract of 16 cfs but don't release any extra water for the Colony.

Response: If the Colony were to receive a supplemental water service contract from Reclamation, DNRC could not guarantee that releases from Tiber would be raised specifically for the Colony's project. Any time outflow rates from Tiber exceed inflows--minus the amount required for rights senior to Reclamation's--Reclamation could potentially market water to the Colony without adversely affecting existing water rights.

Comment: Presently after spring runoff is known, we [Reclamation] establish a flow in the river after discussion with Montana FWP. The flow target is at the stream gaging station just downstream of the dam, station 06101500, Marias River near Chester, MT. The draft EA indicates that the Colony will need to purchase supplemental water from Reclamation if the streamflows at the mouth of the Marias River falls below 500 cfs. Reclamation is under not legal

obligation to assure that the 500 cfs is maintained at the mouth. The only flows that Reclamation is obligated to release is to satisfy senior water users downstream on the Marias. Most, if not all, of the downstream water users are probably senior in priority to Reclamation's water right to Lake Elwell, so Reclamation would be obligated to release the 100 cfs in July as discussed in the draft EA as consumptive use of irrigators downstream.

Response: The EA does not intend to imply that Reclamation is obliged to maintain DFWP's instream flow reservation for the lower Marias River. It simply recognizes that a permit granted to the Colony would be junior to DFWP's reservation, and that the Colony may need to purchase contract water during times when flows in the Marias River are below the instream flow right of DFWP.

Comment: If Reclamation established a summer flow of 500 cfs at the streamflow gage downstream of the dam, and the flow of the Marias River at the mouth fell below 500 cfs, Reclamation would not release additional water to the river to satisfy the Colony demand. If Reclamation entered a contract with the Colony, the Colony would pay for the water, but Reclamation would not release an additional 16 cfs, the Colony would just take the additional water our of the 500 cfs we were already releasing. The draft EA lead readers to believe that Reclamation would release the water needs of the Colony. It could also be interpreted to mean that Reclamation would be maintaining 500 cfs at the mouth, which has not been the situation in the past is will not change as a result of recommendation presented in the draft EA.

Response: The description of the alternatives (Section 2.2) has been changed to be consistent with Reclamation's interpretation of how it may administer any water contract with the Colony. Changes have been made throughout Chapter 4 to be consistent with the changes to the alternatives. DNRC does not imply in the EA that Reclamation will maintain a flow of 500 cfs at the mouth of the Marias River.

Water Resources

Comment: The draft EA on page 10 states the storage capacity of Lake Elwell as being 400,838 acre-feet. That is the amount available in the flood pool at Tiber. There is only 267,994 acre-feet available in the joint use space between elevation 2976 and 2993 where we normally operate. That volume difference will change the annual inflow calculations that are mentioned. (from the U.S. Bureau of Reclamation)

Response: Changes have been made to the EA text to address this comment see page 12.

Comment: The draft EA purports to evaluate the environmental impact of a major irrigation project on the lower Marias when in fact the baseline information and assumptions are inadequate. There is a flow station at the dam. There are no other stations on the lower Marias. There are withdrawals from the Marias below the Dam. There are extensive water rights existing below the dam. No one can estimate the losses in the River due to seepage or evaporation with certainty at this point in time. As a result, in a severe drought year no one can predict the amount

of water available for the lower Marias. The DEA estimates depletions, page 19. No information was given as to how streamflows were measured at Loma. It must be assumed that they are estimates.

Response: DNRC estimated existing water depletions on the lower Marias in Section 3.7 of the draft EA. Flow depletions were estimated by comparing discharge measurements made at Loma, to gaged outflows at the USGS stream gaging station near Chester. All measurements were taken during the 2000 irrigation season, a severe drought year.

DNRC measured streamflows at Loma using standard discharge measurement techniques. This involved stretching a tape across the river, and then measuring the depth of the water and its velocity at about 20 increments across the transect. The discharge for each of these increments in cubic feet per second (cfs) was then calculated by multiplying the width of each increment (feet), by the depth (feet), times the velocity (feet/second). The discharges for the 20 increments were then added to calculate the total discharge of the river. DNRC believes the accuracy of these measurements is within 5 percent.

Comment: This summer the inflows are running about 100 cfs. The inflow reduced by evaporation and seepage is now a negative figure according to BOR. This is substantially below the median and much below the inflow assumptions in the EA.

Response: As explained in Section 3.3, higher spring flows are generally stored in Lake Elwell and then released later in the summer after inflows have dropped. During the late summer of 2000, inflows to Lake Elwell were below 100 cfs. Given the large surface area of the reservoir, it is likely that evaporation from the reservoir exceeded the rate of inflow. DNRC examined inflow data for all types of years, not just the median, when developing the EA.

Comment: Worse case scenarios need to be assumed.

Response: DNRC estimated percent reductions to lower Marias River streamflows due to pumping by the Colony during the driest years (see Table 4.3-1 on page 27).

Comment: The Basic problem with this alternative [Alternative 3] is that it does not add any water to the system. Additional water from BOR will not be available in drought years--especially back to back drought years when the reservoir can not be filled.

Response: In Alternative 3 it was stated that the Colony would be need to purchase releases of stored water from Tiber Dam during times of low flow. It is not meant to imply that any water would be added to the system. There is about 268,000 acre-feet of storage in the joint use zone of Lake Elwell. On September 28, 2000--following the drought this summer--the joint use zone was still about 82% full. The joint use zone will no doubt be drafted further until inflows rise next spring, but some storage will be carried over through the winter. Because stored water can be carried over from year to year, it is not correct to assume the no water would be available from Reclamation during back-to-back drought years.

Comment: DFWP's comments of 4/10/2000 noted recent changes in the operation of Tiber Dam that brings into question the use of historic flow statistics to determine water availability for this project. We feel this information should be incorporated into the EA, including the fact that the Bureau provided in 1994 (and recommendations specify this flow be provided every 4-5 years) intermittent spring pulse flows to benefit pallid sturgeon downstream. A caveat should be provided to Figure 3.3-1, and other related text, noting this information.

Response: DNRC recognizes that operations of Tiber Dam have changed and will continue to be adjusted. We have used only the past 20 years of streamflow records in our analysis--although the actual period of record for the Marias River gaging stations is much longer--because we believe that the more recent records would provide a better picture of how the dam may be operated in the future. The gaging data we used includes that for 1994.

Water Quality

Comment: The water quality requirements we [the Loma Water and Sewer District] have to meet are continually be raised. In 1980 it was 5 NTUs for turbidity now it will be going up to .5 NTUs.

Response: The EA has identified the potential for moderate impacts to turbidity due to the proposed project. These impacts could be reduced to minor with proper irrigation management as suggested under the recommended mitigation measures in this EA. The amount of sediment added by the irrigation project to the Marias River would be small in comparison to that contributed by streambank erosion. DNRC does not believe the proposed irrigation project will raise turbidity levels enough to require additional filtration by the Loma Water and Sewer District.

Comment: The water quality description (page 12) of the Environmental Assessment is probably based on the 1998 list of Threatened and Impaired Water Bodies. The Lower Marias River is listed in the 2000 draft 303(d) list as partially supporting aquatic life and cold water fisheries and not supporting drinking water. This is a concern as the Loma Water and Sewer District withdraws from the Marias. Probable causes of impairment are mercury, flow alteration and thermal modification. While the Marias River has been listed as a low priority stream for development of a TMDL, plans for all impaired water bodies in the state will be completed by 2007. The TMDL for the Marias watershed is scheduled for completion by 2006.

DEQ is concerned that this project will reduce flow and increase water temperature, sediment loads and heavy metal concentrations in the Marias River. The greatest impact will be in late summer when the river is most vulnerable to degradation and damage. We support DNRC's proposed alternative which would terminate withdrawals when stream flow drops below 500 cfs. We urge the Sunnybrook Colony to develop and implement a soil and water conservation plan that incorporates irrigated agriculture Best Management Practices and to participate in the organization of a local watershed group that will develop a TMDL Implementation Plan.

Response: The preferred alternative would not terminate withdrawals when flows drop below 500 cfs. It would simply not allow the Colony to divert noncontract water under its state water right when flows in the lower river drop below 560 cfs. Minor to moderate impacts to flows and associated impacts to water quality would still occur. DNRC is aware of the concerns of the Loma Water and Sewer District, but believes that the potential for impact to the District's operations is minor. DNRC believes too that the formation of local watershed group in the area would be helpful. A watershed group could work with all water users in the basin towards decreasing non-point source pollution, and could seek funds for a gaging station on the Marias river at Loma.

Economics

Comment: The costs of irrigation improvements should be included in the taxation assessment.

Response: DNRC researched this question and found that irrigation improvements and equipment are either exempt from taxes or are taxed as business equipment. The tax liability of business equipment is expected to be phased out by 2007; so, in either case, tax revenues from irrigation improvements and equipment are not a factor in the taxation assessment.

Fisheries

Comment: How will Colony affect DFWP minimum instream flows on the Missouri?

Response: A discussion of the potential effects to DFWP's minimum instream flow reservation on the Missouri River has been added to Section 4.7.

Comment: FWP's April comments noted that the quantified fisheries flow needs are 560 cfs. The fisheries flow referenced throughout the document is 500 cfs. Our reservation amount is slightly less, not due to biology, but to limitations of the water reservation law. So, if the goal is to base the trigger flow on needed fisheries flows downstream, the figure to use is 560 cfs, not 500.

Also, we strongly recommend that the calculations of the minimum flow protection alternative begin from, not the current hydrologic condition, but the current condition plus depletions already approved (quantified later in the document as an additional 31.2 cfs). Or, the Minimum Flow Alternative and potential permit should incorporate the triggers sliding upward as these projects come on line. Otherwise, the analysis is incorrect in stating that fisheries flows would likely be preserved if diversion only occurred when flows at the gauge (above the proposed developments) are above a specific level.

Response: The final EA has been changed to raise the trigger flows by 60 cfs to a flow of 560 cfs at Loma, because these are the desired fisheries flows based on biology. The total of maximum diversion rates for conservation districts below Tiber Dam is 20.3 cfs. We are aware

of no proposals to develop this water in the near future. A condition could be made to any permit granted to the Colony that adjust the trigger flows upward as these projects come on line. This could be a condition that could be proposed during the water rights hearing process.

Comment: Tiber has recently been operated to provide intermittent spring pulse flows (bankfull flows, estimated at 4,000 cfs, for a minimum of 2 days, including ramping up and down on either end of the peak release) for pallid sturgeon downstream. There has also been a quantified need for 700 cfs flows in mid-June to support sauger spawning in the lower River. Although the project (with or without supplemental contract water) would only have an incremental impact on the ability of the Bureau to provide these flows, and for the flows to have their desired effect downstream, we feel the information is relevant to the Fisheries section of the analysis.

Response: The fisheries sections (3.8 and 4.8) of the EA have been revised to include this information.

Recreation and Aesthetics

Comment: We suggest that the recreation section be retitled "Recreation and Aesthetics", and that the section acknowledge that the rivers current primitive character as viewed from the water could be substantially altered at the project site with overhead power lines , the pump development, and all-weather road, and large white and red signage at the pump.

Responses: The suggested changes to the EA have been made (see Sections 3.10 and 4.10).

Cultural Resources

Comment: If the water is obtained all or in part from the Bureau of Reclamation then a cultural resource survey will be required regardless of land ownership. Compliance with the National Historic Preservation Act is not optional. (from the U.S. Bureau of Reclamation)

Response: On page 40 of the Draft EA it was stated that Reclamation may require a cultural resource survey if the Colony were to pursue a supplemental water service contract. This section of the EA has been changed to indicate the Reclamation would require a cultural resources survey.

Comment: FWP is usually able to obtain clearance from SHPO prior to issuing a final EA. The clearance is then attached to the EA. We suggest you may be able to do the same, thereby saving a step for the applicant.

Response: The pipeline for the proposed project would cross a couple of small parcels of state land and a cultural resources survey would probably be required if the Colony were to apply to DNRC for an easement. DNRC would likely require a survey when construction plans are finalized, and prior to construction (see Section 4.11). The rest of the project is on private land where DNRC considers a survey to be at the discretion of the landowner.

Cumulative Impacts

Comment: The definite Blackfeet claims must be used in assessing the cumulative impacts in the environmental assessment [see section]. While it is correct that the tribe is negotiating its water rights, and it is not known how much water would be established for the Tribe under a negotiated Compact, the Tribe's specific claims are known. These claims must be used in assessing reductions in Marias River flows and available storage in Lake Elwell. It is not appropriate to avoid this assessment by merely stating that the Tribe's rights are unknown.

The EA already states on page 39 that "there is the potential for moderate impacts to flows and reservoir levels, and associated fisheries and recreational resources," "without considering potential reserved water rights for the Blackfeet Tribe." If there is the potential for such moderate impacts without considering Blackfeet rights, there is potential for significantly greater impacts if Blackfeet claims are considered.

Moreover, under the preferred Alternative 3: Minimum Flow Protection, the EA states at page 8 that "the Colony would need to have stored water released from Lake Elwell to make up for the water it diverts" when the flow drops below the specified rates. If such stored water is contemplated as part of the preferred alternative, there must be a full assessment stored water in Lake Elwell is available under this alternative. Such assessment must take into account the claims of the Blackfeet Tribe. Unless this is done, there is no way to determine whether the preferred alternative is, in fact, a viable alternative.

Response: Section 5.0 of the draft EA has been modified to summarize these claims of the Blackfeet Tribe. Please note that the summation of these claims substantially exceeds the average annual flow of the Marias River above Tiber Reservoir, which is about 662,300 acre-feet for the USGS gage near Shelby. If the claims were to be used to determine water availability for the project, there could only be one conclusion: that no water is available. This EA finds that there is water physically available for the project. Final conclusions regarding legal water availability will be made during the hearing process.

DNRC agrees that if Blackfeet claims are considered, there is the potential for much greater impacts to Marias River flows, reservoir levels in Lake Elwell, and associated fisheries and recreational resources. However, DNRC can not determine with reasonable certainty how much of the Tribal claims will eventually be developed, and when the development will occur.

In regards to the availability of stored water in Lake Elwell, our analysis of streamflow records indicate that there is a likelihood that stored water is available and, hence, that the alternative has the potential to be viable. DNRC acknowledges that the final determination regarding the availability of stored water will have to be determined by Reclamation.

Comment: As the EA notes on page 4, the legal availability of water is one of the criteria that must be determined by DNRC in its action on Sunnybrook's application for a water permit. The Blackfeet Tribe's claims greatly impact this analysis. In determining the legal availability of water, the Department must determine whether there is water available "which, among other things, has not been federally reserved for Indian tribes." *Confederated Salish and Kootenai Tribe's v. Clinch*, No. 97-609, 1999 WL 1271753 (Mont. Dec. 30, 1999). Under the *Clinch* decision, the Department cannot determine whether water is legally available "until the Tribe's rights are quantified by compact negotiation pursuant to § 85-2-702, MCA, or by a general inter sese water rights adjudication." While the *Clinch* case involved permit applications on the Flathead Reservation, the reasoning and logic of the decision is equally applicable to Sunnybrook's application. Either the Department must take the Tribe's filed claims into account in determining legal availability of water or it must wait until the Blackfeet Tribe's rights are quantified by negotiation or litigation. Similarly, the EA must consider the Blackfeet Tribe's filed water claims in assessing cumulative impacts and in determining the availability of stored water under alternative three, or it must wait until the Tribe's rights are quantified to make those assessments.

Response: The intent of this EA is to assess the potential environmental impacts of the proposed project, and to examine reasonable alternatives and mitigation measures. Although the document does include some discussions and assumptions regarding the legal availability or water, it is not intended make a final determination in this regards. The contested case hearing on the application will be the forum to arrive at final decisions in regards to legal water availability for the proposed project.

Comment: The Bureau of Reclamation water marketing study should be completed first.

Response: Reclamation has indicated that it would be completing it water marketing analysis and EA by the spring of 2001. This EA addresses a state water right application received by DNRC; it does not attempt to meet all the complex federal requirements for marketing water from a Reclamation reservoir.

Comment: ARM 17.4.603(1)(C) proves for a "joint environmental impact statement" prepared jointly by more than one agency. It is clearly called for here so the entire operation including the pig farm can be evaluated by your agency, DEQ and hopefully Bureau of Reclamation.

Response: Because the potential for a significant impact was not identified, DNRC has determined that an EIS is not required for this application. The hog feeding operation is discussed in Section 5.0. Any permit required for this operation would be under the jurisdiction of DEQ. The Colony has yet to apply to DEQ for a permit and it is not certain whether a permit would be required. If the Colony applies to Reclamation for supplemental contract releases from Tiber Dam, Reclamation will require its own environmental analysis and cultural resources survey. This EA does not attempt to meet all of Reclamation's requirements.

Comment: The Colony would be to the west of us. We get a lot of northwest, southwest, and west winds. The dust has been horrible--imagine the drift from pivots and the odor from hog operations etc.

Response: DNRC does not have any regulatory control over odor from a livestock operation. In regards to the concern about drift from the pivots, the Colony has not indicated to DNRC that they intend to land apply animal wastes with the pivots. The more continuos crop cover of irrigated fields should result in reduced wind erosion (see Section 4.5, *Soils*).

Comment: The cumulative impact section is inadequate in that it does not properly evaluate the impacts of the proposed hog operation. The hog operation could involve thousands of hogs.

Response: The Colony has informed DNRC that it intends to operate a 400 sow hog feeding operation (Water Rights Solutions, 2000). The cumulative impacts of the hog operation are discussed (see Section 5.0).

Comment: The water reservations for the Conservation Districts should be subtracted.

Response: The cumulative impacts of water reservations were discussed in Section 5.0. Until these projects are actually developed, there should be no need to subtract the amounts from the flow rates put forth under the preferred alternative (Alternative 3).

Comment: Reclamation is currently studying the effects of marketing water from Tiber Reservoir including current contracts, Rocky Boys reserved water rights, and north-central M&I. We will assess new agricultural development in the amount of 10,000 acre feet. If the colony is to pursue a water service contract with Reclamation, the study now underway could include the effects of marketing that water under new ag development, but the specific contracts would be a separate action that would require NEPA/NHPA compliance.

This study will **not** evaluate the environmental effects of providing flushing flows for cottonwood regeneration. That would require study of the entire basin and is beyond the scope of this effort. It will evaluate the availability of water in the reservoir due to the actions listed above, which could at some point be used to evaluate availability for and effects of a flushing flow from Tiber.

Response: Changes have been made to the discussion on the reclamation water marketing study for Tiber Dam (please see pages 44 and 45) to address this comment.

Need for an EIS and Mitigation

Comment: The agencies reliance on ARM 17.4.607 is misplaced since the mitigation measures recommended will not necessarily be mitigated below the level of significance so that no significant impact is likely to occur.

Response: There has been some confusion as to whether this EA is considered a "mitigated" EA. A mitigated EA is a MEPA document where a significant impact has been identified, but mitigation measured are put forth in the EA that can be used to reduce the impact to below the level of significance. A mitigated EA can be used in place of an EIS where the EIS would otherwise be required. This EA is not a mitigated EA. DNRC does not find any potential significant impacts for this proposed project. Therefore, DNRC does not believe that an EIS is required. The mitigation measured identified are proposed as ways to offset potential minor to moderate impacts. Section 6.3 of the EA has been revised to clarify this. During the hearing process, these suggested mitigation measures may be adopted as conditions if a water rights permit is granted to the Colony.

Comment: Metering should be required.

Response: The Colony intends to install an in-line flow meter in there main water supply pipeline (Water Rights Solutions, 2000).

Comment: When would a monitoring station be installed on the lower river at Loma? I believe the state should pay for this.

Response: In the EA, DNRC recommends that the Colony, conservation districts, and other water users on the Marias River work towards establishing an automated USGS stream gaging station on the river near Loma. Such a station may have an initial installation cost of $10,000 to $20,000, and would cost about $10,000 per year to operate. The USGS would possibly pay for half the cost of installation and annual operation, but the remainder would have to come from the state or local sources. At this time, DNRC believes that proposed project could be developed without adversely affecting existing rights if the Colony did not divert water under a state water use permit when flows at the USGS Marias River near Chester gaging station dropped below the levels outlined under Alternative 3: the *Minimum Flow Alternative*. Having a gaging station on the river near Loma would be helpful, especially as water demands in the basin increase. DNRC does not know when the station may be installed. Presently, DNRC does not have funding to pay for one-half the cost of the station. Local groups or the conservation districts may be able to seek funding for the station through grants.

Comment: We see no system of monitoring in your study to indicate if pumping has stopped when the minimum allowed river flow has been reached.

Response: DNRC does not have the resources to monitor all water users. If problems occur on the Marias River in regards to permit holders pumping water out of priority, the water users in the basin can seek to have a water commissioner appointed to monitor diversions.

Comment: The establishment of a gaging station at Loma and systems to prevent fish entrapment by pumps are suggestions only. The should be requirements, legally enforceable, before a water permit is allowed.

Response: The EA suggests that the mitigation measures be made conditions to the granting of a water use permit, but it is not the final decision making document. A water rights hearing will be held on the application, which will eventually result in an order that grants or denies the application, and sets any conditions. Your comment that the suggested mitigation measures be made legally enforceable requirements is noted.

Comment: There was mention of ground water monitoring wells in an earlier section, but no mention here [in the Recommended Mitigation Section]. Please clarify how this section differs from all the suggestions and recommendations included in other portions of the EA. Also, we suggest any required signage (under Recreation) should not only be "placed", but also "maintained," if it is to continue to be effective and not create a hazard in and of itself.

Response: A narrative has been added to Section 6.2 to explain why these mitigation measures are being recommended and how the recommendations may be incorporated into a final decision on the permit application. A recommendation for monitoring wells has been included in this section. Stipulations for maintenance of the signage have been added.

General

Comment: Where would the access road to the pump site be? If the project requires constructing a road along the river for any length, provisions should be provided along with a minimum setback distance (100 ft.). The pump unit should be located at an elevation high enough to protect it from a flood flow of 10,000 cfs because Reclamation has the authority to release this amount of water and there has been some discussion on flood flow releases for cottonwood regeneration. This siting information should be provided to Figure 3.3-1, and other relevant text.

Response: There is an existing access road to the proposed pump site that runs down a coulee in the SE 1/4 of Section 1, T 28 N, R 8 East and the SW 1/4 of Section 6 T 28 , R East. The location of the access road closely follows that of the pipeline as delineated on the project location map (Figure 1.1-1). The road drops into the river valley near the proposed pump site and would not parallel the river. The road is not all weather, and would have to be upgraded for the project. Gravel would need to be added to the road surface--especially where it drops into the river valley--and it may need to be graded. DNRC agrees that the pumping stations should be designed to withstand flooding. A floodplain development permit will be required from DNRC for the project (see Section 1.3) once it reaches the final design phase.

Comment: We suggest there may need to be slightly more research into the provision of power to the development, including who would provide it (i.e. Hill County REA or MPC), and what procedures/permits would be necessary. This is an associated element of the project, along with the access road, but is not mentioned much in the analysis.

Response: The Hill County Electrical Cooperative would provide power to the project. Easements with landowners may be required, but the Cooperative has indicated that it may

follow the right-of-way of an existing single-phase power line. We anticipate that no state permits would be required because (1) the power line would be to small to be regulated under the Major Facility Siting Act, and (2) the State does not claims ownership of the Marias River channel beyond about five miles upstream of its confluence of the Missouri, so no State easement for the river crossing would be required. Section 4.1 has been updated to provide more information regarding the power line. Section 4.9 (*Wildlife*) and 6.2 (*Recommended Mitigation*) also have been updated to address potential impacts associated with the power line.

Petition to Prepare an Environmental Impact Statement (EIS)

During the Draft EA comment period, a petition with 94 signatures was received requesting DNRC to prepare an EIS on the Sunny Brook Colony irrigation project application. The five reasons stated on the petition and DNRC's responses to them, are summarized below.

Reason #1: The information contained in the EA is not adequate to insure that the decision makers can make an informed decision. (There has been no hydrological modeling of river, potential impacts to water quality and aquatic life have not been adequately quantified and considered, river flows below the Tiber are not being monitored and are unknown).

Response: DNRC assessed the potential effects of the project on Marias River flows in the draft EA by: (1) summarizing outflows from Tiber Reservoir for wet, average, and dry years, (2) subtracting estimated existing depletions on the lower Marias River from Tiber outflows, and (3) calculating percentage reductions to flows due to the proposed project (see Sections 3.3 and 4.3). Because the proposed project would divert a relatively small percentage of the flow of the Marias River, DNRC does not believe it is necessary to develop a hydrologic model to assess potential impacts to streamflows. Marias River flows below Tiber are monitored. DNRC estimated existing flow depletions in the lower Marias River based on water rights and crop water use data, and by comparing flows it measured during the 2000 irrigation season at Loma to those recorded at the USGS Marias River near Chester gage. Potential impacts to water quality are addressed in Section 4.3. Potential impacts aquatic life are discussed in the *Fisheries* impact section of the EA (Section 4.8).

Reason #2: The mitigation measure recommended in the proposed alternative will not be adequate to guaranty protections required by the EA (Monitoring is not hard wired to pumps shut off, no guarantees that suggestion that purchased water from the Bureau of Reclamation may not actually reduce stream flows rather than supplement them).

Response: Because no significant impacts of the project were identified, DNRC found that an EIS for the project is not necessary. This is not a "mitigated EA". The mitigation measures are suggested as ways to offset potential moderate and minor impacts, but not to mitigate a "significant" impact. Section 6.3 has been revised to clarify this.

Reason #3: Cumulative impact analysis is inadequate (the proposed hog operation and other potential impact to water quality on this impacted stream, effects of Native American claims to original water rights, Bureau of Reclamation water operation planning changes are not analyzed. The EA lists them as issues but does not analyze them).

Response: Potential cumulative impacts are discussed and analyzed in Section 5.0 of the EA. Some additional information has been added to this section to offer more details and clarifications.

Reason #4: Additional Alternatives should be considered.

Response: During the public comment period, one additional alternative to be considered in the EA was suggested. In response, the *Tiber Inflow Alternative* has been added to the final EA and its potential impacts assessed (See Section 2.2 and Chapter 4).

Reason #5: An EIS should consider all of the various impacts of the entire project at once not with incremental reviews of portions of the project as proposed by the EA. (The environmental review must consider all significant effects of the project, so that decision makers (after adequate public comment based on adequate information) may determine whether the water use proposed is in the best interest of the public at large. The EA suggests that the project will go forward and can be viewed by the different agencies at different times. We reject this incremental approach because we are concerned that the true impact of the entire project on Marias River flows and Marias River water quality will not be determined until it is too late. We do not want the Marias River to go the way of the Teton River which is being dewatered by a Colony).

Response: DNRC believes that the EA is sufficient to address the impacts of the proposed project. Potential impacts to Marias River flows and water quality have been analyzed and were not found to be significant (see Section 4.3), even when the effects of other potential developments associated with the Colony were taken into account (see Chapter 5.0). DNRC is aware that dewatering occurs on the Teton River, but finds that this proposed project does not have the potential to dewater the Marias River.

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