CHAPTER 3 AFFECTED ENVIRONMENT

SOCIAL AND ECONOMIC RESOURCES

Socioeconomic Environment

Overview of Socioeconomic Environment

The choice of methods for mitigating avalanche risks to rail operations along the southern boundary of Glacier NP has the potential for impacting the socioeconomic environment on several very different scales. In the narrowest sense, the actions taken would occur within a short (approximately 10 mile) section of canyon surrounded primarily by federal lands. The actions chosen, however, would also have implications on a regional scale for BNSF and Amtrak operations outside of the John F. Stevens Canyon avalanche area. Additionally, large construction projects associated with mitigation of avalanche danger could affect local area economies.

The potential affected socioeconomic environment for this analysis includes effects to BNSF that are associated with avalanche control measures (direct cost of control), costs to BNSF of delays and damage due to avalanche hazard, costs and benefits to markets served by BNSF, Amtrak, and travelers of US Highway 2 due to alternative methods of mitigation, and potential benefits to local economies due to BNSF expenditures for avalanche control.

BNSF Operation

Burlington Northern Sate Fe Corporation is a publicly-held corporation that, through its subsidiaries, provides rail transportation services in North America. BNSF has approximately 40,000 full-time employees. For the years 2002, 2003, and 2004, BNSF reported total annual revenues of between approximately nine and eleven billion dollars, and annual net income ranging between 760 and 816 million dollars.[1]

Within Montana, BNSF utilizes John F. Stevens Canyon, along the southern and western boundaries of Glacier NP as a major transportation corridor. In addition to the BNSF Railroad lines, US Highway 2 winds through this canyon. The BNSF line through the canyon was built originally in 1891, and a second set of tracks was added in 1910 (Reardon et al. 2004). Currently the two BNSF tracks allow for simultaneous east and west train traffic. The average BNSF trains are approximately 6,300 feet in length. Over the last six months an average of between 38 and 42 trains per day have passed through the canyon. This freight traffic has increased by approximately 35% over the last 4 years (personal communication, Lane Ross, BNSF).

In addition to the BNSF freight trains moving through the canyon during winter months, two Amtrak passenger trains (an eastbound morning train and a westbound evening train) pass over the tracks each day (Schedule published online at Amtrak.com).

BNSF Avalanche Safety Program

The potential for avalanches within the John Stevens Canyon area has necessitated that BNSF make choices between the risk of avalanche damage or delay and any costs that risk might entail, and costs associated with avalanche mitigation, prediction, and control. In essence, the implicit tradeoff is between preventative control costs on the one hand and costs associated with damage and delays on the other.

[1] Financial data from http://finance.yahoo.com/q/is?s=BNI&annual accessed on 2/14/06.

Not long after the rail lines through the canyon were built, avalanches were frequent enough that the Railroad built a series of protective snowsheds. These sheds, now in some cases approaching 100 years old, still provide significant protection from winter slides. However, some sheds have been destroyed by fire, or avalanche paths have widened rendering incomplete protection in several shed locations.

Currently, BNSF augments existing snowshed protection with a warning system of signal wires. These wires are tripped when a slide occurs in an unprotected location signaling trains to reduce their speeds and be prepared to stop in the event of an obstruction on the tracks. Table 3-13 shows a listing of snowsheds and signal wires currently in use within John Stevens Canyon.

Table 3-13. Current Snowshed and Signal Wire Control Measures

Avalanche Path Protected	Path Width	Length of Signal Fence	Length of Snowshed
Burnout	900	750	-
Shed 4D	1100	-	1100
Shed 5	550	-	380
Shed 6	800	-	820
Shed 7	1150	100	1000
Shed 8	800	-	650
Shed 9	500	-	400
Jakes	600	600	-
Second Slide	440	440	-
Shed 10	1100	350	500
Path 1163	2112	2140	-
Shed 10.7	1200	550	670
Shed 11	500	-	400

Source: compiled from Hamre and Overcast (2004).

BNSF reports that in 2004 costs associated with avalanche detection and snow removal within the canyon included approximately $340,000 for plowing, $5,000 for signal fence installation and repair, and $100,000 for contract services (Table 3-14)[2].

Table 3-14. Current BNSF Costs Associated with Avalanche Prediction and Detection in John Steven Canyon.

Category of cost	Estimated annual cost
Costs of signal wire repair/replacement	$5,000
Costs for snowshed maintenance	$40,000[a]
Costs for snow removal	$340,000
Contract services	$100,000
Total	$485,000

[a] estimate from Hamre and Overcast (2004).

BNSF Goods Transport Between Seattle and Chicago

Table 3-15 details the average daily transport of goods through Essex, MT for the period from November 2004 through April 2005. As the table shows, over 40% of the freight along this route during winter months is intermodal, transported by truck and train. An additional 20% are grain trains (either full or returning empty). Anther 12% consists of BNSF work and helper trains. Additional trains carry autos

[2] Information on 2004 BNSF costs related to avalanche detection and snow removal from personal communication, Mark Boyer, Manager of Maintenance Planning, BNSF, Havre, MT. Nov. 23, 2005.

(5%), and passengers (Amtrak at 5% of daily use). It should be noted that 17.3% of use is intermodal traffic for priority UPS shipments.

Table 3-15. Average Daily Mix of Trains through Essex, MT: November 2004 through April 2005.

Type of Train	Average number per day	Percent of daily traffic
Amtrak	2	5.0%
Bare table intermodal	0.7	1.8%
Grain	4.1	10.3%
High priority manifest	2.4	6.0%
Helper	4.3	10.8%
Normal priority manifest	3.4	8.5%
Premium intermodal	1.4	3.5%
Gauranteed intermodal	0.4	1.0%
Double stack intermodal	7.9	19.8%
Other unit train	0.2	0.5%
Auto train	2	5.0%
Work train	0.6	1.5%
Empty grain train	3.7	9.3%
High priority intermodal UPS	6.9	17.3%
Total Trains	40	100.0%

Source: BNSF (August 18, 2005)

Transportation of hazardous materials by rail during periods of high avalanche danger within the John Stevens Canyon is of particular concern. Table 3-16 shows the number of loaded railcars of hazardous substances that traveled through John Stevens Canyon during the yearlong period from July 1, 2004 to June 30, 2005.

By far, the largest class of hazardous cargo is designated as “freight-all-Kinds Hazardous Materials” (nearly 90% of all hazardous material cars). These are rail cars loaded with containers or trailers that contain a mix of hazardous and non-hazardous materials.

Table 3-16. Major Classes of Railcars Of Hazardous Cargo Traveling John Stevens Canyon: July 2004-June 2005.[a]		
Description Of Car Contents	**Loaded Cars**	**Percent Of Cars With Hazardous Loads**
Freight-all-Kinds -Hazardous Materials	40,287	89.78%
Elevated Temperature Liquid	2,059	4.08%
Diesel Fuel	1,918	3.80%
Propane	1,159	2.29%
Liquefied Petroleum Gas	889	1.76%
Flammable Liquid	709	1.40%
Alcohols	397	0.79%
Pentanes	336	0.67%
Ammonia- Anhydrous	268	0.53%
Carbon Dioxide- Refrigerated Liquid	221	0.44%
Sodium	138	0.27%
Hydrogen Peroxide- Aqueous Solutions- Inhibited	101	0.20%
Total Hazardous Loaded Railcars	50,506	

Source: Edward Chapman, Director of Hazardous Materials, BNSF.
[a] Data provided for substances with 100 cars or more per year shipped along route.

BNSF Accidents, Derailments, and Delays

History of Avalanche Delays and Damage

The motivation for analyzing potential impacts associated with alternative methods of avalanche control within John Stevens Canyon is to mitigate some of the damage and delay costs associated with past avalanche events in the canyon. Reardon and Fagre (2005), and Hamre and Overcast (2004) examined the history of avalanche events within the canyon.

Data was compiled by Reardon and Fagre (2005) on the significant avalanche events (or cycles) during the 28 year reporting period from 1977-2004. During this period, there were seven significant events which resulted in reported damage or delays to railroad operations (Table 3-17). These avalanche cycles spanned between one and four days in length.

The 7 avalanche cycles disturbing railroad operations that were seen over this 28 year period have an estimated average closure time per event/cycle of 39.6 hours including both BNSF and Amtrak operations. This estimate is likely an overstatement of actual delay impacts on BNSF operations as the calculation includes a 48 hour delay of only Amtrak traffic in 2003. Considering the 21 years within the 1977-2004 period without lengthy avalanche disruptions, the average disruption/delay per year is 7.1 hours.

Table 3-17. Historic Record of Lengthy Avalanche Caused Rail Delays and Damage.		
Date of Avalanche Peak	**Days with recorded slides**	**Hours BNSF interrupted**
2-12-1979	2	60
1-23-1982	2	?
2-8-1996	2	7
12-30-1996	3	18-72[b]
3-11-2002	1	Short
3-11-2003	4	48 Amtrak
1-28-2004	2	29

Average per major event	2.3	39.6 [a]
Average per year (all 28 years)	-	7.1

Source: Reardon and Fagre, 2005.
[a] Data only used for the 79, 96, 03, and 04 events. Use of the 2003 48 hour Amtrak closure may overstate impacts on BNSF operations. Additionally, inclusion of the indeterminate "short" 2002 closure would likely reduce the average closure per event.
History of accidents and delays (Reardon)
[b] One-way traffic only for 72 hours.

Several factors complicate the use of historical events in estimating an average level of rail traffic disruption for use in comparisons involving new avalanche control programs. The primary problem involves the spotty, incomplete nature of record keeping associated with disruptions in rail traffic within the canyon. Additionally, snow removal methods have allowed faster clearing of tracks in recent years than in the past (personal Communication, Blase Reardon, USGS, W. Glacier July 26, 2005).

In addition to the lengthy delays and substantial damage due to past avalanche events within John Stevens Canyon, trains routinely encounter shorter delays during winter months. These delays are due to the need to reduce speed to a level where they are able to stop within one-half their range of vision. BNSF representatives estimate that during the prime winter season between January 10th and March 17th approximately 20 percent of the trains traveling through the canyon face an average 20 minute delay/slowdown due to avalanche concerns. BNSF further estimates that for 5 percent of the trains running during winter months, the delays result in additional costs due to the need to switch in fresh crews. (Personal Communication, Lane Ross, BNSF. August 4, 2005).

Economic Cost to BNSF from Avalanches and Avalanche Danger

The need for avalanche prediction, protection, and control measures within John Stevens Canyon arises from real risk associated with rail-avalanche accidents. Historic delays and accidents in the canyon have imposed very real costs on BNSF and Amtrak. These costs include costs of damaged trains, costs of clearing avalanche debris, and costs associated with closures and delays due to avalanches.

Evaluating the potential costs and benefits of the alternatives presented below in Chapter 4, Environmental Consequences, requires first that estimates of current, unmitigated costs associated with avalanche danger in the canyon be estimated. Table 3-18 shows the major classes of costs faced by BNSF and Amtrak associated with avalanche risk in John Stevens Canyon.

Table 3-18. Categories of Costs Associated with Avalanches and Avalanche Danger

Cost category	Description
Delays or travel restrictions	Costs associated with delayed transport of goods due to avalanche-caused track closure or excessive avalanche risk. Costs may include increased personnel costs as well as increased train operation costs and costs associated with late delivery of freight.
Train or Rail damage	Costs associated with accidents involving trains and avalanches. Costs include damaged rail cars, injury or death to rail workers, and damage to tracks or roadbed.
Snow / Debris Removal	Costs associated with plowing and removal of avalanche snow and debris that has blocked the rail line
Avalanche prediction, detection and protection systems	Costs associated with detecting avalanches (signal wires) and building and maintaining snowsheds

Costs associated with rail delays

Estimation of the baseline level of costs incurred by BNSF due to short delays or restrictions is necessarily based on assumptions of average levels of avalanche danger over the winter. As noted above, BNSF estimates that during the January 10 through March 17 prime winter avalanche season approximately 20 percent of trains face a short delay averaging 20 minutes, and 5 percent face additional costs from delays associated with the need to bring in fresh crews. Table 3-17 details estimation of annual costs to BNSF arising from these short delays associated with avalanche danger.

Table 3-19 outlines the estimation of direct costs to BNSF associated with these relatively short winter delays. Based on current winter train traffic levels and information on delay costs provided by BNSF (Personal Communication, Lane Ross, BNSF. Aug. 4, 2005), it is estimated that direct costs to BNSF associated with minor winter delays are in the range of $340,000 per winter.

Table 3-19. Estimated Annual Cost Associated with Short Delays and Travel Restrictions due to Avalanche Danger	
Winter season trains per day	38
Days during Winter season	66
Total Winter season trains	2,508
Percent of trains facing a short delay averaging 20 minutes	20%
Number of trains facing short delays	502
Costs associated with short delays[a]	$100,400
Percent of trains facing additional costs due to need for fresh crews	5%
Number of trains facing additional costs	125
Costs associated with delays necessitating fresh train crews[b]	$237,500
Total estimated costs due to short delays or restrictions	$337,900

Source: Personal Communication, Lane Ross, BNSF. Aug. 4, 2005.
[a] Delays of trains are estimated to cost $600/hour
[b] Estimated to cost an additional $1900 per train.

Costs associated with lengthy avalanche risk and accidents

The primary goal of all precautionary measures taken by BNSF regarding winter operations through John Stevens Canyon is avoidance of avalanche-related rail accidents, such as occurred in the 2004-05 winter. The measure of the effectiveness of any avalanche risk mitigation measures undertaken by the railroad is the degree that potential accidents are successfully avoided. A cost/benefit analysis of an avalanche mitigation measures package would compare the dollar cost of those measures to the benefit gained in reduced costs associated with avalanche risk. Two estimates were derived in developing the baseline level of risk (and associated costs) of avalanche-related rail accidents within the canyon.

The first estimate, shown in Table 3-18, is based on assessments of risk and costs presented by Hamre and Overcast (2004). While the estimates below are presented as annual averages, implicit in these estimates is the understanding that accidents involving avalanches and railcars within the canyon are very infrequent. Many years can pass without accidents . Hamre and Overcast (2004) estimated the frequency of various types of rail cars being hit by an avalanche within the canyon. These estimates are based on train frequency and the length of time each type of car is exposed to avalanche danger during the winter season. Table 3-18 shows that Hamre and Overcast estimate that on average 2.75 freight cars would be struck by avalanches each year. On the other end of the spectrum it is estimated that a mini dozer would be hit every approximately 350 years. Multiplying the estimated annual frequency of accidents for each type of rail car by the estimated cost associated with each type of car being hit yields an estimated annual cost associated with the current unmitigated avalanche risk within the canyon.

Added to this estimated annual cost of damage and injury is the additional estimated cost to BNSF due to delays on the line. The estimate of $25,000 per year is based on an average annual delay due to avalanche closures of 7.1 hours (Table 3-17) and the recognition that with each passing hour another train from each direction is likely affected and delayed.

Table 3-20 shows an estimated total annual cost associated with substantial damage and delays from avalanches within the canyon of approximately $1.6 million dollars. As noted above, this estimate represents an annual average, while actual yearly costs may range from zero in many years to $25,000,000 or more for a very bad accident.

Table 3-20. Estimated Hypothetical Costs Associated with Avalanche Related Derailments / Accidents.

Class of Rail Car	Cost per Accident[a]	Estimated cars hit / year[b]	Average Estimated Cost per year
Freight Car	100,000	2.752	275,000
Locomotive	3,000,000	0.15	450,000
Passenger car	25,000,000	0.035	872,000
Mini Dozer	2,000,000	0.003	6,000
Total Estimated annual Cost of accident damage and injury			1,603,000
Estimated delay cost of an annual average 7.1 hour delay due to avalanches[c]			25,000
Total estimated annual costs to BNSF from major avalanche events			1,628,000

Source: Derived from Hamre and Overcast (2004).
[a] Loss to equipment and life costs from Hamre and Overcast (2004) pp. 42-43.
[b] Encounter probability estimates from Hamre and Overcast (Figure 3.4, pg. 44)
[c] Based on an annual average delay of 7.1 hours from major slides (Table 3.17)

Hamre and Overcast note that their computed encounter probabilities (estimated railcars hit per year) are somewhat higher than shown by accidents that have actually occurred. They suggest that the actual accident rate is lower than their predicted accident rate because of closures forced on the line by avalanche events (Hamre and Overcast 2004 p.43). As an alternative estimate of average annual risk/cost associated with avalanche-related rail accidents in the canyon, a second baseline cost estimate is presented in Table 3-21. This second estimate of baseline risk (and associated cost) is based on actual rail accidents that have occurred within the canyon due to avalanche danger.

Over the 28 year period from 1977 to 2004 there have been one major and several minor avalanche-related rail accidents. (Personal Comm. Blase Reardon, USGS, W. Glacier Aug 22, 2005). The largest accident occurred in 2004 when an empty freight train was stopped within the canyon by one avalanche and was hit by another avalanche while it was stopped. This accident resulted in the loss of 15 grain cars (Hamre and Overcast 2004 at p.1).

In addition to the 2004 incident a locomotive was damaged in 2003 when it was struck by avalanche debris. In addition to the 2003 and 2004 rail incidents, several avalanche-caused accidents involving vehicles on US Highway 2 also occurred during this period. In the winter of 1996-97 a BNSF train was stuck in avalanche debris near snowshed 4c.

Table 3-21 shows the calculation of average costs associated with rail/avalanche accidents during the 28 year period. On average, there has been less than $100,000 in rail damage per year due to avalanches during this period. It must be noted that the estimates of average annual avalanche-related accident costs shown in Table 3-21 are based on available information on accident costs. No comprehensive source of avalanche caused train and rail damage was available for this analysis. Estimates are therefore based on public records (such as news accounts) and communication with current and former BNSF employees. To the extent that incidents of avalanche-related train damage have been missed in this analysis, the associated cost estimates will be underestimated.

Table 3-21. Estimated Costs Associated with Avalanche Related Derailments / Accidents: Based on 1979-2004 Accident Records.			
Date	**Incident**	**Estimated incident cost**	**Average annual cost**
2003	Locomotive damaged by avalanche debris	2,500 [a]	
2004	15 empty grain cars destroyed	1,500,000[b]	
Average annual cost 1979-2004		--	54,000
annual	Estimated delay cost of average 7.1 hour delay	--	25,000
Total average annual cost		--	79,000

Based on conversations with Blase Reardon, Flathead NF, August 22, 2005.
[a] Personal Comm. Mark Boyer, BNSF.
[b] Based on Hamre and Overcast (2004) estimate of value of typical rail car ($100,000)

Comparison of the estimated average annual rail costs associated with avalanches in John Stevens Canyon show a wide range between the hypothetical cost estimate based on avalanche encounter probabilities of $1.6 million and the estimate of $79,000 per year based on the historical accident record. The large difference between these two estimates likely arises from two sources. The high end estimate (based on Hamre and Overcast, 2004) assumes that train traffic does not react to avalanche danger. That is, the trains keep running and the tracks are immediately cleared of snow and debris. In actuality, slides may often block the tracks during high danger periods stopping rail traffic and thus eliminating or reducing risk during the periods of the highest likelihood of accident. A second source of the large range in the estimates is that cost estimates at the high end are largely driven by low probability events. For instance, over one-half of the estimated $1.6 million in annual costs is associated with accidents involving Amtrak passenger cars. Hamre and Overcast note (p. 44) that the most likely scenario is that several passenger cars would be hit at once by an avalanche roughly every 100 years. Therefore the likelihood is relatively low that this type of accident (and its associated costs) would be contained within our 28 year period of record.

While the range of estimated annual costs associated with avalanche/rail accidents in the canyon is very wide, it does provide two points for comparison. One based on recent observed accident rates, and the other based on high-end estimates of risk and exposure to avalanche danger.

Total Estimated Current Costs Associated Avalanche Risk

Table 3-22 presents a summary of the current level of costs associated with avalanche danger faced by BNSF and Amtrak within the John Stevens Canyon.

In total, the estimated annual average cost to BNSF associated with avalanche risk ranges from approximately $900,000 to $2.45 million.

Table 3-22. Current Estimates of Costs and Risk Associated with Rail Travel through Avalanche Zones of John Stevens Canyon.		
	Estimated Annual Cost	
Cost/ Risk category	**Low**	**High**
Estimated Costs of Minor Train Delays or Travel restrictions	337,900	337,900
Estimated Risk/Cost of Avalanche caused Train or Rail damage	79,000	1,628,000
Cost Snow / Debris Removal	340,000	340,000
Cost Snowshed maintenance	40,000	40,000
Cost Avalanche prediction/detection systems	105,000	105,000

Total Estimated Cost	901,900	2,450,900

Recreational Use of Winter Trails

Table 3-23 shows a 10 year series of winter trail use estimates for the three specific trails which would be closed during use of artillery. Visitor logs for the Fielding trailhead are unreliable because the sign-in register is difficult to find and many people bypass it. Rangers in the area estimate that the register logs for the Autumn Creek trail provide good estimates for the Fielding trailhead (personal communication, Kyle Johnson, GNP. August 16, 2005). Table 3-23 shows approximately 800 to 1,000 winter trips are made on the potentially affected trails in a typical winter season.

Table 3-23. Estimated Winter Trail Use for Ole Creek, Scalplock, and Fielding Trails: 1995-2004.

Year	Ole Creek and Scalplock Individual Winter Trips	Fielding Trailhead Individual Winter Trips[a]
1995	217	548
1996	109	450
1997	116	374
1998	152	485
1999	263	573
2000	342	793
2001	383	658
2002	212	406[b]
2003	212	549
2004	212	601

[a] Fielding use estimated as equal to Autumn Creek trail use.
[b] January data missing.

U.S. Highway 2 Winter traffic levels

Table 3-24 below shows the average daily traffic at the West Browning traffic counter for January through March in the years 2000 though 2004. Overall, an average of approximately 1,150 vehicles per day cross this counter during these winter months.

Table 3-24. Average Daily January-March Traffic at Montana DOT West Browning Traffic Counter.

Year	West of Browning Traffic (counter A-36)
2000	1170
2001	1139
2002	1037
2003	1201
2004	1195
5-year average	1148

REGIONAL AND LOCAL COMMUNITIES

The affected socioeconomic region is defined as the two-county area of Flathead, and Glacier Counties. The BNSF rail-line passes through these two primary counties on its approaches to Marias Pass and the John Stevens Canyon. This section discusses economic, employment and demographic characteristics for this two-county area.

Economy

The foundation of the regional economy is mainly based on tourism, agriculture and regional trade. Tourism is a large part of the regional economy and has dramatically increased during the last several years as this region has become one of Montana’s leading tourist destinations.

Production of agricultural goods, including hay, wheat, barley, some hardy fruits and livestock, has been a traditional base of the local economy. Kalispell is approximately 32 miles from the park's entrance at West Glacier. It has become the main trade center for northwest Montana and is important to regional economic activity. Flathead County has a fairly diverse economic structure, while Glacier County has more concentrated economic sectors. In addition to a wide range of recreational opportunities and tourism related businesses, Flathead County has a variety of manufacturers, a concentration of professional services serving the region, growing numbers of second-home residents and a developing focus on visual and performing arts. Tourism and agriculture are the main drivers of the economy of Glacier County.

Employment

Employment by economic sector for Flathead and Glacier Counties is shown in Table 3-25. Most jobs related to the tourism and recreation industry are in the retail trade and services sectors of a county's economy. Average annual unemployment in the two-county area is 5.7%. This is somewhat higher than the state average of 4.4%, mostly because of the seasonal character of the local economy. Due to the large tourism basis of the local economy, employment varies seasonally in the three-county area (www.bls.gov).

Table 3-25. Total Full and Part-time Employment by Industry (2003): Flathead and Glacier Counties.

Economic Industry	Flathead County	Glacier County
Farm	1,124	538
Agriculture[a]	946	(D)
Mining	299	141
Construction	5,250	266
Manufacturing	3,519	29
Transportation, Communications & Utilities	2,194	233
Wholesale	1,020	109
Retail	7,178	571
Finance, Insurance & Real Estate	4,733	(D)
Services	21,853	1,379
Government	4,832	2,232

[a]Includes Agriculture, Forestry and Fishing
Source: Regional Economic Information System, U.S. Bureau of Labor Statistics

Table 3-26 details the labor force composition and unemployment statistics for Flathead and Glacier Counties for 2004.

Table 3-26. Labor Force and Unemployment Statistics for Flathead and Glacier Counties: 2004.

Statistic	Flathead County	Glacier County
Labor Force	41,868	5,942
Total Employees	39,625	5,466
Total Unemployed	2,243	476
Unemployment Rate	5.4%	8.0%
Montana Unemployment Rate	4.4%	

Source: www.bls.gov . Accessed Aug 2, 2005.

Population and Income

In terms of population, Flathead and Glacier Counties show two distinct patterns in recent years. Table 3-27 shows that Flathead County has seen a robust population growth of 25.8% over the 1990 to 2000 time period while Glacier County grew less than half as quickly (a 9.3% population growth over the decade).

In terms of per capita income, Flathead County was $25,406 in 2003 while Glacier County per capita income was only $18,549 in that year.

Table 3-27. Population and Personal Income Characteristics, Flathead and Glacier Counties.			
Statistic	**Flathead**	**Glacier**	**Montana**
Population (2003)	79,485	13,250	917,621
Population change 1990-2000	25.8%	9.3%	12.9%
Per capita personal income (2003)	$25,981	$18,549	$25,406
Population per square mile	14.6	4.4	6.2

Source: www.bea.gov/bea/regional Accessed Aug. 1, 2005.

Sources of Personal Income in Key Industries

The two primary industries that may be affected by actions covered under this EIS are rail transportation and heavy and civil engineering construction. The link to rail transportation is clear, and construction may be impacted to the extent new snowsheds are built by BNSF. Table 3-28 shows 2003 personal income in Flathead and Glacier Counties attributable to these two industries.

Table 3-28. Key Industry Sources of Personal Income in 2003, Flathead and Glacier Counties.		
Industry	**Flathead**	**Glacier**
Rail Transportation	26,177,000	1,361,000
Heavy and Civil Engineering Construction	27,989,000	(D)
Total County Personal Income	2,064,848,000	246,288,000

Source: www.bea.gov/bea/regional/reis Accessed July 28, 2005.
(D) information not disclosed due to small number of reporting entities.