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*Economic Impact Analysis of the Temporary Winter Use Plan for
Yellowstone and Grand Teton National Parks and John D.
Rockefeller, Jr., Memorial Parkway*

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0. INTRODUCTION

Taking action to change the way that snowmobile use is managed in Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway (YELL and GTNP) could potentially affect the economy of the surrounding area. The parks are currently considering five temporary winter use plan alternatives. All five proposed alternatives would reduce peak snowmobile use relative to snowmobile use prior to the 2003–2004 winter season.¹ The primary economic impacts associated with the proposed snowmobile restrictions are the potential changes in the sales, profits, and employment of snowmobile sales and rental shops, restaurants, and other businesses that serve snowmobile riders visiting YELL and GTNP. The total regulatory impact of each alternative will depend in large part on the response of the affected individuals and firms to the changes brought about by the alternatives. For example, if facing reductions in snowmobile use, affected local retailers may be able to provide substitute products and services and thereby reduce the negative impact on their profits. Individual snowmobilers may respond to additional restrictions by snowmobiling in the surrounding national forests instead of YELL and GTNP or choosing to substitute other forms of winter recreation, which will decrease the financial impact on the region. It is also possible that visitation by nonsnowmobile users to YELL and GTNP will increase following additional restrictions on snowmobile use if the restrictions make park visitation more enjoyable for this group of people.²

A variety of economic analyses can be conducted to provide valuable information for policy makers trying to understand the effects of alternative policies. The type of analysis that is most appropriate for examining a particular policy or action depends on the decision under consideration. In the context of examining the impacts of regulation, two of the most important types of economic analysis are economic impact analysis and benefit-cost analysis. These types of analyses are often confused because they both estimate the economic “benefits” associated with a particular policy. However, an economic impact analysis typically examines the effect of a change in policy on the economy of a particular region, while benefit-cost analysis focuses on the change in economic efficiency resulting from a change in policy. Economic impact analyses trace the flows of spending associated with the affected industries to identify changes in sales, income, jobs, and tax revenues resulting from a policy action. Benefit-cost analysis, on the other hand, focuses primarily on changes in social welfare. Unlike economic impact analysis studies, benefit-cost analysis includes both market and nonmarket values (Stynes, 2000).

Economic impact analyses tend to overstate the social costs associated with rules such as the proposed restrictions on snowmobiling in YELL and GTNP because they do not

¹It is possible that Alternative 5 will actually result in increased overall winter visitation.

²Although an increase in expenditures for substitute activities in the YELL and GTNP region in response to snowmobile restrictions will tend to reduce negative regional impacts, there may be reallocation of revenue among businesses.

account for behavioral changes that may partially mitigate losses resulting from regulation. However, these analyses are still very important to policy-makers because they provide an estimate of the impact on the local area most directly affected by the regulation and are useful for relative comparisons among different alternatives.

This analysis estimates the economic impacts of the proposed temporary winter use plan alternatives for the winters of 2004–2005 through 2006–2007. The analysis considers the impacts on five areas: the five-county area (Fremont County in Idaho, Gallatin and Park counties in Montana, and Park and Teton counties in Wyoming); the three-state area (Wyoming, Montana, and Idaho); and three cities (West Yellowstone, Montana; Jackson, Wyoming; and Cody, Wyoming).

Additionally, this analysis estimates economic impacts relative to two baselines: historic snowmobile use (1997-1998 winter season) and a snowmobile ban. The rationale for using these two baselines flows from two regulatory actions and two federal district court rulings. The National Park Service (NPS) issued a special regulation on January 22, 2001, phasing in a snowmobile ban. In settling a law suit filed by the International Snowmobile Manufacturers' Association and other plaintiffs regarding that regulation, NPS agreed to re-evaluate its winter use plan alternatives, and subsequently issued a special regulation on December 11, 2003, permitting snowmobile use subject to certain management restrictions. On December 16, 2003, the Washington, D.C., District Court issued a ruling overturning the December 11, 2003, regulation and implementing the January 22, 2001, regulation. Following that ruling on February 10, 2004, the Wyoming District Court issued a preliminary injunction against implementing the January 22, 2001, regulation.

These two rulings potentially imply the two baselines used in this analysis. In order to cover the potential range of analyses suggested by these rulings, NPS used historic snowmobile use from the 1997-1998 winter season and a snowmobile ban as alternative baselines to estimate the economic impacts of its proposed temporary winter use plan alternatives. NPS believes that the actual economic impacts of the proposed temporary winter use plan alternatives fall within the range of impacts estimated relative to these two baselines, and described in this report.

Section 1 of this report describes the model used to estimate the economic impacts. Section 2 describes the scenarios used in the analysis of each alternative. Section 3 presents the results relative to historic snowmobile use, and Section 4 presents the results relative to a snowmobile ban.

1. APPROACH TO ESTIMATING THE ECONOMIC IMPACTS

This section includes a general discussion of economic impact analyses and regional economic models as well as IMPLAN, the specific input-output (I-O) model chosen for this analysis, and the National Park Service Winter Use Modeling Program, which uses

IMPLAN multipliers in a program designed specifically to estimate economic impacts on YELL.

1.1 Description of Economic Impact Analysis

Economic impact analysis is commonly used to analyze the contribution of a particular activity to a region's economy. This type of analysis has been used to examine the effects of many different activities. For example, this technique has been used to measure the impact of local stadiums, recreation activities (the presence of fishing, boating, and skiing, in a particular area), the presence of military bases, and a wide variety of special regional events that draw visitors from outside the region. An economic impact analysis generally attempts to address the following basic questions concerning an activity of interest:

- How much spending does this activity bring to the region?
- What portion of sales by local businesses is due to this activity?
- How much income does this activity generate for local households and businesses?
- How many jobs does this activity support?
- How much tax revenue is generated by this activity?

In addition to looking at the total effect of an existing activity, economic impact analyses are used to estimate the effects of a proposed change in some aspect of the local economy. There are several major applications of these studies. One of the most common is to evaluate the impacts of opening a new facility, closing an existing facility, or changing the capacity of existing facilities. Businesses often use these studies to lobby for reduced taxes and other incentives to encourage the location of new facilities in a particular region because of the positive impact on employment and economic activity. They have also been used to lobby against closing local military bases as a result of the expected contraction in employment and economic activity. Another common application is to evaluate the effects of changes in policies and actions that affect local businesses either directly or indirectly, such as stricter local air pollution standards, changes in local taxes, or increased government spending on infrastructure, among numerous other possibilities. Economic impact analyses are also frequently used to compare the impact expected from alternative policies under consideration.

1.2 IMPLAN

The IMPLAN software system, available from Minnesota IMPLAN Group, Inc. (2002), is a nonsurvey-based regional I-O model including 528 sectors that can be constructed for any county-defined region in the United States and many zip codes. IMPLAN's database is built from the National Income and Product Accounts (NIPA) published annually from the Bureau of Economic Analysis (BEA) and the 1977 BEA I-O model for the United

States. Data are designed to be internally consistent (i.e., county data sum to state totals and state data sum to national totals).

IMPLAN can generate regional accounts for single counties, groups of counties, single states, groups of states, and the entire United States. Data from numerous other sources are also used in building these regional accounts. Most data entering IMPLAN's database do not represent actual county or state magnitudes. Instead, they are based on national values. For example, county employment in a given sector equals the NIPA-based state total for that sector multiplied by the ratio of county employment in that sector to state employment in that sector. The ratio is calculated directly from County Business Patterns (CBP), but the sector total for the state is not. Consequently, IMPLAN values for counties and states do not necessarily equal actual values reported in CBP or other data sources.

To apply IMPLAN, the analyst must estimate the direct impacts of an economic activity or policy and provide them as input. A data file containing information on the region of interest is used to provide information such as ratios of jobs to sales for each sector, the proportion of spending by individuals and firms located within the region that is spent within the region, and the amount that each sector purchases from all the other sectors within the region per unit of output. Applying the multipliers generated from the data file allows the IMPLAN program to estimate the total regional impacts resulting from a given direct impact.

In short, IMPLAN is a relatively standard I-O model that generates regional accounts for counties and combinations of counties and states. The data used to generate these accounts come from several different sources and are highly transformed prior to incorporation. In some cases, regional values are created where no data previously exist, and for other categories new values are calculated to replace existing data. Thus, IMPLAN contains comprehensive and consistent regional accounts but at the cost of making alterations to existing data and creating new data (Crihfield and Campbell, 1991).

1.3 Yellowstone IMPLAN Model

The National Park Service Winter Use Modeling Program (Winter Use Model), developed by Duffield and Neher (2002), is a Microsoft Excel program that can be used to estimate regional economic impacts due to changes in winter visitation to YELL. The Winter Use Model uses the actual daily visitation data from the 1997–1998 winter season as its baseline.³ The baseline data are organized by day, entrance, and mode of transportation, which can be aggregated to the park level. The Winter Use Model has six separate worksheets: main data input, final visitation changes, final economic impacts, baseline winter use data, modified winter use data, and aggregated visitation changes. Table 1 describes the functions of these worksheets.

³ This baseline represents only one of the two alternative baselines addressed in this report. See the introductory section for a discussion of these baselines.

The Winter Use Model is designed to accept user-specified assumptions and restrictions proposed in winter use management plans. To apply the model, one can modify the assumptions presented in Table 2 to reflect a policy scenario that needs to be evaluated. Based on the chosen assumptions, the model estimates changes in winter visitation and direct regional economic impacts. The Winter Use Model applies region-specific multipliers derived from IMPLAN to derive total regional economic impacts (including business output and employment) given a direct impact.

2. SCENARIOS EXAMINED IN THIS REPORT

Analysis of the local economic impacts requires predicting the likely effects of the alternatives under consideration. Because it is not known exactly how visitation to YELL by snowmobilers and nonsnowmobilers will change as a result of the restrictions placed on snowmobiles, NPS constructed two scenarios for the alternatives to provide a range of possible outcomes.

Table 3 presents the relevant details of the five alternatives evaluated in this report. Under Alternative 1 snowmobiles are not permitted in the parks. That alternative describes the snowmobile ban used as one of two alternative baselines in this analysis. The other alternatives provide for snowmobile access, but access is subject to daily limits and the requirement that most or all of the snowmobiles in YELL be on a guided tour. Under Alternatives 2 and 4, all snowmobiles in YELL must be on a commercially guided tour. Alternative 3 allows for 20 percent of the daily limit at each YELL entrance to be unguided starting in the winter of 2005–2006. The final alternative, Alternative 5, requires that all snowmobiles in YELL be on a guided tour, but 20 percent of the tours can be led by noncommercial guides. Under this alternative, the park would design a certification course that visitors could take to qualify as a noncommercial guide. Alternative 5 is the rule that was finalized on December 11, 2003, but later set aside by the Washington, D.C., District Court ruling on December 16, 2003.

Economic impacts were estimated using the Winter Use Model, which relies on historic snowmobile use during the 1997-1998 winter season as its baseline. That baseline represents only one of the two alternative baselines addressed in this analysis. However, since the Winter Use Model relies on that baseline, the scenarios developed for each alternative are described below relative to historic snowmobile use. Economic impacts for that baseline are reported in Section 3. The economic impacts relative to a snowmobile ban are then reported in Section 4 as incremental differences between the impacts calculated in Section 3 for Alternative 1 (snowmobile ban) and the impacts calculated for the remaining alternatives.

Based on the specifics of the five alternatives, two scenarios, high-impact and low-impact, were created to estimate the effects of each alternative. The high-impact scenario models a larger decline in visitation than the low-impact scenario.⁴ Table 4 presents the

⁴ These scenarios were developed relative to the historic snowmobile use baseline. Results for the snowmobile ban baseline are reported in Section 4.

assumptions used to create the scenarios. For each of the input steps presented in Table 2 and required to run the Winter Use Model, Table 4 reports the assumptions used to generate the economic impacts relative to the historic snowmobile use baseline. In general, the default input levels were used in the model with the exception of Steps 4 and 5. Additionally, in Step 7 for the high-impact scenario, it was assumed that there would be no increases in visitation by people who do not currently visit the park in the winter.

The Winter Use Model does not provide a step for indicating the percentage of former snowmobile riders who will still visit the Greater Yellowstone Area (GYA) and recreate outside the parks if they cannot or do not want to snowmobile in the parks under a particular alternative. It is important to account for these visits, because to the extent that current snowmobile riders continue to visit the GYA and recreate outside the parks, the economic impacts of a particular alternative will be lessened. These visits were accounted for in the step in the Winter Use Model that allows the user to specify the percentage of snowmobile riders who will switch to other activities in the park under a given alternative. For the high-impact scenario, it was assumed that 40 percent of snowmobile riders who are excluded as a result of the daily limits or do not want to ride a snowmobile under a given alternative will still visit the park for other activities or return to the GYA to recreate outside the park based on default assumptions in the Winter Use Model. For the low-impact scenario, it was assumed that 74 percent of former YELL snowmobile riders will continue to visit the GYA based on data from the 2002-2003 Winter Visitor Survey.

The final deviation concerns the treatment of the requirement for guided tours. The Winter Use Model does not contain a step that allows for reductions in baseline visitation in response to the requirement that all snowmobiles be on guided tours. However, in the 2002-2003 Winter Visitor Survey conducted in YELL (NPS, 2003) approximately 38 percent of snowmobile riders said they would not visit the park if guided tours are required, even with the provision for 20 percent noncommercially guided tours. Visitation under guided tour requirements is forecast to be so low that the daily limits on snowmobiles may not be binding for most or all of the winter under all four alternatives that allow snowmobile access. This issue was addressed by calculating hypothetical daily entrance limits that would yield a 38 percent decline in visitation. For comparison, visitation under the caps proposed in the alternative was also calculated assuming that no snowmobile riders switch their trips to less crowded days. The high-impact scenario uses the assumptions that generate the largest reduction in visitation.

2.1 Alternative 1

Under the Alternative 1 high-impact scenario, it was assumed that there will not be an increase in visitation by nonsnowmobile visitors and 40 percent snowmobile riders will either switch to other activities in the park or continue visiting the GYA to recreate outside the parks as a result of the snowmobile ban. The low-impact scenario assumes that visitation will increase by 2.25 percent for nonsnowmobile visitors, and 74 percent of excluded snowmobile riders will still visit the park or the GYA for other activities.

2.2 Alternative 2

Given the daily snowmobile limits and 100 percent guided tour requirement, the Alternative 2 high-impact scenario assumes that excluded snowmobile riders will not shift their snowmobile trips to nonpeak days, and there will not be an increase in visitation by nonsnowmobile visitors. It was assumed that 40 percent of snowmobile riders will continue visiting the GYA but not snowmobile in the park. In this case, using the daily limits and assuming that snowmobile riders would not shift their trips to less-crowded days generated a larger decline in snowmobile visitation than the 38 percent predicted by the 2002-2003 Winter Visitor Survey (NPS, 2003). Under the low-impact scenario, it was assumed that 100 percent of snowmobile riders will be willing to shift their trips to nonpeak days and there will be a 2.25 percent increase in visitation by nonsnowmobile visitors. In addition, 74 percent of excluded snowmobile riders will still visit the park or the GYA for other activities.

2.3 Alternative 3

The Alternative 3 high-impact scenario is similar to Alternative 2. The proposed daily limits coupled with the assumption that none of the riders switch their trips to less-crowded days generated a larger decline in snowmobile visitation than the 38 percent predicted by the 2002-2003 Winter Visitor Survey (NPS, 2003). Recall that for this alternative, 20 percent of the daily limit is reserved for unguided snowmobiles. It was assumed that this fraction of the limit is always filled. This produces an unadjusted decline in snowmobile visitation of 45 percent. In addition, it was assumed that 40 percent of excluded snowmobile riders will continue to visit the park or the GYA for other activities, and that there will not be an increase in visitation by nonsnowmobile visitors. The low-impact scenario assumes that 100 percent of snowmobile riders will shift their trips to less-crowded days, visitation will increase by 2.25 percent for nonsnowmobile visitors, and 74 percent of excluded snowmobile riders will still visit the park for other activities.

2.4 Alternative 4

Under this alternative, the assumption that visitation by snowmobile riders will decline 38 percent if they are required to be on guided tours produces visitation that is lower than the level of visitation allowed under the proposed daily limits, again assuming that none of the snowmobile riders shift their trips to less-crowded days. To account for this in the Winter Use Model, new daily limits were estimated for each entrance that generated a 38 percent reduction in snowmobile visitation. In addition to the estimated daily limits, the Alternative 4 high-impact scenario also assumes that excluded snowmobile riders will not shift their visits to less-crowded days, there will not be an increase in visitation by nonsnowmobile visitors, and 40 percent of excluded snowmobile riders will still return to

the GYA. Under the low-impact scenario, 100 percent of snowmobile riders will be willing to shift uses to nonpeak days, and there will be a 2.25 percent increase in visitation by nonsnowmobile visitors, and 74 percent of excluded snowmobile riders will still visit the park or the GYA for other activities.

2.5 Alternative 5

Under the Alternative 5 high-impact scenario, the 38 percent decline predicted by the survey data is lower than the level of visitation allowed under the daily limit for the 80 percent of snowmobile riders that have to be on guided tours. Again, hypothetical daily limits were generated that would produce a 38 percent decline in visitation for the guided tours. For the 20 percent on noncommercially guided tours, the maximum allowable number of visitors was assumed. These two assumptions generated a 36 percent decline in snowmobile visitation. It was also assumed that excluded snowmobile riders will not shift their snowmobile uses to nonpeak days, there will not be an increase in visitation by nonsnowmobile visitors, and 40 percent of excluded snowmobile riders will continue to visit the GYA. The low-impact scenario, however, assumes that 100 percent of snowmobile riders will shift their uses to nonpeak days, visitation will increase by 2.25 percent for nonsnowmobile visitors, and 74 percent of excluded snowmobile riders will still visit the park for other activities. This scenario actually results in an increase in visitation.

3. ECONOMIC IMPACTS RELATIVE TO HISTORIC SNOWMOBILE USE

The management alternatives being analyzed in this report may affect the local economy in several ways, including changes in park visitation, sales, and profits of local businesses, local employment, and local and state sales tax revenue. Restricting the use of snowmobiles relative to the baseline of 1997–1998 visitation in YELL is expected to decrease economic activity in the region around the park. The following sections describe the estimated economic impacts on five areas (the three-state area, the five-county area, and three specific cities) where the majority of the effects from reduced visitation to YELL will be felt.⁵ Impacts are largest in the three-state area, but the majority of the impacts are centered on the five counties surrounding the park (including Fremont County in Idaho, Gallatin and Park counties in Montana, and Park and Teton counties in Wyoming). Three cities were also modeled separately based on the importance of snowmobiles to the local economy.

⁵ The economic impacts relative to the snowmobile ban baseline are reported in Section 4.

3.1 Effect of Management Alternatives on YELL and GTNP Visitation

Table 4, Line 8, presents the results of the impact analysis on visitation. Alternative 1 prohibits snowmobile use in the parks and generates a predicted decline in visitation between 43 and 16 percent. The other alternatives generate declines between 27 percent and a very slight increase in visitation under the Alternative 5 low-impact scenario.

The anticipated decrease in the number of visitor-days is primarily because of the expectation that some people who previously visited to use their snowmobile will no longer visit the park or will reduce their length of stay because of the restrictions on snowmobile use. The actual decrease in park visitation depends on several factors. Snowmobile riders may shift their trips to less-crowded days when the daily entrance limits are not binding. Some people who previously used snowmobiles in YELL may choose to continue visiting the park to enjoy alternative winter activities available within YELL and GTNP, such as cross-country skiing, snowshoeing, winter hiking, and scenic drives. Some visitors may continue to visit the GYA but recreate outside the park. Many snowmobile riders currently spend more days riding outside YELL than inside the park. As mentioned earlier, visitation by nonsnowmobile riders may increase because the absence of snowmobiles will create a more enjoyable outdoor experience for some members of this group. This increased visitation would partially offset the loss in snowmobile users.

In the model, expectations about the behavior of snowmobile riders and other visitors are captured by the assumptions about the extent to which snowmobile riders can distribute their trips more evenly across the winter season (Line 2 of Table 4), the increase in visitation by other people who do not currently visit the park (Line 3 of Table 4), and the percentage of snowmobile riders who will come to the park to participate in other activities or continue to visit the GYA to recreate outside the park (Table 4, Line 4).

In Table 4, Line 5 is the change in snowmobile visitation based on the daily limits and the percentage of riders who switch to less-crowded days in Line 2. Line 6 presents the adjusted change in snowmobile visitation accounting for continued visitation by snowmobile riders in Line 4. Line 7 presents the total change in visitation by current visitors including visitors who do not ride snowmobiles, and Line 8 factors in any predicted increase in visitation by people who do not currently visit the park in the winter (Line 3).

3.2 Impact of Regulation on Local Business Output

As a result of the incremental reductions in visitation to the YELL area expected under the alternatives relative to the historic snowmobile use baseline, there will be a corresponding reduction in the value of local business output. The primary sectors that are affected by reductions in winter visitation are the tourism sectors, including snowmobile sales and rental shops, restaurants, and retailers. Although the direct impact

of a reduction in visitor spending is primarily felt in these sectors, many additional sectors of the economy will be affected to some extent through secondary impacts. In this analysis, NPS focused on the impacts estimated for the first winter use season after implementation of the rule. Impacts in subsequent years will be very similar.

The direct impact on business revenues was estimated for each scenario by multiplying the reduction in visitation by spending. The default assumption for the Winter Use Model is \$555 per person per trip.

Table 4, Line 9, provides estimates for each scenario of the direct changes in local business output caused by a change in visitation based on the assumed level of spending. Because spending is directly linked to visitation, the scenarios with the largest decline in visitation also result in the largest decline in revenue.

The direct effect of the regulation on the regional economy plus the indirect and induced effects (ripple effects on input suppliers and from changes in household income, respectively) are estimated using the Winter Use Model.

The high-impact scenario for Alternative 1 generates the largest predicted decline of \$30,473,119 for the three-state area. The high-impact scenarios for Alternatives 2 and 3 actually generate larger losses than the low-impact scenario in Alternative 1 through the combination of low daily entrance limits and the assumption that only 40 percent of current snowmobile riders will return to the GYA versus 74 percent in the low-impact scenarios.

Figure 1 compares the effects of the high- and low-impact scenarios for each alternative on the five-county area relative to the historic snowmobile use baseline. The five-county area is predicted to bear 88 percent of the total impacts predicted for the three-state area. The figure displays the variance in impacts depending on the assumptions made. Alternative 4 illustrates the potential impact of the guided tour requirement clearly. Under this alternative, the daily limits are relatively high, and in the low-impact scenario, where all the snowmobile riders are assumed to switch their trips to days when the limits are not binding and visitation by nonsnowmobile riders increases, the overall decline in visitation is only 0.2 percent. However, based on the results of the 2002–2003 Winter Visitor Survey (NPS, 2003), which suggests that only 38 percent of current snowmobile riders would return to the park if they had to take a guided tour, the predicted decline in visitation is 16 percent in the high-impact scenario.

3.3 Change in Employment

Another effect of the reduced visitation predicted under all but one of the scenarios is to reduce employment in the sectors affected by the snowmobile management alternatives relative to baseline conditions. These changes are calculated by IMPLAN based on ratios of sales to employment for the affected industries in the different regions. As a result of the decrease in sales anticipated, companies will need fewer employees. The estimated

reduction in employment for the five-county area calculated using the Winter Use Model ranges from 3 to 740 employees, except Alternative 5's low-impact scenario, for which the model predicts a slight increase. Table 4, Line 10, summarizes the results of the employment analysis. The results are similar in relative magnitude to the changes in direct spending.

4. ECONOMIC IMPACTS RELATIVE TO A SNOWMOBILE BAN

This section reports the estimated economic impacts relative to a snowmobile ban. The difference between these economic impacts and the economic impacts reported in Section 3 relate solely to a change in the baseline from which the economic impacts are measured. As reported in Section 3, the economic impacts relative to historic snowmobile use are generally negative. That results from the additional management restrictions imposed by Alternatives 1 through 5 relative to the historic snowmobile use during the 1997-1998 winter use season. In this section, the economic impacts relative to a snowmobile ban are positive for Alternatives 2 through 5 since those alternatives permit snowmobile use.⁶ Aside from the difference in baseline, all other assumptions regarding visitation, spending, and the multipliers used to calculate business output and employment impacts remain unchanged from those described in Section 3. Therefore, this section does not repeat the discussion of the alternative scenarios or Winter Use Model inputs.

The economic impacts relative to a snowmobile ban are calculated as the incremental differences between the impacts calculated in Section 3 for Alternative 1 (snowmobile ban) and the impacts calculated for the remaining alternatives. For example, given the historic snowmobile use baseline, the employment impact of the Alternative 1 high-impact scenario is a loss of 635 jobs, and that of the Alternative 2 high-impact scenario is a loss of 395 jobs. Therefore, the employment impact of the Alternative 2 high-impact scenario relative to a snowmobile ban is a *gain* of 240 jobs (635 minus 395). The calculation is similar for the business output impacts.

The estimated economic impacts relative to a snowmobile ban are presented in Table 5.⁷ The high-impact scenario of Alternative 5 generates the largest gain in business output (\$20,173,535) of all alternative scenarios examined. Alternatives 4, 3, and 2 generate increasingly smaller gains, respectively. The gains associated with Alternative 5 are approximately twice the gains associated with Alternative 2. Figure 2 illustrates the gains in business output for this baseline. The gains in employment are similar in relative magnitude for these alternatives.

⁶ Alternative 1 represents a snowmobile ban, which is the baseline addressed in this section.

⁷ The line numbers used in Table 5 are consistent with those used in Table 4. Line numbers 1 through 4 are not shown in Table 5 since they relate to the calculation of visitation relative to historic snowmobile use.

5. SUMMARY

Two different measures of the economic impacts resulting from the proposed temporary winter use plan alternatives are presented in this report. Each measure provides slightly different information about the expected economic effects on the region. Additionally, this analysis estimates economic impacts relative to two baselines: historic snowmobile use and a snowmobile ban. Two recent district court rulings potentially imply these two baselines. NPS believes that the actual economic impacts of the proposed temporary winter use plan alternatives fall within the range of impacts estimated and presented in this report.

Given the historic snowmobile use baseline, NPS estimates that the total impacts of the temporary winter use plan alternatives on the three-state area range from a decrease of \$30.5 million to an increase of \$1.6 million in the first year. The reductions in output under the high-impact scenario for Alternative 1, which bans snowmobiles, are about four times greater than the losses predicted under the Alternative 5 high-impact scenario. For Alternatives 1 through 3, the high-impact scenario generates losses between approximately 2.5 and 4.5 times greater than the low-impact scenario. The difference between the high- and low-impact scenarios is greatest for Alternative 4, where losses are over 69 times greater in the high-impact scenario. Assuming the historic snowmobile use baseline, the low-impact scenario for Alternative 5 is the only alternative that actually generates gains based on the prediction that snowmobile visitation will not change, but nonsnowmobile visitation will increase.

Given the snowmobile ban baseline, the estimates of the total impacts for Alternatives 2 through 5 on the three-state area range from an increase of \$5.7 million to an increase of \$22.9 million in the first year. The gains associated with Alternative 5 are approximately twice that of the gains associated with Alternative 2.

The economic impacts estimated for these proposed alternatives are illustrated in Figure 1 for the historic snowmobile use baseline and in Figure 2 for the snowmobile base baseline.

6. UNCERTAINTY

A number of factors will affect the regional economic impacts associated with the management alternatives being analyzed. Different scenarios were developed for the alternatives to show the impacts of varying certain assumptions. Nonetheless, many additional uncertainties remain. Some of the main sources of uncertainty include the following.

- The projections for the historic snowmobile use baseline are based on 1997–98 visitation levels. This level was chosen in part because visitation in more recent years has been affected by regulatory uncertainty. However, past

trends in visitation by snowmobilers may not constitute a good proxy for the future visitation to YELL by snowmobile users. It may understate or overstate the actual change in YELL snowmobile use that would occur in future years under baseline conditions.

- The proportion of snowmobile users who will continue to visit the park region following implementation of new regulations is unknown, although the 2002–2003 Winter Visitor Survey (NPS, 2003) indicates that many current snowmobile visitors may not return if guided tours are required or snowmobiles are banned. The actual proportion of users who continue to visit may be higher or lower than assumed in this analysis.
- The spending patterns and multipliers used in the Winter Use Model were derived from IMPLAN to represent economic activity in the YELL area. To the extent that spending patterns of snowmobile future visitors in YELL differ from the assumptions in the model and changes in the structure of the local economy results in changes in the multipliers, the impacts may be understated or overstated. For example, if the mix of visitors changes from predominantly snowmobile riders to predominantly nonsnowmobile riders, spending patterns may change.
- Similarly, this analysis assumes that the business output and employment multipliers will not change between the different policy alternatives examined. To the extent that the different policy alternatives affect the local economy in different ways, yielding different multipliers, the actual impacts may be understated or overstated.
- In addition, there are the general uncertainties and caveats that are associated with the use of I-O models.
- This analysis estimated impacts for the first year only. While subsequent year impacts are expected to be similar, they may differ as the local economy adjusts to the new regulatory policy.

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8. TABLES

Table 1. Names and Functions of Worksheets within the Winter Use Program

| Worksheet Name | Worksheet Function |
|-------------------------------|--|
| Main Data Input | This sheet is the only sheet intended for direct user modification. This sheet guides the user through a series of user-selected assumptions regarding winter park use and travel restrictions. |
| Final Visitation Changes | This sheet displays both intermediate and final impacts of the inputs from the Main Data Input sheet on winter visitation to the parks. |
| Final Economic Impacts | This sheet uses the calculated percentage changes in visitation from the Final Visitation Changes sheet to calculate the approximate impact of changes in winter use policies on the economic output and employment in a number of relevant economic sub-areas. These estimates are general and represent aggregated economic information from the most recent IMPLAN economic models. |
| Baseline Winter Use Data | This is the raw, unadjusted daily use data for the 1997–98 winter season. This is a protected worksheet that does not accept any modification. |
| Modified Winter Use Data | This sheet presents a series of replicates of the Baseline Winter Use Data, which have been modified to reflect the inputs in the Main Data Input sheet. |
| Aggregated Visitation changes | This is another intermediary sheet that shows a number of the impacts of winter use assumptions on projected use levels. |

Source: Duffield and Neher (2002). National Park Service Winter Use Modeling Program for Yellowstone NP, Grand Teton NP, and JDR N Parkway. Prepared for National Park Service, Yellowstone NP, WY.

Table 2. Data Input Procedures for the Winter Use Model

| Data Input Steps | Description |
|--|--|
| Step 1—Choose a baseline visitation by entrance and mode of transportation | The Winter Use Model uses the actual winter season data from 1997–98 as its baseline data. If the model user wishes to continue to use 1997–1998 as a baseline, then Step 1 should be skipped, and the cells should be left with the default index value of 0.0. If however, a different baseline level is desired, the 1997–1998 data can be scaled (in a generalized way) by entering alternative assumptions about changes in the level of visitation. Alternative assumptions can be entered for individual entrances, travel modes, or combinations of these two. |
| Step 2—Specify re-entry rates by entrance | This step has been included to allow the modification of preliminary estimates of the re-entry rates at individual winter entrance stations. As the actual re-entry rate is less likely to actually change in the future, entries in these cells more likely will reflect an improvement in estimates of the current re-entry rates by park visitors. The default re-entry rates are 25% for the North and West Entrances and 0% for the South and East Entrances. |
| Step 3—Identify snowmobile blockout dates | This step allows the user of the program to invoke this model assumption and any length of snowmobile closure throughout the winter season. |
| Step 4—Specify snowmobile maximum daily limits by entrance | Step 4 allows the user to place a limit on the daily number of snowmobiles entering through any park gate. |
| Step 5—Indicate number of excluded snowmobilers who would shift use to non-peak days by entrance | This program step displays the impact on snowmobile visitation of any snowmobile limits entered in Step 4. With information on the number of snowmobiles excluded under the Step 4 maximums and information on the extent of remaining excess capacity on non-peak days, the user can make additional assumptions about the degree to which excluded snowmobiles would shift use to nonpeak days. |
| Step 6—Identify % increase in snowcoach use by entrance | Step 6 allows the user to make assumptions on changes in snowcoach visitation on a day and entrance-level basis for periods during which snowmobiles are banned from the park. The default rate for each entrance is 0%. |
| Step 7—Indicate % increase in non-winter visitors | This step allows an increase in winter visitation levels by current nonwinter users due to significant restrictions in snowmobile use. The default 2.25% is based on data collected from summer visitors to the parks in 1998. |
| Step 8—Specify trip expenditure per visitor | This final input step allows the use of alternative levels of per-visitor spending. This step could be used to modify the expenditure data from the 1997–1998 winter season to either correspond to new expenditure data or to account for inflation since the original data was collected. The default expenditure is \$555 per person per trip. |

Source: Duffield and Neher (2002). National Park Service Winter Use Modeling Program for Yellowstone NP, Grand Teton NP, and JDR N Parkway. Prepared for National Park Service, Yellowstone NP, WY.

Table 3. Temporary Winter Use Plan Alternatives

| | Alternative 1: Snowcoaches Only | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5: December 11, 2003, Final Rule |
|--------------------|---|--|--|--|---|
| Highlights | This alternative emphasizes snowcoach access to YELL in the winter. All snow roads would be open. This alternative most closely matches the November 2000 decision. | This alternative is roughly comparable to the winter of 2003–2004, and emphasizes snowcoach access while allowing some snowmobile use. | Alternative 3 balances snowmobile and snowcoach access and accommodates visitors who wish to have an unguided experience. Growth would occur in snowcoach access. | Alternative 4 allows additional snowmobile use, while relying on commercial guiding for snowmobile access to YELL. Modest growth in snowmobile access would occur. | This alternative calls for both snowmobile and snowcoach access to the parks. Moderate growth in snowmobile access would occur. |
| Daily entry limits | Snowcoach only | West: 160 South: 121 East: 22 North: 15 Old Faithful: 0 YELL Total: 318 CDST: 25 Grassy Lake: 25 Jackson Lake: 0 GTNP Total: 50 | West: 290: 240 com'l; 50 unguided South: 146: 121 com'l; 25 unguided East: 50: 40 com'l; 10 unguided North: 32: 22 com'l; 10 unguided Old Faithful: 22 com'l YELL Total: 540: 445 com'l; 95 unguided CDST: 25 Grassy Lake: 25 Jackson Lake: 25 GTNP Total: 75 | West: 400 South: 220 East: 40 North: 30 Old Faithful: 30 YELL Total: 720 CDST: 50 Grassy Lake: 50 Jackson Lake: 40 GTNP Total: 140 | West: 550: 440 com'l; 110 noncom'l South: 250: 200 com'l; 50 noncom'l East: 100: 80 com'l; 20 noncom'l North: 20: 16 com'l; 4 noncom'l Old Faithful: 30: 24 com'l; 6 noncom'l YELL Total: 950: 760 com'l; 190 noncom'l CDST: 75 Grassy Lake: 75 Jackson Lake: 40 GTNP Total: 190 |

(continued)

Table 3. Temporary Winter Use Plan Alternatives (continued)

| | Alternative 1: Snowcoaches Only | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5: December 11, 2003, Final Rule |
|---------------------------------|--|--|---|--|---|
| Snowmobile guiding requirements | n/a | 100% commercially guided in YELL Guides not required in GTNP or the Parkway | Appx. 80% commercially guided/20% unguided in YELL Guides not required in GTNP or the Parkway | 100% commercially guided in YELL Guides not required in GTNP or the Parkway | 80% commercially guided / 20% non-commercially guided in YELL Guides not required in GTNP or the Parkway |
| Group size requirements | n/a | No more than 11 snowmobiles | No more than 11 snowmobiles | No more than 11 snowmobiles | No more than 11 snowmobiles |
| Phase-in of Requirements | Immediately | Immediately | Unguided entries would be phased-in beginning with winter of 2005–2006. Unguided entries during 2004–2005 would not be permitted, and this portion of the entry limits would be allocated to commercial guides. Concessionaire would manage the unguided program through a management and service contract. | Immediately | Noncommercial training program would be phased-in during winter of 2005–2006 (this portion of the allocations would be unguided during 2004–2005 season.). In cooperation with gateway communities, businesses, counties, and state tourism organizations, develop a reservation system for the effective utilization of the 20% daily noncommercial entry limits. |

Table 4. Estimated Impacts of Proposed Alternatives Relative to Historic Snowmobile Use

| | Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | |
|---|---------------|---------|---------------|---------|---------------|---------|---------------|--------|---------------|-------|
| | High | Low | High | Low | High | Low | High | Low | High | Low |
| 1. Snowmobile Maximum Daily Limits | | | | | | | | | | |
| YELL West Entrance | 0 | 0 | 160 | 160 | 290 | 290 | 433 | 400 | 543 | 550 |
| YELL South Entrance | 0 | 0 | 121 | 121 | 146 | 146 | 127 | 220 | 177 | 250 |
| YELL East Entrance | 0 | 0 | 22 | 22 | 50 | 50 | 23 | 40 | 43 | 100 |
| YELL North Entrance | 0 | 0 | 15 | 15 | 32 | 32 | 15 | 30 | 19 | 20 |
| YELL Old Faithful Entrance | 0 | 0 | 0 | 0 | 22 | 22 | — | 30 | 6 | 30 |
| 2. Percentage of excluded snowmobile riders who would shift use to less crowded days | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 100% | 0% | 100% |
| 3. Percentage increase in nonsnowmobile visitors | 0% | 2.25% | 0% | 2.25% | 0% | 2.25% | 0% | 2.25% | 0% | 2.25% |
| 4. Percentage of snowmobile riders who will switch to other activities in the park or visit the GYA to recreate outside the parks | 40.4% | 74.3% | 40.4% | 74.3% | 40.4% | 74.3% | 40.4% | 74.3% | 40.4% | 74.3% |
| 5. Unadjusted change in snowmobile visitors | -72,705 | -72,705 | -45,258 | -41,242 | -32,877 | -25,262 | -27,463 | -9,812 | -18,072 | 0 |
| | -100% | -100% | -62% | -57% | -45% | -35% | -38% | -13% | -25% | 0% |
| 6. Adjusted change in snowmobile visitors | -43,332 | -18,685 | -26,974 | -10,599 | -19,595 | -6,492 | -16,368 | -2,522 | -10,771 | 0 |
| | -60% | -26% | -37% | -15% | -27% | -9% | -23% | -3% | -15% | 0% |

(continued)

Table 4. Estimated Impacts of Proposed Alternatives Relative to Historic Snowmobile Use (continued)

| | Alternative 1 | | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | |
|---|---------------|-------------|---------------|------------|---------------|------------|---------------|----------|---------------|-----------|
| | High | Low | High | Low | High | Low | High | Low | High | Low |
| 7. Total Change in Current Winter Visitation including both snowmobile riders and other visitors | -43,332 | -18,685 | -26,974 | -10,599 | -19,595 | -6,492 | -16,368 | -2,522 | -10,771 | 0 |
| | -43% | -18% | -27% | -10% | -19% | -6% | -16% | -2% | -11% | 0% |
| 8. Total change in modeled winter visitation including increases in the number of non-snowmobile visitors | -43,332 | -16,399 | -26,974 | -8,313 | -19,595 | -4,206 | -16,368 | -235 | -10,771 | 2,286 |
| | -43% | -16% | -27% | -8% | -19% | -4% | -16% | -0.2% | -11% | 2% |
| 9. Total local business impact (in 1997 dollars) | | | | | | | | | | |
| Five-county | -26,846,632 | -10,159,960 | -16,711,689 | -5,150,311 | -12,140,028 | -2,605,880 | -10,140,873 | -145,813 | -6,673,097 | 1,416,524 |
| Three-state | -30,473,119 | -11,532,384 | -18,969,132 | -5,846,024 | -13,779,923 | -2,957,886 | -11,510,719 | -165,509 | -7,574,510 | 1,607,870 |
| West Yellowstone | -9,481,119 | -3,588,077 | -5,901,877 | -1,818,877 | -4,287,355 | -920,289 | -3,581,337 | -51,495 | -2,356,662 | 500,258 |
| Jackson | -6,731,308 | -2,547,427 | -4,190,154 | -1,291,348 | -3,043,893 | -653,377 | -2,542,641 | -36,560 | -1,673,159 | 355,168 |
| Cody | -171,863 | -65,041 | -106,983 | -32,971 | -77,716 | -16,682 | -64,918 | -933 | -42,719 | 9,068 |
| 10. Total employment impact | | | | | | | | | | |
| Five-county | -635 | -240 | -395 | -122 | -287 | -62 | -240 | -3 | -158 | 33 |
| Three-state | -740 | -280 | -461 | -142 | -335 | -72 | -280 | -4 | -184 | 39 |
| West Yellowstone | -227 | -86 | -142 | -44 | -103 | -22 | -86 | -1 | -57 | 12 |
| Jackson | -161 | -61 | -100 | -31 | -73 | -16 | -61 | -1 | -40 | 9 |
| Cody | -4 | -2 | -3 | -1 | -2 | -0 | -2 | -0 | -1 | 0 |

Table 5. Estimated Impacts of Proposed Alternatives Relative to a Snowmobile Ban

| | Alternative 2 | | Alternative 3 | | Alternative 4 | | Alternative 5 | |
|---|---------------|-----------|---------------|-----------|---------------|------------|---------------|------------|
| | High | Low | High | Low | High | Low | High | Low |
| 5. Unadjusted change in snowmobile visitors | 27,447 | 31,463 | 39,828 | 47,443 | 45,242 | 62,893 | 54,633 | 72,705 |
| 6. Adjusted change in snowmobile visitors | 16,358 | 8,086 | 23,737 | 12,193 | 26,964 | 16,163 | 32,561 | 18,685 |
| 7. Total Change in Current Winter Visitation including both snowmobile riders and other visitors | 16,358 | 8,086 | 23,737 | 12,193 | 26,964 | 16,163 | 32,561 | 18,685 |
| 8. Total change in modeled winter visitation including increases in the number of non-snowmobile visitors | 16,358 | 8,086 | 23,737 | 12,193 | 26,964 | 16,163 | 32,561 | 18,685 |
| 9. Total local business impact (in 1997 dollars) | | | | | | | | |
| Five-county | 10,134,942 | 5,009,649 | 14,706,604 | 7,554,080 | 16,705,759 | 10,014,147 | 20,173,535 | 11,576,484 |
| Three-state | 11,503,987 | 5,686,361 | 16,693,196 | 8,574,498 | 18,962,400 | 11,366,875 | 22,898,610 | 13,140,254 |
| West Yellowstone | 3,579,242 | 1,769,201 | 5,193,764 | 2,667,788 | 5,899,783 | 3,536,582 | 7,124,458 | 4,088,335 |
| Jackson | 2,541,154 | 1,256,079 | 3,687,415 | 1,894,049 | 4,188,667 | 2,510,867 | 5,058,150 | 2,902,594 |
| Cody | 64,881 | 32,070 | 94,147 | 48,359 | 106,945 | 64,107 | 129,144 | 74,109 |
| 10. Total employment impact | | | | | | | | |
| Five-county | 240 | 118 | 348 | 179 | 395 | 237 | 477 | 274 |
| Three-state | 279 | 138 | 405 | 208 | 461 | 276 | 556 | 319 |
| West Yellowstone | 86 | 42 | 125 | 64 | 141 | 85 | 171 | 98 |
| Jackson | 61 | 30 | 88 | 45 | 100 | 60 | 121 | 70 |
| Cody | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 2 |

Alternative 1 is not shown in this table since it represents the baseline and therefore has zero impacts. Line numbers used in this table are consistent with those used in Table 4. Line numbers 1 through 4 are not shown in this table since they relate to the calculation of visitation relative to historic snowmobile use.

9. FIGURES

Figure 1. Five-County Business Output Impacts Relative to Historic Snowmobile Use

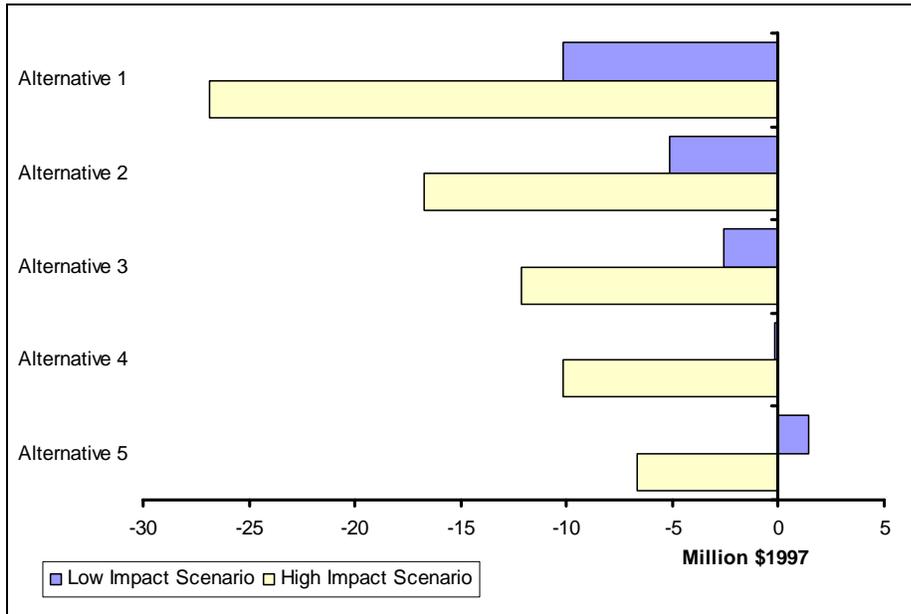


Figure 2. Five-County Business Output Impacts Relative to a Snowmobile Ban

