Distributional Economic Impacts of Civil War Battlefield Preservation Alternatives in the Shenandoah Valley of Virginia

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(ABSTRACT)

The recent disappearance of unpreserved Civil War battlefield sites under the press of private development has initiated new nation-wide preservation efforts of remaining unpreserved battlefield sites by both the public and private sectors. However, preservation efforts of Civil War sites are encumbered when little or no market incentive exists for private landowners to resist the more remunerative rewards of commercial development.

This study quantifies the direct, indirect, and induced distributional economic impacts of battlefield preservation on local economies surrounding selected Civil War battlefield sites located in the Shenandoah Valley of Virginia. Distributional analyses examine the changes in economic activity (e.g., employment and personal income) within a region, and help to document the economic feasibility of battlefield preservation. Both private and government ownership and development of battlefield sites are considered.

The study results indicate that preserving Civil War battlefields can have positive distributional economic impacts on the local economy, but whether or not these impacts justify battlefield preservation by the public or private sector is not established in this study. Distributional impacts are only one type of economic benefit that a battlefield park may contribute to the local economy. The nonmarket value of battlefield parks may provide more benefits to society than the market value of parks, and should be considered in the decision to preserve Civil War battlefields.

Acknowledgements

Like any other significant accomplishment in my life, several individuals also are responsible for its happening and they deserve recognition for their support. I am most grateful to Dr. Jay Sullivan for his interest in this project, but more for his sense of responsibility to foster professional growth in graduate education. I would also like to thank Dr. David Klemperer and Dr. Michael Hite for their constructive criticism of this study. Special thanks go to Chris Tiernary, Mark Lemaster, and Roger Delauter of Frederick County and Richard Connellee of Rockingham County for their assistance with this project.

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Introduction

In a war covering a period of four years, fought over an extensive territory, in which there occurred over 2,000 listed battles, engagements, and sieges wherein organizations of various sizes participated, it is very difficult, if not impossible, to make a satisfactory list of all the battles and engagements that might be considered worthy of some form of monument as a memorial to the organizations and to the men who took part.

C.A. Bach 1925
Army War College

The question of Civil War battlefield preservation has been a recurring national issue ever since the war ended in 1865. State and federal governments as well as private citizens and non-profit organizations have struggled over battlefield preservation issues such as: when public preservation interests exceed private development interests of battlefields; why battlefields should be preserved, or even which battlefields are worthy of preservation; and always, how to pay for battlefield preservation.

In United States v. Gettysburg Electric Railway Company (1896), the constitutionality of condemning land owned by the Gettysburg Electric Railway

Company for the purpose of preserving a portion of the Gettysburg battlefield was challenged in and upheld by the U.S. Supreme Court. The opinion of the court was delivered by Mr. Justice Peckham and read in part:

> *It would be a great object lesson to all who looked upon the land thus cared for, and it would show a proper recognition of the great many things that were done there on those momentous days....The institutions of our country which were saved at this enormous expenditure of life and property ought to and will be regarded with proportionate affection. Here upon this battlefield is one of the proofs of that expenditure, and the sacrifices are rendered more obvious and more easily appreciated when such a battlefield is preserved by the government at the public expense* [emphasis added].

During the first session of the 69th Congress in the House of Representatives (1926), fourteen bills were introduced which authorized nearly 6 million dollars for the establishment of Civil War parks. Other bills which were introduced during the same session provided for the inspection of Civil War battlefield sites and placement of monuments with an intent to eventually establish battlefield parks. Battlefield sites were classified as: those worthy of commemoration by the establishment of a national military park (Class I), and those of sufficient importance to warrant their designation as national monuments (Class II) (69th Congress 1926).

In 1988, Manassas National Battlefield Park was the scene of a modern day skirmish between developers and preservationists that once again focused national attention on the problem of endangered Civil War battlefields. The threat of incompatible adjacent land development of an unpreserved section of Manassas

battlefield ended with Congress expanding the park's boundaries at an estimated cost of $100 million to the federal government.

The first national military park, Chickamauga and Chattanooga Military Park, was established by an act of Congress on April 19, 1890 "for the purpose of preserving and suitably marking for historical and professional military study the fields of some of the most remarkable maneuvers and most brilliant fighting in the 'War of the Rebellion'"(69th Congress 1926). Since those times, through land donations, inter-agency land transfers, and the exercise of eminent domain, twenty-seven areas with Civil War significance and seventy-four national cemeteries with Civil War dead have been preserved by the federal government, and are being administered by the National Park Service (NPS) of the Department of Interior.

Concern over the disappearance of unpreserved Civil War battlefield sites under the press of private development has recently gained national attention through federal and state sponsored programs, private organization activities, and congressionally mandated studies. On July 21, 1990, Department of Interior Secretary Manuel Lujan Jr. announced the American Battlefield Protection Plan (ABPP). The ABPP is aimed at encouraging negotiations between government officials and private interest groups to guard Civil War sites with such methods as zoning, historic district designation, easement, land-banking, or other means. On May 13, 1991, the American Battlefield Protection Foundation, a nonprofit fund raising effort to save threatened Civil War battlefields, was established. Notable

trustees for the Foundation include: Alex Haley, author of **Roots,** James M. McPherson, author of **Battle Cry of Freedom**, and Ken Burns, producer of the 1990 PBS mini-series **The Civil War**. On November 28, 1990, President George Bush signed into law The Civil War Sites Study Act of 1990 (CWSSA). The CWSSA established the Civil War Sites Advisory Commission which has until June of 1993 to prepare a study that identifies unpreserved civil war sites, assesses the short and long-term threats to their integrity, and provides alternatives for their preservation and interpretation by federal, state, and local governments or other public or private organizations.

Though significant concern has been exhibited over Civil War battlefield preservation issues, there has been little or no market incentive (i.e., new tax breaks, creative financing, cooperative agreements) to support these activities in the face of competing demands for the use of the land for more remunerative purposes. The answer in many cases has been to rely upon the non-financial sense of social responsibility of individuals, preservation groups, and historical societies (Lowry 1976). However, relying upon the generosity of individuals is a fragile business relationship at best, and it can be expected that over one or more ownerships many historic or cultural sites which have higher private alternative financial values associated with them will be altered. Consider for example that over one third of the 16,000 plus structures listed in the Historic Buildings Survey since 1933 have been destroyed (Costonis 1974).

Though few market incentives exist, there may be nonmarket benefits derived from battlefield preservation that accrue to society in general, on-site and off-site. On-site benefits may include: first-hand knowledge gained about the Civil War from visiting a battlefield site; or the experience of walking over the same terrain where one's ancestors died in battle. Off-site benefits may include: the preservation of recreation opportunities for people who are not now using the park but who may wish to do so in the future; the satisfaction that some people may experience because a battlefield park exists, even though they may never visit the site; or Americans in general knowing a piece of their past has been saved for future generations to share. Changes in local economic activity associated with battlefield park activities (e.g., visitor and agency expenditures) may even provide the necessary monetary incentive for communities to preserve Civil War sites.

Lowry (1976) boiled down the economic problem of preserving historical landmarks to two major issues: 1) the criteria for justifying or valuing the need for preservation, and 2) justifying financing and implementation of preservationist objectives. Lowry acknowledges that it is possible for economists to value such items as historic buildings and expanses of undeveloped real estate which have special public significance in market terms, but their non-market importance to the public is difficult to appraise, except where tourism can be exploited. Where tourism can be exploited, there is no doubt that economic values of recreation exist. He summarized his discussion by stating that there is no process through which general and widespread acceptance of the economic responsibility to

support preservationist objectives can be expected to be achieved, but that the avenue is necessarily individual and organizational advocacy.

The current study, is a prototype study of the distributional economic impacts of battlefield preservation in the Shenandoah Valley of Virginia under private and government ownership scenarios. Distributional analyses examine the changes in employment, income, and other economic indicators among the population of a region, and are useful for helping to document the feasibility (or lack thereof) of battlefield preservation (i.e., will the positive impacts to the economy of preserving a battlefield site exceed the negative impacts of removing the site from some other use, after the initial flush of preservation spending). Distributional analyses do not evaluate the social desirability of alternative economic states, however. By assessing the distributional economic impacts of a range of preservation alternatives on the local economy, justification for some level, or no level, of battlefield preservation can be established.

Study Objective

The overall objective of this study is to quantify the direct, indirect, and induced distributional economic impacts of Civil War battlefield preservation on the local economies surrounding selected study sites in the Shenandoah Valley. Direct impacts are the immediate economic activities that occur as a result of battlefield visitation or preservation activities, such as income and employment generated in the restaurant industry to serve tourists that visit the site. Indirect

and induced impacts occur when direct impacts cause additional rounds of activity to occur in the local economy, either through factor input purchases by local firms (indirect impacts) or through the consumption spending allowed by wage and salary earnings (induced impacts).

Nonmarket values of Civil War battlefields are not considered in this study. Likewise, recommendations to preserve Civil War battlefield sites, either through the outlay of public funds or by establishment in the private sector, exceed the purpose of this study.

The outline for the rest of this paper is as follows: the second chapter gives a brief review of the literature on economic impacts of tourism and outdoor recreation programs, methodologies available to assess the economic impacts of tourism and recreation activities, and empirical studies of Civil War battlefield economic impacts; chapter three is a discussion of the methods used in this study; chapter four presents and discusses the results of this study; chapter five provides concluding remarks.

Literature Review

Economic Impacts of Tourism and Outdoor Recreation Programs

Reports to the Outdoor Recreation Resources Review Commission (ORRRC 1962) by Commission staff and other contributors in the early 1960's entitled, *Economic Studies of Outdoor Recreation*, were some of the first attempts to apply economic analysis to recreation planning and management (see also Clawson and Knetsch 1966, Robinson 1967, and Krutilla and Knetsch 1970). It was the ORRRC's job to forward to the President and Congress analyses of economic problems of urban and rural outdoor recreation in America. The nature of outdoor recreation demand and supply functions, the costs and benefits of outdoor recreation, and the interrelation of the public and private sectors of the outdoor recreation economy were some of the problems ORRRC studied (ORRRC 1962). Research efforts have steadily increased in number and complexity since that time. One particular subject of interest has been the economic impacts of tourism and outdoor recreation programs on different levels of the economy.

economies is well documented (Fletcher 1989, Cohee et al. 1976, Dean et al. 1978, Alward 1986, Kottke 1988, Schmedemann and McNeely 1967). Also, comparison of tourism and recreation programs to other public investment alternatives, with respect to indicators of economic development (e.g., output, employment, income, government revenues, and income distribution) have been studied (Brown and MacMillan 1977, Mapp and Badger 1970). More specific have been the studies dealing with the many related issues of tourism and recreation programs such as visitor participation rates (West 1977, ORRRC 1962), the accuracy of measurements of visitor expenditures (Mak et al. 1977), the impact of public land programs on local government finances and real estate values (Barron and Jansma 1970, Epp 1971), and the positive and negative impacts resulting from tourism and recreation development (Fleming and Toepper 1990). Of particular relevance to the current study are the studies of the overall impacts of converting existing land uses into national parks; Redwood and Fraser Island National Parks are two examples of these studies.

In the late 1960's, national interest was focused upon the counties of Humboldt and Del Norte, California by controversial proposals to establish a 64,000 acre Redwood National Park within the two counties. Since the settlement of the area by white men in the 1850's, lumber had been the major industry and virtually the only industry selling its product beyond the county's boundaries (Jewett 1968). Jewett developed a quarterly econometric model of Humboldt County to obtain estimates of the impact of a park upon the county's economy.

His analysis showed that other than the immediate effect upon the forest products industry (at most 3% of these jobs would be eliminated because of the park, and these jobs were predicted to be offset by park-related and tourism-related employment), the park would not cause any serious dislocation of workers and income within the county's economy, and may well provide an annual financial boost to the local economy above that of timber-related activities alone, from the same land base.

A 1971 proposal by conservationists to preserve 61,300 acres of Fraser Island (located off the coast of Queensland, Australia) as a national park threatened the forestry and forest product dependent economy of nearby Maryborough. Since the late 19th century, Fraser Island had been a major source of hardwood and softwood timber for regional milling and processing (Noakes and Pigram 1973). Noakes and Pigram attempted to quantify the economic impact (changes in forestry and residential employment) on the region of Maryborough, of the conversion of part, or all, of the forest resources of Fraser Island to a national park. Using an econometric model derived from concepts of economic base theory, Noakes and Pigram developed employment multipliers to estimate the total loss of regional employment due to the reduction of hardwood and softwood timber cutting under different assumptions. They then estimated the additional tourism expenditures necessary to create new jobs in park management and tourism to offset the regional loss of employment from an annual reduction of the Fraser Island timber cut under the different assumptions. Noakes and Pigram

concluded, under their assumptions, that the loss of forestry and residential employment for the Maryborough region could be offset by new expenditures in the tourism industry.

Empirical Studies of Civil War Battlefield Economic Impacts

The economic impacts of battlefield preservation have the potential to be positive or negative. Positive impacts may include: new job opportunities in recreational related industries with an overall increase in local employment levels, an increase in local government revenues from sales taxes on visitor expenditures, or the establishment of other non-recreational related industries in the local economy that complement battlefield preservation. Negative impacts may include: lost job opportunities in traditional occupations like agriculture because of a change in the land use, a decrease in local government property tax revenues due to land being taken out of the tax base, or an increase in the financial liability of local governments for providing more and better public services and facilities to meet the needs of the tourist population.

Lane (1983) conducted a study of the regional economy around Fredericksburg, Virginia to determine its financial gains and losses resulting from the Fredericksburg and Spotsylvania National Military Park. Assuming a Type II

multiplier[1] of 2.0, Lane estimated that the military park cost the regional economy $4 million in lost revenues from taxes, farm income, and their multiplier effects, but brought in about $8 million through park salaries/purchases, tourist dollars, and their multiplier effects, in 1980 dollars.

In 1987, the NPS sponsored a study group to determine the economic impact that tourism generated on the community of Gettysburg, Pennsylvania from visiting Gettysburg National Military Park (GNMP) (Youngblood et al. 1987). Primary surveys of tourists who visited the area, businesses that comprise the local economy, and residents of the community were conducted to obtain information used in calculating the total economic impact. The study group concluded that the direct impact of GNMP and its associated tourism was over $42 million annually, and with the multiplier effect the total impact was over $86 million annually.

Methodologies Available to Assess the Distributional Economic Impacts of Battlefield Parks

Methods that have been used to evaluate the economic impacts of tourism and recreation programs include: the inventory/budget method; input-output analysis; economic base analysis; and benefit-cost analysis (Kottke 1988). In

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[1] A multiplier measures the ratio of the direct plus indirect change (Type I), or the ratio of the direct plus indirect plus induced change (Type II), to the direct change resulting from a unit increase in final demand for any given industry, and may be calculated for income, employment, or output.

addition, Kottke suggests using linear programming to solve for the most appropriate types of tourism businesses or enterprises for a community and the economic impacts on the local economy if the mix of firms were to change.

The inventory/budget method simply summarizes the total financial value of all the goods and services produced and resources consumed by industrial activity. Stoll and others (1988) used it to delineate the recreational boating industry in Texas into economic subgroups by primary output (e.g., boat manufacturing, trailer manufacturing, and boat repair service). Then using those economic subgroups, they constructed an input-output model to determine the boating industry's total economic impact on the Texas economy.

Input-output models focus on the technical interrelationships of industrial sectors within a local or regional economy to determine the economic effects of public and private investment and spending on the economy (Leontief 1986). Summary (1987) used an input-output model to evaluate the linkage between tourism and other economic sectors of the Kenyan economy.[2] Schaffer (1985) used a modified national input-output model to measure the economic impact of tourist expenditures in Hawaii. Mescon and Vozikis (1985) disaggregated the total economic impact that the cruise industry has on Dade County, Florida using

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[2] Linkages represent the cause-effect relationships of industries within the economy and may be referred to as backward-linked or forward-linked. For instance, if industry *i* increases production, industry *i* also increases demand for the other sector's products which are used as inputs to production in industry *i* (backward-linked). If sector *i* increases production, there will be an increased supply of sector *i* product to be used as an input in the production of other sector's output (forward-linked).

a regional input-output model. Gartner and Holecek (1983) used a scaled-down statewide average Type I multiplier from the state of Michigan input-output model to estimate the economic importance of short term recreational/tourism events to a region.

A variation of the standard input-output model is the "from-to" model. The from-to model suggested by Leven (1961) retains the characteristics of the input-output model, but reduces the data requirements and focuses attention on intra-regional linkages. The transaction matrix (inter- and intraindustry flow table) of the from-to model only shows the inputs from area industries to other area industries and final demand sales handled by the firms in the region. Kalter and Lord (1968) used a from-to model to study the economy of Walworth County, Wisconsin, a diversified economy sufficient in size to encompass a wide range of economic activities and where recreational services are mostly exported. They determined that the percentages of direct to total output were high for all of the final demand categories they defined in their study, and thus concluded that there was an absence of highly developed local linkages between the final demand categories and the regional industries.

Economic base analysis is useful for evaluating or estimating the impact of an expanding or new industry in the region (Bendavid 1974). According to economic base theory, exogenous or outside injections of money (including tourist spending) constitute the sole cause of growth in a regional economy (Archer 1976). Garrison (1974) used economic base theory to estimate the local economic

impact of recreation activities at Norris Lake, the first reservoir constructed by the Tennessee Valley Authority, on the rural area of east Tennessee. Rajender et al. (1967) used economic base theory to study the impact of tourism and outdoor recreation on the economy of Teton County, Wyoming.

Benefit-cost analysis is often used to evaluate development proposals in the public goods and services sector (Stoll et al. 1987). Stoll and others defined a "framework" for identifying the economic benefits and beneficiaries of outdoor recreation. However, since the focus of benefit-cost analysis is on the net benefit of a proposed project (efficiency analysis), this method has limited usefulness for economic (distributional) impact analysis (Kottke 1988).

Methods

The projections of distributional impacts have been identified in this study using a "with and without" type of analysis. That is, the impact of battlefield preservation is measured as the difference between the economic activity (employment, income, and industry output) projected under a preservation scenario (the "with project") and the economic activity expected under a "no-preservation" alternative (the "without project"). This "with and without" approach is used in economic analyses to identify the separable costs or benefits (impacts) attributable specifically to the policy or action under consideration.

Assessing the distributional economic impacts of battlefield preservation entails four steps: 1) selecting the study sites; 2) identifying preservation and private development scenarios; 3) estimating visitor and public agency expenditures and other changes in revenue in the local economy; and 4) determining the indirect and induced (multiplier) effects of battlefield preservation versus private development.

Selection of Study Sites

Two sites were selected to study the site-specific distributional economic impacts of battlefield preservation. After consultation with NPS officials, Cross Keys/Port Republic and Third Winchester battlefields were selected based on each site's Civil War significance and representative development pressures. In addition, a less-detailed Shenandoah Valley-wide study was made to assess the impacts on the larger regional economy of the establishment of a system of parks, all associated within a larger park unit (e.g., "The Shenandoah Valley Civil War Parks").

The Cross Keys/Port Republic battlefield is located in the central portion of the Shenandoah Valley off the southern base of Massanutten Mountain in Rockingham County. It was at this site that Thomas "Stonewall" Jackson successfully ended his 1862 Valley Campaign. The gently rolling hills and flood plains surrounding this battlefield were dominated by agricultural and pastoral activities during the time of the Civil War. Today the Cross Keys/Port Republic battlefield looks much as it did at the time of the war, with agricultural and pastoral activities still dominating the landscape. Eight miles to the north of the site is the city of Harrisonburg, a commercial hub both now and at the time of the war.

The city of Winchester, known during the war as the "Northern Gateway to the Confederacy", is located at the lower end of Shenandoah Valley in Frederick County, approximately 75 miles west of Washington D.C. The Third Battle of

Winchester occurred in 1864 and ended with federal troops in possession of the city and in control of the major east-west trade routes in the area for the remainder of the war. Winchester looks much different today than it did during the time of the Civil War. Interstate highways and other major thoroughfares run around and through the city, and the city is home to a number of industries, including the largest cold storage apple warehouse in the world.

In addition to Cross Keys/Port Republic and Winchester, twelve other battlefield sites located in the Shenandoah Valley under consideration for preservation by the NPS were used in the Valley-wide impact study (see Appendix A). The Shenandoah Valley was important to both the Confederate and Union forces because of its economic and strategic significance. Economically, the Shenandoah Valley was the great bread basket for Lee's Army of northern Virginia. Strategically, because of its geographical features and orientation, the Shenandoah Valley provided direct access into the south by northern armies, but at the same time it left the Union capital exposed to the constant threat of attack by southern forces.

Identification of Preservation and Private Development Scenarios

National Park Service and private preservation scenarios were developed based on the condition of each site (i.e., acreage of original battlefield remaining intact and development constraints). The scenarios included NPS ownership with a low degree of park development (e.g., interpretive stops with no visitor services

on site), NPS ownership with a high degree of park development (e.g., full-service visitor center on site), and private ownership with a low degree of park development (e.g., interpretive stops with no visitor services on site). The "no-preservation" alternatives, which were used as a baseline to determine changes in the economic variables of interest, were constructed after consultation with local experts (i.e., county planners, private developers, and historical societies).

The area of the battlefield that would be set aside as a park at Cross Keys/Port Republic is not certain. The battle took place over several square miles, and so far no specific area has been identified by the NPS for preservation. Therefore, a "representative" 100 acre parcel of land reflecting typical ownership characteristics and land use patterns was selected. Two NPS preservation scenarios were developed for this site: 1) NPS ownership of the park with a low level of park improvement, and 2) NPS ownership with a high level of park development. One private scenario, private ownership of the park with a low level of park improvement, was considered for this site. This battlefield is not faced with any immediate threat of development, though because of its proximity to Harrisonburg, a future threat cannot be ruled out.

Much of the original battlefield at Third Winchester has been lost to private development, and the remaining undisturbed portion is under imminent threat of development by a proposed subdivision. Local officials and a historical society have identified a 100 acre tract of private land that comprises the most significant undeveloped portion of the battlefield, which would serve as a suitable

park. A local developer has proposed to build a subdivision which includes a part of the 100 acre tract of land (approximately 60 acres), and as a part of a requirement to set aside greenspace, is willing to leave the 60 acres of the site that fall on his land as open space. The remaining 40 acres are part of two adjacent lots which are privately owned. Frederick County planners have approved the developer's proffer to build a subdivision, but construction has not begun. Two NPS preservation scenarios have also been developed for this site: 1) NPS ownership of the park with a low level of park improvement, and 2) NPS ownership with a high level of park development. One private scenario, private ownership of the park with a low level of park improvement, was considered for this site.

Of the other Valley sites, at least one is nearing complete obliteration, some are partially preserved as units of other established battlefield parks and museums, while the rest remain virtually intact but unprotected from private development threats. On many of the sites there remain buildings, earthworks, and other Civil War artifacts. These sites are denoted by markers, roadside battle maps, and/or monuments. Information about the total park acreage is not available and so a park of 5,000 acres is assumed for this analysis. The Valley-wide park would be comprised of portions of major Civil War battlefields and several smaller historic sites and therefore it is believed that a battlefield park of 5,000 acres is sufficient in size to include all of the sites in the Valley-wide study. This acreage figure is about the same size as Manassas Battlefield at 4,500 acres

and Fredericksburg and Spotsylvania County Battlefields at 5,900 acres, but larger than Richmond Battlefield at 800 acres; all of which commemorate more than one battle. Only NPS ownership with a high level of development was considered for the Valley-wide study due to the extensive nature of the hypothesized battlefield park and the belief that such a large park would not be established without a visitor center. No private development scenario was considered in the Valley-wide study because it is believed that no individual or private organization would establish and maintain a battlefield park of this size.[3]

Estimation of Visitor and Agency Expenditures and Other Changes In Local Revenue

A difficulty in performing distributional economic analyses of outdoor recreation arises because the recreation industry is not delineated as an economic sector by standard industrial classification (SIC) (SIC 1987). Instead, recreation activities are recognized as having direct impacts on many other sectors such as lodging, food, and transportation. Determining the direct impacts of recreation then is a two-step process: first, the number of visitors to a battlefield must be estimated and second, expenditures of visitors in each economic sector of the local economy must be identified.

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[3] The Association for the Preservation of Civil War Sites (APCWS), a non-profit organization dedicated to the preservation of land on Civil War sites with a renowned National Advisory Board, manages seven properties in Virginia totaling 206 acres.

Visitation estimates for the Cross Keys/Port Republic and Third Winchester battlefields were made on the basis of visitor use at Richmond National Battlefield Park (USDI National Park Service 1989). The Richmond battlefield park system is composed of ten small holdings from 6 to 300 acres in size with different levels of park development, spread out over a few hundred square miles, that represent well the condition of unpreserved battlefields and potential for preservation and park development that is found on the individual Shenandoah Valley sites.

Visitor use estimates are collected independently for each of the sites that comprise Richmond battlefield park. Using data from five of these sites[4] for an eleven year period (1979-1989), parameters of a regression equation that describe visitation at an individual site as a linear function of site acreage, driving distance from the site to the nearest interstate highway access, and the level of site improvement (measured as a zero-one variable, indicating whether or not the site had a visitor center) were estimated using ordinary least squares (OLS) (see Appendix B):

annual visits = f(acreage, miles to interstate highway access, level of park improvement).

[4] Only five of the ten sites that make up the Richmond battlefield park system had complete visitation records for the eleven year period giving a sample size of fifty-five.

For the preservation alternatives at Cross Keys/Port Republic, an increase over current visitation levels of approximately 4,200 visitors per year for NPS or private ownership with a low level of park improvement (90% confidence interval limits are approximately 0 and 10,500 visitors) and an increase of approximately 28,200 visitors per year for NPS ownership with a high degree of park improvement (90% confidence interval limits are approximately 14,900 and 41,500) were estimated.[5]

Under the preservation scenarios at Third Winchester, an increase over the "no-preservation" alternative of approximately 51,000 visitors per year for NPS or private ownership with a low level of park improvement (90% confidence interval limits are approximately 43,000 and 58,800) and an increase of approximately 75,000 visitors per year for NPS ownership with a high level of park improvement (90% confidence interval limits are approximately 67,500 and 82,400) were estimated.[6]

Visitation estimates for a Shenandoah Valley-wide battlefield park were made on the basis of visitor use at twelve established NPS Civil War battlefield parks of 1,000 acres in size or greater scattered throughout the southern and

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[5] Though no visitation records are kept due to the unpreserved nature of the site, it is estimated that approximately 500 people visit the site annually, primarily during a celebration honoring General Turner Ashby of the Confederate army in nearby Cross Keys.

[6] The annual number of visitors to this battlefield under the "no-preservation" scenario was assumed to be equal to the average annual visitation at the nearby Stonewall Jackson headquarters which is approximately 6,500 visitors per year (roughly 85 percent of them are non-local).

eastern United States. Visitor statistics for the twelve parks were taken from NPS Statistical Abstracts for the years 1987-1989 (sample size of fifty-five). Using the OLS method of regression, parameters that describe visitation at the "Shenandoah Valley Civil War Parks" as a linear function of park acreage and population within the Rand McNally defined "Major Trading Area" (MTA)[7] surrounding each park were estimated (Rand McNally 1991) (see Appendix B):

annual visits = f(acreage, MTA population).

A mean annual visitation estimate of 953,000 was obtained for the Valley-wide park. Alternate high and low estimates of 1,058,000 and 849,000 visits were identified using the bounds of the 90% confidence interval on mean annual visitation.

For all of the study sites, visitor expenditures were assumed to follow the major spending categories (i.e., lodging, food, entertainment, transportation, and general sales) presented in the Gettysburg National Military Park visitor study (Youngblood et al. 1987), though differences in the mix of industries located in these study areas, as compared to Gettysburg, will cause the amount of the

[7] A "Major Trading Area" is composed of one or more "Basic Trading Areas." Basic Trading Areas follow county lines and are drawn to include the county or counties whose residents make the bulk of their purchases in the area's "Basic Trading Center." Basic Trading Centers are cities which serve as a center for shopping goods purchases and specialized services such as medical care, entertainment, higher education, and a daily newspaper, for the surrounding area.

expenditures going to local firms to vary from that study. Total expenditures per visitor at the Cross Keys/Port Republic and Third Winchester study sites were assumed to equal the average expenditures of visitors staying in the Gettysburg area for one night or less ($30.20/visitor) as presented in the Gettysburg study. This is a reasonable assumption given the size of the study sites and the time it would be expected to tour one of these parks.[8] Using the average expenditures for all visitors to Gettysburg, for all lengths of stay, a figure of $47.00/visit was derived for the Valley-wide park. Implicit in this expenditure/visit figure is the assumption that the average length of stay at the Valley-wide park will be identical to that of Gettysburg. This figure seems reasonable too since the average length of stay does tend to increase with battlefield park size as reported in the NPS statistical abstract for 1990, and thus the opportunity for visitors to spend more money in the regional economy exists.

Annual Park Service operation and maintenance expenditures were assumed to follow the same pattern among industrial sectors as those of Gettysburg park and total expenditures were assumed to be proportional to park acreage, though again differences in the mix of industries located in the local area, as compared to Gettysburg, caused the amount of the expenditures going to local firms to vary from that study. The estimates of annual Park Service expenditures for high and low levels of improvement were $690 and $270 per

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[8] The average length of stay per visit at Civil War sites located in Virginia and listed in the 1990 NPS statistical abstract, is one hour or less.

acre, respectively. The high improvement scenario was estimated using the average expenditures per acre including all expenditure items in the 1991 financial plan and operating program of Gettysburg park (e.g., personnel compensation and benefits, supplies and materials, travel, and maintenance), while the low improvement scenario was estimated just using the average expenditures per acre for the nonbuilding-related items. Nonbuilding-related expenditures were identified using the Gettysburg Park Maintenance Management Report.

Other sources of change in revenue in the local economy due to the establishment of a battlefield park include taxes and foregone revenues from pre-existing land uses. Only changes (direct impacts) in revenue from property, sales, and other pertinent local taxes (i.e., meals and transient occupancy taxes) were considered in this study because they constitute the major portion of local government tax receipts. Other taxes are either too small to have an impact, too difficult to predict and measure, or involve other than local/regional taxes to warrant their consideration in this study (e.g., utility taxes, new business permits/taxes, and severance taxes on gasoline). To determine what would be given up in terms of foregone land uses, it was assumed that sufficient land would be available that only the land use with the lowest value would be precluded. That is, if housing demand was sufficient for a subdivision to be built on the battlefield site, that subdivision (having a high land use value) would ultimately be built at some other location. Such a shift in land use would be expected to occur

until only the lowest value use was foregone. For this study, it was assumed that agriculture represented the lowest valued land use.

Revenue from property taxes goes into the general fund of the local government. In Rockingham County, property taxes are $0.68 per $100 of assessed value. For the representative 100 acres of the Cross Keys/Port Republic battlefield, the assessed value is approximately $1000 per acre, resulting in a tax loss of $680 per year if the battlefield is established under NPS ownership. However, an annual $50 per acre payment in-lieu-of-taxes from the NPS has been assumed based upon a county official's estimate of payment made for other federally owned lands in the area, resulting in a tax gain of $5,000 per year. The net result is higher tax revenues in the local economy.[9] In Frederick County, property taxes are $0.78 per $100 of assessed value and the land on which the battlefield is located is currently assessed at $8000 per acre, resulting in a loss of $6240 per year if a 100 acre Third Winchester battlefield is established under NPS ownership. For the Valley-wide study, land was assumed to be valued at $1000 per acre with an average property tax rate of $0.62 per $100 of assessed value (the average property tax rate in the Valley, weighted by county acreage). A $50 per acre payment in-lieu-of-taxes from the federal treasury was also assumed to be made to Frederick County and the counties within the Valley-wide study.

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[9] Changes in the local taxable land base ultimately will lead to an adjustment of property tax rates to allow the local government to maintain target revenue levels. However, for the small changes considered here it is assumed that the local government will not immediately adjust property tax rates, thereby absorbing a short-term change in revenues.

Sales tax revenues going directly to the general fund of local governments are generated from local-option and special-use taxes (Spengler 1990).[10] The local-option tax is a 1% sales tax that is collected in addition to the 3.5% statewide sales tax, and is in effect in all of the local economies encompassing the three study sites. Special-use taxes vary by county and independent city and include meals and transient occupancy taxes. For Rockingham County and Harrisonburg City, the local economies surrounding Cross Keys/Port Republic battlefield, a transient occupancy tax for lodging of 2% and 4% is charged respectively, while a 2% meal tax is charged in Harrisonburg. A transient occupancy tax and a meals tax of 2% are assessed in Frederick County and Winchester City, the local economies surrounding Third Winchester battlefield. Occupancy and meals taxes of 2% were assumed to be collected on visitor expenditures in the Valley-wide park scenario.

For the Cross Keys/Port Republic battlefield it was deemed that agriculture would be foregone on the entire 100 acres through the establishment of a park. Based upon Census of Agriculture (1989) data for Rockingham County, average annual agricultural revenues are $1,140/farm acre, resulting in a loss of $114,000 (100 acres x $1,140/farm acre) in the local economy. Because in

[10] An additional one percent of total state sales tax revenues is returned to the counties and independent cities for educational purposes. Depending on school/student body size, a county or independent city may receive more or less money than it collected in state sales tax revenues targeted for education. However, for this study, the additional state sales tax revenues returned to the local governments for educational purposes are assumed to be independent of battlefield-related visitor expenditures, and therefore are not expected to change under any battlefield preservation scenario.

all likelihood the proposed subdivision at Third Winchester will be built if no park is established, it was assumed that there would be no difference in foregone economic activities between the preservation and no-preservation alternatives on the 60 acres of the battlefield area which make up the greenspace. Agricultural activity on only the 40 acres of other privately owned land was assumed to be foregone in the "no-preservation" alternative. For Frederick County, average annual agricultural revenues are $160/farm acre, resulting in a loss of $6,400 (40 acres x $160/farm acre) in the local economy. These foregone agricultural revenues were treated as negative direct impacts in the respective local economies. Resource constraints precluded examining the site-specific threats to the integrity of the individual battlefield sites in the Valley-wide study, if they exist, and therefore no speculation was made about foregone opportunities at these sites due to the establishment of a battlefield park.

Determination of Indirect and Induced Effects of Battlefield Preservation

An input-output (I-O) model was chosen to assess the distributional economic impacts of battlefield preservation alternatives on the local economy because it facilitates a comprehensive measurement of the direct, indirect, and induced repercussions of changes in final demand; more so than any of the other methods mentioned above to analyze the economic impacts of tourism and recreation activities. Figure 1 is a hypothetical example of a six-sector I-O table of the local economies in this study.

			Purchasing Sectors								Output
			Intermediate Demand						Final Demand		
			Agri	Manu	Tran	Trad	FIRE	Serv	Visitors	Agency	
Producing Sectors	Intermediate Input	Agriculture	100	250	175	275	125	75	1500	250	2750
		Manufacturing	350								Total Commodity
		Transportation	225								
		Trade	100								
		FIRE	100								
		Services	125								
	Primary Input	Employees	1625	Employee compensation							
		Owners of Business and Capital	125	Profit-type income; Rent; Interest							
Total Industry Output			2750								Gross Regional Output

Figure 1. Hypothetical Input-Output Transactions Table

The rows of the table represent the dollar value of sales by each of the producing sectors to the purchasing sectors. For example, during the period of time covered by the table, agriculture (row 1) sold $250 of its output to manufacturing industries (column 2), $175 to transportation (column 3), $275 to trade (column 4), $125 to FIRE (finance, insurance, and real estate - column 5), and $75 to the services industries (column 6); all intermediate demand and all within the local economy. A further $100 of its product was sold or used within the local agricultural industry itself (column 1). In addition, agriculture sold $1750 directly to the visitor and agency final demand categories combined (columns 7 and 8).[11] The total sales of agriculture were, therefore, $2750 (column 9). The sales made by manufacturing, transportation, trade, FIRE, and services (rows 2 through 6) are considered in a similar manner.

The columns of the table represent the dollar value of purchases by the purchasing sectors from the producing sectors. An I-O table is a double entry accounting system and, as in other accounting techniques, the total of the sales (total commodity output) has to balance with the total of the purchases (total industry output). Thus, in order to produce and sell $2750 worth of goods (the total of row 1), agriculture has to purchase $2750 worth of goods, services, and primary factors of production (the total of column 1). Primary factors of

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[11] In practice, final demand categories would also include state/local and federal government purchases of goods and services other than battlefield related, export sales, and changes in inventory, all within the local economy.

production (primary inputs) for this example are employee compensation and profit-type income.[12] Agriculture is shown as buying $100 from itself, $350 from manufacturing, $225 from transportation, $100 from trade, $100 from FIRE, and $125 from services; all intermediate inputs and all within the local economy. In addition, agriculture has paid $1625 in employee compensation and $125 to owners of business and capital. The manufacturing, transportation, trade, FIRE, and services columns are also interpreted in the same manner.[13]

The I-O table illustrates how the activities of the various sectors of a regional economy are interlinked and how changes in any one of the sectors affect the level of activity in each of the other sectors. Thus an increase in tourist expenditure (final demand) in the trade sector would raise the level of sales and, in consequence, the level of income in this sector. It would also affect the sales and incomes (indirect impacts) of other sectors as the trade sector increased its level of purchases from other sectors. In turn, the increased level of activity in these sectors would require additional inputs, and so sales and incomes in the local economy would rise still further. At the same time, the increase in local incomes would enable the resident population to achieve a higher level of consumer expenditure (induced impacts); and part of this might be spent within

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[12] This would also include import purchases and indirect business taxes in the local economy, but they were left out to simplify this example.

[13] The sales and purchases of physical goods between different sectors in the local economy are referred to as interindustry, while those between the same sector are referred to as intraindustry flows, in the I-O table.

the local economy, thereby creating a further stimulus to each sector to increase its level of output. This process is the multiplier effect, caused by increases in intermediate and final demand for each of the sector's output in the I-O table, and represents the most common and fully developed application of I-O models - the estimation of economic impacts following changes in final demand (Palmer et al. 1985).

There are three basic assumptions of input-output models (Richardson 1972). First, there are no joint products since each commodity is supplied by a single industry and via one method of production. Second, linear production relationships between any two sectors of the economy means constant returns to scale and no substitutes between inputs (i.e., the inputs used in production are proportional to output). Third, the relative prices of inputs do not change (i.e., the system is in equilibrium at given prices).

The USDA Forest Service Impact Analysis for Planning (IMPLAN) system was used to construct a secondary data I-O model of each local economy (Alward and Palmer 1983, Palmer et al. 1985). The local economy is defined here as the counties and independent cities adjacent to a proposed Civil War battlefield park where residents and businesses make the bulk of their purchases and sales. IMPLAN has been used by other researchers to study the economic impacts of tourism and recreation expenditures on the local economy (Bergstrom et al. 1989, Johnson et al. 1989). Furthermore, other techniques for constructing I-O models are available (see Richardson 1985 for a classification of regional I-O techniques),

however the availability, widespread acceptance, cost of operation, and model attributes (e.g., level of disaggregation and flexibility) of IMPLAN fit this project well.

The IMPLAN software system is composed of several computer programs that access a data base of economic information from which nonsurvey-based I-O models for areas as small as a county or group of counties (and independent cities in this case) can be constructed (Palmer et al. 1985). Projections can then be made of the economic impacts of alternative land management planning activities on the local/regional economy. The IMPLAN system is designed to serve three functions: data retrieval and reduction, model development, and impact analysis (Alward and Palmer 1983).

The IMPLAN data base consists of two major components: 1) the national level technology matrix (intermediate sales and intermediate purchases) and 2) estimates of sectoral activity for final demand, primary input, and regional production for each county in the United States (Palmer et al. 1985). The national level technology matrix is a highly disaggregated representation of national average sectoral input and output technology (528 sectors x 528 sectors). Taking the estimates of county-level economic activity for the 528 IMPLAN defined sectors, IMPLAN uses a supply-demand pooling technique to modify the national technological matrix and derive regional (local) production relationships (Miller and Blair 1985). These regional production relationships are then used in constructing the regional (local) matrix of technical coefficients. If the local

economy does not support any one of the 528 IMPLAN defined sectors, they are dropped from the model and a less than 528 x 528 regional matrix of technical coefficients results (i.e., there is no impact in the local economy from industrial activity in these "dropped" sectors).

IMPLAN converts the regional matrix of technical coefficients to a predictive mathematical model - the *Leontief inverse model* (Palmer et al. 1985). The Leontief inverse model (matrix) tallies the total round-by-round effects of a one dollar increase in final demand for each sector's output. In the six sector I-O table above, the Leontief inverse would be a 6 x 6 matrix of elements. The diagonal elements represent the initial dollar of new final demand (i.e., an additional dollar's worth of sector *i*'s product) plus the intra- and interindustry uses. The off-diagonal elements represent the intra- and interindustry uses only. Summing down the elements of a column yields the output multiplier for that sector. For example, a multiplier of 1.53 in sector *i* would imply that $0.53 of additional intra- and interindustry output was required to meet the initial dollar of final demand in sector *i*. Obviously, bigger multipliers mean greater impacts, but multipliers can be misleading depending on how they are constructed and should be interpreted and applied carefully.[14]

[14] For instance, by "closing" the model with respect to households, that is, by including the household sector in the interindustry table, the multipliers in every sector are increased by the amount of labor services purchased that go into meeting one dollar of final demand.

The I-O table from which the indirect and induced impacts are projected for Cross Keys/Port Republic battlefield included Rockingham County and Harrisonburg Independent City. The city of Harrisonburg was included in the impact area because it is the likely location of a large proportion of the visitor and agency expenditures. The resulting I-O table contained 148 of the 528 IMPLAN defined sectors (see Appendix C).

The I-O table from which the indirect and induced impacts are projected for Third Winchester battlefield included Frederick County and Winchester Independent City. Winchester was included in the impact area because it is the likely location for the majority of visitor and agency expenditures. The I-O table of the impact area was composed of 147 of the 528 IMPLAN defined sectors (see Appendix C).

The counties and independent cities making up the regional I-O table from which the indirect and induced impacts are projected for the "Shenandoah Valley-wide Civil War Parks" are shown in Appendix A. The resulting I-O table was made up of 244 of the 528 IMPLAN defined sectors (see Appendix C).

The first step in impact analysis is to assign the direct impacts (i.e., visitor and agency expenditures, and local government and foregone agricultural revenues) to the sector(s) in which they occur. Since I-O multipliers generally consider backward-linkages, direct impacts are assigned to the sectors that represent the point of final demand consumption for that output to ensure that all sectoral linkages are accounted for (Palmer et al. 1985). The total impacts then

are calculated using the industry output, employment, personal income, and total income multipliers derived from the I-O model.

Direct Impacts

Though the visitor expenditures in the Gettysburg park study (Youngblood et al. 1987) have been identified by broad spending category, these outlays do not match the detail of the IMPLAN industry scheme. Consequently, the outlays per visitor (after sales and special-use taxes were deducted) were further disaggregated to the IMPLAN industry scheme using the Bureau of Economic Analysis (BEA) "Input Output Commodity Composition of Personal Consumption Expenditures Tables" (PCE) (see Palmer et al. 1985 for their usage). The PCE tables give the national average breakdown of spending by BEA-defined sectors for several broad spending categories.

The direct impact of visitor spending in each industry of the economy surrounding the proposed battlefield was calculated as follows:

Direct impact in industry *i*	=	projected no. of visitors	x	spending per visitor	x	proportion of spending in category *j*	x	proportion of category *j* spent in IMPLAN industry *i*

The subscript *j* represents the major spending category (i.e., lodging, food, entertainment, transportation, and general sales).

Park Service expenditures in the local economy were first broken into their nonwage and wage (and salary) components using the Gettysburg National Military Park Financial Plan (form 10-561). Each component was then handled separately. The pattern of nonwage Park expenditures was assumed to follow the pattern of nonwage spending outlined in the Gettysburg Financial Plan (items 21-63). An appropriate IMPLAN industry number was identified for each cost item. An average cost breakdown per dollar of total nonwage expenditures was developed by dividing the amount of each cost item by the total nonwage expenditures. The direct impact in each IMPLAN industry was then calculated:

Direct impact in industry *i*	=	projected nonwage expenditures	x	proportion of nonwage spending in IMPLAN industry *i*

Wages and salaries were allocated to IMPLAN sectors by assuming that personnel spend their income in the local economy in the same pattern as the average resident in that local area. The spending of local residents, identified by industry, is available as a final demand vector in the IMPLAN data base. An average breakdown of spending per dollar of personal income is calculated by dividing the personal consumption spending in each IMPLAN industry by the total personal consumption spending in the local area across all industries. The direct impact of wage and salary income therefore is calculated as follows:

Direct impact in industry *i*	=	total wages and salaries	x	proportion of income spent in IMPLAN industry *i*

Revenues to the local governments due to visitor spending in the area are derived through a variety of sales and special-use taxes. Applicable special-use taxes include a meals tax and a hotel occupancy tax. The rate of these sales and special-use taxes was taken from the publication *1990 Tax Rates in Virginia's Cities, Counties, and Selected Towns* (Spengler 1990). These tax dollars were deducted from the visitor spending for meals and lodging, and added to a local government general fund category. From other visitor spending categories, and the wages and salary income of Park employees (if applicable), a local option sales tax of 1% (the local portion of sales taxes in Virginia) was applied and the revenue generated was also added to the local government general fund. A state sales tax of 3.5% (the non-local portion of sales taxes in Virginia) was applied to all visitor spending categories and deducted from the direct impacts in the local economy.

Local government spending of the tax revenues were assumed to follow the pattern of expenditures in the local area exhibited by the local governments for nonschool purposes in the IMPLAN data base.

Direct impact in industry *i*	=	total tax revenues	x	proportion of local government nonschool spending in IMPLAN industry *i*

Establishing a battlefield park may take land out of the property tax base (in the case of federal government ownership) or it may change its assessed value if the county gives a tax break for historical preservation (in the case of private establishment of a battlefield park). When land is removed from the tax base through federal acquisition, payments in-lieu-of-taxes are often made to local governments in compensation for the lost property tax revenues. The changes in revenues derived from property taxes have been allocated to IMPLAN industries by assuming that this increase or reduction in the local government budget would proportionally increase or decrease local expenditures associated with schools. Local government expenditures for schools is included in the IMPLAN data base and was used to allocate these changes to industries.

Direct impact in industry *i*	=	change in property tax revenues	x	proportion of local government school spending in IMPLAN industry *i*

Again, it has been assumed that agricultural land use (being the lowest value land use) would be foregone in the local area by the establishment of a battlefield park. The total foregone crop revenue was dispersed among the detailed IMPLAN industries using the proportion of total county acreage devoted to each type of crop activity (i.e., food and feed grains, vegetables, hay and alfalfa, and fruit orchards). The total livestock revenue was allocated to IMPLAN industries using the proportion of farms in the county devoted to each type of

livestock activity (i.e., beef cattle, dairy cattle, hogs and pigs, sheep and lambs, and chickens).

Direct impact in industry *i*	=	Agric. revenue foregone per acre	x	Proportion of local agriculture activity in industry *i*	x	acres of agric. activity foregone

Total Impacts

Industry output multipliers describe the total value (direct, indirect, and induced) of output of all local industries generated by a direct change in the total output of a single industry. The direct impacts include changes in visitor, agency, local government, and alternate land-use expenditures in the local economy. The total industry output impacts, for all industries in the local economy, that result from the direct impacts in a single industry *i* are calculated as follows:

Total output impact originating from a direct impact in *i*	=	Direct output impact in industry *i*	x	Output multiplier[15] for industry *i*

The overall total output impacts are determined by adding together the total impacts that result from direct changes in each individual local industry.

Employment multipliers describe the total employment (jobs) generated in all industries by a direct change in employment in an industry. Using these

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[15] IMPLAN Type III multipliers, similar to the standard Type II multiplier, that include induced consumer spending are used in this study.

multipliers requires that the direct changes in industry output be converted to direct changes in employment. This conversion has been accomplished using a ratio of employment per unit of output for each local industry. The information necessary for this calculation is available from the IMPLAN database for the counties under consideration. Total employment impacts are therefore calculated as follows:

Total employment impact originating from a direct employment impact in *i*	=	Direct output impact in industry *i*	x	Employment to output ratio for industry *i*	x	Employment multiplier for industry *i*

Personal income includes wage and salary earnings. Direct changes in personal income are calculated from direct industry output changes using a ratio of wages and salaries to total industry output. Again, the information necessary to make this calculation is available from the IMPLAN database.

Total personal income impact originating from a direct employment impact in *i*	=	Direct output impact in industry *i*	x	Personal income to output ratio for industry *i*	x	Personal income multiplier for industry *i*

Total income includes wages and salaries and proprietary income (income accruing to business owners). Direct changes in total income are calculated from the direct changes in industry output using a ratio of total income to output in each local industry.

Total income impact originating from a direct employment impact in *i*	=	Direct output impact in industry *i*	x	Total income to output ratio for industry *i*	x	Total income multiplier for industry *i*

Results and Discussion

Cross Keys/Port Republic

The direct and total impacts of the preservation scenarios for Cross Keys/Port Republic battlefield on the local economy are presented in Tables 1 and 2.[15] Projections of the net changes in annual industry output, employment, and personal and total income under each scenario are based on the low, mean, and high visitation estimates. The negative impacts seen under the low improvement scenarios for the lower visitation estimates occur because visitor and agency expenditures are insufficient to offset the losses due to foregone agricultural production. With the higher visitor estimates and high levels of improvement, the visitor and agency expenditures are able to more than offset the losses due to foregone agricultural production.

The direct and total distributional impacts of battlefield preservation, measured in terms of changes in industrial output, on the Harrisonburg

[15] All of the impacts in this study are expressed in 1982 dollars, the base year of the IMPLAN model.

Table 1 - Direct Impacts of Preservation Scenarios for Cross Keys/Port Republic Battlefield - Agriculture Foregone

Scenario	Visitation Prediction	Industry Output (thousand $)	Employment (jobs)	Personal Income (thousand $)	Total Income (thousand $)
NPS Owned Low Improvement	Low	-93	-0.9	-1	-5
	Mean	-3	2.9	26	33
	High	134	8.7	68	90
NPS Owned High Improvement	Low	254	13.3	105	143
	Mean	543	25.5	193	264
	High	832	37.7	281	385
Private Owned Low Improvement	Low	-95	-0.9	-2	-6
	Mean	-5	2.9	26	32
	High	132	8.7	68	89

Table 2 - Total Impacts of Preservation Scenarios for Cross Keys/Port Republic Battlefield - Agriculture Foregone

Scenario	Visitation Prediction	Industry Output (thousand $)	Employment (jobs)	Personal Income (thousand $)	Total Income (thousand $)
NPS Owned Low Improvement	Low	-126	-1.3	-9	-19
	Mean	8	3.4	31	41
	High	211	10.4	92	131
NPS Owned High Improvement	Low	385	16.1	143	210
	Mean	812	31.0	272	399
	High	1,240	46.0	400	589
Private Owned Low Improvement	Low	-128	-1.3	-10	-20
	Mean	5	3.3	30	39
	High	208	10.4	91	129

City/Rockingham County economy are shown in Figures 2 and 3 by aggregated sector (see Appendix C for the sector aggregation scheme used in these figures) and scenario for mean visitation levels. The direct impacts from private establishment of a battlefield park with low improvement and NPS ownership with low improvement scenarios are nearly identical. The small difference in impacts arises from differences between payments-in-lieu of taxes paid to local governments under NPS ownership and property tax revenues assumed to be paid under private ownership. Industry output in the agricultural sectors declines, while industry output in the other sectors increases. The total direct impacts from NPS ownership with high site improvement are large relative to the low improvement scenarios due to greater agency and visitor expenditures. Though again, agriculture sustains the only losses with the other sectors gaining, especially the service sectors.

The indirect impacts are negative or zero for all sectors under the private and NPS low improvement scenarios at Cross Keys/Port Republic (indirect impacts are not shown separately). Throughout the local economy, the negative indirect impacts caused by foregoing agricultural production exceed the positive indirect impacts caused by visitor and agency expenditures combined. These negative indirect impacts show the strong backward-linked relationship that exists between agriculture and the other sectors in the local economy. Under the NPS high improvement scenario, positive indirect impacts caused by visitor and agency

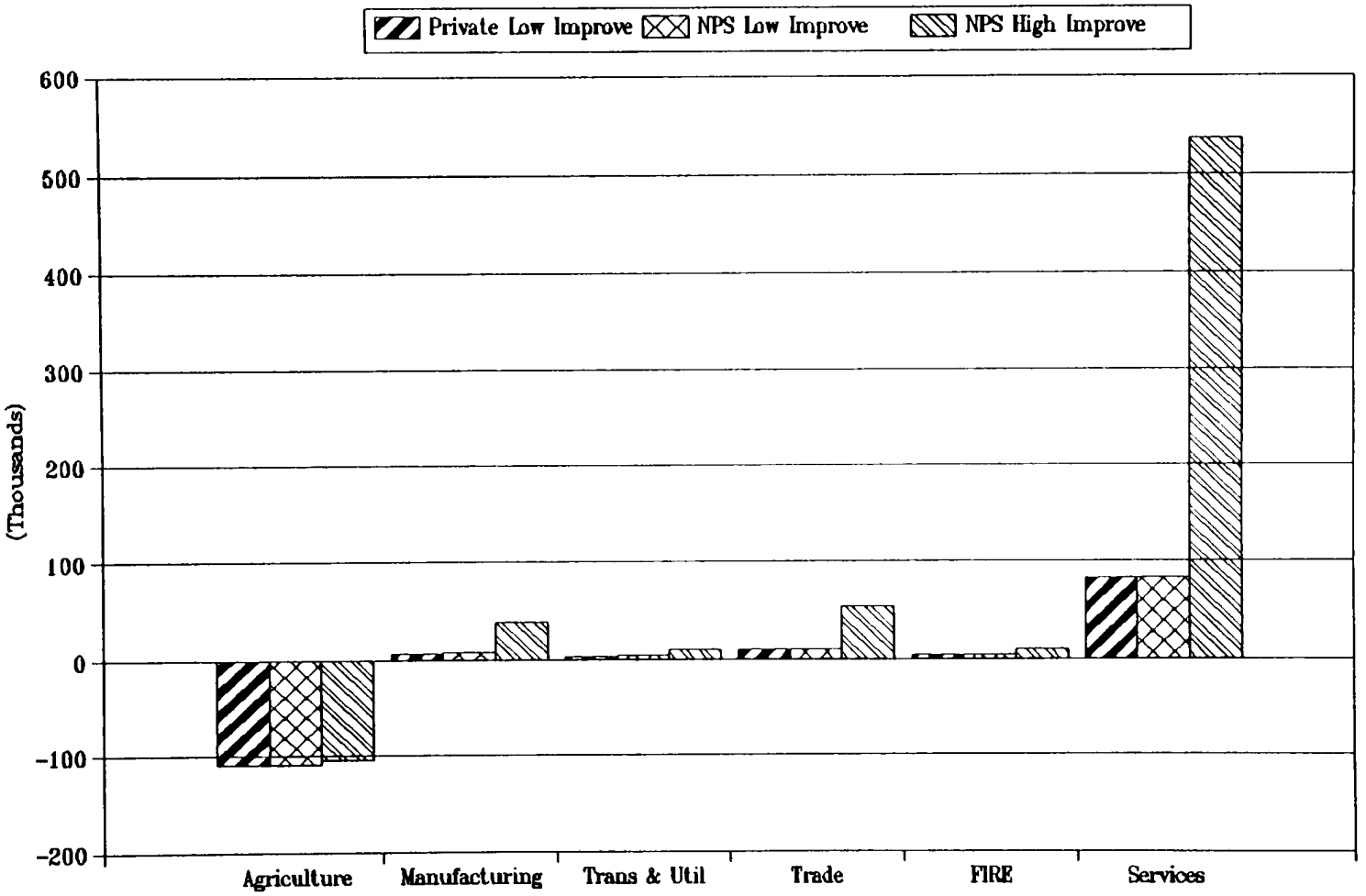

Figure 2. Cross Keys/Port Republic Direct Impacts in Industry Output by Aggregated Sector and Scenario for Mean Visitation Levels

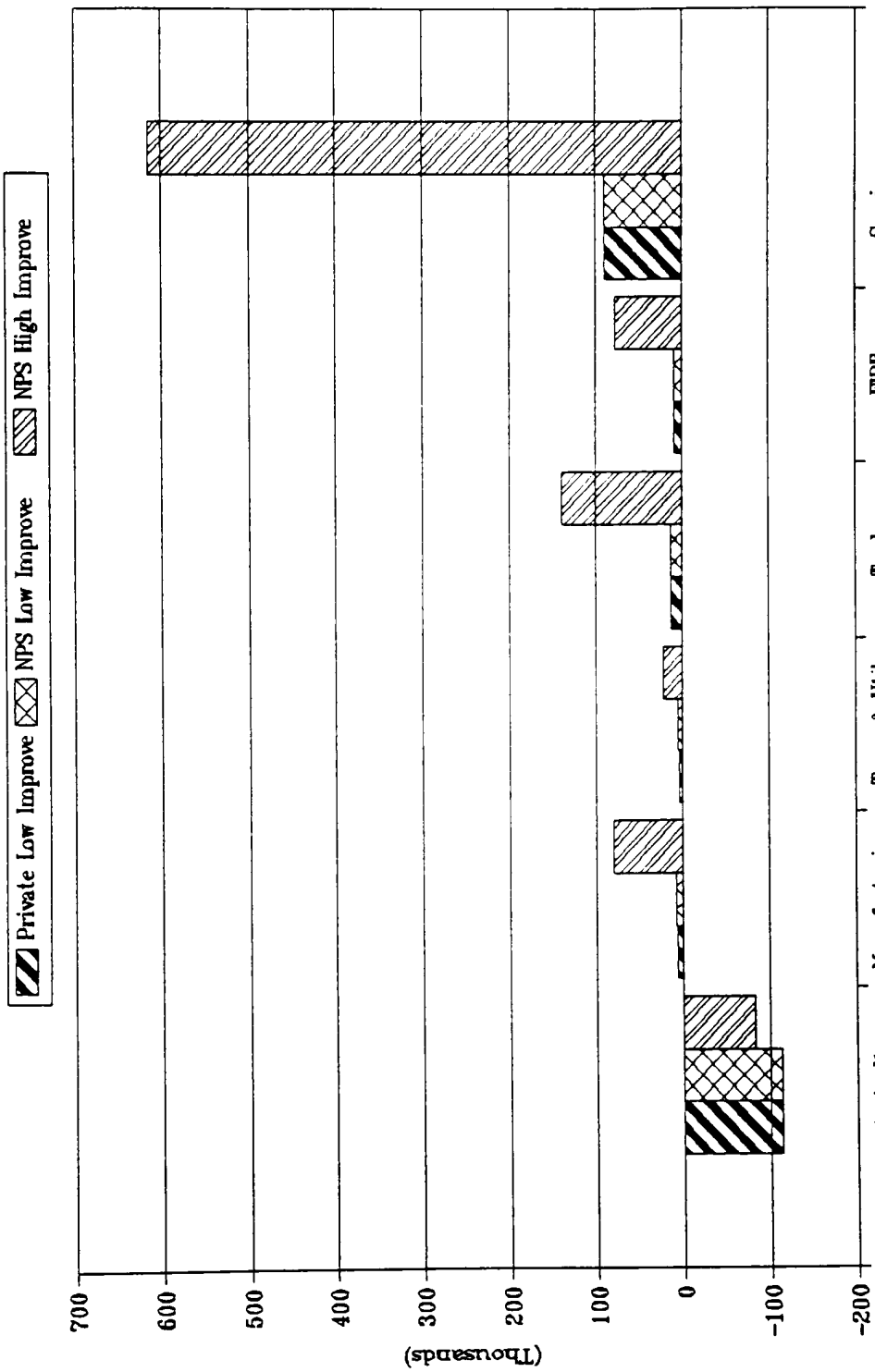

Figure 3. Cross Keys/Port Republic Total Impacts in Industry Output by Aggregated Sector and Scenario for Mean Visitation Levels

expenditures are greater than the negative indirect impacts generated from foregoing agricultural production in all aggregated sectors of the local economy.

Private low improvement and NPS low improvement induced impacts are almost identical across all sectors (not shown separately). Here again, the small difference that does exist can be traced back to differences between the in-lieu payment made under NPS ownership and the property taxes paid under private battlefield establishment. Across all aggregated sectors in the Harrisonburg City/Rockingham County economy, the NPS high improvement scenario induced impacts are more than five times those of the private and NPS low improvement scenarios.

The total economic impacts that are generated from preserving the Cross Keys/Port Republic battlefield indicate the majority of benefits accrue to the service side of the economy (transportation and utilities; wholesale and retail trade; finance, insurance, and real estate; and service sectors), with small benefits for the manufacturing sector and none for the agriculture sector. Annual personal income in the Harrisonburg City/Rockingham County economy increases by approximately $40,000 with a battlefield park established under the private and NPS low site improvement scenarios, and by approximately $360,000 under a NPS high site improvement alternative, in 1990 dollars.[16] Annual personal income in

[16] Personal income values for Harrisonburg City/Rockingham County and Winchester City/Frederick County are adjusted with the 1990 implicit price deflator for gross national product (Economic Report of the President 1991).

the local economy is approximately 1.2 billion dollars without an established battlefield park, in 1990 dollars (U.S. Department of Commerce 1989).

Though the majority of benefits accrue to the service side of the economy, visitor expenditures in the service sectors do have an impact on other sectors via indirect impacts, albeit small. The total impacts are more than twice the direct impacts in every sector but the service sectors. In the service sectors, total impacts are less than twenty-five percent more than the direct impacts. This may indicate that, though many industries other than those included in the service sectors do not sell their output directly to visitors, visitor expenditures in the local economy do have an impact on their business.

Differences can be seen in impacts generated in the local economy between government spending and visitor spending. Government operation and maintenance expenditures are spread out over the local economy, thus raising the level of activity in all sectors. Visitor expenditures are concentrated in the trade and service sectors, thus having an impact upon, at least directly, a smaller portion of the local economy.

Under the current assumption of foregone agricultural production, the establishment of a battlefield at Cross Keys/Port Republic results in a shift in employment from agriculture to the service industries. Agriculture-related jobs that may represent a way of life for some people are replaced by tourist-related jobs that typically have some of the following characteristics: low pay, seasonal employment, and high employee turnover rates (Barrett 1987).

Third Winchester

The direct and total impacts of the preservation scenarios for Third Winchester battlefield on the local economy are presented in Tables 3 and 4. Here again, projections of the net changes in annual industry output, employment, and personal and total income under each scenario are based on the low, mean, and high visitation estimates. Direct and total impacts are positive for all levels of visitation and all scenarios considered. Here, the agency and visitor expenditures more than offset losses in agriculture at all levels of visitation, under all scenarios.

The direct and total distributional impacts of battlefield preservation, measured in terms of changes in industry output, on the Winchester City/Frederick County economy by aggregated sector and scenario for mean visitation levels are shown in Figures 4 and 5, respectively. The same general distribution of direct and total impacts is seen among aggregated sectors, by scenario, as at Cross Keys/Port Republic. Also, generalizations made about visitor expenditures in the service sectors, differences in impacts generated in the local economy between NPS spending and visitor spending, and a shift in employment from agriculture to the service industries, for a Cross Keys/Port Republic battlefield park, apply to Third Winchester.

Third Winchester private and NPS low improvement direct impacts are handled in the same manner as those of the Cross Keys/Port Republic battlefield, and any difference between the low improvement scenarios at Winchester is again

Table 3 - Direct Impacts of Preservation Scenarios for Third Winchester Battlefield - Agriculture Foregone

Scenario	Visitation Prediction	Industry Output (thousand $)	Employment (jobs)	Personal Income (thousand $)	Total Income (thousand $)
NPS Owned Low Improvement	Low	944	35.6	289	397
	Mean	1,117	42.2	342	469
	High	1,289	48.7	394	541
NPS Owned High Improvement	Low	1,501	56.3	459	632
	Mean	1,664	62.5	508	700
	High	1,826	68.6	558	768
Private Owned Low Improvement	Low	945	35.7	289	397
	Mean	1,117	42.2	342	469
	High	1,289	48.7	394	541

Table 4 - Total Impacts of Preservation Scenarios for Third Winchester Battlefield - Agriculture Foregone

Scenario	Visitation Prediction	Industry Output (thousand $)	Employment (jobs)	Personal Income (thousand $)	Total Income (thousand $)
NPS Owned Low Improvement	Low	1,442	45.6	442	656
	Mean	1,706	53.9	522	775
	High	1,969	62.2	603	894
NPS Owned High Improvement	Low	2,290	72.1	700	1,042
	Mean	2,538	79.9	776	1,154
	High	2,787	87.8	852	1,267
Private Owned Low Improvement	Low	1,443	45.6	442	656
	Mean	1,706	53.9	522	775
	High	1,970	62.3	603	895

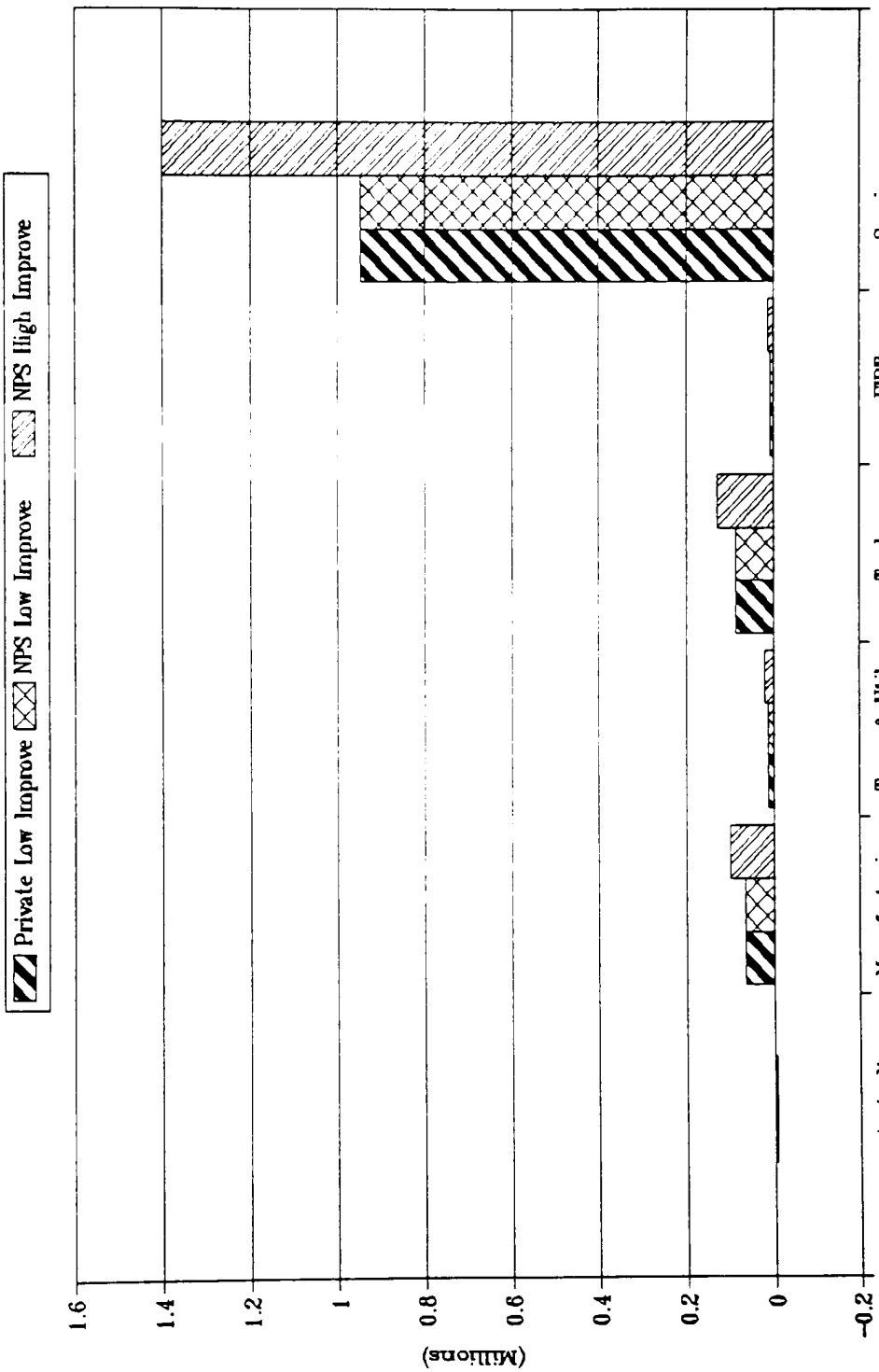

Figure 4. Third Winchester Direct Impacts in Industry Output by Aggregated Sector and Scenario for Mean Visitation Levels

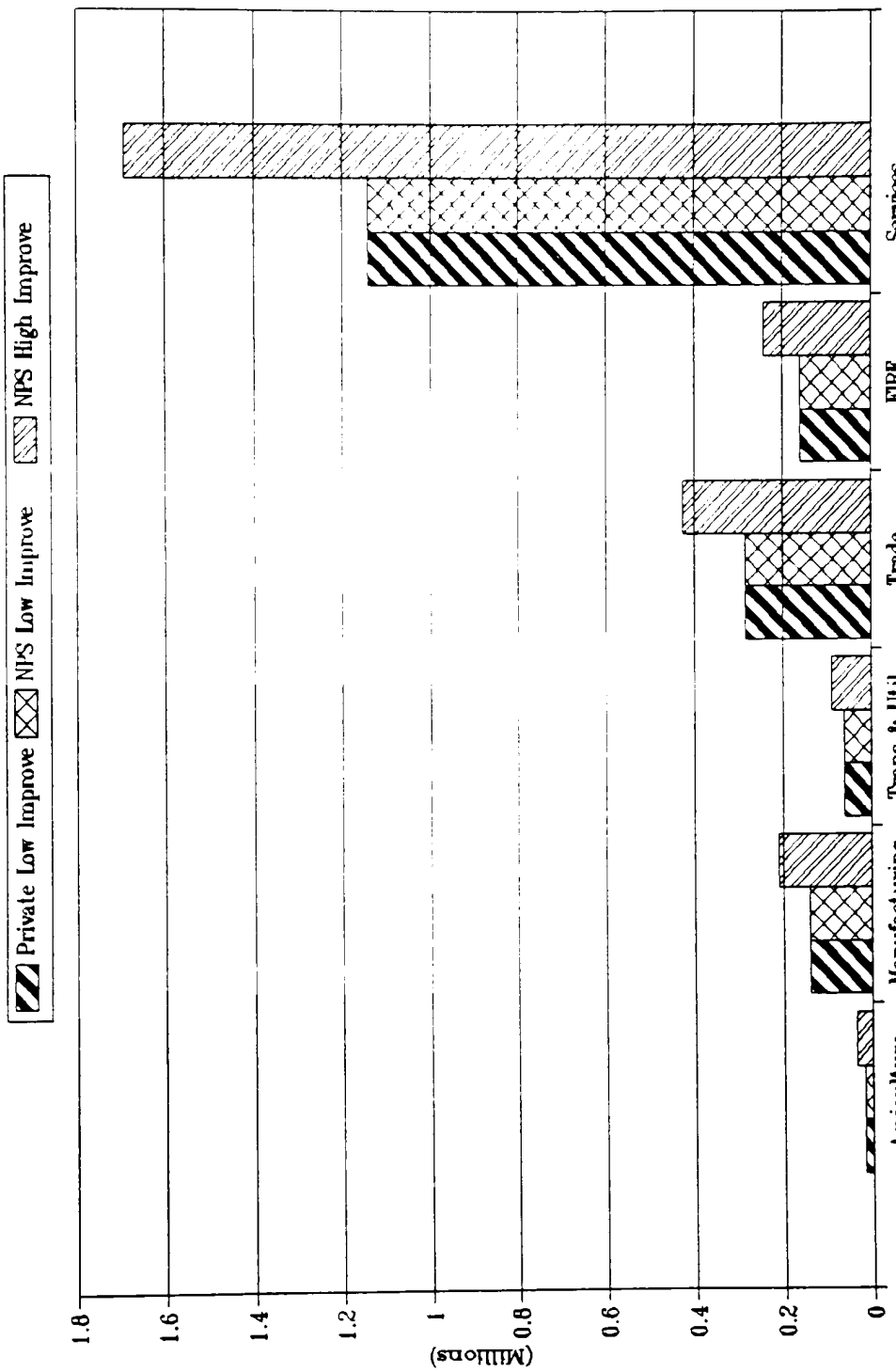

Figure 5. Third Winchester Total Impacts in Industry Output by Aggregated Sector and Scenario for Mean Visitation Levels

due to differences in property tax revenues and in-lieu payments. As before, the direct impacts in the agriculture sectors are negative under these two scenarios due to foreone agricultural production. Industry output in the service sectors increases the most, while the other sectors' outputs increase slightly.

The indirect impacts are positive in all sectors under the private and NPS low improvement scenarios and the NPS high improvement scenario. Negative indirect impacts do occur in every aggregated sector under all scenarios as a result of foregone agricultural production, however positive indirect impacts generated by visitor and agency spending greatly outweigh them.

Induced impacts are positive for all three scenarios, and greatest in the service industries. As expected, the trade and service sectors continue to dominate the other sectors in terms of impacts generated in the local economy (because these impacts stem from the sectors where the majority of direct impacts originate).

The total economic impacts that are generated from preserving the Third Winchester battlefield also indicate that the majority of benefits accrue to the service side of the economy (transportation and utilities; wholesale and retail trade; finance, insurance, and real estate; and service sectors), with small benefits going to the agriculture and manufacturing sectors. Total annual personal income in the Winchester City/Frederick County economy increases approximately $690,000 as a result of the establishment of a battlefield park under the NPS and private low site improvement scenarios, and $1,020,000 under the NPS high site

improvement scenario, in 1990 dollars. Total personal income in the local economy without an established battlefield park is approximately 950 million dollars, in 1990 dollars (U.S. Department of Commerce 1989).

Shenandoah Valley

Projections of the direct and total impacts of the Shenandoah Valley-wide battlefield park are presented in Table 5. The projections represent only the positive contributions to the regional economy, because the negative impacts due to foregone agricultural production are not considered on this study site (see page 29). The direct and total distributional impacts of battlefield preservation on the counties within the Shenandoah Valley-wide economy by aggregated sector and scenario for mean visitation are shown in Figure 6. This graph shows the same general distribution of changes in industry output among aggregated sectors as in the Cross Keys/Port Republic and Third Winchester graphs, except for a shift in employment from agriculture to the service industries (because there was no foregone agricultural activity on this site).

As expected, there are large direct impacts in the service sectors because this is where the greatest proportion of expenditures occur, especially visitor expenditures. However, for such large direct impacts (greater than 80 percent of the total impacts), there are not a lot of indirect and induced impacts generated in the service sectors. These low indirect and induced impacts occur because of

Table 5 - Direct and Total Impacts of the Establishment of a Shenandoah Valley-Wide Battlefield Park

Impact Measure	Visitation Prediction	Industry Output (thousand $)	Employment (jobs)	Personal Income (thousand $)	Total Income (thousand $)
Direct Impacts -	Low	31,422	1,186	9,523	13,274
NPS Owned	Mean	35,039	1,326	10,621	14,780
High Improvement	High	38,655	1,466	11,719	16,285
Total Impacts -	Low	51,807	1,275	11,178	15,790
NPS Owned	Mean	57,821	1,425	12,469	17,588
High Improvement	High	63,836	1,576	13,761	19,385

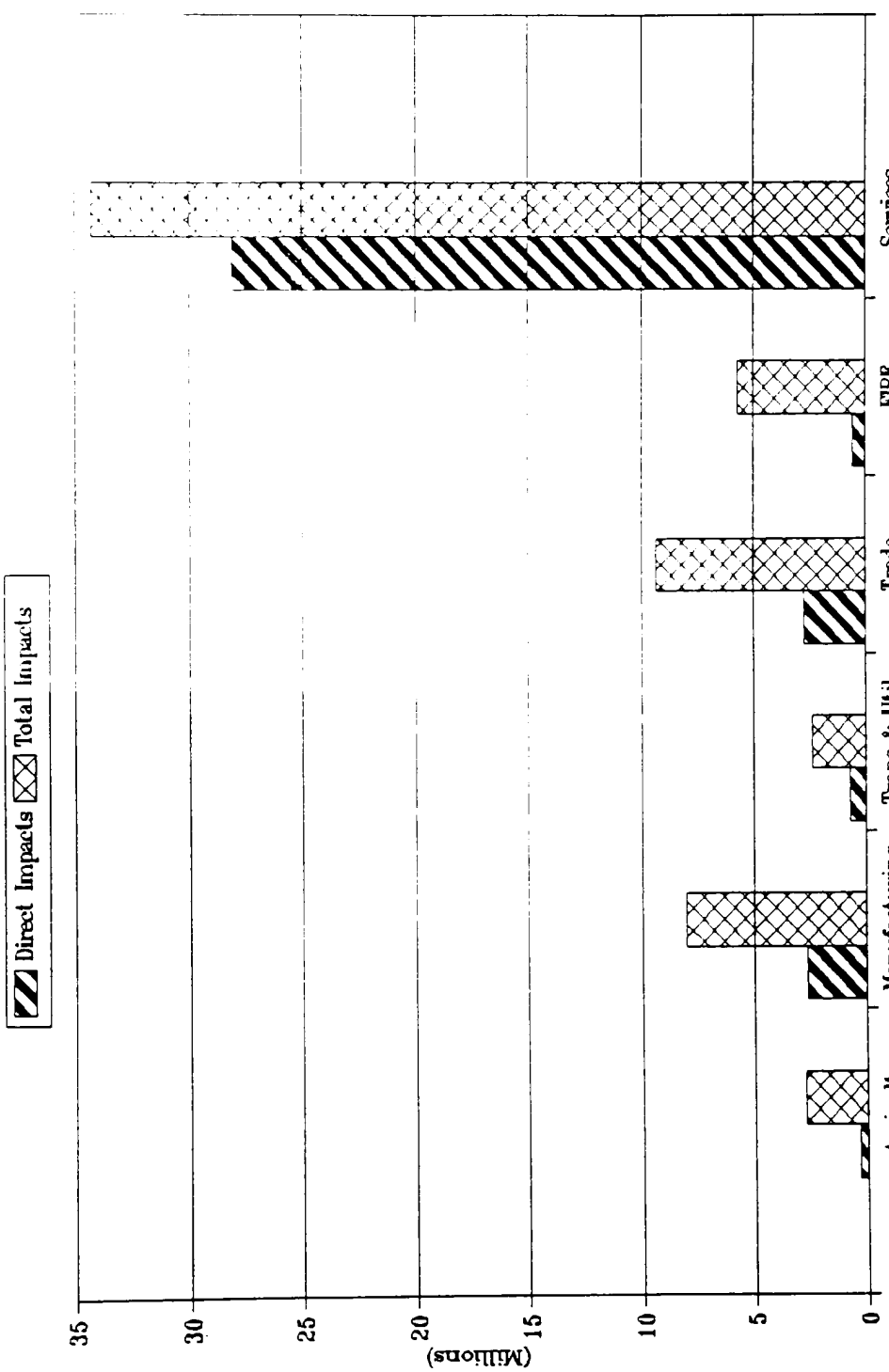

Figure 6. Shenandoah Valley-wide Direct and Total Impacts in Industry Output by Aggregated Sector and Scenario for Mean Visitation

the relatively large "leakage" of industrial activity to regional or national economies.[17]

[17] Leakages represent the amount of local demand that is met by producers outside of the local economy. For example, visitors may spend money on hotel goods and services. To assess the local multiplier effects, this expenditure must be subdivided among its component parts (i.e., the retail/wholesale margins and the proportion that is spent on other locally produced components). If most, or all, of the component parts are supplied by industries outside of the local economy, there can be little or no indirect and induced impacts from hotel businesses in the local economy.

Conclusions

The objective of this study was to quantify the direct, indirect, and induced distributional economic impacts on the local economy of Civil War battlefield preservation alternatives at Cross Keys/Port Republic and Third Winchester battlefields, and the battlefields of the Shenandoah Valley as a whole. Visitation figures at established battlefield parks were used to estimate visitation at each of the study sites using the ordinary least squares method of regression. Visitor expenditure information was taken from a previous study of the economic impacts of tourist spending on the economy proximate to a Civil War park. Agency expenditure information was obtained from established battlefield parks. The foregone economic activities and changes in property and sales tax revenues due to the establishment of a battlefield park, also were considered.

The study results indicate that battlefield preservation is likely to have positive distributional impacts on the local economy, although negative impacts can occur with low visitation. Visitation estimates may be inaccurate, though annual visitation to the study sites appears reasonable when compared with

annual visitation at other established battlefield parks. The visitor expenditure figures used in this study may be conservative, and any increase in them will result in higher positive distributional impacts on the local economy.

Though the overall objective of quantifying the distributional impacts of Civil War battlefield preservation alternatives in the Shenandoah Valley has been addressed, there are inherent limitations in this study. First, there are data limitations, and second, there are limitations to the scope of this study.

The information that would go the farthest in improving the impact projections is the location of suitable park boundaries at each of the battlefield sites under consideration. The anticipated boundary locations are needed primarily to determine what the potential facility developments, losses to the local tax base, and foregone economic opportunities may be under the preservation options.

More detailed information about visitors to existing battlefield parks would be helpful. For instance, knowing why tourists visit certain battlefield parks, why they select individual sites to visit within a battlefield system, and their opinions about battlefield preservation efforts, current or past, would be useful in determining the demand for this kind of recreation experience. In addition, information on visitor profiles, visitor origins, trip characteristics (e.g., single v. multiple destination trips), length of stay, and expenditures by major spending categories, could be collected.

More standardized reporting procedures of visitation figures at existing battlefield parks also would be helpful. Visitation counting procedures have changed, oftentimes only temporarily, at some of the established battlefield parks, making those sites' figures unavailable for use in this study (e.g., number of visits v. visitors hours, or adjusted v. unadjusted visitation figures during periods of construction and special events).

Information about the costs of managing particular aspects of other battlefield parks within the NPS system would help in eliminating the assumption that total Park Service expenditures are proportional to park acreage. In actuality there may be "fixed" personnel requirements associated with battlefield establishment that do no vary by park acreage. Consider that both the 3,900 acre Gettysburg National Battlefield Park and the 800 acre Richmond National Battlefield Park have a superintendent, chief ranger, and interpretive officer.

Information about Park operations expenditures is readily available, but often not in the form required for use in an I-O model (i.e., identified by a standard categories of industries such as OMB's Standard Industrial Classification). During the budget planning phase a "Financial Plan" (NPS form 10-561) is developed that classifies proposed expenditures by categories (e.g., personnel compensation and benefits, travel and transportation, rent,

industries.[18] However, after the budget for Park management is approved, the money is accounted for by program areas or "Primary Work Elements" (e.g., administration, interpretation, protection, maintenance, and resource management) that are difficult to bridge to the I-O industries. One exception is the "Maintenance Management Report" which lists all building- and non-building-related maintenance expenditures, and was used in this study. Because the requested budget often deviates from the approved budget, the Financial Plan categorization of expenditures may be inappropriate.

The overall objective of this study was limited in the sense that only the distributional impacts of battlefield preservation were considered. Non-market values of Civil War battlefields are sure to exist, but their quantification was beyond the scope of this study.[19] Also, net national benefits as a result of establishing a new battlefield park were ignored. With full employment, there may be relatively little national gain, because one region's gain is another region's loss. With high unemployment (beyond frictional), there may be a significant national gain, because of the net increase in employment and income. Because the study results do not include all of the benefits of battlefield preservation, their

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[18] A bridge table is used to distribute the spending for certain categories of goods and services among the economic sectors identified in the input-output model (see Appendix E of Palmer et al.).

[19] Evidence of these non-market values are the approximately 90,000 books and articles that have been written on the multifarious aspects of the Civil War (and growing) (Roland 1991), the yearly re-enactment of some of the more famous and not-so-famous battles, and the number of local historical groups that are dedicated to preserving what remains of Civil War battlefields.

the study results do not include all of the benefits of battlefield preservation, their use is limited to only comparing the economic activity in the local economy before and after battlefield establishment. Where these distributional impacts are small, or negative, preservation of a battlefield may still be justifiable on the basis of societal values.

The study did not address all of the issues of battlefield preservation. Further research could be performed in many areas such as: alternative marketing strategies to make Civil War battlefield preservation more competitive with other development interests; the distributional impacts of battlefield preservation if the technical relationships between the industries in the local economy were to change; resource constraints that may prevent economic growth in a certain sector within the local economy, after a battlefield is preserved; and local real estate tax rates before and after a battlefield is established.

Finally, the advantage of using input-output analysis to study economic development as a result of battlefield preservation is that it shows in detail how changes in one sector's activity (positive or negative) will affect the total economy. However, it should be emphasized that the realization of input-output projections of impacts is not guaranteed. Actual economic impacts often differ from projected economic impacts due to unforseen circumstances, uncertainty in planning, changes in economic conditions, or other similar reasons. Leontief stated: "Much political acumen and drive, much sweat and tears goes into the actual realization even of the best-conceived developmental plan" (Leontief 1963).

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Appendix A

Independent Cities, Counties, and Battlefield Sites in Shenandoah Valley-wide Study

Cities:

Buena Vista
Harrisonburg
Lexington
Staunton
Waynesboro
Winchester

Counties:

Augusta
Bath
Clarke
Frederick
Highland
Page
Rockbridge
Rockingham
Shenandoah
Warren

Battlefield Sites:

First and Second Kernstown
First, Second, and Third Winchester
Cedar Creek
Coal Spring
Cross Keys
Fisher's Hill
Front Royal
McDowell
New Market
Port Republic
Tom's Brook

Appendix B
Visitor Use Estimation

1. Site-Specific Visitation

The parameter estimates, standard errors, and t-statistics for the OLS equation used in predicting annual visitation at Cross Keys/Port Republic and Third Winchester Battlefields are shown below.

	Independent Variables:			
	Constant	Acreage	Distance (miles)	Improvement (0 = low/1 = high)
Coefficient	58928	160.64	-11719	24025
Std Error	5613.5	32.929	1680.1	6463.8
t-ratio	10.50	4.88	-7.29	3.72

Dependent variable is annual number of site visits.

This equation appeared to describe the variation in visitation at the Richmond sites well, giving an R^2 of 0.87 (adjusted R^2 of 0.86). The t-statistics are all significant at the 95% confidence interval and the signs on the parameters are as expected.

The acreage variable was chosen because it is believed that visitation to a site would be influenced by the size of the battlefield preserved (i.e., there may be more to view at bigger battlefields, relative to the size of the battle, and a greater sense of the events that took place perhaps can be acquired). National Park

Service Statistical Abstracts seem to support this belief, although other physical and historical characteristics of the park (e.g., geograhpical features or Civil War significance in terms of number killed, number engaged in battle, regiments present in battle, type of battle, or northern vs. southern victory) influence visitation to be sure.

The driving distance from the site to the nearest interstate highway access influenced visitation negatively. Small battlefields like Cross Keys/Port Republic and Third Winchester are probably not the primary or the only destination for many people travelling through a region. Therefore, the time and effort the average person or group is willing to spend accessing sites like these is probably minimal. The assumption here is that the majority of tourists/recreationists to these sites originate outside the regional (local) economy and use interstate highways for inter-regional travel.

The site improvement variable was selected to distinguish between parks that are staffed and provide interpretation as well as visitor services from those parks that are not staffed, are self-guided, and offer no visitor services. The belief here is that people are more willing to visit battlefield parks that offer visitor services, than those that do not, primarily because of the conveniences they afford.

2. Valley-Wide Visitation

The parameter estimates, standard errors, and t-statistics for the OLS equation used in predicting annual visitation to the "Shenandoah Valley-wide Civil

War Parks" are shown below.

	Independent Variables:		
	Constant	Acreage	Population (thousands)
Coefficient	-272.08	.03326	.13931
Std Error	112.15	.02333	.01653
t-ratio	-2.43	1.43	8.43

Dependent variable is thousands of park visits.

This equation appeared to describe the variation in visitation at established Civil War battlefield parks 1,000 acres in size or greater well, giving an R^2 of 0.75 (adjusted R^2 of 0.73). The acreage variable is not significant at the 95% confidence level in this regression, though it was still considered important for estimating visitation and was retained. The population variable is highly significant.

Population within the Rand McNally Major Trading Area (MTA) of each of the 1,000 acre plus battlefield parks was used in estimating visitation at the Valley-wide park because it conveniently defines an area of local and regional (intra- and interstate) consumer spending patterns. Almost eighty percent of the visitors surveyed in the 1986 Youngblood et al. GNMP study lived within 500 miles of the park, fifty percent within 200 miles of the park; both mileage figures within the definition of many of the major trading areas used in this regression.

Appendix C
Type III Industry Output Multipliers[1]

Aggregated Sector	IMPLAN Sector	Sector Name	Cross Keys/ Port Republic	Third Winchester	Shenandoah Valley
	1	DAIRY FARM PRODUCTS	1.3474	1.3446	1.4881
	2	POULTRY AND EGGS	1.2541	1.3683	1.3576
	3	RANCH FED CATTLE	1.2986	1.3439	1.3803
	4	RANGE FED CATTLE	1.3762	1.3846	1.4899
	5	CATTLE FEEDLOTS	1.8762	1.8781	1.9817
	6	SHEEP, LAMBS AND GOATS	1.53	1.5162	1.6256
	7	HOGS, PIGS AND SWINE	1.4277	1.4264	1.5231
	8	OTHER MEAT ANIMAL PRODUCTS	2.366	1.4865	2.4725
	9	MISCELLANEOUS LIVESTOCK	1.4198	1.4398	1.5747
AGRICULTURE	11	FOOD GRAINS	1.3663	1.4275	1.4861
	12	FEED GRAINS	1.2774	1.2853	1.3559
	13	HAY AND PASTURE	1.2536	1.2871	1.331
	14	GRASS SEEDS	1.2151	1.2675	1.2947
	16	FRUITS	1.5142	1.6331	1.7148
	18	VEGETABLES	1.3235	1.405	1.4327
	19	SUGAR CROPS	1.5373	1.5851	1.6053
	20	MISCELLANEOUS CROPS	1.2497	1.3034	1.3376
	21	OIL BEARING CROPS	1.136	1.1635	1.1823
	22	FOREST PRODUCTS	1.282	1.3192	1.3456
	23	GREENHOUSE AND NURSERY PRODUCTS	1.8888	1.9512	2.1399
	26	AGRICULTURE, FORESTRY, FISHERY SERVICES	1.6761	1.7488	1.9042
	27	LANDSCAPE AND HORTICULTURAL SERVICES	1.5205	1.6173	1.7086
	38	METAL ORES, NOT ELSWHERE CLASSIFIED	1.2215	1.2604	1.303
	40	BITUMINOUS & LIGNITE MINING, SERVICES			1.1921
MANUFACTURING	44	DIMENSION STONE			1.235
	45	CRUSHED AND BROKEN LIMESTONE	1.1765	1.2316	1.2518
	47	CRUSHED AND BROKEN STONE, N. E. C.	1.1631		1.2323
	48	CONSTRUCTION SAND AND GRAVEL	1.1917		1.2581

[1] **Blank cell values** for Cross Keys/Port Republic and Third Winchester indicate that sector was not present in the respective model.

49	INDUSTRIAL SAND		1.2594	1.2793
66	NEW RESIDENTIAL STRUCTURES	1.823	1.9947	2.1639
67	NEW INDUSTRIAL & COMMERCIAL BLDGS	1.2477	1.2887	1.3492
68	NEW UTILITY STRUCTURES	1.3558	1.453	1.4949
69	NEW HIGHWAYS AND STREETS	1.2155	1.2872	1.2973
70	NEW FARM STRUCTURES	1.2877	1.3369	1.3926
71	NEW MINERAL EXTRACTION FACILITIES	1.2361		1.2889
72	NEW GOVERNMENT FACILITIES	1.1871	1.2402	1.2585
73	MAINTENANCE & REPAIR, RESIDENTIAL	1.3681	1.4113	1.4911
74	MAINTENANCE & REPAIR OTHER FACILITIES	1.3085	1.3602	1.4202
75	MAINTENANCE & REPAIR OIL AND GAS WELLS	1.2207		1.3142
82	MEAT PACKING PLANTS	2.2896	2.0047	2.419
84	POULTRY DRESSING PLANTS	1.9352		1.9706
85	POULTRY AND EGG PROCESSING	2.2519		2.3811
86	CREAMERY BUTTER			2.2485
89	ICE CREAM AND FROZEN DESSERTS			1.6587
90	FLUID MILK	1.8524	1.3026	1.9552
93	CANNED FRUITS AND VEGETABLES	1.3851	1.5235	1.558
98	FROZEN SPECIALTIES		1.31	1.5999
99	FLOUR AND OTHER GRAIN MILL PRODUCTS	1.2469		1.3394
103	PREPARED FEEDS, N.E.C	1.2966		1.333
106	BREAD, CAKE, AND RELATED PRODUCTS	1.2828		1.385
109	CONFECTIONERY PRODUCTS		1.2467	1.3174
110	CHOCOLATE AND COCOA PRODUCTS			1.3631
114	WINES, BRANDY, AND BRANDY SPIRITS		1.4409	1.4614
116	BOTTLED AND CANNED SOFT DRINKS		1.3651	1.3606
121	ANIMAL AND MARINE FATS AND OILS	1.3925		1.4899
124	MANUFACTURED ICE	1.3426		1.4747
126	FOOD PREPARATIONS, N.E.C	1.1898	1.2012	1.2379
131	BROADWOVEN FABRIC MILLS & FINISHING			1.5991
133	YARN MILLS AND FINISHING OF TEXTILES			1.8523
135	FLOOR COVERINGS			1.5562
146	HOSIERY, N.E.C		1.683	1.79
150	KNIT FABRIC MILLS			1.8893
151	APPAREL MADE FROM PURCHASED MATERIAL	1.5067	1.5029	1.8334
152	CURTAINS AND DRAPERIES		1.4817	1.621
160	LOGGING CAMPS & LOGGING CONTRACTOR			1.4335
161	SAWMILLS & PLANING MILLS, GENERAL	1.2723	1.3115	1.5422
162	HARDWOOD DIMENSION AND FLOORING MILL		1.6478	1.778
164	MILLWORK	1.5504		1.7992
165	WOOD KITCHEN CABINETS	1.3435	1.4705	1.5656
166	VENEER AND PLYWOOD			1.5095
167	STRUCTURAL WOOD MEMBERS, N.E.C			1.8239

168	PREFABRICATED WOOD BUILDINGS		1.5196	1.7454
170	WOOD PALLETS AND SKIDS	1.4938	1.5447	1.6879
172	WOOD PRODUCTS, N.E.C.			1.7699
173	WOOD CONTAINERS			2.2568
174	WOOD HOUSEHOLD FURNITURE	1.3908	1.4856	1.5651
177	UPHOLSTERED HOUSEHOLD FURNITURE		1.7384	1.8414
178	METAL HOUSEHOLD FURNITURE			1.3416
179	MATTRESSES AND BEDSPRINGS	1.2255		1.3981
180	WOOD OFFICE FURNITURE		1.6355	1.7323
183	WOOD PARTITIONS AND FIXTURES			1.4146
186	FURNITURE AND FIXTURES, N.E.C.			1.3827
189	PAPERBOARD MILLS			1.4093
192	BUILDING PAPER AND BOARD MILLS			1.7826
195	DIE-CUT PAPER AND BOARD			1.1844
198	CONVERTED PAPER PRODUCTS, N.E.C.			1.2564
199	PAPERBOARD CONTAINERS AND BOXES	1.1956		1.2428
200	NEWSPAPERS	1.3687	1.4572	1.505
201	PERIODICALS			1.568
202	BOOK PUBLISHING	1.3592		1.4169
203	BOOK PRINTING	1.1933		1.2731
204	MISCELLANEOUS PUBLISHING			1.3628
205	COMMERCIAL PRINTING	1.2239	1.2747	1.2972
207	MANIFOLD BUSINESS FORMS			1.2063
212	TYPESETTING	1.2276		1.3183
215	INDUSTRIAL IN- & ORGANIC CHEMICALS	1.2216		1.3331
217	FERTILIZERS, MIXING ONLY	1.2562		1.3273
218	AGRICULTURAL CHEMICALS, N.E.C.			1.3473
224	CHEMICAL PREPARATIONS, N.E.C.		1.3118	1.3988
227	CELLULOSIC MAN-MADE FIBERS			1.4772
228	ORGANIC FIBERS, NONCELLULOSIC			1.3153
229	DRUGS	1.2403	1.2254	1.2652
232	SURFACE ACTIVE AGENTS			1.3667
238	PAVING MIXTURES AND BLOCKS			1.2048
243	FABRICATED RUBBER PRODUCTS, N.E.C.		1.324	1.3846
244	MISCELLANEOUS PLASTICS PRODUCTS	1.2028	1.2015	1.2854
246	LEATHER TANNING AND FINISHING			1.9003
252	WOMENS HANDBAGS AND PURSES			1.716
255	GLASS & GLASS PRODUCTS, EXC CONTAINER			1.5827
257	CEMENT, HYDRAULIC			1.4283
258	BRICK AND STRUCTURAL CLAY TILE			1.5592
267	CONCRETE BLOCK AND BRICK		1.3847	1.5034
268	CONCRETE PRODUCTS, N.E.C.	1.2326	1.2963	1.3555
269	READY-MIXED CONCRETE	1.2389	1.2509	1.3962

270	LIME		1.4298	1.4946
274	ASBESTOS PRODUCTS		1.5396	1.6346
295	COPPER ROLLING AND DRAWING			1.3428
296	ALUMINUM ROLLING AND DRAWING	1.2456		1.2629
298	NONFERROUS WIRE DRAWING & INSULATION			1.2332
300	BRASS, BRONZE, AND COPPER CASTINGS			1.5656
303	METAL CANS		1.1679	1.2293
307	HEATING EQUIPMENT, EXCEPT ELECTRIC	1.4165		1.5644
308	FABRICATED STRUCTURAL METAL		1.224	1.268
309	METAL DOORS, SASH, AND TRIM	1.2767		1.3155
310	FABRICATED PLATE WORK (BOILER SHOPS)	1.4586		1.6429
311	SHEET METAL WORK		1.2547	1.3518
313	PREFABRICATED METAL BUILDINGS	1.2797		1.3684
318	METAL STAMPINGS, N.E.C.			1.375
319	CUTLERY			1.312
322	HARDWARE, N.E.C.			1.4731
323	PLATING AND POLISHING			1.4607
327	PIPE, VALVES, AND PIPE FITTINGS			1.2115
329	FABRICATED METAL PRODUCTS, N.E.C.		1.4508	1.6033
332	FARM MACHINERY AND EQUIPMENT	1.4462	1.479	1.4334
335	MINING MACHINERY, EXCEPT OIL FIELD			1.3088
336	OIL FIELD MACHINERY			1.3166
338	CONVEYORS AND CONVEYING EQUIPMENT		1.2662	1.2907
343	SPECIAL DIES & TOOLS AND ACCESSORIES	1.3375		1.4629
347	FOOD PRODUCTS MACHINERY			1.5855
348	TEXTILE MACHINERY			1.5716
352	SPECIAL INDUSTRY MACHINERY, N.E.C.			1.4266
357	POWER TRANSMISSION EQUIPMENT			1.3004
359	GENERAL INDUSTRIAL MACHINERY, N.E.C.			1.3584
361	MACHINERY, EXCEPT ELECTRICAL, N.E.C.	1.2527	1.2952	1.3291
362	ELECTRONIC COMPUTING EQUIPMENT			1.5017
368	REFRIGERATION AND HEATING EQUIPMENT	1.3101		1.4059
370	SERVICE INDUSTRY MACHINES, N.E.C.	*	1.27	1.334
371	INSTRUMENTS TO MEASURE ELECTRICITY			1.9697
373	SWITCHGEAR AND SWITCHBOARD APPARATUS	1.2051		1.3111
374	MOTORS AND GENERATORS			1.3492
375	INDUSTRIAL CONTROLS			1.4796
386	ELECTRIC LAMPS		1.3479	1.4525
388	WIRING DEVICES			1.3223
390	PHONOGRAPH RECORDS AND TAPE		1.3392	1.4367
395	ELECTRONIC COMPONENTS, N.E.C.			1.372
401	TRUCK AND BUS BODIES	1.3222		1.3934
404	MOTOR VEHICLE PARTS AND ACCESSORIES	1.2547	1.2592	1.2845

	409	BOAT BUILDING AND REPAIRING			1.4208
	412	TRAVEL TRAILERS AND CAMPERS		1.4904	1.5821
	415	TRANSPORTATION EQUIPMENT, N.E.C.	1.5095		1.6253
	417	MECHANICAL MEASURING DEVICES			1.3188
MANUFACTURING	422	WATCHES, CLOCKS, AND PARTS			1.5233
	423	OPTICAL INSTRUMENTS AND LENSES			1.2123
	430	MUSICAL INSTRUMENTS			1.5697
	431	GAMES, TOYS, AND CHILDRENS VEHICLES			1.2962
	433	SPORTING AND ATHLETIC GOODS, N.E.C.		1.3135	1.3827
	445	MANUFACTURING INDUSTRIES, N.E.C.			1.5078
	446	RAILROADS AND RELATED SERVICES	1.2008	1.2293	1.3826
	447	LOCAL, INTERURBAN PASSENGER TRANSIT	1.2107	1.4388	1.4044
	448	MOTOR FREIGHT TRANSPORT & WAREHOUSE	1.3002	1.3519	1.4014
	450	AIR TRANSPORTATION			1.3114
	452	TRANSPORTATION SERVICES		1.443	1.4811
TRANSPORTATION	453	ARRANGEMENT OF PASSENGER TRANSPORT	1.3003	1.3718	1.4118
AND UTILITIES	454	COMMUNICATIONS, EXCEPT RADIO AND TV	1.136	1.1762	1.2024
	455	RADIO AND TV BROADCASTING	1.2155	1.2334	1.3102
	456	ELECTRIC SERVICES			1.2564
	457	GAS PRODUCTION AND DISTRIBUTION	1.1142	1.441	1.4509
	458	WATER SUPPLY AND SEWERAGE SYSTEMS	1.1788	1.2319	1.3733
	459	SANITARY SERVICES AND STEAM SUPPLY			1.3265
	460	RECREATIONAL RELATED WHOLESALE	1.1162	1.1476	1.1543
TRADE	461	OTHER WHOLESALE TRADE	1.0824	1.1055	1.1129
	462	RECREATIONAL RELATED RETAIL	1.0514	1.0651	1.0725
	463	OTHER RETAIL TRADE	1.423	1.4489	1.5431
	464	BANKING	1.251	1.3226	1.3647
	465	CREDIT AGENCIES	1.4484	1.5327	1.6115
	466	SECURITY AND COMMODITY BROKERS	1.1874	1.2463	1.2567
FIRE	467	INSURANCE CARRIERS	1.6684	1.8136	1.8025
	468	INSURANCE AGENTS AND BROKERS	1.185	1.2736	1.2842
	469	OWNER-OCCUPIED DWELLINGS	1.0958	1.0547	1.1164
	470	REAL ESTATE	1.1351	1.1461	1.1881
	471	HOTELS AND LODGING PLACES	1.4692	1.5622	1.6846
SERVICES	472	LAUNDRY, CLEANING AND SHOE REPAIR	1.5064	1.5538	1.6652
	473	FUNERAL SERVICE AND CREMATORIES	1.3636	1.4389	1.4823
	474	PORTRAIT AND PHOTOGRAPHIC STUDIOS	1.265	1.5129	1.5282

SERVICES

475	ELECTRICAL REPAIR SERVICES	1.1928	1.2899	1.2859
476	WATCH, CLOCK, JEWELRY AND FURNITURE	1.1923	1.1934	1.2571
477	BEAUTY AND BARBER SHOPS	1.4678	1.5454	1.6144
478	MISCELLANEOUS REPAIR SHOPS	1.1908	1.2164	1.236
479	SERVICES TO BUILDINGS	1.5711	1.7022	1.7899
480	PERSONNEL SUPPLY SERVICES		1.7534	1.6353
481	COMPUTER AND DATA PROCESSING SERVICE	1.119	1.143	1.2
482	MANAGEMENT AND CONSULTING SERVICES	1.3549	1.4457	1.4963
483	DETECTIVE AND PROTECTIVE SERVICES	1.6042	1.7556	1.8556
484	EQUIPMENT REPAIR AND LEASING	1.118	1.1273	1.1429
485	PHOTOFINISHING, COMMERCIAL PHOTO	1.2099	1.2182	1.2728
486	OTHER BUSINESS SERVICES	1.3733	1.5755	1.5376
487	ADVERTISING	1.2645	1.3194	1.3557
488	LEGAL SERVICES	1.2284	1.2682	1.372
489	ENGINEERING, ARCHITECTURAL SERVICES	1.286	1.3649	1.4118
490	ACCOUNTING, AUDITING AND BOOKKEEPING	1.2002	1.2279	1.293
491	EATING AND DRINKING PLACES	1.5699	1.5806	1.7749
492	AUTOMOBILE RENTAL AND LEASING	1.2215	1.2859	1.3024
493	AUTOMOBILE REPAIR AND SERVICES	1.35	1.3422	1.396
494	AUTOMOBILE PARKING AND CAR WASH	1.3016	1.3816	1.4714
495	MOTION PICTURES	1.4545	1.4501	1.7892
496	DANCE HALLS, STUDIOS AND SCHOOLS		2.2906	2.4501
497	THEATRICAL PRODUCERS, BANDS ETC		1.3919	1.4154
498	BOWLING ALLEYS AND POOL HALLS	1.616	1.7701	1.8823
499	COMMERCIAL SPORTS EXCEPT RACING			1.2718
500	RACING AND TRACK OPERATION	1.2588	1.2397	1.3293
501	MEMBERSHIP SPORTS & RECREATION CLUBS	1.7139	1.9479	2.0179
502	AMUSEMENT & RECREATION SERVICES, NEC	1.3234	1.4024	1.4686
503	DOCTORS AND DENTISTS	1.2287	1.2996	1.2846
504	HOSPITALS	1.4269	1.494	1.5867
505	NURSING AND PROTECTIVE CARE	1.4975	1.6373	1.7212
506	OTHER MEDICAL AND HEALTH SERVICES	1.3447	1.3554	1.4134
507	ELEMENTARY AND SECONDARY SCHOOLS	1.943	2.2849	2.4591
508	COLLEGES, UNIVERSITIES, SCHOOLS	1.3084	1.389	1.4547
509	OTHER EDUCATIONAL SERVICES	1.2071		1.2954
510	BUSINESS ASSOCIATIONS	1.7708	1.597	1.802
511	LABOR AND CIVIC ORGANIZATIONS	1.933	2.2095	2.3872
512	RELIGIOUS ORGANIZATIONS	1.4628	1.6827	1.7616
513	OTHER NONPROFIT ORGANIZATIONS	1.3303	1.3709	1.4862
514	RESIDENTIAL CARE	1.8353	2.1896	2.1986
515	SOCIAL SERVICES, N.E.C.	1.3429	1.425	1.4827
516	U.S. POSTAL SERVICE	1.3662	1.4546	1.5075
518	OTHER FEDERAL GOVERNMENT ENTERPRISES	1.2279	1.2742	1.3378

	519	LOCAL GOVERNMENT PASSENGER TRANSIT	1.5694	1.7216	1.903
	520	STATE AND LOCAL ELECTRIC UTILITIES	1.1586		1.4269
	521	OTHER STATE & LOCAL GOVT ENTERPRISES	1.2924	1.418	1.6338
SERVICES	525	GOVERNMENT INDUSTRY	1.6511	1.8714	1.9192
	526	REST OF THE WORLD INDUSTRY	0.996	0.995	0.9944
	527	HOUSEHOLD INDUSTRY	1.8885	2.1053	2.2182
	528	INVENTORY VALUATION ADJUSTMENT	1.0	1.0	1.0

Vitae

The author was born and raised in Salina, Kansas. In 1989 he received a Bachelor of Science degree in Forestry from the University of Idaho. He will graduate from Virginia Polytechnic Insitute and State University with a Master of Science degree in Forestry in December of 1991. He plans to pursue a career in forest management in his home state of Wyoming.