APPENDIX E
REGIONAL ECONOMIC BENEFITS OF THE HFQLG FOREST RECOVERY ACT

Regional Economic Benefits of the Herger-Feinstein Quincy Library Group Forest Recovery Act

Fiscal Year 2000, October 1999 through September 2000

U. S. Department of Agriculture
Forest Service
Herger-Feinstein Quincy Library Group Forest Recovery Act
PO Box 11500
Quincy, CA 95971

David Peters Project Manager

Center for Economic Development
California State University, Chico
Chico, CA 95929-0765
530-898-4598

Dan Ripke Director
Warren Kyle Jensen Program Manager, Economic Studies
Valerie Brueck Data Entry
Maya Wiley Editor

Summary of Results

In fiscal year 2000 (October 1999 through September 2000), Forest Service spending for the Herger-Feinstein Quincy Library Group Forest Recovery Act (HFQLG Act) expanded, leading to continued economic expansion in Lassen, Plumas, and Sierra Counties, referred to as the Core Region subject to the HFQLG Act[1].

While the final figures for year 2000 economic output, jobs, and personal income will not be released until May of 2002, the Center for Economic Development (CED) at California State University, Chico believes that the northern Sierra experienced the greatest single-year economic expansion in at least 10 years, a small part of which was due to increased spending by the Forest Service in its execution of the HFQLG Act. Other reasons include increased tourism and second-home construction locally.

Nearly $11.2 million were spent in the local economy in Lassen, Plumas, and Sierra Counties both directly and indirectly as a result of work related to the HFQLG Act in fiscal year 2000. This figure was nearly five times the fiscal year 1999 amount of $2.3 million.

Of the nearly $6.5 million (*does not include indirect overhead expenses*) spent by the HFQLG Act during fiscal year 2000, nearly $5.0 million was estimated to have been spent directly in the Core Region. This is 2.6 times higher than the previous fiscal year. The money was spent in the form of payroll, travel reimbursements, purchases from local vendors, payments to consultants, and reimbursements to other Forest Service budgets for purchases or services related to the HFQLG Act.

Some of the nearly $5.0 million spent in the Core Region was respent within the Core Region anywhere from once to several times over. This resulted in a total indirect economic benefit of nearly $4.7 million.

In addition, the HFQLG Act directly supported 90 full-time equivalent (FTE) jobs in the local economy in fiscal year 2000. This is over 2.5 times more that the 35 local FTE jobs directly supported by last year's spending. Estimated economic benefits in the Core Region led to an estimated additional 89 FTE jobs either created or preserved for a total employment benefit of 179 FTE jobs that were either created or preserved in the local economy, 3.9 times last year's 46 total FTE jobs supported by the HFQLG Act.

Purpose

President Bill Clinton signed the HFQLG Act on October 21, 1998. The act was a mandate to the U. S. Forest Service to set up a pilot project in the Lassen National Forest, the Plumas National Forest, and the Sierraville Ranger District in the Tahoe National Forest. The intent of the pilot project was to implement resource management activities described in the act, including construction of up to 300,000 acres of Defensible Fuel Profile Zones over a five-year period, which would require greatly increased removal of biomass[2].

There is a general disagreement as to the consequences of increased removal of biomass. Among the disagreements are two claims regarding how this project will affect the local economy. To summarize briefly, the first claim is that removal of biomass will allow the forest to grow more quickly and be healthier and more resistant to disease and catastrophic wildfire, and provide an economic gain for the local area due to increased timber sales. The second claim is that increased biomass removal will result in a sparse forest that will be less attractive to recreational visitors, decrease water quality through erosion, and result in an economic loss in the area due to decreased tourism.

[1] Lassen, Plumas, and Sierra Counties form a region that closely coincides with the area subject to the HFQLG Act.
[2] Biomass includes timber and underbrush.

Therefore, the Forest Service is required under the HFQLG Act to provide status reports to Congress. Section (j) (1) (D) of the HFQLG Act states that "…status reports shall include at least the following…"

> *(j) (1) (D) A description of the economic benefits to local communities achieved by implementation of the pilot project.*

The analysis and conclusions contained in this report, and in the report for fiscal year 1999, in no way supports or refutes either of the two claims regarding economic benefit of the pilot project, above. This report only covers the analysis of money spent by the Forest Service during fiscal year 2000 on the HFQLG Act.

CED was contracted to analyze the economic benefit of fiscal year 2000 of the HFQLG Act on the local economy. The economic benefit study was limited to Lassen, Plumas, and Sierra Counties, or the Core Region as defined in the summary of benefits above. Therefore, the total estimated economic benefits of the HFQLG Act in fiscal year 2000 to these three counties are considered the "mandated description of the economic benefits to local communities" stated above. There are also benefits to outlying areas that are not mandated to be monitored, and therefore are not a part of this study.

An additional part of this report, which was not present in the report for fiscal year 1999, is an analysis of revenue from timber sales awarded as a result of execution of the HFQLG Act. These sales are compared to total spending by the Forest Service in the implementation of the HFQLG Act. In fiscal year 2000, there was one activated timber sale, and therefore, this section in the fiscal year 2000 report is brief. However, as timber sales increase in fiscal year 2001, this section is projected to be a major component of subsequent descriptions of the economic benefits to local communities.

Methodology

CED executed the following methodology in analyzing the economic benefit of the HFQLG Act to the Core Region. This section includes an explanation of how CED analyzed economic benefits, discussion of the model used, and advantages and limitations of the model.

The Forest Service provided the HFQLG Act's fiscal year 2000 financial statements in two forms. First, spending summaries were provided which outlined how money was spent in several categories of spending, including amounts spent in payroll, travel, contractual services, rents, materials, equipment, and grants to other agencies. Second, transaction registers were provided detailing to whom or to what company each dollar was spent, but spending was not categorized as in the summaries.

Each dollar of spending was attached to a particular job code assigned by the Forest Service. Some job codes covered administrative spending, and others covered spending related to present and future timber sales. Each job code had its own summary and transaction register.

CED entered all of the summary spending amounts into a database for analysis and totals were calculated. All payroll was assumed to be spent locally and total payroll was considered the direct personal income benefit of the HFQLG Act. Other line-items were considered business-to-business transactions or business spending. Each category of spending was analyzed separately and CED estimated the percentage of each category that was spent locally. The estimate was made by taking the three job codes with the highest transaction value as described in the summaries. CED then found the corresponding transaction register to determine how much of that money was spent locally. Once calculating the percentage, CED rounded the figure to the nearest 5 percent for ease of calculation, because 5 percent is within CED's estimated margin of error using this method. The results were 15 percent of contracting services dollars spent locally, 100 percent of materials, 50 percent of equipment, and 0 percent of grants. Rent and travel were considered in a different manner. Rent was assumed to be 100 percent local (which mattered little since less than 0.02 percent of fiscal year 2000 spending was rent). Travel, which includes reimbursements to personnel for travel inside and outside of the region, was estimated to include hotel, meals, and gasoline. The center estimated that most travel expenses were persons from inside the area traveling within and outside the Core

Region for meetings. Therefore CED estimated that 40 percent of travel reimbursements were spent locally.

In the fiscal year 1999 report, it was stated that payments to local contracting services were treated as payroll because, like payroll, they are payment for services performed. CED now believes that it is better to consider this business spending because, while it is true that contracting payments are payments for services performed, contractors often respend this money in a different manner than an employee. The difference is subtle in many cases, but enough to affect the outcome of the analysis and increase its reliability.

As in the fiscal year 1999 report, CED performed two separate economic analyses for fiscal year 2000. One analysis was made on direct payroll expenses from the HFQLG Act fiscal year 2000. A second analysis was made on all other local expenditures. CED determined that the separation was necessary for two reasons.

First, the model used does not assume any business-to-business transactions occur locally from non-military federal government (including the Forest Service) to local businesses. In other words, the model assumes there are no local purchases made by the Forest Service. Therefore, CED entered its estimates of all spending to other local industries just as the model would do if it assumed any spending to local industry by the Forest Service. It would be unreliable to factor in personal income expenditures when working with the model in this manner.

Second, personal income distribution of Forest Service employees in the model was not consistent with personal income distribution in HFQLG Act fiscal year 2000. Total income (or the annual equivalent, since most people worked on this project on a temporary basis) could be determined from the information provided by the Forest Service. Based on this information, it was observed that the model's average mean salary for non-military federal government of $36,000 was far below average mean salary of $48,700 determined from the summaries. Personal income data needed to be entered separately, independent from business spending.

The Forest Service also provided an estimate regarding the number of full-time equivalent jobs were employed locally on activities directly related to the HFQLG Act during fiscal year 2000. The Forest Service indicated 90 full-time equivalent positions were working on the pilot project, which was used as the direct employment figure. This number was also used to calculate the average mean salary by dividing from the $4.358 million HFQLG Act payroll. The total number of people employed by the Forest Service and who were used to implement the HFQLG Act in fiscal year 2000, including full- and part-time, actually numbered over 300 people.

CED entered the base data into the model in order to determine the economic benefits of the HFQLG Act fiscal year 2000 as described in the Analysis of Benefits section.

The Economic Model: A regional economic model was built for the Core Region using the IMPLAN economic impact analysis system. IMPLAN models the economy through pre-input matrices measuring dollar flows from industry to industry, from industries to households, and from households to industries. This is called an input-output economic model and can be used to measure how changes in spending by households or an industry produce changes in spending by all households and all industries. The input-output economic model charts the flows from one industry or household to another through a matrix. A matrix is a mathematical equation that is capable of solving for multiple variables all in the same matrix or equation. The theory behind this type of economic impact analysis is best provided in an example.

Assume the Forest Service spends $100.00 directly at a local retail store. Part of that original $100.00 is respent as payroll for the store's employees, some is respent to the wholesaler or manufacturer, some may go to a property manager for rent, some may go to the government for taxes, and so on. If the employee, wholesaler or manufacturer, or property manager is located in the Core Region, that money is assumed to be respent within the Core Region, and is added to the direct impact as indirect impact. If money that is respent again in the region, that spending is also added as indirect impact.

A model based on the social accounting matrix (type SAM model) was used to determine the effects of the HFQLG Act fiscal year 2000. IMPLAN's type SAM model is the most widely used model as of the date of this study. It is used by a majority of economic analysis consulting firms who work with local governments and economic development organizations to analyze the impact of changes to the local business structure.

Advantages: There are many advantages to using the type SAM model, two of which are important enough to mention in this report. The first advantage of using IMPLAN's type SAM model is that it is capable of tracing monetary flows through debits and credits, which have become increasingly prevalent in today's economy (Minnesota IMPLAN Group, 1998). Since a majority of the money flows out of the Forest Service in the form of salary to households, the type SAM model more accurately reflects the likely spending patterns of households in the Core Region.

Second, the type SAM model considers impacts that are induced from increased household income, and therefore increased household spending, in addition to the indirect effect of increased industry spending (Minnesota IMPLAN Group, 1998). This further adds to the accuracy of household expenditures to industries.

These factors combine to help make the type SAM model from IMPLAN the most precise tool for estimating the economic impacts of the HFQLG Act fiscal year 2000 in the Core Region.

Limitations: There are two limitations to IMPLAN's type SAM model that may affect results. CED has worked to minimize these limitations in order to obtain a more accurate estimate from the model. One limitation is the possibility of resources spent by the Forest Service outside the Core Region that are, in turn, respent within the region. This occurs most often in travel expenses, particularly with persons working on the project who live outside of the region, yet travel to the region for the project and spend money. However, the Forest Service was able to recognize and note most payments to persons outside the region for travel inside the region, which reduces the error caused by this limitation.

The second limitation results from a characteristic of all IMPLAN models, including type SAM, that the proportion of an industry's spending to households and other industries is fixed. In other words, the distribution of spending before the event in which you are measuring the impact is the same as the distribution of spending after the impact. For example, if 10 percent of old Forest Service spending is to wheat farms then 10 percent of all new spending is estimated to go to wheat farms. This assumption ignores the possibility that there may be no time for local farmers to increase acres planted to meet the increased demand, even if there is land available to do so. In other words, if additional output is demanded by an industry, all of the industries inputs increase proportionally, and there is no supply constraints or substitutions (Minnesota IMPLAN Group, 1998). Manually entering the Forest Service's components of spending from the HFQLG Act fiscal year 2000 (payroll, travel, and purchases by industry) helps reduce this limitation considerably. The distribution of Forest Service spending before the HFQLG Act has no bearing on, and can be completely separated from, the distribution of spending from the HFQLG Act fiscal year 2000. While this does nothing to effect the same assumption in indirect spending estimates (distribution of indirect spending must be estimated), this limitation is eliminated from the direct spending.

Analysis of Benefits

Before commencing with the analysis, a consideration regarding the beginning and ending of fiscal year 2000 must be taken into account. Fiscal year 2000 began in October 1999 and ended in September 2000. Therefore, this study actually covers the benefit of spending for three months of one calendar year and nine months of the following calendar year. Economic impact analysis is measured in annual data (annual personal income and annual spending). However, economic impact analysis is not dependent upon the benefit occurring from the beginning to end of a calendar year (January through December), only that the direct benefit occurs over a year, ending the day before the same date in the following year. Therefore, benefits of the HFQLG Act fiscal year 2000 are reliably measured using IMPLAN because the fiscal years begin and end on the same date (October 1, 1999 and September 30, 2000)

In the 1999 report, spending during only nine of the twelve months of the year were considered (since spending did not begin until January 1999). If spending for an additional three months in 1999 had been considered, the economic benefits would have been greater in the fiscal year 1999 study. This partially explains why local benefits per dollar spent are higher this fiscal year.

Economic impact analysis often uses a multiplier when summarizing economic benefits. The multiplier is the ratio between the direct effect and estimated total effect on the economy:

$$\textit{economic output multiplier} = \frac{\textit{estimated total economic benefit}}{\textit{direct economic benefit}}$$

The estimated total economic benefit is $11.2 million and the direct economic benefit is $6.50 million. Dividing $11.2 million by $6.50 million gives the economic output multiplier of 1.72 for fiscal year 2000 spending from the HFQLG Act. This multiplier is 0.32 higher than the fiscal year 1999 estimate of 1.40. This difference is due to the longer fiscal year and partially to the higher amounts of business and payroll spending being respent locally compared to previous years.

A multiplier that has been used more often in the past, yet is still useful today, is the employment multiplier.[3] The employment multiplier works the same way as the economic output multiplier in that it is total benefit divided by direct benefit:

$$\textit{employment multiplier} = \frac{\textit{estimated total employment benefit}}{\textit{direct employment benefit}}$$

A total of 179 full-time equivalent (FTE) jobs were supported as a result of fiscal year 2000 spending from the HFQLG Act which directly supported 90 FTE jobs within the Forest Service in the Core Region. Dividing 179 by 90 equals 1.99. Therefore, the employment multiplier for fiscal year 2000 spending from the HFQLG Act is 1.99. Every FTE job created by fiscal year 2000 spending from the HFQLG Act supports and additional 0.99 FTE jobs for a total of 1.99 FTE jobs in the local economy.

This is a very high multiplier, and increased from 1.31 in the fiscal year 1999 report. The longer fiscal year is part of the reason for the increase. However, a greater percentage of local forest service spending went to payroll than in the previous fiscal year and the Core Region is better-suited to providing retail and services to the local population than it is to local businesses. Another factor is increase in annual mean personal income within the Forest Service. More money per job translates to more spent locally per job. In the fiscal year 1999 report, annual mean personal income was $46,000 and in fiscal year 2000 it had increased to $48,700. This figure is much higher than average mean personal incomes in the Core Region, which are estimated to be close to $25,000 based on historical trends, although the exact figure for the year 2000 will not be published by the U. S. Department of Commerce, Bureau of Economic Analysis until May 2002.

Payroll benefits: The Forest Service paid nearly $4.36 million to its employees during the execution of the HFQLG Act in fiscal year 2000 (Table 1, next page). This income was respent in the Core Region resulting in a substantial total benefit of over $8.06 million. Indirectly, payroll disbursements supported 77 additional jobs in the local economy and an estimated increase in personal income of nearly $1.79 million. Nearly $1.92 million in local industry purchases also resulted indirectly from Forest Service payroll.

[3] Until 1997, the employment multiplier was used more often than the output multiplier. Until 1985, employment in economic impact analysis was measured as full-time equivalent employment (Lindall & Olson, 1996). This meant that one job could be measured as one full-time job or two half-time jobs. Since then, employment has been measured as full- and part-time employment. Critics of economic impact analysis argued that employment impacts were ambiguous, meaning that the analyzer could not determine whether or not these were full-time jobs. Furthermore, it could not be determined whether or not these were low-paying jobs. Therefore, economic impact analysis focuses more upon effect on total output rather than employment. Employment is usually included because it is still important as a human impact indicator.

Table 1 - Payroll Benefits of the HFQLG Act in Fiscal Year 2000

Type of Benefit	Direct Benefit	Indirect Benefit	Total Benefit
Employment	90	77	167
Personal Income	$ 4,358,000	$ 1,788,900	$ 6,146,900
Other Business Spending	n/a	$ 1,917,100	$ 1,917,100
Total Spending (Output)	$ 4,358,000	$ 3,706,000	$ 8,064,000

Spending benefits: The Forest Service spent nearly $2.14 million to local businesses during the execution of the HFQLG Act in fiscal year 2000 (Table 2). This is considered the direct benefit of Forest Service spending, since it will be counted as output . Of this total, $639,000 was spent on local businesses in the Core Region. Indirectly, through respending, this value translated into the support of an additional 12 jobs earning nearly $218,000 in personal income and nearly $756,000 in business income annually, resulting in a total benefit of over $3.11 million due to business spending by the HFQLG Act's fiscal year 2000.

Table 2 - Spending Benefits of the HFQLG Act in Fiscal Year 2000

Type of Benefit	Direct Benefit	Indirect Benefit	Total Benefit
Employment	n/a	12	12
Personal Income	n/a	$ 217,700	$ 217,700
Other Business Spending	$ 2,137,800	$ 755,700	$ 2,893,500
Total Spending (Output)	$ 2,137,800	$ 973,400	$ 3,111,200

Total benefits: The total benefits of HFQLG Act fiscal year 2000 are the payroll benefits plus the spending benefits.

Payroll benefits + spending benefits = total benefits

It is estimated that the total economic benefit of the HFQLG Act in fiscal year 2000 was 179 jobs, over $6.36 million in personal income, and nearly $11.2 million in total economic output in Lassen, Plumas, and Sierra Counties.

The multipliers for total HFQLG Act fiscal year 2000 spending is 1.99 for employment and 1.72 for total output. This means that every 1.0 job created by the direct spending benefits of the HFQLG Act added an additional 0.99 jobs in 2000, and every $1.00 spent increased output by an additional $0.72.

Table 3 - Total Benefits of the HFQLG Act in Fiscal Year 2000

Type of Benefit	Direct Benefit	Indirect Benefit	Total Benefit
Employment	90	89	179
Personal Income	$ 4,358,000	$ 2,006,600	$ 6,364,600
Other Business Spending	$ 2,137,800	$ 2,672,800	$ 4,810,600
Total Spending (Output)	$ 6,495,800	$ 4,679,400	$ 11,175,200

A total of nearly $6.50 million was spent by the Forest Service in the implementation of the HFQLG Act in fiscal year 2000. Of this total, nearly $5.00 million of that money was spent in Lassen, Plumas, and Sierra Counties, the Core Region subject to the HFQLG Act, while the remaining $1.50 million was spent on

businesses and consultants outside the Core Region. Payroll accounted for $4.36 million of this total while the remaining $640,000 was spent at local businesses.

While it may appear that the $6.50 million and $5.00 million figures are rounded to the nearest million or hundred-thousand, they are actually rounded to the nearest ten-thousand. The fact that these numbers round out to such exact figures is purely coincidence.

Some of the over $5.00 million spent in the Core Region was estimated to have been respent in the region and a portion of that respent again. Respending of these monies is the indirect effects resulting from HFQLG Act spending in fiscal year 2000 (please see the economic model described on page 3 for an explanation). Indirect spending in the Core Region totaled nearly $4.68 million. Therefore, a grand total of nearly $11.18 million in increased economic output was estimated to have occurred due to the Forest Service's investment into the Core Region through implementation of the HFQLG Act in fiscal year 2000.

Analysis of Revenues and Costs

The HFQLG Act requires a comparison of the revenues generated by, and the costs incurred in, the implementation of the resource management activities in the Annual Status Report to Congress described in section (E) of the act. Section (E) also includes a provision where the Forest Service must provide Congress with revenues and costs during each of the fiscal years 1992 through 1997 for timber management of lands subject to the HFQLG Act prior to its implementation for comparison.

During fiscal year 2000, one of five timber sales awarded as HFQLG Act projects commenced operations in the Sierraville Ranger District of the Tahoe National Forest. Total revenue generated in the fourth quarter from this timber sale was $15,777.38.

Throughout the Lassen and Plumas National Forests and the Sierraville Ranger District of the Tahoe National Forest, a total of $7.17 million was spent in fiscal year 2000 toward the planning and preparation of 21 HFQLG Act projects. Planning was also initiated on 30 projects scheduled for fiscal years 2001 and 2002. Historically it has taken approximately two full years from the start of a project to conduct planning and preparation before an awarded contract where operations for the project on the ground have started.

This information will be compared with a table of revenues and costs previously provided in 1999 for fiscal years 1992 through 1997 for use in subsequent Annual Status Reports to Congress.

Common Terms

There are a number of terms used in this report that are common to economic impact analysis. Following are definitions for a list of the terms used in this report:

Direct benefits: Forest Service funds that went directly to payroll and purchases to local businesses within Lassen, Plumas, and Sierra Counties.

Indirect benefits: All payroll and purchases that were respent inside the Core Region as a result of spending defined in direct benefits.

Personal income: The total amount of income received by individuals within the region. It includes all income received from all sources, including wages and salaries, dividends, and transfer payments such as income supplements and retirement benefits. Personal income benefits are the estimated direct and indirect change in personal income.

Employment: The total number of full- and part-time jobs in a region. Employment benefits are the estimated direct and indirect change in total employment due to Forest Service Spending. Increases in

personal income are used to estimate total employment benefits, using average wage rates by industry as a baseline.

Total spending (output): Direct benefits in this category are equal to total spending from the Forest Service on payroll, travel, purchases, and contracts as a direct result of the HFQLG Act. Indirect benefits are the total increase in economic output of all other industries in the Core Region as a result of Forest Service spending. This spending is considered to be increased output from the Forest Service, and therefore can be added to the indirect effect on output, resulting in a measure of total economic output.

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