Appendix M – Economic Contributions

CONTENTS

Contribution of National Forest and Grassland Resource Management to the US Economy

OBJECTIVE

This paper describes the methods used to estimate the economic contribution of Forest Service (FS) National Forest and Grassland resource management activities to the US economy. This is a summary analysis for National Forest System (NFS) activities. A far more detailed study for the entire Forest Service is carried out periodically for the Strategic Plan Analysis.

ECONOMIES AS SYSTEMS

Economies are webs of interactions between producers and consumers of goods and services. Economic activity supports jobs and jobs give people the disposable income to support economic activity. Natural resource management on National Forests and Grasslands contributes to economic activity nation-wide by providing recreation opportunities and commodities such as timber and grazing. Additionally, a portion of the revenues collected by the Forest Service is returned to states and counties to support schools, road maintenance, and stewardship management projects. The information presented in this report quantifies the economic contribution of Forest Service resource management activities; recreation, hunting, fishing, wildlife watching, grazing, forest management, minerals, secure rural schools returns to states and counties, and budget expenditures supporting management of the National Forest System.

SUMMARY TABLES: ECONOMIC CONTRIBUTION

Table A presents an estimate of the annual economic activity supported by FS management of the National Forests and Grasslands. This includes the effects of expenditures by the Agency to manage natural resources as well as including expenditures made by visitors enjoying recreational opportunities on the National Forests, wildlife related activities such as hunting, fishing, and wildlife watching, economic activity supported by minerals extraction, economic activity in the livestock sector supported by access to FS grazing allotments, and the economic activity supported by logging companies and primary processors of forest products, as well as the gathering and sales other forest products.

Table A: National Forest and Grassland Contributions to US Employment, Income, GDP and Total Sales by Program for 2009.

	Total Contribution (Initial Expenditures plus Ripple Effects)			
Resource *	**Full and Part Time Jobs**	**Labor Income (Thousands of 2009 dollars)**	**GDP (Thousands of 2009 dollars)**	**Output (Total Sales) (Thous. of 2009 dollars)**
Recreation - Not Wildlife Related	199,883	$8,036,853	$13,688,259	$26,418,402
Wildlife and Fish Recreation	24,259	$1,034,624	$1,756,845	$3,392,073
Grazing	3,695	$91,919	$194,047	$540,565
Timber	44,083	$2,054,923	$2,333,635	$11,820,121
Minerals	110,409	$6,885,261	$13,317,234	$24,905,595
Other Forest Products	100	$3,821	$5,906	$12,773
Payments to States/Counties	10,634	$506,774	$705,061	$1,295,913
Forest Service Expenditures	37,175	$1,764,434	$2,504,903	$3,475,555
Total Forest Management	430,238	$20,378,609	$34,505,890	$71,860,997

** Only the "Forest Service Expenditures" line reflects jobs and income generated from FS program budget expenditures. All the previous lines reflect private sector activity stimulated by FS resources entering the national economy.*

These estimates include backward linkages - the ripple effects through the economy of an infusion of money from the use of products and amenities on the National Forests. For example, in FY 2009, visitors to the National Forests spent $13billion for things like lodging, food and fuel (*National Visitor Use Monitoring Result, National Summary Report, FY2009,* April 2010). The full contribution of these expenditures are realized as the hotels, restaurants and gas stations turn around and pay for labor, utilities, taxes and other inputs that enable them to sell goods and services to the visitors. In addition, an economic contribution is made when the employees of the hotels, restaurants and gas stations spend their disposable income. As can be seen in Table A, the total contribution stemming from the initial expenditure of $13billion is more than 24,000 jobs from wildlife related recreation, and over 199,000 jobs from other recreation. The same type of ripple effect can be seen economy-wide in income, GDP and sales.

As another example, the Grazing Program contributed almost 4,000 jobs and over $91 million of wages and proprietor's income economy-wide in 2009. It is important to note that this does not include the total number of ranchers and their employees, but rather is the economic contribution of value added to livestock given access to forage on the National Forests and Grasslands.

The other Programs shown in Table A have comparable ripple effects through the US economy. See Tables C & D for a detailed display of results for this analysis. Table E shows the data and data sources used.

GENERATING ESTIMATES OF INCOME AND EMPLOYMENT

For this analysis, one model was built for the entire US using the "IMPLAN" economic software and data system first developed by the Forest Service and now updated and supported by the Minnesota IMPLAN Group (www.implan.com). IMPLAN models show the interdependencies and interactions of businesses and consumers. Models contain data for 440 economic sectors and 9 income brackets using 2009 data, the most recent data available. Table B shows the source of some of the key data pieces in IMPLAN.

Table B: Sources for the 2009 IMPLAN data set

Data Type	Source Data	Comments
Industry sales	▪ U.S. Bureau of Census (Census) economic censuses, ▪ U.S. Bureau of Economic Analysis (BEA) output estimates ▪ U.S. Bureau of Labor Statistics (BLS) employment projections.	Total Industry Output equals the value of all sales to intermediate (business to business) and final (consumers, exports) demand.
Employment (jobs)	▪ BEA: Regional Economic Information System (REIS) ▪ BLS: ES202 employment security data ▪ Census: County Business Patterns	Employment (jobs) is defined as in 2009 employment. It includes full and part time, temporary, and seasonal jobs as well as multiple jobs held by a single person.
Labor Income	▪ Employee compensation: o BLS ES202 o BEA REIS data. ▪ Proprietor's Income: Federal tax forms.	Labor Income includes: ▪ Employee compensation: the value of wages and benefits ▪ Proprietor's income: Any income received for payment of self-employed work.

IMPLAN is an "Input-output (I-O)" model and is used as a means of examining relationships within an economy both among businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. There are two principle ways IMPLAN is used; an examination of the current situation is a "Contribution Analysis", while a prediction of economic activity in response to a change in management or policy is an "Impact Analysis". The purpose of this report is to estimate the ***contribution*** of current natural resource management to the US economy.

Input-output models are driven by final consumption (or final demand). Industries respond to meet demand for their product or service directly or indirectly (by supplying goods or services to industries responding directly). Each industry that produces goods or services generates demands for other goods and services. A $1 final demand for the goods and services of an industry ultimately leads to an output of more than $1 of the goods and services of the total economy. Other industries supply inputs to the industry

receiving a demand for its product and increase the stimulus to the regional economy. These are secondary effects. People spending wages earned in any of these industries also provide income to other goods and service industries, an "induced effect". Direct, indirect and induced effects are measured with "multipliers" which measure how much employment and income is stimulated by demand for goods and services. Complex economies generate larger multipliers than simple, rural economies. "Response coefficients" are a type of multiplier that measures economic response as a result of each $1million of spending related to natural resource management.

RESPONSE COEFFICIENTS AND FEAST

After the IMPLAN model was built, a million dollars was run through the model for; wildlife and other recreation, range, timber, minerals, and secure rural schools payments. These "response coefficients" are then imported into FEAST, an Excel workbook which handles calculation and reporting tasks.

RESOURCE DATA AND ANALYSIS RESULTS

Table D shows the resource data inputs used in FEAST with the data sources noted. FEAST multiplies these data by the response coefficients from IMPLAN to get the jobs and income estimates. The results tables from FEAST are displayed in Tables A, C and D.

A WORD ABOUT IMPLAN ESTIMATES

In order to use these estimates correctly, please keep a few words of warning in mind:

1. IMPLAN is used to examine "marginal" changes: The numbers presented in Appendix A hold only for relatively small changes to the US economy. Any resource management action large enough to change the underlying structure and trade relationships of the economy will necessarily change the relationships quantified in the coefficients. A new model would need to be specified and run.
2. In reality, effects would be "lumpy": These estimates were generated for a large geographic area which contains well developed and complex economies. At a smaller scale, management actions that affect rural, simple economies would necessarily have smaller response coefficients and thus a smaller job and income response.
3. Jobs do NOT equal Full Time Equivalents. Jobs are annual average full and part time, seasonal, and temporary employment in the private sector.
4. Labor income includes employee compensation (wages plus the value of benefits) and the income of sole proprietors.
5. GDP (Gross National Product): GDP measures the incremental value added to a product or service at each step of the production process. This is a conventional and widely used measure of economic growth. This is called "Value Added" in IMPLAN output.

6. Output (Total Sales): Sales value of goods and services. This is not normally used as a measure of economic growth as it counts both intermediate and final sales of goods and services in the production process.

FULL FEAST OUTPUT TABLES

Contribution of National Forest Management to the US Economy

Table A. Current Economic Contribution of National Forest & Grassland Resource Management

Resource	Jobs (Full and Part Time)	Labor Income (Thous. $2009)	GDP (Thous. $2009)	Output (Total Sales: Thous. $2009)
Recreation - Not Wildlife Related	199,883	$8,036,853	$13,688,259	$26,418,402
Wildlife and Fish Recreation	24,259	$1,034,624	$1,756,845	$3,392,073
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Payments to States/Counties	10,634	$506,774	$705,061	$1,295,913
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Total Forest Management	430,238	$20,378,609	$34,505,890	$71,860,997

Table C. Economic Contribution by Major Industry in 2009

Industry	Jobs (Full and Part Time)	Labor Income (Thous. $2009)	GDP (Thous. $2009)	Output (Total Sales: Thous. $2009)
Agriculture	20,526	516,748	699,493	2,811,386
Mining	32,962	3,051,344	6,581,766	12,385,148
Utilities	1,630	252,497	827,197	1,507,650
Construction	6,382	338,808	371,855	730,657
Manufacturing	28,850	1,858,583	2,818,865	13,381,590
Wholesale Trade	13,998	1,045,712	1,730,686	2,978,726
Transportation & Warehousing	15,957	828,588	1,134,839	2,274,238
Retail Trade	43,160	1,230,102	2,057,695	3,149,274
Information	6,796	629,640	1,112,651	2,747,190
Finance & Insurance	15,653	1,258,586	2,045,412	3,990,378
Real Estate & Rental & Leasing	15,382	436,353	3,508,654	5,407,818
Prof, Scientific, & Tech Services	22,252	1,625,880	2,051,446	3,553,553
Mngt of Companies	4,930	545,615	682,300	1,184,572
Admin, Waste Mngt & Rem Serv	21,325	689,485	859,386	1,475,795
Educational Services	5,212	173,929	184,969	351,445
Health Care & Social Assistance	26,340	1,309,558	1,439,731	2,630,646
Arts, Entertainment, and Rec	20,075	577,228	1,040,958	2,359,514
Accommodation & Food Services	89,218	2,237,936	3,602,751	6,594,857
Other Services	17,444	516,430	636,763	1,295,518
Government	27,824	1,540,977	1,563,423	1,666,160
Total Forest Management	435,914	20,664,001	34,950,838	72,582,327

Table D. Current Role of Forest Service-Related Contributions to the US Economy

Industry	Employment (jobs)		Labor Income (Thousands of 2009 dollars)	
	US Totals	FS-Related	US Totals	FS-Related
Agriculture	3,760,534	20,526	$71,689,938	$ 516,748
Mining	905,275	32,962	$125,532,267	$ 3,051,344
Utilities	557,117	1,630	$96,592,447	$ 252,497
Construction	11,286,915	6,382	$581,557,209	$ 338,808
Manufacturing	13,829,566	28,850	$1,079,427,116	$ 1,858,583
Wholesale Trade	6,323,779	13,998	$475,756,596	$ 1,045,712
Transportation & Warehousing	18,850,522	15,957	$557,046,036	$ 828,588
Retail Trade	5,652,794	43,160	$302,253,880	$ 1,230,102
Information	3,592,765	6,796	$334,252,107	$ 629,640
Finance & Insurance	8,178,963	15,653	$713,060,733	$ 1,258,586
Real Estate & Rental & Leasing	7,564,435	15,382	$230,879,080	$ 436,353
Prof, Scientific, & Tech Services	12,035,141	22,252	$932,623,837	$ 1,625,880
Mngt of Companies	1,861,054	4,930	$211,683,964	$ 545,615
Admin, Waste Mngt & Rem Serv	10,442,019	21,325	$349,340,727	$ 689,485
Educational Services	3,492,557	5,212	$115,082,530	$ 173,929
Health Care & Social Assistance	17,562,096	26,340	$862,689,084	$ 1,309,558
Arts, Entertainment, and Rec	3,531,574	20,075	$97,209,354	$ 577,228
Accommodation & Food Services	11,949,225	89,218	$257,694,287	$ 2,237,936
Other Services	10,080,334	17,444	$267,143,307	$ 516,430
Government	24,860,136	27,824	$1,587,921,038	$ 1,540,977
Total	176,316,800	435,914	$9,249,435,537	$ 20,664,001
FS as Percent of Total	---	0.25%	---	0.22%

DATA INPUT SUMMARY REPORT

- NL - NonLocal Visitors who live more than 50 miles from the National Forest
- L – Local Visitors who live within 50 miles of the National Forest
- Day – Day use
- OVN-NF – Overnight on the National Forest
- OVN – Overnight off the National Forest
- NOTE: Non-primary visits (visitors who were recreating on the forest or grassland but not in the area primarily to visit the forest) were added to the Local Day use visit total to reflect their low spending on NF recreation.

Table E: Data Input to FEAST

1

Recreation Use	Units	Current
NL-Day	Visits	12,941,720
NL-OVN-NF	Visits	9,412,160
NL-OVN	Visits	20,000,840
L-Day Trips	Visits	69,414,680
L-OVN-NF	Visits	4,706,080
L-OVN	Visits	1,176,520
NL-Day Downhill Ski	Visits	4,477,800
NL-OVN Downhill Ski	Visits	13,134,880
L-Day Downhill Ski	Visits	11,642,280
L-OVN Downhill Ski	Visits	597,040

Source: "Spending Profiles of National Forest Visitors, NVUM Round 2 Update", White, Eric and Dan Stynes, March 2010

2

Recreation Expenditures / Unit	Units	Current
NL-Day Trips	$/Visit	24.30
NL-OVN-NF	$/Visit	79.70
NL-OVN	$/Visit	205.13
L-Day Trips	$/Visit	15.08
L-OVN-NF	$/Visit	57.41
L-OVN	$/Visit	86.04
NL-Day Downhill Ski	$/Visit	53.86
NL-OVN Downhill Ski	$/Visit	268.16
L-Day Downhill Ski	$/Visit	29.33
L-OVN Downhill Ski	$/Visit	88.80

Source: "Spending Profiles of National Forest Visitors, NVUM Round 2 Update", White, Eric and Dan Stynes, March 2010

3

Range Use	Units	Current
Cattle & Horses	HMs	4,818,401
Sheep & Goats	HMs	1,984,715
Cattle Inventory -- Impact Area	Animals	96,034,500
Cattle weighted proportion marketed	Number	.46
Cattle weighted selling price	$/Animal	1,104
FS Cattle HMs in Inventory Data Year	HMs	4,818,401
Sheep Inventory -- Impact Area	Animals	4,636,500
Sheep weighted proportion marketed	Number	.26
Sheep weighted selling price	$/Animal	306
FS Sheep HMs in Inventory Data Year	HMs	1,984,715

Sources: "Annual Grazing Statistical Report", (www.fs.fed.us/ranglands/reports/index.shtml)
And National Agricultural Statistics Service (www.usda.gov/nass)

4

Wildlife & Fish Use	Units	Current
NL-Day Trips	Visits	3,609,341
NL-OVN-NF	Visits	3,886,982
NL-OVN	Visits	3,054,058
L-Day Trips	Visits	15,825,571
L-OVN-NF	Visits	832,925
L-OVN	Visits	555,283

Source: "Spending Profiles of National Forest Visitors, NVUM Round 2 Update",
White, Eric and Dan Stynes, March 2010

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Wildlife & Fish Expenditures/Unit	Units	Current
NL-Day Trips	$/Visit	27.83
NL-OVN-NF	$/Visit	125.84
NL-OVN	$/Visit	199.17
L-Day Trips	$/Visit	21.12
L-OVN-NF	$/Visit	81.57
L-OVN	$/Visit	88.71

Source: "Spending Profiles of National Forest Visitors, NVUM Round 2 Update",
White, Eric and Dan Stynes, March 2010

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Timber	Units	Current
Softwood Sawtimber	CCF	2,094,229
Softwood Pulp	CCF	493,911
Hardwood Sawtimber	CCF	167,253
Hardwood Pulp	CCF	252,089
Poles	CCF	12,724
Posts	CCF	7,237
Fuelwood	CCF	501,376
All Other Products	CCF	410,911

Sources: Annual Cut and Sold Reports, Volume harvested, "Service-wide Products FY 2009"
(www.fs.fed.us/forestmanagement/reports/sold-harvest/cut-sold.html).

7

Secure Rural Schools/25% Fund	Units	Current
Roads	$	198,733
Schools	$	198,733
General Gov't	$	23,380
Title II Projects	$	46,761

Source: "ASR18-1_18-2_FY2009.xls", (www.fs.fed.us/srs/county2009.shtml)

8

FS Employment & Expenditures All Programs	Units	Current
NFS FTEs All Programs	FTEs	14,500
Expenditures		
Salary	%	.39
Nonsalary	%	.61
Total NFS	Thous $$	$1,452,729

Source: Ross Arnold, WO Research, SPRA, personal communication, and National Finance Center, Budget Object Code annual expenditure data.

9

Minerals Quantities and Prices	Units	Quantity	Price/Unit ($2009)
1. Oil and Gas Extraction			
Natural Gas	M Cubic Feet	159,241,085	4
Crude Oil	Barrels	132,388,830	69
Natural Gas Liquids	Gallons	788,702,427	1
2. Coal Mining	Short Tons	271,600,000	14
4. Copper, Nickel, Lead and Zinc Mining			
Copper	Short Tons	36,810	2
Lead	Short Tons	230,113	1
Zinc	Short Tons	120,392	1
5. Gold, Silver, and Other Metal Ore Mining			
Gold	Troy Ounces	86,300	972
Silver	Troy Ounces	8,600,000	15
6. Stone Mining and Quarrying			
Crushed Stone (Common Variety)	Short Tons	6,100,000	42
7. Sand, Gravel, Clay, and Refractory Mining			
Construction Sand and Gravel	Short Tons	11,600,000	8
8. Other Nonmetallic Mineral Mining			
Phosphate	Short Tons	2,200,000	127
16. Primary Nonferrous Metal, Except Copper & Alumn			
Platinum	Troy Ounces	123,000	1207.55
Palladium	Troy Ounces	407,000	265.65

Source: FS Minerals Management

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Other Forest Products Quantities	Units	Current
Other Forest Products	ccf	410,911

Source: Source: Annual Cut and Sold Reports, Volume harvested, "Service-wide Products FY 2009" (www.fs.fed.us/forestmanagement/reports/sold-harvest/cut-sold.html).

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Other Forest Products Costs (2008 dollars)	Units	Current
Other Forest Products	ccf	10

Sources: Annual Cut and Sold Reports, Volume harvested, "Service-wide Products FY 2009" (www.fs.fed.us/forestmanagement/reports/sold-harvest/cut-sold.html).

12

IMPLAN Data for Impact Area	Units	Current
Employment	number	176,316,800
Employee Compensation	$	8,038,855,998,714
Proprietary Income	$	1,106,300,002,875
Labor Income	$	9,145,155,991,341
Other Property Income	$	4,248,944,035,175
Total Income	$	13,394,100,039,978

Source: 2009 US IMPLAN model