



United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

SEP 12 2011

The Honorable Daniel K. Akaka
Chairman
Committee on Indian Affairs
United States Senate
838 Hart Senate Office Building
Washington, D.C. 20510-6450

Dear Mr. Chairman:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

This pre-season forecast predicted fire suppression costs to be between \$1.168 billion and \$1.764 billion for FY 2011. These estimates are based on the best climate, weather, and other related data currently available, as well as the best current models and other analytical tools to estimate fire costs.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Vilsack", written over a circular stamp.

Thomas J. Vilsack
Secretary

Enclosure



United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

SEP 12 2011

The Honorable John A. Barrasso
Vice Chairman
Committee on Indian Affairs
United States Senate
838 Hart Senate Office Building
Washington, D.C. 20510-6450

Dear Senator Barrasso:

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SEP 12 2011

The Honorable John A. Barrasso
Ranking Member
Subcommittee on Public Lands and Forests
Committee on Energy and Natural Resources
United States Senate
304 Dirksen Senate Office Building
Washington, D.C. 20510-6158

Dear Senator Barrasso:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Thomas J. Vilsack
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Washington, D.C. 20250

SEP 12 2011

The Honorable Ron Wyden
Chairman
Subcommittee on Public Lands and Forests
Committee on Energy and Natural Resources
United States Senate
304 Dirksen Senate Office Building
Washington, D.C. 20510-6158

Dear Mr. Chairman:

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Washington, D.C. 20250

SEP 12 2011

The Honorable Robert Bishop
Chairman
Subcommittee on National Parks, Forest and Public Lands
Committee on Natural Resources
U.S. House of Representatives
1017 Longworth House Office Building
Washington, D.C. 20515-6207

Dear Mr. Chairman:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Washington, D.C. 20250

SEP 12 2011

The Honorable Raul M. Grijalva
Ranking Member
Subcommittee on National Parks, Forests and Public Lands
Committee on Natural Resources
U.S. House of Representatives
1017 Longworth House Office Building
Washington, D.C. 20515-6207

Dear Congressman Grijalva:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Washington, D.C. 20250

SEP 12 2011

The Honorable Glenn Thompson
Chairman
Subcommittee on Conservation, Energy and Forestry
Committee on Agriculture
U.S. House of Representatives
1336 Longworth House Office Building
Washington, D.C. 20515-6001

Dear Mr. Chairman:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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SEP 12 2011

The Honorable Tim Holden
Ranking Member
Subcommittee on Conservation, Energy, and Forestry
Committee on Agriculture
U.S. House of Representatives
1305 Longworth House Office Building
Washington, D.C. 20515-6001

Dear Congressman Holden:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Secretary

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SEP 12 2011

The Honorable James P. Moran
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
U.S. House and Representatives
1016 Longworth House Office Building
Washington, D.C. 20515-6015

Dear Congressman Moran:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Thomas J. Vilsack
Secretary

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SEP 12 2011

The Honorable Michael K. Simpson
Chairman
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
U.S. House of Representatives
B-308 Rayburn House Office Building
Washington, D.C. 20515-6015

Dear Mr. Chairman:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Secretary

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SEP 12 2011

The Honorable Jack Reed
Chairman
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
United States Senate
131 Dirksen Senate Office Building
Washington, D.C. 20510-6033

Dear Mr. Chairman:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Thomas J. Vilsack
Secretary

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Washington, D.C. 20250

SEP 12 2011

The Honorable Lisa Murkowski
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
United States Senate
125 Hart Senate Office Building
Washington, D.C. 20510-6033

Dear Senator Murkowski:

Enclosed is a report that outlines the U.S. Department of Agriculture's Forest Service's initial estimate of anticipated wildland fire suppression cost for fiscal year (FY) 2011 as required in the FLAME Act of 2009 (Title V of Div. A of Public Law Number 111-88). This estimate is pursuant to section 502(h)(3) of the FLAME Act of 2009, which requires the Secretary of Agriculture to submit an estimate of the anticipated wildfire suppression costs for FY 2011 the first week of March. I apologize for the delayed response.

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Thomas J. Wilsack
Secretary

Enclosure

**March Fiscal Year 2011 Federal Land Assistance, Management and Enhancement (FLAME) Act
Suppression Expenditure Forecast For the USDA Forest Service**

Jeffrey P. Prestemon, Krista Gebert, Karen L. Abt

March 7, 2011

Executive Summary

The U.S. Department of Agriculture's (USDA) Forest Service predicts that Agency total emergency suppression spending for fiscal year (FY) 2011, which includes a fixed charge for the WFSU Cost Pool and National Aviation Assets (\$402.0 million), will range with 90 percent confidence between \$1,085 million and \$1,847 million, with a median forecast of \$1,466 million. The 80 percent confidence band ranges from \$1,168 million to \$1,764 million. This total is comprised of above-average spending expected for the national forests of the Pacific Southwest (Region 5), Pacific Northwest (Region 6), and the combined total of the spending in Southern (Region 8) and Eastern (Region 9) National Forests. Higher than recent historical average spending in some of these regions is expected because of ongoing La Niña conditions in the eastern tropical Pacific Ocean. La Niña is linked to below-normal rainfall and above-normal temperatures and hence higher wildfire activity in some of these regions. The Pacific Southwest's higher costs are also connected to the current phase of the Pacific Decadal Oscillation favoring warmer and drier weather, ongoing drought, and a historical trend of rising costs independent of drought and La Niña. In contrast, the national forests of the interior West are expected to continue with relatively low wildfire activity, due to alleviating drought and the wetter weather.

Modeling Details

To meet the statutory requirements of the FLAME Act, the Forest Service developed statistical models based on peer reviewed research^{1,2}. These models are estimated simultaneously, as a system of six equations. For this forecast, like the forecasts issued in the Fall of 2009, the Spring of 2010 for FY 2010, and in September for FY 2011, equations are specified for the following regions or regional aggregates: (i) Region 1 plus Region 4, (ii) Region 2 plus Region 3, (iii) Region 5, (iv) Region 6, (v) Region 8 plus Region 9, and (vi) Region 10 plus the National Interagency Fire Center, Washington Office, and research stations, which we label in this report as "RFS." The statistical relationships estimated in the system connect emergency spending in the coming fiscal year in the region or regional aggregate to lagged measures of drought (Palmer indices), ocean temperatures (the Niño-3 sea surface temperature anomaly), and ocean pressure (Pacific Decadal Oscillation, Atlantic Multidecadal Oscillation, and Southern Oscillation indices). The equation for Region 5 includes a time trend. Equation Model estimates are shown in Table A, which appears in an Appendix to this report.

Forecasts are done with data on region-level costs that exclude special Cost Pool and aviation charges. Data range from 1995 to 2010 and for modeling purposes are deflated to a common dollar index of 2004. Forecast models account for correlations in both coefficient statistical estimates and equation errors. Forecasts are done by randomly sampling from equation error and coefficient error distributions in a way that accounts for the observed correlations in coefficient and equation errors. Monte Carlo simulations, therefore, randomly draw from these correlated random error distributions and are repeated 50,000 times. At the end of the simulation, all values are ranked and then used to develop a probability density function (Figure 1) and are exploited to extract mean, median, and upper and lower bounds of various confidence limits.

Modeling Results

¹ Prestemon, J.P., K.L. Abt, and K. Gebert. 2008. Suppression cost forecasts in advance of wildfire seasons. *Forest Science* 54(4):381-396.

² Abt, K.L., J.P. Prestemon, and K. Gebert. 2009. Wildfire suppression cost forecasts for the US Forest Service. *Journal of Forestry* 107(4):173-178.

The March Current Year Forecast Model (MCYFM) has a median forecast in 2011 inflated dollars of \$1,466 million. This is calculated as the sum across all individual region or regional aggregate forecasts and corresponds with the middle value out of 50,000 simulated values. The 95% confidence limit of this forecast ranges from \$1,009 million to \$1,923 million; the narrower 90% confidence limits are \$1,085 million to \$1,847 million, while the even narrower 80% confidence limits are \$1,168 million to \$1,764 million. The 90% confidence band characterizes the statistical probability that there is only a one out of ten chance that the realized value for 2011 will fall outside the range of \$1,085 million to \$1,847 million. Table 2 provides information on maximum expenditures across varying probability levels. For example, there is a 60% chance that expenditures will fall below \$1,526 million in FY 2011.

This MCYFM indicates an expectation that the western coastal regions and the East will have above-average costs, while the interior West (Regions 1-4) will have below-average costs, when compared across spending from 1996 to 2010 (Table 3). This same ranking emerges when comparing this 2011 forecast with spending over the last 34 years.

To assess the performance of the MCYFM, cross-validated (“jackknife”) forecasts of agency-wide suppression costs were done; these are shown in Figure 2. The cross-validation is done to assess how well such a model performs in “out-of-sample” conditions. The goodness of fit in the forecast can also be assessed using the Root Mean Squared Error (RMSE), the Mean Absolute Percent Error (MAPE), and the correct direction of change prediction. The cross-validation exercise indicates that the RMSE is \$227 million in constant 2004 dollar terms. This is more uncertain than previous versions of the Fall Current Year Forecast Model, which had a RMSE of \$207 million or the Spring Current Year Forecast Model (SCYFM), with a RMSE of \$149 million, as calculated over 1995 to 2009. But it is less uncertain when compared with the September Out-Year Forecast Model. MAPE comparisons indicate that the MCYFM is somewhat better, at 29%, compared to the September model (30%) but not as precise as the SCYFM (20%). The correct direction of change prediction is 93%, marginally better than September, FCYFM, and the SCYFM (each at 87%).

Ongoing improvements are expected in the forecasting procedure, as more data are accumulated on historical costs and new modeling methods are incorporated for these FLAME Act forecasts. For example, development of improved Department of Interior agency forecasting models may enable simultaneous modeling that could enhance the accuracy of both Forest Service and Interior FLAME Act forecast models.

Contact Information for this Report

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Fax: 919-549-4047

Table 1. Fiscal Year 2011 Emergency Suppression Cost Forecasts, by Region, current (FY 2011) dollars

	R 1&4	R 2&3	R 5	R 6	R 8&9	R 10&13	Total
	2011 \$ Million						
Median	34	9	638	199	57	530	1,466
95% Confidence Lower Bound	0	0	497	86	12	435	1,009
95% Confidence Upper Bound	280	138	779	313	102	625	1,923
90% Confidence Lower Bound	0	0	519	104	20	450	1,085
90% Confidence Upper Bound	241	118	756	294	95	610	1,847
80% Confidence Lower Bound	0	0	545	125	28	467	1,168
80% Confidence Upper Bound	195	93	730	274	86	592	1,764

Note: This table includes the FY 2011 WFSU Cost Pool and National Aviation Assets as a fixed charge of \$402 million, which is added to the Region 10 + RFS forecast and the agency-wide total.

Table 2. Fiscal Year 2011 Emergency Suppression Cost Forecasts, by Percentiles (FY 2011) dollars.	
Probability (%) of Falling Below Indicated Dollar Amount	Realized Amount (\$ Million 2011)
1	923
5	1,085
10	1,168
20	1,270
30	1,343
40	1,407
50	1,466
60	1,526
70	1,590
80	1,662
90	1,764
95	1,847
99	2,008

Note: This table includes the FY 2011 WFSU Cost Pool and National Aviation Assets as a fixed charge of \$402 million, which is added to the Region 10 + RFS forecast and the agency-wide total.

Table 3. Fiscal Year 2011 Emergency Suppression Cost Forecasts, by Terciles		
Region or Aggregate	Tercile of Costs Expected, Last 15 Years	Tercile of Costs Expected, Last 33 Years
R 1 + R4	Lower	Lower
R 2 + R3	Lower	Lower
R 5	Upper	Upper
R 6	Upper	Upper
R 8 + R9	Upper	Upper
R 10 + RFS	Lower	Middle
Total	Middle	Upper

Note: FY 2011 WFSU Cost Pool charges are assumed to be zero in this and all previous year rankings.

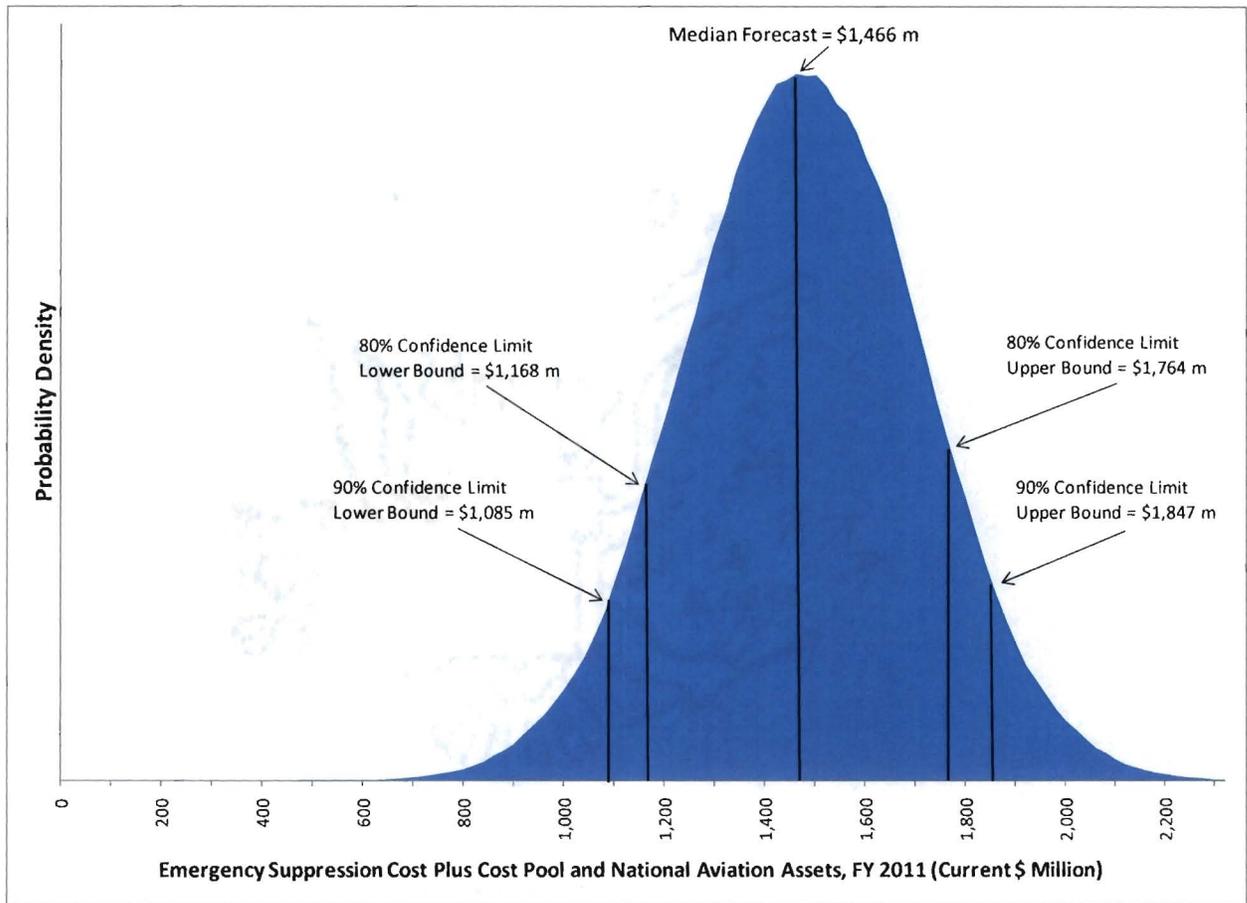


Figure 1. USDA Forest Service emergency suppression cost forecast probability density, FY 2011, March FLAME Act Current Year Forecast Model. Note: FY 2011 WFSU Cost Pool and National Aviation Assets as a fixed charge of \$402 million are included in this probability density display.

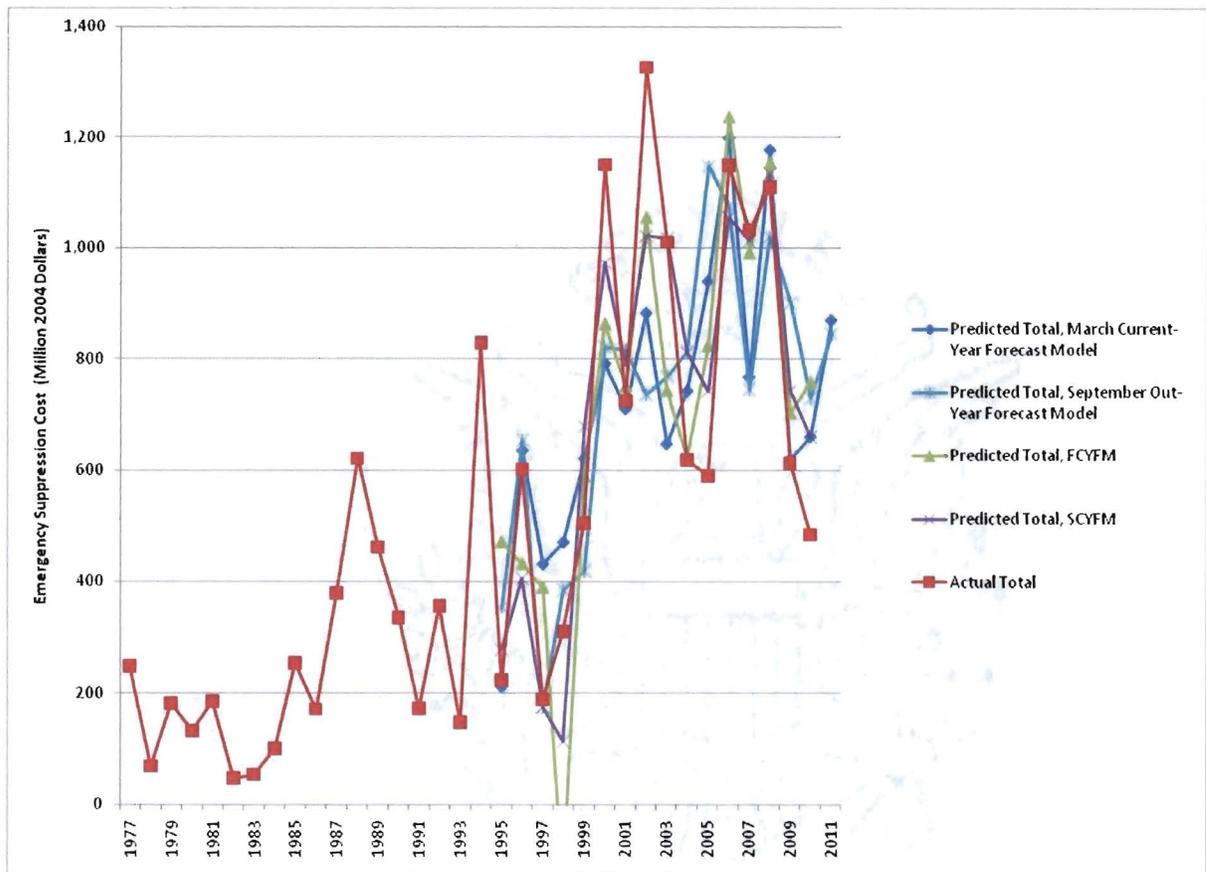


Figure 2. Cross-validated forecasts of agency-wide total USDA Forest Service emergency suppression costs, 1995-2011, and actual spending, 1977-2010, comparing the March Current Year Forecast Model with the September Out-Year Forecast model, Fall Current Year Forecast Model (FCYFM), and the Spring Current Year Forecast Model (SCYFM). Values shown are in constant (2004) US dollars to account for inflation. All figures exclude special agency Cost Pool and aviation charges.

Appendix: Estimate of the September Out-Year Forecast Model System of Equations

Table A. Seemingly Unrelated Regression Equation Estimates, Forest Service September Out-Year Forecast Model

Dependent Variable	Independent Variables	Coefficient	Std. Error	t-Statistic	P-Value	R ²	Durbin-Watson Statistic
Region 1 + Region 4 Cost	Constant	55,870,269	31,683,893	1.76	0.08	0.49	1.65
	SOI August(t-1)	-38,069,029	14,817,434	-2.57	0.01		
	AMO October-February (t-1)	534,000,000	145,000,000	3.69	0.00		
Region 2 + Region 3 Cost	Constant	5,025,050	30,223,007	0.17	0.87	0.55	2.05
	SOI August(t-1)	-35,321,973	10,270,312	-3.44	0.00		
	Niño-3 SSTA November (t-1)	-34,490,872	11,834,042	-2.91	0.00		
	R2&R3 Average December Palmer Z-Index (t-1)	-38,033,123	14,330,269	-2.65	0.01		
Region 5 Cost	Constant	37,700,000,000	4,770,000,000	-7.91	0.00	0.87	1.67
	Year	19,061,141	2,384,207	7.99	0.00		
	Niño-3 SSTA October (t-1)	-95,159,299	11,669,253	-8.15	0.00		
	PDO October(t-1)*Niño-3 October(t-1)	37,940,546	7,861,912	4.83	0.00		
	R5 September Palmer Z-Index(t-1)	161,000,000	25,217,238	6.39	0.00		
Region 6 Cost	Constant	56,695,325	15,276,343	3.71	0.00	0.67	1.11
	R5 December Palmer H-Index(t-1)	-8,948,851	4,762,345	-1.88	0.06		
	SOI September(t-1) - SOI August(t-1)	64,290,354	12,690,332	5.07	0.00		
	Niño-3 SSTA November (t-1)	-22,851,711	7,249,684	-3.15	0.00		
Region 8 + Region 9 Cost	Constant	52,835,553	5,319,940	9.93	0.00	0.50	1.96
	R4 June Palmer H-Index(t-1)	4,192,703	1,794,970	2.34	0.02		
	R9 December Palmer H-Index(t-1)	-12,496,585	3,599,658	-3.47	0.00		
Region 10 + RFS Cost	Constant	129,000,000	17,244,761	7.47	0.00	0.56	1.52
	Region 10 + RFS Cost(t-1)	-0.411	0.136	-3.01	0.00		
	R1 Palmer H-Index June (t-1)	-21,082,837	5,500,275	-3.83	0.00		
	R2 Palmer H-Index June (t-1)	12,853,239	4,133,785	3.11	0.00		