

NPS BURN SEVERITY MAPPING REPORT FOR YEAR 2001

OVERVIEW

Operational 30-meter burn severity mapping at a national scale is unprecedented for a federal agency such as the National Park Service (NPS).¹ The NPS has established an operational cooperative project with U.S. Geological Survey Biological Resource Division (BRD) and the EROS Data Center (EDC) to produce and deliver a suite of post-fire GIS and cartographic products for NPS. This represents an implementation phase following research begun in 1995 by BRD and NPS. EROS Data Center will produce a set of standardized map products and GIS data set using primarily Landsat 7 ETM+ 30-meter resolution image data. These products will include burn severity assessments, final fire perimeter, and tabulation of areas burned per severity classes and vegetation types. EDC is also responsible for distribution and storage of this data. NPS is responsible for selecting burns to map, field validation of burn severity assessments, coordinating training in remote sensing and field validation methods, and providing funds to EDC that support burn severity mapping, distribution of results, and data archiving. Carl Key (BRD) and Nate Benson (NPS) will oversee development and implementation of the burn severity mapping program, provide quality control for map products, support analysis of field validation data, and conduct training in remote sensing and field validation methods.

Key Program Participants

NPS	BRD	EDC
Nate Benson	Carl Key	Zhiliang Zhu
Brian Sorbel		Donald Ohlen
Tim Sexton		Steve Howard
Dick Bahr		Randy McKinley
Brad Cella		
Paul Reeberg		

YEAR 2001 EXPENSES

- NPS:
 - In Fiscal Year 2001, NPS allocated \$250,000 to purchase satellite scenes and pay for production of burn severity maps of fires for year 2000 and 2001; NPS was unable to transfer the money to EDC until the end of September; therefore not much of the money was expended in FY2001. EDC was able to carry over this funding. As of November 30, 2001 EDC has spent \$10,374 on salary, travel, and purchasing Landsat scenes.

¹Burn severity is the degree of environmental change caused by fire, or the result(s) of fire. It is the cumulative effect of fire on ecological communities comprising the landscape. The GIS and cartographic products that this program produces will delineate final fire perimeter and provide more thorough information on the range of effects within the burn than any other tool federal land management agencies are currently using. It will help define lasting impacts and environmental responses from fire, to prepare for long-term management of burned areas. Because many fires cannot be closely monitored while active, post-fire evaluations will also yield insight into fire behavior across varying topography and vegetation, thus contributing basic information for research and modeling.

- Nate Benson spent approximately 20% (\$12,000) of his time developing, implementing, and coordinating NPS Burn Severity Mapping Program and conducting training on remote sensing and field validation methods.
- NPS fire effects modules were trained in ground validation methods. Some modules were able to collect ground validation data. Approximately \$50,000 was spent in labor costs to collect this data; the fire effects modules absorbed these costs.
- BRD:
 - Carl Key (BRD researcher and developer of NBR/CBI) spent 35% (\$25,000) of his time and \$5,000 in base support funds assisting NPS with the Burn Severity Mapping program.
 - Park Oriented Biological Support grant - \$16,000
 - Supported training for NPS/EDC/BRD employees.
 - Supported travel costs for Carl Key and Nate Benson to attend conferences and meetings.
 - Purchase Landsat scenes for severity mapping at Bandelier National Monument and Glacier National Park.
 - Joint Fire Science - \$12,000 (Funding Mr. Key received to support other projects; however these projects also supported the NPS Burn Severity Mapping Program)
 - Supported writing of remote sensing and field validation methods for FIREMON web site.
 - Purchased equipment to support burn severity mapping.
 - Supported travel to meetings
- EDC:
EDC through the FIREVIEW project provided approximately \$14,000 to demonstrate proof of concept to FMLB and support burn severity mapping in NPS units.

ACCOMPLISHMENTS FOR 2001
Burn Severity Assessments Completed in 2001

Assessment Type	Park Unit	Fire Year	Size (acres)	Number of Fires*	Funding Source
Initial	Yukon Charlie	1999	154076	5	NPS
Initial/Extended	Bandelier	2000	47650	1	BRD
Initial/Extended	Big South Fork	2000	7365	4	NPS
Extended	Glacier	2000	2742	2	BRD
Extended	Grand Canyon	2000	27700	2	Fireview
Extended	Grand Teton	2000	9455	4	Fireview
Extended	Jewel Cave	2000	84782	1	Fireview
Initial/Extended	Mesa Verde	2000	28504	2	NPS/Fireview
Extended	Wind Cave	2000	1136	1	NPS/Fireview
Initial/Extended	Yellowstone	2000	6257	4	NPS/Fireview
Initial	Yosemite	2001	8016	1	NPS
Initial	Glacier	2001	71000	1	BRD
Initial	Grand Canyon	2001	9242	3	NPS
Initial	Grand Teton	2001	4470	1	Fireview
Initial	Yellowstone	2001	13477	8	NPS
TOTAL	11 NPS Units		475872	40	

*Includes fires 10 acres or greater and fires adjacent to park service units.

Ground Validation Plots Installed in 2001

NPS Unit	# of Plots Installed
Bandelier	5
Big South Fork	8
Glacier	20
Grand Canyon	54
Grand Teton	60
Mesa Verde	31
Yellowstone	26
Yukon Charlie	118
TOTAL	318

Training/Presentations in 2001

- Remote Sensing and Field Validation Methods Training, Los Alamos NM, 8/28-30/01
- Remote Sensing and Field Validation Methods Training, Glacier NP MT, 9/25-27/01
- Burn Severity Presentation on Alaska, NPS GIS Conference, Primm Valley NV, 12/6/01

- Burn Severity Training, Fire GIS Workshop – Primm Valley NV, 12/10/01
- Burn Severity Presentation, RX92- NCTC Virginia, 1/25/01
- Burn Severity Presentation, National FMO Conference (Pacific West Region), 2/28/01
- Burn Severity Presentation, NPS inventory and Monitoring group, Ft. Collins, 3/9/01
- Burn Severity Presentation, NPS Fire Ecology Steering Committee, Tallahassee, 5/2/01
- Remote Sensing Training, Yellowstone National Park WY, 9/19/01
- Remote Sensing Training, Sioux Falls SD, 8/7-9/01

Support Products Created in 2001

- Draft of overview and remote sensing and field validation methods are available on the FIREMON web site: <http://fire.org/firemon/>.
- Developed Access database to store ground validation data. Also available on FIREMON web site.
- Initiated web site development to archive burn severity mapping data.

Prioritization of Year 2000 Fires for Burn Severity Mapping

Fires are prioritized for mapping based on size, vegetation type, and significance of a fire (ecological, social, and/or political reasons). Prioritization can change based on local, regional, and/or national need. In most cases, low priority fires will not be completed unless they are part of satellite scene that contains a high or medium ranked fire. Ancillary fires are fires greater than 10 acres and less than 100 acres. Parks had to have at least one low priority fire to be ranked.

ALASKA 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Denali	Sum of Acres	43578				43578
	Number of Fires	4				4

NORTHEAST REGION 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Shenandoah	Sum of Acres	24222				24222
	Number of Fires	1				1

MIDWEST REGION 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Jewel Cave	Sum of Acres	84782				84782
	Number of Fires	1				1
Theodore Roosevelt	Sum of Acres		278			278
	Number of Fires		1			1
Wind Cave	Sum of Acres	1136				1136
	Number of Fires	1				1
Total Acres		85918	278			86196
Total Number of Fires		2	1			3

SOUTHEAST REGION 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Big South Fork	Sum of Acres	7365				7365
	Number of Fires	4				4
Everglades	Sum of Acres	9403	644	541	48	10636
	Number of Fires	9	2	3	1	15
Total Acres		16768	644	541	48	18001
Total Number of Fires		13	2	3	1	19

PACIFIC NORTHWEST REGION 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
City of Rocks	Sum of Acres	10586.6				10586.6
	Number of Fires	1				1
Craters of the Moon	Sum of Acres		585	180		765
	Number of Fires		1	1		2
Death Valley	Sum of Acres	5861				5861
	Number of Fires	1				1
Great Basin	Sum of Acres	2500			30	2530
	Number of Fires	1			1	2
Hawaii Volcanoes	Sum of Acres	1000				1000
	Number of Fires	1				1
Total Acres		19947.6	585	180	30	20742.6
Total Number of Fires		4	1	1	1	7

INTERMOUNTAIN REGION 2000 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Bandelier	Sum of Acres	47650				47650
	Number of Fires	1				1
Big Thicket	Sum of Acres			448		448
	Number of Fires			3		3
Bryce Canyon	Sum of Acres			500		500
	Number of Fires			2		2
Dinosaur	Sum of Acres	11055				11055
	Number of Fires	1				1
Glacier	Sum of Acres	2386	356			2742
	Number of Fires	1	1			2
Grand Canyon	Sum of Acres	13000				13000
	Number of Fires	1				1
Great Sand Dunes	Sum of Acres	2403				2403
	Number of Fires	1				1
Great Teton	Sum of Acres	16055				16055
	Number of Fires	5				5
Lake Meridith	Sum of Acres		1480	240		1720
	Number of Fires		3	2		5
Mesa Verde		1890				1890
		2				2
Pecos	Sum of Acres	130				130
	Number of Fires	1				1
Yellowstone	Sum of Acres	6257				6257
	Number of Fires	4				4
Total Acres		100826	1836	1188		103850
Total Number of Fires		18	4	7		28

OUTLOOK FOR 2002

Goals

- Complete extended assessment of all high priority fires for year 2000 and 2001
- Provide initial assessments of 2002 fires as requested.
- Ground validate more than 25% of 2000 and 2001 high priority fires
- Initiate burn severity atlases in three parks.
- Provide two training sessions on remote sensing and ground validation methods.
- Have burn severity web site operational by July of 2002.
- Have version 1 of remote sensing and field validation methods on FIREMON web site by April 2002.

Funding

FIREPRO has allocated money this year to complete extended assessments of 2001 fires, perform initial assessments of 2002 fires (as requested), develop fire atlases in parks, and develop a web site to enable greater access to burn severity data. FIREPRO has also provided funding to support burn severity field validation/ remote sensing training, and funds to support costs associated with field validation.

Prioritization of Year 2001 Fires for Burn Severity Mapping

Fires are prioritized for mapping based on size, vegetation type, and significance of a fire (ecological, social, and/or political reasons). Prioritization can change based on local, regional, and/or national need. In most cases, low priority fires will not be completed unless they are part of satellite scene that contains a high or medium ranked fire. Ancillary fires are fires greater than 10 acres and less than 100 acres. Parks had to have at least one low priority fire to be ranked.

INTERMOUNTAIN REGION 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Amistad	Sum of Acres			100	80	180
	Number of Fires			1	1	2
Bandelier	Sum of Acres	6100				6100
	Number of Fires	1				1
Big Thicket	Sum of Acres	1060	575		107	1742
	Number of Fires	1	1		2	4
Bryce Canyon	Sum of Acres	1191		170	25	1386
	Number of Fires	1		1	1	3
Dinosaur	Sum of Acres	2192	1180	395	295.5	4062.5
	Number of Fires	1	3	2	10	16
Glacier	Sum of Acres	71000				71000
	Number of Fires	1				1
Grand Canyon	Sum of Acres	3900	902	250		5052
	Number of Fires	2	1	1		4
Grand Teton	Sum of Acres	8507	800	231	266	9804
	Number of Fires	2	2	2	10	16
Lake Meredith	Sum of Acres		1622	407	20	2049
	Number of Fires		3	2	2	7
Yellowstone	Sum of Acres	6600	1150	240	10	8000
	Number of Fires	2	2	2	1	7
Zion	Sum of Acres		595			595
	Number of Fires		1			1
Total Acres		100,550	6,824	1,793	804	109,971
Total Number of Fires		11	13	11	27	62

ALASKA 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Denali	Sum of Acres	4704				4704
	Number of Fires	1				1

MIDWEST REGION 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Badlands	Sum of Acres	3572	303.8			3875.8
	Number of Fires	1	1			2
Buffalo River	Sum of Acres	1470	937		90	2497.4
	Number of Fires	1	1		2	4
Devils Tower	Sum of Acres		320			320
	Number of Fires		1			1
Indiana Dunes	Sum of Acres			388	254	642
	Number of Fires			2	6	8
Ozark	Sum of Acres		601.9	250		851.9
	Number of Fires		1	2		3
Tallgrass Prairies	Sum of Acres		9173		64	9237.4
	Number of Fires		2		1	3
Wilson's Creek	Sum of Acres			200.9		200.9
	Number of Fires			1		1
Wind Cave	Sum of Acres	1848			15	1863
	Number of Fires	1			1	2
Total Acres		6890	11336	839	424	19,488
Total Number of Fires		3	6	5	10	24

SOUTHEAST REGION 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Big Cypress	Sum of Acres	62665	1511	729.8	357.9	65263.7
	Number of Fires	8	3	4	9	24
Everglades	Sum of Acres	39777	6011	1124	291	47203
	Number of Fires	11	10	6	10	37
Great Smoky Mt	Sum of Acres	8500	1331.6	671.4	55	10558
	Number of Fires	2	2	3	2	9
Gulf Islands	Sum of Acres			108		108
	Number of Fires			1		1
Little River	Sum of Acres			274	44	318
	Number of Fires			1	1	2
Obed	Sum of Acres			200		200
	Number of Fires			1		1
Total Acres		110942	8853.6	3107.2	747.9	123650.7
Total Number of Fires		21	15	16	22	74

NORTHEAST REGION 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
New River	Sum of Acres		547		59.9	606.9
	Number of Fires		1		2	3
Shenandoah	Sum of Acres			130.5		130.5
	Number of Fires			1		1
Total Acres			547	131	60	737
Total Number of Fires			1	1	2	4

PACIFIC NORTHWEST REGION 2001 FIRES

NPS Unit		High	Medium	Low	Ancillary	Total
Crater Lake	Sum of Acres				143	143
	Number of Fires				2	2
John Day	Sum of Acres	1300				1300
	Number of Fires	1				1
Joshua Tree	Sum of Acres			373		373
	Number of Fires			3		3
Lake Meade	Sum of Acres		618	100	30	748
	Number of Fires		1	1	2	4
Mojave	Sum of Acres			120	10	130
	Number of Fires			1	1	2
North Cascades	Sum of Acres	56445			30	56475
	Number of Fires	2			1	3
Point Reyes	Sum of Acres		339		10.3	349.3
	Number of Fires		1		1	2
Redwood	Sum of Acres		330	258	211.5	799.5
	Number of Fires		1	1	3	5
Sequoia Kings	Sum of Acres	4152	508		120	4780
	Number of Fires	1	1		2	4
Whiskeytown	Sum of Acres	1800	650		17	2467
	Number of Fires	1	1		1	3
Yosemite	Sum of Acres	8016			71	8087
	Number of Fires	1			3	4
Total Acres		71713	2445	851	642.8	75652
Total Number of Fires		6	5	6	16	33

Other Fires To Map in 2002

NPS Unit	Fire Name	Fire Year	Size (Acres)
Noatak	Uvgoon2	1999	88345
Everglades	All fires	1999	29107
Saguaro	Box Canyon	1999	6477