

# COMPOSITE BURN INDEX (CBI) PHOTO SERIES

## Conifer Forest Examples

Scott Lang, NPS Glacier; Carl Key, USGS Northern Rocky Mountain Science Center; Nate Benson, NPS Fire Management Program Center. 2007.



The CBI PHOTO SERIES shows burn conditions taken from field plots along a gradient of fire impact. Representative plots were selected where photos and data illustrated composite site-effects at intervals of severity. Examples offer a means to calibrate field interpretations, and display the variety of stratum responses contributing to overall ratings. One can also see the difficulty in applying burn severity categories or labels. This poster covers three Northwest Montana fires from 2003 that were field sampled in 2004 by National Park Service and USGS crews.

The CBI is a field rating (0.0 to 3.0) of burn conditions averaged over a site. It is based on averaging 4-5 rating factors within Understory (A. - C.), Overstory (D. - E.), and over all strata (A. - E.) to rate the Total Plot.

Wedge Canyon Fire  
Post-fire Photo Very Low Severity



Patchy burn with 21% understory charring throughout plot. 15% consumption of downed fuels. Regenerated grasses/forbs dominate understory 98%, with some small pockets of colonizers 2%. Shrubs and low trees show 5% mortality. Overstory trees show 3% scorching, and tree ground char remains < 1.8 m. Overstory tree mortality is < 2%. Pinegrass/fireweed understory. Overstory of mixed conifer Douglas fir, spruce, and lodgepole subcanopy, with larch upper canopy.

**PLOT 1042**

A. Substrates	0.56
B. Herbs and Shrubs	0.40
C. Tall Shrubs and Trees	0.45
D. Intermediate Trees	0.32
E. Big Trees	0.08
Understory CBI	0.48
Overstory CBI	0.18
Total Plot CBI	0.36

Robert Fire  
Post-fire Photo Low Severity



Patchy burn with 39% charring of understory throughout plot. 17% consumption of downed fuels. Regenerated grasses/forbs dominate understory 92%, with some small pockets of colonizers 8%. Shrubs and low trees show 55% mortality. Overstory shows 15% scorching, and tree ground char remains < 1.8 m. Overstory tree mortality is 12%. Pinegrass/fireweed understory. Overstory of birch subcanopy and lodgepole upper canopy.

**PLOT 9009**

A. Substrates	1.10
B. Herbs and Shrubs	0.53
C. Tall Shrubs and Trees	2.10
D. Intermediate Trees	0.60
E. Big Trees	0.66
Understory CBI	1.23
Overstory CBI	0.63
Total Plot CBI	0.95

Robert Fire  
Post-fire Photo Moderate Severity



Consistent 55% charring of understory throughout plot. 14% consumption of downed fuels. Mix of colonizers 75%, and regenerated grasses/forbs 25% in understory. Shrubs and low trees show 23% mortality. Overstory has 45% scorch, some torching 10%, and tree ground char remains < 4.0 m. Tree subcanopy mortality is 90%. Overstory tree mortality is 20%. Fine branching, and a few green crowns remain. Fireweed, foamflower, and pathfinder understory. Overstory of open mixed conifer larch, spruce, and subalpine fir.

**PLOT 1029**

A. Substrates	0.80
B. Herbs and Shrubs	2.30
C. Tall Shrubs and Trees	1.92
D. Intermediate Trees	2.32
E. Big Trees	1.06
Understory CBI	1.58
Overstory CBI	1.69
Total Plot CBI	1.63

Wedge Canyon Fire  
Post-fire Photo Moderate- High Severity



Consistent 95% charring of understory throughout plot. 18% consumption of downed fuels. Colonizers dominate understory 80%, with some regenerated grasses/forbs 20%. Shrubs and low trees show 90% mortality. Overstory has 80% scorch, some torching 10%, and tree ground char remains < 4.0 m. 100% mortality of overstory trees, with some branch consumption. Fireweed, Spiraea and seral lodgepole understory. Overstory of dead even aged lodgepole.

**PLOT 2296**

A. Substrates	1.24
B. Herbs and Shrubs	2.15
C. Tall Shrubs and Trees	2.50
D. Intermediate Trees	2.04
E. Big Trees	2.04
Understory CBI	1.91
Overstory CBI	2.04
Total Plot CBI	1.97

Robert Fire  
Post-fire Photo Very High Severity



Consistent 98% charring of understory throughout plot. 35% consumption of downed fuels. Colonizers in low density dominate the understory 10%. Very little regeneration of pre-fire plants 2%. Shrubs and small trees show 100% mortality. Overstory shows 100% torching of trees. No green crowns remain. High branch consumption. Low density fireweed, willow, alder, and fire moss understory. Intermediate dead lodgepole overstory.

**PLOT 1017**

A. Substrates	2.10
B. Herbs and Shrubs	2.83
C. Tall Shrubs and Trees	2.95
D. Intermediate Trees	3.00
E. Big Trees	3.00
Understory CBI	2.58
Overstory CBI	3.00
Total Plot CBI	2.74

Trapper Fire  
Post-fire Photo Low Severity



Patchy burn with 38% understory charring throughout plot. 13% consumption of downed fuels. Regenerated grasses/forbs dominate understory 88%, with some small pockets of colonizers 8%. Sapling conifers show 12% mortality. Overstory shows 10% scorch, and tree ground char remains < 1.5 m. Overstory tree mortality is 18%. Understory of thimbleberry with small pockets of fireweed. Mixed conifer overstory of spruce, Douglas fir, lodgepole, and larch.

**PLOT 1138**

A. Substrates	0.76
B. Herbs and Shrubs	0.88
C. Tall Shrubs and Trees	1.15
D. Intermediate Trees	0.78
E. Big Trees	N/A
Understory CBI	0.92
Overstory CBI	0.78
Total Plot CBI	0.88

Wedge Fire  
Post-fire Photo Low Severity



Patchy burn with 36% charring of understory throughout plot. 12% consumption of downed fuels. Regenerated grasses/forbs dominate understory 90%, with some small pockets of colonizers 10%. Sapling conifers show 60% mortality. Overstory shows 31% scorch, and tree ground char remains < 1.8 m. Overstory tree mortality is 20%. Understory of pinegrass, with small pockets of fireweed. Overstory of moderately open Douglas fir and larch.

**PLOT 1157**

A. Substrates	0.76
B. Herbs and Shrubs	1.03
C. Tall Shrubs and Trees	1.73
D. Intermediate Trees	1.26
E. Big Trees	0.24
Understory CBI	1.14
Overstory CBI	0.75
Total Plot CBI	0.97

Robert Fire  
Post-fire Photo Moderate Severity



Consistent 58% charring of understory throughout plot. 15% consumption of downed fuels. Mix of regenerated grasses/forbs 60%, and colonizers 40% in understory. Shrubs and small trees show 60% mortality. Overstory shows 75% scorch, some torching 3%, and tree ground char remains < 4.0 m. Overstory tree mortality is 65%. Some green crowns remain. Understory of Spiraea, pinegrass and fireweed. Overstory subcanopy of spruce and lodgepole, with open upper canopy of larch and spruce.

**PLOT 2075**

A. Substrates	0.92
B. Herbs and Shrubs	1.90
C. Tall Shrubs and Trees	1.63
D. Intermediate Trees	1.84
E. Big Trees	1.64
Understory CBI	1.43
Overstory CBI	1.74
Total Plot CBI	1.57

Robert Fire  
Post-fire Photo High Severity



Consistent 65% charring of understory throughout plot. 34% consumption of downed fuels, with much newly exposed soil. Colonizers dominate understory 88%. Shrubs and small trees show 85% mortality. Overstory shows 80% scorch, some torching 3%, and tree ground char remains < 7.0 m. Overstory tree mortality is 98%; some branch consumption and isolated green crowns remain. Understory of dense fireweed with some fire moss. Overstory of mostly dead mixed conifer Douglas fir, larch, and spruce.

**PLOT 3148**

A. Substrates	2.12
B. Herbs and Shrubs	2.40
C. Tall Shrubs and Trees	2.50
D. Intermediate Trees	0.00
E. Big Trees	2.38
Understory CBI	2.32
Overstory CBI	2.38
Total Plot CBI	2.33

Robert Fire  
Post-fire Photo Very High Severity



Consistent burn with 98% charring of understory throughout plot. 42% consumption of downed fuels, and much exposed soil. Colonizers in low density dominate the understory 15%. Very little regeneration of pre-fire plants 2%. Shrubs and small trees show 99% mortality. Overstory shows 98% torching, and high branch consumption in crowns. No green crowns remain. Understory of low density fireweed, fire moss, and seral lodgepole. Overstory of dead spruce and lodgepole.

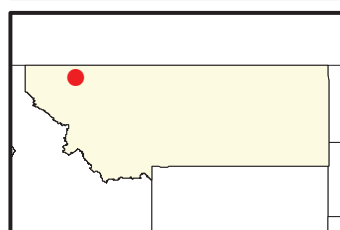
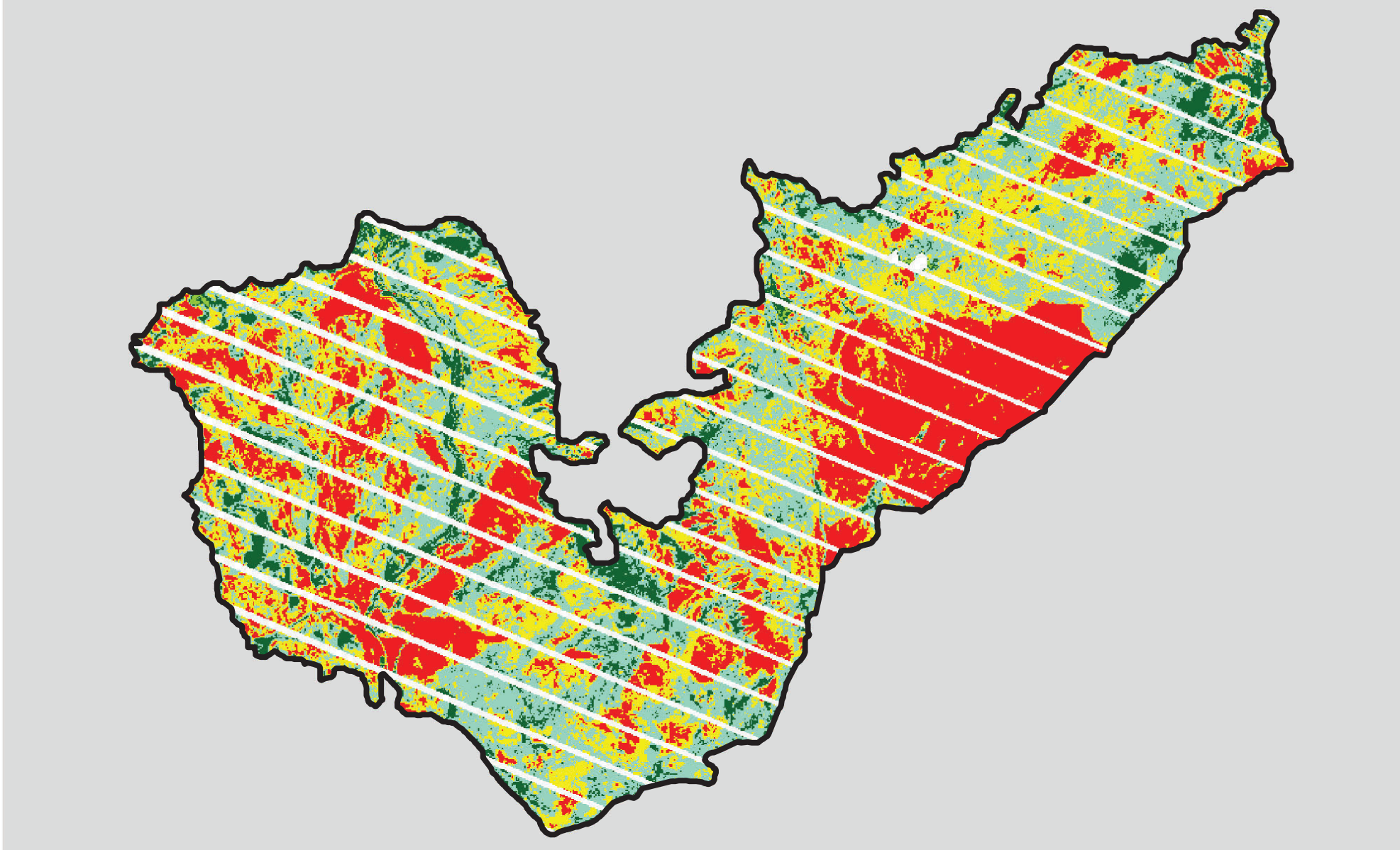
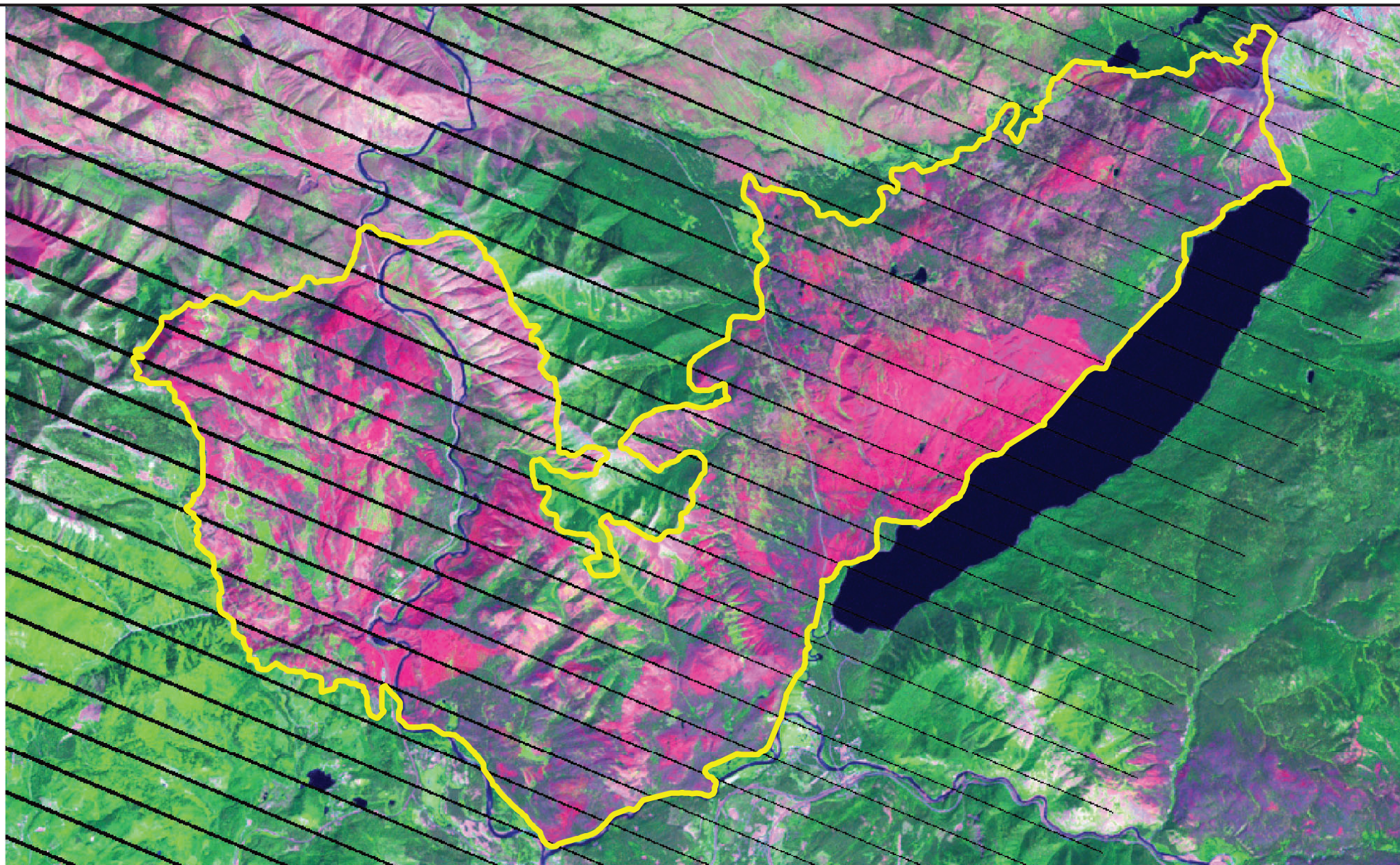
**PLOT 1012**

A. Substrates	2.62
B. Herbs and Shrubs	2.70
C. Tall Shrubs and Trees	2.85
D. Intermediate Trees	2.95
E. Big Trees	2.85
Understory CBI	2.72
Overstory CBI	2.90
Total Plot CBI	2.79



# 2003 Montana: ROBERT

mt4856111405520030723



Latitude: 48° 33' 39.6"  
 Longitude: -114° 03' 18.0"  
 Fire Ignition Date: July 23, 2003  
 Assessment Type: Extended  
 Pre-Fire Image Date: July 10, 2002 (Landsat 7)  
 Post-Fire Image Date: July 15, 2004 (Landsat 7)



This map portrays fire severity for the fire specified in the map title and summarizes proportions of fire severity classes. These data are produced under the Monitoring Trends in Burn Severity (MTBS) project jointly implemented by the USGS EROS and the USFS RSAC. The MTBS project ascertains the locations of fires based on available fire occurrence information provided by federal and state agencies, and other reliable sources. The MTBS project reserves the right to correct, update or modify geospatial inputs to this map without notification.

\* Areas in either the pre-fire or post-fire reflectance imagery containing clouds, snow, shadows, smoke, significantly sized water bodies, missing lines of image data, etc.



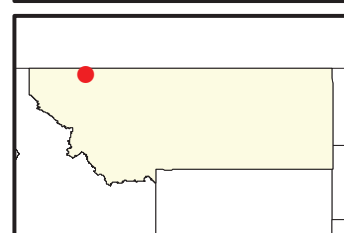
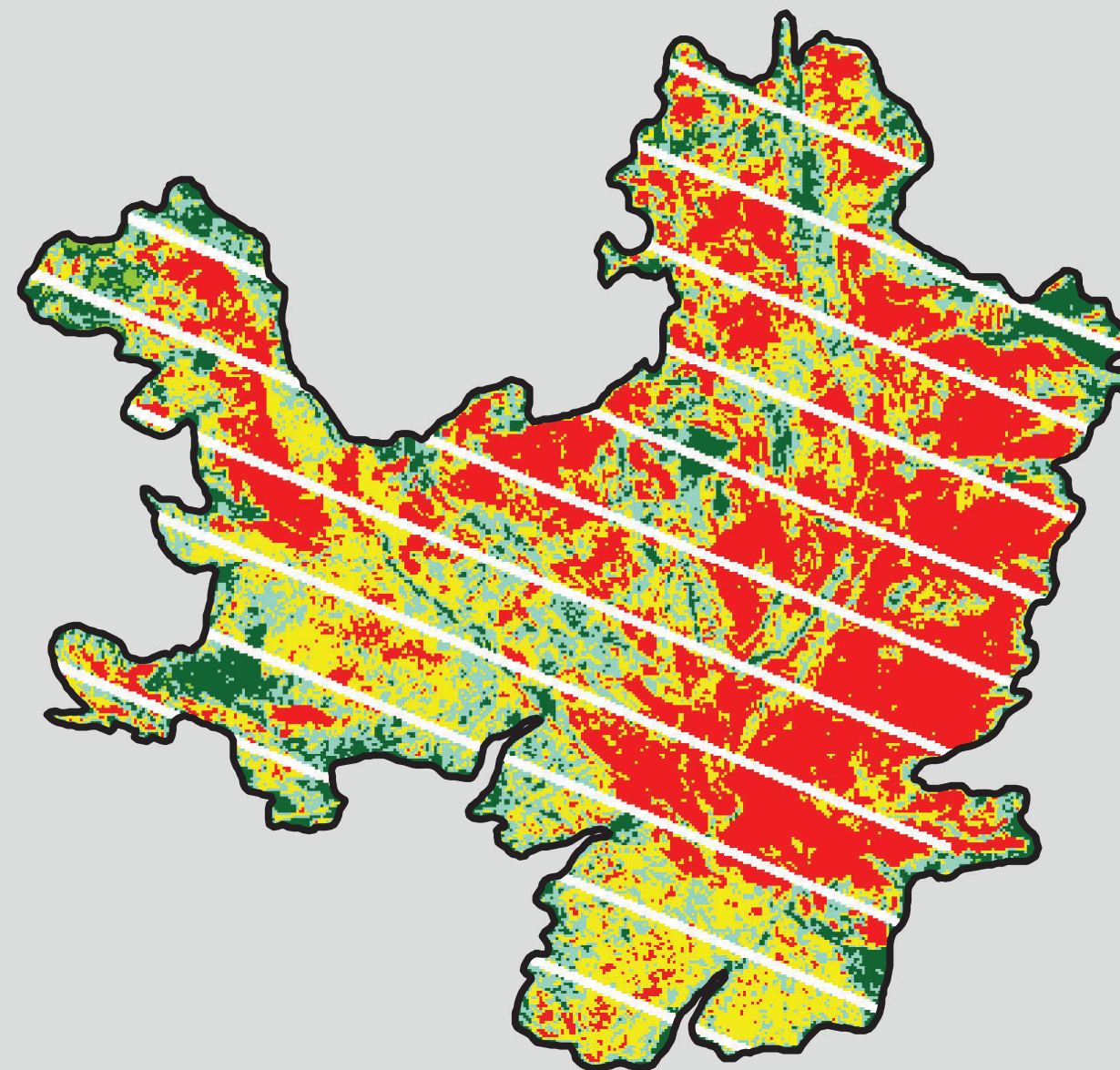
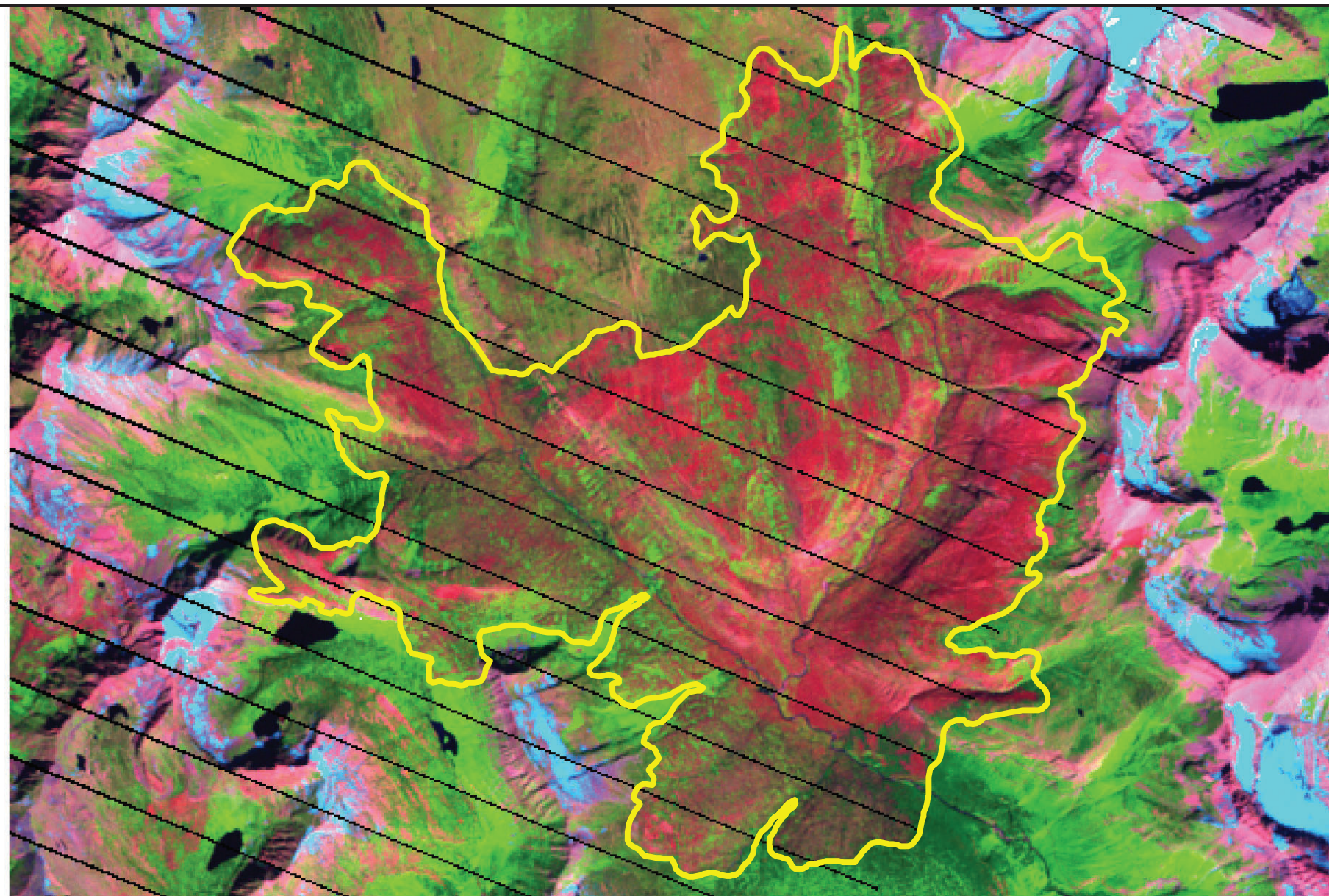
## Acreage of Burn Severity

Burn Severity	Acres
Unburned to Low	4,839
Low	15,532
Moderate	14,379
High	12,071
Increased Greenness	123
Non-Processing Area Mask*	7,549
<b>Total</b>	<b>54,493</b>



# 2003 Montana: TRAPPER CREEK FIRE (TRAPPER CREEK)

mt4878011384220030718



Latitude: 48° 46' 48.0"  
 Longitude: -113° 50' 31.2"  
 Fire Ignition Date: July 18, 2003  
 Assessment Type: Extended  
 Pre-Fire Image Date: July 20, 2000 (Landsat 7)  
 Post-Fire Image Date: July 15, 2004 (Landsat 7)



This map portrays fire severity for the fire specified in the map title and summarizes proportions of fire severity classes. These data are produced under the Monitoring Trends in Burn Severity (MTBS) project jointly implemented by the USGS EROS and the USFS RSAC. The MTBS project ascertains the locations of fires based on available fire occurrence information provided by federal and state agencies, and other reliable sources. The MTBS project reserves the right to correct, update or modify geospatial inputs to this map without notification.

\* Areas in either the pre-fire or post-fire reflectance imagery containing clouds, snow, shadows, smoke, significantly sized water bodies, missing lines of image data, etc.



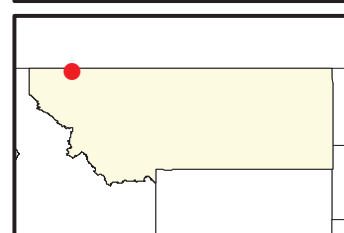
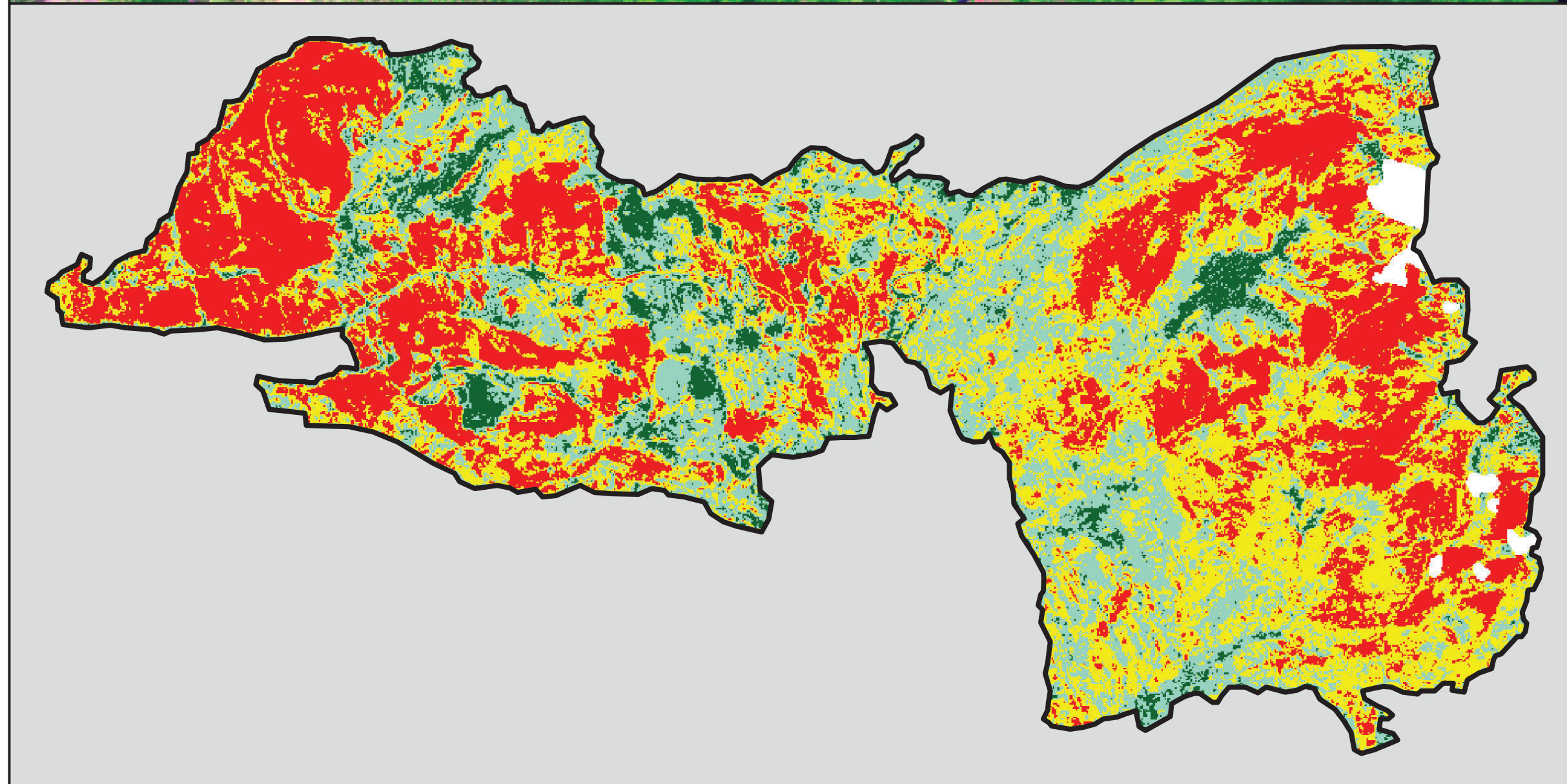
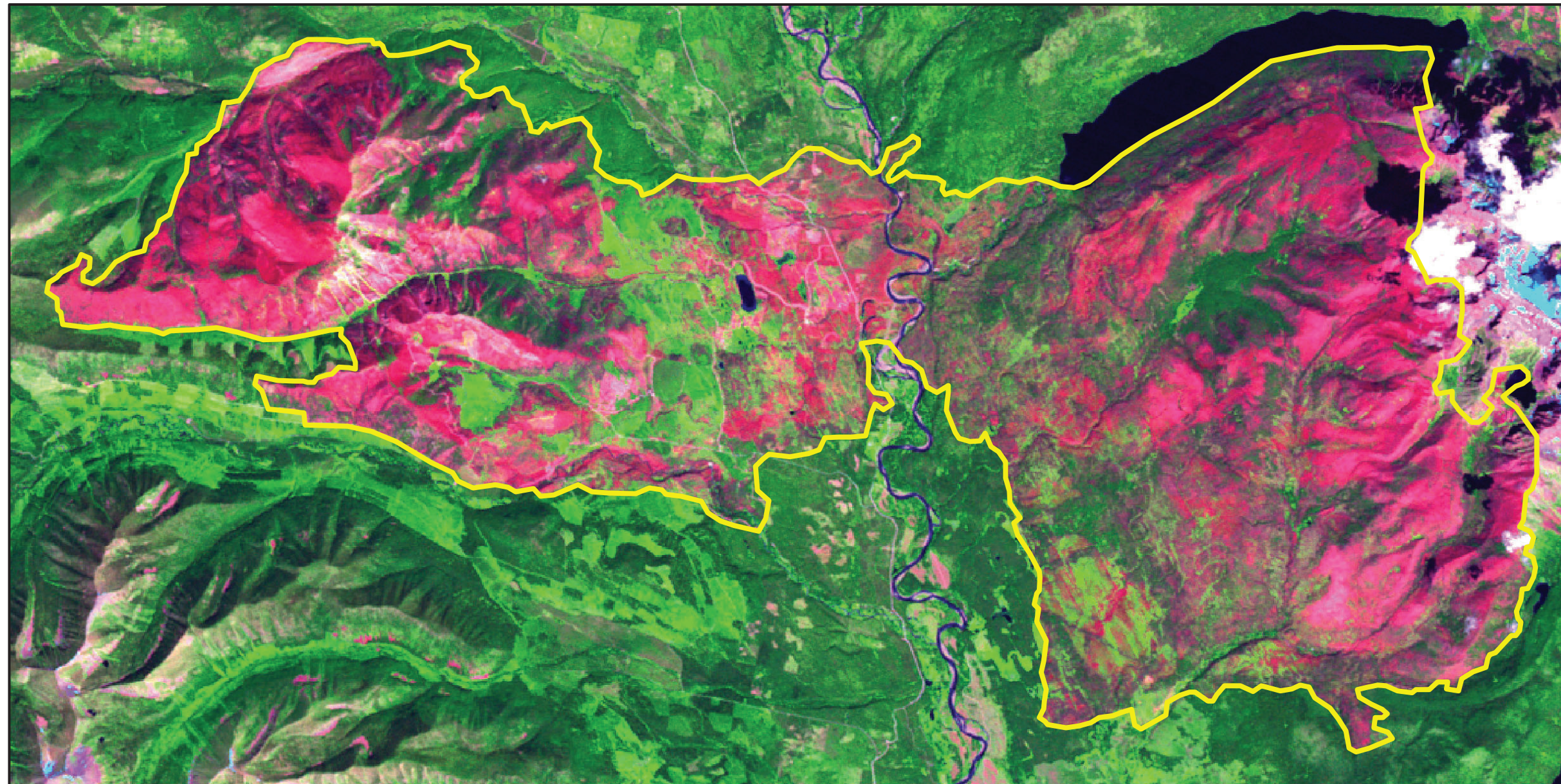
## Acreage of Burn Severity

Burn Severity	Acres
Unburned to Low	1,975
Low	3,056
Moderate	5,003
High	5,894
Increased Greenness	65
Non-Processing Area Mask*	2,030
<b>Total</b>	<b>18,023</b>



# 2003 Montana: WEDGE CANYON

mt4890111437420030718



Latitude: 48° 54' 03.6"  
 Longitude: -114° 22' 26.4"  
 Fire Ignition Date: July 18, 2003  
 Assessment Type: Extended  
 Pre-Fire Image Date: July 17, 2002 (Landsat 7)  
 Post-Fire Image Date: July 14, 2004 (Landsat 5)



This map portrays fire severity for the fire specified in the map title and summarizes proportions of fire severity classes. These data are produced under the Monitoring Trends in Burn Severity (MTBS) project jointly implemented by the USGS EROS and the USFS RSAC. The MTBS project ascertains the locations of fires based on available fire occurrence information provided by federal and state agencies, and other reliable sources. The MTBS project reserves the right to correct, update or modify geospatial inputs to this map without notification.

\* Areas in either the pre-fire or post-fire reflectance imagery containing clouds, snow, shadows, smoke, significantly sized water bodies, missing lines of image data, etc.



## Acreage of Burn Severity

Burn Severity	Acres
Unburned to Low	3,299
Low	13,249
Moderate	18,577
High	16,279
Increased Greenness	22
Non-Processing Area Mask*	570
<b>Total</b>	<b>51,995</b>