

Identification\_Information:

Citation:

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Originator: U.S. Geological Survey, Glacier Field Station

Publication\_Date: 20070906

Title: Red Eagle Fire of Glacier National Park - 2006

Geospatial\_Data\_Presentation\_Form:

Raster digital data as GeoTIFFs or ArcInfo GRIDS.

Vector data are also available as ArcView Shape Files.

Publication\_Information:

Publication\_Place: Glacier National Park, West Glacier, MT USA

Publisher: U.S. Geological Survey

Online\_Linkage: <http://edc.usgs.gov>

Description:

Abstract:

The U.S. Geological Survey (USGS) has entered into a cooperative agreement with the National Park Service (NPS) to deliver satellite imagery and derivative products centered on major fires that impact national parks and other federal lands. This data set was compiled at the request of a federal land management agency and is part of a suite of products generated for a specific fire.

See the National Burn Severity Mapping web site at:

<http://burnseverity.cr.usgs.gov/>

Purpose:

The purpose of this project is to develop a robust mapping methodology and consistent data products that allow federal land managers and fire ecologists to evaluate and compare burn severity within individual fires and between fires across various ecosystems. These products will help land managers to more effectively plan, implement and monitor fire recovery activities.

Supplemental\_Information:

Fire Name: Red Eagle

Agency: National Park Service

Land Management Unit: Glacier National Park

Date of Fire: 7/28/2006

Type of assessment: Extended

Acres within Fire Perimeter: 33,000

Landsat Path and Row: 41/26

Pre-Fire Landsat Date/Scene ID:

Landsat 5; Jul. 21, 2003 /LT5041026000320210 (primary scene)

Landsat 5; Aug. 27, 2005 /LT5041026000523910 (2nd scene, cloud fill in above)

Post-Fire Landsat Date/Scene ID:

Landsat 5; Aug. 01, 2007 /LT5041026000721310 (primary scene)

Landsat 5; Jul. 16, 2007 /LT5041026000719710 (2nd scene, cloud fill in above)

Landsat 5; Aug. 17, 2007 /LT5041026000722910 (3rd scene, cloud fill in above)

Output Dataset Projection: Albers Conical Equal Area

1st Standard Parallel: 29 30 00 N

2nd Standard Parallel: 45 30 00 N

Longitude of Central Meridian: 96 00 00 W

Latitude of Origin: 23 00 00 N

False Northing: 0.000

False Easting: 0.000

Datum Name: NAD83

Spheroid Name: GRS 1980

Image subset Corner Coordinate

(center of upper left pixel, projection meters)

ULX: -1306740.0 LRX: -1265700.0

ULY: 2984160.0 LRY: 2956140.0

Image subset size:

#Rows: 935

#Columns: 1369

Pixel size: 30 meters

Bounding Box:

North Lat: 48 43 37 N

South Lat: 48 37 38 N

East Long: 113 16 25 W

West Long: 113 38 01 W

Latitude and Longitude within Fire Perimeter:

Lat: 48 41 39 N

Long: 113 25 60 W

Fire Perimeter: Digitized on screen from dNBR and False-Color Landsat data.

For further information on NLAPS and Landsat TM data, please refer to the metadata documentation found on the USGS Clearinghouse website at: <http://www.fgdc.gov/clearinghouse/clearinghouse.html>

Product List:

LT5041026000320210\_refl\_sub.tif

Pre-Fire Landsat reflectance data subset (bands 1-5,7 GeoTIFF format)

LT5041026000523910\_refl\_sub.tif

Pre-Fire Landsat reflectance data subset (bands 1-5,7 GeoTIFF format)

LT5041026000721310\_refl\_sub.tif

Post-Fire Landsat reflectance data subset (bands 1-5,7 GeoTIFF format)

LT5041026000719710\_refl\_sub.tif

Post-Fire Landsat reflectance data subset (bands 1-5,7 GeoTIFF format)

LT5041026000722910\_refl\_sub.tif

Post-Fire Landsat reflectance data subset (bands 1-5,7 GeoTIFF format)

d0320207213 (d=dNBR, 0320207213 = YYDDYYDD (2003 July 21 2007 Aug 1 (DDD=Julian Day))

Primary Differenced Normalized Burn Ratio (dNBR) subset (Signed 16 bit ArcInfo GRID format)

d0523907213

2nd Differenced Normalized Burn Ratio (dNBR) subset (Signed 16 bit ArcInfo GRID format)

d0523907197

3rd Differenced Normalized Burn Ratio (dNBR) (Signed 16 bit ArcInfo GRID format)

d0523907229

4th Differenced Normalized Burn Ratio (dNBR) (Signed 16 bit ArcInfo GRID format)

reea06b\_dnbr Composite dNBR(see Process Step, below)(Signed 16 bit ArcInfo GRID format)

Final mosaic dNBR, d0320207213 with clouds filled by d0523907213, d0523907197 and d0523907229

reea06b\_6class.tif

DNBR mosaic classified into 6 levels, including enhanced and unburned (see Process Step, below)

reea06b\_pi.shp

Fire Perimeter (shape file) includes cloud masks:

clouds\_03202.shp

Cloud polygons digitized from False-Color Landsat LT5041026000320210\_refl\_sub

clouds\_07197.shp

Cloud polygons digitized from False-Color Landsat LT5041026000719710\_refl\_sub

clouds\_07213.shp

Cloud polygons digitized from False-Color Landsat LT5041026000721310\_refl\_sub

Time\_Period\_of\_Content:

Time\_Period\_Information:

Multiple\_Dates/Times:

Single\_Date/Time:

Calendar\_Date: 7/21/2003 (pre-fire image)

Single\_Date/Time:

Calendar\_Date: 7/28/2006 (date fire began)

Single\_Date/Time:

Calendar\_Date: 8/01/2007 (primary post-fire image)

Currentness\_Reference: ground condition

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: as needed

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: -113.38.01

East\_Bounding\_Coordinate: -113.16.25

North\_Bounding\_Coordinate: 48.43.37

South\_Bounding\_Coordinate: 48.37.38

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: none

Theme\_Keyword: burn mapping

Theme\_Keyword: imagery

Theme\_Keyword: fire

Theme\_Keyword: Landsat

Theme\_Keyword: National Park Service

Place:

Place\_Keyword\_Thesaurus: none

Place\_Keyword: Glacier National Park

Place\_Keyword: Red Eagle

Place\_Keyword: Montana

Access\_Constraints: FTP data sets are available to any user.

Use\_Constraints: There are no restrictions on use, except for reasonable and proper acknowledgement of information sources, and research publication prior to publication by principal author.

Point\_of\_Contact:

Contact\_Information:

+001 406-888-7991

Contact\_Organization\_Primary:

Contact\_Organization: U.S. Geological Survey, Northern Rocky Mountain Science Center

Contact\_Position: Geographer

Contact\_Voice\_Telephone: +001 406-888-7991

Contact\_Address:

Address\_Type: physical and mailing address

Address: USGS, Northern Rocky Mountain Science Center, c/o Glacier National Park

City: West Glacier

State\_or\_Province: MT

Postal\_Code: 59936

Country: USA

Contact\_TDD/TTY\_Telephone:

Contact\_Voice\_Telephone: +001 406-888-7991

Contact\_Facsimile\_Telephone:

Contact\_Electronic\_Mail\_Address: carl\_key@usgs.gov

Hours\_of\_Service: 0800 - 1600 CT, M-F, -7 h GMT

Contact\_Instructions: [http://edc2.usgs.gov/fsp/severity/contact\\_us.asp](http://edc2.usgs.gov/fsp/severity/contact_us.asp)

Data\_Set\_Credit: USGS and NASA

Native\_Data\_Set\_Environment: Oracle, ERDAS Imagine, & ArcInfo

Data\_Quality\_Information:

Attribute\_Accuracy:

Attribute\_Accuracy\_Report:

Three on-board calibrators (two solar, one internal) provide an absolute accuracy of 5 percent, excluding band 6.

Logical\_Consistency\_Report:

These Landsat data are collected from a nominal altitude of 705 kilometers in a near-polar, near-circular, sun-synchronous orbit at an inclination of 98.2 degrees, imaging the same 183-km swath of Earth's surface every 16 days. The pixels representing the bands for the image are in the data set only once.

Completeness\_Report: Fire perimeter was digitized manually on screen, with 30-meter weed and grain tolerances.

Positional\_Accuracy:

Horizontal\_Positional\_Accuracy:

Horizontal\_Positional\_Accuracy\_Report:

Energy reflected from Earth's surface passes through a whisk-broom scanning system and all-reflective optics before being collected by the solid-state detectors at the focal plane.

Lineage:

Process\_Step:

Process\_Description:

These data products are derived from Landsat Thematic Mapper data. A pre-fire scene and a post-fire scene are analyzed to create a Differenced Normalized Burn Ratio (DNBR) image. The DNBR image portrays the variations of burn severity within the fire.

The Landsat images are terrain corrected and geometrically rectified to an Albers Conical Equal Area map projection using the National Landsat Archive Production System (NLAPS). The images are further processed to convert bands 1-5 and 7 to at-satellite-reflectance.

The Normalized Burn Ratio (NBR) is computed for each date of imagery using the following formula:

$$(\text{Band 4} - \text{Band 7}) / (\text{Band 4} + \text{Band 7}) = \text{NBR}$$

The differenced NBR is computed by subtracting the post-fire NBR from

the pre-fire NBR:  
PreNBR - PostNBR = DNBR

Higher DNBR values are correlated with more severe burns. The DNBR image is evaluated to determine the threshold value between burned and unburned areas. The perimeter of the fire is delineated using the DNBR image. The DNBR image, the pre-fire and post-fire TM images, and a fire perimeter vector file are provided in digital format.

reea06b\_dnbr (grid) made up of the following patch sequence:  
d0320207213 (both 03202 and 07213 contained clouds, 03202 contained 2002 Fox Creek burn);  
if clouds in 03202 or Fox Creek burn, then insert d0523907213 (05239 had no clouds);  
if clouds in 07213, then insert d0523907197 (07197 contained clouds);  
if (clouds in 07213 AND 07197), i.e. where they overlap, then insert d0523907229 (no clouds but slightly smoky in 07229).

Severity thresholds for reea06b\_dnbr:

6-Class version:	5-Class version:
<= -80 enhanced	<= -80 enhanced
-79 unburned-very low	-79 unburned-very low
110 low	110 low
290 moderate-low	350 moderate
460 moderate-high	>= 580 high
>= 630 high	

Source\_Used\_Citation\_Abbreviation: TM  
Process\_Date: 20070901  
Source\_Produced\_Citation\_Abbreviation: DNBR

Cloud\_Cover: 10  
Distribution\_Information:  
Distributor:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: U.S. Geological Survey

Contact\_Position:  
Principal Scientist  
Land Cover Applications

Contact\_Address:  
Address\_Type: mailing and physical address  
Address:

47914 252nd Street

EROS Data Center  
City: Sioux Falls

State\_or\_Province: SD  
Postal\_Code: 57198-0001  
Country: USA

Contact\_Voice\_Telephone: +001 605-594-6151  
Contact\_TDD/TTY\_Telephone: +001 605 594-6933  
Contact\_Facsimile\_Telephone: +001 605 594-6589  
Contact\_Electronic\_Mail\_Address: fsedc@usgs.gov  
Hours\_of\_Service: 0800 - 1600 CT, M-F, -6 h GMT  
Contact\_Instructions: [http://edc2.usgs.gov/fsp/severity/contact\\_us.asp](http://edc2.usgs.gov/fsp/severity/contact_us.asp)

Distribution\_Liability:  
No warranty expressed or implied is made by the USGS regarding the use of the data, nor does the act of distribution constitute any such warranty.

Standard\_Order\_Process:  
Digital\_Form:

Digital\_Transfer\_Information:  
Format\_Name: Geo-TIFF  
Format\_Version\_Number: 1

Digital\_Transfer\_Option:  
Online\_Option:  
Computer\_Contact\_Information:  
Network\_Address:  
Network\_Resource\_Name: [http://edc2.usgs.gov/fsp/severity/download\\_data.asp](http://edc2.usgs.gov/fsp/severity/download_data.asp)  
Digital\_Form:  
Digital\_Transfer\_Information:  
Format\_Name: DNBR ArcInfo GRID

Format\_Version\_Number: 1  
Digital\_Transfer\_Option:  
Online\_Option:  
Computer\_Contact\_Information:  
Network\_Address:  
Network\_Resource\_Name: [http://edc2.usgs.gov/fsp/severity/download\\_data.asp](http://edc2.usgs.gov/fsp/severity/download_data.asp)  
Digital\_Form:

Digital\_Transfer\_Information:  
Format\_Name: shape file  
Format\_Version\_Number: 1

Digital\_Transfer\_Option:  
Online\_Option:  
Computer\_Contact\_Information:  
Network\_Address:

Network\_Resource\_Name: [http://edc2.usgs.gov/fsp/severity/download\\_data.asp](http://edc2.usgs.gov/fsp/severity/download_data.asp)

Fees: No charge

Ordering\_Instructions: <http://edc2.usgs.gov/fsp/severity/help.asp#ordering>

Turnaround:

Metadata\_Reference\_Information:

Metadata\_Date: 20070909

Metadata\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization:

USGS EROS Data Center

Science & Applications Branch

Contact\_Position:

Principal Scientist

Land Cover Applications

Contact\_Address:

Address\_Type: mailing and physical address

Address:

47914 252nd Street

EROS Data Center

City: Sioux Falls

State\_or\_Province: SD

Postal\_Code: 57198-0001

Country: USA

Contact\_Voice\_Telephone: +001 605-594-6151

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Contact\_Facsimile\_Telephone: +001 605-594-6589

Contact\_Electronic\_Mail\_Address: [fsedc@usgs.gov](mailto:fsedc@usgs.gov)

Hours\_of\_Service: 0800 - 1600 CT, M-F, -6 h GMT

Contact\_Instructions: [http://edc2.usgs.gov/fsp/severity/contact\\_us.asp](http://edc2.usgs.gov/fsp/severity/contact_us.asp)

Metadata\_Standard\_Name: Content Standard for Digital Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998

Metadata\_Access\_Constraints: none

Metadata\_Use\_Constraints: none