



United States Department of Agriculture
Forest Service

Using the BARC for BAER Support

Annual BARC Training
April 14, 2021

Carl Albury
Remote Sensing and GIS Specialist
Disturbance Assessment and Services Program

Geospatial Technology and Applications Center | GTAC
USDA Forest Service

GTAC Mapping Our Future Together



Webinar Housekeeping

▪ Video and Audio

- Available through MS Teams only
- All participant's microphones will be muted
 - Questions are encouraged
 - Raise your 'Teams' hand, or submit a question in the chat

▪ Webinar/Instructor evaluation

- Survey link will be sent via email following the training session

• Recording

- The training will be recorded, a link will be distributed after the training is complete



BARC Workshop Agenda

- **Overview Presentation** ~ 45 minutes
- **Exercise 1** – How to order a BARC map ~ 15 minutes
- **Break** – 15 minutes
- **Exercise 2** - Editing The BARC/Creating the Soil Burn Severity dataset ~30 minutes (demo)
- **Exercise 3** - Analyzing the SBS ~15 minutes (demo)
- **Work on exercises at your own pace** – until 2:00 MDT



BARC Workshop: Objectives

- Learn more about the BAER Imagery Support program and other post-fire mapping programs
- Learn how to order BARC products
- Know where to get technical assistance and who to contact for help (both USFS and DOI)
- Understand how the BARC products are made
- Know the difference between the BARC4, BARC256, and SBS
- Learn how to create the SBS by modifying the BARC256
- Learn how to analyze the SBS against other GIS layers

Some Context



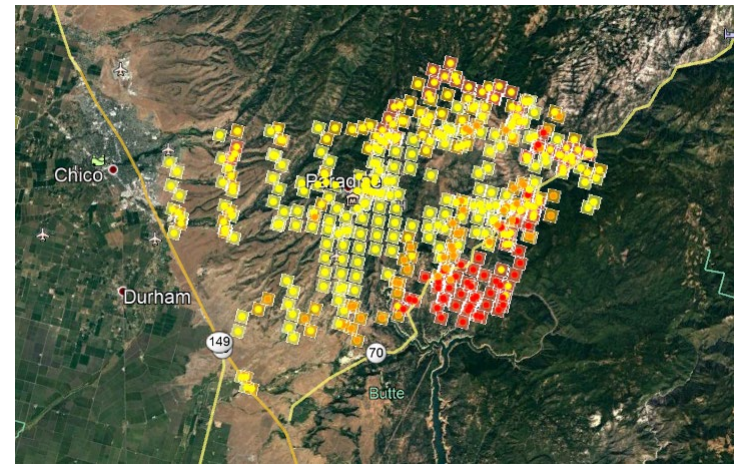
**FIRE SUPPORT OPERATIONS ARE
INTERAGENCY**

**GEOSPATIAL SUPPORT ALSO
INTERAGENCY**

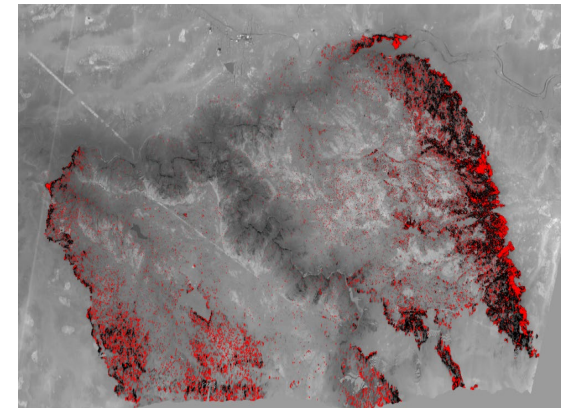


FIRE SUPPORT PROGRAMS (USFS and USGS)

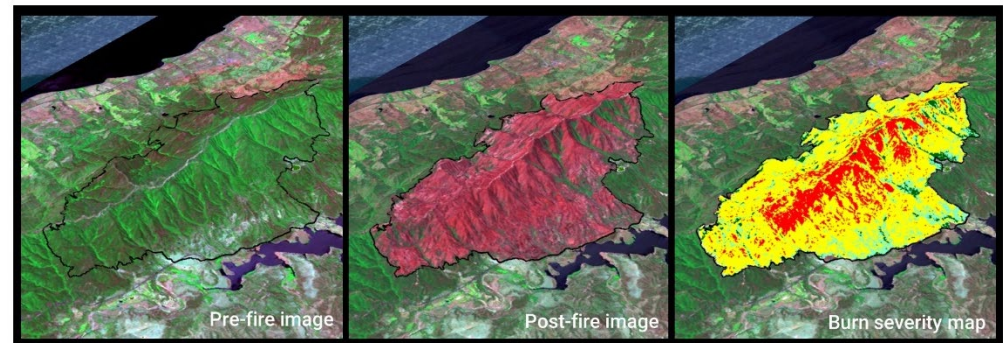
Active fire:



Tactical fire
Support: NIROPS

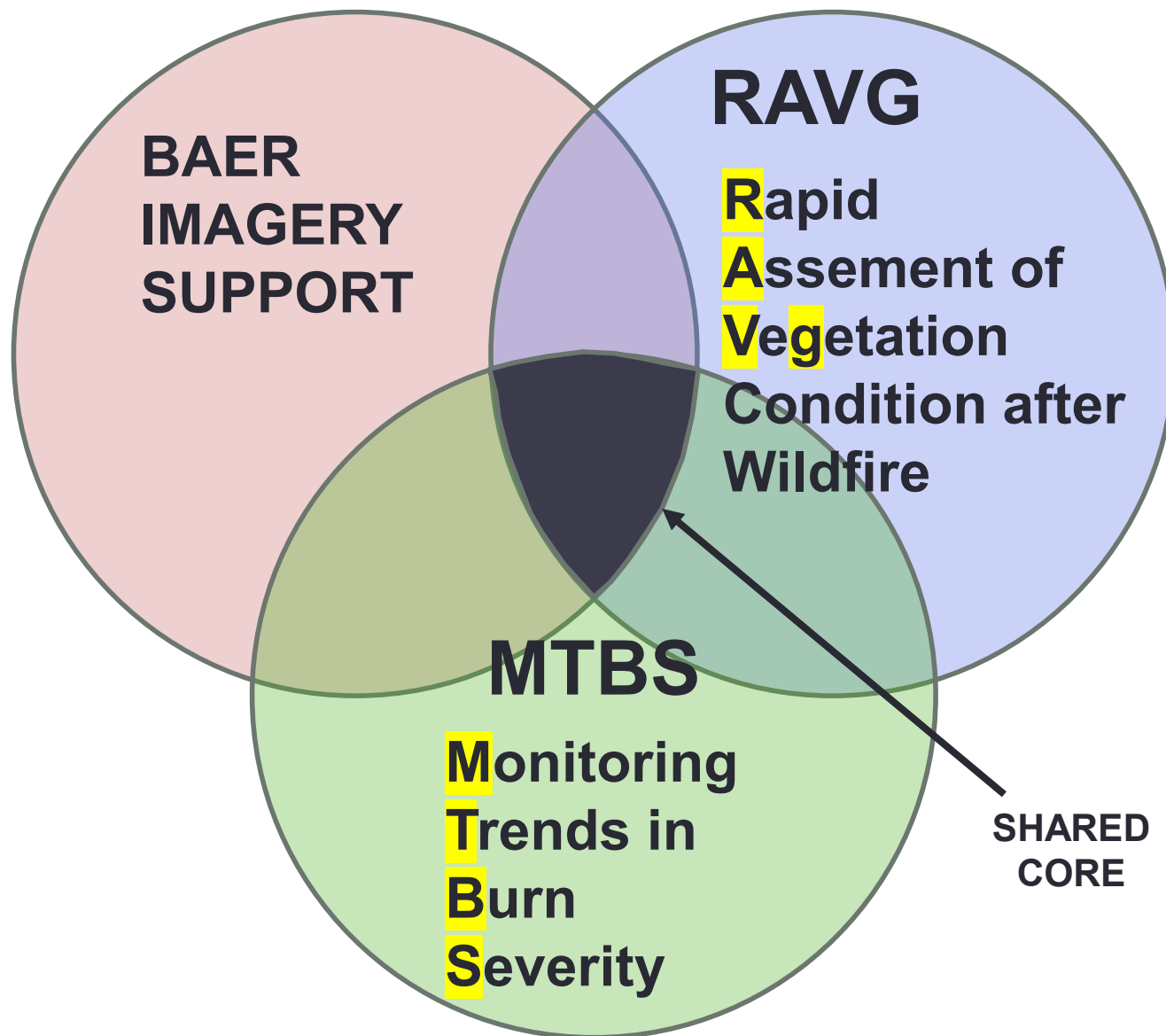


Post-fire:
Burn severity
mapping



POST-FIRE MAPPING PROGRAMS

SIMILAR BUT DIFFERENT





**BAER
IMAGERY
SUPPORT**

RAVG

MTBS

# Fires Mapped per Year	Temporal Extent	Scope	Timing	Availability
Map ~ 100 fires/year	Started in 2001	USFS BAER teams only. By request. USGS maps for all DOI agencies.	Near real-time (initial assessment)	BARC data available only to USFS, SBS made public
Map ~ 100 fires/year	Started in 2007	Forested areas on FS managed lands. Size criteria.	Within a few months of the fire (initial assessment)	Data available to public
Map ~ 1000 fires/year	Started in 2006. Maps fires back to 1984	All lands across CONUS, AK, HI and PR. Size criteria.	Mapped the following year (extended assessment)	Data available to public



**BAER
IMAGERY
SUPPORT**

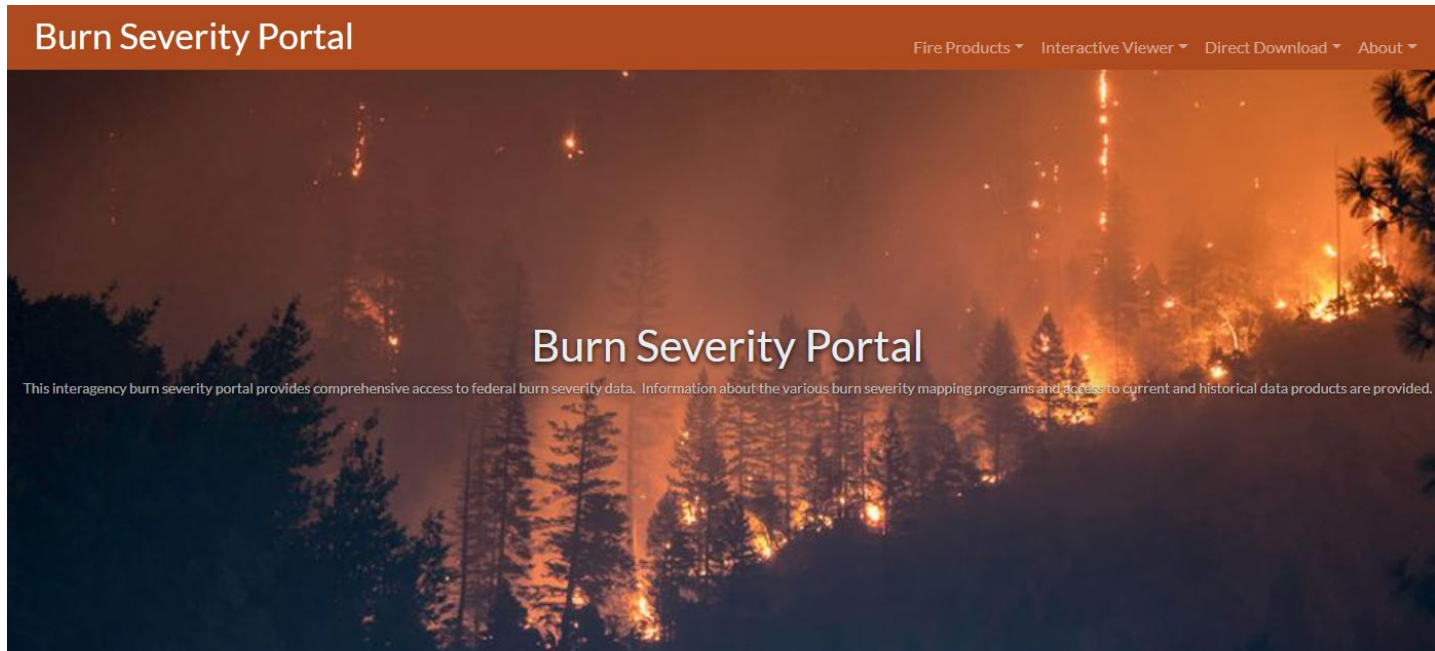
RAVG

MTBS

USFS Contact	DOI Contact	Website
Carl Albury carl.albury@usda.gov	Kurtis Nelson knelson@usgs.gov	https://fsapps.nw cg.gov/baer/
Craig Baker craig.baker@usda.gov	Kurtis Nelson knelson@usgs.gov	https://fsapps.nw cg.gov/ravg/
MTBS help desk SM.FS.mtbs@usda.gov	MTBS help desk SM.FS.mtbs@usda.gov	www.mtbs.gov

Burn Severity Portal

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



BAER

Burned Area Emergency Response

BAER teams rapidly assess the effects of fire on vegetation, soils and watershed function and develop a plan with actions to stabilize the fire affected landscape and mitigate...



CBI

Composite Burn Index

The Composite Burn Index was developed by Key and Benson (2006) to assess the on the ground fire effects on vegetation and soil (i.e. burn severity).



NPS

National Park Service

When requested by an NPS unit, or interagency partner program, USGS EROS has mapped wildland fires that are smaller than those mapped by the Monitoring Trends in Burn

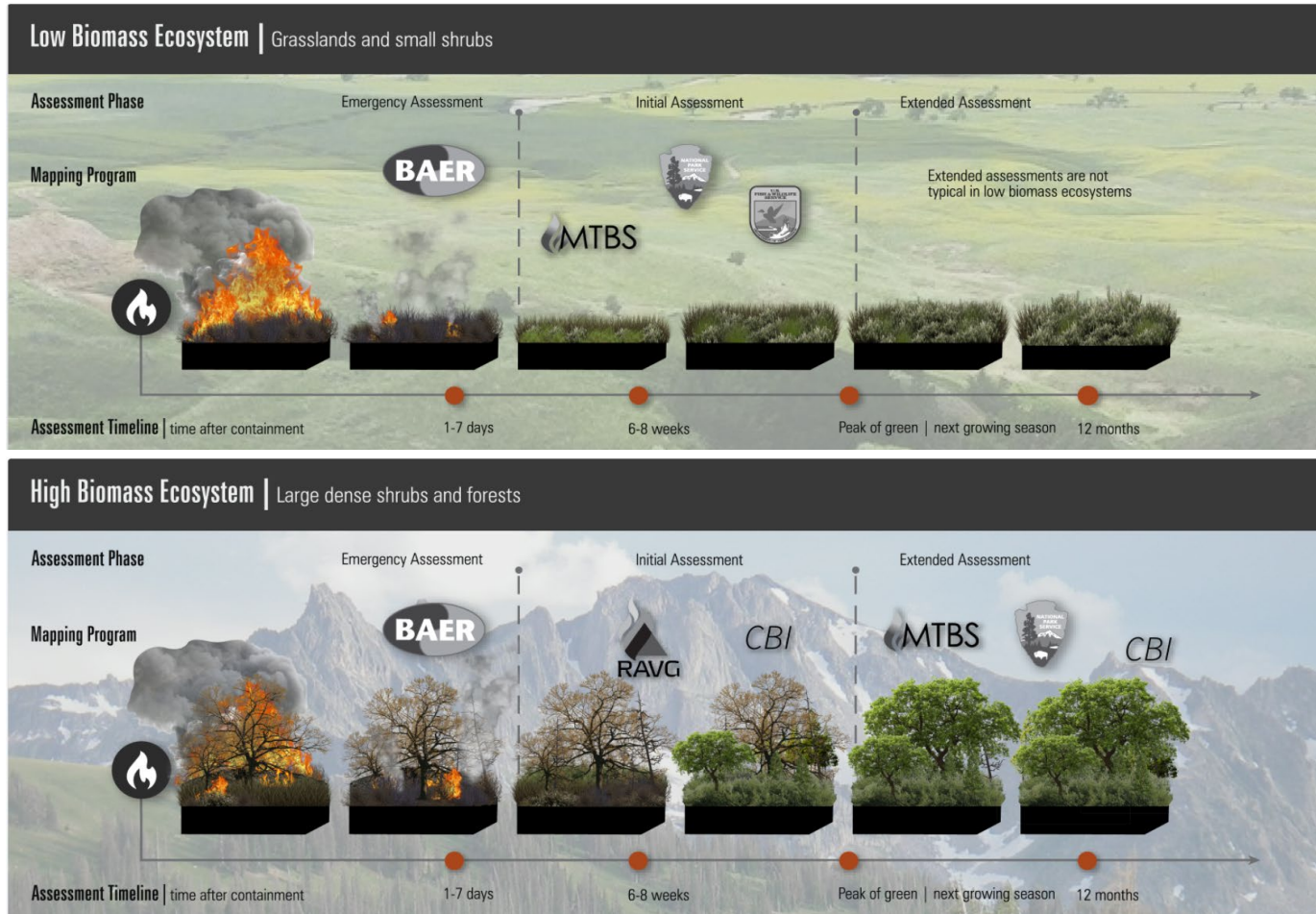


Burn Severity Portal

- Location to access federal burn severity data
 - An interagency effort to provide comprehensive access to burn severity data
 - <https://burnseverity.cr.usgs.gov>
- Provides fire products for MTBS, BAER, RAVG, NPS, CBI, FWS Fire Atlas
 - Allows for users to directly compare burn severity products side by side and access burn severity field plot data
- Provides information about the methods/approach used for each of the different programs/products
- Interactive viewer lets users view, locate and then download any and all available products from a specific fire event
 - Ability to download and compare BAER, RAVG and MTBS mappings of the same fire, for example

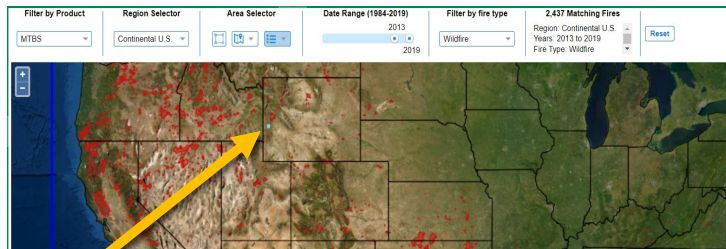
Available Products

- Several Products available through the Burn Severity Portal
 - MTBS, BAER, RAVG, NPS, CBI, FWS Fire Atlas



Interactive Viewer

- Allows users to view, locate and download all fire/plot data over a given time period
 - Lets users filter by program, region (continental US, AK, HI, PR), date and Fire Type
 - Filter by state, or draw a bounding box
 - Locate fire/plot and then double click on feature of interest to isolate it



Selected fire
perimeter/plot
point by double-
click


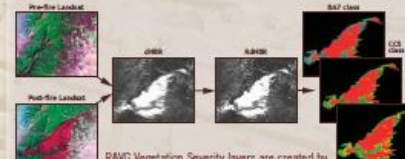



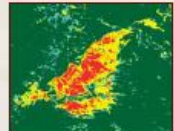



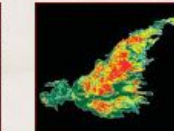
- Downloads .zip fire bundle to your computer in order to analyze and view locally with your preferred GIS software package

Fire Bundle Downloads						
Download 1 Fires						
<input type="checkbox"/>	Fire Name	Acres	Ignition Date	Fire Type	Product	Fire Id ↑
<input type="checkbox"/>	POLE CREEK	3,395	2017-08-04	Wildfire	MTBS	WY4219011071520170804
<input type="checkbox"/>	SIMMONS	20,950	2016-07-11	Wildfire	MTBS	WY4231010419220160711
<input checked="" type="checkbox"/>	MARTEN CREEK	6,383	2018-09-16	Wildfire	MTBS	WY4270611067920180916
<input type="checkbox"/>	FAIRFIELD	1,457	2013-07-22	Wildfire	MTBS	WY4273810886420130722
<input type="checkbox"/>	STATION	9,845	2015-10-11	Wildfire	MTBS	WY4287610628620151011
<input type="checkbox"/>	SOUTH FORK 1	1,073	2015-09-26	Wildfire	MTBS	WY4302610888320150926

Post-fire Mapping Programs

Post-fire Mapping Products: BAER, RAVG, and MTBS

The USDA Forest Service Remote Sensing Applications Center (RSAC) supports three major post-fire mapping programs

	BAER	RAVG	MTBS
	(Burned Area Emergency Response) www.fs.fed.us/eng/rsac/baer	(Rapid Assessment of Vegetation Condition After Wildfire) www.fs.fed.us/postfirevegcondition	(Monitoring Trends in Burn Severity) www.mtbs.gov
DESCRIPTION	<p>The Burned Area Emergency Response (BAER) support at RSAC includes tracking fire progression, satellite overpasses, image acquisition, and Burned Area Reflectance Classification (BARC) creation. The BARC is a GIS layer used by BAER teams as they perform an emergency assessment of the burned area. The BARC is a first approximation at soil burn severity on the burned land.</p>	<p>The Rapid Assessment of Vegetation Condition after Wildfire (RAVG) program produces data describing post-fire vegetation conditions on National Forest System (NFS) lands. RAVG produces a suite of geospatial and tabular outputs that include standard vegetation mortality summary tables and maps. The tables and maps are produced by integrating existing vegetation maps and burn severity maps.</p>	<p>Monitoring Trends in Burn Severity (MTBS) is a multi-year program designed to consistently map the burn severity and burn area boundaries of fires across all lands of the United States for the period spanning 1984 through 2010. The data generated by MTBS will be used to identify national trends in burn severity, providing information necessary to monitor the effectiveness and effects of the National Fire Plan and Healthy Forests Restoration Act.</p>
MAPPING METHOD	 <p>The BARC256 is created by rescaling the dNBR from 16- to 8-bit imagery. The BARC4 is created by recoding the dNBR into 4 discrete classes.</p>	 <p>RAVG Vegetation Severity layers are created by thresholding and regression modeling based on hundreds of field plots.</p>	 <p>The thematic dNBR is created by recoding the continuous dNBR after calibration from the RdNBR.</p>
AUDIENCE	<p>The BARC is delivered to BAER teams. These teams are dispatched to make an assessment of the burned area within seven calendar days from fire containment. One of their first tasks is to create a soil burn severity map. The BARC is used to create that map.</p>	<p>The primary audience for RAVG data and products are Regional Silviculturists who need to communicate yearly reforestation and restoration needs to the Washington Office and Congressional decision makers for specific funding requests.</p>	<p>The MTBS project serves four primary user groups:</p> <ol style="list-style-type: none"> 1. National policies and policy makers 2. Field management units 3. Existing databases from other comparably scaled programs 4. Research and academic entities interested in fire severity.
TIMELINE	1 - 7 days after fire containment	30 - 45 days after fire containment	12 - 18 months after fire containment
DELIVERABLES	<ul style="list-style-type: none"> ■ Pre- and post-fire satellite imagery ■ BARC layers (thematic and continuous) ■ Metadata ■ 3D image drapes 	<ul style="list-style-type: none"> ■ Pre- and post-fire satellite imagery ■ Fire perimeter shapefile ■ dNBR and RdNBR (continuous) ■ Composite (burn index (CBI)) layer ■ % change in basal area layer ■ % change in canopy cover layer ■ Summary table and map ■ Metadata 	<ul style="list-style-type: none"> ■ Pre- and post-fire satellite imagery ■ dNBR and RdNBR (continuous) ■ 5-class thematic thresholded dNBR ■ Burn area boundaries ■ Data summaries ■ Metadata ■ 3D image drapes
EXAMPLE	<p>Trigo Ignition: 4/15/2008 Contained: 5/11/2008</p>    <p>Perimeter Acres: N/A Assessment Type: Emergency Pre-fire Image Date: 5/21/2007 Post-fire Image Date: 5/15/2008</p>	<p>Perimeter Acres: 14,297 Assessment Type: Initial</p>   <p>Pre-fire Image Date: 5/21/2007 Post-fire Image Date: 5/1/2008</p>	<p>Perimeter Acres: 13,855 Assessment Type: Extended</p>   <p>Pre-fire Image Date: 7/8/2007 Post-fire Image Date: 7/29/2009</p>

CONTACT ■ For more information about any of these programs, please contact the USFS Remote Sensing Applications Center (RSAC) at 801-975-3750

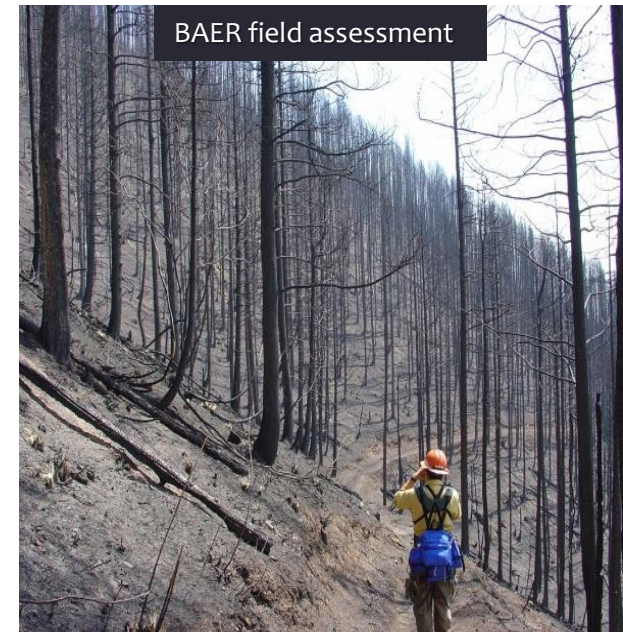


BAER Imagery Support



Burned Area Emergency Response (BAER)

- **Forest Service/DOI fast track emergency assessment**
 - Teams comprised of soil scientists, hydrologists, recreation specialists, engineers, GIS Specialists and others
- **Assess fire effects on the soil and watershed hydrologic function (erosion and flood potential)**
- **Prescribe and implement emergency stabilization measures to mitigate potential hazards to:**
 - Life
 - Property
 - Long-term soil productivity
 - Water quality
 - Natural resources
- **BAER response plan is required within 7 days of fire containment**

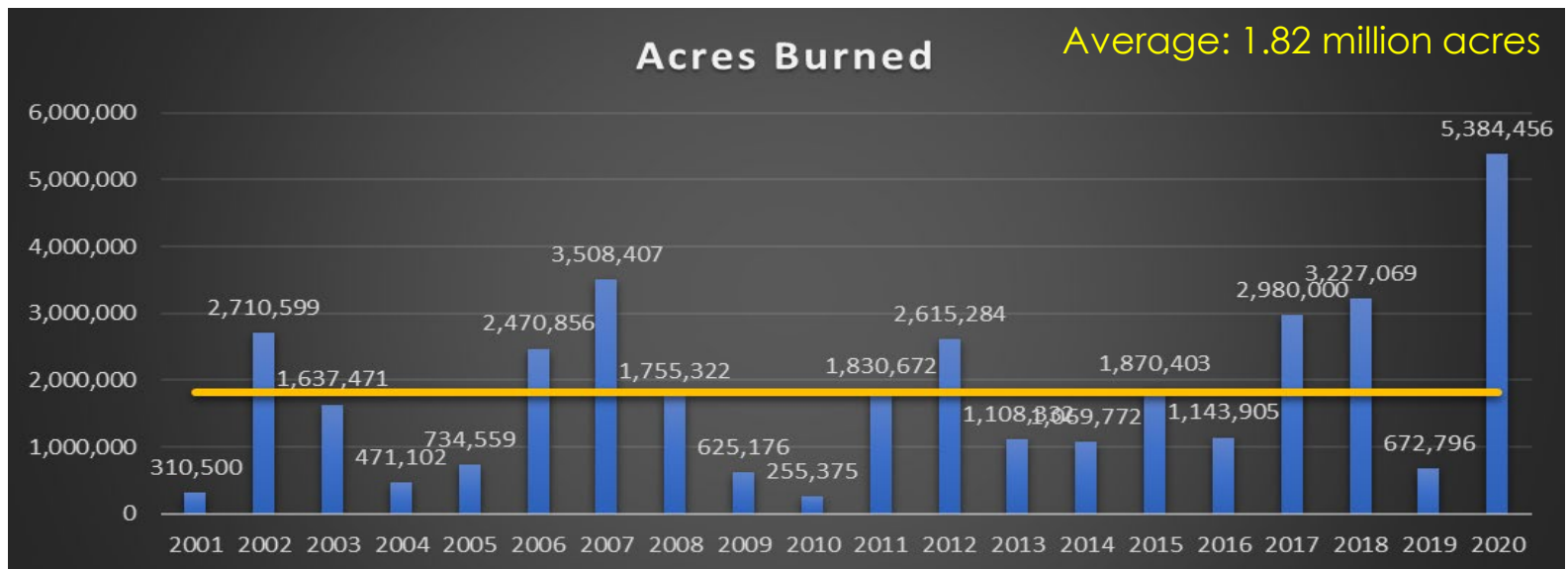
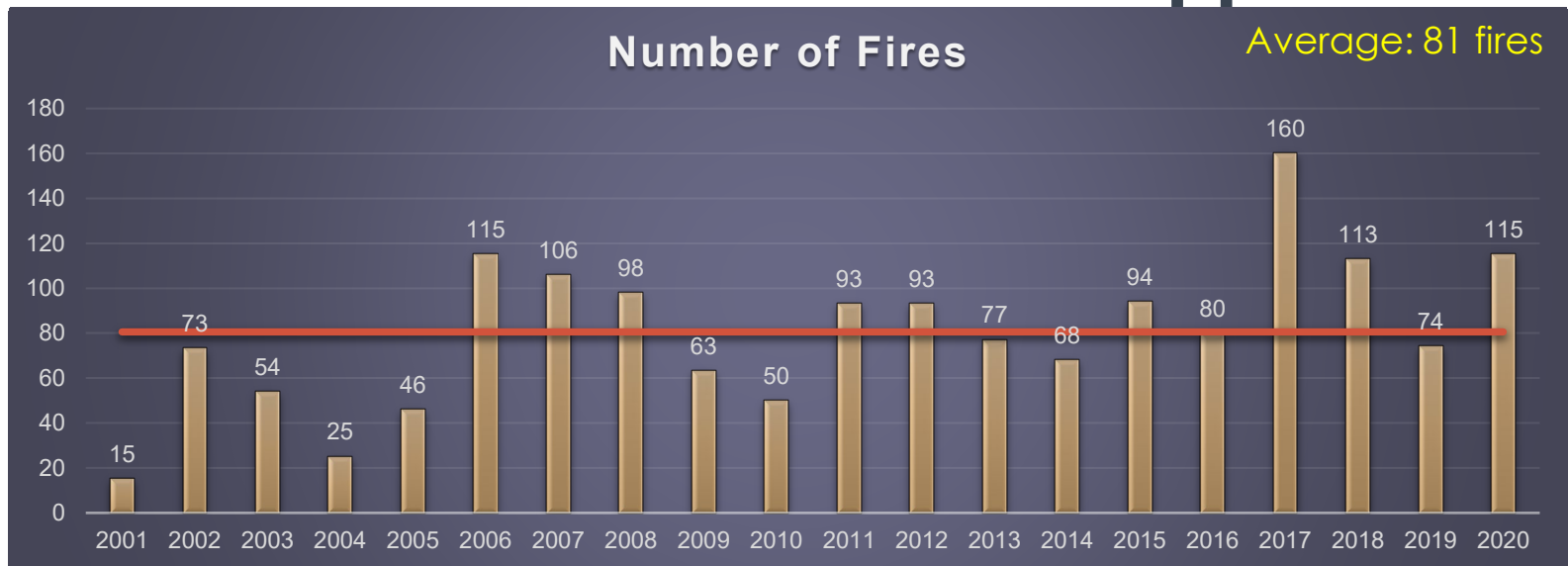


Remote Sensing in Support of the BAER Process

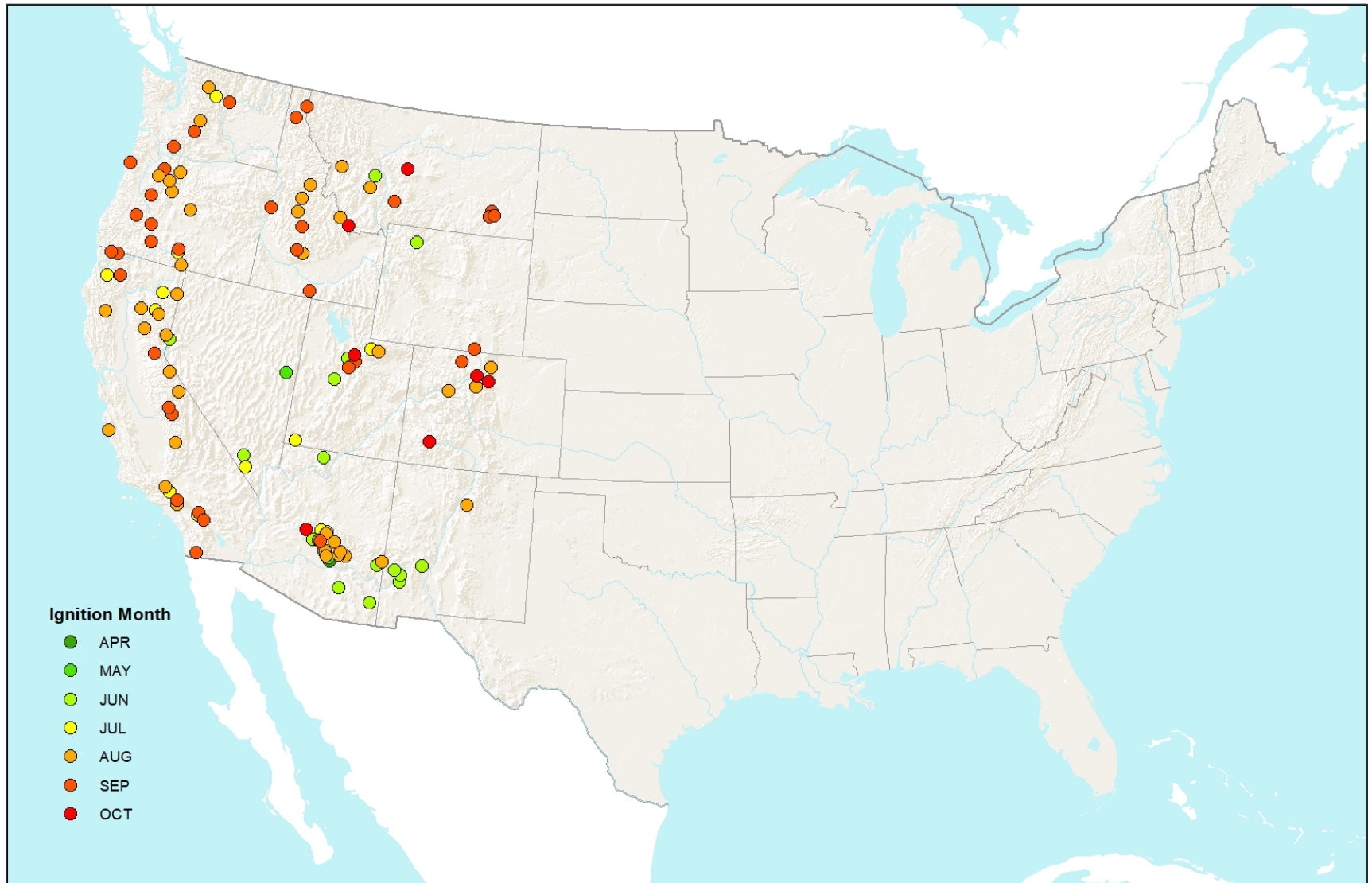
- **GTAC/EROS** create a Burned Area Reflectance Classification (**BARC**) showing which areas have the highest burn severity and are therefore most likely to suffer negative impacts.
- BARC maps are used by BAER teams to **focus field verification and analysis to areas of concern**
 - Minimizes field time
 - provides data for areas with limited access
 - Increases BAER team safety
- **Facilitates rapid development of a geospatial soil burn severity product by BAER team**
 - Improved product compared to previous methods such as hand-drawn maps
 - Used in analysis/modeling to determine necessary BAER treatments
- **GTAC provides support to USFS BAER teams; EROS supports DOI BAER teams**
 - Consistent products for all agencies
 - Support provided since 2001



USFS/GTAC BAER Team Support

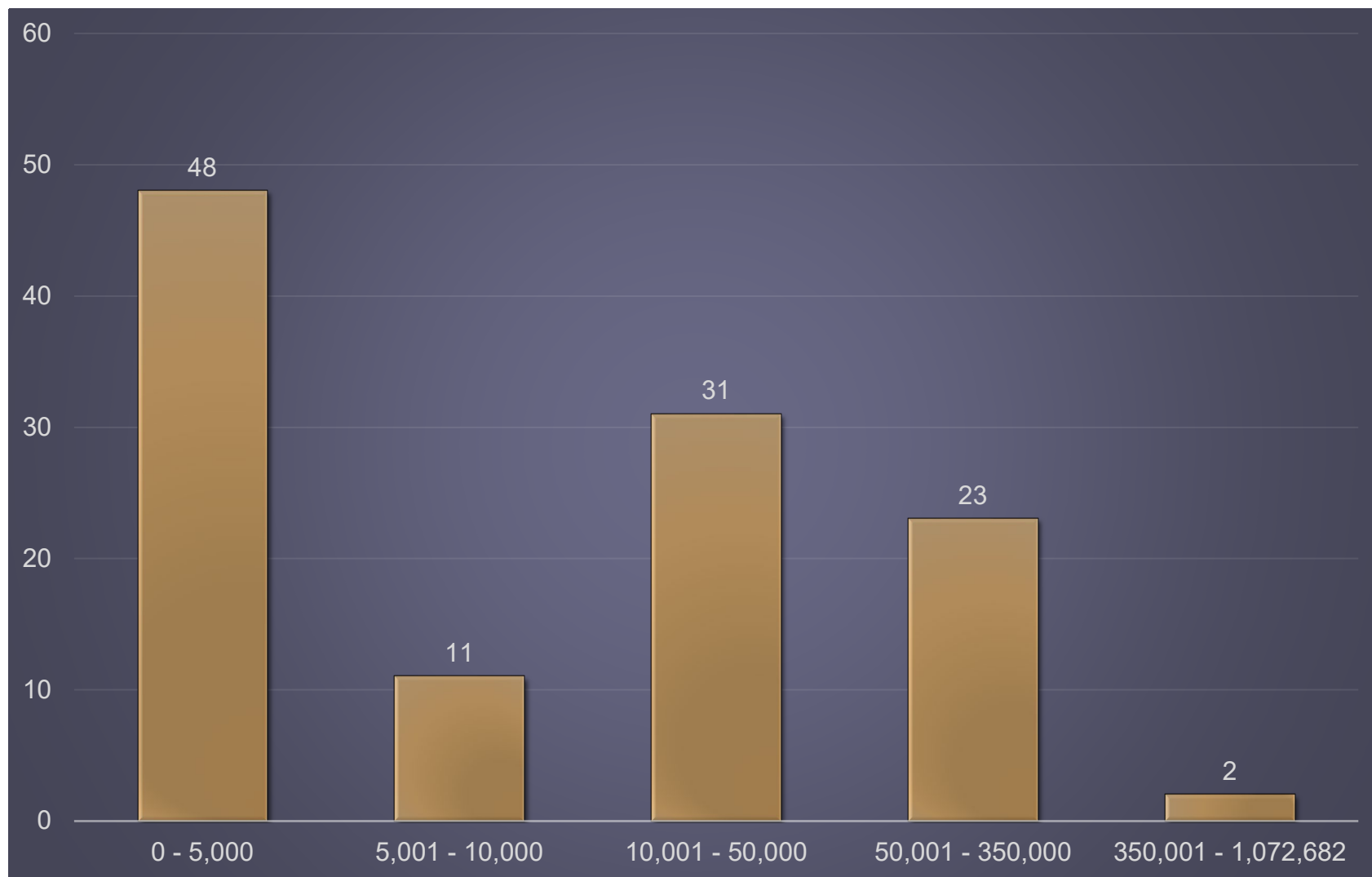


Mappings by Ignition Month



2020 USFS data only

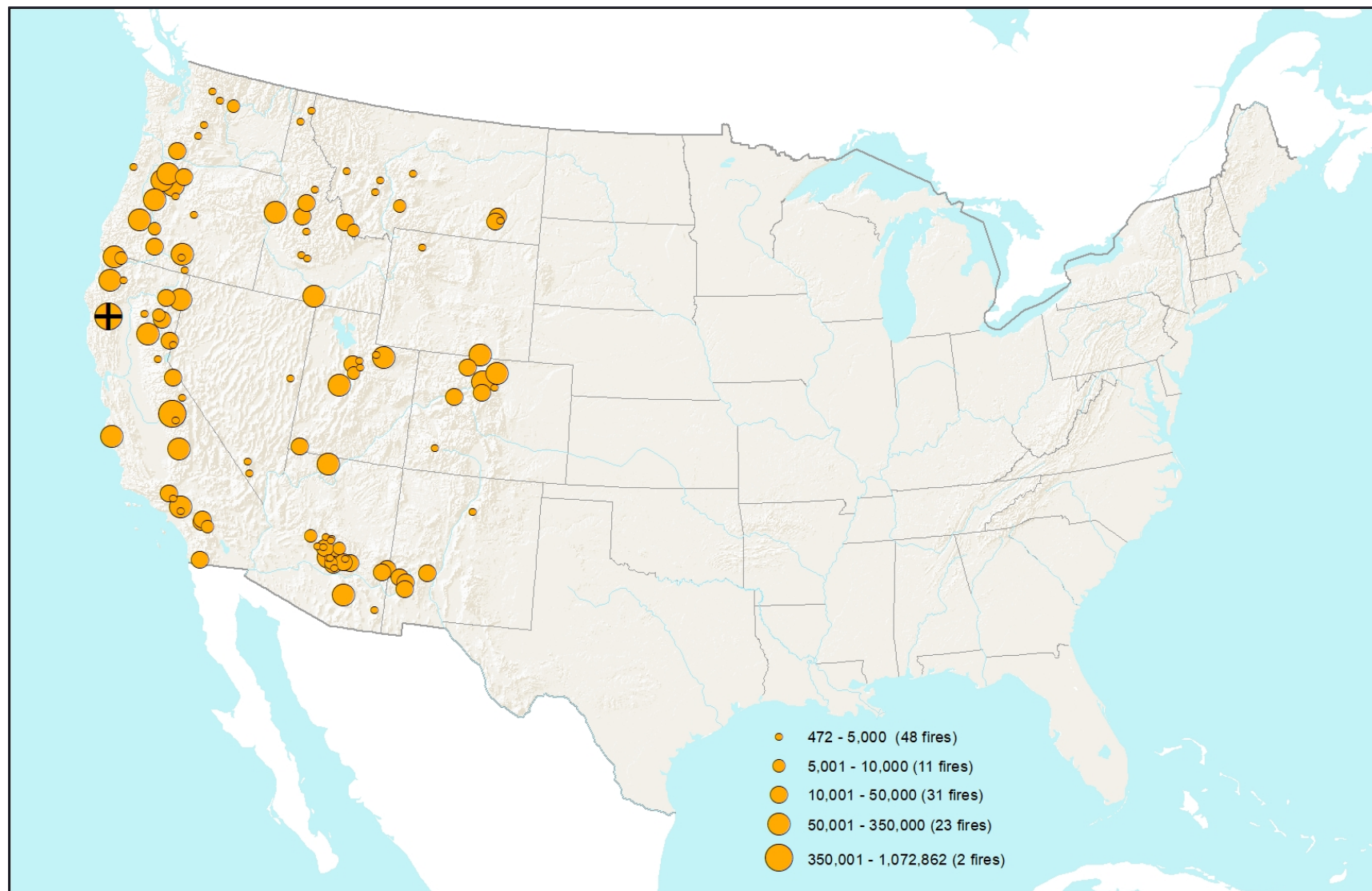
Mappings by Size



2020 USFS data only



Mappings by Size



2020 USFS data only

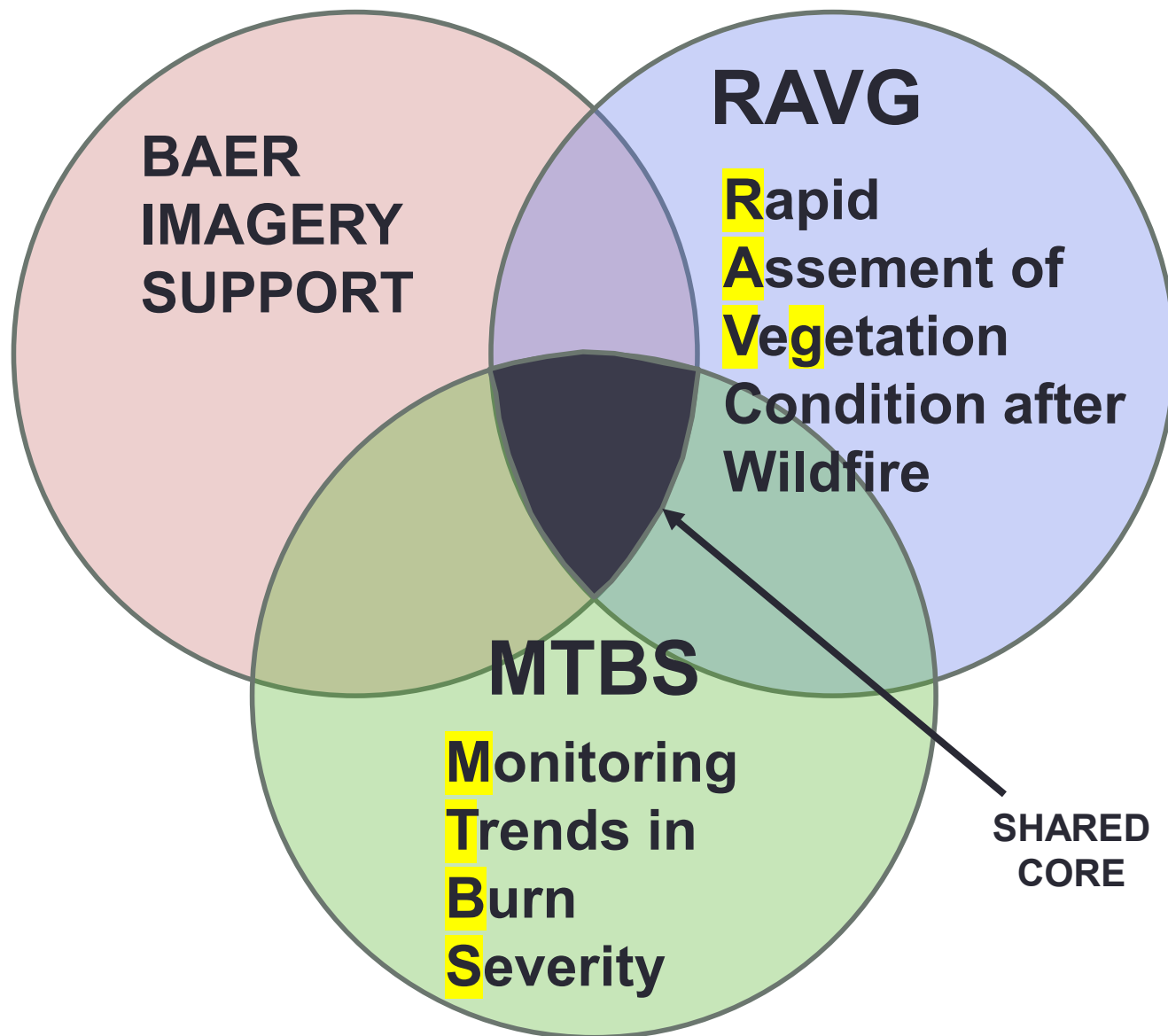


How the BARC is Created

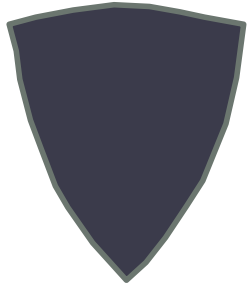


POST-FIRE MAPPING PROGRAMS

SIMILAR BUT DIFFERENT



SHARED
CORE



- ALL 3 PROGRAMS BASED ON SAME **REMOTE SENSING** PRINCIPLES
- BEHIND THE SCENES, ALL 3 SHARE AN **INFRASTRUCTURE** FOR MAPPING
 - DATABASE
 - SCRIPTS
 - SOFTWARE



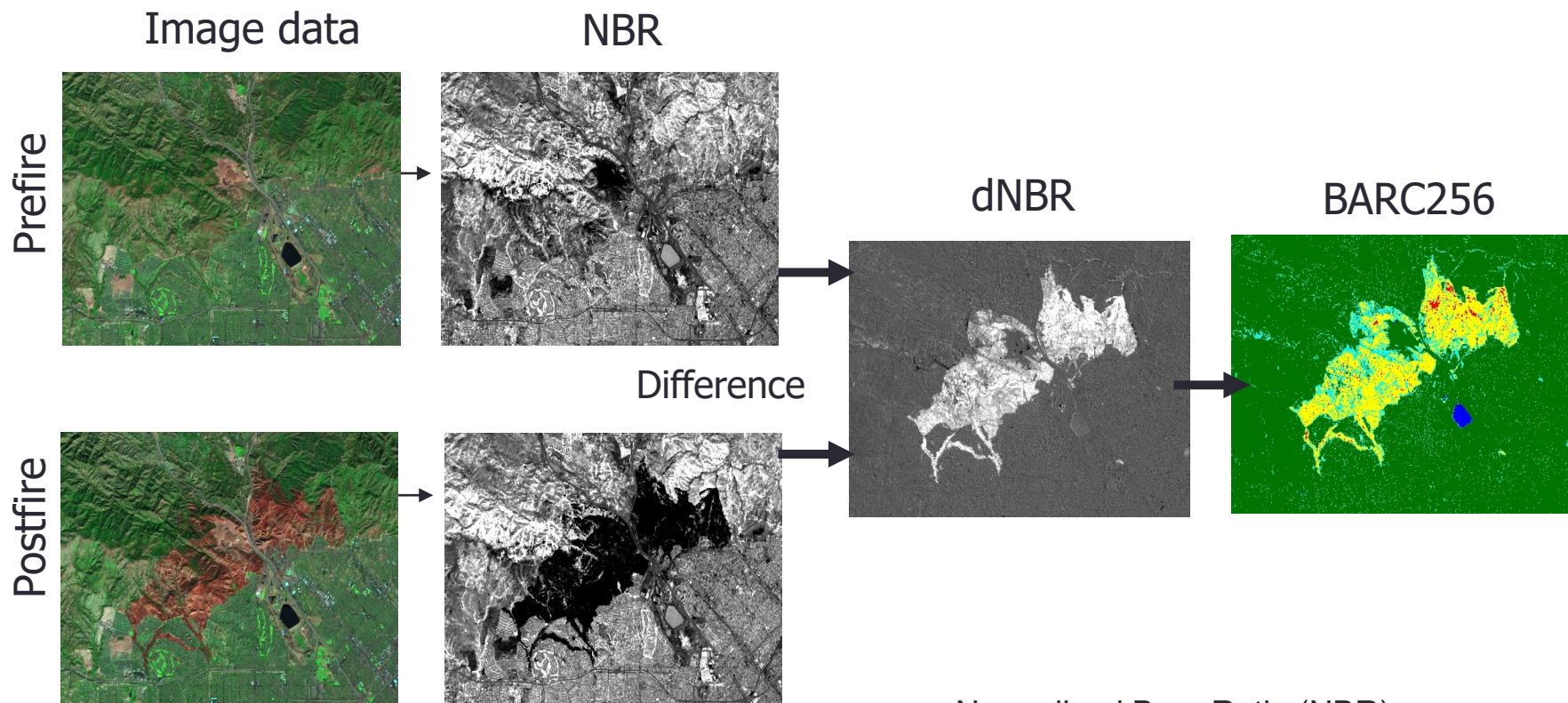
ArcGIS



Google Earth Engine



Creating Burn Severity Products



Normalized Burn Ratio (NBR)

$$\text{NBR} = (\text{NIR} - \text{SWIR}) / (\text{NIR} + \text{SWIR})$$

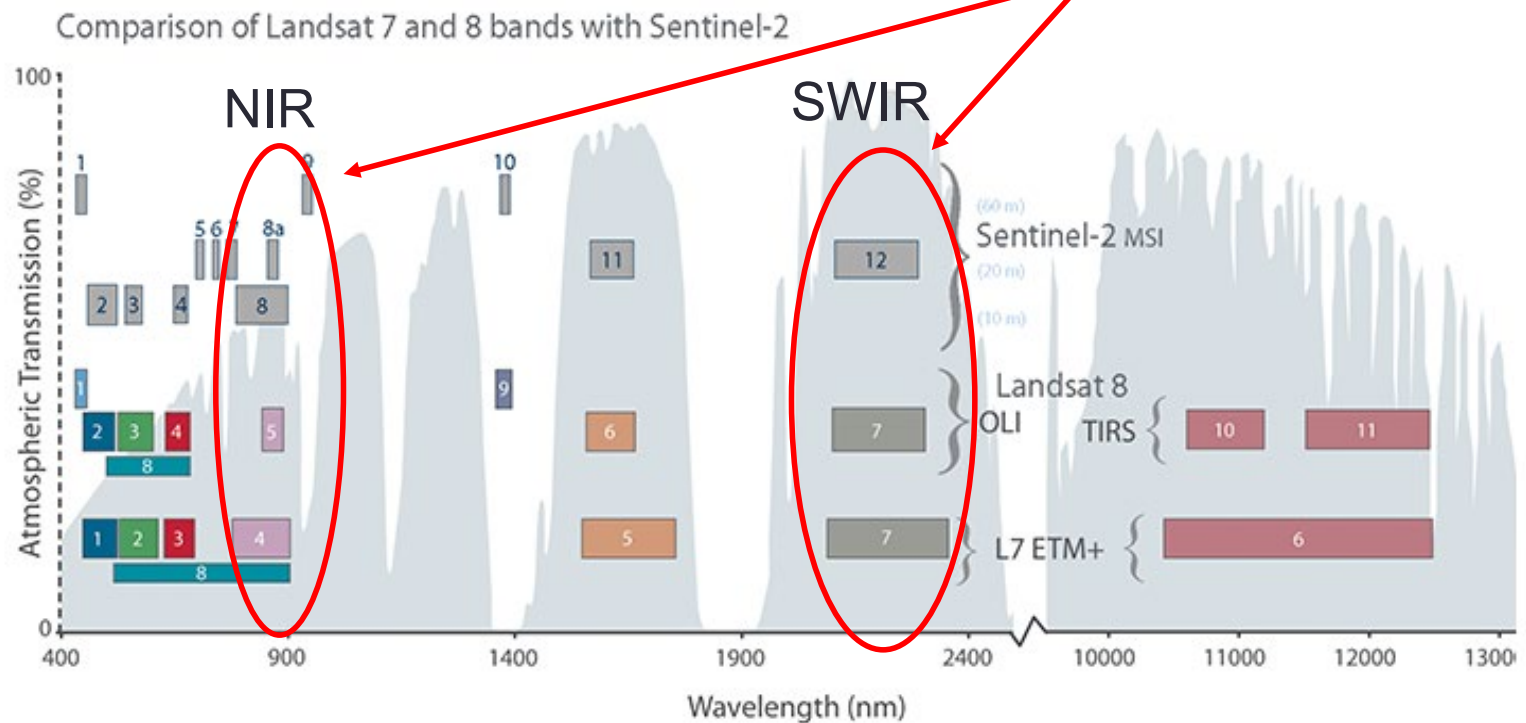
Differenced Normalized Burn Ratio (dNBR)

$$\text{dNBR} = \text{Pre NBR} - \text{Post NBR}$$

NIR = near infrared
SWIR = shortwave infrared

Image Bands

The BARC product utilizes the NIR and SWIR bands.



Source: <http://landsat.gsfc.nasa.gov/wp-content/uploads/2015/06/Landsat.v.Sentinel-2.png>

Unique Differences: Final Products

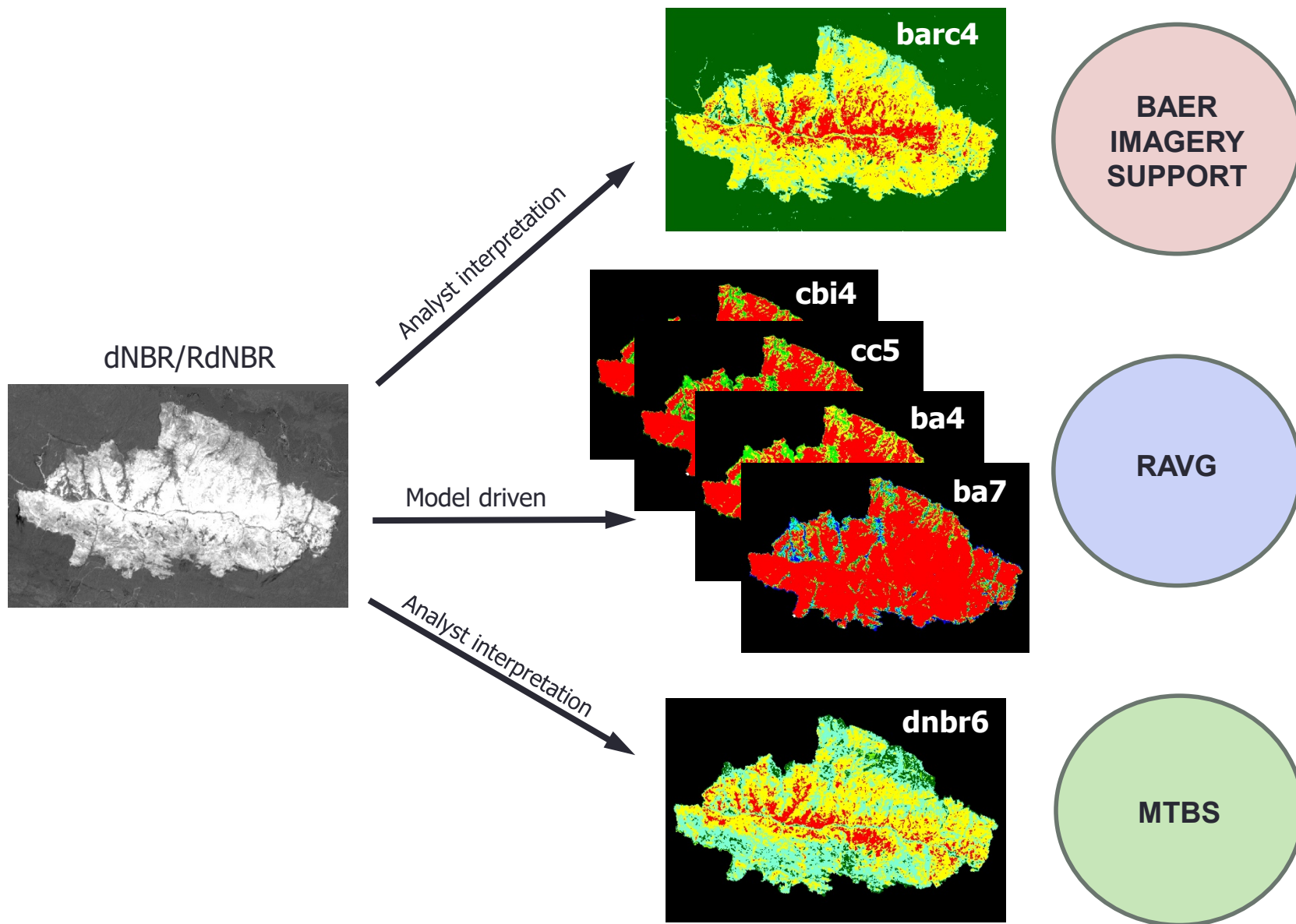


Image Sources



2017 BAER Imagery Support Program Sensors

CORE

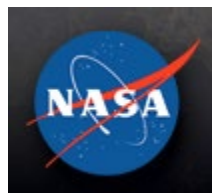
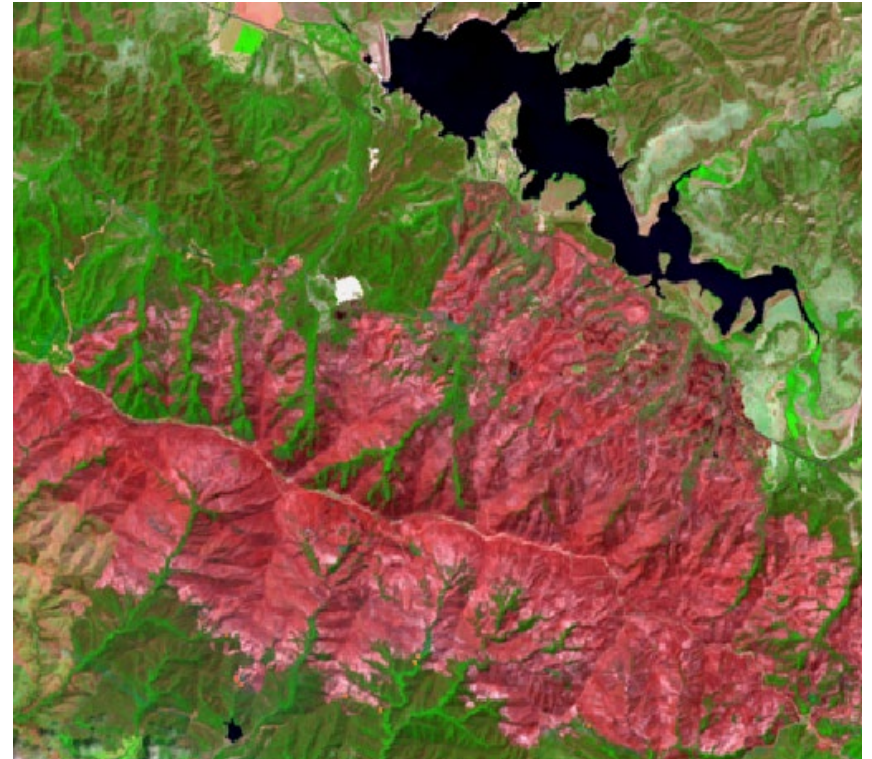
Sensor	Spatial Resolution	Temporal Resolution (days)	Analysis	Source	Use with BAER
Landsat 8 OLI	30m	16	dNBR	USGS EROS	Frequent
Sentinel-2	20m	5/10	dNBR	ESA Copernicus/ USGS EROS	Frequent
Landsat 7 ETM+	30m	16	dNBR	USGS EROS	Reduced role with availability of S2 data

NON-CORE

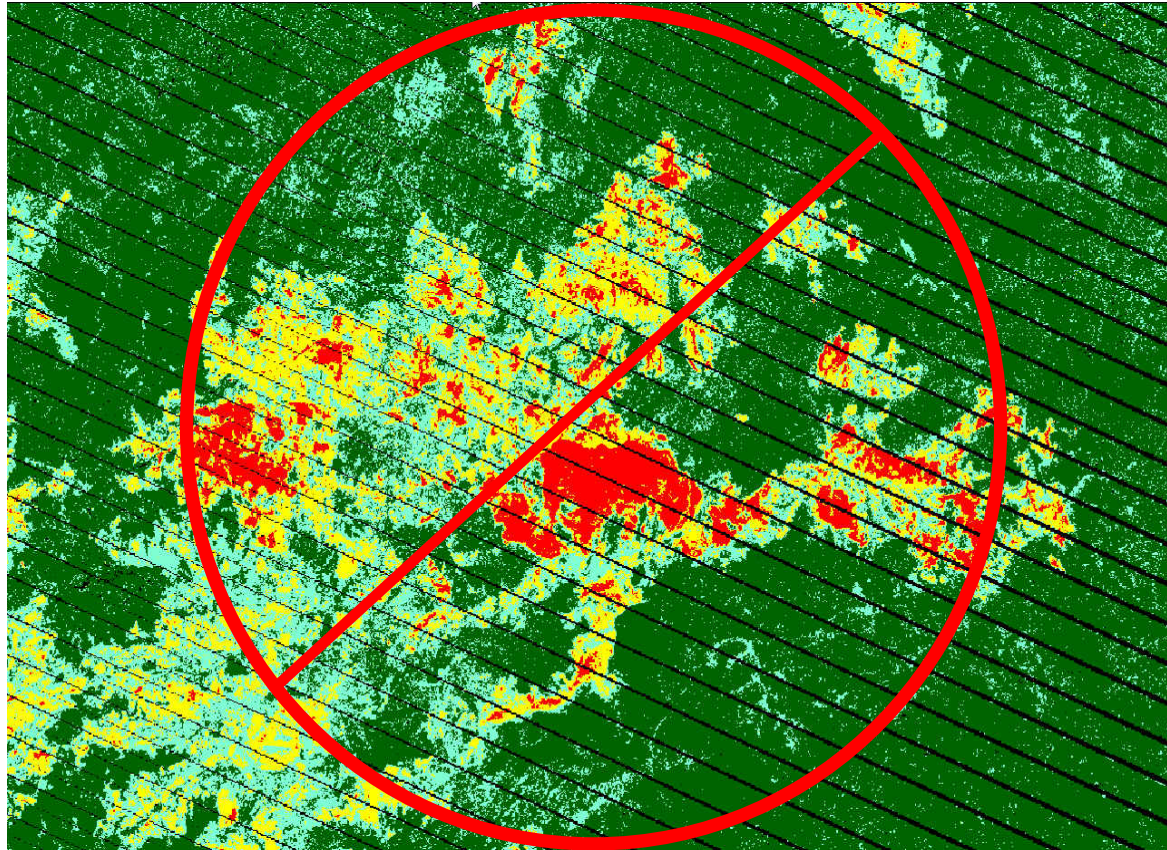
SPOT 6/7, Worldview 2/3	< 10m	varies	dNDVI	USGS Hazard Data Distribution System	Occasional – may use to calibrate severity classes
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Landsat

- Engineered by NASA; Data managed by USGS
- Tried and true – well tested and documented
- Revisit time: 16 days independently
 - 8 days alternating (7&8)
- Resolution : 30 meters
- Delivery time: 3+ hours
- Currently using L8 and when necessary



Landsat 7 SLC-off Data

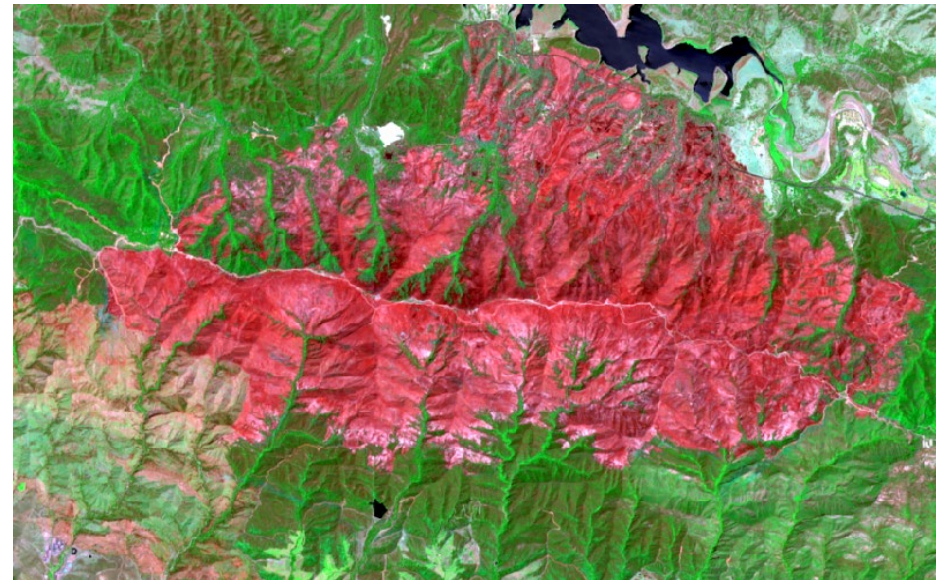


With addition of Sentinel 2 imagery, we are phasing out L7.
Only using when no other good imagery is available.

Sentinel 2

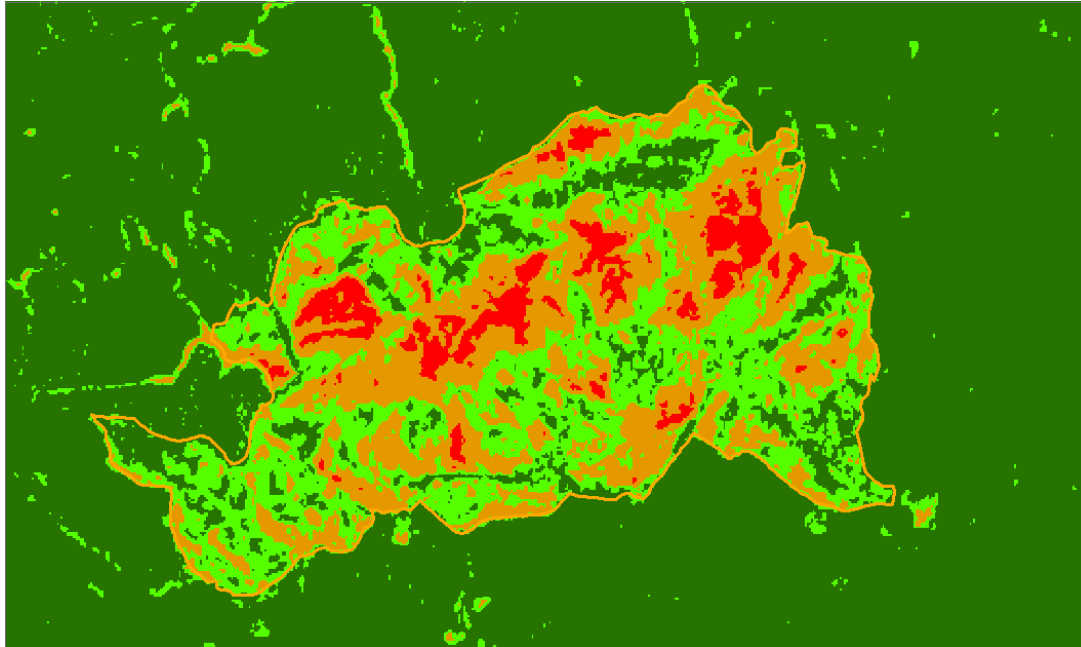


- European Space Agency
- Revisit time: 10 days but 2 satellites = 5 days
- Resolution : 20 meters
- Delivery time: 1-2 days
- Have tested and compared to L8 products. Highly compatible with Landsat and creates comparable products.



Landsat 8/Sentinel 2 Comparison

L8 (20m)



Example:
Trailhead fire CA,
2016

S2 (20m)

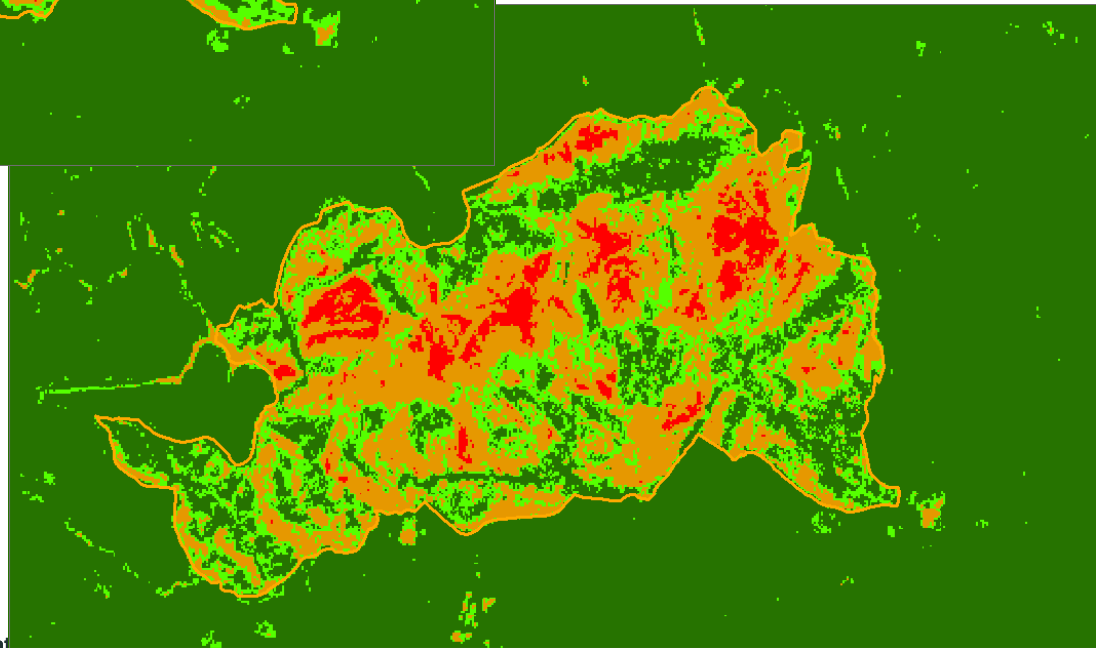
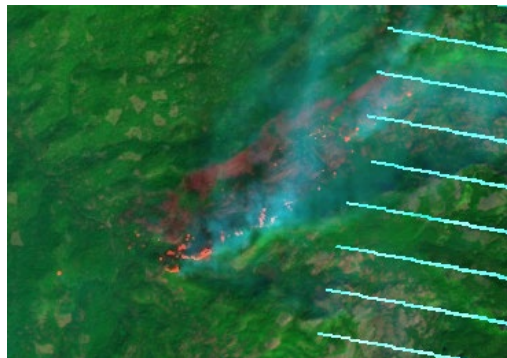


Image Selection Process

October

11

L7 available. Active fire, smoke. Data gaps. Next L7 10/27.



14

BARC requested

S2 available. Active fire & some smoke.



17

S2 available and high quality.
Image chosen for BARC

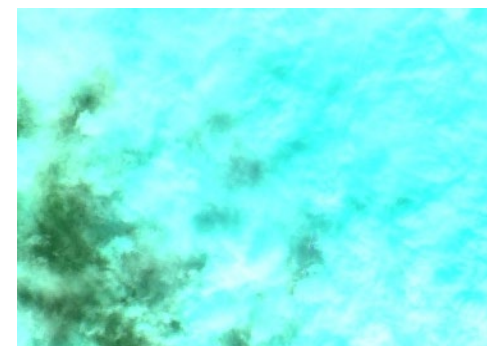


18

BAER team start date

19

L8 image completely cloudy and unusable



How to Order a BARC

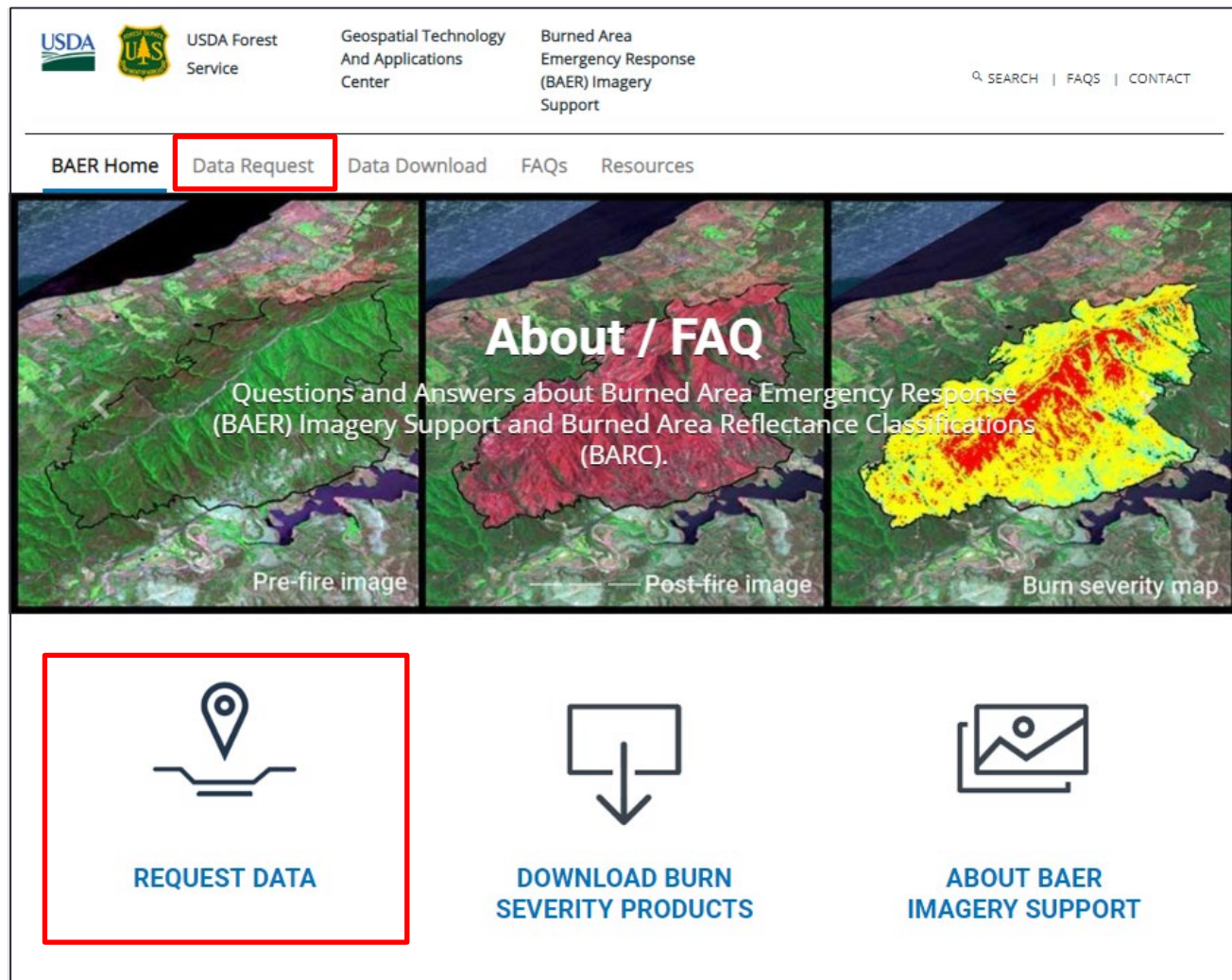




BAER Imagery Support Ordering Limitations

- BARC mapping by request only
- Priority is for **official BAER assessments**
- GTAC will provide **1-2 BARC packages per incident** without charge
- **Exceptions** may be made for prolonged incidents
- **Non-BAER** related BARC maps may be ordered on a **cost-reimbursable** basis (USFS)
 - Prescribed fire
 - Habitat assessments and other non-BAER post-fire needs
 - Contact Kurtis Nelson for questions regarding DOI incidents

New Website



The screenshot displays the BAER website interface. At the top, the header includes the USDA and UAS logos, the text "USDA Forest Service", "Geospatial Technology And Applications Center", and "Burned Area Emergency Response (BAER) Imagery Support". On the right, there are links for "SEARCH", "FAQS", and "CONTACT". Below the header is a navigation bar with "BAER Home", "Data Request" (highlighted with a red box), "Data Download", "FAQs", and "Resources". The main content area features three panels: "Pre-fire image", "Post-fire image" (with the text "About / FAQ" and "Questions and Answers about Burned Area Emergency Response (BAER) Imagery Support and Burned Area Reflectance Classifications (BARC)."), and "Burn severity map". Below these panels are three icons: a location pin icon (with "REQUEST DATA" below it, highlighted by a red box), a download arrow icon (with "DOWNLOAD BURN SEVERITY PRODUCTS" below it), and an envelope icon (with "ABOUT BAER IMAGERY SUPPORT" below it).

<http://fsapps/nwcg.gov/baer/>

Request Application (BIRCH)

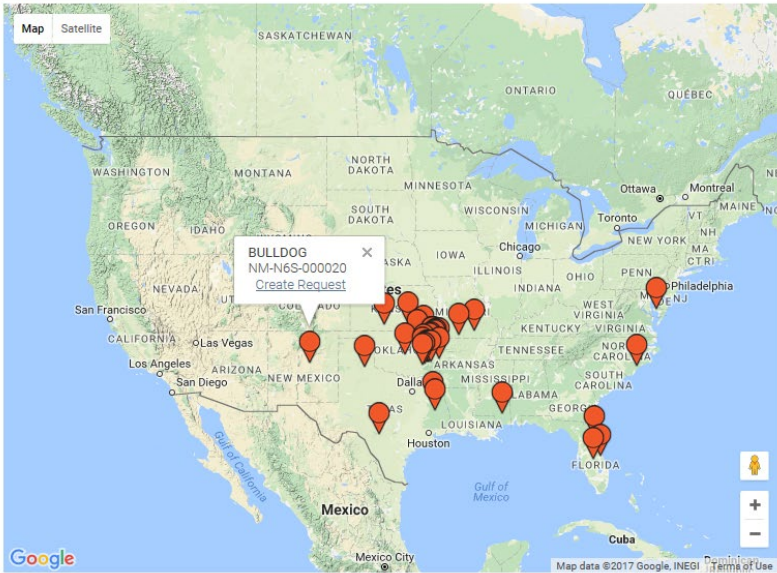
BAER Imagery Support
BARC Request Page

Incident Map Request Queue Login





To submit a BAER support request or to check on the status of an existing request please select the incident from the map or the dropdown list. You can also browse existing requests from the [Request Queue](#)

Don't see your incident? [Create Blank Request](#)

Select... ▼



Having trouble? If your request is related to a US Forest Service fire contact Justin Epting at jepting@fs.fed.us. If your request is related to a Dept. of Interior fire contact Randy McKinley at rmckinley@usgs.gov. If your request is not related to an active BAER incident please send an email to BAERImagery@fs.fed.us

- Google maps interface
- Populated with current large incidents
- If fire not listed, user can add manually
- Ex. 1 walks you through the process of ordering
- Account required (very simple, instantaneous)

<https://fsapps.nwcg.gov/mtbs/birch/>

BAER Imagery Support Request Application

BAER Imagery Support

BARC Request Page

[Incident Map](#) [Request Queue](#) [Logout](#) [User Administration](#)

Send To BRAFTA

Incident Information

Incident name	TRAIL MOUNTAIN	Incident ID	UT-MLF-008089
Agency	USFS	Acres	13710
Ignition date	0018-06-07	Percent contained	17
Expected containment date	0018-07-11		

Incident Location

Add by Google Maps

Lat -OR- **Enter Coordinates in DMS**




Long

BAER Team and Data Delivery Information

BAER Assessment Start Date	2018-06-25	Department	Forest Service ▼
BAER Team Leader Name	TBD	Requestor name	Jeff Bruggink
Requestor email	jbruggink@fs.fed.us	Requestor phone	801-825-5357
Comments	copy Brendan Waterman		
Supporting Agency	USFS-RSAC ▼		
Status	Complete ▼		

Cancel **Submit**

Having trouble? If your request is related to a US Forest Service fire contact Justin Epting at jepting@fs.fed.us. If your request is related to a Dept. of Interior fire contact Kurtis Nelson at knelson@usgs.gov. If your request is not related to an active BAER incident please send an email to BAERimagery@fs.fed.us



BAER Imagery Support Request Application

BAER Imagery Support

BARC Request Page

[Incident Map](#) [Request Queue](#) [Login](#)

You may only edit requests that you have created.

Only show: Year

Incident Name	Administrative Unit	Supporting Agency	BAER Assessment Start Date	Requested Date	Status	
Santa Cruz	National Park Service	USGS-EROS	2018-04-09	2018-04-04	Complete	Show
Diener / Bluewater	USFS	USFS-RSAC	2018-04-23	2018-04-19	Complete	Show
RATTLESNAKE	USFS	USFS-RSAC	2018-05-04	2018-04-26	Complete	Show
TINDER	USFS	USFS-RSAC	2018-05-05	2018-05-02	Complete	Show
Buzzard	USFS Gila NF	USFS-RSAC	2018-06-03	2018-05-31	Complete	Show
Soldier Canyon	BIA- Mescalero	USGS-EROS	2018-06-11	2018-06-10	Complete	Show
377	USFS-Apache Sitgreaves NF	USFS-RSAC	2018-06-14	2018-06-11	Complete	Show
416	USFS	USFS-RSAC	2018-06-18	2018-06-14	Complete	Show
Stone	USFS Angeles NF	USFS-RSAC	2018-06-15	2018-06-14	Complete	Show
Horse Park Fire	BLM	USGS-EROS	2018-06-01	2018-06-15	Complete	Show
BADGER CREEK	Medicine Bow NF	USFS-RSAC	2018-06-25	2018-06-15	Complete	Show
TRAIL MOUNTAIN	USFS	USFS-RSAC	2018-06-25	2018-06-16	Complete	Show
SAN ANTONIO	National Park Service	USGS-EROS	2018-06-25	2018-06-20	Complete	Show

Same site for USFS and DOI

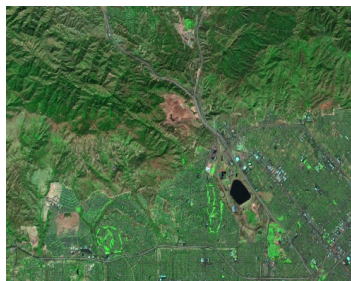


What's Included with a BARC Package

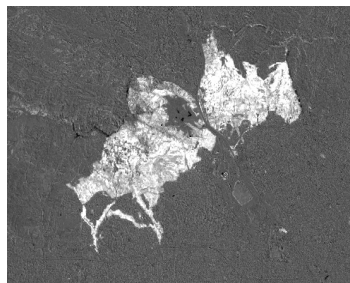


Products

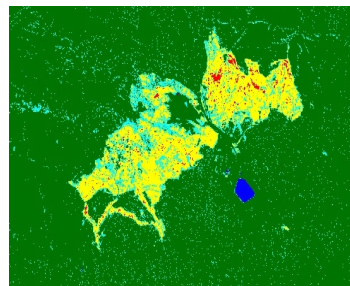
Prefire image



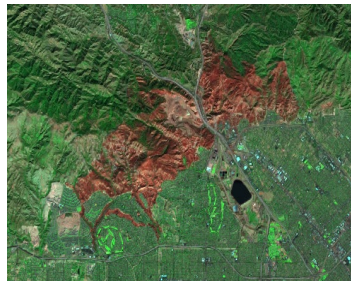
dnbr



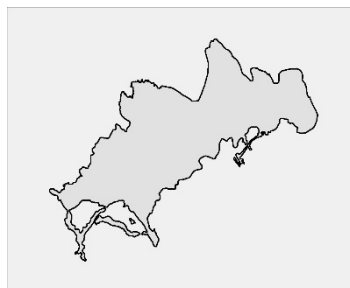
BARC256



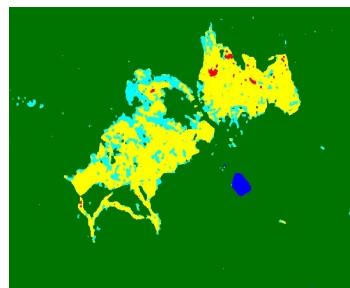
Postfire image



Burn boundary



BARC4



- Google Earth KMZ of BARC4
- Metadata
- JPG Thumbnails

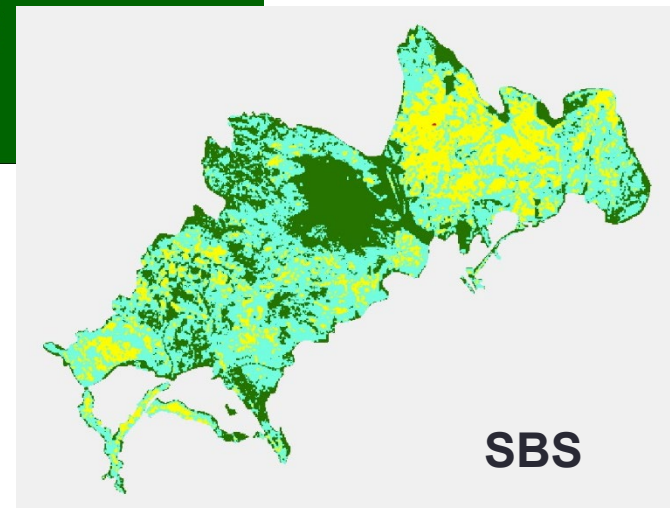
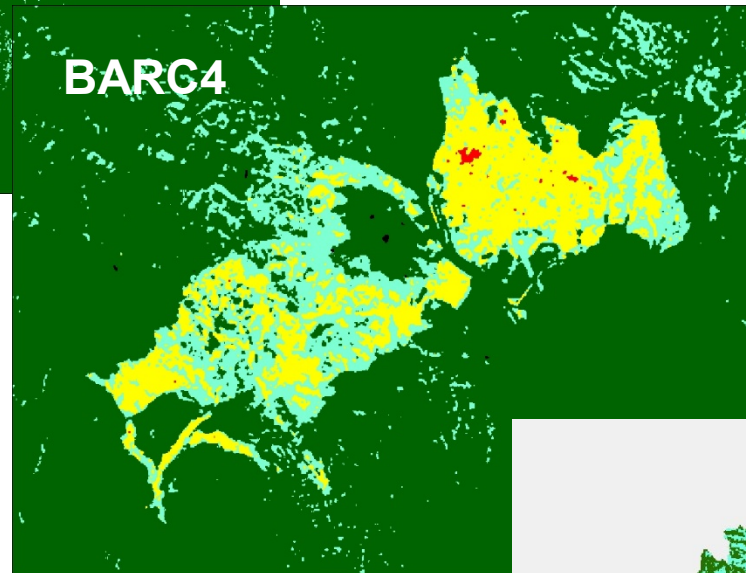
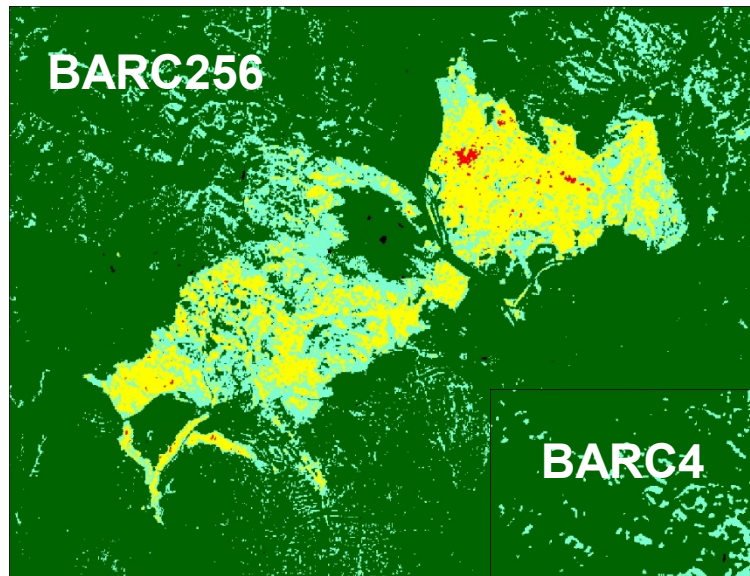


Side note: BARC256 vs BARC4 vs SBS

- **BARC256:** 8-bit burn severity derived from 16-bit dNBR.
Used to create the SBS
 - $\text{BARC256} = (\text{dNBR} + 275) / 5$
- **BARC4:** filtered/smoothed version of the BARC256 with only 4-5 thematic classes
 - Can't be modified to create the SBS
 - Filtered/smoothed which some people like and others don't
- **SBS: Soil Burn Severity**
 - Final, field-validated burn severity based on BAER team sampling, flight reconnaissance, etc.



Saddleridge fire (CA), 2019





Data Delivery

- **BARC data will be staged on Box drive**
 - Requestor will be emailed a link
 - For USFS BAER teams only
- **All other support, usually delivered via email**

File Nomenclature

Event ID



File Type

File Name

Prefire	id4509211653520120909_20110920_I5_refl.tif
Postfire	id4509211653520120909_20120930_I7_refl.tif
dNBR/dNDVI	id4509211653520120909_20110920_20120930_dnbr.tif
BARC4	id4509211653520120909_20110920_20120930_dnbr_bar4.tif
BARC256	id4509211653520120909_20110920_20120930_dnbr_bar256.tif
Perimeter	id4509211653520120909_20110920_20120930_burn_bndy.shp
Metadata	id4509211653520120909_20110920_20120930_metadata.txt
Thumbnails	id4509211653520120909_20110920_20120930_bar.jpg
Google Earth	id4509211653520120909_20110920_20120930.kmz

Plus 2 Word documents

Soil Burn Severity



What is SBS?

1. SBS is the field-validated final burn severity dataset
2. It is necessary for all BAER related mitigation measures
3. Also necessary for debris flow hazard modeling
4. It is the only dataset that we make publicly available

This field guide helps BAER teams to consistently interpret, field validate and map soil burn severity



Included in training data bundle, and a downloadable PDF is available:

[Field Guide for Mapping Post-Fire Soil Burn Severity](http://treesearch.fs.fed.us/pubs/36236)
<http://treesearch.fs.fed.us/pubs/36236>





Soil Burn Severity

- GTAC acts as a repository for SBS data.
- GTAC distributes SBS data for fire research, management, decision making, etc.
- Received 70 - 80% back over past three years.
- After field assessment, post final soil burn severity data to T-drive:

**T:\FS\NFS\WOEngineering\GMO-
RSAC\RDAS\BAER_FINAL_SoilBurnSeverity**

Soil Burn Severity Guidance

■ Raster dataset

- GeoTIFF
- 4 class thematic

■ Metadata

- Follow template provided with the data bundle

■ Ancillary data

- Geolocated photos
- Include vector format (shapefile) if desired
- PDF of BAER team map

■ Posted to T-drive

Instructions for Archiving the Soil Burn Severity Data

The Soil Burn Severity (SBS) dataset should be submitted to GTAC where it will be archived and made available to land managers, the fire research community and the public. These datasets are also used to assess the accuracy of the BARC products and to maintain high quality standards. It is therefore critical that they are submitted.

Upon completion of an SBS map, the BAER Team Leader should approve the map and authorize the BAER GIS specialist to transmit a copy of the SBS data to GTAC for archiving and distribution. The SBS data should follow the guidelines below. If you need help with converting or submitting data, please contact Justin Epting at justin.epting@usda.gov.

1) SBS dataset format

- A. GeoTIFF raster format (.tif extension), classified into four categories: Unburned to very low, Low, Moderate, and High.

2) Metadata

- A. Open the metadata text file included in the SBS data bundle and complete the following sections:

- Soil Burn Severity Contacts – enter the names of the BAER team, as indicated
- Soil Burn Severity Thresholds – enter the updated threshold values, or leave blank if no changes were made
- Systematic or Manual adjustments (for instances where the BARC was adjusted)
 - Systematic adjustments involve modifying the thresholds of the BARC256 and applying to the entire dataset
 - Manual editing refers to changing only specific portions of the BARC, based on field sampling and reconnaissance data. These changes are usually made manually in the GIS.
- Processing Steps
 - Document the steps taken to convert the BARC4 to the SBS dataset. For example:
Step 1 - Adjusted the threshold between High and Moderate severity from 200 to 210 based on 10 field observations in those classes
Step 2 - Used a vegetation cover map to reclassify grasslands to Low burn severity,
Step 3 - Used a vegetation cover map to reclassify chaparral from High to Moderate burn severity.
 - If no changes were made, enter the steps taken to review or validate the BARC.
- Additional comments – add comments for any other pertinent information

Note: If you investigated the fire and found the BARC to be accurate, thus requiring no changes, please state that clearly.

3) Additional datasets (optional)

- A. If you have additional datasets such as the vector version of the SBS, the final burn severity PDF map, geotagged photos, ground points or polygons that were drawn to help delineate the burned areas, please include those along with your SBS data, if you like. These data are very useful for interpretation and for understanding how the BARC was validated and the SBS created.

4) Delivery of SBS data



- A. Zip the SBS data, metadata and additional datasets together, name it with the format:
Firename_Region.zip
- B. Post the zip file to this location:
T:\FS\NFS\WOEngineering\GMO-RSAC\RDAS\BAER_FINAL_SoilBurnSeverity
- C. Send an email to baerimagery@fs.fed.us or justin.epting@usda.gov to alert GTAC

5) Archive Site

- A. SBS maps will be posted to <https://fsapps.nwcg.gov/baer/baer-imagery-support-data-download>, a link to the data will be included in the "Soil Burn Severity" column.



BAER Imagery Support Website

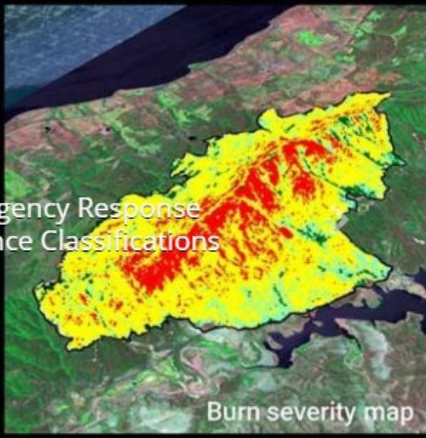


USDA Forest Service

Geospatial Technology And Applications Center

Burned Area Emergency Response (BAER) Imagery Support

SEARCH | FAQs | CONTACT


[BAER Home](#) [Data Request](#) [Data Download](#) [FAQs](#) [Resources](#)




About / FAQ

Questions and Answers about Burned Area Emergency Response (BAER) Imagery Support and Burned Area Reflectance Classifications (BARC).


Pre-fire image Post-fire image Burn severity map



REQUEST DATA



DOWNLOAD BURN SEVERITY PRODUCTS
























































ABOUT BAER IMAGERY SUPPORT


<http://fsapps/nwcg.gov/baer/>

Public Data Distribution

1. Preliminary data bundle made available on the BAER Imagery Support website
 - Prefire and postfire imagery subsets
 - dNBR
 - Metadata
 - **BARC is not included in the bundle (available only to BAER team)**
2. Soil Burn Severity data bundle made available once received

Region 05 (Pacific Southwest)

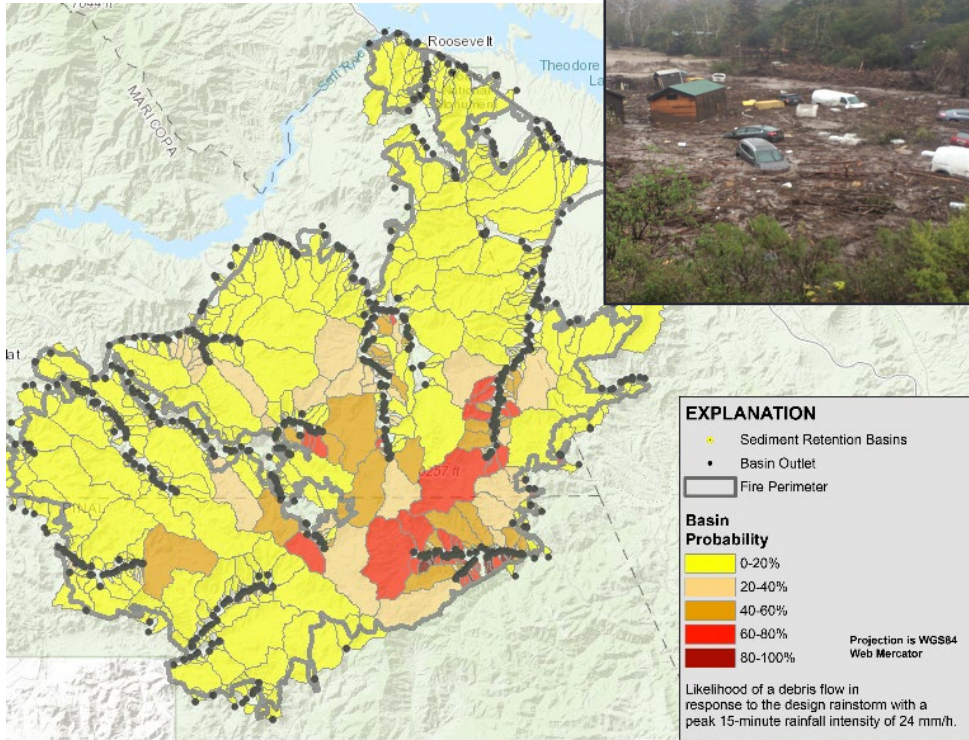
Fire Name	Fire ID	Ignition Date	Administrative Unit	State	Preliminary Data		Soil Burn Data	
Camp	ca3982012144020181108	11/08/2018	Plumas National Forest	California				
Charlie	ca3449011860020180922	09/22/2018	Angeles National Forest	California				
Cranston	ca3372011680020180725	07/25/2018	San Bernardino National Forest	California				
Delta	ca4094312242720180905	09/05/2018	Shasta-Trinity National Forest	California				
Donnell	ca3834911992920180801	08/01/2018	Stanislaus National Forest	California				
Ferguson	ca3765211988120180713	07/13/2018	Sierra National Forest	California				
Georges	ca3664611822120180708	07/08/2018	Inyo National Forest	Nevada				
Hirz	ca4089112222820180809	08/09/2018	Shasta-Trinity National Forest	California				
Holy	ca3367611751620180806	08/06/2018	Cleveland National Forest	California				
Kerlin	ca4061612352420180904	09/04/2018	Shasta-Trinity National Forest	California				
Lions	ca3756511912720180611	07/06/2018	Sierra National Forest	California				
Mendocino Complex	ca3924012311020180727	07/27/2018	Mendocino National Forest	California				
Stone	ca3490011851020180604	06/04/2018	Angeles National Forest	California				
Stone MDF	ca4139512105720180815	08/15/2018	Modoc National Forest	California				
Valley	ca3409611695820180706	07/06/2018	San Bernardino National Forest	California				
Whaleback	ca4063012088020180727	07/27/2018	Lassen National Forest	California				



Modeling Tools that Utilize BARC/SBS data



Modeling Tools - BAER



Example: Debris-flow hazard assessment for the 2019 Woodbury Fire near Phoenix, AZ



USGS program for rapid hazard assessment and early warning of debris flows

Dennis Staley and others

For more info, see:

<https://www.usgs.gov/natural-hazards/landslide-hazards/science/emergency-assessment-post-fire-debris-flow-hazards>



Modeling Tools - BAER

WEPP and other models developed by Pete Robichaud and colleagues

- **Water Erosion Prediction Project (WEPP-GeoWEPP)**
 - Estimates sediment yield and runoff from interrill and rill erosion processes at the hillslope scale (slope, cover, soil, climate)
- **Erosion Risk Management Tool (ERMiT)**
 - Uses multiple runs of WEPP over a range of input parameters to predict event sediment delivery in probabilistic terms on burned and recovering forest, range, and chaparral lands (slope, soil, climate, soil burn severity)
- **Revised Universal Soil Loss Equation (RUSLE)**
 - Estimates average annual soil movement resulting from interrill and rill erosion (slope, cover, soil, climate)
- **Values At Risk (VAR) Calculation Tool**
 - Supports valuation of Values at Risk; considers spatial info (burn severity, treatments, in relation to identified VARs) and ERMiT results

For more info, see: <https://forest.moscowfsi.wsu.edu/fswepp/>















WEPP Online Tools

<https://forest.moscowfsi.wsu.edu/fswepp/>



Forest Service WEPP Interfaces



	WEPP:Road 599 runs YTD	WEPP:Road Batch 199 runs, 16872 segments YTD	
	ERMiT 13349 runs YTD	ERMiT batch (download) 122 runs YTD	
	Disturbed WEPP 2983 runs YTD	Disturbed WEPP batch (download) 83 runs YTD	
	Tahoe Basin Sediment Model 92 runs YTD	Biomass Sediment Model 17 runs YTD	
	FuME (Fuel Management) 128 runs YTD	Rock:Clime	
	WEPP Watershed Online GIS	Peak Flow Calculator	
	Water And Sediment Predictor Under development	Other WEPP resources	

Units: ☐ metric ☒ U.S. customary ☐ [personality](#) (a to z)

[\[FS WEPP hints and requirements \]](#) [\[Send FS WEPP developers your comments on the Forest Service WEPP Interfaces \]](#)
[\[FS WEPP privacy disclaimer \]](#)

[Bill Elliot](#), USDA Forest Service RMRS Air, Water, and Aquatics Environments, Moscow, Idaho
These interfaces funded in part by

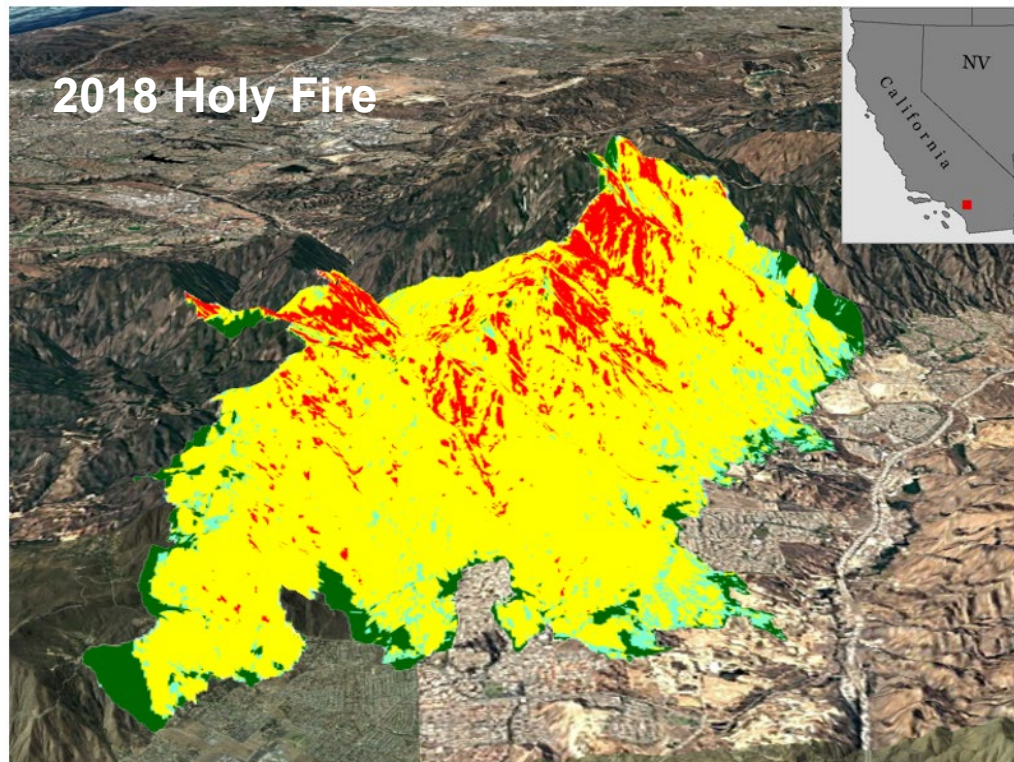


GIS Exercises - Preview



GIS Exercises Preview

- Exercise 1 – How to Order a BARC
- Exercise 2 – Editing The BARC
- Exercise 3 – GIS Analysis



Exercise 1 – How to Order a BARC

Problem: You've been asked to request a BARC map for an upcoming BAER team assessment.

Topics covered:

1. Create a new account
2. Go through the steps to request a BARC for a fire shown on the map
3. Go through the steps to request a BARC for a fire not shown on the map

BAER Imagery Support
BARC Request Page

Incident Map Request Queue Login

To submit a BAER support request or to check on the status of an existing request please select the incident from the map or the dropdown list. You can also browse existing requests from the [Request Queue](#)

Don't see your incident? [Create Blank Request](#)

Select...

Map Satellite

BULLDOG NM-N6S-000020
[Create Request](#)

Having trouble? If your request is related to a US Forest Service fire contact Justin Epting at jepting@fs.fed.us. If your request is related to a Dept. of Interior fire contact Randy McKinley at rmckinley@usgs.gov. If your request is not related to an active BAER incident please send an email to BAERimagery@fs.fed.us

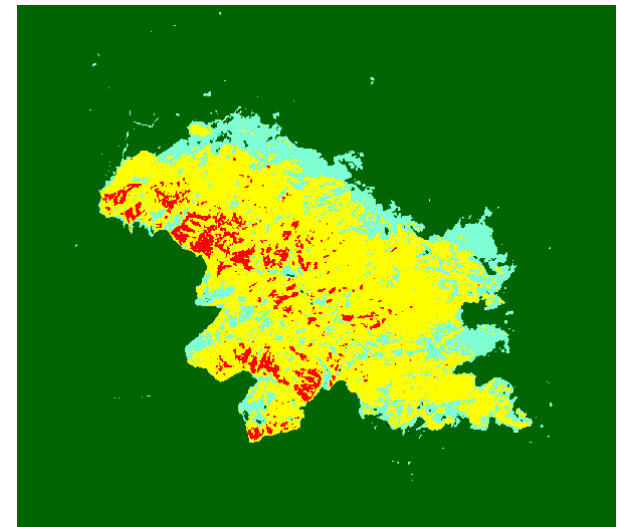
BAER RSAC USFS USGS

Exercise 2 – Editing the BARC

Problem: *The BARC received from GTAC does not match the field observations and needs to be adjusted.*

Topics covered:

1. Symbolize and visualize BARC package data
2. Compare field data to the BARC
3. Edit the BARC256 based on field data
4. Create the Soil Burn Severity dataset
5. Complete metadata and return SBS to GTAC



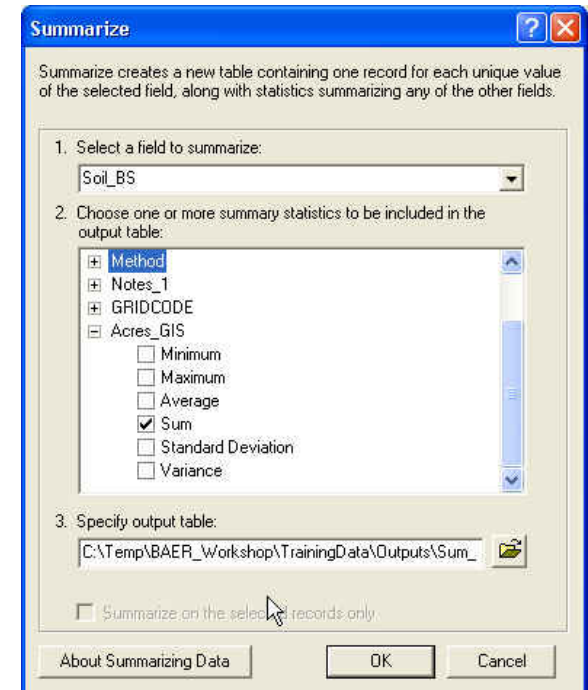
2018 Holy Fire, California

Exercise 3 – GIS Analysis

Problem: For the reporting phase of your burn severity mapping you need to summarize the burn severity acres by land management.

Topics covered:

1. Create a new attribute and calculate a field
2. Summarize a field based on categorical data
3. Summarize the intersection of two layers





Contacts and Tech Support

Training is available for all interagency BARC users

For help and information please contact:

US Forest Service:

Carl Albury

carl.albury@usda.gov

(801) 975-3351

Department of the Interior:

Kurtis Nelson

knelson@usgs.gov

(605) 594-2805

Order BAER Imagery:

<https://fsapps.nwcg.gov/mtbs/birch/>

For additional information please visit the GTAC BAER website:

<https://fsapps.nwcg.gov/baer/>



United States Department of Agriculture
Forest Service



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