C. Steps for Completing Burn Severity Assessment Requests

Overview

National Park Service (NPS) units in which a single fire exceeded 500 acres will request an assessment of burn severity through the NPS-U.S. Geological Survey (USGS) National Burn Severity Mapping Project website. NPS units should also consider requesting burn severity assessments for single fires 300 to 500 acres in size, or multiple fires that exceed 500 acres (but no single fire that is larger than 300 acres). An on-line request form has been developed to facilitate this requesting process (described in detail in step 2 below). The requesting unit does **not** have to pay for the assessment.

Park and cluster level Fire Management Officers (FMOs) should identify an individual to complete the on-line request form with input from fire management staff. Currently, in many parks, the fire ecologist or fire GIS specialist has taken on this role. Before completion of any requested assessment, National Burn Severity Mapping Project staff will first evaluate potential quality of requested assessments. If quality of assessment is questionable they will work with park staff to determine whether to proceed with the assessment. Cloudiness, size of burn, vegetation type, and availability of Landsat scenes can all impact assessment quality.

The initial and extended burn severity assessments are a nationally approved NPS fire effects monitoring protocol. The Joint NPS-USGS National Burn Severity Mapping Project addresses the need to quantify fire effects on NPS lands in order to develop an archive of fire history. This archive includes all fire types: wildfire, prescribed and wildland fire use. The goal is to monitor by means of standardized geographic databases employing consistent measures of "burn severity", defined as the magnitude of ecological change caused by fire. Burn Severity Assessments use Landsat 30-meter data and a derived radiometric value called the Normalized Burn Ratio (NBR). The difference between pre-and post-fire NBR datasets is computed to determine the extent and degree of landscape change resulting from fire. Remote sensing and field methods for burn severity and a general overview of burn severity mapping are available at the NPS-USGS National Burn Severity Mapping Project website: http://burnseverity.cr.usgs.gov/.

The GIS and cartographic products that the National Burn Severity Mapping Project produces delineate fire perimeter and provide information on the range of effects within the burn. These products help to define lasting impacts and environmental responses from fire and to prepare for long-term management of burned areas. Because many fires cannot be closely monitored while active, post-fire evaluations also yield insight into fire behavior across varying topography and vegetation, thus contributing basic information for research and modeling.

Request Deadlines

All requests should be completed within a few months after the end of the local NPS unit's primary fire season.

Burn Severity Assessment Types

Requests may include Extended Assessments, Initial Assessments, or both. Please review the descriptions below to determine which is appropriate for your area.

Rapid Assessments are assessments specifically completed for Burned Area Emergency Rehabilitation (BAER). These assessments are not requested through the NPS-USGS National Burn Severity Mapping Project website (see Rapid Assessment for more information).

- *Extended Assessment (EA)*: Generally completed on all large burns. Post-fire Landsat scenes are acquired during the first growing season after the fire. Timing varies with geographic region; it may be 8-11 months post-fire in the northwest, while only 1-4 months post-fire in the southeast. The EA provides a final complete view of the burn, including the ability to capture delayed mortality and survivorship of burned vegetation. For this reason, it tends to be a better indicator of severity than the Initial Assessment by offering a means to evaluate the full range of first-order ecological effects. In most cases, it also provides a good delineation of the burned area and fire perimeter. By waiting until the next growing season, the opportunity to acquire optimal remote sensing data is also greater than with Initial Assessments. The EA is important for long-term management, ecological understanding and study of burns.

- *Initial Assessment (IA)*: The IA is generally done within one week to two months after the fire. It *may* fall within the timeframe of rapid response by BAER teams. There are two triggers for IA: 1) when the fire stops growing significantly, or preferably when the fire is completely out, and 2) when acceptable Landsat data is available. Because of data timing and quality issues, it may not be possible to do an IA on all burns. The IA usually cannot capture both delayed mortality and regrowth or survivorship of burned vegetation especially in western coniferous systems. Thus, IA normally misses some important factors for gauging burn severity, and may tend to overestimate severity. Moreover, in some cases, the fire may still be active after the last Landsat scene suitable for IA, so the IA may not show the final area or composition of the burn. Depending on how late in the year burning concludes, snow and low sun angles may also reduce the quality of results.

- *Rapid Assessment:* BAER teams often conduct rapid assessments of fires using remote sensing products. This post-fire emergency assessment can include requesting a Burned Area Reflectance Classification (BARC). BAER teams complete this request immediately prior to or after arriving on the fire; the product needs to be delivered to the team as soon as possible, often less than a week after the request. The intent of the BARC map is to provide the BAER teams with a product to assist in determining emergency stabilization needs; it may or may not meet the objectives for fuels monitoring or vegetative fire effects analysis. The incident pays for BARC maps. To request Burned Area Emergency Response (BAER) Imagery Support go to: http://www.fs.fed.us/eng/rsac/baer/.

STEP 1: Determine the Type of Burn Severity Assessment Needed

Extended Assessments are recommended in all cases with the following exceptions:

- All of the burn occurs within ecotypes that respond quickly after fire, and first-order effects are ephemeral. This includes many grasslands, mesic shrub and herbaceous communities. Often in these cases, just knowing whether or not an area burned is sufficient, because severity is uniformly low and homogeneous. We can review available post-fire data in these cases to help determine whether it would be productive to proceed with an EA.
- The burn is small (<300 acres), and it did not produce sufficient area representing a range of effects, e.g. it was mostly low to moderate severity. Such burns may be more cost effectively characterized by other means.

Initial Assessments may be warranted under one or more of the following conditions:

- The burn is large and has significant socio-economic impacts, or when there is an urgent need for public information and/or emergency response.
- Significant portions of the burn occur within ecotypes that respond quickly after fire, or where first-order effects are ephemeral, as in many grasslands, or mesic shrub and herbaceous communities.
- The burn is in deciduous forest and/or it is a fall burn after leaves have fallen, such that, the next season's growth is likely to completely obscure the burn.
- The burn is the subject of study, with objectives to compare burn responses over time.

Both Initial and Extended Assessments may be useful in some circumstances for full information on the extent and composition of burns:

- Low severity fires that occur in high-density, closed-canopy forest (deciduous or coniferous), to better delineate the burn scar as well as the severity mosaic.
- Where burns are exceedingly complex involving several different ecotypes, again, using the IA to distinguish burned and unburned areas, and to delineate the perimeter, while capturing additional burn severity information with the EA.
- If there is uncertainty about the need for either an IA or EA, seek assistance through the contact information on the web site. It is possible, for example, to complete the EA and then determine the need for an IA after looking at the results. Since all Landsat scenes are archived, the ability always exists to go back and complete any assessment type at a later date.

Additional Guidelines:

- For most solitary fires, only burns greater than 300 acres should be mapped. Smaller fires can be mapped when there is solid justification.
- A Landsat scene covers 180km by 180 km, and all fires within that scene will be captured, so there is no need to submit multiple requests for all fires covered within the same scene area and timeframe. Complete a request for the largest fire, and make note of the additional fires on the on-line request form.
- EA can effectively map burn severity in forest or shrub communities when burns are mixed severity and greater than 100 acres. However, when fires are low severity and/or homogeneous in those communities, consider an assessment only when fires are greater than 300 acres.

- In grasslands or other communities where first-order effects are short lived, consider burn severity assessments only when a fire is greater than 300 acres. When fire effects are ephemeral, an IA may provide all the information necessary to capture the burn and unburned mosaic. An EA may not contribute much about severity, except perhaps that productivity was actually enhanced by the fire.
- There often are unique circumstances and uncertainties about completing a burn severity assessment. Feel free to contact the NPS Fire Ecology Program Lead with any questions about the need or type of assessment.

STEP 2: Complete On-line Request for Burn Severity Assessment:

1. Go to http://burnseverity.cr.usgs.gov/fire_main.asp
2. Click on "Request Data"
3. Click "NPS Burn Severity Mapping Requests"
4. Fill out form:
   - Under "Type of Analysis" enter the assessment type. The options are Extended, Initial, or Both. Your default selection should not be "both". If you request an Initial or both (initial and extended assessment), you will need to write a brief justification on why the IA is needed.
   - Make sure to list smaller secondary fires in the request. Burn severity assessments can detect fires that are around ten acres; if these fires are included in the request, USGS EROS Data Center (EDC) will map their perimeters when feasible. Also, inclusion of these fires may influence what pre- and post-fire scenes that EDC selects for the assessment.
   - If there is urgency, please state that in the comment section of the request form and EDC will try to complete the assessment as soon as EDC acquires acceptable Landsat scenes.

Timeframe and Products

Once the request is submitted, EDC will begin selecting and processing Landsat data. Scene selection for extended assessment depends on when green up occurs and in high elevation fires this may not happen until late summer. For extended assessment there is usually no urgency in completing the assessment, however, EDC will try to have most assessments completed by fall.

When the assessment has been completed, EDC will post the results on the National Burn Severity Mapping Project website under the *Data Archive* link, and will send the primary contact person, identified in the on-line request form, three cds:

- One cd will have an ArcView project with a full Landsat scene dNBR, a rescaled first draft of burn severity classes, the fire perimeter, and metadata.
- The other two cds will have the pre- and post-fire Landsat scenes in the park's designated projections and in the Geo-tiff format, (see *Data Contents* link for further details).

If you have any questions regarding completion of the burn severity assessment request form, or what type of assessment to request, contact USGS EDC or NPS Fire Ecology Program Lead:

- Stephen Howard, EDC, 605-594-6027, smhoward@usgs.gov
- Don Ohlen, EDC, 605-594-6026, ohlen@usgs.gov
- Nate Benson, NPS, 208-387-5219, nate_benson@nps.gov