FPA – LANDFIRE
Questions and Answers
Summer 2008

The following are a compilation of questions from the bureaus of the Department of the Interior on the LANDFIRE and Fire Program Analysis (FPA) projects. The effort of gathering the questions, coordinating/developing the answers, along with following up and clarifying the information took place during the summer of 2008. Many of the questions were summarized and combined to provide for clarity. The questions were specifically addressed to either FPA or LANDFIRE and were subsequently answered by each projects management team. Each question is identified by project name for reference. Questions and answers were not divided along project lines but were partitioned into Management / Overview questions and Technical / Application questions with sub categories of scale, general, and update strategy topics. If there are further questions please contact each projects helpdesk: FPA (fa_fpa@nifc.blm.gov) and LANDFIRE (helpdesk@landfire.gov).

Management and Overview Questions:

Scale . . .

1. What is the appropriate scale for use of the LANDFIRE (LF) products?

Answer: LANDFIRE products are designed to facilitate national- and regional-level strategic planning and reporting of wildland fire management activities. The appropriate use is at the national-level, landscape-scale to support strategic vegetation, fire, and fuels management planning (fire, analysis, budgeting) with consistent products to evaluate management alternatives across-boundaries.
As listed on the LANDFIRE website the following information is provided. *"LANDFIRE data products are designed to facilitate national- and regional-level strategic planning and reporting of wildland fire management activities. Data products are created at a 30-meter grid spatial resolution raster data set. LANDFIRE National products were designed to provide national (all states) strategic planning and regional (single large states or groups of smaller states) analysis. Products support strategic/tactical planning for large sub-regional landscapes (such as significant portions of state(s) or multiple federal administrative entities). The applicability of LANDFIRE National products to support fire and land management planning on smaller areas will vary by product, location, and specific use. LANDFIRE National data products are produced at scales that may be useful for prioritizing and planning hazardous fuel reduction and ecosystem restoration projects; however, products may need to be adjusted by local users."*
Managers and planners must make their own evaluation of the data that is available for their use dependent on the scale and their requirements (i.e. habitat requirements for the species being considered; Community Leaders and interagency partners). The LANDFIRE products are not intended to replace local products but serve as a backup providing wall-to-wall cross boundary products. It is the responsibility of the user to be familiar with the value, assumptions, and limitations of the LANDFIRE products.
LANDFIRE products are consistent across all ownerships. LANDFIRE makes a basic distinction between data and products. LANDFIRE will use local data (field plots, disturbance area or management areas of change). LANDFIRE can not use local products (a locally developed vegetation or fire behavior fuel map; locally developed map legend) LANDFIRE uses national consistent processes and methods to derive the comprehensive suite of products for the nation.

2. What is the scale at which FPA will run?

Answer: The standard grid cell resolution that will be conducted by all analysis (Initial Response Simulator and Large Fire Module) will be at 270-meters.

3. What is the appropriate/optimal scale of usage for LANDFIRE products for FPA? (FPA analysis and Fire Workload Area).

Answer: FPA's analysis is at a more strategic and coarser scale. A cell size of 270-meters is optimum for the FPA's analysis requirements (the smallest area within the model's computational limits is greater than the 18 acres that make up a 270-meter grid cell). LANDFIRE's use is appropriate because of the consistent way it was developed and its comprehensive coverage. LANDFIRE contains the suite of product themes that are inclusive to wildfire modeling requirements.

4. Is there a communication strategy for the LANDFIRE project and is there a list-serve?

Answer: LANDFIRE has a communication plan. This plan outlines the strategy identifying the communication approach to reach different audiences, customers, or stakeholders with information targeted to their needs. LANDFIRE was funded as a technical development and production organization. A communications and outreach staff was not provided. LANDFIRE has to carefully balance information, presentations, and product requests with production and product delivery timelines. LANDFIRE does not have a list-serve where information is automatically broadcast to those on a list. Informational updates are periodically posted at www.landfire.gov. The LANDFIRE Executive Oversight Committee (EOC) and the LF Business Leads are interested in feedback regarding more useful communication methods to reach managers. Your suggestions will help us develop a more useful communication plan and approach given project constraints.

General . . .

5. Does LANDFIRE produce a newsletter or similar information publication on a regular basis?

Answer: LANDFIRE produces information bulletins. These bulletins are posted at http://www.landfire.gov/documents_bulletins.php. These bulletins are produced generally on a bi-annual basis and are often available at meetings or workshops. Bulletins are not produced on a more frequent basis because information about LANDFIRE does not change that often as tasks are repetitive in nature accomplishing the same tasks for each map zone across the country.

6. Why can't LANDFIRE be the compilation of the best data available by ecoregion instead of the "one-size fits all" system of data?

Answer: LANDFIRE was not chartered to be an ecoregional effort. It is a national effort sponsored by the Wildland Fire Leadership Council (WFLC) to produce comprehensive wall-to-wall maps for the entire 50

states covering all land ownerships, not just federal lands. A key quality objective of the LANDFIRE project is consistency across all ownerships. LANDFIRE provides national, broad-scale products that can be used across multiple ecoregions. LANDFIRE makes a basic distinction between "best data available" and local products. The difference with a distinction is, the Charter requires LANDFIRE to use national consistent processes/methods to derive the products, LANDFIRE does not use local products derived from local data sources (i.e. a vegetation or fire behavior products using a local classification/legend). The LANDFIRE Charter directs - "Extensive field data will be compiled from existing sources." If you have provided your field data and they passed an intensive quality assurance/quality control (QA/QC) process; then the LANDFIRE products reflect your ecoregion. The requirements for field data can be found at http://www.landfire.gov/participate_frd_share.php where there are two documents plus a link to the FAQs dealing with the "Reference Database." The LANDFIRE mapping efforts rely heavily on field-referenced data describing vegetation composition, structure, and wildland fuel. The LANDFIRE reference database comprises data from numerous sources, both government and non-government, and provides "training" information for LANDFIRE mapping tasks. The LANDFIRE team relies on the user community for access to vegetation or fuel data compiled for inventory, monitoring, mapping, research, or similar purposes.

7. Current expected use of LANDFIRE seems to be only fire/fuels. Are Natural Resource values incorporated into the LANDFIRE process?

Answer: Fire is one of the main reasons the project was initiated, however the sponsors of this effort envisioned its use for broader resource management and the natural resource community. In fact the full title of the project is; "Landscape Fire and Resource Management Planning Tools Project." LANDFIRE produces a suite of vegetation layers which build upon fire and natural resource field data. Fire is a natural ecological process which is an integral part of natural resource management. Many of the LANDFIRE products incorporate disturbances other than fire (such as flooding, insect & disease, and wind throw) and include basic ecological and management information relevant to non-fire-adapted ecosystems.

8. What is the link between LANDFIRE and Wildland Fire Decision Support System (WFDSS)?

Answer: LANDFIRE and WFDSS are two separate projects. WFDSS is a decision support system (application) that uses LANDFIRE products. WFDSS relies on the benefits of having a large gapless product set. Because of the consistent and comprehensive nature of the LANDFIRE products, these products support management requirements and timely information in the decision process. WFDSS is aware of the limitations and assumptions of the products. Individual or local landscape files limitations and assumptions are not known to all users. As with any probability-based predictive model, the results depend on the quality of data input and how closely the actual conditions match the model conditions. For 20 Fire Spread Probability (FSPro) runs from the 2007 fire season, 85% were accurate. LANDFIRE holds an annual After Action Review (AAR) with WFDSS personnel at the end of every fire season to discuss and understand what went well and what could be improved. The Rapid Refresh update approach was discussed and developed with support from WFDSS personnel. Local experts (fire behavior specialists) should use the knowledge gained from creating local landscape files and working with these types of data sets to provide information and data to the LANDFIRE update process.

Update Strategies . . .

9. Will the LANDFIRE Refresh process allow for updates other than the disturbance polygons mentioned in the February 2008 briefing paper?

Answer: Yes. The Rapid Refresh allowed for LANDFIRE map zone-wide updates to fire behavior fuel models and canopy characteristic by changing rule assignments to existing vegetation and life-zone layers. This is in addition to the "update" of existing vegetation and fire behavior fuel layers within wildland fire perimeters. The full Refresh allows for zone-wide updates to existing vegetation, succession class, and biophysical setting along with the addition of other layers, such as soils, to improve rule set assignments and succession modeling to produce vegetation, fire behavior and fire effects layers. This will be in addition to "updates" within disturbance or change polygons for wildland fire, fuel and vegetation treatments, and other disturbances (i.e. insect mortality, hurricanes, agricultural areas, invasive areas, etc.). For both Rapid Refresh and Refresh the "updates" are correlated across LF mapping zones and geographic areas to provide for consistency. No direct editing of vegetation, fire behavior, or fire effects is allowed. All "updates" must be based on a rule set associated with the underlying vegetation and environmental layers. This process provides consistency and ecological rationale.

10. What are the workload impacts of the LANDFIRE Refresh update to field personnel? (i.e. expertise required to complete the update processes)

Answer: Time estimates for development of the local data vary widely depending on size of unit, complexity, and number of disturbance types and polygons. In general it takes about 1 month for 1 Fire/Fuel/Vegetation specialist with 1 GIS specialist to collect, attribute, and catalog update polygons and rule change recommendations for a large fire/land management unit (5-10 million acres). All disturbance and change polygons will require a correct local projection and attribute data. One of the important attributes is the entry of the Treatment ID for polygons that are associated with a fuels project submitted to NFPORS or FACTS. There may be cases where local units will not have a perimeter for a disturbance or change, such as a burnable agricultural area, and will want to collect that perimeter using a GPS and download the data into GIS and provide this data as part of the update package to LANDFIRE. Rapid Refresh will occur from January through June of 2008 with the bulk of the processing work by NIFTT, RSAC, and EROS with review and recommendation by geographic area Focus Group members. For the Refresh, the prototype period will start following completion of Rapid Refresh and wrap up by the Fall of 2008.

11. In LANDFIRE, some areas are showing as non-vegetated on the existing vegetation layer. How do we update this information?

Answer: Refresh is needed for non-vegetated (water, snow/ice, barren) areas that have vegetation and existing vegetation types that do not have vegetation. This is closely linked with refresh of fire behavior fuel models and fuel loading models identified as burnable or non-burnable. There are several options that will be tested. From a GIS perspective one of the easiest methods is to have the field provide shape files using ground GPS or imagery to delineate water, snow/ice, rock, and barren soil. Adjustment of existing vegetation raster rule sets is another method. A third method could analyze 30-meter imagery further.

12. How can we update the LANDFIRE classification to more accurately reflect the vegetation and fuel types in our areas? Could classifications such as REGAP or local vegetation maps be incorporated into the base LANDFIRE products?

Answer: Subject Matter Experts (SMEs) by Geographic Area Coordination Center (geographic areas) should provide input on suggestions to modify the existing vegetation type classification and associated cover and height classification. This could result in generation of an additional vegetation layer with simpler names and less classes that could increase accuracy and reduce complexity. Since GAP is working towards completing all 50 states it could be used as an input layer to make adjustments in the LANDFIRE vegetation type layer. However, GAP and REGAP (has only completed Pacific Northwest, Southwest, and Southeast) do not have consistent legends across all 50 states so a correlation effort would have to occur that would resolve these inconsistencies. Local vegetation maps that were not continuous or consistent across all 50 states could only be used by SMEs to help in their analysis of rule set adjustments or disturbance and change polygon updates.

13. What are the plans and timelines for the LF Refresh update?

As directed by the LANDFIRE Project Charter, operations and maintenance hand-off plans/strategies are being developed. The strategies include a Refresh, Biennial and Decadal update. The first of these strategies, the Refresh has begun with the first stage of a Rapid Refresh being conducted by the National Interagency Fuels Technology Team (NIFTT) with data processing support through the Forest Service Remote Sensing Application Center (RSAC) and USGS Earth Resources Observation and Science (EROS) center which began production work in January of 2008 and delivered products in June 2008. Additional information is available at http://www.landfire.gov/updating_products.php. Following the completion of the RR, the teams began prototype work on the Refresh methodology. There are several options that will be tested in this prototype phase. The prototype will wrap up in the Fall of 2008. A schedule and more information will be provided as Refresh will begin with data gathering and production work for the first area. The LANDFIRE program is vital to support the full spectrum of fire management and natural resource management programs with timely and quality updated products. Initial documentation on the plans and strategies of the program are available at http://www.landfire.gov/documents_updatedprod.php. Refresh production work is intended to be carried out from the fall of 2008 through the fall of 2010. The plan was to provide initial technical direction in the spring of 2008 on data preparation processes (Data needs & types, data format, and other needed parameters) that the field could begin work on prior to the official data call for their production area, however this was postponed given lessons learned from the RR, initial prototyping results, and fire season work load impacts. This data preparation letter will be coming out early in the fall of 2008 and will be followed by a more detailed briefing paper on the Refresh strategy.

Technical & Application Questions

Scale . . .

1. Will FPA use LANDFIRE, which products are being used, and at what resolution will they be applied?

Answer: FPA is using LANDFIRE fuel model (both 13 Anderson and 40 Scott & Burgan) as well as the basic topographic themes: Elevation, Slope, Aspect; and the four canopy attributes data layers Canopy Cover,

Canopy Height, Canopy Base Height, Canopy Bulk Density. FPA will use the updated Rapid Refresh products as they become available. The longer-term Refresh LANDFIRE products will be used as they are released. FPA is resampling the 30-meter LANDFIRE fuels layers into a 270-meter grid cell resolution. FPA tested both the "Nearest Neighbor" (cell value assignment) and "Center Cell" (using the fuel model of the center of a 9x9 cell block to assign a fuel model to the new larger cell) methods of resampling the 30-meter layers to the 270-meter grid cell and found that the "Nearest Neighbor" method produced results that best represented the distribution and ratio of fuel models contained in the 30-meter LANDFIRE fuels layer. Therefore, FPA selected the "Nearest Neighbor method to perform the resampling.

2. In the FPA analysis, what is the size threshold for updates that need to be shown in LANDFIRE to make a difference in the FPA model outputs? (how large of an area or percentage of an FPU really makes a change in the fuel model and subsequently in the analysis?)

Answer: Answer: A 270-meter grid cell (approximately 18 acres) is the smallest area of change that FPA believes to be significant in terms of modeling for strategic purposes. Impact of changes will vary from FPU to FPU depending on multiple factors. One of the added capabilities of FPA is for the FPUs to model "what if" fuels treatment scenarios to assist in answering this question for their unique situation so that they can demonstrate the need for appropriate levels of fuel treatment funding to achieve their land management objectives.

General . . .

3. How does the LF Rapid Refresh and Refresh products connect with FPA and its analysis?

Answer: FPA is using LANDFIRE products. FPA participated in the design of the Rapid Refresh approach and will use these updated products as they become available. The longer-term Refresh LANDFIRE products will be used as it is released.

4. Is FPA using LANDFIRE as delivered on the National Map? Does FPA have the most current version? Is FPA making adjustments to the LANDFIRE products based on LANDFIREs "Notifications" and "Version Alerts"? If adjustments are being made what are those adjustments?

Answer: FPA is using LANDFIRE products that have been transposed into ORACLE data tables that are originally prepared for the WFDSS program. Tables are used because of their portability and ease of use in the data extraction phase where Landscape files are created for use in the IRS and Large Fire Modules of FPA. These ORACLE tables are derived from the most current versions of LANDFIRE available.

5. What soil information was used in the development of LANDFIRE?

Answer: LANDFIRE used select attributes the State Soil Geographic (STATSGO) geo-spatial data in the western United States as this was the only spatial representation of soils information. STATSGO attributes such as percent sand, silt, and clay; max soil depth; and water holding capacity were refined spatially using

DEM-derived slope and used as input to WX-BGC modeling and vegetation mapping. In the mid-west and the eastern United States, the same STATSGO attributes were used for running the WX-BGC model as in the west. In addition, county-level data from the Soil Survey Geographic Database (SSURGO) were processed into a continuous and comprehensive spatial dataset for the mid-west and eastern United States. Numerous SSURGO attributes, including soil texture (percent sand, silt, clay, coarse), soil order, max depth, pH, drainage class, and ecological site description (ecoclass), were used in creating LANDFIRE potential vegetation layers (ESP and BpS).

6. How can the limitations and issues with of the LANDFIRE products be prominently displayed to all users so it is used appropriately?

Answer: On the LANDFIRE home page there is a section prominently highlighting "IMPORTANT user information on Data Products" which links the user to "Version Alerts" and "Notifications" (http://www.landfire.gov/version_alerts.php and http://www.landfire.gov/notifications.php). As we are made aware of issues that have the potential to affect many users we evaluate the problem, determine how people can work through it and post the information. These alerts and notifications address known issues with the products and provide tips and information to users on how to deal with these issues. LANDFIRE provides the best information possible to assist users with questions. People may also contact the helpdesk with specific issues or questions (helpdesk@landfire.gov). These questions often are incorporated into the FAQs (also found on the LANDFIRE website) or into the Version Alerts and Notifications.

7. When will the metadata and accuracy assessments be complete and available for LF?

Answer: Metadata is currently available as part of each product and can be downloaded from the USGS *National Map LANDFIRE*. The LANDFIRE web site has a page addressing Data Product Quality which is divided into three sections outlining LANDFIRE's procedures for evaluating product quality. The first section covers the feedback process, the second, the review process, and the third section covers the product quality assessment process. LANDFIRE has a Product Quality Working Team (PQWT) and Plan. The PQWT is composed of LANDFIRE production team members and external experts that have and are assessing the quality of LANDFIRE products. The "LANDFIRE National Western Milestone Agreement Assessment Summary" report has been completed and is posted on the LANDFIRE website Data Product Quality page at: http://www.landfire.gov/products_dataquality.php.

8. Some LF zones and products appear to be discontinuous. Will there be an effort to edge match the map zones?

Answer: We acknowledge the seamlines in the LANDFIRE products. There is a substantial amount of effort to edge match map zones and to work with products that appear discontinuous. There are two kinds of seamlines in LANDFIRE spatial products. The first kind is between map zones (i.e. zone boundaries). The use of map zones or other geographic partitions is necessary because our computers can't handle the whole nation at once. When data (both field plots and satellite images, biophysical gradients) are partitioned into pieces, the statistical relationships between these subsets of data are re-distributed and changed, resulting in different mapping models between map zones (than would have been if there were no zones or geographic partitions). If the magnitude of the changes is small, then there wouldn't be seamlines. If differences between mapping models are large, then we have seamlines. As long as field plots are spatially distributed well, seamlines are generally between similar classes, such as mesic Douglas-fir versus dry mesic Douglas-fir.

In such cases, we should not alter the data sets, because changes may have unwanted (and sometimes unanticipated) impacts on derivative output products. If seamlines are related to different life forms (e.g. shrub on one side, grass on the other), then we try to fix it. Keep in mind that, at least in case of existing vegetation layers, we already have taken steps to minimize such major seamlines. Because a seamline often touches several classes, re-classification is not a trivial matter and could cause bigger problems elsewhere. Thus, cosmetically fixing it along a seamline, with a narrow buffer, is the best option in this case. The guiding principle for us is one that minimizes impact on integrity of underlying data but still "surgically" removes the lines. The second kind of seamline is the one that occurs within map zones, caused by either different dates in satellite imagery (sometimes representing different phenological status of the vegetation and thereby resulting in different reflectance properties), or effects of coarser input data in biophysical gradients. We have taken various steps (image normalization, etc.) to minimize such problems as much as is possible. The within-map zone seamlines still exist in LANDFIRE products, but they tend to be scattered here and there and their effects are not expected to be a major issue.
LANDFIRE asked Joe Scott (40 Fire Behavior Fuel Models Scott, Burgen) to review our methods and develop recommendations. Joe has developed a white paper addressing LANDFIRE's mapping procedures titled "Review and Assessment of LANDFIRE Canopy Fuel Mapping Procedures". This report is posted on the Data Product Quality page located at http://www.landfire.gov/products_dataquality.php.

9. Is the LANDFIRE information on the DVDs the same information as available on the website? or is there updated information that is not yet available on the website?

Answer: The LANDFIRE products and metadata on the DVDs delivered by the Remote Sensing Applications Center (RSAC) are the same as the products available on the USGS National Map. The USGS National Map LANDFIRE website is the source for the most current version of LANDFIRE. There may be a difference in the information on a DVD set depending on when the DVDs image were created and if there have been adjustments to the LANDFIRE products with information posted on the "Alerts and Versioning" sections of landfire.gov website. When products are completed and loaded on to the National Map these products are then shared with RSAC and they process the DVDs.

10. Various individuals have received DVDs of data that are stamped with the LANDFIRE logo, are these products official?

Answer: Without seeing the DVD and logos it is difficult to respond, however, DVDs are created by RSAC and distributed with the LANDFIRE logo as well as the USGS and Forest Service logos. Products on the DVDs are distributed from the Remote Sensing Applications Center (RSAC) in Salt Lake City and are official LANDFIRE products. They are available to people who have problems with accessing or downloading products from the USGS National Map. If you wish to receive DVDs please request a copy at landfire.gov.

11. What is the difference between LANDFIRE and ReGAP?

Answer: The US Forest Service and the Department of the Interior's LANDFIRE project focus is to support large landscape vegetation, fire and fuels management activities producing approximately 24 geospatial layers. The GAP Analysis Program (GAP) is under the management of the US Geological Survey (USGS) and is a program that provides broad geographic information of approximately 3 geospatial layers on the status of species and their habitats. The GAP Analysis's ReGAP effort is a re-mapping project that has delivered data layers for the Pacific Northwest, Southwest, and Southeast United States.

LANDFIRE and GAP Analysis Program managers have met to discuss future coordination and integration. We are currently working closely together in sharing information and are collaborating with intra-program review and data development.

Update Strategy . . .

12. It appears FPA is going to use LANDFIRE products. Is there a way to update and improve the national LANDFIRE fire behavior products?

Answer: FPA uses LANDFIRE fuel model and canopy characteristics as data input to both the Initial Response Simulator and the Large Fire Module. The 30-meter LANDFIRE products are re-sampled to 270-meter cells prior to running the models. The FPA Project advises FPUs to work closely with the LANDFIRE Project in terms of their established "Refresh" and "Biennial" update process to improve those products where concerns exist. LANDFIRE's refresh effort is striving to become a tactical data set for these types of questions. An outcome of the refresh cycle is to produce a National Guidebook approach to guide users with consistent update methods to input or inform maintenance of a tactical dataset for the future.

13. As identified in the 2007 LANDFIRE After Action Review (AAR), the first areas to undergo calibration/review did not receive the improved processes that have been implemented in later calibration workshops. How is this going to be addressed?

Answer: LANDFIRE acknowledges this a problem and are trying to blend this concern with the project schedule to complete the Eastern milestone. LANDFIRE uses a change control process when addressing quality issues. The process evaluates cost, schedule, and quality. Given the project schedule and up coming fire/field season in 2008; this activity may be precluded from happening until the fall of the year or be incorporated in operation and maintenance activities. Either way, an update to these areas will be conducted when it is feasible both from a technical and management perspective.

14. When does the LANDFIRE website get updated products?

Answer: The LANDFIRE website is updated on an incremental basis as map zone products are completed and quality is checked. A general schedule for delivery dates of LANDFIRE products by map zone is available at our website. These dates are an estimated time of completion and delivery to USGS. It generally takes several weeks once a map zone is completed to run QA/QC processes at both the production (MFSL/EROS/TNC) and delivery (USGS National Map LANDFIRE) sites before the products are finally posted to the National Map. Once that is done a copy is sent to the Forest Service Remote Sensing Application Center (RSAC) to make products available for DVD requests.

15. How will the field receive product updates about LF in the future?

Answer: The user community will need to check back periodically to see if new information has been provided. Information about LANDFIRE does not change frequently as tasks are repetitive in nature accomplishing the same tasks for each map zone across the country. Updates to the products are

planned as part of the program; Refresh, Biennial, and Decadal Update Strategies. To meet users' varying needs, we have established four mechanisms for accessing or obtaining LANDFIRE products: 1). The USGS National Map LANDFIRE, 2). Direct download using the LANDFIRE Data Access Tool, 3). Physical delivery on request via DVD, and 4). Electronic delivery via an FTP site. Please see (http://www.landfire.gov/dataproduct_overview.php) for more information.

16. What is the process for verifying I have the most current LANDFIRE products?

Answer: It is always a good idea to check the LANDFIRE website (www.landfire.gov) homepage under Versioning Alerts. This provides information on whether new versions of map zones and/or data layers have been produced that would replace earlier versions. If there are new versions, then the new products can be downloaded from the USGS National Map. Users may also get the same Versioning Alert through the National Map LANDFIRE (http://landfire.cr.usgs.gov/viewer/) this is provided through a Really Simple Syndication (RSS) web feed. If you still have questions please contact the LANDFIRE helpdesk (helpdesk@landfire.gov).

17. Will the LF Refresh, Biennial, or Decadal update make wholesale corrections to the existing vegetation layer?

Answer: The Refresh will make "wholesale" updates to the existing vegetation layers within disturbance or change polygons and map zone-wide updates will occur if based on rule set rationale using other layers (such as burn severity) as inputs or succession modeling. An important aspect of the update approach is to maintain consistency in methods and continuity of products.

18. Will LANDFIRE use National Fire Plan Operations and Reporting System (NFPORS) data?

Answer: Refresh will link to the Interior NFPORS system and Forest Service - Forest Activities Tracking System (FACTS) data on treatments. The NFPORS point data will be used where possible, but this will be limited unless other data are provided with the spatial extent of the treatment area. Personnel that have provided treatment perimeter data as requested in NFPORS will be a step ahead in ensuring that their data is included in LANDFIRE updates. Those that have not provided their perimeter data will have the opportunity to provide it as part of the Refresh data call but having data that are part of national or regional data sets improves the utility for multiple applications. The Refresh process is dependent principally on sources of data that have been catalogued and are readily available from regional or national sources enabling limited time and resources to be focused on production work. NFPORS or FACTS Treatment ID number will be included in the attribute data of the Refresh products.

19. Is LANDFIRE coordinating with NFPORS on fuel treatment polygons/spatial data standards?

Answer: Yes, LANDFIRE is coordinating with NFPORS leadership on criteria and standards as well as with the National Interagency Fuels Coordinating Group (NIFCG).

20. When will the data collection standards for NFPORS and LF Refresh be available?

Answer: General direction on how to inventory, collect, and catalog Refresh disturbance and change polygons was to be provided in the spring of 2008, however given the demands of the fire season along with preliminary Refresh Prototype results this information has been postponed until the end of the summer / early fall 2008. LANDFIRE completed the Rapid Refresh in June followed by a project close out and after action review of this effort in July. During this time LANDFIRE began prototyping the Refresh approach. After the prototype is completed, the formal Refresh update will begin. Detailed standards for LANDFIRE Refresh will not be available until after the prototypes have been completed. This will be announced through both direct contacts with field personnel that have been involved with the LANDFIRE effort as well as through line and staff. LANDFIRE will likely complete the standards and Refresh field guidance by the fall of 2008. LANDFIRE does not speak for NFPORS so LANDFIRE does not know when the standards will be available.

21. How do we coordinate a LANDFIRE response between partners that may not be participating in FPA? Who is going to be responsible for the non-federal lands?

Answer: LANDFIRE intends is to use national/regional data sets for incorporation into the update process. If non-federal data has been incorporated into national/regional data sets or non-federal entities provide data for the LANDFIRE Refresh it will be used in the update process. Where these partners or non-federal groups have data, they are invited to provide their data sets to be incorporated into the update process. As LANDFIRE is both a fire and natural resource product set, it is in the best interest of partners to work together to provide field data. Coordination will be dependent on existing relationships at the local, regional, or national levels. The Refresh process is not based on FPUs but will be conducted by geographic areas with data being processed by NLCD map zone, however given that coordination is occurring at the FPU level personnel may wish to collaborate together on data sets. LANDFIRE Executive Oversight Committee has representation from the National Association of State Foresters and the National Association of Counties.

22. Can we update the national Successional Class (S-Class) LANDFIRE layers with local efforts?

Answer: Yes. Refresh will allow for "updates" to succession class and the underlying biophysical setting. However, no direct editing is allowed. Updates must occur via changes in rule sets based on zone-wide input layers. Updates must occur via rule sets based on input layers within disturbance or change polygons, such as burn severity or a treatment type. Rules must be integrated between vegetation and succession class layers to assure logical outcomes. This process provides consistency and ecological rationale. During Refresh the biophysical setting layer will be correlated across zones along with associated FRCC reference conditions to reduce complexity of planning areas that cross zones.

23. Will the Fire Regime Condition Class (FRCC) field collection be incorporated into LANDFIRE?

Answer: For Refresh this occurs in an indirect manner. Personnel experienced with FRCC field collection will be able to recommend changes in succession class or biophysical setting rules to implement updates across the zone or within polygons. Their knowledge of the field conditions of FRCC will greatly aid in their ability to develop these rules. In order to produce an updated FRCC map, local personnel will want to be familiar with the FRCC Mapping Tool.

24. Is there a way to update the LF FRCC layer with data from local efforts?

Answer: For the LF Refresh this can occur, but only in an indirect manner. Local units that have local FRCC maps can use the knowledge of how these maps were developed to recommend changes to succession class or biophysical setting rules to implement updates across the zone or within disturbance or change polygons. In order to produce an updated FRCC map, personnel will want to be familiar with the FRCC Mapping Tool.

25. How can local ecological site information that includes soil surveys be incorporated in the LF vegetation classification and biophysical settings BPS layers?

Answer: For Refresh the development of this process will occur during the prototyping of the process. Local units that have tested the use of ecological site and soil survey layers to enhance the biophysical setting layer should provide input as to the source and criteria for these layers and the methods for enhancing the biophysical setting layer. During the prototyping of Refresh, several options for developing and enhancing soil or physical setting layers will be tested across zones and geographic areas. Local input should be provided as part of Rapid Refresh or during the prototype of Refresh during the summer of 2008. If your area has been selected as a prototype area you will be contacted for coordination efforts.

26. Are there strategies to update both the existing vegetation and S-Class LANDFIRE layers to improve the depiction of non-native vegetation?

Answer: Refresh strategy includes incorporating non-native disturbance or change polygon data from local units. Some zone-wide update rules may be possible but must be tested for consistency and logic.

27. What base imagery or local data will be used in the LF Refresh and who will supply it?

Answer: For Refresh the base zone-wide data will be the LANDFIRE data layers, circa 2001. Wildland fire perimeters from 1999 to current and burn severity grid data from Monitoring Trends in Burn Severity (MTBS) and other sources will be incorporated. Imagery used for determining burn severity will also be used to enhance other disturbance change detection. National soils and physical setting maps correlated across zones will likely be developed. Focus of local data will be on collection and attributing of disturbance or change polygons by local personnel for fuel and vegetation treatments and other disturbances, such as non-native plants or agricultural areas with burnable fuels.

28. Are disturbance perimeter data change rules going to be uniquely applied by perimeter or will a LF change rule affect the entire map zone?

Answer: For Refresh the data change rules must be based on input layer(s) within the disturbance perimeters that can be consistently developed for that type of disturbance between zones and geographic areas, such as burn severity or a treatment type effect. This provides for consistency and ecological rationale. Resulting change rules may be relatively locally unique if an input layer within the disturbance polygon has a relatively unique set of conditions, such as a sequence of seeding and burning treatments on a given type of physical setting changing the fuel model. Other change rules my affect many disturbance or

change polygons across a map zone, such as non-native plant polygons affecting the existing vegetation type or succession class assignment.

29. What is the size limitation (min. or max.) for disturbance perimeter data that can be reported? (thresholds that will be used in the LANDFIRE update process)

Answer: For Refresh this will be tested during the prototypes. For Rapid Refresh, wildland fire perimeters as small as 10 acres and as large as 100,000 plus acres were incorporated. RR leveraged the national Monitoring Trends in Burn Severity (MTBS) data sets with disturbance thresholds of 1,000 acres in the Western U.S. and 500 acres in the Eastern U.S and well a the inclusion of MODIS data. In Rapid Refresh the minimum threshold for a wildland fire perimeter was based on checking to be sure the polygon had a natural irregular shape and was not a GIS modeled square or circle. During Refresh a different method will be developed for burnable versus non-burnable agriculture, as these polygons may often be a circle or square. The maximum is not as important a factor as the limitation in development of the input layers upon which the change rules will be based. In Refresh four types of models are considered as to these thresholds: vegetation dynamics, fire behavior, fire effects, and fire regime condition class. Their sensitivity to change of input data decreases in the same order as listed.
The inputs to vegetation models for prediction of historical variation and future change within a biophysical setting are based on combinations of existing vegetation type, cover, and height that determine the succession class. As a result, vegetation dynamics can change on a small group of pixels within a relatively small disturbance polygon (e.g. 5 acres).
Fire behavior is driven by surface fuel model and canopy characteristics that are assigned across a range of existing vegetation type, cover, height, and life zone characteristics (e.g. 10 acres). A 10 acre polygon in a given location can substantially effect direction or rate of fire spread.
Fire effects are highly dependent on intensity of the combination of frontal and post-frontal combustion and the contiguous size of the effect (e.g. 10-100 acres).
Fire Regime Condition Class is a landscape measure with size dependence associated with the fire regime. Frequent non-replacement and mixed fire regimes can be assessed for relatively small areas depending on topographic variability (e.g. 100-10,000 acres), while infrequent and rare replacement rely on a much larger area for assessment.

30. Can the outcomes/updates completed during the LF Rapid Refresh process be refined during the Refresh process or is Rapid Refresh the only opportunity to make updates based on those fire polygons?

Answer: Updates to zone-wide layers and within disturbance or change polygons can be further refined during the Refresh process. Wildland fire polygons for the Rapid Refresh can be expanded upon for the Refresh along with inclusion of other polygons for treatments, disturbances, and other changes.

31. What are the sources that will be used for fire polygons that will be updated in LF Rapid Refresh and Refresh?

Answer: Sources of wildland fire polygons for Rapid Refresh included only those available in January 2008 on national and regional ftp sites. The sources for most appear to be from Type I and II Incident or Fire Use Teams. For Refresh geographic areas, region and state offices, and local units will be able to review what was developed for Rapid Refresh and add additional wildland fire perimeters. In addition, geographic areas,

region and state offices, and local units can add prescribed fire and other treatment perimeters. Where the perimeter has a NFPORS or FACTS data record, a link will be made through entry of the Treatment ID as an attribute of the polygon data.

32. How will the Successional Class (S-Class) LANDFIRE product be updated? What information can the field provide to help update this layer?

Answer: In Refresh the rules for producing Sclass from vegetation, biophysical setting, and other input layers can be adjusted to provide a zone-wide update. Existing vegetation layers will be updated for disturbance and succession since disturbance so these changes will be inputs to an "update" of the Sclass. Field Subject Matter Experts (SMEs) can provide input during the Refresh prototypes for development of other layers, such as soils or physical setting, which can improve upon rule inputs. During the geographic area Refresh processing these same SMEs can recommend changes in rules and provide disturbance polygons.

33. For the Refresh update, can areas substitute the existing vegetation layer in LANDFIRE with another vegetation layer?

Answer: No. However, another existing vegetation layer that was wall-to-wall for all 50 states could be used to enhance the LANDFIRE layers via additions to the rule sets.

34. How can more LANDFIRE ground truthing be conducted?

Answer: A sampling process has been developed for ground truthing LANDFIRE vegetation layers and modeling fuel layers. Existing ground truth data has and can be used in the LANDFIRE processing. If local units have plans for ground truth sampling they should contact helpdesk@landfire.gov for more information on sample design.

35. What databases and/or sources are going to be used for both LF Rapid Refresh and Refresh?

Answer: The LANDFIRE base layers, scripts to produce output layers, ground truth plot reference data base, and the NIFTT fire behavior, effects, and regime models provide the continuous data and predictive framework across the nation for Rapid Refresh and Refresh. Agencies by geographic areas provide the Subject Matter Experts (SMEs) and disturbance and change polygons to develop the zone-wide updates and polygon specific "updates." MTBS and other burn severity data will be used to populate the wildland fire polygons. Remote sensing data used for MTBS may also be used to conduct change detection for other types of disturbances. National sources will be tapped for maps on insect, disease, and weather event damage. The vegetation dynamics models and other vegetation transition data will be used to account for changes in succession since the time of remote sensing and since disturbance.

36. What are the data standards for LANDFIRE Refresh?

Answer: LANDFIRE follows federal and agency data standards for geographic information systems (GIS) data. This includes but is not limited to data standards developed by; USDA Forest Service, USDI, USGS, Federal Geographic Data Committee (FGDC), National Interagency Fuels Coordinating Group (NIFCG), National Wildland fire Coordinating Group (NWCG), NWCG sub-groups and projects, and the Geospatial Task Group (GTG). LANDFIRE conforms to applicable data standards on developing and ensuring consistency with products.

37. Local areas may have 1-inch pixel resolution data versus 2-meter resolution imagery. How will data resolution issues be handled in the LANDFIRE Refresh updates?

Answer: All LANDFIRE data is managed at the 30-meter pixel resolution scale.

38. Natural Resource programs and many disciplines other than fire/fuels are using or plan to use the LANDFIRE products. Are the LANDFIRE updating strategies (Program to update products through operations & maintenance efforts) going to include natural resource input into LANDFIRE?

Answer: LANDFIRE National currently includes vegetation data and natural resources disturbances other than fire in the Vegetation Dynamics Development Tool (VDDT) modeling, vegetation descriptions, and Successional Class and Biophysical Settings (BpS) layers. With the update strategy, all changes to fire behavior, effects, and regime layers are driven by rules or models using the vegetation and biophysical or physical setting layers as inputs. Resource specialists in vegetation are encouraged to use the vegetation data layers to generate resource values and to provide input along with fire and fuel specialists on updates to the vegetation layers. Agencies by geographic areas will provide Subject Matter Experts (SMEs) to develop and adjust rules for updates of the vegetation and other layers. Agencies are and will be encouraged to form teams of SMEs or groups that include specialists from Natural Resource programs to review the products and subsequently provide information specific to natural resource program areas to be included in product updates. The LANDFIRE Executive Oversight Committee is exploring and working to provide greater integration of program areas for the implementation of LANDFIRE program updates.