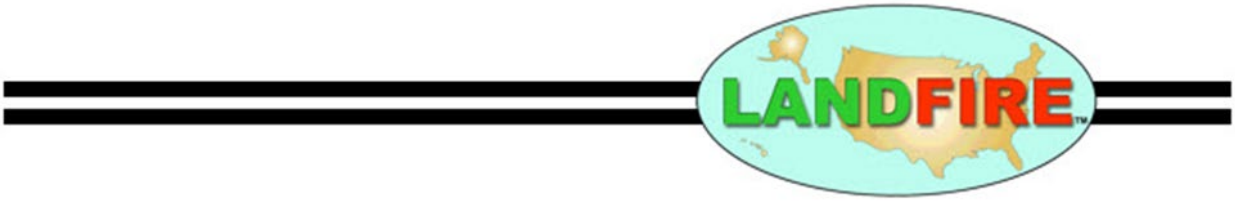


# LANDFIRE
# DEFINITIONS, QUALITY, AND STANDARDS
# ANNUAL REPORT

# Contents

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# Section 1 Introduction to LANDFIRE

Each calendar year the Landscape Fire and Resource Management Planning Tools (LANDFIRE) project produces and delivers more than 65 products for multiple extents, including the Conterminous United States (CONUS), Alaska (AK), Hawaii (HI) and the Insular Areas (IA). The uniqueness of LANDFIRE data makes it essential to some government requirements, such as wildfire risk assessments, habitat assessments, and operational firefighting.

The U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center Technical Support Services Contract (TSSC) is charged with reviewing data definitions, quality, and standards across the program. This is done to validate and verify compliance of LANDFIRE data, including compliance with the 2018 Geospatial Data Act (GDA) and the National Spatial Data Infrastructure (NSDI). This report addresses pertinent requirements from these efforts, including LANDFIRE's lessons learned from past Office of Inspector General (OIG) reports. This report concludes that LANDFIRE is clearly and transparently detailing its applicable standards.

## 1.1 Partnerships

LANDFIRE is a shared interagency wildland fire management data program across the United States and Territories. Leadership, management, and oversight are through the U.S. Department of Agriculture Forest Service (USFS) - Fire and Aviation Management, and the U.S. Department of the Interior (DOI) – Office of Wildland Fire. LANDFIRE production is coordinated by USGS EROS under the EROS TSSC (KBR) division. LANDFIRE's partner, The Nature Conservancy (TNC), is also highly involved in data production and communication.

External partners and stakeholders involved in data management activities include:

- Other federal agencies and projects (USFS, DOI)
  - Rock Mountain Research Station (RMRS)
  - Missoula Fire Sciences Laboratory
  - USGS Gap Analysis
  - USGS National Land Imaging Program
- States
- Local governments
- Regional governments
- Tribal governments
- Non-profits (such as TNC)

The following processes are in place to ensure partners and stakeholders are involved:

- Partnership outreach activities (e.g., office hours, newsletter)
- Expert consultations
- Network outreach (e.g., Joint Fire Science Program)
- Federal, state, and local outreach (e.g., LANDFIRE's annual data call letter)

## 1.2 Inputs and Contributors

The LANDFIRE program has a rich history of partnerships with other mapping and data programs. LANDFIRE spatial data incorporates many federally funded national satellite platforms and geospatial datasets from government and private sources. Inputs and contributors may change over time and per version, but a compiled list can be found below that includes, but is not limited to, the agencies and organizations featured. See the full comprehensive list of data contributions at LANDFIRE Data Contribution List.

- U.S. Forest Service Forest Inventory and Analysis (FIA)
    - Plots within LANDFIRE's Reference Database (LFRDB)
- LANDFIRE relies heavily on Landsat, which is a cooperative effort between the National Aeronautics and Space Administration (NASA) and the USGS. LANDFIRE has access to NASA's Commercial SmallSat Data Acquisition imagery (such as Planet) to help identify vegetation and disturbances, and to augment image interpretation. LANDFIRE also uses Harmonized Landsat Sentinel 2 and the Landsat-based Irrigation Dataset (LANID).
    - Some other datasets housed within Landsat that LANDFIRE utilizes
        - Landsat Burned Area Science Products (BA)
        - Landsat Dynamic Surface Water Extent (DSWE)
- Other inputs and contributors include:
    - Burn Severity Portal datasets
        - National Park Service (NPS)
        - Monitoring Trends in Burn Severity (MTBS)
        - Burned Area Reflectance Classification (BARC)
        - Rapid Assessment of Vegetation Condition after Wildfire (RAVG)
    - 3D Elevation Program (3DEP)
        - Topographic products
    - Forest Service Activity Tracking System (FACTS)
    - Interior Fuels Post-fire Reporting System (IFPRS)
    - Microsoft Building Footprint rasterized by USGS
    - National Agriculture Imagery Program (NAIP)
    - National Agricultural Statistics Service (NASS)
        - Cropland data layer
    - National Fire Plan Operations and Reporting System (NFPORS)
    - National Insect and Disease Risk Map (NIDRM)
    - National Interagency Fire Center (NIFC)
    - Multi-Resolution Land Characteristics (MRLC) Consortium
        - National Land Cover Database (NLCD)
            - Urban and impervious surface data, pasture, and hay
        - North American Land Change Monitoring System (NALCMS)
            - Vegetation type, cover, and height in the 90km buffer area
    - Protected Areas Database of the United States (PAD US)

- Wildfire Risk to Communities (WRC)
- Maxar imagery provided with the Earth Science Research Institute (Esri) license to access high-resolution digital imagery

When an agency or organization contributes data to LANDFIRE, such as disturbance and treatment polygons and LFRDB vegetation and fuel plot data, it is evaluated for quality prior to acquisition.

LANDFIRE employs the following methods to ensure quality in geospatial data collected from federal and non-federal sources:

- Geospatial data quality standards are specified in contract documents.
- Independent Verification and Validation (IV&V) methods are conducted.
- Staff data experts review and approve geospatial data deliverables.
- Data standards are enforced through automated processes such as database controls or script tools.
- LANDFIRE acquires data from other federal projects that are responsible for Quality Assessment and Quality Control (QA/QC).

# Section 2 Data Creation and Testing

When a new LANDFIRE version is being created the production and distribution teams work together to seamlessly release products to the public. To better understand the workflow building up to a release, see Figure 2-1 and Figure 2-2.

For more information about the methodology behind LANDFIRE, see LANDFIRE Technical Documentation.

## 2.1 Methodology and Standards

This section details LANDFIRE's production and distribution geospatial data and metadata standards.

### 2.1.1 Internal Data Standards

LANDFIRE's internal standards include:

- Attribute tables and Attribute Data Dictionaries (ADDs)
    - Attribute tables and ADDs are checked for conformity and consistency across products. They are also tested to ensure they align with each other and correlate appropriately to the versions data and metadata.
- Naming conventions
    - Naming conventions must be easily read by humans, not just by machines, such that people can read and understand what they are looking at. They must describe:
        - Who (LANDFIRE)
        - What (product and version)
        - When (version)
        - Where (extent)
- Data production
    - Rasters are created with:
        - 30 x 30m pixel dimensions that align with a standardized grid
        - Standardized projections in North American Datum of 1983 Albers (NAD83 Albers)
            - See the full list of standard projections used in LANDFIRE data
        - Standardized data type, bit depth, number of bands and consistency among products for common classes such as water, barren, snow/ice, agriculture, and development
        - Consistent 'No Data' and background values among products
        - Full coverage of data extent with bounding box

### 2.1.2 Quality Assessment and Quality Control (QA/QC)

LANDFIRE performs internal QA/QC on the geospatial data at both the production and distribution stages (Figure 2-2).

- QA/QC includes, but is not limited to:
    - Validating pixels
    - Verifying extents
    - Verifying attribute tables and ensuring they align correctly with data
    - Validating basic file characteristics including file format, bit depth, datum, and projection
    - Validating product coverage, including data and No Data extents
    - Validating product characteristics to ensure that values are within acceptable ranges, and that there are no unexpected values
    - Verifying rows and columns
    - Verifying that lifeform matches between cover and height products, and for some specific versions (e.g., LF 2023), verify that EVT lifeforms match with cover and height

LANDFIRE records results of Data, Integration, and Systems Testing in a Product Acceptance Report (PAR), which is delivered to program leadership for approval before each public release.

### 2.1.3 Metadata Standards

LANDFIRE creates and maintains International Organization for Standardization (ISO) 19115 FGDC-STD-001-1998-compliant XML format metadata for all products and extents within a version. USGS guidelines are followed when creating LANDFIRE metadata.

A general breakdown of the metadata process includes these steps:

1. Produce metadata
    a. Metadata records are unique for each product and extent. For example, Existing Vegetation Cover (EVC) has four unique metadata records within the LF 2023 version:
        i. LF 2023 EVC CONUS
        ii. LF 2023 EVC AK
        iii. LF 2023 EVC HI
        iv. LF 2023 EVC Puerto Rico and US Virgin Islands
2. Internal review
    a. Team member within LANDFIRE
3. External review
    a. Someone outside of LANDFIRE
    b. Also includes a review of the geospatial data
4. Release and publish metadata

## 2.2 Data & Metadata Releases

### 2.2.1 Information Product Data System (IPDS)

From the USGS Fundamental Science Practices: "IPDS is the web-based application that enables USGS to track, monitor, and update progress as an information product works its way through the review, approval, and production steps to its ultimate release. IPDS implements USGS Fundamental Science Practices (FSP) routing processes which allow authors to routinely collaborate to ensure that USGS series information products have met the appropriate FSP and publishing requirements prior to release."

The process (See Figure 2-1) includes:

1. Create IPDS record for the version.
2. Populate the record with content, load in metadata records, and add an author list.
3. Find a metadata and geospatial data peer reviewer – each product within an extent release needs a peer review.
4. The reviewer must be one person - within the USGS but outside of the project - who is a data manager or metadata manager familiar with data and metadata.
5. Prepare USGS metadata and data review checklists and generate review documents for each metadata record.
6. Reconcile feedback from peer review.
7. Upload all evidence and documents to IPDS.
8. Once the version is complete (i.e., once data for all extents have been released), request peer review reconciliation and get approval from the Bureau.
9. The IPDS record is then reviewed and moved into a "hold" state.
10. When the ScienceBase landing page is public: Publish the IPDS record; it releases to the IPDS dark archive (an archive that is inaccessible to the public, to preserve record integrity).

### 2.2.2 Releases on LANDFIRE's Trusted Digital Repositories

From the USGS Repository web page: "A data repository is a centralized location to store, curate, and maintain data. Data repositories are often managed by data curation personnel who ensure that files are managed and preserved for the long-term."

LANDFIRE utilizes two Trusted Digital Repositories (TDRs) for publishing data, LANDFIRE.gov and ScienceBase

A Trusted Digital Repository (TDR) is defined by the USGS as "one whose mission is to provide reliable, long-term access to managed digital resources to its customers, now and in the future."

A USGS TDR must:

- Accept responsibility for the long-term maintenance of digital resources on behalf of its depositors and for the benefit of users
- Be an organizational system that supports and demonstrates not only the long-term fiscal sustainability of the repository but also the digital information for which it has responsibility
- Be designed in accordance with commonly accepted system conventions and standards
- Establish methodologies for system evaluation that meet community expectations for trustworthiness

#### 2.2.2.1 LANDFIRE.gov

Before a LANDFIRE release, the team does extensive testing on all distribution platforms and services. The LANDFIRE EROS team manually tests the map viewer and the LANDFIRE Product Service (LFPS) and Image Service (see Figure 2-2) on the development server.

- Pre-release testing includes, but is not limited to:
    1. Verify titles, table of contents, attribute labels and colors, pixel display, naming conventions, download functionality, etc.
    2. Test download(s) and integrity of download email(s) from the map viewer
    3. Once downloaded, verify that rasters look as expected with correct properties, and that the download bundle has all expected components
    4. The above tests are done for all projection options that are offered via the map viewer and/or LFPS and Image Service
    5. For LFPS coordinate updates to the product table and confirm the table is correct
- Post-release testing includes:
    - Spot checks, using the same tests as above

Pre- and post-release testing on the full extent downloads page includes ensuring that zip downloads are successful, data looks as expected, and that the zip bundles are structured correctly and contain all pieces (TIFF, CSV, XML metadata file, etc.) as expected. Before a release, zip bundle downloads are checked on the website development space.

#### 2.2.2.2 ScienceBase

ScienceBase is a collaborative scientific data and management platform used directly by science and project teams within the USGS. According to the ScienceBase web page, “ScienceBase provides access to aggregated information derived from many data and information domains, including feeds from existing data systems, metadata catalogs, and scientists contributing new and original content. ScienceBase architecture is designed to help science teams and data practitioners centralize their data and information resources to create a foundation needed for their work. ScienceBase, both original software and engineered components, is released as an

open-source project to promote involvement from the larger scientific programming community both inside and outside the USGS."

The process (see Figure 2-1) includes:

1. Create ScienceBase landing page for the version using the IPDS record number.
2. Once created, use the DOI number generated by ScienceBase and implant it within the metadata.
3. Once a version is completed, populate the ScienceBase landing page with content and an author list (that matches IPDS), then make child items for each product and each extent.
4. Request public release from ScienceBase and undergo ScienceBase review.
5. When the review is complete, the ScienceBase landing page for the version is made public and the DOI number becomes active.
6. Once the ScienceBase page is public, automated harvests take place for each of these platforms on their individual schedules (in this order):
   a. Science Data Catalog (SDC)
   b. Data.gov
   c. GeoPlatform.gov

LANDFIRE landing pages on ScienceBase by version (this list will be added to each year).

- LF 2001 https://doi.org/10.5066/P13KXTGM
- LF 2014 NGDA Products https://doi.org/10.5066/P9YKVN2R
- LF 2022 https://doi.org/10.5066/P974JF8W
- LF 2023 https://doi.org/10.5066/P9BJP7OV
- LF 2024 (url will be active late 2025 or early 2026) https://doi.org/10.5066/P1XVKXRL

## 2.2.3 Releases on LANDFIRE's Other Distribution Sites

### 2.2.3.1 ArcGIS Online (AGOL)

Once a version is completed and all extents have been released, at the end of the calendar year, data and metadata for each product is manually loaded by the EROS team to the USGS LANDFIRE AGOL space. AGOL pages are populated with descriptions, tags, titles, etc., reviewed internally, then published to the public.

### 2.2.3.2 Awesome Google Earth Engine (GEE) Community

In addition to AGOL, LANDFIRE also distributes data for the latest version via the Awesome GEE Community. Once a version is completed, updates to this GEE space are coordinated with the Point of Contact (POC) for the Awesome GEE Community. After updates are implemented, the LF EROS team does a review and provides any changes (if needed).

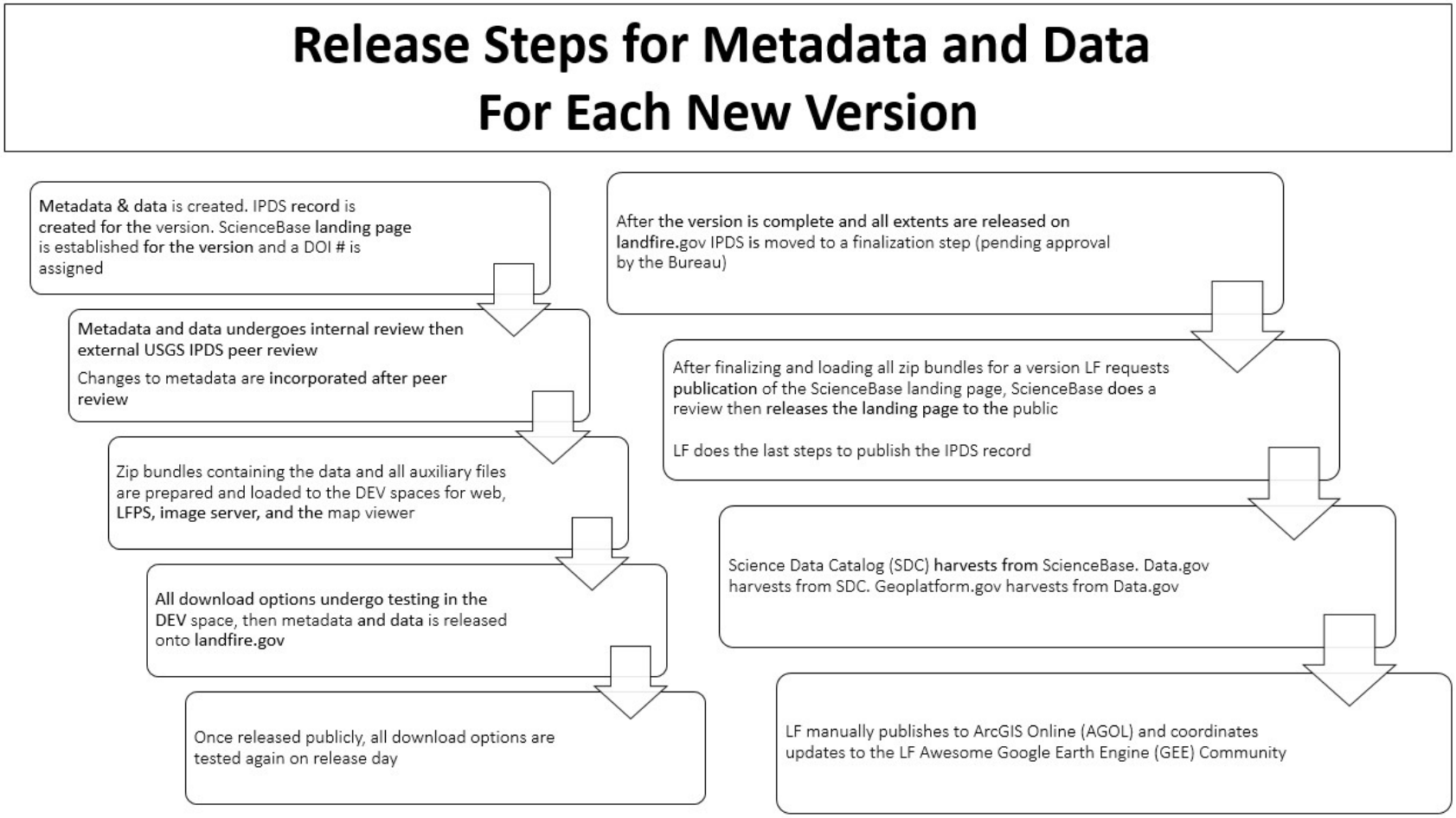


***Figure 2-1. Release steps for data and metadata***

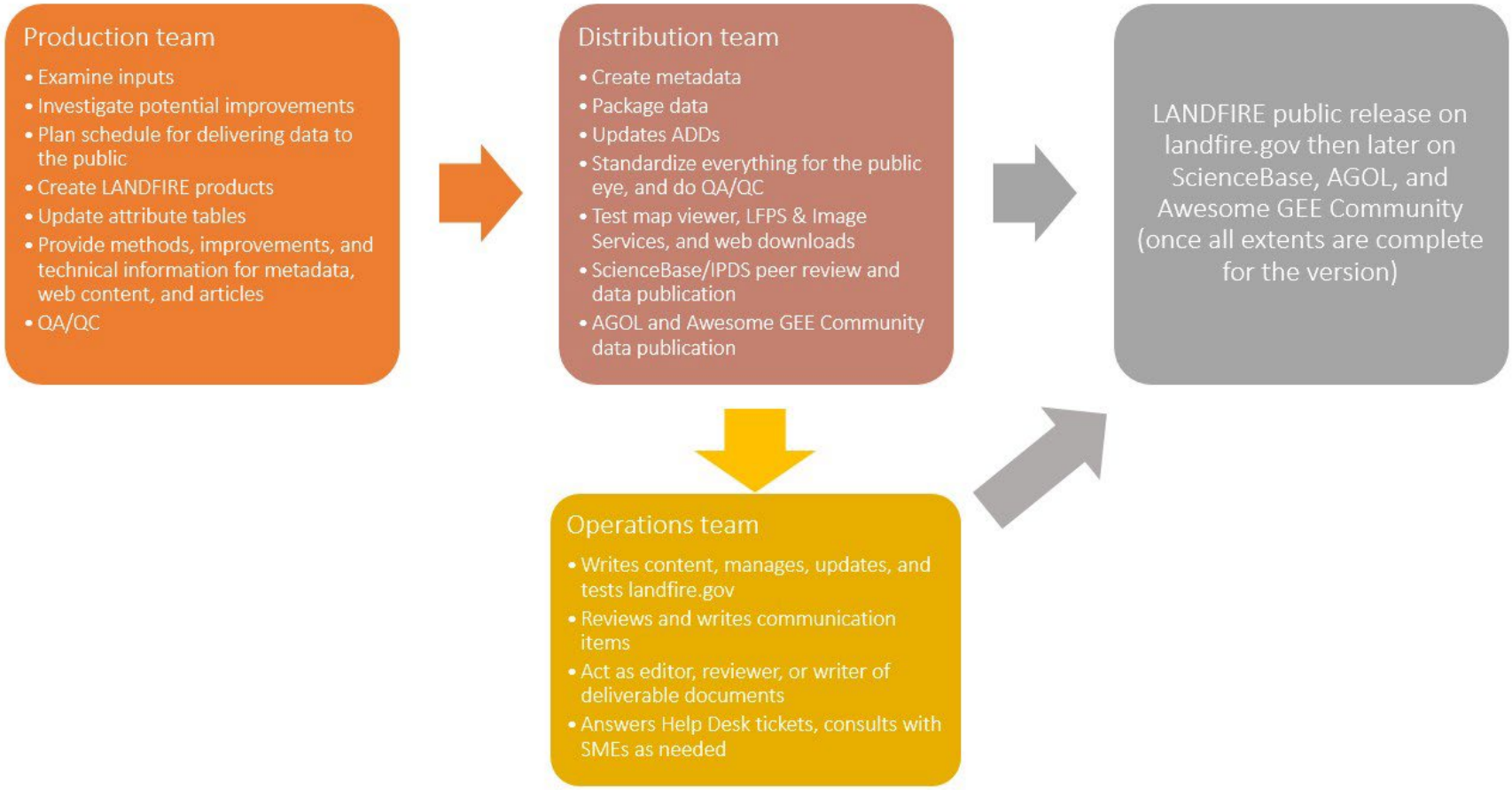


***Figure 2-2. LANDFIRE release workflow***

# Section 3 Retiring Versions and Data Backups in LANDFIRE Archive

## 3.1 Retiring Geospatial Data

LANDFIRE follows Findable, Accessible, Interoperable, Reusable (FAIR) principles espoused by the Federal Data Strategy (FDS) and does not remove (or retire) data. Older data that is no longer available immediately on LANDFIRE.gov or the map viewer is available by user request, and LANDFIRE data on ScienceBase remains in the public domain. ScienceBase does not currently support an archive or dark archive system for retiring data.

The National Archives and Records Administration (NARA) cannot currently support the large scale of digital geospatial data. From the FY2024 NARA Office of Inspector General (OIG) Management and Performance Challenges report, section on the Electronics Records Archive (ERA): "On April 17, 2023, ERA 2.0 was expanded for all Federal agencies to use ERA 2.0 for records scheduling and transfer processes. However, until ERA 2.0's functionality is built and put into full production, the current ERA's longstanding deficiencies may continue to impact NARA. Additionally, the vast volume of electronic records that will need to be preserved are simply staggering, and NARA is challenged to meet data storage requirements for them. NARA's in-house data storage is reaching capacity, impacting the agency's digitization efforts and other IT programs. Without sufficient storage, NARA would have difficulty accepting, storing, and processing electronic records or make them available to the public."

Additionally, NARA is only used in circumstances where there is a need to completely retire a dataset from online availability. LANDFIRE data is never truly retired from public domain, simply removed from the website, map viewer, etc., and it is still available by contacting the LF Help Desk, therefore using NARA as an archive system is not applicable.

## 3.2 Archiving and Backups

LANDFIRE manages and collaborates with USGS EROS resources to maintain two backup processes that occur nightly and utilize the USGS EROS infrastructure.

1. Short-term archive
    a. A short-term storage option hosted at EROS makes files easily recoverable for approximately six months.
2. Long-term archive
    a. The other process is a permanent storage option that is always being appended. Files never expire or get automatically removed from this system. With this permanent storage option, there are three copies kept of each file. These copies are stored in unique locations.

# Section 4 NGDA Products

Within the LF 2014 Update (LF 2014), four products for the CONUS extent have the status designated by the Federal Geospatial Data Committee (FGDC) Steering Committee of National Geospatial Data Assets (NGDA). These products are:

- LF 2014 Forest Canopy Cover (CC)
- LF 2014 Environmental Site Potential (ESP)
- LF 2014 Existing Vegetation Cover (EVC)
- LF 2014 Fire Regime Groups (FRG)

In CY2023 the metadata for these products was brought into the current standard (ISO 19115 FGDC-STD-001-1998) and released onto a unique ScienceBase landing page with a DOI number (DOI 10.5066/P9YKVN2R). These products then followed the harvest flow outlined in Figure 2-1 to populate Data.gov and GeoPlatform.gov.

## 4.1 Standards Applicable to LANDFIRE NGDA Products

In an attempt to help facilitate audits and examinations, below is a list of standards that are applicable to LANDFIRE's four LF 2014 NGDA products. Note that this list will be added to with time and is not all-inclusive, many additional standards applicable to all LANDFIRE products are also listed below, in Section 5.

### Geospatial Positioning Accuracy Standards, Part 1: Reporting Methodology, FGDC-STD-007.1-1998

**Description of the Standard:**

> All spatial data activities should develop a classification scheme following the standard given below. The standard for reporting positional accuracy is defined for horizontal and/or vertical coordinates, depending on the characteristics of the datasets.
>
> Horizontal: The reporting standard in the horizontal component is the radius of a circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95-percent of the time.
>
> Vertical: The reporting standard in the vertical component is a linear uncertainty value, such that the true or theoretical location of the point falls within +/- of that linear uncertainty value 95-percent of the time. The reporting accuracy standard should be defined in metric (International System of Units, SI) units. However, accuracy will be reported in English (inch-pound) units where the point coordinates or elevations are reported in English units. The method used to evaluate accuracy should be described.
>
> Examples include: statistical testing, least squares adjustment results, comparison with values of higher accuracy, repeat measurements, estimation, etc. The accuracy standard for point data in each part of the document will identify the type of application and if applicable, the accuracy level recommended for that application. Coordinate values should be based on National datums. Horizontal coordinate values should preferably be referenced to the North American Datum of 1983 (NAD 83). Vertical coordinate values

should preferably be referenced to North American Vertical Datum of 1988 (NAVD 88). However, it is recognized that many legacy maps and geospatial data are referenced to older national datums, such as the North American Datum of 1927 (NAD 27) and the National Geodetic Vertical Datum of 1929 (NGVD 29). If coordinate values are not referenced to the National datum but their relationship to the national datum is known, identify the datum and its relationship to a National datum. If the relationship between the local datum and the National datum is not specified, identify the datum, but state that its relationship to a National datum is unspecified.

**Applicability to LANDFIRE NGDA Products:**

LF 2014 ESP

As a modeled representation of the potential vegetation that could occur in a pixel given climatic, elevation, and geologic constraints providing a horizontal/landscape dataset; therefore, there is no way to verify horizontal accuracy of this layer given the modeling across these data elements.

LF 2014 EVC and CC

Vegetation cover for tree, shrub and herb lifeforms was modeled with machine learning, plot data, lidar data and Landsat imagery. In 2014, an accuracy assessment in the horizontal data layer was not required or performed. The LANDFIRE program has done some accuracy assessments; one in a prior version (LF 2001) and one for the most recent base map (LF 2016 Remap).

LF 2014 FRG

As a modeled depiction of the fire regime in existence prior to European colonization, the horizontal accuracy of this layer was not assessed as there is not enough data to be able to complete an assessment across all vegetation type.

## Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy, FGDC-STD-007.3-1998

**Description of the Standard:**

The National Standard for Spatial Data Accuracy (NSSDA) implements a statistical and testing methodology for estimating the positional accuracy of points on maps and in digital geospatial data, with respect to georeferenced ground positions of higher accuracy. The NSSDA applies to fully georeferenced maps and digital geospatial data, in either raster, point, or vector format, derived from sources such as aerial photographs, satellite imagery, and ground surveys. It provides a common language for reporting accuracy to facilitate the identification of spatial data for geographic applications.

This standard is classified as a Data Usability Standard by the FGDC Standards Reference Model. A Data Usability Standard describes how to express “the applicability or essence of a dataset or data element” and includes “data quality, assessment, accuracy, and reporting or documentation standards” (FGDC, 1996, p. 8) This standard does not define threshold accuracy values. Agencies are encouraged to establish thresholds for their product specifications and applications and for contracting purposes. Ultimately,

users identify acceptable accuracies for their applications. Data and map producers must determine what accuracy exists or is achievable for their data and report it according to NSSDA.

The NSSDA uses root-mean-square error (RMSE) to estimate positional accuracy. RMSE is the square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points. Accuracy is reported in ground distances at the 95% confidence level. Accuracy reported at the 95% confidence level means that 95% of the positions in the dataset will have an error with respect to true ground position that is equal to or smaller than the reported accuracy value. The reported accuracy value reflects all uncertainties, including those introduced by geodetic control coordinates, compilation, and final computation of ground coordinate values in the product.

**Applicability to LANDFIRE NGDA Products:**

All LANDFIRE NGDA products created for the LF 2014 update were based on modeling with Landsat 5 and Landsat 7 satellite imagery, therefore the accuracy of the classes modeled follow the Landsat imagery positional accuracy. See page 54: Landsat 7 Data Users Handbook (d9-wret.s3.us-west-2.amazonaws.com) for details on the geospatial accuracy of this imagery. Also see the following link on geospatial accuracy details of Landsat 5: Landsat Geometric Verify Image and Report | U.S. Geological Survey (usgs.gov).

## GeoTIFF Revision 1.0

**Description of the Standard:**

GeoTIFF is a format extension for storing georeference and geocoding information in a TIFF 6.0 compliant raster file by tying a raster image to a known model space or map projection. A GeoTIFF file is a TIFF 6.0 [TIFF_6] file, and inherits the file structure as described in the corresponding portion of the TIFF spec. The GeoTIFF format uses a defined set of TIFF tags to describe cartographic information associated with TIFF imagery that originates from satellite imaging systems, scanned aerial photography, scanned maps, digital elevation models, or as a result of geographic analyses. GeoTIFF can store a broad range of georeferencing information, catering to geographic as well as projected coordinate systems needs. Supported projections include UTM, US State Plane and National Grids, as well as the underlying projection types such as Transverse Mercator, Lambert Conformal Conic, etc. GeoTIFF uses a "MetaTag" (GeoKey) approach to encode dozens of information elements into just 6 private tags (33550, 34264, 33922, 34735, 34736, and 34737), taking advantage of TIFF platform-independent data format representation to avoid cross-platform interchange difficulties. GeoTIFF uses numerical codes to describe projection types, coordinate systems, datums, ellipsoids, etc. In the Format Specification Revision 1.0, see Section 2.4. GeoTIFF File and Key Structure and the Appendices for Tag ID, Key ID and numerical code details. Like the TIFF format, GeoTIFF uses 32-bit offsets, limiting its extent to 4 gigabytes. The needs of GIS, large format scanners, medical imaging and other fields have prompted development of the variant BigTIFF format, which transcends the 4 GB TIFF limit using 64-bit offsets, thereby potentially supporting files up to 18,000 petabytes in size.

**Applicability to LANDFIRE NGDA Products:**

All LF NGDA products are available in GeoTIFF format.

# Section 5 LANDFIRE Self-Assessment of Applicable GDA Standards

This section is a LANDFIRE self-assessment of applicable standards within the GDA. LANDFIRE used the FGDC report “Program Annual Report and Self-Assessment" to help guide this portion of the document. Note that LANDFIRE is abbreviated LF in this section to conserve space.

## 5.1 USC 43 Sec 2808(a) (1) LF Geospatial Strategies

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Prepare, maintain, publish, and implement a strategy for advancing geographic information and related geospatial data and activities appropriate to the mission of LF, in support of the strategic plan for the NSDI. | **Satisfactory in FY2025. See Section 2.** LF has developed and implemented a plan to produce and disseminate the data and all auxiliary files that are necessary for a new version, in a manner that meets the guidance provided by USFS and DOI business leads.<br><br>LF’s plan addresses compliance with the GDA, such as utilizing USGS FSP, posting to ScienceBase, SDC, Data.gov, and GeoPlatform.gov. See LANDFIRE Program: Schedule/Versions |

## 5.2 USC 43 Sec 2808(a) (2) Support Data Sharing

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Collect, maintain, disseminate, and preserve geospatial data such that the resulting data, information, or products can be readily shared with other federal agencies and non-federal users. | **Satisfactory in FY2025. See Section 2.2.** LF data and metadata are currently openly shared to the public. Data are available for download as full extent zip files on LF website, as a user selected area of interest from the LF map viewer, and via streaming formats such as WMS, WCS, a hosted API service, and Esri image service. |

## 5.3 USC 43 Sec 2808(a) (3) Promote Data Integration

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Promote the integration of geospatial data from all sources. | **Satisfactory in FY2025. See Sections 1.1 and 1.2.** LF hosts a data-sharing infrastructure where partners and/or users can share and discover data. LF provides data in openly standardized readable formats, or as downloadable file packages. LF also develops APIs and image services to promote integration of LF data in external applications. |

## 5.4 USC 43 Sec 2808(a) (4) Ensure Records Retention Schedule for Geospatial Data

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Ensure that data information products and other records created in geospatial data and activities are included on LF record schedules that have been approved by the National Archives and Records Administration (NARA). | **Satisfactory in FY2025. See Sections 3.1 and 3.2**. LF utilizes an archive system through the USGS EROS infrastructure and also follows FGDC and USGS ScienceBase guidance. |

## 5.5 USC 43 Sec 2808(a) (5) Allocate Resources for Geospatial Data Management Responsibilities

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Allocate resources to fulfill the responsibilities of effective geospatial data collection, production, and stewardship with regard to related activities of the covered agency, and as necessary to support the activities of the Committee. | **Satisfactory in FY2025.** LF allocates resources by keeping a data manager on staff who oversees or is involved in all items within this report. |

## 5.6 USC 43 Sec 2808(a) (6) Use Data Standards

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Use the geospatial data standards, including the standards for metadata for geospatial data, and other appropriate standards, including documenting geospatial data with the relevant metadata and making metadata available through the GeoPlatform. Include information about all geospatial datasets owned or managed by LF that are, or should be, available to the public in accordance with statutory authorities and missions; not just NGDA Datasets. | **Satisfactory in FY2025. See Sections 2.1 and 4.1.** Eligible geospatial datasets use FGDC-endorsed data standards under OMB A-16, 2002, including but not limited to: FGDC-STD-001-1998 and FGDC Geospatial Positioning Accuracy Standards Part 1: Reporting Methodology, FGDC-STD-007.1-1998 and Part 3: National Standard for Spatial Data Accuracy, FGDC-STD-007.3-1998. LF geospatial datasets also adheres to GeoTIFF Revision 1.0. LF metadata and geospatial data is available through LANDFIRE.gov, ScienceBase, Data.gov, and the GeoPlatform. |

## 5.7 USC 43 Sec 2808(a) (7) Support Coordination and Partnerships

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Coordinate and work in partnership with other federal agencies, agencies of state, tribal, and local governments, institutions of higher education, and the private sector to efficiently and cost-effectively collect, integrate, maintain, disseminate, and preserve geospatial data, building upon existing non-federal geospatial data to the extent possible. | **Satisfactory in FY2025. See Sections 1.1 and 1.2.** LF has many partners and collaborators and is always striving to improve coordination and communication. |

## 5.8 USC 43 Sec 2808(a) (8) Promote Application of Geospatial Data Assets

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Use geospatial information to:<br>• make federal geospatial information and services more useful to the public;<br>• enhance operations;<br>• support decision-making; and<br>• enhance reporting to the public and to Congress | **Satisfactory in FY2025.** LF leverages geospatial information to enhance reporting via public reports, (e.g., fact sheets, data briefs, annual reports, and other published LF reports), Congressional reports, and internal LF plans, reports, and communications. See the LF Resources or Outreach page, and the LF Technical Documentation for more information. |

## 5.9 USC 43 Sec 2808(a) (9) Protection of Privacy and Confidentiality

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Protect personal privacy and maintain confidentiality in accordance with Federal policy and law. | **Satisfactory in FY2025.** All LF geospatial data is housed in a system covered by a current Authorization to Operate (ATO) and is appropriately protected in accordance with applicable laws and regulations. LF data released to the public via any of LF distribution services does not contain any privacy-related or sensitive data. |

## 5.10 USC 43 Sec 2808(a) (10) Declassified Data

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Participate in determining, when applicable, whether declassified data can contribute to and become a part of the NSDI. | **Satisfactory in FY2025.** LF data is not classified; it is freely available and in the public domain. LF contributes to the NSDI by following FGDC standards and by being present on the GeoPlatform. |

## 5.11 USC 43 Sec 2808(a) (11) Non-Duplication of Data

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Search all sources, including the GeoPlatform, to determine if existing Federal, State, local, or private geospatial data meets the needs of the covered agency before expending funds for geospatial data collection. | **Satisfactory in FY2025.** In FY2021 the DOI issued Department of the Interior Acquisition, Arts, and Asset Policy (DOI-AAAP) 0169. This policy applied to all planned acquisition action within the Department (including LF) and required that any purchase of geospatial data comply with metadata guidance issued by the FGDC.<br><br>Additionally, it specified that any request for geospatial data be accompanied by a written affirmation that a search was conducted on GeoPlatform.gov to determine that no existing Federal, State, local or private data meets the Government's needs. LF is a foundational data source and the only data source available for many applications including (but not limited to) fire behavior modeling and wildfire risk assessments. Additionally, derivative products are common, using LF as a starting point. |

## 5.12 USC 43 Sec 2808(a) (12) Ensuring High-Quality Data

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| To the maximum extent practicable, ensure that a person receiving federal funds for geospatial data collection provides high-quality data. | **Satisfactory in FY2025**. **See Section 1.2**. LF utilizes geospatial data within the public domain that is held to quality standards and expectations.<br><br>Most data LF uses are airborne and satellite imagery or derivative data produced by the federal government and are free to use by all.<br><br>* "a person receiving federal funds" has been interpreted to mean non-federal organizations or corporations; for example, contract or grant recipients |

## 5.13 USC 43 Sec 2808(a) (13) Point of Contact

| GDA Requirement | LANDFIRE Self-Assessment |
|---|---|
| Appoint a contact to coordinate with the lead covered agencies for collection, acquisition, maintenance, and dissemination of the NGDA data themes used by LF. | **Satisfactory in FY2025.** A LF Point of Contact (POC) has been appointed for all records that are currently designated as NGDA within the Land Use - Land Cover theme.<br><br>The DOI coordinates with the FGDC for the development, maintenance, and dissemination of the NGDA data themes. Final data coordination is led by the FGDC before incorporation into the GeoPlatform. |

# Section 6 Acronyms

| Acronym | Definition |
|---|---|
| 3DEP | 3D Elevation Program |
| ADD | Attribute Data Dictionary |
| AGOL | ArcGIS Online |
| AK | Alaska |
| ATO | Authorization to Operate |
| BARC | Burned Area Reflectance Classification |
| CC | Canopy Cover |
| CONUS | Conterminous United States |
| CY | Calendar Year |
| DOI | Department of the Interior |
| DOI-AAAP | Department of the Interior Acquisition, Arts, and Asset Policy |
| EROS | Earth Resources Observation and Science |
| ESP | Environmental Site Potential |
| ESRI or Esri | Earth Science Research Institute |
| EVC | Existing Vegetation Cover |
| FAIR | Findable, Accessible, Interoperable, Reusable |
| FDS | Federal Data Strategy |
| FedRAMP | Federal Risk and Authorization Management Program |
| FGDC | Federal Geospatial Data Committee |
| FIA | Forest Inventory Analysis |
| FISMA | Federal Information Security Management Act |
| FRG | Fire Regime Group |
| FSP | Fundamental Science Practices |
| FY | Fiscal Year |
| GDA | Geospatial Data Act |
| HI | Hawaii |
| IA | Insular Areas |
| IPDS | Information Product Data System |
| ISO | International Organization for Standardization |
| IV&V | Independent Verification and Validation |
| LANDFIRE | Landscape Fire and Resource Management Planning Tools |
| LANID | Landsat-based Irrigation Dataset |
| LFPS | LANDFIRE Product Service |
| LFRDB | LF Reference Database |
| M | Meter |
| MTBS | Monitoring Trends in Burn Severity |
| NAD83 | North American Datum of 1983 |
| NAIP | National Agriculture Imagery Program |
| NALCMS | North American Land Change Monitoring System |

| Acronym | Definition |
|---|---|
| NARA | National Archives and Records Administration |
| NASS | National Agricultural Statistics Service |
| NGDA | National Geospatial Data Asset |
| NLCD | National Land Cover Database |
| NSDI | National Spatial Data Infrastructure |
| OIG | Office of Inspector General |
| OMB | Office of Management and Budget |
| PAR | Product Acceptance Report |
| PIA | Privacy Impact Assessment |
| POC | Point of Contact |
| PTA | Privacy Threshold Analysis |
| QA/QC | Quality Assessment/Quality Control |
| RAVG | Rapid Assessment of Vegetative Condition after Wildfire |
| SDC | Science Data Catalog |
| TDR | Trusted Digital Repository |
| TNC | The Nature Conservancy |
| TSSC | Technical Support Services Contract |
| USFS | U.S. Forest Service |
| USGS | U.S. Geological Survey |
| WCS | Web Coverage Service |
| WMS | Web Map Services |
| WUI | Wildland Urban Interface |