

LANDFIRE National Western Milestone Overall Quality Assessment Report

The LANDFIRE National Western Milestone Overall Quality Assessment Summary is a product of the LANDFIRE Product Quality Working Team (PQWT). The PQWT is composed of individuals from the major LANDFIRE production teams, and external individuals from the USFS Remote Sensing Applications Center and two universities. The LANDFIRE Product Quality Assessment Report provides potential users access to information about the quality of the LANDFIRE data so that the LANDFIRE products may be fully and appropriately used. There were no specific quality targets or requirements in the LANDFIRE Charter for LANDFIRE National milestones, but the production teams strived to create the highest quality products possible under the project budget and schedule constraints. Details of the quality control processes used in the project can be found in the Product Quality and Control Assessment (PQCA) Plan on www.landfire.gov. This summary report examines overall agreement by Super Zone for the Western Milestone. The results for Similarity Classes and Society of American Foresters (SAF) / Society for Range Management (SRM) Classes were generated by cross-walking LANDFIRE Ecological Systems. The structure and quality of the cross-walk itself will impact the resulting agreement estimates. Note that another report focusing on analyzing LANDFIRE Super Zone agreement will be developed and distributed soon. We will also make individual Map Zone contingency tables available for download in the future. Users must be cautious when interpreting this information because sample sizes are often problematic.

As with all quality assessments, it is important that the user understand the limitations of the assessment process. To assess the “accuracy” of a product, a comparable product considered to be “true” (often called “reference” in the literature) must be available. For LANDFIRE, no “true” data existed, so we used a sample (called holdout plots) of the LANDFIRE Reference Data Base ground plots that were not used to develop the products. Because there were numerous issues with the holdout plots, such as total sample size, plot classification methodology, variable plot quality, etc., we chose to use the term “agreement” rather than “accuracy”. This distinction is common in the literature.

Because the holdout plots were the only reference data available for the agreement assessments, only the products that were directly developed from the LANDFIRE Reference Data Base (LFRDB) [Environmental Site Potential (ESP), Existing Vegetation Type (EVT)] could be quantitatively assessed. The PQCA plan also included the assessment of model quality using Cross Validation (CV) statistics for Canopy Base Height (CBH) and Canopy Bulk Density (CBD) in zones where there were a sufficient number of plots to make the CV statistic meaningful. However, users should NOT interpret CV as final product agreement, and CV results are not included in this report. The quality of some LANDFIRE products, such as Succession Class and Fire Regime Condition Class, will be assessed in the 10 Nature Conservancy LANDFIRE Application Projects scattered around the country. The results of these projects are not yet available, and are not included in these reports.

Overall Agreement for Existing Vegetation Type

| Super Zone | Ecological System Agreement (%) | # of EVT Classes | Similarity Class Agreement (%) | # of EVT Similarity Classes Assessed | SAF/SRM Agreement (%) | # of SAF/SRM Classes Assessed |
|-----------------------------|---------------------------------|------------------|--------------------------------|--------------------------------------|-----------------------|-------------------------------|
| Great Basin | 50 | 56 | 63 | 22 | 52 | 36 |
| Northern Rockies | 32 | 54 | 46 | 28 | 42 | 36 |
| Northwest Pacific Southwest | 38 | 84 | 54 | 31 | 47 | 53 |
| Southwest | 39 | 48 | 60 | 21 | 39 | 36 |
| Southwest | 44 | 70 | 55 | 28 | 50 | 41 |
| OVERALL | 40 | 182 | 55 | 54 | 47 | 94 |

Overall Agreement for Environmental Site Potential

| Super Zone | Ecological System Agreement (%) | # of ESP Classes Assessed | ESP Similarity Class Agreement (%) | # of ESP Similarity Classes Assessed |
|-------------------|---------------------------------|---------------------------|------------------------------------|--------------------------------------|
| Great Basin | 44 | 49 | 57 | 20 |
| Northern Rockies | 41 | 44 | 62 | 24 |
| Northwest | 50 | 64 | 61 | 27 |
| Pacific Southwest | 44 | 43 | 55 | 19 |
| Southwest | 49 | 56 | 62 | 23 |
| OVERALL | 46 | 139 | 60 | 48 |

Assessment Highlights

- The overall agreement between LANDFIRE EVT and hold-out plots averaged 40% for the approximately 180 unique Ecological Systems in the Western Milestone map zones.
- LANDFIRE was designed as a strategic data product, but we are evaluating its quality using a per-pixel (30m) assessment. These agreement results do not indicate how well LANDFIRE is supporting strategic analyses.
- Agreement results based on a 5x5 window centered on plot locations were approximately the same as individual pixel results, indicating that mis-registration (geo-location) error between the map product and reference plot data is not significantly impacting the agreement results.
- While LANDFIRE does not deliver these products, we investigated the agreement for less detailed SAF/SRM EVT (47%) and NatureServe EVT Similarity Classes (55%) using “cross-walks.” As with other studies, agreement tends to increase as the number of mapped categories decreases, although not in every case.
- There is significant variability in agreement across Super Zones, primarily due to differences in the number and distribution of plots used to develop the classification, and the inherent map-ability of the categories being mapped in different geographies.
- Agreement for ESP is generally slightly higher than EVT agreement (46% for Ecological Systems), but not dramatically so. The number of ESP classes is similar to EVT, and the ESP mapping process utilized the same plot data base, so we expect the agreement results to be similar.
- Overall agreement only tells part of the story. Users are encouraged to review the actual contingency tables and class-specific agreements for each Super Zone (included in an upcoming report) to fully understand the results of the assessment.
- Fire Behavior Fuel Model (FBFM13) is an important LANDFIRE product. However, there is no method or data available to quantitatively assess its quality. Given the number of categories (13), EVT agreement results, and that the results are “calibrated” by local experts, the PQWT predicts that on average the agreement of the FBFM13 will exceed 60%. The tendency of local users to “adjust” FBFM13 for current conditions does make this prediction more difficult to verify.