The terraPulse platform

Location intelligence for natural assets—Know the land.

Introduction

TerraPulse is a cloud-based data platform for analyzing and monitoring large land areas. Leveraging the consistency of global satellite data, the system comprises three parts: terraPulse data, the terraView monitoring dashboard, and terraServe—the geospatial API for data scientists. TerraPulse data are dynamic, digital maps of ecosystem cover, structure, and function. The terraView dashboard displays the current value of each map layer and retrieves historical values for selected points and areas. The terraServe API allows efficient, big-data access to the terraPulse data cube for analysts and modelers.

Land changes—so should your maps.

Based on streaming satellite imagery, calibrated to high-quality reference data, and built on the Amazon Web Services (AWS) cloud platform for round-the-clock storage, backup, and delivery, terraPulse enables access to the highest-quality information on land cover and its changes over time. Built for any geographic area and time period at high spatial and temporal resolution, terraPulse describes the status, history, and potential of each piece of land with local resolution, temporal repeatability, and scientific accuracy.

TerraPulse supports decision-makers in a wide range of fields, including forestry, wildlife management, insurance, and carbon markets. We provide stakeholders with accurate, timely, and consistent insights that allow analysts, managers, and executives to save time and money, improve efficiency, and enhance organizational performance.

Whether your organization has a department trained in GIS and remote sensing or you're a small startup creating an entirely new industry, our flexible data solutions and subject experts will provide the means to make better-informed decisions.

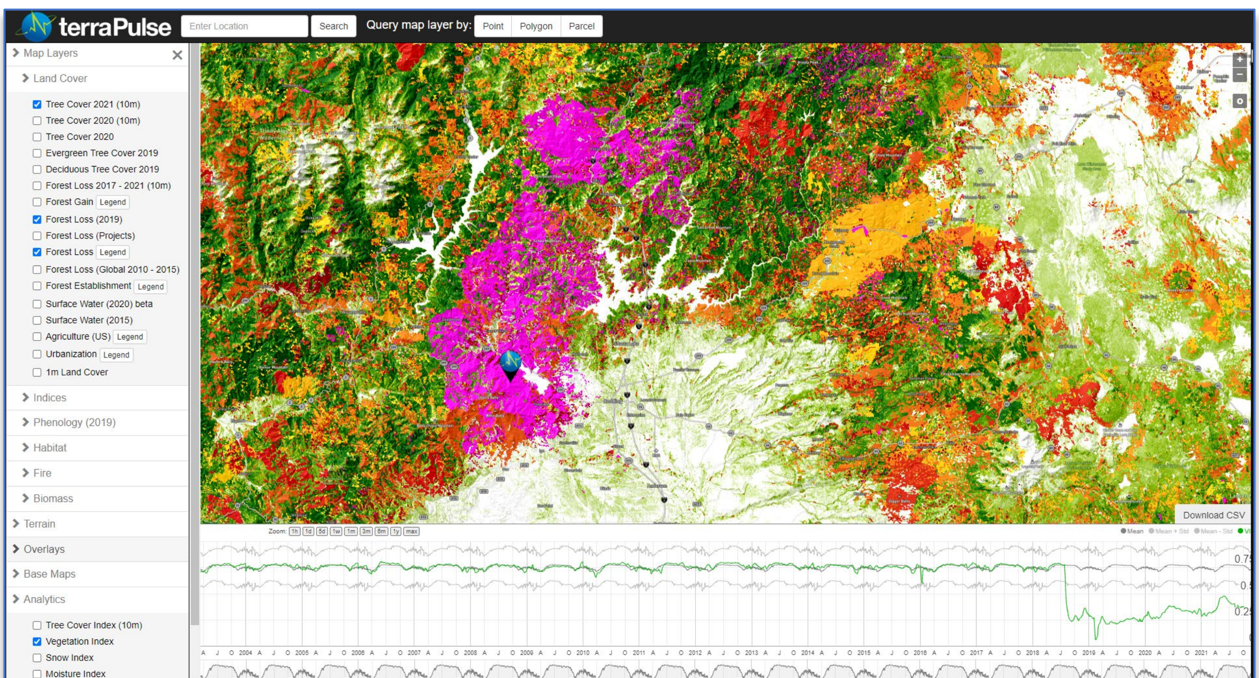
Contents

terraPulse Data

The terraPulse data cube is a high-dimensional, digital record of Earth's biosphere. Mined from satellite measurements by artificial intelligence, terraPulse datasets are gridded maps of the cover, structure, and function of ecosystems. Data layers are provided at scales from single pixels, points, or polygons up to the entire globe, and successive layers depict changes over time. Spatial scales range from sub-meter to global, and measurements are updated from daily to annually extending from 1984 to the present.

On request, certainties of terraPulse data products are reported at pixel and regional scales. Uncertainty at the pixel level is represented as Root-Mean-Square Error (RMSE) of continuous layers and as probabilities of categorical layers. At the regional level, uncertainty of continuous layers is represented as RMSE, Mean Absolute and Bias Errors, and linear regression diagnostics (slope, intercept, R-Squared); regional uncertainty of categorical layers is represented by confusion matrices and User's, Producer's, and Overall Accuracies. Standard validation is based on withheld samples of model training data; custom calibration and validation to the clients' own reference data are also available.

TerraPulse data are delivered via Secure File Transfer Protocol (SFTP), via the terraServe API in GeoJSON, CSV, SHP, or TIFF format, and via the terraView dashboard for rapid assessment, monitoring, and communication to teams and stakeholders.



The terraView dashboard showing the area of the Carr Fire (2019) in California. Tree Cover in 2021 is shown in the map as shades of green, The year of most recent Forest Foss is mapped as a yellow-red heatmap, and 2019 Forest Loss is highlighted in magenta. Time-serial NDVI in the charting window confirms the exact date of the burn for the pinned location.

Land Cover

The terraPulse Land Cover dataset is the most granular description of Earth's terrestrial ecosystems. The data represent the state of ecosystems as basic cover types, including tree, building, pavement, grass/herb, bare, and water. At sub-meter resolution, these types are represented as single categories. At coarser resolutions (e.g., 10- or 30-meter pixels) and across larger areas (e.g., property parcels, regions, or countries), cover is summarized as areas (e.g., m^2) or areal percentages. Through the specific lens of each variable described in the following sections, changes over time are detected using both the estimate and the uncertainty of the value in each pixel.

Data Products

Land-cover type

Unit: *categorical (building, pavement, tree, grass/herb, bare, water), area, percent*

Scale:

__Spatial__: up to 1-meter resolution, global extent

__Temporal__: variable

Latency: *previous year*

The terraView dashboard showing the 1-meter resolution terraPulse Land Cover Type layer over a wildland-urban interface in Sonoma County, California. Cover types are: building (red), pavement (gray), tree (dark green), grass/herb (light green), water (blue).

Forests

The terraPulse Forests datasets are based on time-serial maps of tree cover, the percentage of horizontal area in each pixel covered by woody vegetation taller than 3 to 5 meters. Each variable is available from 1984 to 2023 at up to 30-meter resolution and from 2017 on at 10-meter resolution, as well as derivative losses or gains and integrated age and time since disturbance. Through the terraPulse Land Cover Dataset, the Tree Cover layer is also available as a binary measurement at sub-meter resolution, with historical coverage depending on availability of high-resolution imagery. Certainty of continuous data products (e.g., Tree Cover) is represented by Root Mean Square Error, and certainty of categorical products is represented by probability of class membership.

Data Products

Tree Cover

Unit: *area* (e.g., m^2), *percent*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Tree Cover Change

Unit: *rate in terms of area (e.g., +/- m^2 / year) or percent (e.g., +/- % / year)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Deciduous Tree Cover

Unit: *area (e.g., m^2), percent*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Evergreen Tree Cover

Unit: *area (e.g., m^2), percent*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Forest Cover

Unit: *binary (forest/nonforest), area (e.g., m^2), percent*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Forest Cover Loss

Unit: *rate in binary (loss/no-loss) or area (e.g., m^2) units, year of loss*

Scale:

- ***Spatial**:* *up to 10-m resolution, global extent*
- ***Temporal**:* *up to annual resolution from 1984 – present*

Latency: *previous year*

Forest Cover Gain

Unit: *rate in binary(gain/no-gain) or area (e.g., m^2) units, year of gain*

Scale:

- ***Spatial**:* *up to 10-m resolution, global extent*
- ***Temporal**:* *up to annual resolution from 1984 – present*

Latency: *previous year*

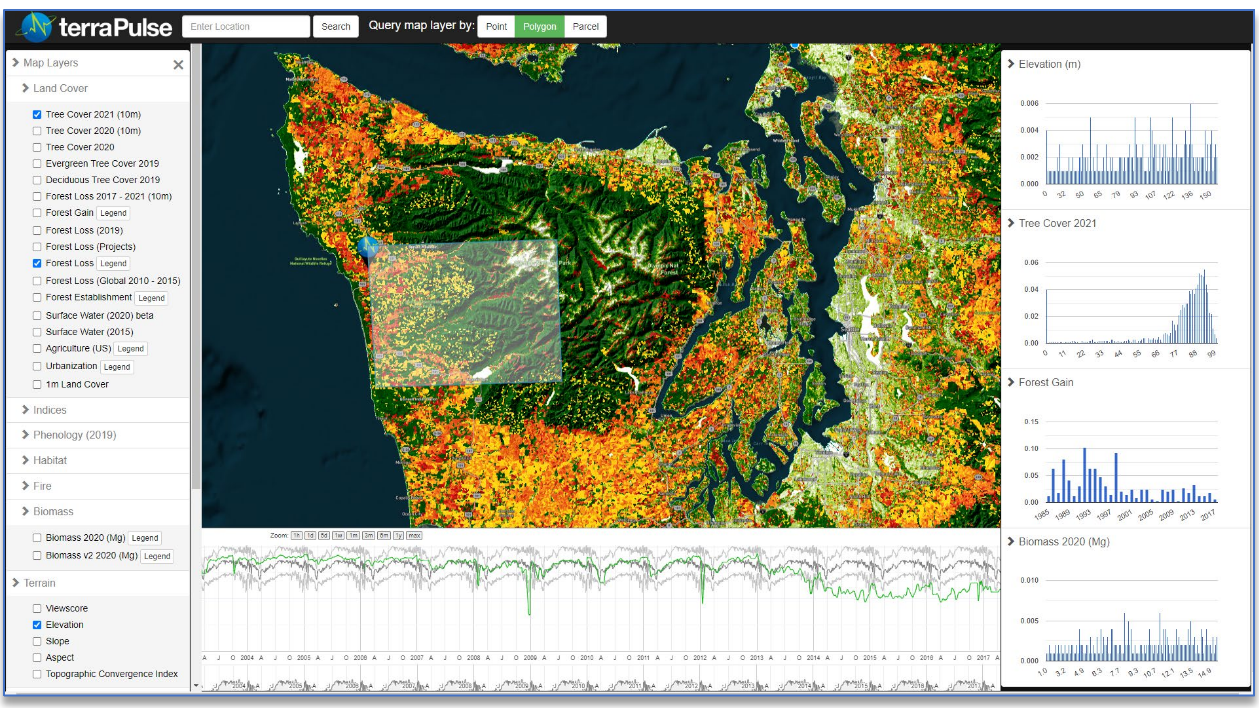
Forest Age

Unit: *years since forest gain*

Scale:

- ***Spatial:*** *up to 10-m resolution, global extent*
- ***Temporal:*** *up to annual resolution from 1984 – present*

Latency: *previous year*



Forest activity and biomass over the Olympic Peninsula, Washington, USA. TerraPulse Forest Loss (1985 – 2021) is mapped as a heatmap over terraPulse Tree Cover (2021) in shades of green. The chart panel (right) shows the age-class distribution as year of most recent Forest Gain, as well as the frequency distributions of 2021 Tree Cover, 2020 Aboveground Forest Biomass, and elevation for the shaded polygon. Note the regional cohort of forest gains following the enactment of the Northwest Forest Plan in 1994. The time-series (bottom) shows the Normalized Difference Vegetation Index at daily, 500-meter resolution from 2000 to 2021 at the pinned location for one stand harvested in 2013. Note the distinctly evergreen phenology before the cut and the recovery in the first years afterward.

Water

The terraPulse Surface Water dataset maps inundation of the ground surface by liquid, unfrozen water—either categorically at any point in time or proportionally over longer intervals—and is available globally at up to 30-meter resolution from 1984 to 2023 and at 10-meter resolution from 2017 onward. Through the terraPulse Land Cover Layer, the Surface Water layer is also available as a binary measurement at sub-meter resolution, with historical coverage depending on availability of high-resolution imagery. Certainty of continuous data products is represented by Root Mean Square Error, and certainty of categorical products is represented by probability of class membership.

Data Products

Surface Water Cover

Unit: *binary, coarsened to percent of area*

Scale:

- ***Spatial:*** *up to 10-m resolution, global extent*
- ***Temporal:*** *up to annual resolution from 1984 – present*

Latency: *previous year*

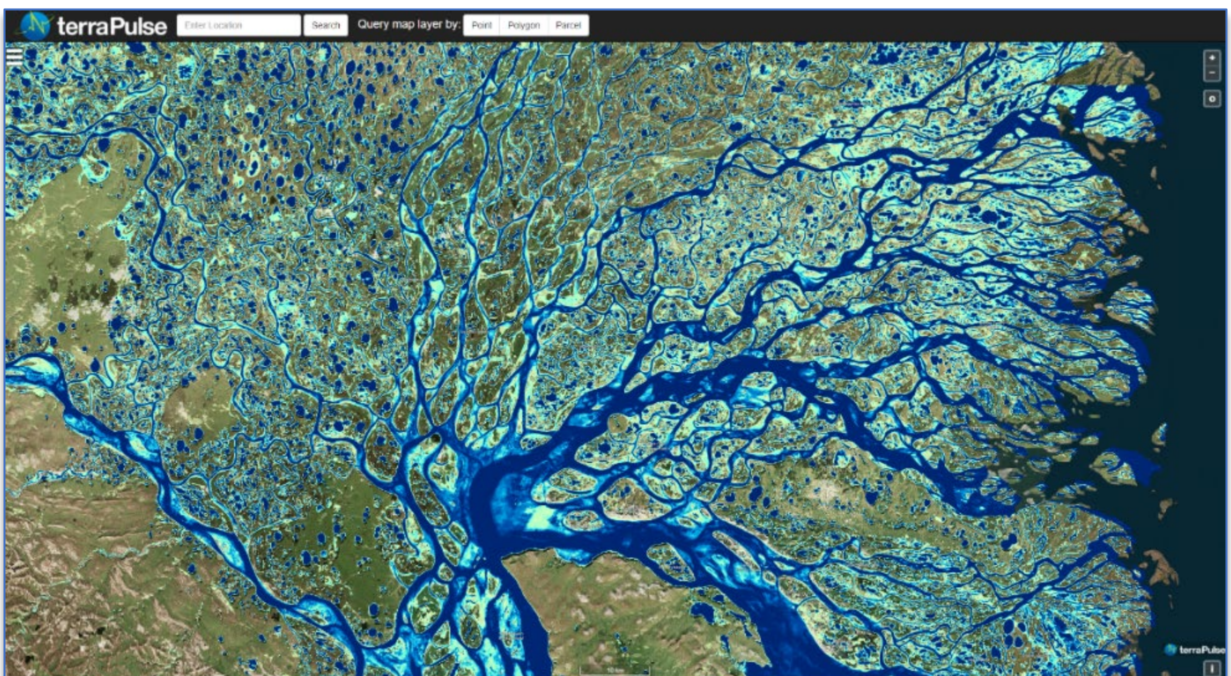
Hydroperiod & Inundation Frequency

Unit: *percent of period inundated*

Scale:

- ***Spatial***: *up to 10-m resolution, global extent*
- ***Temporal***: *up to monthly resolution from 1984 – present*

Latency: *previous year*



The terraView dashboard showing the terraPulse hydroperiod layer (2020) over the Lena River Delta in Russia. The background image is a high-resolution satellite image. The yellow-blue colors are the percentage of the year each pixel was inundated with (liquid) water.

Urban

The terraPulse Urban dataset maps urban cover and change as spatio-temporal estimates of impervious surface cover. The data are based on high-resolution satellite estimates of building and pavement cover, interpolated to 10- or 30-meter, annual resolution using Landsat, Sentinel, and other data sources. Through the terraPulse Land Cover Dataset, the Impervious Surface Cover layer is also available as a binary measurement at sub-meter resolution, with historical coverage depending on availability of high-resolution imagery. Certainty of continuous data products is represented as Root Mean Square Error, and certainty of categorical products is represented as probability of class membership.

Data Products

Impervious Surface Cover

Unit: *area (e.g., m^2), percent of area*

Scale:

Spatial: *up to 1-m resolution, global extent*

Temporal: *up to annual resolution from 1984 – present*

Latency: *previous year*

Impervious Surface Change

Unit: +/- area *(e.g., m^2/ yr), or percent of area (% / yr)*

Scale:

Spatial: *up to 1-m resolution, global extent*

Temporal: *up to annual resolution from 1984 – present*

Latency: *previous year*

Urban Cover

Unit: *binary (urban/nonurban), area (e.g., m^2)*

Scale:

Spatial*: up to 10-m resolution, global extent*

Temporal*: up to annual resolution from 1984 – present*

Latency: *previous year*

Urban Gain

Unit: *binary(gain/no-gain) or rate in terms of area (e.g., m^2/yr), year of gain*

Scale:

Spatial*:* *up to 10-m resolution, global extent*

Temporal*:* *up to annual resolution from 1984 – present*

Latency: *previous year*

Development Year

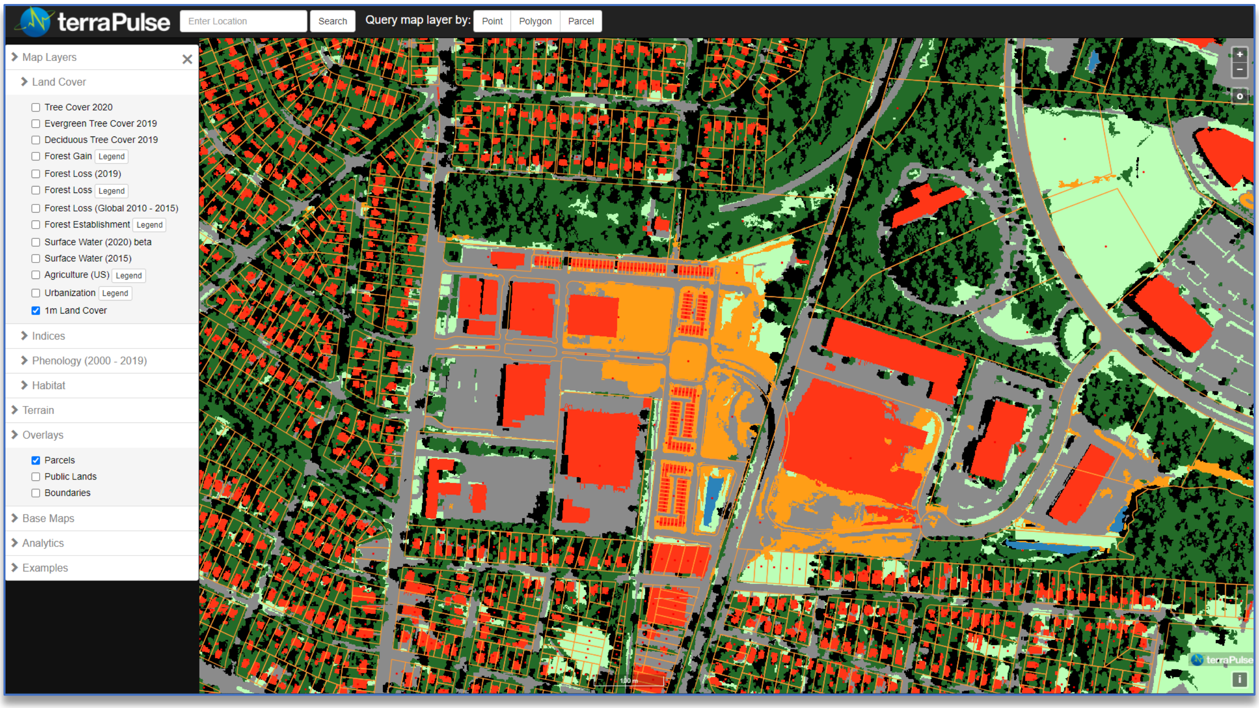
Unit: *year of urban gain*

Scale:

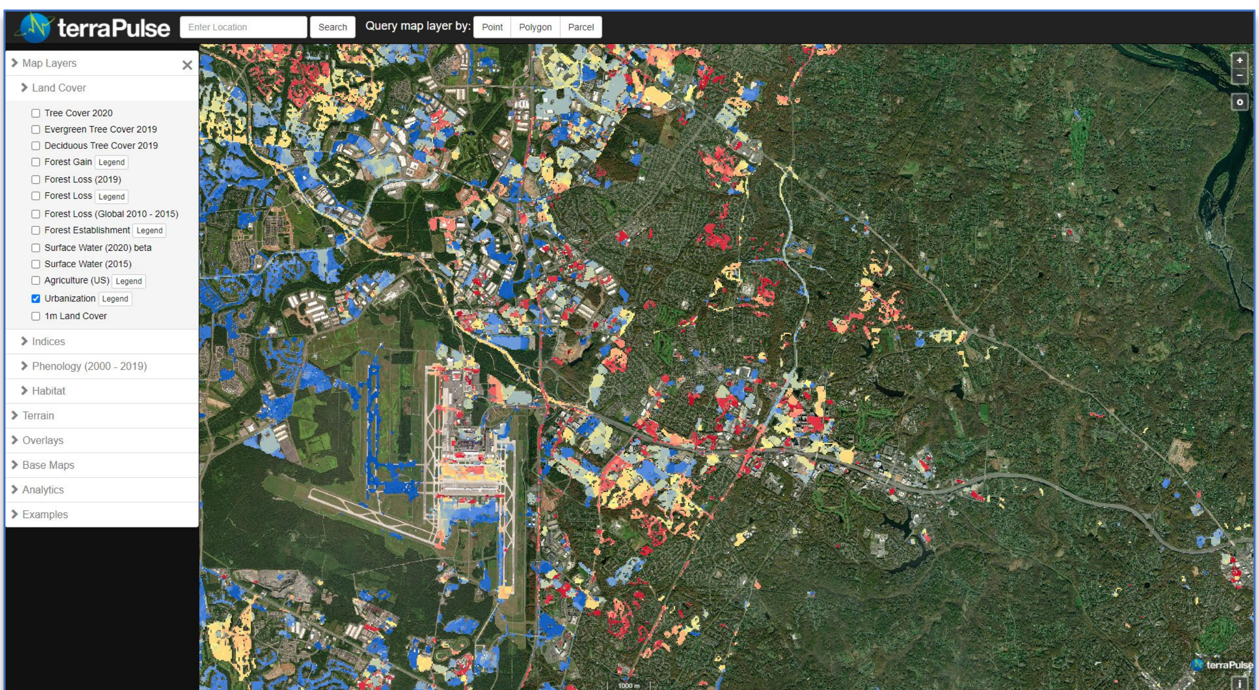
Spatial: *up to 10-m resolution, global extent*

Temporal: *up to annual resolution from 1984 – present*

Latency: *previous year*



High (1-meter) resolution terraPulse Land Cover Type over College Park, Maryland, including six categories: building (red), pavement (gray), tree (dark green), grass/herb (light green), water (blue), and bare (orange). Property parcels are outlined in orange. Note the large patches of bare soil during commercial development of the construction site in the map center.



The terraView dashboard showing terraPulse Development Year dataset over the area around Dulles-Washington International Airport. The heatmap represents the year of urban growth from 1985 (blue) to 2010 (red).

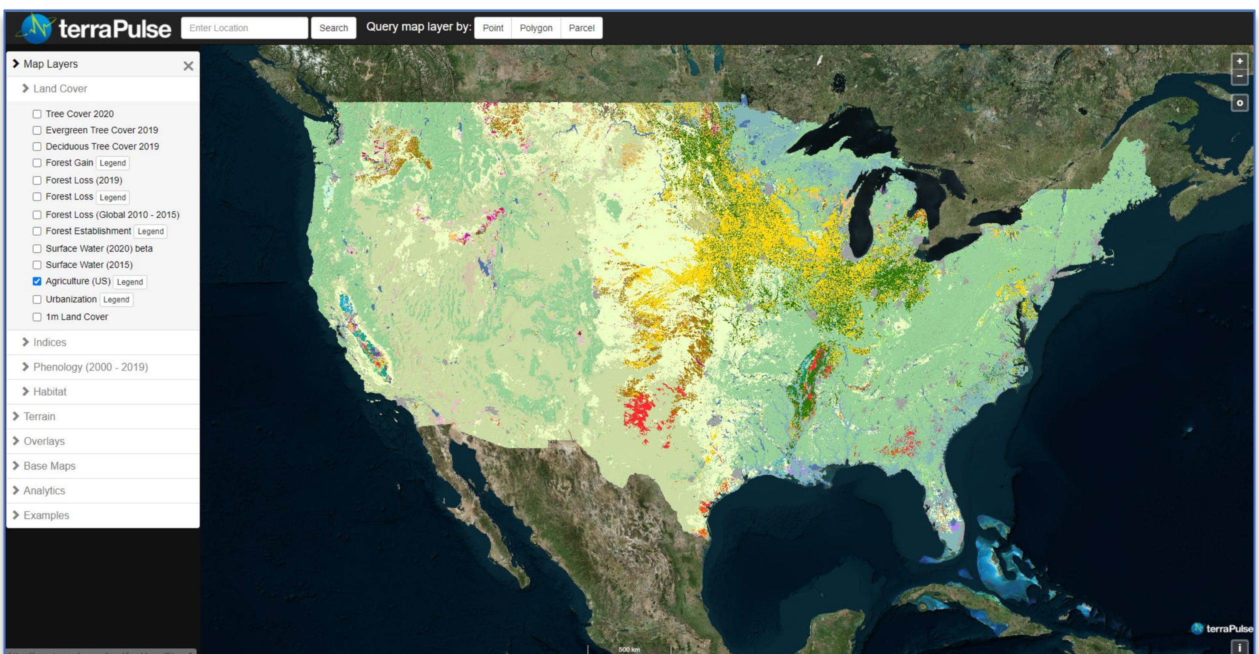
Cropland

TerraPulse hosts the US Department of Agriculture (USDA) Cropland Data Layer for visualization on terraView and download through terraServe. The data cover the conterminous US at a resolution of 30 meters from 2008 or 2010 to the previous year; coverage may be greater or lesser depending on regional agricultural intensity. The data represent 107 agricultural crop species and types, as well as seven non-agricultural types. Combined with indices of vegetation productivity and seasonality, cropland type maps can be used to predict yields, identify arable fields, and compare local productivity to regional and long-term averages.

Data Products

Crop Type

Unit:	*categorical*	
Scale:		
	Spatial:	*30-m resolution, continental US*
	Temporal:	*2008 – present (additional years vary by state)*
Latency:	*previous year*	



The terraView dashboard showing the USDA Cropland Data Layer over the conterminous US in 2020. The USDA CDL dataset is available at 30-meter, annual resolution over the conterminous US from 2008 to 2023.

Biomass

The terraPulse Biomass dataset represents actual and potential aboveground biomass, as either biomass (Mg) or biomass density (Mg/ha), at up to 30-meter, annual resolution globally from 1984 to 2023 and at 10-meter resolution from 2017 onward. The Aboveground Biomass layer is also available at sub-meter resolution, with coverage depending on availability of high-resolution imagery. The products are estimated by artificial intelligence trained on spaceborne lidar and other reference measurements correlated to a suite of terraPulse vegetation cover, disturbance history, spectral indices, and other environmental variables. Certainty is represented by Root Mean Square Error.

The terraPulse biomass dataset is provided at two levels, with standard calibration or as an enterprise dataset calibrated to client reference measurements.

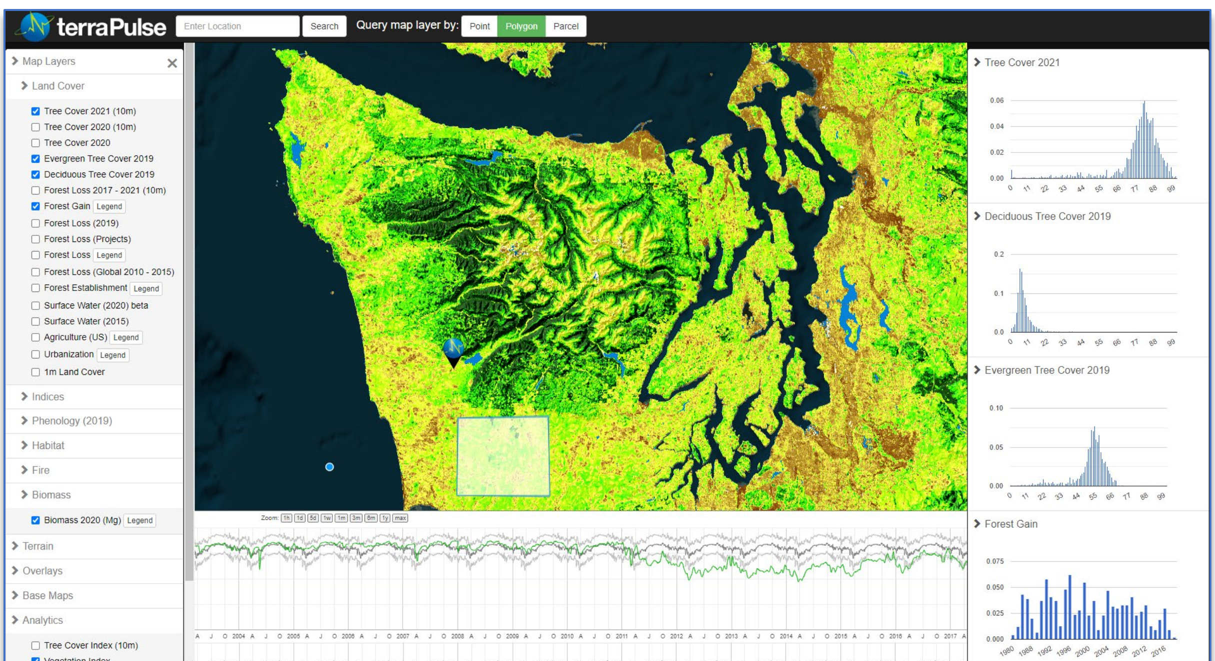
Data Products

Aboveground Biomass

Unit: Mg (biomass) or Mg/ha (biomass density)
Scale:
Spatial: *up to sub-meter resolution, global*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*

Aboveground Biomass Change

Unit: Mg/year or Mg/ha/year
Scale:
Spatial: *up to sub-meter resolution, global*
Temporal: *up to annual resolution from 1984 – present*
Latency: *previous year*



Forest composition, dynamics, and biomass in the Olympic Peninsula, USA. The map shows Above Ground Biomass (2021) in shades of brown (low) to green (high). The time-series displays daily values of the Normalized Difference Vegetation Index at the pinned location from 2000 to 2021, and the charting window shows the frequency histograms of AGB and Stand Age, as well as Evergreen (2019), Deciduous (2019), and (total) Tree Cover (2021), in the shaded region of the map.

Wildfire

The terraPulse Wildfire dataset estimates the probability of fire occurrence as a function of vegetation cover and type, terrain, phenology, and climate. Terms and their definitions are based on Hardy (2001), Wildland fire hazard and risk: problems, definitions, and context, *Forest Ecology and Management* 211: 73-82. The algorithm is trained on over 20 years of fire history, by ecoregion, in correlation to the suite of terraPulse datasets as predictors. Certainty of continuous data products is represented by Root Mean Square Error.

Data products are available at up to daily, 10-meter resolution or as longer-term (e.g, annual or multi-decadal) summaries at pixel or coarser resolutions. Fire Danger is also available as future projections based on predicted meteorological data.

Data Products

Fire History

Unit: *fire occurrence, burned area*
Scale:
Spatial: *up to 500-m resolution, global extent*
Temporal: *up to daily resolution, 2001 – present*
Latency: *previous year*

Wildfire Hazard

Unit: *probability of ignition given vegetation (fuel) and terrain*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to daily resolution, 1984 – present*
Latency: *previous year*

Wildfire Danger

Unit: *probability of ignition given vegetation (fuel), terrain, and weather*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to daily resolution, 1984 – present*
Latency: *previous year*

Wildfire Exposure

Unit: *biomass (Mg C or Mg C/ha) or other asset value (e.g., habitat, tree cover)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to daily resolution, 1984 – present*
Latency: *previous year*

Wildfire Vulnerability (Risk)

Unit: *asset value (e.g., biomass, tree cover, habitat) x probability of ignition*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to daily resolution, 1984 – present*
Latency: *previous year*

Wildfire Severity

Unit: *difference in asset value (e.g., biomass, tree cover, habitat) or index (e.g., dNBR)*

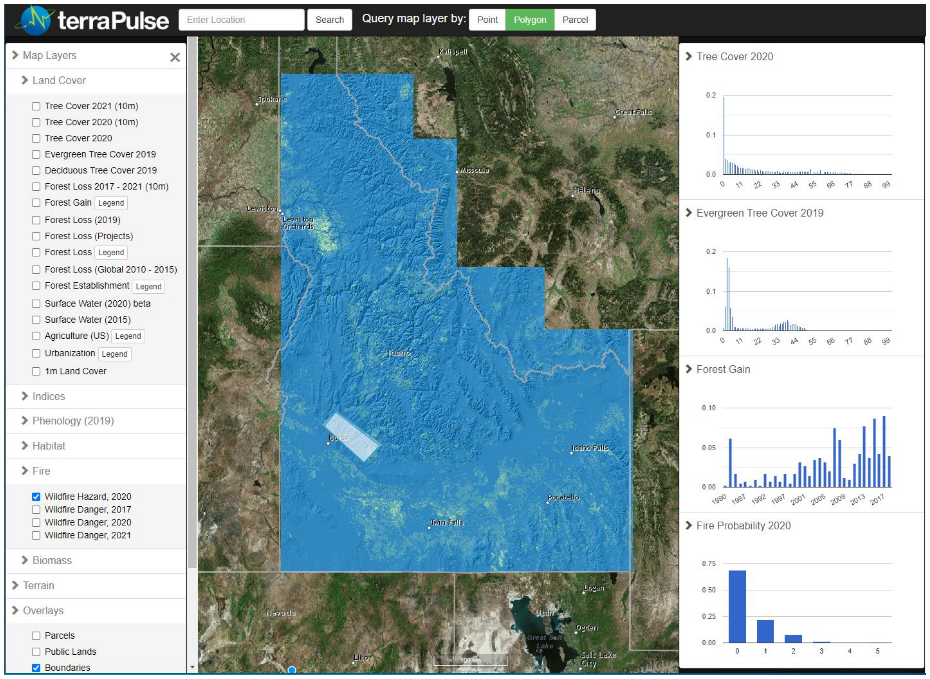
Scale:

Spatial: *up to 10-m resolution, global extent*

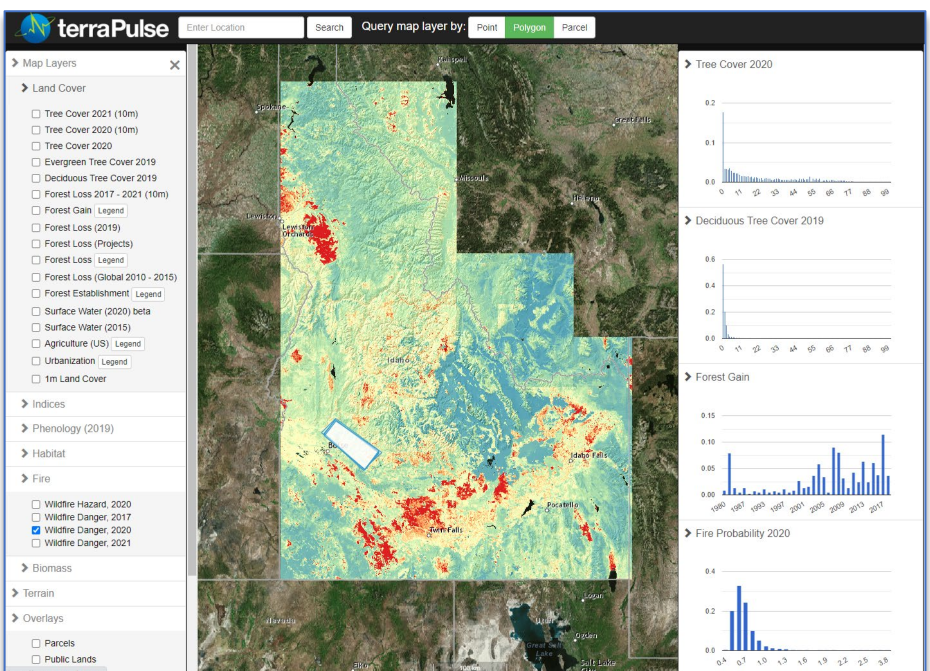
Temporal: *up to daily resolution, 1984 – present*

Latency: *previous year*

Fire hazard and forest condition in Idaho, USA. The map window displays Fire Hazard (2020) as a blue-red heatmap at 30-meter resolution. Frequency histograms of total Tree Cover (2020), Evergreen Tree Cover (2019), Stand Age (Forest Gain), and Fire Hazard for the shaded map region are shown in the charting panel.



Fire danger and forest condition in Idaho, USA. The map window displays Fire Hazard (2020) as a blue-red heatmap at 30-meter resolution. Frequency histograms of total Tree Cover (2020), Evergreen Tree Cover (2019), Stand Age (Forest Gain), and Fire Danger for the shaded map region are shown in the charting panel.



Species & Habitat

The terraPulse Species & Habitat dataset maps the spatial distribution of the environmental niche and/or spectral characteristics of each of hundreds of species. Each map is based on available records of species abundance or occurrence and coincident values of environmental predictors drawn from the terraPulse data cube. Depending on data availability, predictive maps of habitat suitability are available at up to daily, 10-meter resolution across the entire geographic distribution of the species.

Data Products

Habitat Suitability

Unit: *probability of occurrence given vegetation and terrain*

Scale:

- ***Spatial:*** *up to 10-m resolution across species' range*
- ***Temporal:*** *1984 – present*

Latency: *up to daily*

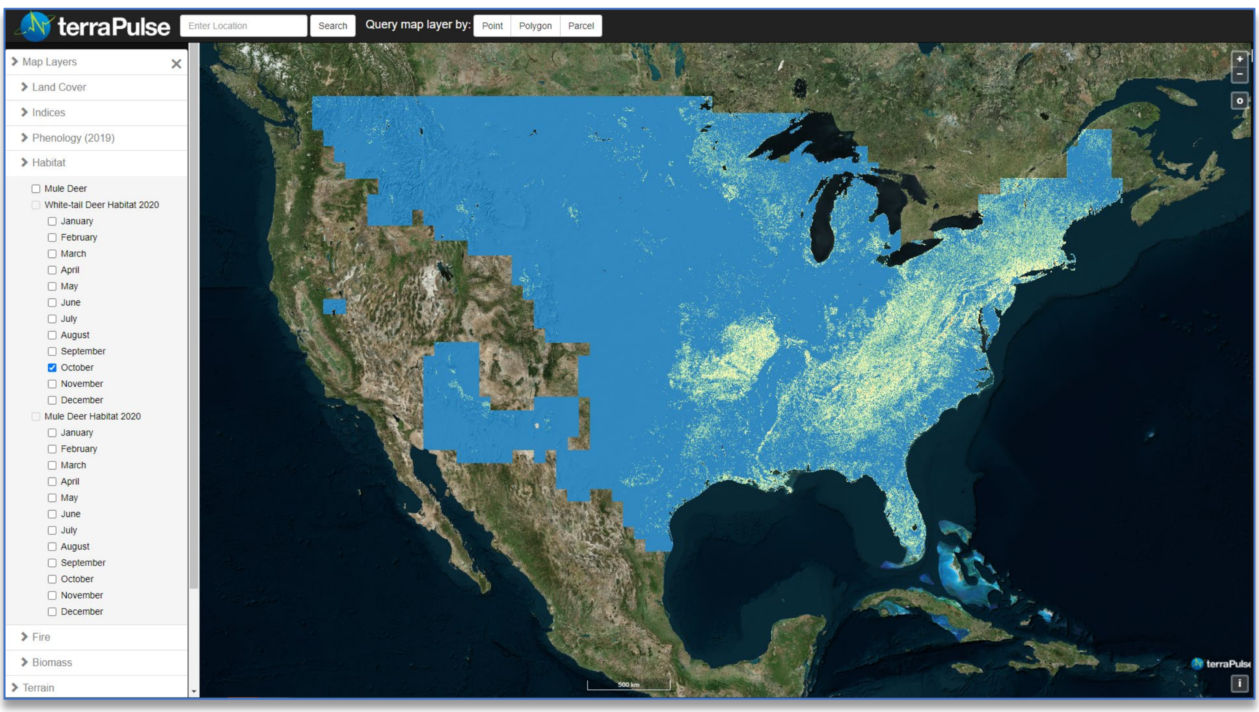


Figure 1. White-tail deer (Odocoileus virginianus) habitat suitability across the species' range within the conterminous United States in October, 2021. Estimates are based on public records correlated to values of terraPulse predictors coincident to the date of sighting.

Indices

Crop-, range-, and wildland systems require frequently updated data for monitoring plant health and condition, surface moisture, and snow. TerraPulse produces a variety of satellite-based indices at up to 10-meter, daily resolution, as well as differences over time and long-term summaries of historical conditions and variability.

Data Products

Vegetation Productivity: Normalized Difference Vegetation Index (NDVI)

Unit: *unitless ratio*
Scale:
- ***Spatial:*** *up to 10-meter resolution globally*
- ***Temporal:*** *up to daily resolution, 1984 to present*

Latency: *1-14 days*

Surface Moisture: Normalized Difference Moisture Index (NDMI)

Unit: *unitless ratio*
Scale:
- ***Spatial:*** *up to 10-meter resolution globally*
- ***Temporal:*** *up to daily resolution, 1984 to present*

Latency: *1-14 days*

Snow cover: Normalized Difference Snow Index (NDSI)

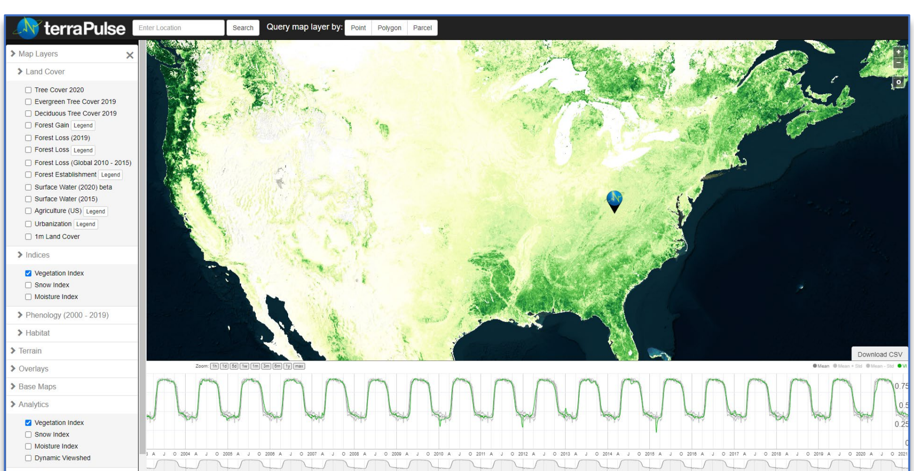
Unit: *unitless ratio*
Scale:
- ***Spatial:*** *up to 10-meter resolution globally*
- ***Temporal:*** *up to daily resolution, 1984 to present*

Latency: *1-14 days*

Fire severity: Normalized Burn Ratio (NBR)

Unit: *unitless ratio*
Scale:
- ***Spatial:*** *up to 10-meter resolution globally*
- ***Temporal:*** *up to daily resolution, 1984 to present*

Latency: *1-14 days*



TerraView showing the most recent daily acquisition of Normalized Difference Vegetation Index (NDVI) in the map window and the complete time-series for the pinned location in the charting window.

Seasons & Phenology

Phenology is the study of seasonal biotic cycles. Phenological processes in plants are driven by climate and soil, as well as plant physiology. In turn, plant phenology affects cycling of energy, water, and nutrients, as well as seasonal animal behavior. The terraPulse Seasons & Phenology datasets are derived from time-serial measurements of the Normalized Difference Vegetation Index or other indices (NDVI, NDMI, NDSI) in each pixel. To improve representation in temperate, boreal, and arctic regions, data can be masked for snow upon request.

Data Products

Start of Season (SOS)

Unit: *day of year (DOY), index value (e.g., NDVI)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 2001 – present*
Latency: *previous year*

Peak of Season (POS)

Unit: *day of year (DOY), index value (e.g., NDVI)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 2001 – present*
Latency: *previous year*

End of Season (EOS)

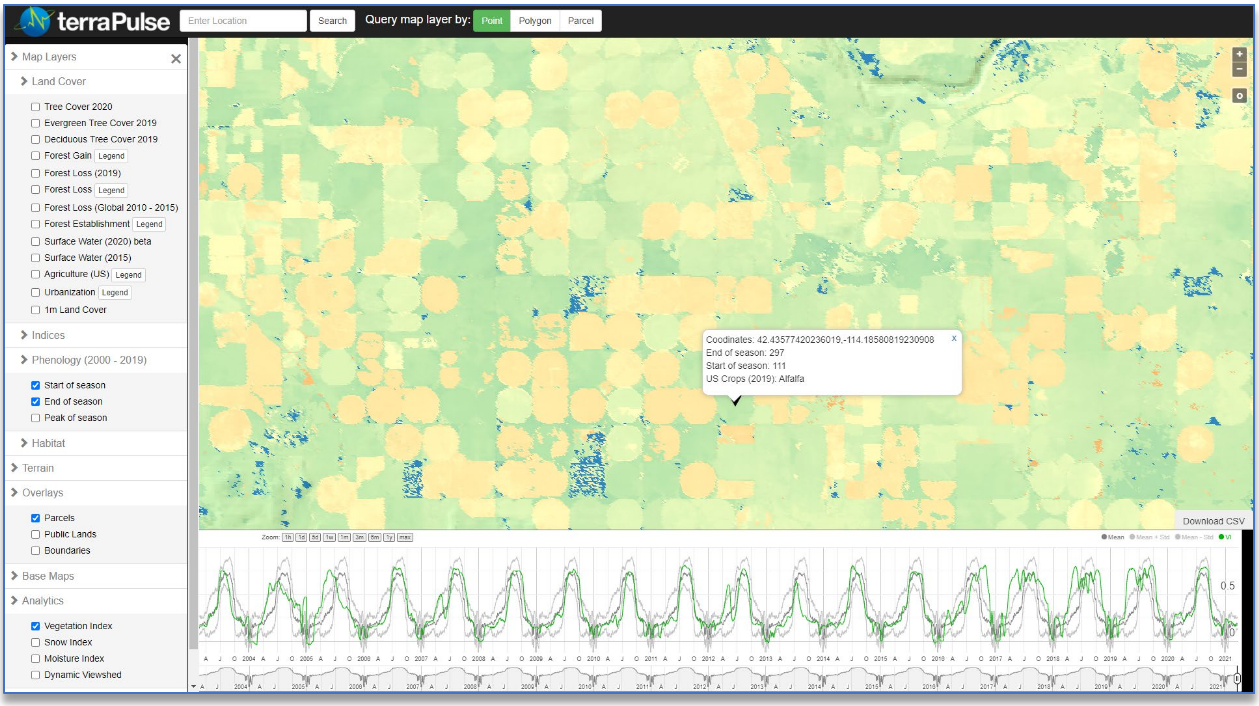
Unit: *day of year (DOY), index value (e.g., NDVI)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 2001 – present*
Latency: *previous year*

Length of Season (LOS)

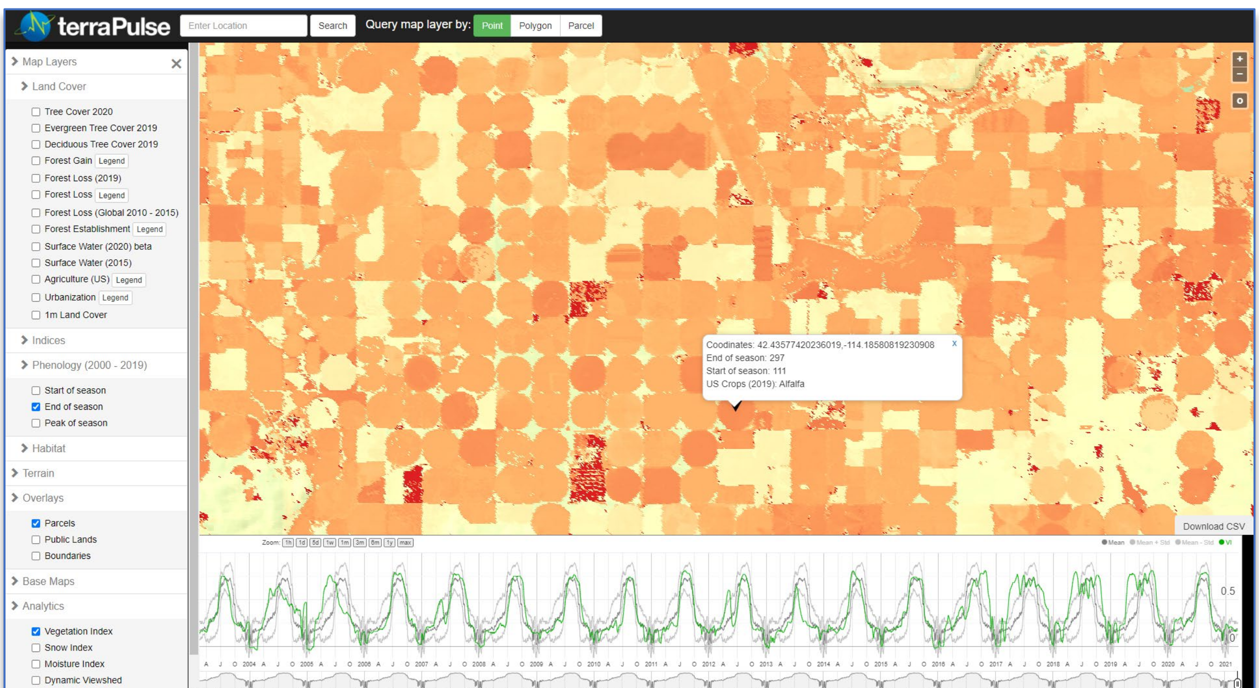
Unit: *days*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 2001 – present*
Latency: *previous year*

Total of Season (TOS)

Unit: *index value (e.g., NDVI)*
Scale:
Spatial: *up to 10-m resolution, global extent*
Temporal: *up to annual resolution from 2001 – present*
Latency: *previous year*



The terraView dashboard showing terraPulse Phenology Start of Season (day of year) over an agricultural region in southern Idaho, USA and historical NDVI of an alfalfa field at the pinned location in the time-series chart. Corresponding to crop establishment, the pinned location shows SOS on day 111 (April 21) in 2020.



The terraView dashboard showing terraPulse Phenology End of Season (day of year) over an agricultural region in southern Idaho, USA and historical NDVI of an alfalfa field at the pinned location in the time-series chart. The pinned location shows EOS on day 111 (October 23) in 2020, corresponding to crop harvest.

Terrain

The terraPulse Terrain product suite is derived from gridded measurements of elevation captured by optical and radar sensors aboard a variety of Earth-orbiting satellites. These layers are static over time and aid interpretation of dynamic, satellite-based variables to inform decisions such as site selection for agricultural and forest uses, habitat improvement, and energy development.

Data Products

Elevation

Unit: *feet or meters*
Scale:
Spatial: *up to 30-m resolution, global extent*
Temporal: *static*
Source: *USGS*

Slope

Unit: *degrees or percent*
Scale:
Spatial: *up to 30-m resolution, global extent*
Temporal: *static*
Source: *USGS*

Aspect

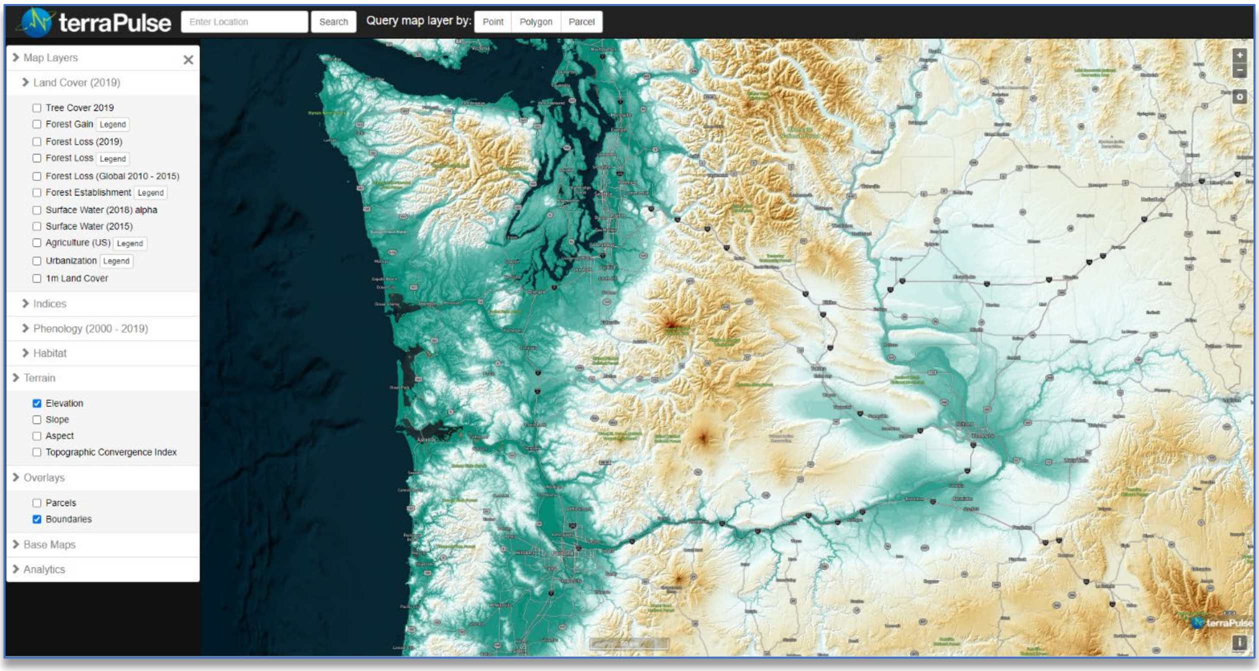
Unit: *azimuth degrees*
Scale:
Spatial: *up to 30-m resolution, global extent*
Temporal: *static*
Source: *USGS*

Topographic Wetness Index

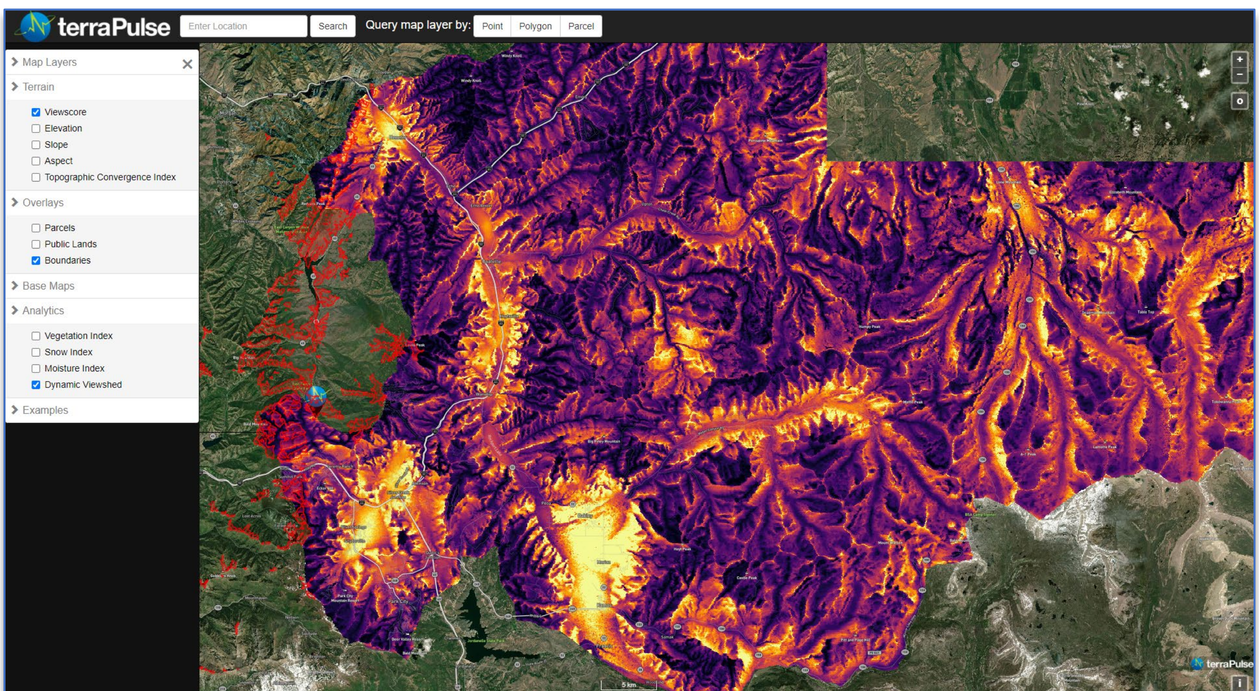
Unit: *watershed catchment area divided by tan(slope)*
Scale:
Spatial: *up to 30-m resolution, global extent*
Temporal: *static*
Source: *USGS*

ViewScore topographic visibility index

Unit: *visible area (sq. km.)*
Scale:
Spatial: *up to 30-m resolution, global extent*
Temporal: *static*
Source: *USGS*



The terraView dashboard showing the terraPulse Elevation layer over the Pacific Northwestern United States. Note the steep relief of the Olympic Peninsula and the volcanoes of the central Cascades Mountain Range.



The terraView dashboard showing the terraPulse ViewScore layer over Summit County, Utah. In units of visible viewshed area, the heatmap ranges from zero (dark purple) to thousands in yellow. The area visible to the pinned location is outlined in red.

Ownership

TerraPulse offers custom public lands layers derived from the United States Geological Survey (USGS) Protected Areas Database of the US (PAD-US) supplemented with various state and local databases. This layer covers the continental US at a resolution of 30 meters and is available for visualization on terraView and download through terraServe. The data represent seven categories: National Parks; National Forests; Military Lands; BLM/BLR Lands; State Parks (including related state-managed protected areas); State Forests/Wildlife Management Areas, and other Public Lands. Easements can be added by request.

Data Products

US Public Lands

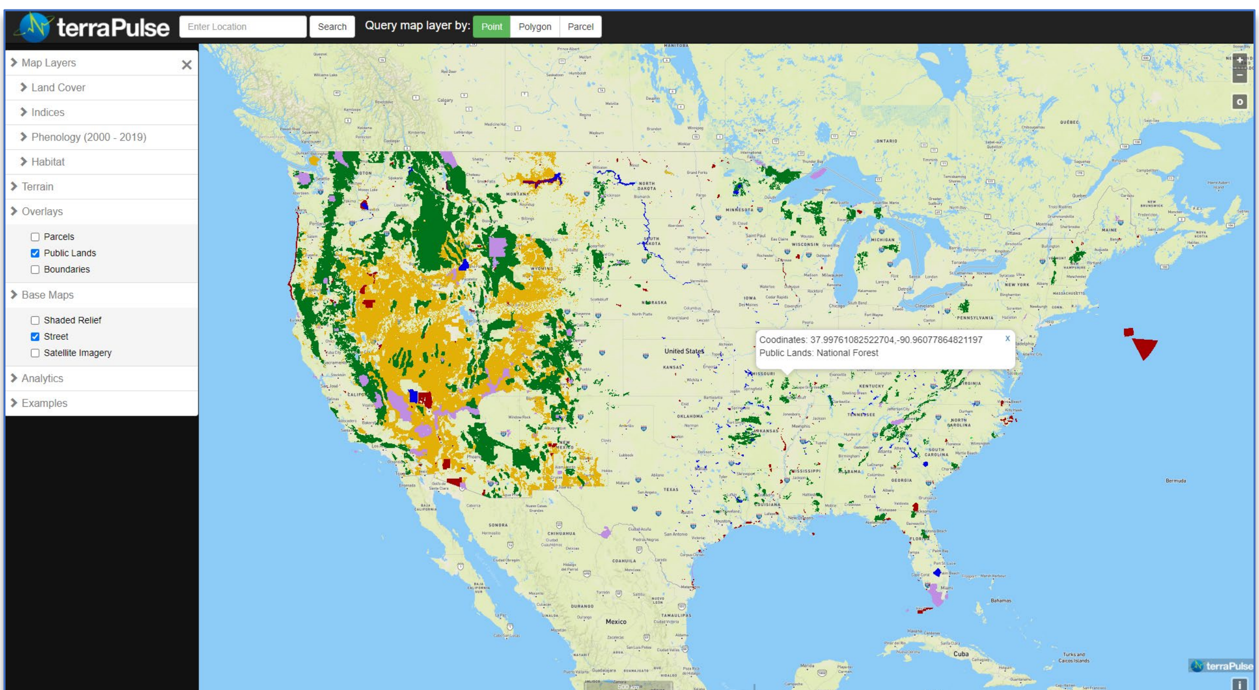
Unit: *categorical (e.g., National Parks; National Forests; Military Lands; BLM/BLR Lands; Tribal Lands; State Parks; State Forests/Wildlife Management Areas; other Public Lands)*

Scale:

Spatial: *up to 30-m resolution, global extent*

Temporal: *static*

Source: *Protected Areas Database of the US (PAD-US), supplemented by state data*



The terraView dashboard showing the terraPulse Public Lands map over the conterminous United States. The pinned location shows management by the US Forest Service.

terraView Dashboard

Map layers

Most current value of each terraPulse map layer

Vector overlays

- Roads, Cities, Boundaries
- Custom AOI’s (e.g., management units, supplied by user)

Functions

- Map, Pan, Zoom
- GPS & text location search
- Graphical and numerical point- and polygon summary
- Time-series charts
- Parcel-level property reports

Security

Private accounts and data access

Browser

Chrome preferred

terraServe API

Application Programming Interface (API)

Values of the terraPulse data layers may be accessed through the terraServe Application Programming Interface (API). The terraServe API is available as a subscription service to developers and data scientists.

MapTiles

Any terraPulse map layer can be visualized on mapping platforms such as ArcGIS, QGIS, Google Maps, MapBox, Leaflet, and OpenLayers. The map tiles are exposed using XYZ tiles, where each tile is a 256 x 256 PNG using a EPSG: 3857 projection.

Company Overview

Advances in satellite technology and big-data computation have enabled large-scale monitoring of land use by government, commercial, and philanthropic organizations. Established in 2014, terraPulse, Inc. (http://www.terrapulse.com/) is a geospatial technology company devoted to creating timely, accurate information about the changing world and delivering sensible solutions to serve forestry, urban planning, wildlife conservation, watershed, and other natural resource management. TerraPulse provides standard and custom datasets for the science and management of ecosystems, as well as expert advisory and consulting services to enable sustainable land use based current science.

TerraPulse mines global satellite imagery with machine learning to map, monitor, and detect ecosystem changes over time. Our algorithms have been vetted through rigorous peer review and published in high-ranking scientific journals (copies available upon request). The terraPulse process delivers long-term, globally consistent mapping and monitoring of current conditions and enables retrieval of historical baselines from the satellite record, as well as detection of significant changes over time. TerraPulse produces a variety of satellite-based indices at up to 10-m, daily resolution, as well as longer-term summaries of historical conditions and variability.

Relied upon by agencies as large as NASA, World Bank, the US Forest Service, and Bureau of Land Management, our algorithms apply decades of expertise in satellite image analysis to automate the provision of actionable, near real time, and cost-effective decision-making tools to serve land and natural resource economies.

Company history

TerraPulse, Inc. began in 1998 as the Global Land Cover Facility (GLCF), a NASA-sponsored laboratory between the Institute for Advanced Computer Studies and the University of Maryland. Located between the mission-design centers at NASA Goddard Space Flight Center and Washington DC, the GLCF was uniquely situated for the task of creating novel earth science data products to enable a growing community of Earth scientists.

At GLCF, terraPulse's co-founders created the world's first Landsat-based global maps of tree and water cover, as well as the world's first annual, 30-m resolution time-serial maps of impervious surface cover. Average monthly distribution ranged from 15-20 terabytes, with peaks exceeding 30 terabytes per month. While publishing these groundbreaking datasets in the scientific literature, terraPulse's co-founders started the company in order to expose their technology outside of academia, to accelerate the flow of information between the biosphere and the global economy, and to contribute to the mutual sustainability of Earth's increasingly coupled natural and human ecosystem.