How High-Res Imagery & Change Detection can Change the World

Chippie Kislik, PhD - Planet - October 2023

FOREST HARVESTING • British Columbia, Canada • September 21, 2022

VISIT US AT BOOTH 18

Meet the Planet Team at the Texas GIS Forum

OCTOBER 23-27, 2023 • AUSTIN, TEXAS
COMMONS CONFERENCE CENTER

SPEAKER

CHIPPIE KISLIK
PreSales Engineer

CHRIS WILSON
Account Executive

AMANDA FALKNER
Sales Development Representative

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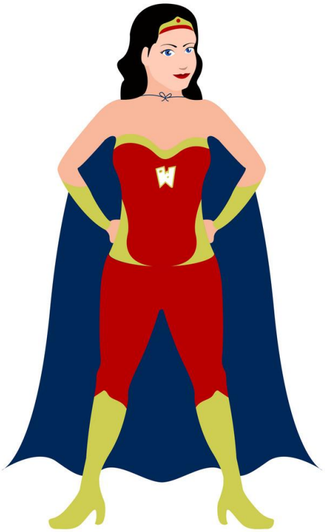
What could you do with Superpowers?

- X-Ray Vision
- Time Travel
- Fly anywhere in seconds

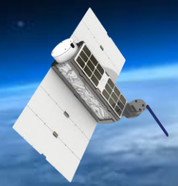


Monitor your areas of interest, discover patterns, and get timely insights

Outline

1. Remote Sensing Applications
2. Planet Capabilities
3. Change Detection
4. GIS Integrations & Imagery Pipeline

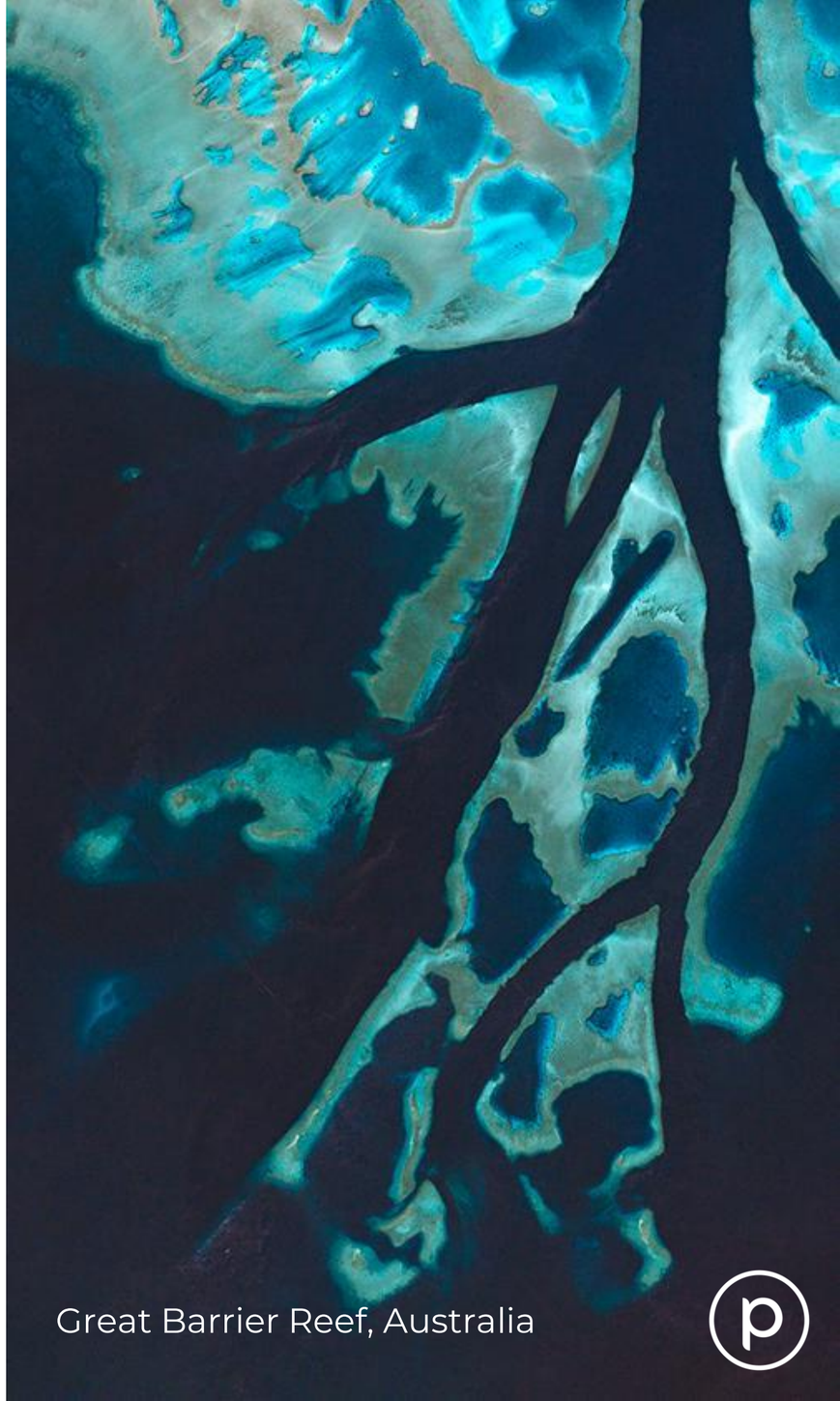
You can’t fix what you can’t see.



Remote Sensing

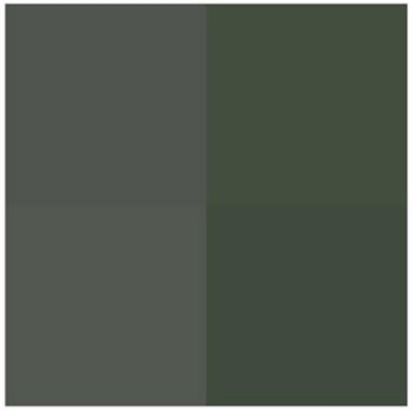
- **The science of identifying, observing, collecting, and measuring objects without coming into direct contact with them**

- **Examples**:
  - **Satellite imagery**
  - Topographic data (i.e., LiDAR)
  - Radar (SAR)
  - Surface temperature
  - Spectrometers
  - Hyperspectral imagers



Great Barrier Reef, Australia

Spatial Resolution



Aqua (MODIS)
250m Resolution

Landsat-8
30m Resolution

Sentinel-2
10m Resolution

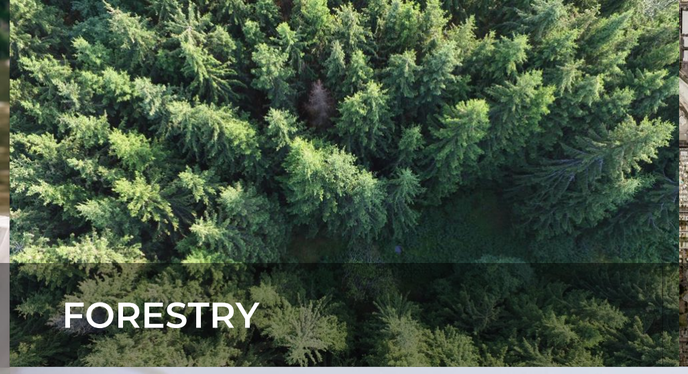
PlanetScope (Dove)
3m Resolution

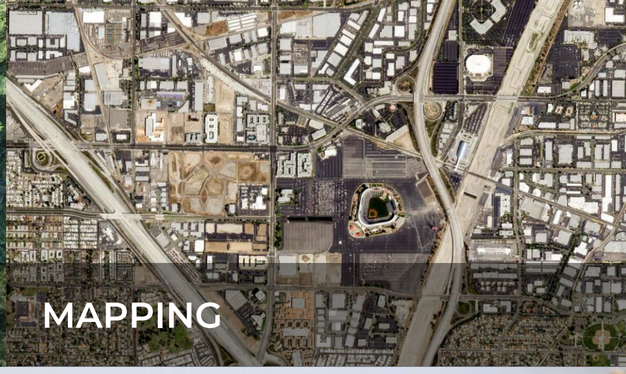
SkySat
0.5m Resolution

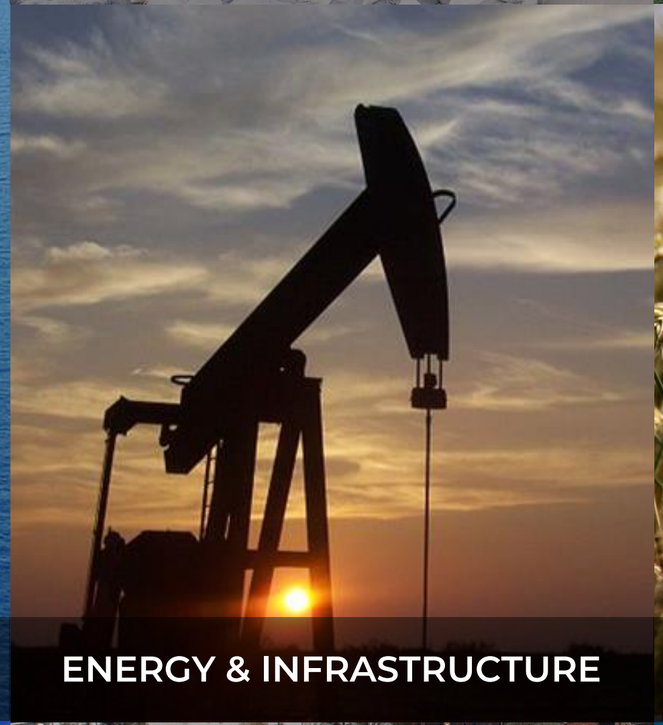
Worldview-4
0.3m Resolution

DEFENSE & INTELLIGENCE

EMERGENCY MANAGEMENT

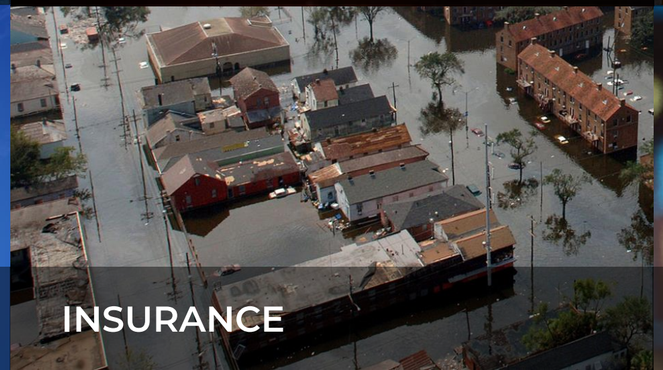

FORESTRY


MAPPING

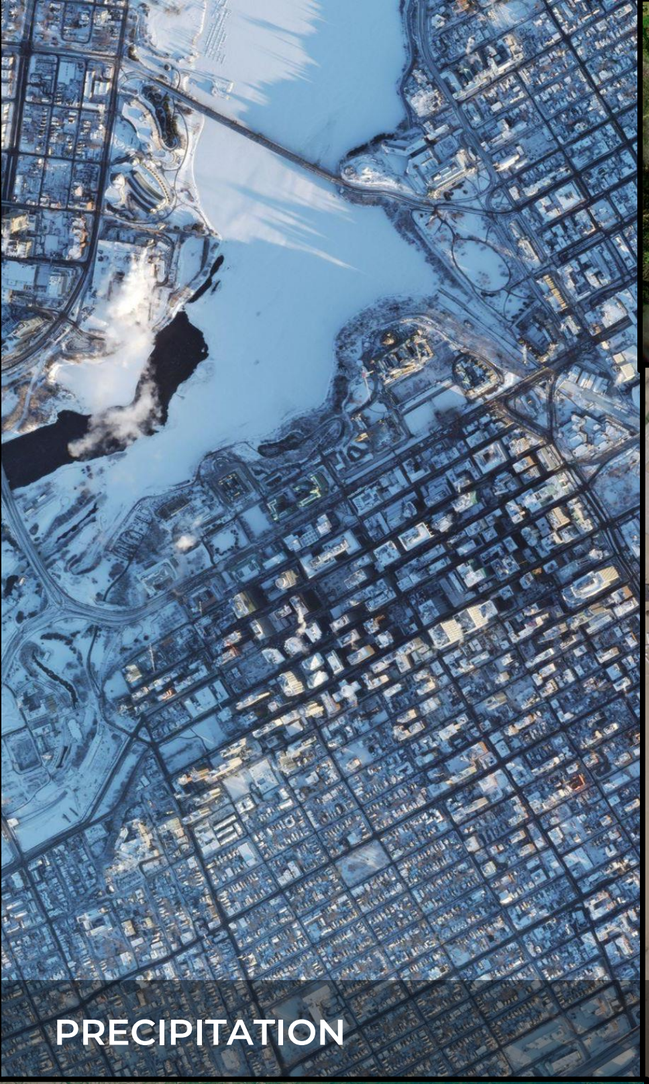

ENERGY & INFRASTRUCTURE

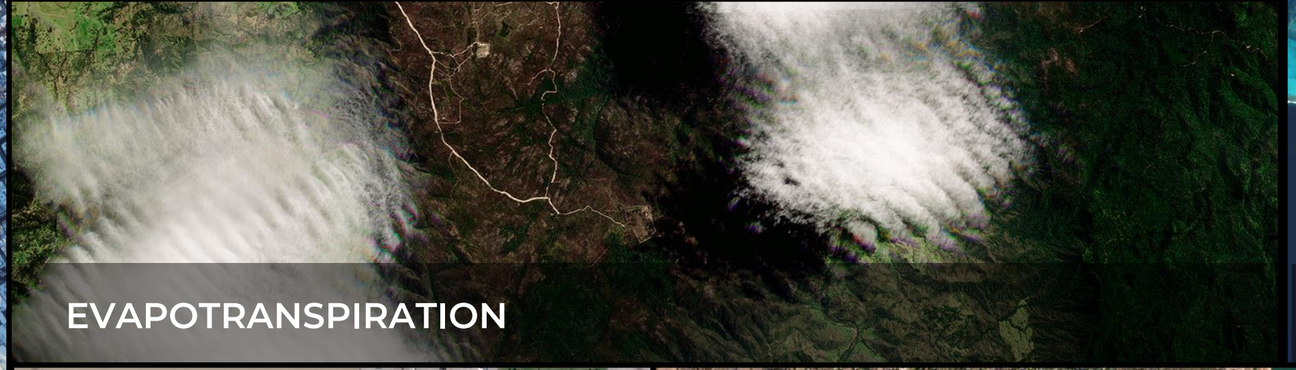
AGRICULTURE

CIVIL GOVERNMENT

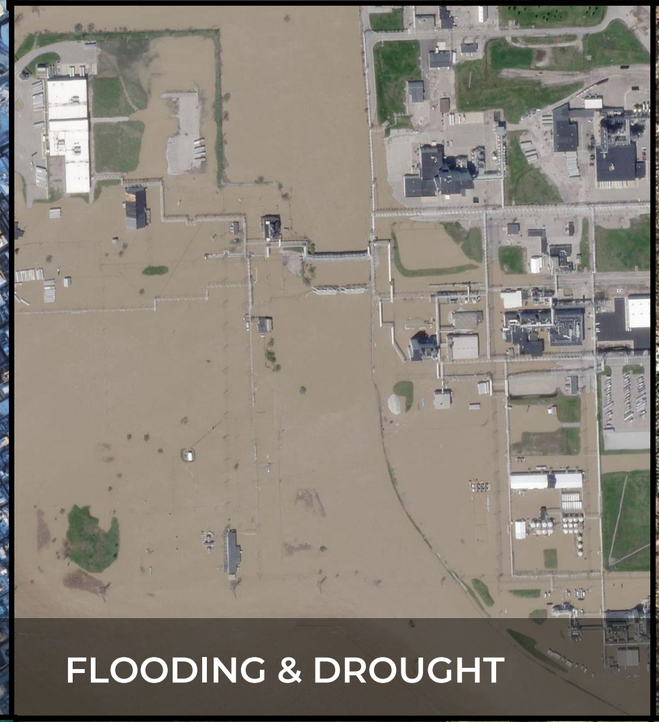

INSURANCE

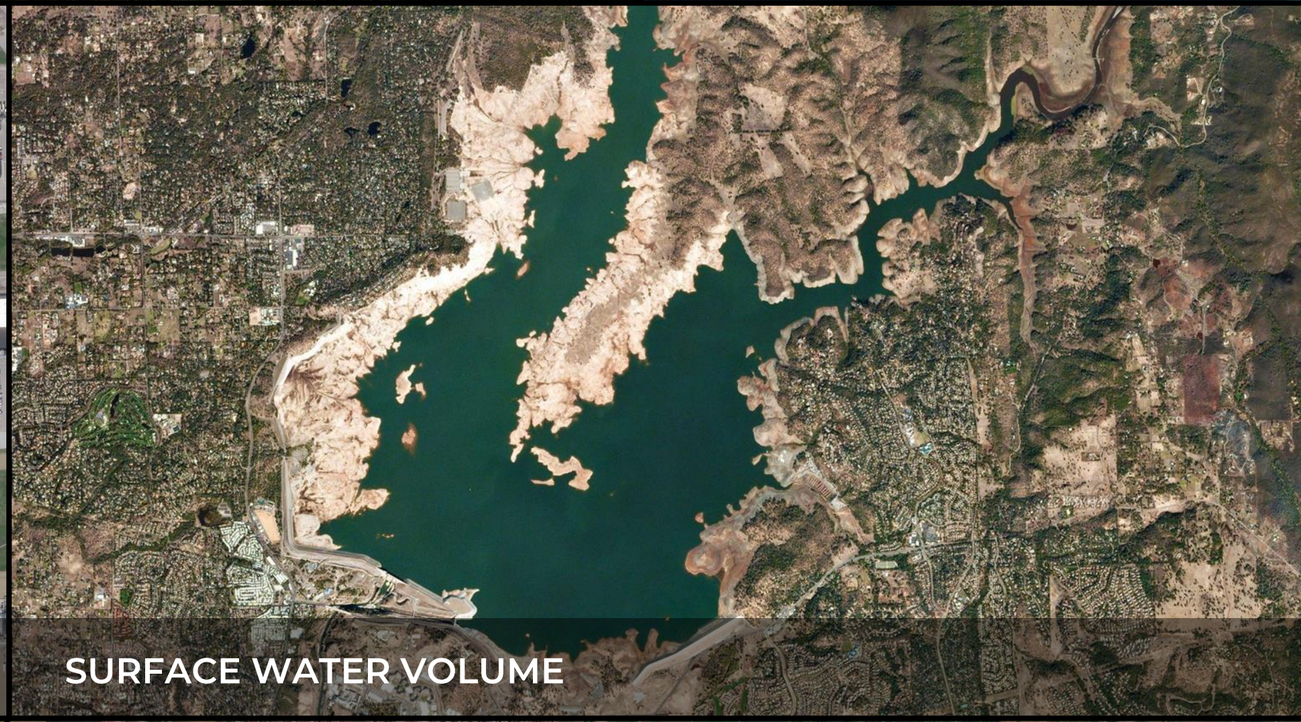
FINANCE & BUSINESS INTELLIGENCE

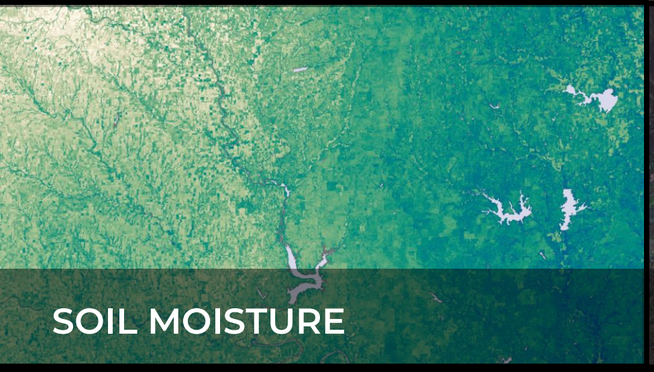

PRECIPITATION


EVAPOTRANSPIRATION

COASTAL ECOSYSTEMS


FLOODING & DROUGHT


SURFACE WATER VOLUME


SOIL MOISTURE

HARMFUL ALGAL BLOOMS

WATER QUALITY MONITORING

Our Constellations

Global Coverage

Planet’s constellation of satellites is always-on, imaging the entire Earth every day

Frequent Revisit

Daily imagery helps you detect anomalies, take action and capitalize on change

Easy & Efficient Access

Integrate same-day imagery into your processes with Planet's APIs or online tools

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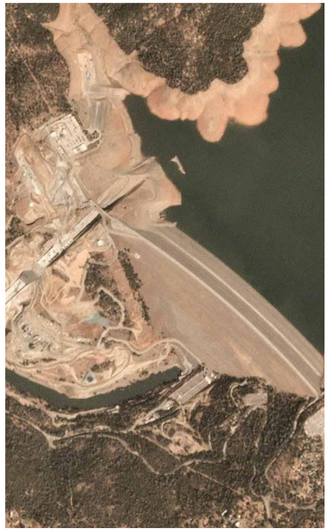
Planet’s broad suite of solutions

CAPTURE

Monitoring

PlanetScope 3.7 m imagery updated on a near-daily basis



Tasking

SkySat imagery tasking with the highest intraday revisit capability commercially available

ENHANCE

Basemaps

Visually consistent and scientifically accurate imagery over broad areas

Archive

Access to proprietary datasets back to 2009 and public datasets back to 1972

ANALYZE

Analytic Feeds

Detection and analytic capabilities layered on top of Planet Monitoring and Basemaps

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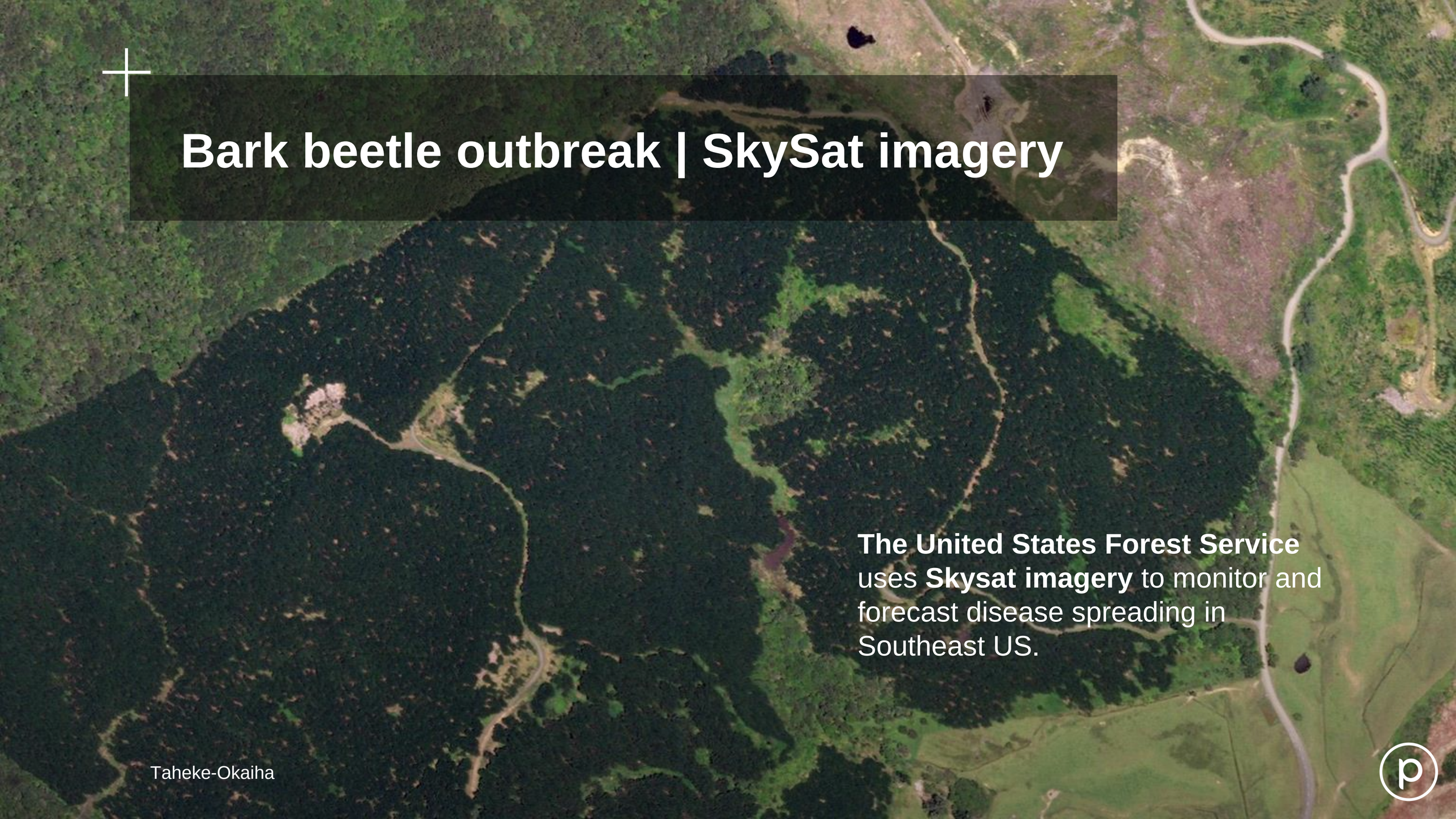
View change over time

Exit

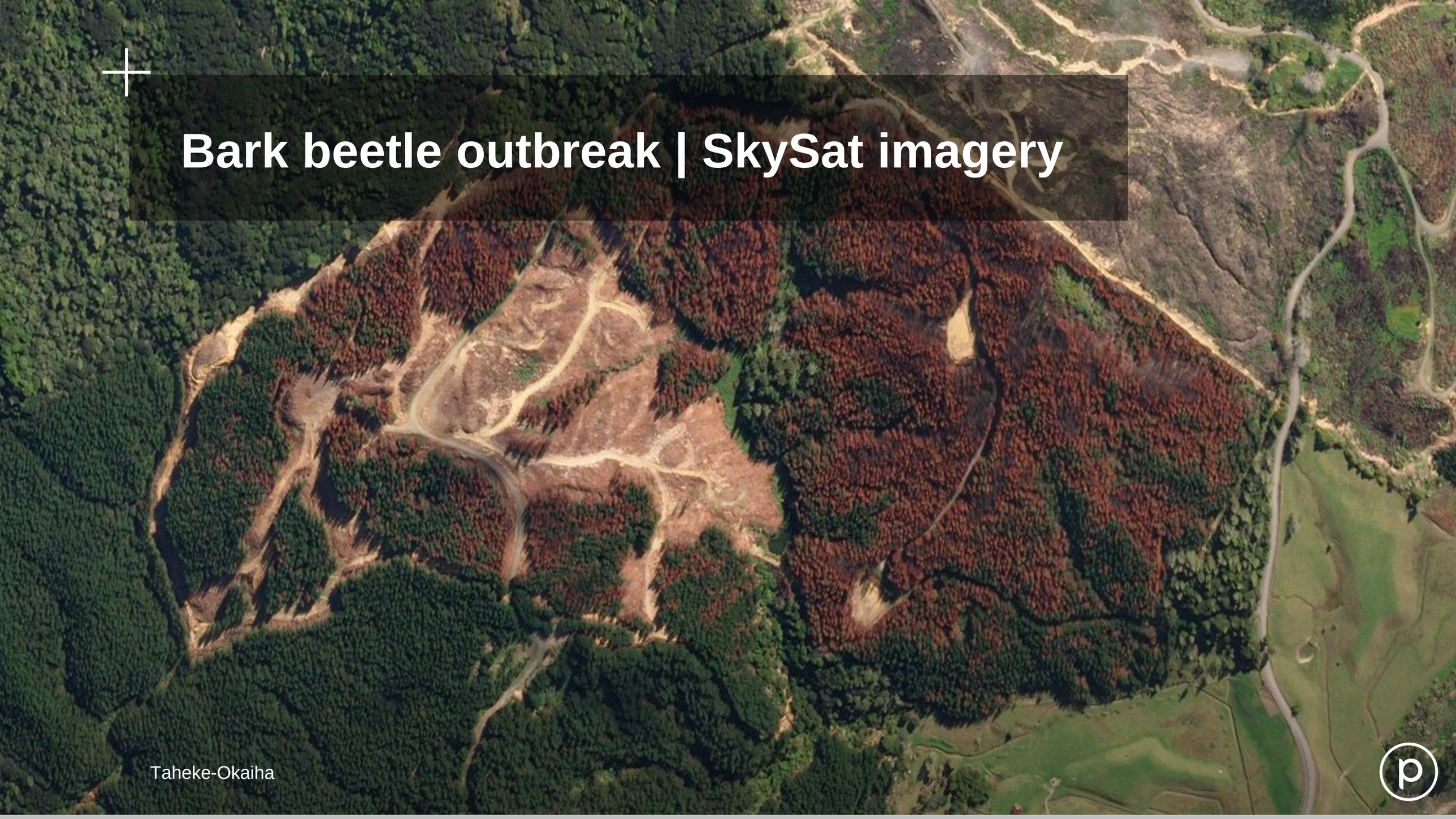
Bark beetle outbreak | SkySat imagery



The United States Forest Service uses **Skysat imagery** to monitor and forecast disease spreading in Southeast US.

Taheke-Okaiha

Bark beetle outbreak | SkySat imagery



Taheke-Okaiha

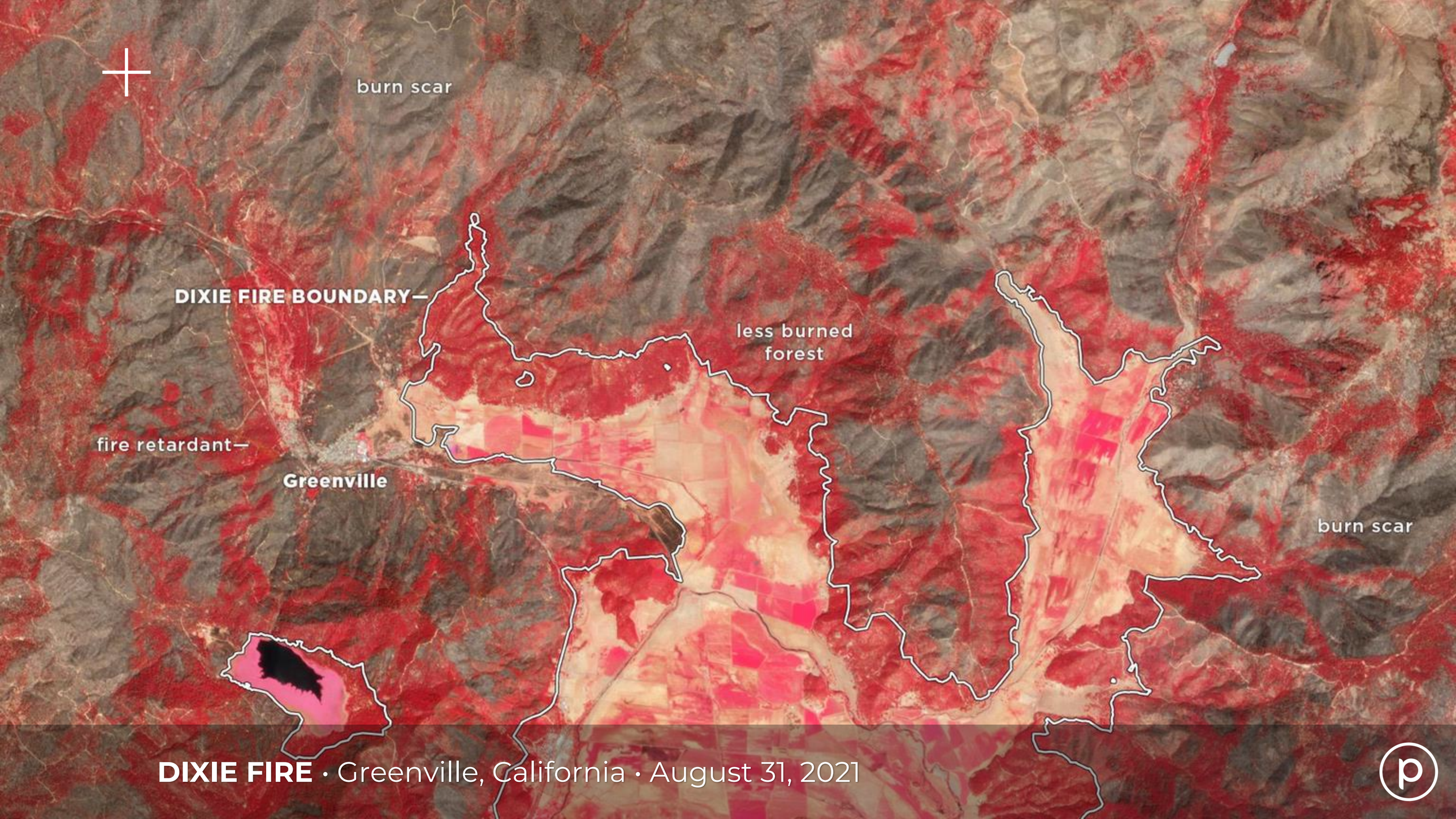
Fall Foliage. Raystown Lake, Pennsylvania, USA • Planetscope, 21 September 2020

Fall Foliage. Raystown Lake, Pennsylvania, USA • Planetscope, 22 October 2020

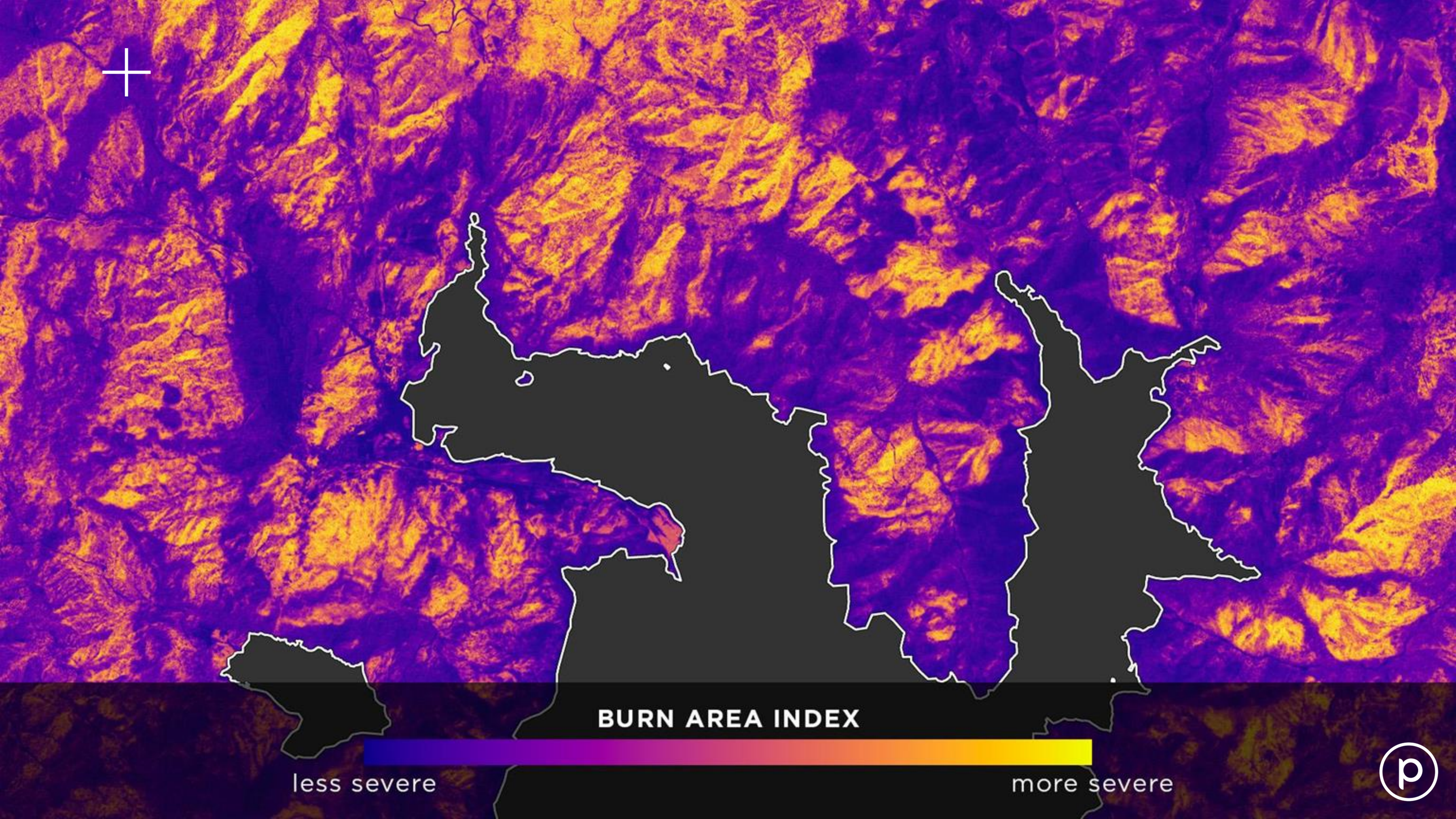
TITTABAWASSEE RIVER
Midland, Michigan • May 13, 2020 • Skysat

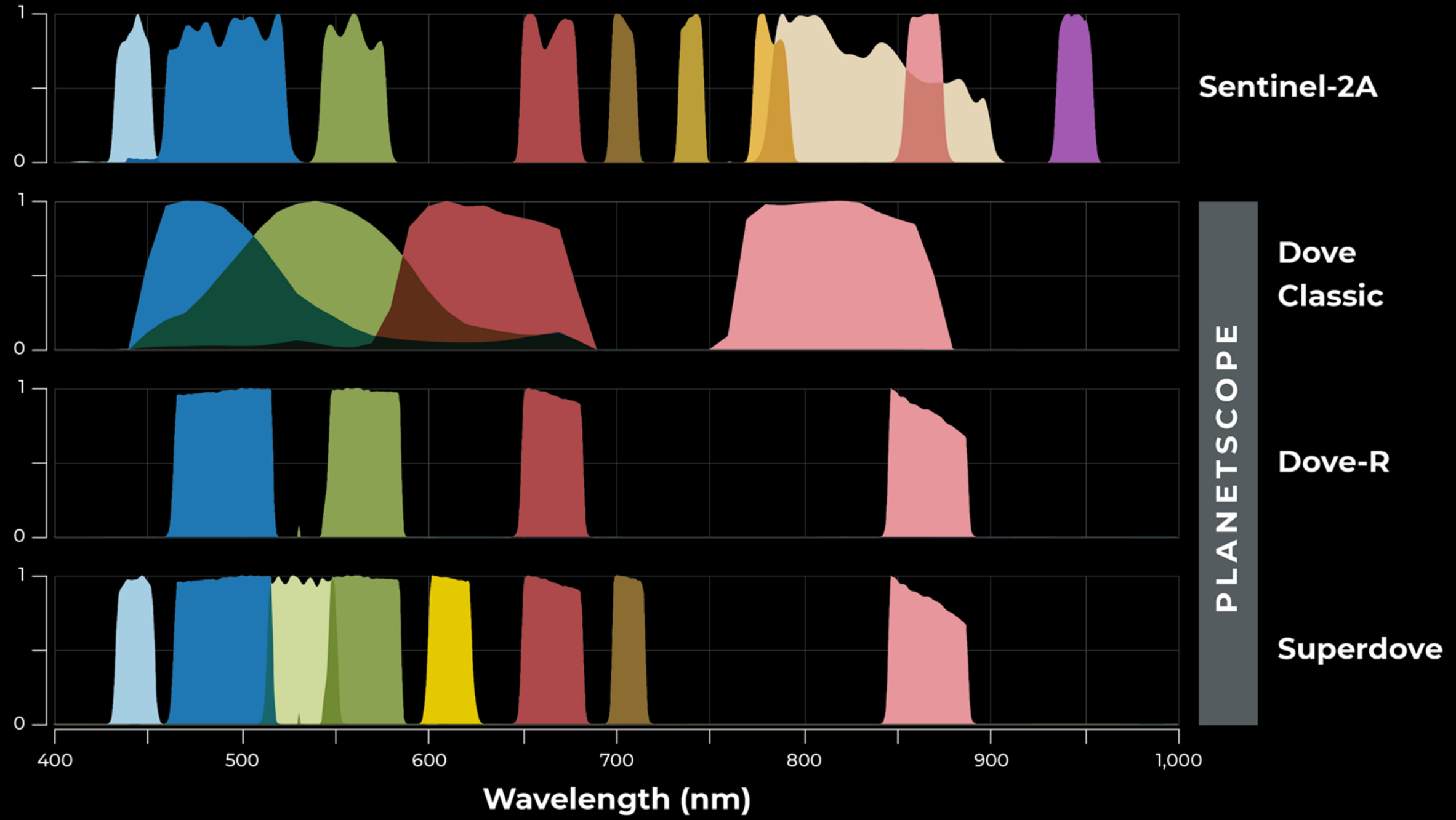
TITTABAWASSEE RIVER
Midland, Michigan • May 20, 2020 • Skysat

DIXIE FIRE · Greenville, California · August 31, 2021



DIXIE FIRE · Greenville, California · August 31, 2021


BURN AREA INDEX
less severe
more severe


1
0
Sentinel-2A
Dove
Classic
Dove-R
Superdove
PLANETSCOPE
400
500
600
700
800
900
1,000
Wavelength (nm)

Suite of Remote Sensing Indices

Early Season

MSAVI

After emergence, before row closure

NDVI

Reproductive stage

NDRE

During senescence, dry down

PSRI

Planet’s broad suite of solutions

Monitoring

PlanetScope
3.7 m imagery updated on a near-daily basis

Tasking

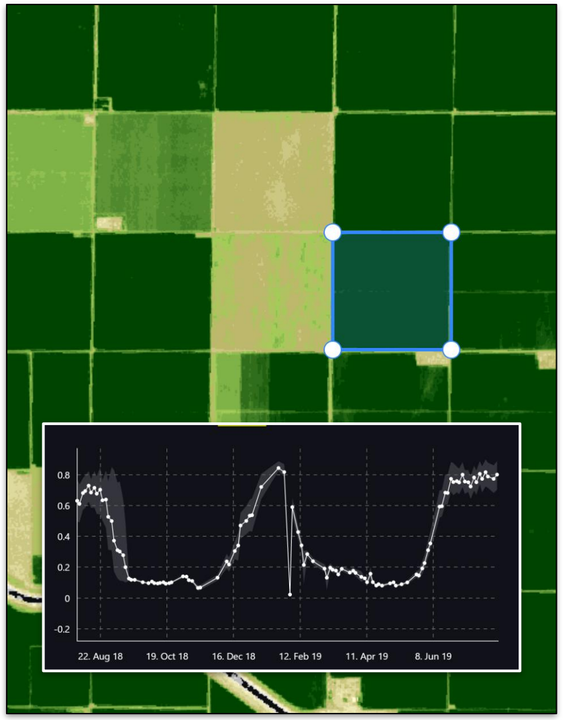
SkySat imagery tasking with rapid intraday revisit capability

Planetary Variables

Measurements of phenomena on the Earth’s surface

Platform

API-first cloud platform to extract insights from imagery at scale



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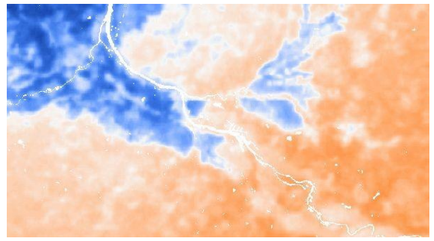
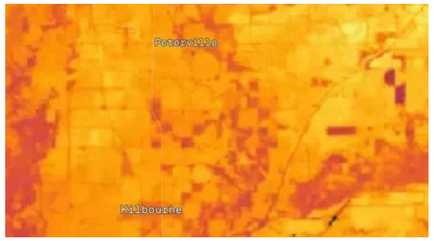
Planetary Variables Measure Key Phenomena

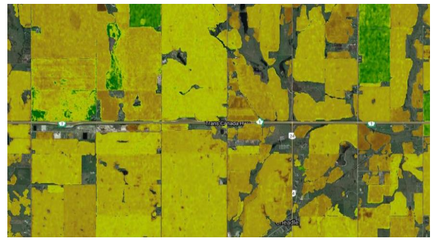
Measuring Key Phenomena on the Earth's Surface



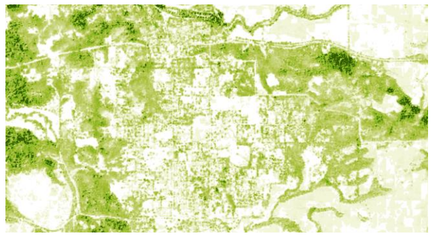
SOIL WATER CONTENT



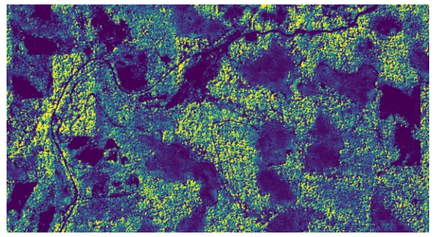
LAND SURFACE TEMPERATURE



CROP BIOMASS



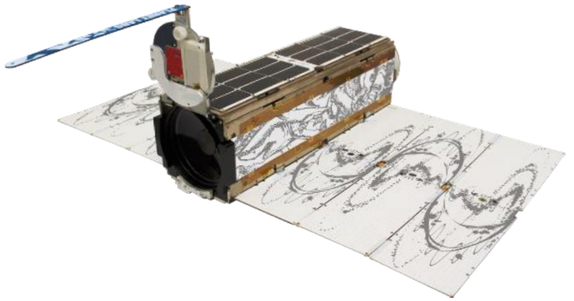
FOREST STRUCTURE



FOREST CARBON

VEGETATION ENCROACHMENT

A Virtual Constellation of Planet and Public Sensors



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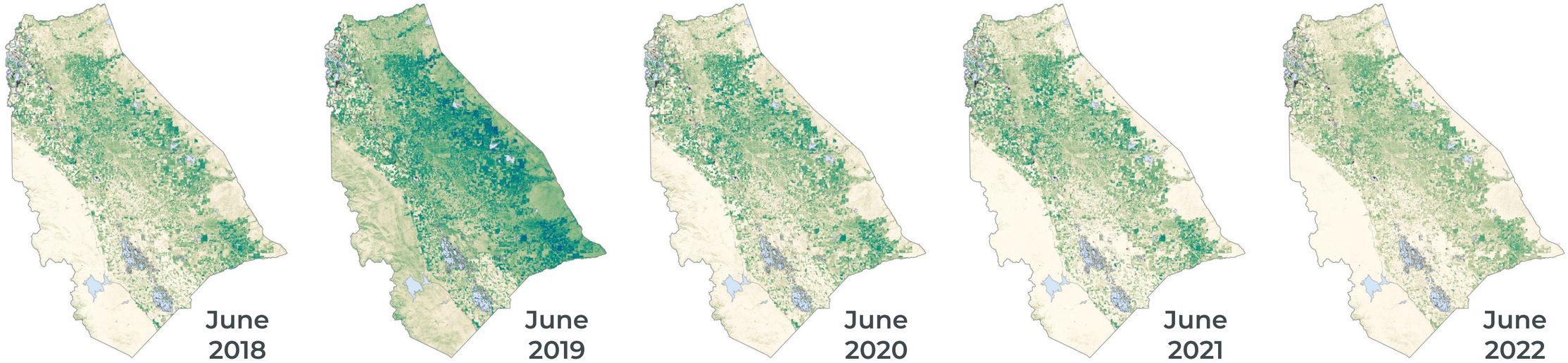
Drought monitoring

Soil Water Content in San Joaquin, Stanislaus, and Merced Counties, California



Measuring Soil Water Content provides a consistent data feed to track dry conditions against historical norms.

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ACCESS PLANET DATA

Accessing Planet Data

Planet offers a broad suite of APIs, web tools, and GIS integrations to access the Planet Catalog.

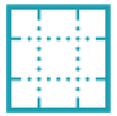
UIs

Planet Explorer

QGIS esri

Integrations

APIs



Data API

Tiles API

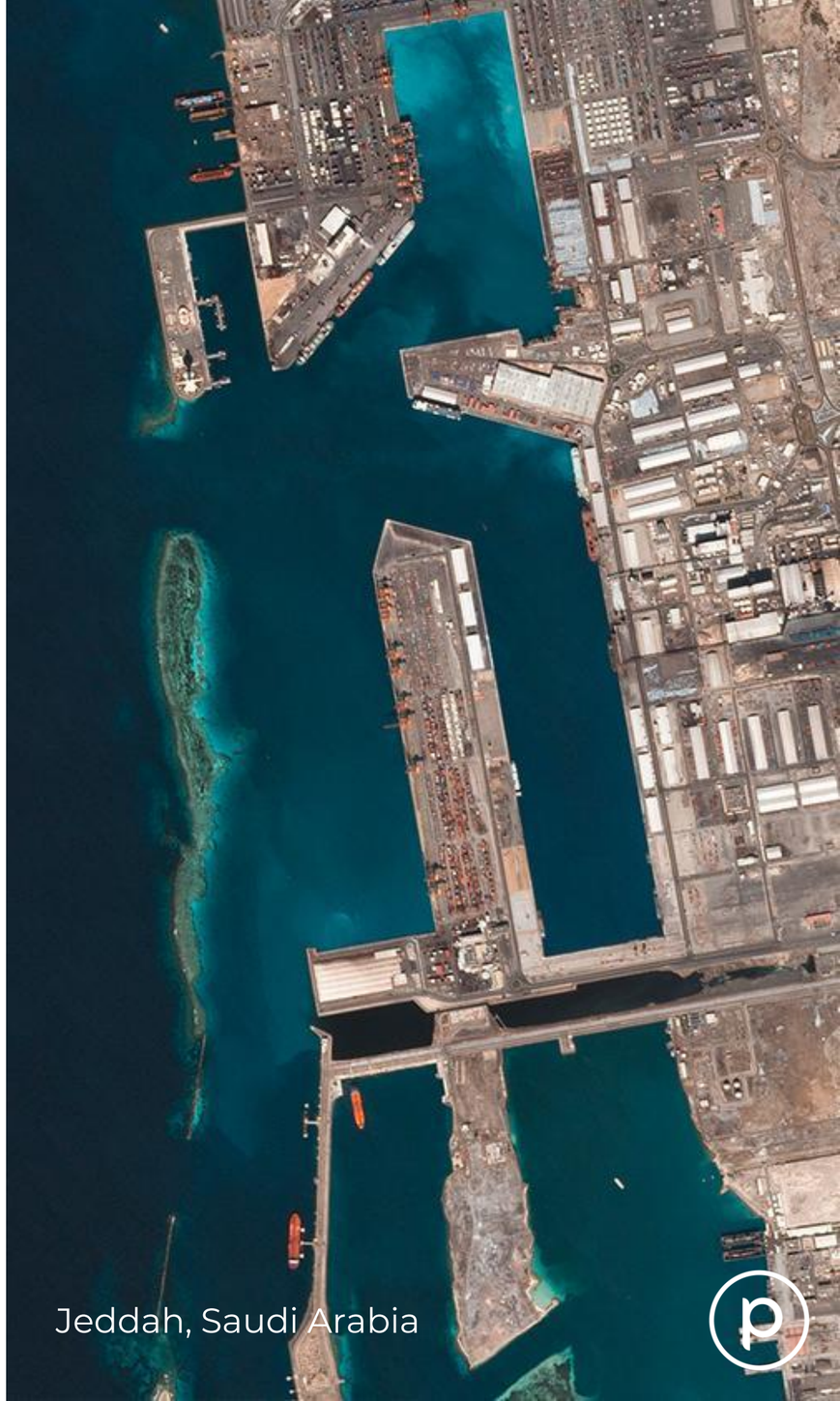
Orders API

Subscriptions API

GIS Integrations

Bringing Planet data to your preferred workflows

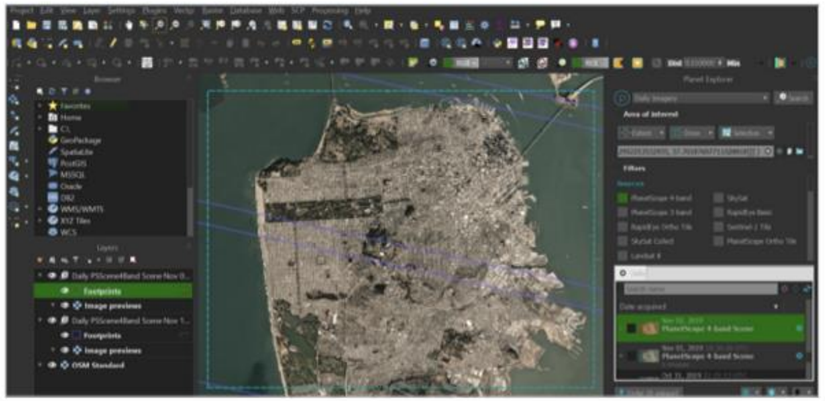
- With Planet integrations, you can **directly access** Planet imagery in leading geospatial platforms, no manual builds required.
- **Enrich your analysis** and complement your authoritative content with high-frequency Planet imagery
- Get **deeper insights, faster,** using your preferred tools and features



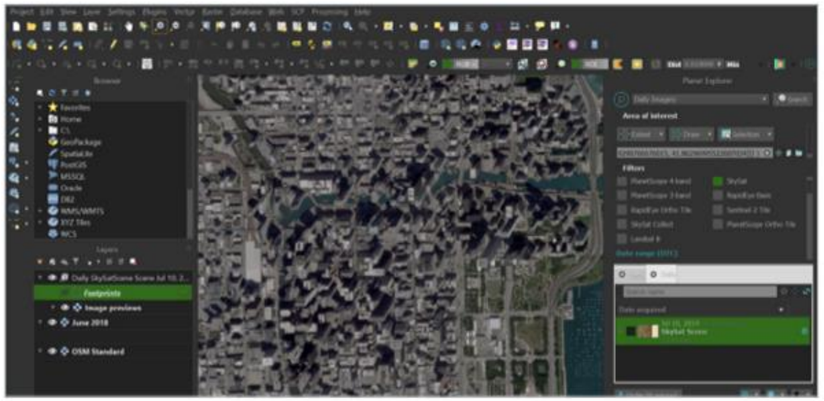
Jeddah, Saudi Arabia

How it Works

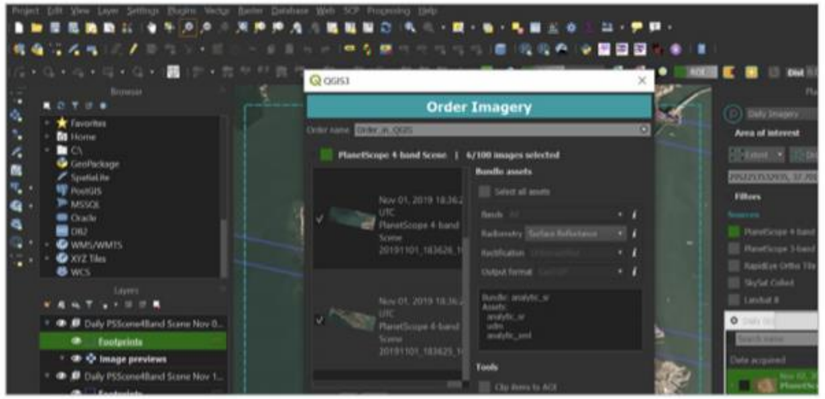
Access, search, and download Planet imagery in ArcPro & QGIS



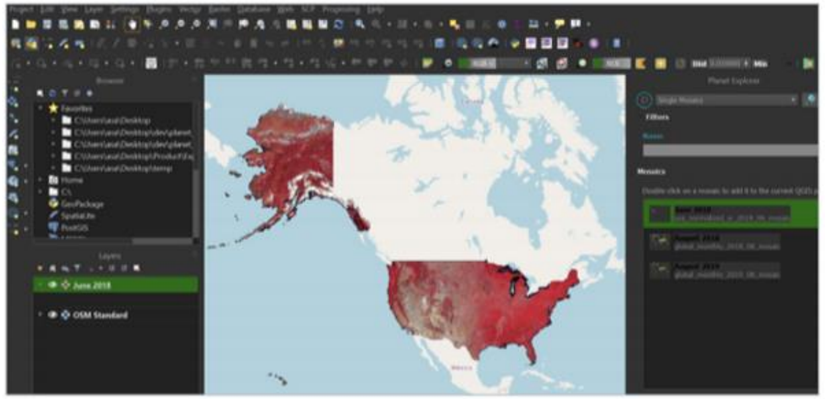
SEARCH: Easily search and filter through all available Planet imagery



DISCOVER: Find the best imagery for your analysis, whether PlanetScope or SkySat



DOWNLOAD: Efficiently download multiple images to pull into your workflow



ENRICH: Perform geospatial analytics on top of Planet imagery

How it Works

Perform large-scale analysis with Planet data in GEE

1. Upgrade to **Google Cloud Project**-backed Earth Engine Account

1. Use Planet **Order & Subscriptions APIs**

1. **Import** Planet imagery

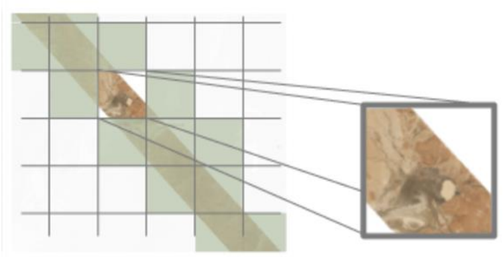
Learn more at our Developer Resource Center

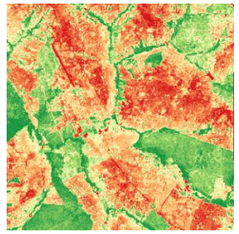
Typical Image Delivery Workflow

DATA API

ORDERS API RASTER PROCESSING

DELIVERY





Search/Discovery → Order SR Product → Clip → Composite → Calculate NDVI → Cloud Delivery

API Request/HTTPS

WMTS/COG Streaming

Credit @matt.ballard

Sentinel Hub APIs

Ingest, prepare, transform and deliver Earth Observation data and insights

Data

Available by default

Public Imagery
(e.g. Sentinel-2)

Must registered by user to SH

Bring Your Own COG API

Third Party Data Import API
(e.g. PlanetScope, SkySat)

sentinelhub

Search

Catalog API
(i.e. STAC Catalog)

Stream

OGC API
(e.g. WMS, WMTS for GIS)

Configuration Utility

Order/Analyze

Returns rasters

Returns numbers

Synchronous, Results returned in seconds

Process API

Statistical API

Asynchronous Results delivered to cloud storage
⅓ the cost in PUs

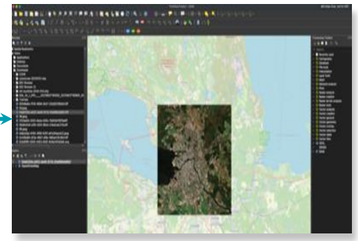
Batch Process API

Batch Statistical API (beta)

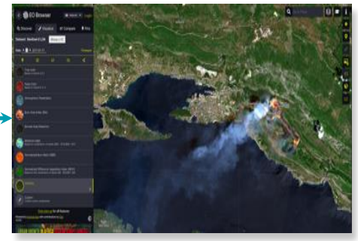
Machine Learning with open source eo-learn package. Must be run client-side (not run within SH)

eo-learn

Application



GIS Integrations



Web/Mobile Apps

Programming & Data Science

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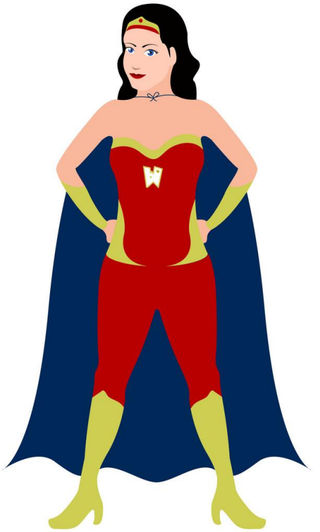
What could you do with Superpowers?

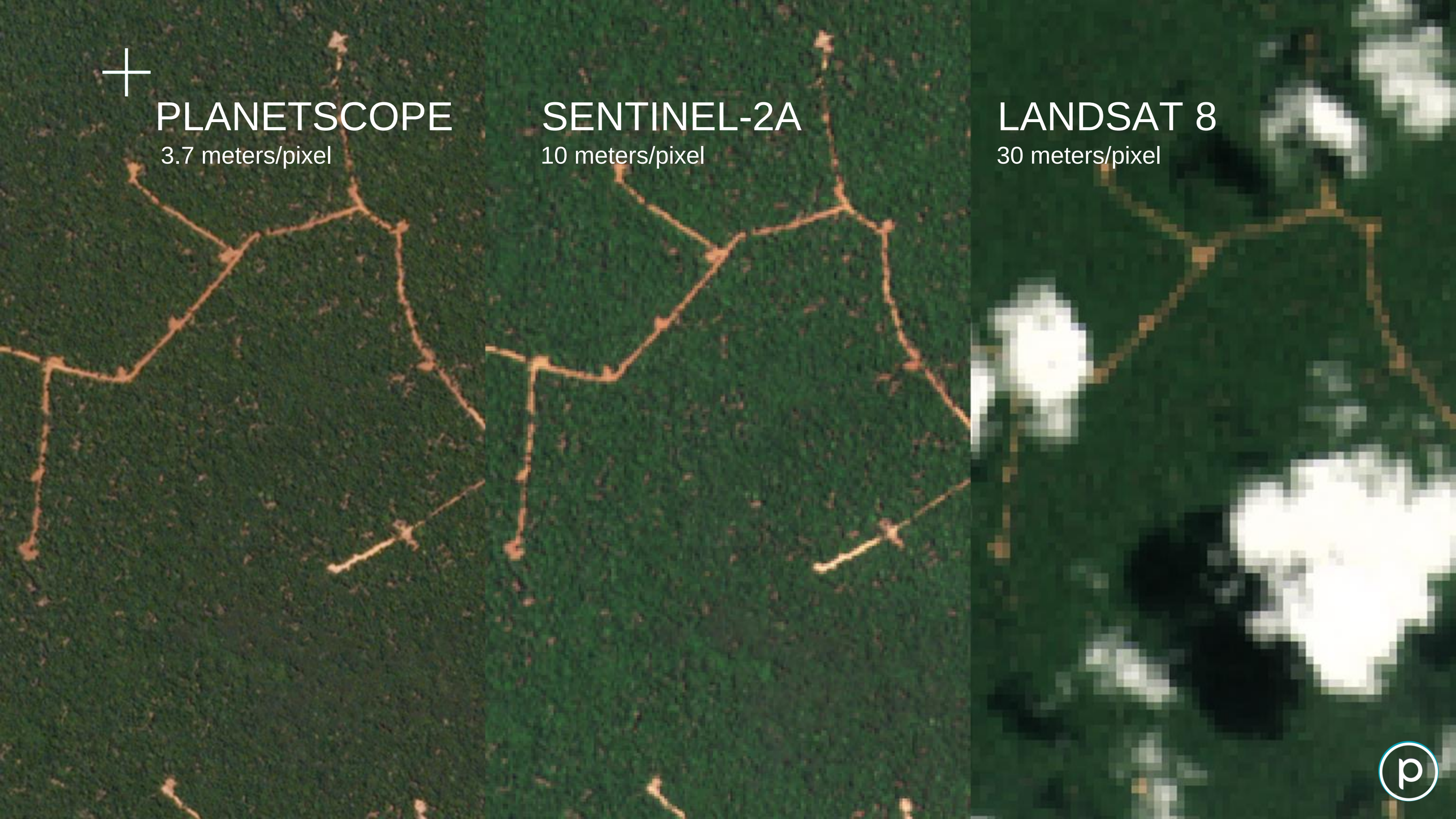
- X-Ray Vision
- Time Travel
- Fly anywhere in seconds



Monitor your areas of interest, discover patterns, and get timely insights

Thank you!

chippie@planet.com

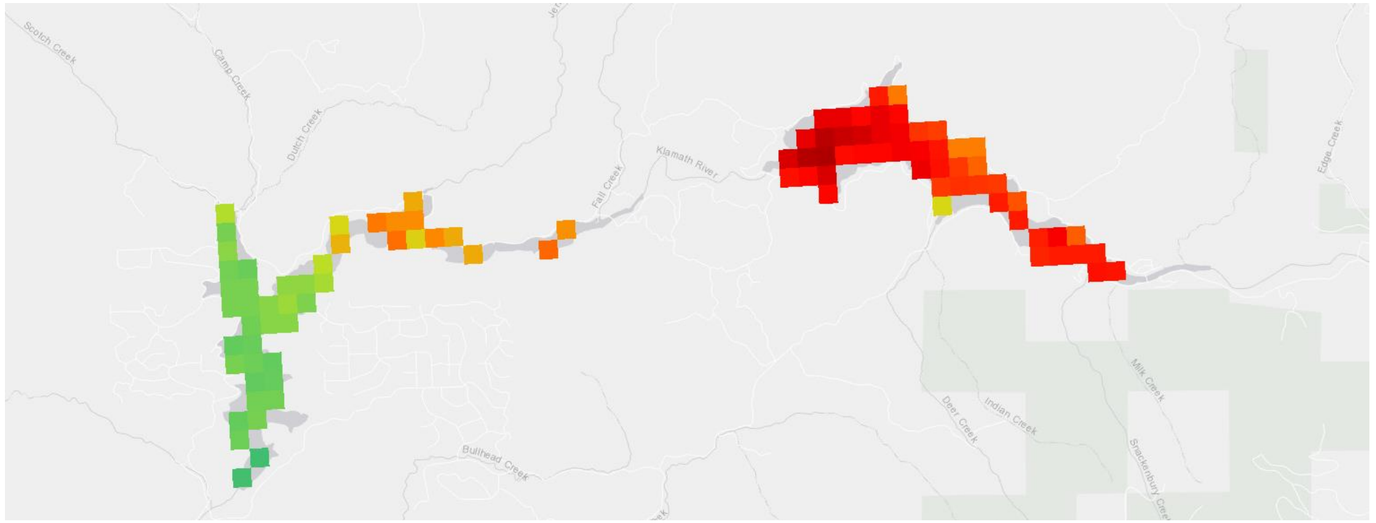

PLANETSCOPE
3.7 meters/pixel
SENTINEL-2A
10 meters/pixel
LANDSAT 8
30 meters/pixel

Planet vs. Sentinel-2 & -3 in northern California

PlanetScope (3.7m) : August 30, 2022

Sentinel-2 (10m) : August 30, 2022

Sentinel-3 (300m) : August 30, 2022



FLOODING • Coolangatta, Queensland, Australia • February 18, 2022

FLOODING • Coolangatta, Queensland, Australia • March 1, 2022

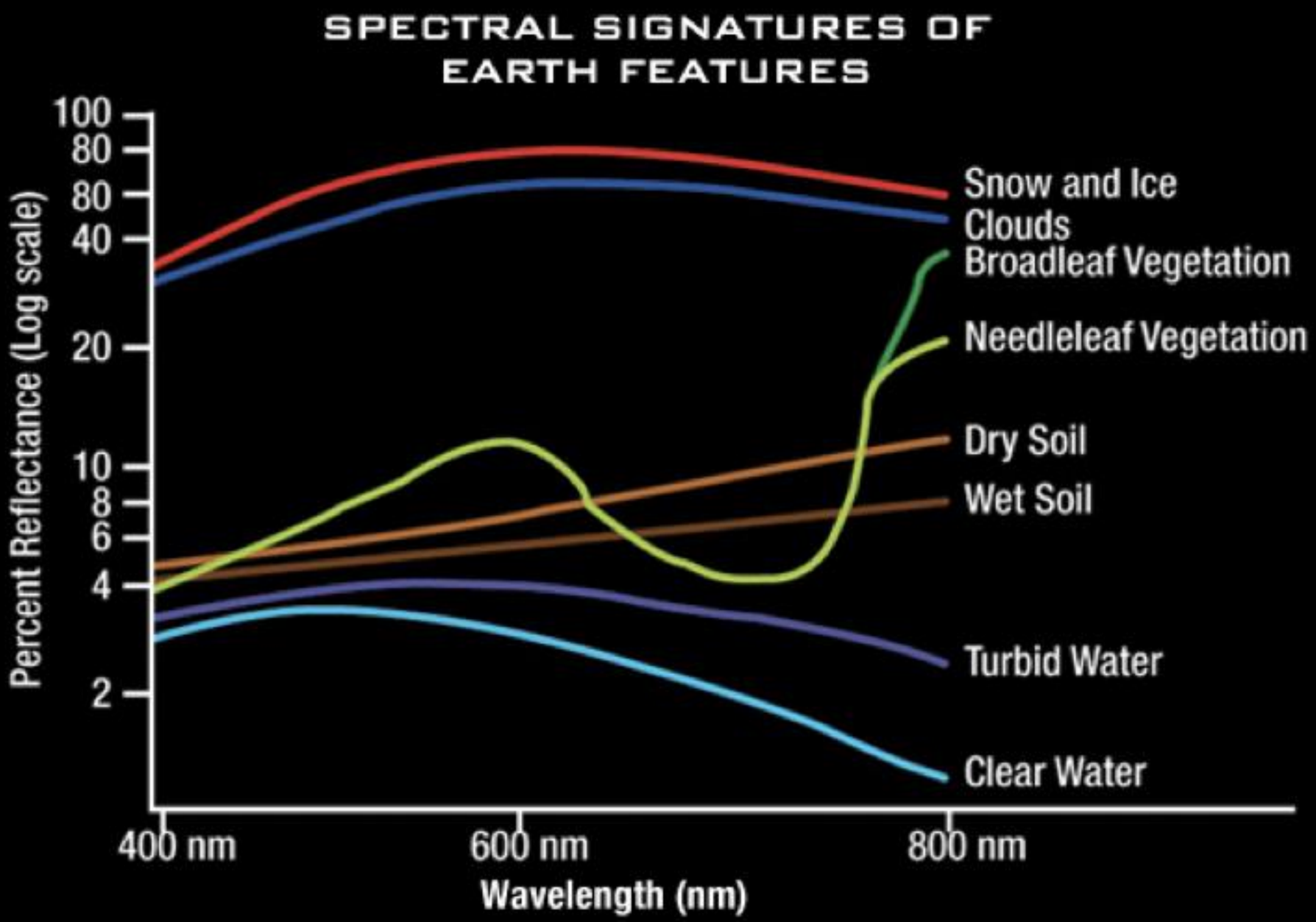


Image credit: NASA