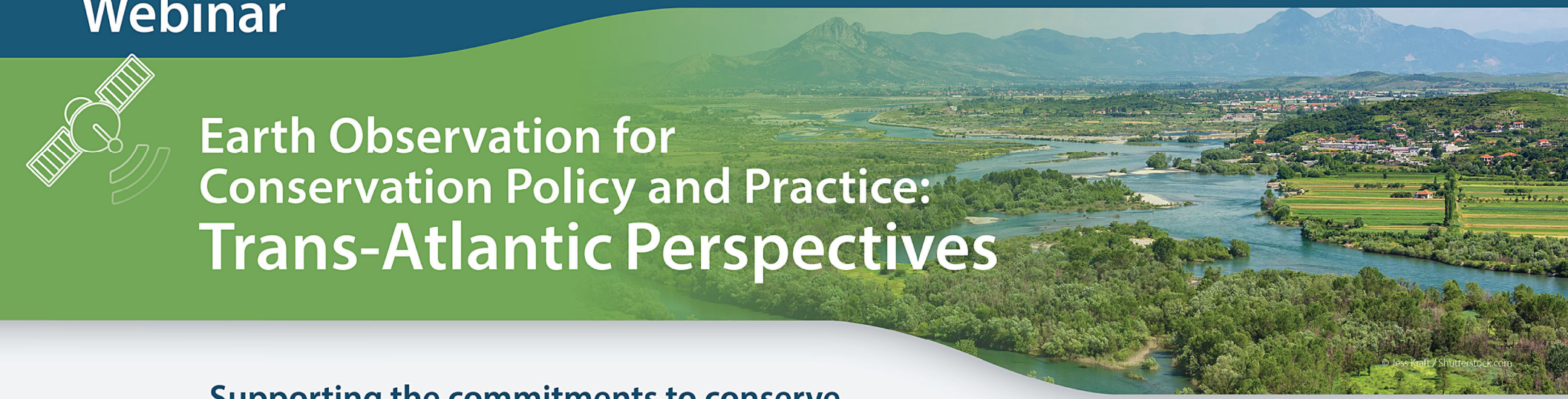
Webinar

Earth Observation for Conservation Policy and Practice: Trans-Atlantic Perspectives



Supporting the commitments to conserve 30% of lands and waters by 2030

DATE: **20 APRIL 2021**
TIME: **16:00 – 18:30 CET (EUROPE)**
10:00 – 12:30 ET (UNITED STATES)

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821918.

www.enviroLENS.eu

INTERNATIONAL LAND CONSERVATION NETWORK
CENTER FOR GEOSPATIAL SOLUTIONS
IUCN
Eurosite
esri
LINCOLN INSTITUTE OF LAND POLICY 75 YEARS
CWTI COUNTERING WILDLIFE TRAFFICKING INSTITUTE
EARTH LEAGUE INTERNATIONAL

EO and the EU nature legislation EU-Grasslands Watch

Earth observation to inform conservation policy and practice (Trans-Atlantic perspective)

20th of April 2021

Bruno Combal, Ph.D.

DG ENVIRONMENT – European Commission

The Nature directives and EU protected areas

Based on 2 European directives: Birds (1979) and Habitats (1992) directives

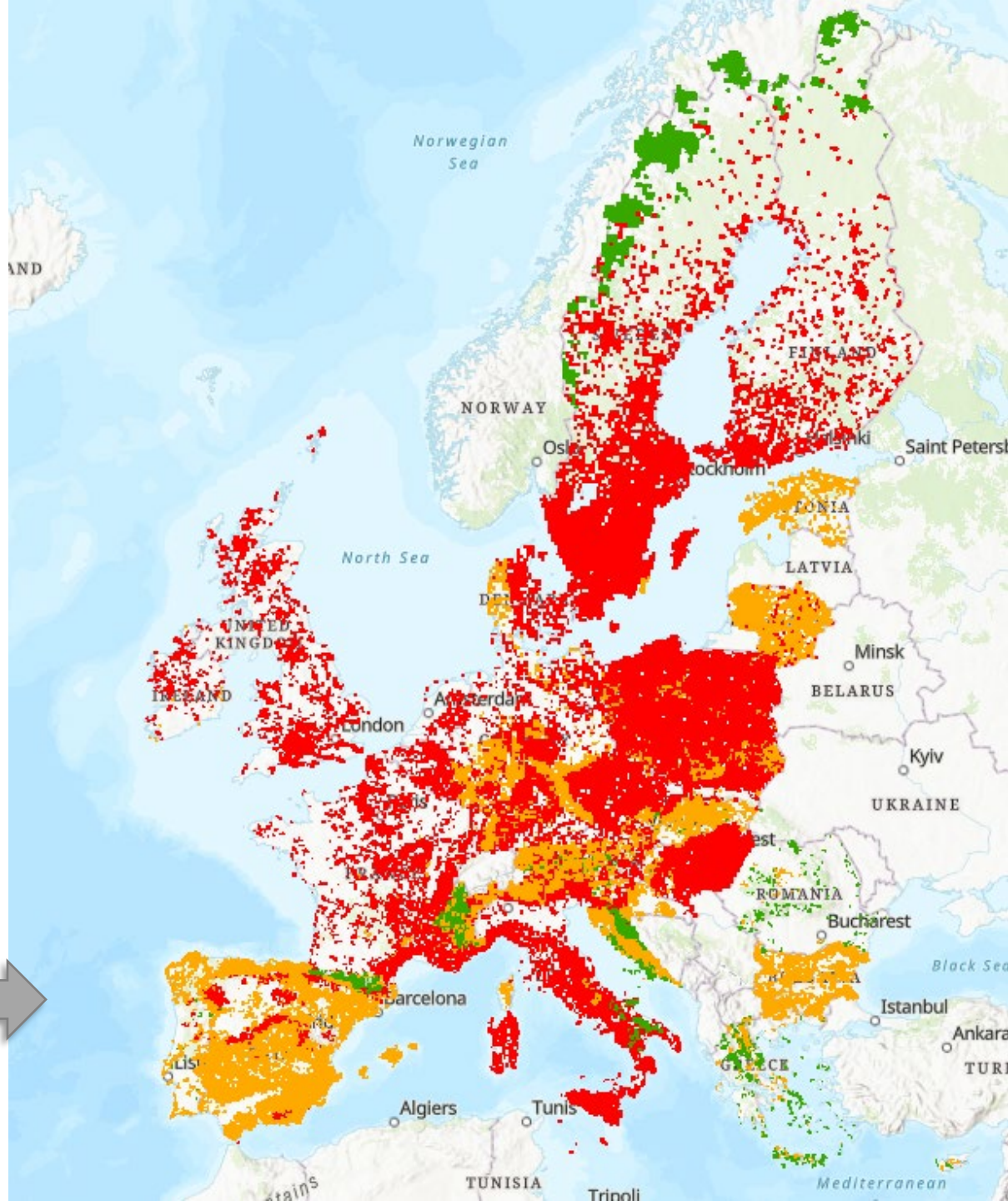
- They protect all wild birds species, and a list of defined habitats and species (flora and fauna)
- Natura 2000 sites are designated by each member states to protect, restore and improve the conservation status; sites must be managed (they have a conservation objectives)

Biodiversity Strategy 2030: 18% to 30% protected areas (with Nationally designated sites, and including 10% of strict protection), new restoration targets

Article 17/12 reporting

Member states report data about the species and habitats at national scale (State of nature)
https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020

eg: Natural and semi-natural grassland conservation status (2013-2018), 10kmx10km grid



natura2000.eea.europa.eu

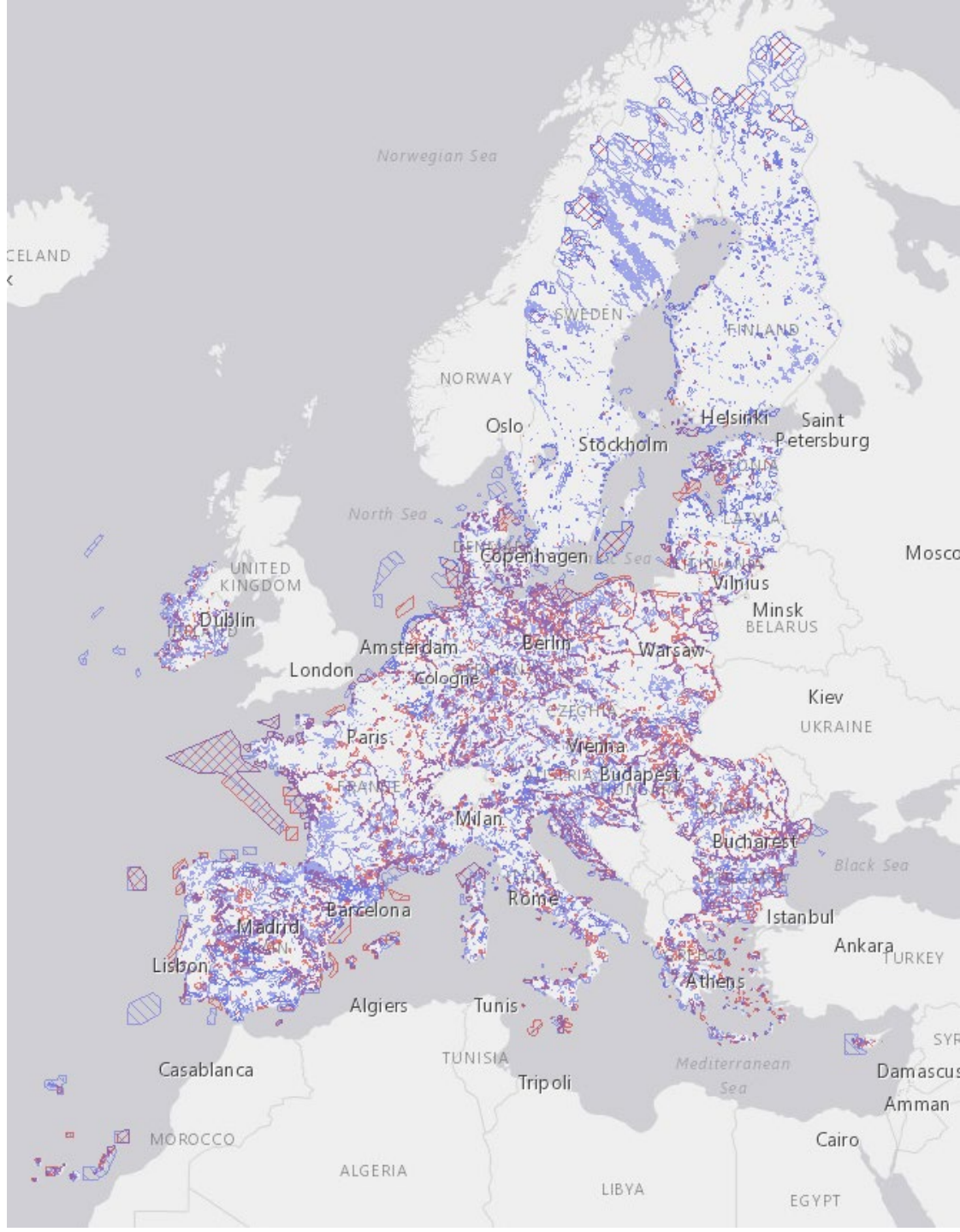
27 Members states

27 918 sites covering 18.5 % of land

Protected species:

- +460 birds
- 1389 species and 233 habitats

Each site has a description of the protected species and habitats and conservation objectives



Copernicus: missions and services

missions

- Sentinel 1 to 6. Sentinel 1: SAR, Sentinel 2: optical
- 30 Contributing missions: Eumetsat satellites, Landsat, SPOT, Radarsat, etc.
- In-situ component

services

Global and European services:

Land	Climate change
Marine	Emergency
Atmosphere	Security

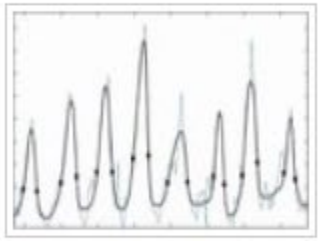
COPERNICUS Land Monitoring Service
https://land.copernicus.eu (European component)

Pan-European


CORINE Land Cover

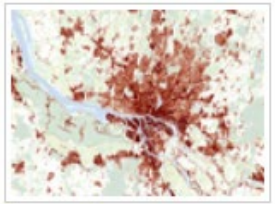

CLC+


High Resolution Layers


Biophysical parameters

European Ground Motion Service


Related Pan-European products


Imperviousness

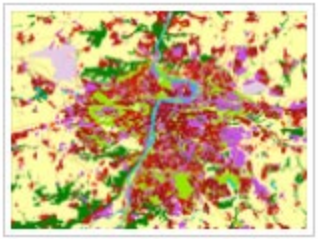

Forests

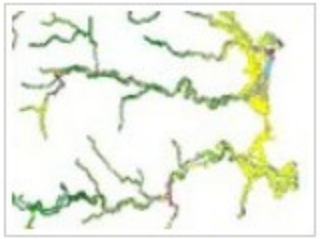

Grassland


Water & Wetness


Small Woody Features

Local


Urban Atlas


Riparian Zones


Natura 2000 (N2K)


Coastal Zones

High level products addressing policy needs

European Commission

EU-Grassland Watch (release date: 2022)
A downstream application of Copernicus

A public platform, allowing to see (and download all data):

Annual changes of land cover in Natura 2000 sites: annual change, from 1994 to now

Loss/gain of grasslands: European scale/Natura 2000 site

Intensification (mowing, ploughing) and abandonment (natural/semi-natural grasslands are protected): indication about potential loss of biodiversity, or mis-management

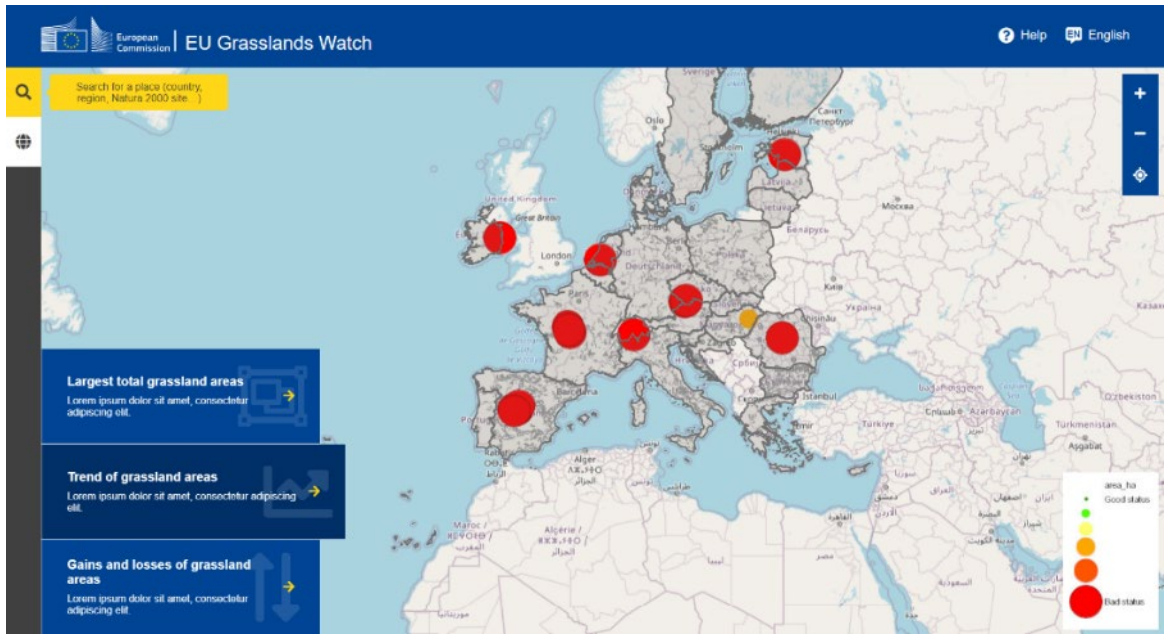
Performance of protected sites vs non-protected areas

- 1992 – 2016: Landsat, after 2015: Sentinel 1 (SAR) and Sentinel 2 (optical)
- Yearly update, automatic processing (DIAS)
- Currently under development: http://www.cop4n2k.eu/

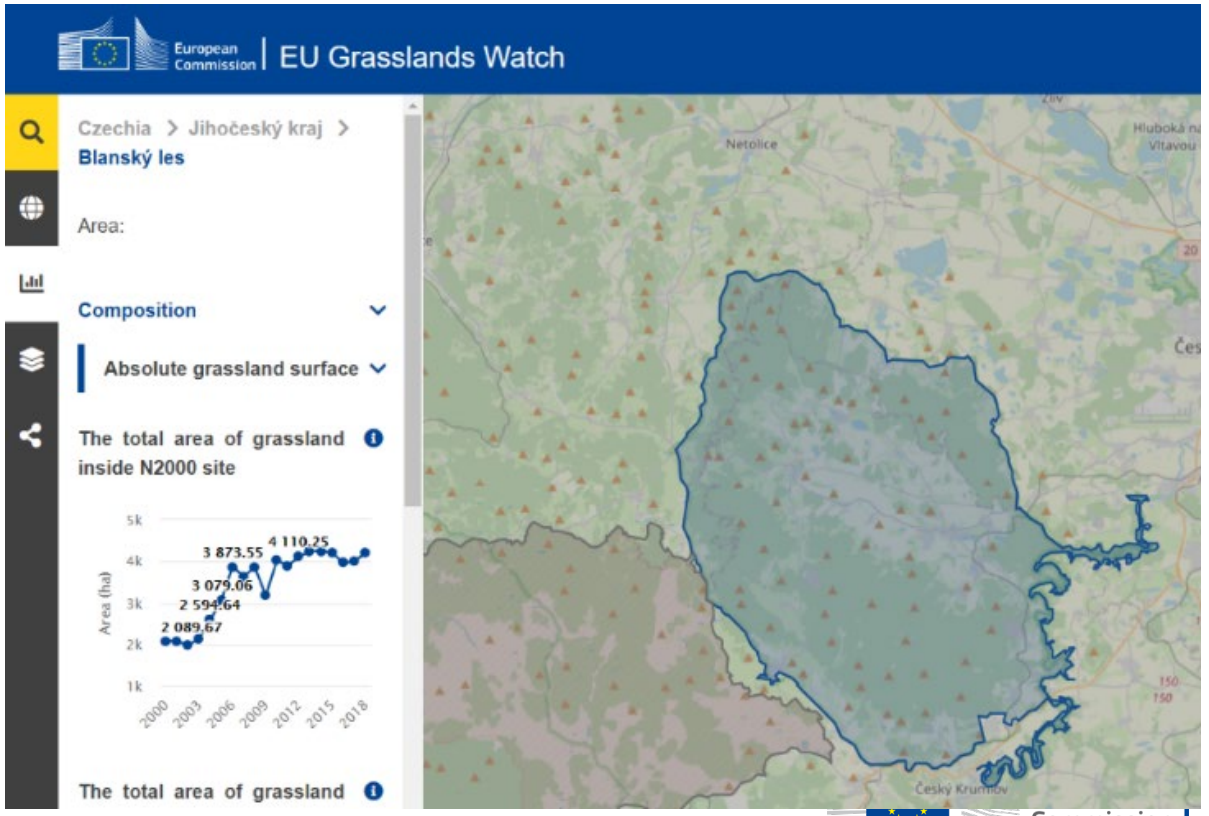
European Commission

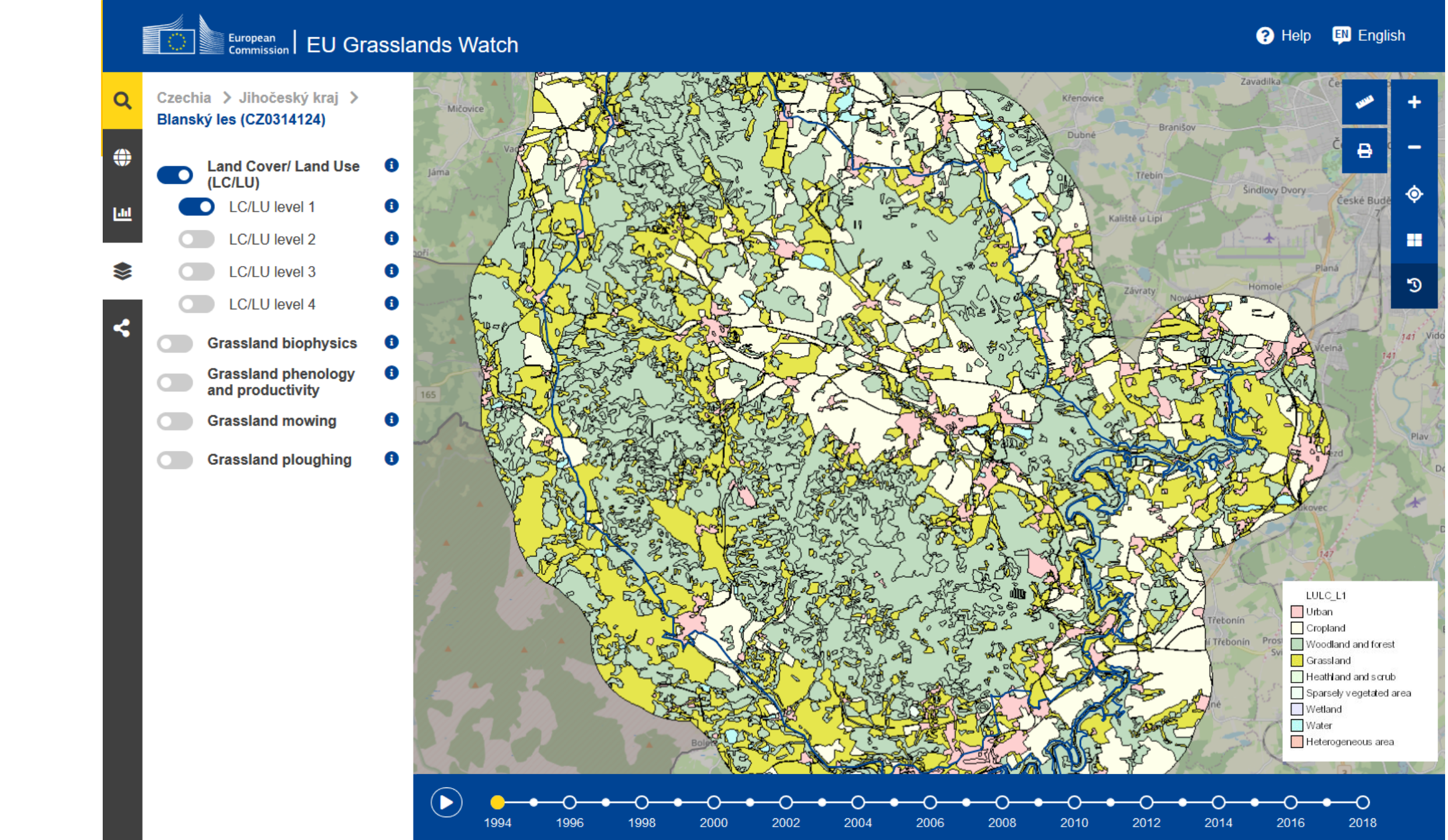
From EU scale to local information

EU view: hot spots of change, which areas are undergoing the most changes?

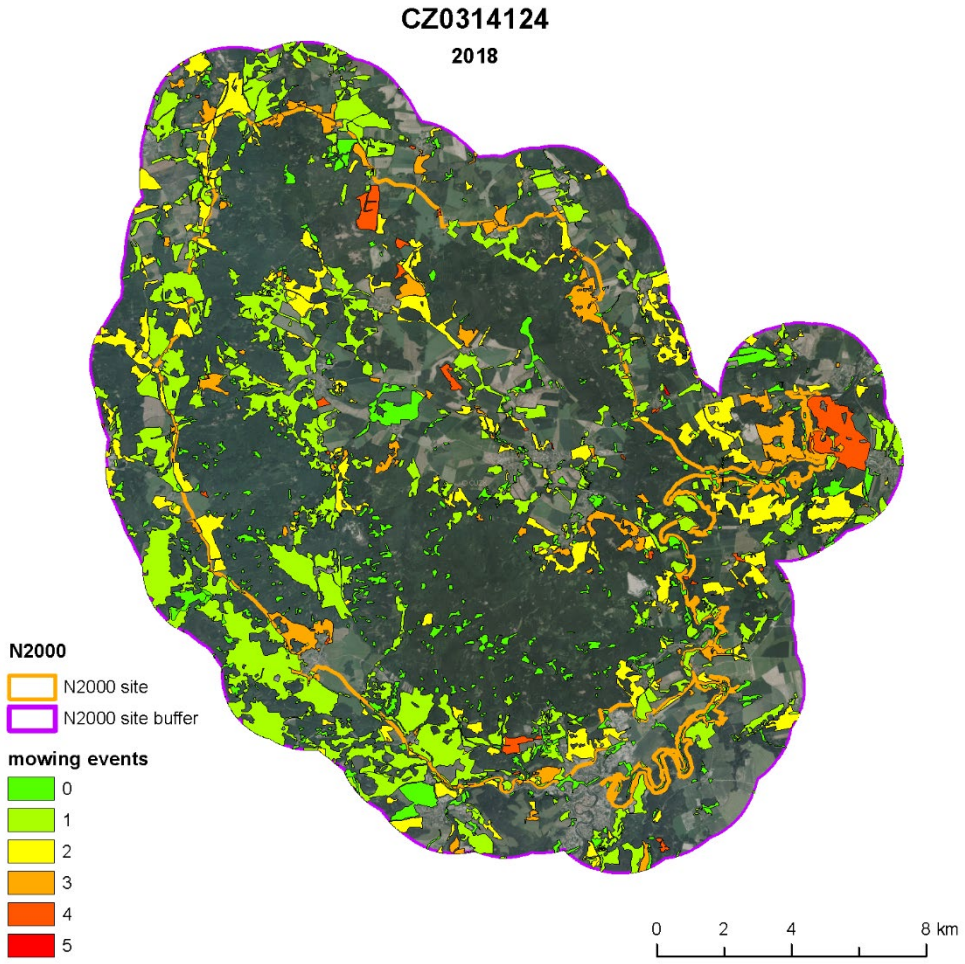


Natura 2000 site level: changes at full thematic detail, visualisation of time series

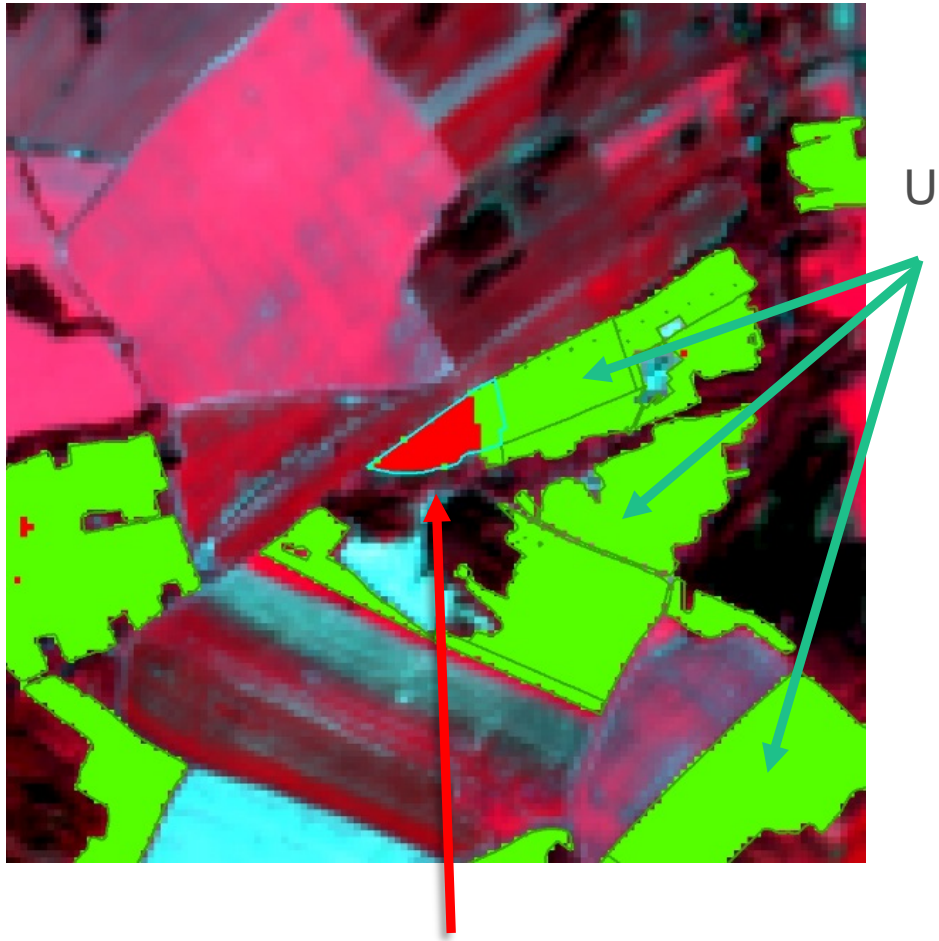



European Commission
EU Grasslands Watch
Help
English
Czechia > Jihočeský kraj >
Blanský les (CZ0314124)
Land Cover/ Land Use (LC/LU)
LC/LU level 1
LC/LU level 2
LC/LU level 3
LC/LU level 4
Grassland biophysics
Grassland phenology and productivity
Grassland mowing
Grassland ploughing
LULC_L1
Urban
Cropland
Woodland and forest
Grassland
Heathland and scrub
Sparsely vegetated area
Wetland
Water
Heterogeneous area
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018

Indications of intensification



Count of annual mowing



Unplough grasslands

Detection of ploughing

→ Require expert analysis/Interpretation

European Commission

http://discomap.eea.europa.eu/natura2000

Monitoring surface water (from 1985 to now)

- Done by EC's Joint Research Centre, using Landsat and Google Earth Engine: https://global-surface-water.appspot.com/
- UN Environment SDG 6.6.1 product

We used it to monitor water abstraction, seasonality, change of regime in Natura 2000 sites

Can it be used to characterize humid areas and their biodiversity?

Some (very incomplete) conclusions

Earth observation and geospatial information are of interest for EU legislation

- Knowing the current status of conservation of the habitats and their trends
- Compliance assurance: where do we have an environmental issue?
- Compliance assurance promotion: public information about the current situation

Continental/Country scale – Local scales: different uses

But it is not only about technology, it is mostly about environmental expertise!

Thank you

European Commission

enviroLENS

eLENS: Using Earth Observation to assist environmental policy making and monitoring

Alexandra Ibragimova, IUCN ECARO

Mario Dohr, GeoVille

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821918

Introducing enviroLENS

(c) ESA_Pierre Carril

- Deliver **EO-based services providing evidences** on environmental incidences and legal violation
- Support **data gathering** process
- Foster **data-driven decision-making**

Timeline: Dec 2018 - May 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821918

Partners

GeoVille

DLA PIPER

ARISTOTLE UNIVERSITY OF THESSALONIKI

IUCN

Jožef Stefan Institute

SINERGISE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821918

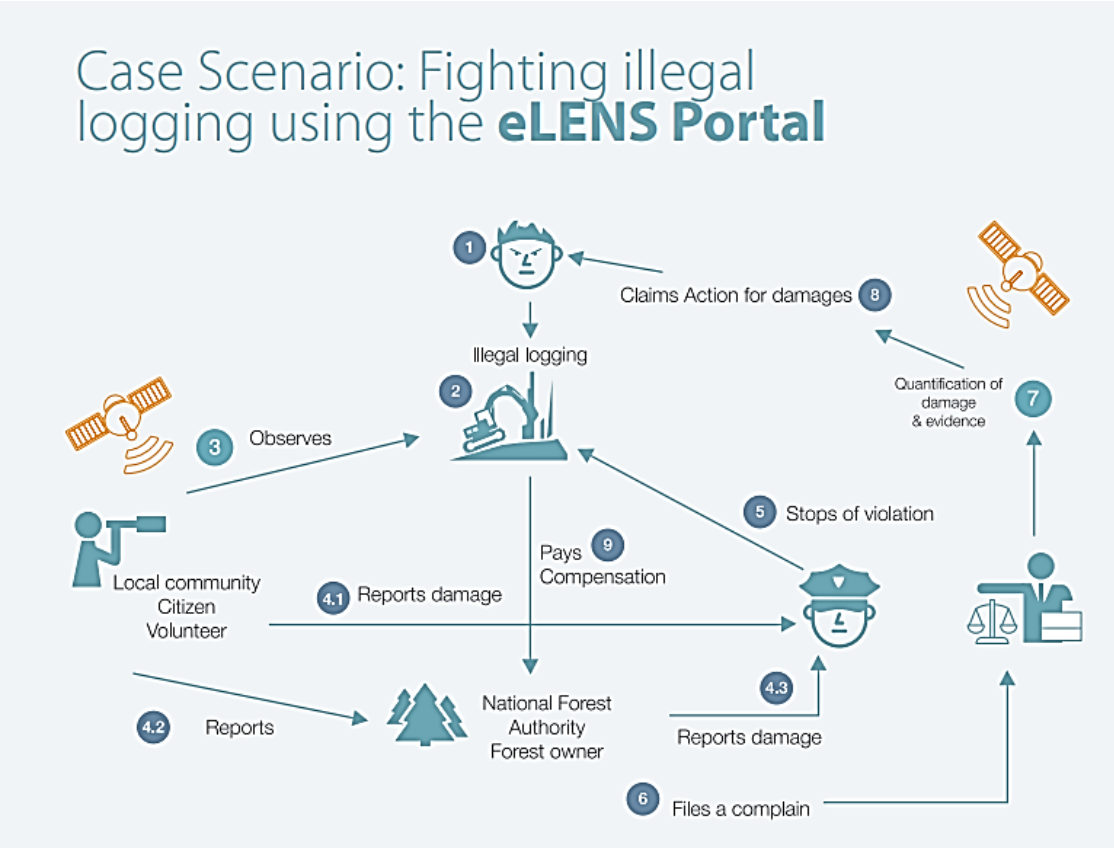
Earth Observation for conservation policy

Challenges

- Lack of human resources
- Lack of financial resources
- Timeliness of inspection
- Remoteness and scale

Opportunities

- Historical data to influence future decisions
- Timeliness and frequency of data
- Easy access
- Vast amount of data
- Reduced cost and targeted inspection/intervention



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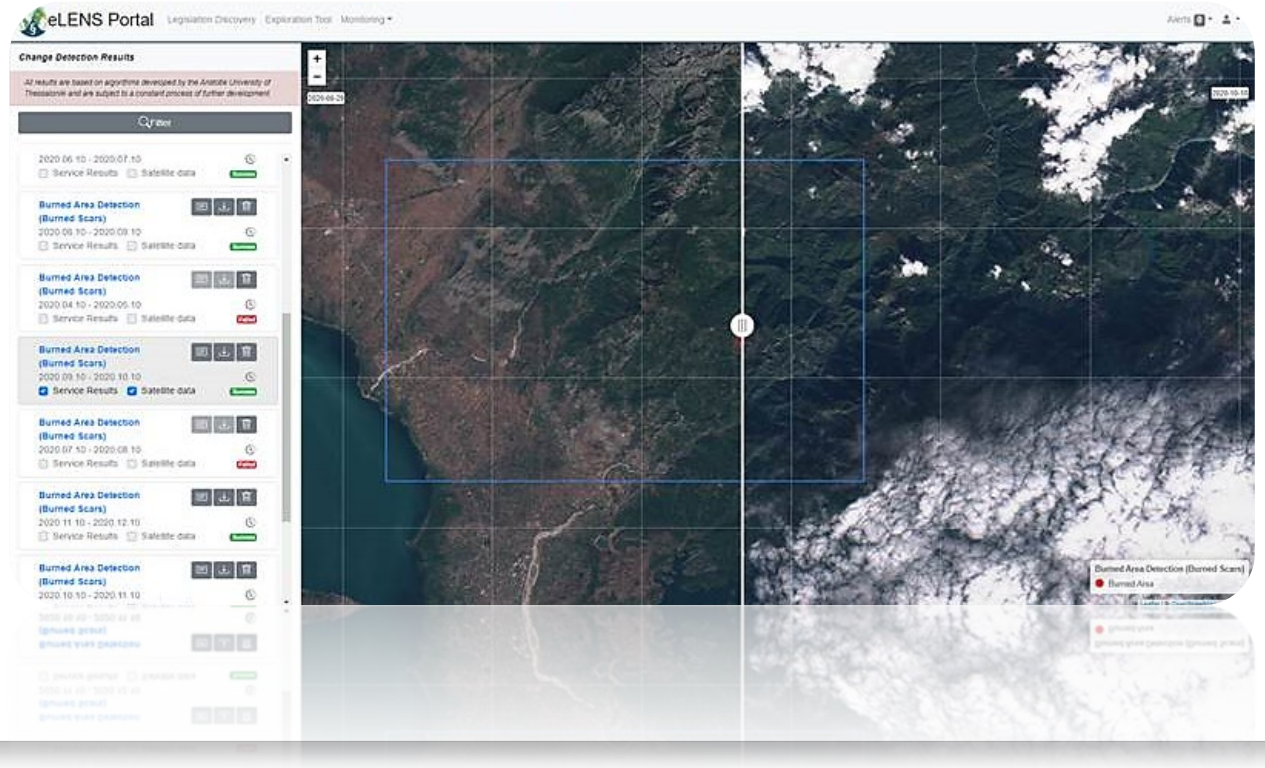
eLENS portal

The Beta version of the portal is available



The services developed:

- Legislation discovery (eLENS Miner)
- Exploration tool
- Monitoring and Alerts (deforestation detection, burnt scars, water level extent, illegal construction)

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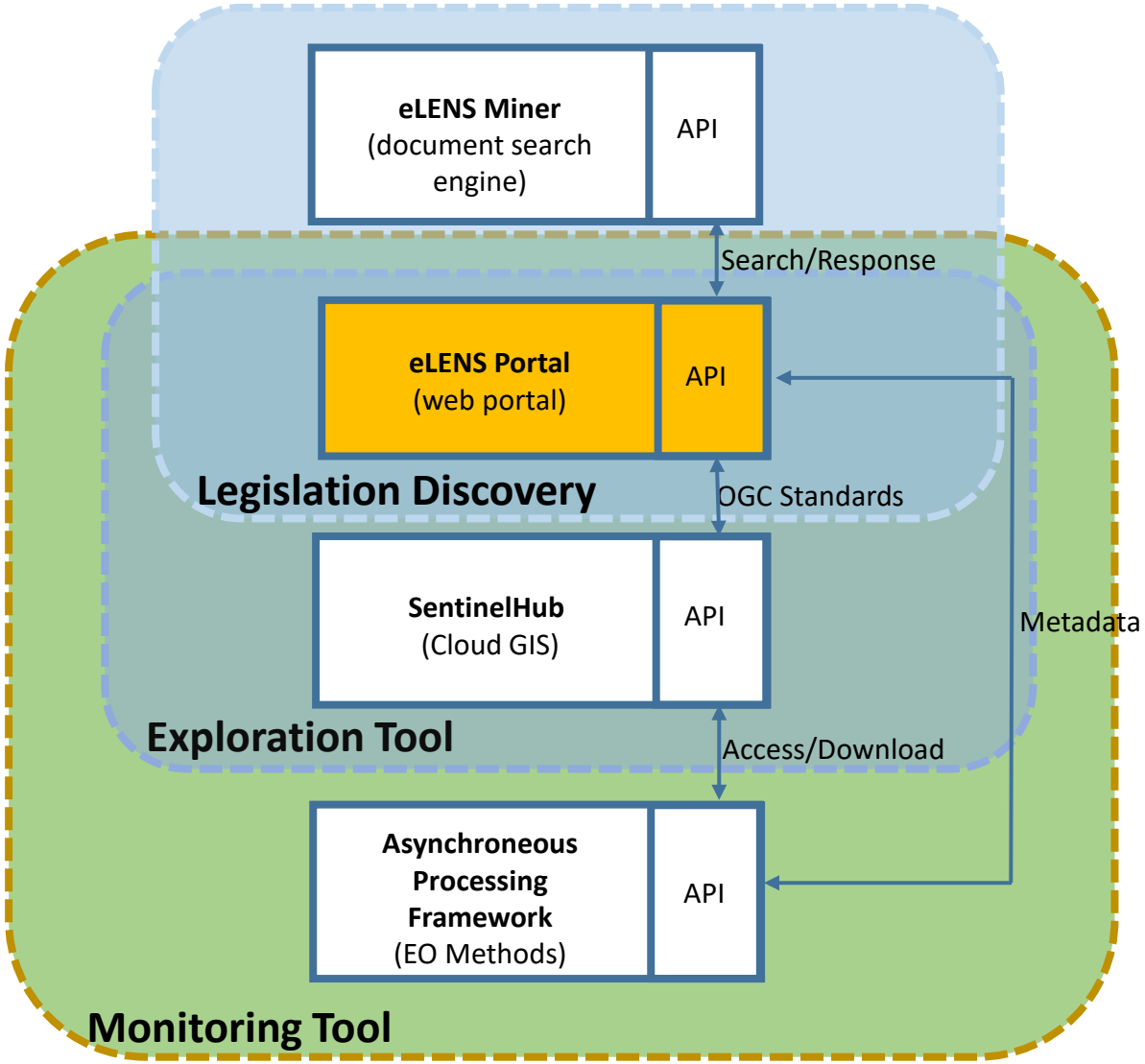
eLENS Portal System Design



Images update: every 2-4 days

Spatial resolution:

Landsat-8: 30 m

Sentinel-2: 10 m

13 **spectral bands**

The project uses data of the EU Copernicus Programme

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821918

eLENS Portal use cases (IUCN led)

MONITORING OF PROTECTED HABITATS CONDITION

ILLEGAL CONSTRUCTION AND INFRASTRUCTURE DEVELOPMENT

DEFORESTATION DETECTION

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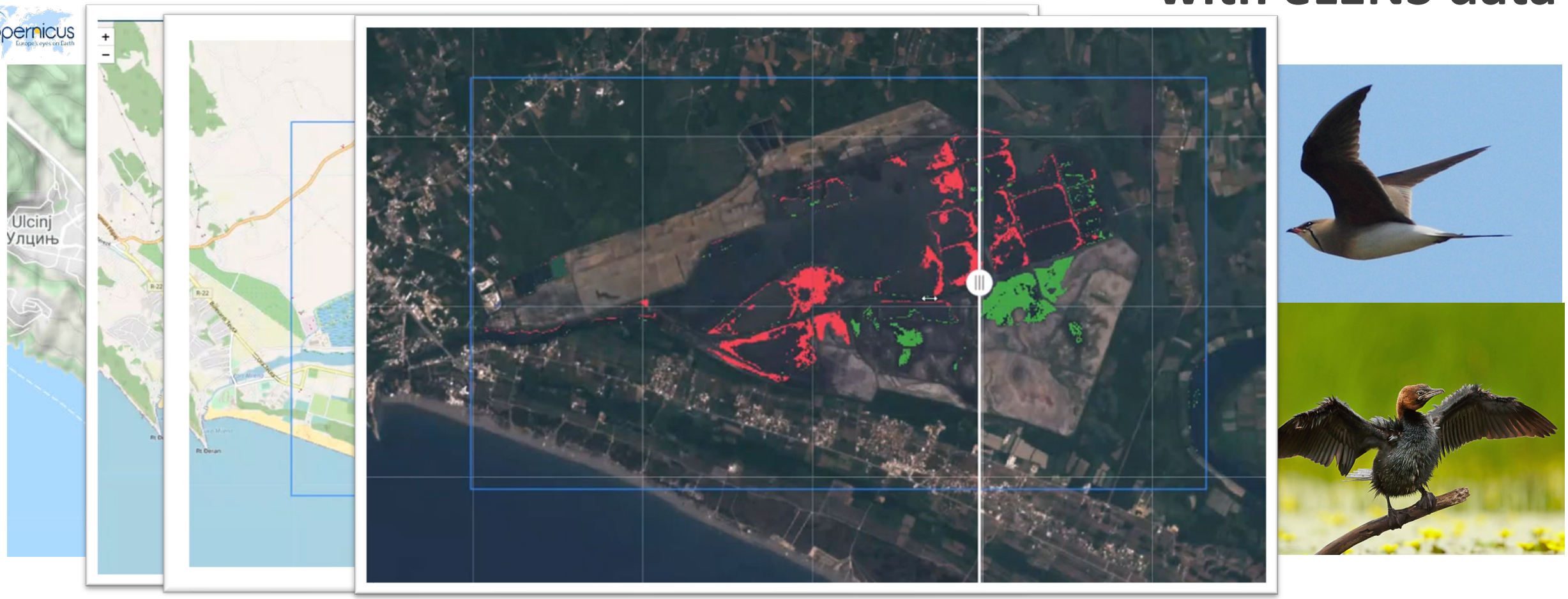
Supporting habitats protection with eLENS data



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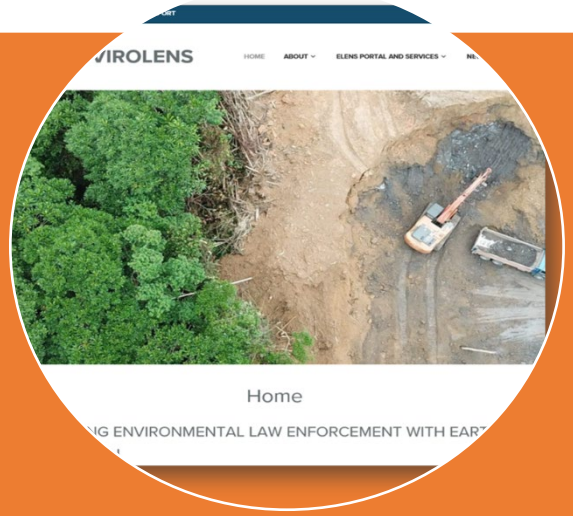
Stay connected

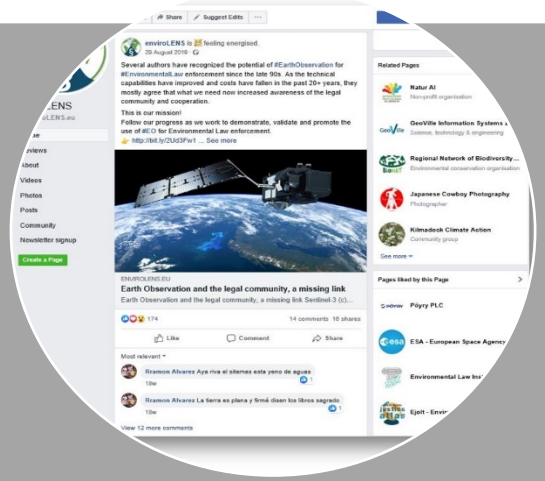


Website

www.envirolens.eu

Newsletter

eepurl.com/gsClez



Social media

Facebook @enviroLENS.eu

Twitter @enviroLENS

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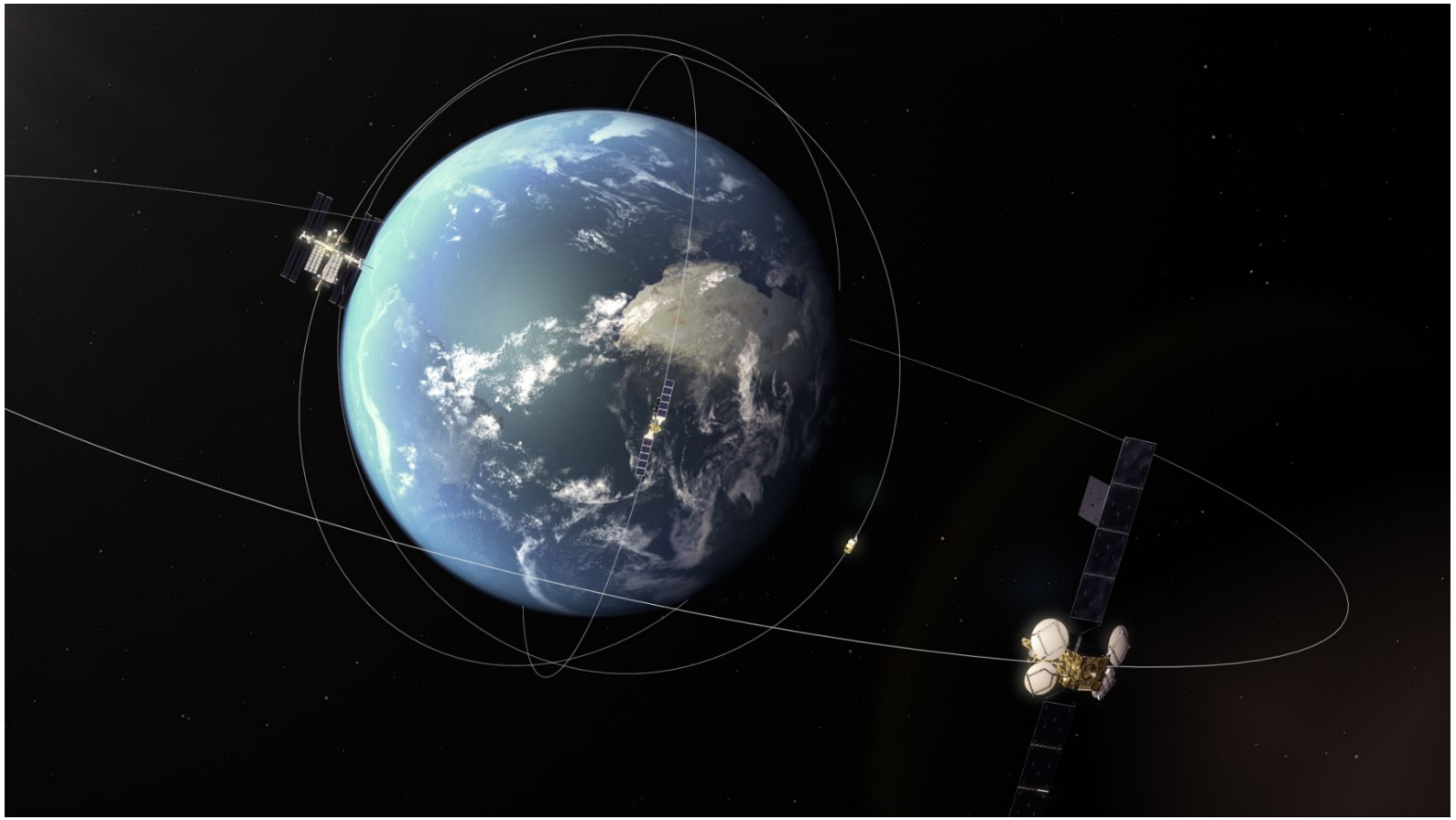
Thank you for your attention!



Questions, comments:
ecaro@iucn.org

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Eurosite

Remote Sensing Support Group

Clive Hurford, EO webinar, 20 April 2021

The origins of the Eurosite RSSG

- The suggestion for a remote sensing support group came from the floor at the Eurosite ‘New Technologies’ workshop in April 2019
- The issue was raised again by delegates in post-workshop correspondence
- A proposal was then put to the Secretariat, who added the work of the group to the Eurosite work programme for the next two years
- This work programme was approved in autumn 2019
- And then the Covid-19 pandemic caused some rescheduling

The distribution of contributors to the Remote Sensing Support Group

Eurosite

The main aim of the RSSG

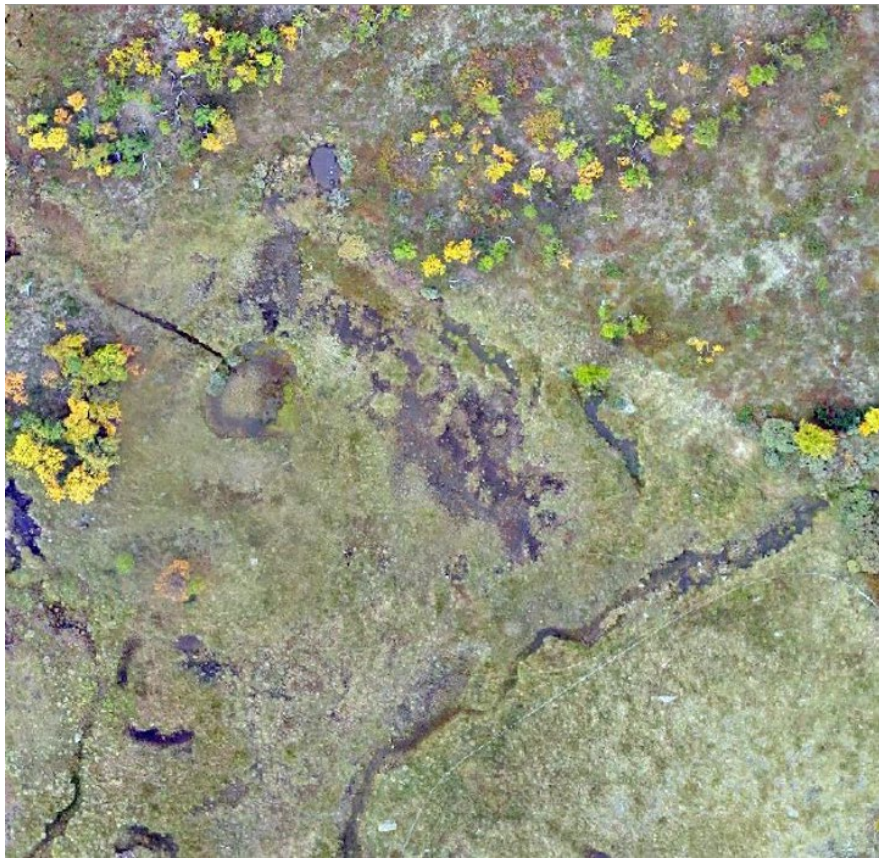
- Is to establish a series of national / regional hubs to facilitate information exchange between remote sensing terchnicians and land managers responsible delivering biodiversity management and monitoring

The current distribution of the Eurosite information exchange hubs

Eurosite

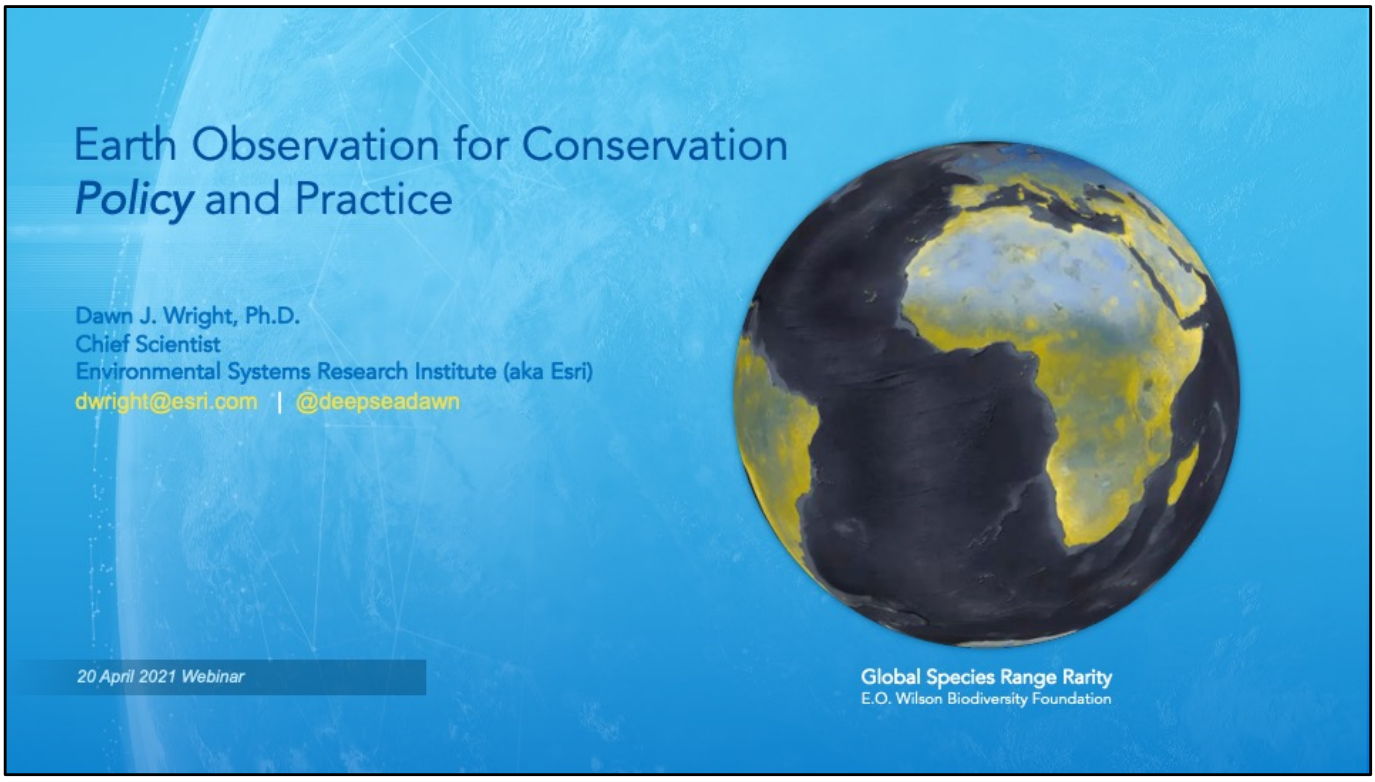
In 2021, the group aims to:

- If at all possible, provide a small number of face to face ‘within-country’ information exchange workshops - through the existing hub network;
- Enable social network interactions, e.g. through the Eurosite Facebook page; and
- Provide access to relevant manuals, articles and case studies on a Eurosite web portal; and
- Create the possibility for personal consultations, as necessary;



Eurosite

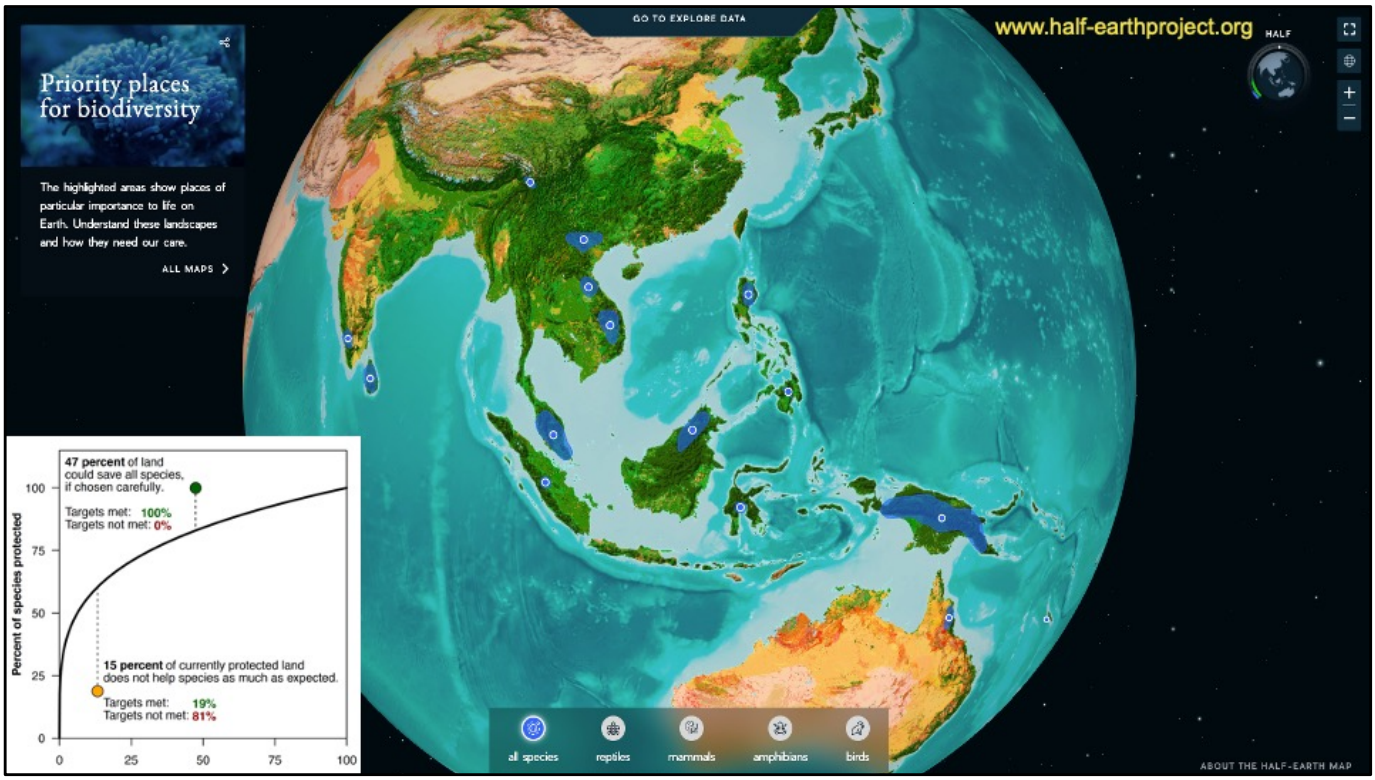
Thank you for your attention



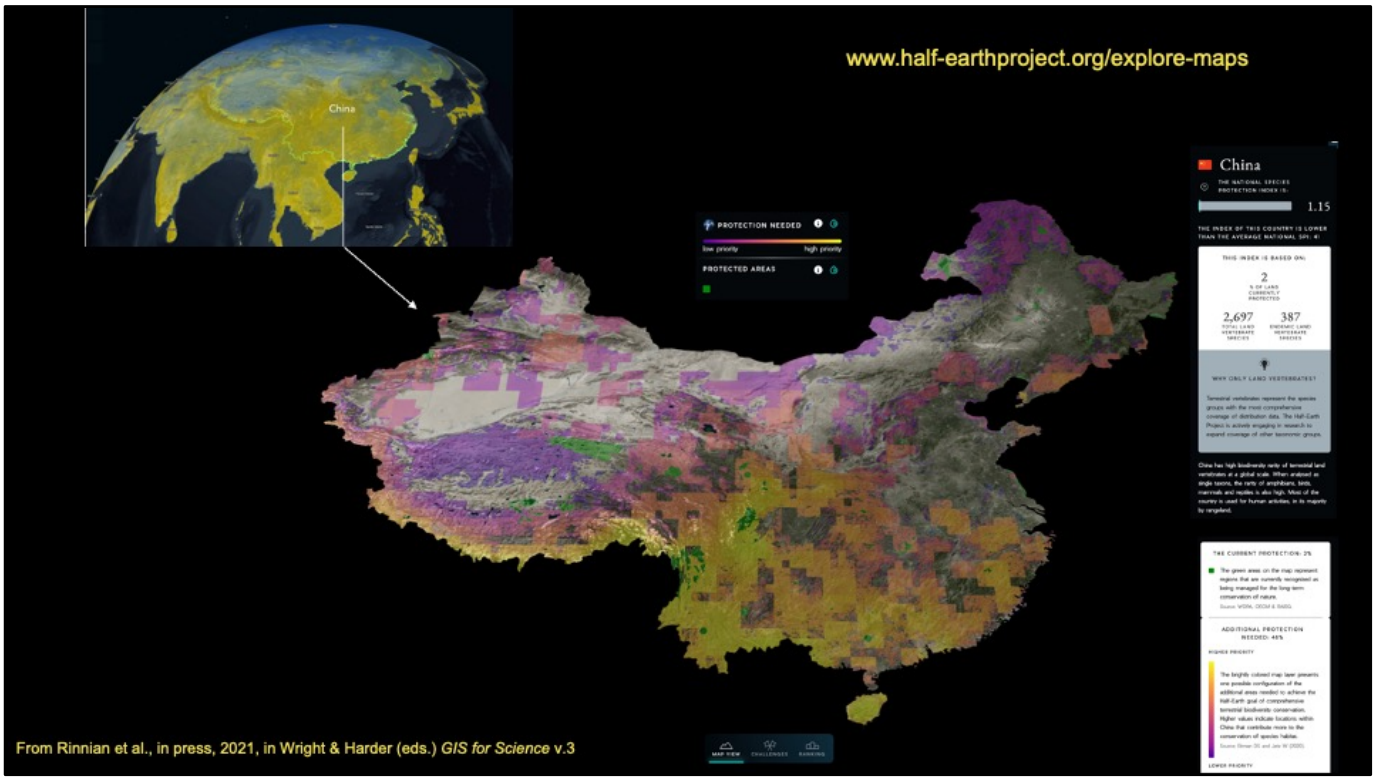
Wonderful to be here with you today, and to hear of the projects and perspectives of our European colleagues, especially with the European Geosciences Union (EGU) General Assembly having started just yesterday.

I have been charged with covering more of a US policy perspective on Earth observation for conservation, and from the standpoint of Half Earth and 30 x 30.

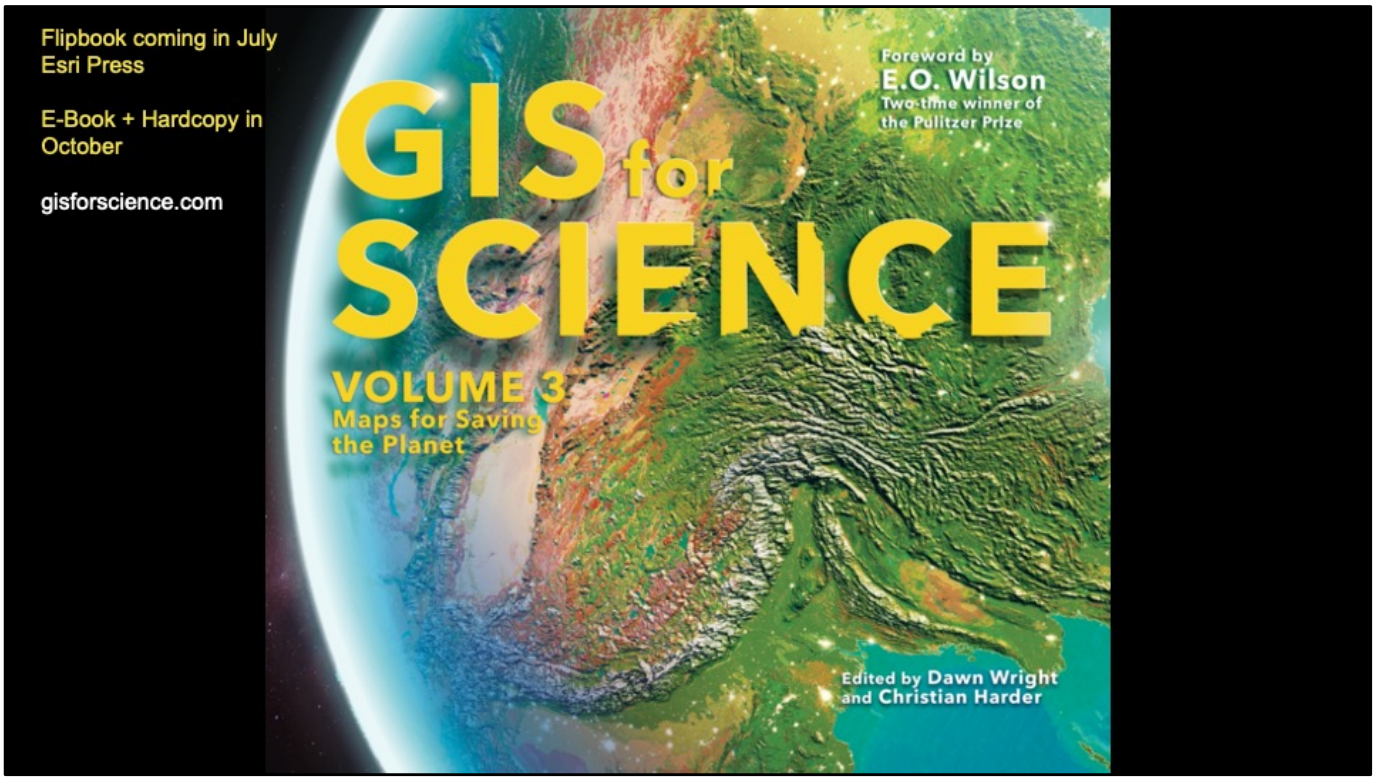
The foundational science of the Half-Earth Project that is a forerunner to 30 x 30 another initiatives, places species front and center as the core unit of conservation concern, as you can see in this rotating globe of worldwide species range rarity, for both the land *and* ocean. Species are critical elements underpinning the ecosystems that constitute our landscapes and seascapes. We can think of them as nodes on this very intricate web of life that are ultimately behind nature's benefits to people. Ensuring that species are represented in our characterizations of the planet's biodiversity is thus a necessary first step in safeguarding them from extinction.



The Half-Earth Project tracks conservation progress at the species level and aggregates this information to identify places where additional conservation actions will best contribute to the preservation of biodiversity. To this end, one of its primary goals is to provide a globally and taxonomically comprehensive mapping of **species distributions** for use in conservation planning. Here I'm showing a snapshot of the Half-Earth Project Map, which is a joint effort of Yale U. and the Map of Life network, Vizzuality, and Esri, where you can interactively explore global biodiversity data, priority areas for conservation, and various biodiversity indicators. With regard to the LAND, you can find global patterns of species richness and rarity for all known species of amphibians, birds, mammals, reptiles, cacti, and conifers – derived in part from remotely-sensed landcover products. And the project is linking with other efforts to do similarly for the ocean.



The most recent update to the Half-Earth Map introduces National Report Cards and a Species Protection Index (seen here focused on China), which help to measure how many species groups are protected by each country's conservation efforts, focusing at the national level on how conserved places are protecting the species within them. This is very important for POLICY because as a biodiversity indicator, the SPI helps ensure that conservation actions continue to reflect and achieve conservation goals through time by prioritizing areas where biodiversity protection is most needed. The SPI can be updated regularly to reflect additions to protected area networks and for countries with low SPI values. The layers of priority areas for conservation show where efforts can be directed to make the most rapid gains in species protection. SPI are under consideration by the Convention on Biological Diversity as a trial indicator for collaborative, coordinated global action plans, and as such are also on offer to organizations such as the UN World Conservation Monitoring Centre, the Group on Earth Observations Biodiversity Observation Network (GEO BON), and the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services).



The story of the Half Earth Project is told in one of the chapters of our new book coming out this summer, with a foreword written by EO Wilson and the Half Earth map gracing the cover.

What is 30x30 on this Side of the Atlantic?

An emerging global movement to stop the rapid loss of species, and to improve resiliency to climate change by setting aside more of the Earth's surface for nature. Leading naturalist E.O. Wilson has called for the preservation of half the Earth's surface for nature, which has also inspired and set the scientific foundation for 30 x 30. Protecting 30% of land and sea by the year 2030 is gaining momentum in more than 50 countries, including the United States and Canada committing to achieving this target.

The High Ambition Coalition (HAC) for Nature and People is an intergovernmental group of more than 50 countries co-chaired by Costa Rica and France and by the United Kingdom as Ocean co-chair, championing a global deal for nature and people that can halt the accelerating loss of species, and protect vital ecosystems that are the source of our economic security

It is seen as a Paris Climate type gathering of UN states to make biodiversity commitment, except with a great level of rigor in terms of measuring, accounting, and ACCOUNTABILITY.

Achieving 30x30

Continued

- Improved management of existing protected areas.
- Increased funding.
- Clear, enforceable implementation mechanism.

Biden – Harris Administration Executive Order

Jan. 27th, 2021

The order commits to the goal of conserving at least 30 percent of our lands and oceans by 2030 and launches a process for stakeholder engagement from agricultural and forest landowners, fishermen, Tribes, States, Territories, local officials, and others to identify strategies that will result in broad participation.

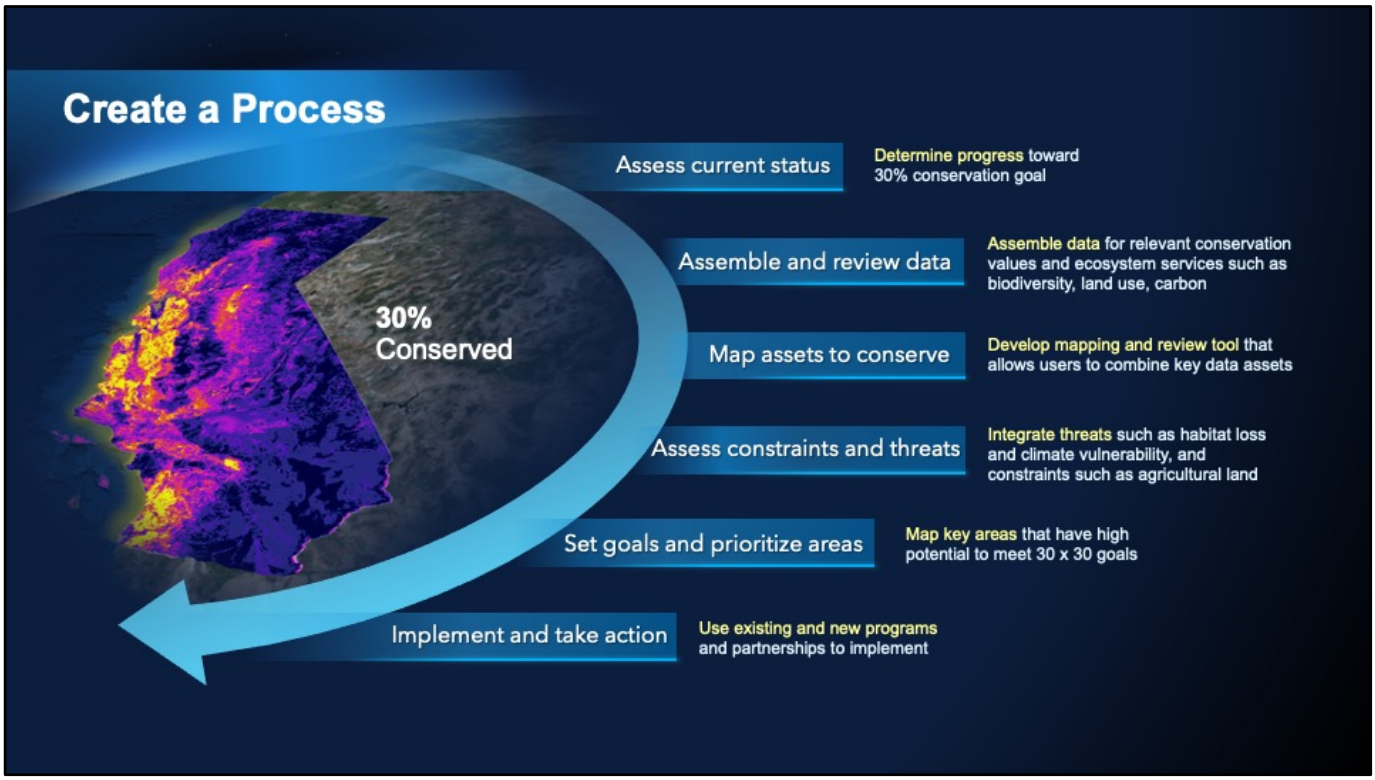
Existing 30x30 Efforts in US States

- **Hawaii:** In 2016, Hawaii committed to effectively manage 30% of its nearshore marine environment by 2030.
- **Maine:** The Climate Action Plan issued by Maine Governor Janel Mills includes a proposal to conserve at least 30% of Maine's lands by 2030.
- **South Carolina:** In South Carolina, a bipartisan group of state legislators have introduced the "[South Carolina Thirty-By-Thirty Conservation Act] [4]" to assemble an interagency task force to develop a plan to meet a statewide 30x30 goal. [4]: https://www.scstatehouse.gov/sess123_2019-2020/prever/1024_20200121.htm
- **Virginia:** Virginia has established a data-driven, land conservation strategy, called ConserveVirgina, to preserve high conservation value lands across the state.
- **California:** In 2020, California Governor Gavin Newsom signed an executive order to combat species and ecosystem destruction by conserving and restoring 30% of the state's land and coastal water by 2030.

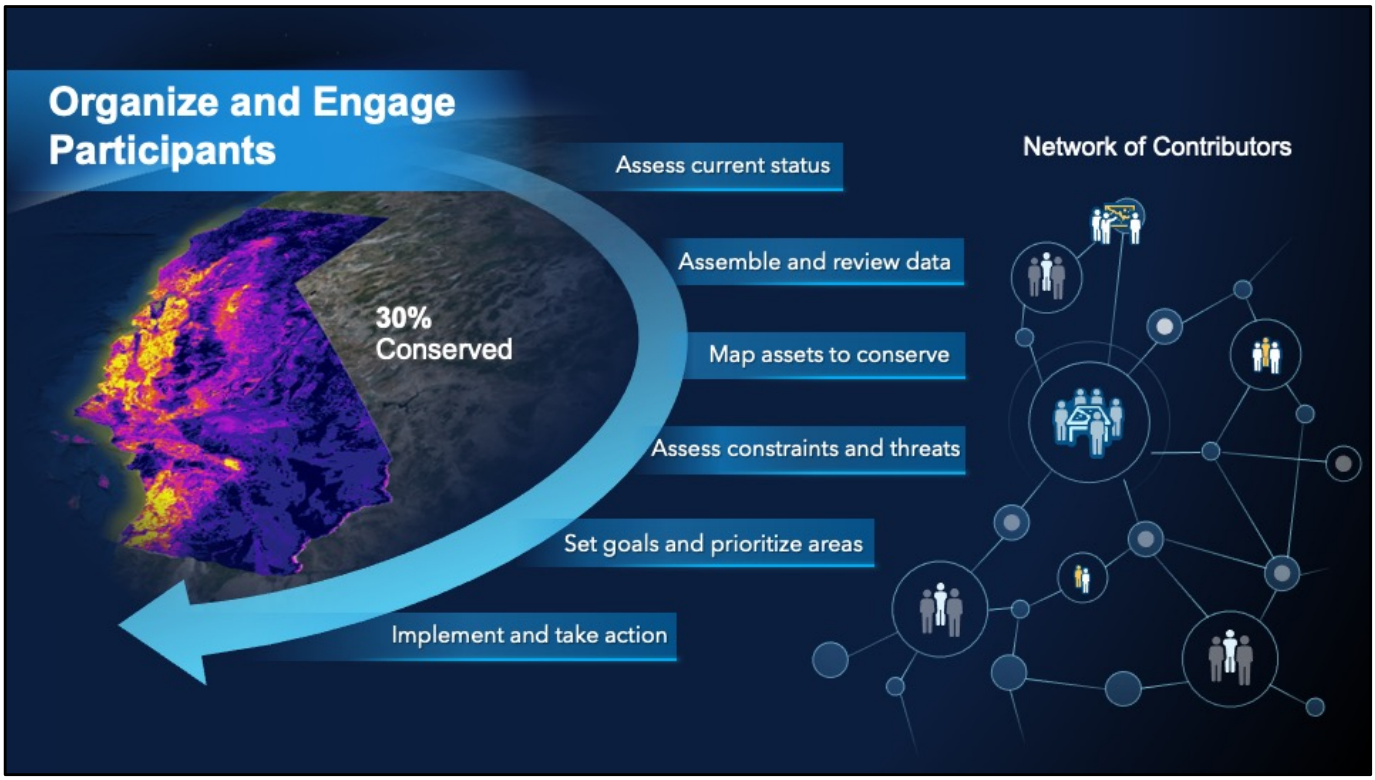
Source: https://www.natureamerica.org/supporters

Gov. Newsom Signs Executive Order to Preserve 30% of CA by 2030

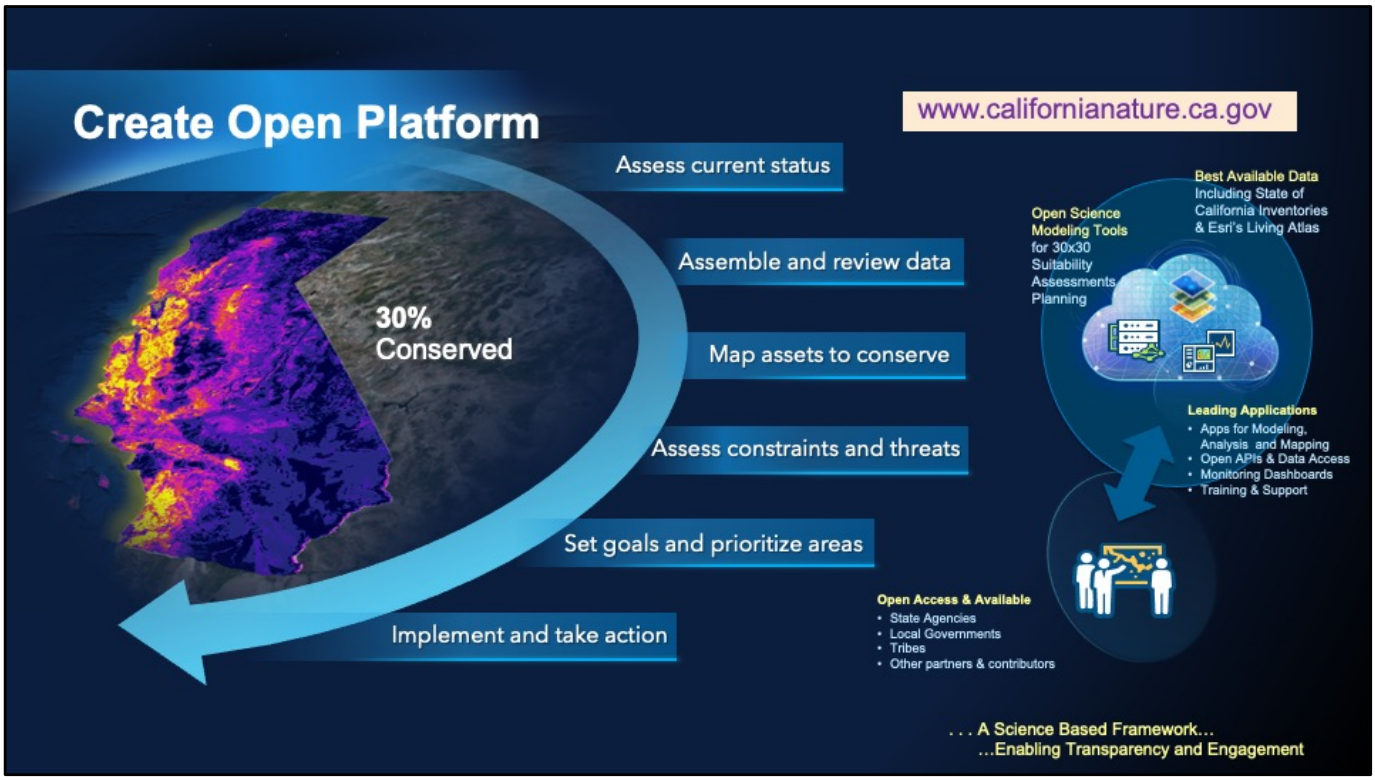
October 7th, 2020



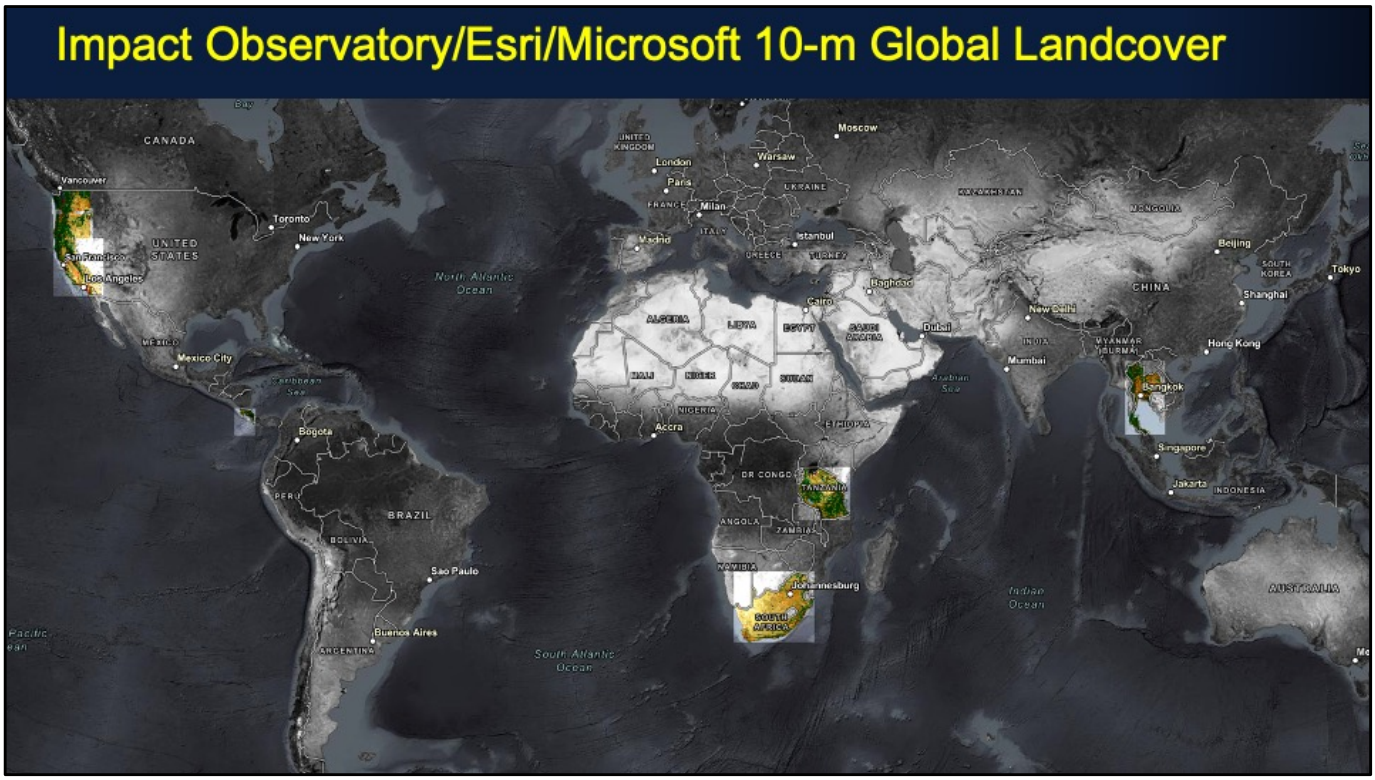
Under the Newsome executive order, the California Natural Resources Agency has launched California Nature to engage Californians in advancing the state's commitment to conserving 30 percent of lands and coastal waters by 2030 (30x30)



Of course many partners are involved in this, including a collaborative leading effort among Nature Conservancy, Resources Legacy Fund, and Esri



Esri is building the technology that underpins the open platform which is evolving at www.californianature.ca.gov



A final quick note on PRACTICE and especially as a segue to my colleague Jeff Allenby. I can't resist providing a SNEAK PEAK at a project that will NOT be officially launched until this summer.

Driven by the need for trusted, accessible, and high-resolution source for global land cover, and ultimately land cover on-demand to improve planning and to monitor change.

This is an initial collaboration among 3 mission-driven technology companies
Impact Observatory brings machine and deep learning algorithms and data to bear for sustainability and environmental monitoring
Microsoft
Esri
This project currently building a global land-cover map and evaluating deep learning models.
- Using a 10m near cloud free mosaic produced with MS/IO using Sentinel-2 (high-rez optical as nicely explained by Bruno) and hosted on Microsoft's Planetary Computer
- 10 Class Tier-1 Anderson Classification.
-Training data provided from the Dynamic World Project with NGS/Google/WRI

And on this map you can see the target test areas for land cover classification (US West Coast States-CA, OR, WA), Costa Rica, Tanzania/Rwanda, Thailand, and South Africa.

Earth Observation for Conservation *Policy* and Practice

Dawn J. Wright, Ph.D.
Chief Scientist
Environmental Systems Research Institute (aka Esri)
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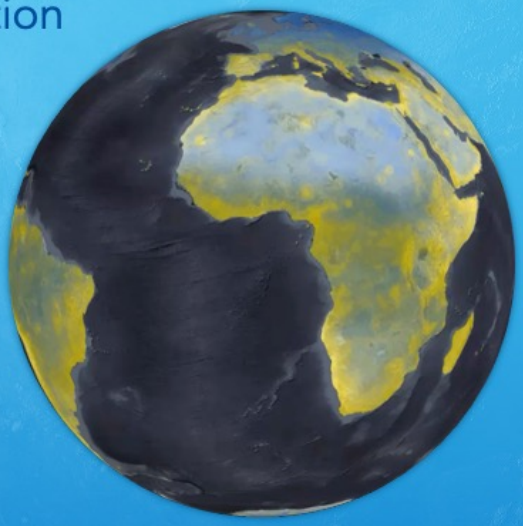
20 April 2021 Webinar



Global Species Range Rarity
E.O. Wilson Biodiversity Foundation

Empowering Conservation Partners to Achieve 30 by 30

Unlocking the Potential of Technology to Advance the Pace and Quality of Global Efforts

Jeffrey Allenby, GISP
Director of Geospatial Technology

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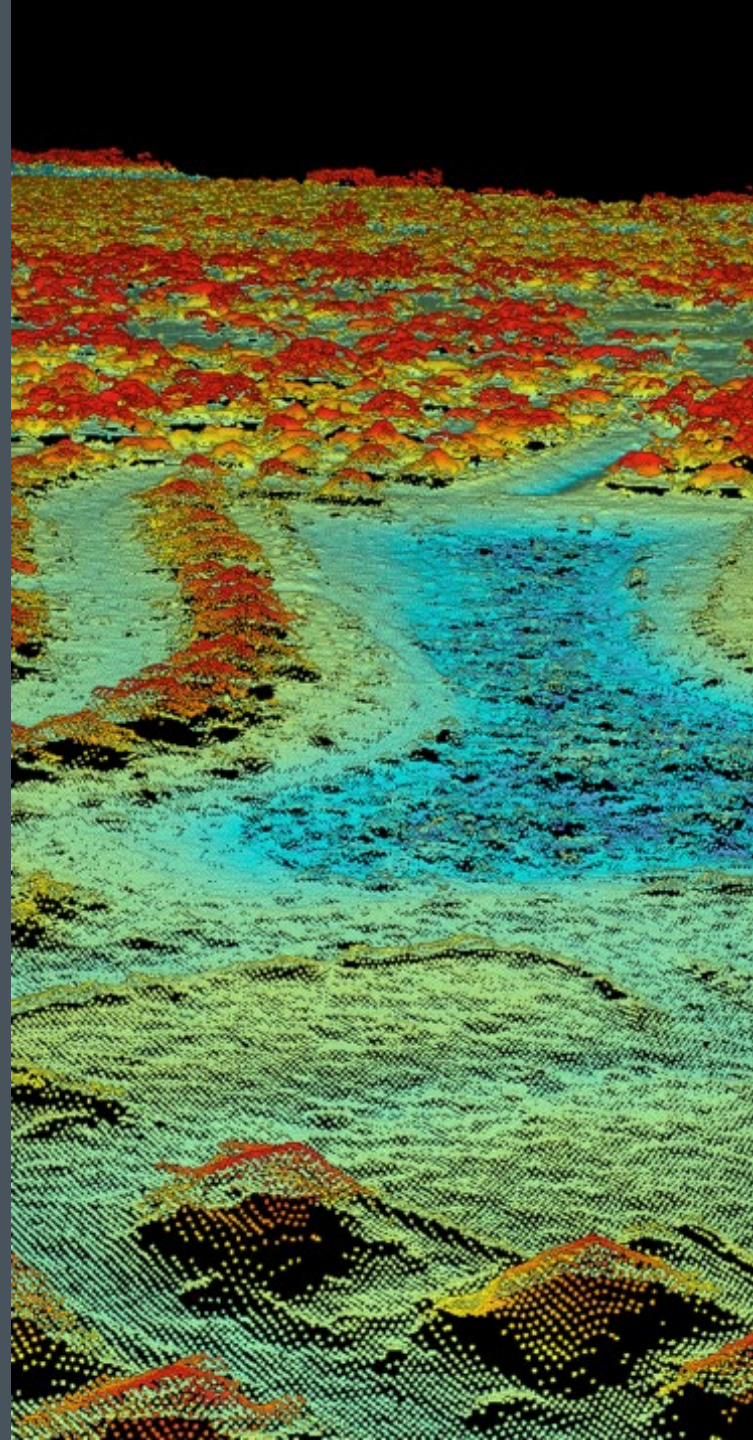
LINCOLN INSTITUTE
OF LAND POLICY

Why is it so hard for environmental partners to use technology?

CENTER FOR GEOSPATIAL SOLUTIONS

Common Barriers to Entry

- They might not know where to focus their efforts
- They might not have access to the right information or tools to answer core questions
- They might not have the right staff or expertise available to execute the analyses they need
- They might not know how to incorporate “new” technologies to better address their challenges




The Center for Geospatial Solutions was created to help partners fix these issues
We want to help partners ask the right questions and transform the right data into actionable insights about the landscape

Moving from Opportunity to Strategy

Moving from Opportunity to Strategy

- Translate abstract strategies into tangible analyses
- Identify the most important landscapes for protection
- Map threats and capacity to focus efforts on "at risk" areas

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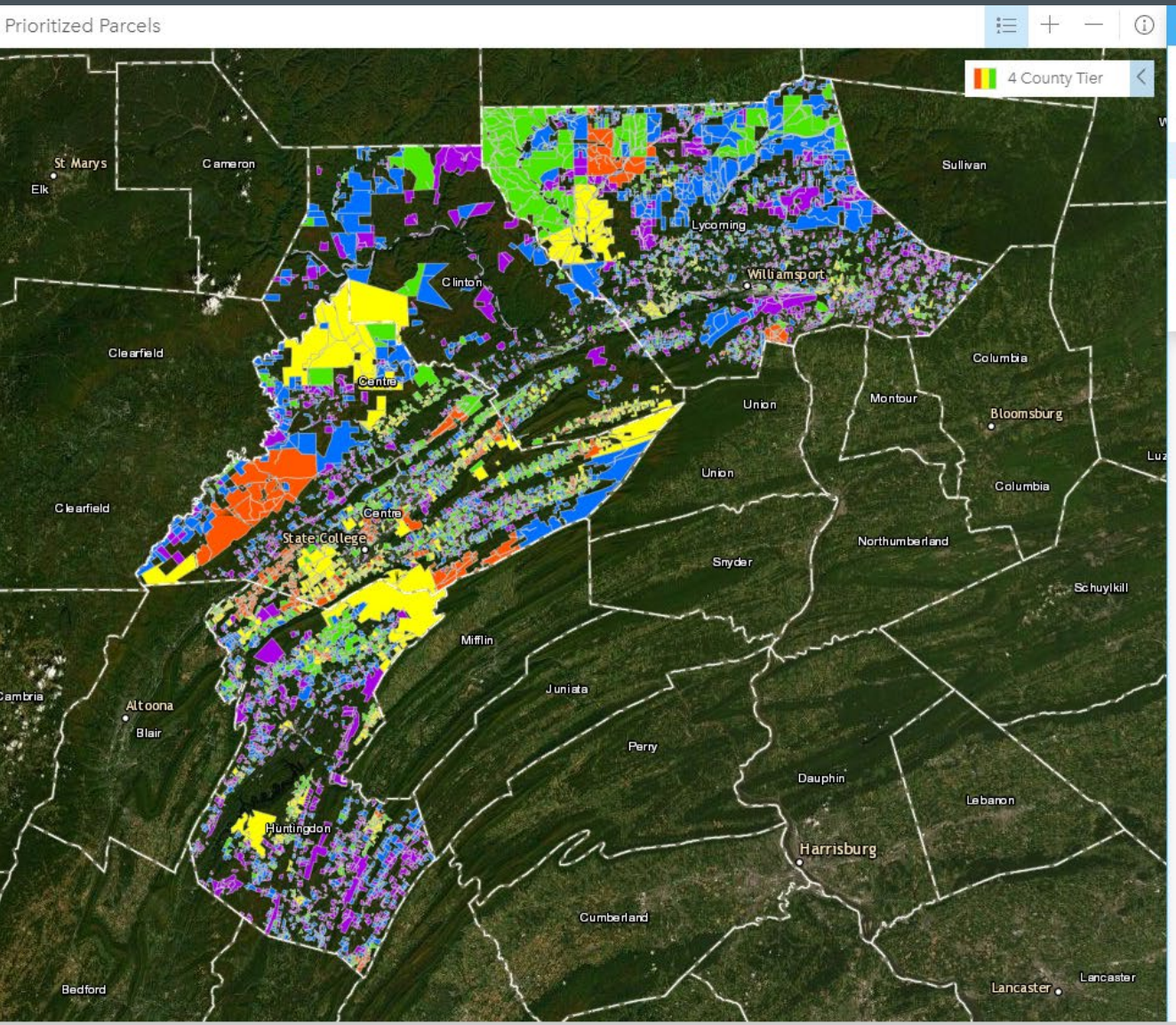
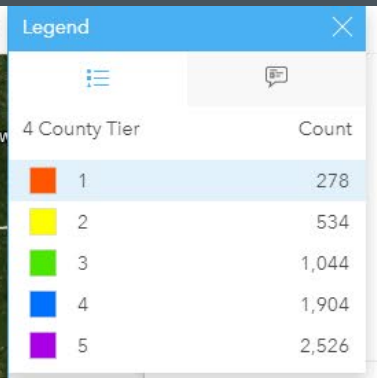
New data works at the project level

New data works at the project level

Identify Priorities Across Entire Landscapes





Tier 1 and Tier 2 parcels intersect Upstream Ag-Impaired Catchments

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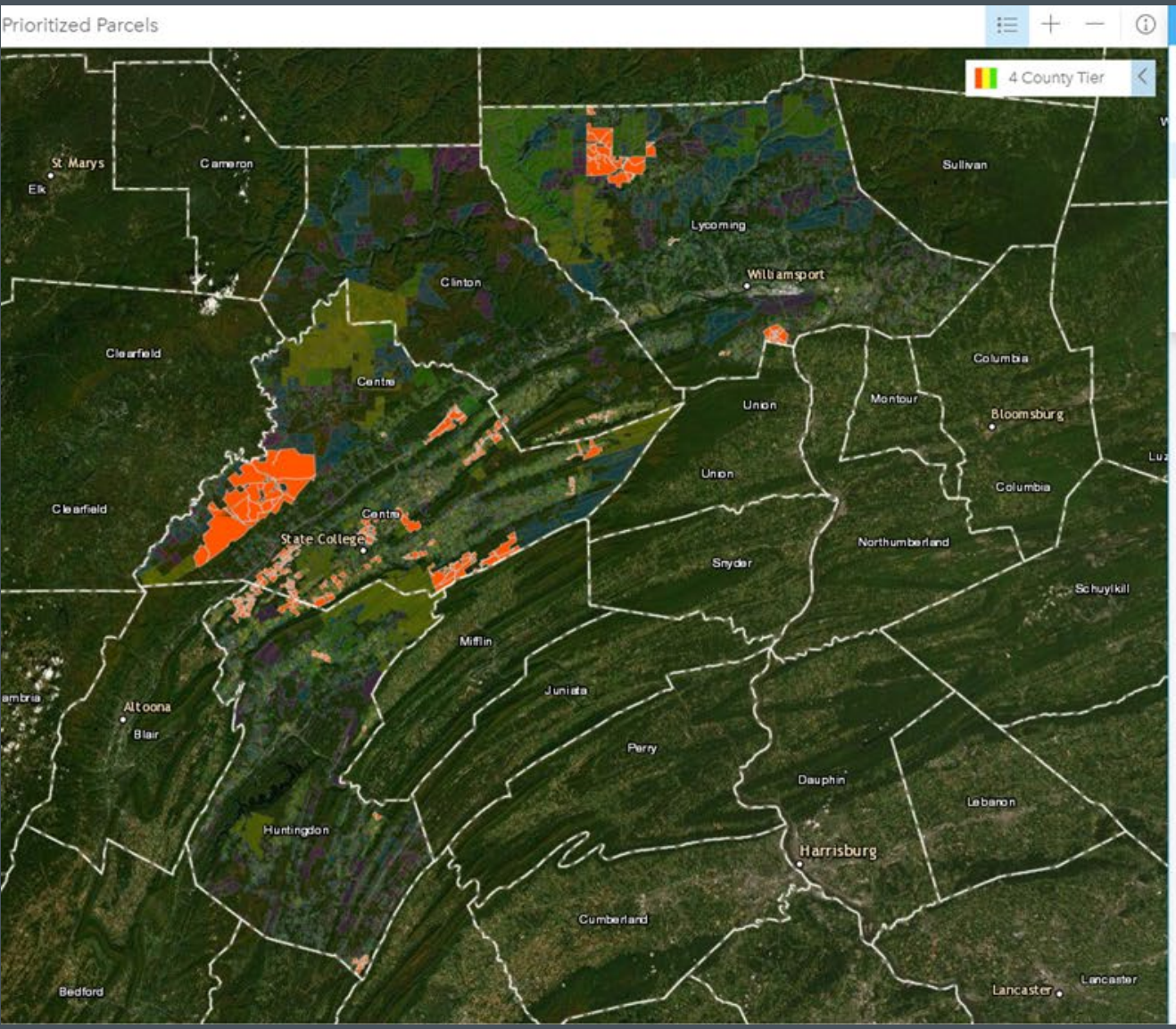
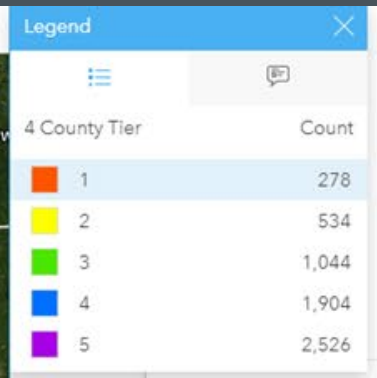
Identify Priorities Across Entire Landscapes





Tier 1 and Tier 2 parcels intersect Upstream Ag-Impaired Catchments

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

CENTER FOR GEOSPATIAL SOLUTIONS

Moving from Opportunity to Strategy

- Translate abstract strategies into tangible analyses
- Identify the most important landscapes for protection
- Map threats and capacity to focus efforts on “at risk” areas

- **Document baseline conditions to improve future management**
- **Create effective management plans to maximize benefits**
- **Improve accounting for global conservation initiatives**

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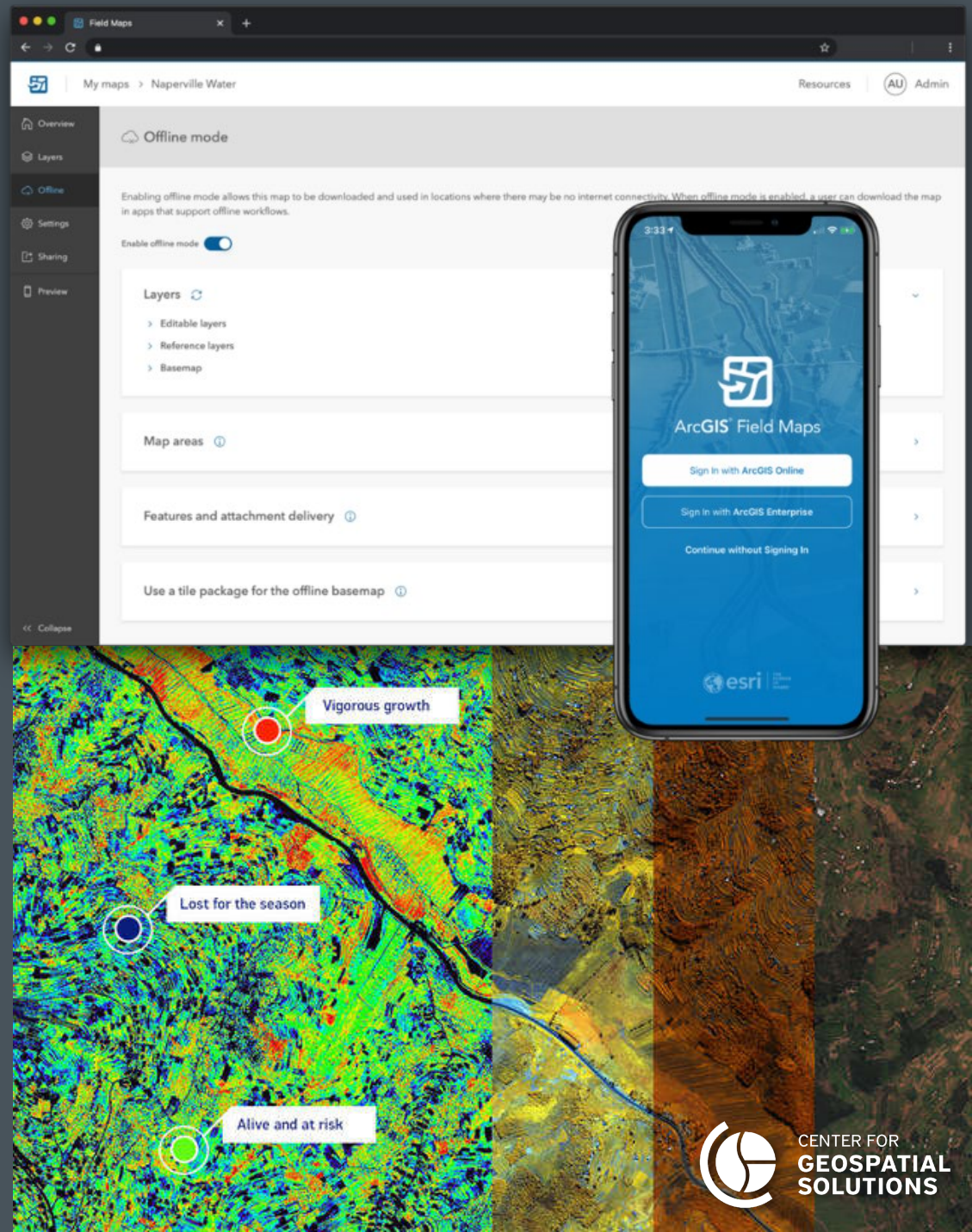
Databases not Documents

- Technology-centric design ensures data is managed intentionally from the start
- Information becomes accessible throughout an organization
- Less time is spent gathering information throughout conservation processes

Streamlining Data Management

- Facilitate field monitoring and reporting leveraging new tools
- Document areas of interest by combining field and desktop analysis
- Identify co-benefits of conservation that may be beyond your primary mission



Moving from Opportunity to Strategy

Prioritize

- Translate abstract strategies into tangible analyses
- Identify the most important landscapes for protection
- Map threats and capacity to focus efforts on “at risk” areas

Secure

- Document baseline conditions to improve future models
- Create effective management plans to maximize benefits
- Improve accounting for global conservation initiatives

Monitor

- **Identify minor threats before they escalate into major issues**
- **Maximize efficiency of limited staff and resources**
- **Ensure conservation actions are having intended outcomes**

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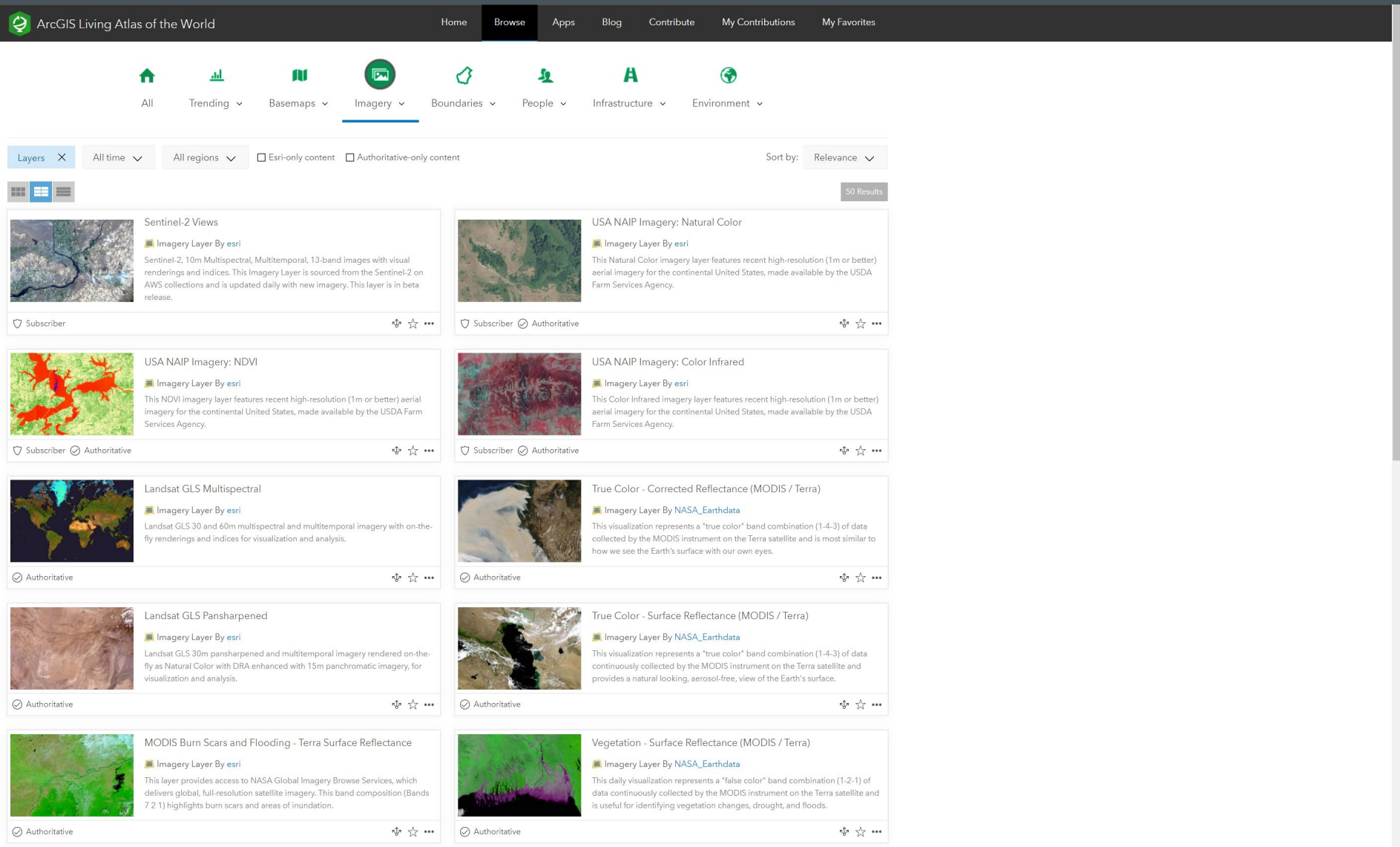
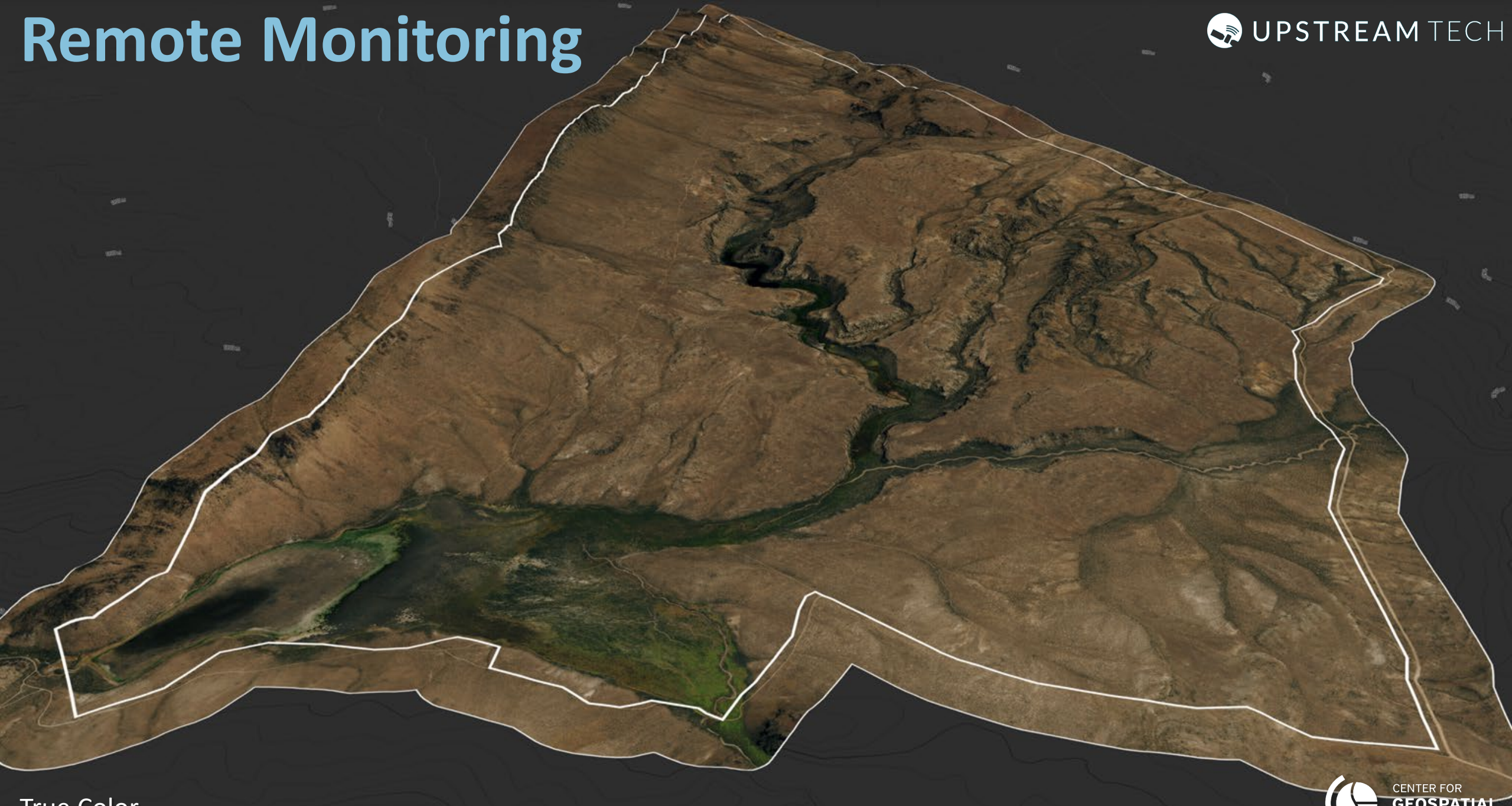
Accessing Earth Observations Data



Remote Monitoring

UPSTREAM TECH

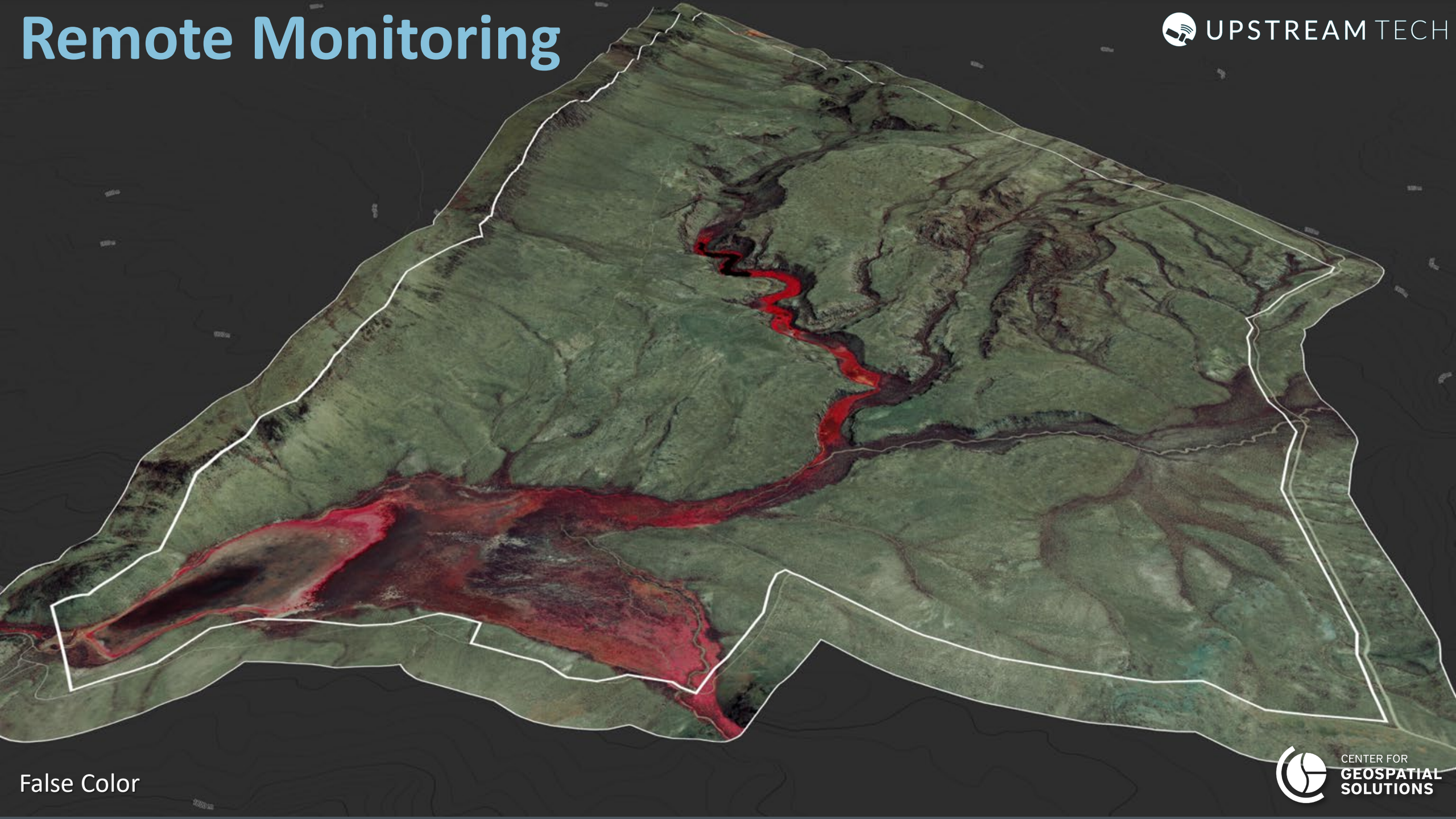


True Color

CENTER FOR GEOSPATIAL SOLUTIONS

Remote Monitoring

UPSTREAM TECH



False Color

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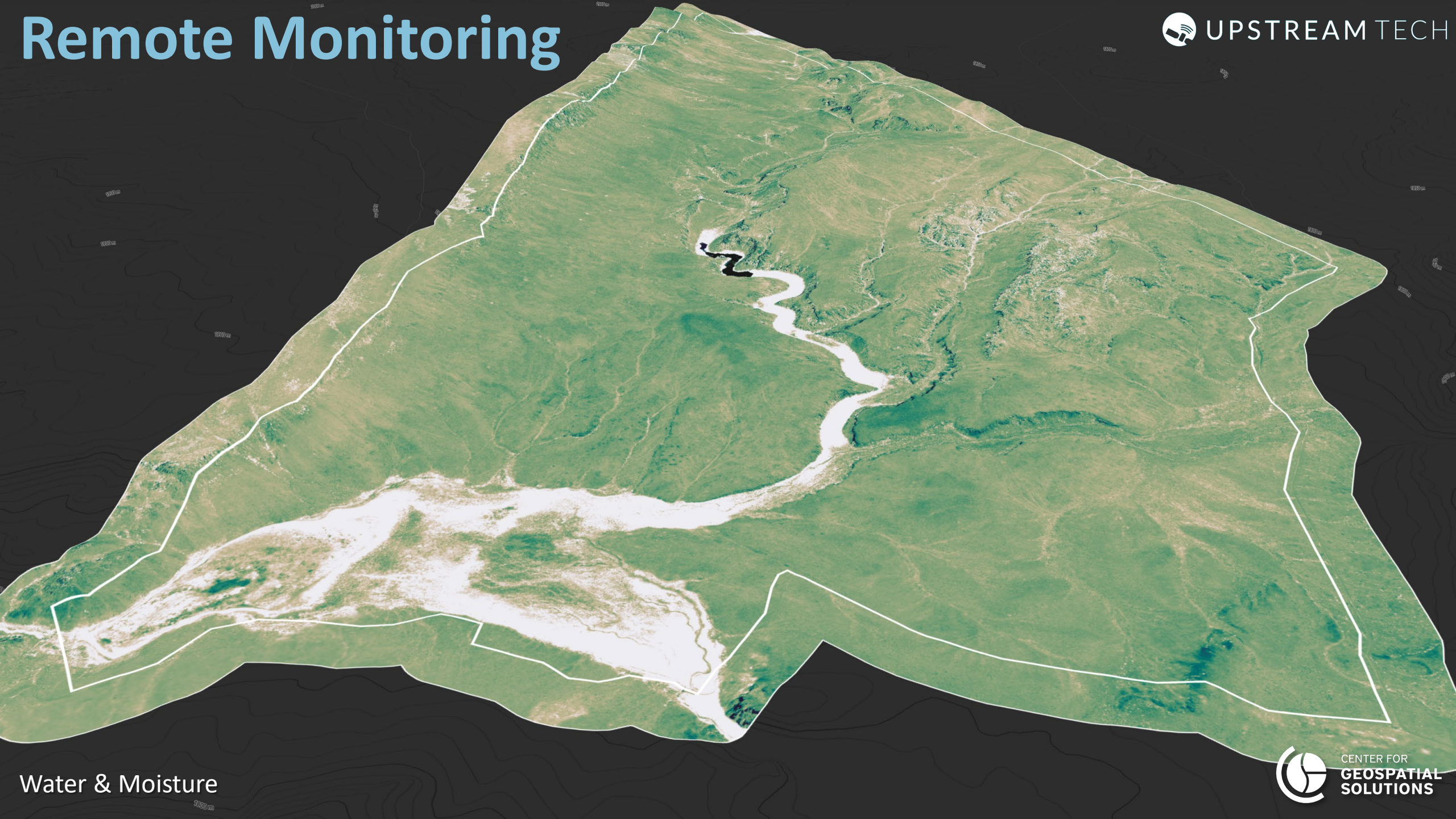
Remote Monitoring



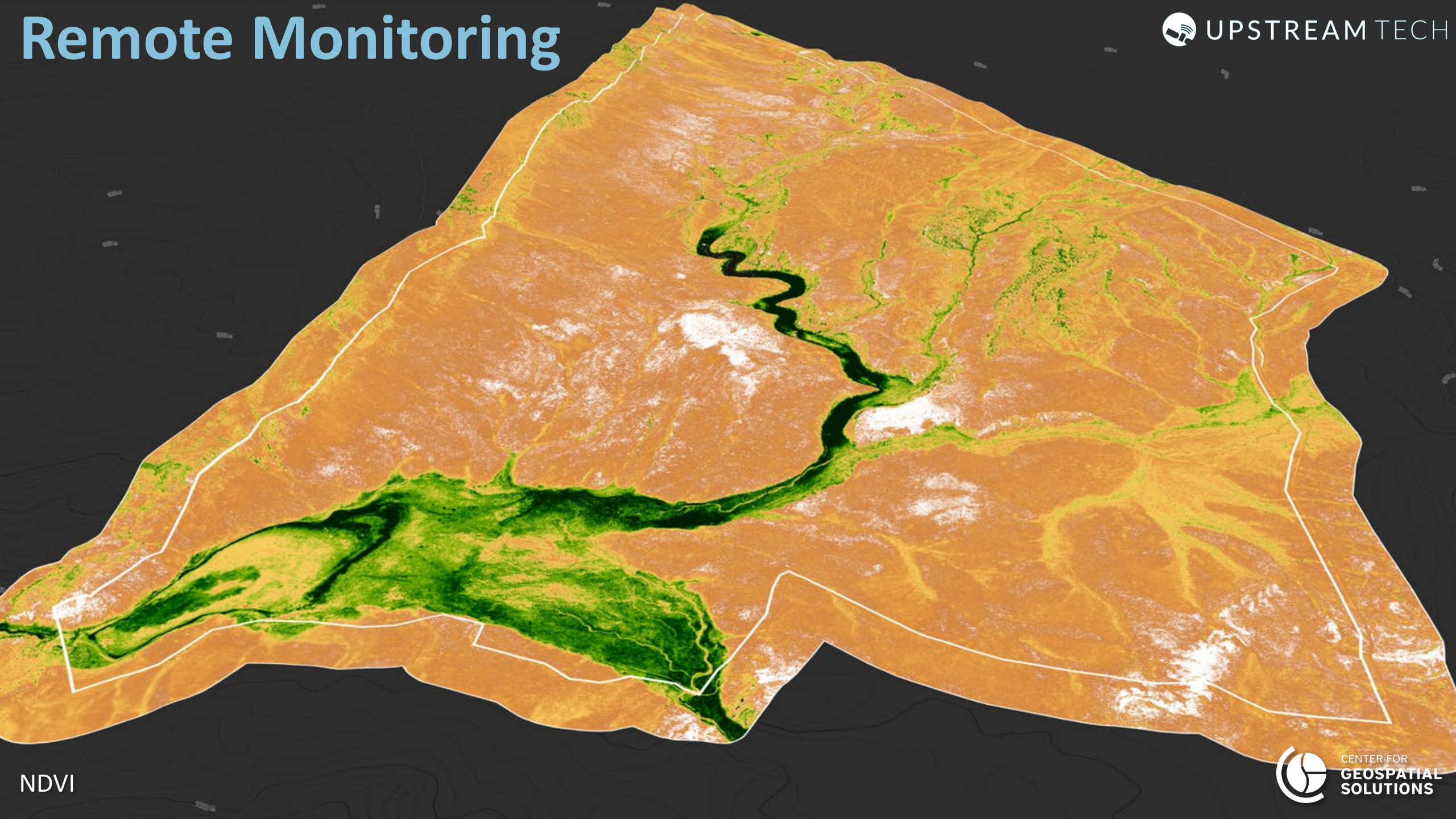
UPSTREAM TECH

Water & Moisture

CENTER FOR GEOSPATIAL SOLUTIONS

Remote Monitoring

UPSTREAM TECH



NDVI

CENTER FOR GEOSPATIAL SOLUTIONS

Moving from Opportunity to Strategy

Prioritize

- Translate abstract strategies into tangible analyses
- Identify the most important landscapes for protection
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Secure

- Document baseline conditions to improve future management
- Create effective management plans to maximize benefits
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Monitor

- Identify minor threats before they escalate into major issues
- Maximize efficiency of limited staff and resources
- Ensure conservation actions are having intended outcomes

CENTER FOR GEOSPATIAL SOLUTIONS

Partnership Ecosystem Development

- CGS is constantly interacting with partners working to solve similar challenges around the globe
- We want to connect partners working on similar issues and in similar geographies
- CGS often acts as a “matchmaker” for new partnership opportunities

esri THE SCIENCE OF WHERE™

Internet of Water

NATURE CONSERVANCY CANADA

UPSTREAM TECH

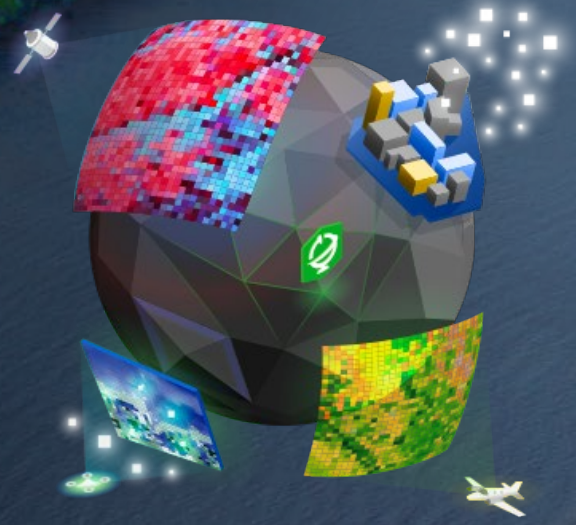
Land Trust Alliance

FLINTPRO

planet.

CENTER FOR GEOSPATIAL SOLUTIONS

Where We Go From Here



REFINE

Locally relevant data & expertise to analyze and solve local challenges

INPUTS TO THE MODEL

- Policy
- Science
- Constituency Building

Test bed landscapes focused on achieving 30 by 30 success

APPLY

PULSE OF THE PLANET

Real-time data and tools to manage the planet for change

PRIORITIZED INVESTMENTS

PARTNERSHIPS

LOCALLY RELEVANT ACTION

Thank You!

Jeffrey Allenby

Director of Geospatial Technology
jallenby@lincolninst.edu

www.cgs.earth

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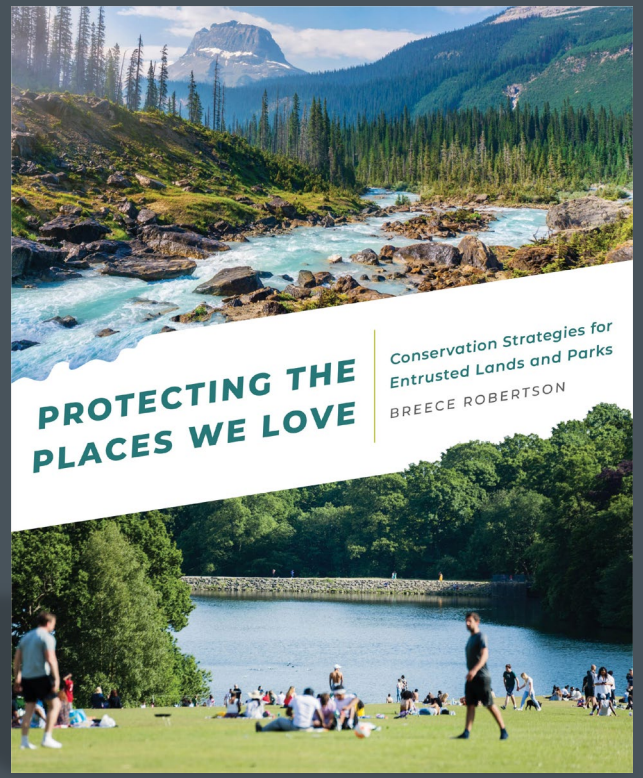
GEOSPATIAL
SOLUTIONS

LINCOLN INSTITUTE
OF LAND POLICY



Available April 27th on
Amazon and Esri Press!

The Need to Address Environmental Security Issues through the Lens of Remote Sensing Capabilities

Odean Serrano, PhD

Founder, Open Source Environmental Security

& Countering Wildlife Trafficking Institute

&

Earth League International, GEOINT Programs

Pathway to Link the Environment Science & Security through Geospatial Analysis

BS Mathematics

MS Environmental Science and Policy

PhD Environmental Science and Policy

Kennedy Space Center &
NASA Headquarters, DC
Presidential Executive Orders
Inter-Agency MOU Development

Intel Analysis Officer
Strategic Planner
International Affairs
New Program Developer
Congress/Human Geography Program

NGA/IC Environmental Geography
Climate Security
Water Security
Food Security
Biodiversity, Ecosystems & Security

First IC Lead for Combating Wildlife Trafficking

Collaboration Across the IC
Multi-Disciplinary, Multi-Stakeholder (Government, Academic, and Industry)
Multi-Scalar (Local, Regional, Global)

Current

CWTI COUNTERING WILDLIFE TRAFFICKING INSTITUTE

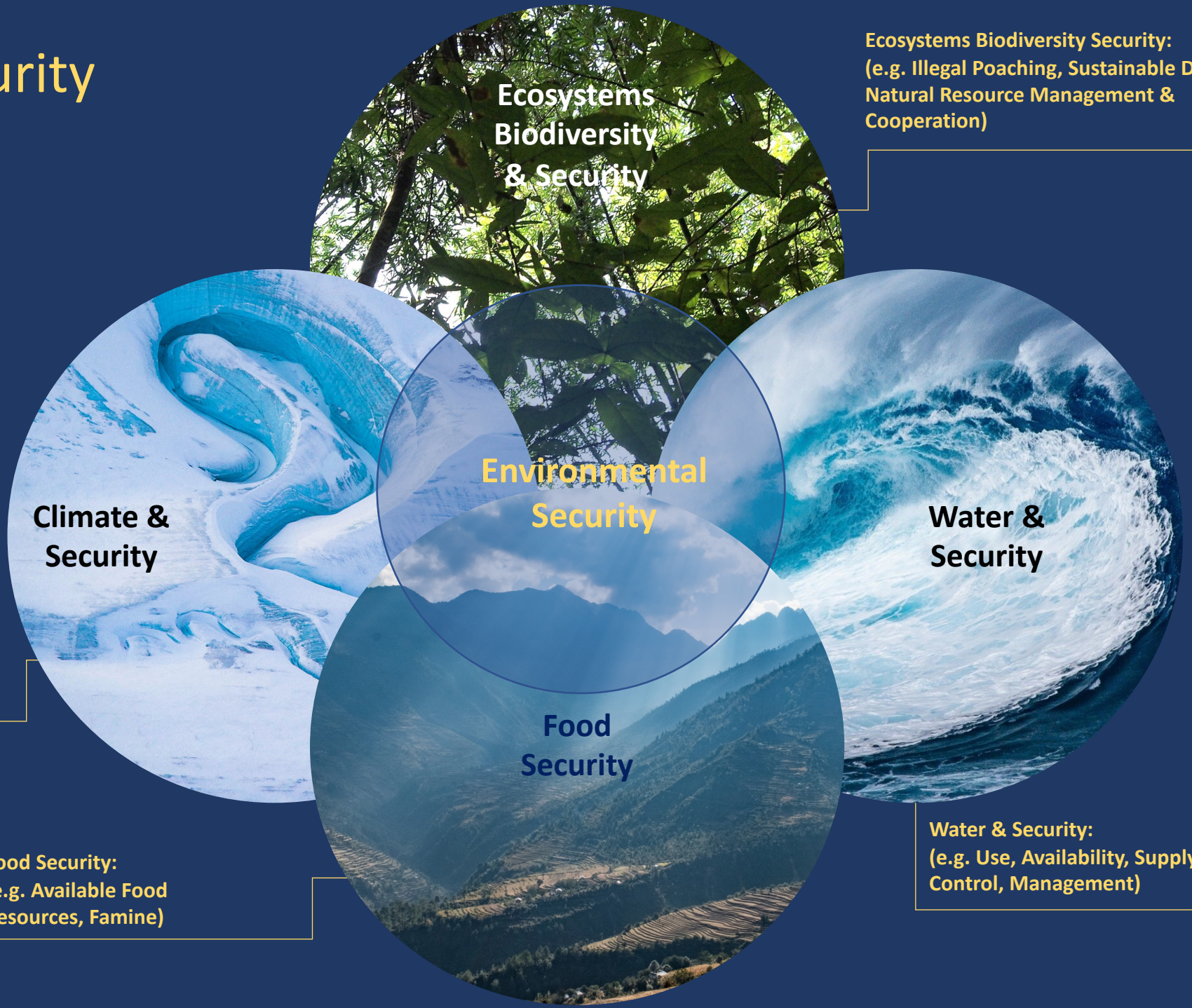
EARTH LEAGUE INTERNATIONAL

GEOSPATIAL INSTITUTE SAINT LOUIS UNIVERSITY

Environmental Security

1) To leverage, coordinate, and share data and analysis in the fields of: Climate, Ecosystems, Food, and Water, with a focus on national security priorities.

1) To facilitate collaboration and understanding among environmental geography stakeholders with respective government agencies, NGO's, and academia.



Ecosystems Biodiversity Security:
(e.g. Illegal Poaching, Sustainable Design, Natural Resource Management & Cooperation)

Climate & Security:
Longer-term weather patterns and climate dynamics
(e.g. Drought, Ice-Melt)

Food Security:
(e.g. Available Food Resources, Famine)

Water & Security:
(e.g. Use, Availability, Supply, Control, Management)

EARTH LEAGUE INTERNATIONAL

www.earthleagueinternational.org

Mission: To fight wildlife and environmental crimes through Intelligence, Investigative and Multi-Int Analytics in support of law enforcement and intelligence agencies.

Team Composition

Former US Government & Officials:
FBI
CIA
NGA/ODNI
Former Police Officers

Expertise

Criminal Analysis * OSINT Analysis
Geospatial Intelligence Analysis
Multi-national Undercover Investigators

Environmental Crimes requires Intelligence to address “Convergence”

To fight global threats on Natural Resources, means to also to understand the nexus other crimes Convergence

* Species Convergence: Multiple Species being trafficked by same networks: Flora/Fauna/Minerals/Timber
* Crime Convergence: Merging of Different types of Crimes: narcotics, human smuggling, money laundering
* Transnational Organized Crime Network Convergence

Presently the fight against Environmental Crime, professional intelligence is almost completely absent. Governments, donors, media and the public are overly focused mostly on Anti-Poaching and Awareness Campaigns. **Intelligence** is at the center of the strategy to combat these issues.

ELI conducts Intelligence Analysis to fill the Environmental Crime Convergence Gaps

Environmental Crime Supply Chain Intelligence Gap:
Species Convergence, Crime Convergence,
Transnational Organized Crime

Anti-Poaching ⟷ Intelligence ⟷ Save Species
Awareness Campaigns

Out Partners to Solve Environmental Crimes and Threat Convergence
IUCN (US Member), IUCN Netherlands Project Partner, International Fora, and Governments

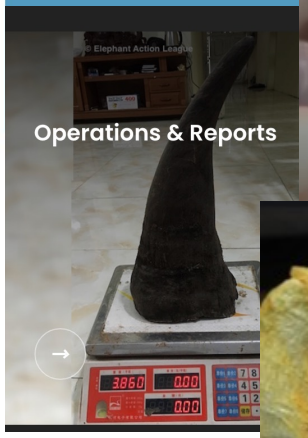
Fighting wildlife trafficking is extremely complex and cannot be overly simplified. Rather it requires multi-disciplinary expertise, key partnerships and sufficiently applied resources.
~ Andrea Crosta

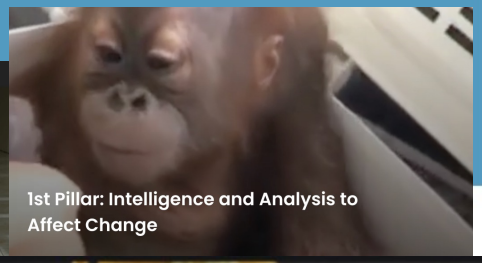
ELI initiates and sustains deliberate partnerships to ensure secure information and analytic sharing with key law enforcement and governmental agencies.

3 PILLAR APPROACH TO FIGHT ENVIRONMENTAL CRIME AND CORRUPTION

I. INTELLIGENCE & ANALYSIS

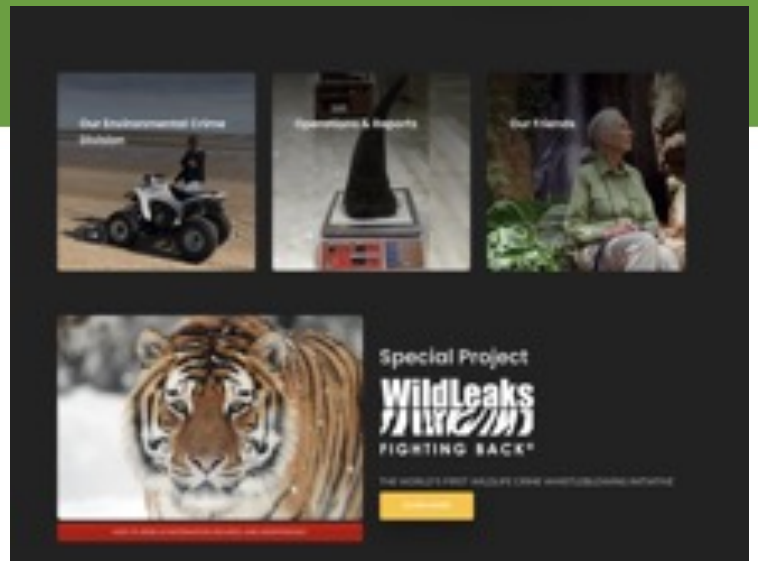
Intelligence-gathering, undercover operations, and analysis





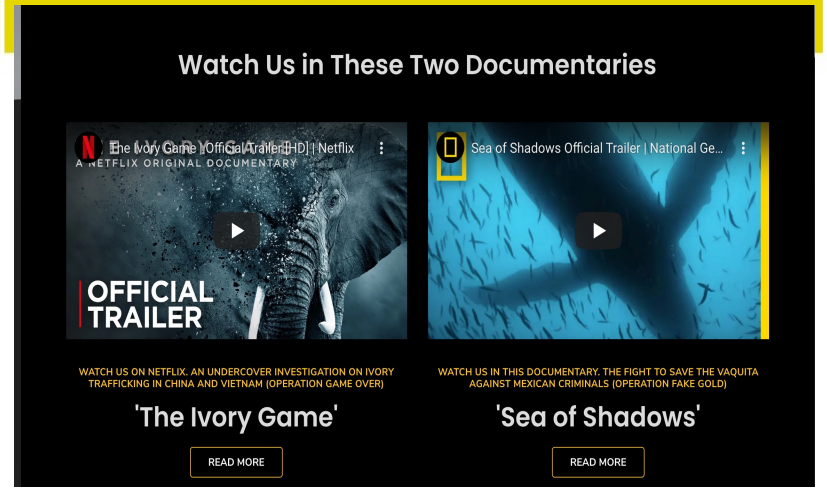
II. WHISTLEBLOWING & THE WILDLEAKS PROJECT

WildLeaks, the world's first whistleblower initiative dedicated to environmental crime



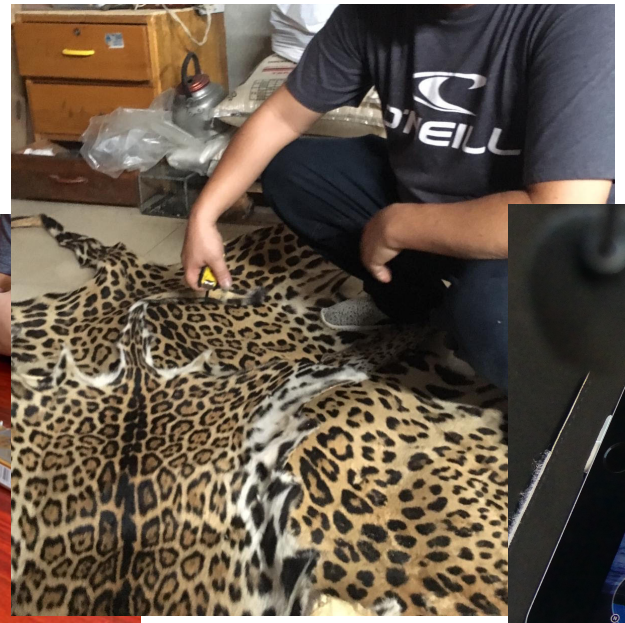
III. MEDIA & PUBLIC OUTREACH

Public reports, documentaries, TV series, podcasts & graphic novels focused on raising awareness of the impact of environmental crime on the environment and on the people



Pillar I: Intelligence Gathering, Investigations and Analysis

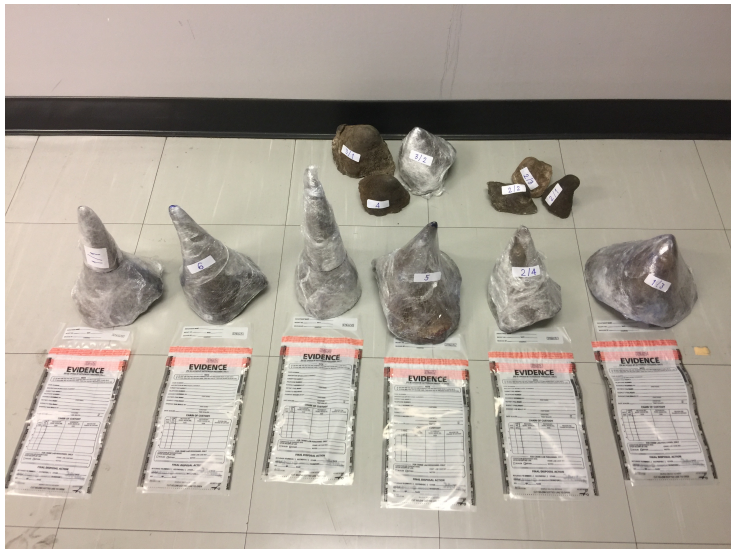
ELI's core of our work centers around intelligence-gathering, undercover operations though evidence-based approach: acquisition of videos, audio, documents.

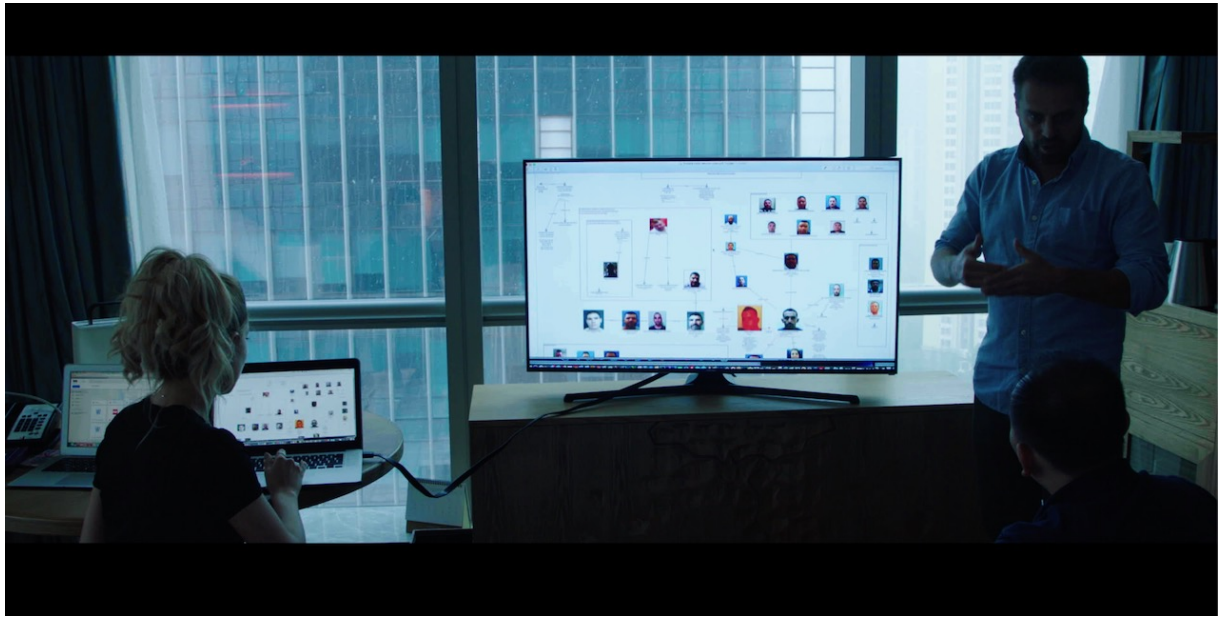


Pillar I: Intelligence Gathering, Investigations and Analysis

Following the intelligence gathering and undercover operations, ELI's analysis targets environmental criminals, traffickers and transnational criminal networks involved in environmental crime, **all with the aim of supporting the work of trusted law enforcement and key government agencies.**

It is ELI's principle that professionally run intelligence activities are currently the most important and cost-effective tools for fighting environmental crime.



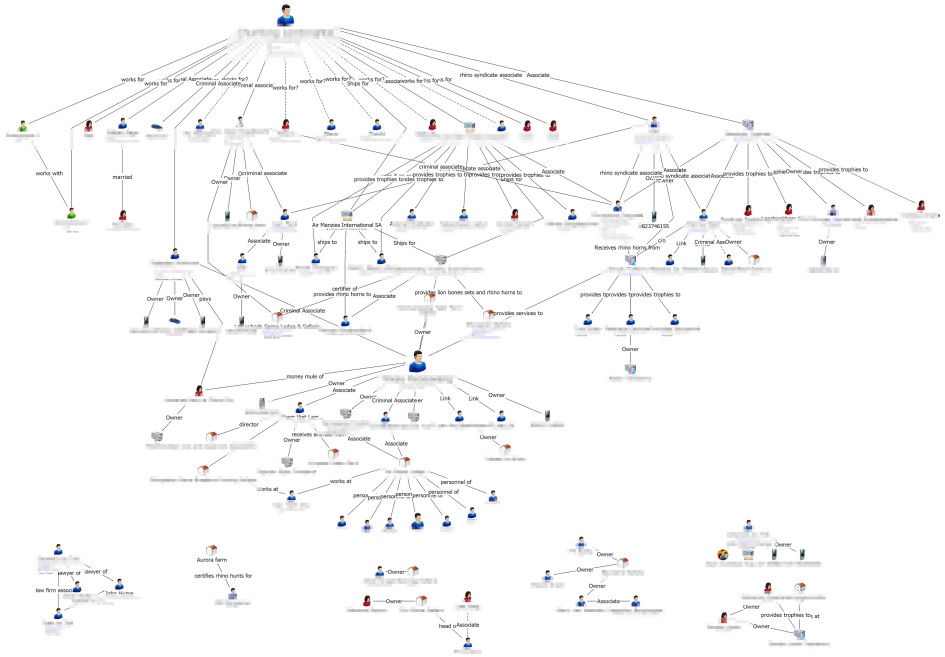


Linking ELI Field Ops with Criminal Network Analytics using ESRI Geospatial Environment

ELI uses ESRI's Tools Suite to integrate field collections within a geospatial environment

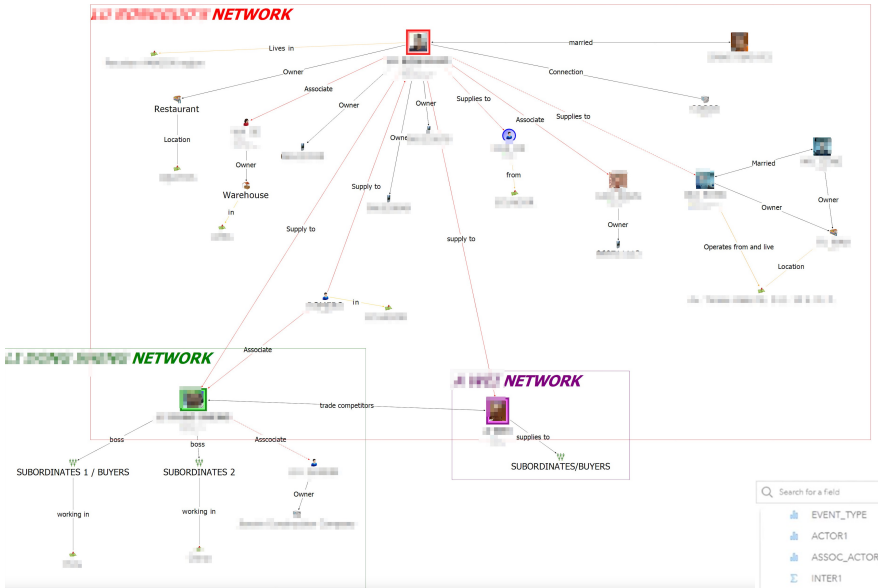
© Esri

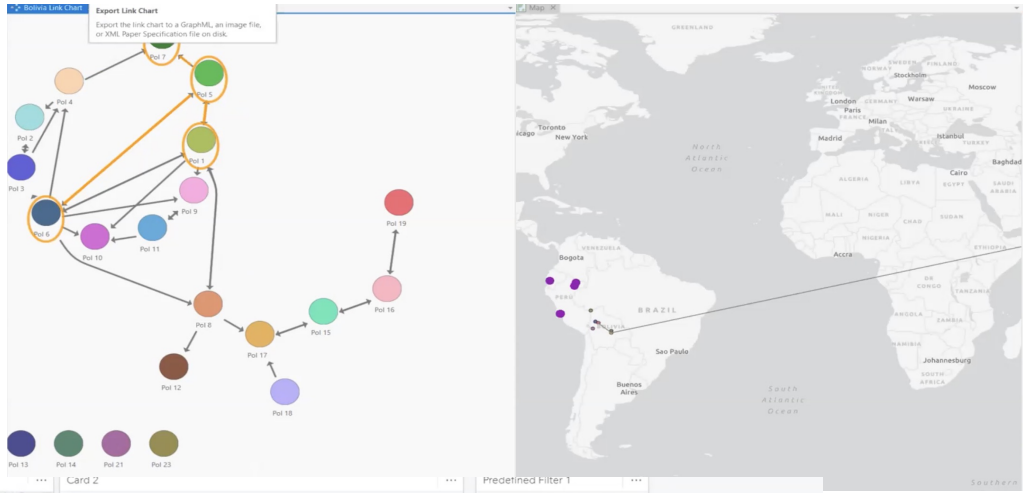
Criminal Analysis

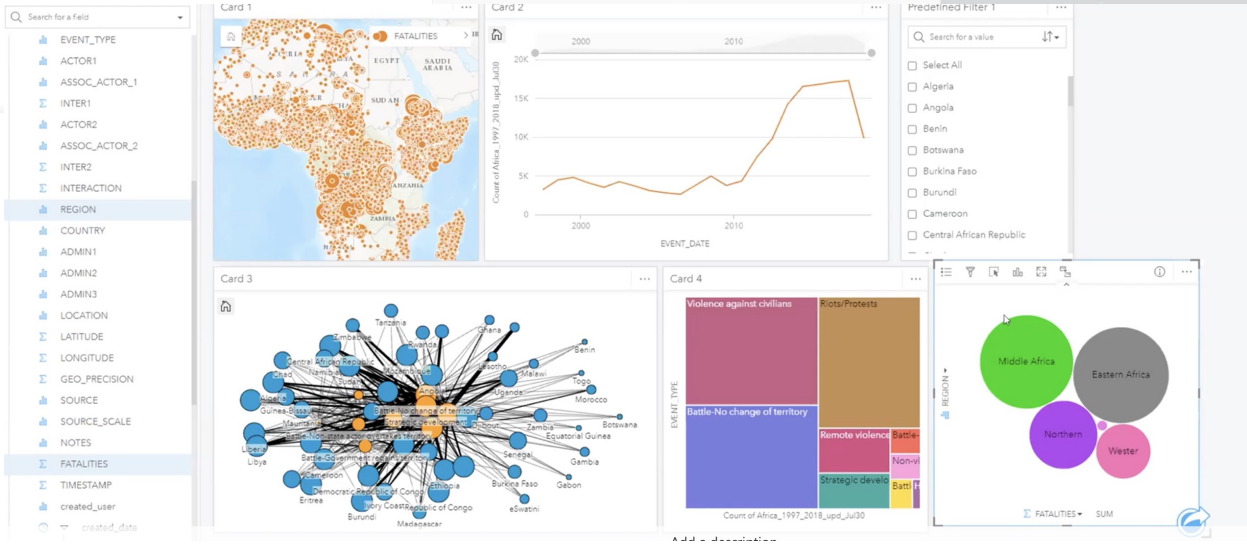


© Earth League International

Linking ELI Criminal Analytics within the ELI Geospatial Environment







The combination of criminal networks, Open Source Intelligence and geospatial analysis to yield associated measures of hotspots trends, risks and priorities.

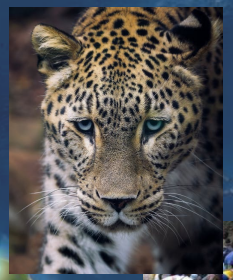
Our Reach: Earth League International: Intelligence Agency for Earth
Utilizes GIS to analyze and synthesize the convergence of Wildlife Trafficking and International Crime

ELI works with IUCN (US) and Governments

17 Countries, 27 Criminal Networks, over 250 Persons of Interest

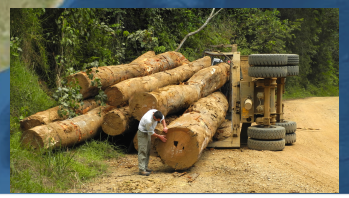
Multiple Species being Trafficked Converging with Multiple Crimes









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Earthstar Geographics

POWERED BY esri

ELI MULTI-INT Geospatial Analytic Collaborative Environment

EARTH LEAGUE INTERNATIONAL **Command & Control Center**

Powered by esri THE SCIENCE OF WHERE

ELI TEAM LIVE MESSAGING SESSION
- ❑ ALERTS
- ❑ TEAM COMS LINK
- ❑ VIDEO CONFERENCE LINK

Inputs:
Ground Collections:
Human Reporting
Handheld Reporting

Sensor Collections:
Signals
GPS Tracking
Overhead
Satellite Feeds

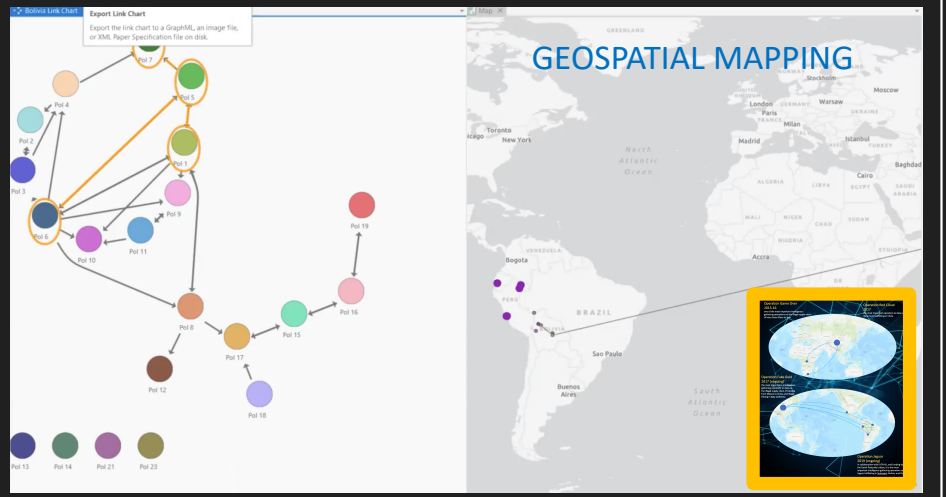
HUMAN INTELLIGENCE ANALYTICS

CRIMAL MAPPING

OUTGOING
- ❑ INVESTIGATIONS REPORTING ON DEMAND
- ❑ CIB
- ❑ LAW ENFORCEMENT ALERTS

INTEGRATED ANALYTICS CENTER

HUMAN, CYBER & GEOSPATIAL INTELLIGENCE ANALYTICS



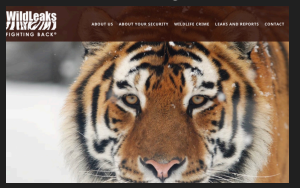
SPECIES TRAFFICKING NETWORKS | HUMAN NETWORKS | FINANCIAL NETWORKS | TRANSPORTATION NETWORKS | HOTSPOTS TRENDS

LIVE INKS TO SECURITY ISSUES

CYBER INTELLIGENCE ANALYTICS

INVESTIGATIONS AUDIO/VIDEO FEEDS

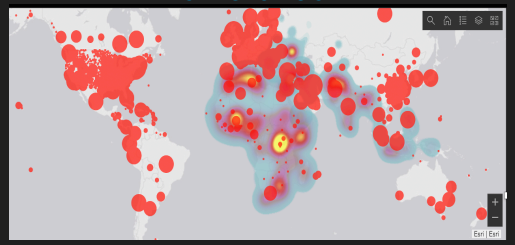
WILDLEAKS FEED



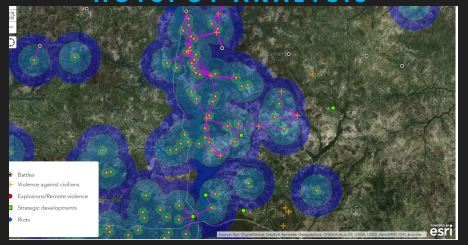
INCOMING
- ❑ Daily Agent Location
- ❑ Live Data Feeds / Observations

Outputs:
Tip and Cue Alerts
Reports
Enhanced Data
Analytic Products
Metrics

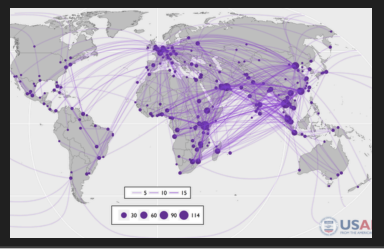
LINKS TO SECURITY



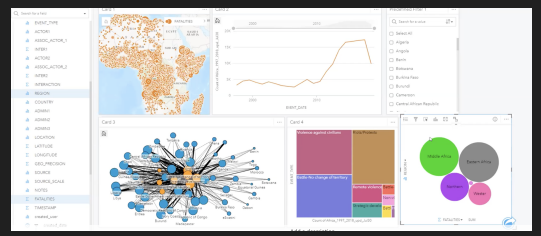
HOTSPOT ANALYSIS



ROUTE ANALYSIS



METRICS DASHBOARD



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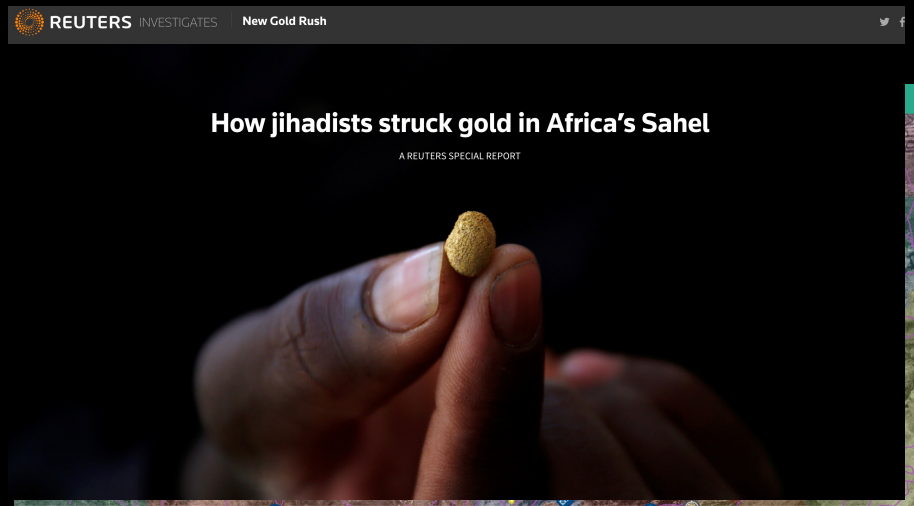
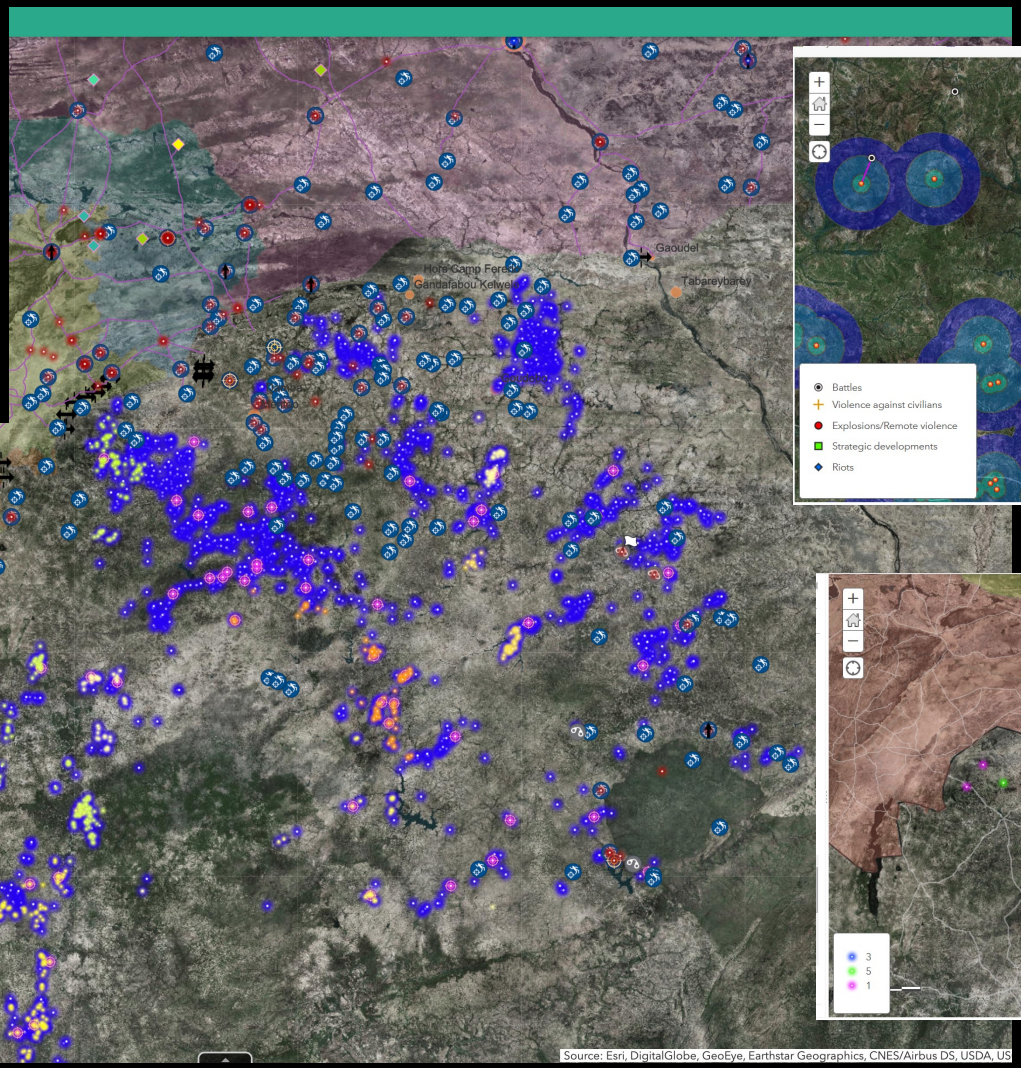
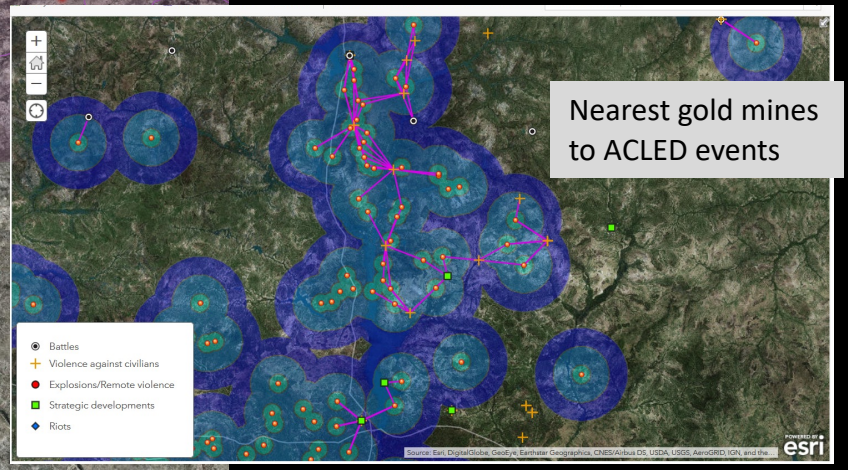
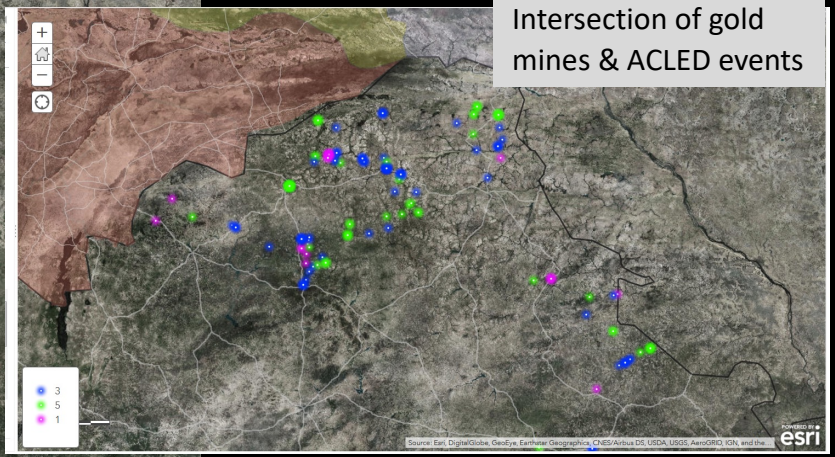
EO / Geospatial Analysis: Gold Mining & Conflict







Nearest gold mines to ACLED events



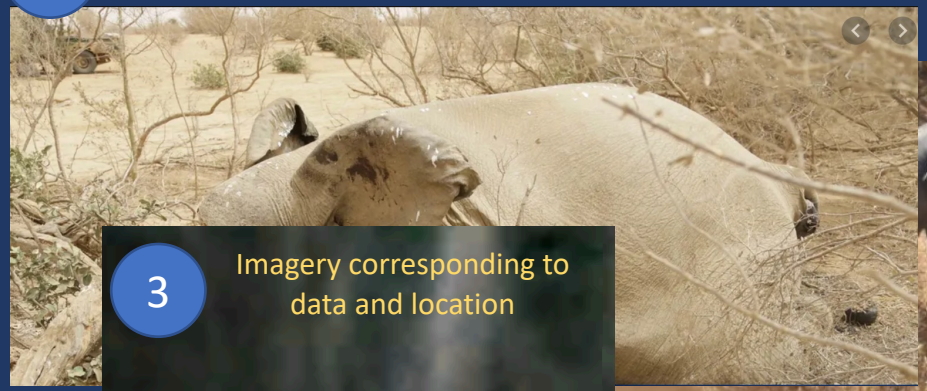
Intersection of gold mines & ACLED events

Geospatial Analysis By, CWTI, Dr. Odean Serrano, Laura Roy, & Kevin Wells

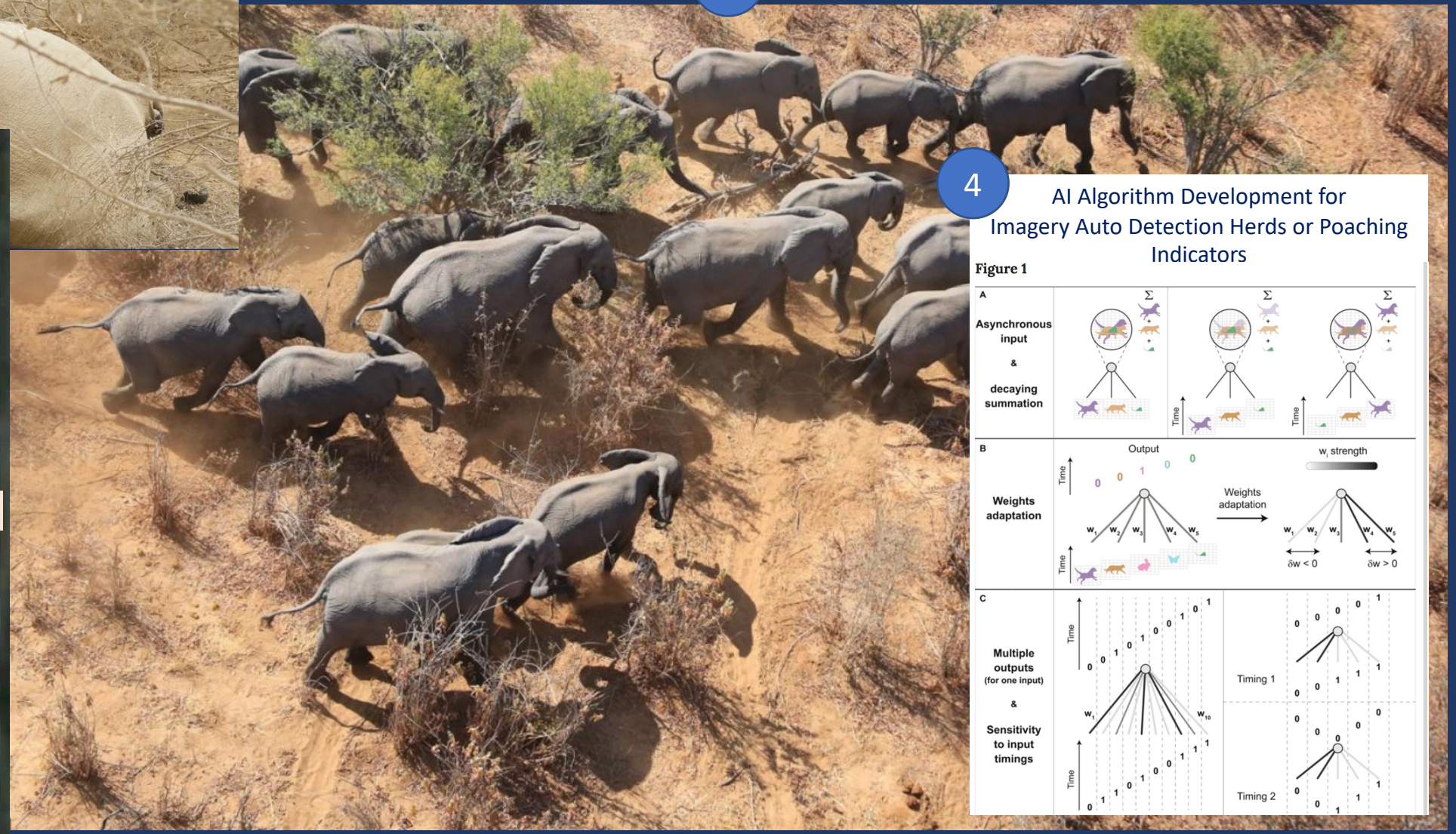
The Need for EO to address Environmental Security: Wildlife Trafficking Exemplar

CWTI
COUNTERING WILDLIFE TRAFFICKING INSTITUTE

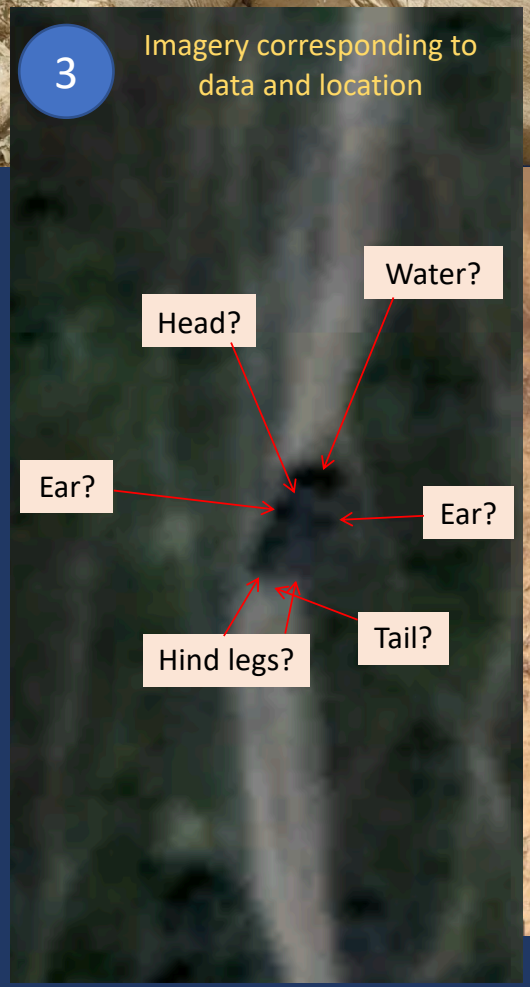
1 Poached Elephant (Ground Photo)



2 Herd Data (Arial)



3 Imagery corresponding to data and location



4 AI Algorithm Development for Imagery Auto Detection Herds or Poaching Indicators

1) The Guardian 2016, 2) National Geographic; 3) Google Earth Image/CWTI Analysis, 2018; 4) Nature.com, August,2019

Research Proposal: Species to Sats

Sensor Aggregate ML/AI Analysis
In support of: NASA/Nature/NatGeo

Research Proposal Concept Design By,
Odean Serrano, PhD, CWTI/ELI Geospatial Programs
& Jeff Allenby, Center for Geospatial Solutions

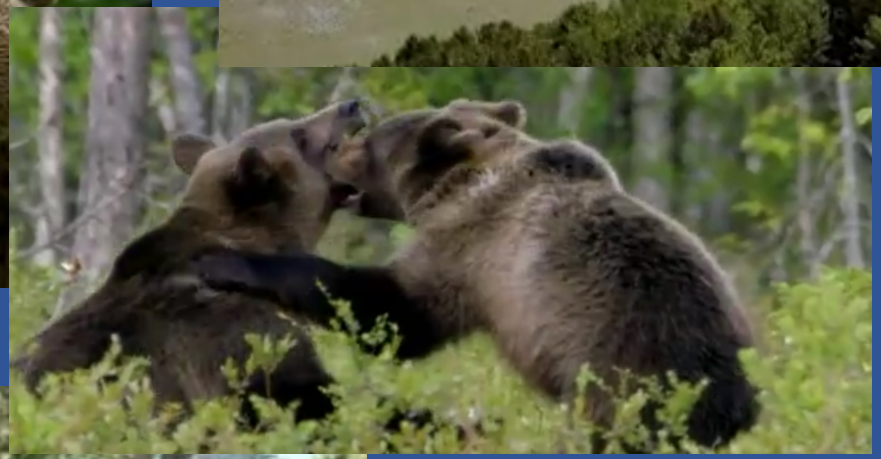
CWTI
COUNTERING WILDLIFE TRAFFICKING INSTITUTE

CENTER FOR GEOSPATIAL SOLUTIONS

Small Sat Sensors

Drone/UAV/
Plane Sensors

Static Camera Traps



Species Collars
Eurasian Brown Bear
Turkey

Nature.Com: Animals with Cameras

https://www.pbs.org/wnet/nature/animals-cameras-episode-3/15978/?button=fullepisode

Data, Analysis and Modeling Compositions for 30-30-30 Implementation

Schema By Dr. Odean Serrano

Geospatial Analysis Powered by ESRI

30-30-30 POLICYIMPLEMENTATION

AUTOMATION

- Artificial Intelligence
- Machine Learning Modeling

GEOSPATIAL ANALYSIS

LEVERAGING ENVIROLENS

- Remote Sensing
- Geospatial Mapping
- Sensor Tracking
- Link Analysis

GEOINT With/For Intelligence Agency Partners

OSINT/HUMAN ANALYSIS

- Criminal Analysis
- Search | Discover

GROUND COLLECTIONS GROUND- TRUTHING

FRONT LINE | FIELD OPERATIONS

Information/Knowledge Collection
*Raw Form, Handheld Apps

Briefing/Report For Law Enforcement Partners

CWTI COUNTERING WILDLIFE TRAFFICKING INSTITUTE

esri THE SCIENCE OF WHERE

Geospatial Analysis & Applied Remote Sensing
Data-Driven Modeling, Decision-making, and Policy Implementation for the Environment

Schema By: Dr. Odean Serrano, CWTI, Earth League International | Jeff Allenby, Center For Geospatial Solutions | Stephen Leard, SLU

CENTER FOR GEOSPATIAL SOLUTIONS

Overview + Motivation

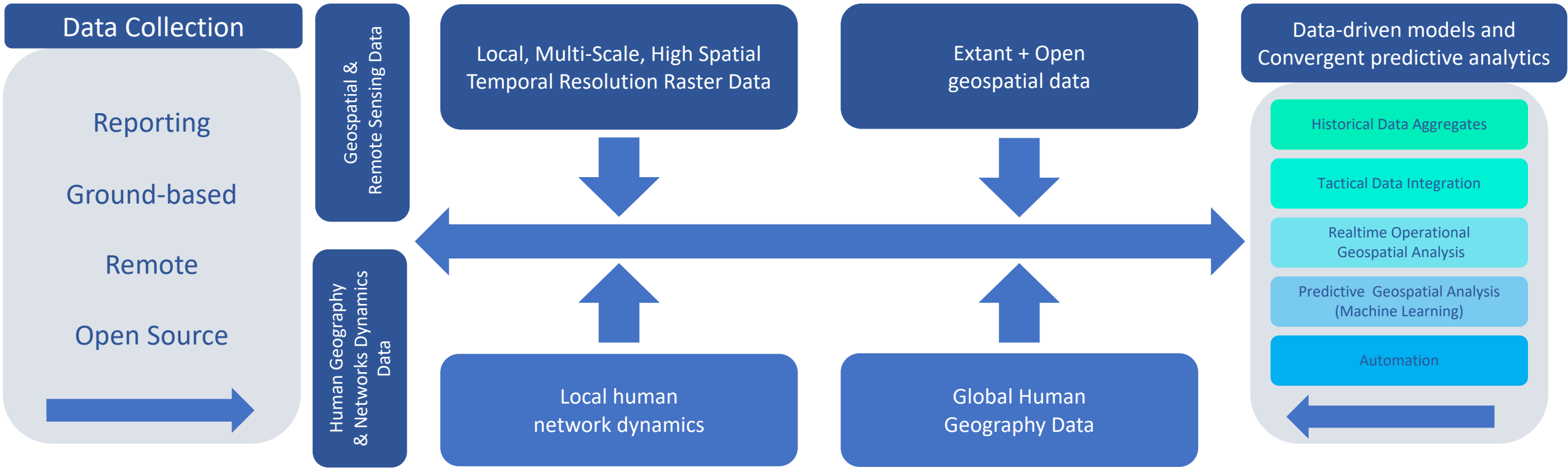
Integrate remotely sensed, biodiversity, and conservation data to inform and assist a variety of stakeholders seeking solutions to end the global wildlife poaching epidemic.

Research Questions

What predictive factors significantly correlate to environmental crime events?
How can models integrate with geopolitical network and global human geography data?

Methods + Models

- Predictive models for operations & actionable intelligence
- Hotspots, trends, networks dynamics, & crime convergence
- Influence policy implementation & resource allocations



Implementing 30-30-30

Protecting 30 percent of U.S. land, 30 percent of U.S. Oceans by 2030

Define and Harmonize	Define and Harmonize stakeholder analytic priorities
Share Data & Expertise	Share Data and Expertise: Develop, promote and maintain current data repository and roster of analytics expertise
Foster Collaboration	Foster Collaboration: Promote data and analytic method sharing among subject matter experts
Deepen Understanding	Deepen Understanding: Co-Produce contextual analysis and publications
Resulting in Actionable Solutions	Resulting in Actionable Solutions: Host community wide in-depth sessions to continually enhanced action

Happy Earth Day!

EARTH OBSERVATION for CONSERVATION POLICY & PRACTICE

Transatlantic Perspectives – WEBINAR – 20 APRIL 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 821918

Raise Awareness for changes in climate + nature

Better Insights

TRANSFORMATION in Conservation Community & Society

TECHNOLOGY to make our work more IMPACTFUL

DATA → Help decision-making → near real-time

enviroLENS

Modular system Design → adapt fast + easy in future

- Lack of Resources
- Timelines
- Remote access

PORTAL

Monitoring + Alerts · Exploration · Legislation Discovery

Easy!

Compare Images

Give non-EO Experts access

EO-based evidence for environmental violations → Nature Conservation

EUROSITE

Diverse stakeholders … Facilitate working groups

"Respect local, traditional knowledge"

We need … · Evidence-based · Respectful · Adaptable · COMMUNICATIVE … Research

Remote Sensing SUPPORT GROUP

"New Technologies" Workshop

Regional Exchange Hubs

Land managers ↔ Facilitate 2 WAY info exchange ↔ Experts

EU GRASSLAND WATCH

Public Website

- Landcover-change
- Take data and bring to everybody

Open the data to the PUBLIC

"It's not about tech, but Environmental Expertise!"

Where are the HOTSPOTS of change?

Time dimension is interesting → t

Indicators exist! → Needs monitoring

Copernicus satellite & Services – Land Monitoring

Monitoring Surface Water

EU Nature LEGISLATION

§ Nature directives → Birds ('79) · Habitats ('92)

§ Biodiversity Strategy 2030 → 30% → 18% protected land + water

Q&A

Solutions?

- Maps + Templates to address Environmental Racism
- Provide Solutions that incorporate how people/orgs work …

Fine Resolution Imagery

- more data → more processing power
- What does the USER really need?
- Small scale ↔ Global
- ASRI Platform as Glue
- Exchange: Technicians ↔ Ground staff

"You can not do analysis w/out Ground truth data"

Field Surveys vs Remote Sensing

Combine ground data + remote data → Better Quality

Google earth is far more detailed

Privacy issues?

What DATA is most needed?

→ It depends on what you want to monitor.

CLOSING

People expect …

- Transparency
- Accountability

SHARE data + solutions

EO data is ACCESSIBLE ++ to everyone → scale land protection

Remote sensing

Ground truthing … tightly coupled.

Identify BIGGEST IMPACT

IMAGINE 2030

- species saved from extinction
- people live Sustainably
- stable temperature
- equity is the NORM…

Reach out & Collaborate

HALF EARTH Project

Species as critical nodes

Project tracks conservation progress

E.O. Wilsons Map

Score Card 2.07 30 National

+ inspired!

"30x30" Protect 30% of land + water by 2030

globally emerging Momentum

Biden-Harris Administrative Order Jan. 2021

→ Commitment → Measurement → Accountability

California: Creating a process & open Platform

Barriers for environmental organisations

- No access to the right info
- Where to focus?
- No experts on staff
- How to incorporate "new" w/ "old"?

center for GEOSPATIAL SOLUTIONS

"We meet them where they are!"

Databases not Documents inaccessible

Global Models that are actionable on local level

Help …

Prioritize where to focus your time → Secure Baseline + Management Plan → Monitor Ensure Outcomes

Environmental SECURITY

Ecosystems Biodiversity · Climate · Water · Food

Policy Implementation · Algorithms / Models

Leveraging EnviroLENS · Geospatial Analysis

prioritize

Ground Truthing

Symbiotic Relationship

Environmental CRIMES need Intelligence to address "Convergence" of crimes

People on the ground

- Intelligence Gathering → unstructured data
- Criminal Analytics

– Notes by VISUALSENSEMAKING.eu –