Discover, Share, Decide, Act:

Geographic Information Aids Installation-Community Partnerships

2023

ADC Installation Innovation Forum

Why Esri ?

Helping to Tackle Climate Change, Sustainability and Conservation are at the Core of Esri's Culture

Over 10 Million Users

- **33,000** Businesses
- **12,000** Colleges & Universities
- **8,600** Utilities
- **12,600** NGOs
- **1,200** National Government Agencies
- **12,000** States & Regional Agencies
- **30,800** Cities & Local Governments

- 50+ years of experience in GIS and modeling
- Trusted partner & advisor
- Building blocks for producing authoritative content
- Open and standards compliant
- Established SI & Professional Services network
- Constantly innovating & evolving

...for individuals, corporations, communities and nations.

Agenda

- Panelist Introductions
- Moderator: Geographic Information and the Geographic Approach
- Panelists: Real world examples
  - Identifying and sharing relevant data
  - Innovative and compelling approaches
  - Insights, outcomes and lessons learned
- Q&A

Jack Haefner:
Defense Team Lead,
Esri

Catherine Foley:
Energy and Climate
Resilience Manager,
Deloitte

Chris Martin:
Director of GIS Services,
Matrix Design Group

Information-Driven Decision Making

Information is advantageous to partnership Win-Win outcomes

What's Relevant?

What is the Current State?

Creative Approaches?

What Are Our Options?

What is Important?

Learning from Each Another

Understanding Broad Interests…

Encourages Rational Judgement

Win-Win Outcomes

Must Have: Shared and Discoverable Information

Information availability improves installation / community collaboration

Accessible

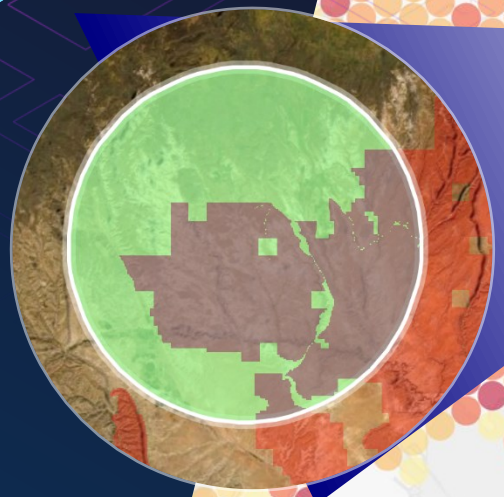
Understandable

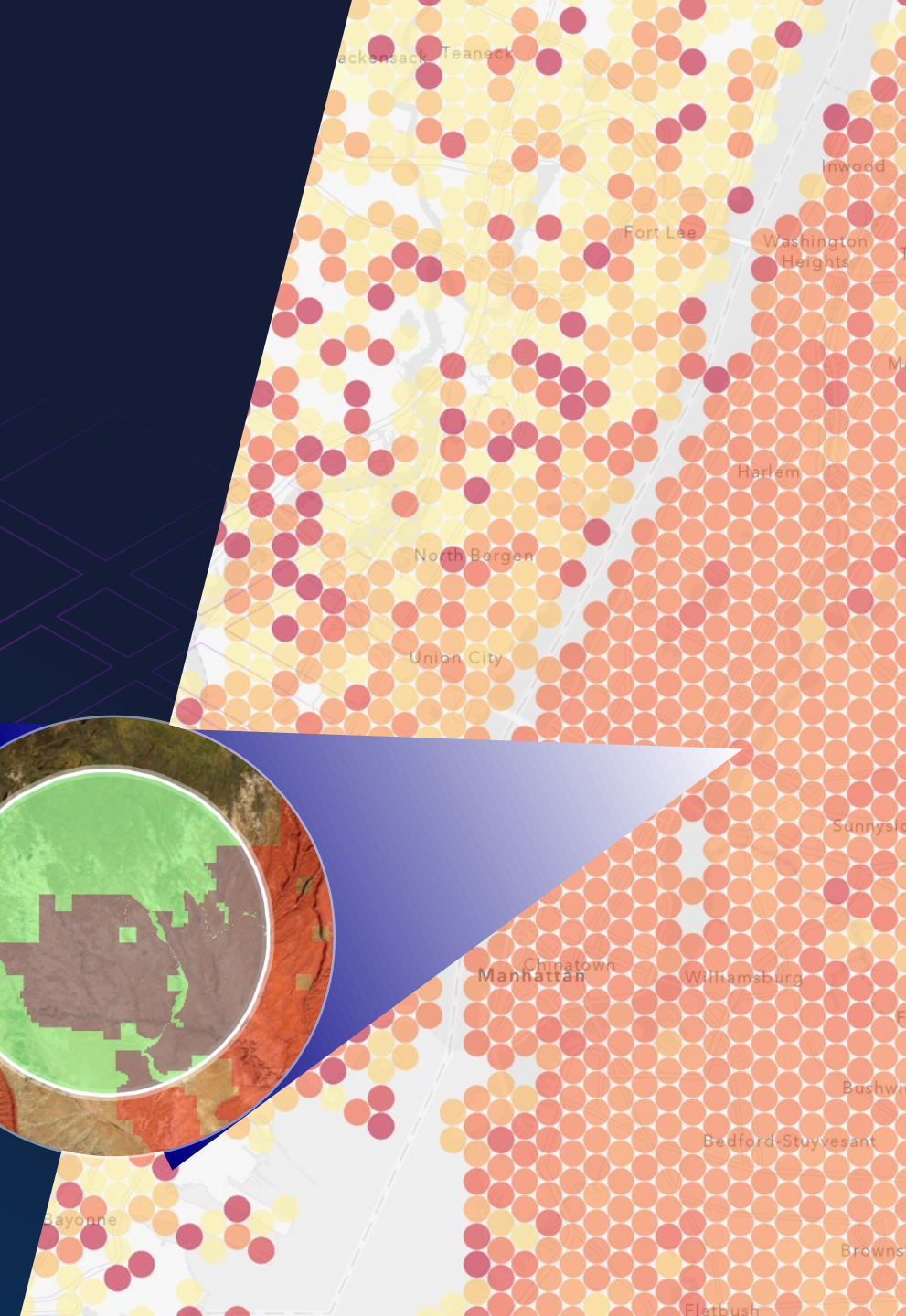
Timely

Power of Location

Geographic Information Enables New Insights

- Shared Places
- People
- Resource Competition
- Infrastructure and Mission
- Processes





Geographic Approach

A Way of Thinking and Problem Solving
That Integrates Geographic Information & Science
Into How We Understand and Manage Our Environs

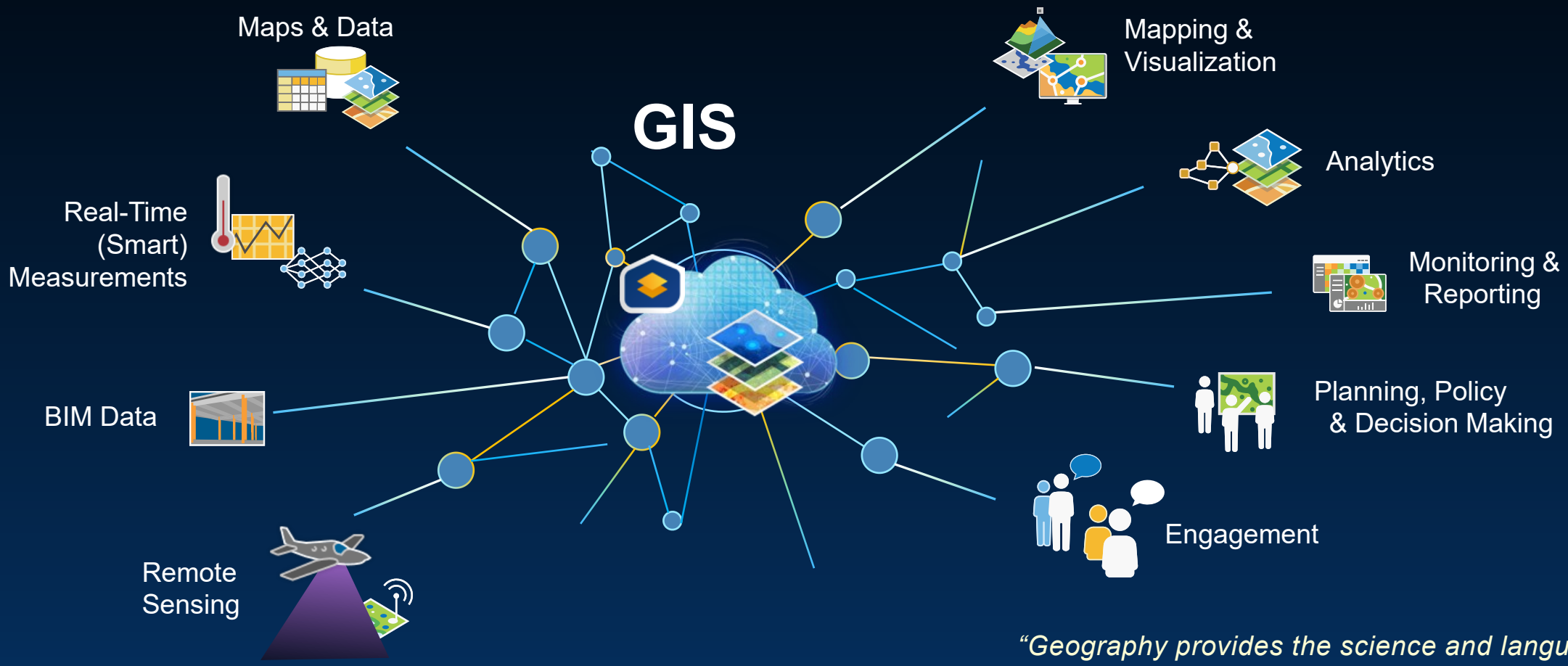
GeoScience
and Understanding

Supporting
Multi-Objective
Solutions

. . . An Inclusive and Multidisciplinary Process
Applicable to Every Sector of Society

Geographic Approach is Empowered by GIS

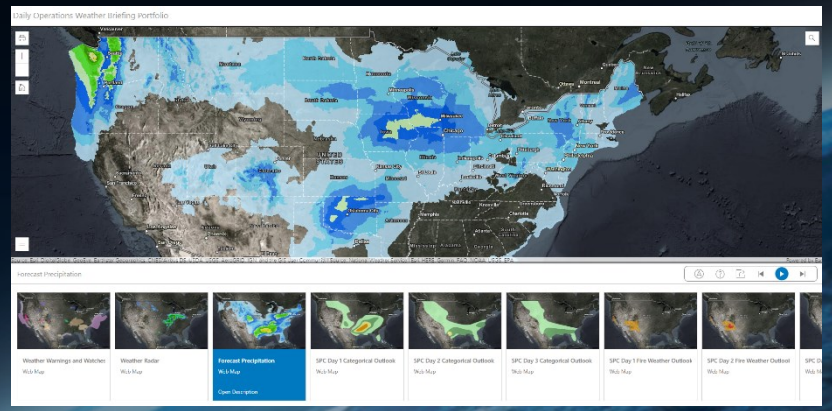
A system for managing and applying Geographic Information



"Geography provides the science and language.
GIS provides the technological tools."

ArcGIS Enables Sharing & Discovery, Supports Understanding

Amplifying the value of information



Live Feeds of Weather Data

Demographics

Land Cover Habitats Biodiversity

Basemaps Transportation Landscape

Environment Movement Infrastructure

Hydro Traffic Weather

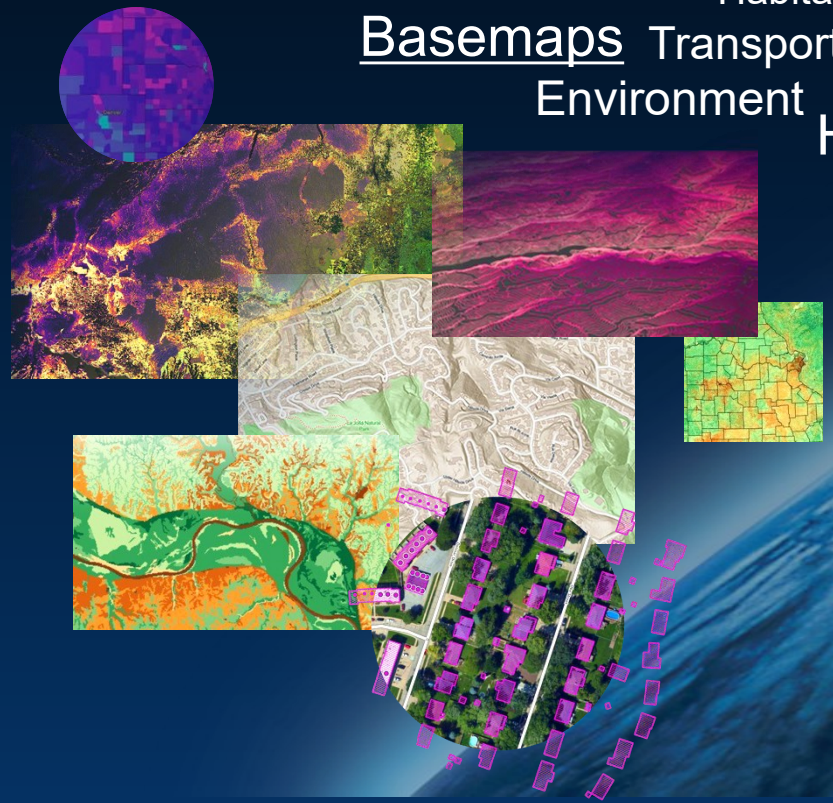
Elevation Boundaries

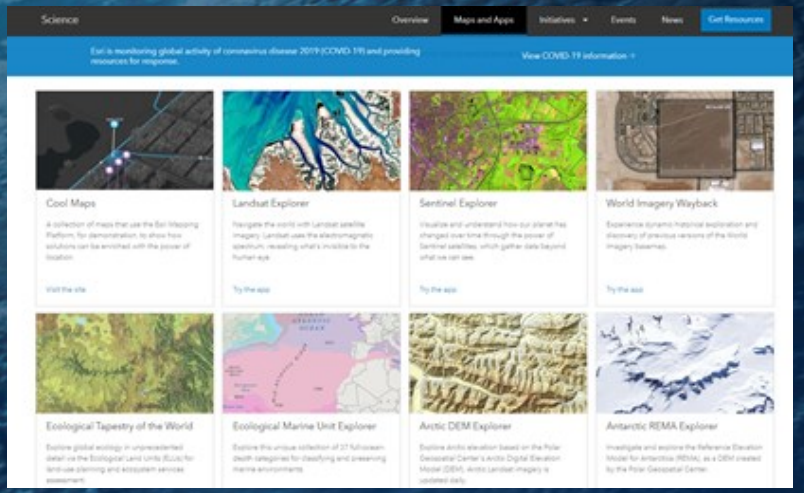
Business Imagery

Processes Oceans Hazards

Authoritative Community Content

Weather Soils

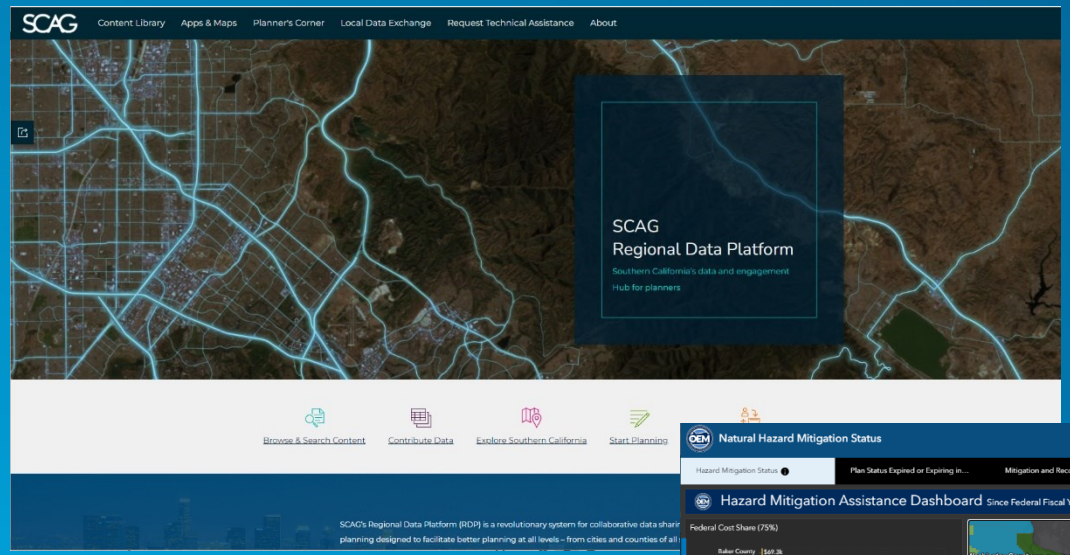




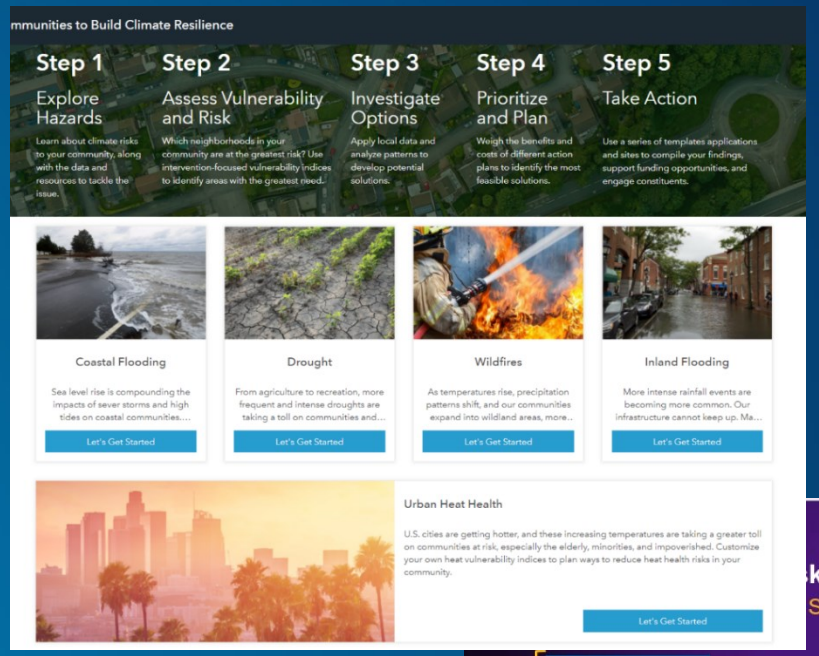
Living Atlas of the World

Proven Approach for Collaboration

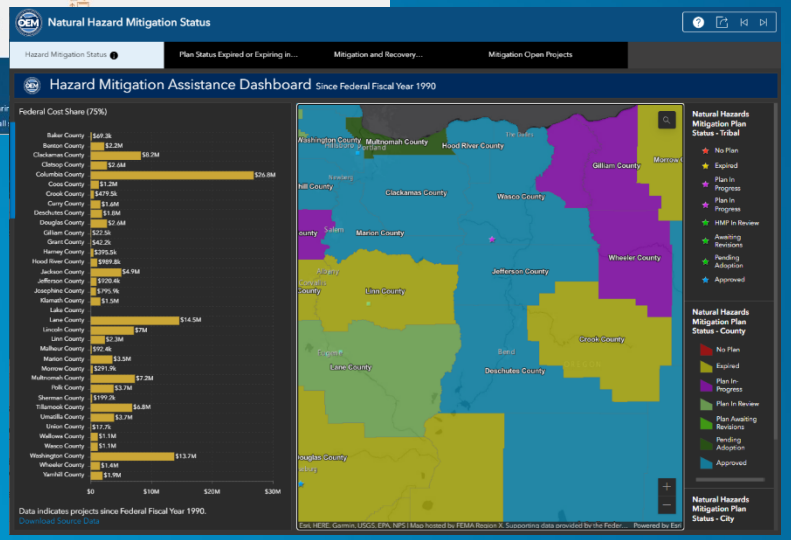
Improving access and increasing collaboration



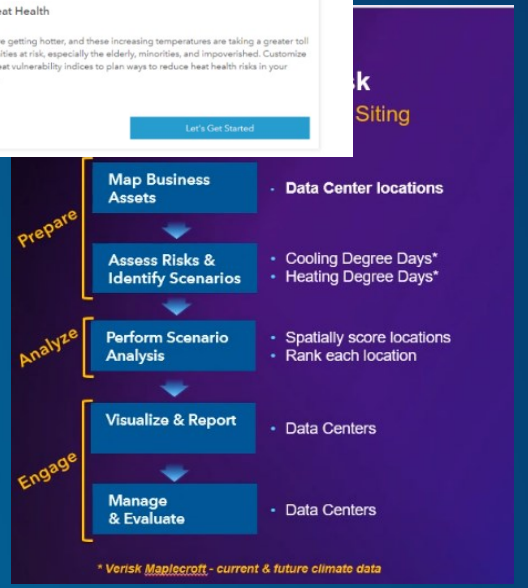
Facilitate Sharing



Guide Processes



Invest Transparently



Calculate Risk

Catherine Foley:
Energy and Climate Resilience Manager, Deloitte

Deloitte-University of Colorado, Boulder Climate Innovation Collaboratory

Pairing innovative data science and research with leading market insights and services to accelerate climate adaptation and mitigation efforts.

ArcGIS

Data Analysis

CHALLENGE and GOAL

In 2022, Deloitte recognized the opportunity to join forces with University of Colorado Boulder (CU Boulder) to combine the best of academia and business and building valuable solutions for our public and private sector clients.

Deloitte and CU-Boulder launched an alliance to expand access to critical climate data science, applied research, groundbreaking solutions, and cross-sector information to bring bold and innovative solutions infused with leading market practices. The core tenets of the alliance include a focus on innovations that support government ability to address climate change and create innovative, and scalable climate solutions.

SOLUTION

We recognize the importance of data for facility and community planning and are leveraging our deep domain knowledge in water and carbon management, wildfire prediction and response, and infrastructure risk mitigation to develop innovating approaches to help federal, state and local government agencies and communities address their most critical challenges.

Currently working on two pilots to drive forward innovation on wildfire management and nature-based solutions.

IMPACT

- Both pilots will provide data and analytics to support data-informed decision making for state, local, federal and community partners.
- Wildfire pilot will bring the following solutions that could benefit existing data and bolster communications and partnerships with local communities:
  - ***Predicting Wildfire Risk:*** *Earth Lab's Risk Futures data combines wildfire prediction modeling with risk assessment to help leaders identify their most at-risk assets and infrastructure.*
  - **Modeling Evacuations:** *A combination of transportation infrastructure data, hazard projections, and building exposure models will enable communities to plan for wildfire events.*

Deloitte-University of Colorado, Boulder Climate Innovation Collaboratory

Pairing innovative data science and research with leading market insights and services to accelerate climate adaptation and mitigation efforts.

ArcGIS Data Analysis

Pilot: Driving Critical Wildfire Solutions

Deloitte and the University of Colorado Boulder (CU Boulder)'s new **Climate Innovation Collaboratory** is translating **cutting-edge wildfire research** and **data** into **innovative** solutions to address the most critical challenges for federal, state and local government agencies and communities. Together, the joint team **will expand government access to critical wildfire data and science** through **innovative approaches.**

- **PRE-FIRE** Resilience Planning and Mitigation
- **ACTIVE FIRE** Response and Public Engagement
- **POST-FIRE** Recovery

WHAT WE ARE WORKING ON

We have conducted **30+ interviews** with subject matter specialists across the wildfire lifecycle to ascertain some of the biggest challenges our clients are facing. Utilizing CU-Boulder's leading wildfire research and analytics tools, we have begun to develop innovative solutions to accelerate mitigation and adaptation efforts.

Near Real-Time National Incident Command Reporting Data for Critical Fire Monitoring

High Resolution Fire Evacuation and Building Risk Mapper

Fire Hazard x Exposure x Vulnerability = Risk for Resilience (FHERVR)

Deloitte-University of Colorado, Boulder Climate Innovation Collaboratory

ArcGIS Data Analysis

Pairing innovative data science and research with leading market insights and services to accelerate climate adaptation and mitigation efforts.

Pilot: Managing Environmental Commodities

The **Climate Innovation Collaboratory** is leveraging innovative IoT technology for ground water and soil carbon monitoring to build **transformative monitoring solutions**, improved methodologies for calculations, and cross-sector **collaborative** platforms to address the most critical challenges for environmental commodities.

NEAR REAL TIME Data Collection

INNOVATIVE Resource Measurement

DIGITALLY ENABLED Resource Management & Collaboration

WHAT WE ARE BUILDING

In collaboration with market stakeholders, government agencies, and private sector actors we are working across the water and carbon resource markets to develop leading technologies, calculation methodologies, and management platforms to improve environmental commodity management.

Market Leading IoT Sensors for Groundwater and Soil Carbon Monitoring

Advanced Carbon Calculation Methodologies

Environmental Commodities Management

NOAA | 2030 Southwest Regional Footprint Study

This project is a reassessment of NOAA's footprint considering mission needs, location, mobility, resiliency, continuity of operations, and workplace

ArcGIS Excel Data Analysis Python

CHALLENGE and GOAL

The NOAA 2030 Regional Footprint Study supports the agency in its evolution toward a correctly sized footprint that provides the appropriate locations and facilities for NOAA's mission. This support includes exploring opportunities to strengthen facility alignment with the mission while also considering mission needs, location, mobility, resiliency, continuity of operations, and workplace.

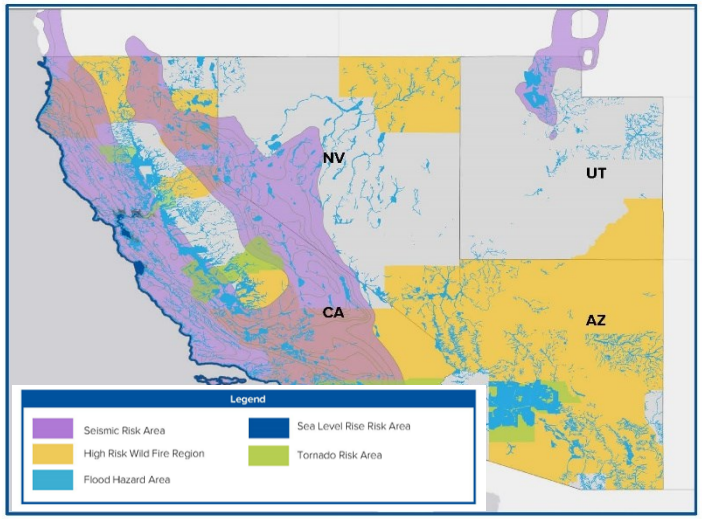
As part of this effort, Deloitte developed geospatial analysis to provide a full understanding of the existing facility footprint. These geospatial analytics include resiliency impacts, community engagement and partnerships, and Diversity, Equity, and Inclusion considerations.

SOLUTION

The Southwest Regional Footprint Study provided an improved understanding of opportunities and pressures related to NOAA's talent and mission that are critical to footprint planning decisions.

Deloitte provided geospatial intelligence support that included full consideration of resiliency issues currently impacting the Southwest Footprint and potential future resiliency risks to existing and proposed sites. Geospatial analysis included the identification of existing industry, government, and academic partnerships and potential future partnerships with consideration to mission alignment and Diversity, Equity, and Inclusion priorities.

Resiliency Risks



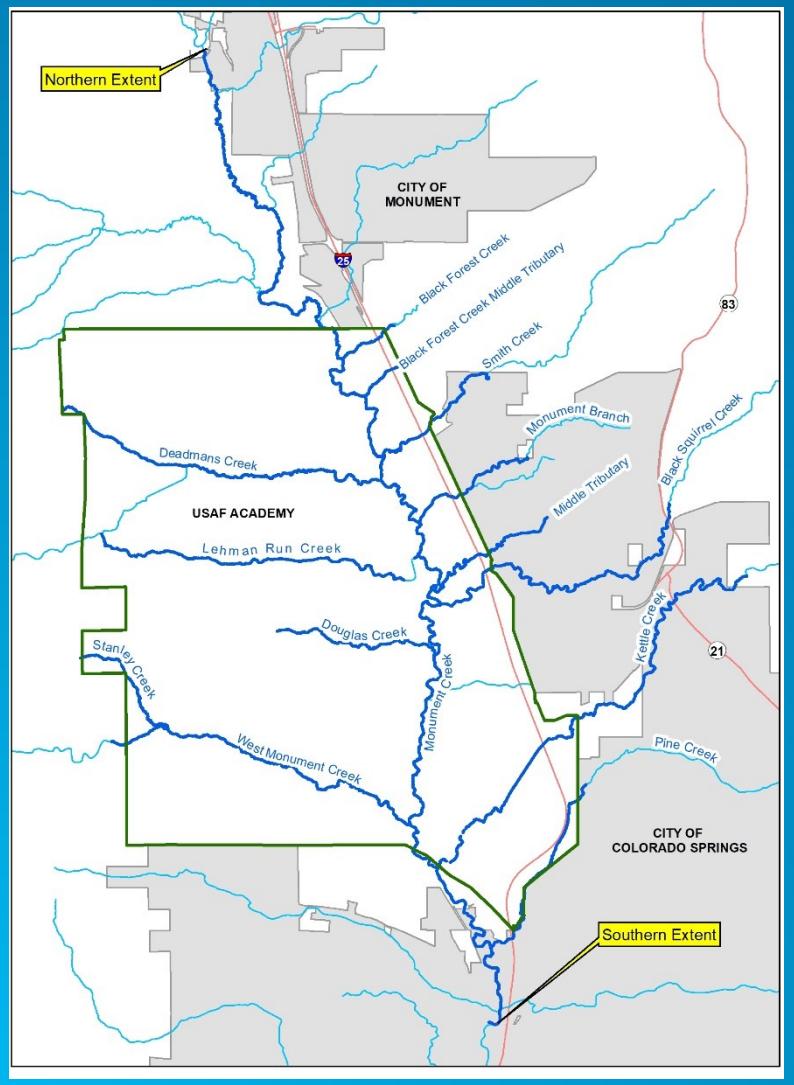
IMPACT

- Maps created were key tools for the Deloitte project team to gain a holistic understanding of the NOAA Southwest Footprint and communicate with the NOAA executive steering committee as well as external stakeholders throughout the region. This was accomplished through the integration of geospatial datasets and financial modelling tools, the summation of stakeholder and partner interviews, and the presentation of proposed options.
- Maps were developed that illustrated both the current NOAA footprint as well as proposed footprint moves and staffing impacts.

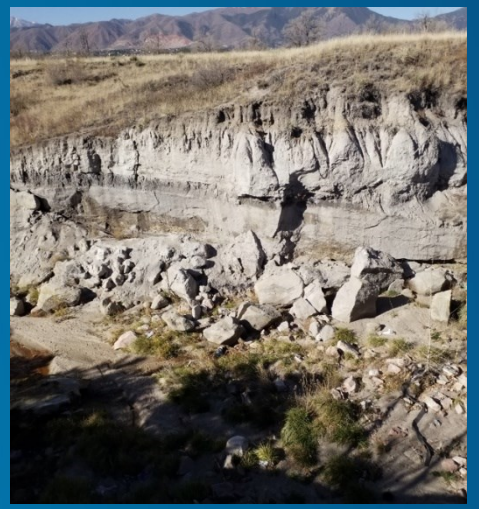
Chris Martin:
Director of GIS Services,
Matrix Design Group

Monument Creek USAFA Corridor Planning Study

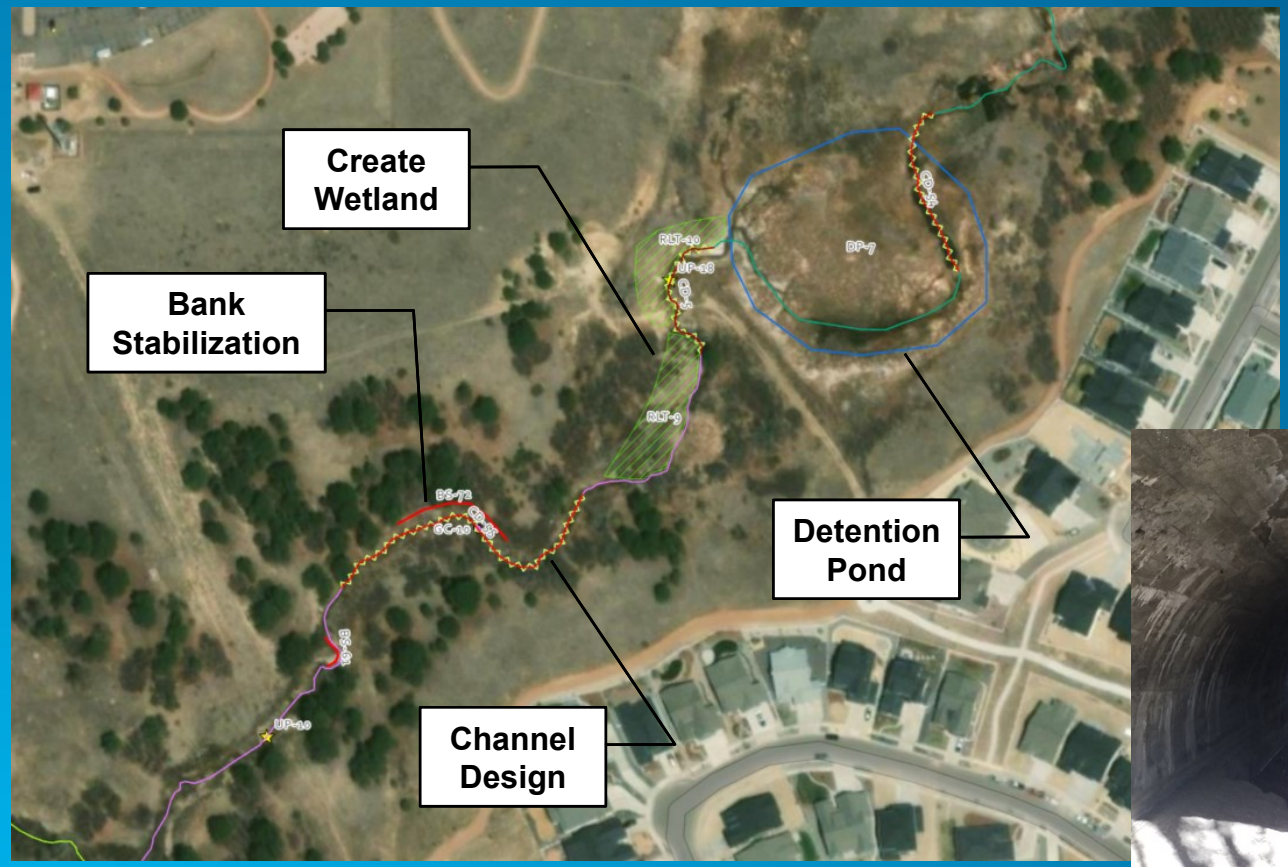
The military/civilian interface along Monument Creek in Colorado Springs, CO



- City of Colorado Springs and the US Air Force Academy partnered on an OLDCC funded, GIS-based planning study in the Monument Creek watershed
  - Identify opportunities for collaborative management, restoration, and preservation
    - Consider the threatened Preble's Meadow Jumping Mouse habitat
    - Technical analysis and field verification

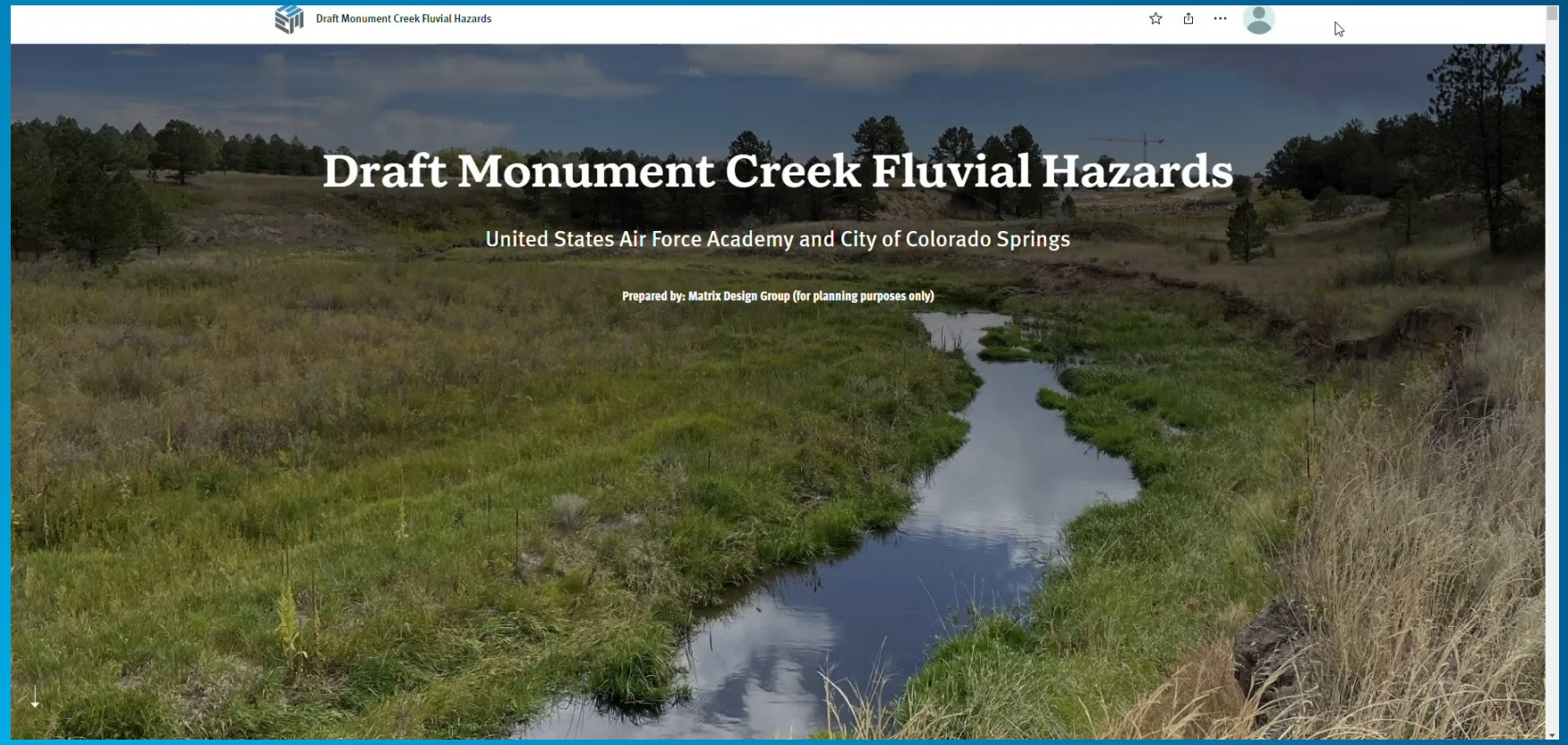


Monument Creek USAFA Corridor Planning Study



- 51 projects were identified
  - Project types included wetland conservation, floodplain and low terrace reconnection, revegetation, general channel design, etc.
- Data-driven prioritization
- Next steps: Funding, coordination with 3rd parties, design and execution

Monument Creek USAFA Corridor Planning Study

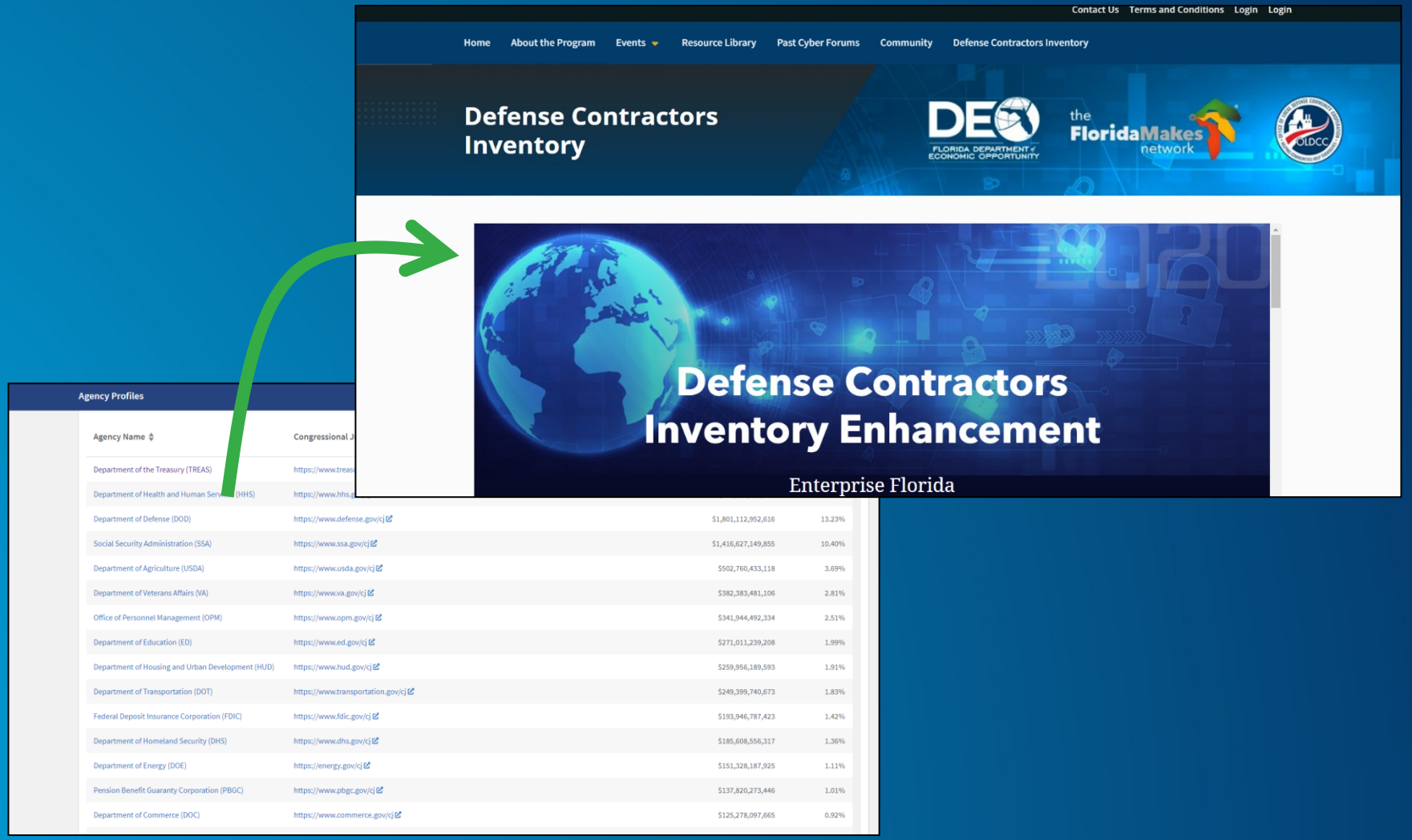


- An ArcGIS Online StoryMap was created to show the Fluvial Hazard Study done alongside the Corridor Planning Study
- ArcGIS Online and Field Maps were used to collect data, comments, and images of the watershed
- Creating accessible online interfaces and multi-objective solutions

Florida Defense Contractor Inventory Enhancement

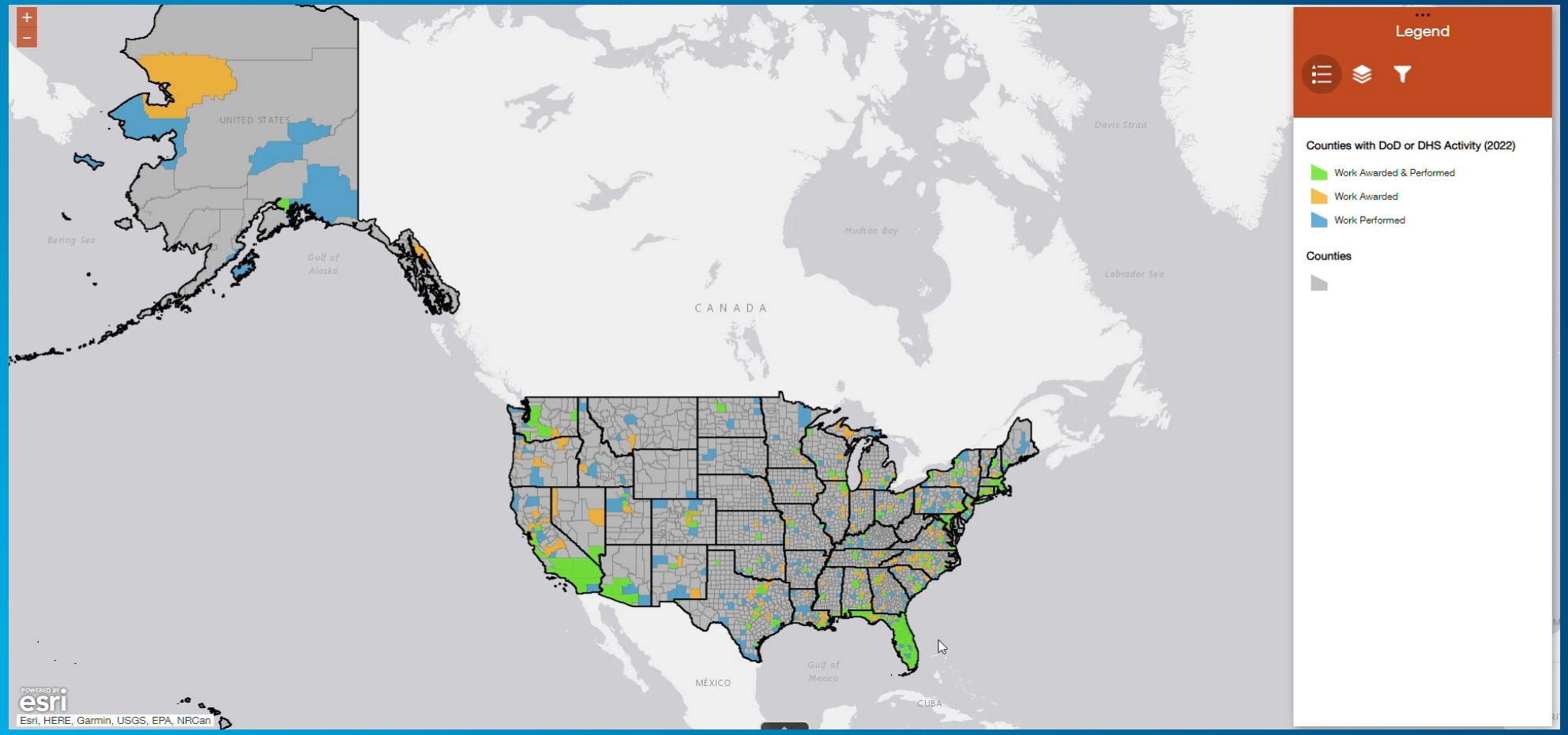
Improving access to defense spending information

- Enterprise Florida, Inc. wished to provide easily accessible and actionable defense spending info to:
  - Small businesses
  - Economic Development Organizations looking to expand or relocate to Florida
- Created 4 tools that leverage USASPENDING.gov data (spreadsheet format)
  - Contract Map
  - Data Through Time
  - Supply Chain Map
  - Database Explorer



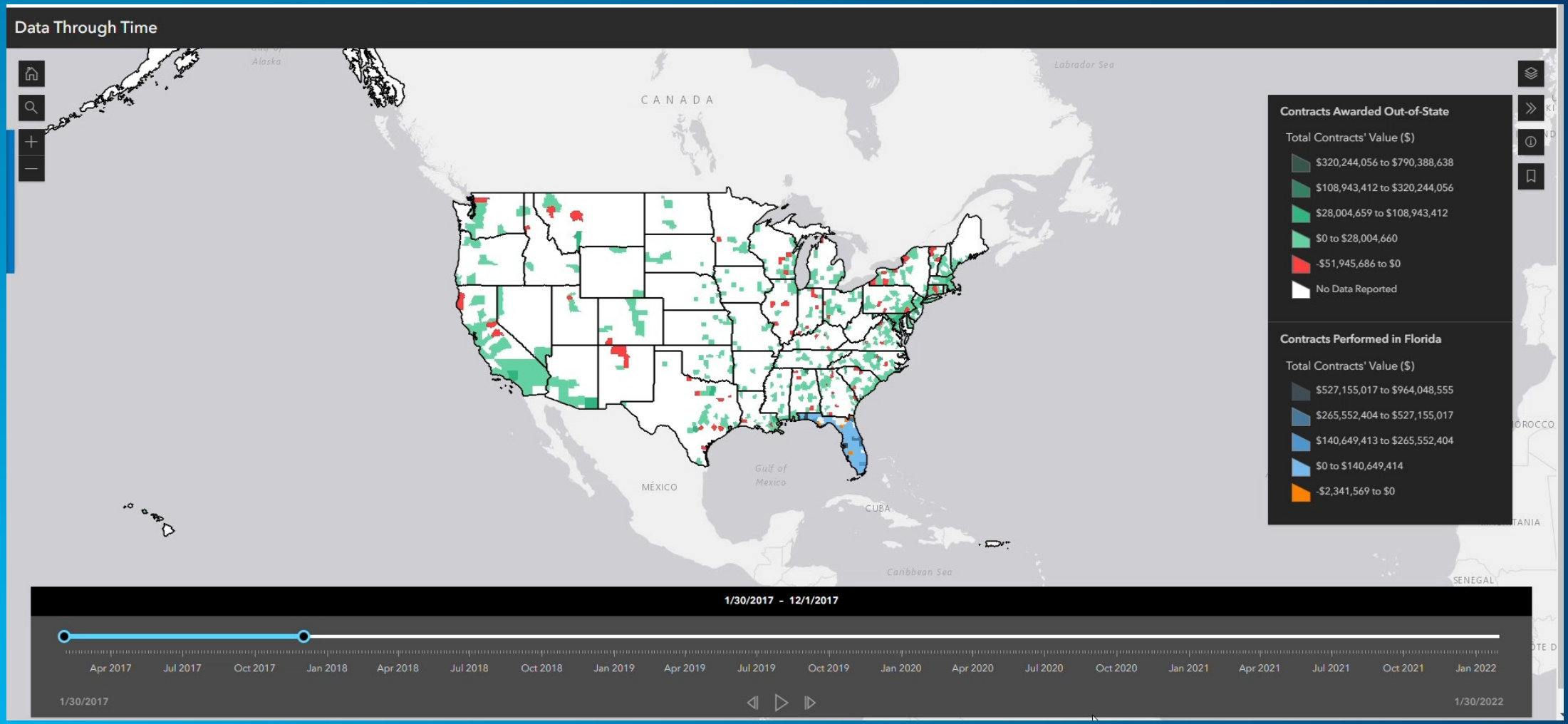
Florida Defense Contractor Inventory Enhancement

- Contract Map
- See where Florida-based contractors are performing work across the country and where out-of-state contractors are performing work within the state



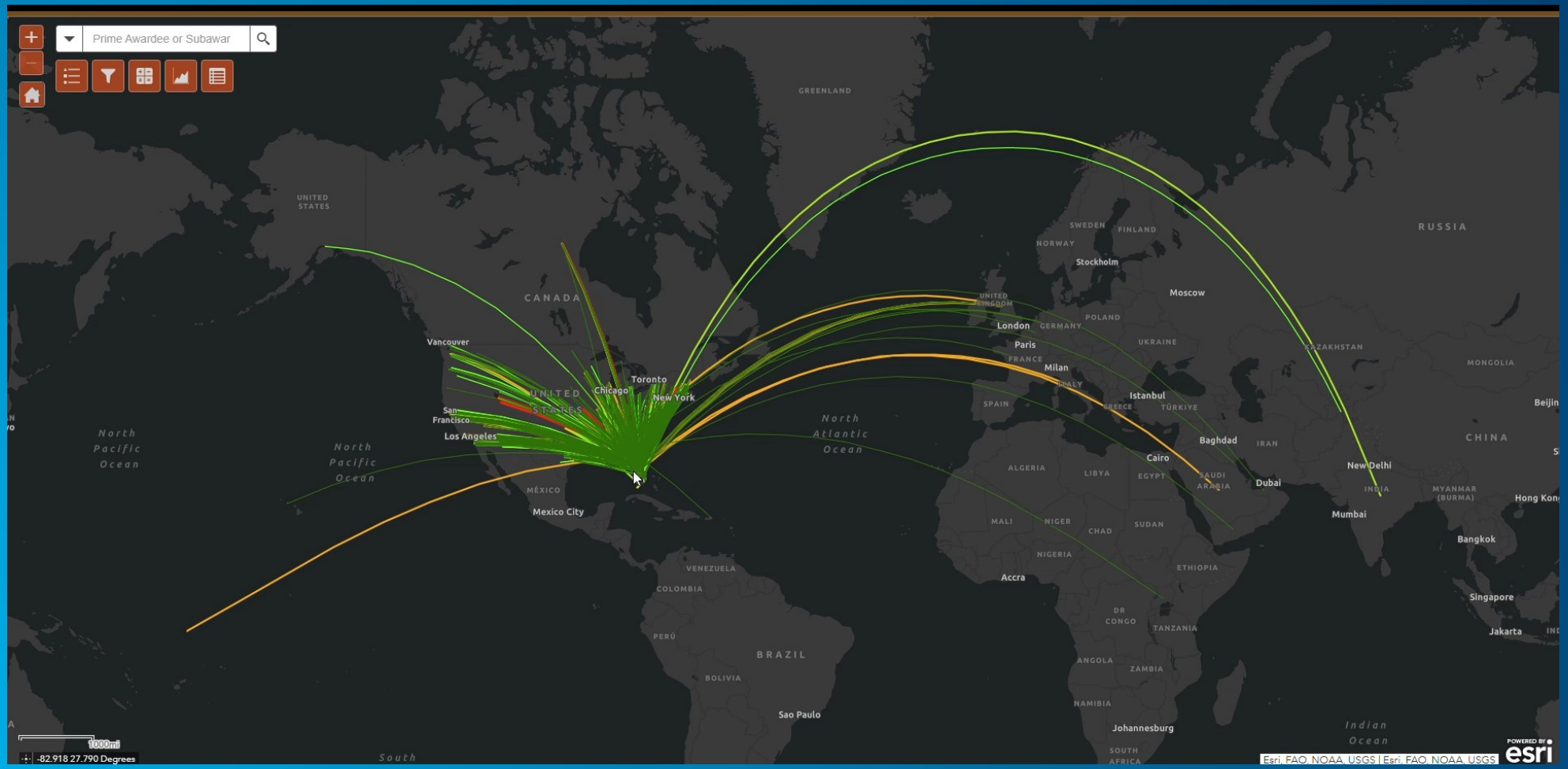
Florida Defense Contractor Inventory Enhancement

- Data Through Time
- Contracts awarded out of state, contracts performed in Florida



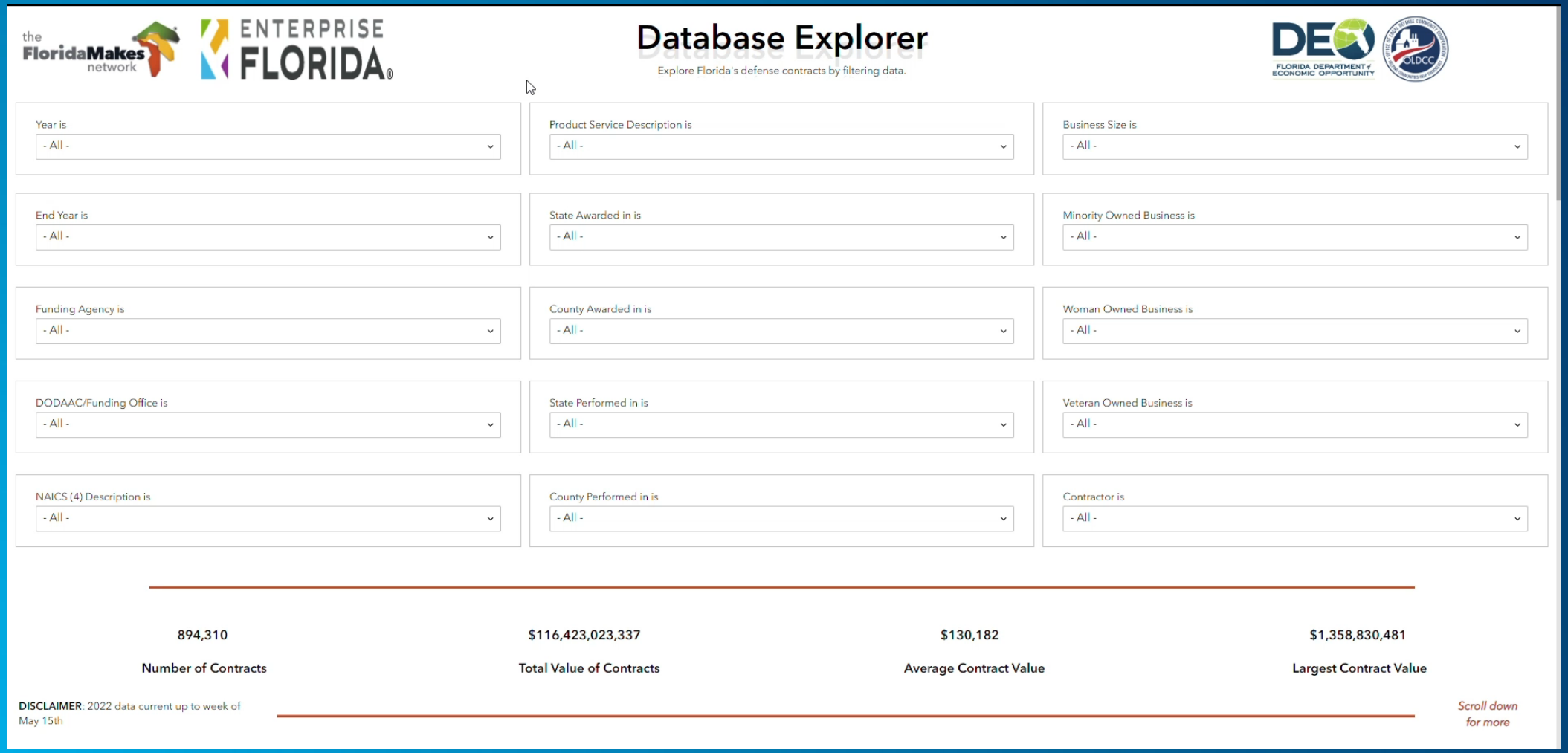
Florida Defense Contractor Inventory Enhancement

- Supply Chain Map
- Supply chains of prime or subcontractors linked to Florida



Florida Defense Contractor Inventory Enhancement

- Database Explorer
- Filtering defense contracts by year, office, county, business owner, etc.

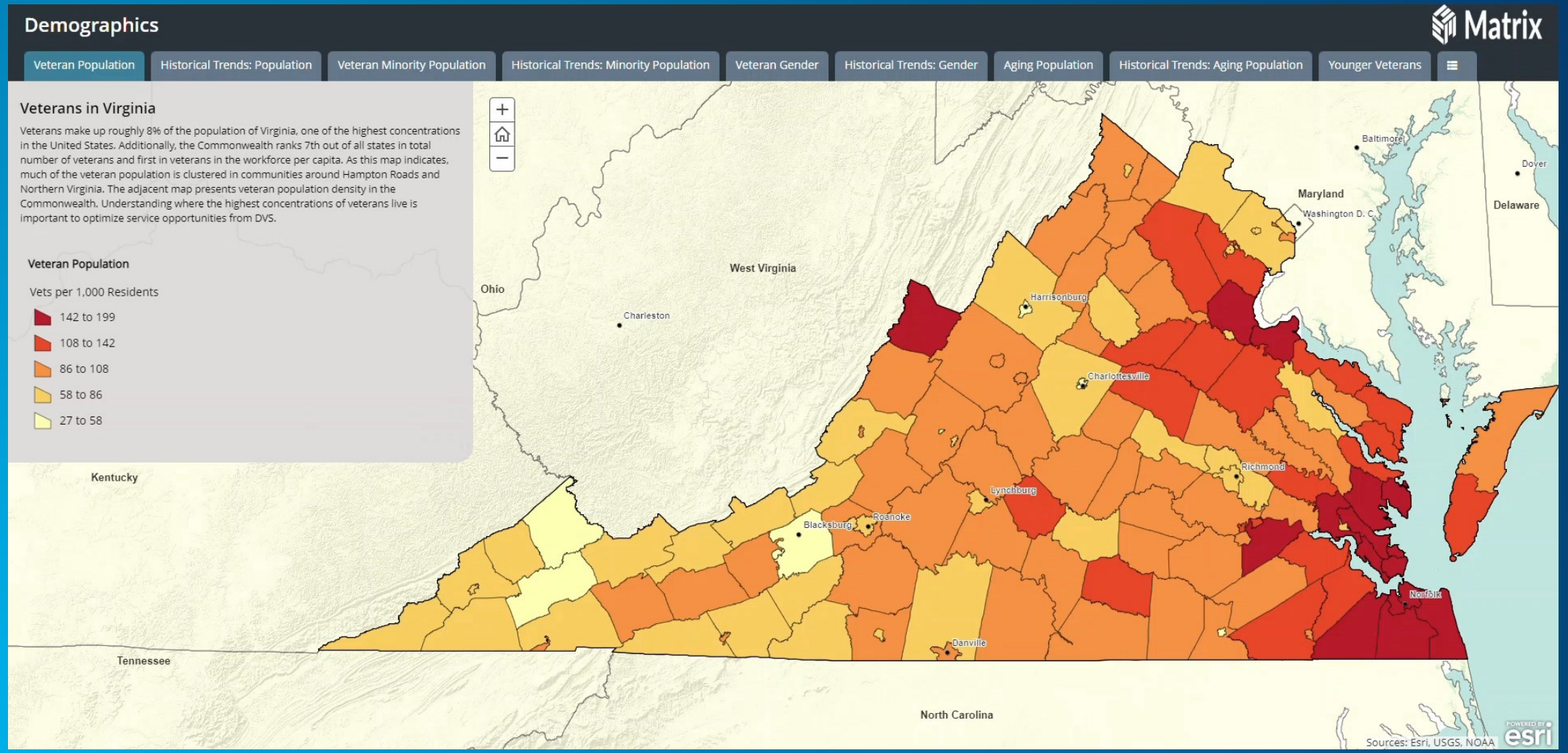


Florida Defense Contractor Inventory Enhancement

- Creating transparency and ease of access for defense spending
- Using integrated web applications and StoryMaps to deliver data in a manageable and understandable way
- Making USASPENDING.com data more accessible and visually-driven

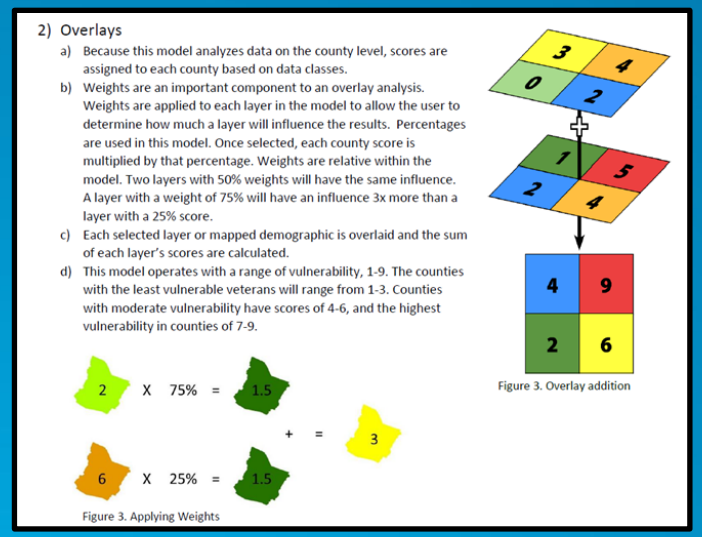
Virginia's Veterans Mapping Application

Visualizing veteran demographics, economics, service access, and vulnerability in Virginia using Esri web applications



Virginia's Veterans Mapping Application

- Commissioned by the Virginia's Secretary of Veterans and Defense Affairs
- Overlay analysis to combine mapped demographic data
- Integrating publicly available census and demographic data to create customizable visuals



2) Overlays

a) Because this model analyzes data on the county level, scores are assigned to each county based on data classes.

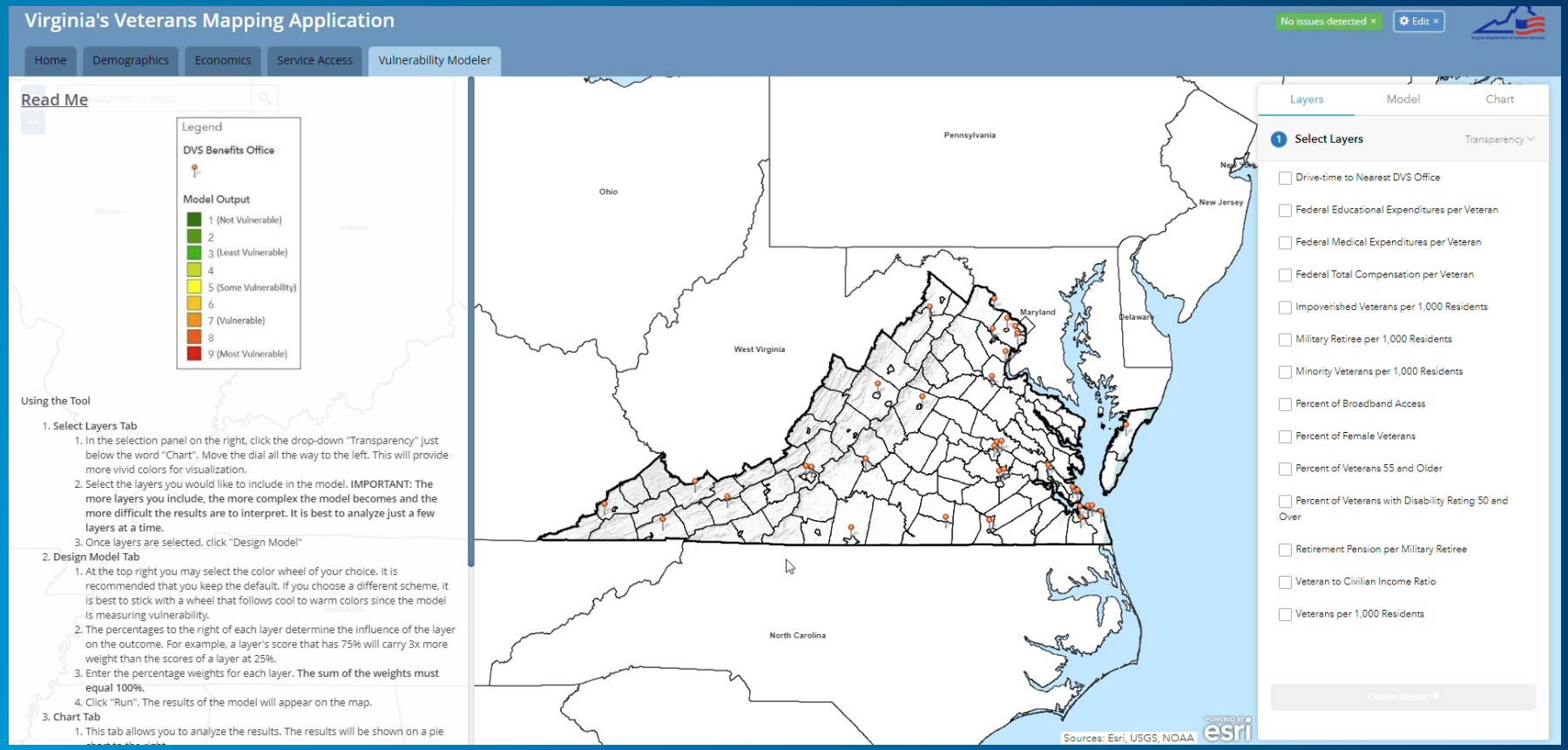
b) Weights are an important component to an overlay analysis. Weights are applied to each layer in the model to allow the user to determine how much a layer will influence the results. Percentages are used in this model. Once selected, each county score is multiplied by that percentage. Weights are relative within the model. Two layers with 50% weights will have the same influence. A layer with a weight of 75% will have an influence 3x more than a layer with a 25% score.

c) Each selected layer or mapped demographic is overlaid and the sum of each layer's scores are calculated.

d) This model operates with a range of vulnerability, 1-9. The counties with the least vulnerable veterans will range from 1-3. Counties with moderate vulnerability have scores of 4-6, and the highest vulnerability in counties of 7-9.

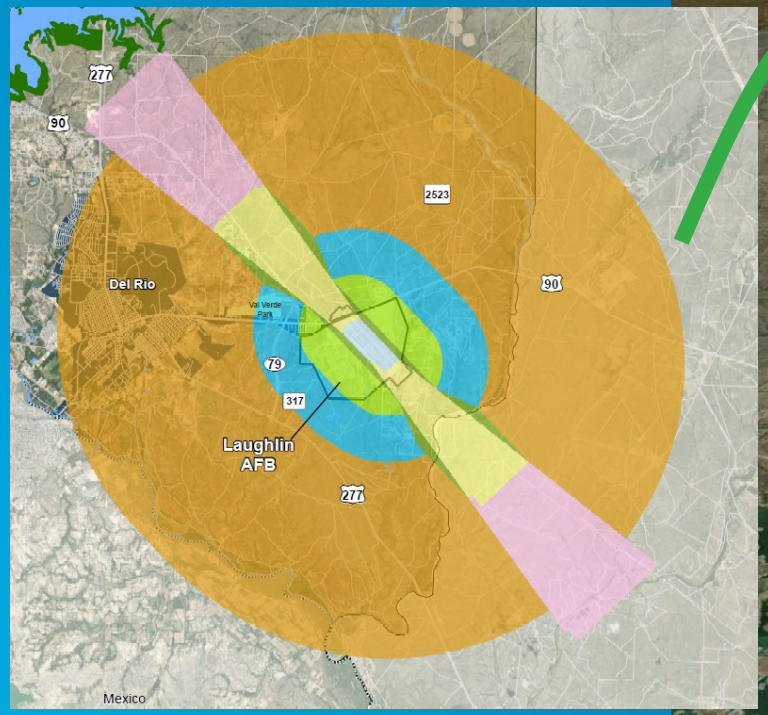
Figure 3. Overlay addition

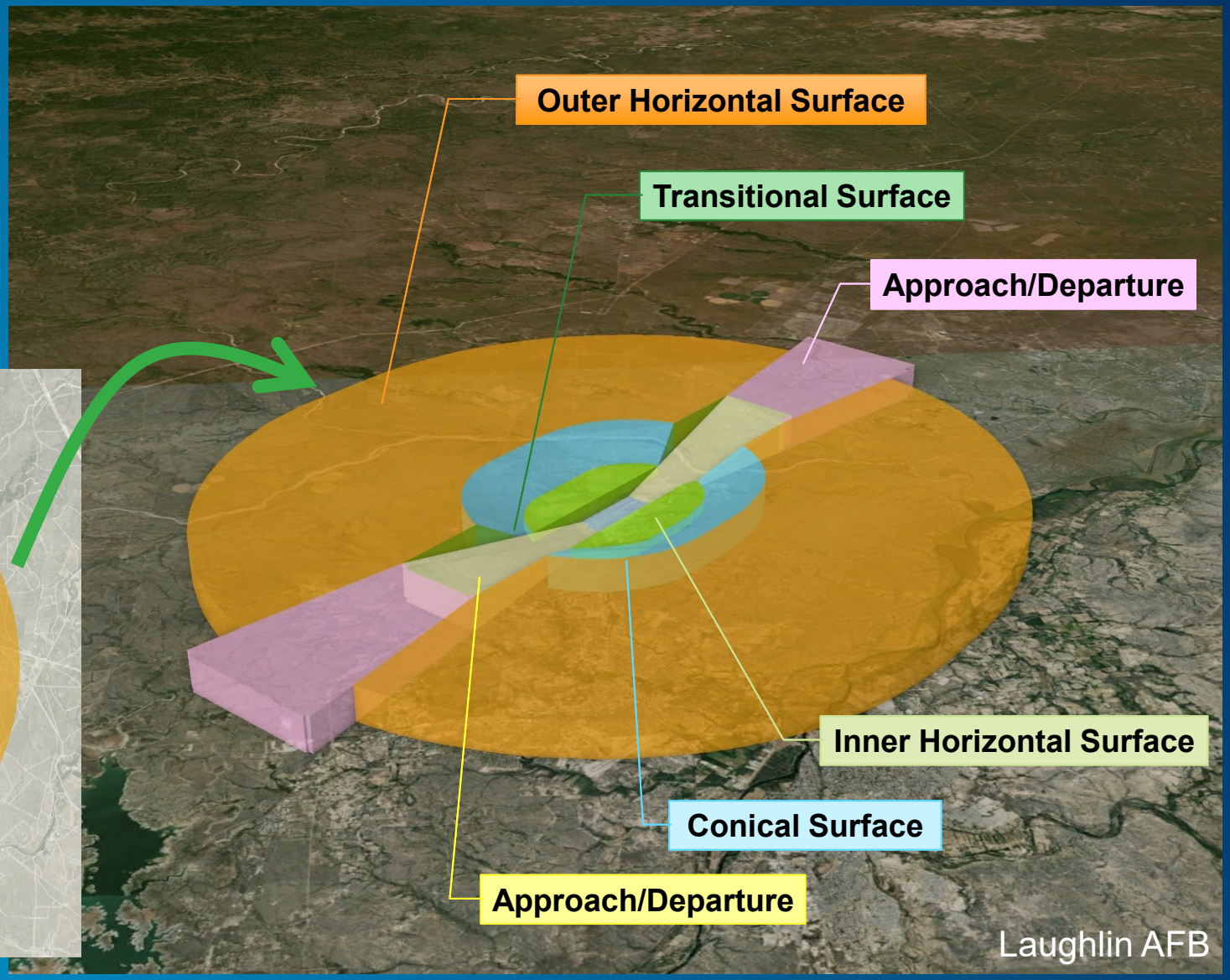
Figure 3. Applying Weights



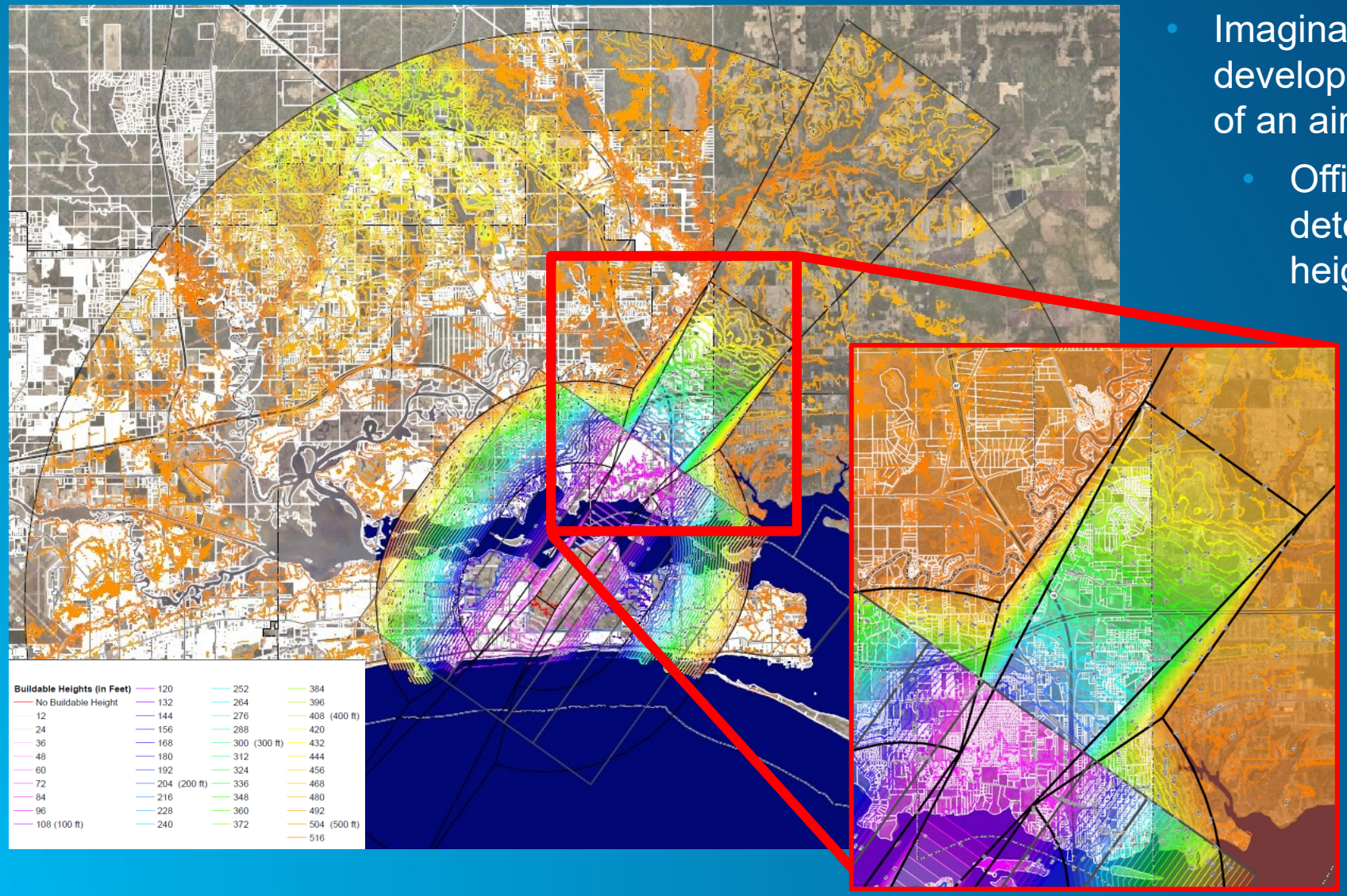
Buildable Heights and Imaginary Surfaces

- A complex set of ‘imaginary’ surfaces that range from 0 ft above ground level (AGL) to 500 ft AGL, approx.
- Defined in the DoD Unified Facilities document





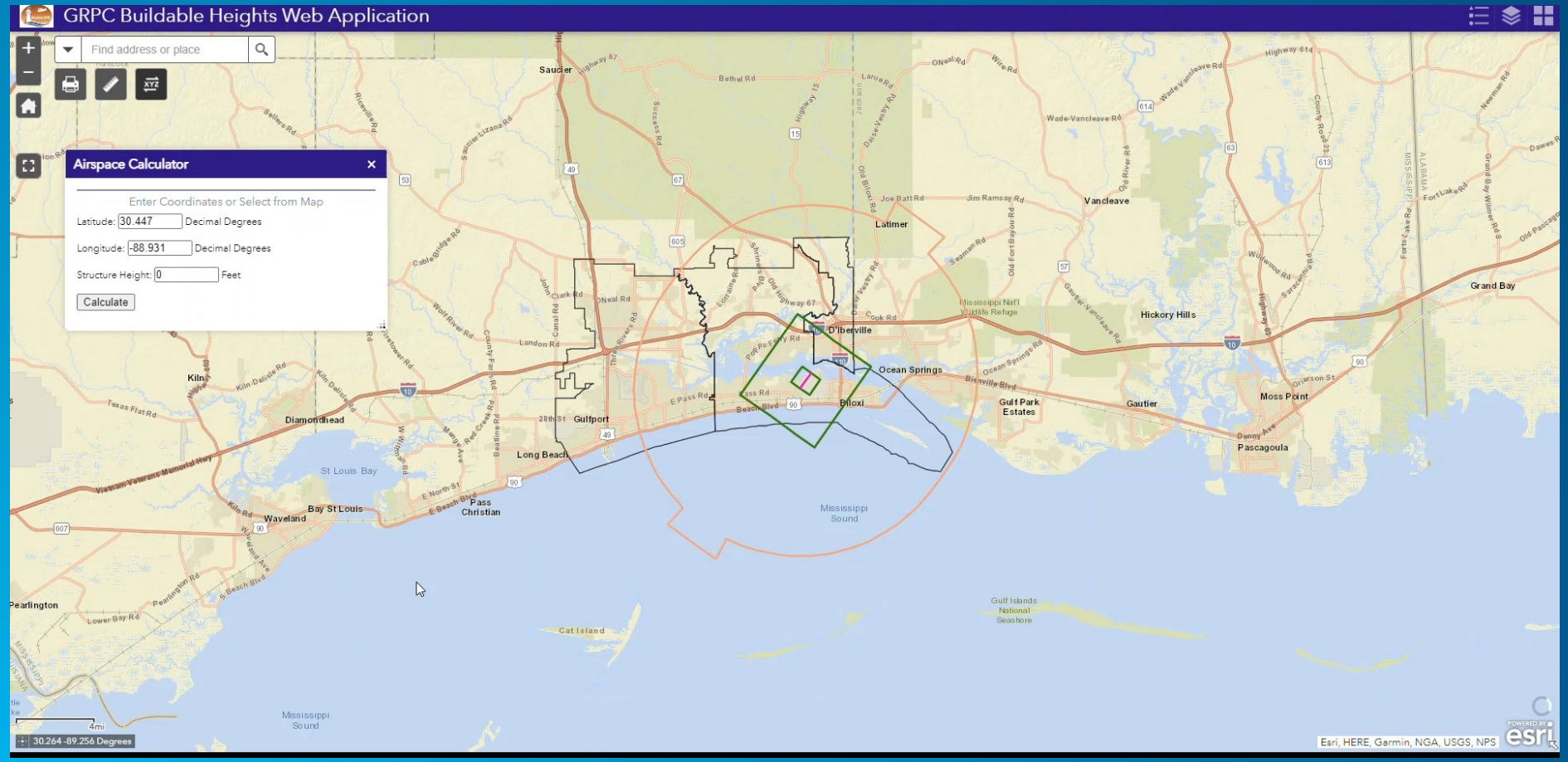
Buildable Heights and Imaginary Surfaces



- Imaginary surfaces impact developments within ~10 miles of an airfield
  - Officials need a way to determine buildable heights to avoid airspace

Buildable Heights Web Application for Keesler AFB

The Gulf Regional Planning Commission requested an application to include an Airspace Calculator tool



- The Airspace Calculator allows the user to enter coordinates (or click on the map to select a point), and enter a desired structure height
- The calculator will inform the user if the desired structure will penetrate the airspace or not
- Giving users accessible tools to assess infrastructure

Thank You for Attending