

Technology Session : Fostering Forest Management Activities

ICIMOD, Nepal 02- Sep 2021

Forestry and wildlife Protection Solutions: Enterprise GIS for Forestry Management

ArcGIS

A Complete Geospatial Platform for Conservation



ArcGIS Enterprise

A Complete Web GIS



Secure



Mapping



Analysis



Data Management

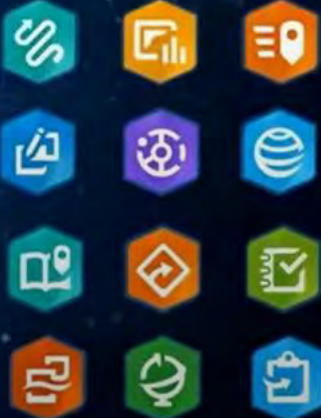


Open



User Roles & Access

Integrated Apps





Identification of Key Engagement Areas

How Capture Meets Delivery

Foundational Information



Efforts thus far have made focused on the system of computerization of textual records integrated with digitized GIS layers- Administrative Boundaries, Forest Cover, Forest Type, etc for the country. However, by itself this system has limited benefits, unless the system is Simple Web Enabled, Dynamic, User Interactive and capable of updating in real time in line to the business areas.





Our Implementation Approach

Create, Configure and Use

ArcGIS Eco-System

Solution for the Requirement



#1

#2

#3

Create Knowledge Base System

Configure Application

Use for Dissemination, Decision Making & Planning

- Indicators of the Planet
- Solution Templates
- Ready to use Tools
- Use Unstructured Data

- Map Viewer
- Web App Builder Tools
- Templates Story
- Widgets

- Web Applications
- Operational Dashboard
- Mobile Apps
- ArcGIS Hub -Community Engagement
- Insights for ArcGIS

Creation of Knowledge Base System – Indicators of the Planet

#1

Indicators

Natural Hazards

Monitoring Climate

Environmental Threats

Ecosystem Health

Humans at Risk

ArcGIS LIVING ATLAS - INDICATORS OF THE PLANET BETA

Air Quality

Today
1,357
locations with
poor air quality

Increased 20.86%
in 24 hours

OpenAQ

Drought

This week
17.4%
of agricultural areas

Increased 299,596 sq km
in a week

NOAA

Wildfire

Today
186,111
thermal detections

Decreased -4,464 fires
in 24 hours

NOAA/NASA

Conservation

This month
54,734,053
sq km
land & ocean area protected

Increased 327,537 sq km
in a month

UNEP/IUCN

Deforestation

Last week
1,134
sq km
forested area lost

8,952 sq km lost
this year

Global Forest Watch

COVID-19 Cases

Last 24 hrs
30,406,197
confirmed cases

14 day trend is increasing

JHU/Esri

Earthquakes

This week
82
major earthquakes

6.4 magnitude
largest event this week

USGS

Cyclones

Today
5
active storms

68 storms this year

NOAA/JTWC

Arctic Sea Ice

Last month
-31.07%
of normal extent

#3 lowest August
since 1979

NSIDC

Coral Bleaching

This week
31
locations
at risk of bleaching

Increased 6 locations
in a week

NOAA

Global Temperatures

Last week
0.94
Deg C
above 20th Century average

#2 warmest August
since 1880

NOAA

Women in Parliament

Last month
25.1%
of national
representatives

Increased 167 members
in a year

IPU

Sea Level Rise

This week
2.96
millimeters
average global increase

NOAA

El Niño

This month
-0.38
ENSO Index

NOAA

Carbon Dioxide

Last month
413.04
parts per million

Increased +2.32 ppm

Ocean Health

This year
70.58
global average score

Decreased -0.09 points

Piracy

This month
3
events that threatened shipping

Decreased -9 events

Armed Conflict

This week
3,880
events

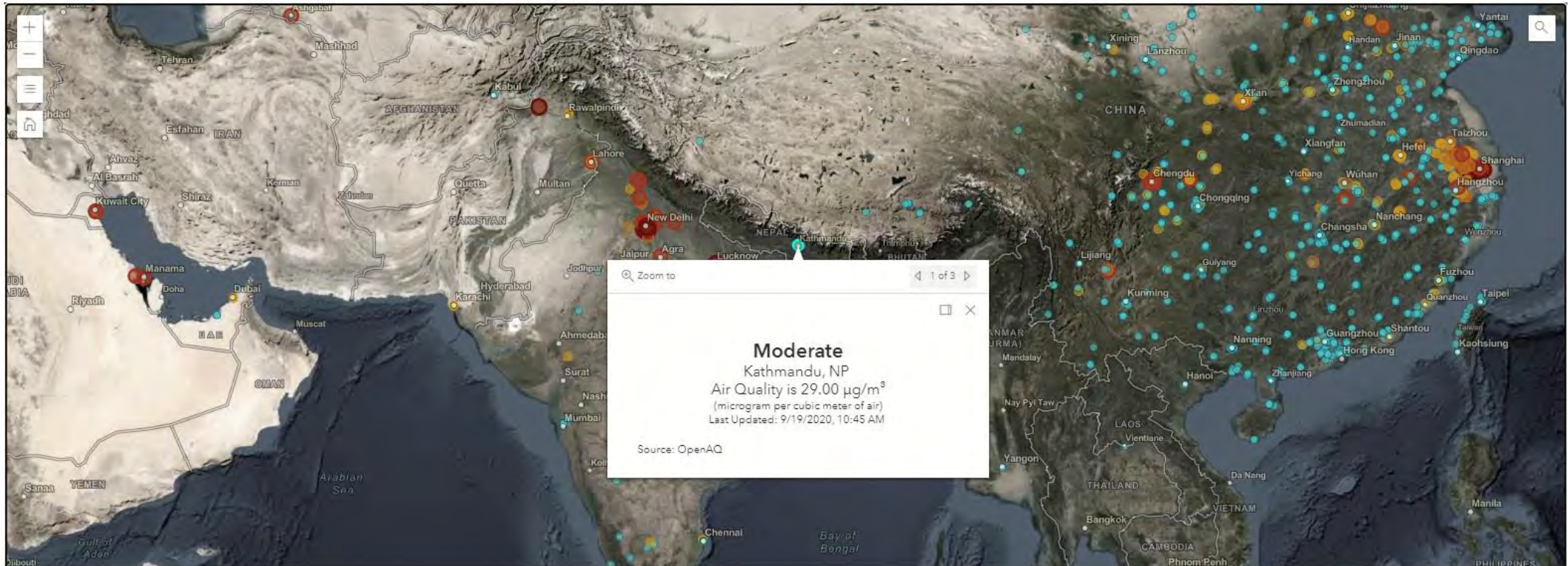
Increased 2,631 events

Creation of Knowledge Base System – Indicators of the Planet (ArcGIS Living Atlas)



Air pollution, both ambient and household, increases the risk of cardiovascular and respiratory disease and, in 2016, led to some 7 million deaths worldwide. Sub-Saharan Africa and most of Asia and Oceania (excluding Australia/New Zealand) have the highest mortality rates associated with air pollution, as a large proportion of the population still rely on polluting fuels and technologies for cooking.

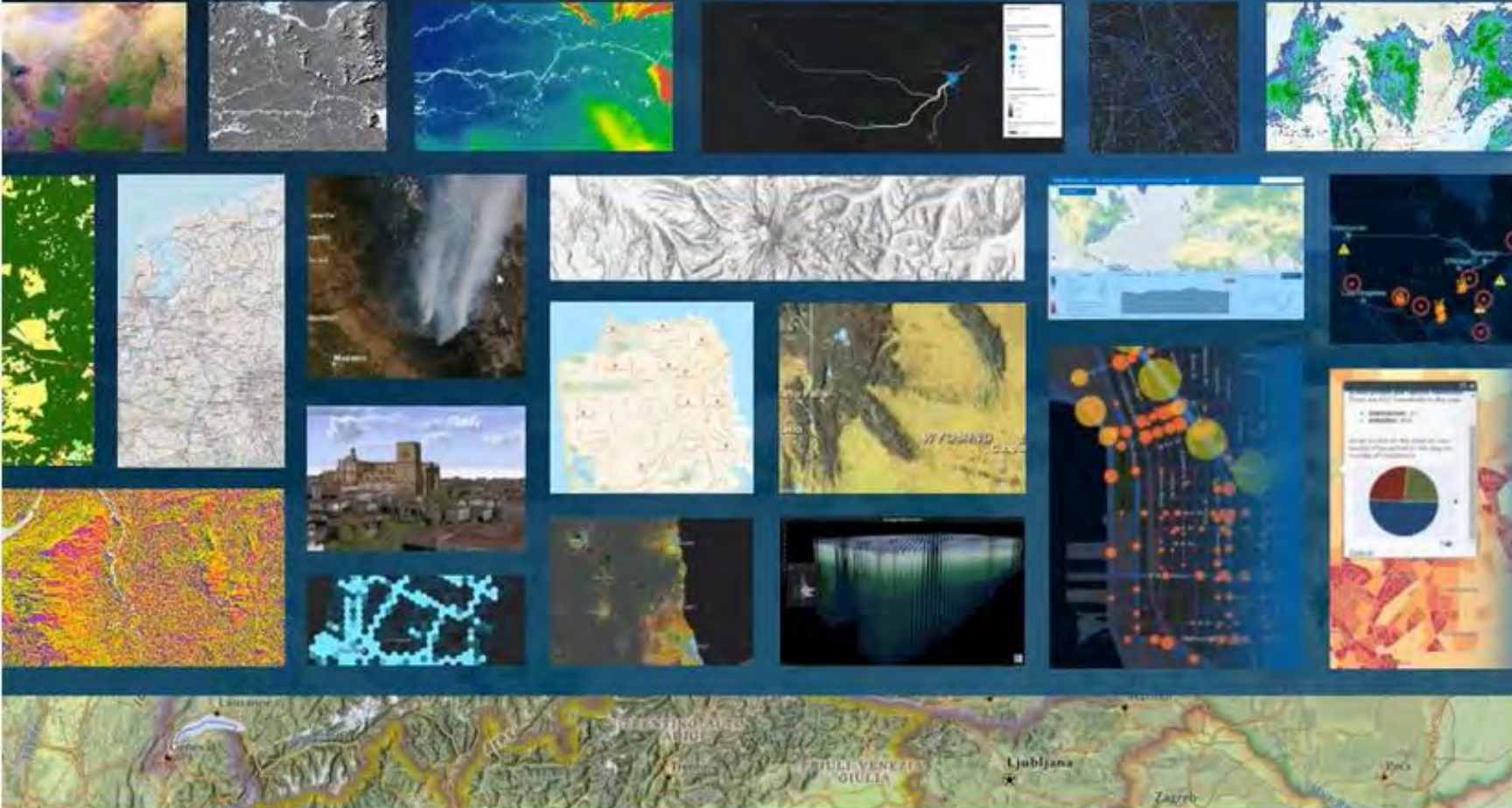
OpenAQ, a non-profit organization, collects air quality information from stations around the world and provides it as free and open data to help better monitor and manage the air we breathe.



ArcGIS Content

A Living Atlas of the World for Conserving Our World

Over 8,500 Ready-to-Use
Maps and Datasets



Trending
Transportation
Environment
Weather
Landscape
Infrastructure
Basemaps
Boundaries
Land Cover
Soils
Utilities
Imagery
Observations
People
Demographics
Traffic
Habitats
Elevation
Hydro
Hazards

... And Millions of Maps, Layers
and Datasets Shared by Users

Creation of Knowledge Base System –ArcGIS Living Atlas



Forest Fire



Search Examples



All



Trending



Basemaps



Imagery



Boundaries



People



Infrastructure



Environment

All content types

All time

All regions

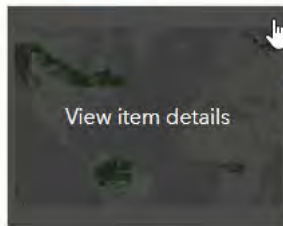
Esri-only content

Authoritative-only content

Sort by: Relevance



53 Results



Intact Forest Landscapes (2000)

Intact Forest Landscapes (2000) Watch

Identifies the world's last remaining unfragmented forest landscapes, large enough to retain all native biodiversity and showing no signs of human alteration as of the year 2016. This layer also shows the reduction in the extent of Intact Forest Landscapes from 2000 to 2016.



Forest Change for Canada

Web Map By National_Forest_Information_System

The forest change data included in this product is national in scope (entire forested ecosystem) and represents the first wall-to-wall characterization of wildfire and harvest in Canada for the period 1985-2012.



USA Current Wildfires

Feature Layer By esri_livefeeds2

This layer shows wildfires that have been updated within the past 7 days in the United States from IRWIN and NIFC information.

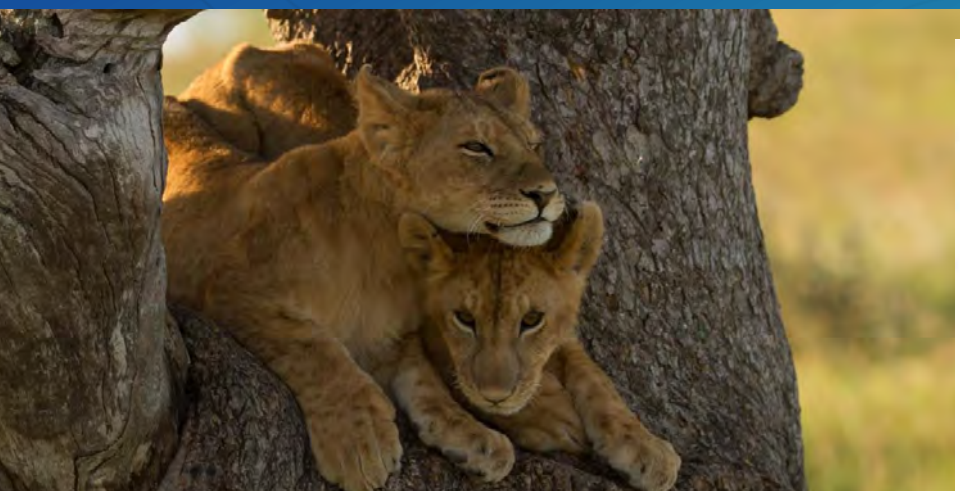
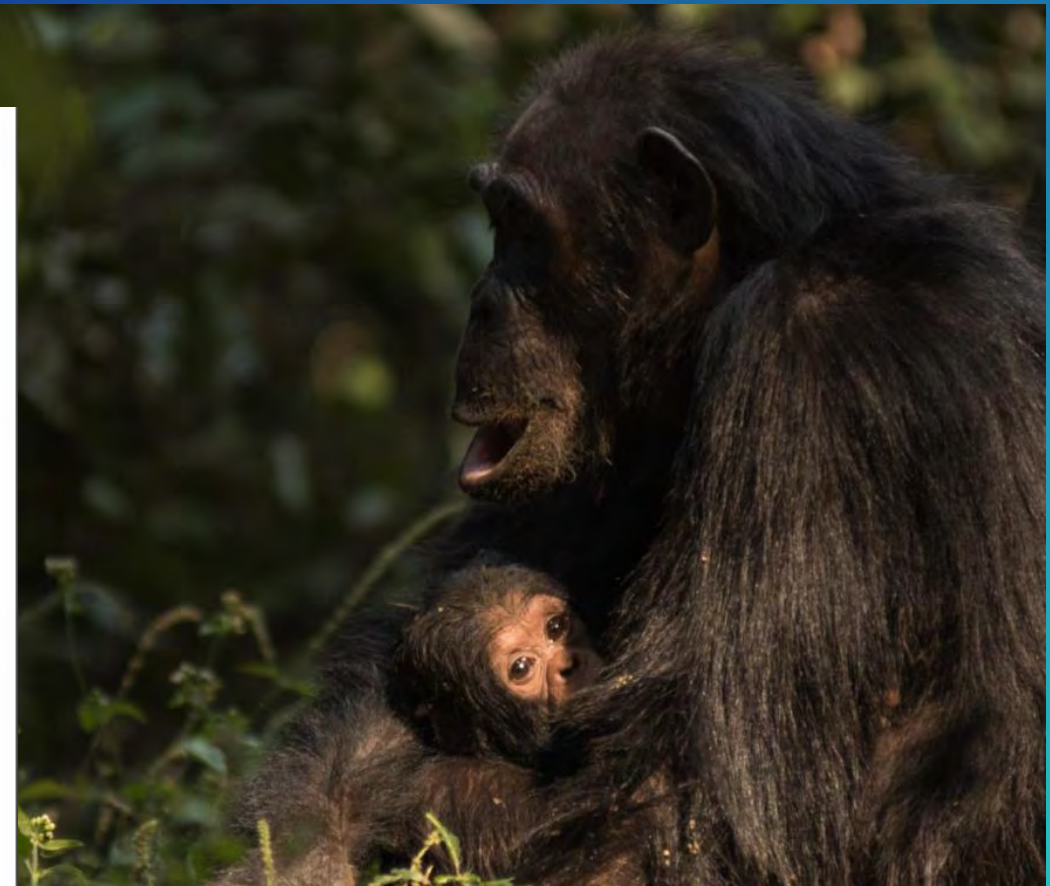


California Wildland Fire Direct Protection Areas - 2021

Feature Layer By USFSRegion05

Direct Protection Areas (Current: 2021) for California. This dataset indicates the agency/organization with primary responsibility for suppressing wildland fire within each polygon boundary.

Creation of Knowledge Base System –Forest Data Model



Downloads - Design Templates

The Design Templates are the result of the community-based design process. The general concepts and terms for this discipline are described here. Tools and examples to create a template data model are also included for advanced users.

- [Forestry Data Model User Guide](#) Adobe Acrobat – pdf format (480 kb)
- [Conceptual Design](#) – pdf format (18 kb)
- [Design Template](#) – zip format (865 kb)

Creation of Knowledge Base System – Ready to Use Tools

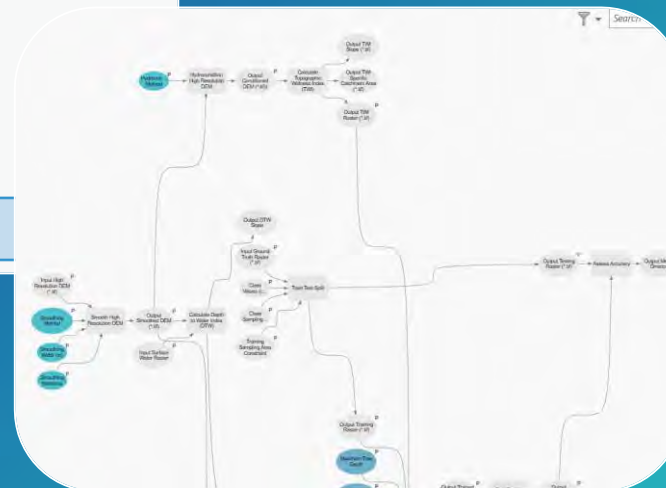
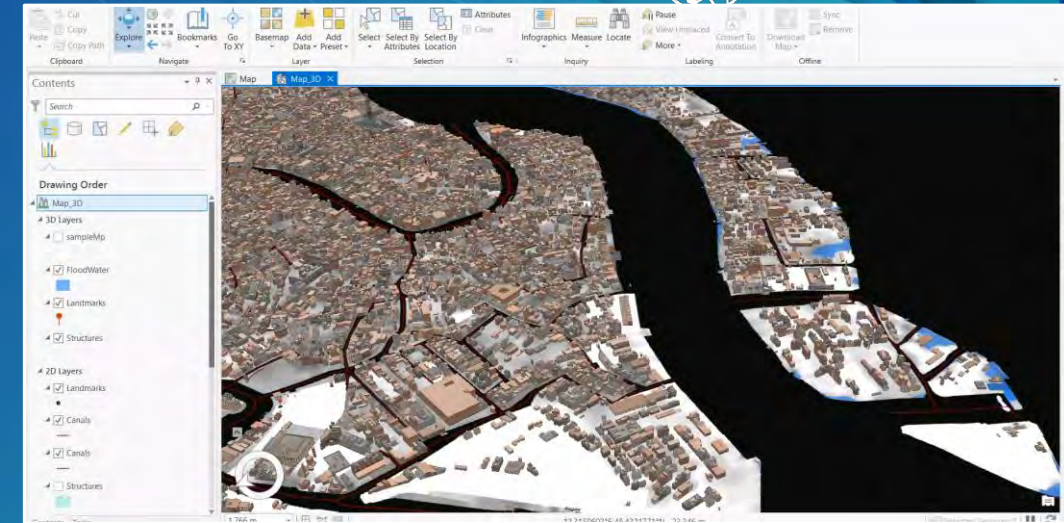


Arc Hydro Tools Pro

- ▶ Attribute Tools
- ▶ GIS Data Exchange
- ▶ H & H Modeling
- ▶ Network Tools
- ▶ Point Characterization
- ▶ Terrain Morphology
- ▶ Terrain Preprocessing
- ▶ Terrain Preprocessing Work
- ▶ Utility
- ▶ Watershed Processing

Wetland Identification

- ▶ Assess Accuracy
- ▶ Calculate Curvature
- ▶ Calculate Depth to Water Index (DTW)
- ▶ Calculate Topographic Wetness Index (TWI)
- ▶ Hydrocondition High Resolution DEM
- ▶ Run Random Trees
- ▶ Smooth High Resolution DEM
- ▶ Train Random Trees
- ▶ Train Test Split
- ▶ Wetland ID Workflow



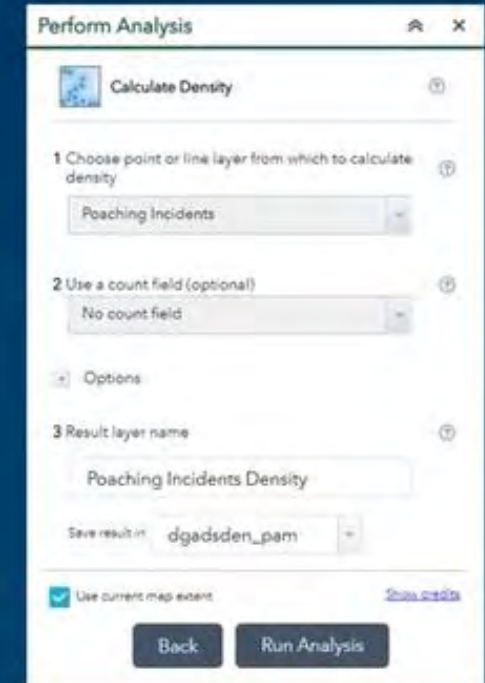
- ▶ Flood Planning
 - ▶ Create Flood Impact Area
 - ▶ Create Flood Impact Plan
- ▶ Map Book
 - ▶ Create PDF Map Book
 - ▶ Create Street Index Report
- ▶ Public Notification
 - ▶ GenerateAveryLabels
 - ▶ GenerateCSVMailingList
- ▶ Target Hazard Mapping
 - ▶ Load Hazard Parcel Data
 - ▶ Populate Hazard Criteria
 - ▶ Summarize Hazard Value
 - ▶ Target Hazard Value

Spatial Analysis

Feature Analysis

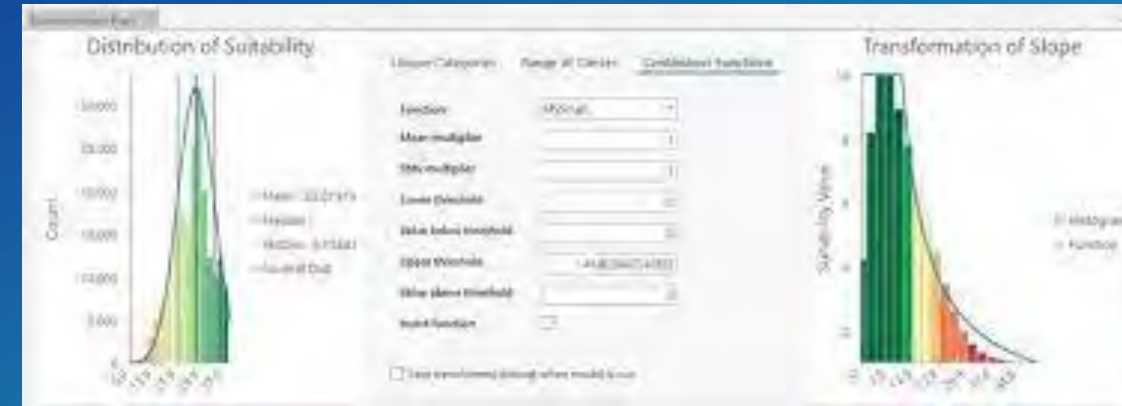
- Summarize Data
- Find Locations
- Data Enrichment
- Analyze Patterns
- Use Proximity
- Manage Data

- 27 standard tools



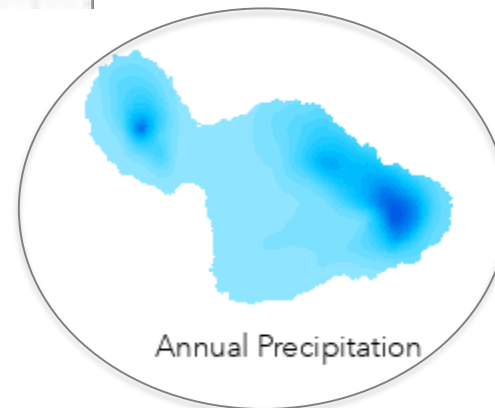
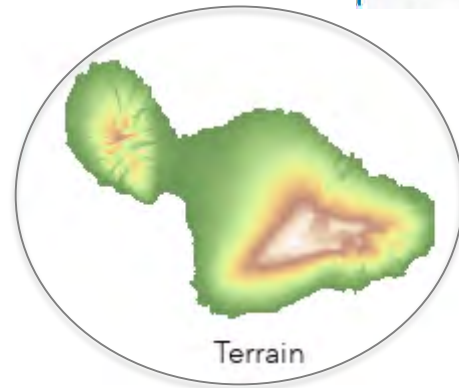
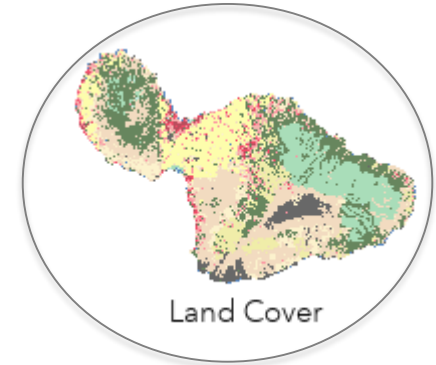
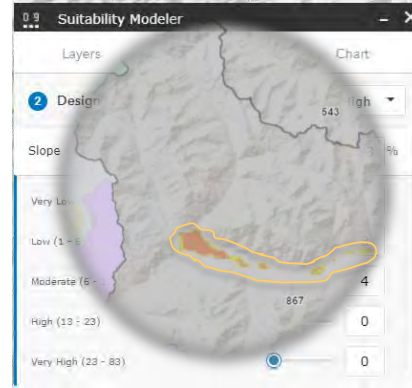
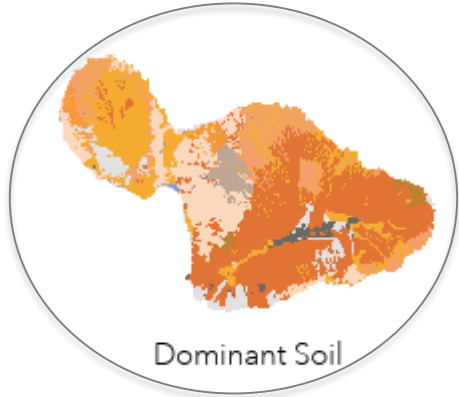
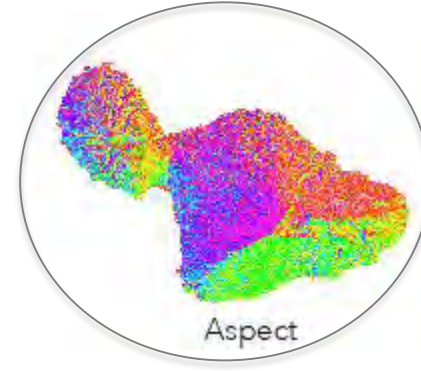
Suitability Analysis – Ready to Use Tools

- Identify the preferred criteria for the Suitable Sites.
- Transform the values within each criterion to a common scale.
- Weight and combine the criteria and submodels.
- Locate the best Site patches.
- Overlap with existing Structure to plan the .



Sl No	Type of Conservation Structure	Criteria to be followed
1	Contour Bunding	Slope: Level to Medium Soil Texture: Low Small to Medium Watershed area Runoff potential is medium
2	Gully Plug	Level to medium ground and very low soil texture
3	Percolation Tank	Large watershed more than 40 hectares, level to medium slope, medium to high soil texture with low runoff potential
4	Nala Bund	Medium watershed, level to gentle slope, medium soil texture, medium runoff potential
5	Farm Pond	Watershed area more than 2 hectares with level to gentle slope and low percolation and low to medium runoff

Suitability Analysis (Water Recharge Structures) – Ready to Use Tools



#2

Configure Online Applications (Code/No Code) – Map Viewer

The screenshot displays the ArcGIS Map Viewer interface. The main map area shows a city grid with a yellow and cyan overlay, likely representing a data layer. The interface includes a left sidebar with navigation options and a right sidebar with configuration options.

Left Sidebar (Navigation):

- Layers
- Basemap
- Legend
- Bookmarks
- Save
- Create new map
- Open existing map
- Share map
- Print
- Feedback
- What's next?
- Collapse

Right Sidebar (Configuration):

- Properties
- Styles
- Filter
- Configure pop-ups
- Configure attributes
- Search
- Measurement
- Directions
- Location
- Collapse

Map Content:

The map displays a city grid with a yellow and cyan overlay. The overlay consists of numerous small, irregular shapes, likely representing individual buildings or parcels. The colors are bright yellow and cyan, set against a dark background. The map is viewed from a top-down perspective.

Bottom Bar:

Esri, HERE, Garmin, INCREMENT P, USGS, EPA, NPS, US Census Bureau, USDA

Powered by Esri

Configure Online Applications (without programming)- Web App Builder

The screenshot shows the Web App Builder interface for an application titled "IMT Miami - Incident Analysis App". The interface includes a top navigation bar with "Home", "Web AppBuilder for ArcGIS", and the app name. Below this is a toolbar with "Theme", "Map", "Widget", and "Attribute" options. A central map displays a geographic area with a heatmap overlay. On the left, a "Style" panel offers various themes (Billboard, Box, Dart, Foldable, Dashboard, Launchpad, Jewelry Box, Plateau, Tab) and a color selection tool. At the bottom, a "Locate Incident" panel features a search bar, a "Buffer Distance (Miles)" slider set to 10, and a "Locate Incident" button. The bottom right corner shows a "Launch" button and "Previews" and "Save" options.

This screenshot displays the "Web AppBuilder Custom Widgets" and "Web AppBuilder Custom Themes" gallery. It features a navigation menu with "Overview", "Content", "People", and "Subspaces". The main content area shows a grid of widget and theme thumbnails, with a red banner at the bottom right highlighting "Web AppBuilder Custom Themes".

A grid of 40+ widget icons is displayed, each with a label. A large green text overlay in the center of the grid reads "40+ widgets". The widgets include: Add Data, About, Analysis, Basemap G..., Batch Attrib..., Bookmark, Chart, Directions, District Loo..., Draw, Edit, Filter, GeoLookup, Geoprocess..., Group P..., Measurement, Near Me, Oblique Vie..., Print, Query, Related Tab..., Report Feat..., Reviewer D..., Search, Select, Share, Situation A..., Smart Editor, Stream, Summary, Swipe, Time Slider, Attribute T..., Coordinate, Home, My Location, Overview..., Scalebar, Search, Zoom Slider, Splash, Coordinate..., Grid Overlay, Infographic, Parcel Drafter, Screening, and Suitability...

The "NearMe" widget interface shows a search bar with "Esri World Geocoder" entered. Below the search bar is a slider for "Show results within 1 Kilometers" ranging from 0 to 3. A list of results is shown below, including "Museums (21)", "Libraries (10)", and "Sports Venues (3)".

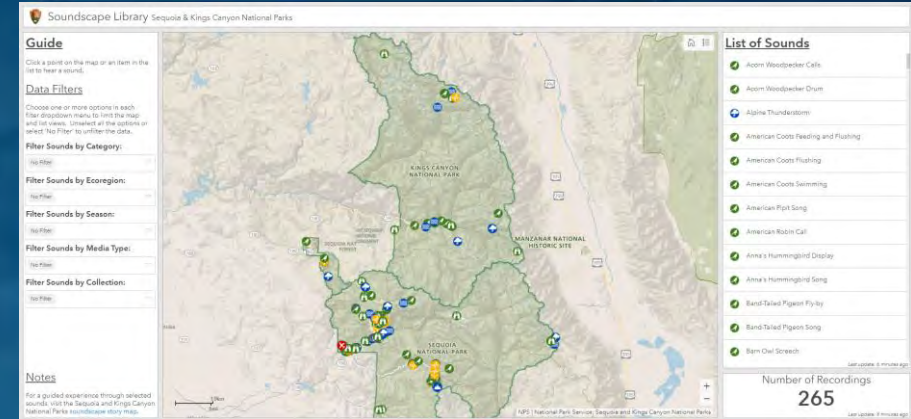
The "Query" widget interface shows a "Tasks" section with a dropdown menu set to "RelationshipOID - Buildings_OID _Query Result". Below this, it displays "Number of features found: 1". A "Related Parcel" section shows details for a specific parcel: "SHAPE_Length 135.11" and "SHAPE_Area 1,067.13". A "Parcels_OID" link is also visible.

The "Analysis" widget interface shows three analysis tasks: "Choose Best Facilities", "Connect Origins to Destinations", and "Create Buffers". Each task is represented by a small diagram and a help icon.

#3

Use for Decision Making & Planning– Operational Dashboards, Hub sites

ArcGIS Dashboards



Department of Forest - A GIS based Operational Dashboard

Select Circle: ALL | Division: ALL | Range: ALL | Block: ALL | Rest: ALL

Assets	Plantation
Total Rest House: 12	Total Plantation: 16,700

Rest House Details:

- SEOG 2 ROOM
- FTI CHIAL 3 ROOM
- KHALINI 9 ROOM
- GANAHATI 2 ROOM
- TOTU 6 ROOM
- SUNNI 3 ROOM
- KHATNOL 1 ROOM
- KARYALI 2 ROOM
- HIMRI 3 ROOM
- KOTI 2 ROOM
- THACHI 2 ROOM

Plantation Details:

- Beat : SUNNI Trees Planted : 2,200.00
- Beat : KADHARGHAT Trees Planted : 2,200.00
- Beat : KARYALI Trees Planted : 1,600.00
- Beat : HIMRI Trees Planted : 1,600.00

Beatwise Plantation:

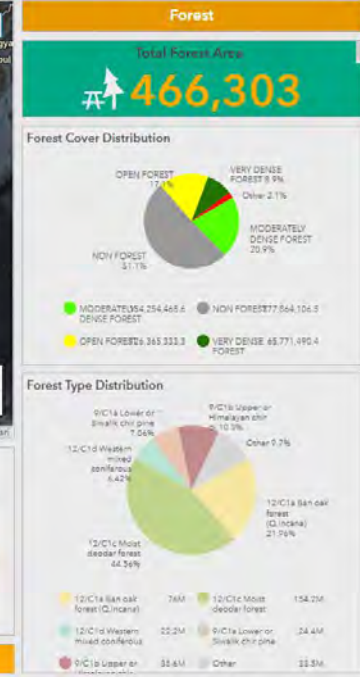
Beat	Plantation
SUNNI	2,200
KADHARGHAT	2,200
KARYALI	1,600
HIMRI	1,600

State Progress (As on 01.01.21)

Annual Plan	% Achv
2.3M	38%

Vegetation Type (Area) and Bio Richness (Area in ha) charts are also present.

Click for Report, Charts and Information



Collaboration with ArcGIS Hub

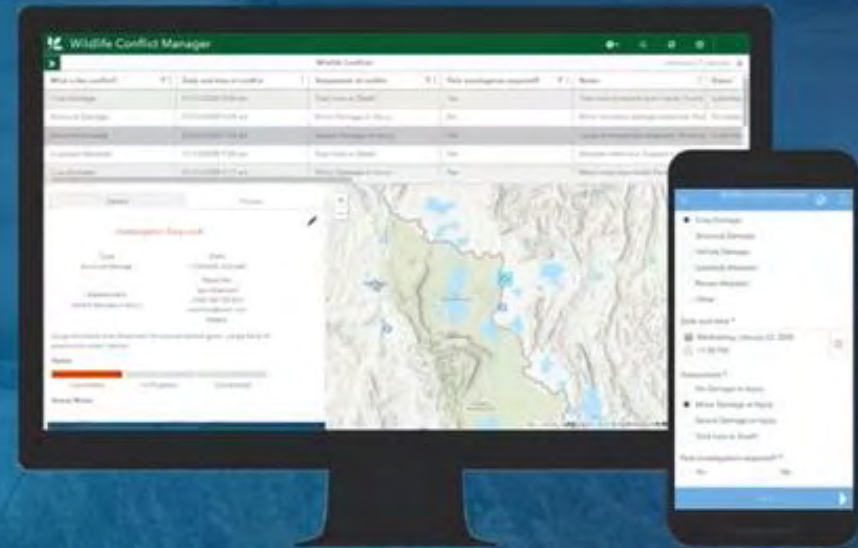
- Facilitate multi-stakeholder initiatives
- Launch initiatives to address issues, missions, or project goals
- Share open data to support community decisions
- Engage partners through focused maps and apps



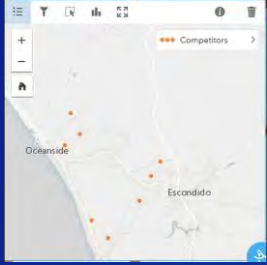
ArcGIS Solutions for Conservation

Overview and Demo

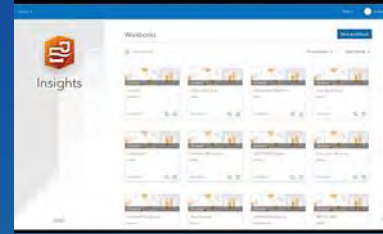
Let's See the Solution Hub.....



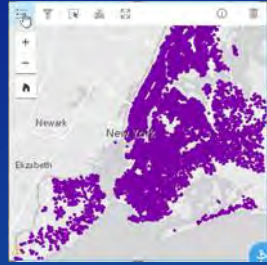
Summary



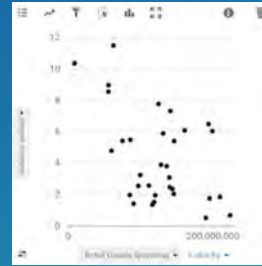
Analysis



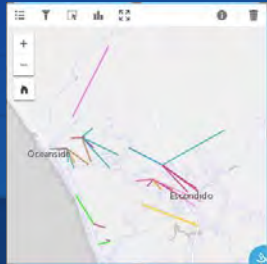
Connect to Data Sources



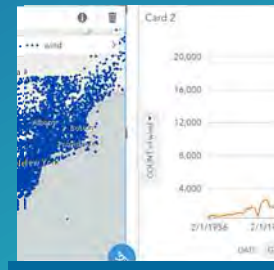
Visualization



Add Demographic Data



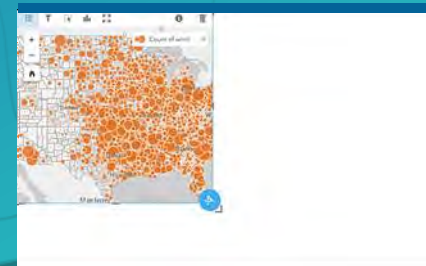
Explore, Iterate



Share and Communicate



Guided Workflows



Record and Rerun Workflows

Humans have a long, storied relationship with forests. This globe illustrates the proximity of many major urban centers to Earth's tree-covered areas.

More trees Fewer trees

Data: UMD/Google/USGS/NASA

- Fewer than 100,000 people
- 100,001 to 9,999,999 people
- More than 10,000,000 people





Thank you !!