

# Eco-Logical Webinar Series



## A New Data Tool for Implementing Eco-Logical: Eco-Plan Beta Testing

Presenters

September 10, 2014

**Brian Gardner**, Federal Highway Administration,  
Office of Planning

[\(Learn more about Eco-  
Logical at the FHWA website\)](#)

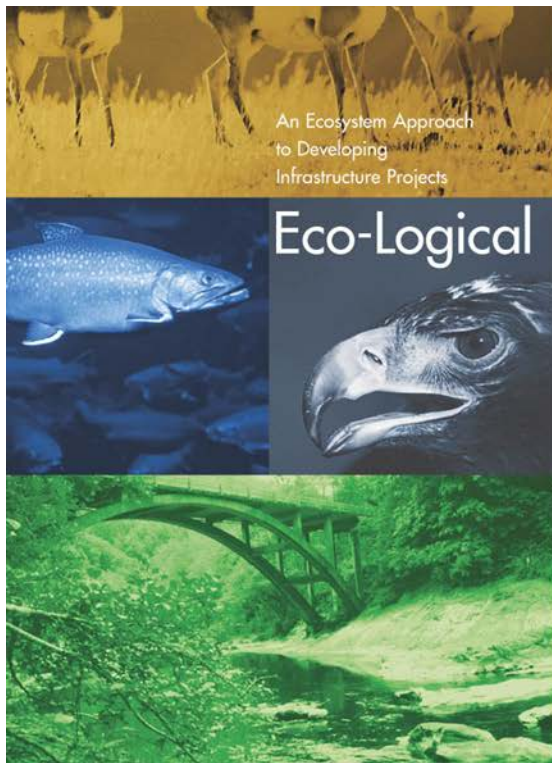
**Stephen Ziegler**, ICF International

# Steps to Ensure Optimal Webinar Connection

This webinar broadcasts audio over the phone line and through the web room, which can strain some internet connections. To prevent audio skipping or webinar delay we recommend participants:

- Close all background programs
- Use a wired internet connection, if possible
- Do not use a Virtual Private Network (VPN), if possible
- Mute their webroom audio (toggle is located at the top of webroom screen) and use phone audio only

# Where did the idea for Eco-Plan originate?



Prepared by the Steering Team  
April 2006

Signed by the Steering Team Partners' Leadership

Dale Bosworth, Chief of Forest Service  
Forest Service  
U.S. Department of Agriculture

J. Richard Capka, Acting Administrator  
Federal Highway Administration  
U.S. Department of Transportation

Kathleen Clarke, Director  
Bureau of Land Management  
U.S. Department of the Interior

George S. Dunlop, Principal Deputy  
Assistant Secretary  
Department of the Army

H. Dale Hall, Director  
U.S. Fish and Wildlife Service  
U.S. Department of the Interior

Fran Mainella, Director  
National Park Service  
U.S. Department of the Interior

Anne Miller, Director  
Office of Federal Activities  
U.S. Environmental Protection Agency

Diane Regas, Director  
Office of Wetlands, Oceans, and Watersheds  
U.S. Environmental Protection Agency

James R. Walpole, General Counsel  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration

# Steps of the Eco-Logical approach

1. **Build and strengthen collaborative partnerships**
2. **Integrate natural environment plans**
3. **Create a Regional Ecosystem Framework (REF)**
4. **Assess effects on conservation objectives**

Partner  
Share Data  
Analyze Effects

5. Establish and prioritize ecological actions
6. Develop crediting strategy

Identify key sites  
and actions

7. Develop programmatic consultation, biological opinion, or permit
8. Implement agreements, adaptive management, and deliver projects
9. Update REF


Document  
Implement  
Evaluate

# Steps of the Eco-Logical approach

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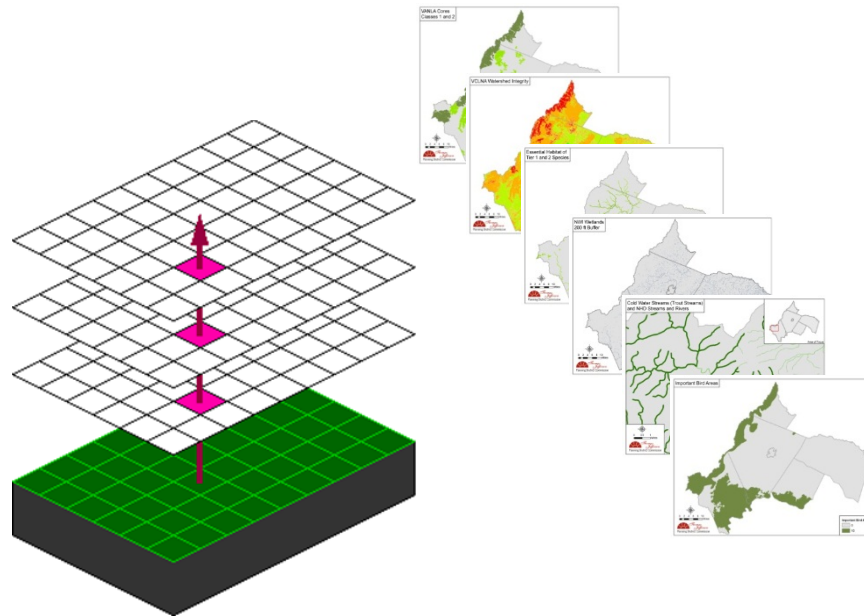
Partner  
Share Data  
Analyze Effects

Identify key sites  
and actions

Document  
Implement  
Evaluate

# What is Eco-Plan?

- An interactive, web-mapping tool that overlays national resource data and preliminary project data to inform pre-NEPA discussions regarding resource concerns and mitigation opportunities



# What is the process to develop and support Eco-Plan?

## Research

- SHRP2 C06 -> EcoLogical
- SHRP2 C40 -> EcoPlan

## Evaluate

- Pilots
- Beta testing

## Implement

- Convene, Facilitate, Collaborate
- Host
- Finance

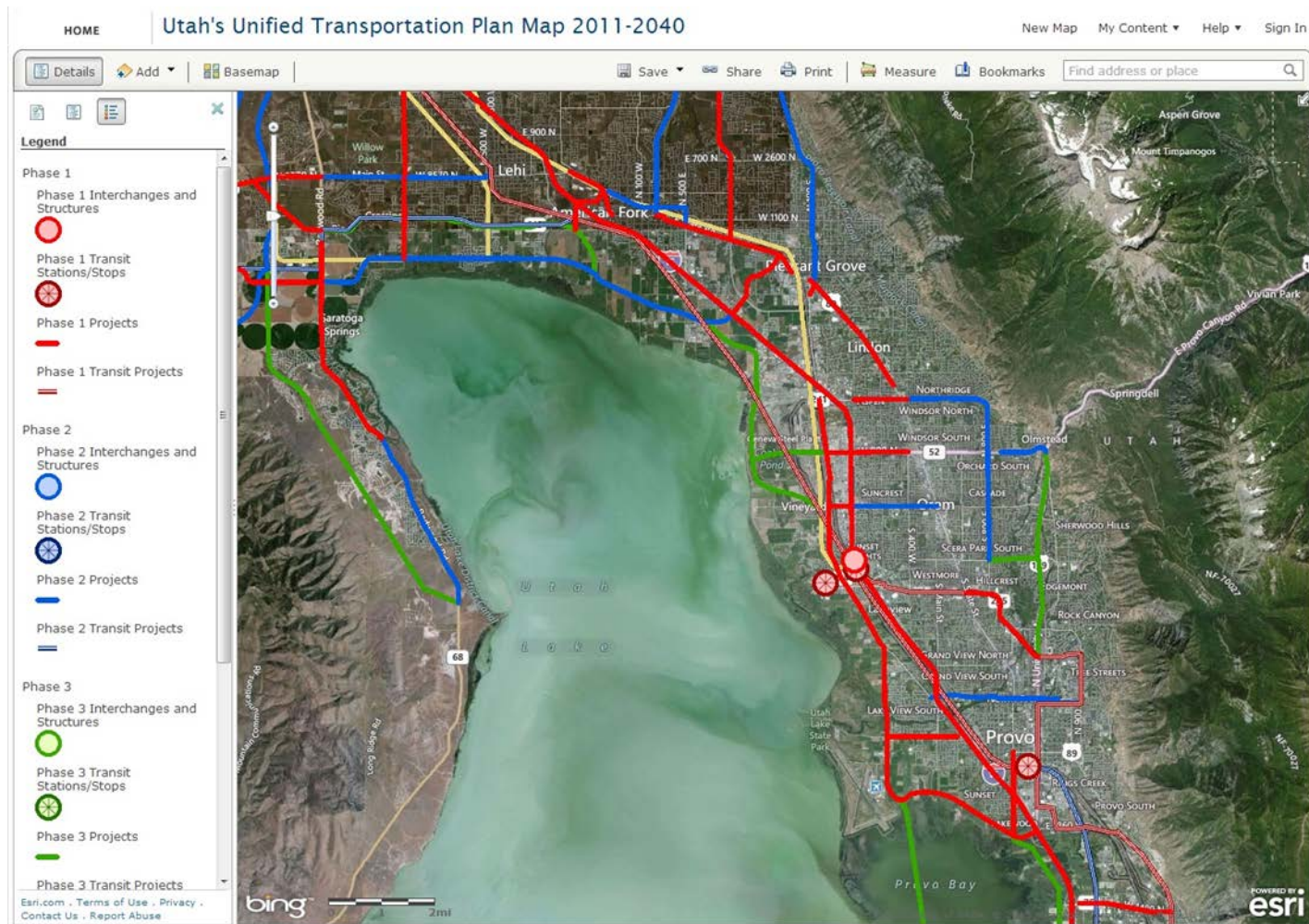


# Where does geospatial data fit into the planning process?





# Where does geospatial data fit into the planning process?



# How can I apply Eco-Plan?

- **CalTrans** evaluated the transferability of Eco-Plan to California's Regional Advance Mitigation Planning Framework impact assessment method (RAMP)
- **East-West Gateway Council of Governments** explored how those with limited GIS experience and staff at small MPOs could access national level environmental datasets
- **Contra Costa Transportation Authority** compared Eco-Plan's effectiveness to other tools in a feasibility study

# How can I provide feedback?

FHWA is seeking beta testers of Eco-Plan and Eco-Plan Advanced. As you test the tool, please email [mike.ruth@dot.gov](mailto:mike.ruth@dot.gov) with feedback on:

1. Ease of use for various levels of GIS expertise
2. User interface
3. Anticipated time/money costs or savings
4. How the tool can be used on current projects
5. Compatibility with other data and tools
6. Relationships to other tools
7. General feedback – Do you like the tool? Would you use it?

# Eco-Logical Webinar Series



## Eco-Plan Beta Testing

[\(Learn more about Eco-Logical at the FHWA website\)](#)

- **Brian Gardner**, Federal Highway Administration ([Brian.Gardner@dot.gov](mailto:Brian.Gardner@dot.gov))
- **Stephen Ziegler**, ICF International ([Stephen.Ziegler@icfi.com](mailto:Stephen.Ziegler@icfi.com))
- **Mike Ruth**, Federal Highway Administration ([Mike.Ruth@dot.gov](mailto:Mike.Ruth@dot.gov))
- **Haley Peckett**, Volpe Center/USDOT ([Haley.Peckett@dot.gov](mailto:Haley.Peckett@dot.gov))



## Eco-Plan

### SHRP 2 C40A Product Overview

Prepared for:

**FHWA Pilot Webinar**

**Steve Ziegler**

**September 10, 2014**

# Agenda

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- **Project Overview**
- **Vision**
- **Architecture**
- **Eco-Plan Overview**



# Project Overview

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## ■ SHRP C40A Integration of National-Level Geospatial, Ecological Tools and Data

### ■ Scope

- Build a national-level GIS tool to provide the data and analysis
- Support *Eco-Logical* and Integrated Ecological Framework (IEF)
- Focus on novice users with little in-house GIS resources
- Leverage Federal web services to provide up-to-date data
- Pre-NEPA ecological screening

### ■ Process

- Form several groups to provide design input and testing feedback
  - C40Bs, User Group, Technical Expert Task Group, Beta Testers
- Gathered and documented needs
- Developed a vision
- Designed the architecture
- Tested and updated based on feedback

# User and Testing Help

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## ■ State, MPO and Research Feedback

### State DOTs

- Alaska
- Maine
- Utah

### MPOs

- Dallas/Ft. Worth (Dallas/Ft. Worth, TX)
- East-West Gateway Council of Governments (St. Louis, MO)
- North Front Range Metropolitan Planning Organization (Ft. Collins, CO)
- Rogue Valley Council of Governments (Jackson Co., OR)
- Thomas Jefferson Planning District Commission (Charlottesville, VA)

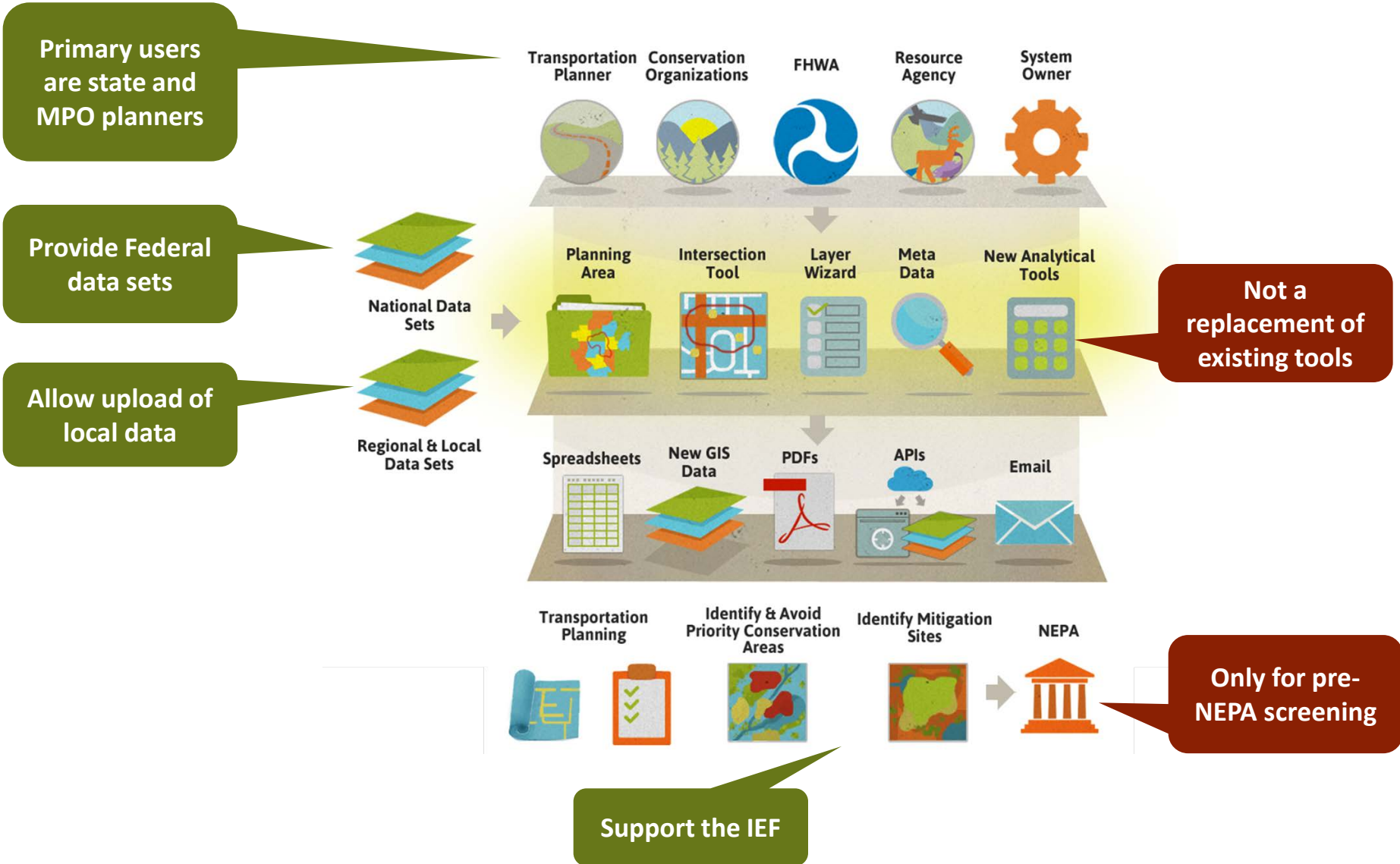
### Research

- University of California, Davis
- Missouri Resource Assessment Partnership (MoRAP)

### Others

- AASHTO TIG 2
- EPA Region 6
- FHWA
- Parsons
- Idaho Department of Fish and Game

# Vision



# Architecture – Eco-Plan and Eco-Plan Advanced



## Eco-Plan

Eco-Plan supports transportation planning by providing prepared maps of national ecological data sets that can be used to avoid and minimize transportation impacts.

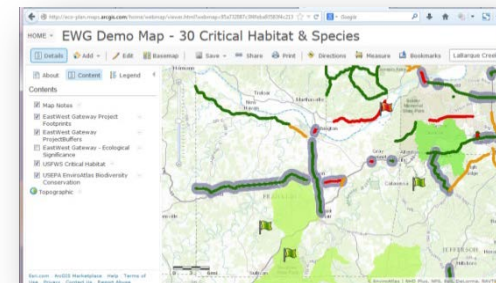
- ✓ Review maps of national ecological data sets
- ✓ Find data and other useful GIS information
- ✓ Upload or draw a planning area or transportation network
- ✓ No GIS skills needed



## Eco-Plan Advanced

Eco-Plan Advanced, a separate website hosted by Esri ArcGIS Online, provides all of the information available through Eco-Plan with additional capabilities.

- ✓ Add any data set to the prepared maps of national ecological data
- ✓ Set up groups to save, share and comment on maps
- ✓ Conduct GIS analysis and create reports
- ✓ Requires GIS skills
- ✓ [Learn More](#)



# Architecture - Data

## Natural Environment

### Land Cover, Soils and Geology

- Natural Resource Inventory and Monitoring, Vegetation (Mapping) Inventory Program (National Parks)
- Land Cover
- Forest Density
- Grassland Density
- Soil Survey Geographic (SSURGO)
- U.S. General Soil Map (STATSGO)
- Natural Resource Inventory and Monitoring, Geologic Resources Inventory
- National Geologic Map Database

### Species Distribution

- Digital Distribution Maps of various species

### Protected Lands and Waters

- National Wilderness Preservation System
- USFS Wilderness Areas
- USFS National Grasslands
- Protected Areas Database of the United States National Estuaries Restoration Inventory
- USFS Basic Ownership
- US Fish and Wildlife Service Regional Boundaries
- USFS Wild and Scenic Rivers
- USFS Other National Designated Areas
- Administrative Boundaries of National Park System Units
- Protected Areas Database
- Federal Lands
- National Conservation Easement Database
- National Marine Sanctuary Area Boundaries
- Sole Source Aquifers

### Water and Wetlands

- Streams
- Water Bodies
- National Wetlands Inventory
- Watersheds/Hydrologic Units (HUC)
- Q3 Flood Hazards
- Flood Hazard Zones

### Habitat

- North American Bird Conservation Joint Ventures Map Services
- FWS Critical Habitat
- Riparian Areas of the Western United States
- Areas without Roads

## Built Environment

### Environmental Contamination

- Ozone 8-hour (by 1997 and 2008 standards)
- Lead (by 2008 standard)
- Fine Particle (PM2.5) Annual (by 1997 and 2006 standards)
- Hazardous Waste (RCRAInfo)
- Air emissions (AFS)
- Water dischargers (PCS/ICIS)
- Toxic releases (TRI)
- Superfund (CERCLIS)
- Brownfields (ACRES)
- RADInfo
- Toxic Substances Control Act (TSCA)
- USGS water monitors (NWIS)
- EPA water monitors (STORET)
- Impaired Streams and Water bodies

### Land Use

- Road Density
- Major land uses in the United States
- Transportation Systems

## Cultural/Social

### Demographics

- Demographic Characteristics (Race, Ethnicity, Gender, etc. as available from 1990, 2000, and 2010 Census)
- Housing Historic Density (1979 and 2010)
- Housing Historic Density (Projected 2050)
- Population Density (2000 and 2010)

### Political Boundaries

- States
- Cities
- Counties
- Urban Areas
- Legislative Boundaries
- MPO Boundaries

# Eco-Plan Overview



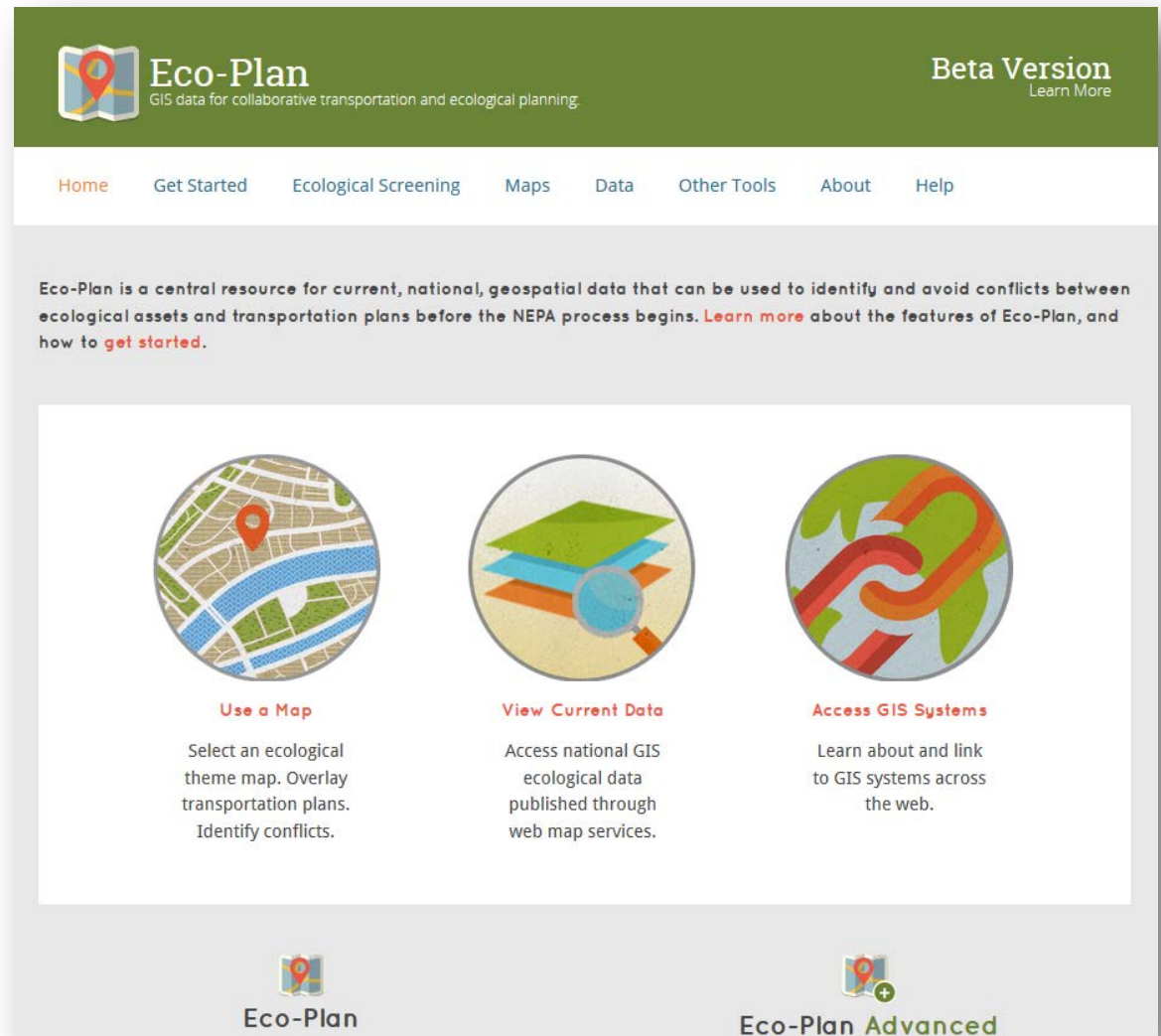
# Demo

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- **Live demo with slides as backup**

# Home

- Introduce the user to the tool
- Encourage the user to use a map, view data, or see other tools
- Describe Eco-Plan and Eco-Plan Advanced



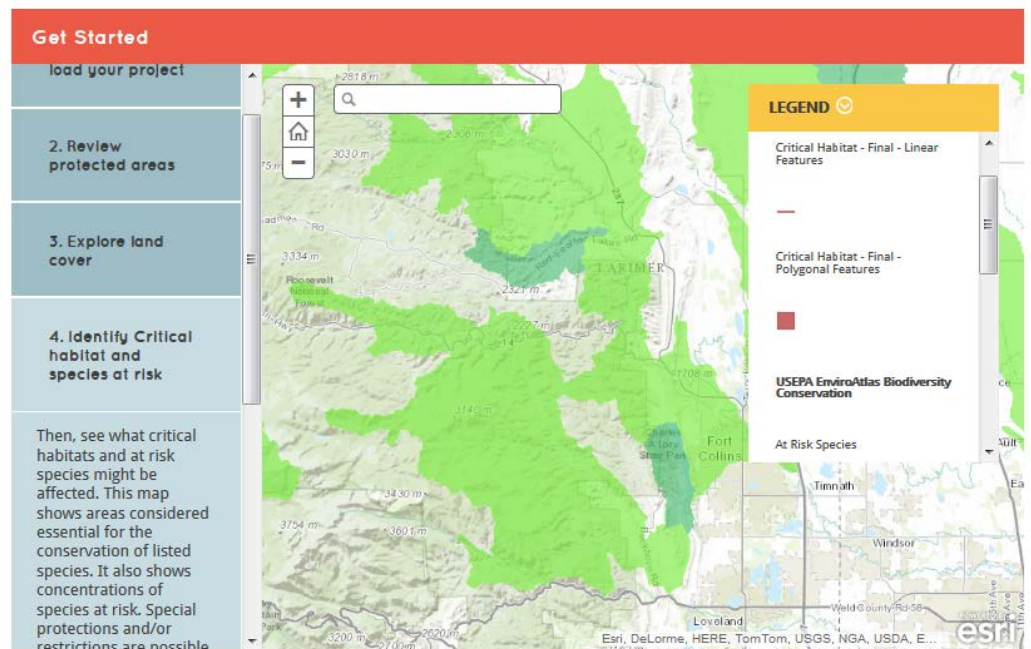
# Get Started

- Introduce the user to the theme maps
- Provide an interactive view of several themes of data

## Get Started

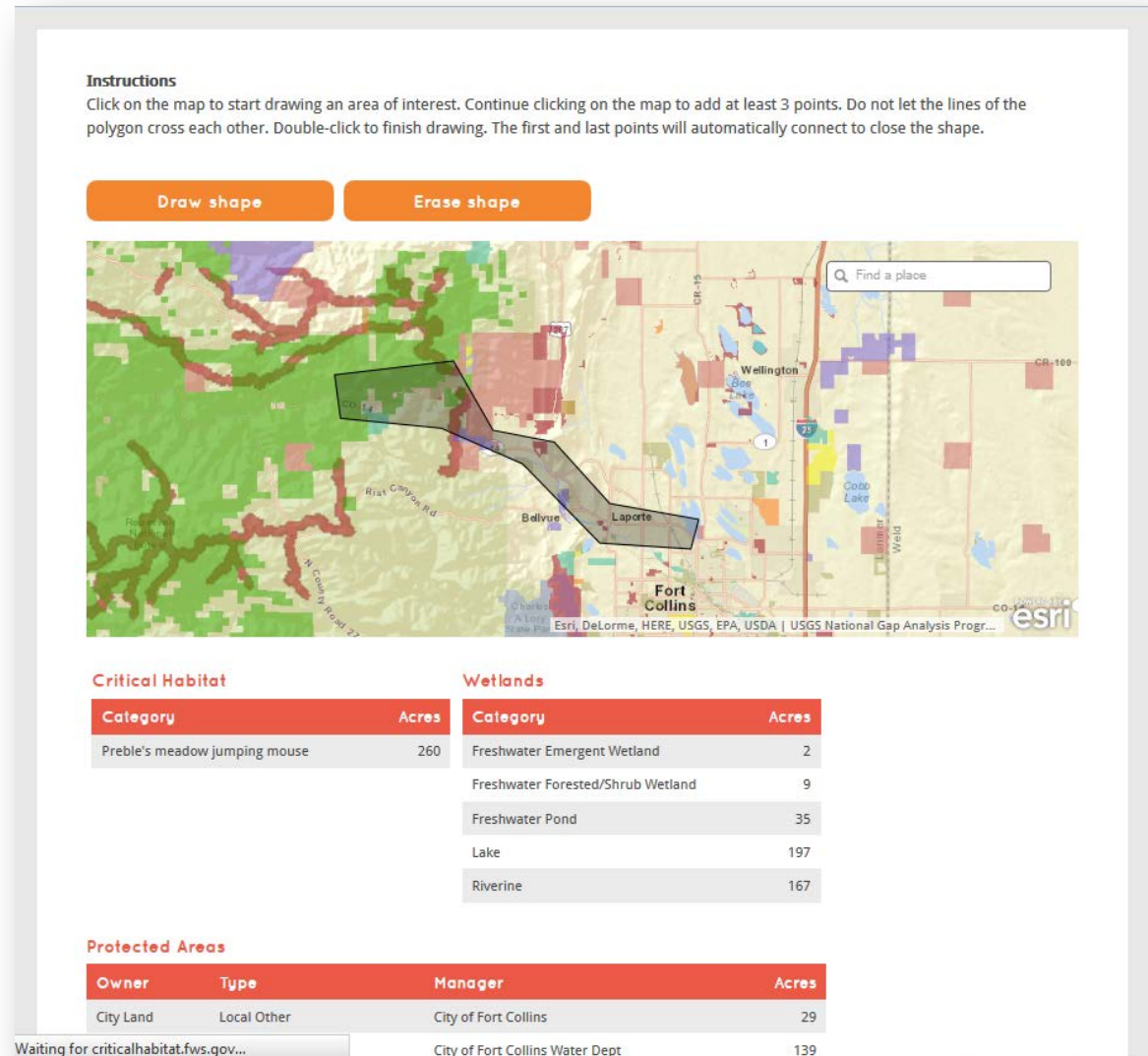
Eco-Plan brings together data and maps to support integrated transportation and ecological planning. It provides examples and guidance to help transportation professionals identify and avoid potential ecological impacts of their transportation plans. Eco-Plan can be an early step in preparing to create a regional ecological framework using the **Integrated Ecological Framework**.

Use Eco-Plan to compare the location of planned transportation projects with ecological theme maps. These maps use national data sets which are kept up-to-date and published on web services by authoritative sources. They are intended for regional planning guidance before NEPA, not site-specific environmental analysis and permitting.



# Ecological Screening

- Provide a simple ecological screening tool based on the user's shape
- Prototype functionality limited to
  - Several states
  - Only critical habitat, wetlands, and protected areas data
- Waiting for future owner to expand



# Maps

- Gallery of themes maps and popular data services

## Recommended Theme Maps



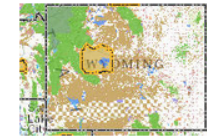
### Critical Habitat and At Risk Species Theme

US Fish and Wildlife Service's Critical Habitats and NatureServe's At Risk Terrestrial Species layers are displayed



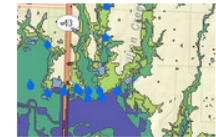
### Development Potential in Unprotected Areas Theme

Development potential (road and activity density) is shown with protected areas and critical habitat



### Protected Areas and Boundaries Theme

This map shows political boundaries (state, county, municipalities) along with protected areas in the U.S



### Watersheds and Wetlands Theme

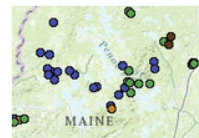
Wetlands, watershed boundaries, water monitoring locations, and shoreline in the U.S

## Popular Map Services



### USGS GAP Land Cover Theme

The USGS GAP national land cover provides information on the vegetation of the United States to help with conservation or land use planning decisions.



### TNC Protected Lands Theme

Lands and waters in which The Nature Conservancy (TNC) has a legal interest are shown in this map.



### National Wilderness Preservation System Theme

This map shows boundaries for the National Wilderness Areas that are managed by the U.S. Forest Service (NFS)

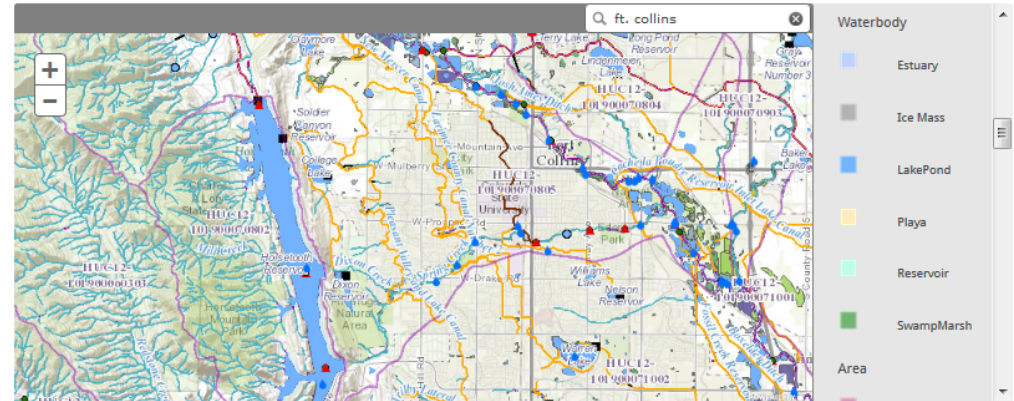


# Map Details

- Detailed information on the theme maps
  - Description
  - How To Use
  - Tips
  - Things To Be Aware Of
  - Data Services

## Map: Watersheds and Wetlands Theme

**Summary:** Wetlands, watershed boundaries, water monitoring locations, and shoreline in the U.S



[Upload your transportation plan](#)

[Open Eco-Plan Advanced](#)

**Description:** This map displays wetlands, watershed boundaries, water monitoring locations, and shoreline in the U.S using the following data:

- The extent, approximate location, and type of wetlands and deep water habitats in the U.S. and its territories from the US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI).
- The US Geological Survey (USGS) watershed boundaries for hydrologic unit code (HUC) levels: 2, 4, 8, 10, and 12 from the National Hydrography Dataset (NHD).
- National water quality data from STORET, a database administered by the U.S. Environmental Protection Agency (EPA).
- A medium-resolution, single-line shoreline for the U.S. from the National Oceanic and Atmospheric Administration (NOAA).

### How To Use The Map:

- Add your project and zoom to its location.
- Use the NWI layer to identify wetland features that are close to your project.
- Use the STORET layer to identify water quality monitoring stations that are close to your project.
- Hydrologic Unit Codes appear as labels on the map.
- Zoom the map in to a large city to see the map features. If your project is large you may have to zoom in to a portion of the project to see these features.

**User Tip:** The Wetlands layer will be visible when the map is zoomed to a large city.

The STORET layer will also be visible when the map is zoomed to a large city.



# Data

- List of authoritative data sources useful in transportation planning and resource conservation
  - Natural Environment
  - Cultural/Social
  - Built Environment

The screenshot displays the Eco-Plan website interface. At the top, the header includes the Eco-Plan logo (a map icon with a red location pin) and the text "Eco-Plan GIS data for collaborative transportation and ecological planning." To the right of the header is a "Beta Version" badge with a "Learn More" link. Below the header is a navigation bar with links: Home, Get Started, Ecological Screening, Maps, Data (highlighted in orange), Other Tools, About, and Help.

The main content area is titled "Data Gallery" and contains the following text: "This is a portal of authoritative, national, geospatial data sets that can support implementation of the **Integrated Ecological Framework**. This portal only includes map services published by the data provider. The data on Eco-Plan are updated automatically when the data provider updates the data used in the map services. The Data Gallery does not include data sets that must be downloaded and processed. Use this portal to:

- Search for data, view information about data (metadata), and learn how it can be used.
- Open any single data set in the provider's web map service.

Below this text is a note: "Access the data through Eco-Plan Advanced for functions like selecting multiple data sets to view on a map, adding state or local data, and conducting analysis." Underneath the note are three orange buttons: "Natural Environment", "Cultural / Social", and "Built Environment".

The "Natural Environment" button is selected, leading to a section titled "Natural Environment" with a leaf icon. This section is divided into two columns:

- Habitat**
  - USEPA Ecoregions Level III and IV
  - USFWS Critical Habitat
  - USGS Ecosystems
  - USGS Land Cover (Ecological Systems)
  - USGS Land Cover (National Vegetation Classification - Class Land Use)
  - USGS Land Cover (National Vegetation Classification - Division Land Use)
  - USGS Land Cover (National Vegetation Classification - Formation Land Use)
  - USGS Land Cover (National Vegetation Classification - Subclass Land Use)
- Land Cover, Soils, and Geology**
  - USDA NRCS Soil Survey Map
  - USGS Land Cover (Ecological Systems)
  - USGS Land Cover (National Vegetation Classification - Class Land Use)
  - USGS Land Cover (National Vegetation Classification - Division Land Use)
  - USGS Land Cover (National Vegetation Classification - Formation Land Use)
  - USGS Land Cover (National Vegetation Classification - Macrogroup Land Use)
  - USGS Land Cover (National Vegetation Classification - Subclass Land Use)

# Data Details

- Details on authoritative data sets
  - Source
  - URL
  - Status
  - Description
  - User Tips
  - Things To Be Aware Of
  - Additional Information

The screenshot shows the Eco-Plan website interface. The header is green with the Eco-Plan logo and tagline 'GIS data for collaborative transportation and ecological planning' on the left, and 'Beta Version' with a 'Learn More' link on the right. A navigation bar below the header contains links: Home, Get Started, Ecological Screening, Maps, Data (highlighted in orange), Other Tools, About, and Help. The main content area has a light blue header for the data title: 'Data: NPScape Population Density Census 2010 (Tiled)'. Below this, the page provides details for the data source, URL, status, description, user tips, and things to be aware of.

**Eco-Plan**  
GIS data for collaborative transportation and ecological planning

**Beta Version**  
[Learn More](#)

[Home](#) [Get Started](#) [Ecological Screening](#) [Maps](#) [Data](#) [Other Tools](#) [About](#) [Help](#)

### Data: NPScape Population Density Census 2010 (Tiled)

**Source:** National Park Service

**URL:** [http://lrmaservices.nps.gov/ArcGIS/rest/services/NPScape/NPScape\\_Population\\_Density\\_Census2010\\_Tiled/MapServer](http://lrmaservices.nps.gov/ArcGIS/rest/services/NPScape/NPScape_Population_Density_Census2010_Tiled/MapServer)

**Status:** Publication Date: 2012 Progress: Completed Updated: Unknown

**Description:** The National Park Service created two data services to show population growth around the national parks. Population densities for 2000 and 2010 were based on US Census block-group data.

This dataset displays 2010 population density in a raster format. Raster cells are tagged with a value to indicate population density. Cells in urban areas will have a higher value than cells in rural areas. The 2000 population density dataset could be compared with this dataset to document urban growth.

The National Park Service also created three datasets to show housing growth around the national parks. See the following three data services in the Eco-Plan Data Gallery: NPScape Housing Historic Density (1970), NPScape Housing Historic Density (2010), NPScape Housing Historic Density (2050).

**User Tip:** This data set is visible when the map is zoomed to the 48 continental states. Darker cells represent higher population density or an urban area; lighter cells have a lower population density.

Data stored in a raster format consists of a matrix of cells (or pixels) organized into rows and columns (or a grid) where each cell contains a value representing information. Examples of rasters are digital aerial photographs, imagery from satellites, digital pictures.

**Things To Be Aware Of:** The NPScape population metrics are intended to assist with determining the direct and indirect impact of housing on habitat, landscape structure, fragmentation, species composition, and hydrologic processes.

The data and maps provided through Eco-Plan are meant to be used by transportation professionals to identify and avoid potential

# Other Tools

- Gallery of other useful GIS planning tools

The screenshot shows the Eco-Plan website interface. At the top, there's a green header with the Eco-Plan logo (a map icon with a red location pin) and the text "Eco-Plan GIS data for collaborative transportation and ecological planning". To the right of the header, it says "Beta Version" with a "Learn More" link. Below the header is a navigation bar with links: Home, Get Started, Ecological Screening, Maps, Data, Other Tools (highlighted in orange), About, and Help.

The main content area is titled "Other Tools" and contains a paragraph: "Eco-Plan provides access to a range of other GIS tools that support integrated transportation and ecological planning. Through this portal you can learn about unique features of each tool, understand how each tool complements Eco-Plan, and access each tool directly." Below this paragraph are three orange buttons: "National", "Regional/State", and "Local".

The "National" button is selected, leading to a section titled "National GIS Tools". This section displays a grid of eight tool thumbnails. Each thumbnail includes a screenshot of the tool's interface and a brief description:

- Data Basin**: A science-based mapping and analysis platform developed by the Conservation Biology Institute that supports learning, research, and sustainable environmental stewardship.
- EnviroAtlas**: A web-based tool developed by US Environmental Protection Agency to view, analyze, and access information focusing on the benefits we receive from our environment.
- Environmental Conservation Online System (ECOS)**: A gateway web site providing access to data systems in the US Fish and Wildlife Service.
- ESA WEB TOOL**: An online tool developed by Federal Highway Administration to streamline preparation of Biological Assessments and the consultation process under Section 7 of the Federal Endangered Species Act.

Below these, there are four more tool thumbnails, but they are partially cut off at the bottom of the screenshot.

# Other Tools Details

## ■ Details of other user GIS planning tools

- URL
- Geographic Scope
- Source
- Analytical Functions and Reports Available
- Data Types
- Highlights
- When To Use
- Things To Be Aware Of


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GIS data for collaborative transportation and ecological planning.

Beta Version  
[Learn More](#)

[Home](#) [Get Started](#) [Ecological Screening](#) [Maps](#) [Data](#) [Other Tools](#) [About](#) [Help](#)

### Information Planning and Conservation System (IPaC)

The Information, Planning, and Conservation (IPaC) decision support system is a conservation planning tool for streamlining the environmental review process. It provides the ability to explore the landscape and help to site your projects in a way that minimizes conflicts with natural resources. With IPaC's landscape explorer tool, the user can view wetlands, GAP land cover, USFWS critical habitat, and other nature resource map layers. It also provides a preliminary USFWS species list and, in many locations across the U.S., a USFWS Official Species list. Available, too, are links to species life history information, the USFWS Migratory Bird program, Bald and Golden Eagle Protection Act information, and more.



**URL:** <http://ecos.fws.gov/ipac/>

**Geographic Scope:** National

**Source:** US Fish and Wildlife Service

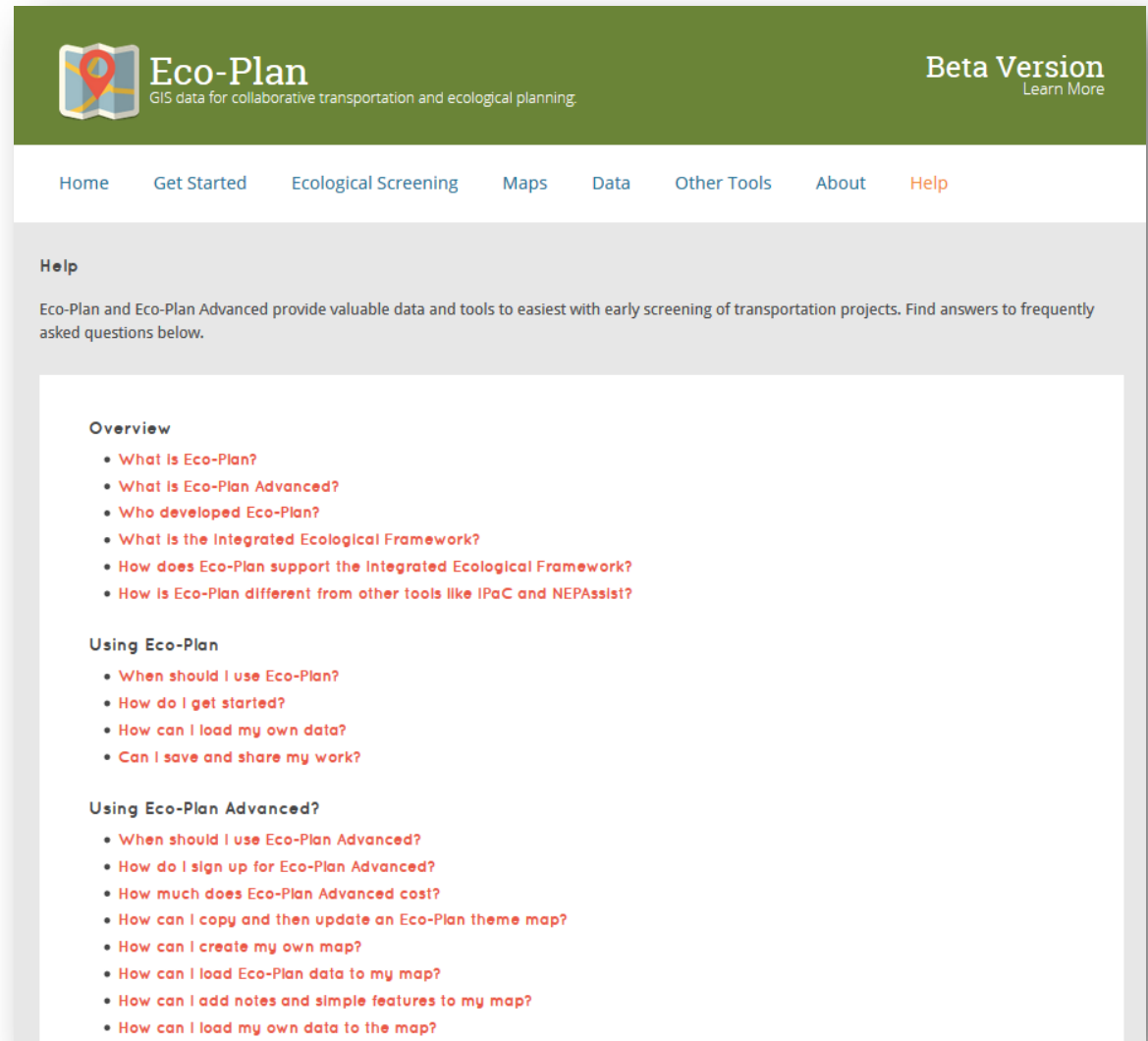
**Analytical Functions and Reports Available:**

- Spatial query (list features within the analysis boundary)
- Provides a report

**Data Types or Data Sets Used:** IPaC's landscape explorer tool allows users to view wetlands, GAP land cover, USFWS critical habitat, and other natural resource map layers. It provides lists of species and identifies resource conservation measures available in the project

# Help

## ■ Frequently Asked Questions



The screenshot shows the Eco-Plan website's Help page. The header is green with the Eco-Plan logo (a map icon with a red location pin) and the text "Eco-Plan GIS data for collaborative transportation and ecological planning." on the left, and "Beta Version Learn More" on the right. Below the header is a white navigation bar with links: Home, Get Started, Ecological Screening, Maps, Data, Other Tools, About, and Help (highlighted in orange). The main content area has a grey background with the heading "Help" and a paragraph: "Eco-Plan and Eco-Plan Advanced provide valuable data and tools to assist with early screening of transportation projects. Find answers to frequently asked questions below." Below this is a white box containing three sections of frequently asked questions, each with a list of links in red text.

**Eco-Plan**  
GIS data for collaborative transportation and ecological planning.

**Beta Version**  
[Learn More](#)

[Home](#) [Get Started](#) [Ecological Screening](#) [Maps](#) [Data](#) [Other Tools](#) [About](#) [Help](#)

### Help

Eco-Plan and Eco-Plan Advanced provide valuable data and tools to assist with early screening of transportation projects. Find answers to frequently asked questions below.

#### Overview

- [What is Eco-Plan?](#)
- [What is Eco-Plan Advanced?](#)
- [Who developed Eco-Plan?](#)
- [What is the Integrated Ecological Framework?](#)
- [How does Eco-Plan support the Integrated Ecological Framework?](#)
- [How is Eco-Plan different from other tools like IPaC and NEPAassist?](#)

#### Using Eco-Plan

- [When should I use Eco-Plan?](#)
- [How do I get started?](#)
- [How can I load my own data?](#)
- [Can I save and share my work?](#)

#### Using Eco-Plan Advanced?

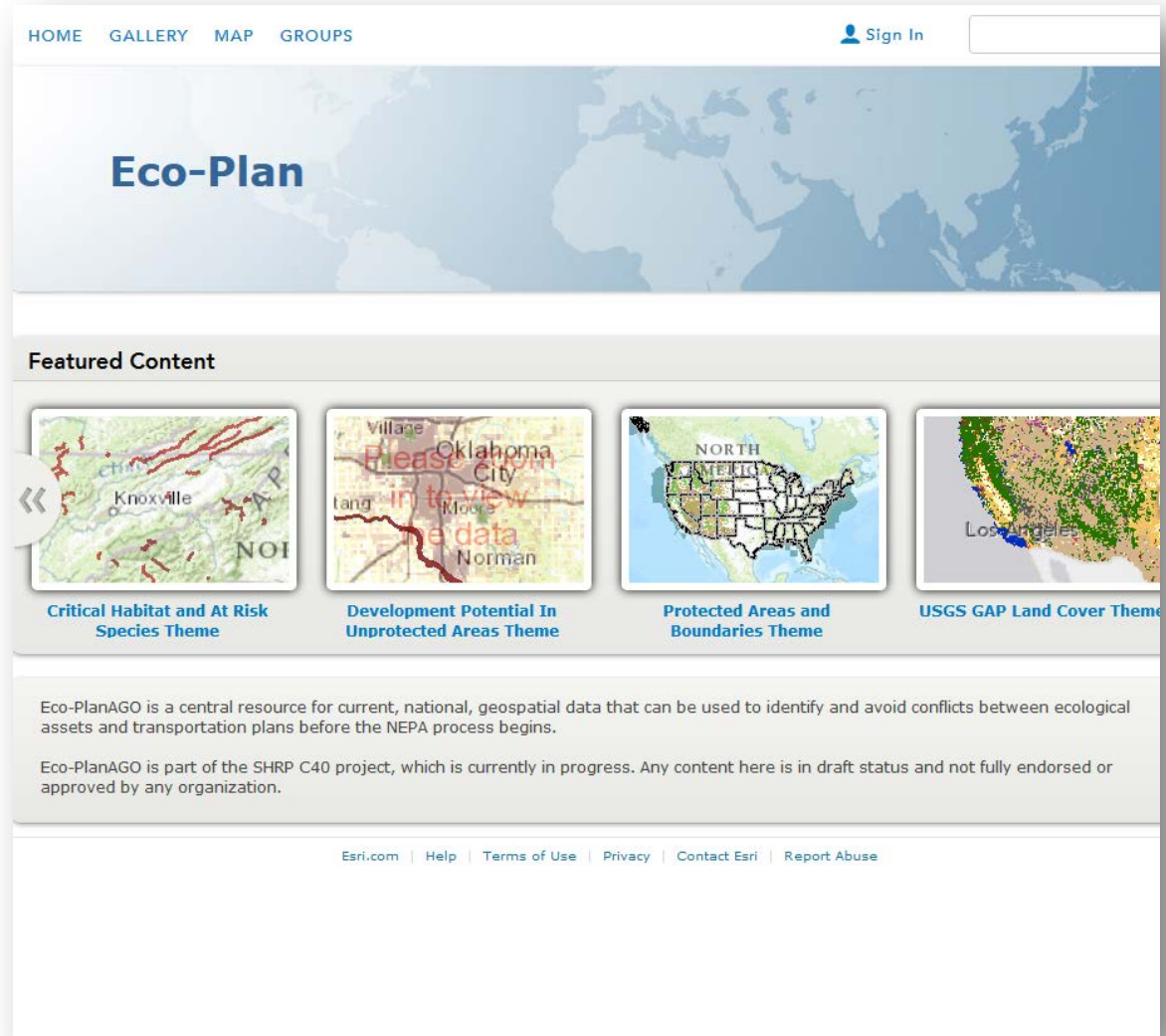
- [When should I use Eco-Plan Advanced?](#)
- [How do I sign up for Eco-Plan Advanced?](#)
- [How much does Eco-Plan Advanced cost?](#)
- [How can I copy and then update an Eco-Plan theme map?](#)
- [How can I create my own map?](#)
- [How can I load Eco-Plan data to my map?](#)
- [How can I add notes and simple features to my map?](#)
- [How can I load my own data to the map?](#)

# Eco-Plan Advanced Overview



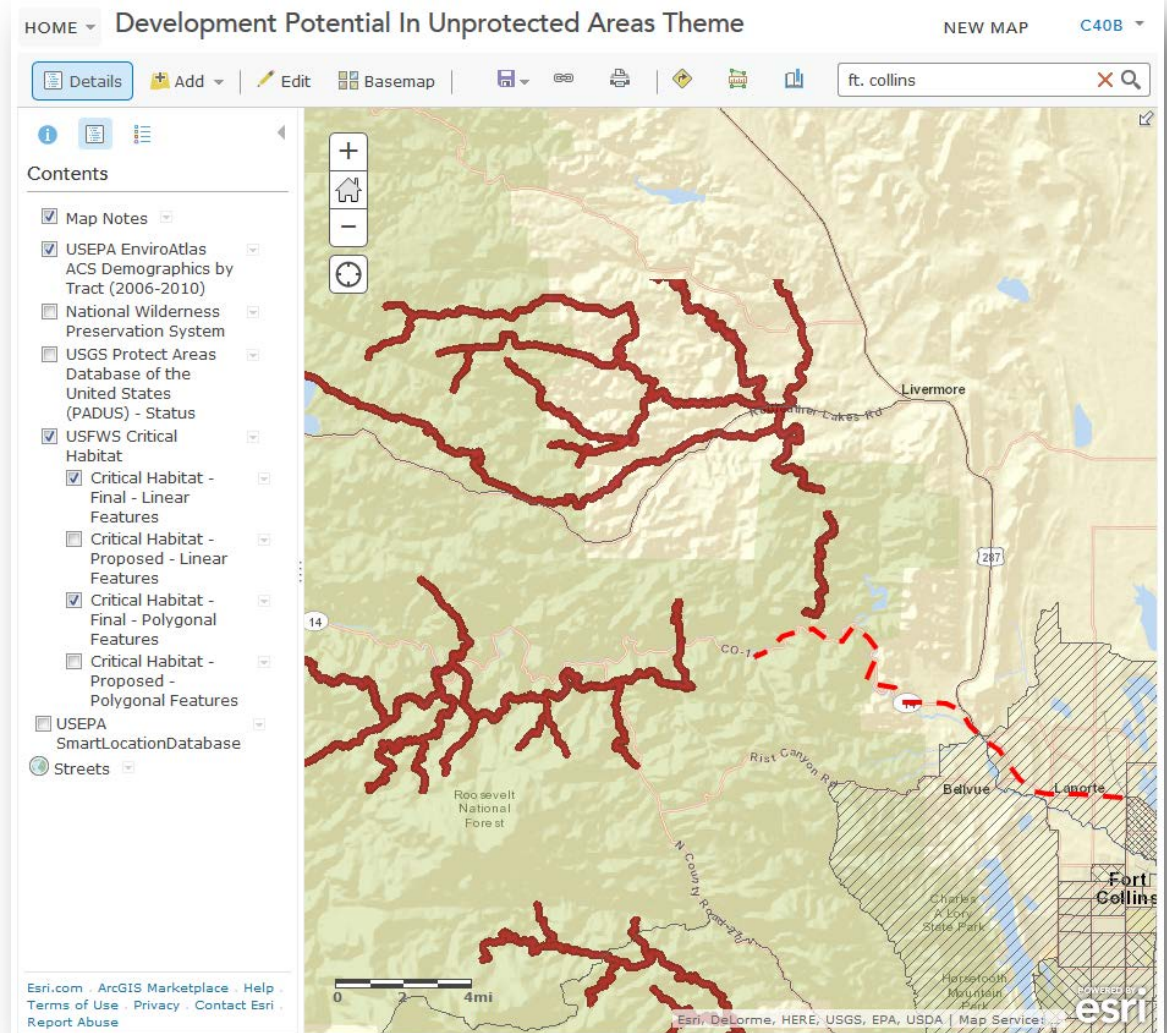
# Eco-Plan Advanced Home

- Gallery of recent maps



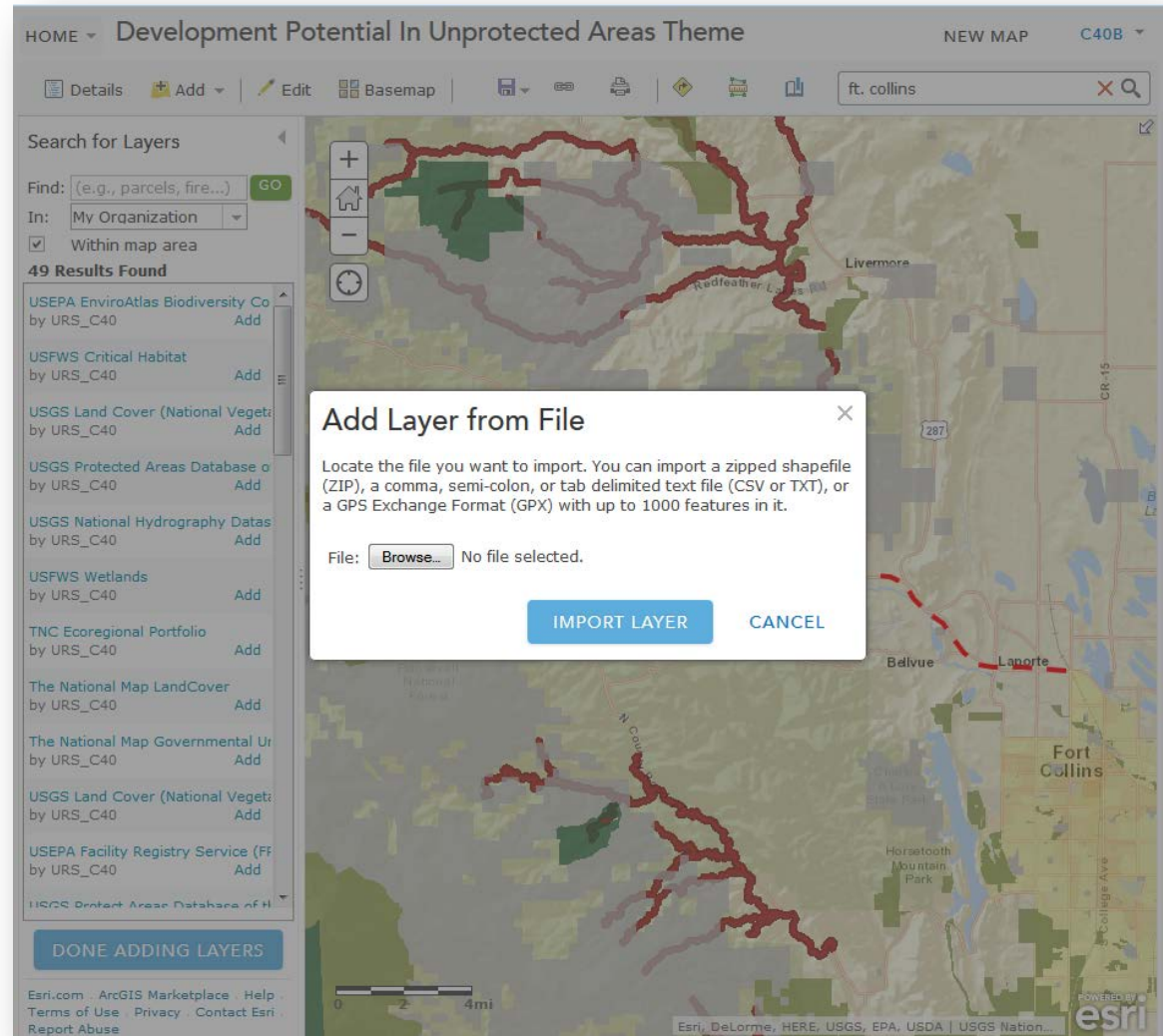
# Customize Maps

- Find and copy existing theme maps for customization
- Show/hide data layers



# Add Local Data

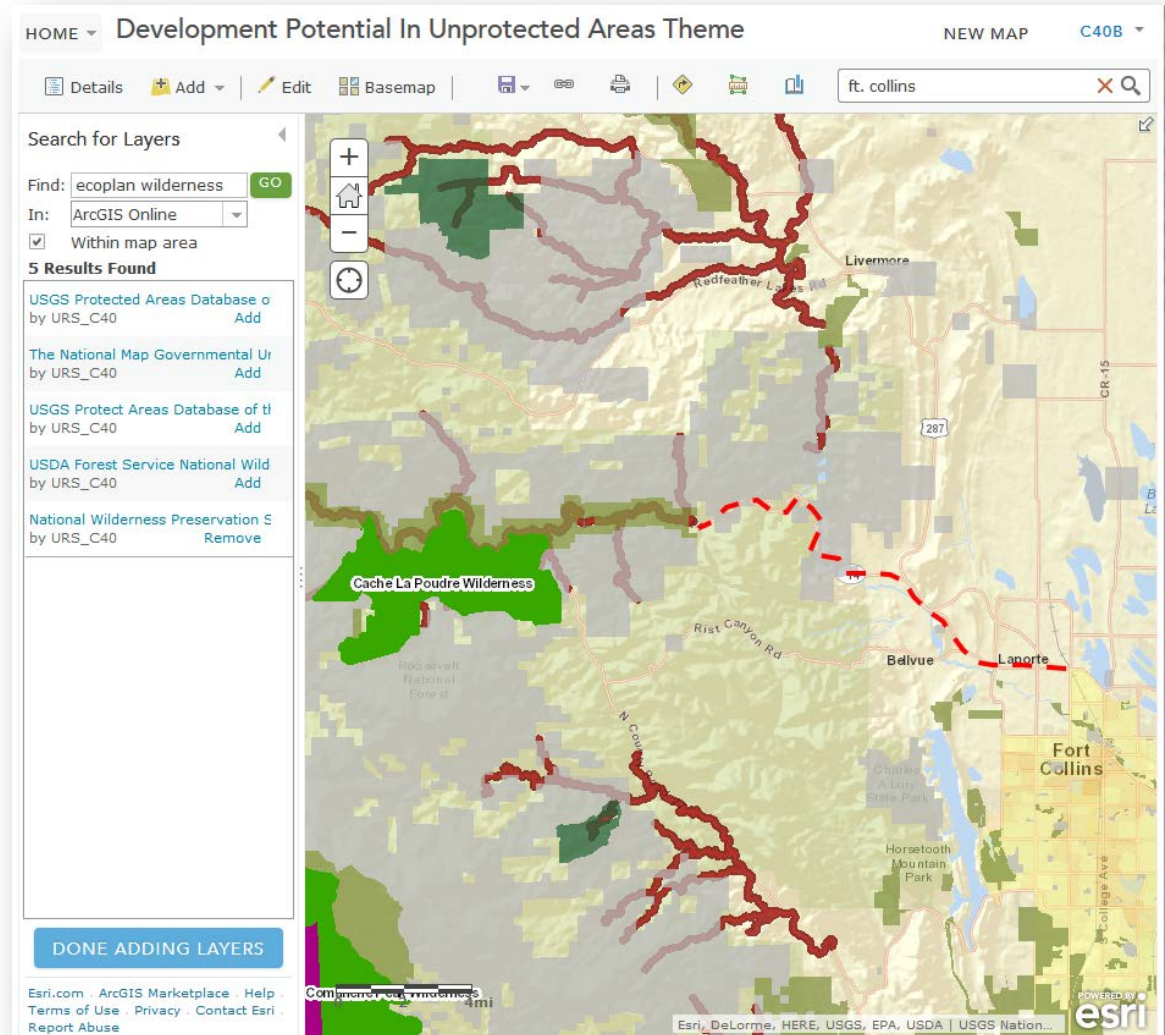
- Add your own local data from shape files





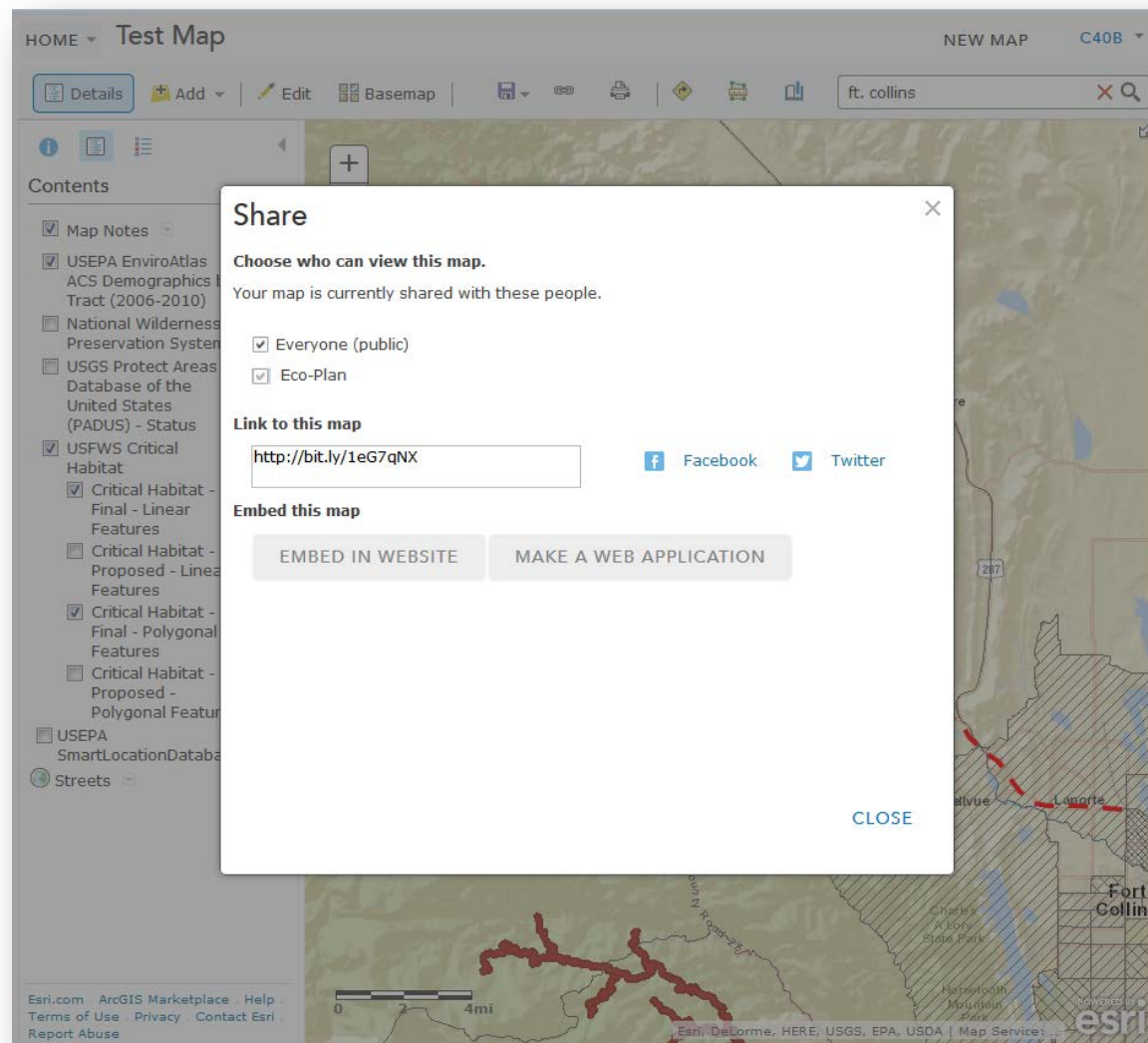
# Add Other Data From Web

- Search for authoritative data sets identified by Eco-Plan
- Add data sets from ArcGIS Online or the Web



# Share

- Share maps/data with the public or selected groups



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