NatureServe
A Network Connecting Science With Conservation

NatureServe's Environmental Review Tool

A Repeatable Online Software Solution for Agencies

Arizona Game & Fish
MANAGING TODAY FOR WILDLIFE TOMORROW

Pennsylvania Department of Natural Resources
PNDI Receipt: project_report_prahls_island_test_1556_2652.pdf

1. PROJECT INFORMATION

Project Name: **Prahls Island Test**
Date of Review: **3/31/2015 09:19:03 AM**
Project Category: **Timber harvesting and Vegetation Management, Contr**
species
Project Area: **9.15 acres**
County(s): **Bucks**
Township/Municipality(s): **TINICUM**
ZIP Code: **18947**
Quadrangle Name(s): **LUMBERVILLE**
Watersheds HUC 8: **Middle Delaware-Musconetcong**
Watersheds HUC 12: **Paunnacussing Creek-Delawar**
Decimal Degrees: **40.445256 N, -75.067982 W**
Degrees Minutes Seconds: **40° 26' 42.9232'' N, 75° 4'**

2. SEARCH RESULTS

Agency	Results
PA Game Commission	**Potential Impa**
PA Department of Conservation and Natural Resources	No Known Impa
PA Fish and Boat Commission	**Conservation**
U.S. Fish and Wildlife Service	**Potential Impa**

As summarized above, Pennsylvania Natural Diversity
impacts to threatened and endangered and/or special o
response above indicates "No Further Review Required"
required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency
comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental
Protection Permit is required.

NCDENR
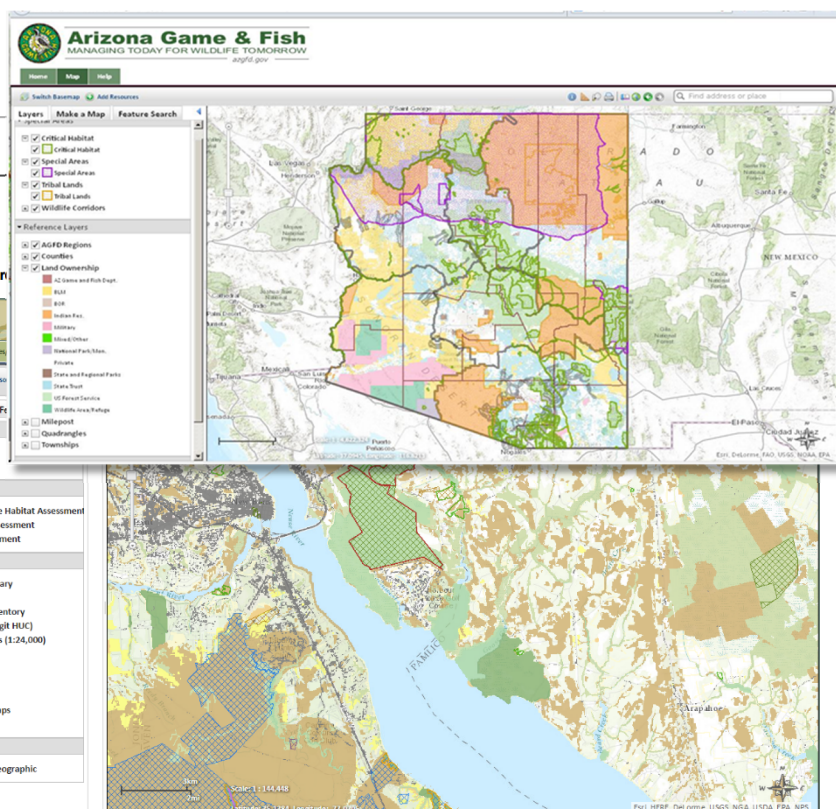
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Introduction

NatureServe has developed an environmental review tool (ERT) online application framework, currently successfully deployed for the states of Virginia, Arizona, and North Carolina with further deployments for Louisiana and Pennsylvania in development. By leveraging and extending this existing robust platform, NatureServe can deploy a new custom ERT for other agencies and organizations within 3-9 months, depending on the level of customization required.
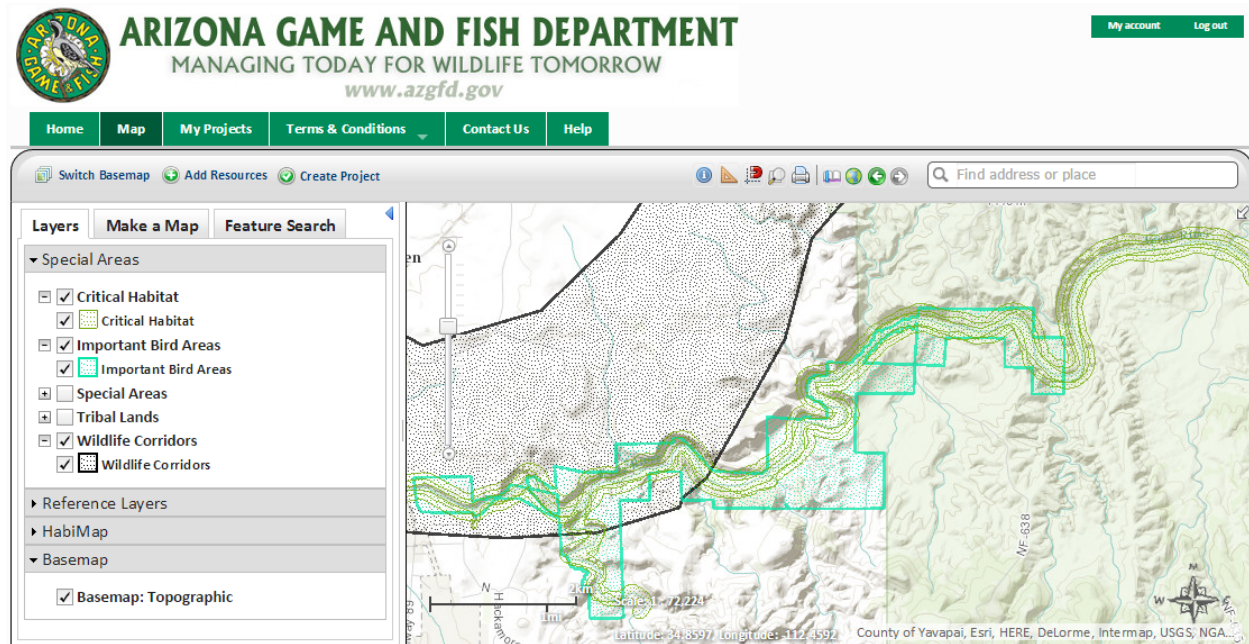
The Arizona Online Environmental Review Tool map viewer shown here includes standard map navigation, drawing, and search tools. The Layers tab organizes all of the map layers into one or more layer groups and displays the map legend information.

Environmental Review Tool (ERT) Framework

The ERT is built primarily on two third-party products: the Drupal Content Management System and ArcGIS for Server. The ERT's core functions allow:

- Access to natural resources and other map layers via a secure web map viewer.
- Ability for public users to explore and query map layers and make maps, e.g. for conservation planning purposes.
- The submission of projects for environmental review screening.
- The automated review (via a geoprocessing service) of submitted projects and production of PDF reports, including embedded maps.

Using the Drupal CMS as the base for the platform ensures that the ERT is flexible, easily tailored to meet an Agency's specifications, and provides Agency Administrators the ability to manage system configurations and update contents on a day to day basis.

ERT uses ArcGIS Server for its GIS needs (licensing cost additional). Layers are hosted for display and query and a geoprocess performs the detailed GIS analyses required for project review. System

functionality is therefore logically and cleanly split between the Drupal front end and the ArcGIS backend, so that each component performs only the job that it is best at.

ERT users can be assigned to a given access level, such as:

- Anonymous – public web users allowed access to unrestricted data.
- Customers – self-registered users can be placed into various user 'roles', where each role can give tailored access to more sensitive resources or to additional application functionality.
- Agency Reviewers – users who work for the sponsor agency and are allowed privileged access. Such users are normally tasked with reviewing projects.
- Administrators – highly privileged users who may administer certain system configurations.

Summary of Available System Features

Core "out of the box" ERT Features

The core ERT platform is configurable to include the following features:

- User management with role based security and administration.
- Website customization to include logo, background colors, borders, fonts, general look and feel.
- Web page content creation and management.
- Web map viewer with standard navigation tools, drawing tools, print capability, etc.
- Map layer table of contents with configurable layer naming, ordering, and grouping.
- Configurable layer visibility tied to user role
- Project input and submission, access based on role.
- Customizable project submission details, with option for uploaded file attachments.
- Customizable project review analysis function – compares submitted project shapes against one or more analysis layers and generates a result report.
- Customizable project review result report – contains configurable elements, such as a map and tabular details, conflict/no-conflict language supplied by the Agency.
- Project boundary shapefile generation and email notification when review complete.
- Agency reviewer access to submitted projects, including on screen review using map viewer zoom to project shape.
- Admin functions to support user management, report text management, project review analysis triggers, project types, email templates, and other configurable elements.
- Secure, high-availability hosting with nightly backup.

Optional "advanced" ERT Features

The ERT platform may optionally be customized to include advanced features, at additional cost determined by the level of effort required to meet the desired specifications:

- Advanced custom project review analysis and results, which may include multiple result reports and/or multiple maps, based on complex criteria where report details can vary depending on user role.
- Advanced custom workflows, which may include enhanced project status management, coordination among multiple agencies, etc.
- Project versioning – users may edit either project details or site geometry as submission for another project review.

- Project footprint feature service – a secure feature service to allow access to submitted project footprints via the Map Viewer.
- Species Search module – custom lookup of species lists from user supplied data.
- Subscription based access – users belong to a Subscription and access is governed by the role assigned to that Subscription.
- Payment processing – credit card processing on a project submission basis, subscription basis, or upon user registration.
- Custom archiving, data migration, or other data extraction functionality.

System Architecture Details

As previously mentioned, the ERT is built primarily upon Drupal and ArcGIS technologies. Drupal provides the framework for the website component and ArcGIS provides the necessary tools for visualizing and analyzing map data. In addition, technologies such as the Apache HTTP Server and a database (such as MS-SQL Server or MySQL) are part of the ERT architecture.

Drupal

The Drupal CMS provides the user and content management components for the system. The flexibility in the Drupal framework provides the ability to enhance or customize various aspects of the ERT. The following sections describe some of these customizations which we feel would be most relevant to most, if not all, ERT implementations.

User Roles

The most common ERT User Roles have been defined as follows, yet are customizable based upon the needs of the individual Site.

- Anonymous – potential customers who find or are directed to ERT
- Customer – typically a basic user with limited privileges
- Partner – typically a user who would be granted access to sensitive heritage data
- Agency Reviewer – Agency staff users who evaluate/review projects
- Site Administrator – Agency staff users with privileges to configure system settings and contents

User Registration

Leveraging the Drupal user registration functions, the ERT provides the following basic user management functions. The ERT has also extended Drupal to provide reliable spam protection as related to user registration.

- Self-registration for anonymous (public) users
- Email verification
- Password recovery
- Site Administrator access for user management functions such as altering user roles, changing passwords, or canceling user accounts.

User Profile

In addition to the Drupal default fields of email address and password, the ERT extends the User Profile to include the following fields for capturing user details upon registration:

- First name
- Last name
- Organization/Business Affiliation

- Mailing Address
- Phone Number
- Salutation (optional)
- Fax Number (optional)

Content Types

The ERT leverages the concept of Drupal Content Types to define the relevant elements as needed by the ERT to perform its functions. The Content Type elements are the "meta" descriptions for Site Content and, as such, will be pre-configured in the system prior to the ERT becoming available to end users. Site Administrator users will have Administrative functions available to add or configure Site Content as determined by the Content Types.

- Layer Group
  - o Provides for logical grouping of layers in the map viewer table of contents
- Layer
  - o Represents a single layer which should appear in the map viewer table of contents, referenced by published map service URL
  - o Source can be internal to ERT or any other web accessible server
  - o Supports Map, Feature, and WGC services
  - o Layers can be marked secure and thus only viewable via ERT
- Project Type
  - o A hierarchal based representation of the types of projects to be submitted for review
  - o Supports configuration of buffer amounts in standard units (feet, miles, meters, km)
  - o Coordinates with Report Text site content for project type specific triggers
- Project
  - o Represents the details of a submitted project, including, but not limited to, the project area, description, ID, status, submitter details, related user attached files, and generated reports.

An optional configuration allows Administrators to specify the list of Project Types available when submitting a project and associated recommendations to be included in the project report text.

- Report Text
  - o Represents a formatted piece of text to be inserted into a project report
  - o Report Text content can incorporate existing report language and/or can be dynamically configured by the Site Administrator as needed.

- o   A text editor supports a wide variety of text formatting, including adjustment of font sizes, bold/italics, colors/highlighting, and/or tables, etc.
- Dynamic Analysis Trigger
  - o   Represents the dynamic configuration of layer-specific project review triggers
  - o   Coordinates with Report Text site content for layer or attribute triggers
- Email Template
  - o   Represents pre-defined email structure and text, which can be triggered at various points in the workflow
  - o   The templates support tokens such as '[user:email]', which will dynamically insert the relevant user's email address into the text

Email Templates

Title	Body
project-email-template	Dear [node:field_ertcore_contact_name], **Project:** [node:title] **Project ID:** [node:field_ertcore_project_id] **Date Submitted:** [node:created:short] **On Behalf Of:** [node:field_ertcore_on_behalf_of] **Organization:** [node:field_ertcore_organization] **Project Description:** [node:field_ertcore_project_desc] **Project Status:** [node:field_ertcore_project_status] **(insert text**…
review-complete-external	Dear [user:name], An initial review of your project, entitled [node:title], has been completed. The resulting report can be found at [node:url] If natural…

Site Administrator users have extensive content configuration options, including Email Templates that combine pre-defined static and dynamic report text contents.

Content Permissions
Content Permissions are extensively defined for all User Roles across all Site Content, as related to viewing, editing, or managing Site Content and related fields. For example, a Project could be submitted by a Customer, but the project status may only be updated to Completed by an Agency Reviewer.

Map Viewer
A custom full screen Map Viewer has been developed using JavaScript and ArcGIS JavaScript APIs, which includes, but is not limited to, the following features:

- Layer Catalog
  - o   Filter and Feature Search functions available per layer, as configured
- Add Map Resources
  - o   Inclusion of map layers from any available map service using URL
  - o   Import Shapefiles from a conforming .zip shapefile
- Standard pan/zoom, previous, next, original extents, etc.
- Zoom to Coordinates and Geocoded Search
- Tools for Identify, Measure, and Snap To
- Drawing Tools for Points, Lines, and Polygons

- Custom Feature Search Tool supports queries for all layers with published fields
- Custom Make A Map Tool supports map annotations and may incorporate any visible layers
- Print visible Web Map as PDF or Image
- Custom Submit Project for Project Review

ERT includes customizable map viewer components including a Feature Search tool (shown at left) that allows users to query available map layer attributes and a Make a Map tool (shown at right) that allows users to mark up their map with annotation shapes and labels.

Automated Project Review

The ERT provides a framework for project review, where a background process is triggered by a request for project review event. ArcGIS tools are utilized for developing and publishing a customized and secure Analysis geoprocess, which is invoked by the ERT during the project review process. Review inputs and outputs are customized as required and may include elements such as:

- Review Inputs:
  - The project site boundary as submitted by user
  - Project buffer amount, as either pre-defined or configured by Site Administrator
- Analysis geoprocess is executed, as customized
- Review Output(s):
  - Geoprocess results containing intersected features, as related to sensitive, planning, and/or reference layer data
  - Map services such that output results can be visualized in review report, if desired

- Project Review Output:
    - A PDF document capturing the necessary details as defined by the Agency
    - Esri Print Task services used for generating report map images
    - Layers included in report maps may be defined by Agency
    - Result report is stored with the associated Project in the ERT
- Relevant users are notified of Project Review completion using configured Email Template(s)

Project Review Output

As described above, a fully customized PDF document is generated by the Automated Project Review process. Texts configured as Report Text content can be statically or dynamically included in the report based upon the results of the analysis review. Various elements such as headers, footers, and watermarks can also appear on each page in the report, as desired.

Major Project Report sections typically include:

- Project information
- Static language
- Dynamic language specific to review results
- Species table
- Color map(s)
- Agency Disclaimers
- Agency Mission Statement

Project Listings

The ERT provides the following project lists, as relevant to the logged in user:

- My Projects
    - Available to the submitting User
    - Link to Project
- All projects
    - Available to relevant User Roles, such as Agency Reviewer and Site Administrator
    - Sortable and Searchable by most relevant project fields, such as Project ID, Submit Date, Project Type
    - Link to Project

Project Notes and Emails

The ERT provides functions where privileged users such as Agency Reviewer or Site Administrator may add notes to a project or send an email to the contact person of a project. Project Notes provide a convenient way to maintain review related or collaboration documentation specific to a project. Project Emails use a pre-defined email structure as configured in an Email Template allowing specific email details to be amended before sending to the user. Each email will be saved as a Project Note for history tracking purposes and the user sending the email will be cc'd to their own email address.

ArcGIS for Server

ArcGIS for Server provides the GIS backend of the system (licensing cost additional). It supports publishing map services, feature services, and geoprocesses as appropriate and they can be backed by either a relational enterprise geodatabase or file geodatabases, both of which are secure and very efficient.

As the ERT Map Viewer will be able to consume services from any source, it is possible for the ERT to host only a small subset of layers (at minimum those required for analysis). For example, the Map Viewer may consume Agency hosted species distribution model map services.

The Map Viewer respects all service formatting, thus scale dependencies, symbology, feature labeling, field labeling on Identify (via field aliasing), etc. are all set by the service publisher. It is therefore up to Agency staff to ensure the services are published in a format to meet ERT users' needs.

Review Geoprocess

Automated review of project submissions is performed by a standard ArcGIS geoprocess. This enables the ERT to leverage the full power of the Esri software platform to perform complex analyses. A clear separation of concerns between the front and backend processing is maintained, and as such, geoprocessing services can be authored and tested on the desktop before publishing, to ensure correct functionality. **Note** that the project review geoprocessing service(s) is secure and will never be available to systems outside of the ERT application.

Optional Components (can be included at additional cost)

Project Footprint Feature Service

A secure feature service may be elected to allow access to submitted project footprints via the Map Viewer. Features may contain the following attributes (at minimum):

- Project ID
- Project Title
- Project Description
- Project Version ID
- Link to Project page within ERT

As footprints are added or amended and reports generated, footprints will be added to this feature service. The feature service will be available to the Map Viewer and privileged users would see the Project Footprint layer in the Layer Catalog. **Note** that the service will never be publicly available.

Subscriptions

A subscription registration model may be elected to allow subscription-based access to the site. Under this model, individual user accounts are associated with a subscription. Agencies may opt for this model as a mechanism for collecting an annual subscription fee from an organization, for example.

Credit Card Payment Processing

Agencies that wish to collect fees for access to ERT functions may be elect to implement credit card processing on a project submission basis, subscription basis, or upon user registration.

Species Search Module

This optional module provides a custom natural heritage database search from user supplied data. The Virginia Natural Heritage ERT Species/Community Search tool example shown below allows users to specify name, status, and/or location search criteria. Results can include hyperlinks to species/community profiles on NatureServe Explorer or other online resource and can be saved to PDF.

The Virginia Natural Heritage Data Explorer, built on the ERT platform, includes an optional Species/Community Search module, shown here, which returns a list of natural heritage resources matching user specified search criteria that can be saved to a PDF.

Questionnaire for Estimating Customization Effort

1. How many map layers will be hosted (for viewing, query, or map making)?

2. How many map layers will be hosted (for project review analysis)?

3. How many environmental review projects per year are anticipated?

4. What is your Agency staff GIS capability?
    a. Low = require assistance to prepare data sources, map documents, and map services
    b. Medium = require guidelines and support for symbology
    c. High = can provide all GIS input ready to publish as-is

5. Do you require customized end user online help documentation?

6. Do you require Site Administrator user training?

7. Do you have specific database software requirements?
    a. Standard implementation includes MySQL (no extra cost)
    b. Optionally can configure to use SQL Server (additional licensing costs apply)

8. Can your Agency provide an ArcGIS Server license? If no, additional licensing costs apply.

9. What level of site styling is required?
    a. Low = standard ERT theme with your Agency logo and color scheme
    b. Medium = deeper restyling to include background colors, images, borders, fonts, etc.
    c. High = responsive to work on mobile devices

10. What level of project review customization is required?
    a. Basic – single results report, one standard map, basic conflict tabular data and language
    b. Advanced – multiple reports, multiple custom maps, contents based on complex criteria

11. What additional customizations are required?
    a. Project editing – yes/no?
    b. Content versioning – yes/no?
    c. Custom Species Search lookup tool – yes/no?
    d. User/Data migration – yes/no?
    e. Credit card payment processing – yes/no?
    f. Subscription registration – yes/no?