



EcoAtlas - Lake Tahoe Environmental Improvement Program: Tool Integration White Paper

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EcoAtlas - EIP Reporting Tool Integration

INITIAL DISCUSSIONS - 2015

This section captures the discussions held in 2015 on ideas for integrations between [EcoAtlas](#) and [EIP Reporting Tool](#). It draws upon meetings held on April 27, 2015 (show 'n tell) and May 20, 2015 (brainstorming conference call), and research of both systems.

OVERVIEW

Today's environmental data management challenges lie not in creating new databases and tools, but in integrating them such that information can be readily shared and leveraged across multiple tools for multiple uses and users. Doing so will support new analyses, generate new insights, and enable long-term, multi-agency, landscape scale partnerships to drive restoration, mitigation, and conservation projects in high-return natural areas.

The EcoAtlas and the EIP Reporting Tool were developed independently to meet complimentary but different needs. While they both have capacity to store project information, and share some audiences, their purposes are distinct. This document outlines some opportunities for sharing information between the two tools, while allowing them to continue to serve their intended purposes. **Our premise is that automated data flows between them would provide value to users of either tool. Further, we expect these data flows will establish patterns that other tool providers can leverage.**

OBJECTIVES

The following are objectives for integrations between these two systems:

- Support more informed prioritization of projects in the Lake Tahoe basin. For example, EcoAtlas could show all wetland and SEZ projects in order to better assess current condition of these habitats.
- Minimize redundant data entry across the two systems.
- Demonstrate to all users, partners, and stakeholders that these two systems are complimentary. Specifically, clarify:
 - what each system is/does in order to minimize confusion, and
 - which tool is the system of record for various types of information.
- Provide Lake Tahoe basin project data to EcoAtlas users.

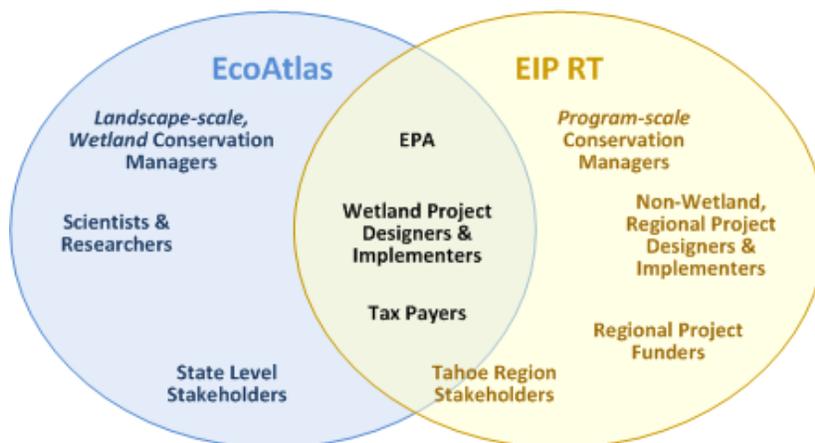
RESPONSIBILITIES OF EACH TOOL

EcoAtlas is a tool for visualizing the condition and extent of California's aquatic resources. Its primary audience includes landscape-scale wetland conservation managers and planners, scientists & researchers, wetland project designers/implementers, and state-level stakeholders. Its secondary audience is the general public (tax payers). The California Wetland Monitoring Group (CMMW) provides oversight for the development of content and functionality. Created by the San Francisco Estuary Institute and launched in summer of 2013, EcoAtlas has been funded to date by EPA and CA State Water Resources Control Board.

Its key strengths lie in its mapping functionality and providing centralized access to various condition datasets: for example, sediment and toxicity records provided by CA Exchange

Network (CEDEN), species data from CA Natural Diversity (CNDDDB), numeric scores of wetland conditions from CA Rapid Assessment Monitoring (CRAM), and surface water map layers from CA Aquatic Resource Inventory (CARI). While technically the tool could provide data from any region, as of June 2015, the majority of its data is for the Bay Delta, South Coast, and Central Coast regions (~700 projects, 2500 wetland condition data records, 7 map layers).

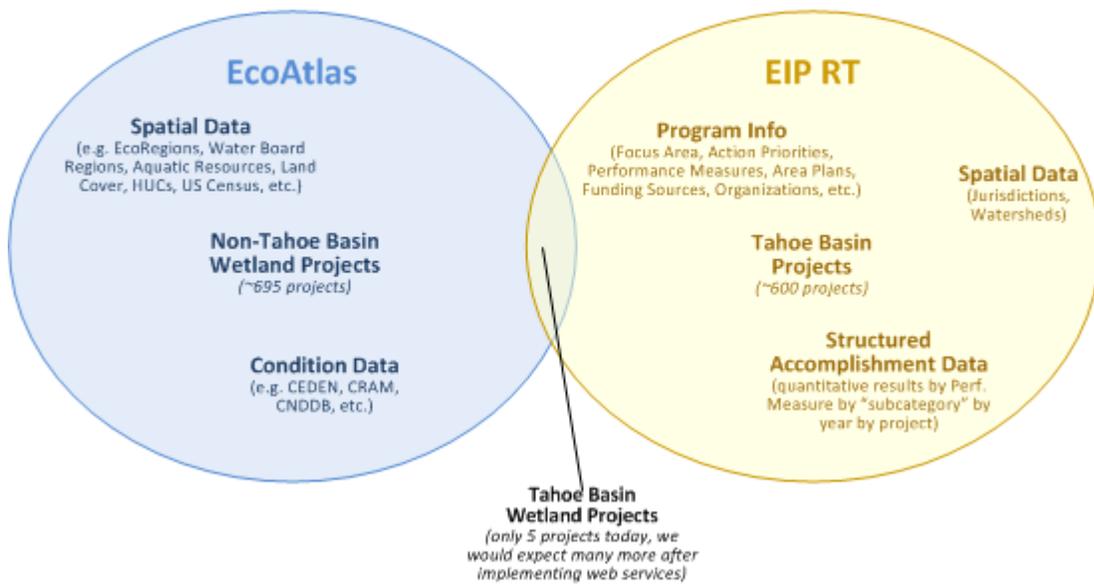
Audience Overlap



The **EIP Reporting Tool** tracks the funding and accomplishments of projects participating in Tahoe’s Environmental Improvement Program. Its primary audience includes Tahoe Basin project designers & implementers, conservation managers, project funders, and stakeholders (e.g. politicians, regional resource managers, regulators). Its secondary audience includes lake residents and tax payers. Created by Tahoe Regional Planning Agency (TRPA), the administrator of the EIP, the Reporting Tool was developed by Sitka Technology Group. Funded by EPA and TRPA, the EIP RT is the second attempt at creating a regional tool. While not officially launched, TRPA and EIP participants started using it regularly in late 2014 [Note: the formal public launch is scheduled for Summer/Fall 2015].

Its key strength is its workflow for capturing annual project information updates, in particular project expenditures by funding source and quantitative performance measure accomplishments. Users can also plot their projects on a map and upload before/after photos, which enables automatic generation of project Fact Sheets. These data are automatically aggregated and summarized in graph and data table formats. As of June 2015, it holds ~600 project records spanning 2007-present, and provides details on \$442M of investments.

Content Overlap Today

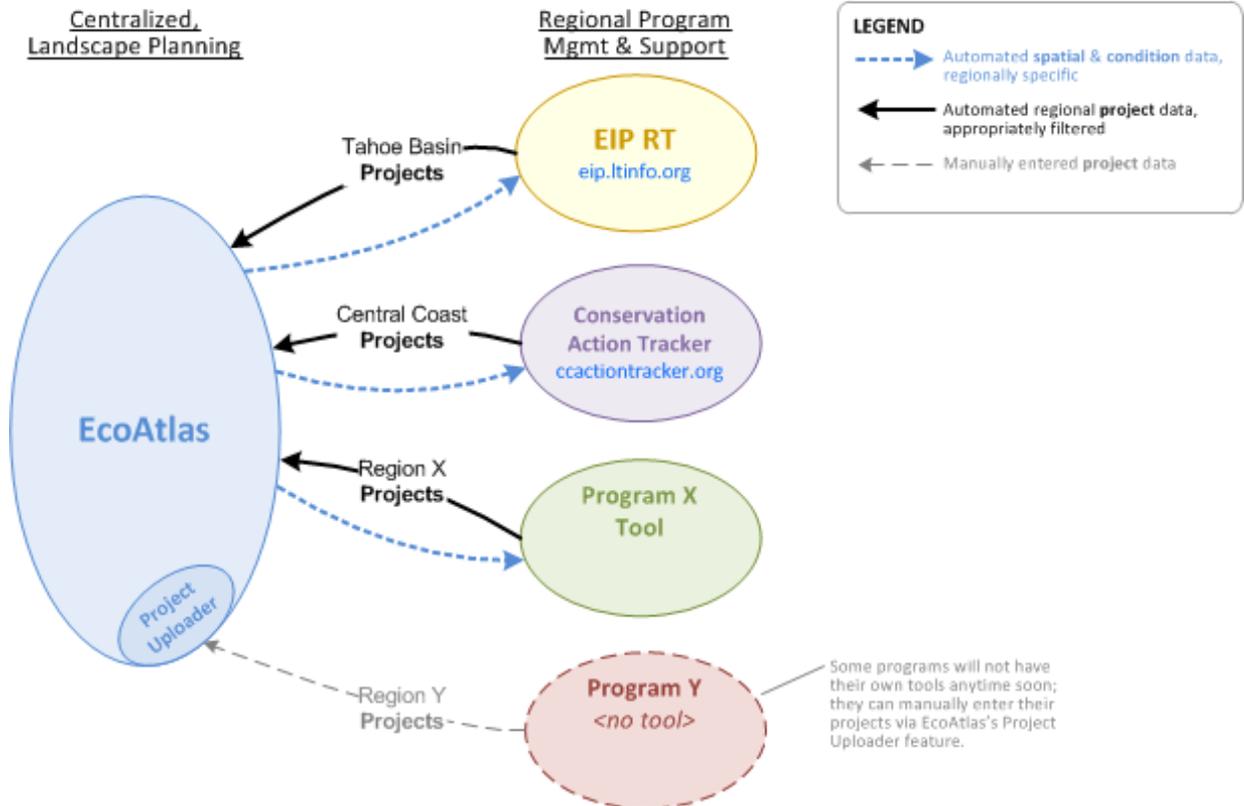


POTENTIAL FUTURE STATE

Given the minor content and modest audience overlaps, the ideal future state is one where appropriate content flows easily between the two tools, allowing users to leverage the information investments without necessarily having to navigate between the two tools (although we would not want to prevent it). This will enable both tools to evolve independently to keep pace with ever-changing regulatory frameworks, program policies, and end user requirements.

This plays to the strength of EcoAtlas as a state-level aggregator of content and enabler of landscape-scale planning and design; and, plays to the strength of EIP Reporting Tool as a region- and program-specific, workflow-driven collector of structured project implementation data.

Potential Data Flows



It is the belief of the creators and supporters of both tools that the symbiotic relationship illustrated above will maximize the value to all users and funders. Further, they believe such an arrangement could serve as a blueprint for EcoAtlas to integrate other program-specific, regional information systems.

These automated data flows will require minor improvements (specifically, definition and implementation of web services) to the tools on both sides. Note that the spatial & condition data from EcoAtlas might include information about nearby projects that are not included in the program. Also note that the appropriately filtered, program-specific regional project data might flow as textual or map-based data.

USE CASES

A few fictitious use cases demonstrate how real users might benefit from reciprocal data flows between these tools.

Gathering Data for a Conservation Plan

Sally, a scientist working for US Geological Survey, has been tasked with drafting a wetland conservation plan for the Sierra ecoregion. She wants to start by understanding the historical context of the region, including all the completed and in-progress wetland restoration projects. Sally would like to classify these projects by type, implementer, time, and ideally by their results. She knows from her contacts at US EPA that a recently created web site called EcoAtlas may have at least some of the information she's after.

Sally goes to ecoatlas.org, selects Sierra from the home page, and clicks the Project Info icon. The "Wetland Projects" page loads and lists 27 projects and displays their status, completion year, implementer, county, and total acres. Sally then clicks on the map and views where in the ecoregion these projects are located, clicks on one in El Dorado County, and views the details on the "High Meadows/Cold Creek Restoration" project. There she sees info she needs for her analysis including key accomplishments.

Sally wonders about the providence of the data, and is curious if there's even more detail on this project, so she clicks the link, "project data sourced from Tahoe Basin's EIP Reporting Tool," and is taken to the project's Fact Sheet on eip.laketahoeinfo.org. There she sees contact information, detailed accomplishment data by performance measure and subcategory, funding sources, and before/after photos. Bingo!

She then navigates "up" to the "Watershed Management" page and sees its list of 66 projects. After comparing the project list in EcoAtlas, she realizes the EIP Reporting Tool's list includes projects in Deferred, Terminated, and Planning Design (even those not planned to start for four years). She clicks the "Download" link and gets all the structured data available for these projects and pulls it into Excel so she can start her analysis. Jackpot!

Within 15 minutes Sally has a critical data set for her Sierra Wetland Conservation Plan!

Planning a Riparian Revegetation Project

Jim, a stream ecologist who works for the Truckee River Watershed Council, would love to restore the riparian habitat in Johnson Meadow Creek, a tributary to the Upper Truckee River. Jim is currently applying for grants and lining up other resources for his proposed riparian revegetation project that will finally address the spread of invasive species. He knows he'll have better chances attracting funding if he can demonstrate how his project builds on successes, and learns from the mistakes, of other nearby projects.

Luckily for Jim, he attended a recent council meeting where he learned of an online tool that has all the restoration projects completed in the past eight years, as well as those planned for the next five years. He fires up his web browser and hits eip.laketahoeinfo.org and goes to the EIP Project Locations page where he gets a map that he can filter. From the Program filter, Jim selects "Invasive Species," turns on the Watershed layer, and points the map to the Truckee River. He clicks a few project markers and quickly gets a sense of the data available to him. Jim notices he also has access to Land Cover, StreamStats, and US Census data relevant to his proposed project location. Yahtzee!

Jim views the details on the three projects closest to Meadow Creek, and learns who implemented them, gets a full project descriptions and photos documenting their progress. He is thrilled that within a few seconds he has access to nearby sediment and toxicity records from CEDEN, water surface data from CARI, and wetland assessment data from CRAM. Even better, he notices a link to a "Landscape Profile" based on the project's location. Jim clicks it and a new browser tab pops open with a polished looking PDF document titled "Landscape Profile brought to you by EcoAtlas." This is exactly the type of information that will not only help him with his grant applications, but even better, help him design a better riparian revegetation project. Score!

Within 20 minutes, Jim has some key data for his grants AND has discovered nearby projects that he can learn from and build on top of!

POTENTIAL INTEGRATIONS

The above use cases are made possible by a few key data flows, or integrations between the two systems. The working assumption is these integrations will be real-time, read-only web service connections. In other words, at least for starters, each system will be able request (via a method call) and receive information from the other, but not be able to update (write) information in the other system.

Depending on security requirements, these methods may be freely available to anyone (anonymous access), or may require authentication or use of a token. These methods will most likely be implemented using the SOAP protocol.

Here is a brief description of web service methods implied by the use cases above.

EIP Reporting Tool methods

- **EIP_GetProjectList** – provides a list of ALL projects in the system that the EIP wants to share publicly (for example, it may not include projects in Deferred or Terminated stages). Includes project information such as:
Project ID, EIP ID, Title, Program, Lead Implementer, Start Date, End Date, Stage, Latitude, Longitude, 6th field HUC, State, County, Project Details URL, Project Factsheet URL
- **EIP_GetProjectsByHUC** – provides a list of projects within a 6th field HUC. The calling system must include a valid 12-digit HUC code. Includes project information such as:
Project ID, EIP ID, Title, Program, Short Description, Lead Implementer, Start Date, End Date, Stage, Latitude, Longitude, State, County, Project Details URL, Project Factsheet URL
- **EIP_GetProjectAccomplishments** – provides a list of performance measure values by subcategory for a given project. The calling system must include a valid 10-digit EIP Project ID. Includes performance measure and project information such as:
Project ID, EIP ID, PM ID, PM Name, PM Units, PM SubcategoryName1, PM SubcategoryOption1, PM SubcategoryName2, PM SubcategoryOption2, PM SubcategoryName3, PM SubcategoryOption3, PM SubcategoryName4, PM SubcategoryOption4, PM ProjectYear, PM ProjectValue
- **EIP_GetProjectDescription** – provides the full text of the description for a given project. The calling system must include a valid 10-digit EIP Project ID. Includes project information such as:
Project ID, EIP ID, Title, Description
- **EIP_GetProjectKeyPhoto** – provides the key photo for a given project. The calling system must include a valid 10-digit EIP Project ID. Includes project information such as:
Project ID, EIP ID, Title, Key Photo

- **EIP_GetPerformanceMeasures** – provides the list of all performance measures. Includes information such as: *PM ID, PM Name, PM Description, PM Units, PM SubcategoryName1, PM Subcategory1Option1, PM Subcategory1Option2, ..., PM Subcategory1OptionN, PM SubcategoryName2, PM Subcategory2Option1, PM Subcategory2Option2, ..., PM Subcategory2OptionN, ...*

EcoAtlas methods

- **EA_GetProjectList** – provides a list of ALL projects in the system that SFEI wants to share publicly. Includes project information such as:
Project ID, Title, Start Date, End Date, Stage, Latitude, Longitude, 6th field HUC, State, County
- **EA_GetProjectsByHUC** – provides a list of projects within a 6th field HUC. The calling system must include a valid 12-digit HUC code. Includes project information such as:
Project ID, Title, Short Description, Lead Implementer, Start Date, End Date, Stage, Latitude, Longitude, State, County, Project URL
- **EA_GetProjectDescription** – provides the full text of the description for a given project. The calling system must include a valid 10-digit EIP Project ID. Includes project information such as:
Project ID, Title, Description
- **EA_GetNearbyDatasets** – provides a list of datasets whose geospatial feature(s) are within X meters of given location. The calling system must include latitude and longitude coordinates, and a buffer distance X.
- **EA_GetLayersIntersectedByFeature** – provides a list of layers that intersect with the given feature (e.g. point + buffer, line or polygon). The calling system must include a feature.
- **EA_GetLandscapeProfile** – provides a URL to a Landscape Profile report for the given feature (e.g. point + buffer, line or polygon). The calling system must include a feature.

OPEN QUESTIONS & ISSUES

Here are a few open questions and issues related to this potential data integration:

Questions

- About how long would it take for Sitka to provide the EIP RT web service methods listed above? Is the cost associated with doing so already covered under current scope of work? Will there be funding for long-term O&M of this web service?
- Do any of the EIP RT method calls listed above cause concern? Would any of them significantly add to the delivery time or cost?
- About how long would it take for SFEI to provide the EcoAtlas web service methods listed above? Is the cost associated with doing so already covered under current scope of work? Will there be funding for long-term O&M of this web service?
- Do any of the EcoAtlas method calls listed above cause concern? Would any of them significantly add to the delivery time or cost?
- What is EcoAtlas' long term funding?

- Are there any performance or security concerns with either system related to providing these methods? Is it OK to call these methods at any time of day, or should some be restricted to “off hours?”
- Who will be responsible for maintaining these connections, who will users contact for support?

Issues

- SFEI needs to determine the long term Help Desk resource needs and staffing plan for EcoAtlas.
- Both development teams need to be available at the same time to work through the technical details and help troubleshooting during implementation. Ideally, both development teams implement their respective method calls within the same timeframe.

NEXT STEPS

The next steps to delivering the data flow integrations described above include:

- Present status of EcoAtlas and CRAM to the Lahontan Board (July 2016)
- Define and host “Workshop 2” focused on Lahontan participants/stakeholders outside the Tahoe Basin that only covers EcoAtlas functionality and encourages participants to start using it and providing feedback.
- Define and host “Workshop 3” targeted at Lake Tahoe basin audience that covers the “roll out” of both tools, with a focus on explaining how these two tools are complimentary.
- Have technical session between Sitka and SFEI to specify the details of the first 2-4 integrations between the two systems. Outcome of this session should be a draft specification that both Sitka and SFEI can estimate effort required to implement.
- Augment appropriate workplans and budgets so that SFEI and Sitka can implement two pilot integrations (one where data flows from EcoAtlas to EIP RT, and another where it flows the other way).

DEVELOPMENT WORK - 2016

Tool Integration Update

Prepared by Matt Deniston, Sitka and Cristina Grosso, SFEI-ASC for the Lake Tahoe Info Oversight Committee Meeting on February 2, 2016

Sitka and SFEI-ASC staff discussed the “EcoAtlas-EIP Reporting Tool Integration, Initial Discussions – 2015” reported above. This report summarizes the discussion from two brainstorming meetings in 2015 and suggests several use cases and potential integrations between the two tools.

Below are several recommendations for proposed integrations between the Lake Tahoe EIP Project Tracker (<https://eip.laketahoeinfo.org/>) and EcoAtlas (www.ecoatlas.org):

1. EcoAtlas user views EIP projects along with other projects in EcoAtlas
 - Sitka will develop EIP Tracker method “EIP_GetProjectList” to provide a list of projects in the system (where stage=Planning/Design, Implementation, Post-Implementation and Completed; Deferred and Terminated will not be included).
 - Method will include project information such as: Project ID, EIP ID, Project Name, Stage, Focus Area, Latitude, Longitude, Project Details URL
 - Pending Questions/Decisions:
 - Should we include projects from all six focus areas (including Watersheds, Habitat, and Water Quality; Forest Management; Air Quality and Transportation; Recreation and Scenic Resources; Applied Science; and Program Support), OR only projects from the Watersheds, Habitat, and Water Quality Focus Area in EcoAtlas?
2. EIP user views nearby EcoAtlas projects
 - Web service for accessing projects in EcoAtlas is available from [SFEI-ASC's Data Center page](#). This includes project information such as: Project ID, Project Name, Project Type, Status, and Project Details URL.
 - Sitka needs to experiment a bit with this web service since it's a “GIS vector dataset” rather than a simple SOAP service.
 - For an example of an application using this service, visit the Central Coast [Conservation Action Tracker](#) (select Project Locations and the Wetland Projects map layer).
 - SFEI-ASC will add Ecoregion codes to the wetland projects web service, or Sitka will need to filter the Lake Tahoe projects from the statewide dataset. SFEI-ASC may need to implement other changes based on Sitka's review of the web service.
3. EIP user accesses Landscape Profile report for projects that have detailed project location information (polygon)
 - For example, SFEI-ASC could develop the method “EA_GetLandscapeProfile” to provide a URL to a Landscape Profile report for a given project polygon.
 - Next steps:
 - Developers from Sitka and SFEI-ASC will discuss options within the next two weeks. SFEI-ASC is currently in the process of rewriting the Landscape Profile report code and will need to assess the feasibility within the desired timeframe.

Timeline and Availability

- For efficiency purposes, it is best if staff from Sitka and SFEI-ASC have time to work on their tasks concurrently.
- Sitka works on monthly development sprints.
- The SFEI-ASC team will be available beginning in March/April. SFEI-ASC's availability is pending confirmation with their lead developer.

Funding

- Sitka has allocated \$10K for working on integration tasks.
- SFEI-ASC needs to estimate costs for their tasks. \$10K from the current EPA Lahontan grant has been redirected from the Help Desk and Final Report tasks to work on uploading SIG TARI into CARI and EcoAtlas. This work will be completed in time for the next workshop scheduled in March/April.

Status

Sitka and SFEI-ASC staff implemented the first recommendation noted above: "EcoAtlas user views EIP projects along with other projects in EcoAtlas".

Sitka staff developed a web service for the EIP projects, and ASC modified the EcoAtlas application code to display these projects along with other projects in the Habitat Projects data layer. While the EIP has several focus areas, only projects from the Watersheds, Habitat, and Water Quality Focus Area are displayed in EcoAtlas. These projects appear as points with a link to the EIP project summary on the Lake Tahoe Info website, and are color-coded based on their stage status. EIP projects cannot be downloaded or filtered through the Habitat Projects Tool in EcoAtlas at this time.

In addition, SFEI-ASC staff modified the web service to include the Ecoregion field, so Sitka can implement the second recommendation noted above: "EIP user views nearby EcoAtlas projects" depending on funding and priorities.