



# Appendix: Web Services

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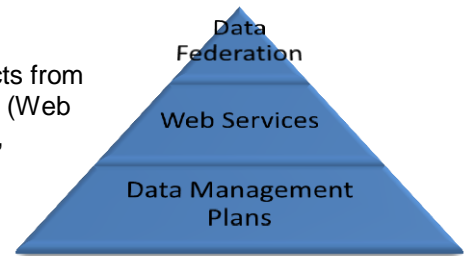
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## Enhancing Data Sharing through Web Services

In September 2015, the Delta Stewardship Council's white paper [Enhancing the Vision for Managing California's Environmental Information](#) offered a broadly shared vision for the advancement of environmental data sharing. Associated with the paper's recommendations are key concepts that we hope to explain further in a series of "fact sheets." These brief documents each address a different mechanism within a broader data-sharing strategy: [Data Management Plans](#), Web Services, and [Data Federation](#).

We invite you to review each of these fact sheets, recognizing the range of subjects from fairly basic in sophistication (Data Management Plans) to moderately complicated (Web Services) to highly complex and coordinated (Data Federation). Working together, these technologies can help to modernize public data distribution. But our shared understanding of the underlying concepts, and of their respective value, is vital.



### What are some examples of web services at work?

The table below highlights the unique features and examples of different types of web services. However, they all share the common functionality and purpose to have standard protocols that allow data users to query portions of a server's information based on spatial constraints and other criteria. Examples include both applications that rely on data delivered by web services and how groups disseminate access to their web services.

Definition of Service	Unique Features	Examples and Uses
<b>Web Coverage Service (WCS)</b> is a digital geospatial information representing space/time-varying phenomena	Provides access to coverage data in forms that are useful for client-side rendering, as input into scientific models, and for other clients.	
<b>Web Feature Service (WFS)</b> is a standard that provides an interface allowing requests for geographical features across the web using platform-independent calls, which allows for editing and spatial analysis. <a href="#">More &gt;</a>	Query returns data that allow for features to be queried, updated, created, or deleted by the client	
<b>Web Map Service (WMS)</b> is a standard protocol for serving georeferenced map images over the internet that are generated by a map server using data from a GIS database. <a href="#">More &gt;</a>	Results of query allow for rendering of images	<a href="#">Central Coast Conservation Action Tracker</a>
<b>Representational State Transfer (REST)</b> is an architecture principle in which the web services are viewed as resources. The key characteristic of a RESTful	Web services can be uniquely identified by their URLs	<a href="#">National Water Quality Data Portal</a>

Definition of Service	Unique Features	Examples and Uses
Web service is the explicit use of HTTP methods to denote the invocation of different operations. <a href="#">More &gt;</a>	REST services are state-less by definition, and therefore must rely upon client-side methods to maintain specific variables, such as session ID or query history.	<a href="#">USGS StreamStats</a>  <a href="#">USFW Delta Juvenile Fish Monitoring Program (DJFMP) trawl and seine data</a>  <a href="#">NOAA National Water Information System (NWIS)</a>
<b>Simple Object Access Protocol (SOAP)</b> web service depends upon a number of technologies (such as UDDI, WSDL, SOAP, HTTP) and protocol to transport and transform data between a service provider and the consumer <a href="#">More &gt;</a>	SOAP services may be stateful (i.e., retain context information on the server)	<a href="#">NOAA National Water Information System (NWIS)</a>

**How do web services fit into the workflow of applications?**

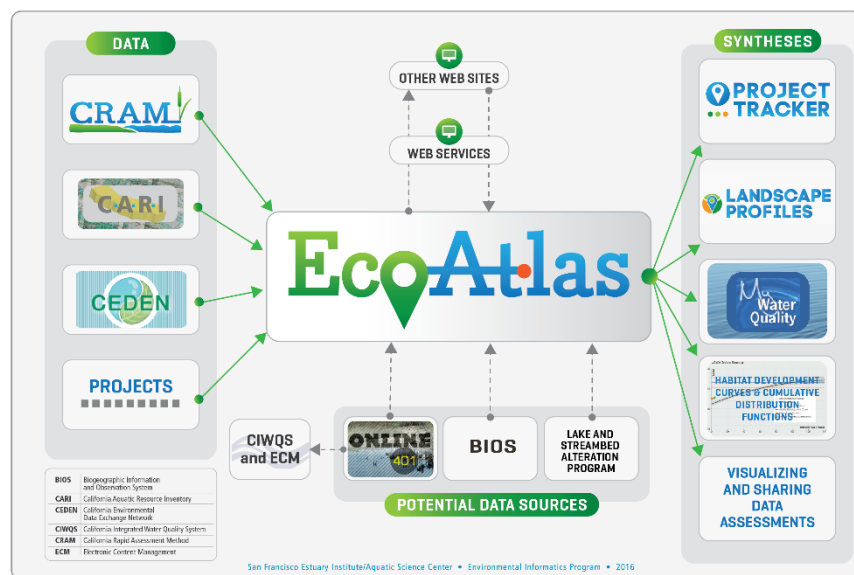
Below are a few examples of how web services fit into the workflow for applications.

Bay-Delta Live ([www.baydeltalive.com](http://www.baydeltalive.com)) - Placeholder image for diagram



California Environmental Data Exchange Network (CEDEN, <http://www.ceden.org>) - Placeholder image for diagram





### EcoAtlas ([www.ecoatlas.org](http://www.ecoatlas.org))

In addition to displaying data stored on local servers, EcoAtlas visualizes datasets (such as USGS StreamStats and Lake Tahoe EIP projects) by obtaining the data through web services. Other groups can also integrate EcoAtlas' [habitat projects and CRAM data](#) into their tools through web services.

### What are some other challenges and considerations when transferring data?

- Integrating [real-time sensor data](#) is challenging due to the amount of data and can benefit from the use of web services to display information in real-time.
- [Trusted third party tokens](#) can help manage user authentication across agencies.
- [Crowd-sourced data services](#) rely upon a loose affiliation of interested public data contributors to provide updates and review edits to the dataset, such as [OpenStreetMap](#). This option could help with the long-term maintenance of authoritative datasets.

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