



State of Washington
2016 NASCIO Award Nomination

Project Title	Washington State Trails Database
Nomination Category	Cross-Boundary Collaboration & Partnership
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I. EXECUTIVE SUMMARY

Geographic data and technologies provide public policymakers and citizens with the tools to understand and solve complex environmental, land use, and societal issues. The [Geospatial Program Office](#) was established within Washington State's Office of the CIO in recognition of the remarkable value of Location Based Services and Geographic Information Systems (GIS) technology.

In 2006, the state legislature requested a project that would aggregate trails data in Washington, a state well-known for its green spaces. An aggregated trails database would allow citizens to view the trails and trailhead features for all federal, state, local, and other Washington trails, as well as provide other landscape and policy benefits. However, initial project estimates—\$1.7 to \$2.3 million—put the project on hold.

In addition to cost challenges, a decentralized oversight environment created major challenges for enterprise-level trails data projects. In Washington, no one entity is wholly responsible for managing trails data. Acquiring the data necessary for an aggregated database meant reaching out to more than 20 organizations that have no direct requirement to provide data to any one, central authority.

By using a group of volunteers and leveraging new cloud-based collaborative tools, the Geospatial Program Office began building the Washington State Trails Database in 2013. Nine months into the project, the office was awarded a small grant—less than ten percent of the original project cost estimate—from the Recreation and Conservation Office (RCO) to expand, accelerate, and standardize the collection effort, which took the pilot effort into development.

Despite the challenges, the Geospatial Program Office team delivered the Washington State Trails Database in 2015. The resulting database represents close to 12,000 miles of trails following the federal data specification. The team also delivered the first prototype for collecting trailhead information—data like parking, associated facilities, and pet-friendliness, which all are essential for outdoor enthusiasts.

The success of the Washington State Trails Database project required collaboration in nearly every aspect of the project—from funding to development. Creating an aggregated trails database was challenging, but because the Washington State Trails Database represents such significant value to the state, the Washington State Geospatial Program Office, in partnership with a diverse group of people and organizations who believed in the project's value, rose to the challenge.

II. CONCEPT

The Washington State Trails Database started with a small group of volunteers and students with a background in GIS and a passion for the outdoors. The team began designing the pilot spatial database following the Federal Trails standard and migrating readily-available, digital data. Building out the descriptive information was crucial, making sure descriptors like trail name, use, and management information would be available to end users.

After nine months, the effort came to the attention of the state Recreation and Conservation Office, who awarded the Office of the Chief Information Officer's (OCIO) Geospatial Program Office a small Nonhighway and Off-road Vehicle Activities (NOVA) grant of \$177,000 to support the data collection effort.

The NOVA grant funded a team of editors who assembled an up-to-date snapshot of trails using the state-adopted Federal Geographic Data Committee (FGCD) Trails Data Standard as the framework. The pilot became a full-fledged project and the team began using ArcGIS Server (the core GIS server software made by Esri) and various cloud services for database hosting, data editing, and publishing. The web-based File Upload Form ("Breadcrumbs") allowed users to upload GPS and other approved file types. Esri's Collector for ArcGIS Application is free for both iOS and Android devices, uses web map with editable feature service, and allows authorized users to update existing trail uses information only.

But the effort wasn't just about moving data. The project also relied on leveraging a distributed and non-traditional workforce. Cloud-based collaboration tools, like Kerika, allowed the team of data editors from across the state to work together without having to be co-located. This browser-based task board allowed the team to coordinate the project tasks and documentation. Repurposing existing cloud-based servers and concurrent GIS software licenses, as well as the ArcGIS Online mapping and visualization tools, made it possible for the team to do the data aggregation for a tenth of the initial cost estimate.

As with any aggregation effort, different organizations have their own way of storing data for their individual business uses. The team needed to combine the data but didn't want to spend a lot of time figuring out who had the "best data storage model." That's why adopting the federal model—developed by trails experts—was an easy choice.

In September 2015, the data collection phase of the Washington State Trails Database project was successfully completed. The wrap-up phase took place through December 2015, and included publishing the Washington State Trails Database online and making it universally available via multiple access points. This included making available standardized data and metadata, the mapping application, the collection and updating tools, and the associated technical project information and processes used to assemble the trail and trailhead data.

The Geospatial Program Office took a very “open data” approach to making the Washington State Trails Database available in numerous ways:

- Published downloadable data, accessible online.
- Published REST services accessible using ArcGIS Online.
- Delivered a web-based mapping application via ArcGIS Online for non-GIS users so they could view trails maps and add further map data.
- Provided code to non-profits to enable them to display the data within their websites.
- Created the initial authoritative crowd-sourcing tools so the user community can update the trails-related information.

The trails mapping application and data are hosted on the state’s Geospatial Portal (www.geography.wa.gov). Collaboration between the OCIO's Geospatial Program Office and the Recreation and Conservation Office is ongoing.

III. SIGNIFICANCE

Most states do not coordinate or integrate their state’s trails data. As a result, the innovation in the [Washington State Trails Database](#) project was partly “*The What.*”

But the biggest challenge with collaboration projects that require massive data collection is managing the relationships with the various stakeholder groups, and the OCIO’s Geospatial Program Office also had to be creative in “*The How.*”

The team launched a major outreach effort led by a former Washington Conservation Corps trail-builder who had “boots-on-the-ground” experience working within that tight knit user community. This was key to the project’s outreach and coordination success.

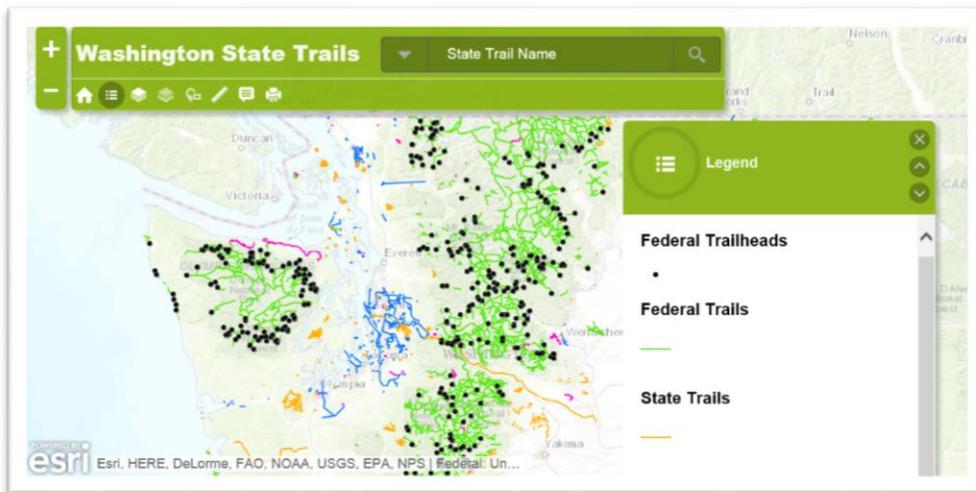
The outreach effort raised awareness about the project, developed connections within the trails user community, and leveraged these relationships to acquire the data necessary to build a comprehensive spatial database. Data was collected from more than 20 organizations—including federal, state, and local governmental entities.

The effort fostered federal, state, local, and private partnerships across the state. State agencies—including the Department of Natural Resources, Department of Fish and Wildlife, Department of Transportation, and the Parks and Recreation Commission—already use the Washington State Trails Database in their operational decision-making.

The project continues to engage a wide variety of communities, including people who are passionate about Washington’s trails, businesses engaged in outdoor trails applications development and services, and GIS professionals.

Benefits of the Washington State Trails Database include:

- Brings together authoritative data for the first time from multiple sources making it easier for entities to plan future joint projects.
- Is invaluable for trails planning and maintenance purposes, as well as county conservation and recreation planning.
- Can be used in environmental impact statements and recreation access planning.
- Is useful to hikers, horseback riders, and other trail users who want to view the trails and trailhead features together.



IV. IMPACT

Washingtonians spend 56 days each year recreating outdoors, resulting in \$21.6 billion in annual expenditures on outdoor recreation. They climb, hike, ride horses, and a myriad of other outdoor activities that require trails.

Within the online mapping application, users can see trail and trailhead features as well as attribute information for those locations. The database reflects the diversity of recreational opportunities in Washington and illustrates the complexity of Washington's vast trail networks.

Working Smarter...

For state and local government, having a consolidated trails visual of the “what” and “who” results in better decisions on the ground. Recreation and land managers now have a comprehensive planning tool for the first time that shows the adjacent trail resources across

the landscape, meaning they can coordinate their maintenance efforts between entities. They can also coordinate the spending of limited resources more wisely and plan recreation improvements on a broader landscape.

Reaching Out Across Governmental Boundaries...

Washington will be the first state to have its statewide trails data incorporated into the national map. This is the first step towards building a national trails database that follows the federal trails standard.

The US Geological Survey (USGS) National Map, the entity responsible for the digital, online versions of the USGS quadrangle maps, recently learned of the trails aggregation and mapping effort. The OCIO was approached by the Denver Office to see if they could acquire a copy of the data to analyze its quality and accuracy for inclusion into the maps. The Washington State Trails Database passed the USGS data quality assessment with a score of greater than 90%. Based on that score, the OCIO will be entering into a *Memorandum of Understanding (MOU) For Coordination and Cooperation Pertaining to the Development of Framework Data Themes and the Implementation of the National Map*.

Collecting Data into the Future...

The Recreation and Conservation Office (RCO) averages 264 grant awards for \$69 million each fiscal year. But the RCO doesn't do the work alone. Since 1964, grant recipients have contributed more than \$1 billion in matching resources, making the total investment in Washington's outdoors top \$3 billion. The RCO has written into its grant application process a new requirement that recipients will now "map" any trail projects to ensure the continued improvement and use of the spatial database and GIS maps and data over time. This shows long-term commitment and importance of the data.

Building the States Spatial Data Infrastructure...

One of the ideas behind the project was to get as much trails data into the same GIS data structure or format so the individual GIS data maintainers would embrace this new trails database. A shared structure also makes updates to the spatial database and maps easier. In April 2016, another small RCO grant was awarded to refresh the trails GIS database. That work again will again use the crowdsourcing demonstration tools built during the initial project and will begin collaboratively with a call to state and local governments to provide any new or updates trails data.

Open and Transparent...

The data quality, as well as its free and open distribution also has produced telling results. Already the data has been requested for inclusion into various non-profit and for-profit databases and is currently being used by individual hikers, recreational user groups, and local,

state, and federal government agencies. Access is offered through a variety of methods for developers and data consumers, as well as citizens.

- REST/SOAP Services
- [Feature Services](#)
- [Mapping Application](#)
- [ArcGIS On-line](#)
- [WA State Geospatial Clearinghouse](#)
- [WA Geospatial Portal](#)

The goal is to make the data as accessible as possible to a broad set of users.



Project Metrics:

- 2007 estimated cost: \$1.7 to 2.3 million
- 2014 grant: \$177,000
- Migrated trails to federal standard
- Built a new trailhead point data model
- Over 12,000 miles of trails in GIS
- Over 530 trailheads in new data model
- Two trails data improvement tools built
- One trails “breadcrumb” collector app built

An initial trails feasibility study in 2006 had estimated the project cost would run in excess of \$1.7 million dollars, but rapid changes in spatial technology, decreases in technology costs, access to cloud technology, and browser-based tools made tackling a project like this more feasible. By embracing these technology changes, staff from Bellingham to Bainbridge and from Bainbridge to Olympia, had an easier way to collect and publish this valuable information.

The Geospatial Program Office took a big project that could have cost millions and found a way to build it at a fraction of the cost, largely by implementing an innovative process, hiring nontraditional team members, incorporating new technologies, and harnessing the power of collaboration.