



WASHINGTON STATE
Recreation and
Conservation Office



The Washington Trails Database Initiative

2015 International Trails Symposium
Portland, OR

May 18, 2015

Team

Executive Sponsors

- Darrell Jennings, Recreation and Conservation Office (RCO)
- Joy Paulus, Office of the Chief Information Officer (OCIO)

Technical Lead

- Jenny Konwinski

Data Editors

- Reid Ammann
- Michael Hammond

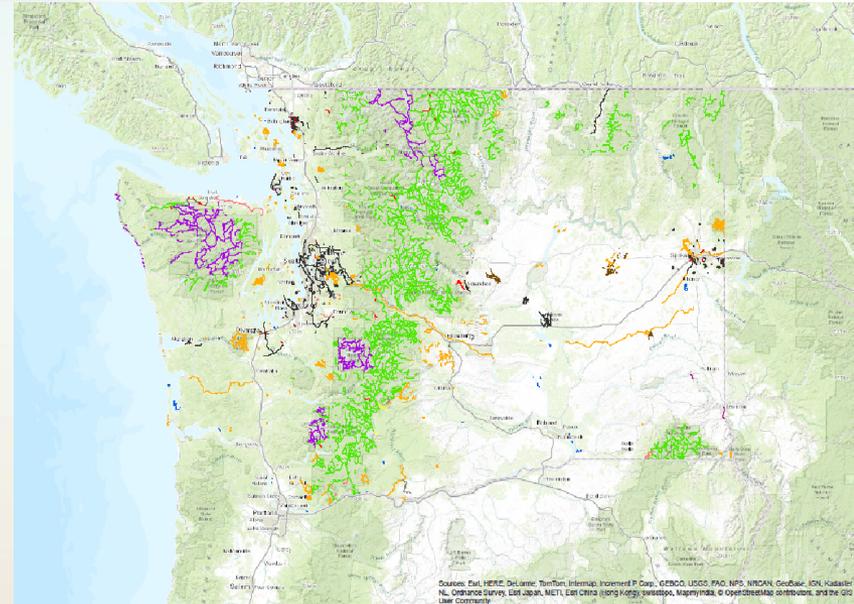
Outreach

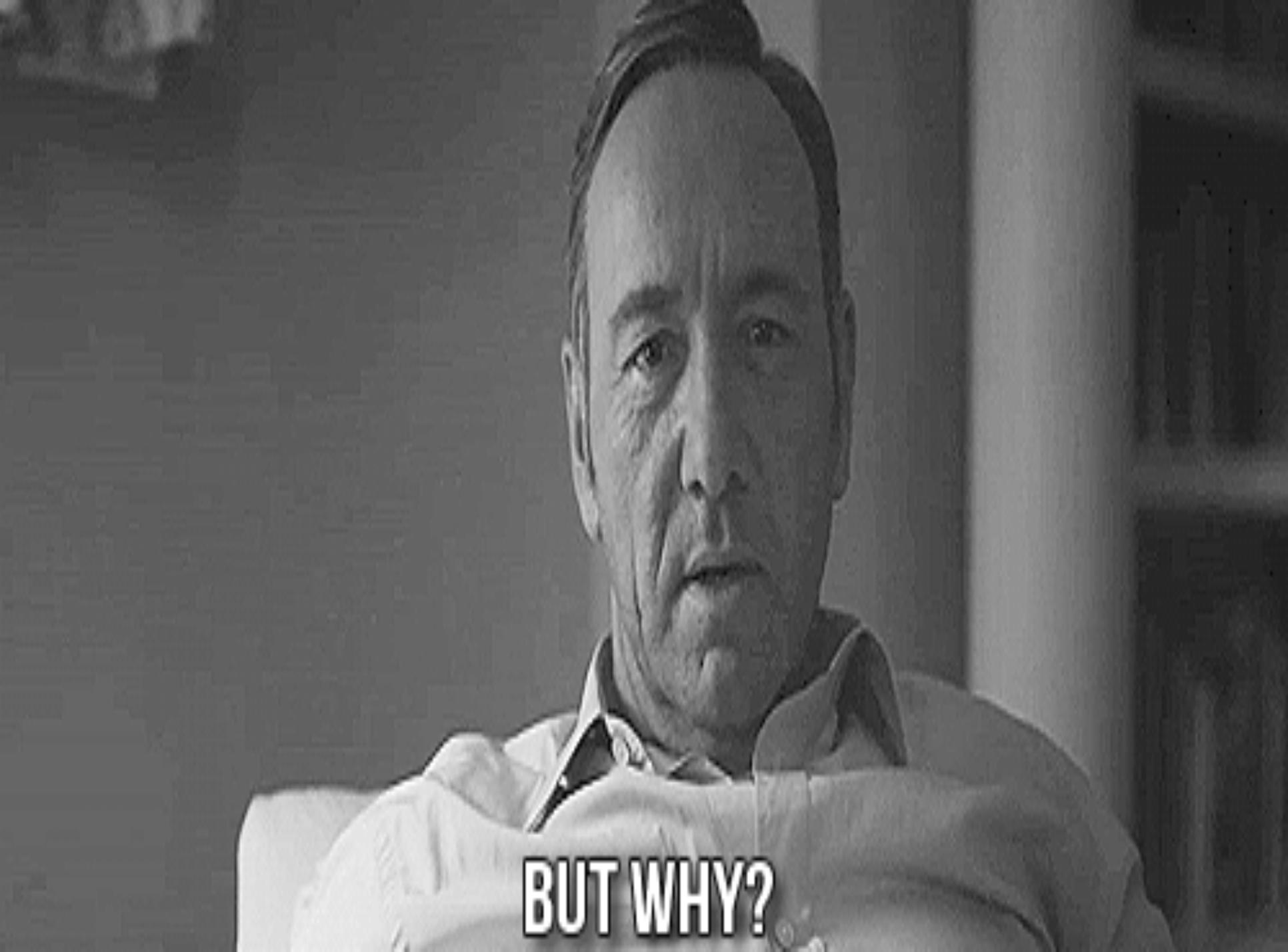
- Katz Kiendl



Overview

- Create a trails map and database
- Began as a student project
- Received grant funding
- Designed using federal standards
- Contains ~11,000 miles of trails



A black and white close-up photograph of a middle-aged man with a questioning or skeptical expression. He has a receding hairline and is wearing a light-colored, button-down shirt. The background is slightly out of focus, showing what appears to be a bookshelf on the right side. The lighting is soft, highlighting the contours of his face.

BUT WHY?

Why Make a Trails Database?

- Groups from all over the state maintain trail databases
- Using one standard design can save time & resources
- The data is out there
- Request from State Legislature

Project History

September 2014
Project gets funding!

June 2014
Complete initial data
collection & attribution

January 2015
Start trailhead project with
new student group

February 2014
Database design is
finalized

April 2015
Data collection &
attribution is
finished

September 2013
Pilot project seeks
volunteers

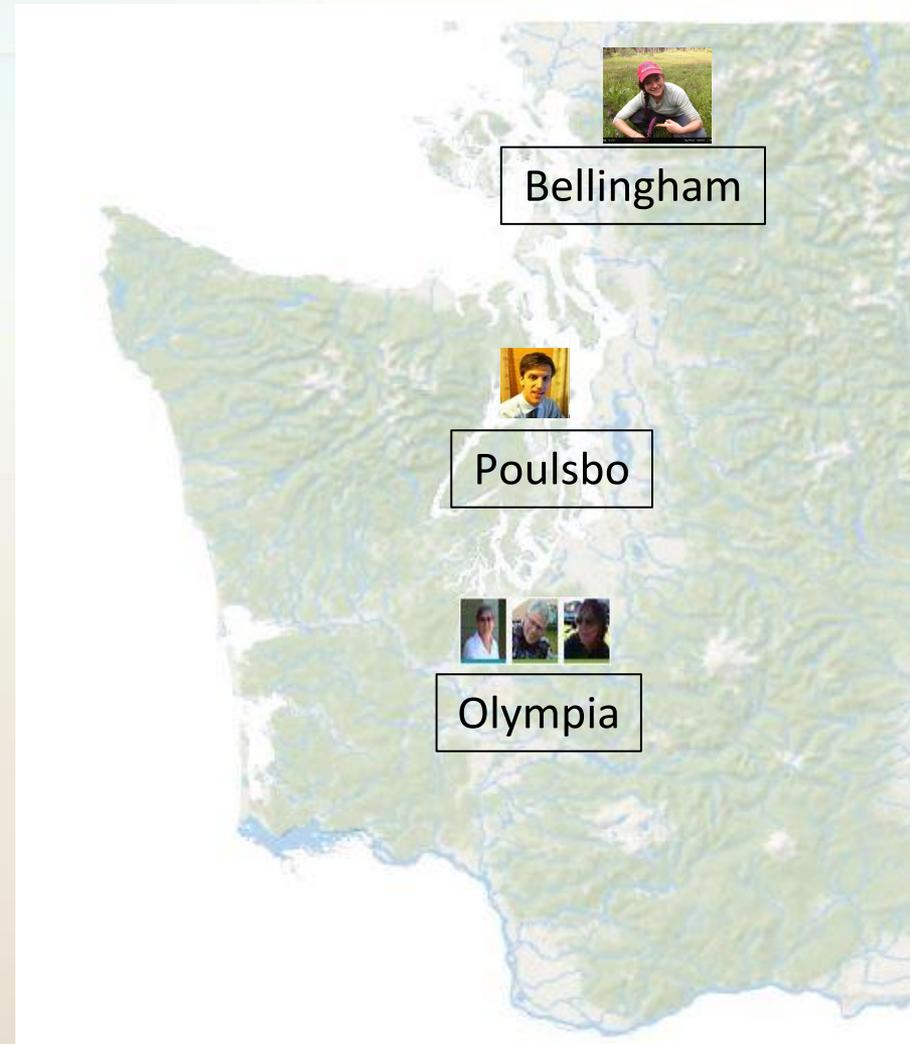
April 2015
Web tools are
developed

January 2007
Trails database cost
estimate presented

June 2015
Trails map to be
published online

Project Management

- Team members located around the state
- Used web tools like Kerika to share data & information
- Weekly teleconferences
- Status reports



Trails Data Collection

- Aggregate, not create
- Incorporated data from more than 20 different organizations
- Data search lasted 6 months

1. Forest Service

2. King County

The screenshot shows the 'Data Extract Tool' interface. At the top, it says 'Data Extract Tool' and 'Extract U.S. Forest Service Enterprise Data'. Below this is a map of North America with a 'Data Extract' panel overlaid. The panel has two main sections: '1. Select an area of interest' and '2. Select a maximum of 3 layers to extract'. The first section allows users to draw an area on the map or choose a National Forest from a dropdown menu. The second section lists layers such as 'Ranger District Boundaries', 'Recreation Opportunities', 'Road Basic', 'Roadless Area Idaho 2008', and 'Roadless Area Colorado 2012'. A scale bar at the bottom indicates 4000 km and 3000 miles. The map shows the Pacific Northwest region.

The screenshot shows the 'King County GIS Center' website. The header includes navigation links for HOME, NEWS, SERVICES, DIRECTORY, CONTACT, and SEARCH TERMS. The main content area is titled 'King County GIS Data Portal' and 'Welcome to the King County GIS data download page.' It features a 'PLEASE NOTE' section stating that users need GIS or mapping software to view or use the data sets. Below this, there are 'Available Data Formats' (SHP, GDB, KMZ) and 'Download Options' (thematic category or individual feature layers). A table at the bottom lists file types, categories, approximate sizes, and summaries.

File Types	Category	Approx. Size (MB)	Summary
		shp/gdb/kmz	

Trails Example

HOME Statewide Trails (Draft), 5/4/15

NEW MAP Reid

Details Basemap

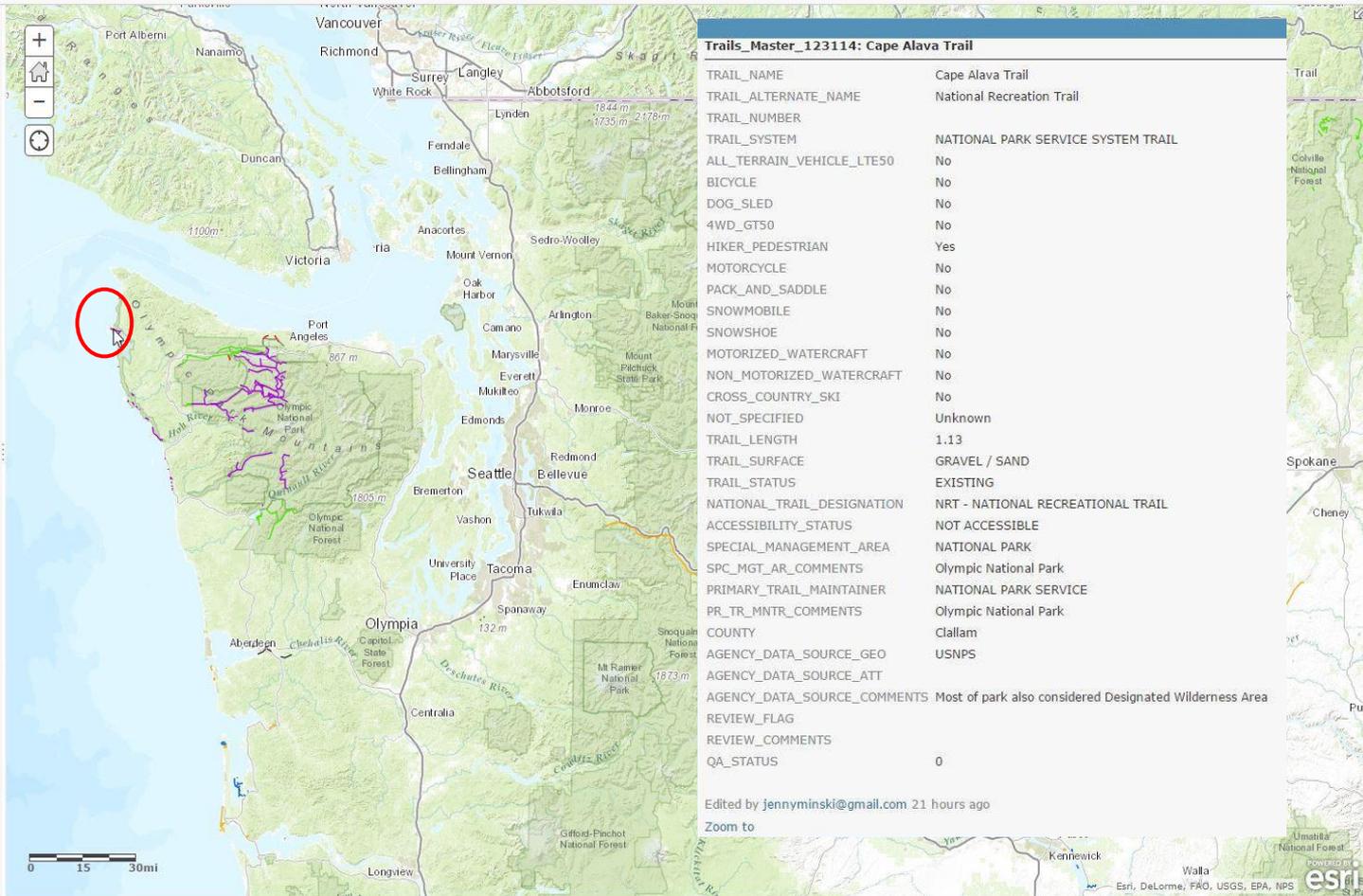
Share Print Measure Find address or place

About Content Legend

Legend

Draft Statewide Trails, 5/4/15

- BUREAU OF INDIAN AFFAIRS
- BUREAU OF LAND MANAGEMENT
- BUREAU OF RECLAMATION
- COMMERCIAL USER
- DEPARTMENT OF DEFENSE
- DEPARTMENT OF ENERGY
- FEDERAL AVIATION ADMINISTRATION
- FISH AND WILDLIFE SERVICE
- FOREST SERVICE
- LOCAL GOVERNMENT
- NATIONAL PARK SERVICE
- NONGOVERNMENTAL ORGANIZATION
- OTHER FEDERAL AGENCY
- PRIVATE
- STATE
- TRIBAL
- UNKNOWN
- US ARMY CORPS OF ENGINEERS
- VOLUNTEER
- Uncoded



Trails_Master_123114: Cape Alava Trail

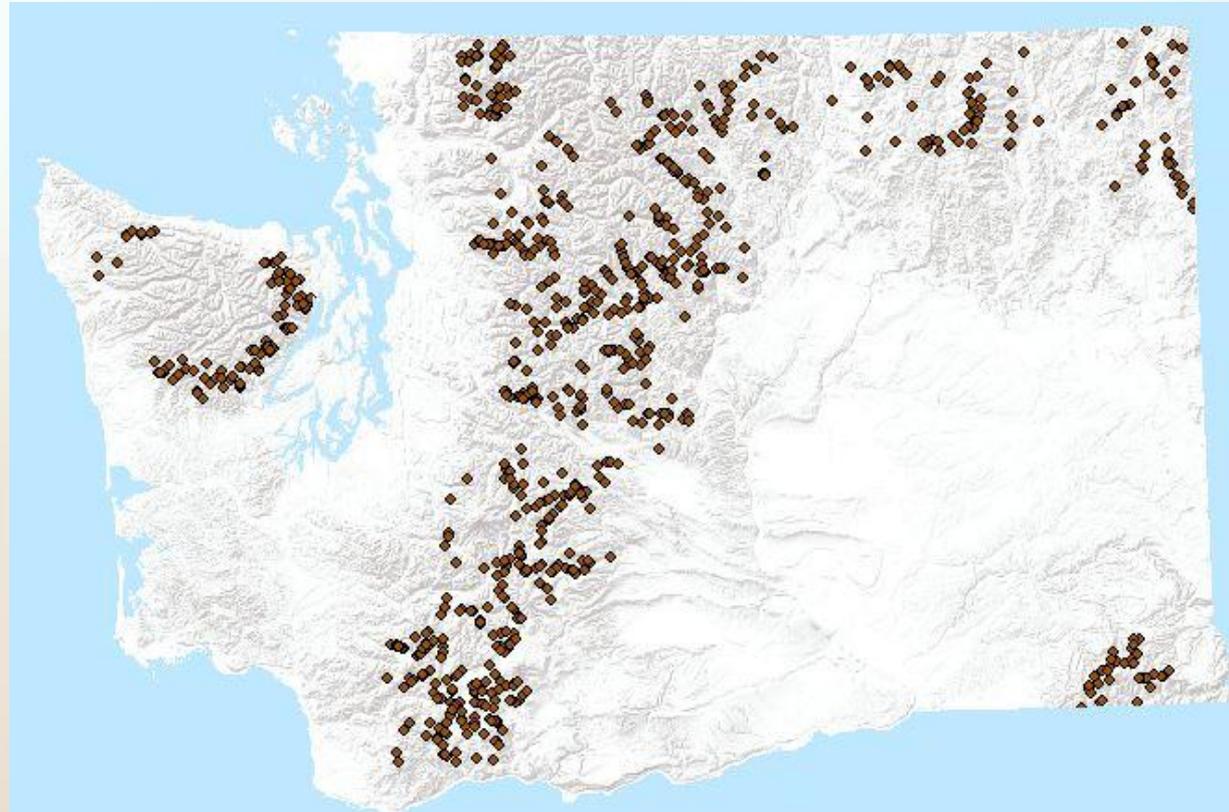
TRAIL_NAME	Cape Alava Trail
TRAIL_ALTERNATE_NAME	National Recreation Trail
TRAIL_NUMBER	
TRAIL_SYSTEM	NATIONAL PARK SERVICE SYSTEM TRAIL
ALL_TERRAIN_VEHICLE_LTES0	No
BICYCLE	No
DOG_SLED	No
4WD_GTS0	No
HIKER_PEDESTRIAN	Yes
MOTORCYCLE	No
PACK_AND_SADDLE	No
SNOWMOBILE	No
SNOWSHOE	No
MOTORIZED_WATERCRAFT	No
NON_MOTORIZED_WATERCRAFT	No
CROSS_COUNTRY_SKI	No
NOT_SPECIFIED	Unknown
TRAIL_LENGTH	1.13
TRAIL_SURFACE	GRAVEL / SAND
TRAIL_STATUS	EXISTING
NATIONAL_TRAIL_DESIGNATION	NRT - NATIONAL RECREATIONAL TRAIL
ACCESSIBILITY_STATUS	NOT ACCESSIBLE
SPECIAL_MANAGEMENT_AREA	NATIONAL PARK
SPC_MGT_AR_COMMENTS	Olympic National Park
PRIMARY_TRAIL_MAINTAINER	NATIONAL PARK SERVICE
PR_TR_MNTR_COMMENTS	Olympic National Park
COUNTY	Clallam
AGENCY_DATA_SOURCE_GEO	USNPS
AGENCY_DATA_SOURCE_ATT	
AGENCY_DATA_SOURCE_COMMENTS	Most of park also considered Designated Wilderness Area
REVIEW_FLAG	
REVIEW_COMMENTS	
QA_STATUS	0

Edited by jennyminski@gmail.com 21 hours ago

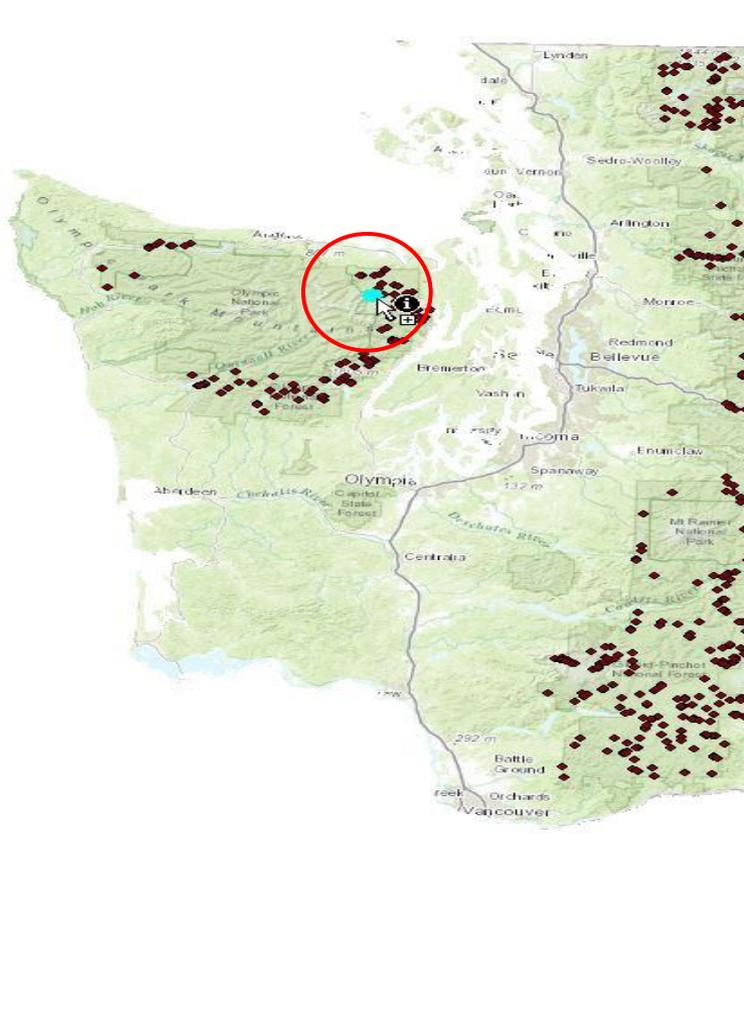
Zoom to

Trailheads: Why?

- Some information left out of trails database
- University volunteers expressed interest
- Dataset readily available



Trailheads Example



The map displays the state of Washington with numerous red diamond markers representing trailheads. A red circle highlights a specific trailhead in the Olympic National Forest area, near the town of Forks. A mouse cursor is positioned over this trailhead, and an information window is open.

Identify

Identify from: <Top-most layer>

- [-] Washington State Trailheads
 - Upper Dungeness Trailhead

Location: 991,951.765 939,176.596 Feet

Field	Value
OBJECTID	982
SHAPE	Point
TRAILHEAD_NAME	Upper Dungeness Trailhead
PRIMARY_TRAIL_MAINTAINER	FOREST SERVICE
TRAILHEAD_STATUS	OPEN
RESTROOMS	Yes
PARKING_AVAILABLE	Yes
PARKING_PERMIT	Yes
BACKPACKING_PERMIT	No
DOGS	Yes
PACK_AND_SADDLE	No
INTERPRETIVE_TRAIL	No
RAIL_TRAIL	No
DATA_SOURCE_ATT	USFS
EDITOR_ID	Reid Ammann
AGENCY_DATA_SOURCE_GEO	USFS
GEO_DATA_DATE	2/3/2015
LAST_EDIT_DATE	5/5/2015
ESTABLISHED_CAMPSITE_ON_TRAIL	Yes
COMMENTS	<null>
DATA_SOURCE_ATT_URL	http://www.fs.usda.gov/recarea/olympic/recarea/?recid=481
PR_TR_MNTR_COMMENTS	Olympic National Forest Service

Identified 1 feature

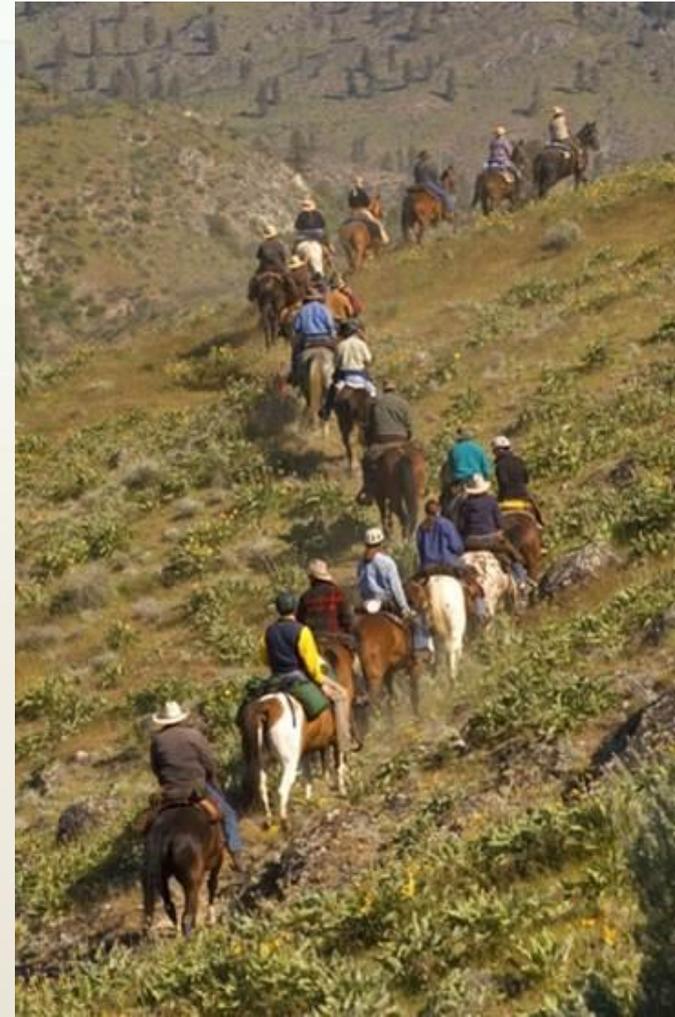
Technical Details

- In the “Cloud”...
 - MS SQL Server Express
 - ArcGIS Server
 - Amazon Web Services



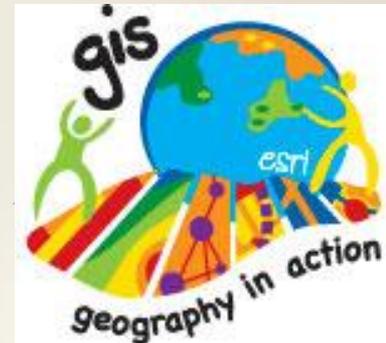
Why the Cloud?

- Several years after feasibility report
- Needed adaptable work environment
- Distributed team
- Limited resources



Database Details

- Esri's ArcGIS Platform & Geodatabase
- Design follows FGDC Trail Data Standards
 - Data Dictionary
 - Outlines database structure & definitions
 - Metadata
 - Data about data
 - Documents information necessary to use database appropriately



Data Dictionary

StatewideTrails_DD.pdf - Adobe Reader

File Edit View Window Help

Open [Icons] 2 / 7 153%

Tools Fill & Sign Comment

Field	Data Type	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
TR_NM	String	75	TRAIL_NAME	TR_NM			false		
TR_ALT_NM	String	75	TRAIL_ALTERNATE_NAME	TR_ALT_NM			false		
TR_NUM	String	40	TRAIL_NUMBER	TR_NUM			false		
TR_SYS	String	40	TRAIL_SYSTEM	TR_SYS	TrailSystem		true		
ATV	String	10	ALL_TERRAIN_VEHICLE_LTE50	ATV	YesNoUnk		false		
BICYCLE	String	10	BICYCLE	BICYCLE	YesNoUnk		false		
DOG_SLED	String	10	DOG_SLED	DOG_SLED	YesNoUnk		false		
FOUR_WHEEL_DRIVE	String	10	4WD_GT50	FOUR_WHEEL_DRIVE	YesNoUnk		false		
HIKER_PEDESTRIAN	String	10	HIKER_PEDESTRIAN	HIKER_PEDESTRIAN	YesNoUnk		false		
MOTORCYCLE	String	10	MOTORCYCLE	MOTORCYCLE	YesNoUnk		false		
PACK_AND_SADDLE	String	10	PACK_AND_SADDLE	PACK_AND_SADDLE	YesNoUnk		false		
SNOWMOBILE	String	10	SNOWMOBILE	SNOWMOBILE	YesNoUnk		false		
SNOWSHOE	String	10	SNOWSHOE	SNOWSHOE	YesNoUnk		false		
MOTORIZED_WATERCRAFT	String	10	MOTORIZED_WATERCRAFT	MOTORIZED_WATERCRAFT	YesNoUnk		false		
NON_MOTORIZED_WATERCRAFT	String	10	NON_MOTORIZED_WATERCRAFT	NON_MOTORIZED_WATERCRAFT	YesNoUnk		false		
CROSS_COUNTRY_SKI	String	10	CROSS_COUNTRY_SKI	CROSS_COUNTRY_SKI	YesNoUnk		false		
NOT_SPECIFIED	String	10	NOT_SPECIFIED	NOT_SPECIFIED	YesNoUnk		false		
TR_LENGTH	Double	8	TRAIL_LENGTH	TR_LENGTH			false		
TR_SURFC	String	40	TRAIL_SURFACE	TR_SURFC	TrailSurface		true		
TR_STATUS	String	40	TRAIL_STATUS	TR_STATUS	TrailStatus		false		
NAT_TR_DES	String	80	NATIONAL_TRAIL_DESIGNATION	NAT_TR_DES	NationalTrailDesignation		true		
ACCESS_STA	String	40	ACCESSIBILITY_STATUS	ACCESS_STA	ADA		false		
SPC_MGT_AR	String	60	SPECIAL_MANAGEMENT_AREA	SPC_MGT_AR	SpecialManagementArea		true		
SPC_MGT_AR_COMMENTS	String	255	SPC_MGT_AR_COMMENTS	SPC_MGT_AR_COMMENTS			true		
PR_TR_MNTR	String	40	PRIMARY_TRAIL_MAINTAINER	PR_TR_MNTR	PrimaryTrailMaintainer		true		
PR_TR_MNTR_COMMENTS	String	255	PR_TR_MNTR_COMMENTS	PR_TR_MNTR_COMMENTS			true		
COUNTY	String	40	COUNTY	COUNTY	County		false		
AGENCY_DATA_SOURCE_GEO	String	40	AGENCY_DATA_SOURCE_GEO	AGENCY_DATA_SOURCE_GEO			false		
AGENCY_DATA_SOURCE_ATT	String	40	AGENCY_DATA_SOURCE_ATT	AGENCY_DATA_SOURCE_ATT			false		
AGENCY_DATA_SOURCE_COMMENTS	String	120	AGENCY_DATA_SOURCE_COMMENTS	AGENCY_DATA_SOURCE_COMMENTS			true		
REVIEW_FLAG	String	10	REVIEW_FLAG	REVIEW_FLAG	YesNoUnk		true		
REVIEW_COMMENTS	String	255	REVIEW_COMMENTS	REVIEW_COMMENTS			true		
QA_STATUS	SmallInteger	2	QA_STATUS	QA_STATUS	QAStatus	1	false		
created_user	String	255	created_user	created_user			true		

Metadata

Trails_Master_123114

file:///C:/Users/JennyK/AppData/Local/Temp/Temp1_phpRPyuuz.zip/TrailsMaster123114_JK410_NewOrig.faq.html

Trails_Master_123114

Metadata also available as - [\[Outline\]](#) - [\[Parseable text\]](#) - [\[XML\]](#)

Frequently anticipated questions:

- [What does this data set describe?](#)
 1. [How might this data set be cited?](#)
 2. [What geographic area does the data set cover?](#)
 3. [What does it look like?](#)
 4. [Does the data set describe conditions during a particular time period?](#)
 5. [What is the general form of this data set?](#)
 6. [How does the data set represent geographic features?](#)
 7. [How does the data set describe geographic features?](#)
- [Who produced the data set?](#)
 1. [Who are the originators of the data set?](#)
 2. [Who also contributed to the data set?](#)
 3. [To whom should users address questions about the data?](#)
- [Why was the data set created?](#)
- [How was the data set created?](#)
 1. [From what previous works were the data drawn?](#)
 2. [How were the data generated, processed, and modified?](#)
 3. [What similar or related data should the user be aware of?](#)
- [How reliable are the data, what problems remain in the data set?](#)
 1. [How well have the observations been checked?](#)
 2. [How accurate are the geographic locations?](#)
 3. [How accurate are the heights or depths?](#)
 4. [Where are the gaps in the data? What is missing?](#)
 5. [How consistent are the relationships among the data, including topology?](#)
- [How can someone get a copy of the data set?](#)
 1. [Are there legal restrictions on access or use of the data?](#)
 2. [Who distributes the data?](#)
 3. [What's the catalog number I need to order this data set?](#)
 4. [What legal disclaimers am I supposed to read?](#)
 5. [How can I download or order the data?](#)
- [Who wrote the metadata?](#)

What does this data set describe?

Title: Trails_Master_123114

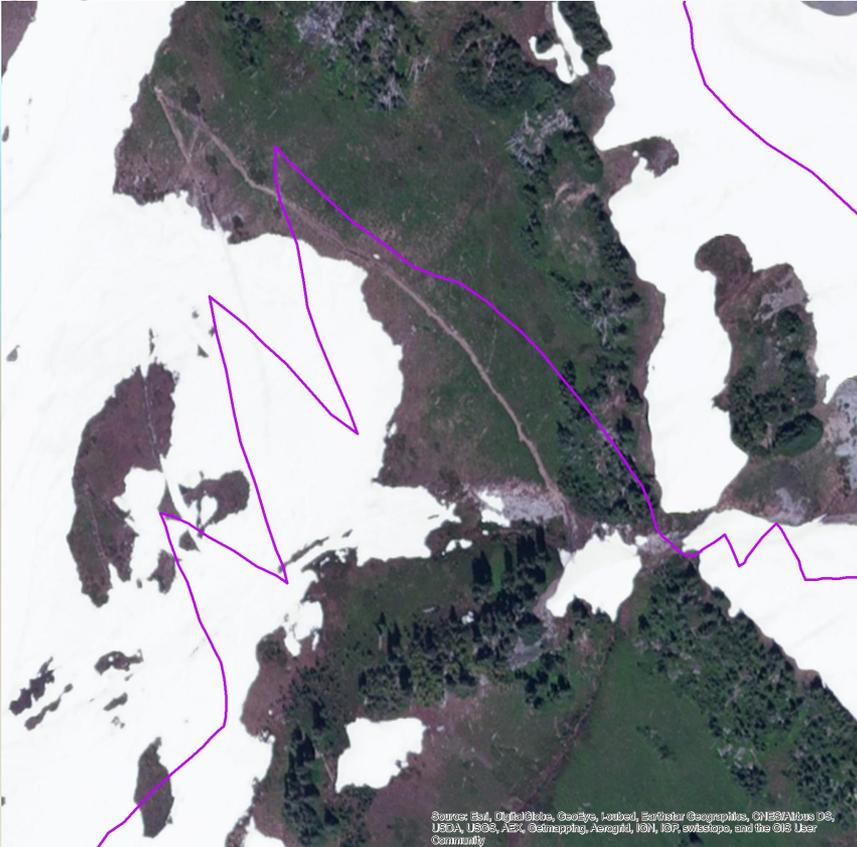
1. **How might this data set be cited?**
Washington State Office of the Chief Information Officer (OCIO), Geospatial Program Office, 20150630, Trails_Master_123114.
2. **What geographic area does the data set cover?**
West_Bounding_Coordinate: -124.798416
East_Bounding_Coordinate: -116.752260

Editing Trails Data

- Aggregated statewide database split into work areas
- Editors accessed areas through server web services
 - Created & edited local copies
 - Flagged trails for additional review
 - Synced edits to server copies
- Edits were reviewed by technical lead & posted to statewide version



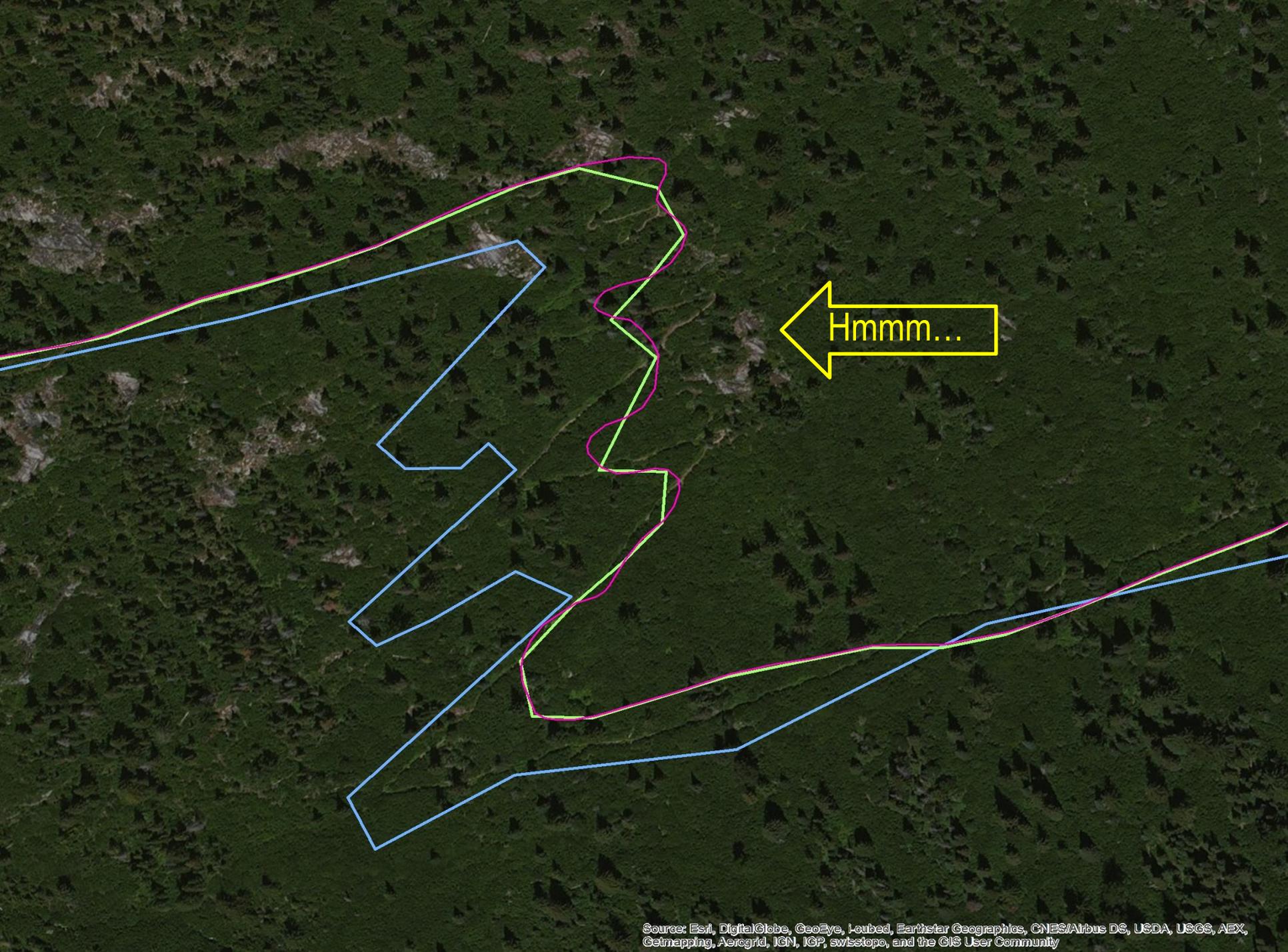
What We Didn't Edit...



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Geomatics, Aergrid, IGN, IGP, swisstopo, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Geomatics, Aergrid, IGN, IGP, swisstopo, and the GIS User Community



Hmmm...

Project Metrics

- 2007 Project Estimate ~\$1.7-2.3M; 2014 Pilot Grant ~\$177K
 - Migrated data to federal standard
 - Fostered federal, state, local & private partnerships
 - Developed trailhead attribute guideline
- | <u>Target</u> | <u>Result</u> |
|---------------|-------------------|
| 10,000 miles | ~11,000 miles |
| 0 trailheads | ~1,000 trailheads |

10,000 miles
0 trailheads

~11,000 miles
~1,000 trailheads



Lessons Learned

- Estimating resources
- Selecting partners
- Tracking metrics



The Final Piece... Leveraging Technology

Needed tools for potential future data collection efforts

Esri's Collector for ArcGIS application

- Free for both iOS & Android devices
- Utilizes web map with editable feature service
- Statewide database split into regions to optimize performance
- Currently allows authoritative users to update uses only

Web-based file upload form ("Breadcrumbs")

- Currently allows authoritative users to upload GPS & other approved file types

Examples

- ArcGIS Online / Collector
- “Breadcrumbs”
- Kerika



HOME Statewide Trails (Draft), 5/4/15

NEW MAP CREATE PRESENTATION Jenny

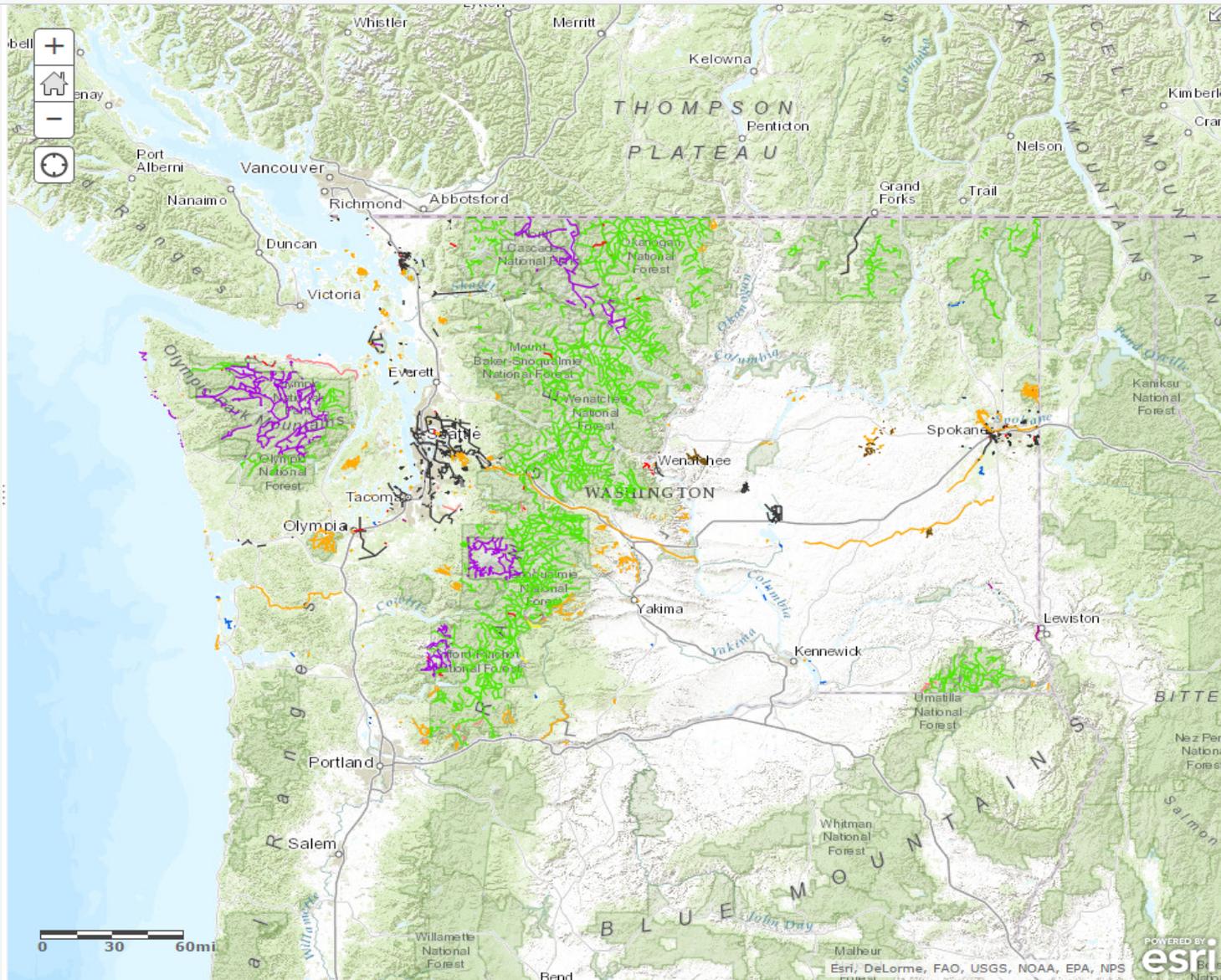
Details Add Basemap Save Share Print Directions Measure Bookmarks Find address or place

Legend

Draft Statewide Trails, 5/4/15

- BUREAU OF INDIAN AFFAIRS
- BUREAU OF LAND MANAGEMENT
- BUREAU OF RECLAMATION
- COMMERCIAL USER
- DEPARTMENT OF DEFENSE
- DEPARTMENT OF ENERGY
- FEDERAL AVIATION ADMINISTRATION
- FISH AND WILDLIFE SERVICE
- FOREST SERVICE
- LOCAL GOVERNMENT
- NATIONAL PARK SERVICE
- NONGOVERNMENTAL ORGANIZATION
- OTHER FEDERAL AGENCY
- PRIVATE
- STATE
- TRIBAL
- UNKNOWN
- US ARMY CORPS OF ENGINEERS
- VOLUNTEER
- Uncoded

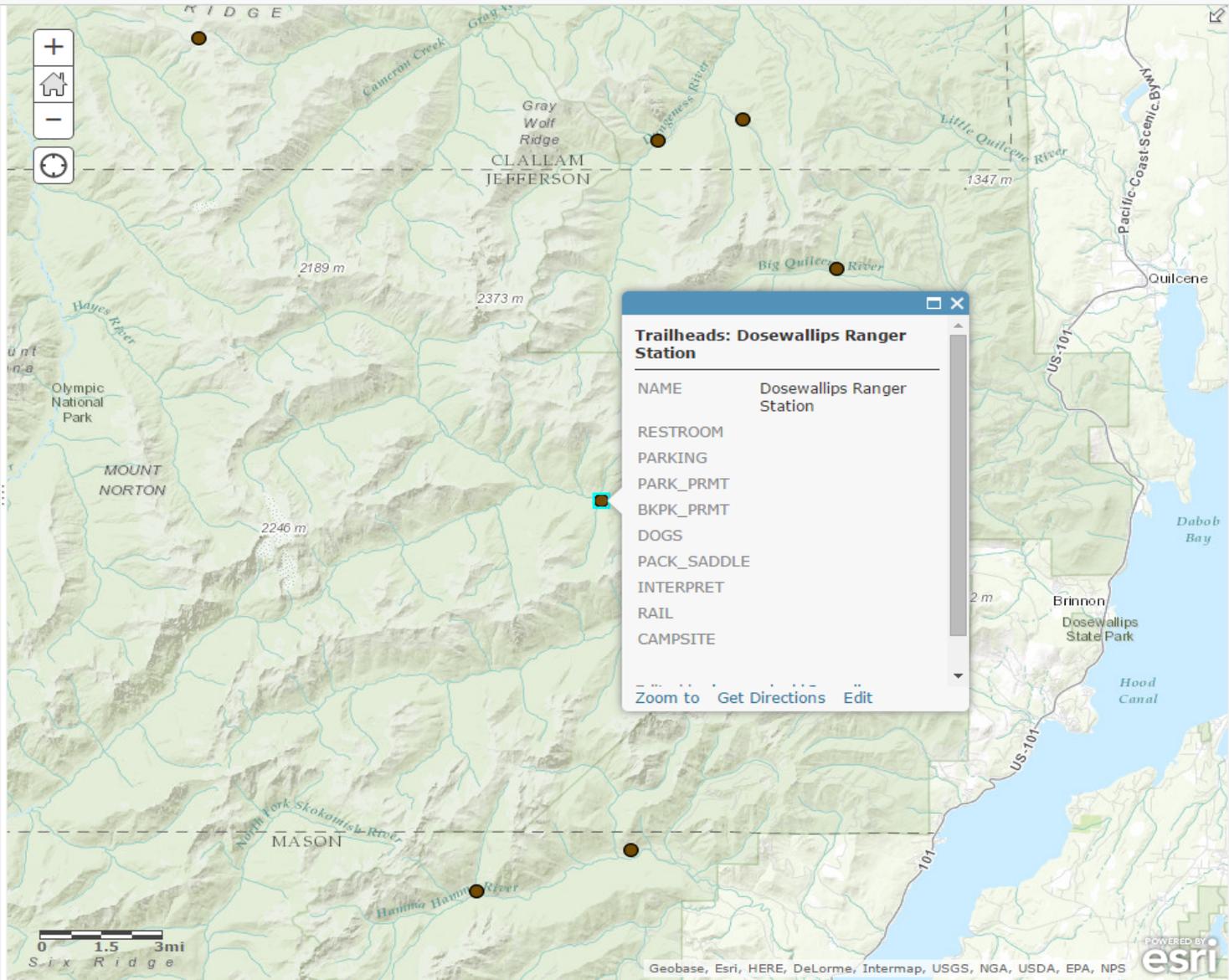
Esri.com · ArcGIS Marketplace · Help · Terms of Use · Privacy · Contact Esri · Report Abuse



Legend

Trailheads - Trailheads

-



Trailheads: Dosewallips Ranger Station

NAME	Dosewallips Ranger Station
RESTROOM	
PARKING	
PARK_PRMT	
BKPK_PRMT	
DOGS	
PACK_SADDLE	
INTERPRET	
RAIL	
CAMPSITE	

Zoom to Get Directions Edit

HOME WA Trails Collector - Central South

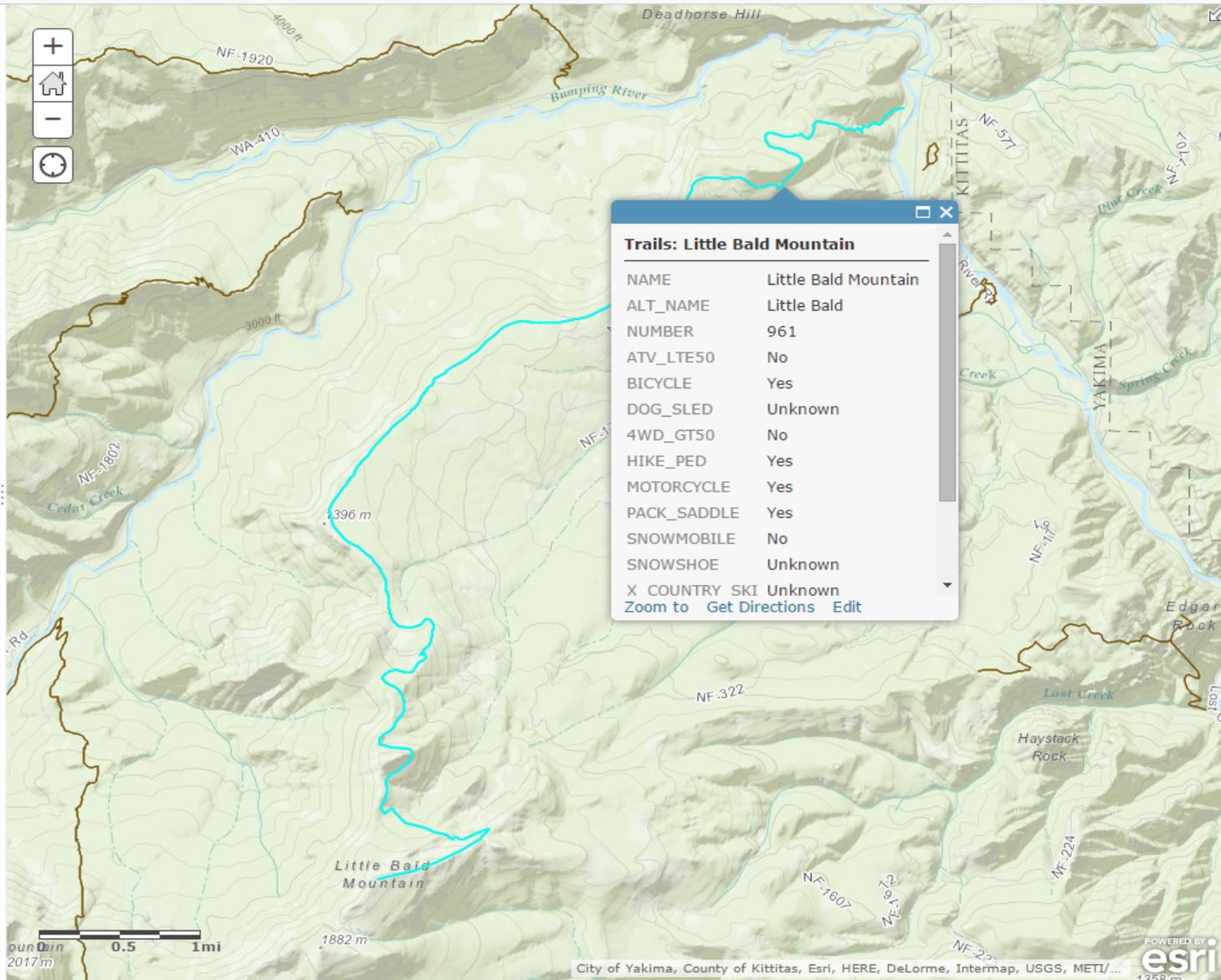
NEW MAP Jenny

- Details
- Add
- Edit
- Basemap
- Save
- Share
- Print
- Directions
- Measure
- Bookmarks

Find address or place

Legend

Trails_CentralSouth - Trails



Trails: Little Bald Mountain

NAME	Little Bald Mountain
ALT_NAME	Little Bald
NUMBER	961
ATV_LTE50	No
BICYCLE	Yes
DOG_SLED	Unknown
4WD_GT50	No
HIKE_PED	Yes
MOTORCYCLE	Yes
PACK_SADDLE	Yes
SNOWMOBILE	No
SNOWSHOE	Unknown
X_COUNTRY_SKI	Unknown

Zoom to Get Directions Edit

Help us improve our website. Please use the Feedback tab to the right or email ocio@ocio.wa.gov



Initiatives

Trail Bread Crumb Collector

Washington Master Addressing Services (WAMAS)

Agile Development

Geospatial Program Office

Trail Bread Crumb Collector

Washington Geographic Information Council (WAGIC)

Governance & Standards

Data & Services

Geographic Information Technology (GIT) Committee

State & Local Data Coordination & Aggregation Initiative

Project Oversight & Decision Package Prioritization

Technology Business Management (TBM)

Innovation Labs

Open Data

Washington BusinessHub

Washington OneNet | FirstNet

Washington State Trails Database Project

IT Workforce Development

Online and Mobile Services

Home » Trail Bread Crumb Collector

This form is part of the Washington State Trails Database project, a collaboration between the OCIO's Geospatial Program Office and the Recreation and Conservation Office.

Trail name *

Data collection date

Month Day Year

Data format

- None -

County *

- Select -

Land type

- None -

File to upload *

Choose File No file chosen Upload

Comments

Submit

feedback

Kerika: Washington State

https://kerika.com/my/a6Qk?v=workflow

Kerika Search Jennifer Konwinski

Home Washington State Trailheads...

Reid Ammann's Proj... Washington State Trailheads Project Workflow

To Do In Progress Done

Trailhead Definition

Database Design

Notes on Attributing

Data Collection

Meeting Notes

Fields to Add

Conference Call Option

Status Reports

Possible Crowdsourcing Project Done Mar 10

Geodatabase Designs from other States Done Mar 18

Datasets to Attribute Done Apr 21

+ NEW CARD

Kerika: Weekly Activity Reports

https://kerika.com/m/UUSu/v/pU?v=workflow&tab=attachments

Kerika Search Jennifer Konwinski

Home Joy Paulus's Projects

To Do

Reid A. Deliverables

+ NEW CARD

Weekly Activity Reports in In Progress

Details

38 attachments

1 message

Add tags

Set due date

Set status

History

Attachments

Upload + Web content + Canvas

RA_StatewideTrails_WeeklyReport_4-13_to_4_19_2015.docx	Added Apr 16
RA_StatewideTrails_WeeklyReport_4-6_to_4_12_2015.docx	Added Apr 13
MH_StatewideTrails_WeeklyReport_0310to0323_2015.docx	Added Mar 24
RA_StatewideTrails_WeeklyReport_2_23_to_3_1_2015.docx	Added Mar 10
RA_StatewideTrails_WeeklyReport_3_2_to_3_8_2015.docx	Added Mar 10
RA_StatewideTrails_WeeklyReport_3_9_to_3_15_2015.docx	Added Mar 10
MH_StatewideTrails_WeeklyReport_0302to0309_2015.docx	Added Mar 10
MH_StatewideTrails_MonthlyReport_for_0127to0302_2015.docx	Added Mar 03
RA_StatewideTrails_WeeklyReport_2_2_to_2_8_2015.docx	Added Feb 04
RA_StatewideTrails_WeeklyReport_1_26to_2_1_2015.docx	Added Feb 04
RA_StatewideTrails_WeeklyReport_1_19to1_25_2015.docx	Added Feb 04
RA_StatewideTrails_WeeklyReport_1_12to1_18_2015.docx	Added Feb 04
MH_StatewideTrails_WeeklyReport_0113to0126_2015.docx	Added Jan 27
MH_StatewideTrails_WeeklyReport_0106to0112_2015.docx	Added Jan 13
MH_StatewideTrails_WeeklyReport_1230to0105_2015.docx	Added Jan 08
RA_StatewideTrails_WeeklyReport_1_5to1_11_2015.docx	Added Jan 07
RA_StatewideTrails_WeeklyReport_12_29_2014_to_1_4_2015.docx	Added Jan 05

+ NEW CARD

For More Information...

<https://ocio.wa.gov/initiatives/washington-state-trails-database-project>

Office of the Chief Information Officer
Washington State

Home About **Initiatives** Policies News Calendar Bill Watch

Initiatives

- Washington Master Addressing Services (WAMAS)
- Agile Development
- ▶ Geospatial Program Office
- ▶ Project Oversight & Decision Package Prioritization
- ▶ Technology Business Management (TBM)
- Innovation Labs
- ▶ Open Data
- Washington Business One Stop
- ▶ Washington OneNet | FirstNet
- ▼ **Washington State Trails Database Project**
 - About the Project
 - Mapping & Technical Details
- ▶ Online and Mobile Services

Washington State Trails Database Project

Home » **Initiatives** » Washington State Trails Database Project

The Washington State Trails Database Project



The Washington State Database project is a collaboration between the OCIO's Geospatial Program Office and the Recreation and Conservation Office. Through a NOVA grant a team of editors are working to compile an up-to-date trails database using the state adopted FGDC Trail Data Standard as the framework for defining trail features. The database will reflect the diversity of recreational opportunity in Washington, displaying multi-use trails from a wide range of land management agencies... from the Forest Service to state trust lands to local government. The resulting database will illustrate the complexity of Washington's vast trail networks.

LINKS TO PROJECT DOCUMENTS

- ▶ [Contract Status Report](#)
- ▶ [Data Editing Status Report](#)
- ▶ [Trails Data Dictionary](#)
- ▶ [Data Collecting & Updating Tools Development Description](#)
- ▶ [Data Collection Tools Diagram](#)
- ▶ [Presentation - 2014 WA State Trails Conference](#)

feedback