



# Lidar for Washington's Forest Lands

Abby Gleason - Lidar Manager  
Washington Geological Survey  
(360) 902-1560  
Abigail.Gleason@dnr.wa.gov



WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

[dnr.wa.gov](http://dnr.wa.gov)

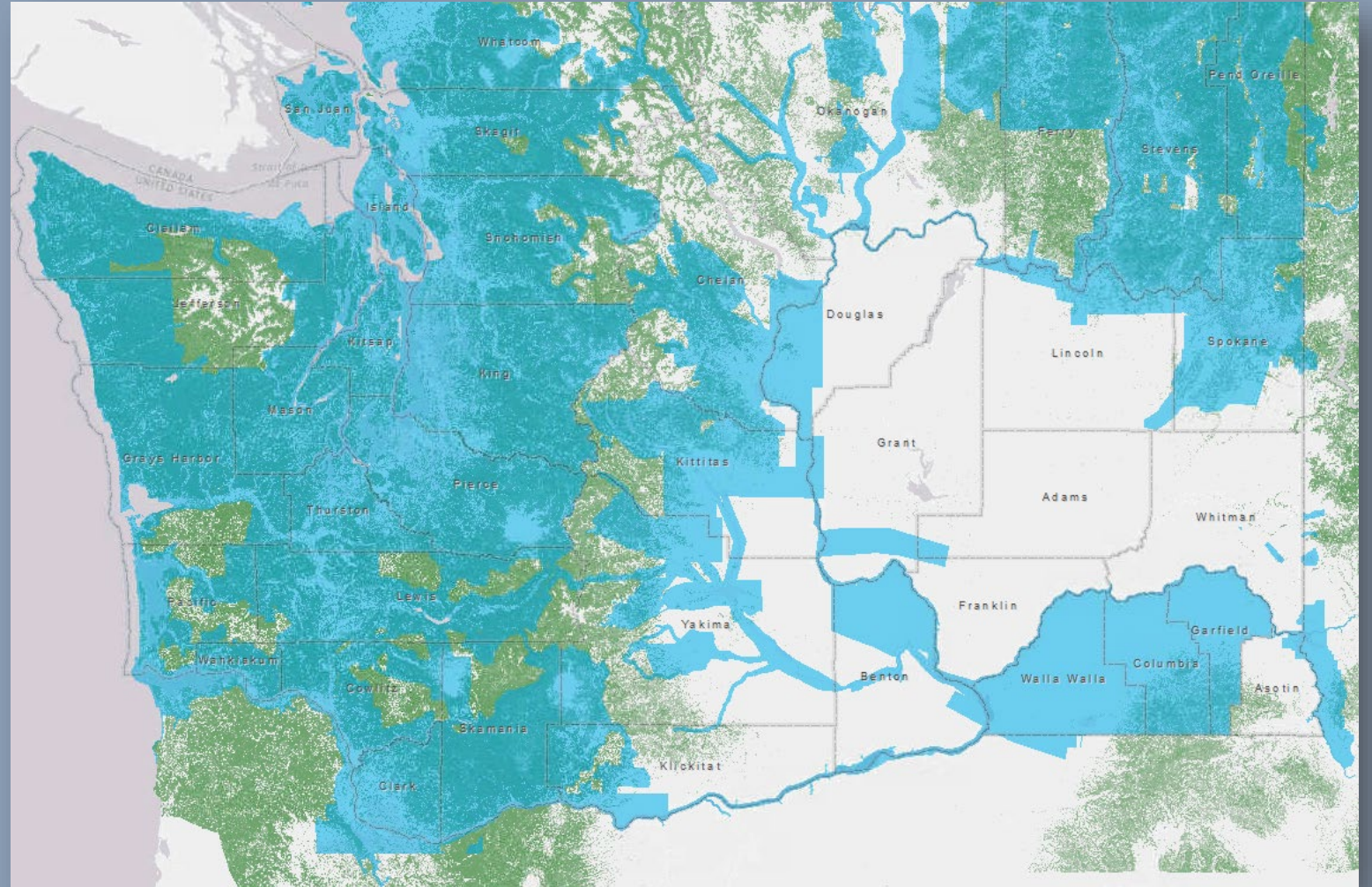
# Agenda

- Washington lidar coverage and what's coming
- Lidar quality
- Forested lands
- Forested lands – opportunities for collection
- Washington State Lidar Advisory Group and plan
- Washington Lidar Portal
- Lidar resources



# Washington Lidar Coverage

Current state public lidar coverage –available on the Washington Lidar Portal today



 Current public lidar coverage

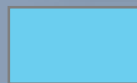
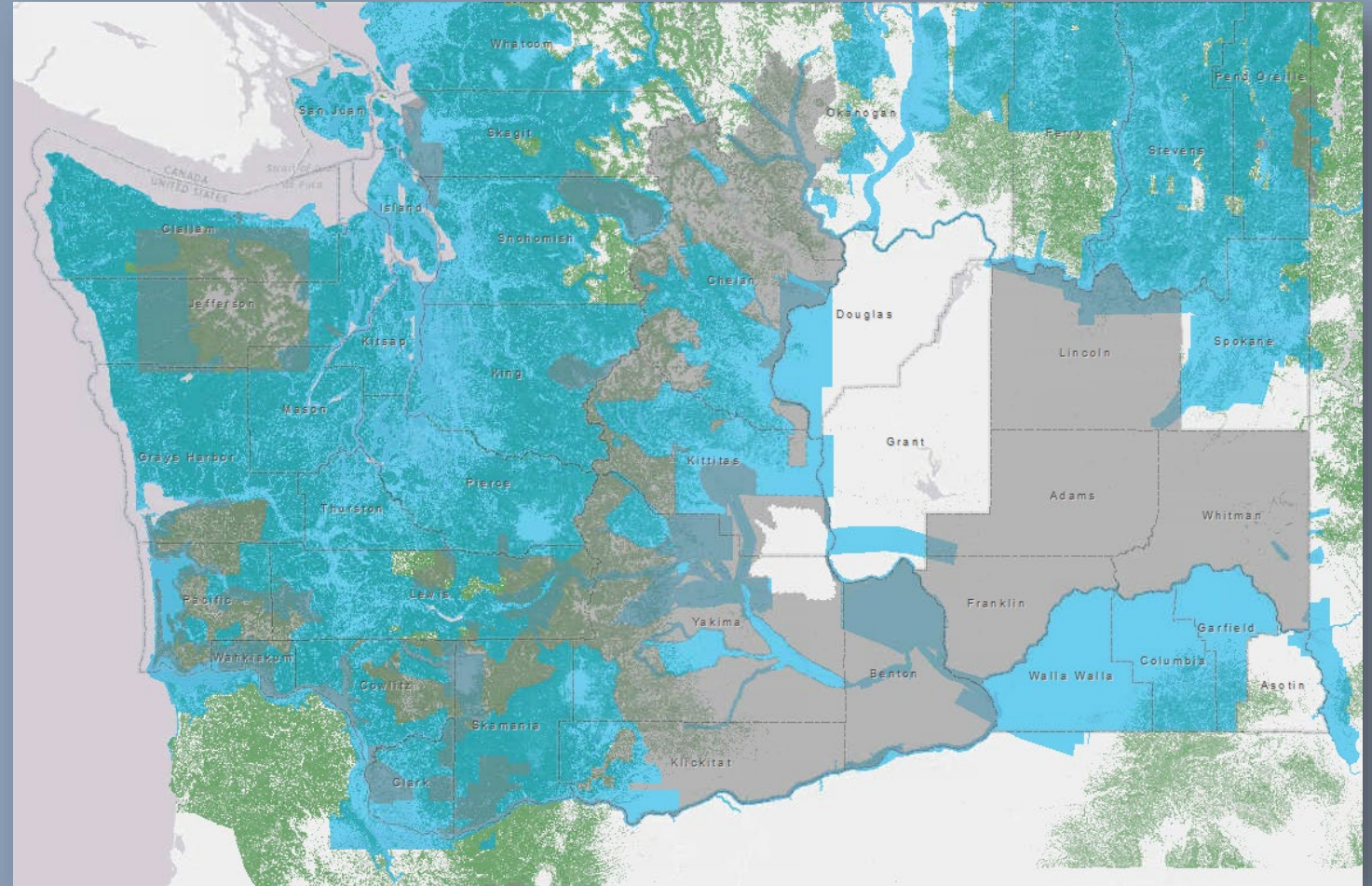




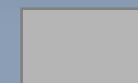
# More Data Coming Soon!

Lidar collection has really gained traction, thanks to:

- Legislative funding
- 3D Elevation grant program
- Partnerships with federal agencies (FEMA, NRCS, USGS) and local governments
- Broader DNR participation
- PSLC



Current public lidar coverage

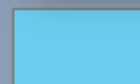
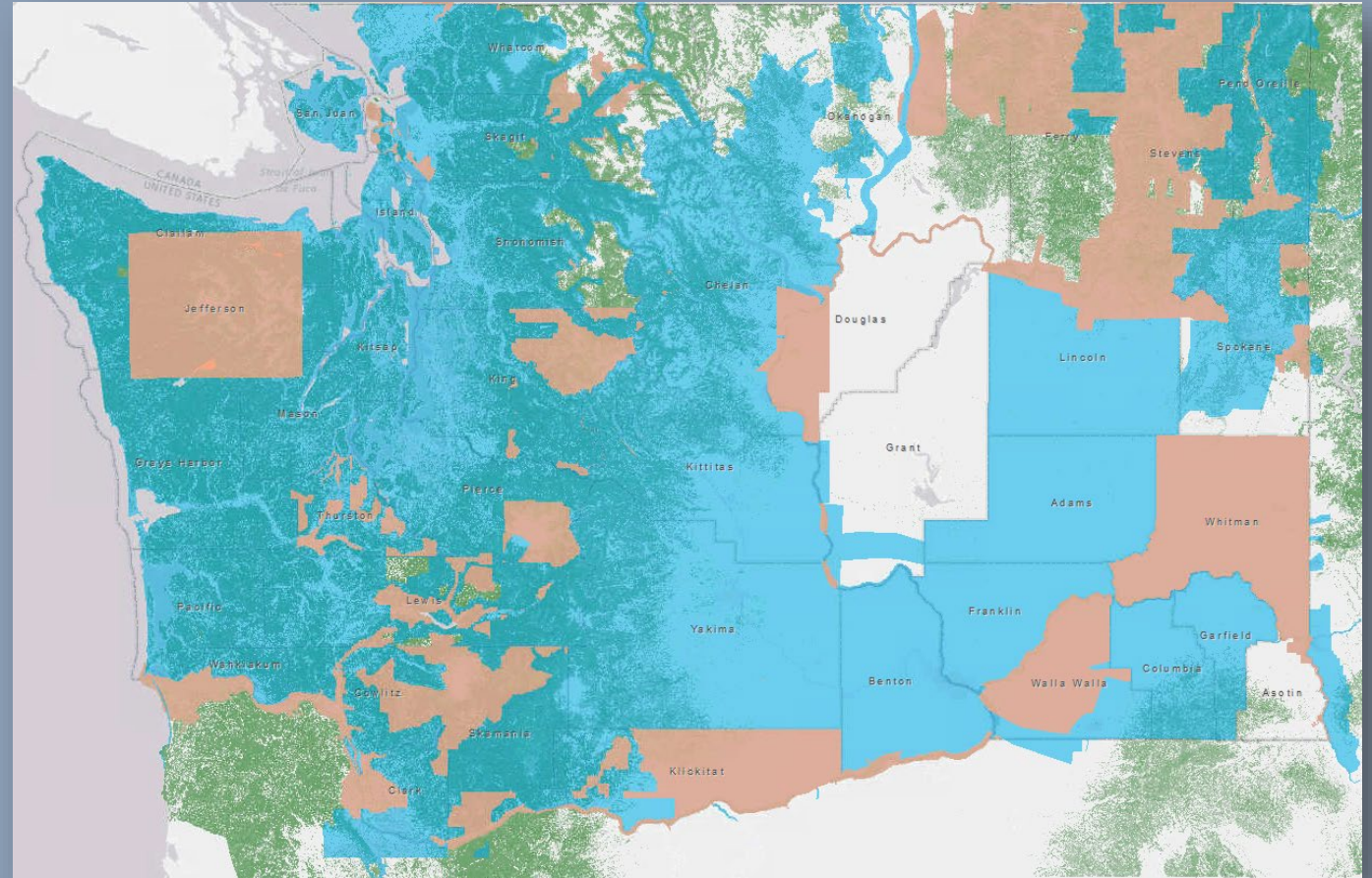


Incoming data



# However, Quality Really Matters

- Quality usually relates to the density of ground hits, or measurements, available in the dataset. This affects the ability to identify hazards, model streams, and do survey planning
- ~15,100 square miles need to be recollected
- With the area that has no public lidar available, ~28,000 square miles overall to be collected



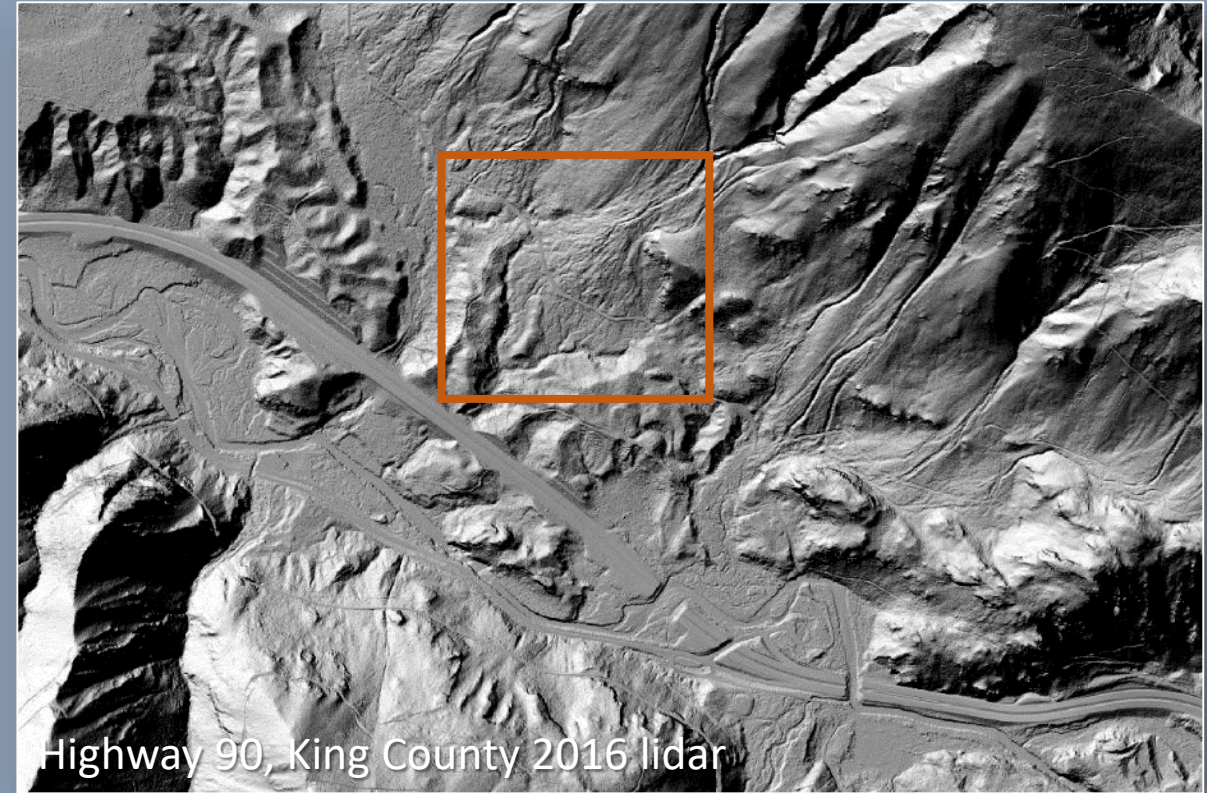
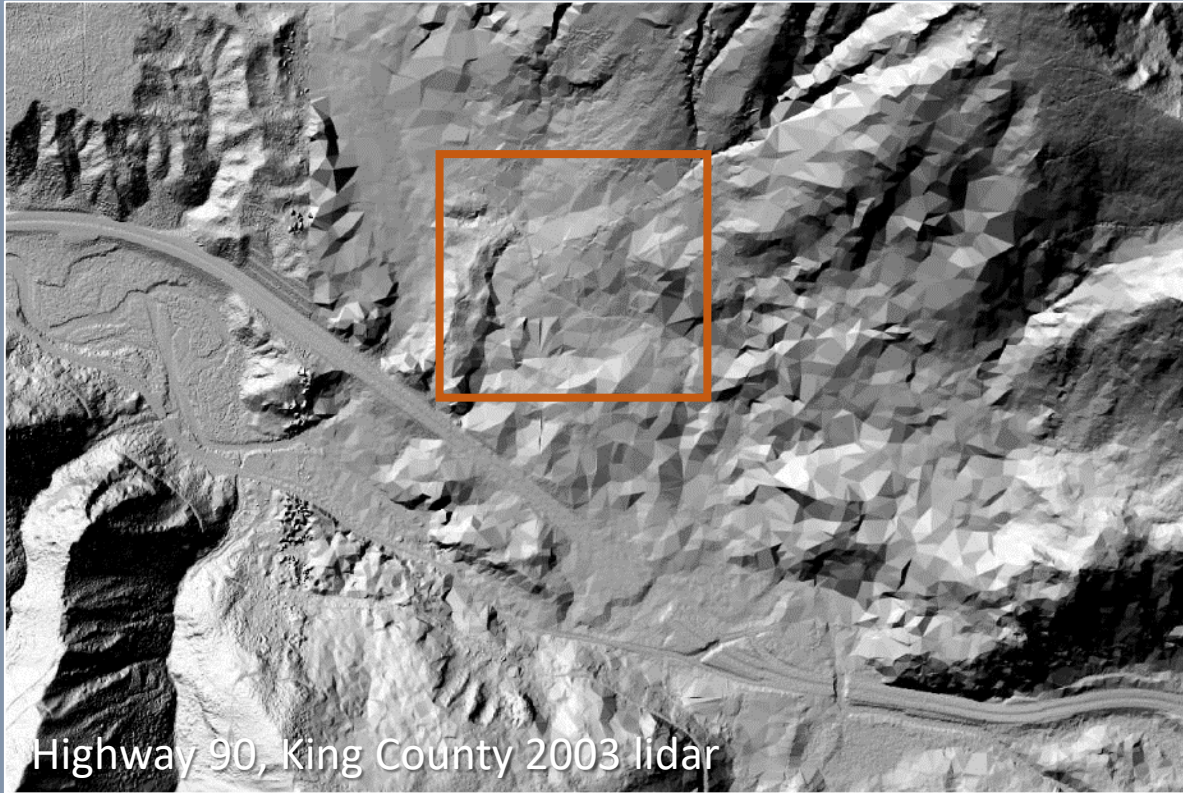
High quality data



Lower quality data



# Quality and Technology Changes Over Time

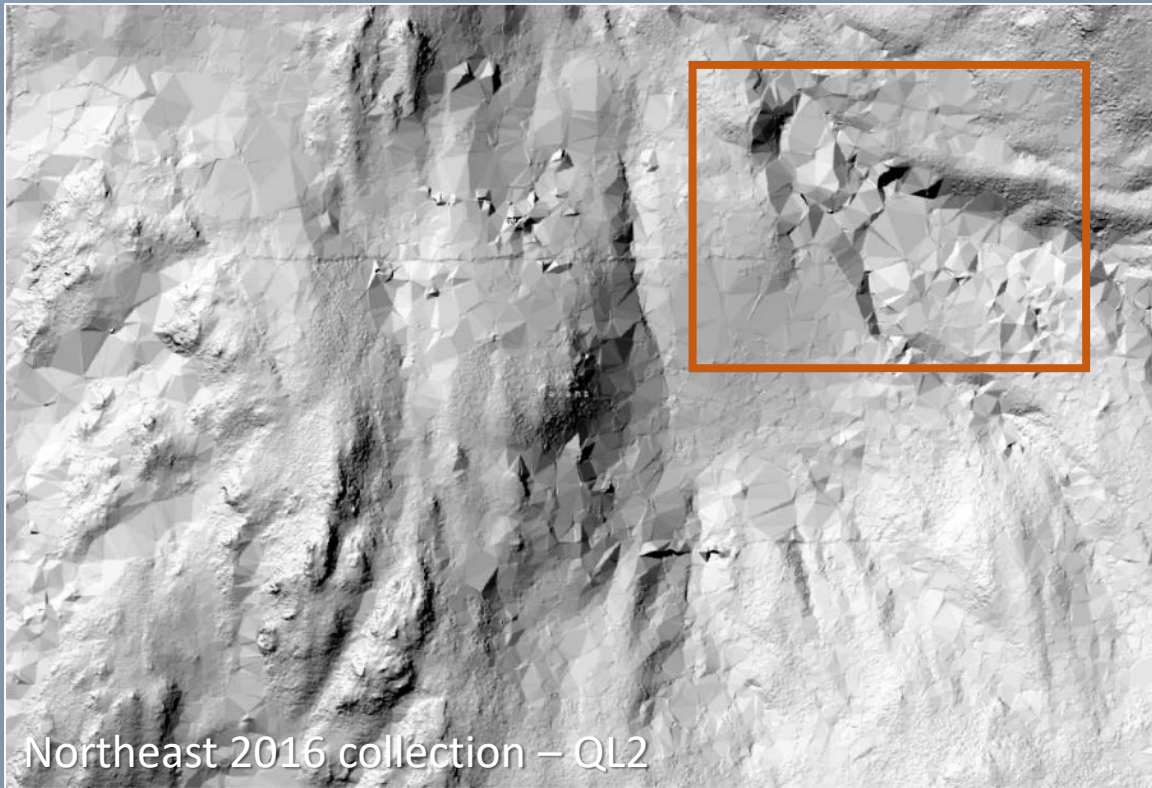
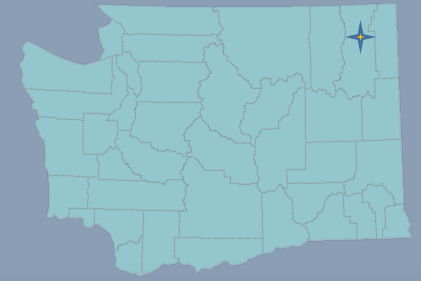


Advancements in lidar technology, updates on older collections can help gain new insights, remap and learn a lot more!

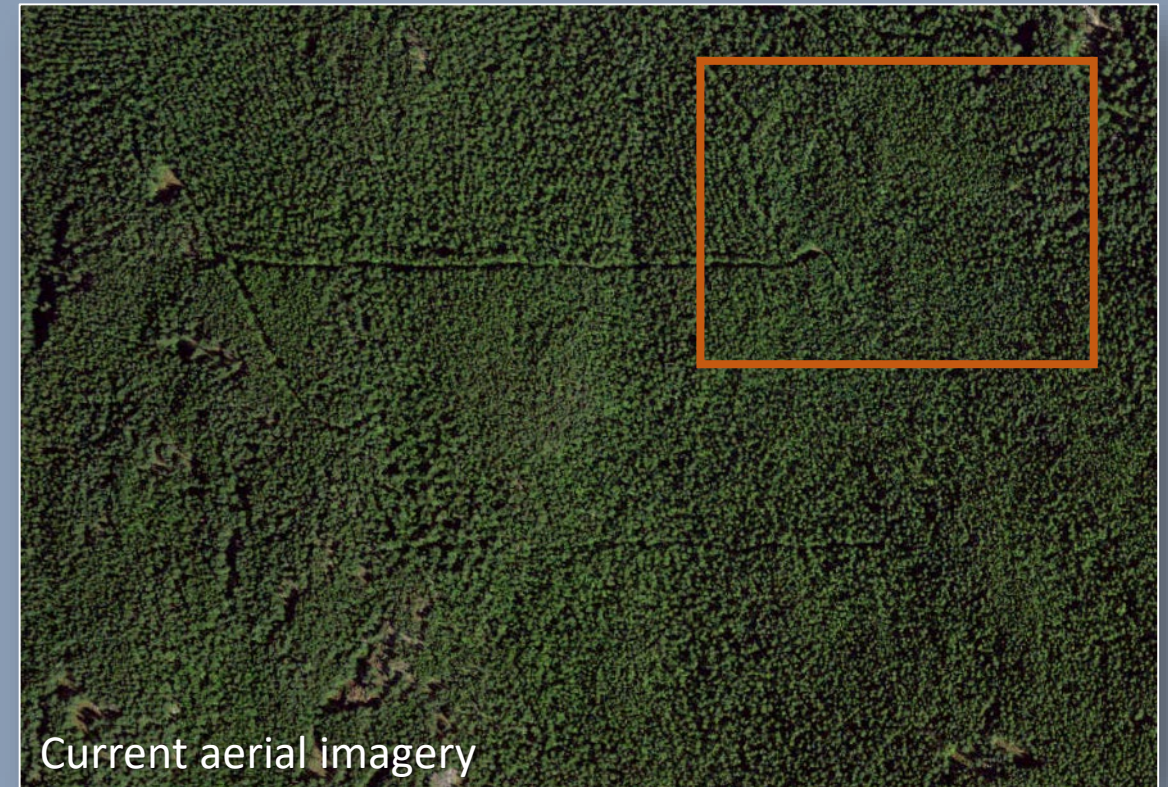




# Quality and Consistency



Northeast 2016 collection – QL2



Current aerial imagery

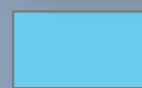
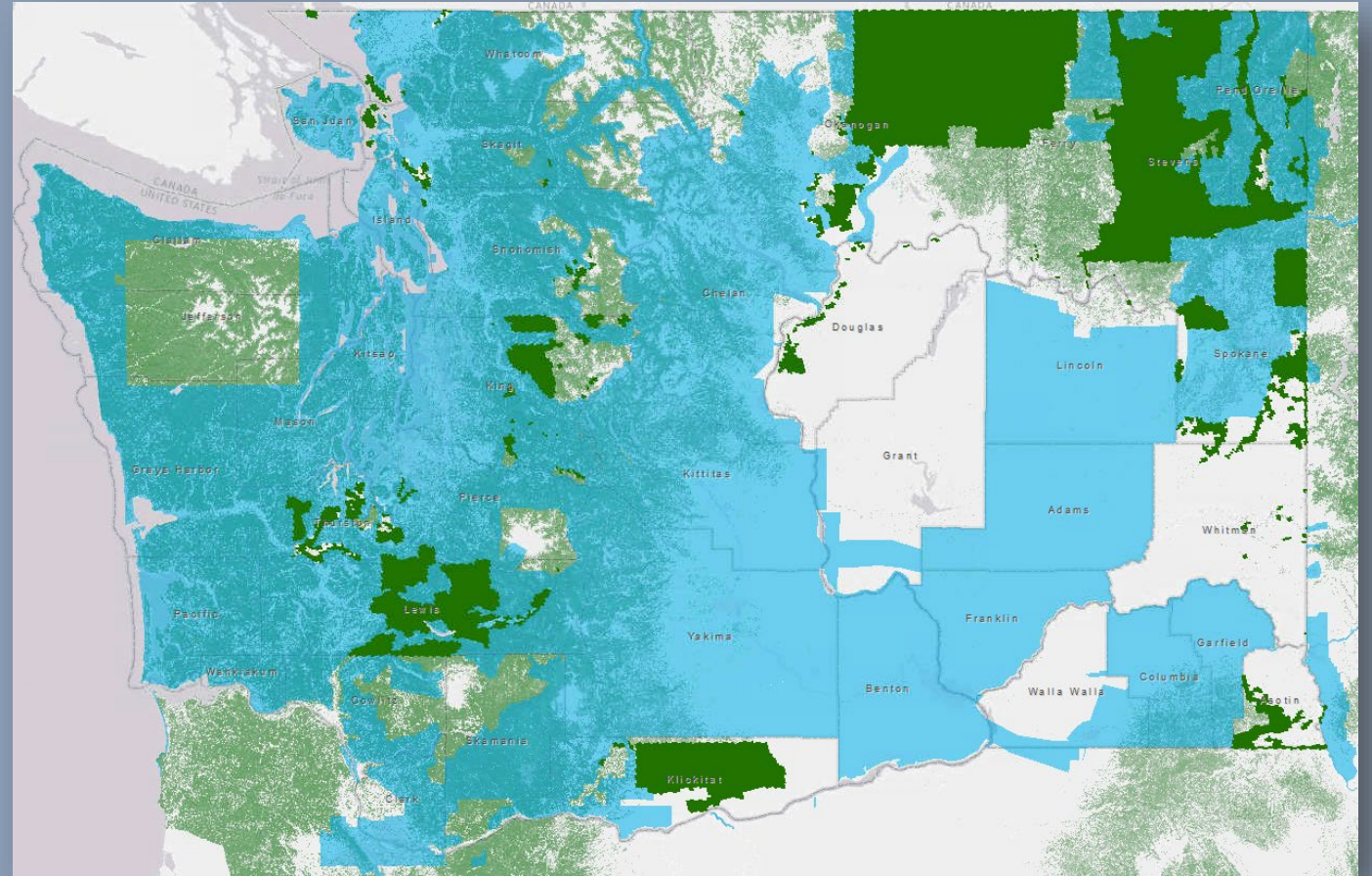
In areas with heavier vegetation, not enough of the lidar pulse is returned and more interpolation of the ground surface is needed



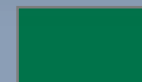


# What Does This Mean for Forest Lands?

- 8,519 square miles of public and private forested lands still need collection or recollection
- Some of these lands are scattered, it is more economical to collect larger, more contiguous areas



Current and planned high quality coverage

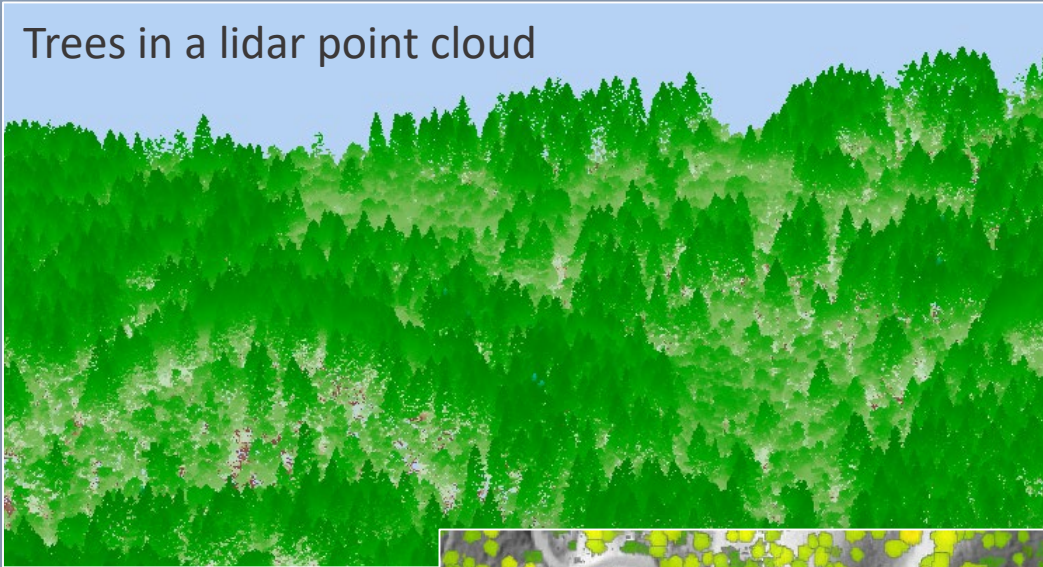


Needed forested lands

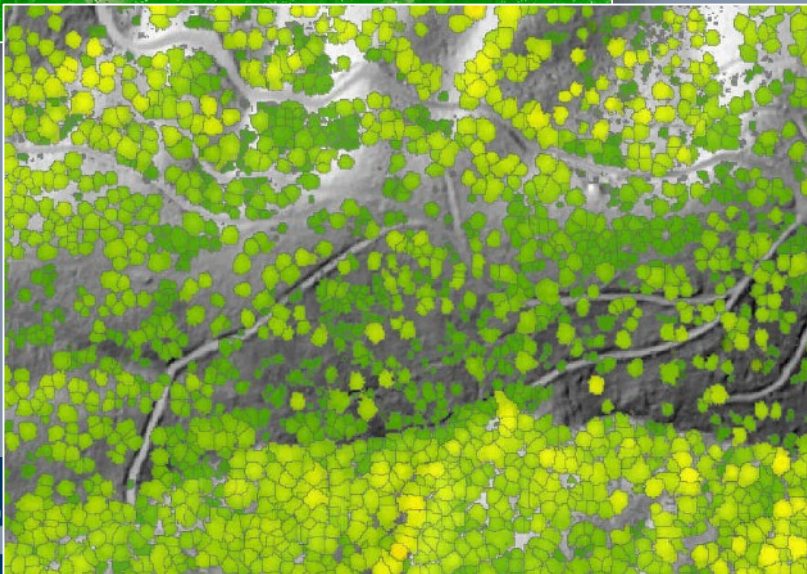


# Forest Lands - Funding and Challenges

Trees in a lidar point cloud



Segmented  
tree crowns

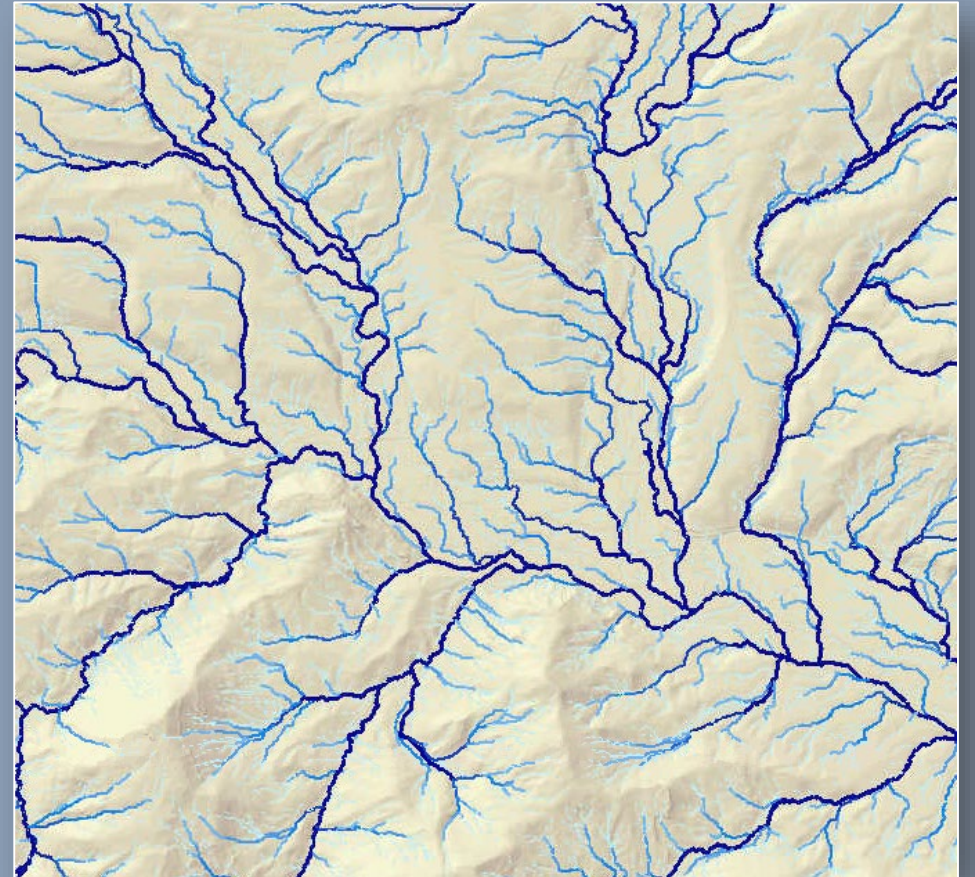


- Using average costs from previous DNR/USGS projects: ~\$4,396,000 to acquire, and likely more to have efficient acquisition
- At current DNR funding levels within WGS, it would take three bienniums (6 years) to acquire, plus WGS has other factors to consider (hazard areas)
- Other challenges include weather, smoke, snow and other environmental factors that impact acquisition and timelines



# Forest Lands - Opportunities

- Lidar is collected through direct funding and contracts, partnerships, and grants
  - Washington Geological Survey
  - USGS 3DEP grant program
  - Partnerships with USFS, FEMA
- WGS has a DNR contract as well as submits a proposal to the USGS each biennium
- Participation in the Lidar Advisory group helps set priorities and look for partnership opportunities



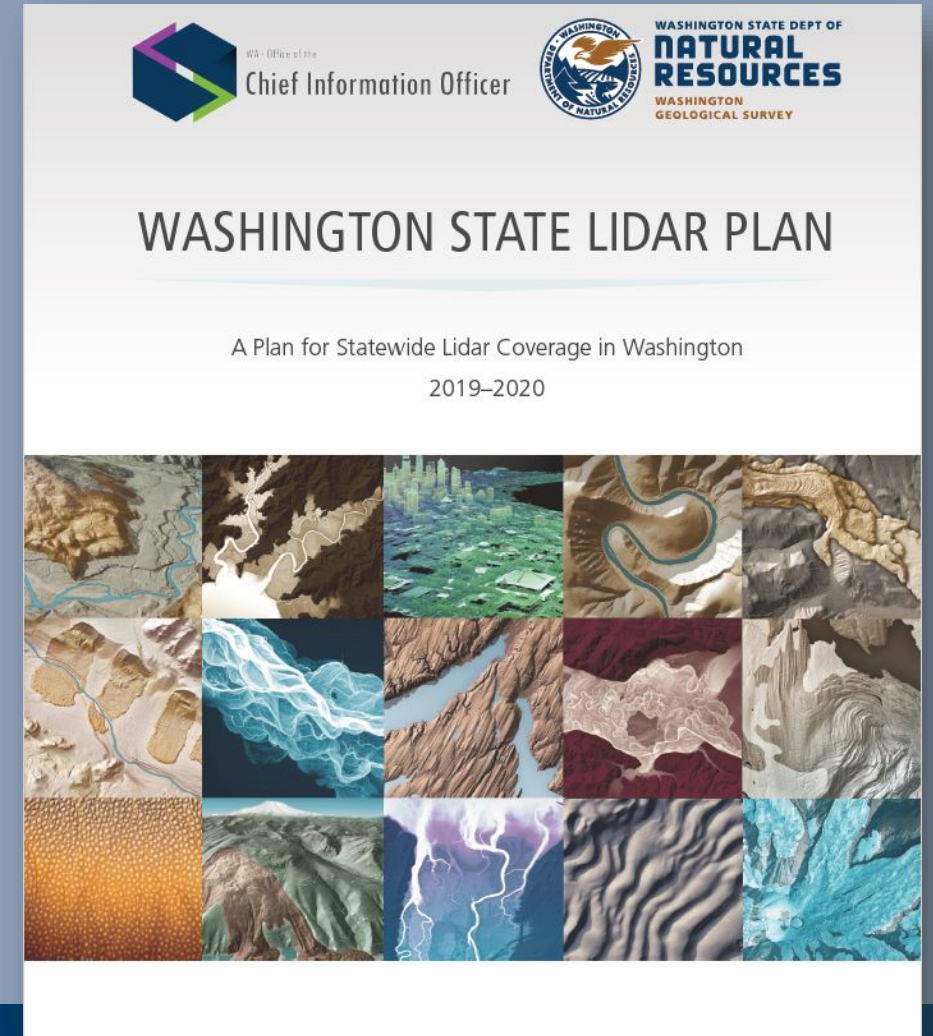
Stream typing  
using lidar data

— Main stem  
— Tributary



# Planning for the Future

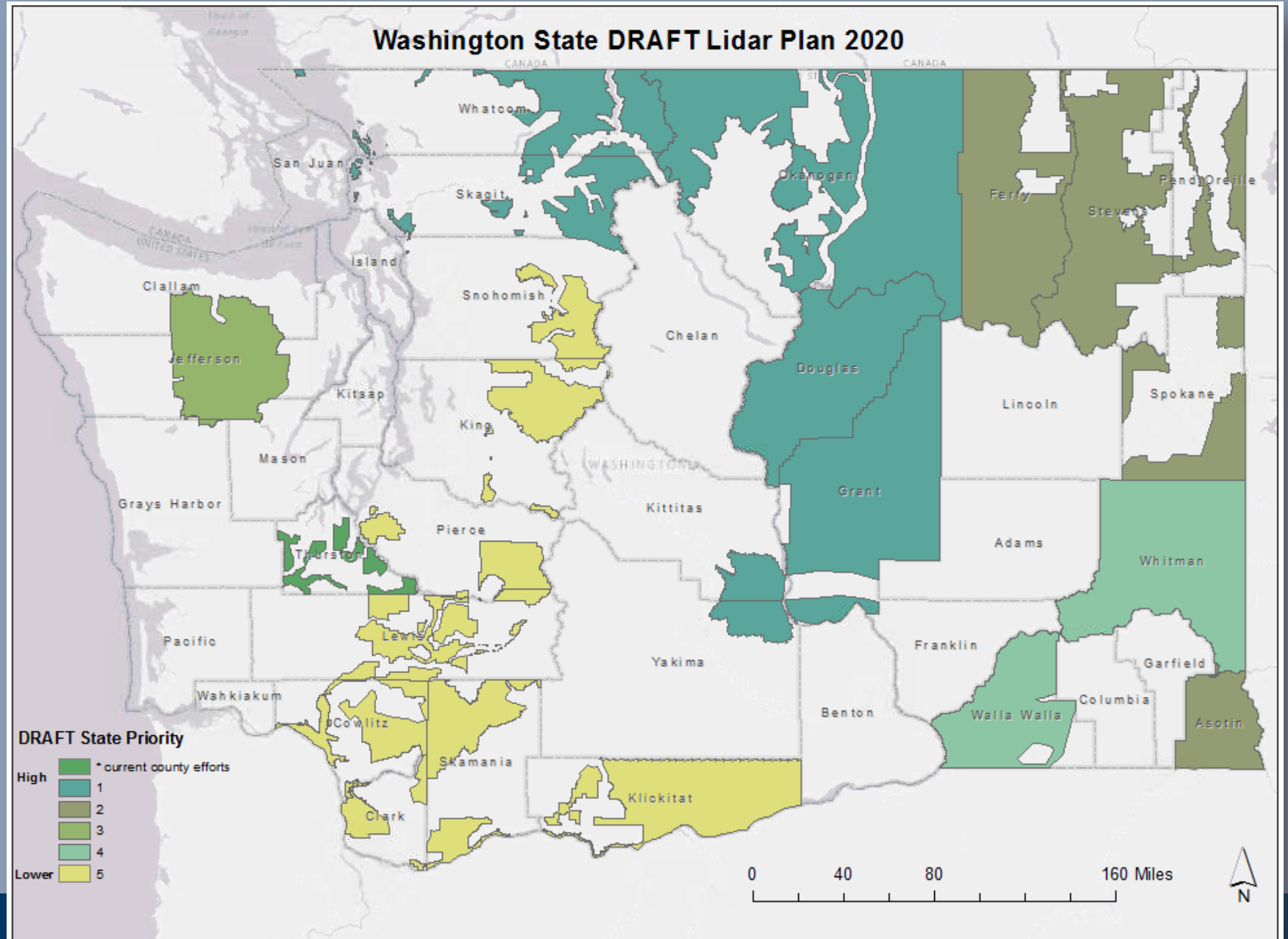
- WGS, OCIO, and Lidar Advisory Group developed the Washington State Lidar Plan in 2019
- Looks at the uses and benefits to lidar in Washington State, high quality standards for lidar collection, and the outlook for statewide collection as well as refreshing areas on a regular basis
- Washington has already seen benefits to having a state plan with regards to federal partnership
- Companion story map created to make the plan accessible to all users and decision makers





Map 1: Current plan, until revised in June 2020

Map 2: Draft plan, to be discussed in June



# The Washington Lidar Advisory Group

The Lidar Advisory Group works toward cooperation and collaboration across the state. Goals are:

- Work together on a project and find funding resources or strategies
- Synchronize project areas to extend a collection area
- Share project extents and intents early to facilitate decision making

The group will meet in June to discuss priorities, funding, and collection opportunities

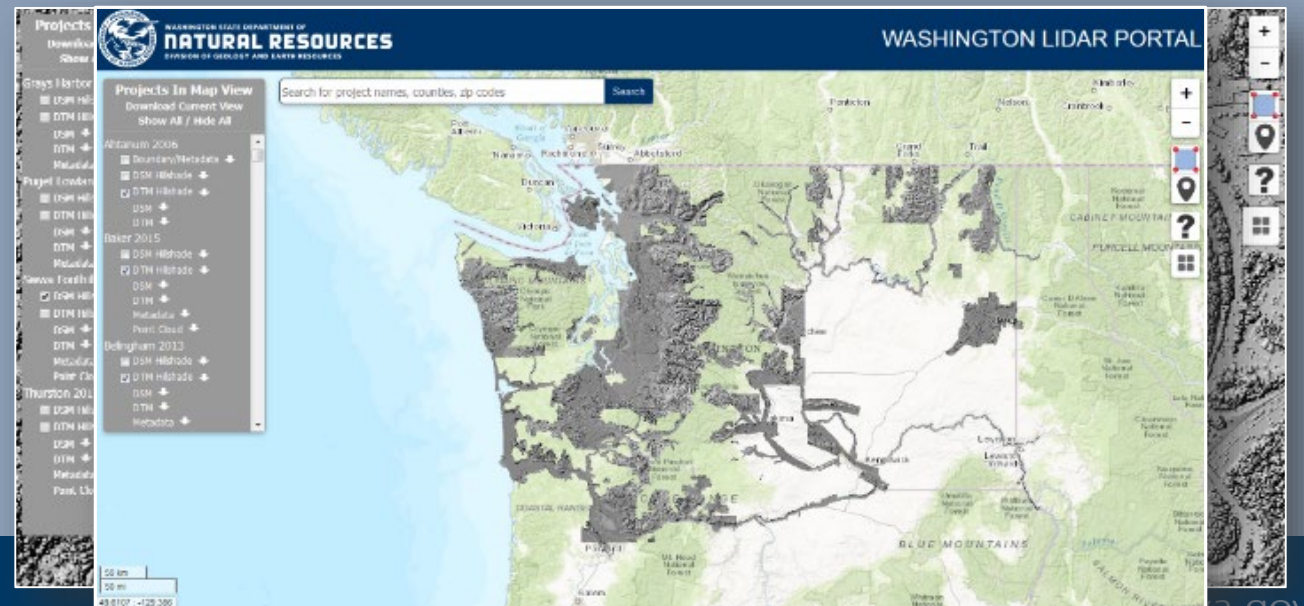




# Public Distribution, the Lidar Portal

- Free to the public for data download
- Point clouds (.laz), DEMs, hillshades available
- Area of interest or project wide download options
- Data viewable at full resolution, great for exploring Washington's topography and features

Visit <http://lidarportal.dnr.wa.gov>



# Lidar for Forest Lands - In Summary

- 8,500+ square miles of public and private forested lands remain to be collected with high quality lidar in support of stream basin delineation and stream typing, slope stability, and other use cases
- With current estimates, funding needed is at least ~\$4,400,000
- There are options and opportunities. Lidar collection does take time and dedication, funding and partnership. We can accomplish this and provide critical elevation data for programs on forested lands





# Lidar Resources

WGS lidar download portal:

<http://lidarportal.dnr.wa.gov/>

WGS lidar website:

<https://www.dnr.wa.gov/lidar>

Information on:

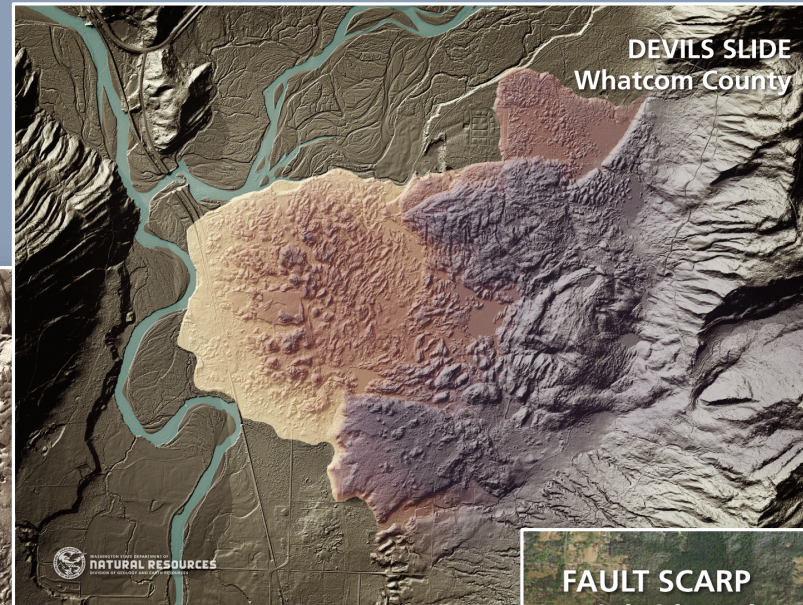
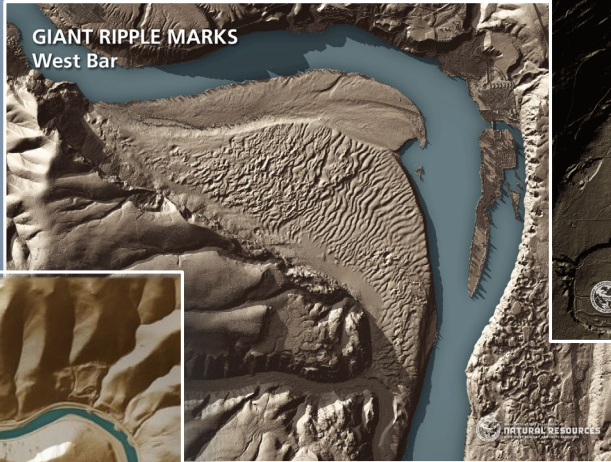
- State lidar plan
- State plan story map
- How lidar works
- Lidar screensavers

The screenshot shows the website for the Washington State Department of Natural Resources, specifically the Lidar page. The header includes the department's logo, name, and commissioner's name, along with a search bar and a translate dropdown. The navigation menu lists 'PROGRAMS AND SERVICES', 'ABOUT', 'MANAGED LANDS', and 'EMPLOYMENT'. The page content features a sidebar with links to 'Publications and Maps', 'Geologic Information Portal', 'Washington Geologic Survey Publications Catalog', 'GIS Data and Databases', 'Presentation Archive', 'Lidar', and 'Story Maps'. The main content area is titled 'Lidar' and includes a large image of a glacier crevasse with the caption 'Crevasse within the Carbon Glacier, Mount Rainier'. Below the image is a section for 'The State Lidar Plan' with a story map thumbnail. On the right, there is a 'CONTACT US' section with contact information for Abigail Gleason and Leslie (Guy) McWethy, and a 'LIDAR SCREENSAVERS' section with two download options for 2018 screensavers: 'WIDESCREEN 16:9 RATIO' and 'STANDARD 4:3 RATIO'.



# Thank You!

## Questions?



Lidar resources and images at:  
<http://www.dnr.wa.gov/lidar>



WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

dnr.wa.gov



