Land Cover for Environmental Applications

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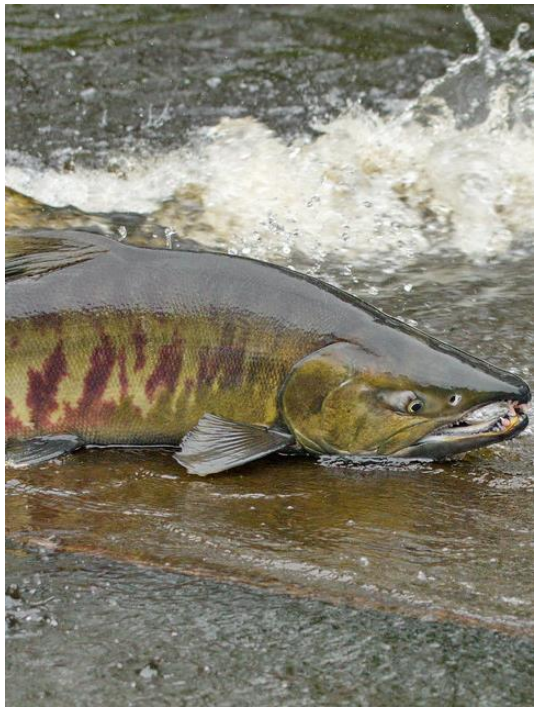
5/20/2026

Washington Department of FISH & WILDLIFE

Washington Dept. of Fish and Wildlife



Preserve

Protect

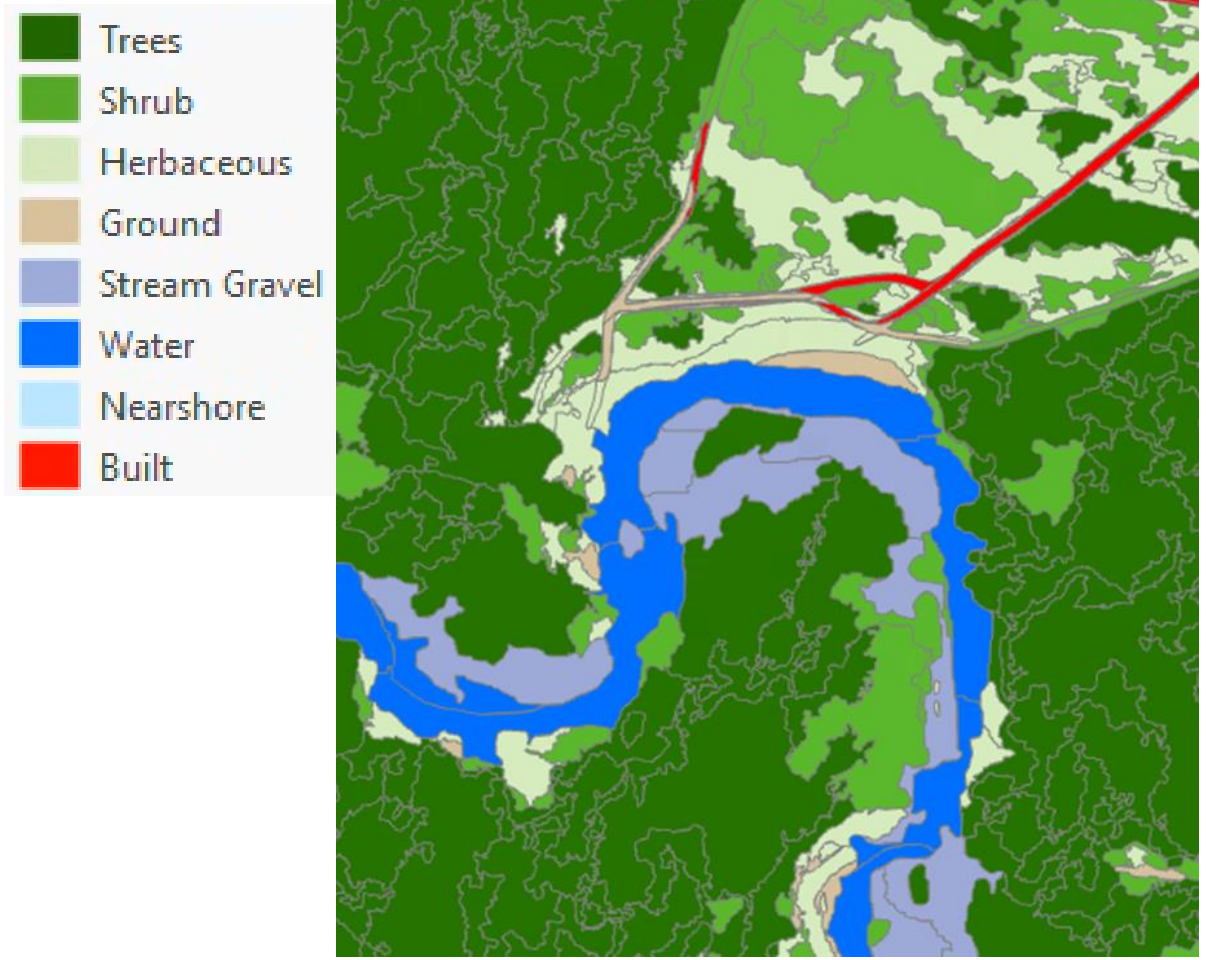
Perpetuate

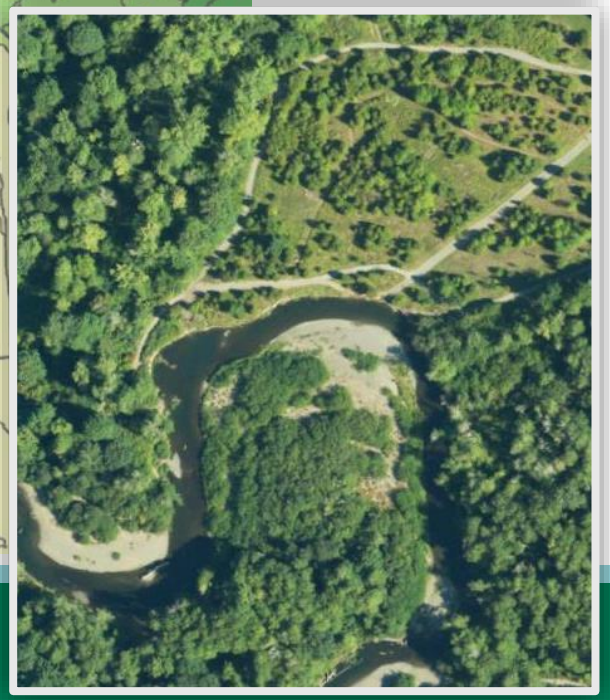
Fish, Wildlife, and Ecosystems

All while providing sustainable fish and wildlife recreational and commercial opportunities.

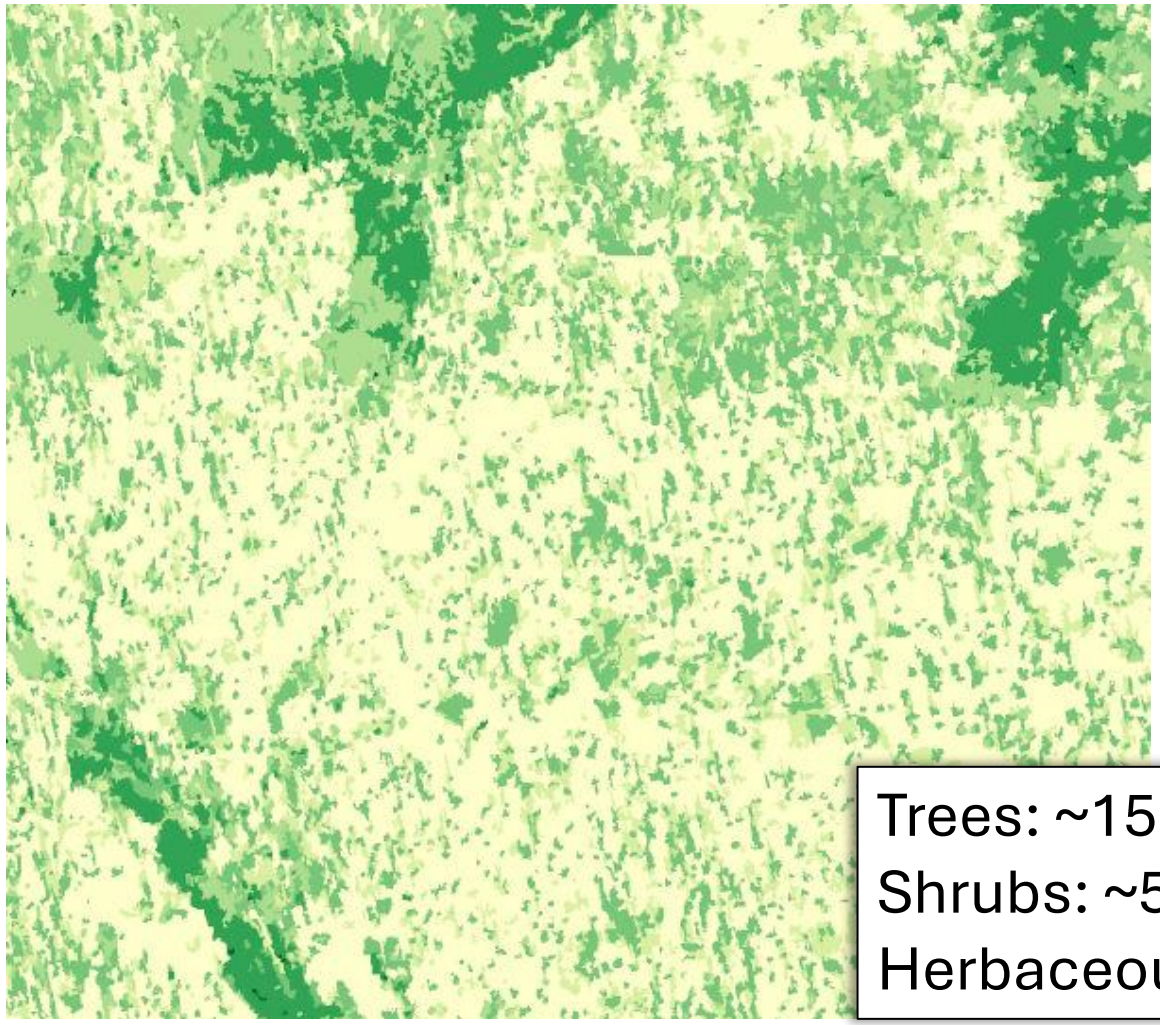
Land cover classes

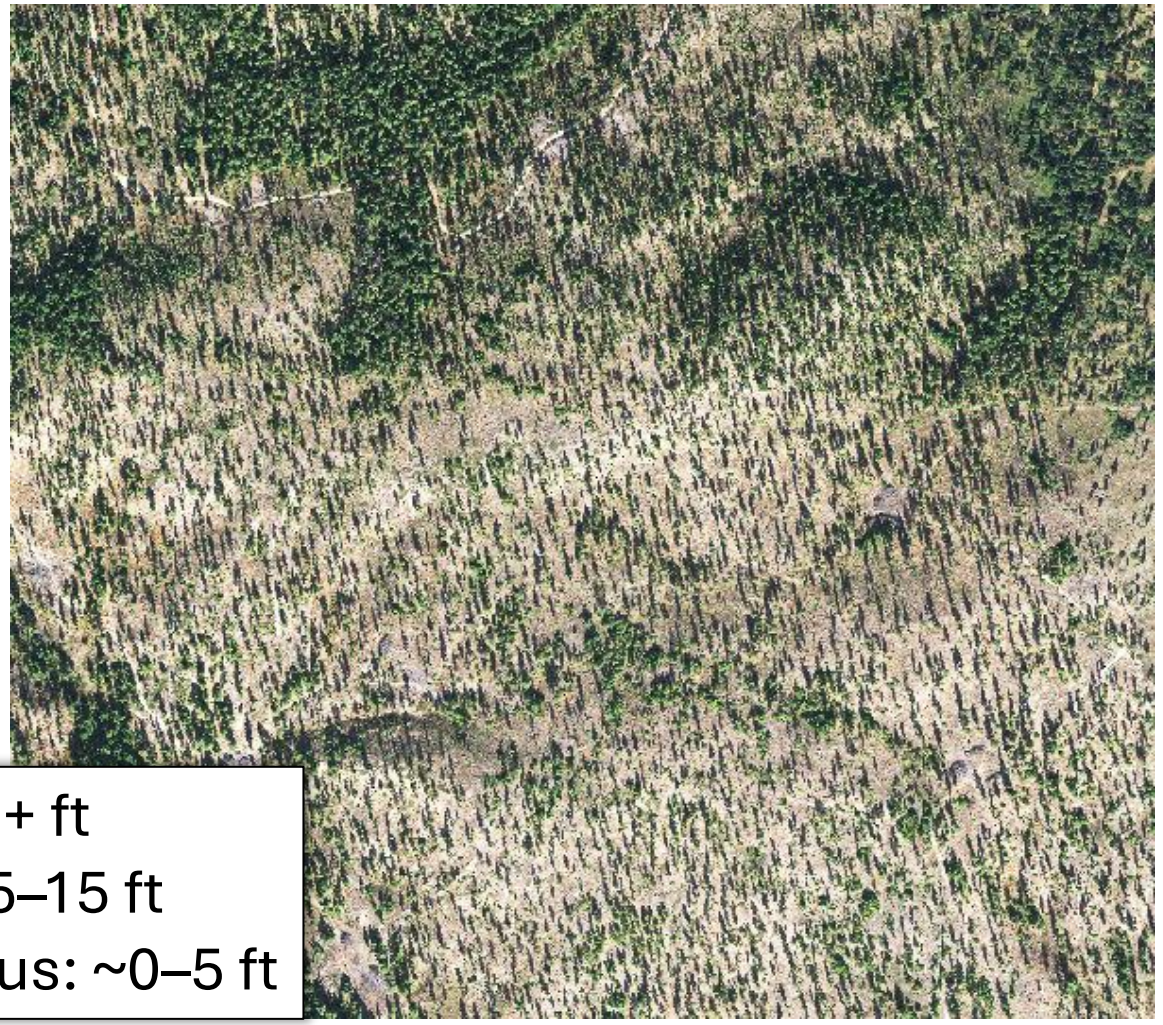
Modeled height





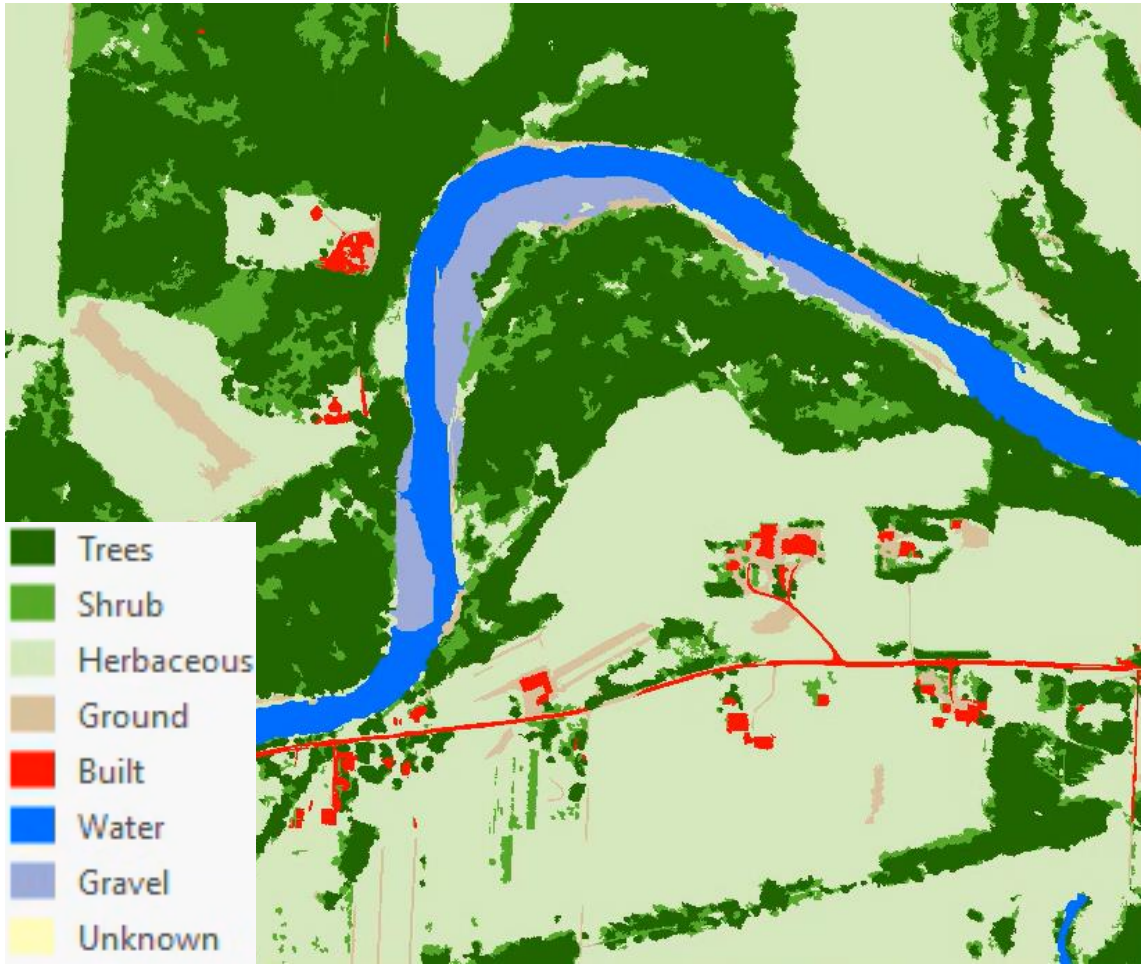
Vegetation height



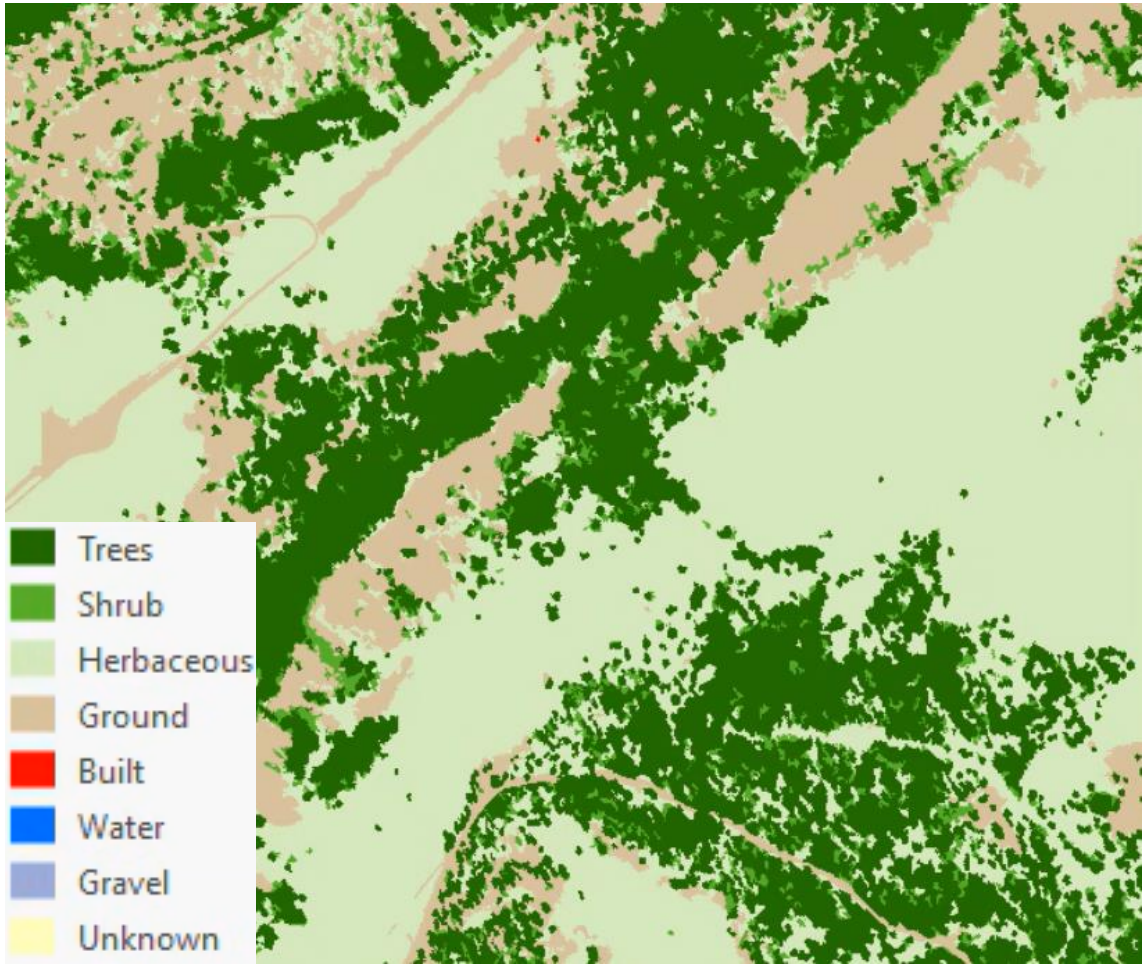


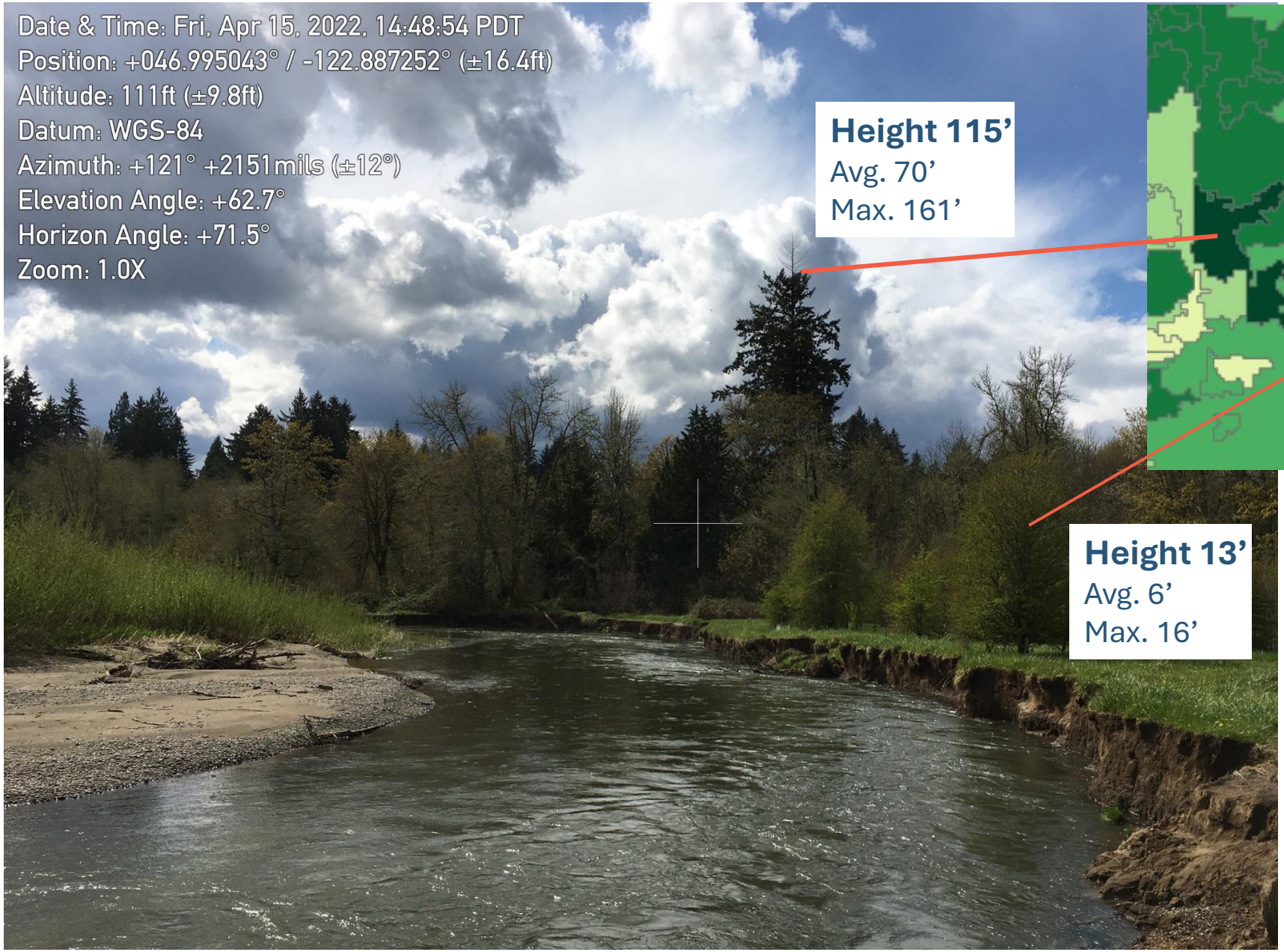
Trees: ~15+ ft
Shrubs: ~5–15 ft
Herbaceous: ~0–5 ft

Western WA example



Eastern WA example





Height 115’
Avg. 70’
Max. 161’

Height 13’
Avg. 6’
Max. 16’

Attributes
Height
Average Height
Minimum Height
Maximum Height
Standard Deviation of Heights
Normalized Difference Vegetation Index

Height

- 0 - 10
- 11 - 20
- 21 - 50
- 51 - 80
- 81 - 110
- 111 - 196

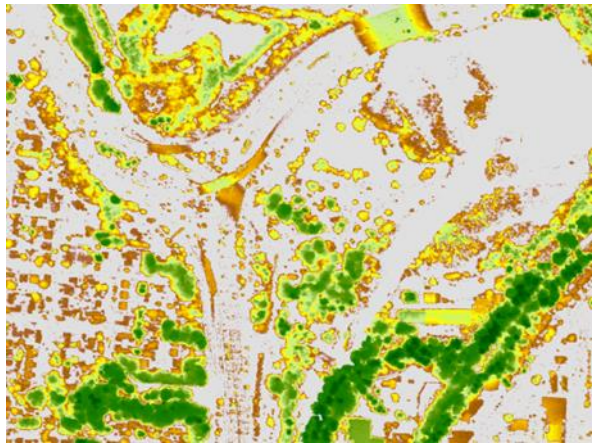
Production steps

High resolution imagery and lidar inputs

RGB (1ft)

Near-infrared

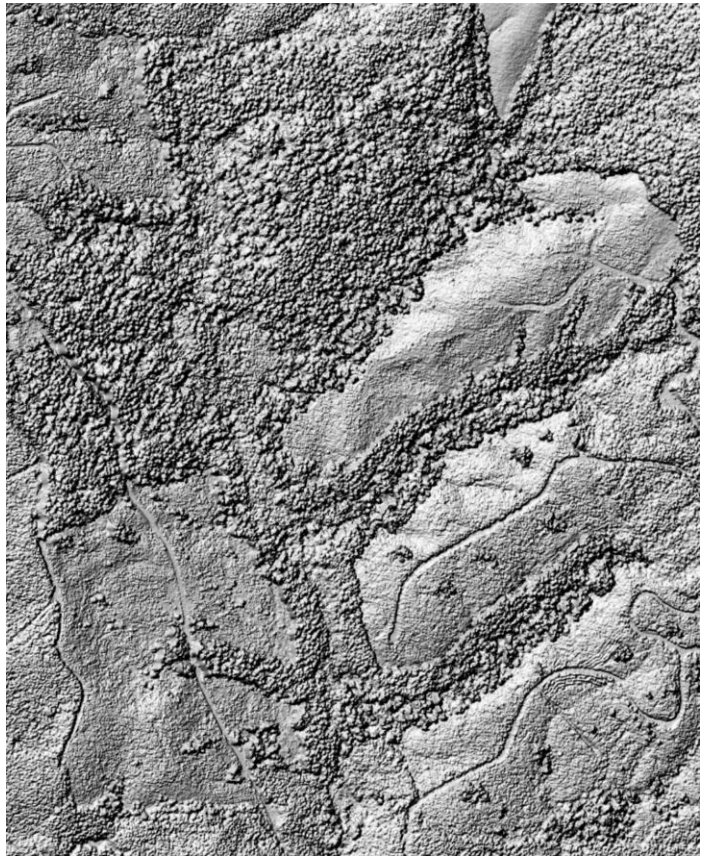
Calculated Height Model



Normalized Difference Vegetation Index (NDVI)

Calculated Height Model

Digital Surface Model



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Digital Terrain Model

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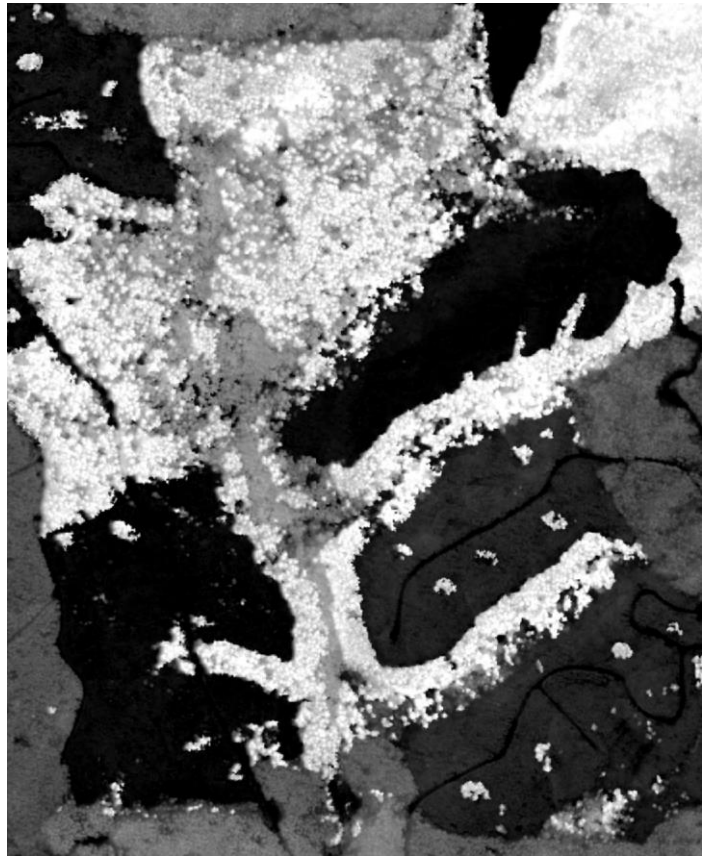
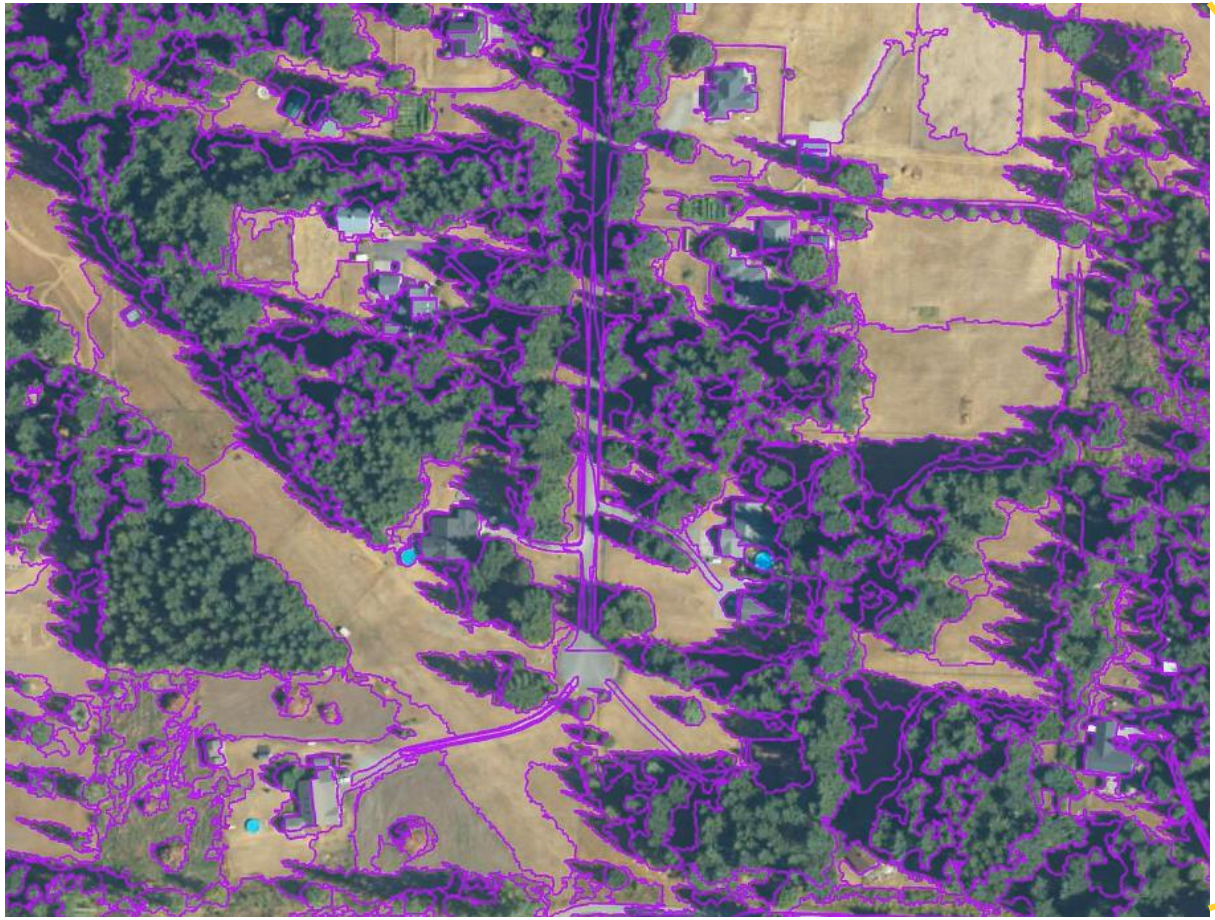
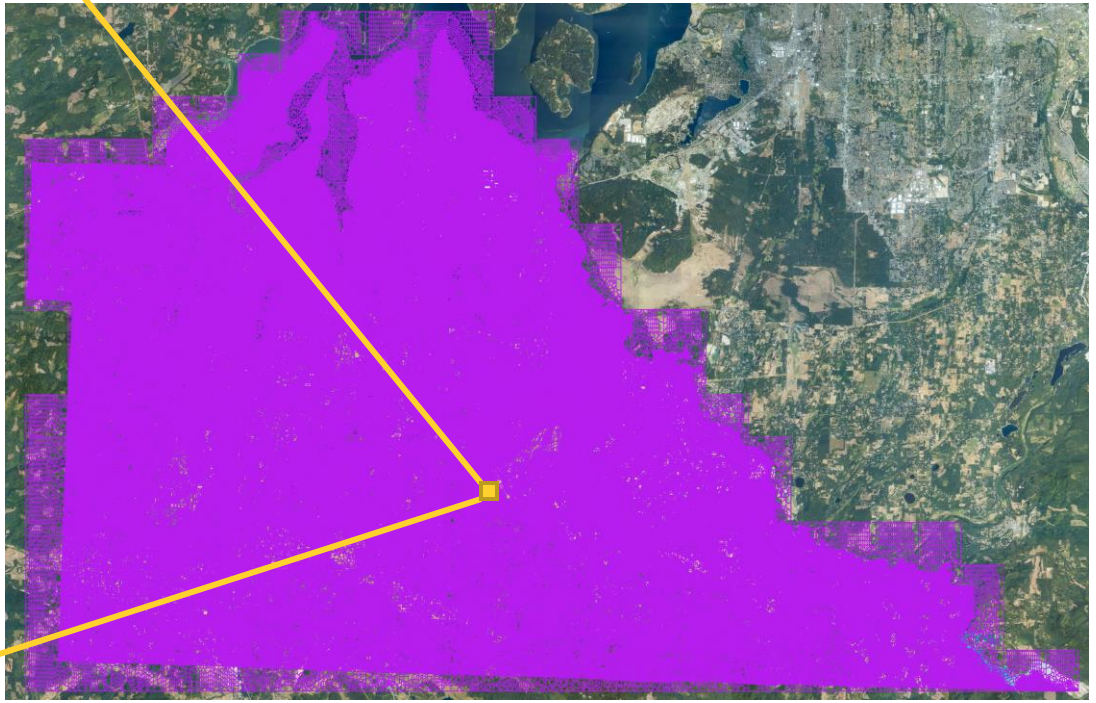
Calculated Height Model

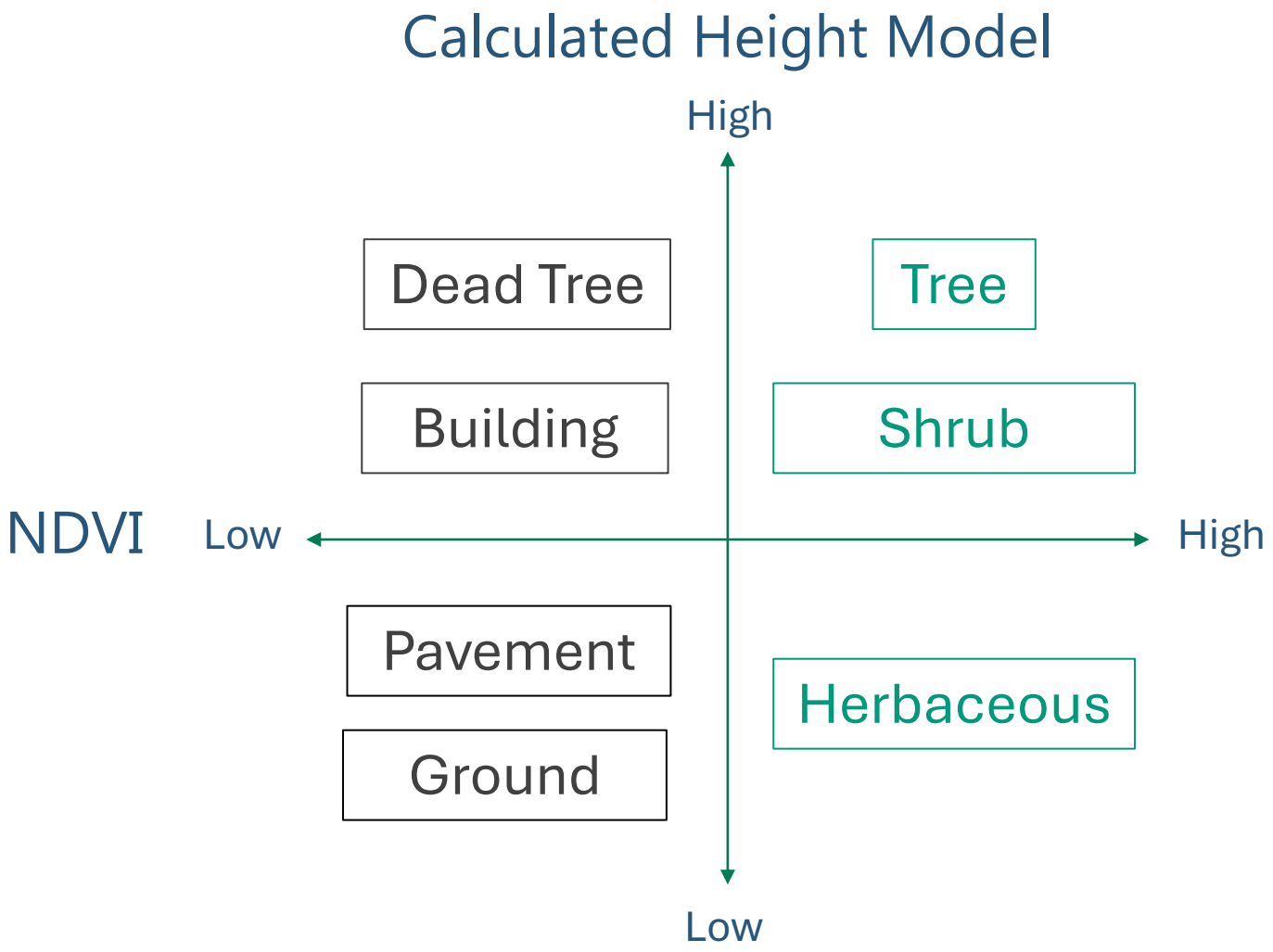


Object segmentation

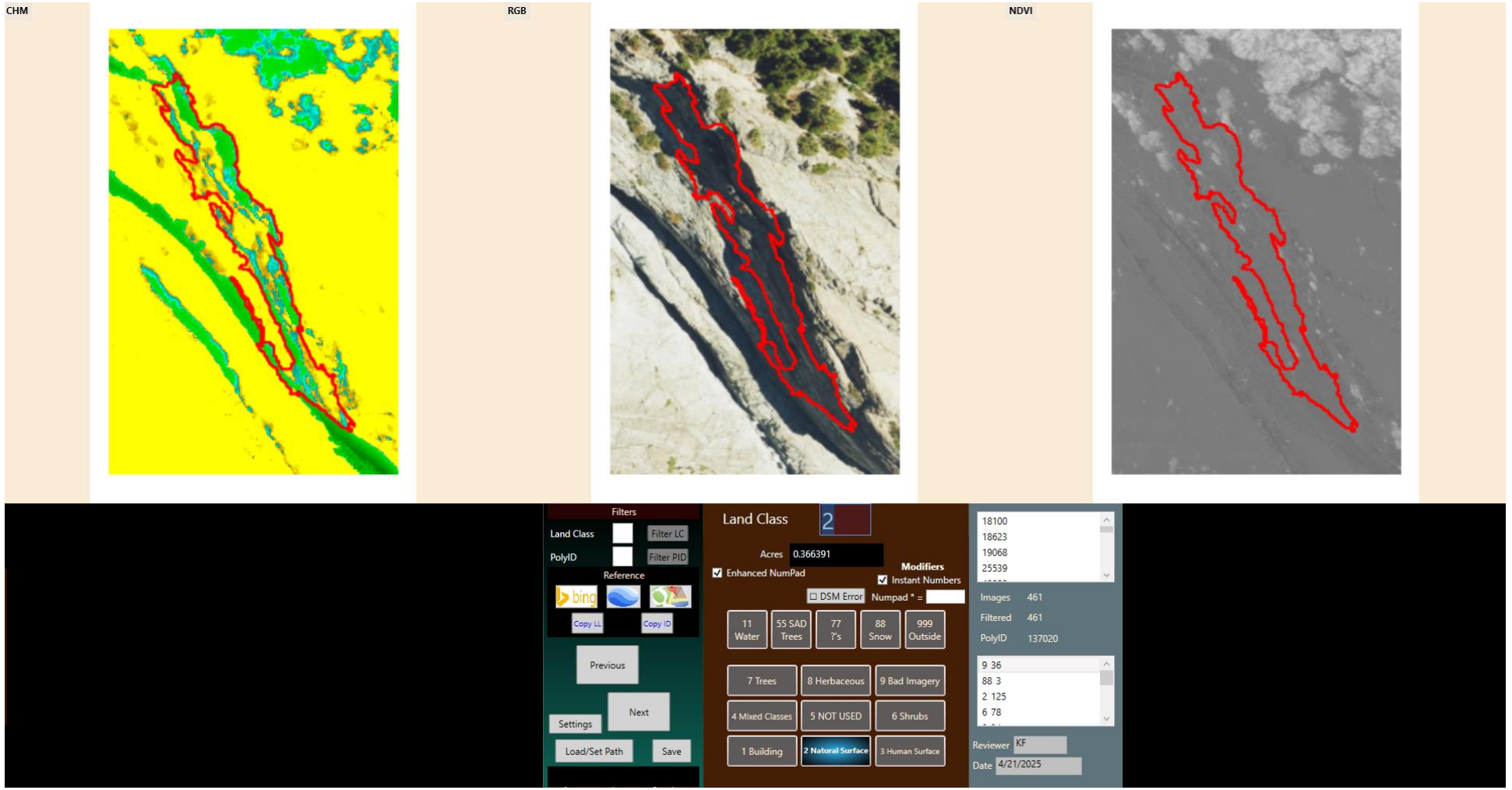




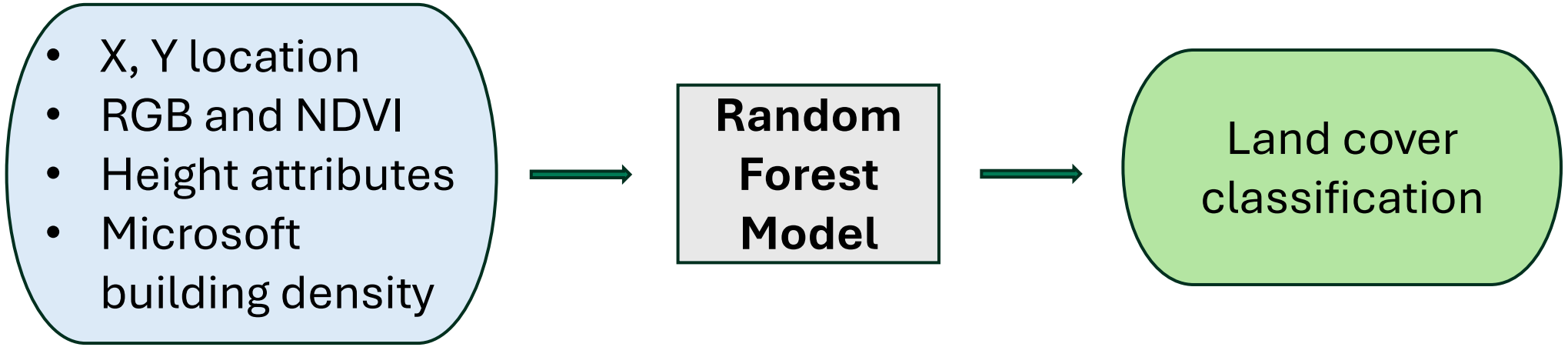
Simplified land cover mapping



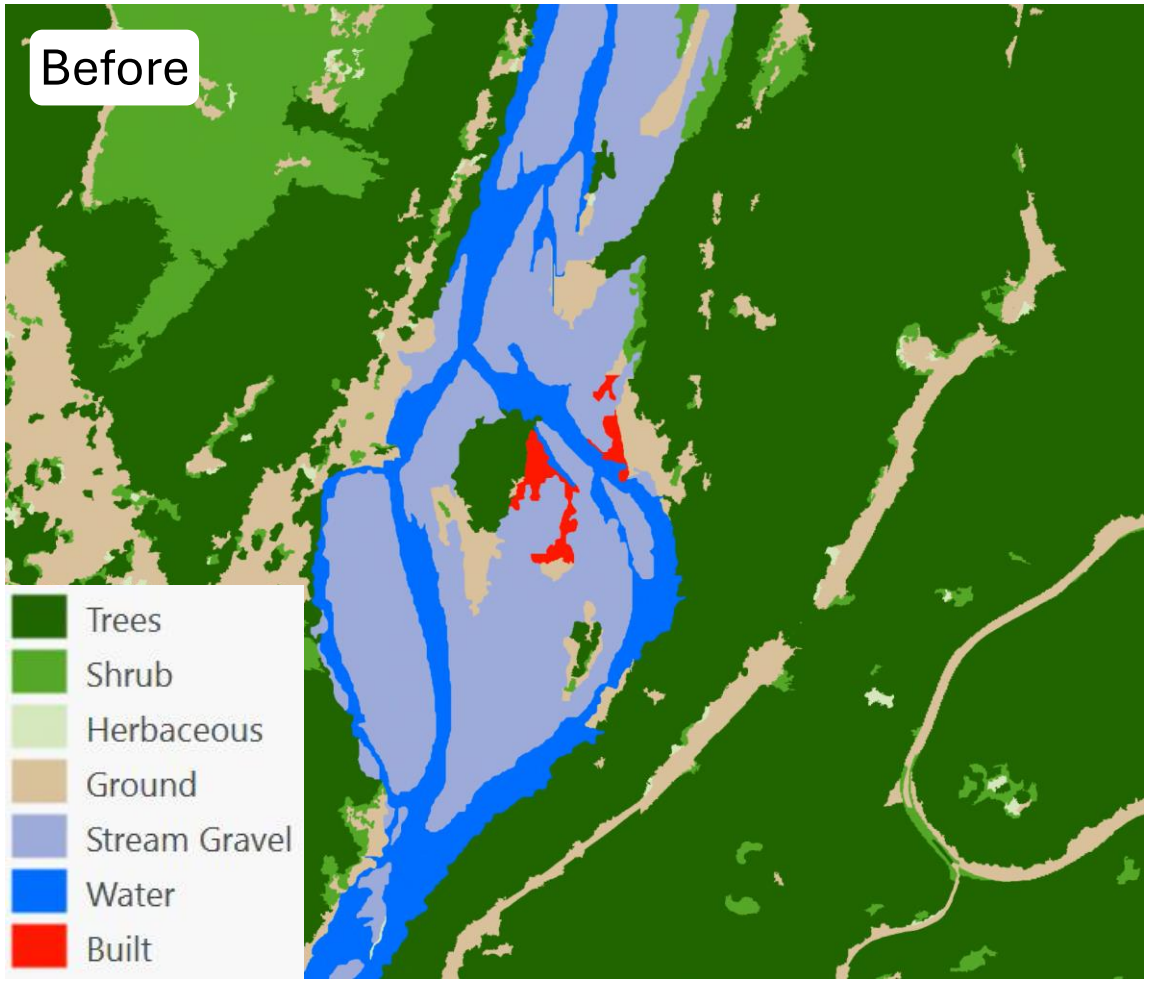
Sample review

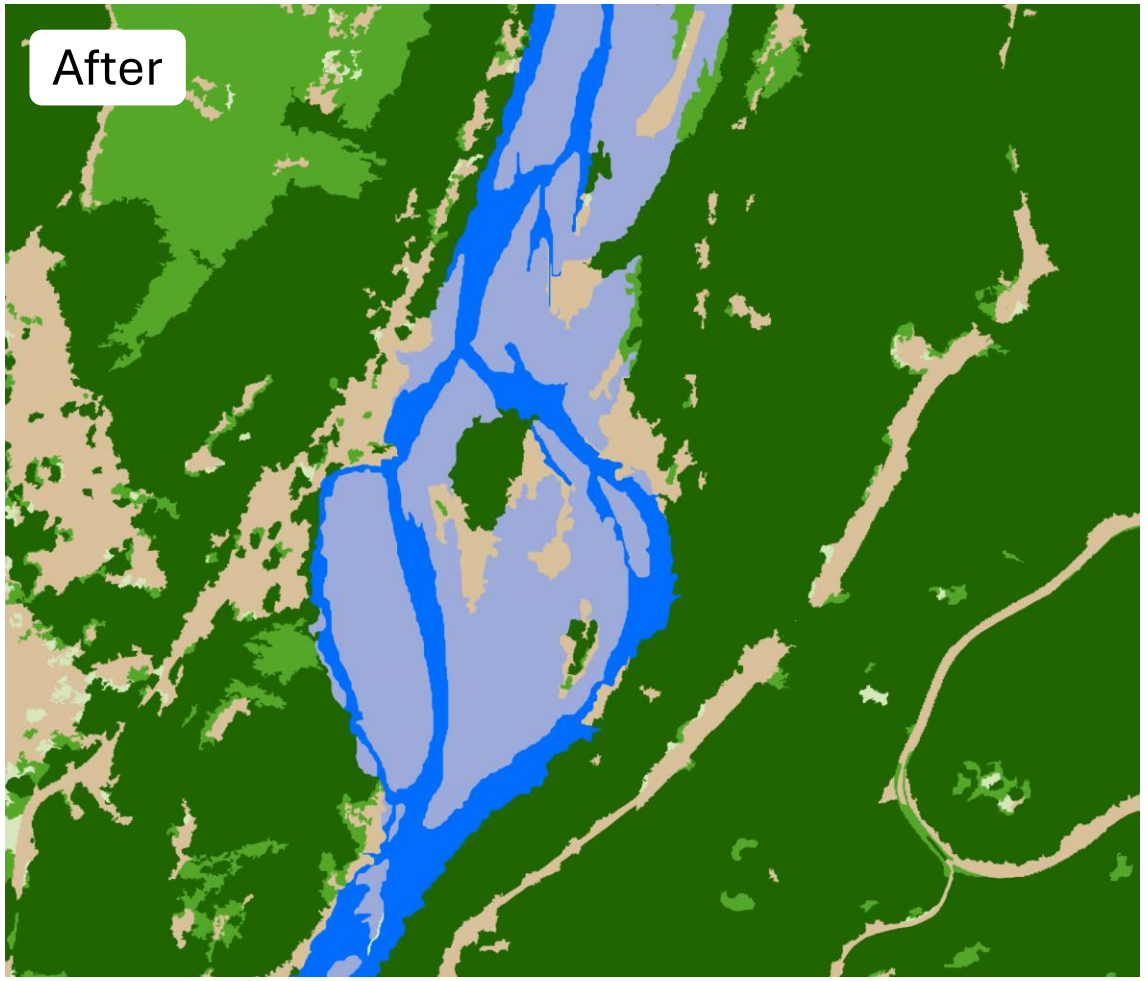


Random forest classifier

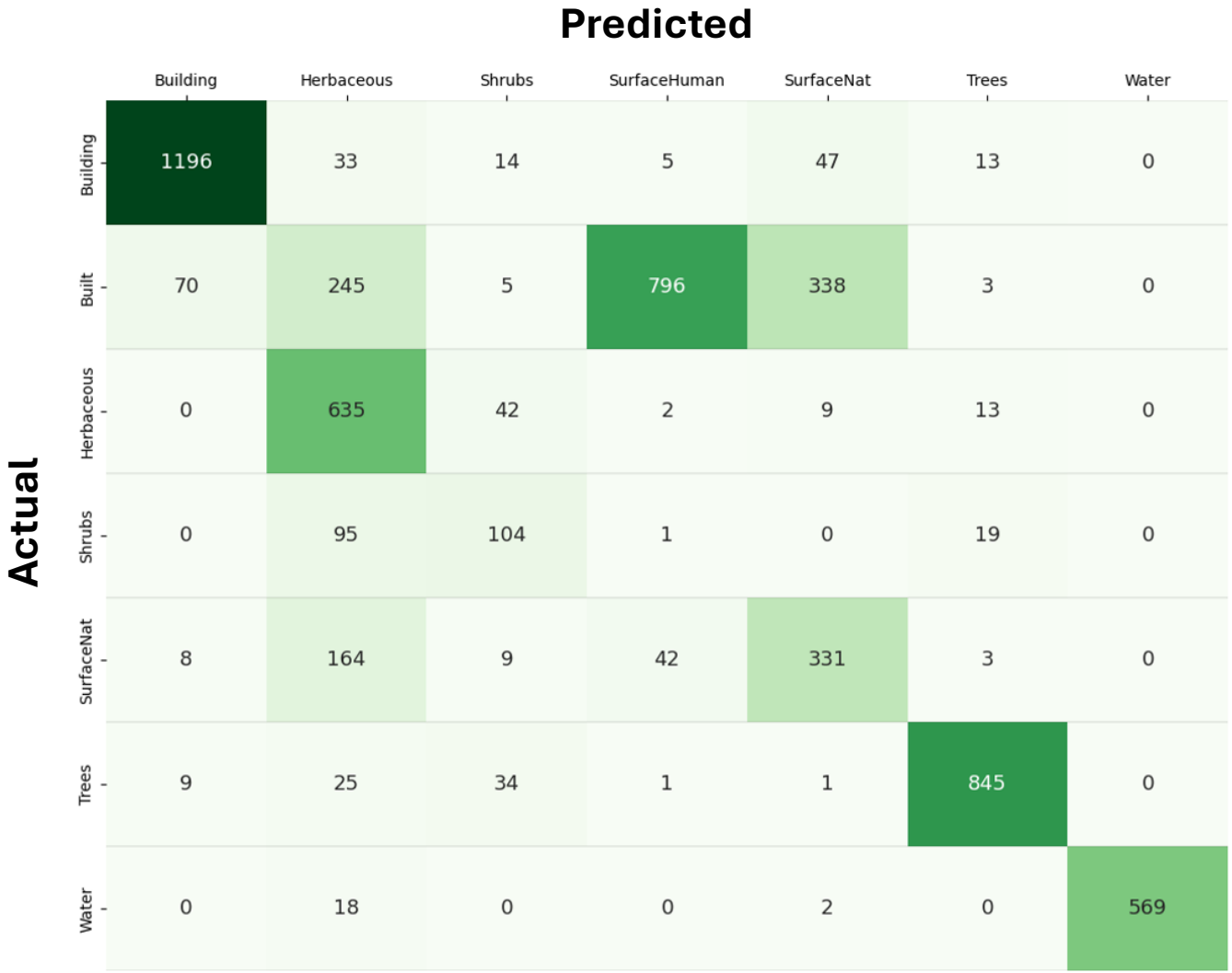


QA/QC


Before
Trees
Shrub
Herbaceous
Ground
Stream Gravel
Water
Built


After

Accuracy assessment

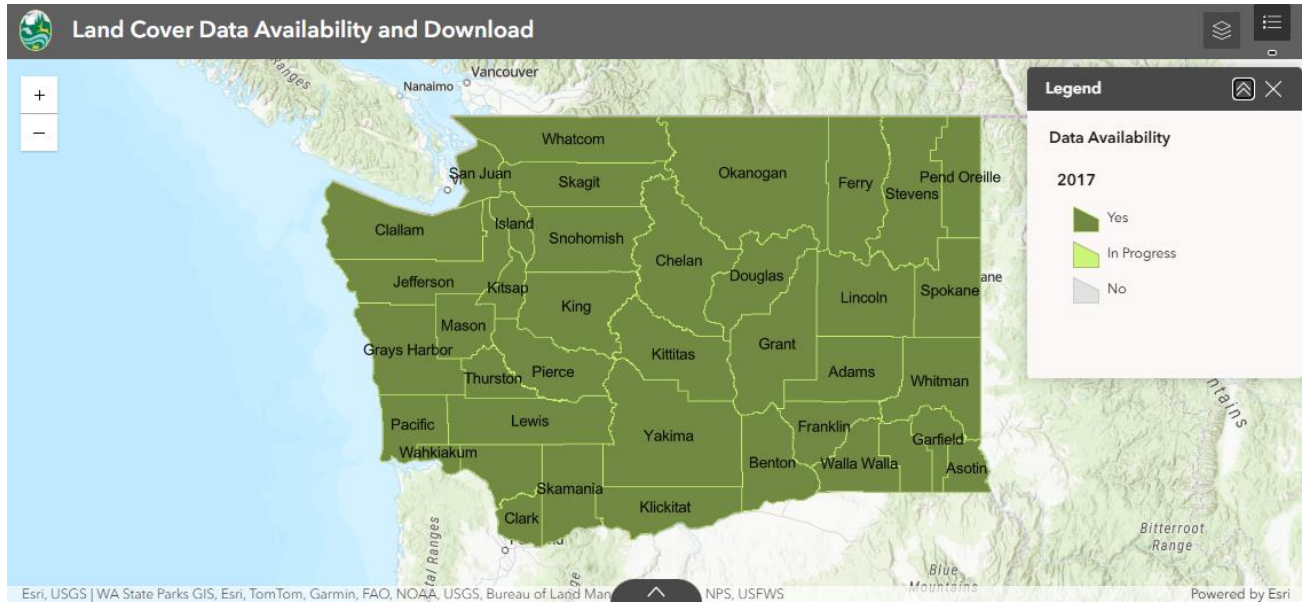


Required: 90% fuzzy trees

Example: 96.2%

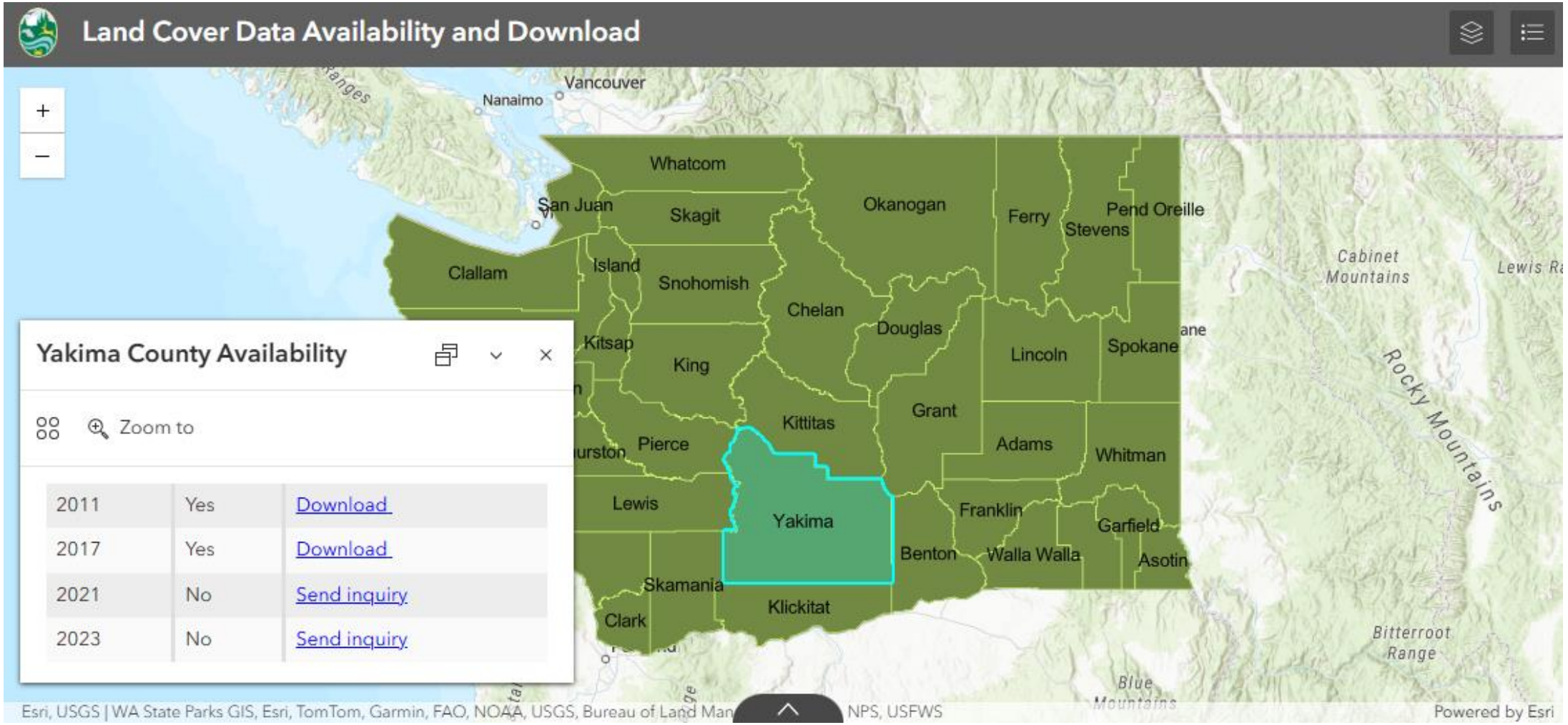
Current coverage

- hrcd.wdfw.wa.gov
- Statewide 2017 coverage*
- Some counties for 2011, 2021, and 2023



*Exact extent depends on lidar and imagery availability

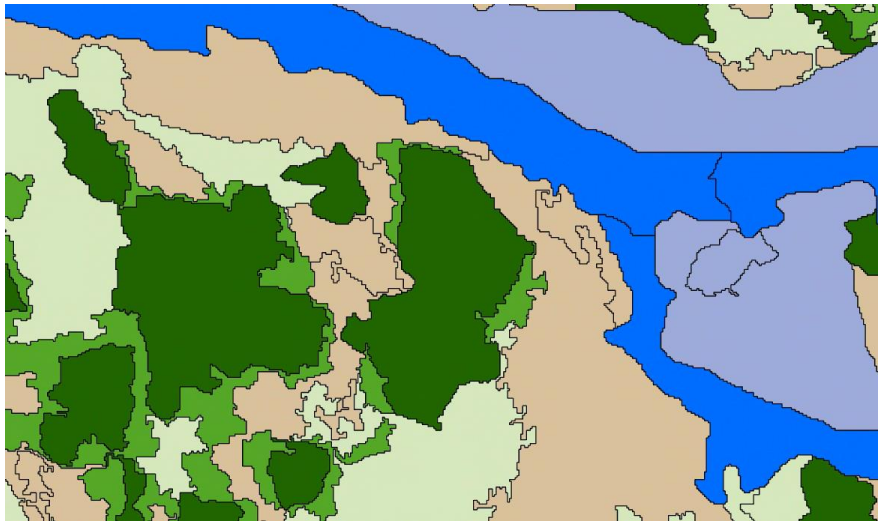
Download or request high-res data



Data formats

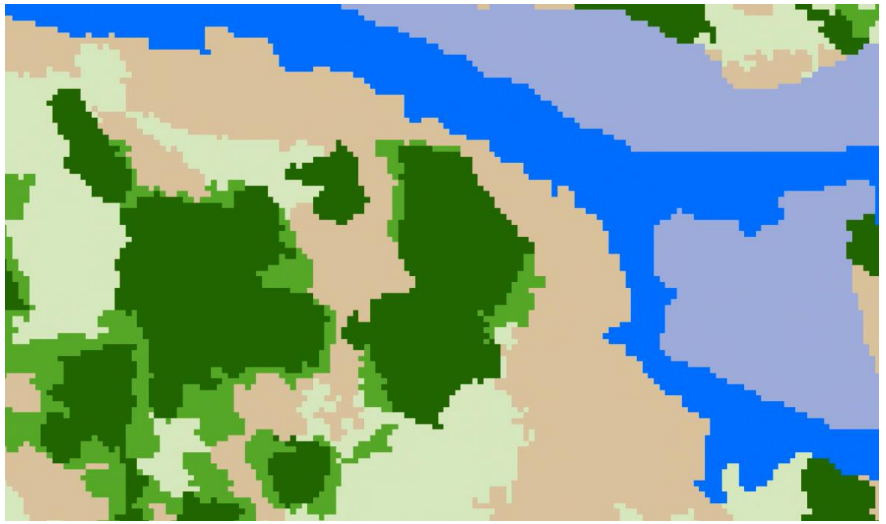
Vector:

- Height and NDVI attributes for broader applications
- Edges may be more precise



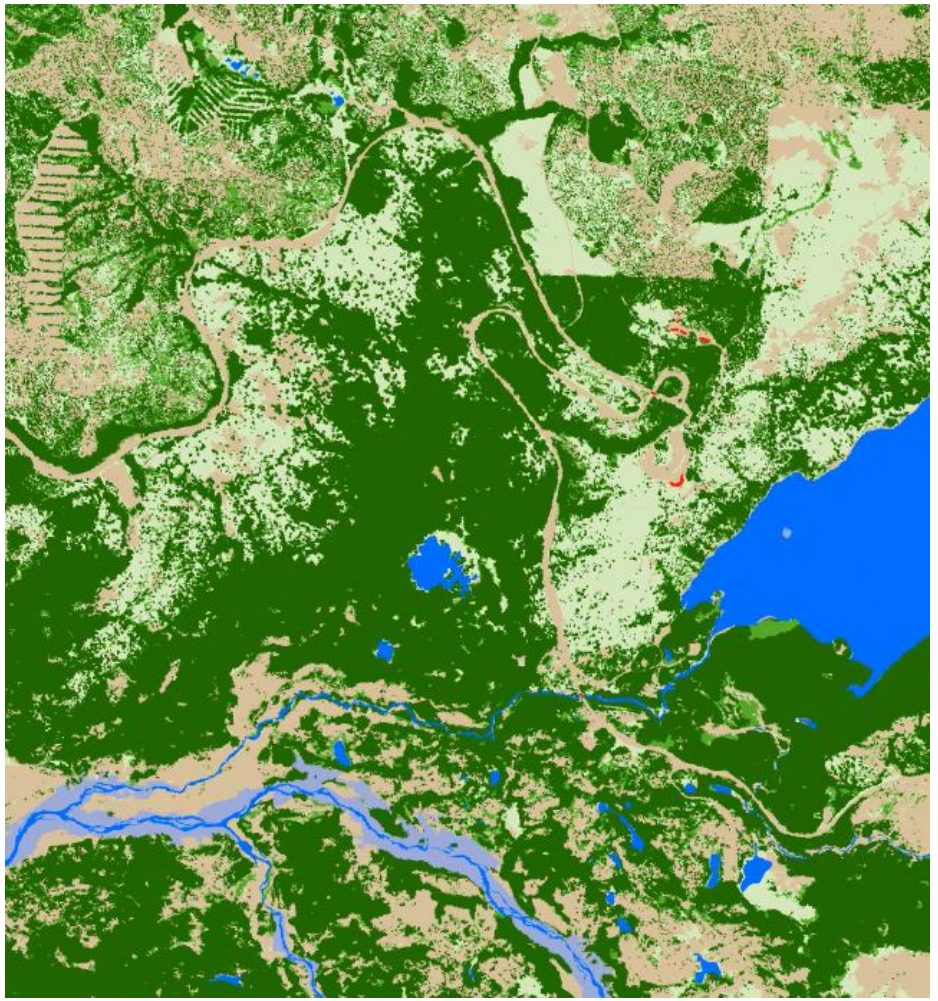
Raster:

- Smaller file size
- Faster display
- 3 ft cell size



What is this data good for?

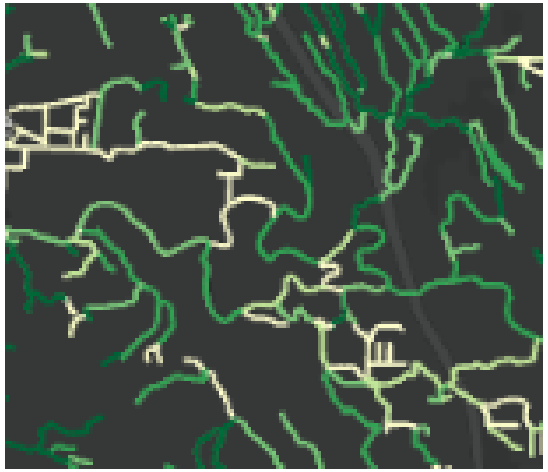
- Vegetation precision, especially trees
- Height information
- Statewide
- Multiple years
- Combine with change detection
- Habitat monitoring

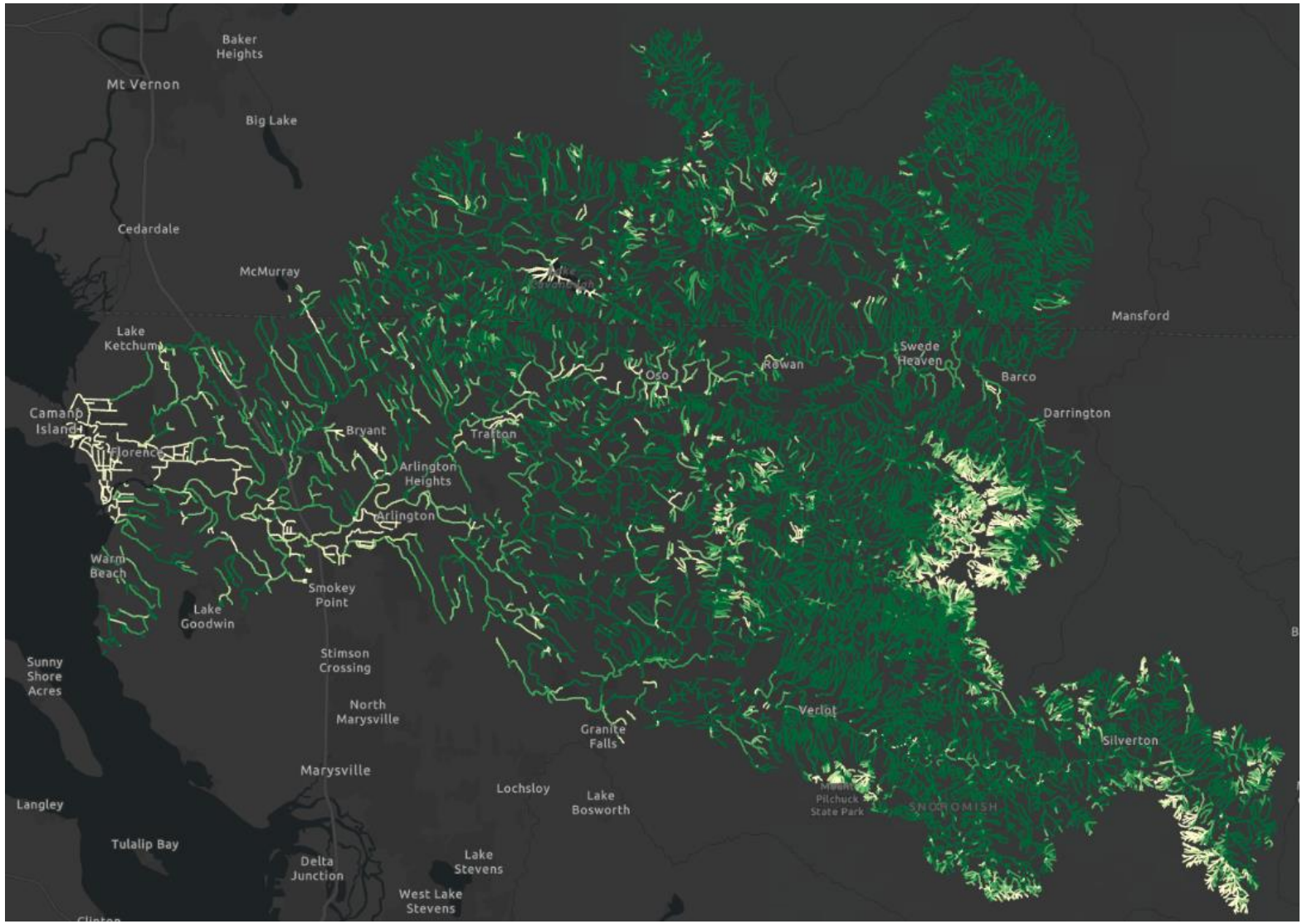


Riparian tree proportion (WRIA 5)

Percentage with tree canopy

- < 20%
- 20 – 40%
- 40 – 60%
- 60 – 80%
- > 80%

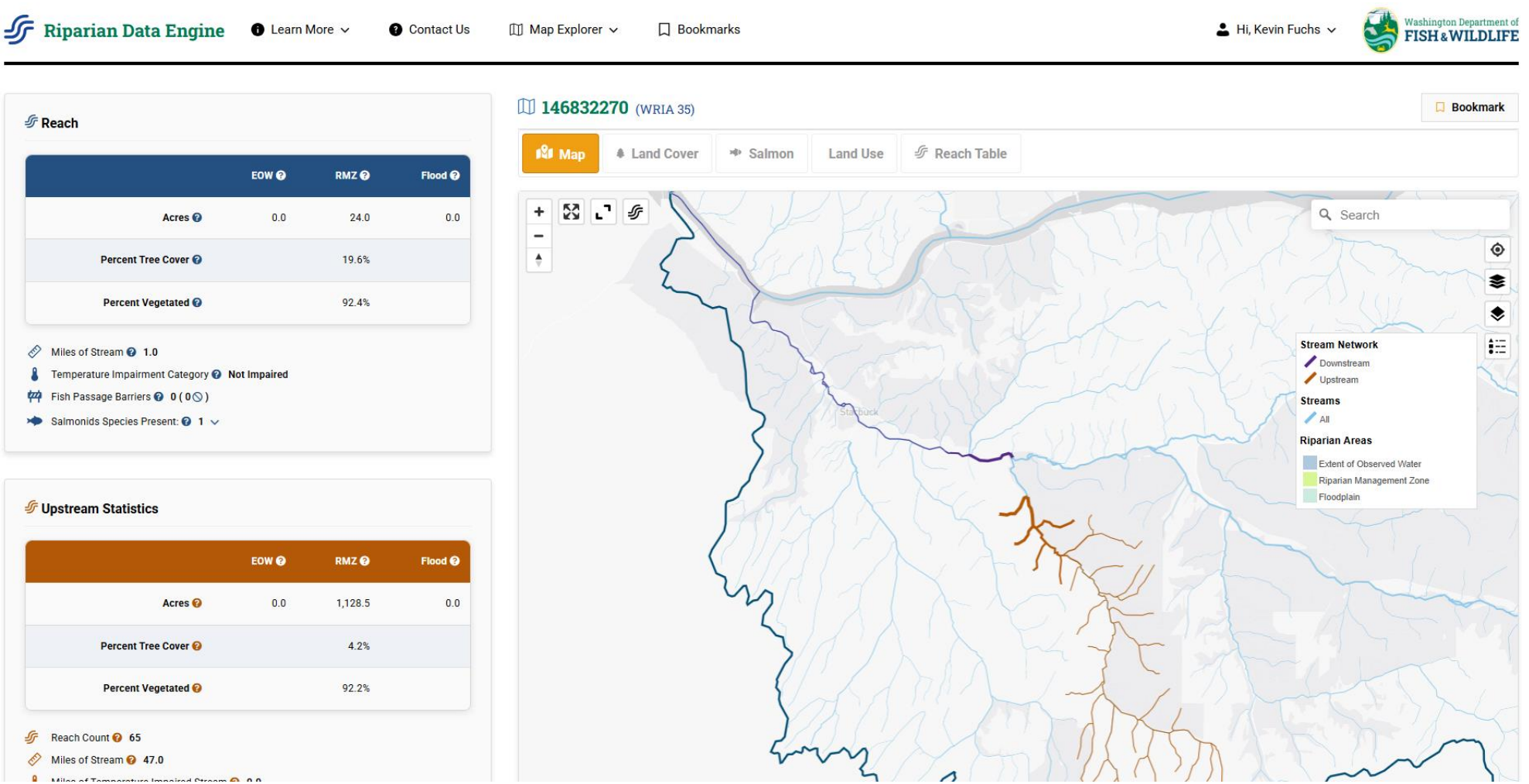




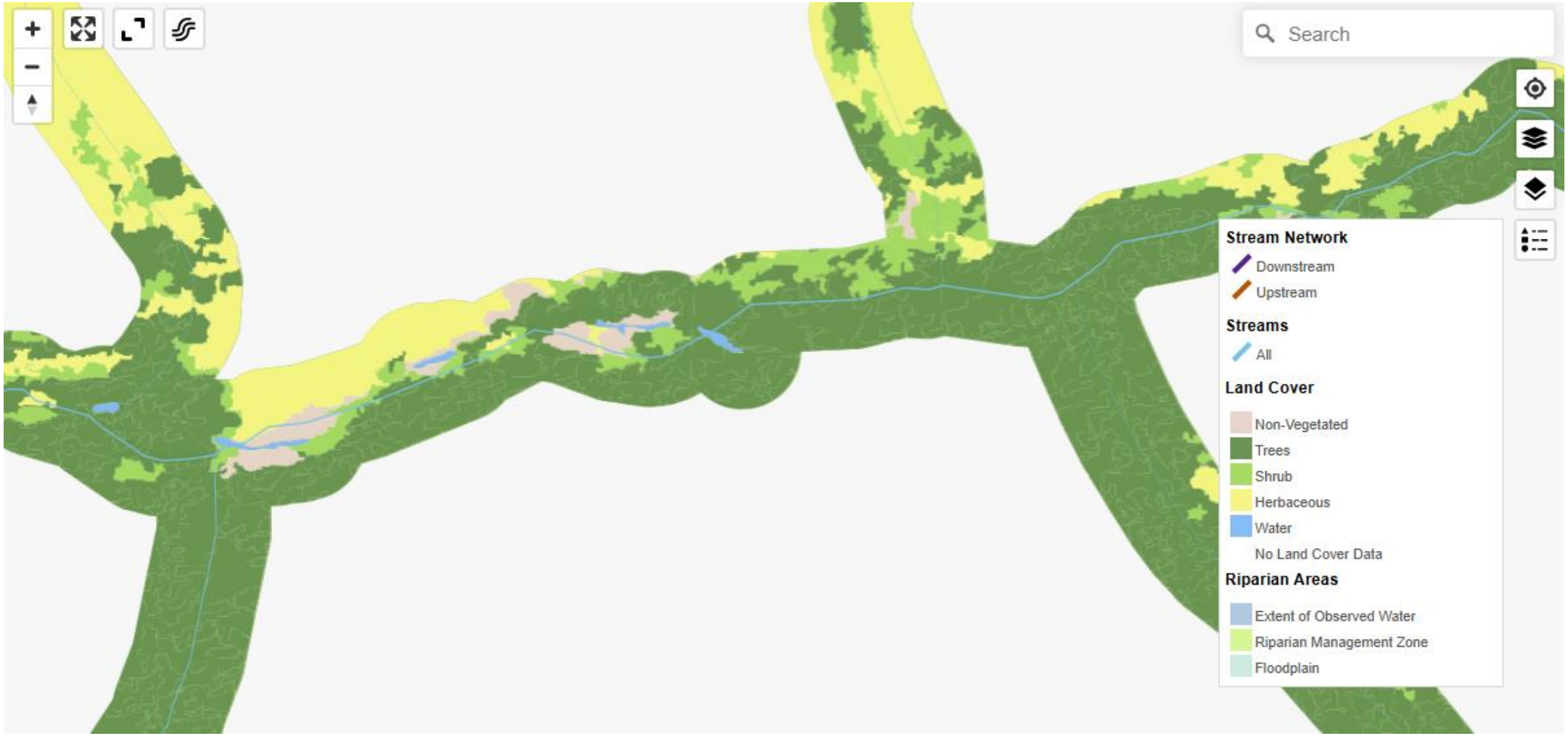
Riparian Data Engine

ripariandata.wdfw.wa.gov

Riparian Data Engine

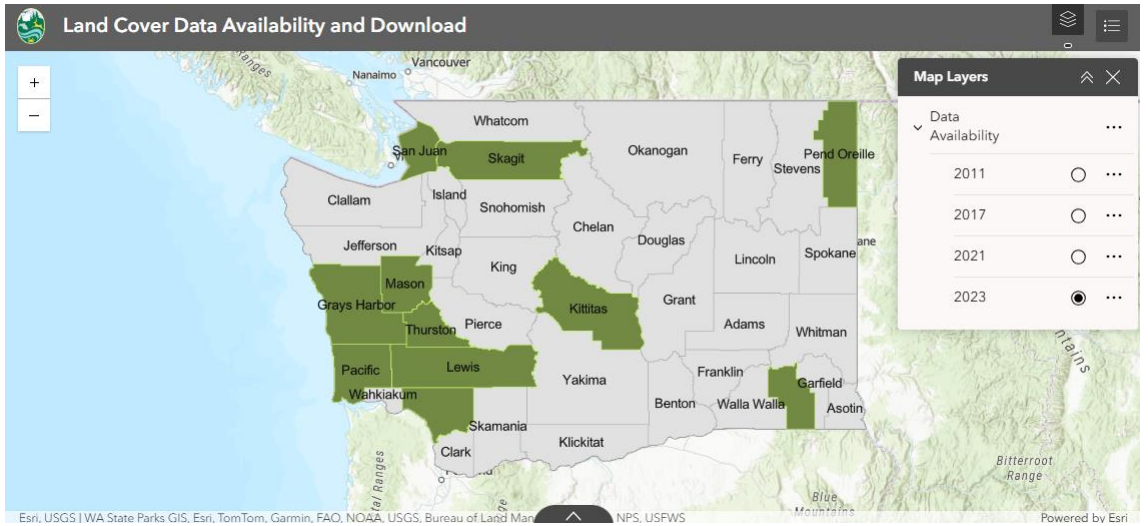


Riparian Data Engine



Upcoming data – funding dependent

- Statewide 2023
- Planning for statewide every 3-6 years
- Fill in previous data gaps with newly available lidar
- Improve deep learning models



How do you use land cover?

- Team:
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  - hrcd@dfw.wa.gov
- Production manager:
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