

# Good Things Come in Small Pixels

## NOAA's Next Generation of Coastal Land Cover

Bret Folger

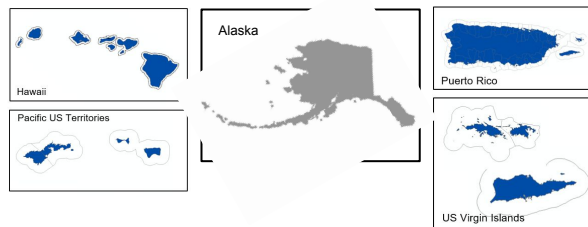
[bret.folger@noaa.gov](mailto:bret.folger@noaa.gov)

May 2026

# Coastal Change Analysis Program (C-CAP)

<https://coast.noaa.gov/digitalcoast/topics/coastal-land-cover.html>

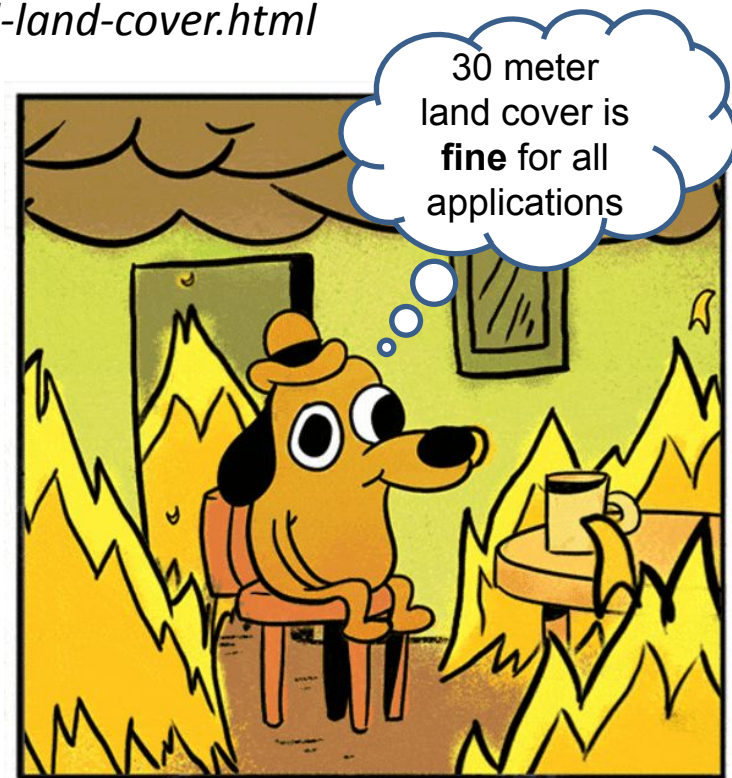
- FGDC National Geospatial Data Asset
- Coastal expression of the NLCD
- Regional Products at 30-meter
  - Updated every 5 years (1996 – 2021)
  - Historic dates in select geographies
  - 2026 update planned for FY27



# Coastal Change Analysis Program (C-CAP)

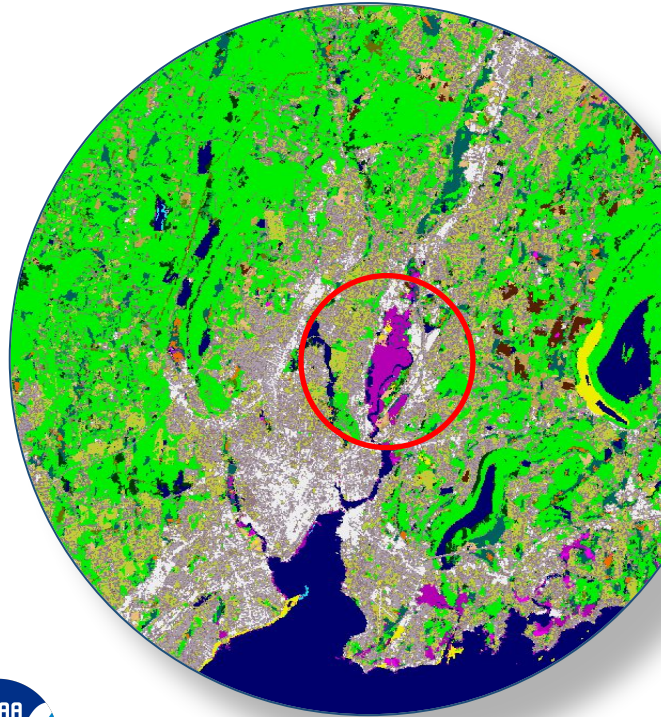
<https://coast.noaa.gov/digitalcoast/topics/coastal-land-cover.html>

- FGDC National Geospatial Data Asset
- Coastal expression of the NLCD
- Regional Products at 30-meter
  - Updated every 5 years (1996 – 2021)
  - Historic dates in select geographies
  - 2026 update planned for FY27
- High Resolution Products at 1-meter
  - Historically expensive to produce
  - Faster, cheaper, better now possible
  - 2021/2025 national buildout in progress
  - Vision of updates every 4 to 6 years

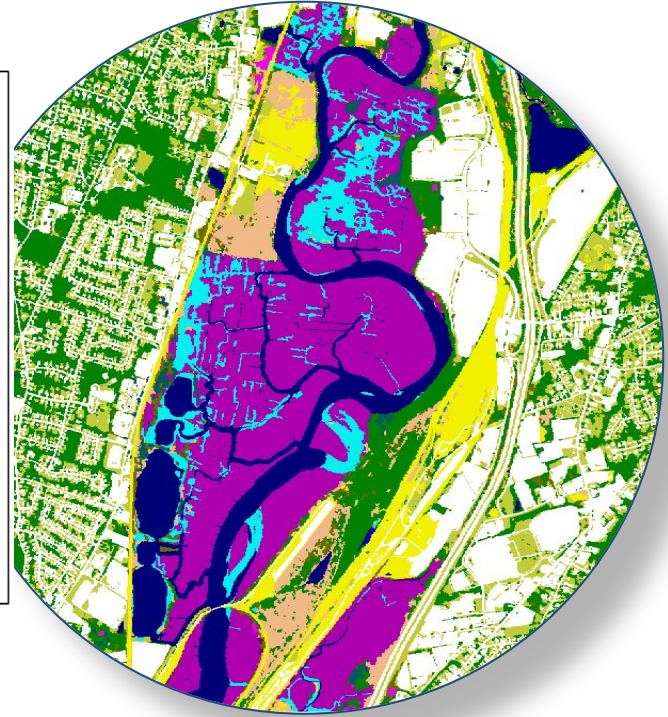


# Comparison of Resolutions

## REGIONAL (30 METER)



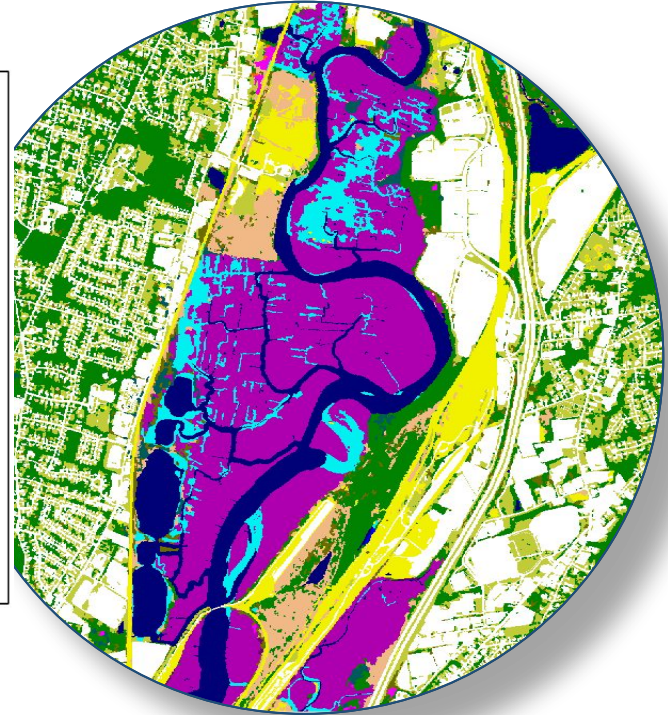
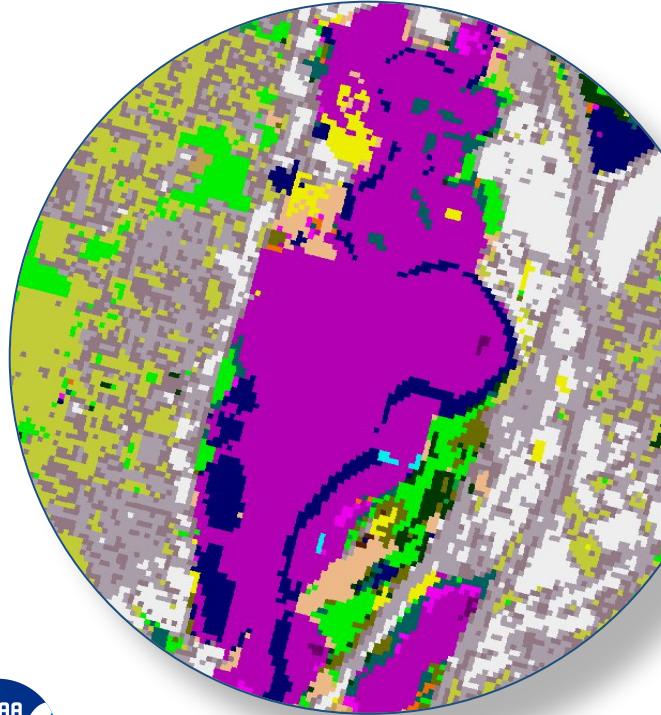
## LOCAL (1 METER)



# Comparison of Resolutions

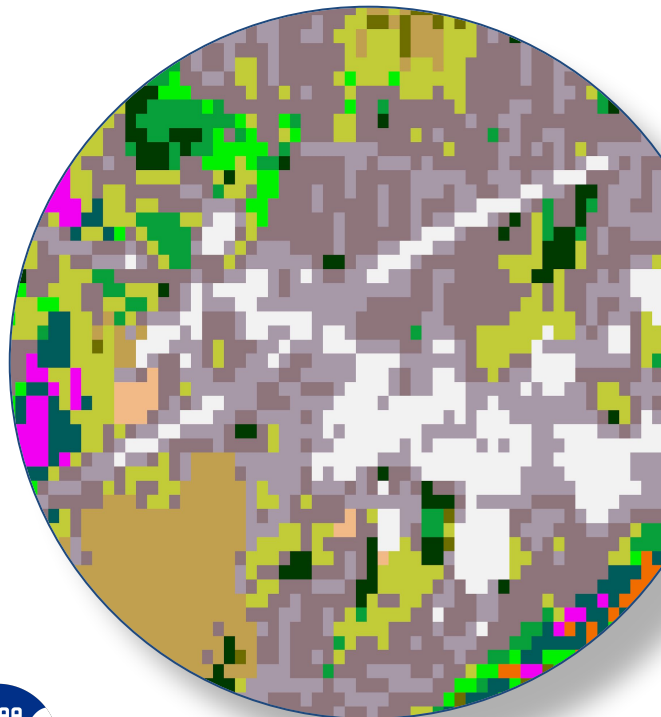
## REGIONAL (30 METER)

## LOCAL (1 METER)



# Comparison of Resolutions

## REGIONAL (30 METER)



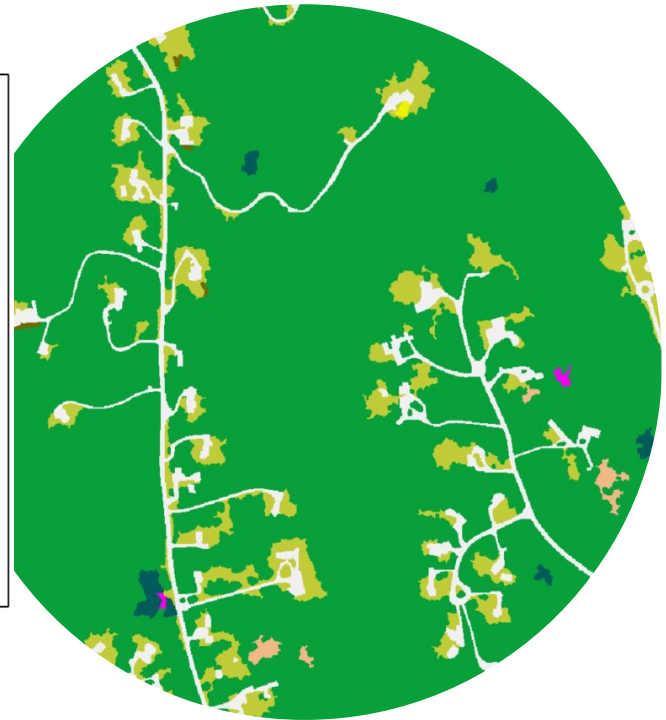
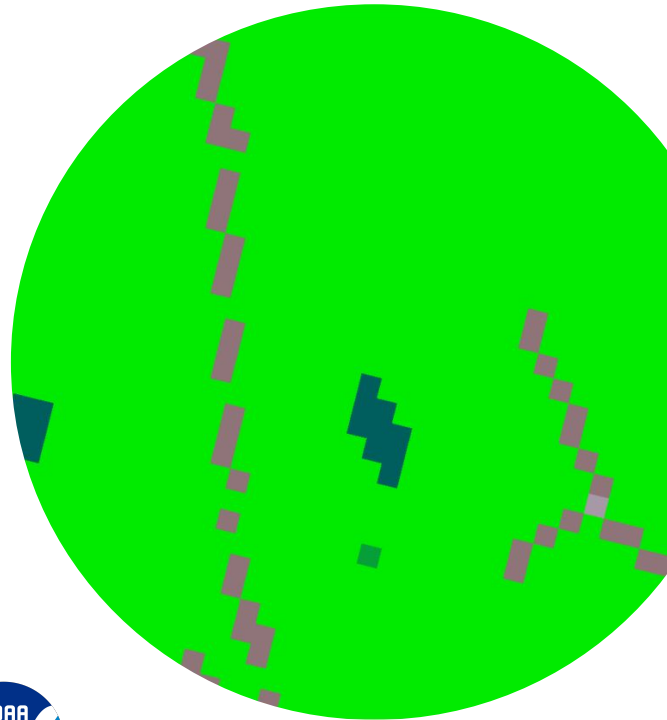
## LOCAL (1 METER)



# Comparison of Resolutions

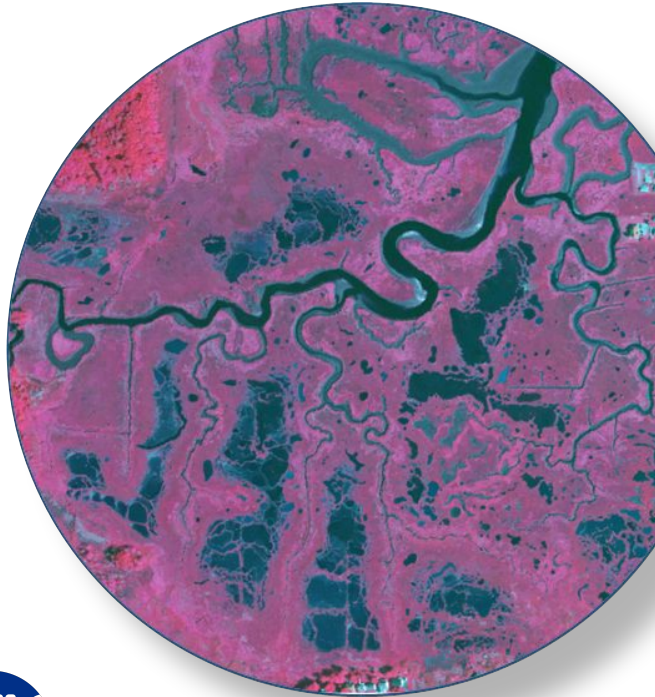
## REGIONAL (30-METER)

## LOCAL (1-METER)

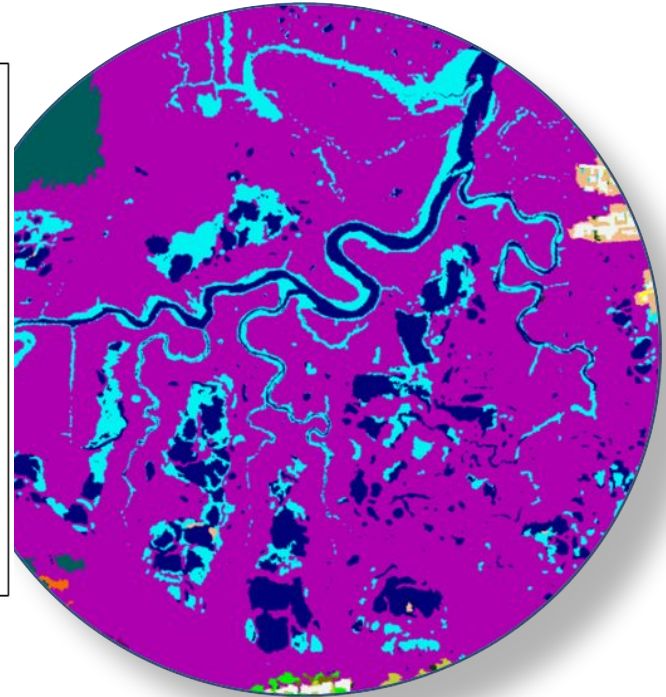


# High Resolution Land Cover

ORTHOIMAGE



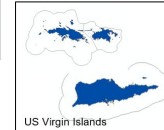
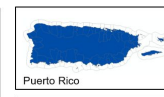
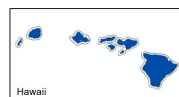
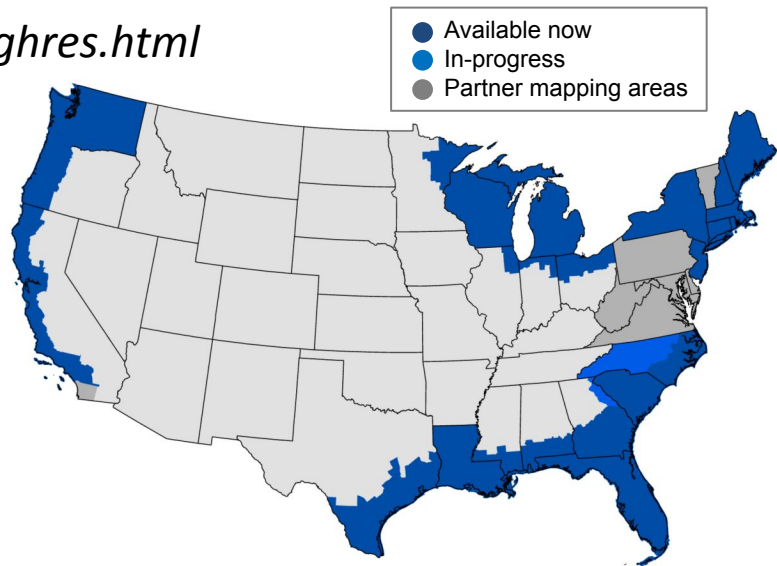
LAND COVER



# High Resolution C-CAP

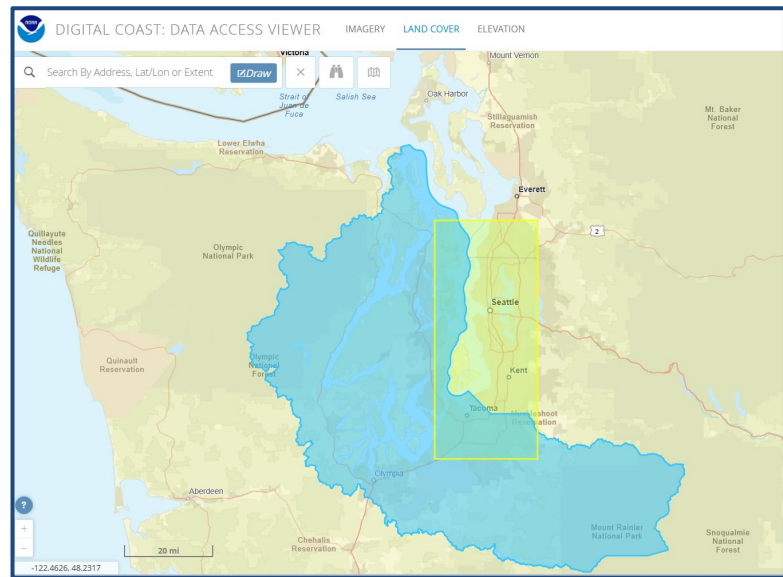
<https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

- Initial Mapping Products (Phase 1)
  - Impervious, Canopy, & Water layers
  - Based on 2020 & 2021 imagery
  - Released January 2024



# Past Washington Land Cover Work

- Wetlands mapping with Dept. of Ecology
- 2016/2017 C-CAP pilots Puget Sound area
- 2023 full state land cover buy up for:
  - 1 meter Canopy, & Water layers, expanded Impervious categories
  - [Available at:](https://geo.wa.gov/datasets/land-cover-statewide-ecopia-data-2021-2022-3ft-raster/about)  
<https://geo.wa.gov/datasets/land-cover-statewide-ecopia-data-2021-2022-3ft-raster/about>












 Canopy



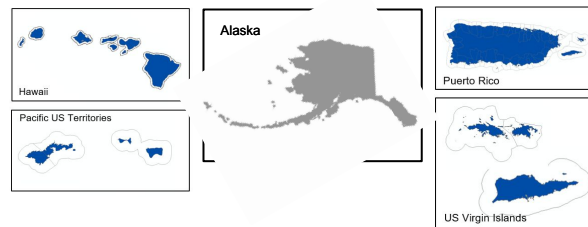
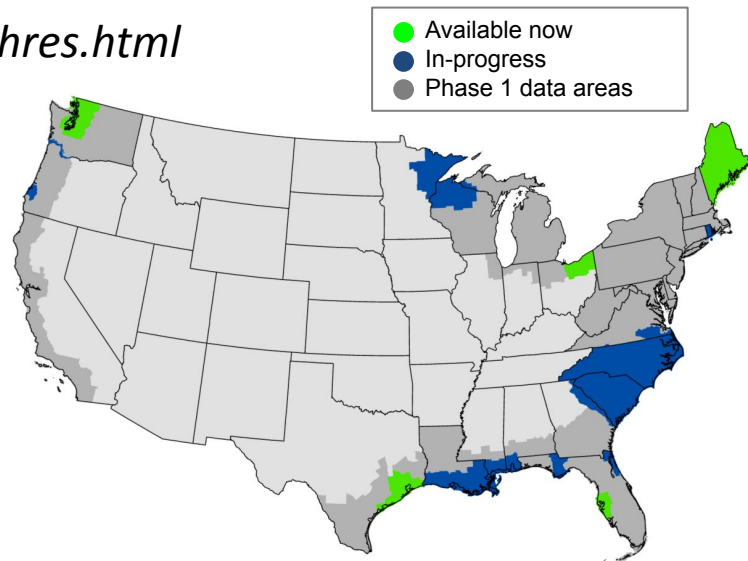
Water



# High Resolution C-CAP

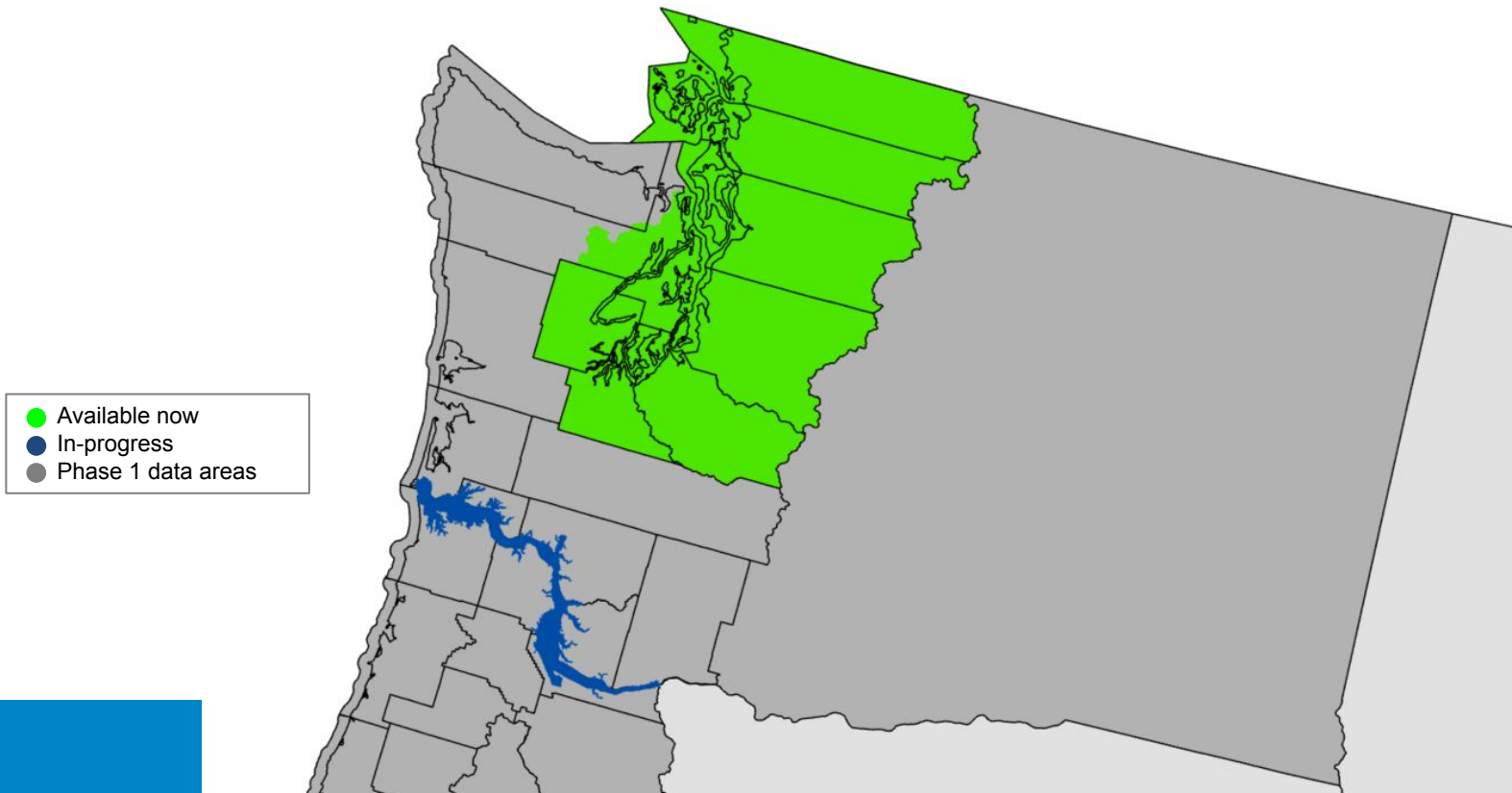
<https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

- Initial Mapping Products (Phase 1)
  - Impervious, Canopy, & Water layers
  - Based on 2020 & 2021 imagery
  - Released January 2024
- Full Scheme Land Cover (Phase 2)
  - Refinements made to initial layers
  - Additional categories added
  - Goal of future updates every 4 to 6 years
  - Looking for interested partners



# High Resolution C-CAP

<https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>



# C-CAP Land Cover Categories

Impervious

Impervious under canopy

Open Space Developed

Cultivated

Pasture/Hay

Grassland

Upland Forest / Tree

Upland Scrub/Shrub

Bare Land

Snow/Ice

Palustrine Forested Wetland

Palustrine Scrub/Shrub Wetland

Palustrine Emergent Wetland

Estuarine Forested Wetland

Estuarine Scrub/Shrub Wetland

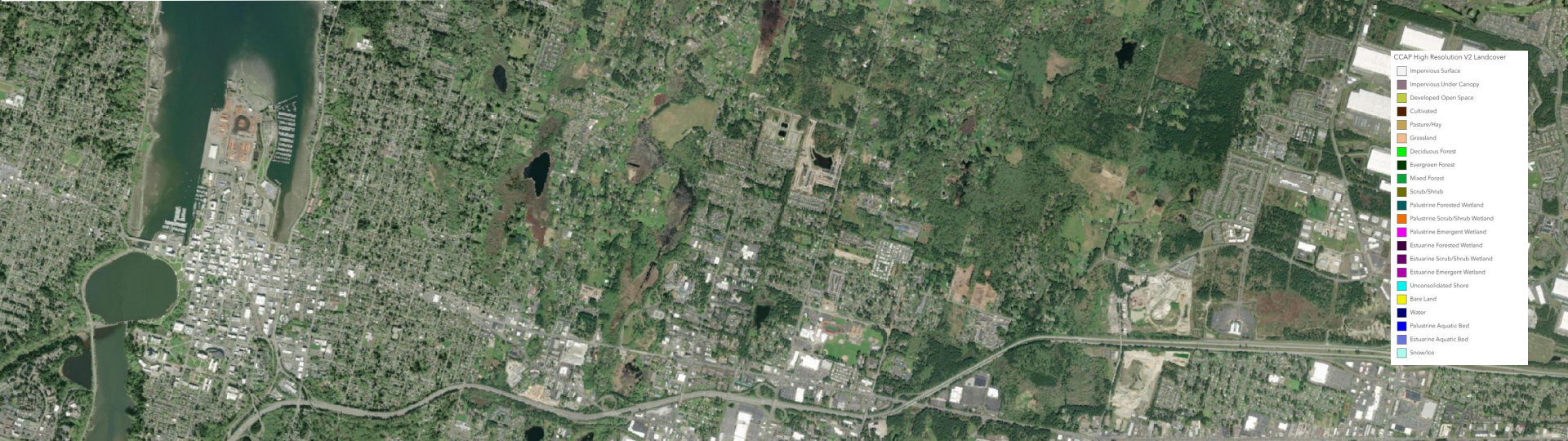
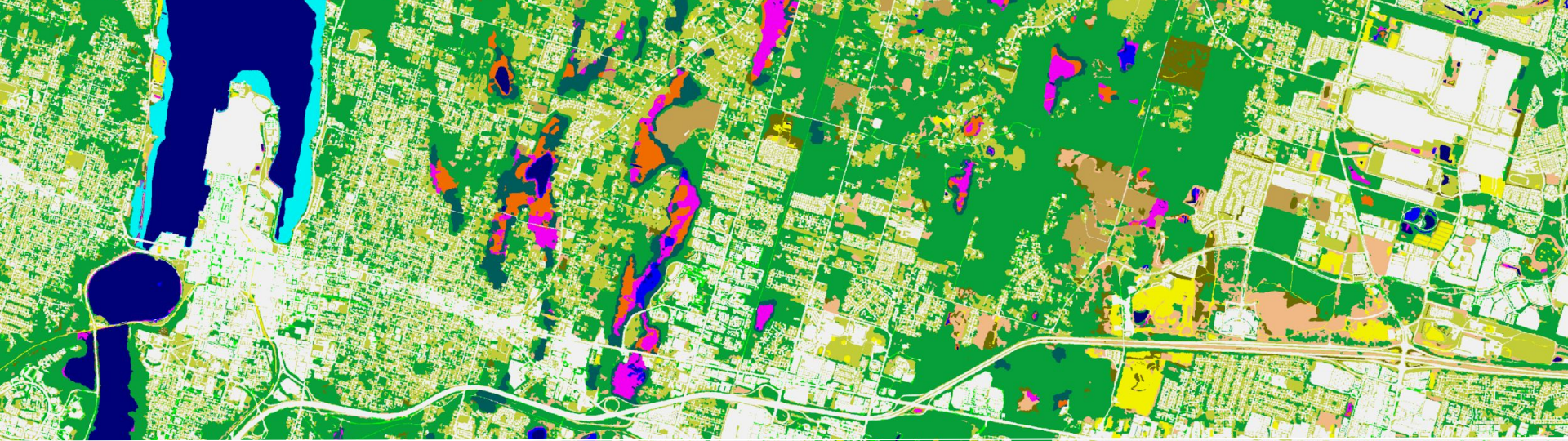
Estuarine Emergent Wetland

Water

Palustrine Aquatic Bed

Estuarine Aquatic Bed



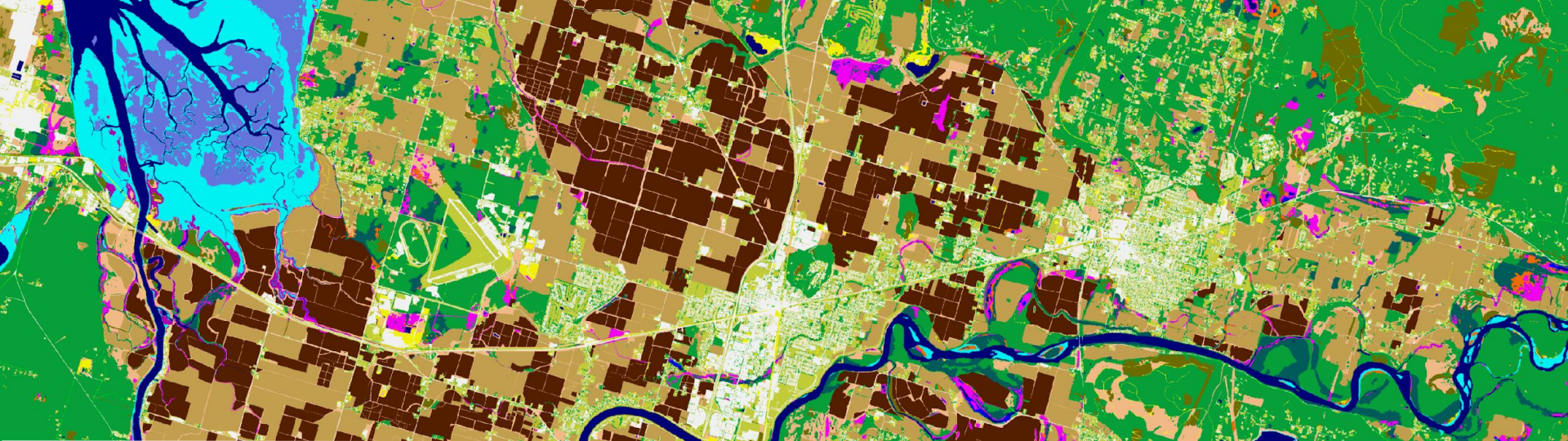


- CCAP High Resolution V2 Landcover
- Impervious Surface
  - Impervious Under Canopy
  - Developed Open Space
  - Cultivated
  - Pasture/Hay
  - Grassland
  - Deciduous Forest
  - Evergreen Forest
  - Mixed Forest
  - Scrub/Shrub
  - Palustrine Forested Wetland
  - Palustrine Scrub/Shrub Wetland
  - Palustrine Emergent Wetland
  - Estuarine Forested Wetland
  - Estuarine Scrub/Shrub Wetland
  - Estuarine Emergent Wetland
  - Unconsolidated Shore
  - Bare Land
  - Water
  - Palustrine Aquatic Bed
  - Estuarine Aquatic Bed
  - Snow/Ice



CCAP High Resolution V2 Landcover

White	Impervious Surface
Light Gray	Impervious Under Canopy
Light Green	Developed Open Space
Yellow	Cultivated
Orange	Pasture/Hay
Light Yellow	Grassland
Light Green	Deciduous Forest
Dark Green	Evergreen Forest
Medium Green	Mixed Forest
Dark Green	Scrub/Shrub
Dark Green	Palustrine Forested Wetland
Orange	Palustrine Scrub/Shrub Wetland
Pink	Palustrine Emergent Wetland
Dark Purple	Estuarine Forested Wetland
Light Purple	Estuarine Scrub/Shrub Wetland
Dark Purple	Estuarine Emergent Wetland
Light Blue	Unconsolidated Shore
Yellow	Bare Land
Blue	Water
Dark Blue	Palustrine Aquatic Bed
Light Blue	Estuarine Aquatic Bed
Light Blue	Snow/Ice

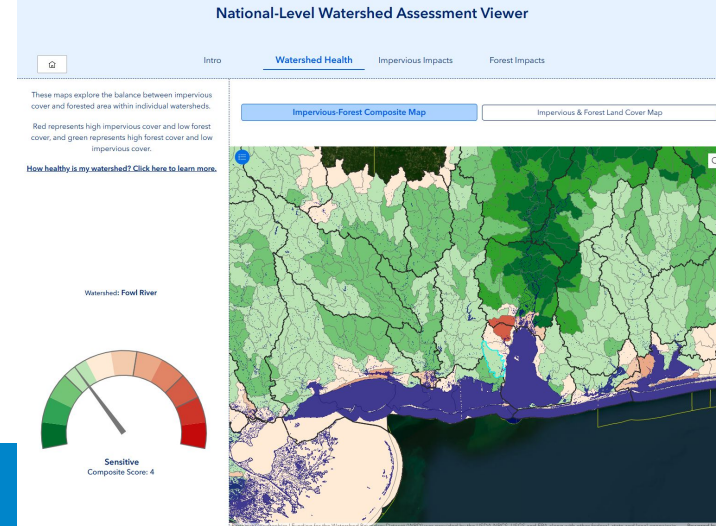
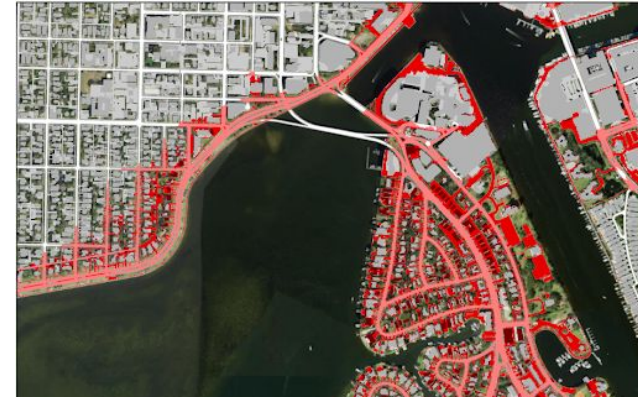


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  - Snow/Ice

# Example Applications

<https://coast.noaa.gov/states/stories/landcover.html>

- **Improved Flood Modeling and Risk Assessment**
  - SLOSH Modeling in the Caribbean
  - Transportation Infrastructure in Texas
  - Lowering Flood Insurance Rates (FEMA CRS)
- **Stormwater management and Water Quality**
  - Stormwater Mapping in Jacksonville, FL
  - Assessing Stream Health in Snohomish, WA
  - Water quality assessment screening tool
- **Heat Risk and Urban Forestry**
  - Mitigating Urban Heat Risks in SC



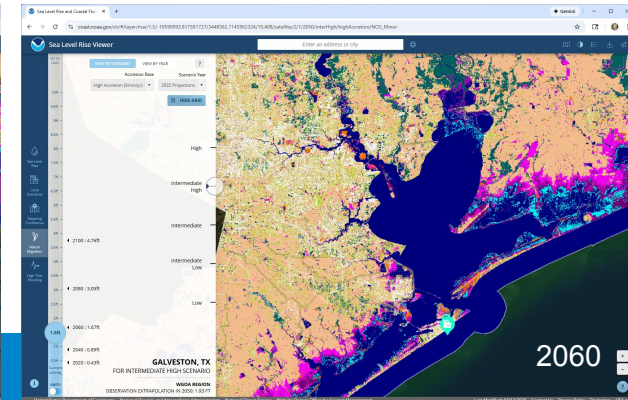
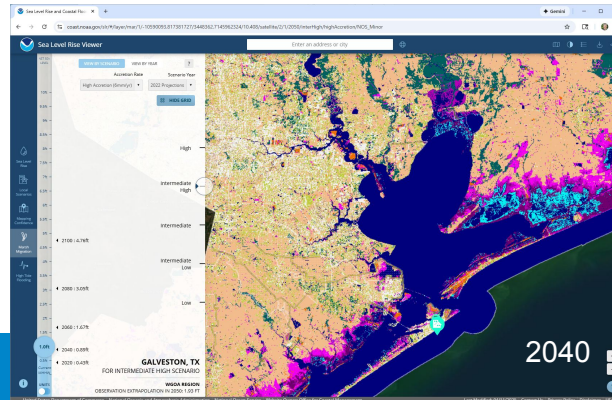
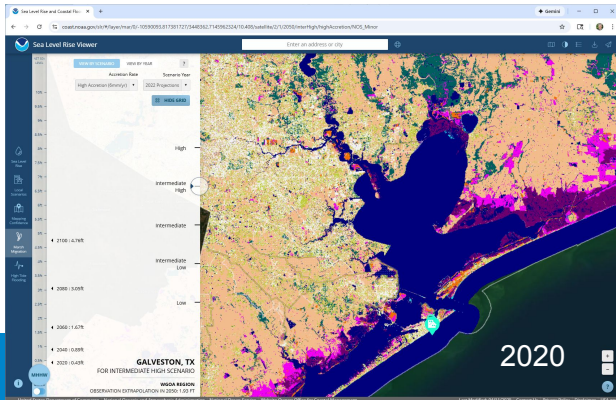
# Example Applications

<https://coast.noaa.gov/states/stories/landcover.html>

- **Wetland Monitoring, Conservation, or Restoration**
  - Comprehensive Marsh Management in NH
  - Coastal Wetland Impacts & Migration Modeling

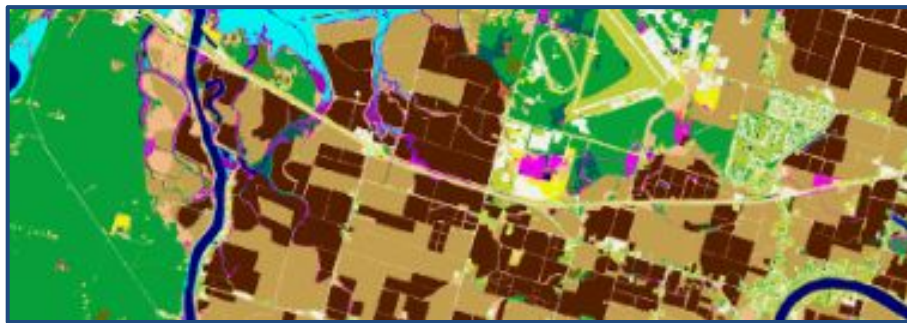
[coast.noaa.gov/slr](https://coast.noaa.gov/slr)

Houston-Galveston, TX Example  
Intermediate High Scenario  
6mm/year of Accretion



# Accuracy Assessment

- 98% accuracy using stratified random sampling and photo interpretation
- Small amount of existing errors predominantly surrounded delineating *agriculture, open space developed, and pasture*, and separating *shrub & forest*



# Accessing High Resolution C-CAP Data

*coast.noaa.gov/digitalcoast/data/ccaphighres.html*

OFFICE FOR COASTAL MANAGEMENT  
**DIGITAL COAST**

Home / Data / Catalog / C-CAP High-Resolution ...

## C-CAP High-Resolution Land Cover

NOAA Office for Coastal Management

[Download Data by State](#) [Seamless Download](#) [Map Services](#)

AREA OF COVERAGE	CLASSIFICATION	RESOLUTION
Most coastal areas nationwide	Up to 25 categories	1 to 2.4 meter

### Overview

[View 178 Datasets](#)

These nationally standardized map products bring NOAA's national land cover mapping framework to the local level. The 1-meter raster-based maps provide a level of detail not available in previous regional (30-meter) products.

Two file types are available. Initial mapping layers focus only on impervious, canopy, and water features that were produced through the application of advanced artificial intelligence classifiers. Refined land cover products, which incorporate ancillary data and expert systems, improve upon initial data and expand mapping to include up to 20 standard C-CAP land cover categories, including wetlands.



# Accessing High Resolution C-CAP Data

*coast.noaa.gov/dataviewer/#/landcover/search/*

The screenshot displays the Digital Coast Data Access Viewer interface. The top navigation bar includes 'DIGITAL COAST: DATA ACCESS VIEWER', 'IMAGERY', 'LAND COVER', and 'ELEVATION'. A search bar is located at the top left, and a 'Filter by Provider' dropdown is at the top right. The main map area shows a map of Washington state with a yellow rectangular search box highlighting a region in the Puget Sound area. The search results list on the right contains the following items:

Search Result	File Size	Action
2021 NOAA C-CAP Version 2 Impervious Cover: Washington NOAA OCM	879.04 MB - BULK DOWNLOAD	[Download Icon]
2021 NOAA C-CAP Version 2 Canopy Cover: Washington NOAA OCM	879.04 MB - BULK DOWNLOAD	[Download Icon]
2021 NOAA C-CAP Version 2 Water Cover: Washington NOAA OCM	879.04 MB - BULK DOWNLOAD	[Download Icon]
2021 NOAA OCM C-CAP Regional Land Cover NOAA OCM	1003.52 KB - BULK DOWNLOAD	[Download Icon]
2017 NOAA OCM High Res Land Cover : Southern Puget Sound, Washington NOAA OCM	410.88 MB - BULK DOWNLOAD	[Download Icon]
2016 High Res Land Cover: Snohomish County, WA NOAA OCM	86.93 MB - BULK DOWNLOAD	[Download Icon]
2016 NOAA OCM C-CAP Regional Land Cover		[Download Icon]

Showing 15 results



# Questions?

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*Visit us on the Digital Coast at:*

<https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

<https://coast.noaa.gov/digitalcoast/topics/coastal-land-cover.html>

