

A Hybrid Approach to Land Cover Classification

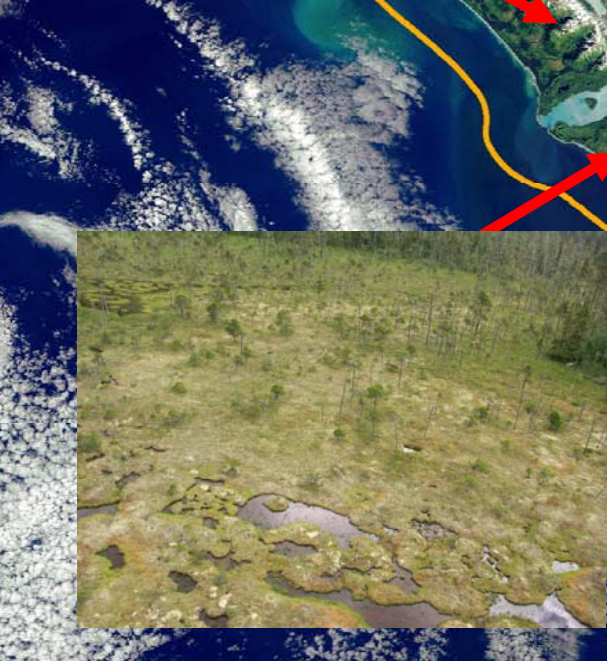
Integrating Manually Interpreted Photography and Digitally Classified Satellite Data

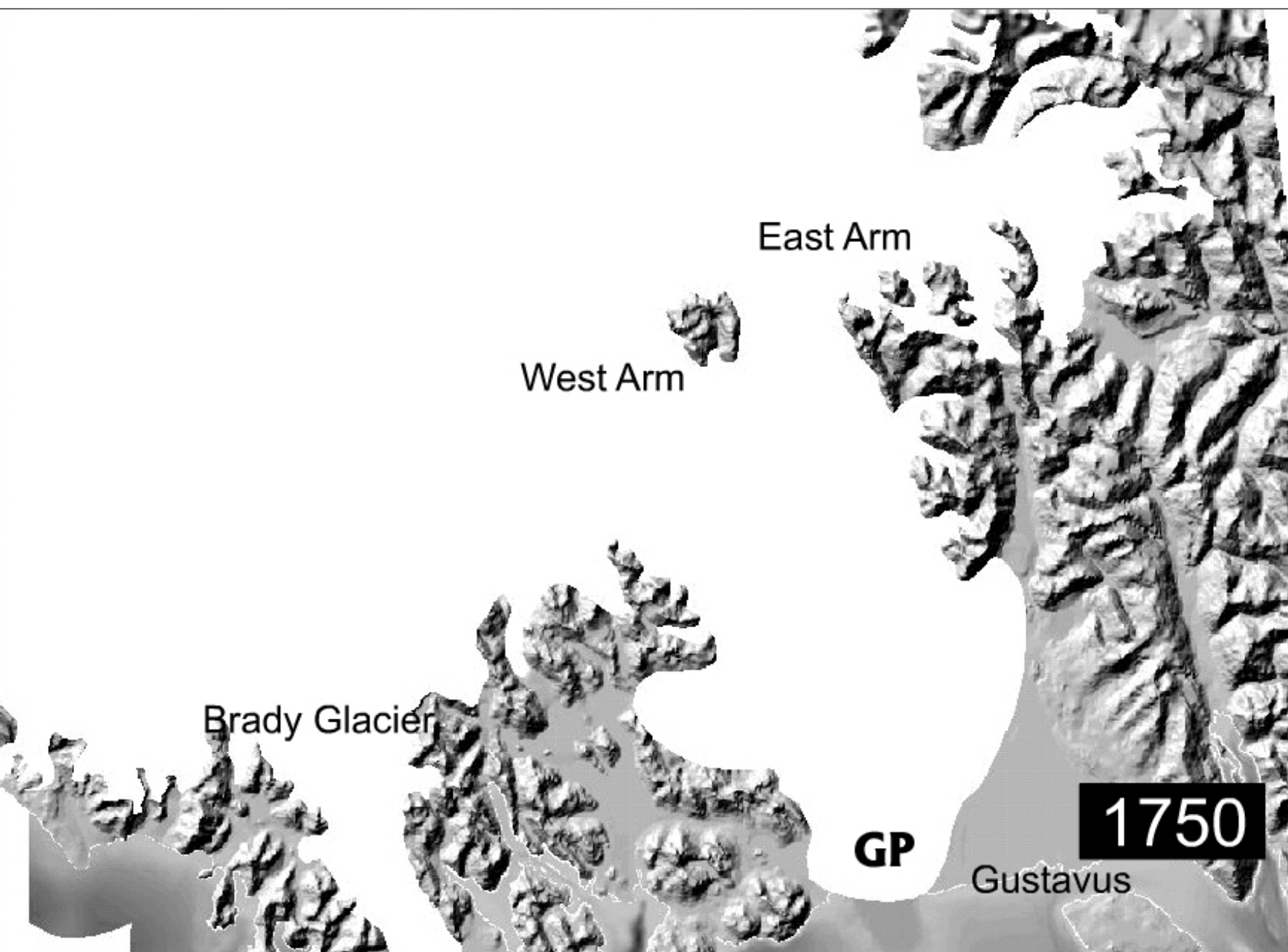
National Park Service
Alaska Landcover Mapping Program
240 W. 5th Avenue
Anchorage, Alaska 99501

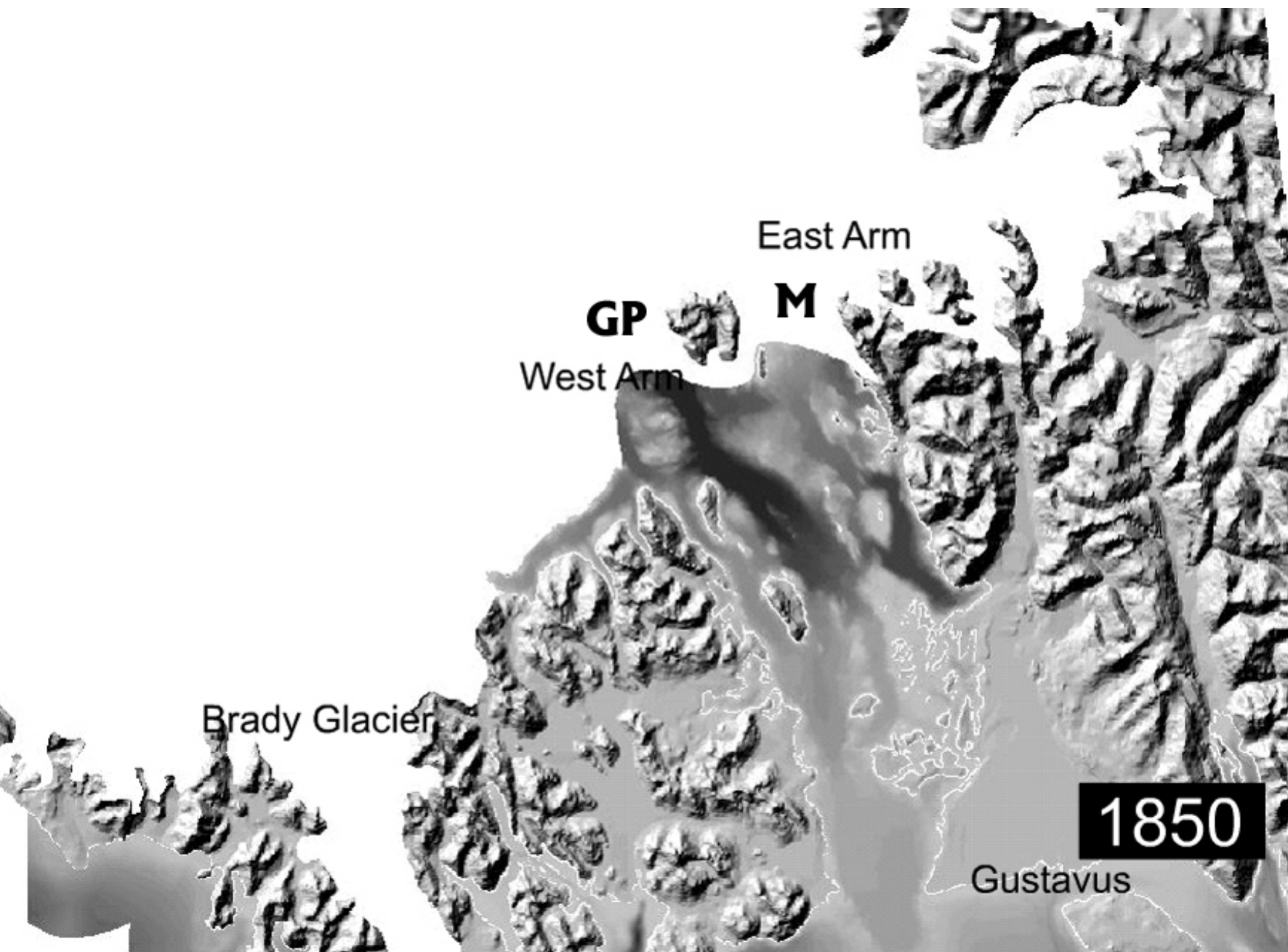
Jess Grunblatt
Inventory Coordinator

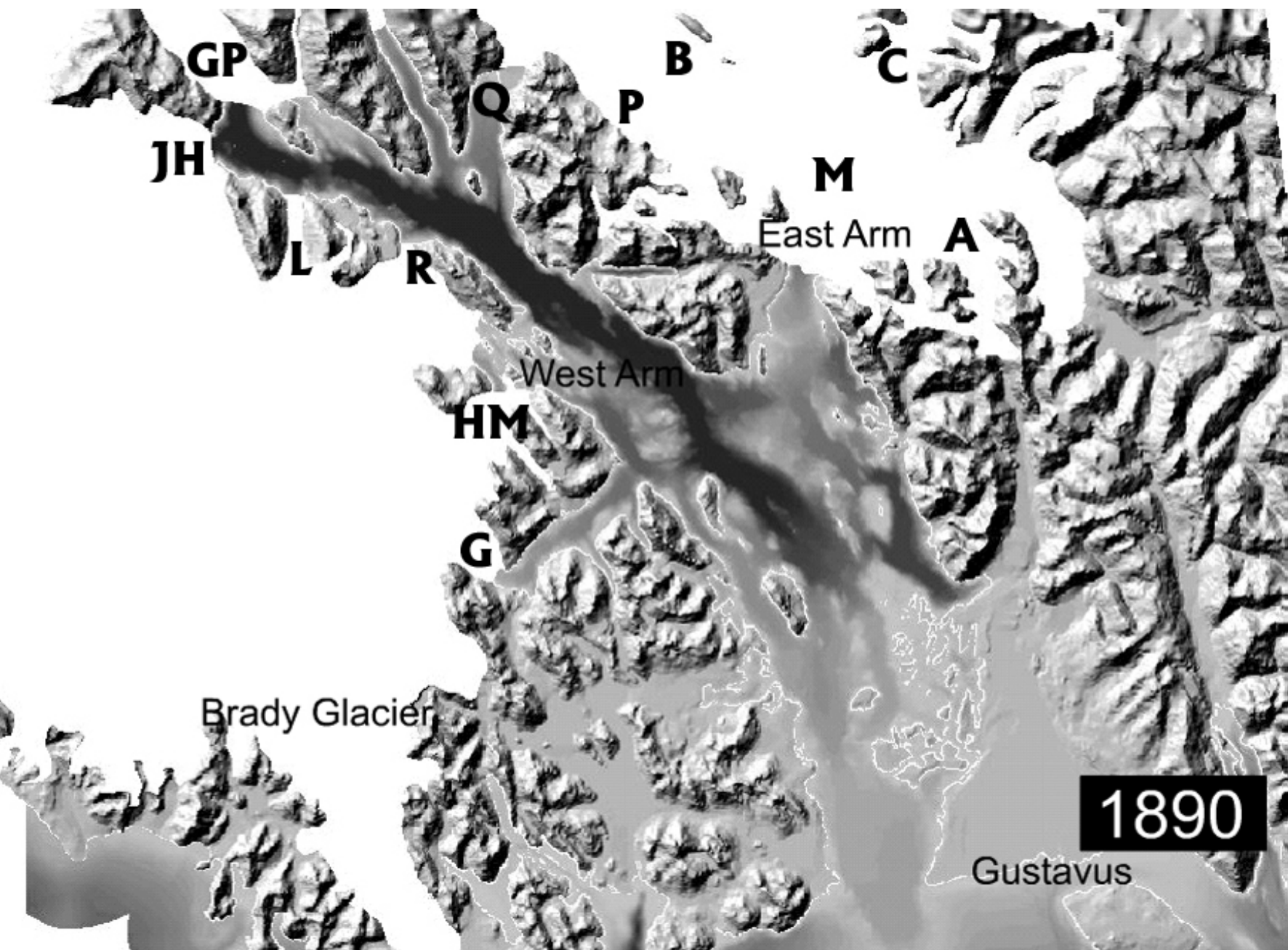
Glacier Bay National Park and Preserve
Landcover Mapping Project

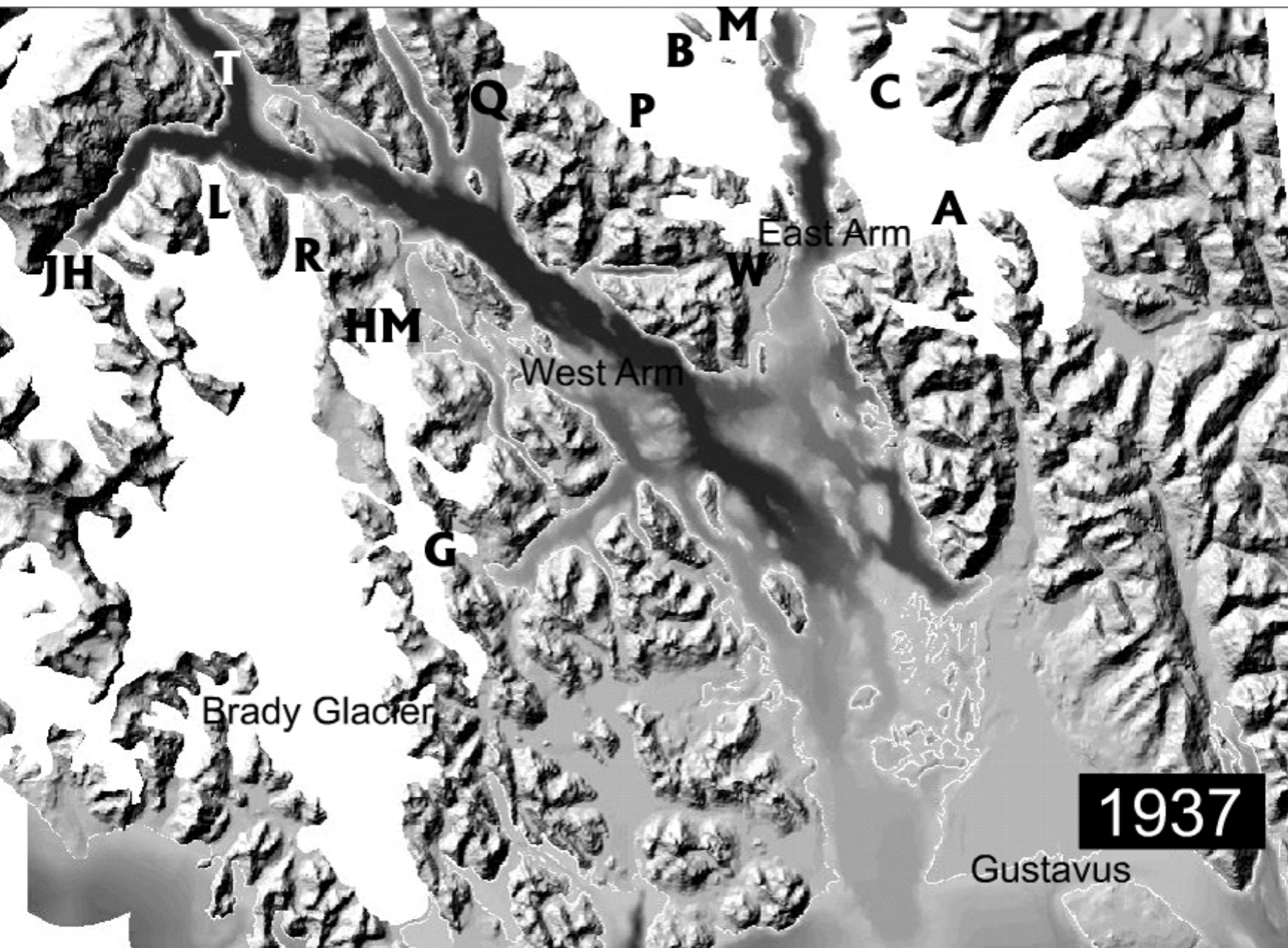


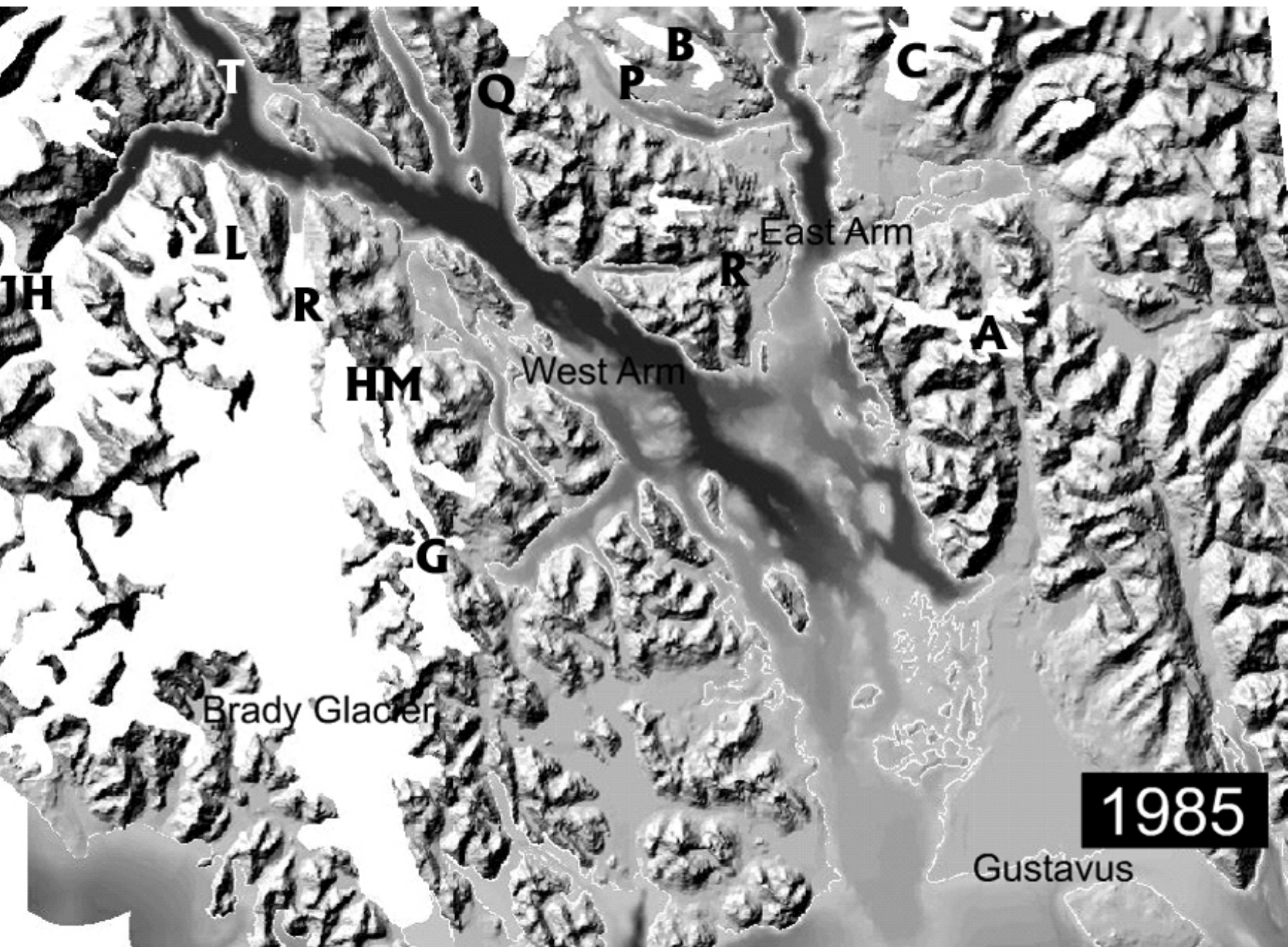












Glacier Bay National Park and Preserve Landcover Mapping

Issues

Management

- OHV Trails - Wetlands
- Dry Bay - Salmon Fishery
- Wilderness Management

Research

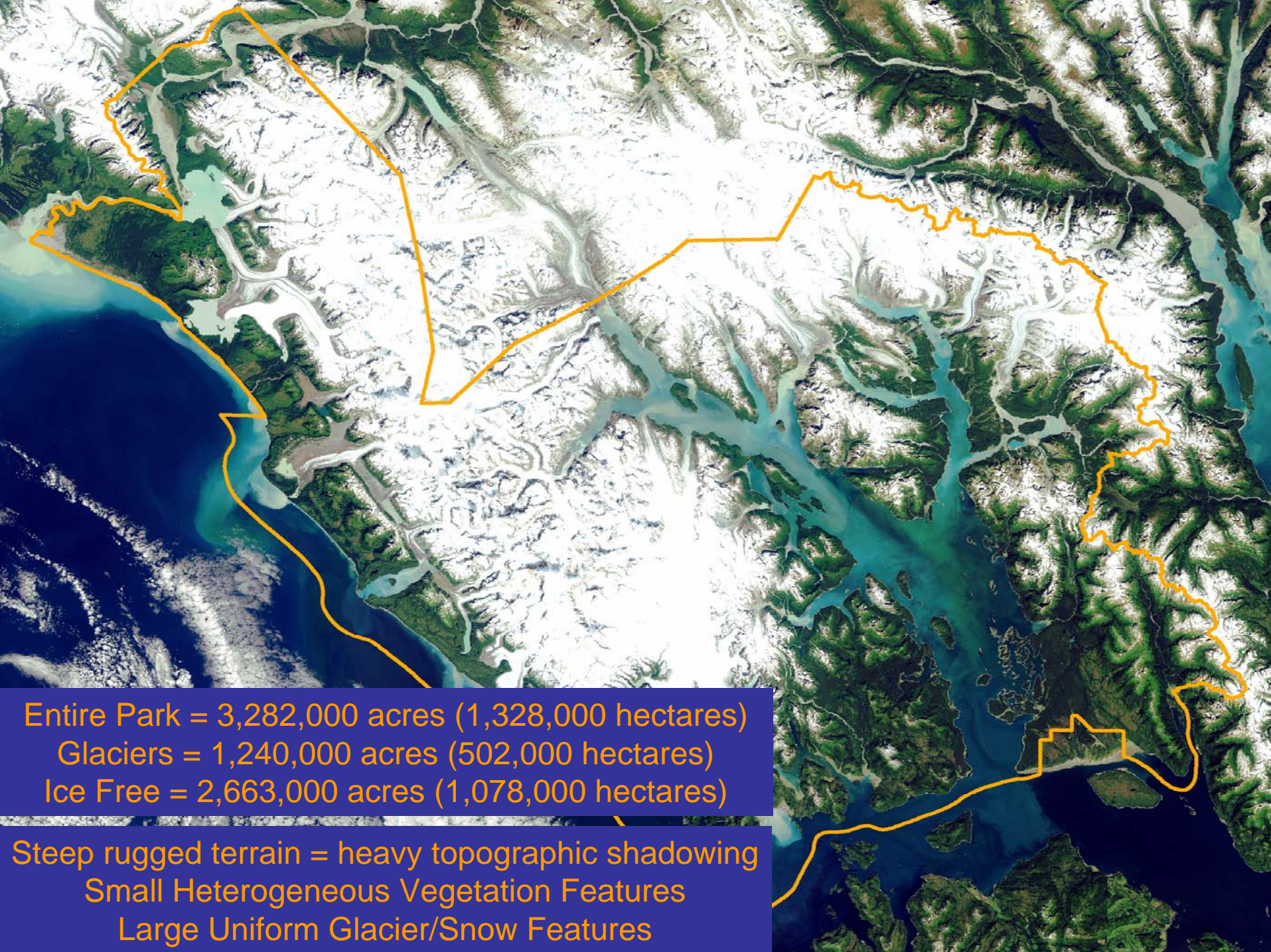
- Habitat
- Climate Change
 - Vegetation
 - Glacier

I&M

Technologies

Manual Photo Interpretation

Digital Image Classification



Entire Park = 3,282,000 acres (1,328,000 hectares)
Glaciers = 1,240,000 acres (502,000 hectares)
Ice Free = 2,663,000 acres (1,078,000 hectares)

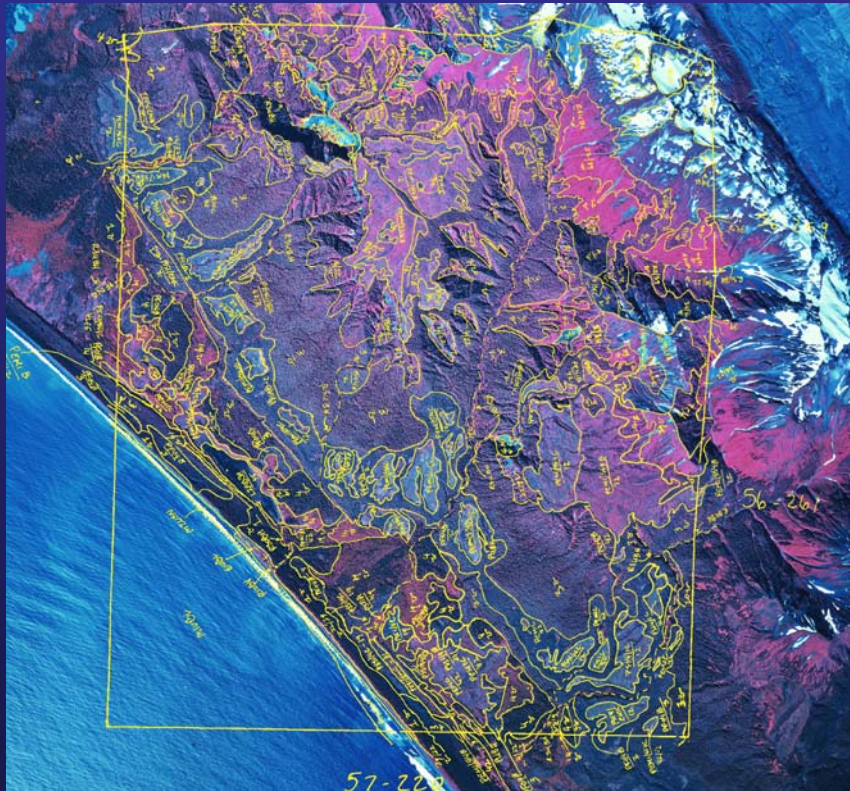
Steep rugged terrain = heavy topographic shadowing
Small Heterogeneous Vegetation Features
Large Uniform Glacier/Snow Features

Vegetation

Manual Photo Interpretation

Alaska Natural Heritage Program
National Wetlands Inventory

Upland – 20 acre (8 hectare) MMU
Wetlands – 5 acre (2 hectare) MMU



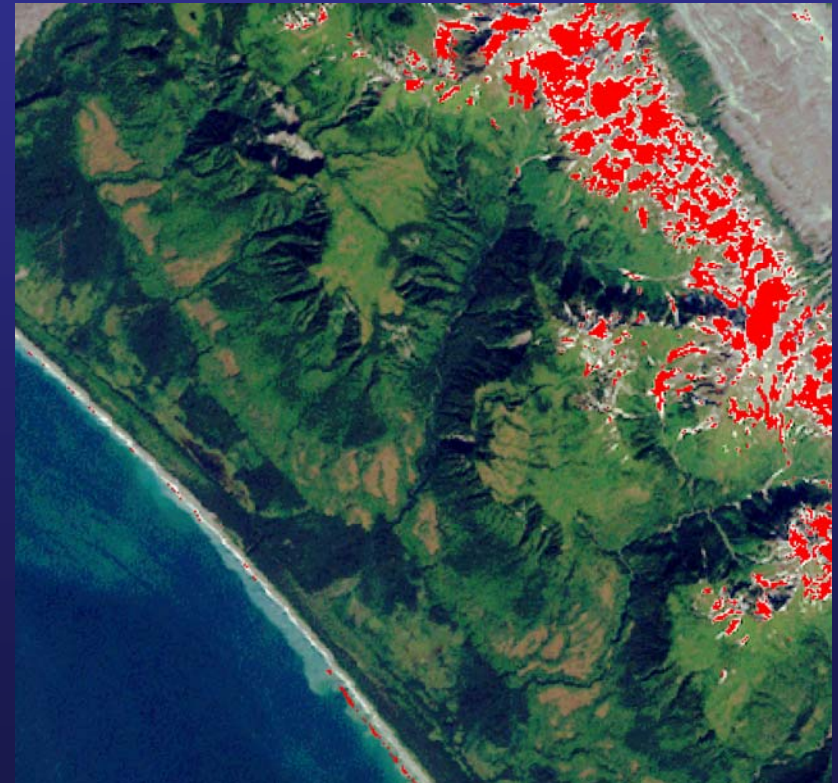
1:65,000 CIR Photography

(screen capture at ~1:50,000)

Snow/Ice

Digital Image Classification

National Park Service



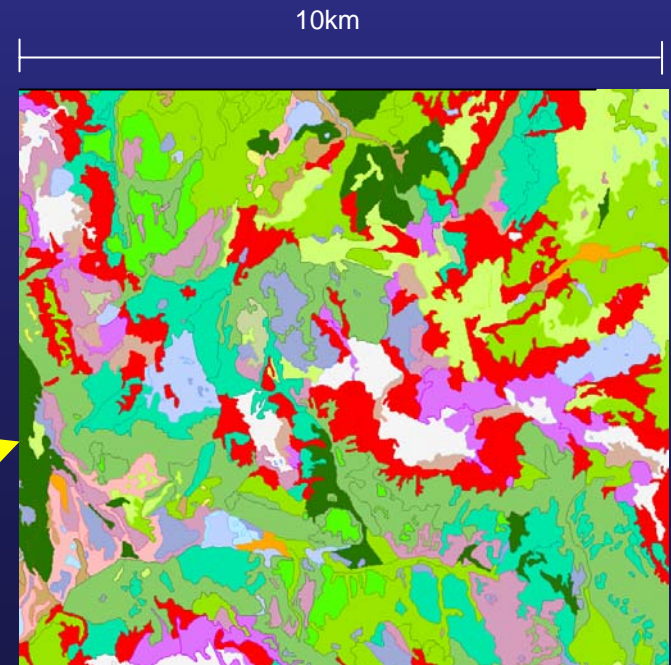
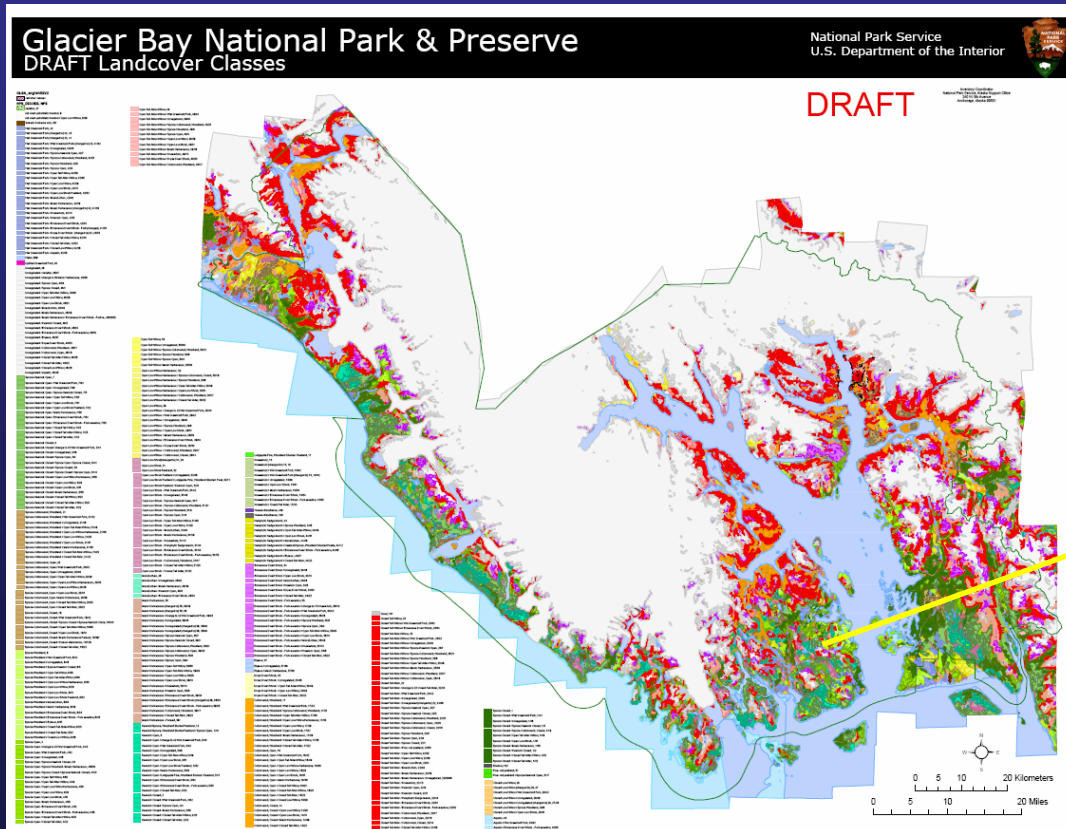
Thematic Mapper (TM7)

Aerial Photography

Interpretation + Automation/Attribute + Registration

Appropriate Detail

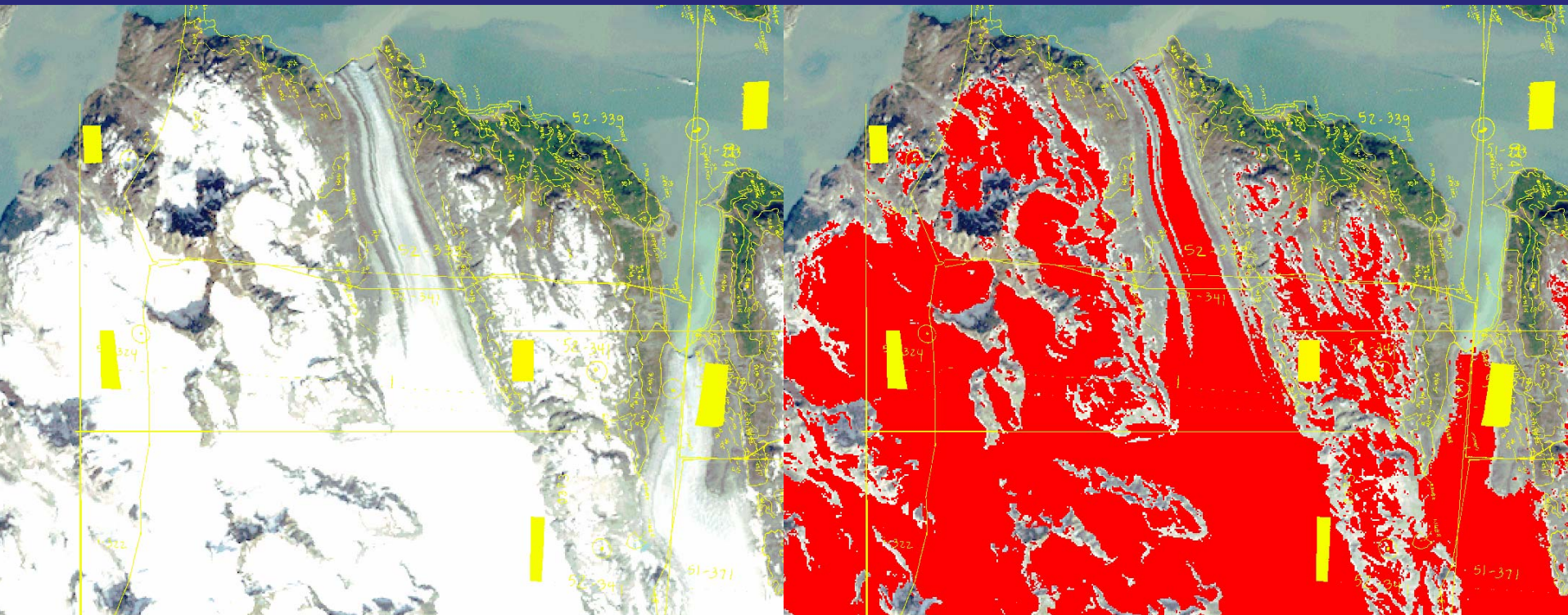
Currently - reviewing interpretation accuracy
- reviewing registration



Digital Image Interpretation – Snow/Ice

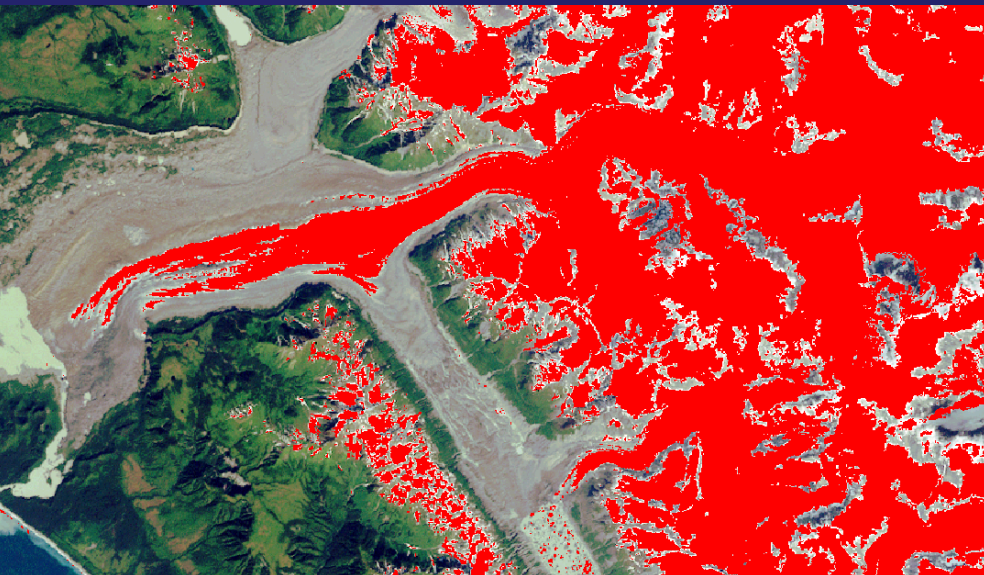
Unsupervised Clustering – 200 classes
Class Assignment Based on Visual Interpretation

Output = Raster Mask

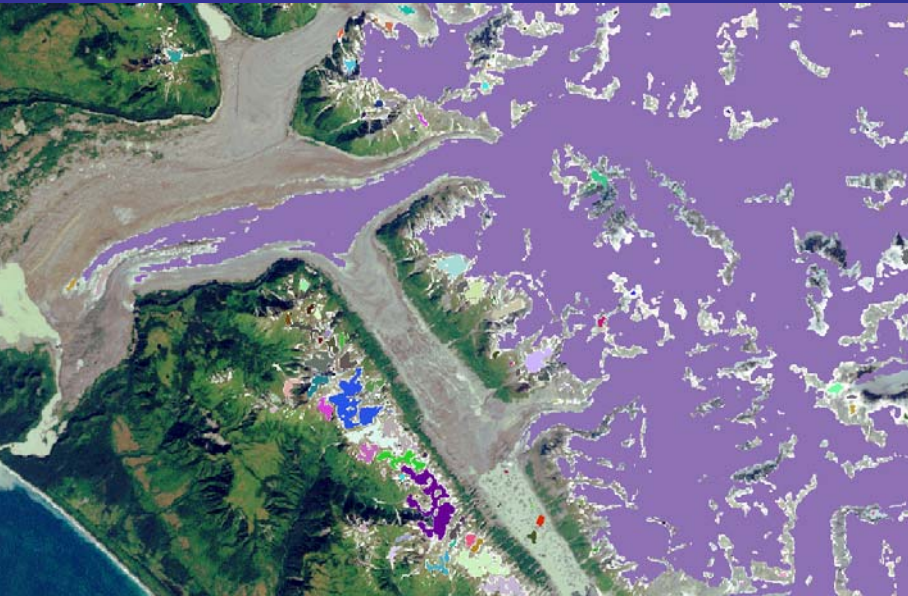


Isoclass (200 class)
Reclassify

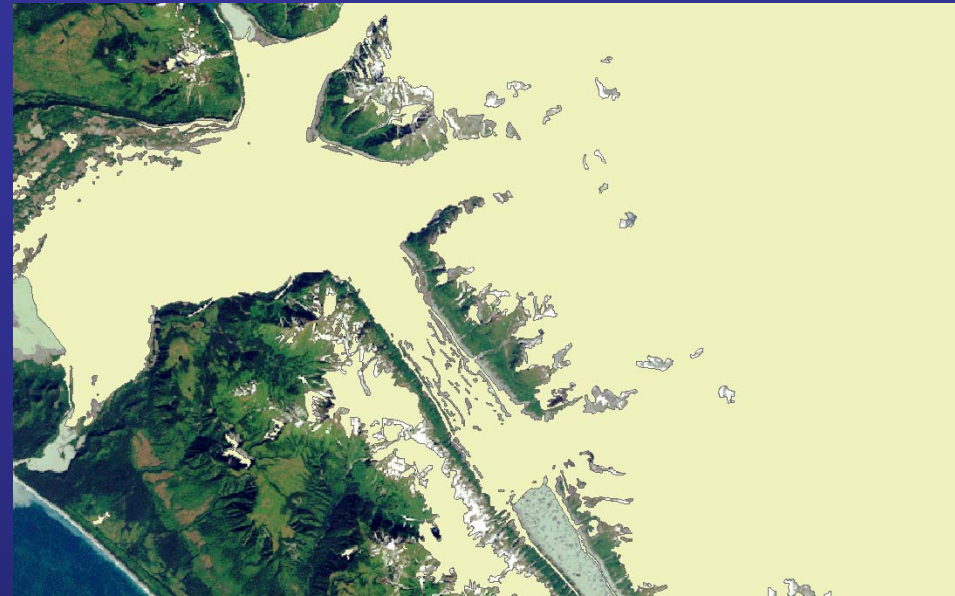
3x3 Filter



Clump - Sieve



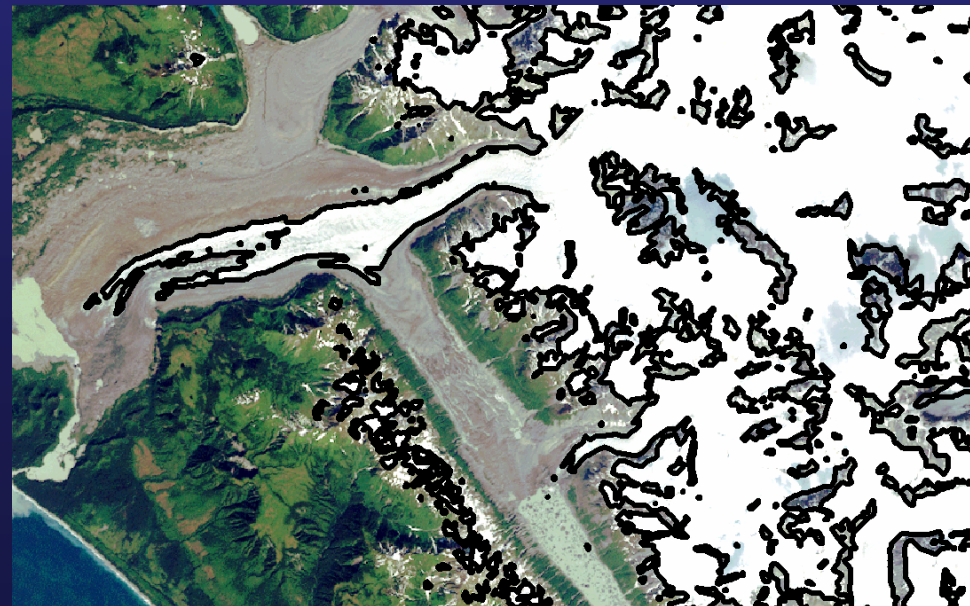
Noveg Mask



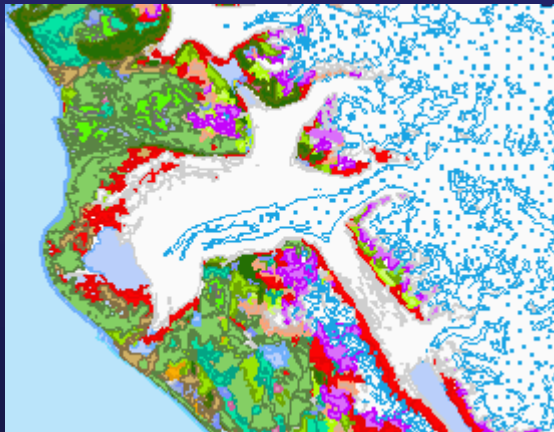
5x5 Filter



Final Vectorized Snow/Ice Polygons



Integrated Land Cover





Area of Extent

Volume

Terminus Position





Katmai National Park and Preserve Detailed Spectral Database Indexed to Ecological Parameters



Legend: What Can We “See”???



Before or After Analysis

Object Size (spatial resolution)

Class Names (thematic resolution)



Disaggregated Signature Development:

Geographic Resource Solutions, Inc.

Signature Characteristics

Many Signatures

Small Variance Structure

Independent Covariance

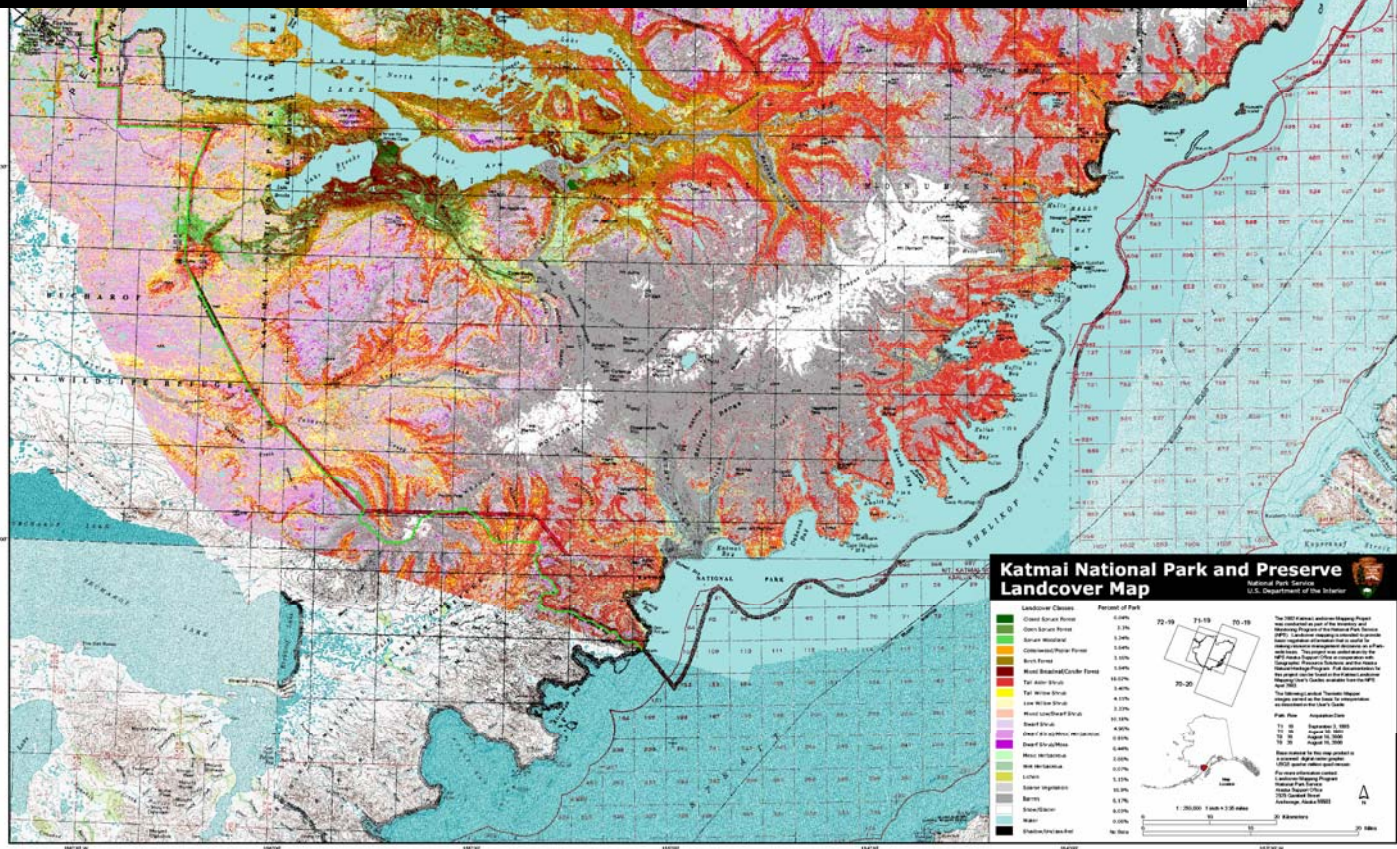
Ecologically Indexed

Site	Calculated Class	%Tree Cover	%Conifer	%Balsam Poplar	% Birch	%Shrub	%Alder	%Willow	%Forb	%Barren
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Error Management

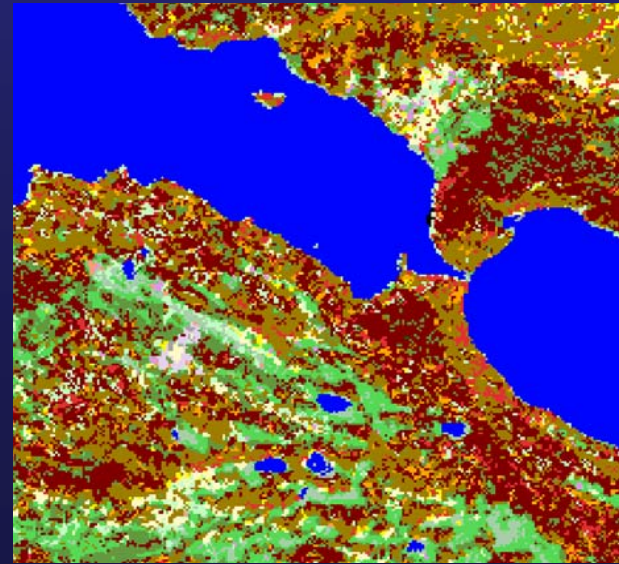
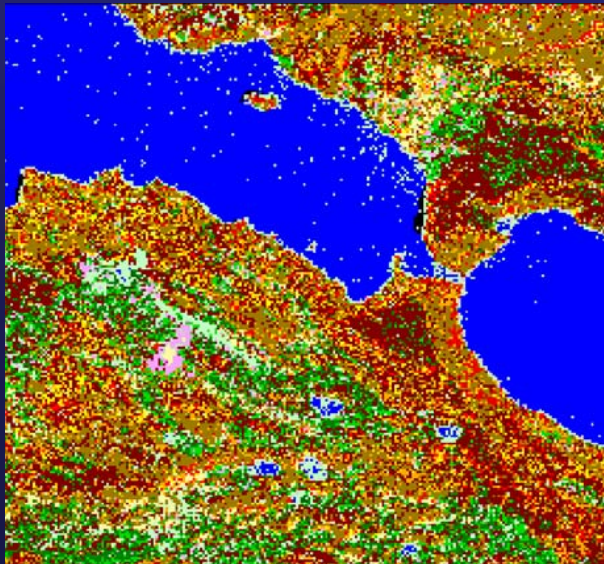
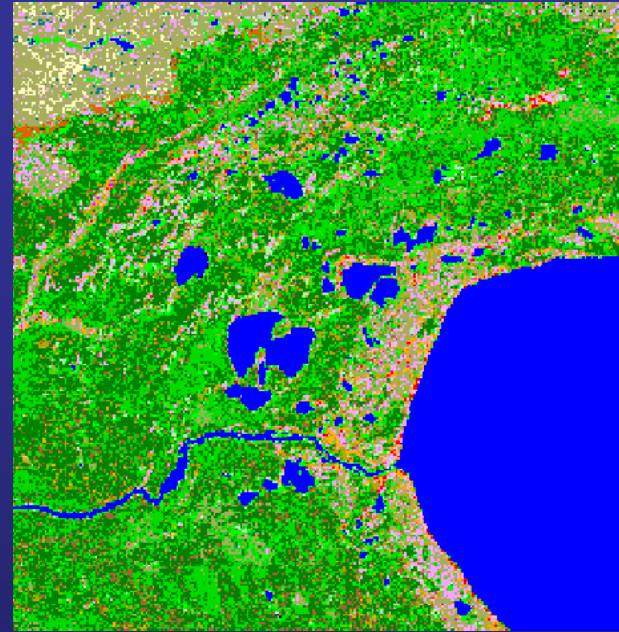
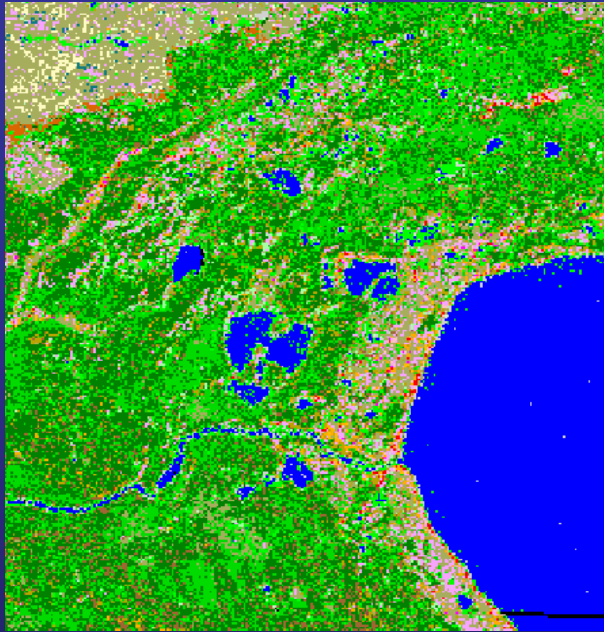
Pixel Fidelity (self classify) - JM Distance

Sequential Classification - Thresholds



Classification Evaluation: Models

Water Correction = Band 4 + Band 5

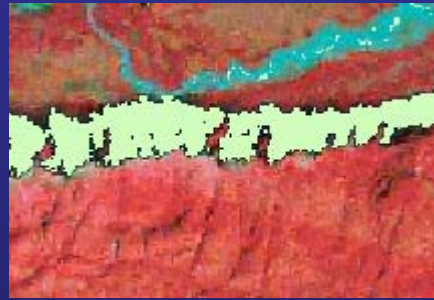


Classification Evaluation: Models

Shadowed Slope Correction

**Dark object definition with terrain
model to produce shadow mask**

CIR Image Data



**Class reassignment
within shadow mask
based on PI**

mixed shrub to alder
wet/mesic graminoid to sparse
water to unknown

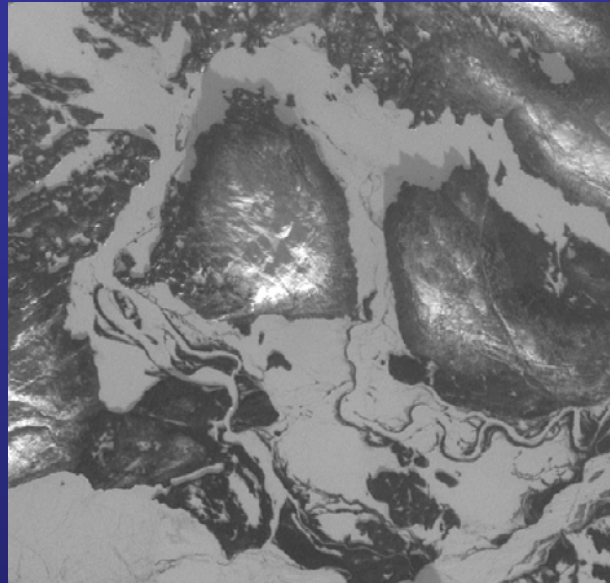
Classification Evaluation: Models

Winter Image Correction

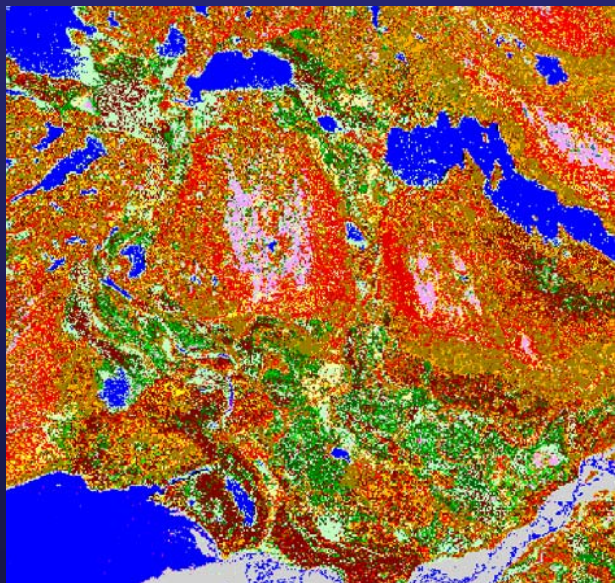
CIR
summer



band 1
winter



uncorrected



corrected

