Multiscale Land Cover Design for The National Map

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Design Challenge:
Removing pixilation while maintaining precision

Raw NLCD data: 30m pixels
Design Challenge:
Removing pixilation while maintaining precision

Feathered Edge and Spray Can processing (2m pixels)

And avoiding suggestion of more accuracy than warranted
Deciding What Land Cover Classes to Represent

**Goal:** Try to make a map that includes as much land cover information as possible, while still being aesthetically appealing and organized.

- If possible, never want a user to have to guess what land cover feature exists on the ground (i.e. provide as much information of possible)
- Simultaneously not overloading the map with too much land cover information so that it becomes less intuitive

**Solution:** responsible class grouping
Responsibly Grouping Similar Classes

• 20 classes to 5 classes without deletion of land cover regions

Dave Greenlee – Recommended moving away from categorical wooded land cover, to Percent Canopy
Using NLCD for Land Cover

Reclassify to 3 land cover categories for topo maps:

**Agriculture**
- 81 Pasture/Hay
- 82 Cultivated Crops

**Grassland**
- 52 Shrub/Scrub
- 71 Grassland/Herbaceous
- 72 Sedge/Herbaceous*
- 73 Lichens*
- 74 Moss*
- 81 Pasture/Hay
- 82 Cultivated Crops

**Barren**
- 31 Barren Land

* Alaska only

www.mrlc.gov/nlcd01_leg.php
Using NLCD for Land Cover

Replace 7 categories with 2 ordered data sets: **Percent Canopy** and **Percent Impervious** (2001)

- 41 Deciduous Forest
- 42 Evergreen Forest
- 43 Mixed Forest
- 21 Developed, Open Space
- 22 Developed, Low Intensity
- 23 Developed, Medium Intensity
- 24 Developed, High Intensity

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Replace 4 with **NHD** (vector hydrography)

And ignore 4 Alaska-only categories for now
Symbolization

Categorical colors + magnitude ramps + canvas
Subtle lightness contrasts

Agriculture
Grassland
Barren
Canvas

Built Up
Canopy
Color ramps: lightness and hue

Land Cover “a”

common shared color

Land Cover “b”

Example at 1:24,000
Lightness contrast for magnitude information

% Canopy - % Impervious
ScaleMaster

caching scales

### Hydrography
- Hydro areas: 1GsoC-, 2C-, 3GsC-Sz, 4C-, 5GsoC-
- Hydro lines: 1Gcs, 2C-L-, 3GsC-Sz, 4C-Sz, 5GsoC-SzL-

### Physical
- Hillshade
  - Contour: 1Go, 2Go
  - Summit: 1LpSz, 2C-

- Land Cover: 1Sc, 2Gr, 3Cc, 4Gg, 5Gg, 6Gg

### Transportation
- Freeway/Highway/Ramp: 1C-, 2Sz, 3C-
- Collector/Local/Service/4WD: 1C-Sz, 2C-Sz, 3C-1C-
- Rail: 1LaSSc-
- Airport: 1LaSz, 2C-, 3C-

### Cultural
- EMS/Hospital: 1LaSz, 2C-, 3C-
- Church/Locale/School: 1C-LaSz, 2C-
- Neighborhood (GNIS point): 1La-, 2La-, 3La-, 4L-

### Administrative
- Incorporated Place: 1La, 2La, 3La-, 4La-, 5La, 6La-, 7L+
- Minor Civil Division: 1LaSz, 2C-
- County: 1Sz
- Federal Land: 1LaSp
- National/State: 1Sz
Spray Can, Upsampling

1:40,000
30m at 1:120,000 is 1/4mm on screen/paper
(a pixel is a 1/4mm)
Comparison:
Feather /
Spray Can /
Upsampling

Raw Data Resampled to 125m Pixels 1:500,000
Feather/Spray Can/Upsampling

Raw 30m Pixels

1:24,000
Checking Land Cover Representation across Multiple Study Areas

- Downloading NLCD, Percent Impervious, Percent Canopy for each of 10 subbasins (study areas), as well as for a single quad within each subbasin

- Processing these data using the Spray Can/Feathered Edge/Upsampling up to 1:120,000 on each quad, then resampling to larger pixels for the entire subbasin

**Purpose:** To check land cover representation across varying terrains (ex. arid vs. wet – mountainous vs. flat – rural vs. urban)
1. Spray Can Processing

- Raw 30m Pixels
- Shrink/upsample
- Buffer and Randomize
- Extract random pixels within buffer
- Allocate for final Spray Can Effect

2. Feathered Edge

- Reclass desired LC as nodata
- Euclidean distance
- Set threshold distance