

Estimating Distribution and Range Extent for Grizzly Bear Populations



Current Method

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Tools and Technology

Methods to Estimate Distribution and Range Extent of Grizzly Bears in the Greater Yellowstone Ecosystem

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ABSTRACT The distribution of the Greater Yellowstone Ecosystem grizzly bear (*Ursus arctos*) population has expanded into areas unoccupied since the early 20th century. Up-to-date information on the area and extent of this distribution is crucial for federal, state, and tribal wildlife and land managers to make informed decisions regarding grizzly bear management. The most recent estimate of grizzly bear distribution (2004)

This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information

Current Method

- Uses all **verified** grizzly bear location data (telemetry locations, capture, reported mortalities, reported conflicts, DNA, observations)
- Uses a 3km x 3km grid, each cell has verified occurrence or does not
- Uses zonal analysis and ordinary kriging to develop a predicted surface of grizzly bear distribution
- Defines outer perimeter of occupied range without overestimating

Verification of Reported Occurrences

- Important for reports outside of known ranges
- Candidate photos of bears, tracks, and/or other evidence is sent to a panel of grizzly bear researchers and managers, hair samples are sent for DNA analysis
- Unanimous opinion or confirmation by DNA is needed for a report to be considered verified

Tail camera picture from Little Belt Mountains, 2016



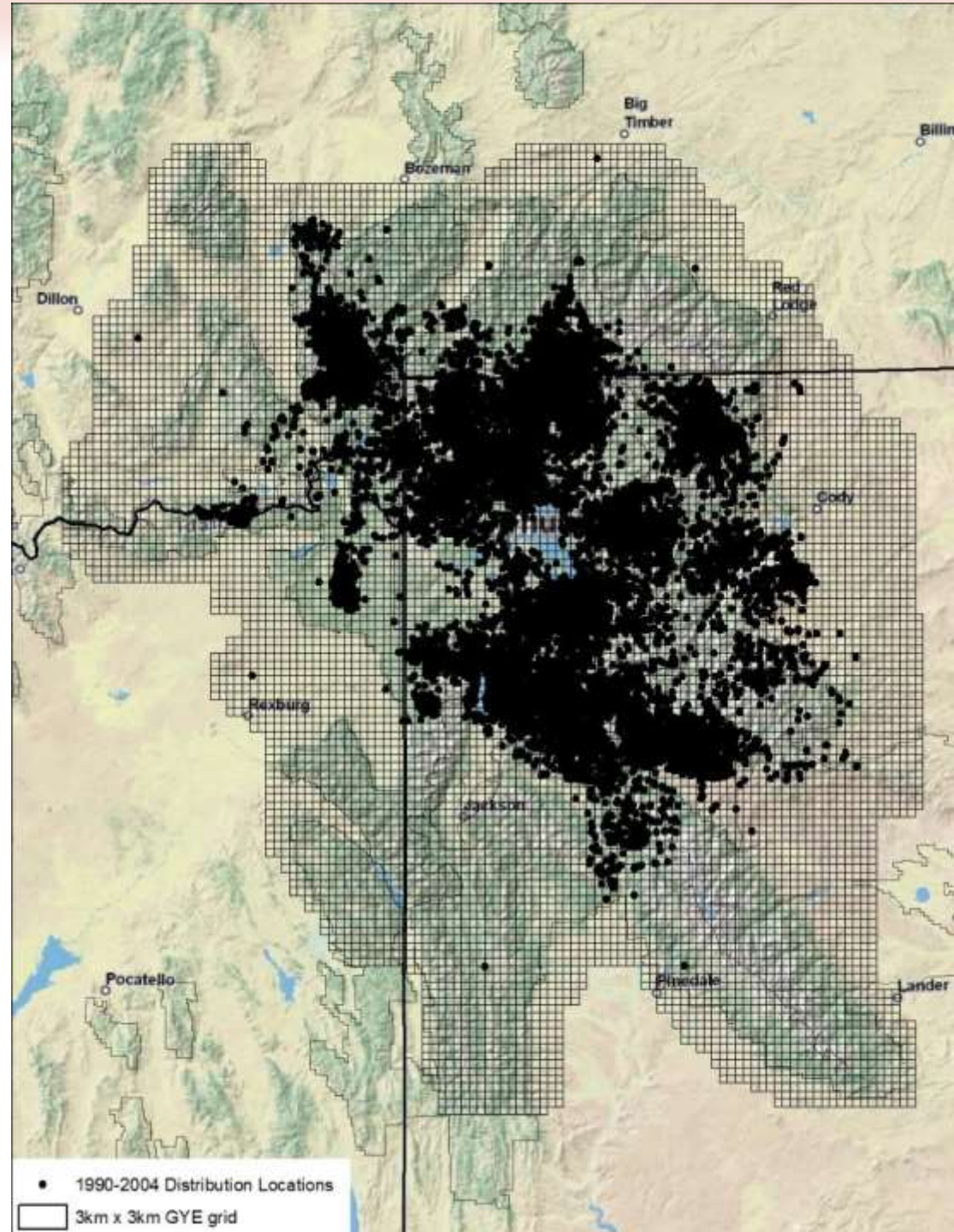
Courtesy of MTFWP

Greater Yellowstone Ecosystem

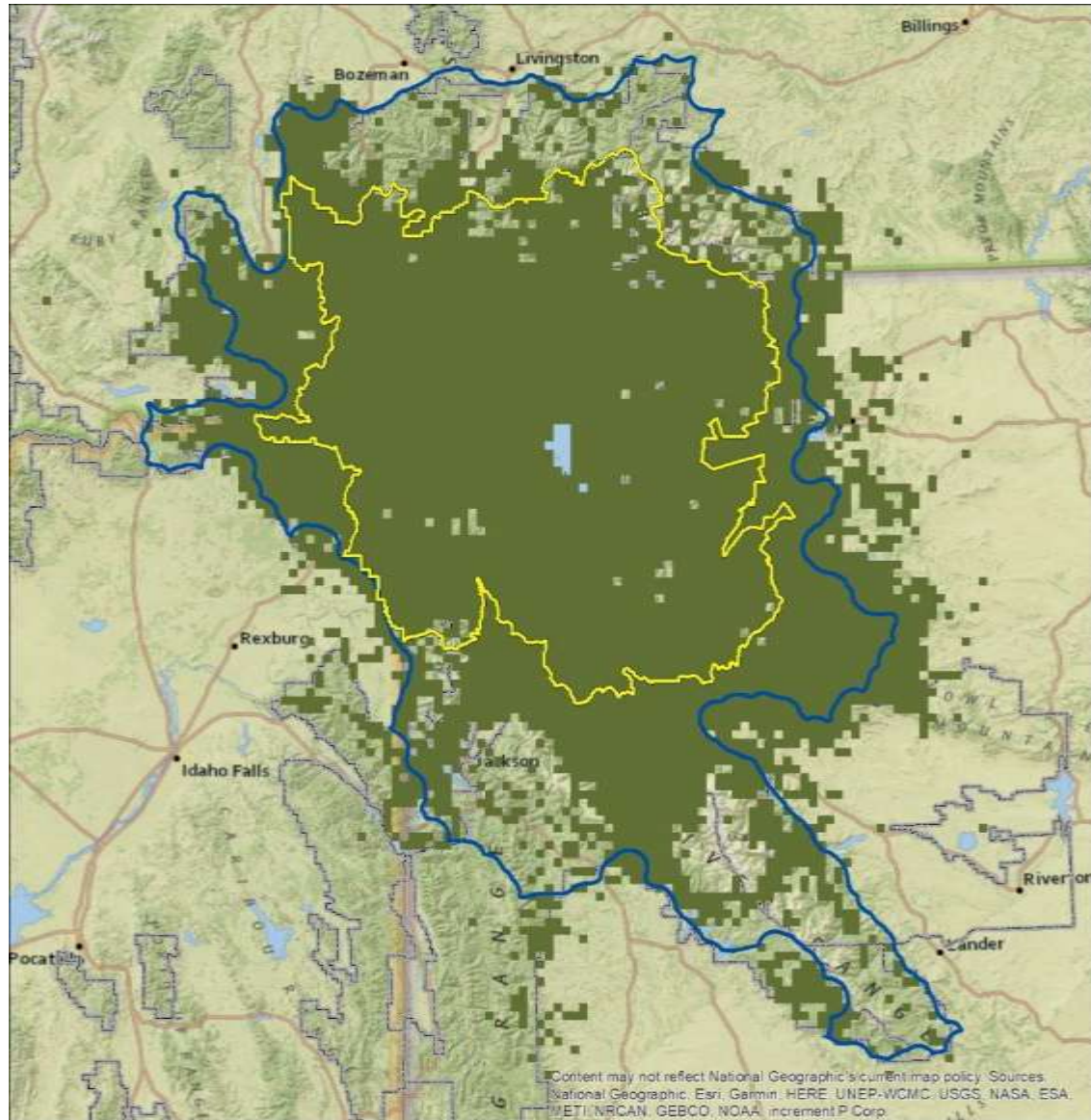
- National Parks = 10,344 km²
- Primary Conservation Area/Recovery Zone = 23,828 km²
- Demographic Monitoring Area (DMA) = 49,931 km²



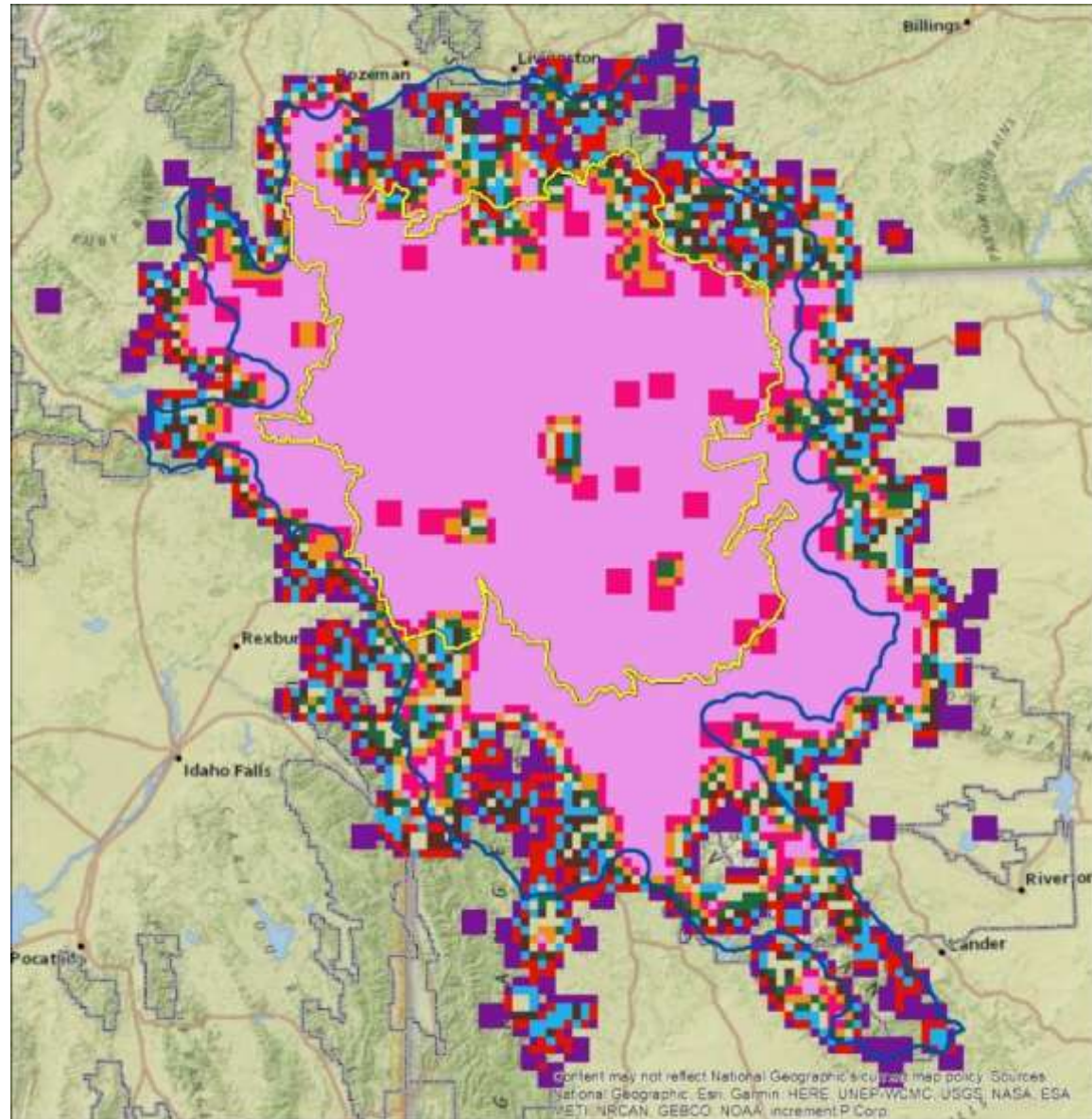
3x3 km grid cells in with verified occurrences, 1990-2004



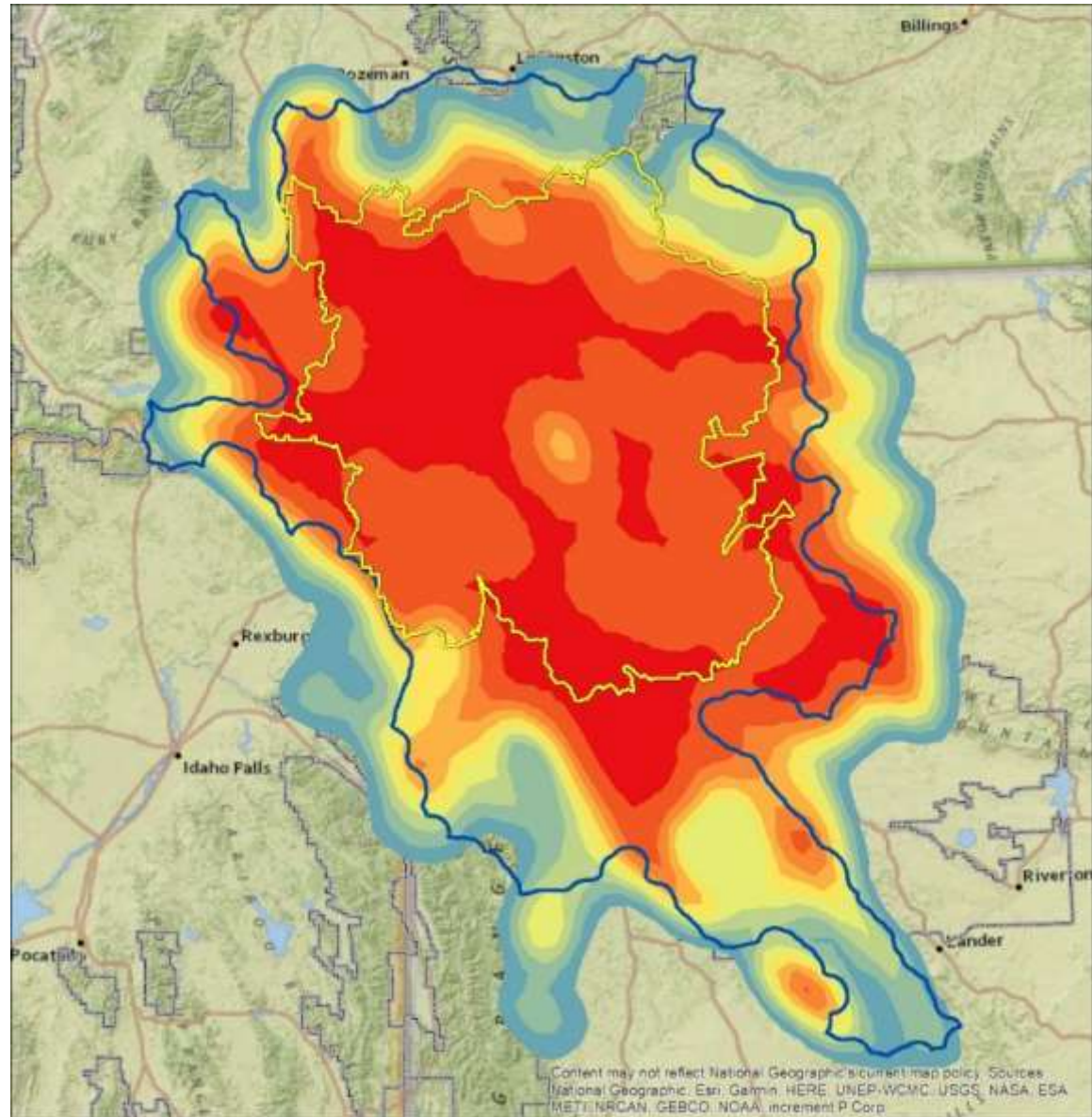
Occupied grid cells, 2004-2018



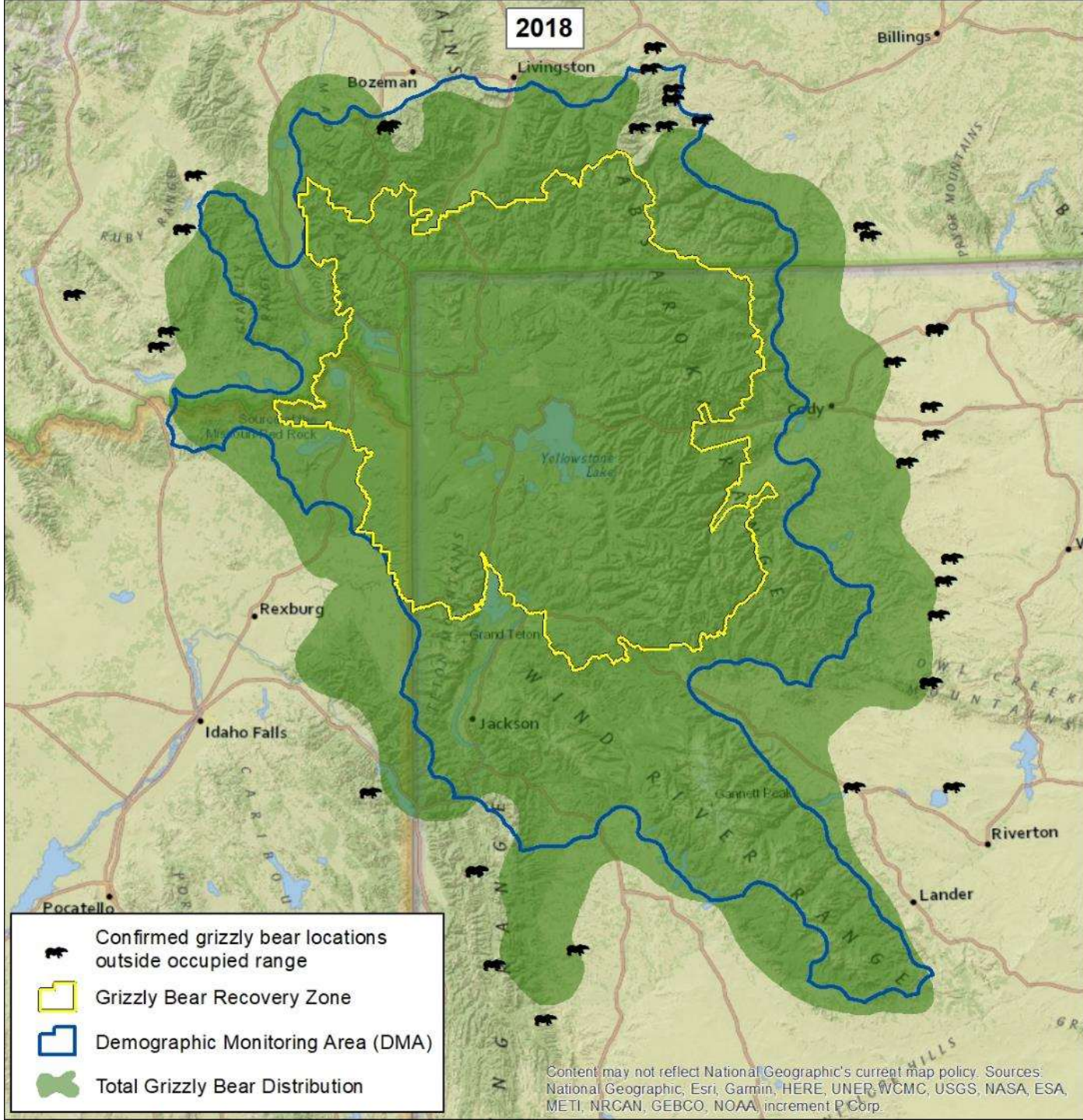
Nearest-neighbor grid cells, 2004- 2018



Kriged density surface, 2004-2018



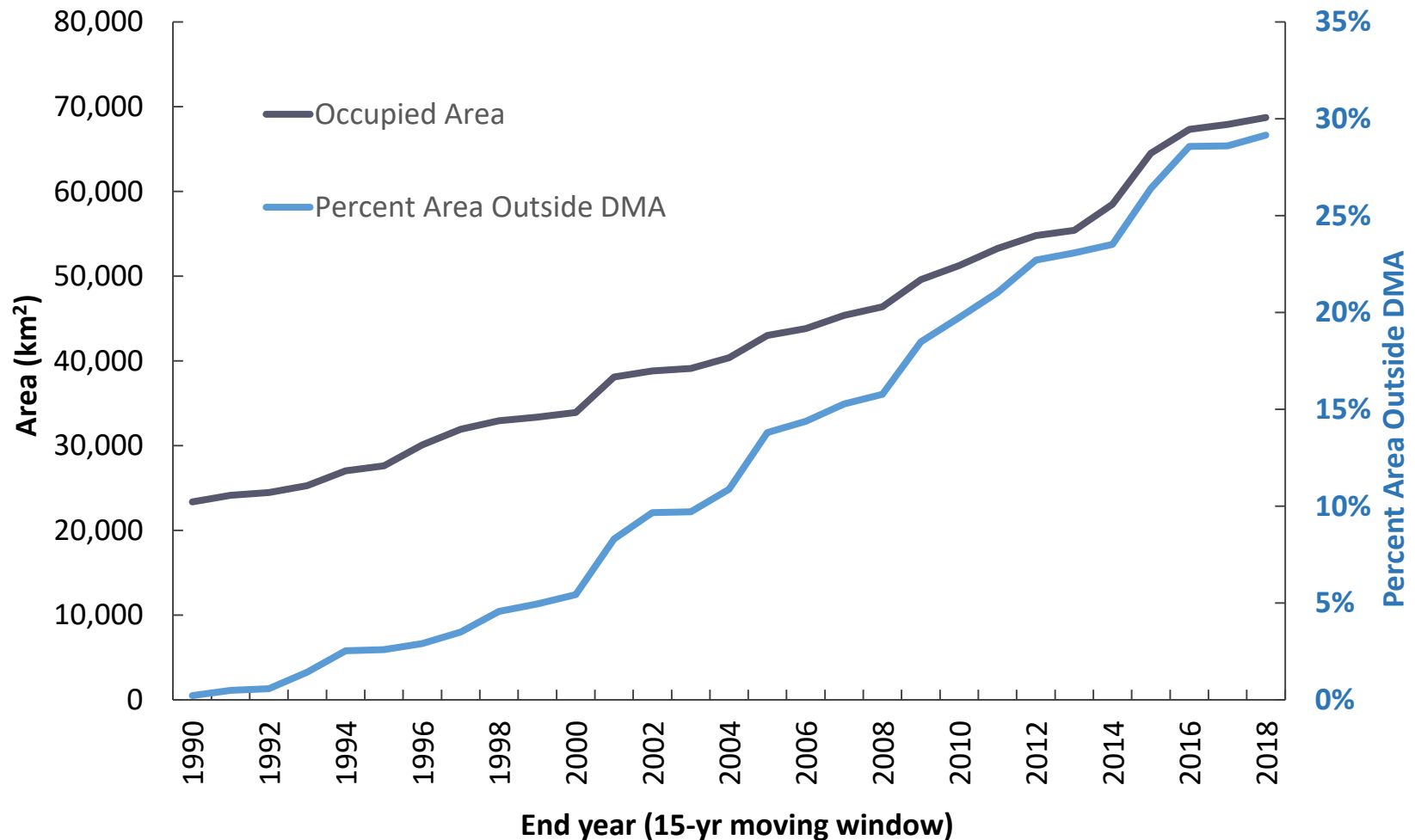
2018



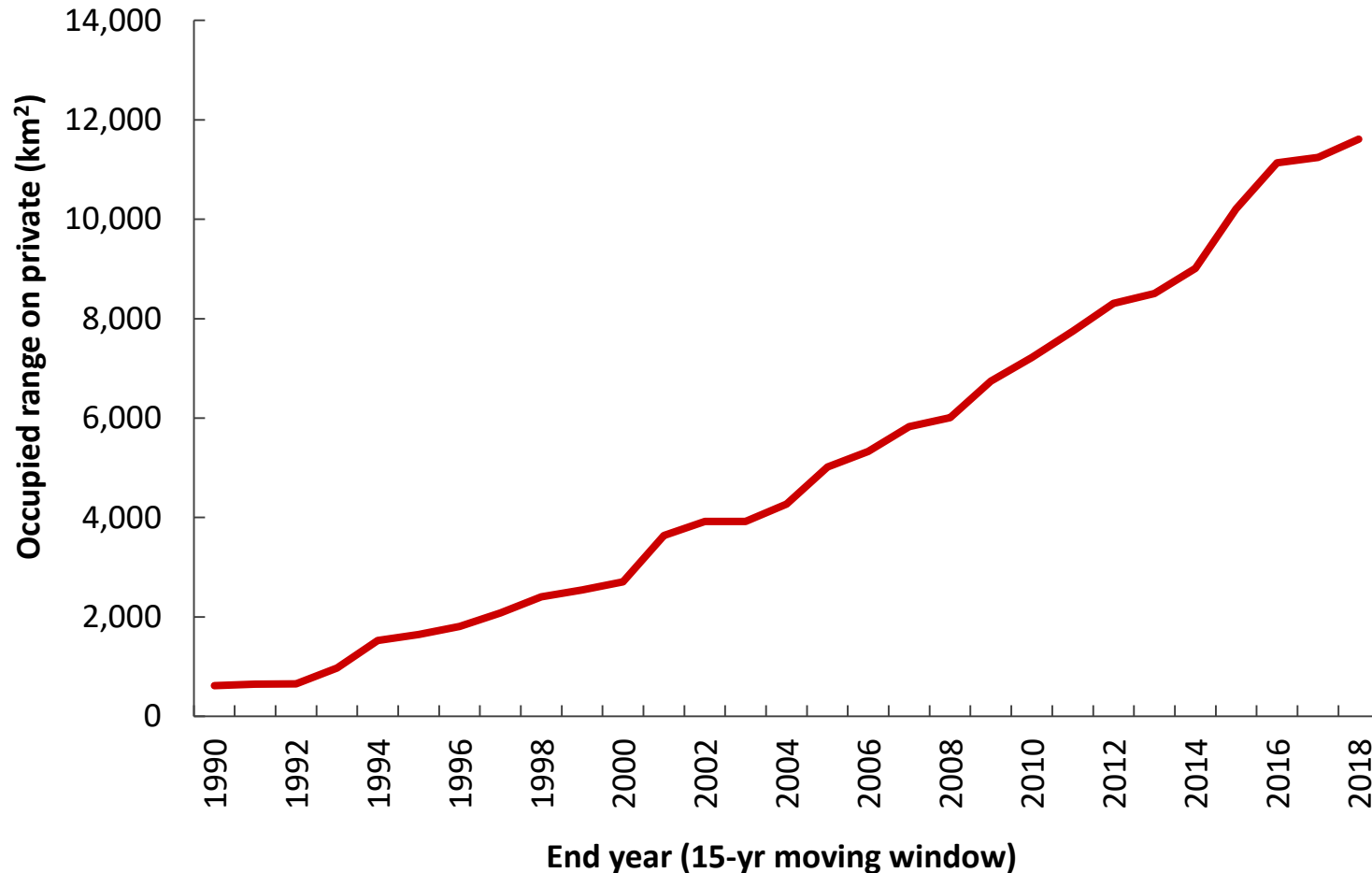
-  Confirmed grizzly bear locations outside occupied range
-  Grizzly Bear Recovery Zone
-  Demographic Monitoring Area (DMA)
-  Total Grizzly Bear Distribution

Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNER, WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Occupied grizzly bear range and percent outside DMA 1990-2018

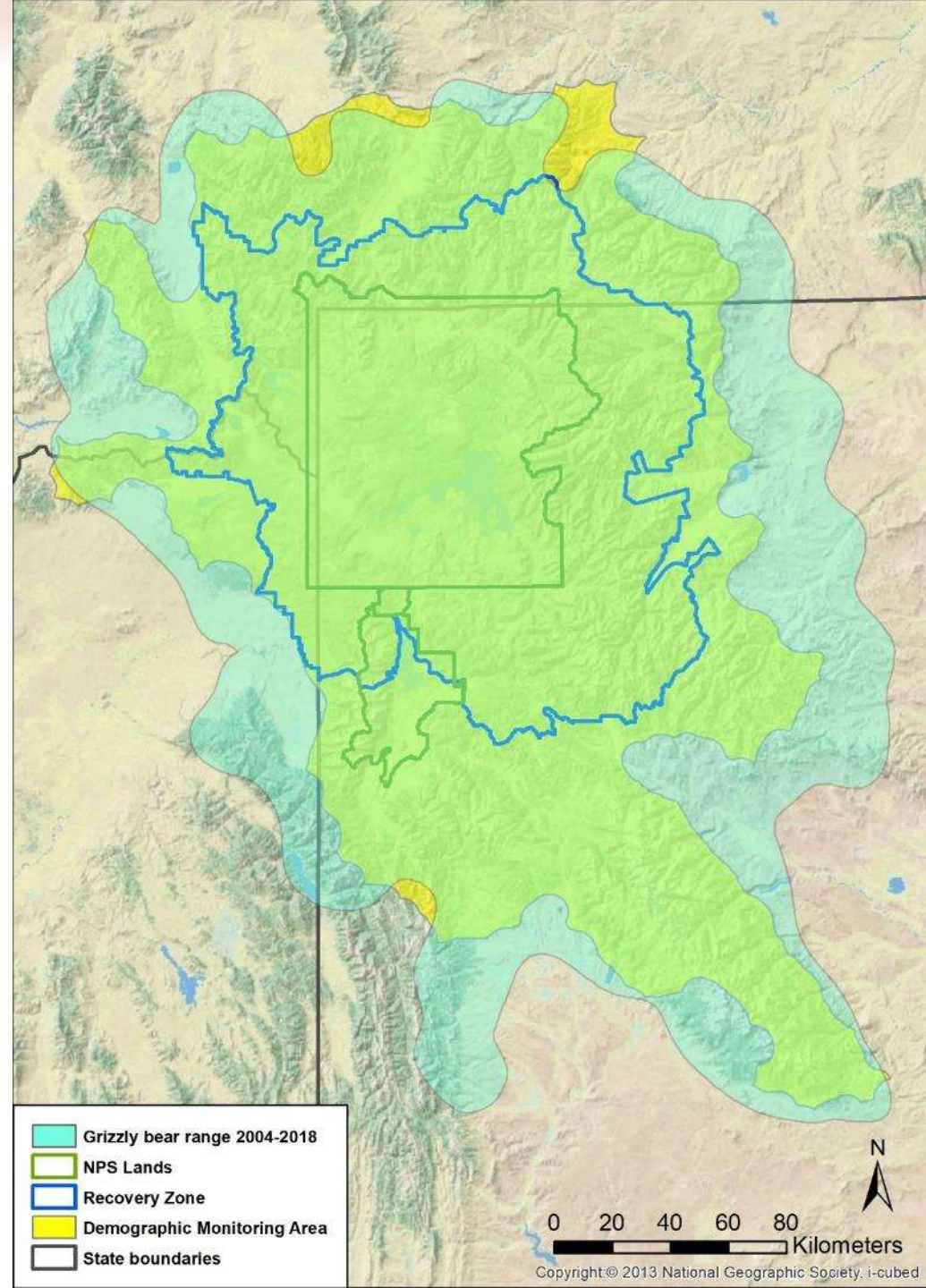


Occupied grizzly bear range and private land 1990-2018



Greater Yellowstone Ecosystem

- Occupied range (2004-2018) = 68,736 km²
 - 98% of DMA occupied
 - 30% outside the DMA
 - ~12,000 km² private land



Grizzly bear distributions and outliers

