

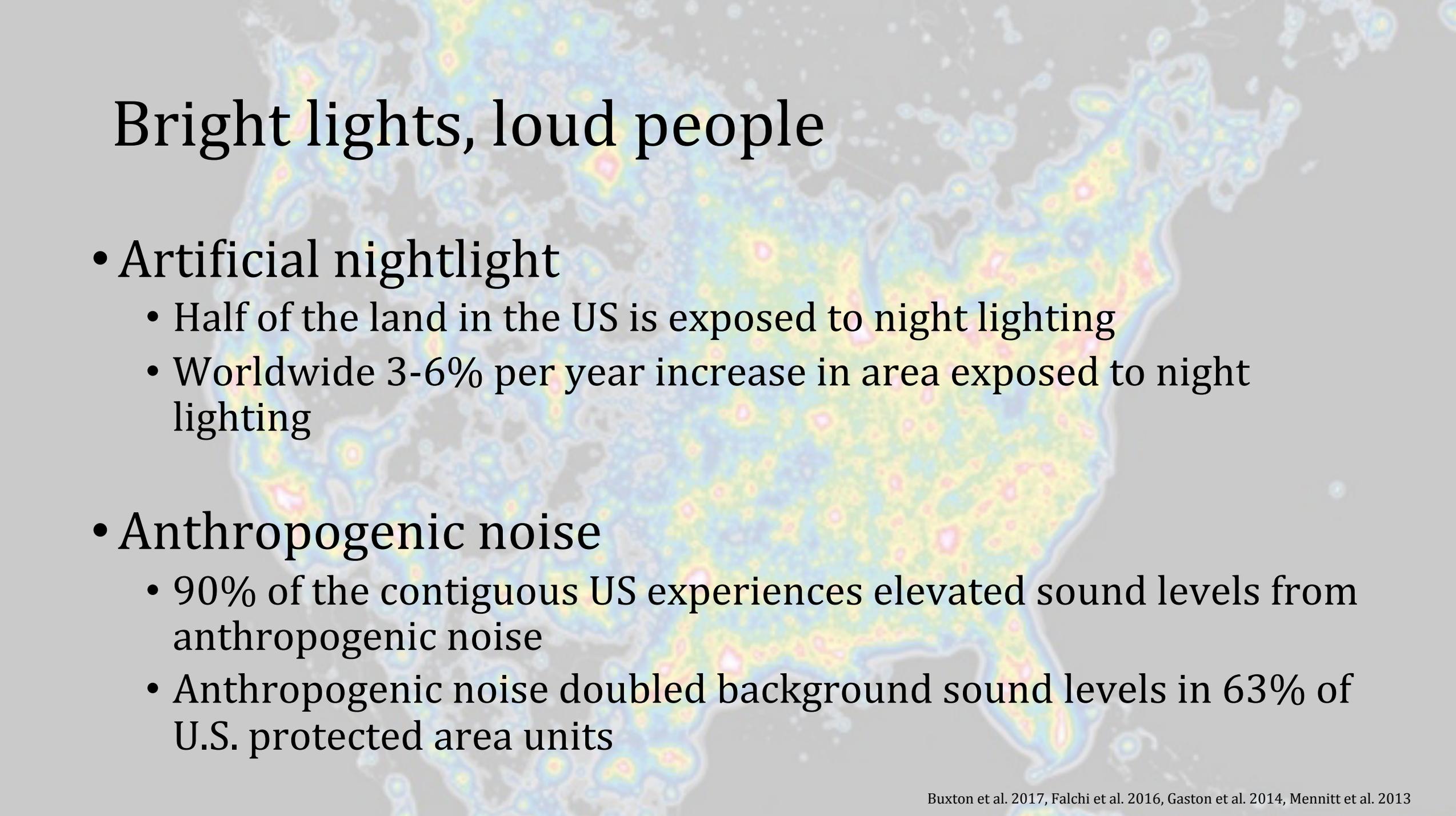
**Using NASA resources to better inform  
wildlife conservation in the  
Anthropocene: Spatially predicting  
impacts of anthropogenic nightlight and  
noise on wildlife habitat integrity across  
the contiguous United States**

NASA Ecological Forecasting Project 2017-2021

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Partners: National Park Service Natural Sounds and Night Skies Division

# Bright lights, loud people



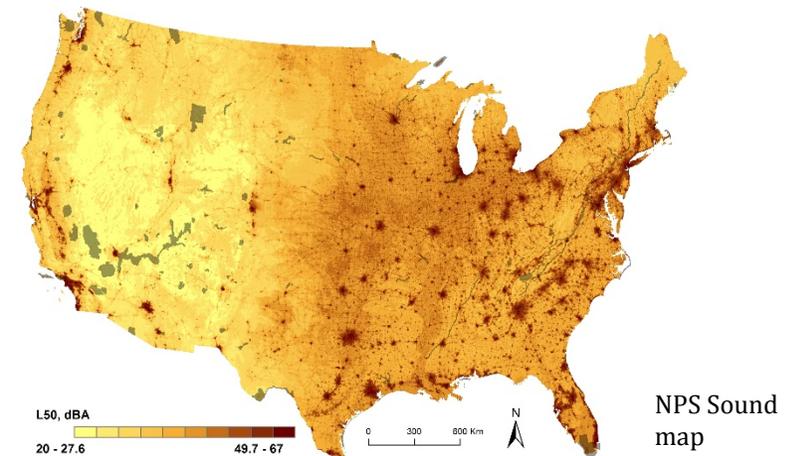
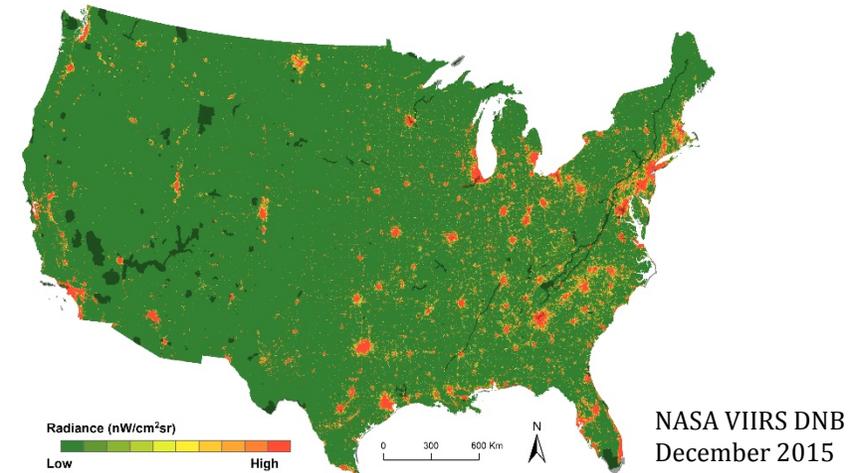
- Artificial nightlight
  - Half of the land in the US is exposed to night lighting
  - Worldwide 3-6% per year increase in area exposed to night lighting
- Anthropogenic noise
  - 90% of the contiguous US experiences elevated sound levels from anthropogenic noise
  - Anthropogenic noise doubled background sound levels in 63% of U.S. protected area units

# Importance of light and sound regimes

- Wide-ranging effects
  - Fitness-related behaviors
  - Create barriers to animal movement through otherwise good habitat
  - Convert some wildlife populations from sources to sinks
  - Diminish species richness
- Mitigating these negative effects is major activity of the NPS Natural Sounds and Night Skies (NS<sup>2</sup>) Division (end user)

# Linking micro to macro

- Combine new insights from behavioral and sensory ecology with large scale data and spatial analyses
- Integrate NASA VIIRS day-night band and NPS (soundscape) data
- Contiguous US and protected-area centered ecosystems



# Phases

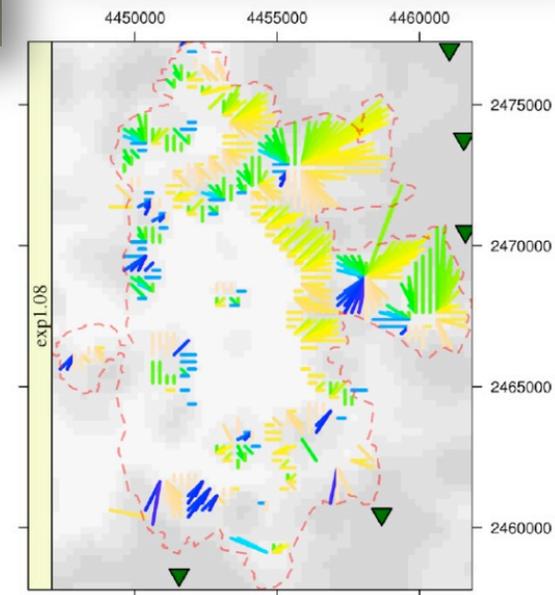
- Generate spatially-explicit risk indices for species with different sensitivities to anthropogenic nightlight and noise (ANLN)
- Spatially predict the quantitative impacts of ANLN risk on wildlife habitat quality and connectivity
- Facilitate transfer of products to the NPS end-user and their inter-agency partners, evaluate management options, and forecast benefits



Dave Keeling



Mountainlion.org



Marcantonio et al. 2015

# Outreach & dissemination

- Reach millions of park visitors through educational programs and interpretative signs, websites, and other outreach venues
- Spatially-explicit predictions of wildlife habitats at risk useful in outreach programs

