Act Green

A near-real time integrated mapping and reporting system for re-wilding efforts: extending a model from tigers (*Panthera tigris*) to lions (*Panthera leo*), jaguars (*Panthera onca*), and American bison (*Bison bison*)

Act Green

PI: Eric Sanderson (WCS)
Co-I: Volker Radeloff (Univ. of Wisconsin), Jon Paul Rodriguez (IUCN SSC), Dennis Jorgensen (WWF)
Postdoc: Ruusa Magano-David (UW)
Named Personnel: [Kim Fisher (WCS)], Charles Yackulic (USGS), Jamie Sanderlin (USFS), Urs and Christine Breitenmoser (IUCN Cat Specialst Group), Sandra Petrone (WWF-Mexico); Luke Hunter (WCS)
Consultants: Dustin Sampson (USGS), Nathaniel Robinson, Samantha Nicholson (African Lion Databank)

GOALS FOR ActGreen

1. Measure the effectiveness of rewilding efforts, intentional or not:
   Restoration and Survey Landscapes → Conservation Landscapes

2. Forecast future habitat availability under different scenarios:
   Human Footprint scenarios → Species Landscapes

3. Advance remote sensing approach with consistent and rapidly-updated metrics
   Go faster! Increase the frequency of analysis

4. Parameterize, validate, distribute and popularize models for jaguar, lion, and bison
   Adapt the tiger system so that it is relevant for 3 other species on 3 other continents

5. Ensure adoption by end-users

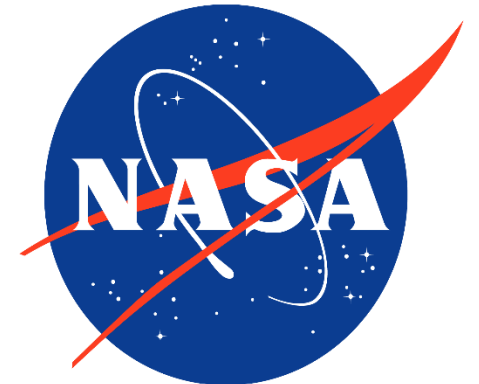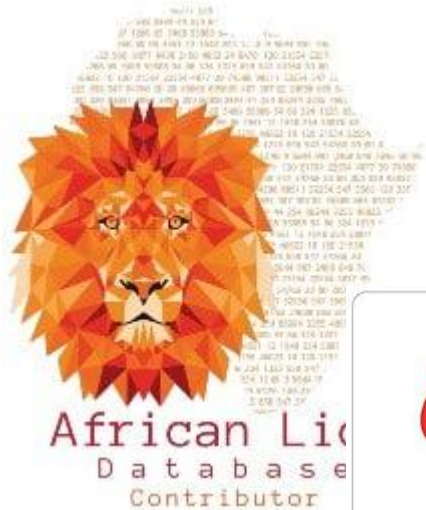   Integrate the outputs into the decisions/assessments made by core users and partner organizations

PRIMARY END-USERS

+ partners in governments, non-profits and civil society

PROJECT PARTNERS

A Near Real-time Monitoring System for Tiger (*Panthera tigris*) Conservation (TCL 3.0)

Google Earth Engine

Analytical steps

Indigenous range map – defines area of interest (AOI)

Time frame of the analysis – defines length of time series

Structural habitat
- What defines habitat?
- What remotely sensed / other inputs can be used to make those maps?

Effective potential habitat
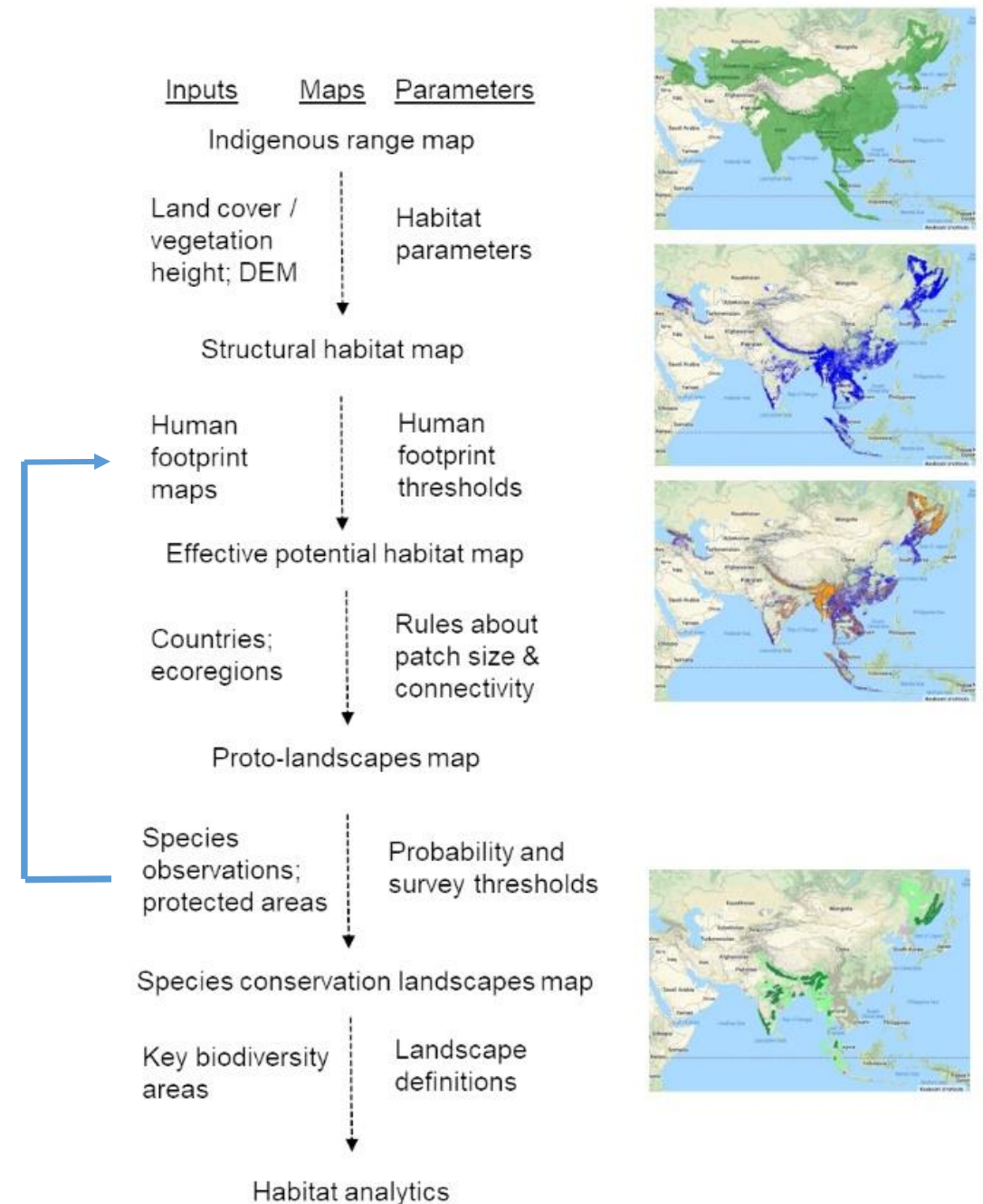- How are human beings interacting with the species?
- Where are the human beings?

Patch size and connectivity
- What is a minimum patch size to be relevant to this species?
- What distances can be so easily crossed for two patches to be considered connected?
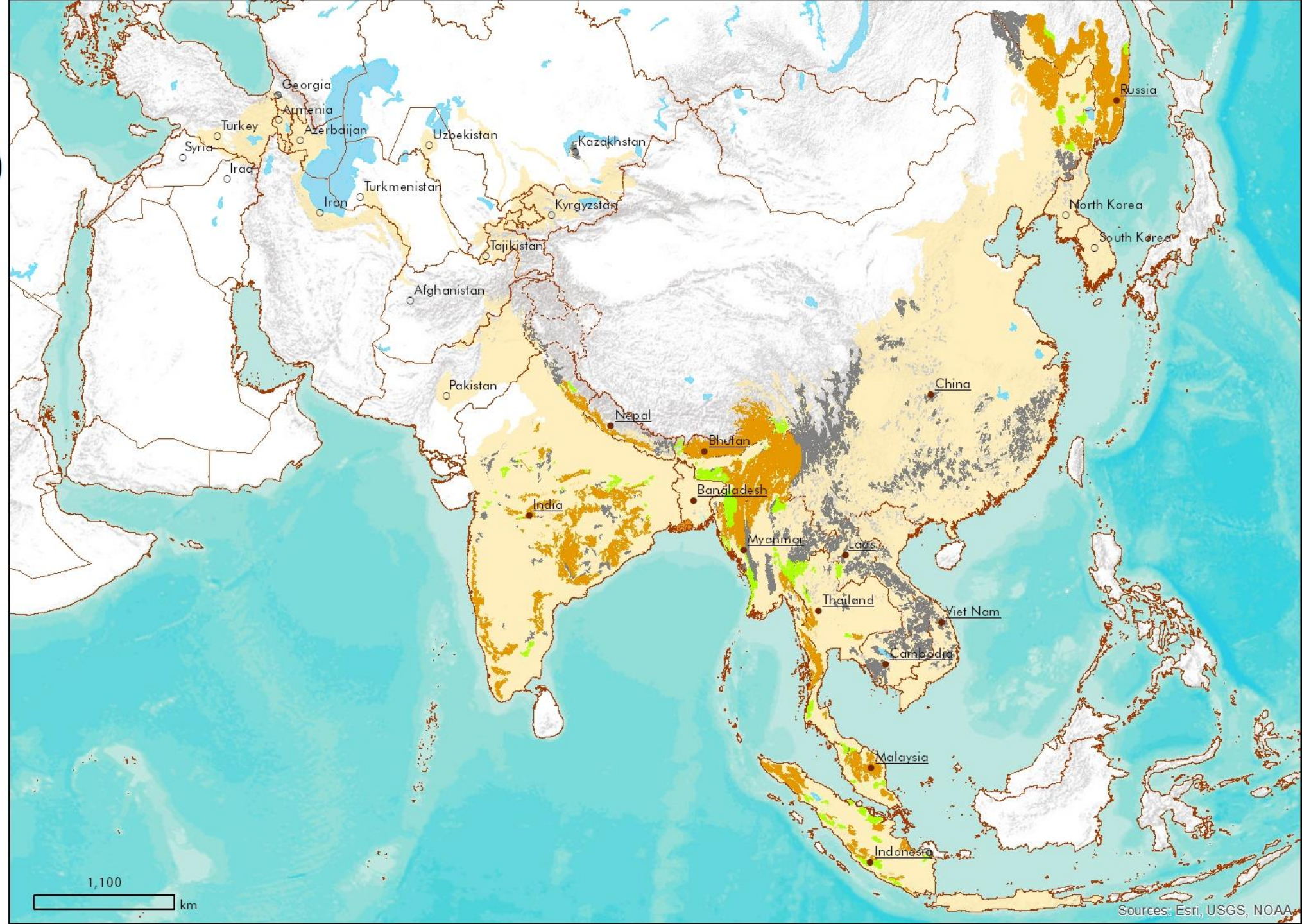
Species observations
- Where and when was the species surveyed?
- Where was it observed?

Figure 1. Schematic diagram of the species conservation landscape process.

Inputs   Maps   Parameters

Indigenous range map

Land cover / vegetation height; DEM   Habitat parameters

Structural habitat map

Human footprint maps   Human footprint thresholds

Effective potential habitat map

Countries; ecoregions   Rules about patch size & connectivity

Proto-landscapes map

Species observations; protected areas   Probability and survey thresholds

Species conservation landscapes map

Key biodiversity areas   Landscape definitions

Habitat analytics

Tiger Conservation Landscapes 3.0

Tiger range countries

Former tiger range countries

Landscapes 2020-01-01

- restoration
- restoraton fragment
- species
- species fragment
- survey
- survey fragment
- indigenous range

Tiger range information based on data shared by government agencies for purposes of the TCL 3.0 analysis or in the public domain. Political boundaries are shown for reference and do not imply endorsement by the US government, NASA, WCS or any project participants.

1,100

km
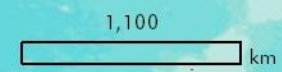
Sources: Esri, USGS, NOAA

Communication at multiple scales using common metrics

Species Conservation Landscapes

Country-Level Conservation

Regional Tiger Conservation

Global Tiger Conservation

Update

Advisory committee: Christine Breitenmoser (IUCN Cat Specialist Group); Robert Wallace (WCS); Ronaldo Morato (Centro Nacional de Pesquisa e Conservação de Mamíferos Carnívoros); Włodek Jędrzejewski (indepedent researcher); Jeffrey Thompson (independent researcher); Sandra Petrone (WWF Mexico); Luke Hunter (WCS); Salom Roberto (Panthera); Melissa Arias (WWF)

Inputs	Status
Indigenous range	*Completed:* Adapted from Sanderson et al. (2002), modified based on Sanderson et al. (2021)
Structural habitat	*First Draft:* ESA CCI land cover; SRTM; forest change
Potential effective habitat	*Plan:* Use human footprint thresholds (per tigers)
Proto-landscapes	*Plan:* Use same rules as tigers
Species observations	*Agreement in principle to use:* Antunes et al. (2022) – Amazonian camera trap db; Thompson et al. (2020) – Radio-tracking database; Jędrzejewski et al. (2018) – Jaguar *ad hoc* observations db

Update

Inputs	Status
Indigenous range	*In process:* Adapted from Martin et al. (2022)
Structural habitat	*First Draft:* ESA CCI land cover (grasslands; open forests); SRTM (elev., slope); productivity (NDVI)
Potential effective habitat	*In discussion:* Fencing, bison as "livestock"
Proto-landscapes	*In discussion*
Species observations	*Agreement in principle to use:* Plumb et al. (in review) IUCN Red List assessment; USDA Agricultural Census... more synthesis required

Update

Advisory committee: Christine Breitenmoser (IUCN Cat Specialist Group); Paul Funston (independent researcher); Amy Dickman (Oxford Univ.); Andrew Loveridge (Oxford Univ.); Hans Bauer (Oxford Univ.); Samantha Nicholson (African Lion Databank); Luke Hunter (WCS); Phil Henschel (Panthera)

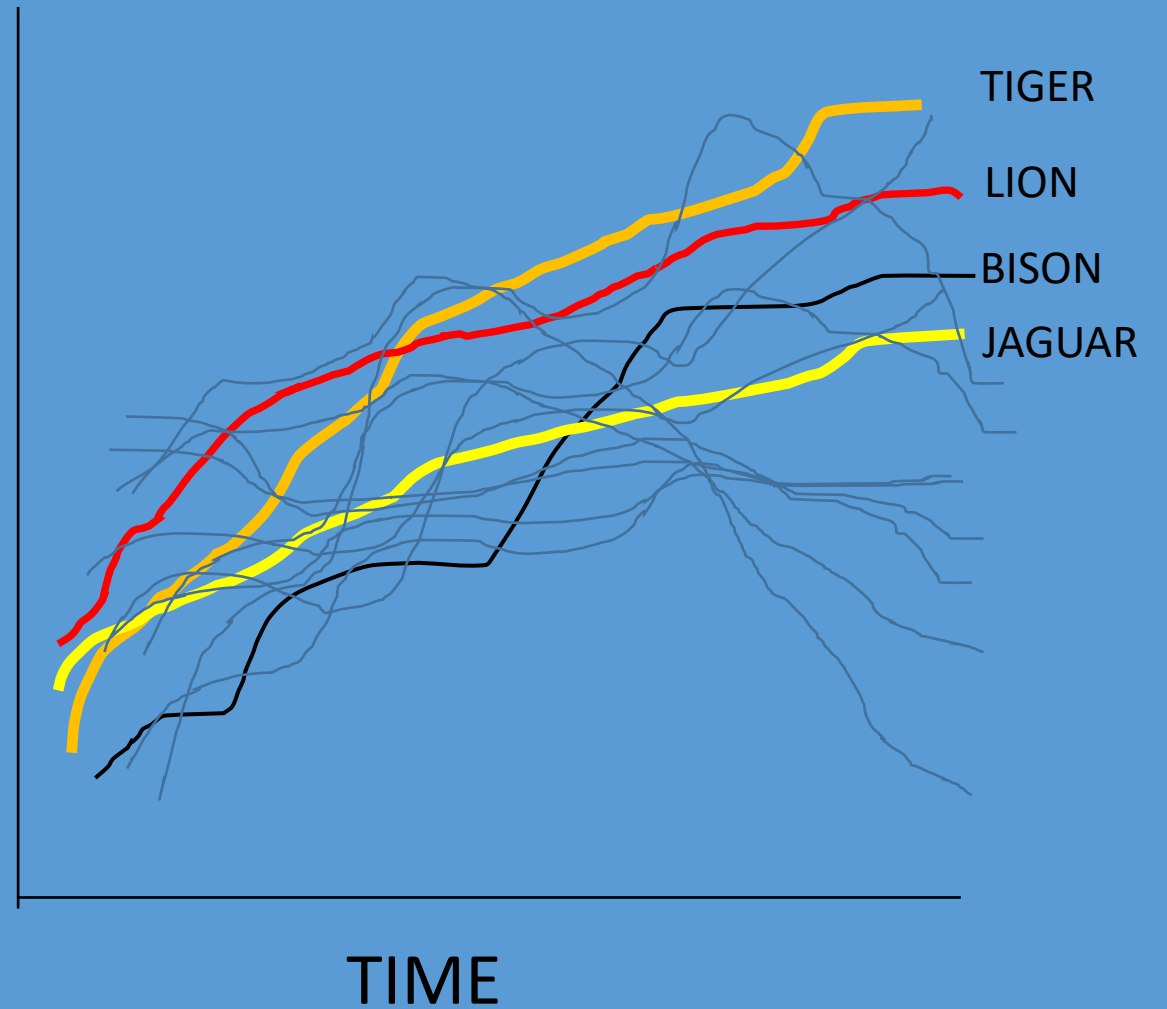| Inputs	Status
Indigenous range	*In process:* Adapted from Panthera historical range
Structural habitat	*First Draft:* ESA CCI land cover (open ecosystems)
Potential effective habitat	*Plan:* Use human footprint thresholds (per tigers)
Proto-landscapes	*Plan:* Use same rules as tigers
Species observations	*Agreement in principle to use:* African Lion Databank

Act Green

A near-real time integrated mapping and reporting system for re-wilding efforts: extending a model from tigers (*Panthera tigris*) to lions (*Panthera leo*), jaguars (*Panthera onca*), and American bison (*Bison bison*)