A Near-real-time Integrated Mapping and Reporting system for Critical Biodiversity Sites under Sustainable Development Goal 15: the tiger as model

NASA Grant Number 80NSSC19K0201.
Sustaining Living Systems in a Time of Climate Variability and Change

Project team

PI: Eric Sanderson (WCS)

Co-PI: Dale Miquelle (WCS), Matt Hansen (UMD)

Technical team: Kim Fisher (WCS), Chris Clark (Pomona College), Adam Duncan (WCS), Jesse Moy (consultant), Karina Moy (volunteer), Peter Potapov (UMD), Timothy O'Brien (WCS), Hugh Robinson (Panthera), Mari Roberts (NYU), Nathaniel Robinson (Panthera), Lucinda Royte (WCS), Dustin Sampson (SparkGeo), Jamie Sanderlin (USFS), Charles Yackulic (USGS)

Advisors: Mike Beleky (WWF), Liz Bennett (WCS), Urs & Christine Breitenmoser (IUCN-SSC Cat Specialist Group), Stuart Chapman (WWF Intl.), Peter Clyne (WCS), Dechen Dorji (WWF), Elisa Facchini (IUCN), John Goodrich (Panthera), Thomas Gray (WWF), Molly Grace (University of Oxford), Abishek Harihar (Panthera), Luke Hunter (WCS), Margaret Kinnaird (WWF Intl.), Matt Linkie (WCS), Douglas MacMillan (University of Kent), Willy Marthy (WCS), Deborah Martyr (FFI), John Robinson (WCS), Sogoto Roy (IUCN), Joe Walston (WCS), Karen Wood (Panthera),

Data contributors/reviewers: Zahangir Alom (WCS), Vidya Athreyea (WCS), Pranav Chanchani (WWF), David Cooper (University of Edinburgh), Jathanna Devcharan (WCS), Alex Diment (WCS), Will Duckworth (independent researcher), Kaveh Faiziolahi (Mohitban Society), Evan Greenspan (Wildlife Asia), Peter Greengross (independent researcher), U Saw Htun (WCS), Aili Kang (WCS), Andrew Kitchner (National Museum of Scotland), Pyae Phyoe Kyaw (WCS), Barney Long (ReWild), Tony Lynam (WCS), Jiji Mazak (independent researcher), Minh Nguyen (Colorado State University), Katya Nikolaeva (WCS), Grigory Mazmaniants (WWF), Clara Montgomery (Wildlife Asia), Dusit Ngoprasert (King Mongkut's University of Technology), Stephane Ostrowski (WCS), Anak Pattanvibool (WCS), Olga Pereladova (WWF), Wulan Pusparini (Univ. Oxford), Akchousanh Rasphone (WCS), Mark Rayan (WCS), Imran Siddiqui (WCS), Santi Saypanya (WCS), Detrit Sittibal (WCS), Rob Steinmetz (WWF), Naruemon Tantipisanuh (KMUTT), Kanchan Thapa (WWF-Nepal), Aiman Wang (WCS), Jhala Yadvendradev (Wildlife Institute of India), Nobuyuki Yamaguchi (independent researcher)

Grants administration: Daniel Collette (WCS), Anastisya Kowal (WCS), Lisa Yook (WCS)

Program: Laura Rogers (NASA), Keith Gaddis (NASA), Woody Turner (NASA)

NGO collaboration in support of the post-2022 GTI process

Our coalition

FAUNA & FLORA INTERNATIONAL · IUCN · PANTHERA · TRAFFIC the wildlife trade monitoring network · WCS · WWF

Our pledge to help secure a viable future for the tiger

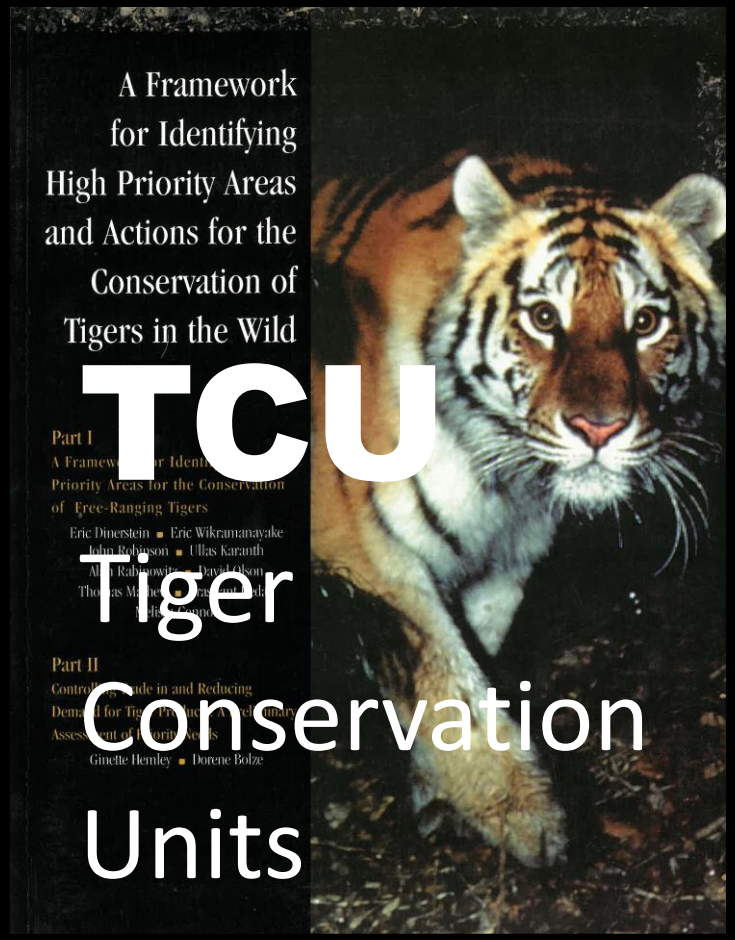
The six non-governmental organisations (NGOs), all closely involved with tiger conservation and strong supporters of the Global Tiger Initiative (GTI) and Global Tiger Recovery Program (GTRP), have come together to share some ideas with the tiger range countries (TRCs) and other members of the Global Tiger Initiative for consideration for the next phase of this ambitious initiative.

15.1. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

Indicator 15.1.1: Forest area as a proportion of total land area

Indicator 15.1.2: Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type

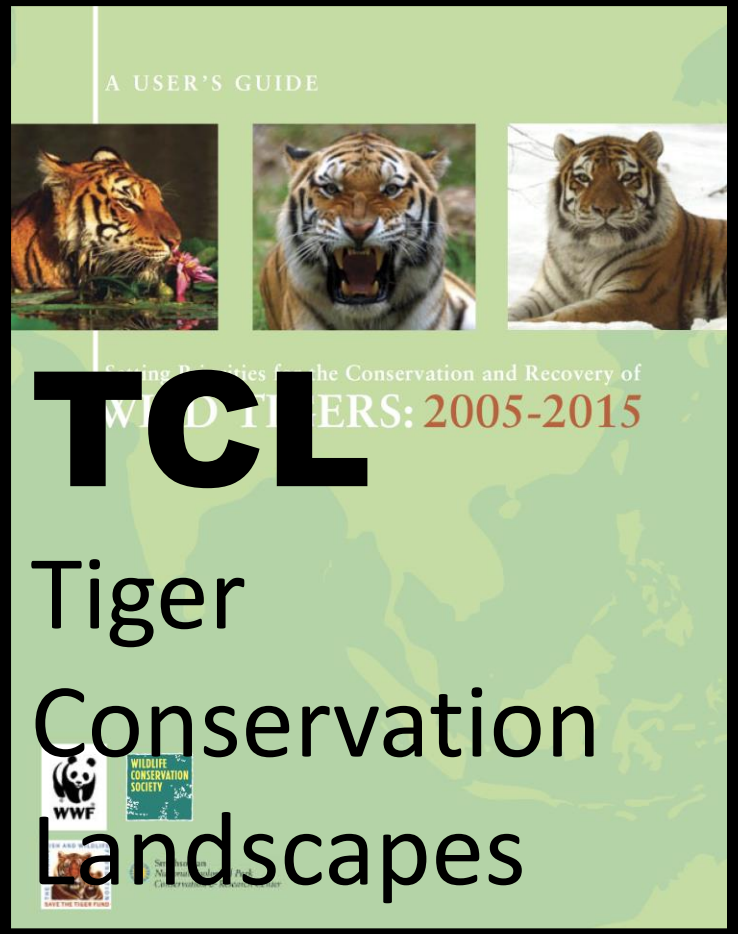
IUCN image catalog / Alex Silwa



TCU

Tiger Conservation Units

Dinerstein E, et al. 1995. A Framework for Identifying High Priority Areas and Actions for the Conservation of Tigers in the Wild. World Wildlife Fund-US, Wildlife Conservation Society, National Fish and Wildlife Foundation's Save the Tiger Fund, Washington D.C.



TCL

Tiger Conservation Landscapes

Sanderson E et al. 2006. Setting priorities for the conservation and recovery of wild tigers: 2005-2015. The Technical Assessment. National Fish and Wildlife Foundation - Save the Tiger Fund, Wildlife Conservation Society and World Wildlife Fund - US, Washington, D.C.

TCL 3.0

But it's so slow…

TCU 1995-2005 → TCL 2005-2015 → 2019?

3 years of GIS work

Another 3 years of data collection & programming

Not-replicable

Code base deprecated

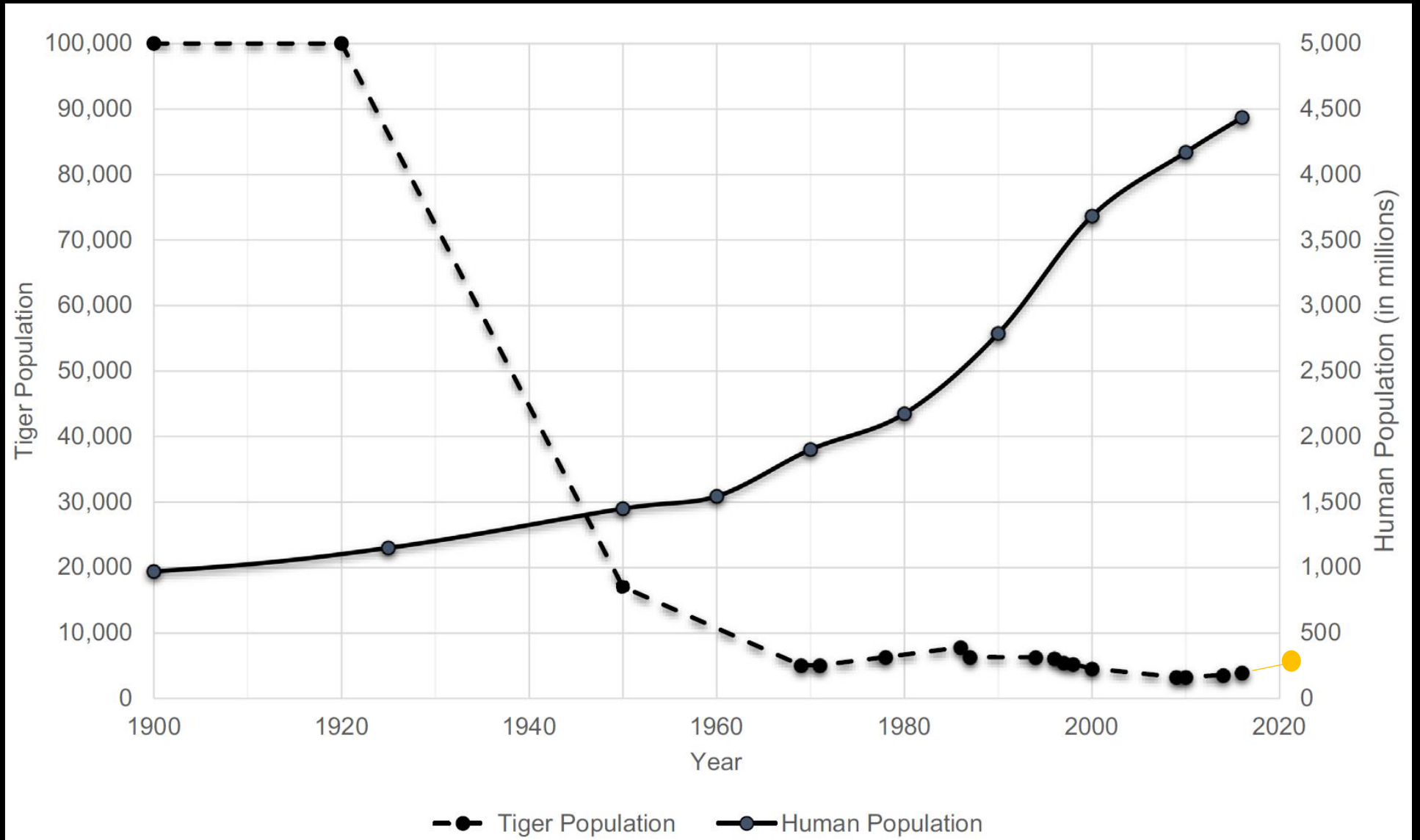
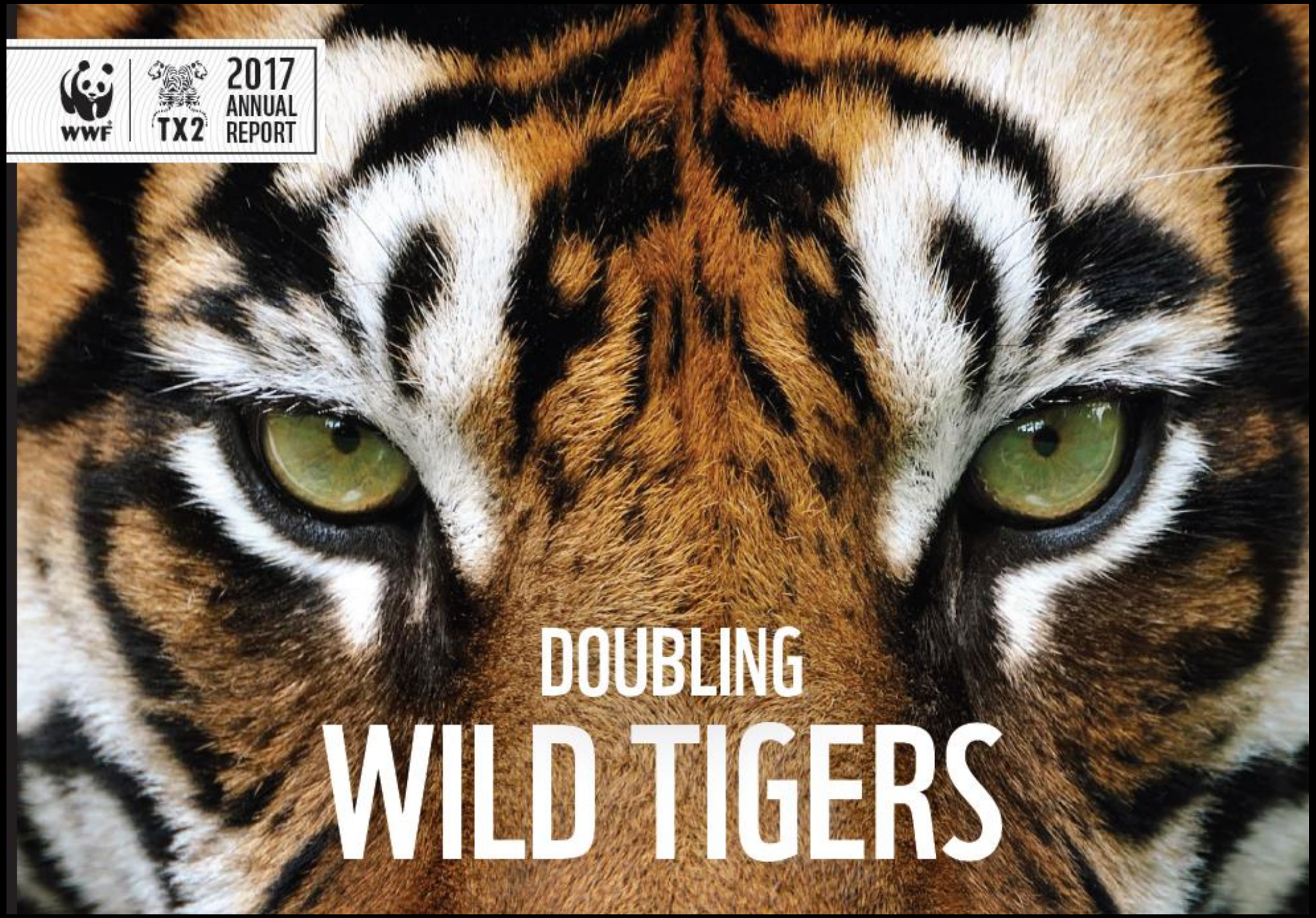


Fig. 1. Populations of people and wild tigers in Asia 1900–2015.

Sanderson et al. 2019. Biological Conservation 231:13–23

An Optimistic Goal, 2012

A Need for Trend Analysis



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?

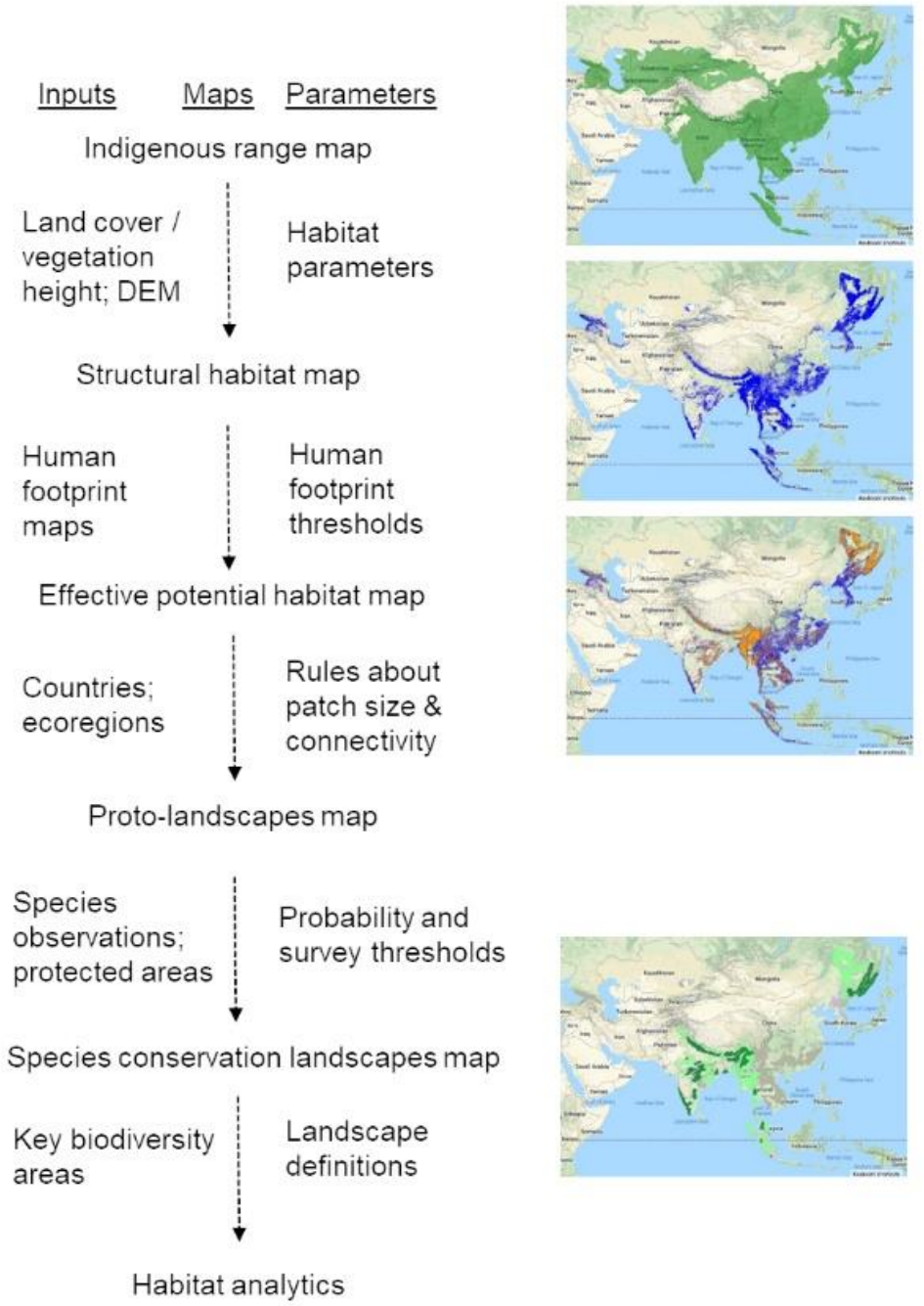
Patch size and connectivity

- 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

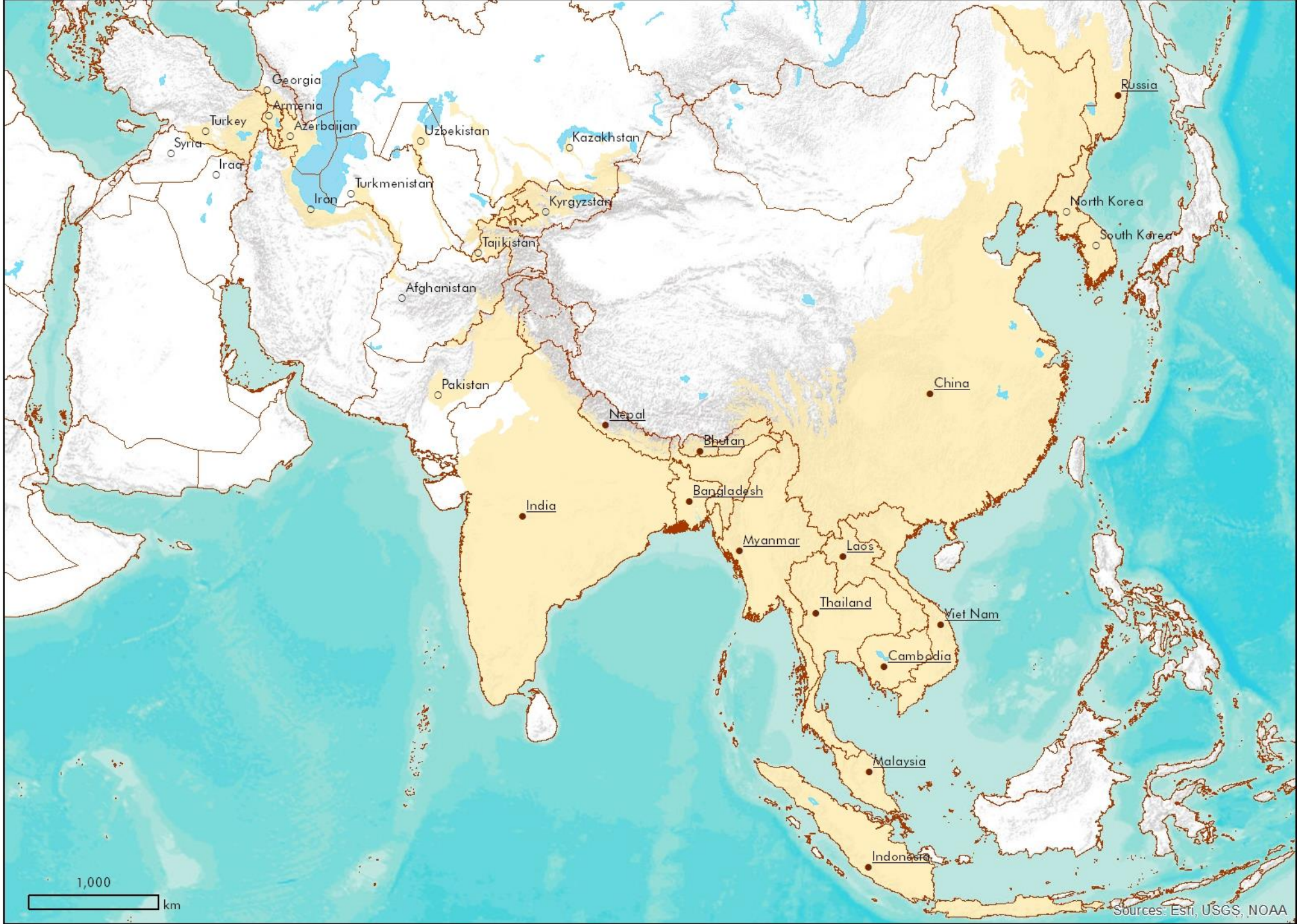
- Where and when was the species surveyed?
- Where was it observed?

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



Tiger Conservation Landscapes 3.0

Indigenous range
Likely resident range



indigenous range

Tiger range countries

Former tiger range countries

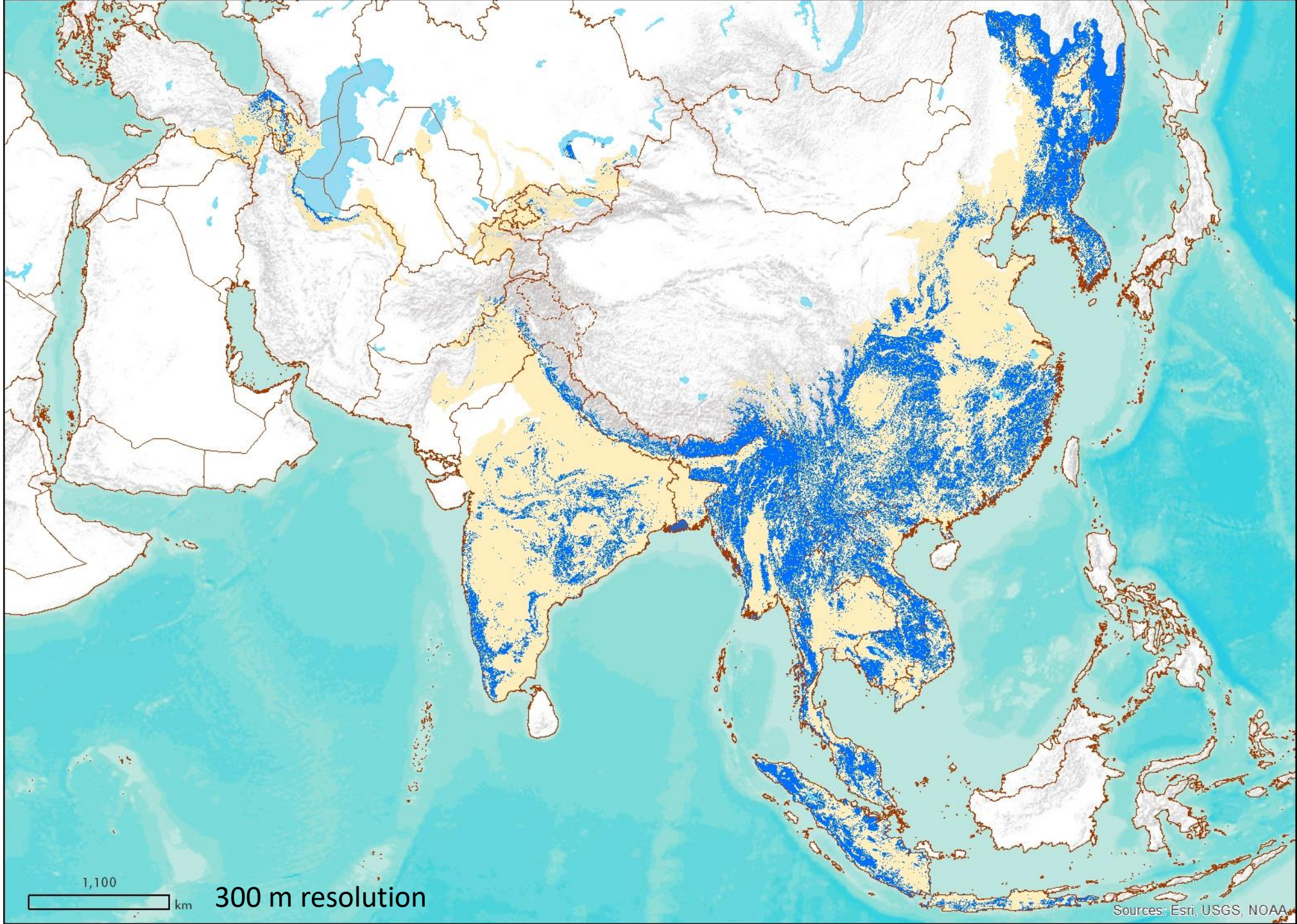
Modern countries

Disputed

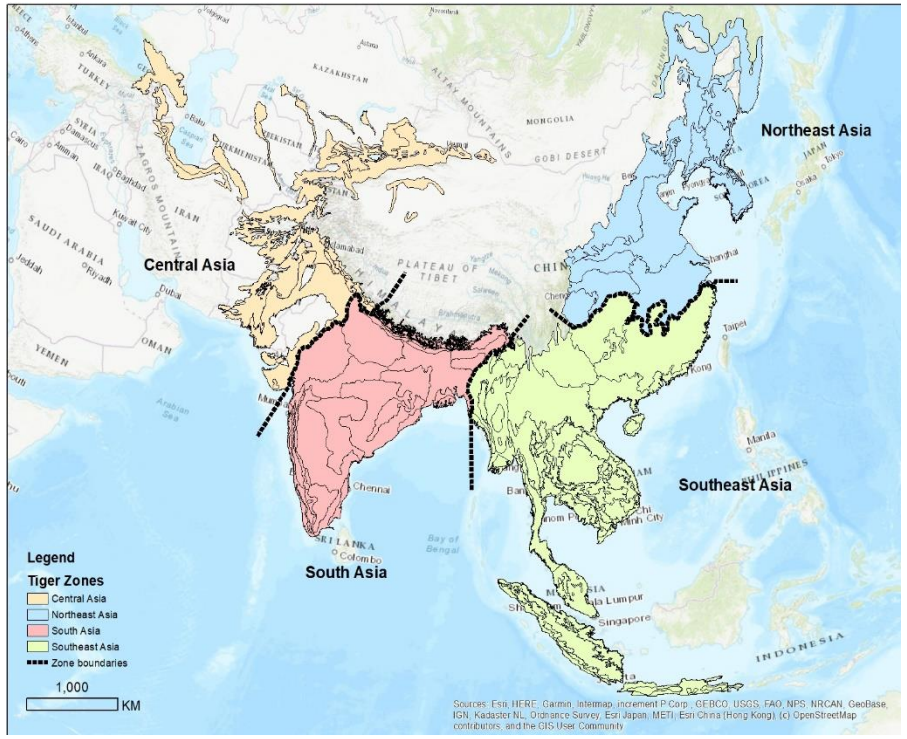
Tiger range information based on data shared by government agencies for purposes of the TCL 3.0 analysis or in the public domain. Political boundaries are shown for reference and do not imply endorsement by the US government, NASA, WCS or any project participants.

Tiger Conservation Landscapes 3.0

Structural Habitat
2020-01-01



Satellite view: Structural habitat



South Asia = zone 1
Southeast Asia = zone 2
Northeast Asia = zone 3
Central Asia = zone 4

Reclassification table

Elevation thresholds (m)					
Zone 1	Zone 2	Zone 3	Zone 4	Veg height (m)	Land use / land cover
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, evergreen, open (15-40%)
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, evergreen, closed to open (>15%)
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, evergreen, closed (>40%)
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, deciduous, open (15-40%)
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, deciduous, closed to open (>15%)
<4750	<4750	<2150	<2150	0	Tree cover, needleleaved, deciduous, closed (>40%)
<4750	<4750	<2150	<2150	0	Tree cover, mixed leaf type (broadleaved and needleleaved)
<4750	<4750	<2150	<2150	0	Tree cover, flooded, saline water
<4750	<4750	<2150	<2150	0	Tree cover, flooded, fresh or brakish water
<4750	<4750	<2150	<2150	0	Tree cover, broadleaved, evergreen, closed to open (>15%)
<4750	<4750	<2150	<2150	0	Tree cover, broadleaved, deciduous, open (15-40%)
<4750	<4750	<2150	<2150	0	Tree cover, broadleaved, deciduous, closed to open (>15%)
<4750	<4750	<2150	<2150	0	Tree cover, broadleaved, deciduous, closed (>40%)
<4750	<4750	<2150	<2150	0	Tree or shrub cover (Mosaic tree and shrub > 50%)
<4750	<4750	<2150	<2150	> 5 m	Mosaic tree and shrub (>50%) / herbaceous cover (<50%)
<4750	<4750	<2150	<2150	> 5 m	Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%)
<4750	<4750	<2150	<2150	0	Shrubland
<4750	<4750	<2150	<2150	0	Evergreen shrubland
<4750	<4750	<2150	<2150	0	Deciduous shrubland
0	0	0	0	0	Shrub or herbaceous cover, flooded, fresh/saline/brakish water
0	0	0	0	0	Mosaic herbaceous cover (>50%) / tree and shrub (<50%)
0	0	0	0	0	Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%)
0	0	0	0	0	Lichens and mosses
0	0	0	0	0	Herbaceous cover
0	0	0	0	0	Grassland
0	0	0	0	0	Sparse vegetation (tree, shrub, herbaceous cover) (<15%)
0	0	0	0	0	Sparse tree (<15%)
0	0	0	0	0	Sparse shrub (<15%)
0	0	0	0	0	Sparse herbaceous cover (<15%)
0	0	0	0	0	Unconsolidated bare areas
0	0	0	0	0	Urban areas
0	0	0	0	0	Cropland, rainfed
0	0	0	0	0	Cropland, irrigated or postâ€flooding
0	0	0	0	0	Consolidated bare areas
0	0	0	0	0	Bare areas
0	0	0	0	0	Permanent snow and ice
0	0	0	0	0	Water bodies
0	0	0	0	0	No Data

STRM DEM

ESA CCI land cover classes

Landsat derived vegetation height – 5 year interval (Potapov et al. 2021)

Tiger Conservation Landscapes 3.0

Human Footprint =
A proxy for human impacts beneath the canopy

Empty forests

Dmitry Makeev

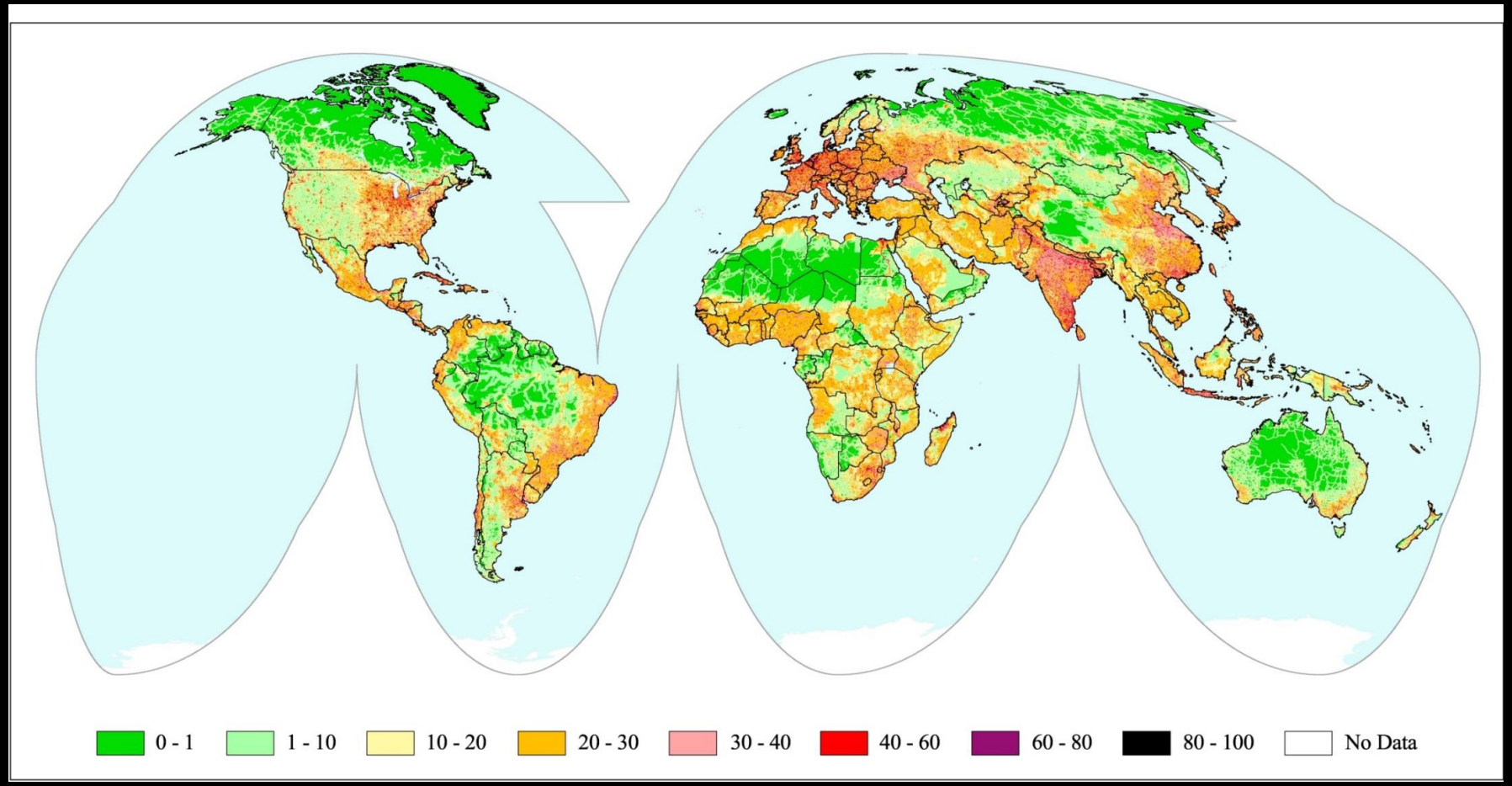
Tomua (2022) The Guardian

Fetch (2022) State of the Planet

Hance (2018) The Guardian

Human Footprint

Population density
Land use
Access
Nighttime lights



~ 1995

Sanderson EW, Jaiteh M, Levy MA, Redford KH, Wannebo AV, Woolmer G. 2002. The human footprint and the last of the wild. Bioscience **52**:891–904.

2009, 2016

Venter O, Sanderson EW, Magrach A, Possingham HP, Small C, Fekete BM, Wood P, Laurance WF, Levy M, Watson JEM. 2016. Sixteen years of change in the global terrestrial human footprint and implications for biodiversity conservation. Nature Communications.

2000, 2001, …

Human Footprint 3.0

Human Footprint v.3.0

Inputs

1st generation

2nd generation

2nd

2nd

2nd

2nd

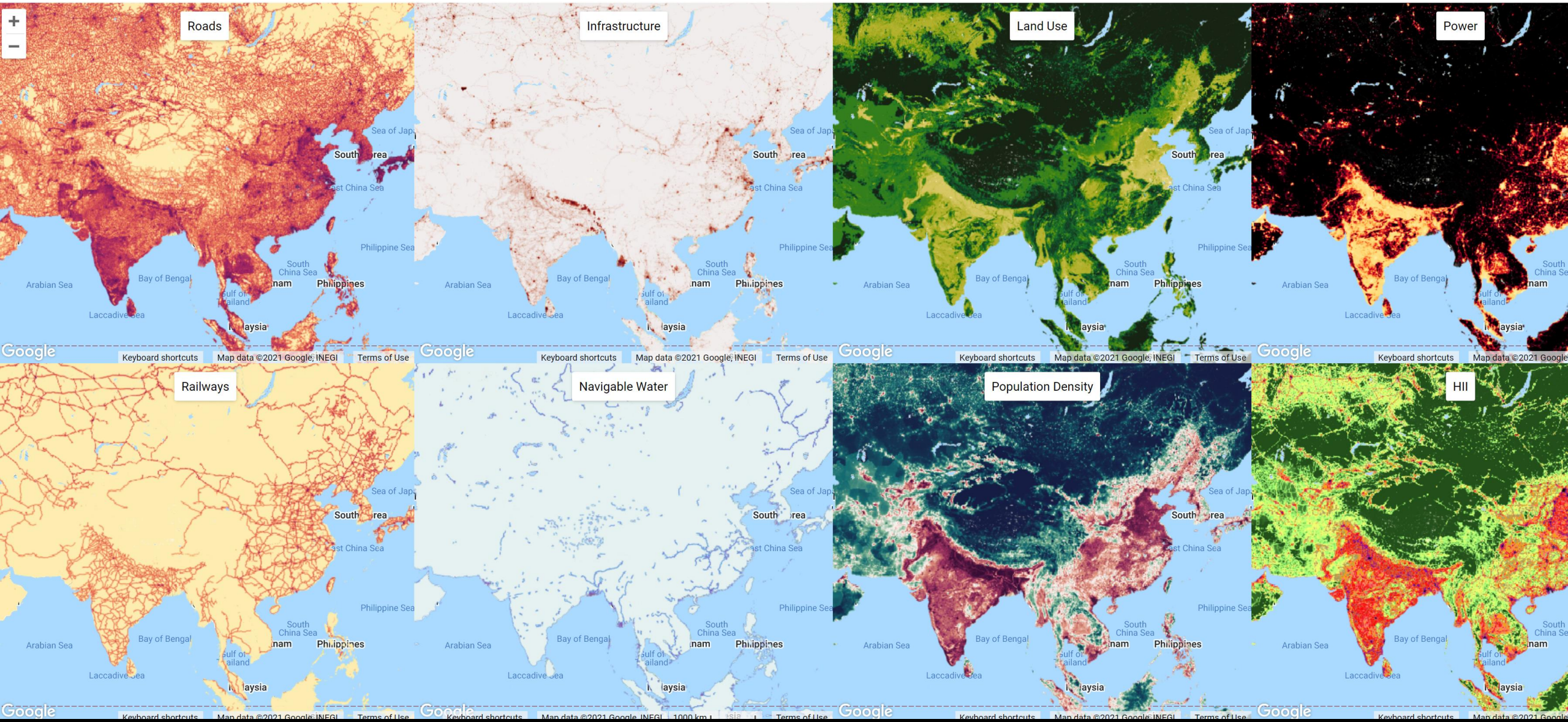
Human influence driver	First Gen.	Second Gen.	Global dataset	Native time period; frequency	Native resol.	Human impact weighting[a]
Population density	√	√	WorldPop[29] Residential Population	2000 – present; annual	100 m	3.333 * log(persons / km^2 + 1); if density > 1000 persons / km^2 → 10
Land Cover	√	√	ESA CCI Land Cover Dataset[30]	1992 – present; annual	300 m	Depends on land cover class and population density; 33 classes[a]
Infrastructure						
… Structures	√	√	Global Human Settlement Layer[28]	2000 – 2014; static	30 m	10
		√	Open Street Map[31]	2012 – present; weekly	Vector	Depends on type; 192 types[a]
… Roads	√	√	gRoads[26]	1980 – 2010; static	Vector	8
		√	Open Street Map[31]	2012 – present; weekly	Vector	Depends on type; 29 types[a]
… Railways	√	√	Vector Map 0[27]	c. 1990 – 2000; static	Vector	Depends on status; 5 classes[a]
		√	Open Street Map[31]	2012 – present; weekly	Vector	Depends on type; 14 types[a]
Accessibility						
… via Populated Coasts	√	√	ESA CCI Water Bodies Map[51]	2000; static	150 m	e^(distance * -0.0003) * 4[b]
… via Navigable Waters	√	√	Global Surface Waters[51]	1984 – present; annual	30 m	e^(distance * -0.0003) * 4[b]
… via Roads	√	√	gRoads[26]	1980 – 2010; static	Vector	e^(distance * -0.0003) * 4[c]
		√	Open Street Map[31]	2012 – present; weekly	Vector	e^(distance * constant) * weight[c]
Power	√		Inter-calibrated stable nighttime lights series from DMSP[32,38]	1992 – 2019; annual	30 arc-seconds	10 equal area quantiles[d] → 0 - 10
		√	Inter-calibrated stable nighttime lights series from VIIRS[33, 38]	2014 – present; annual	15 arc-seconds	10 equal area quantiles[d] → 0 - 10

Earth Engine Apps Experimental

Search places

HII Driver Visualization

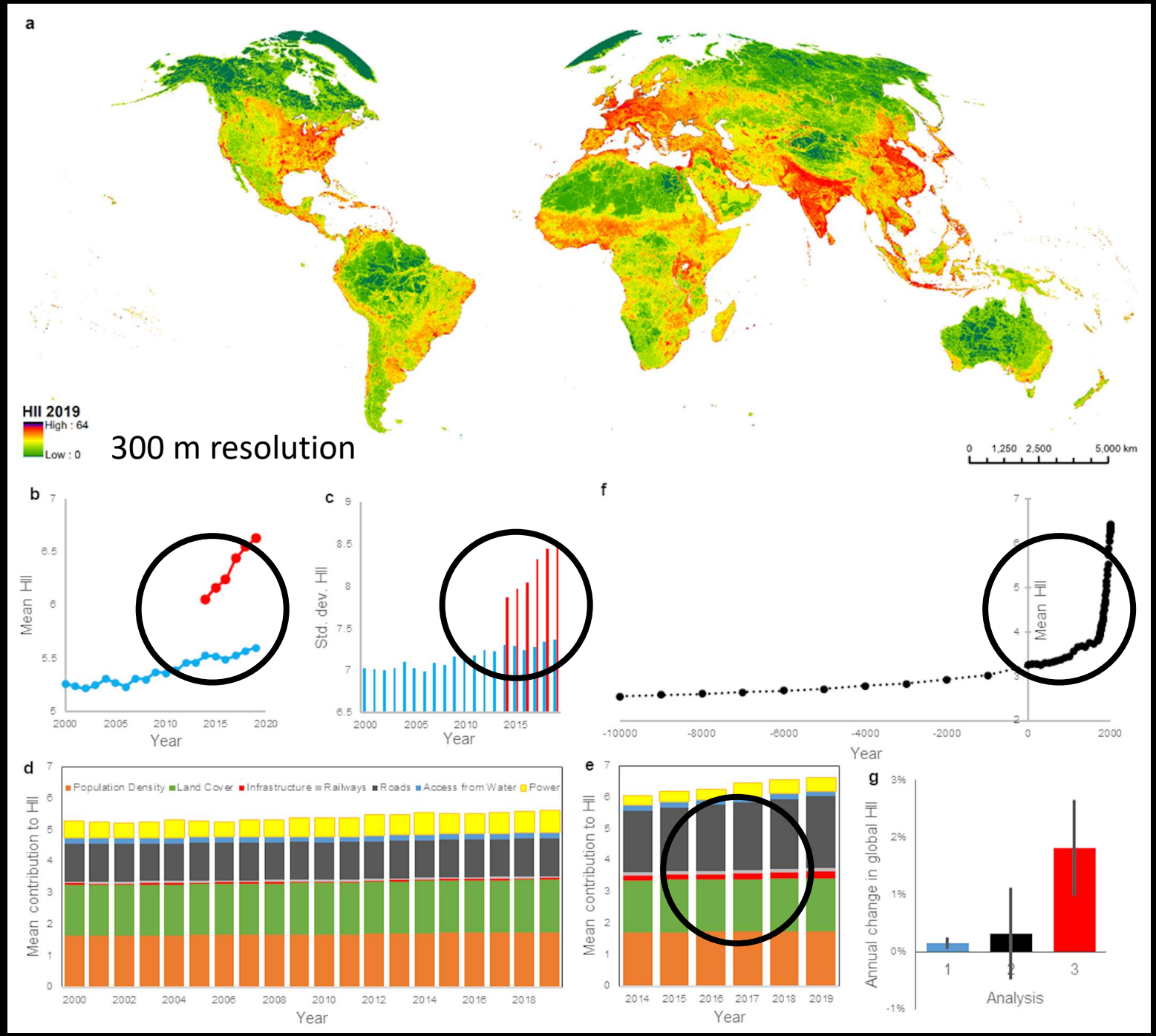
2020



Human Footprint v.3.0

Adding OSM, VIIRS

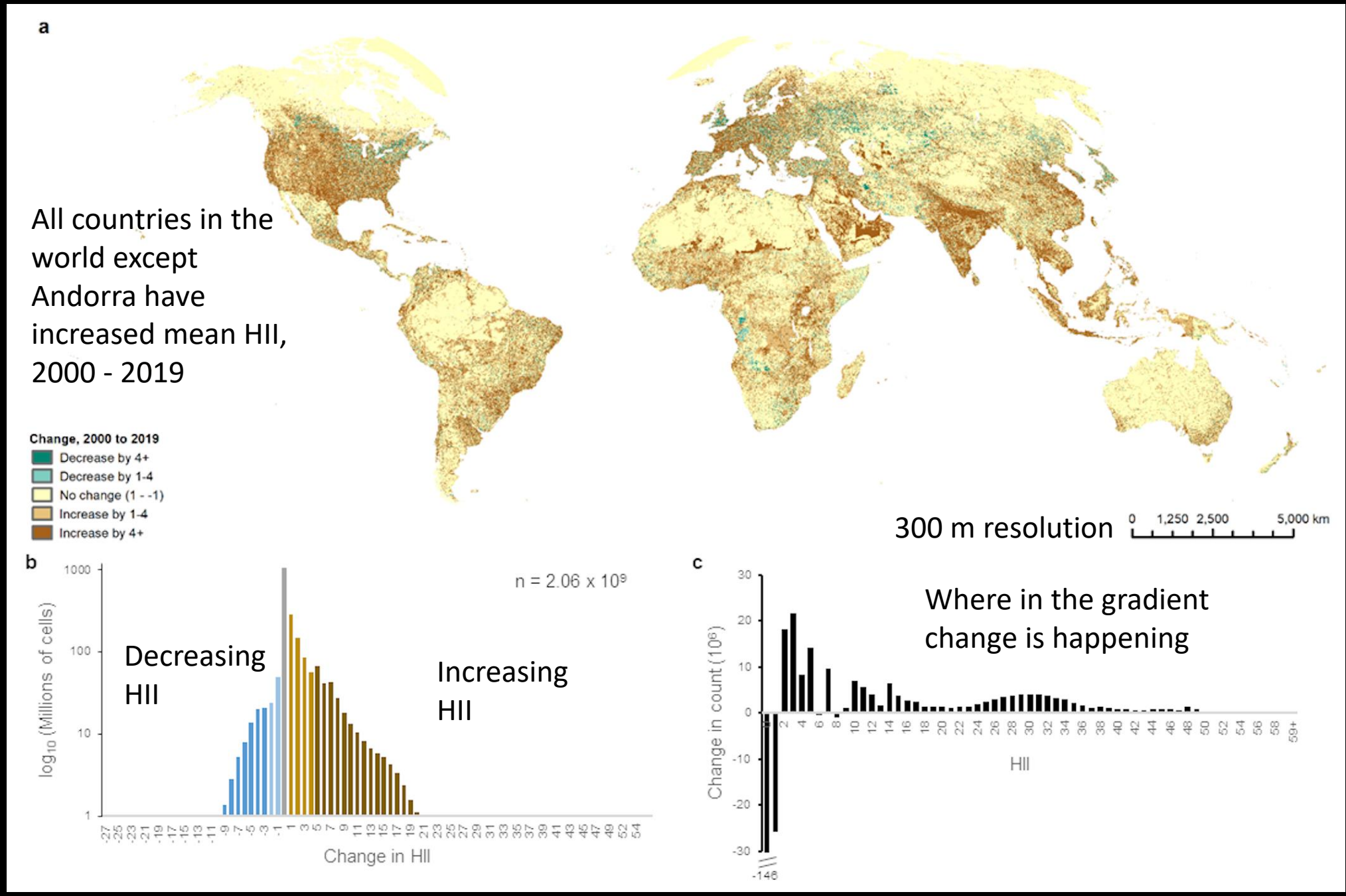
- Increased mean HII
- Increased variation in HII
- Change what drives the pattern
- Suggests that the rate of HII is increasing faster now than ever before



Data access:
https://wcshumanfootprint.org/

Human Footprint v.3.0

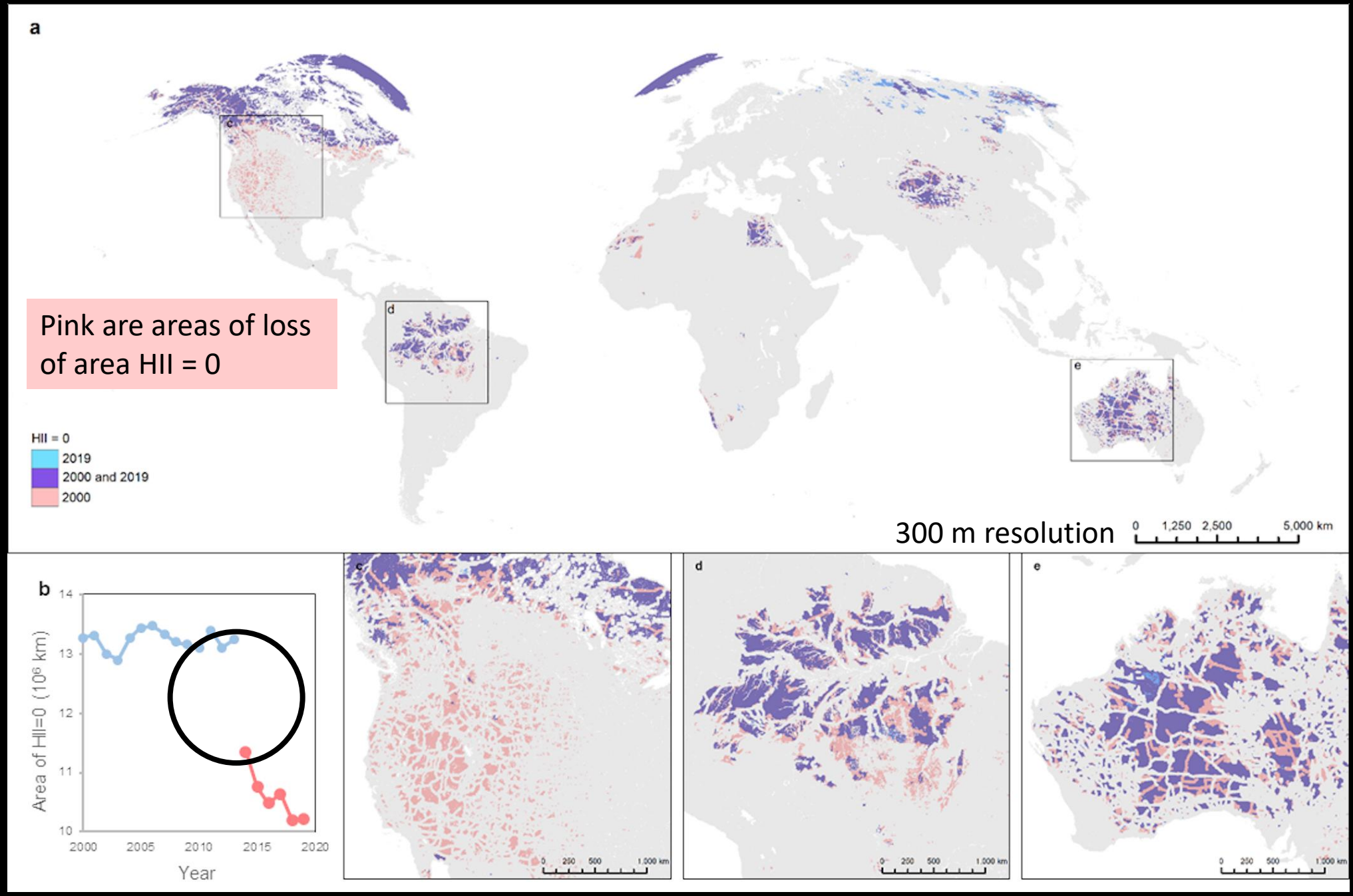
Pixel level changes between 2000 - 2019



Data access:
https://wcshumanfootprint.org/

Human Footprint v.3.0

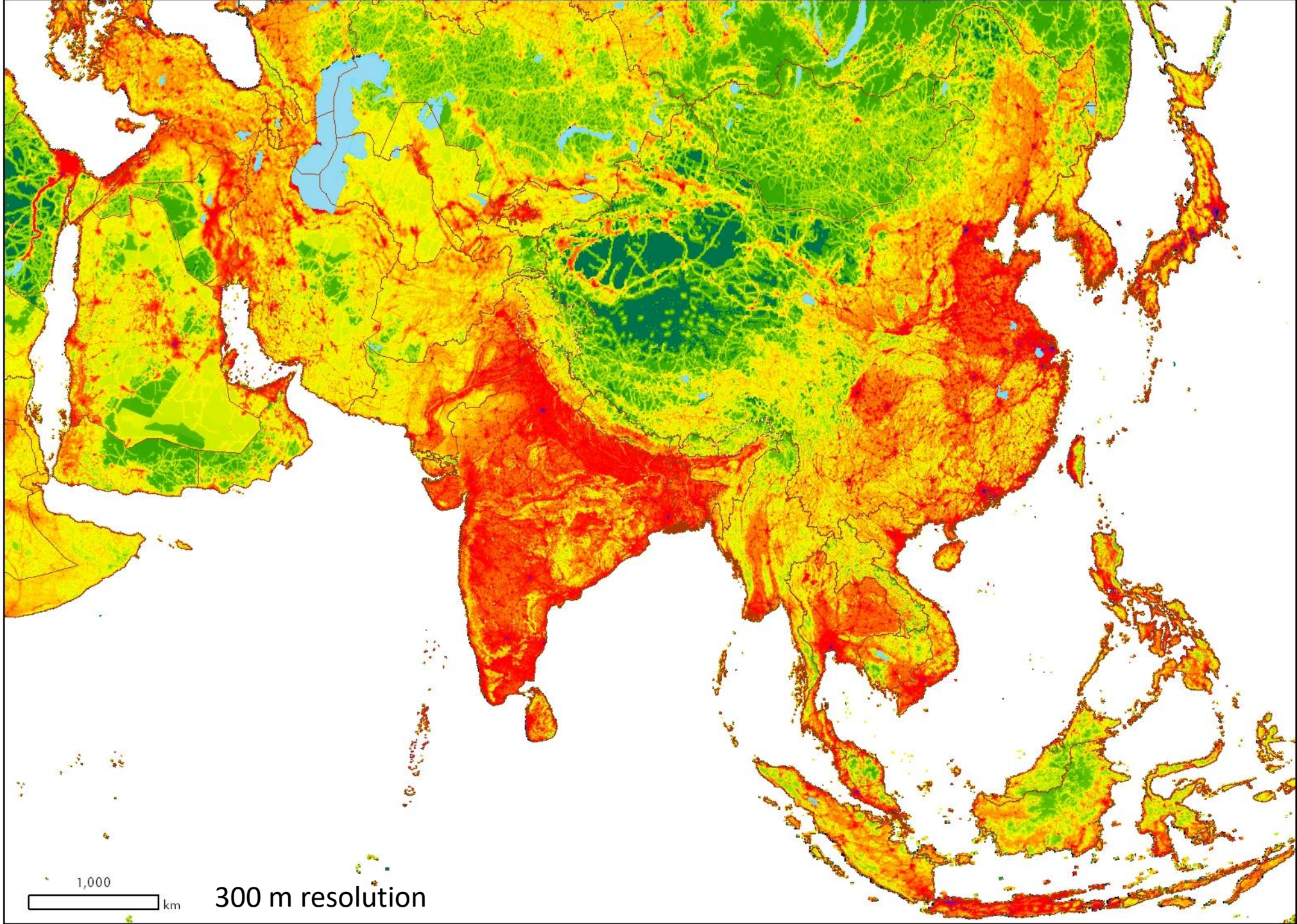
Change in least influenced areas



Data access:
https://wcshumanfootprint.org/

Tiger Conservation Landscapes 3.0

Human Footprint
2020-01-01

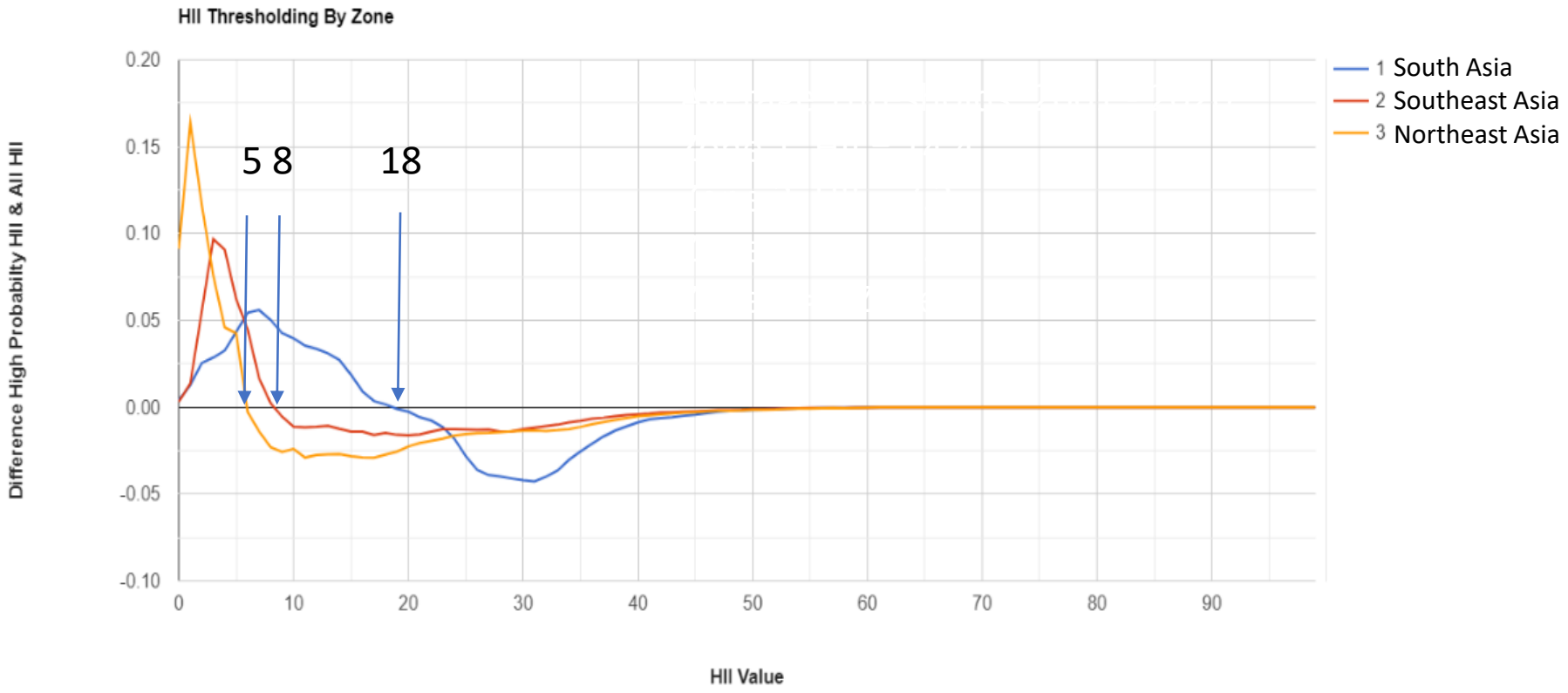


Tiger range information based on data shared by government agencies for purposes of the TCL 3.0 analysis or in the public domain. Political boundaries are shown for reference and do not imply endorsement by the US government, NASA, WCS or any project participants.

Social tolerance for tigers varies by region

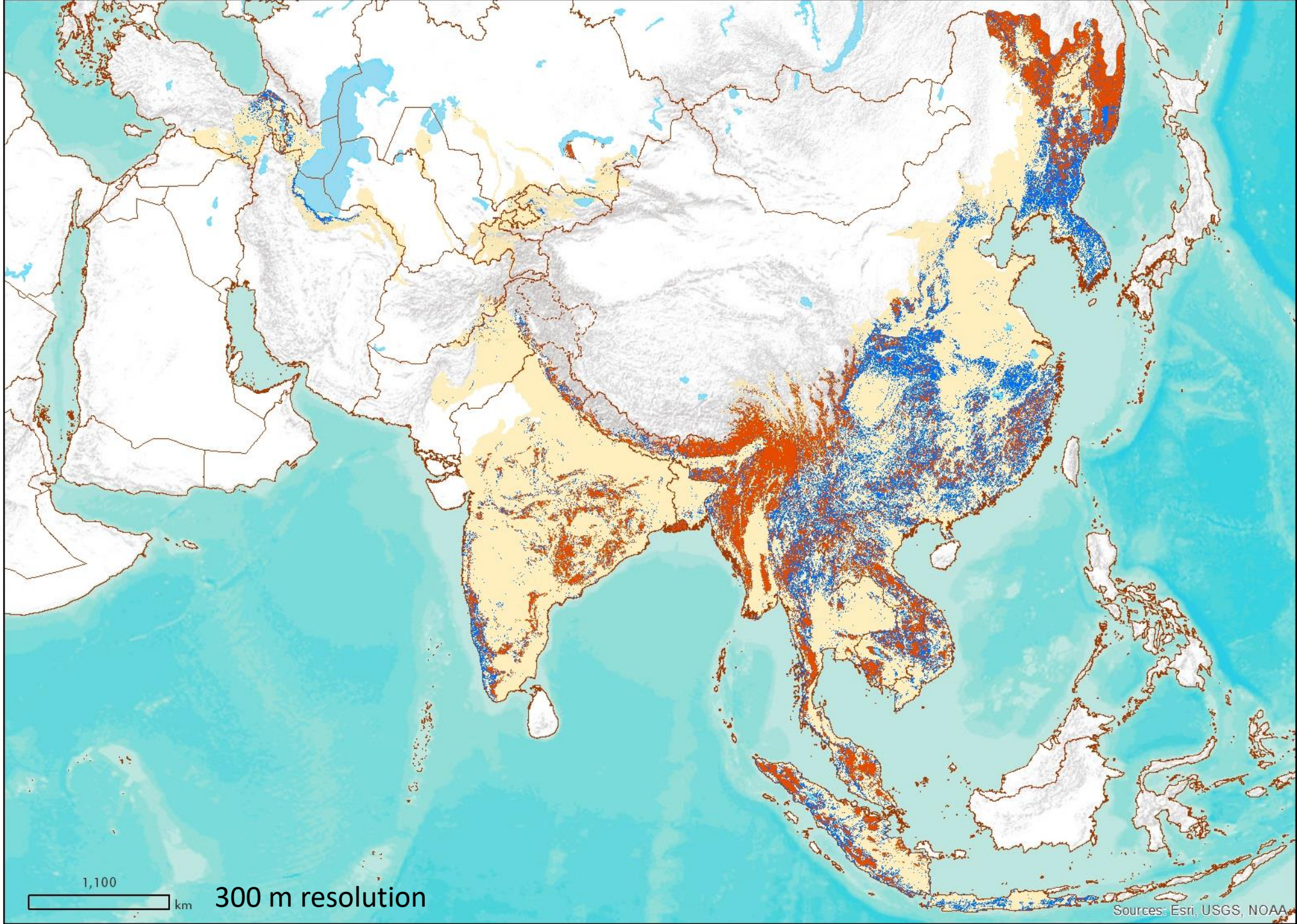
1. Measure HII of positive observations
2. Sample HII in zone without regard to locations
3. Calculate the frequency histogram of HII values for 1. and 2.
4. Subtract the two histograms
5. Find first value where difference crosses 0

Human influence index



Tiger Conservation Landscapes 3.0

Structural Habitat
Effective Potential Habitat
2020-01-01



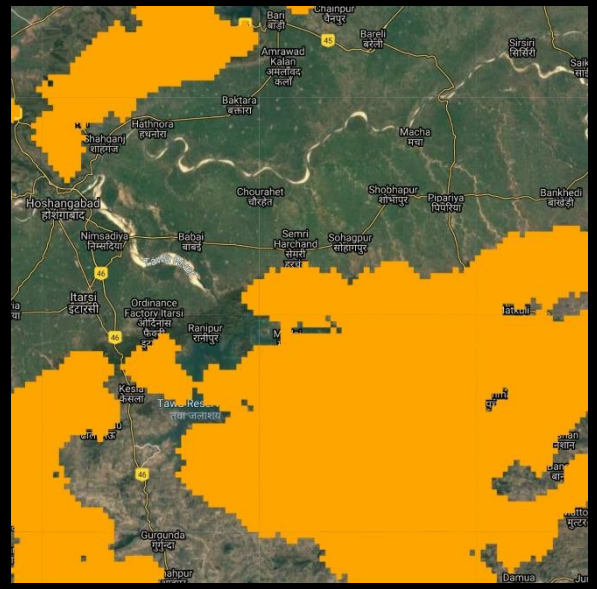
Tiger range information based on data shared by government agencies for purposes of the TCL 3.0 analysis or in the public domain. Political boundaries are shown for reference and do not imply endorsement by the US government, NASA, WCS or any project participants.

Landscape delineation

Core patch size (large enough for >= 5 tigers, depending on ecoregion)

Stepping stone patch size (1/10 of core)

Connectivity (within 4 km of another habitat patch)



Segment by state or province*

Potential effective habitat

Potential Landscapes

Segmented potential landscapes by state or province

* Proxy for management approach (country, state)

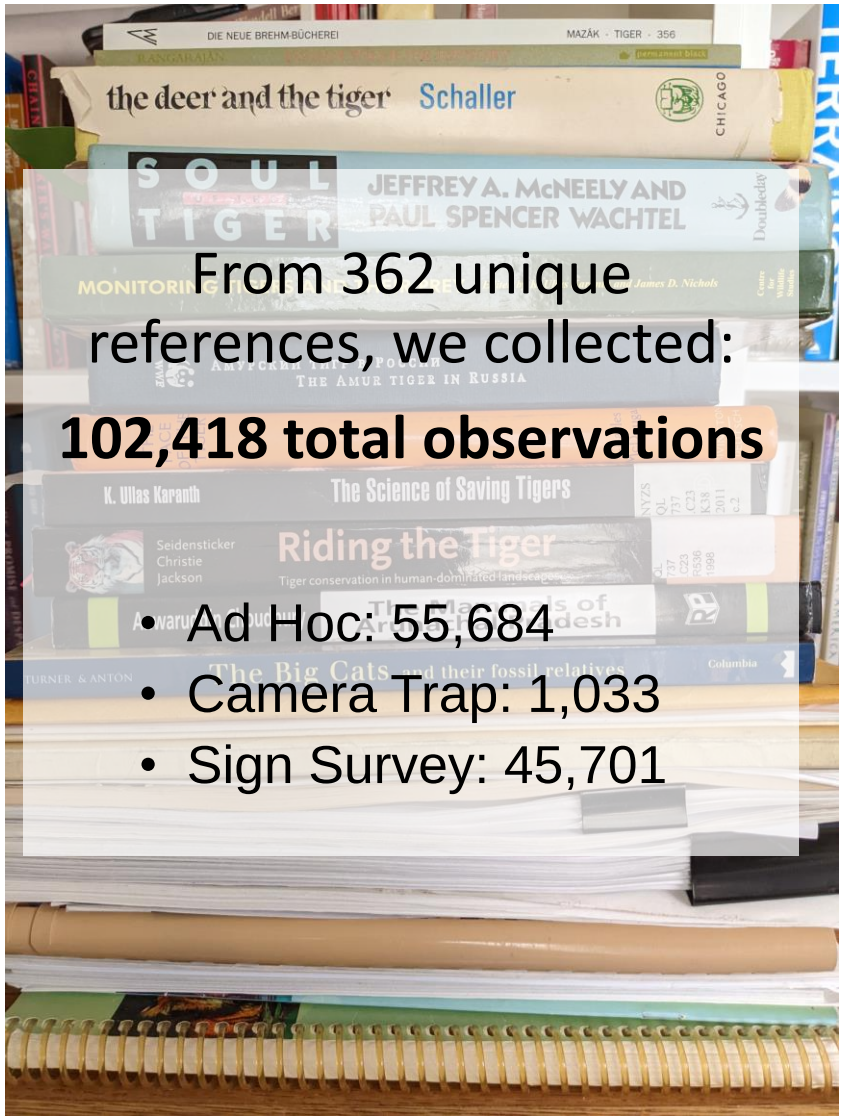
Tiger survey data

- Four types of observations
  - Camera trap observations, with measures of effort per camera
  - Camera trap observations with density, with measures of overall search effort
  - Sign survey, with measures of effort per grid cell
  - Ad hoc observations, positive only observations

- All observations must have
  - Time period (start and end date)
  - Location (either lat/lon or grid cell)
  - Source (observer, paper or report reference)

- Systematic search of the literature from 1996 - 2022

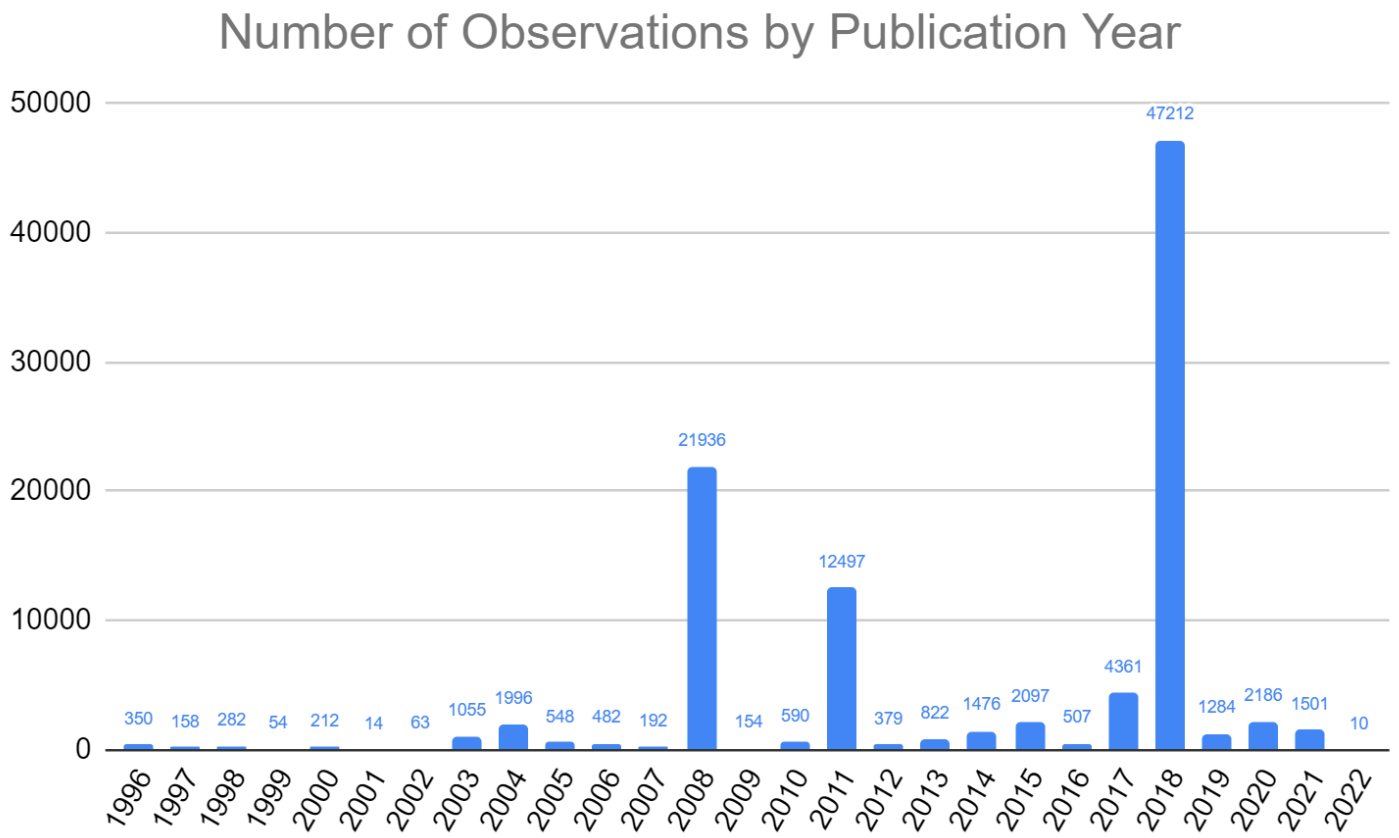
Tiger Observations, 1996 - 2022



From 362 unique references, we collected:

102,418 total observations

- Ad Hoc: 55,684
- Camera Trap: 1,033
- Sign Survey: 45,701



Tiger Conservation Landscapes 3.0

Probability estimate

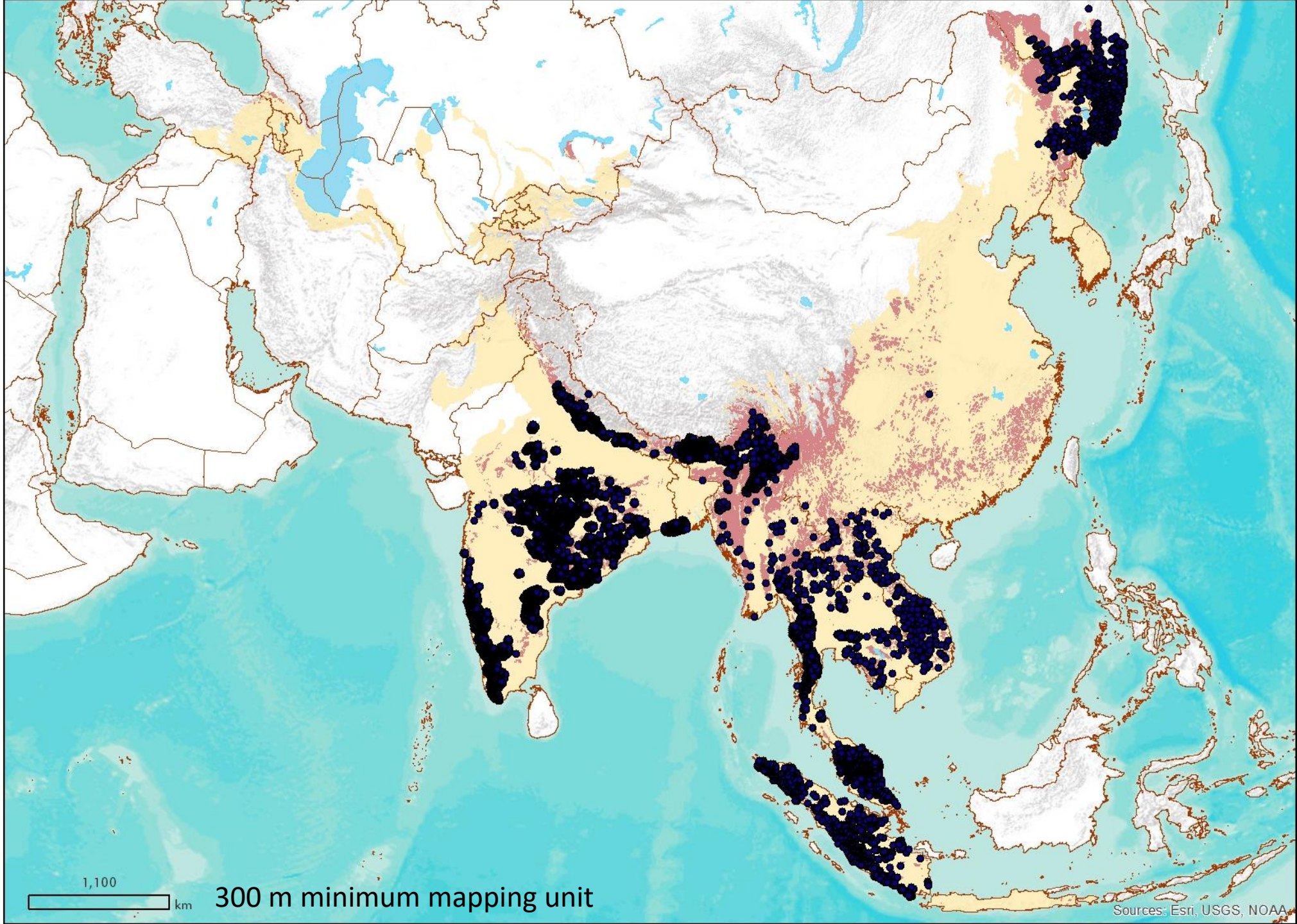
- All survey locations

proto-landscapes

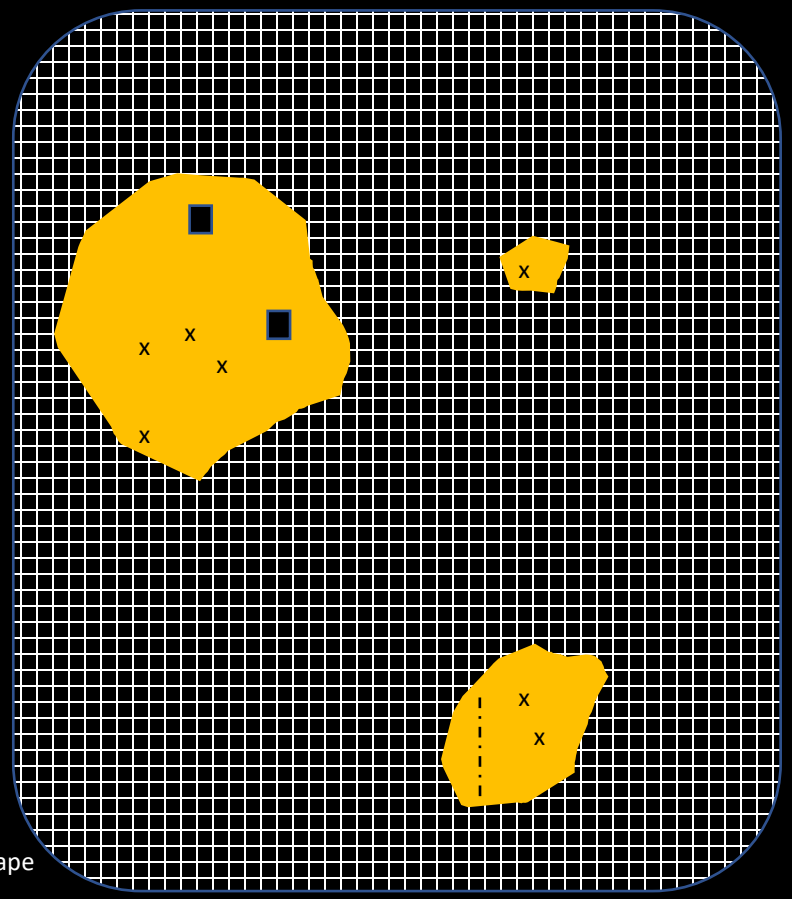
proto-landscapes

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.



Estimate tiger probability



- Find observations within the last 5 years
- Estimate unconditional probability of tiger presence in a patch based on patch size, percentage protection, positive observations, and survey effort per state/province
- Estimate conditional probably given those factors and observational data within last five years
- Estimate survey effort as 1 – difference of the conditional / unconditional probability

Method: Modified from Nichols et al (2008)

Landscape classification

Segmented potential landscapes

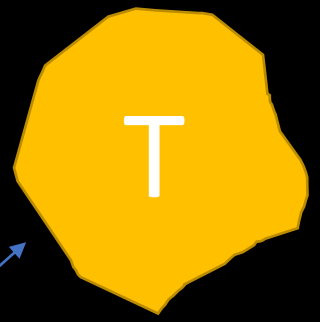
Within indigenous range = 1
Within extirpated mask = 0
Conditional prob. of tigers (P_{tig})
Survey effort for tigers (S_{tig})
Area (km2)
State/province

Have tigers been observed?

P_{tig} > Tiger Presence Threshold

95%... If all ad hoc, also least 3 observations

Yes

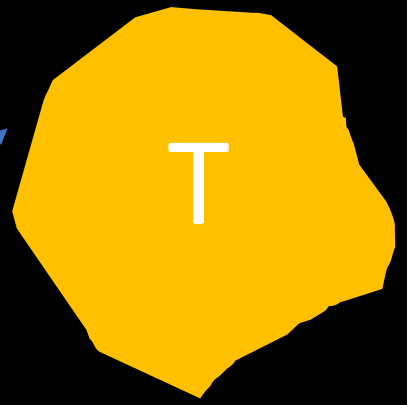


No

Is it big enough?

Area > Core patch size for ecoregion

Yes



TCL

No

Fragment with tigers

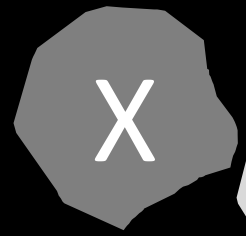
Has it been surveyed?

S_{tig} > Sufficient Survey Threshold

or

Extirpated area = 1

Yes



Restoration Landscape

No

Survey Landscape

Tiger Conservation Landscapes 3.0

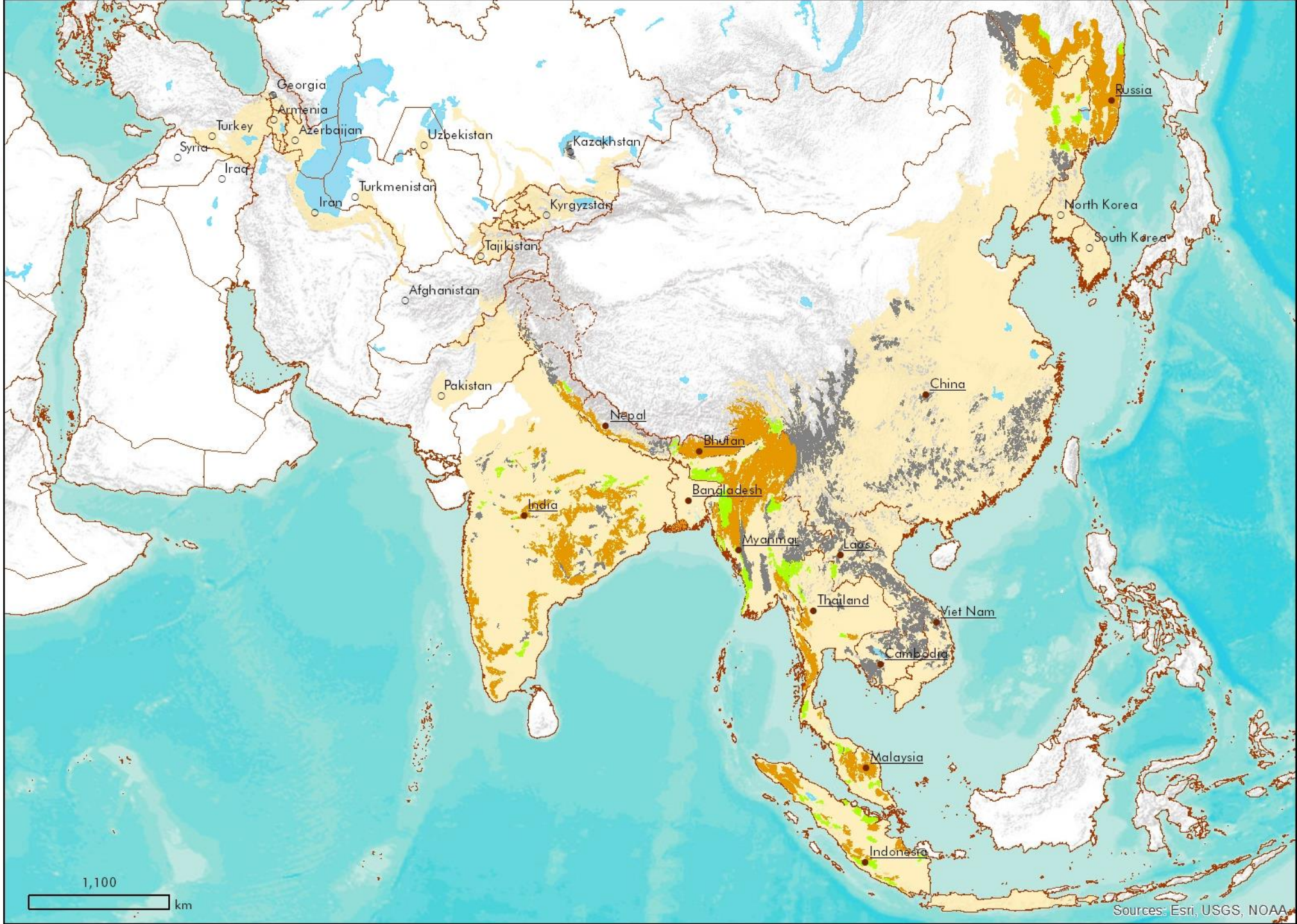
Species conservation landscapes
2020-01-01

- 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.



Tiger Conservation Landscapes 3.0

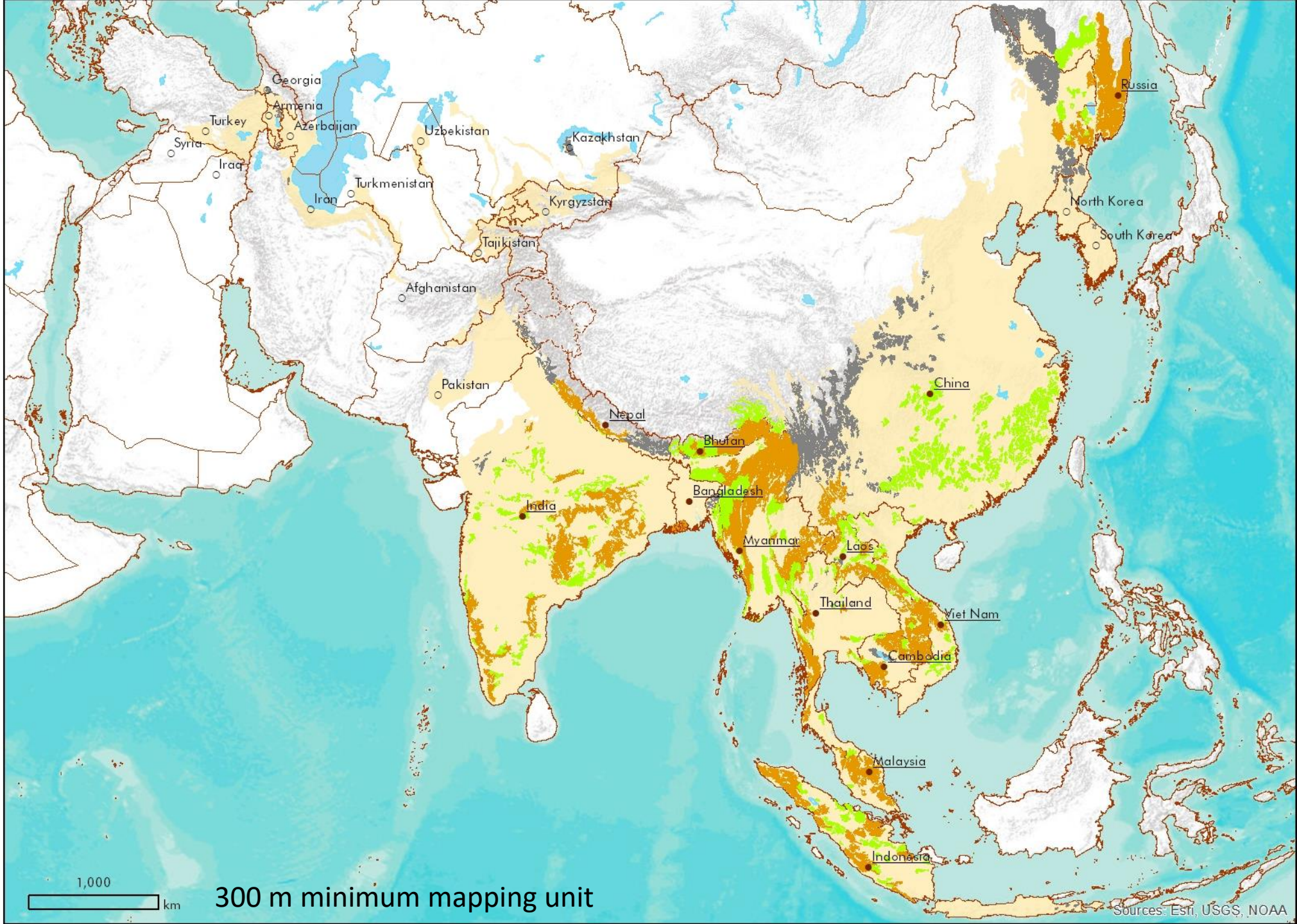
Species conservation landscapes
2001-01-01

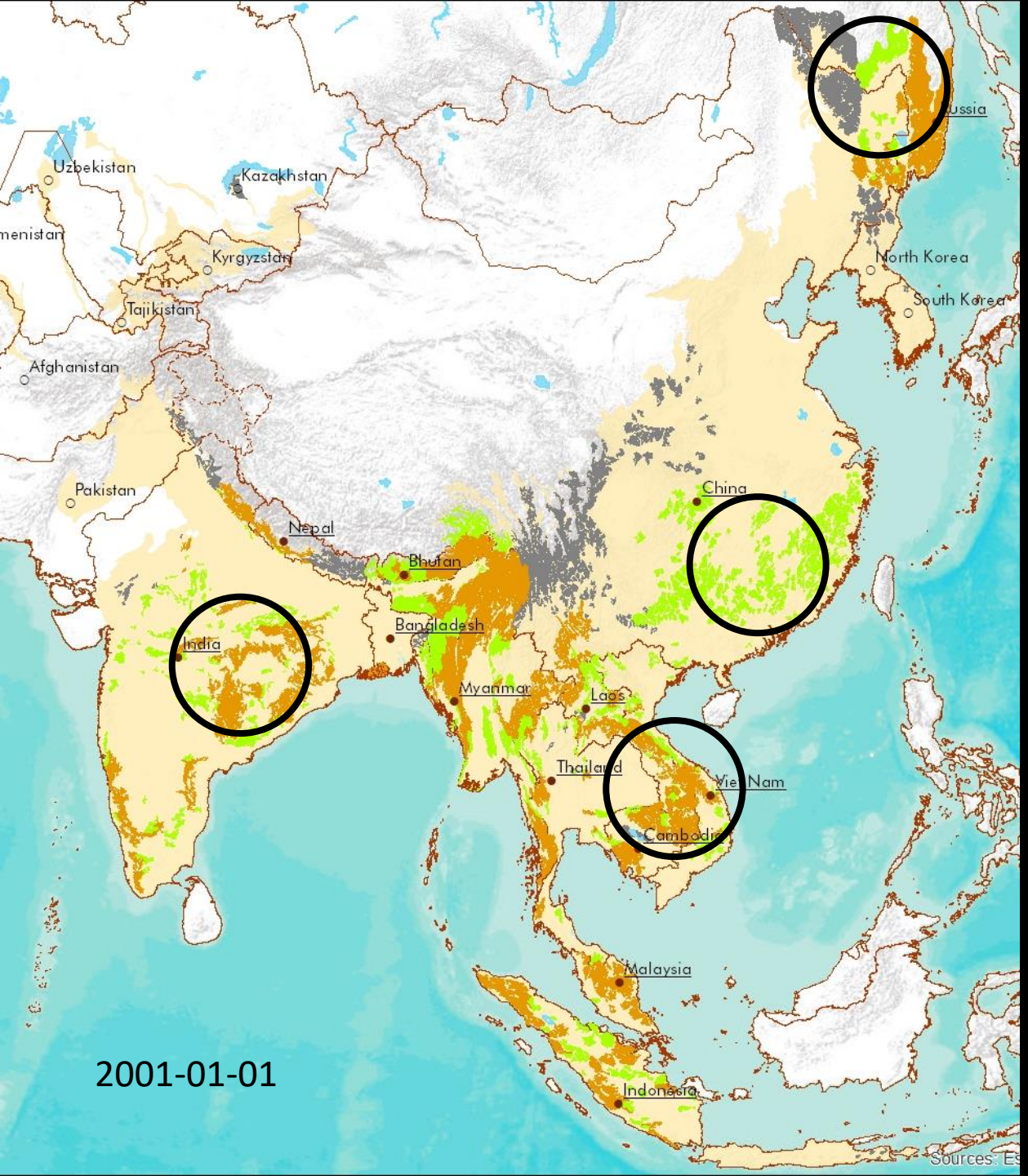
- Tiger range countries
- Former tiger range countries

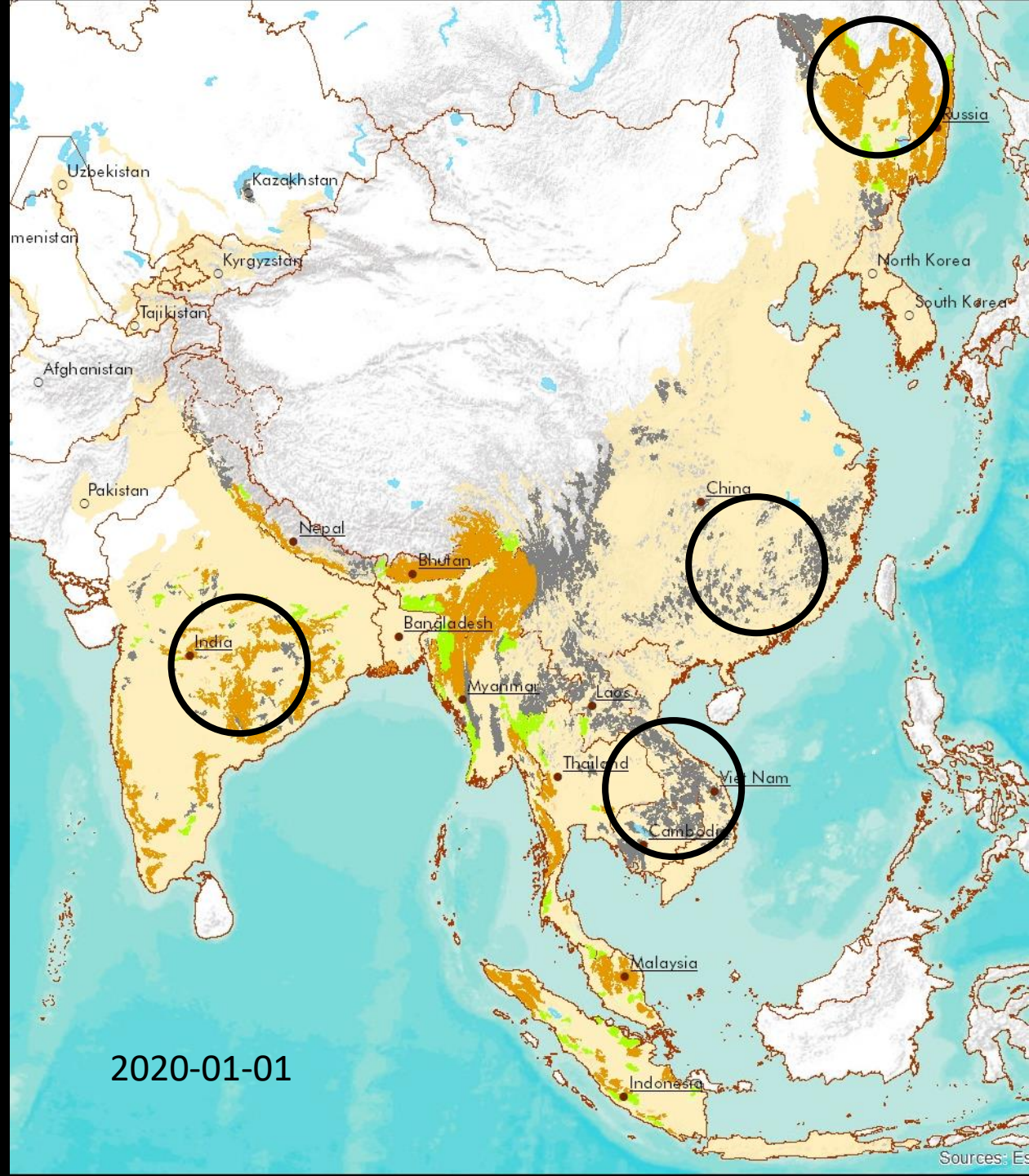
Landscapes 2001-01-01

- 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.




Uzbekistan
Kazakhstan
Kyrgyzstan
Tajikistan
Afghanistan
Pakistan
Nepal
Bhutan
India
Bangladesh
Myanmar
Laos
Thailand
Vie Nam
Cambodia
China
North Korea
South Korea
Malaysia
Indonesia
2001-01-01


Uzbekistan
Kazakhstan
Kyrgyzstan
Tajikistan
Afghanistan
Pakistan
Nepal
Bhutan
India
Bangladesh
Myanmar
Laos
Thailand
Vie Nam
Cambodia
China
North Korea
South Korea
Malaysia
Indonesia
2020-01-01

Tiger Conservation Landscapes 3.0

Surveyed area

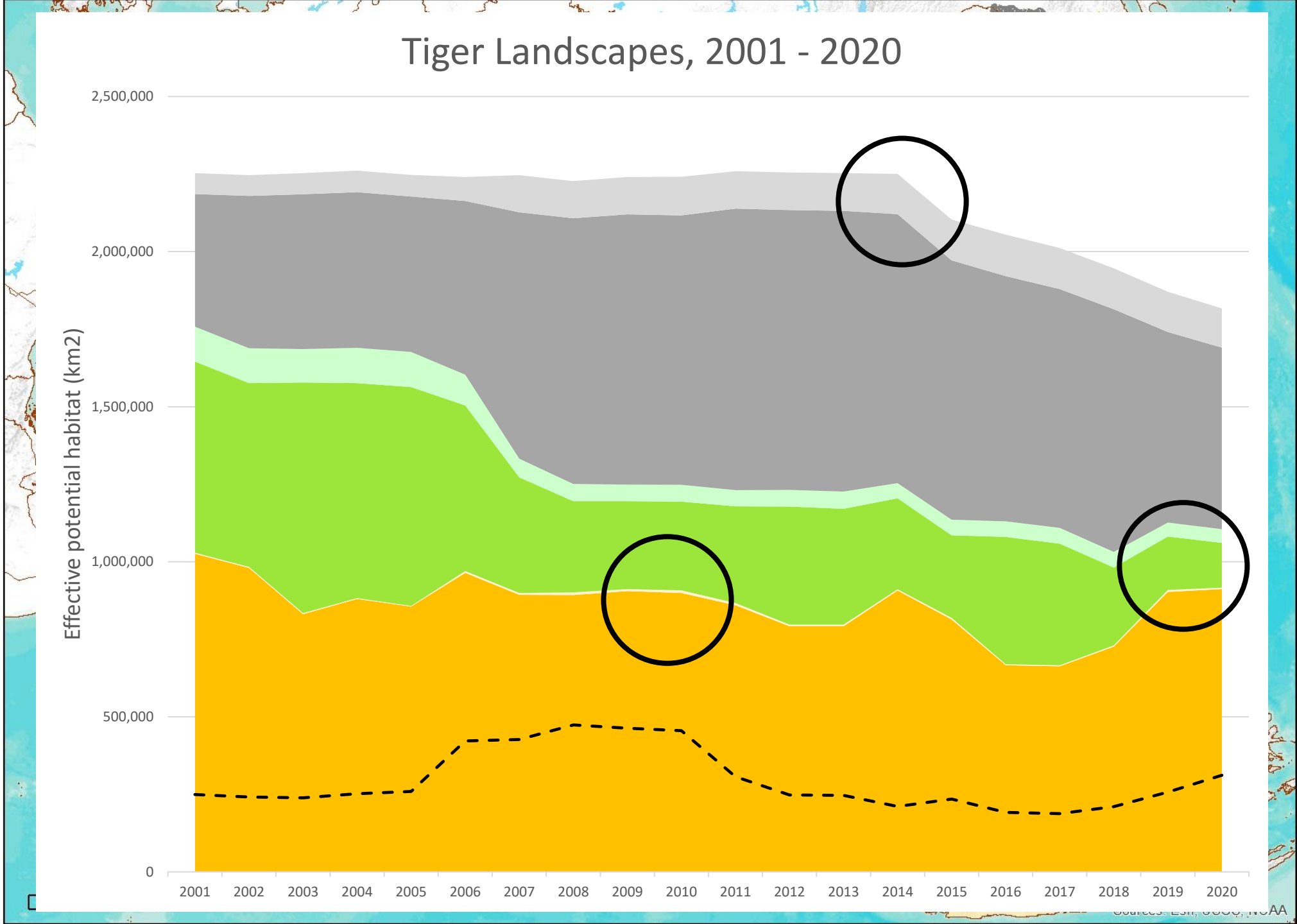
Tiger range countries

Former tiger range countries

Landscapes 2001-01-01

- 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.



Tiger Conservation Landscapes 3.0

Surveyed area

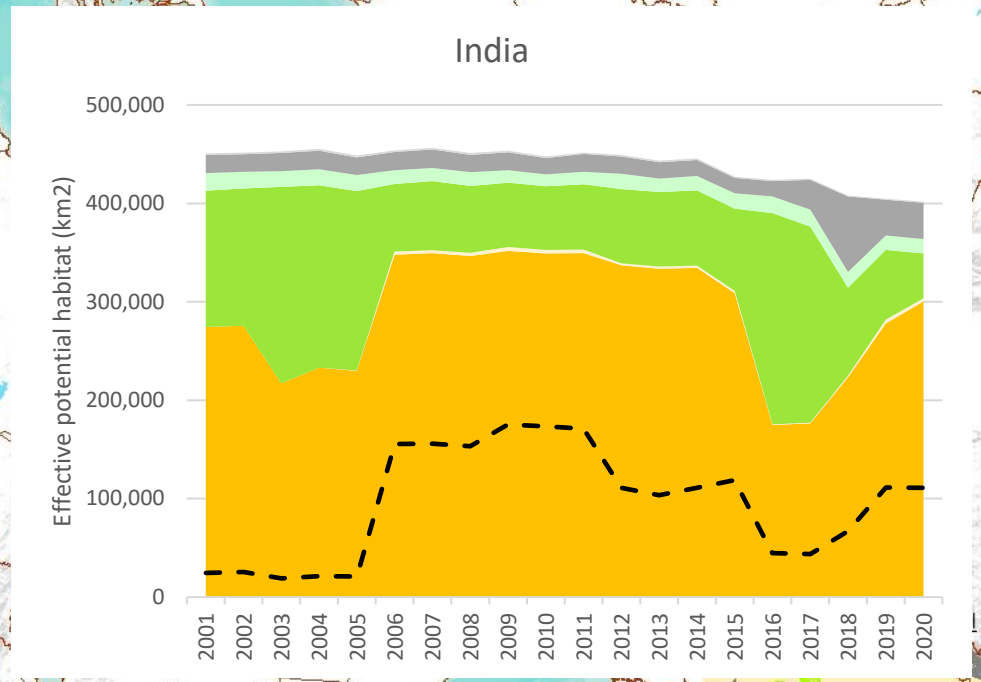
Tiger range countries

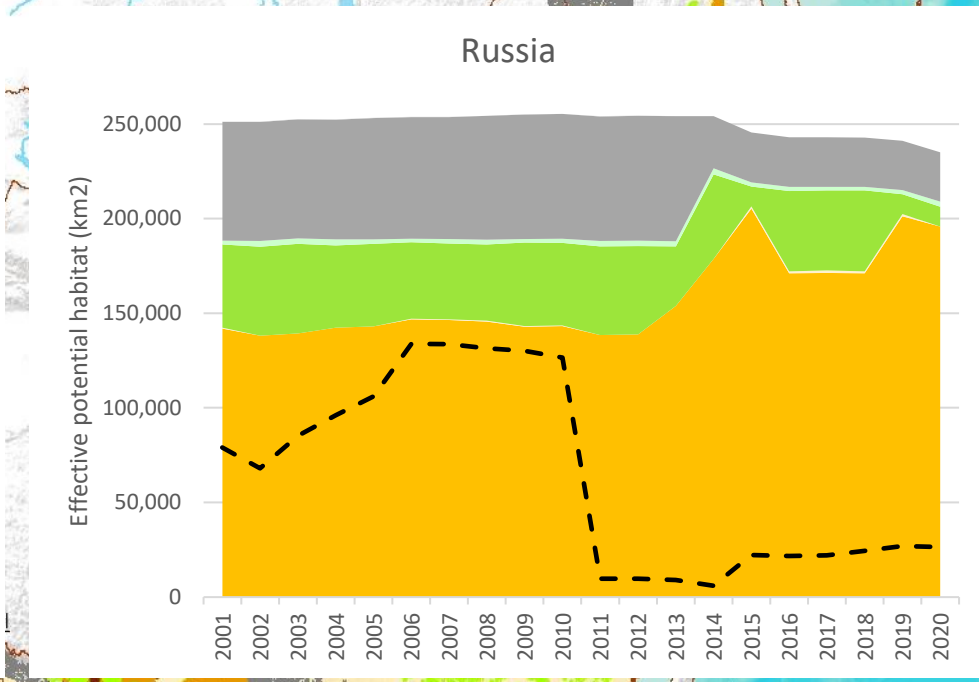
Former tiger range countries

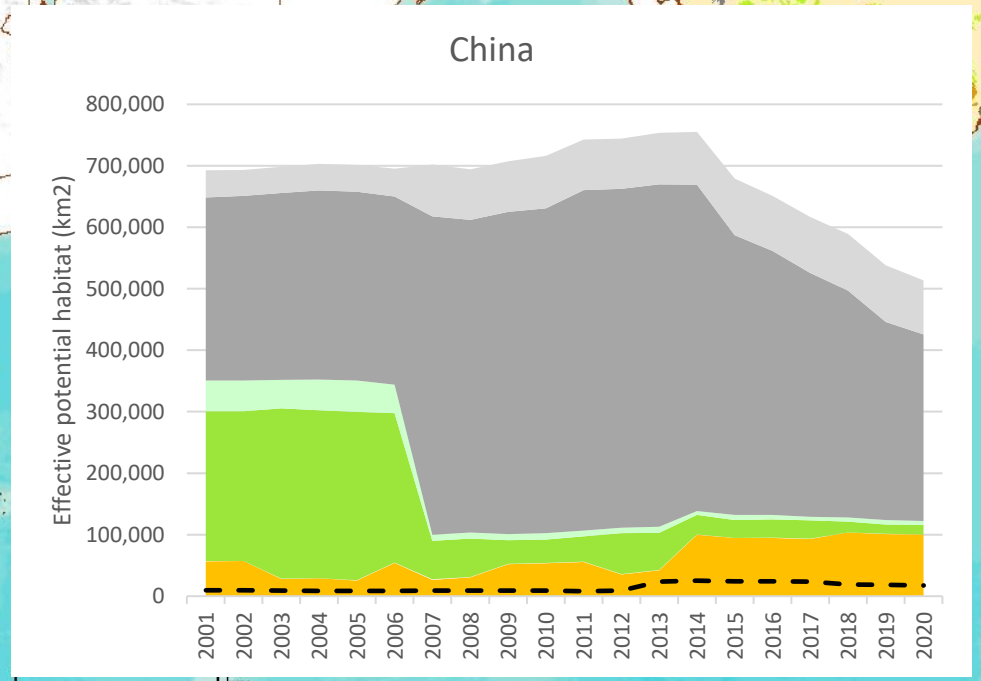
Landscapes 2001-01-01

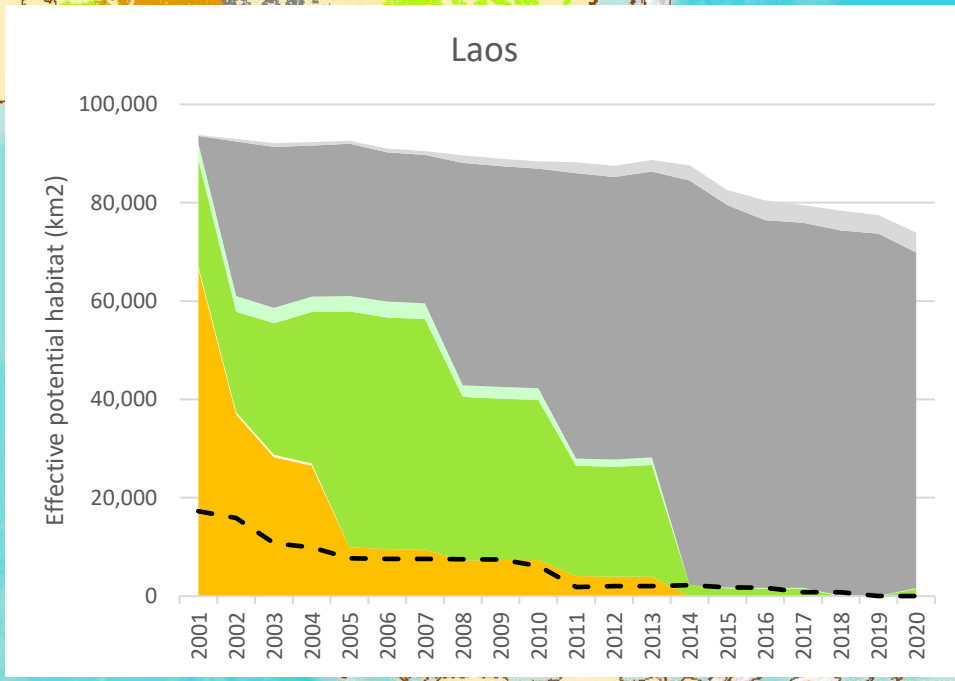
- restoration
- restoraton fragment
- species
- species fragment
- survey
- survey fragment
- indigenous range

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.

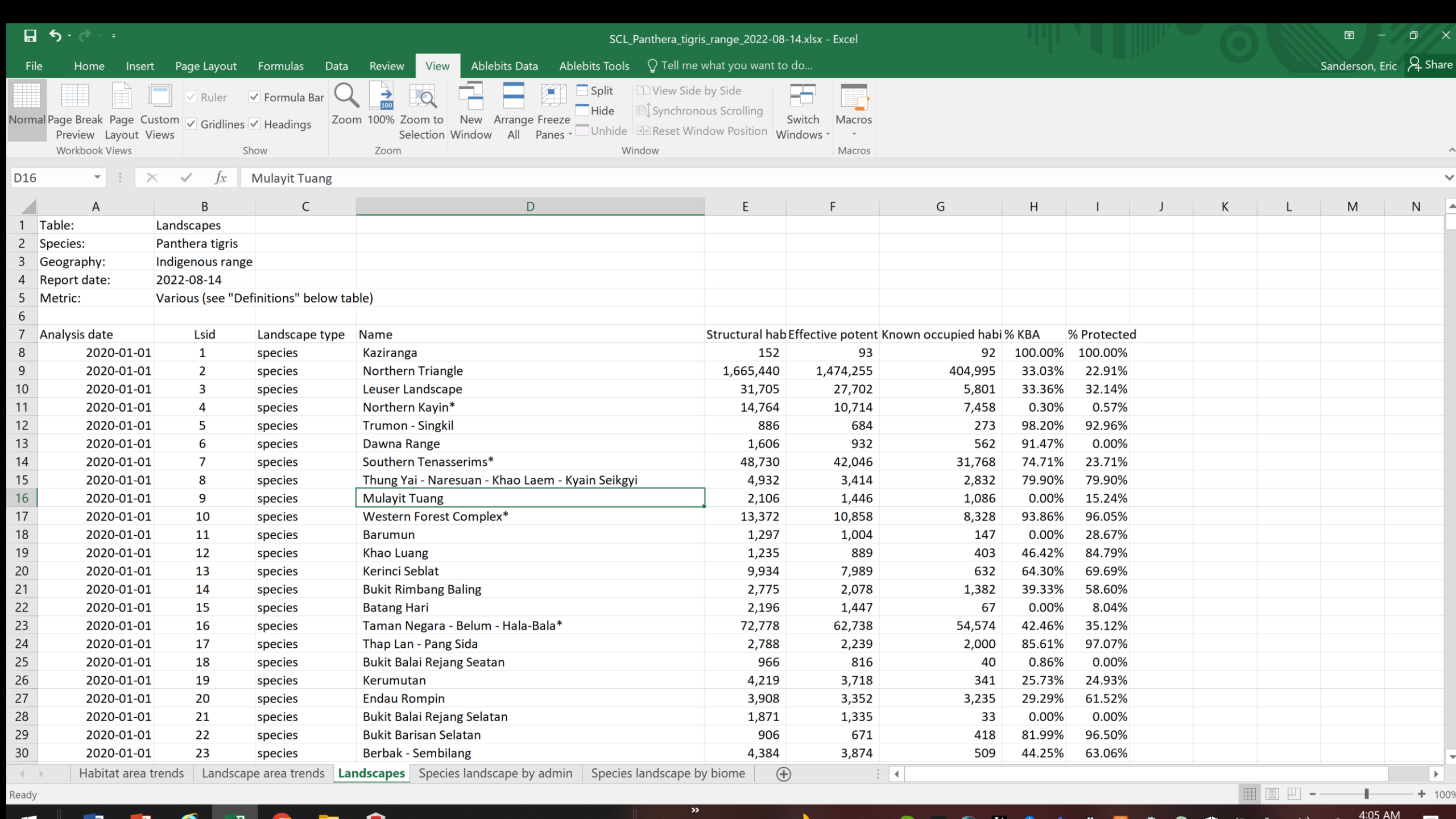








Sources: Esri, USGS, NOAA



SCL_Panther_tigris_range_2022-08-14.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Ablebits Data Ablebits Tools Tell me what you want to do... Sanderson, Eric Share

Normal Page Break Preview Page Layout Custom Views Workbook Views
Ruler Formula Bar Gridlines Headings Show
Zoom 100% Zoom to Selection Zoom
New Window Arrange All Freeze Panes Split Hide Unhide View Side by Side Synchronous Scrolling Reset Window Position Window
Switch Windows
Macros Macros

D16 Mulayit Tuang

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Table:	Landscapes												
2	Species:	Panthera tigris												
3	Geography:	Indigenous range												
4	Report date:	2022-08-14												
5	Metric:	Various (see "Definitions" below table)												
6														
7	Analysis date	Lsid	Landscape type	Name	Structural hab	Effective potent	Known occupied habi	% KBA	% Protected					
8	2020-01-01	1	species	Kaziranga	152	93	92	100.00%	100.00%					
9	2020-01-01	2	species	Northern Triangle	1,665,440	1,474,255	404,995	33.03%	22.91%					
10	2020-01-01	3	species	Leuser Landscape	31,705	27,702	5,801	33.36%	32.14%					
11	2020-01-01	4	species	Northern Kayin*	14,764	10,714	7,458	0.30%	0.57%					
12	2020-01-01	5	species	Trumon - Singkil	886	684	273	98.20%	92.96%					
13	2020-01-01	6	species	Dawna Range	1,606	932	562	91.47%	0.00%					
14	2020-01-01	7	species	Southern Tenasserims*	48,730	42,046	31,768	74.71%	23.71%					
15	2020-01-01	8	species	Thung Yai - Naresuan - Khao Laem - Kyain Seikgyi	4,932	3,414	2,832	79.90%	79.90%					
16	2020-01-01	9	species	Mulayit Tuang	2,106	1,446	1,086	0.00%	15.24%					
17	2020-01-01	10	species	Western Forest Complex*	13,372	10,858	8,328	93.86%	96.05%					
18	2020-01-01	11	species	Barumun	1,297	1,004	147	0.00%	28.67%					
19	2020-01-01	12	species	Khao Luang	1,235	889	403	46.42%	84.79%					
20	2020-01-01	13	species	Kerinci Seblat	9,934	7,989	632	64.30%	69.69%					
21	2020-01-01	14	species	Bukit Rimbang Baling	2,775	2,078	1,382	39.33%	58.60%					
22	2020-01-01	15	species	Batang Hari	2,196	1,447	67	0.00%	8.04%					
23	2020-01-01	16	species	Taman Negara - Belum - Hala-Bala*	72,778	62,738	54,574	42.46%	35.12%					
24	2020-01-01	17	species	Thap Lan - Pang Sida	2,788	2,239	2,000	85.61%	97.07%					
25	2020-01-01	18	species	Bukit Balai Rejang Seatan	966	816	40	0.86%	0.00%					
26	2020-01-01	19	species	Kerumutan	4,219	3,718	341	25.73%	24.93%					
27	2020-01-01	20	species	Endau Rompin	3,908	3,352	3,235	29.29%	61.52%					
28	2020-01-01	21	species	Bukit Balai Rejang Selatan	1,871	1,335	33	0.00%	0.00%					
29	2020-01-01	22	species	Bukit Barisan Selatan	906	671	418	81.99%	96.50%					
30	2020-01-01	23	species	Berbak - Sembilang	4,384	3,874	509	44.25%	63.06%					

Habitat area trends | Landscape area trends | Landscapes | Species landscape by admin | Species landscape by biome

Ready 100%

4:05 AM

TCL 3.0

Tiger Conservation Landscapes analysis 3.0

2000 – 2020

Trends in habitat
Population delineation

IUCN RED LIST

Ecological representation
Historical range
Populations within subunits

IUCN GREEN STATUS

Shared Vision for Tiger Conservation

TCL 3 will measure progress over next 12 years

POSSIBLE APPROACHES FOR ENHANCING THE GLOBAL TIGER INITIATIVE IN 2022 - AN NGO COALITION VIEW

The Global Tiger Initiative (GTI), and its 13-country Global Tiger Recovery Program (2010-2022) have begun to reverse a centuries-long decline in wild tigers.

A 2nd Global Tiger Summit - which will define the next 12 years of global tiger conservation - will take place in Vladivostok in September 2022.

The tiger range country (TRC) representatives will be negotiating a new 12-year plan, and will be looking for improvements and innovations.

NEW TOP LEVEL GTI GOALS

The original TX2 goal (doubling wild tiger numbers between 2010-2022) was successful in rallying a wide variety of stakeholders. TRCs should consider introducing a new top-level goal (or goals) that might have a similar impact.

AN AREA BASED GOAL FOR TIGER RECOVERY:

- For example: expand the total range occupied by tigers by 50% over 2022 levels.
- Restore habitat.
- Adopt plans for tiger dispersal and/or reintroduction.

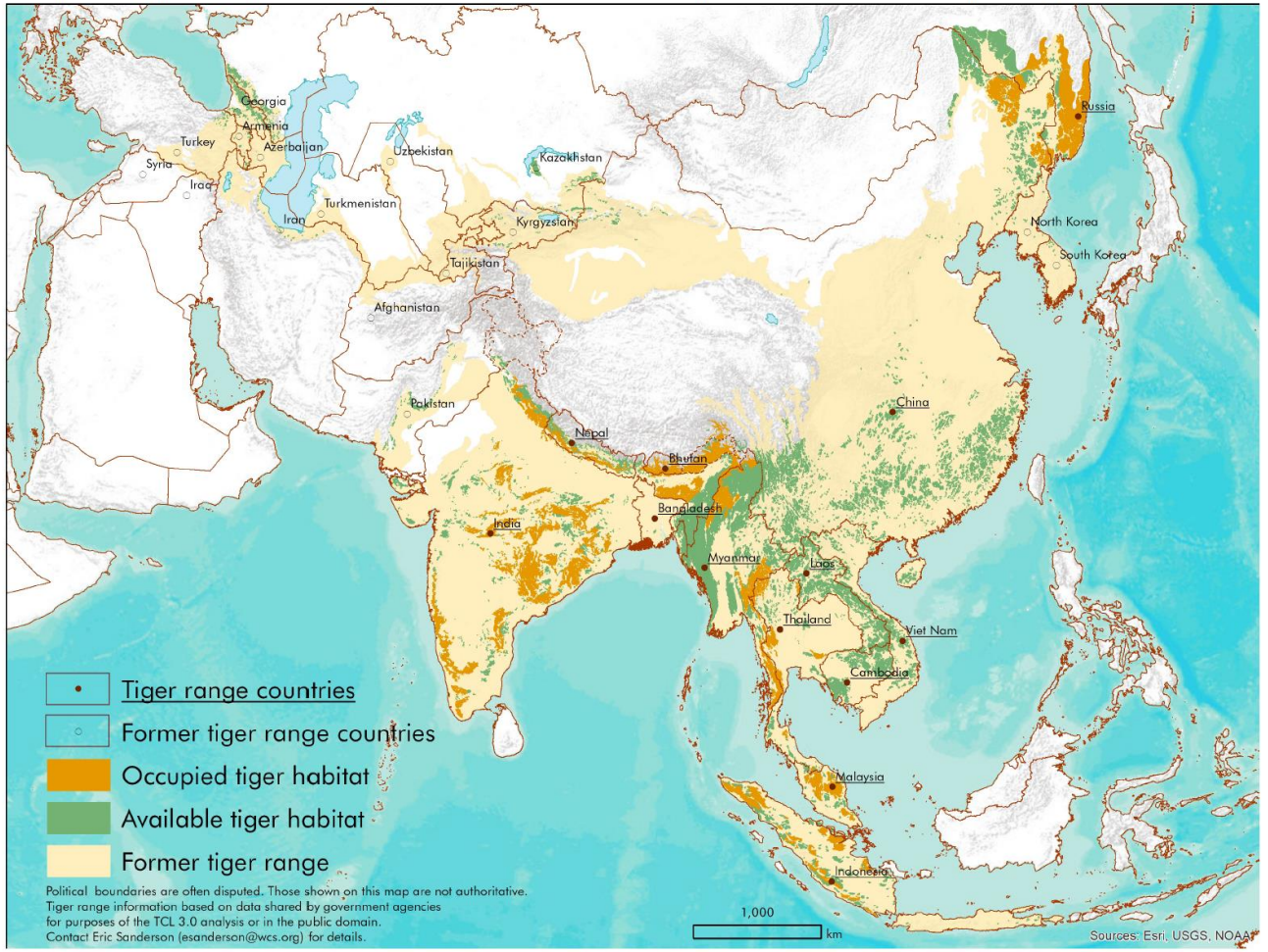
OTHER POSSIBLE TOPICS FOR NEW TOP-LEVEL GOALS:

- Prevent all losses in existing tiger populations between 2022 and 2034.
- Increase the proportion of tiger populations at carrying capacity.
- Maintain tigers across all major ecological settings in their indigenous range.

Six major tiger conservation NGOs have come together to suggest some options for the next phase of the GTI.

FAUNA & FLORA INTERNATIONAL · IUCN · PANTHERA · TRAFFIC the wildlife trade monitoring network · WCS · WWF

Map showing potentially available tiger habitat (such assessments might inform an area-based expansion goal under the GTI)



Tiger Conservation Landscapes v.3.0

Publications

Coalition for Securing a Viable Future for the Tiger. 2021. Securing a viable future for the tiger. FFI, IUCN, Panthera, TRAFFIC, WCS, WWF.

Coalition for Securing a Viable Future for the Tiger. 2022. For the Year of the Tiger, a shared vision for the future of the iconic cat. Mongabay.com.

Coalition for Securing a Viable Future for the Tiger. 2022. For World Tiger Day, bold new commitments are needed to exapand tiger range. Mongabay.com

Goodrich et al. 2022. Red List Assessment for the Tiger (*Panthera tigris*). IUCN Red List Authority.

Miquelle and Sanderson. 2022. Identifying, protecting and restoring Tiger Conservation Landscapes. Briefing report prepared for the Global Tiger Forum.

Potapov P et al. 2021. Mapping global forest canopy height through integration of GEDI and Landsat data. Remote Sensing of Environment **253**:112165.

Sanderson EW, Moy J, Rose C, Fisher K, Jones B, Balk D, Clyne P, Miquelle D, Walston J. 2019. Implications of the shared socioeconomic pathways for tiger (Panthera tigris) conservation. Biological Conservation 231:13–23.

Sanderson et al. (between journals) The march of the human footprint.

Sanderson et al. (in prep.) The indigenous range of the tiger (*Panthera tigris*).

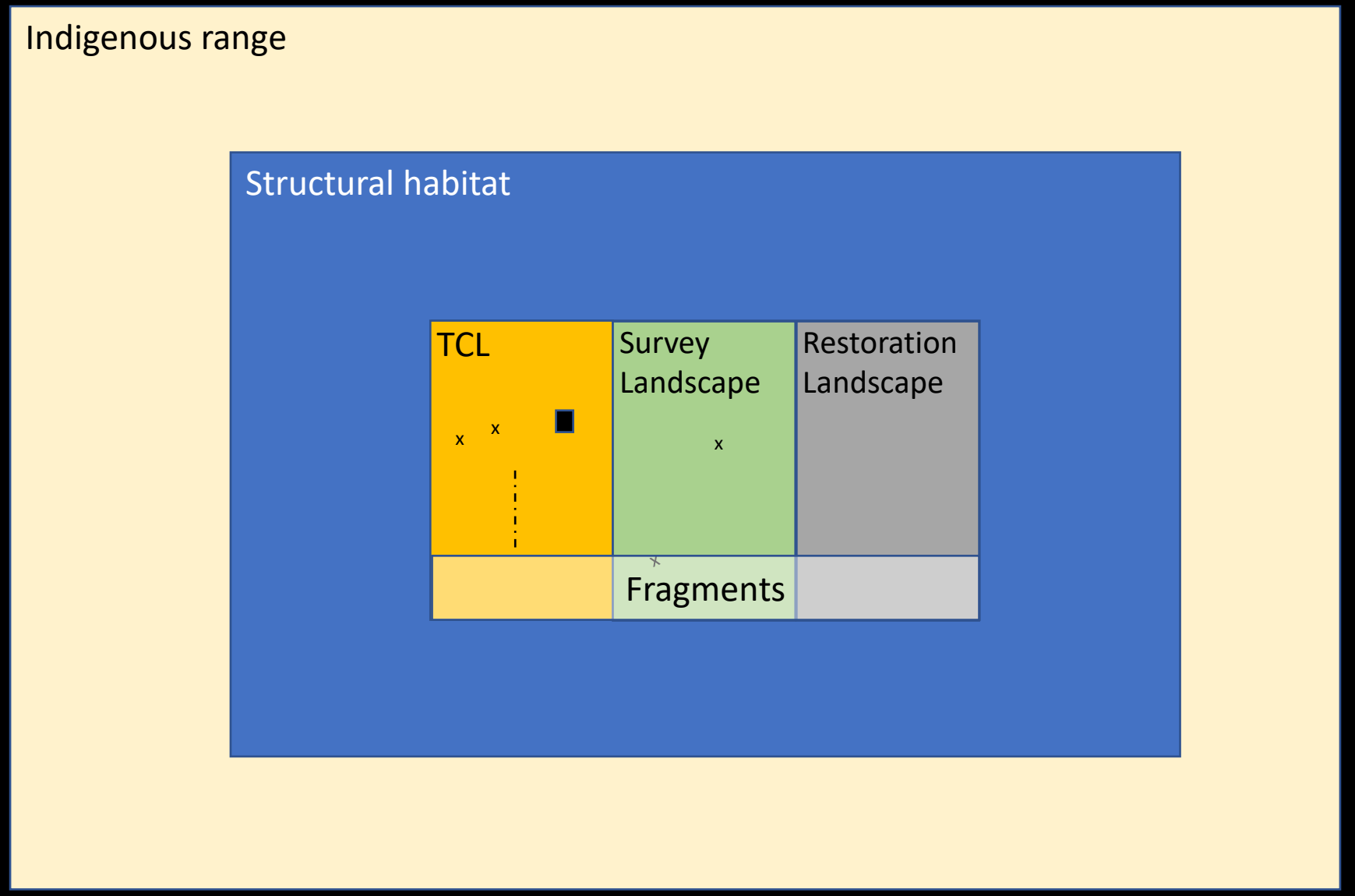
Sanderson et al. (in prep.) Stabilization of and future prospects for tiger (*Panthera tigris*) habitat in Asia.

IUCN image catalog / Alex Silwa

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*)

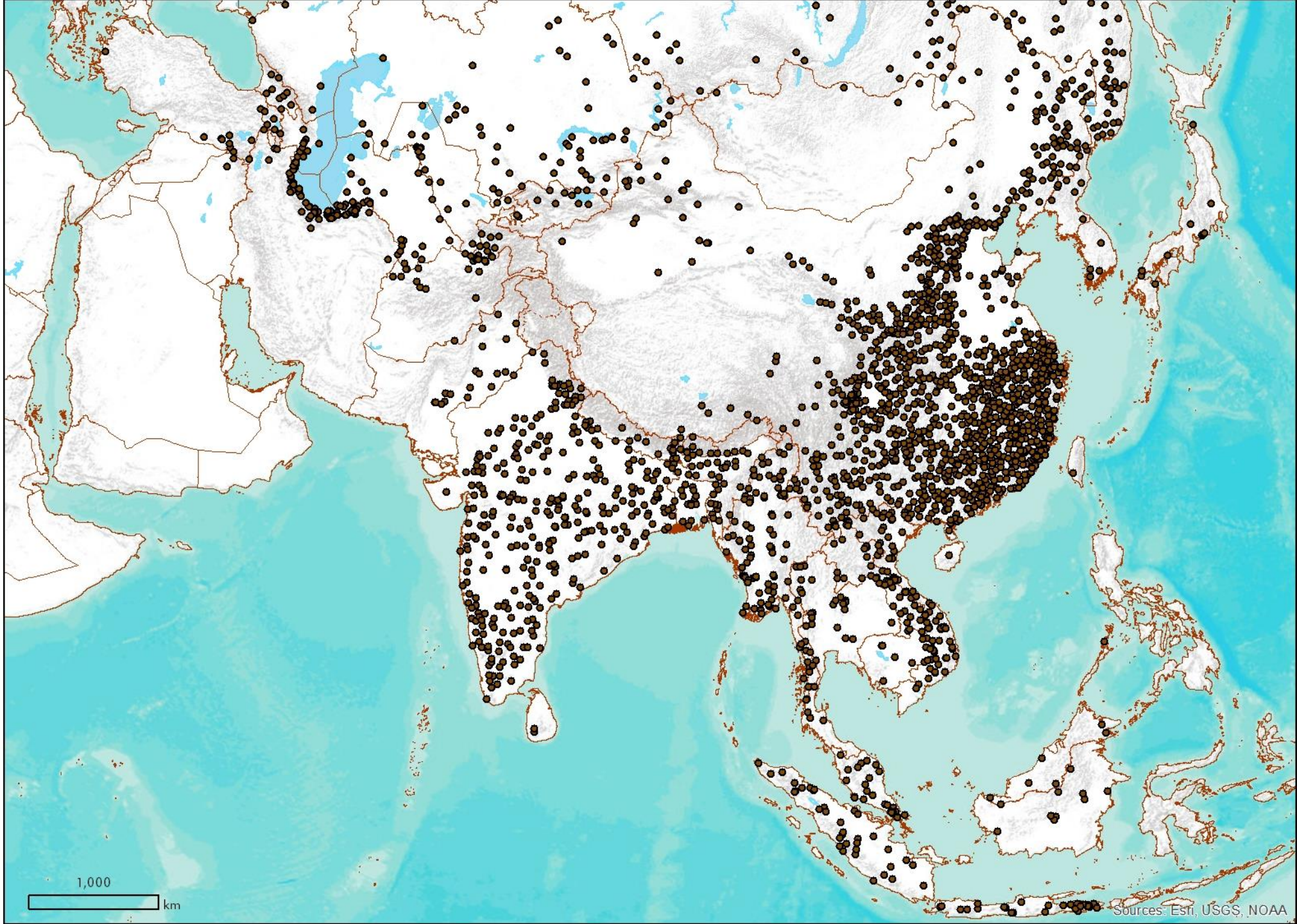
Analytical steps



Tiger Conservation Landscapes 3.0

Indigenous range

600 BCE – 1995 CE



Historic observations

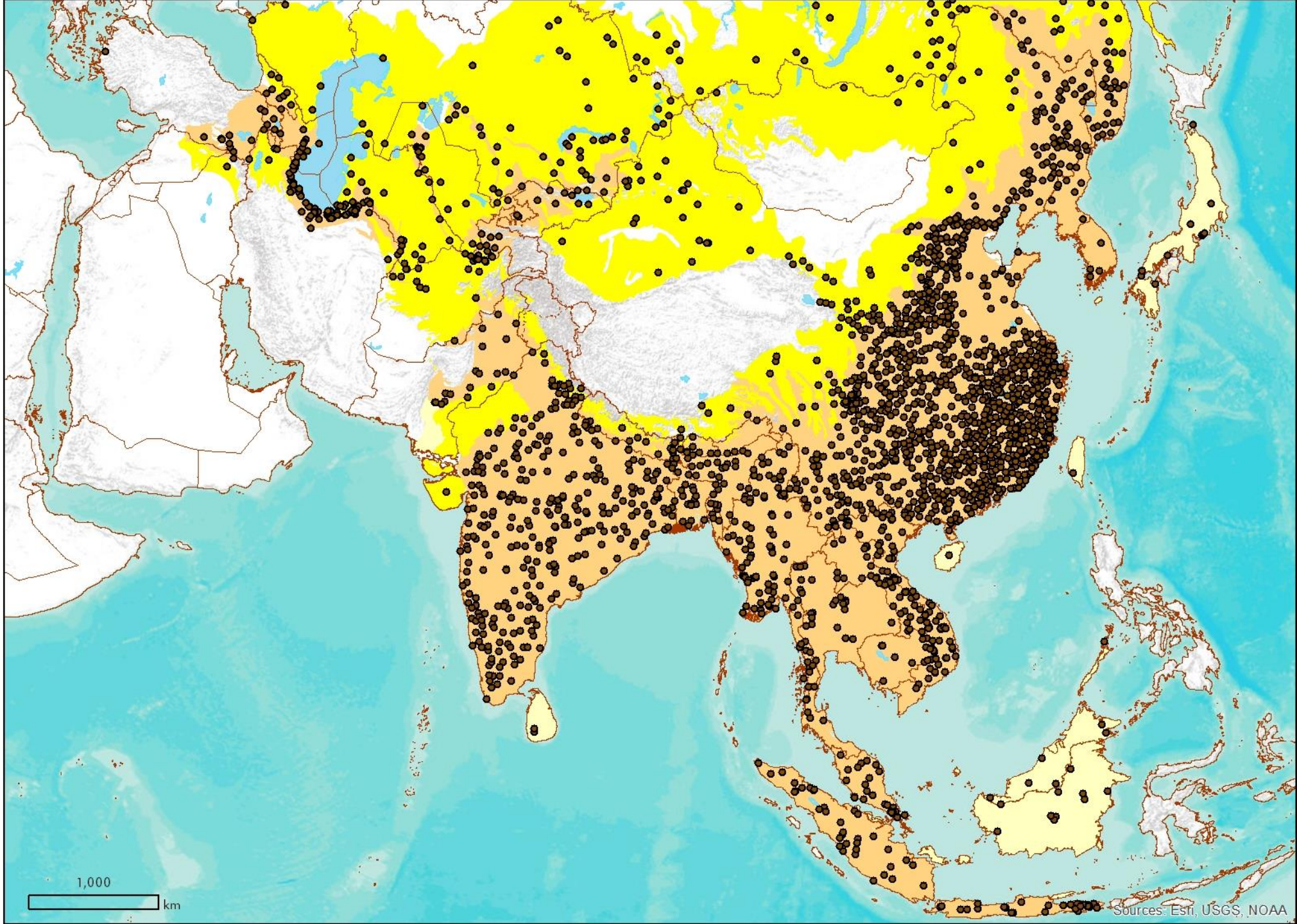
Modern countries

Disputed

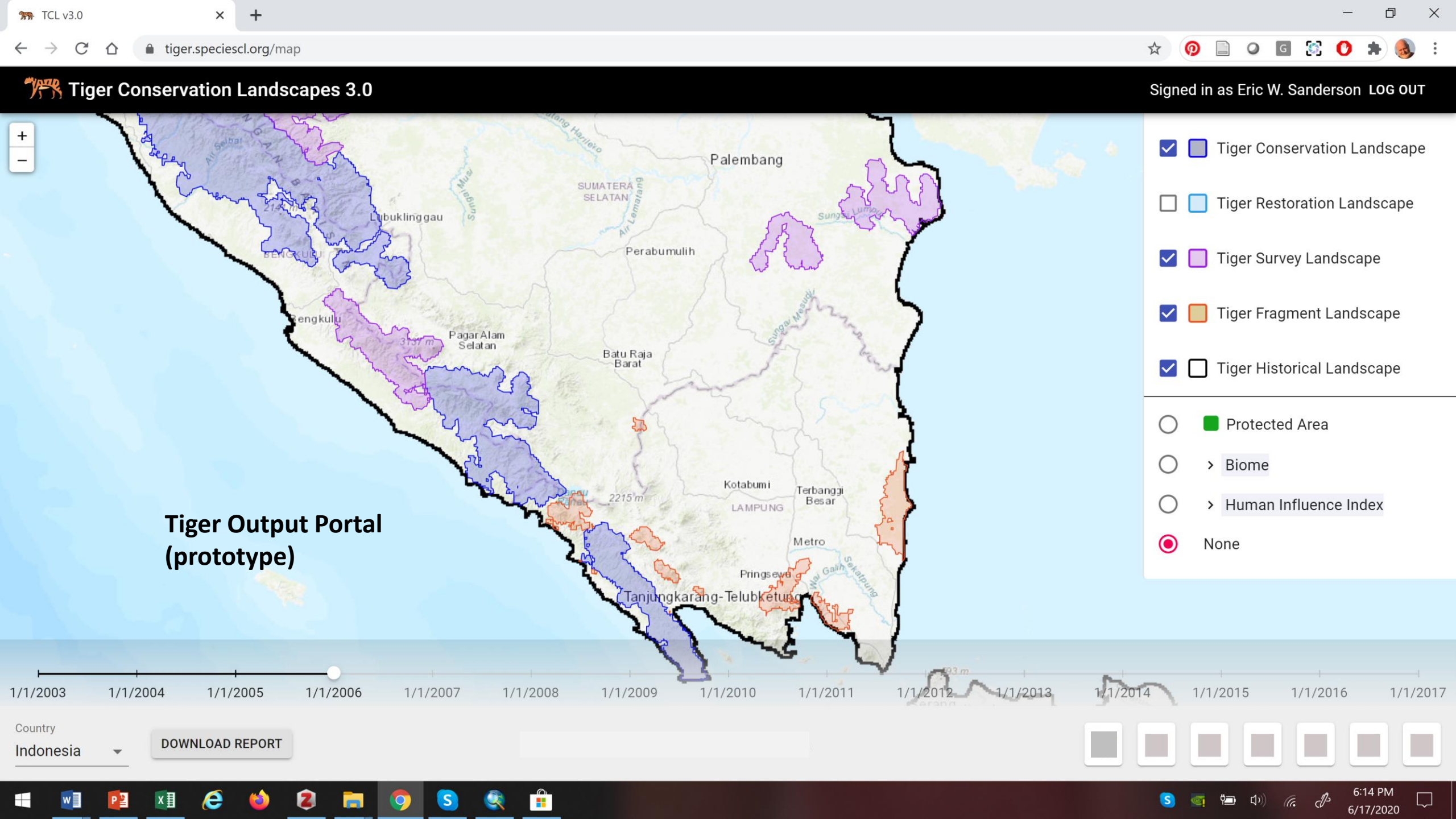
Tiger range information based on data shared by government agencies for purposes of the TCL 3.0 analysis or in the public domain. Political boundaries are shown for reference and do not imply endorsement by the US government, NASA, WCS or any project participants.

Tiger Conservation Landscapes 3.0

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.


TCL v3.0
tiger.speciescl.org/map
Tiger Conservation Landscapes 3.0
Signed in as Eric W. Sanderson LOG OUT
Palembang
SUMATERA SELATAN
Lubuklinggau
Perabumulih
Bengkulu
Pagar Alam Selatan
Batu Raja Barat
Kotabumi
Terbanggi Besar
LAMPUNG
Metro
Pringsewi
Tanjungkarang-Telubketung
Tiger Conservation Landscape
Tiger Restoration Landscape
Tiger Survey Landscape
Tiger Fragment Landscape
Tiger Historical Landscape
Protected Area
Biome
Human Influence Index
None
Tiger Output Portal (prototype)
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
Country
Indonesia
DOWNLOAD REPORT
6:14 PM
6/17/2020

Interpretation

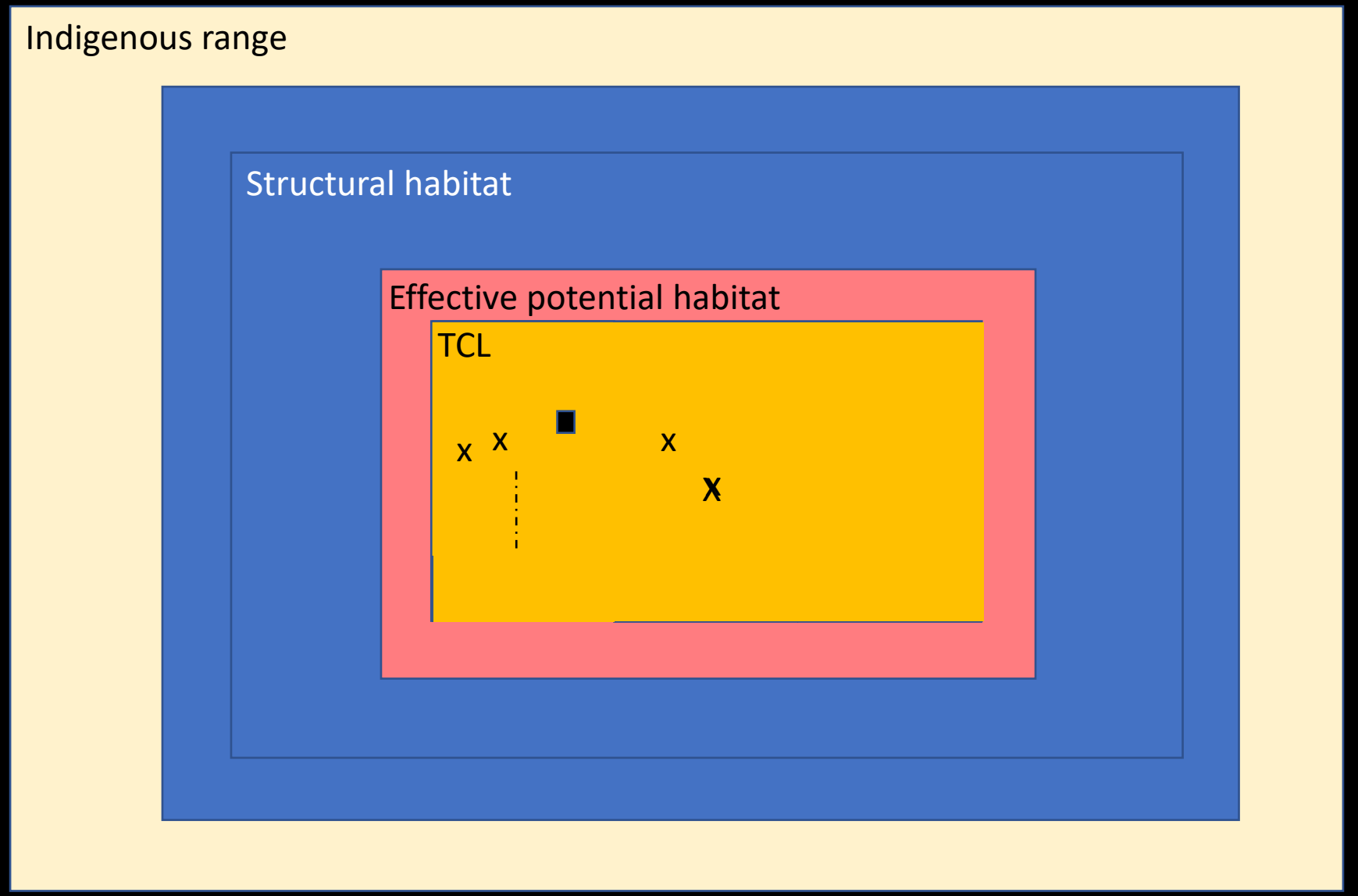
Increase connectivty

Survey areas

Restore populations

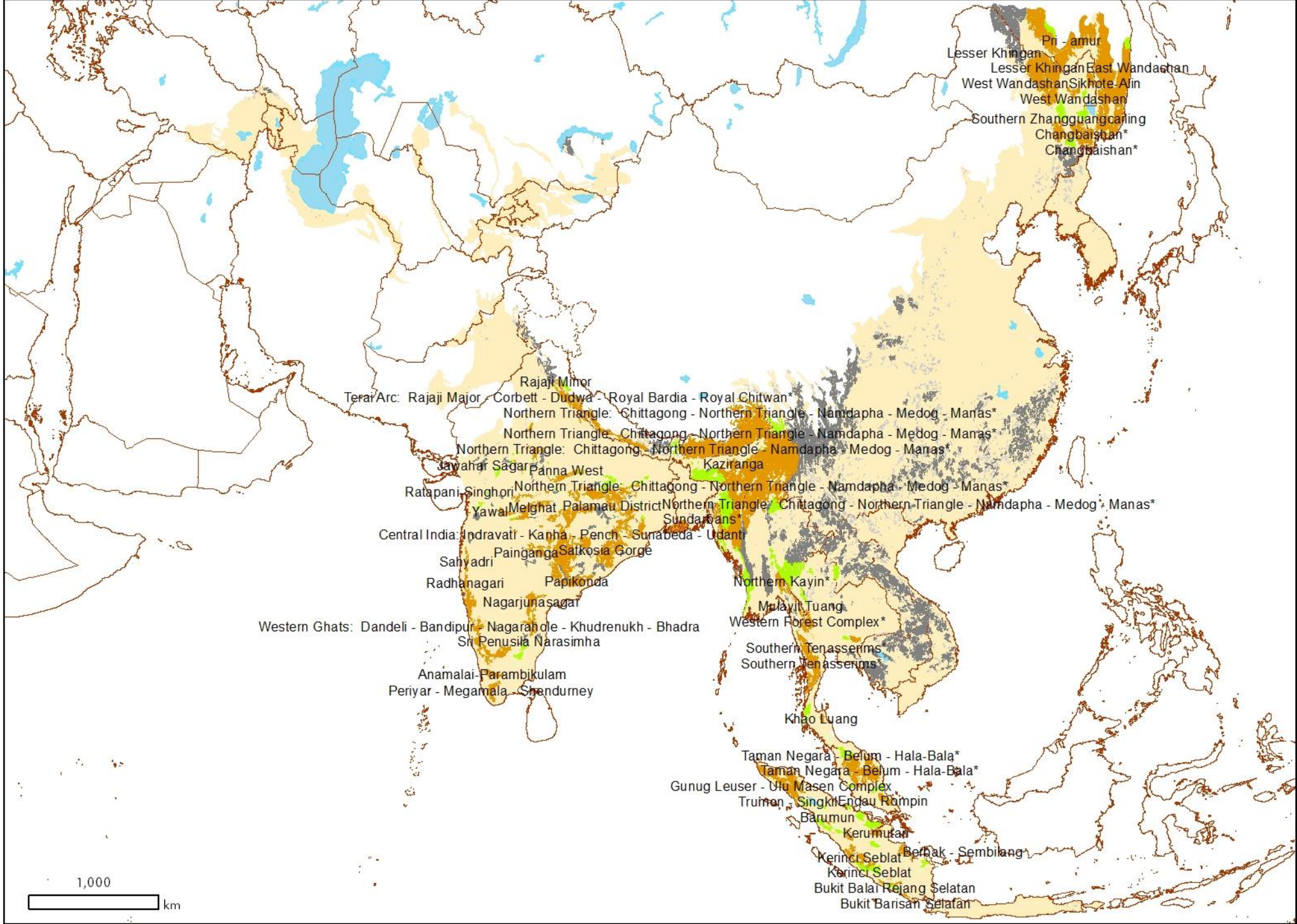
Increase social tolerance

Restore forest



Tiger Conservation Landscapes 3.0

2020-01-01



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.