Table S1. Variables used for estimating elephant occupancy probability.

Variable	Description	Data source	Expected effects on elephant detection/occupancy	Original resolution	Supporting citation
		Detection			
Elephant location	Field observation data	Divisional Forest Office of Keonjhar District			
		Occupancy			
		Environmental variables			
Forest	Dense forest, Open forest and Bush	Forest Survey of India	Positive	23.5 m * 23.5 m	[16,39,81,82]
Enhanced Vegetation Index (EVI)	Proxy for forage availability	MODIS Terra product MOD13A3	Positive	1km * 1km Monthly	[19,62]
Terrain Roughness Index (TRI)	relative change in elevation that represents the unevenness of the region	Space Shuttle Radar Topography Mission- Digital elevation model	Negative	30m * 30m	[19]
Precipitation	Annual averaged precipitation (min ~650 mm; avg ~2500 mm; maximum ~5900 mm)	Special Relief Organization, Government of Odisha	Positive	1km * 1km Monthly	[83-85]
Temperature	Annual averaged of daytime land surface temperature	Terra MODIS-MOD11A1	Negative	Daily	[85,86]
		Anthropogenic variables			
Euclidian distance to (ECD) Waterbodies	Euclidian distance to water bodies from each pixels	Sentinel-2 Level-1C and Divisional Forest Office	Negative	10m * 10m	[30,87]
ECD Mining	Euclidian distance to mining sites from each pixel	Sentinel-2 Level-1C and Divisional Forest Office	Positive	10m * 10m	[57,88]
ECD Cropland	Euclidian distance to cropland from each pixel	Sentinel-2 Level-1C and Divisional Forest Office	Positive	10m * 10m	[89-91]
ECD Rural	Euclidian distance to rural from each pixel	Sentinel-2 Level-1C and Divisional Forest Office	Both +/-	10m * 10m	[28,91,92]
ECD Urban	Euclidian distance to urban from each pixel	Sentinel-2 Level-1C and Divisional Forest Office	Positive	10m * 10m	[28,91,92]

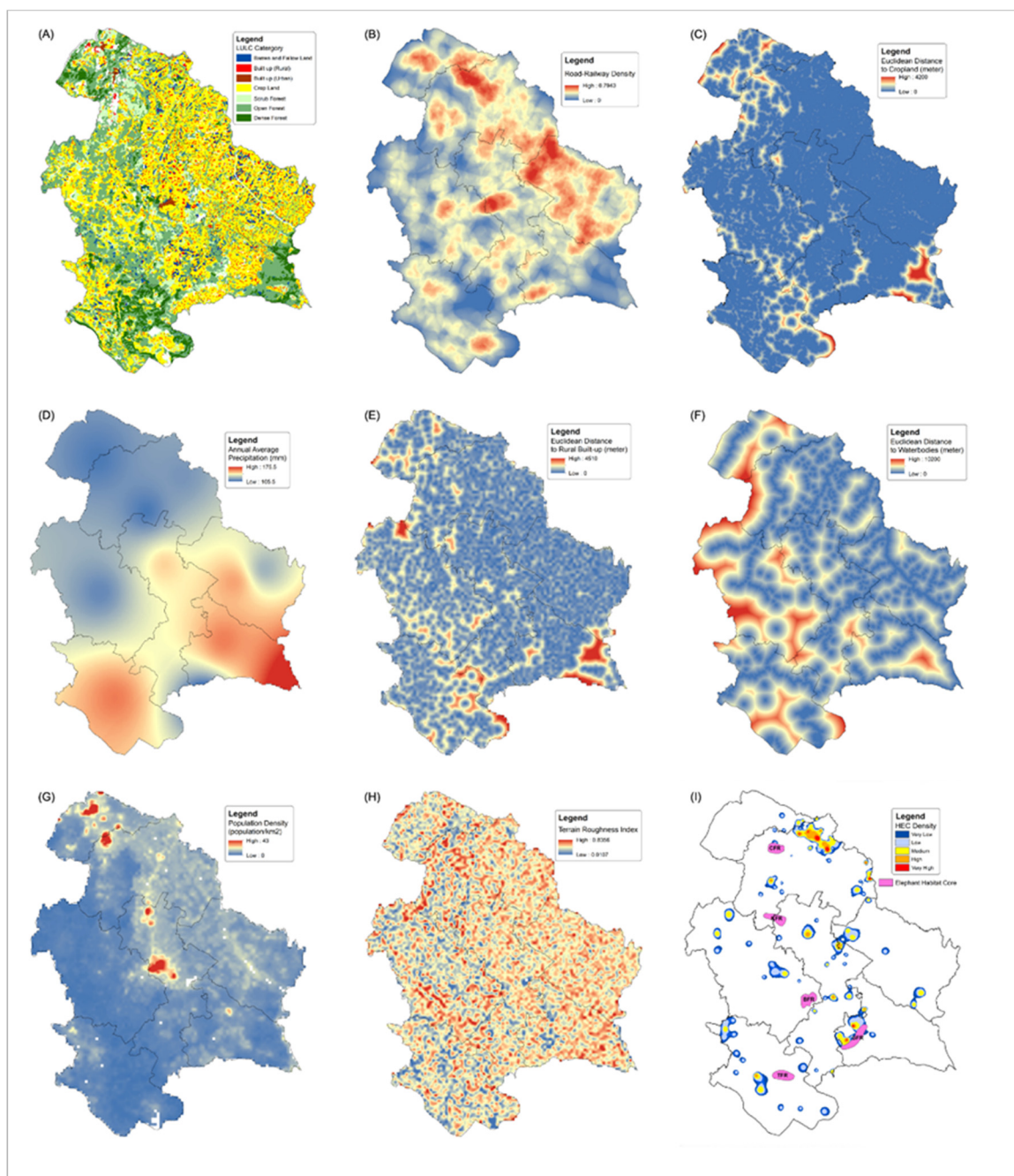| Road-Railway density	Density of all major roads and railway line in each pixel	Divisional Forest Office	Negative		[93-95]
Human population Density	Density of human population in each pixel	SEDAC (CIESIN-SEDAC)	Negative	1km * 1km	[19,85]

Figure S1. Significant data layers used for elephant occupancy and building resistance surface. (A) LULC (including open/dense forest, scrub land, urban/rural development, croplands and fallow lands), (B) road-railway density, (C) ECD cropland, (D) annual average precipitation, (E) ECD rural development, (F) ECD waterbodies, (G) population density, (H) terrain roughness/slope and (I) HEC

density. The layers (A) to (E) were used for detectability modeling, while LULC, road-railway density, population density, slope, and HEC density layers were used to build a resistance surface by an analysis overlaying weighted layers based on resistance score and weights (Table 2.) [LULC: land use land cover, ECD: Euclidean distance, HEC: Human elephant conflict]
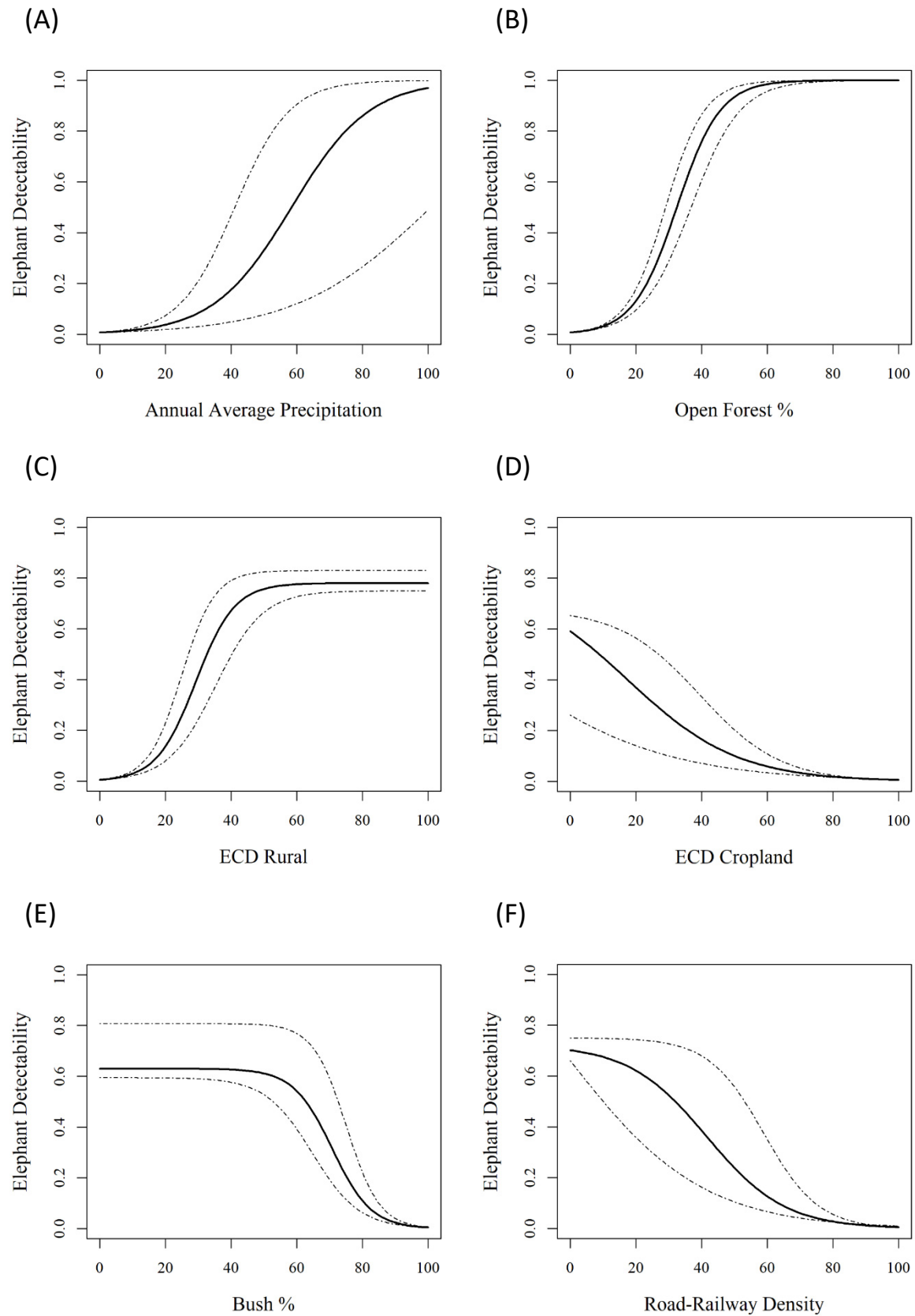
Figure S2. Relationships between the estimated probability for elephant occupancy and the influential covariates. Precipitation (A), open forest% (B) and ECD rural (D) showed a positive relationship, while

ECD cropland(C), Road-Railway density (E) and bush% (F) were negatively related to the probability of elephant occupancy. [ECD: Euclidean distance]
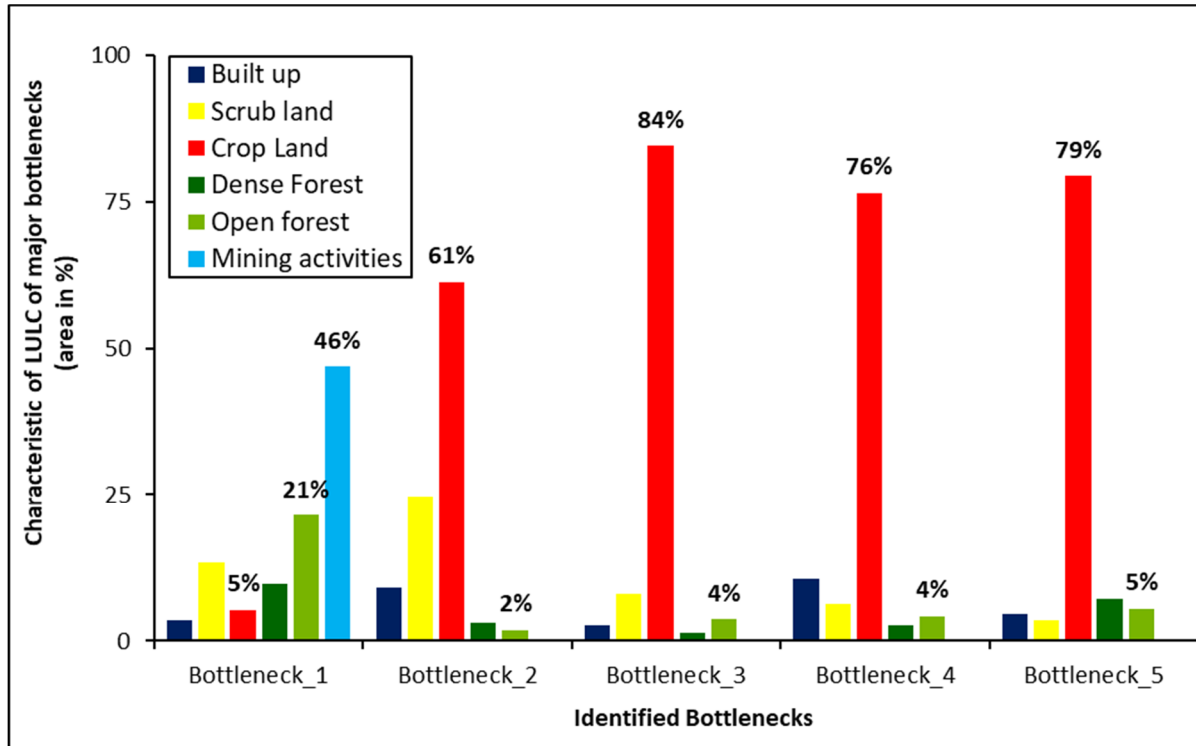

Figure S3. Landscape characteristics of the identified major bottlenecks along with their respective average cumulative movement flow. These bottlenecks were extracted from the polygons containing grid-cells with a cumulative movement flow exceeding 0.4Amp/grid.