



Migratory species and linear infrastructure in the Indian landscape

Risks and solutions

Asha Rajvanshi

*Former Scientist and Head, EIA Cell,
Wildlife Institute of India
asharajvanshi@gmail.com*

Presentation outline

- *Overview of developments in Indian landscape*
- *Risks from linear infrastructure projects to migratory species*
- *Mitigation measures recommended*
- *Trials and outcome for different species*
- *Enabling support for uptake of mitigation practices*
- *Policy relevance of results for planning wildlife- friendly infrastructure*
- *Capacity building efforts – Need and experience*
- *Tasks ahead*



The landscapes that command the highest importance for maintaining connectivity are also the most fragmented and vulnerable to further change



GREAT INDIAN BUSTARD

Distribution

Restricted in only two isolated regions in India with the largest population of 150 birds in Thar landscape of Rajasthan. 75% decline in population

Status

Listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, CMS Convention and Appendix I of CITES, Critically Endangered on the IUCN Red List

Key Threats

- Habitat alteration and loss,
- Change in cropping pattern
- Intensification of agriculture
- Eggs and nests predation
- Development projects
- Powerline induced mortality
- **Risk of extinction**

Power lines pose the biggest threat to bustards due to their low flying nature and poor frontal vision.

From a rapidly dwindling population of about 128 ± 19 individuals in Thar (WII Research), 15 percent deaths annually due to collision with high voltage power lines poses a series threat of extinction



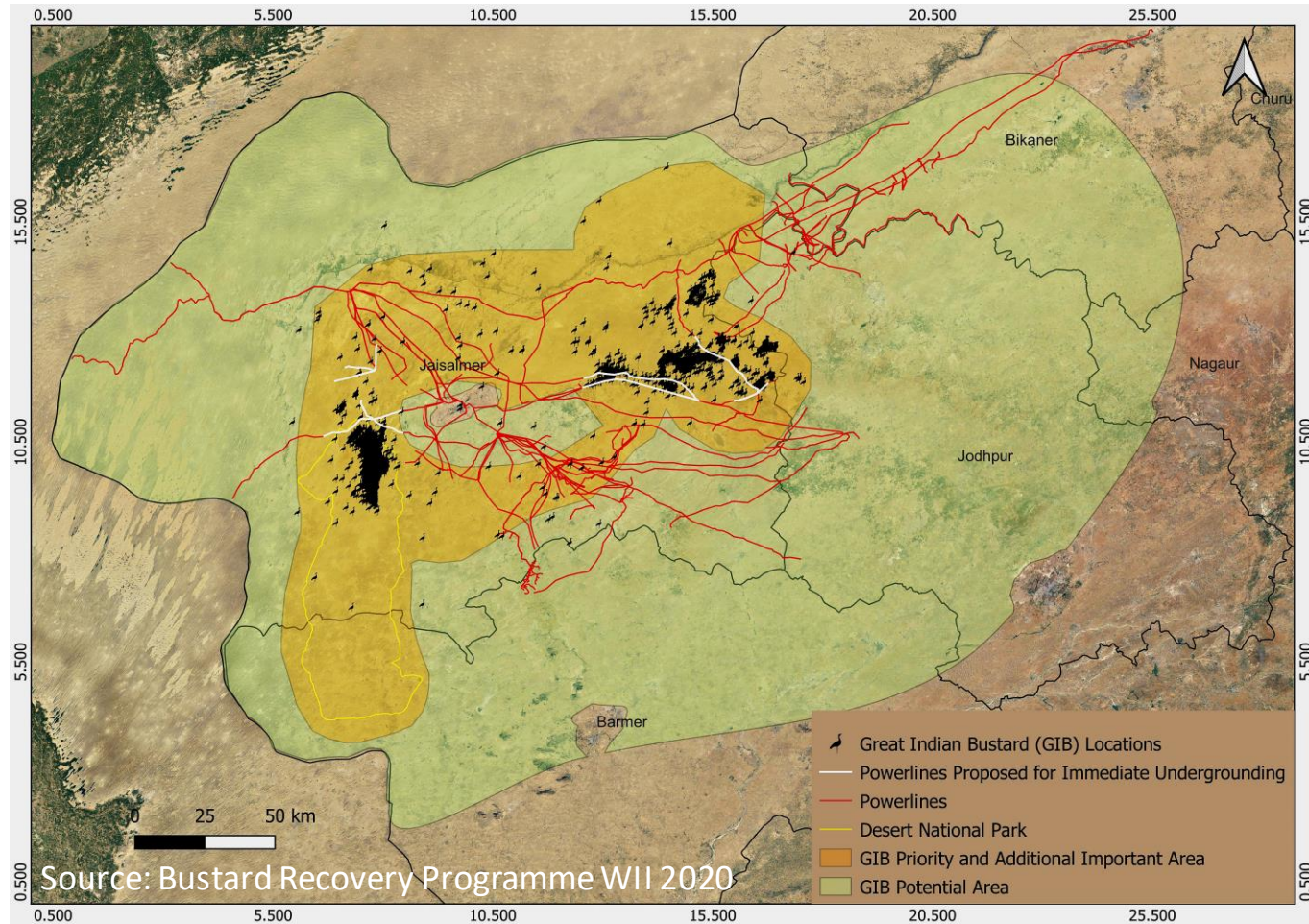
Image:Devesh Gadhvi



Bipin C.M



<https://tribune.com/>



Installation of firefly bird diverters to avoid collision

Mitigation strategy for insurance against extinction

A conservation breeding program has been initiated in Rajasthan to breed Great Indian Bustard in captivity and rewild them



Action also meets commitment to make Concerted Action Plan for the GIB under the aegis of the Convention on the Conservation of Migratory Species of Wild Animals (CMS)

Risk to flamingo due to transmission lines in the Arid Plains of Kachchh is significant



IUCN Status	Least Concern
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POPULATION SIZE
550-680 THOU

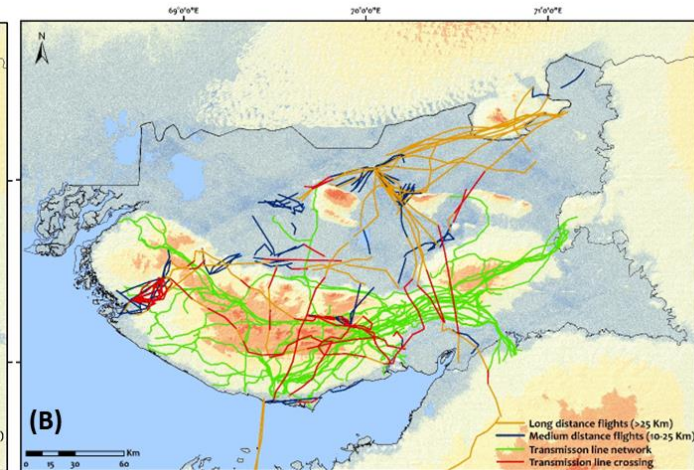
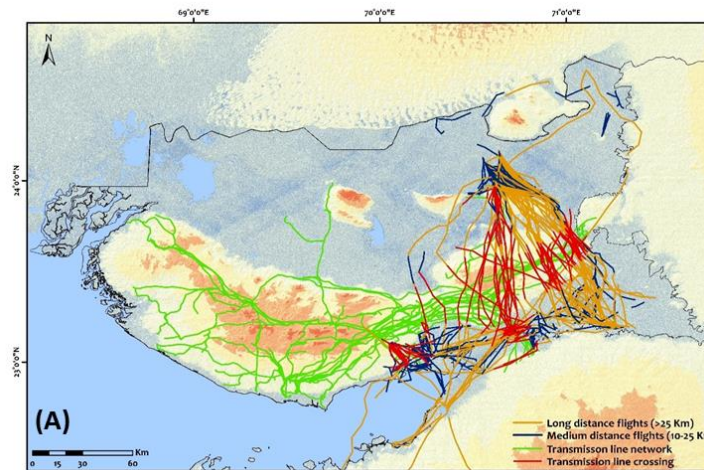
LIFE SPAN
40-60YRS

TOP SPEED
59 KM/H

WEIGHT
2-4 KG

HEIGHT
110-150 CM

LENGTH
80-150 CM



Movement tracks of Lesser Flamingo (A) and Greater Flamingo (B) showing the crossing of powerlines (in red color) WII study (2019-2021).



IUCN Status	Near Threatened
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POPULATION SIZE
2.2-3.3 MLN

LIFE SPAN
50 YRS

TOP SPEED
60 KM/H

WEIGHT
1.2-2.7 KG

HEIGHT
80-90 CM

LENGTH
90-125 CM

Source- <https://animalia.bio/>

Mitigation options

- Re-route power lines away from high use areas
- Leave buffer distance for birds to avoid collision during take off and landing when routing power lines around high-use areas
- Install LMDs (spheres, swinging plates, spiral vibration dampers, bird flappers, flags, and crossed bands) to make power-lines visible



Photo: Subrat Kumar Seet

LEGAL SUPPORT

Hon'ble Supreme Court's directives (W.P 838 of 2019), dated 19th April 2021

'Powerlines be taken underground immediately, stressing that irrespective of the cost factor the priority shall be to save the near-extinct birds. Until the lines are made underground, bird-diverters are to be installed on all lines immediately'.

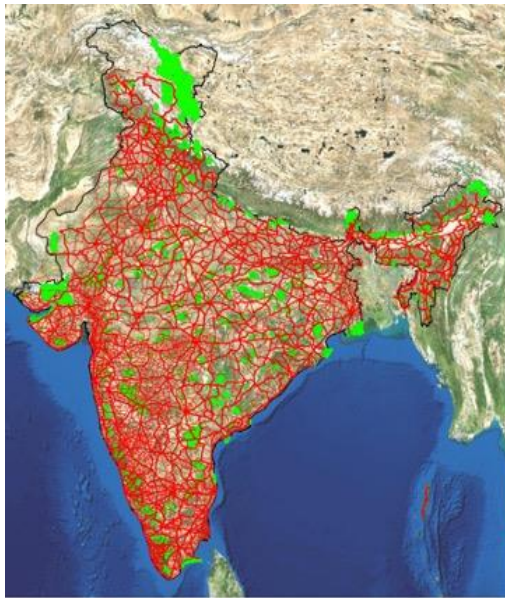
Hon'ble Supreme Court's directives (April 2022) for setting a committee for assessing the feasibility of laying transmission lines underground in Great Indian Bustard Priority and Potential Areas

Guidelines were issued by SC Committee in consultation with Central Electricity Authority

Directive for technical specification and installation guideline for Bird Flight Diverter in GIB areas

RISK TO MAMMALIAN SPECIES

Multiple forms of challenges exist for connectivity of natural landscapes across the country



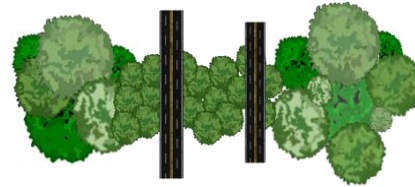
2nd largest road network in the world

5.2 Million Km

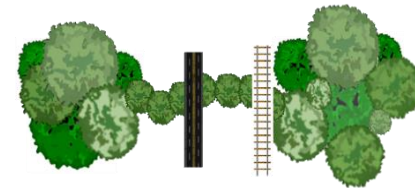
4th largest rail network in the world

3.0 Million Km

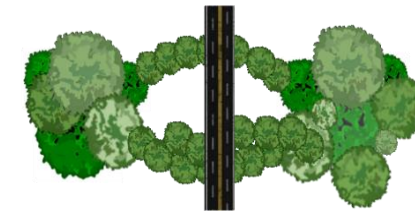
Protected Areas (PAs)
Road Network (SH & NH)
Rail Network



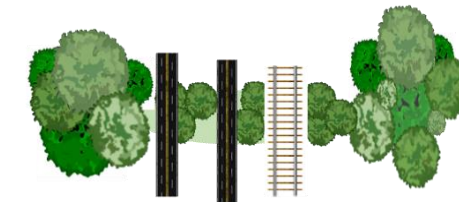
Multiple cut through a healthy corridor



Multiple linear infrastructure through a narrow corridor



Cuts through two or more corridors connecting PAs



Multiple linear cut through a "steppng-stone" corridor

Need for Best Practice Guidance was perceived



http://wii.gov.in/images//images/documents/eia/EIA_BPG_Report_2017.pdf

Part I

- Mainstreaming Biodiversity
- Regulatory Framework
- Overview of Development

Part II

- Mitigation of Impacts
- Enhancing Permeability
- Connecting Landscapes

Part III

- Structural and Non-Structural Measures
- Noise Attenuation Measures
- Power lines and Bird Mortality

- Glossary
- Photographic Plates

Guidance on design considerations in mitigation infrastructure

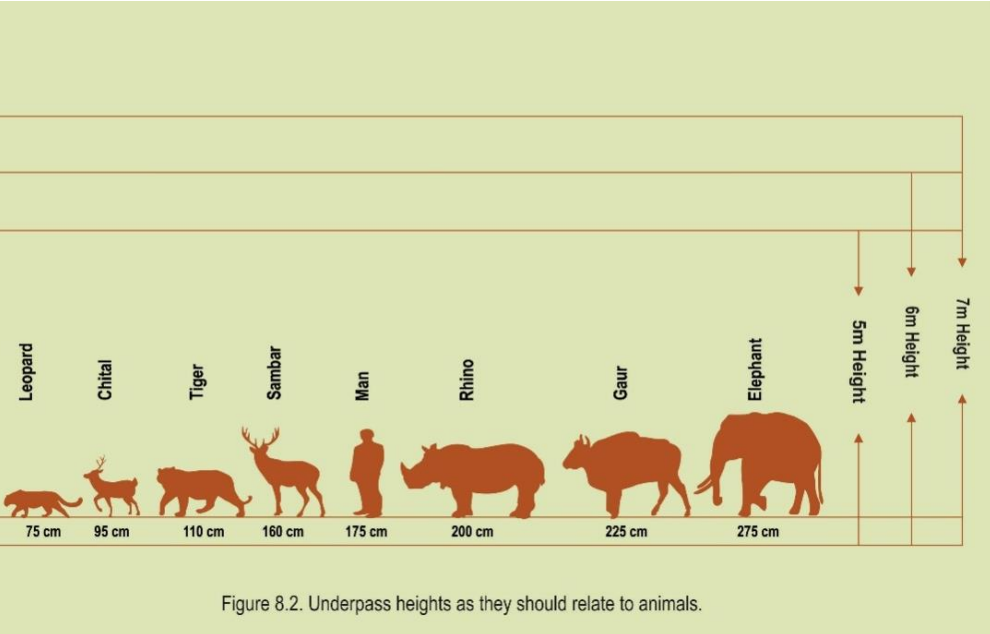
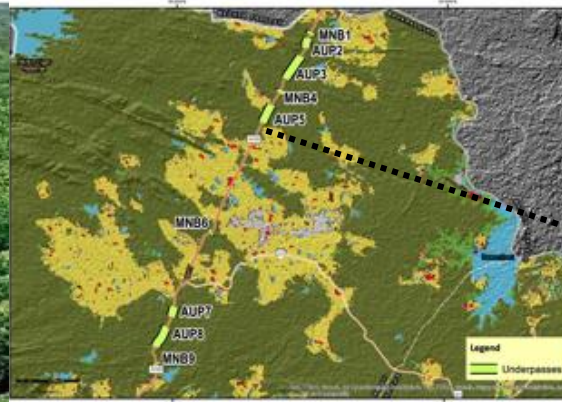


Figure 8.2. Underpass heights as they should relate to animals.



Successful implementation of guidance on ground



ANIMAL UNDERPASSES
ON NATIONAL
HIGHWAY 44



https://www.reddit.com/r/IndiaSpeaks/comments/pbung6/pench_tiger_reserve_india_a_16_km_long_elevated/

- Nine structures (5 underpasses & 4 minor bridges)
- 50 to 750 m wide
- Aligned across 40% (or 6.6 km) road through forest

- First dedicated animal crossing structures in India
- Largest underpass for animals in the world
- 18 species using the crossing structures

Success Indicators

Which species are using the animal underpasses?

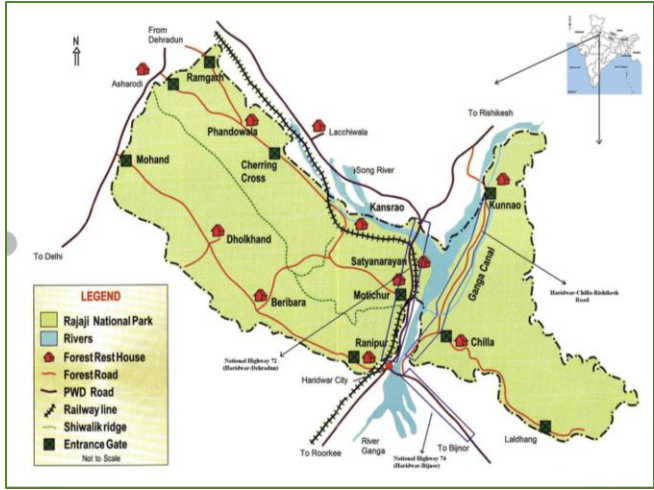
SPECIES	2019	2020	TOTAL
Barking deer		4	4
Chausingha		3	3
Chital	3450	10170	13620
Gaur	58	92	150
Hare	353	813	1166
Jackal	12	15	27
Jungle cat	250	309	559
Leopard	37	167	204
Mongoose	28	23	51
Monitor lizard	2		2
Nilgai	123	708	831
Palm civet	40	20	60
Pangolin		1	1
Porcupine	3	229	232
Rusty spotted cat	1	2	3
Sambar	49	108	157
Sloth bear	7	19	26
Small Indian civet	19	21	40
Tiger	155	352	507
Unidentified	71	101	172
Wild dog	261	777	1038
Wild pig	756	2646	3402
Wolf		14	14

21 wild mammal species
(excluding langur, rhesus macaque)
193% increase in use from 2019 to 2020
16 tiger individuals

4/5/2020 7:03 PM C3_ A



Mitigation structures for connecting habitats of large mammals in Rajaji National Park and Tiger Reserve



Multiple linear infrastructures cut across vital movement corridors of tigers and elephants between Eastern and Western parts of Rajaji National Park

In 2011, Hon'ble Supreme Court directed construction of three flyovers (736 m, 500, and 400m)



Image : WTI



Flyovers were not built as per schedule leading to prolonged on-site disturbance

15 2 2015

In 2019 the National Green Tribunal directed National Highways Authority of India (NHAI) to complete construction of flyovers on National Highway-74 adjoining Rajaji Tiger Reserve within 12 months

Flyovers are now ready in crucial sections

Evidence of restored connectivity



Images: NHAI



Source Uttarakhand Forest Department

ENABLING DIRECTIVES FOR UPTAKE OF GUIDANCE

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

Notification for Mandatory submission of a Wildlife passage plan for all linear infrastructure dated 13 JULY 2018

'No proposal of linear infrastructure projects submitted to the State Govts. by the user agency should be forwarded to the Standing Committee of NBWL without Animal Passage Plan prepared in consultation of the State CWLW on the basis of WII's Best Practice Guidance Manual'

RECOMMENDATIONS
AND ACTIONS



TASK FORCE



ADOPTED BY OTHER
MINISTRIES



GREEN
COURT

Judgements

NBWL,
NTCA,
FAC,
State Forest
and Wildlife
Departments

Ministry of Power,
Power Grid Corp.
Central Electricity
Authority,
MOEF&CC

Power,
New & Renewable
Energy,
Railway,
Transport

Nodal Ministry for
Environmental
Approvals
MoEFCC

Further uptake by Governments

Min. of New & Renewable Energy - 22nd February, 2019

‘Mandatory requirement of bird diverters for approval of new power line projects aligned through Pas and other wild life rich areas’.

National Green Tribunal

Mitigate all impacts of power lines in priority GIB habitats

Disapprove new wind turbines and remove existing structures from areas critical for GIB conservation

Min. of Road Transport & Highway- 29th May, 2019

All implementing agencies to **follow the provisions of the WII**

Guidance at the planning stage itself.

‘Avoid any road alignment through National Parks and Wildlife sanctuaries, even if it requires taking a longer route/bypass’.

Min. of Indian Railways

Preparation of species specific plans for new railway projects

Joint Task Force recommendations and Special Committee set by the Hon’ble Supreme Court

Underground cables through protected areas and eco sensitive zones

Use of bird deflectors.

Capacity building efforts



ADB

World Bank



Wildlife Managers

IAIA



MoEFCC

Indian Railways



Highway Authorities



Tasks Ahead

Investing in **G**REENING the Infrastructure

- *Promoting the discipline of connectivity conservation in all seriousness for creating a crossroad for conservation and economy*
- *More research for sensitive planning and designing of mitigation structures*
- *Monitoring of the responses of animals to built passages- What works and what does not?*

Fostering partnerships with global conservation bodies (CBD, CMS, IPBES, UNEP-WCMC)

Promoting SEA can strengthen regional planning for linear infrastructures to ensure landscape connectivity

Unplanned developments



Planned developments

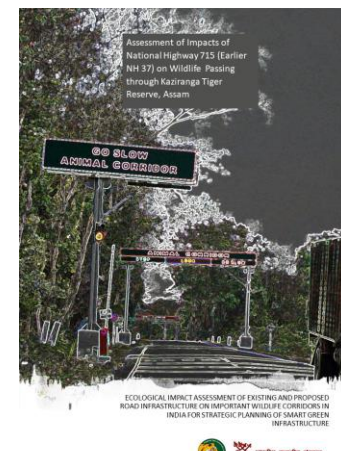
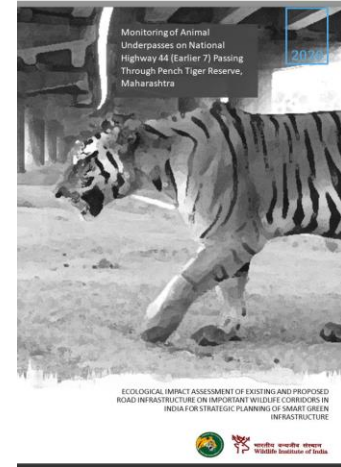
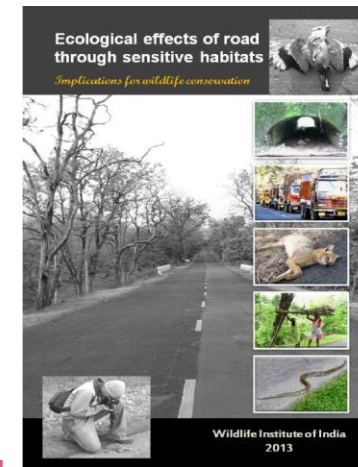
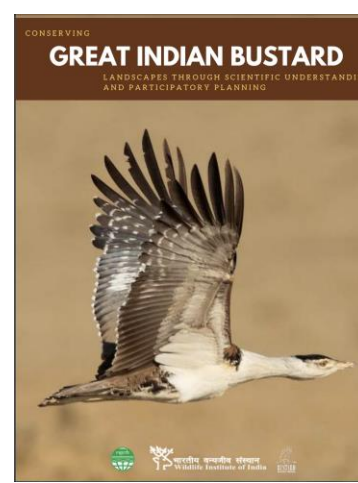
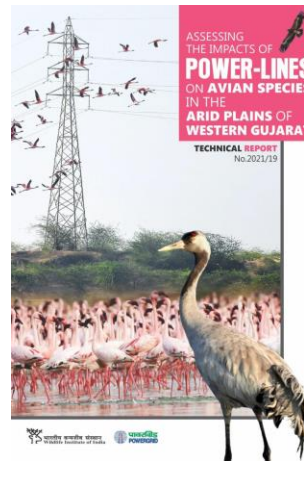
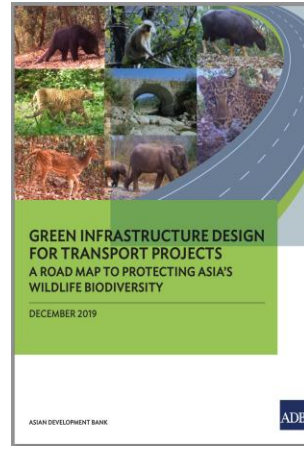
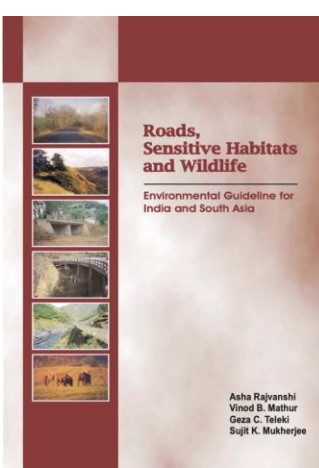
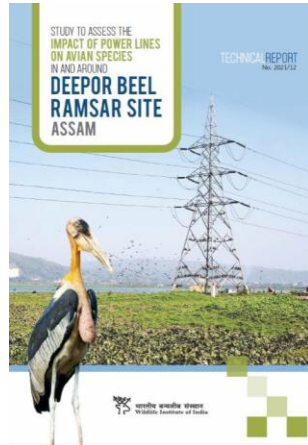
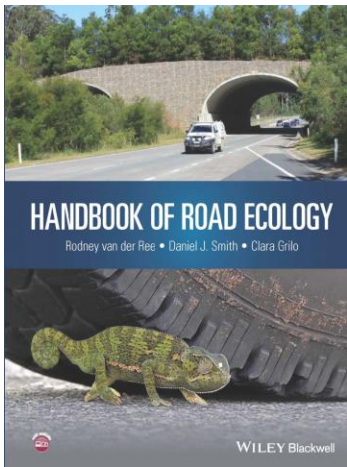
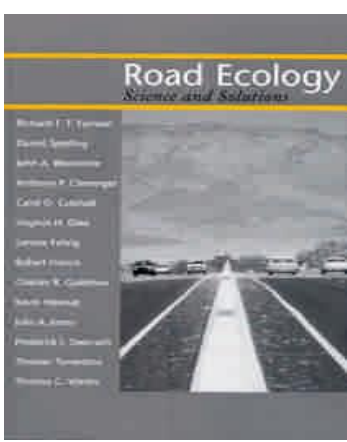


Graphics: Sharmistha Singh

SEA need to be firmly included in the national planning processes

SEA to be included in capacity building and awareness raising efforts

LEARNING RESOURCES



THANK YOU



Acknowledgements

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