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Monitoring of Animal Underpass on NH 44, Pench Tiger Reserve, Maharashtra (2019 – 2022)

ADB-WII WEBINAR SERIES 2021-2022
Greening Transportation Projects

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

ADB

WEBINAR SERIES 4
Lessons from the Field -
Success Stories of Mitigation
Measures in Maintaining and
Enhancing Connectivity and
Concluding Session - Summing
up of the Webinar Series with
Key Takeaways

10 Feb 2022
11 a.m.-12.30 p.m. Philippines (GMT+8)
8.30-10 a.m. India (GMT+5.30)

This webinar shares established best practices, recommendations, and principles with real life successful examples of mitigation measures by wildlife biologists. The series concludes with key takeaways from panel of experts on the field of green linear infrastructure.

An enriching dialogue among stakeholders on how to build capacity for conserving and managing natural capital during planning and implementation of transportation projects. We learn about the real-life examples and case studies that showcase the positive effects of green linear infrastructure on biodiversity. We also get a glimpse into the science and work that goes behind building the world's largest mitigation measures in India. Our experts bring forth the administrative capacity constraints in planning green transportation project as it remains one of the biggest challenges for avoiding and mitigating potential impacts of road, rail and other transport infrastructure. Finally, the way forward to enable mainstreaming of conservation issues and biodiversity concerns into the decision-making process of transportation projects. The objective is to build capacity for a range of stakeholders in harmonising conservation and development, and retrofitting and investing in nature-based infrastructure development.

MODERATOR

11-11.05 a.m. Opening Remarks

MALVIKA ONIAL
Scientist D, Animal Ecology & Conservation Biology and Associate Nodal Officer, Environmental Impact Assessment Cell, Wildlife Institute of India

JAMIE LEATHER
Chief of Transport Sector Group, Sustainable Development and Climate Change Department, Asian Development Bank

11.05-12.05 a.m. Success Stories of Mitigation Measures in Greening Transportation Projects

Asia Wide Biodiversity Impact Assessment of Linear Infrastructures (15 mins)

ROB AMENT
Senior Conservationist, Center for Large Landscape Conservation, Bozeman, MT, USA

Implementation Challenges: Learnings and Experiences (10 mins)

DHANANJAI MOHAN
Director, Wildlife Institute of India

Case Study Toolbox for Nepal and Canada (15 mins)

TONY CLEVENGER
Senior Research Scientist, Western Transportation Institute, Montana State University, Bozeman, MT, USA

Miles to go... Ways Forward: Strengthening Initiatives in Different Sectors (10 mins)

V.B. MATHUR
Chairperson, National Biodiversity Authority, India

World's Largest Mitigation Measures in India (10 mins)

BILAL HABIB
Scientist-E & Head of Animal Ecology and Conservation Biology, Wildlife Institute of India

12.05-12.25 a.m. Interactive Session: Ask the Panel of Experts

12.25 am-12.30 p.m. Summary of the Series and Closing Remarks

BILAL HABIB
Scientist-E & Head of Animal Ecology and Conservation Biology, Wildlife Institute of India

Registration HERE

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भारतीय वन्यजीव संस्थान
Wildlife Institute of India

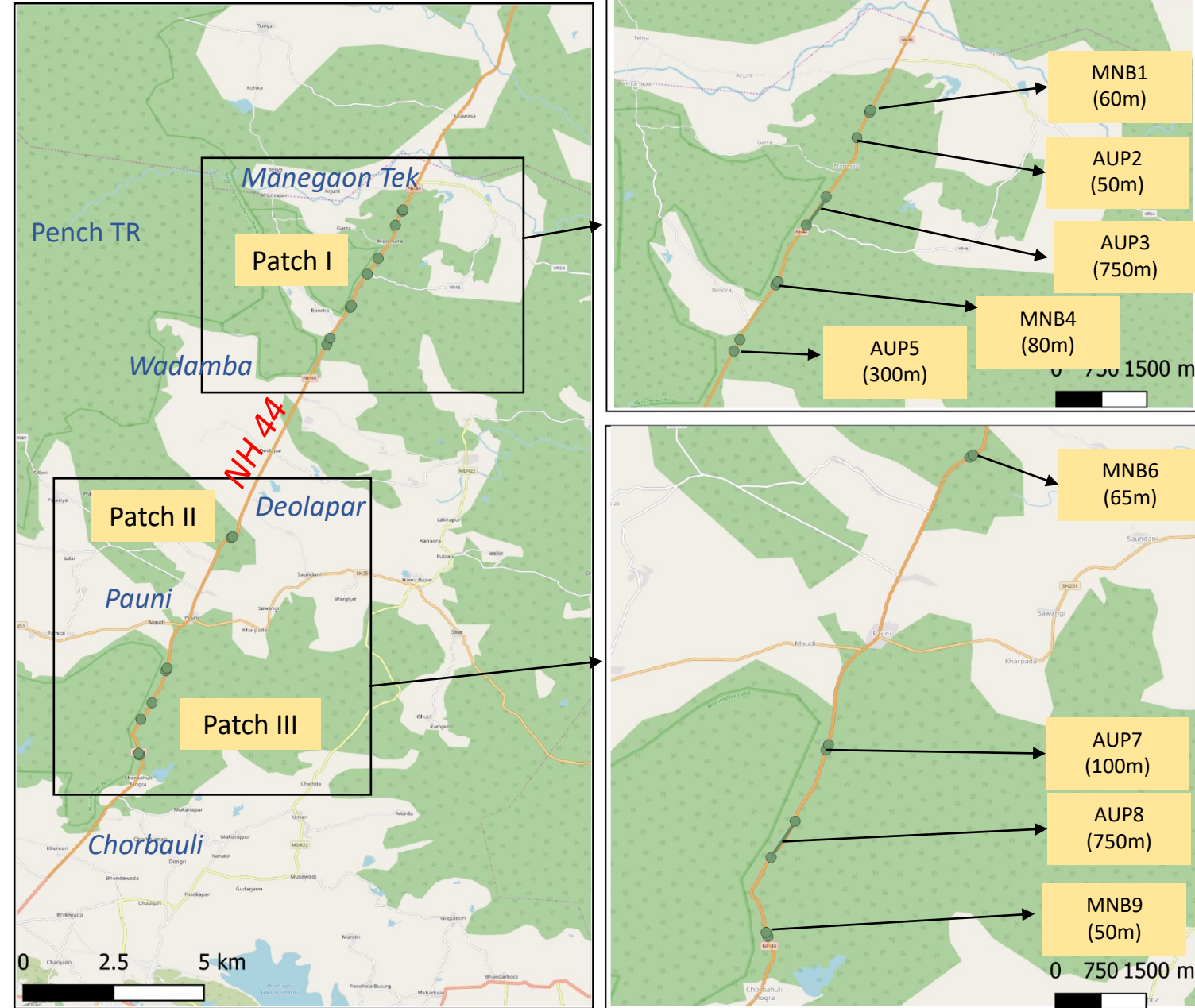
महाराष्ट्र वन विभाग

India's first wildlife underpasses

A series of nine underpasses was constructed on National Highway 44 (previously 7) passing through Pench Tiger Reserve, Maharashtra

These underpasses (50 – 750 m wide) are the first animal underpasses to be constructed in the country to mitigate impacts of roads.

Construction was completed by end of 2018, and WII started monitoring the structures since March 2019.



Monitoring design

Monitoring by camera traps
One camera per span (length between adjacent pillars) of underpass (15-30 m)

Span width

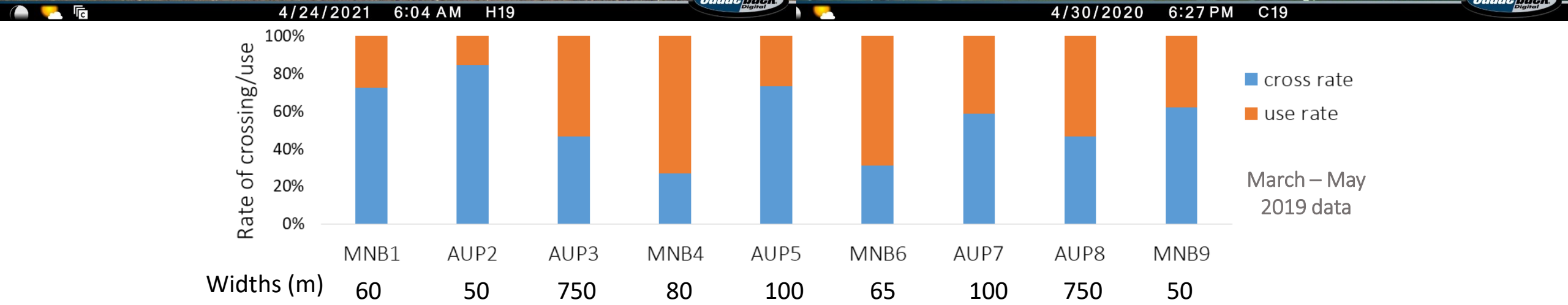
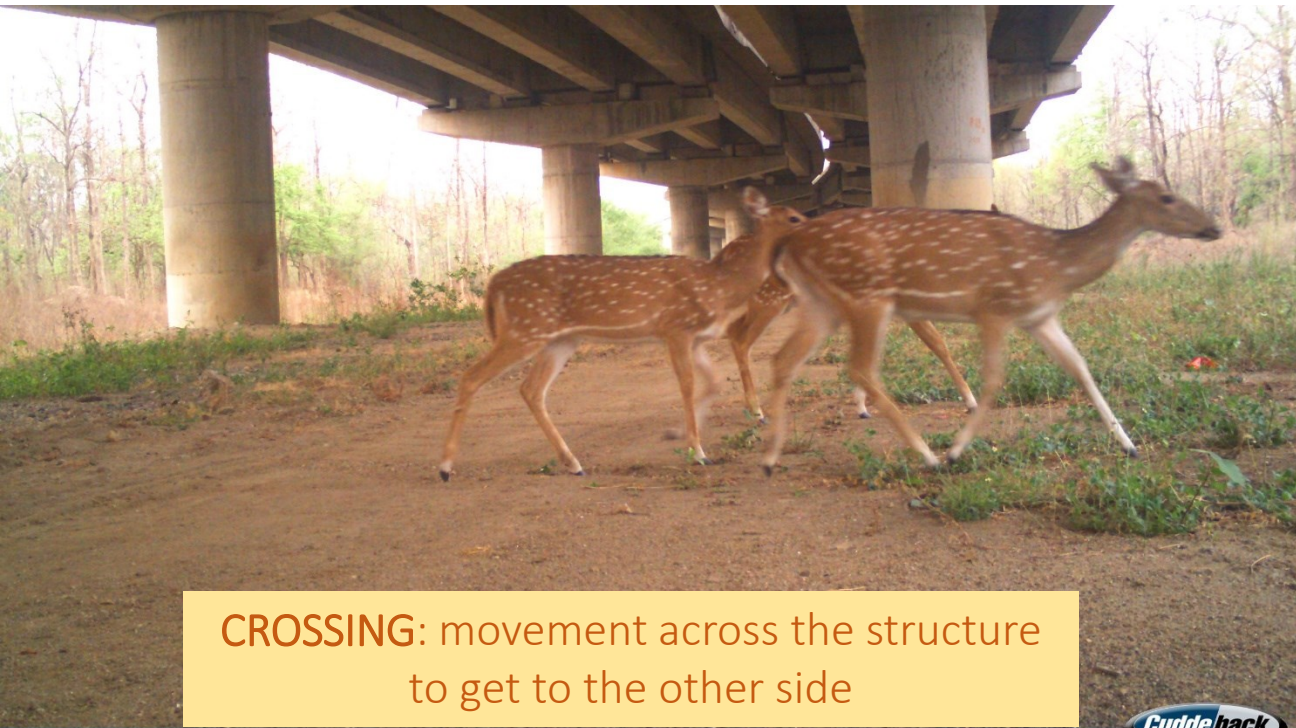
Which species are using the animal underpasses?

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

What do we mean by captures of wildlife?

Why not crossings?



Do animals immediately take to the underpasses?

Monitoring period

15-01-2019 15-04-2019 15-08-2019 15-11-2019 19-02-2020 09-05-2020 06-09-2020





First time users





New learnings



10/13/2020 6:15 PM G1







3/29/2020 9:43 AM G2




Better together



3/14/2020 3:37 PM B1_





A photograph of a group of coyotes under a concrete bridge. One coyote in the foreground is sniffing the ground. Several other coyotes are in the background, some sniffing and others standing. The bridge has large concrete pillars and a curved overpass. The ground is dirt and gravel. There is a large, semi-transparent circular graphic on the left side of the image.

Marking territories



Fighting arena



6/21/2020 6:28 AM H10

Resting spot



Naturalisation



7/15/2019

8:29 AM

H11

Naturalisation



7/27/2020

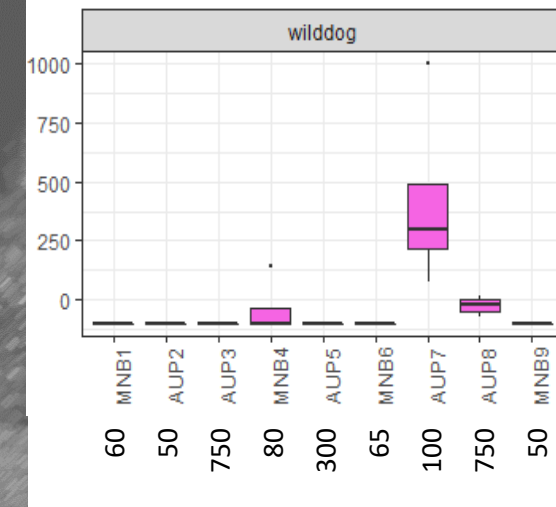
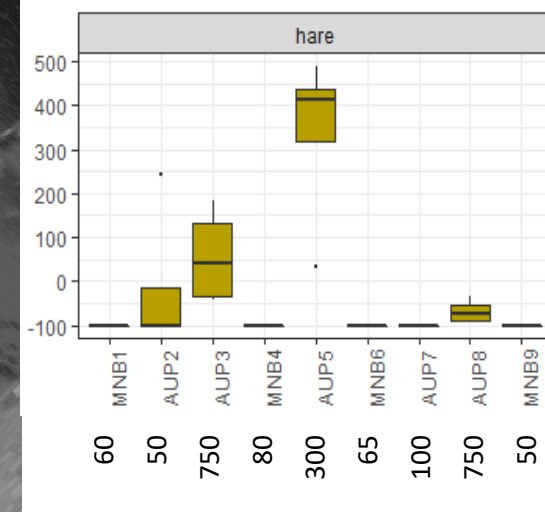
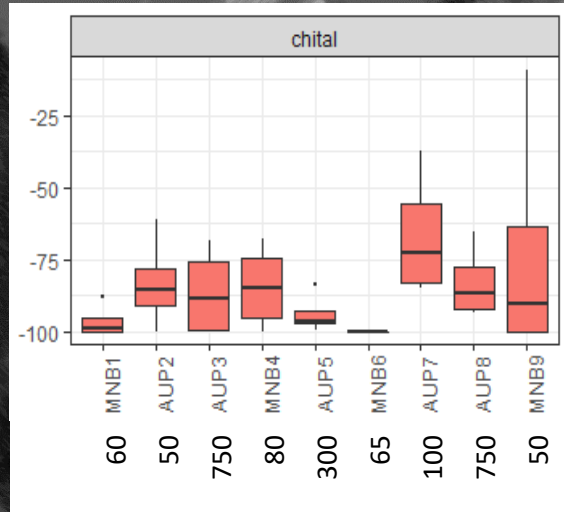
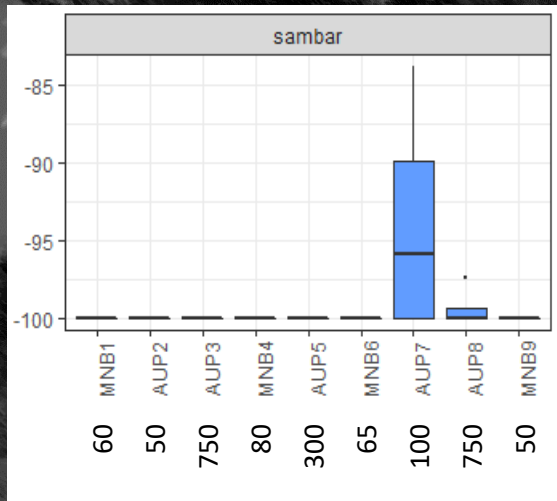
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H11



Can crossing structures mimic natural habitat?

UNDERPASS PERFORMANCE = $\frac{\text{movement rate in underpass} - \text{movement rate in adjacent habitat}}{\text{movement rate in adjacent habitat}} \times 100\%$

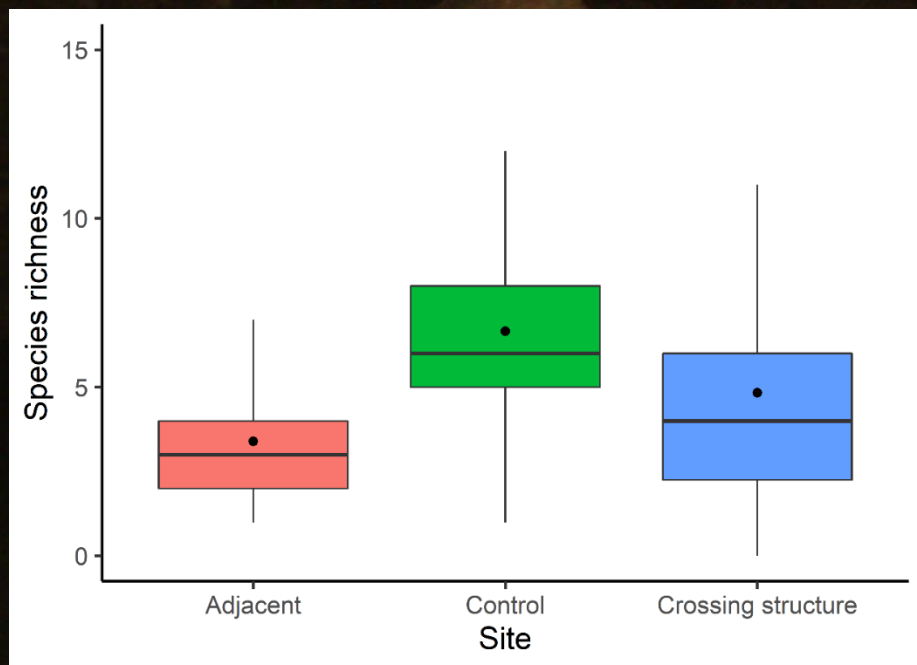
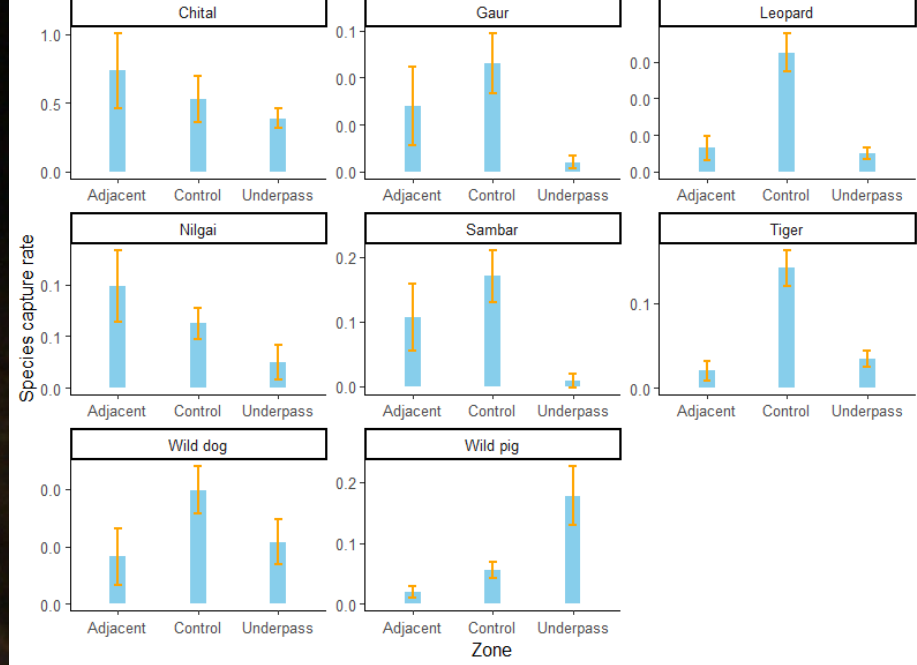


Negative performance:

sensitive species, probably not yet habituated to underpasses (sambar, nilgai);
species with high movement rates in adjacent habitat (chital)

Positive performance:

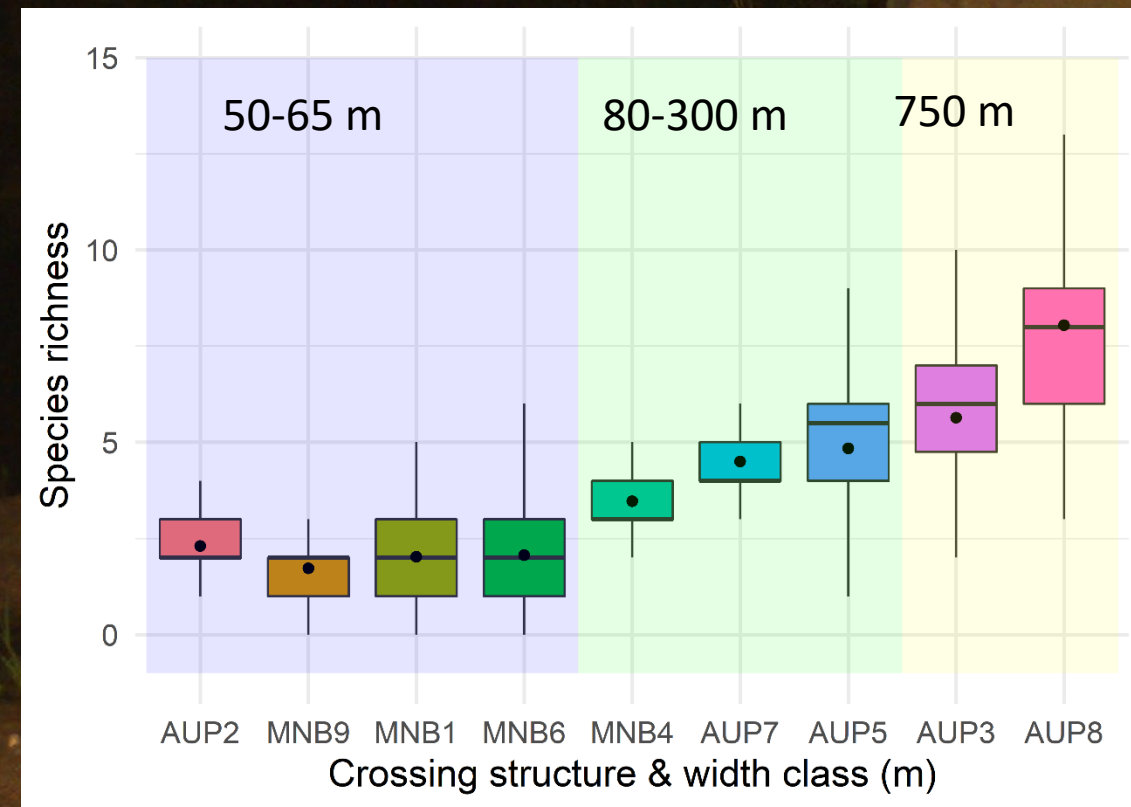
Mostly in big (>100 m) underpasses for species of open habitat types



Movement rates under crossing structures similar to natural rates for some species

Species richness under crossing structures is less than that inside forest

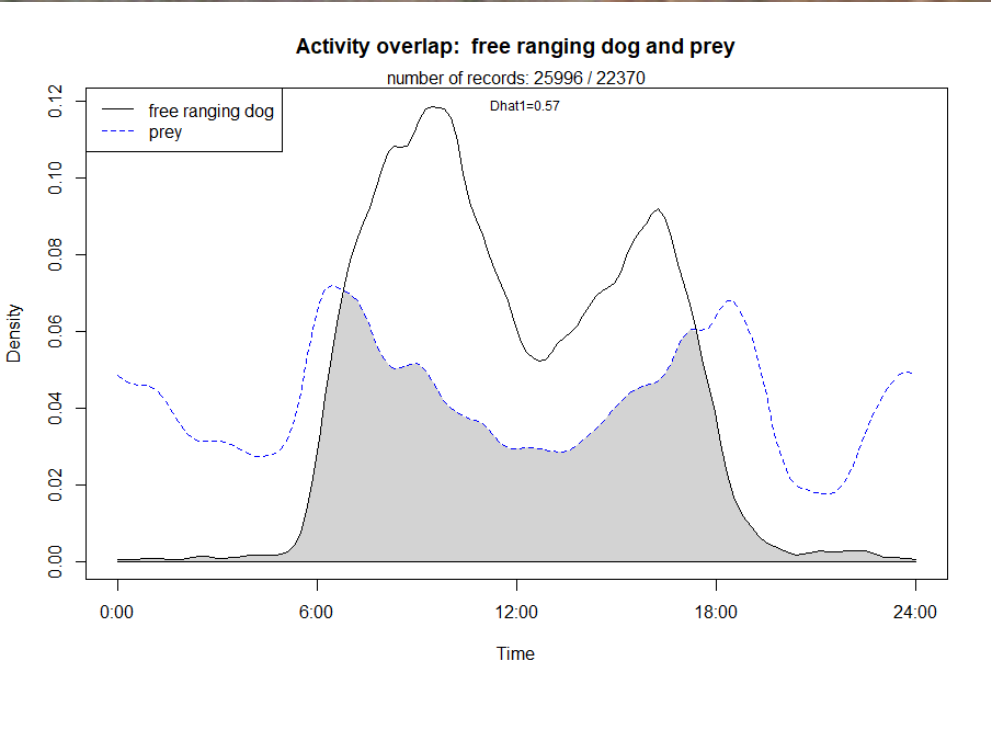
Mean species richness increases with crossing structure width.



Wild dog haven?



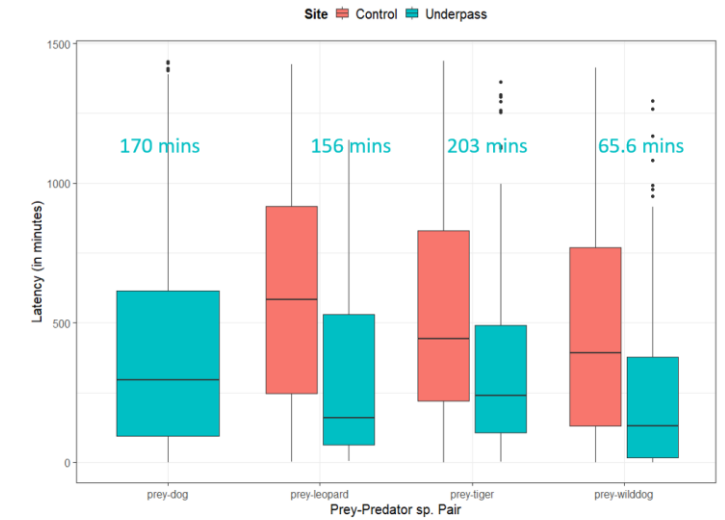
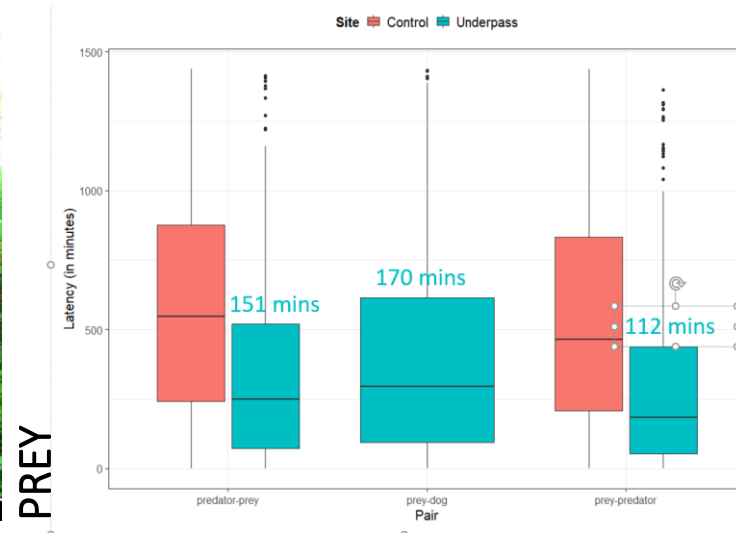
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Do underpasses act as 'prey traps'?

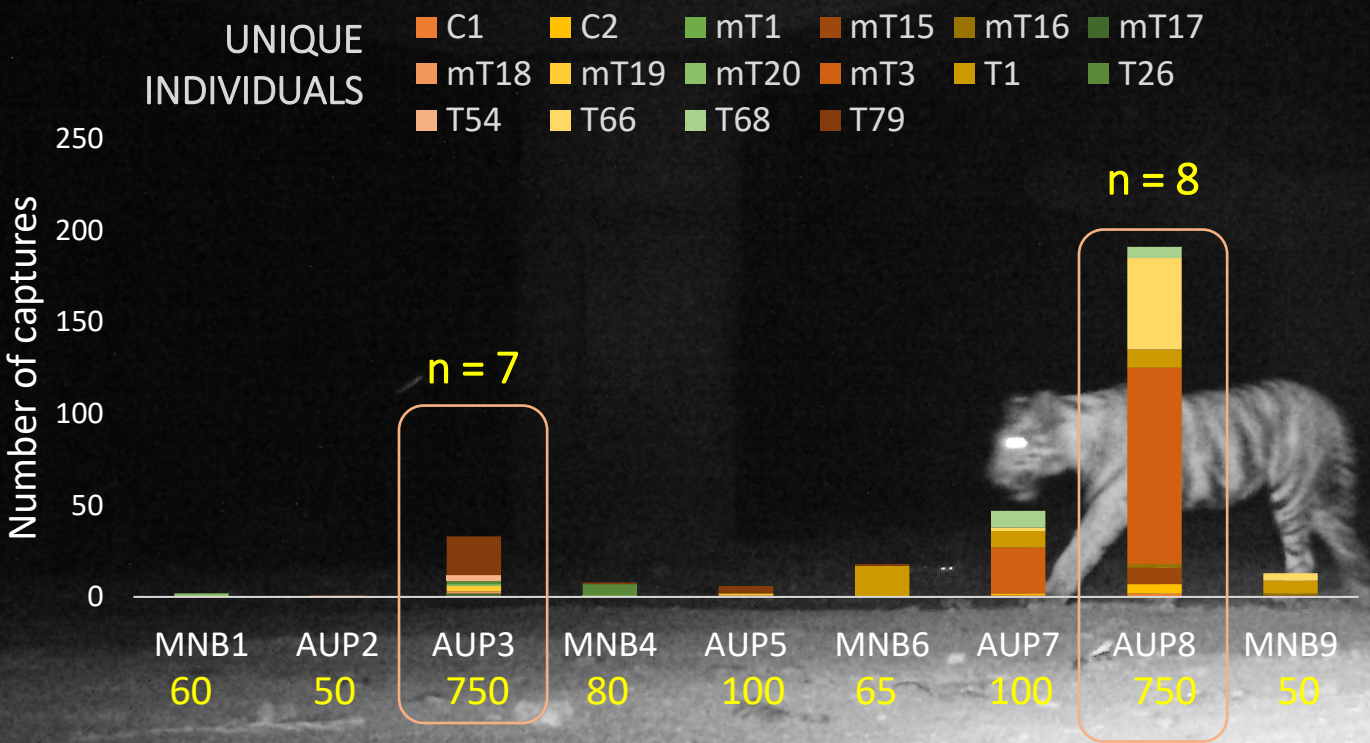


Latency (time)



No evidence of underpasses acting as 'prey-trap'.
Wild dog-prey latency time is the least (65.6 minutes).

What is the use of underpasses by tigers?



16 Unique Individuals

Tigers of NH 44



At least 16 tiger individuals during March 2019 – December 2020.

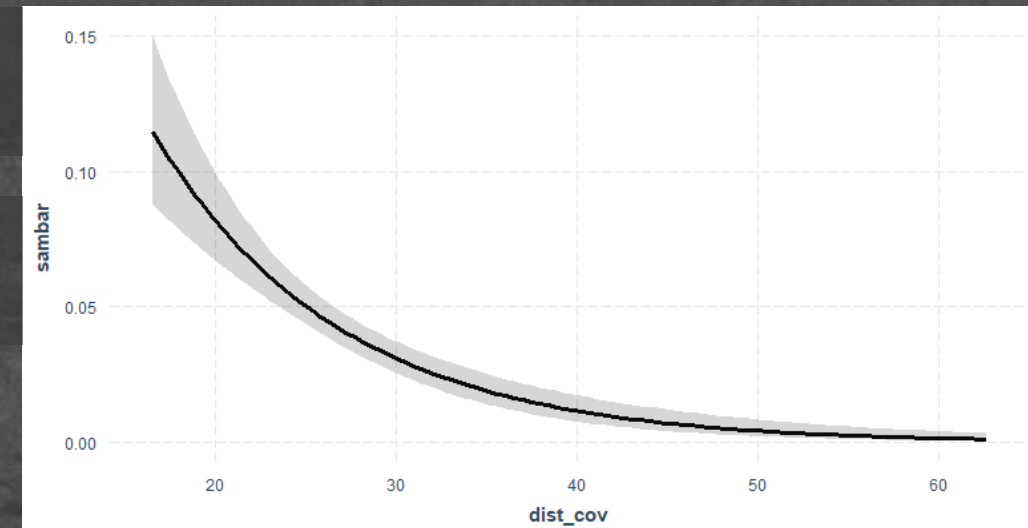
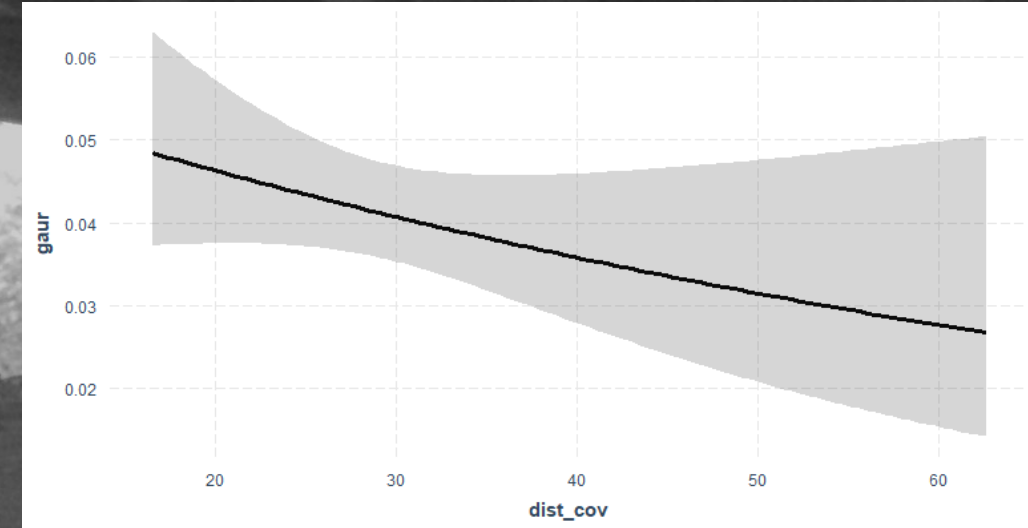
These include six individuals that have been captured inside the Pench Tiger Reserve, Maharashtra, and at least 3 cubs/sub-adults.

Management inputs



Vegetation cover near underpass
increases use by herbivores

Human use decreases use by some
mammals



ACKNOWLEDGMENT

- PCCF (HoFF), Maharashtra
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- FD, Pench Tiger Reserve
- DD, Pench Tiger Reserve
- MD, FDCM, Nagpur
- CCF (T), Nagpur Div.
- DCF (T), Nagpur Div.
- RFO – Pauni, Deolapar, Chorbauli (Pench TR) Pauni (T), Deolapar (T)
- Akanksha Saxena
- Long-Term Monitoring Team (Pench)
- Forest guards
- Field assistants

