Himalayan Biodiversity:
Natural History and Animal Behavior

Spring 2021, ANTH 1801
WEB Synchronous/Asynchronous
Wednesday, 8 – 9 am EST

General Education Requirements
Natural Science,
Specific Geographic Region

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COURSE DESCRIPTION

Ranging in altitude from several hundred meters above sea level to over seven thousand, from subtropical forests to high altitude meadows and deserts, and from areas with little or no rainfall to regions that are among the wettest in the world, the Himalayas define a region of enormous geological variation and biodiversity. The goal of this course is to gain an understanding of this diversity, with a focus on ecology. Within the framework of standard classificatory schemes – mammals, birds, reptiles, and insects – we will focus on specific organisms within specific genre for more detailed behavioral analysis.

LEARNING OBJECTIVES AND OUTCOMES

There are four interrelated **learning objectives**:

1. To develop an appreciation for the unique biodiversity of India in general and the Himalayas in particular.
2. To develop an understanding of how animals have adapted to their environment and how their behavior reflects ecological interdependence.
3. To understand how environmental change threatens biodiversity.
4. To gain a critical understanding of the challenges associated with conservation and environmental protection in the Himalayas.

There are four earning **outcomes.** After taking the course

1. students will possess detailed knowledge about how mountain environments are linked to biodiversity.
2. students will be able to explain how animal behavior reflects ecological interdependence in the Himalayas, and how this reflects general patterns of adaptation.
3. students will be able to identify specific factors that are leading to environmental change and will be able to explain their impact on biodiversity in the Himalayas.
4. Student will be able to explain how and why Himalayan forests and fauna are threatened and how they are being protected.

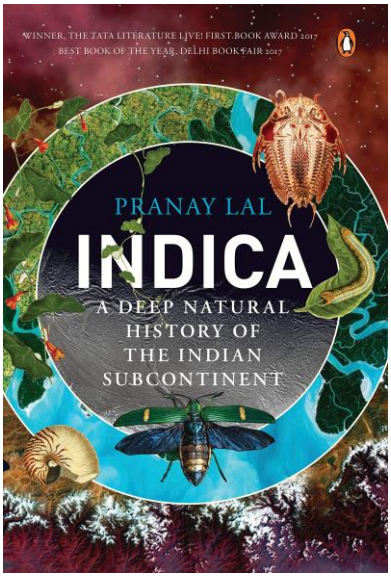
TEXTS

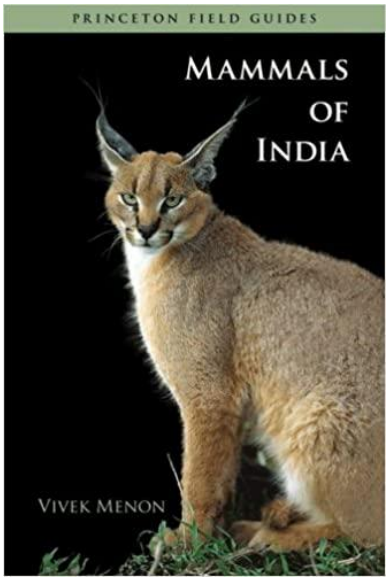
Required

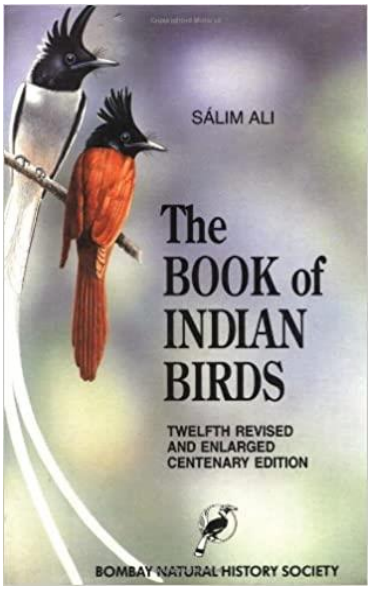
Pranav Lal, 2016, *Indica: A Deep Natural History of the Indian Subcontinent*. New Delhi: Penguin, India Allen Lane

Vivek Menon, 2009. *Mammals of India*. Princeton: Princeton University Press.

Salim Ali, 1997. *The Book of Indian Birds*. New Delhi: Oxford.







Recommended and Supplemental Texts

David Zurick, Julsun Pacheco, Basanta Raj Shrestha, Birendra Bajracharya, 2006. *Illustrated Atlas of the Himalaya.* Lexington: University of Kentucky Press.

Stephen Alter, 2020. *Wild Himalaya: A Natural History of the Greatest Mountain Range on Earth.* New Delhi: Aleph.

S. S. Negi, 1992 *Himalayan Wildlife, Habitat and Conservation*. New Delhi: Indus Publishing.

Jim Corbett, 1994. *Jungle Lore.* New Delhi: Oxford

Salim Ali, 1985. *The Fall of a Sparrow*. New Delhi Oxford

Suniti Bhushan Datta and Nikhil Devasar. 2012. *Birding in the Doon Valley*. Landour: Winterline Publishing

Websites:

https://www.bioatlasindia.org/

https://globalforestatlas.yale.edu/
https://www.birdsofindia.org/
https://www.birdsofindia.co.in/
https://www.wwfindia.org/
https://ntca.gov.in/
https://www.tigernet.nic.in/
https://indiabiodiversity.org/
https://www.conservationindia.org/

https://www.wti.org.in/
https://india.wcs.org/
https://www.wildlifeconservationtrust.org/
https://www.ncf-india.org/
https://www.tncindia.in/

OFFICE HOURS

Given that students and the instructor will be on different time zones, office hours will be scheduled on an ad hoc basis by appointment. Please contact the instructor via email to make the necessary arrangements for a zoom meeting.

COURSE REQUIREMENTS AND FORMAT

The course is delivered in a hybrid synchronous/asynchronous mode. All students meet together with the instructor for one hour per week via zoom meetings: Tuesday, 8 – 9 am EST.

Synchronous: Weekly synchronous meetings provide a framework for structured seminar discussion led by the instructor and student working groups. Weekly meetings build on curated multi-media modules developed by the instructor. Each week students engage with a new module after completing reading assignments that highlight specific topics, issues, problems and questions. After applying what has been learned to the mediated material in each module students will analyze and interpret their virtual experiences through structured discussion and debate.

Asynchronous: Each week students will spend 1.5 self-scheduled hours working through a pre-recorded, online, multi-media module focused thematically on a specific topic, issue, question or problem. Modules are prepared by the instructor using content that is uniquely produced for the course incorporating a wealth of material that is available online. Each module contains recorded, onsite guided tours, commentaries, analyses and interpretations that build on reading assignments by taking students on virtual trips to specific locations in the mountains.

Canvas Course Interface: The course is delivered by the University of Pittsburgh's *Canvas* Learning Management System. Synchronous class meetings are scheduled and accessed via zoom meetings on the *Canvas* interface. The class syllabus and all other material including recorded modules are posted under the appropriate tab on the *Canvas* course page menu. All reading assignments that are not from the required texts (see above) are available as pdf copies that are posted along with each module, as appropriate.

ASSIGNMENTS:

There are two integrated assignments that will be scored, an essay and a multi-media module.

Essay (40 points): Write a 3000-word essay using at least ten academic sources. The essay must be on a question or problem that is relevant to the course. The essay will provide the academic foundation for the multi-media module project. **(Due Week 10)**

Multi-Media Module (40 points): Using the multi-media modules produced for this course as models and as examples of how media can be combined, collect resources and produce one of your own! The module you produce should build on the intellectual and academic foundation of the essay. **(Due Week 14)**

Attendance and Participation: (20 points)

Total: 100 points

GRADING:

A	**95 – 100**
A-	**90 – 94**
B+	**85 – 89**
B	**80 – 84**
B-	**75 – 79**
C+	**70 – 74**
C	**65 – 69**
C-	**60 – 64**
D+	**55 – 59**
D	**50 – 54**
F	**49 or below**

Policies of the Dietrich School of Arts and Sciences:

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Academic Integrity

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators. To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Understanding and Avoiding Plagiarism tutorial.

Student Opinion of Teaching Surveys

Students in this class will be asked to complete a *Student Opinion of Teaching Survey*. Surveys will be sent via Pitt email and appear on your Canva landing page during the last three weeks of class meeting days. Your responses are anonymous. Please take time to thoughtfully respond, your feedback is important to me.

Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Accessibility

Canvas is ADA Compliant and has fully implemented the final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998. Please note that, due to the flexibility provided in this product, it is possible for some material to inadvertently fall outside of these guidelines.

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Email Communication Policy:

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an e-mail forwarding service that allows students to read their e-mail via other service providers (e.g., Gmail, Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address. To forward e-mail sent to your University account, go to *http://accounts.pitt.edu*, log into your account, click on *Edit Forwarding Addresses*, and follow the instructions on the page. Be sure to log out of your account when you have finished. (For the full E-mail Communication Policy, go to *www.bc.pitt.edu/policies/policy/09/09-10-01.html*.)

WEEKLY SCHEUDLE

From the standpoint of natural history the Himalaya may be subdivided into discrete ecological zones. Each week will be dedicated to one of these zones. Multi-media modules will provide an overview of the biodiversity in each zone, with a focus on specific flora and fauna that provide a perspective on that zone.

Reading assignments provide a detailed understanding of the ecological adaption of various species of tree, flowering plants, mammals, birds, reptiles and insects.

The book by the biochemist Pranay Lal *Indicus: A Deep Natural History of the Indian Subcontinent* should be read to provide broad context for understanding evolutionary change, natural history and biodiversity in the Himalayas.

Week 1 – 1/18 – 1/22

Synchronous: Introduction and Overview: Ecology and Environment

Asynchronous/Expeditions: The Himalayas: A Geological Overview and Preview of the Ecological Zones

Reading: *Indica, Why on Earth* and *Breath of Life* (Chapters 1 and 2)

Week 2 – 1/25 – 1/29

Synchronous: Subtropical Pine Forests

Asynchronous/Expeditions: The Himalayan subtropical pine forests extend nearly 3,000 km across the length of the Himalayas, traversing Pakistan, India, Nepal, and Bhutan. *Chir* pine (*Pinus roxburghii*) is the dominant pine in the ecoregion. While the Kali Gandaki river valley divides the region into a drier western forest and a wetter eastern forest, the two sections have similar ecosystem dynamics and species assemblages and thus are considered one ecoregion. Monsoon rains from the Bay of Bengal deliver rains to the eastern Himalayas, causing this region to be wetter than its western counterpart. Fires are common features of these *chir* pine forests, thus the understory is relatively sparse save for a few species of grass. These include *Arundinella setosa, Imperata cylindrica,* and shrubs from the genera *Rubus* and *Berberis*. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica*, *Fins, Flippers and Feet* and *Revival* (Chapter 3 and 4); Ali and Menon, Sections on Relevant Birds and Mammals.

Week 3 – 2/1 – 2/5

Synchronous: Subtropical Broadleaf Forests

Asynchronous/Expeditions: The Himalayan subtropical broadleaf forests cover an area of 14,700 square miles (38,000 square kilometers) and encompass many different forest types. These forest types comprise dry systems of scrub, subtropical dry evergreen

forests, northern dry mixed deciduous forests, and dry dipterocarp forests, as well as wetter systems of moist mixed deciduous forests, subtropical broadleaf wet hill forests, northern tropical semi-evergreen forests, and northern tropical wet evergreen forests. These broadleaf forests extend east to west between elevations of 500 and 1,000 meters. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica*, *The Making* and *Beasts and Behemoths* (Chapters 5 and 6); Ali and Menon, Sections on Relevant Birds and Mammals.

Week 4 – 2/8 – 2/12

Synchronous: Western Broadleaf Forests

Asynchronous/Expeditions: The **Western Himalayan broadleaf forests** and Western Himalayan subalpine conifer forests make up the temperate forests of the western Himalayas. These forests span from 600 to 3,800 meters, mainly on the western slopes. Common plant species include spruce (*Picea smithiana*), yew (*Taxus wallichiana*), fir (*Abies pindrow*), blue pine (*Pinus wallichiana*), rhododendron (*Rhododendron campanulatum*), and birch (*Betula utilis*). Endangered and endemic shrub species *Lactuca* undulate and *Berberis lambertii* also call these forests home. Just a few of the characteristic animals of these forests include the western tragopan (a species of pheasant), the snow leopard, the Bengal tiger, and the Himalayan tahr. All of these species are listed as endangered, with the exception of the Himalayan tahr, which is classified as near threatened. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica*, *Isolation* (Chapter 7); From Ali and Menon, Sections on Relevant Birds and Mammals.

Week 5 – 2/15 – 2/19

Synchronous: Western Himalayan Subalpine Conifer Forest

Asynchronous/Expeditions: The Western Himalayan broadleaf forests and **Western Himalayan subalpine conifer forests** make up the temperate forests of the western Himalayas. These forests span from 600 to 3,800 meters, mainly on the western slopes. Common plant species include spruce (*Picea smithiana*), yew (*Taxus wallichiana*), fir (*Abies pindrow*), blue pine (*Pinus wallichiana*), rhododendron (*Rhododendron campanulatum*), and birch (*Betula utilis*). Endangered and endemic shrub species *Lactuca* undulate and *Berberis lambertii* also call these forests home. Just a few of the characteristic animals of these forests include the western tragopan (a species of pheasant), the snow leopard, the Bengal tiger, and the Himalayan tahr. All of these species are listed as endangered, with the exception of the Himalayan tahr, which is classified as near threatened. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica, Deccan's Inferno* (Chapter 8); From Ali and Menon, Sections on Relevant Birds and Mammals.

Week 6 – 2/22 – 2/26

Synchronous: Eastern Himalayan Broadleaf Forest

Asynchronous/Expeditions: Temperate forests in the eastern Himalayas include the **Eastern Himalayan broadleaf forests**, Eastern Himalayan subalpine conifer forests, Northern Triangle temperate forests, and Northeastern Himalayan subalpine conifer forests. Occupying elevations from 3,000 to 13,000 ft (900 to 3,900 m), these forests harbor remarkable diversity, especially within the broadleaf forests. Numerous biodiversity hotspots exist within these broadleaf forests, offering a haven for endemic plants and animals. A number of these endemic plants are endangered, including orchid species *Cymbidium whiteae*, *Paphiopedilum fairrieanum*, and *P. wardii*, and maple species *Acer oblongumand* and *Acer hookeri*. The broadleaf forests are home to over 500 bird species, while the subalpine conifer forests are home to over 200. Many charismatic mammals can also be found in this ecoregion; golden langur, lesser or red panda, Himalayan black bear, and clouded leopard are all native to this habitat. Unfortunately, these species are all endangered. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica, Humble Beginnings* (Chapter 9); From Ali and Menon, Sections on Relevant Birds and Mammals.

Week 7 – 3/1 – 3/5

Synchronous: Eastern Himalayan Subalpine Conifer Forests

Asynchronous/Expeditions: Temperate forests in the eastern Himalayas include the Eastern Himalayan broadleaf forests, **Eastern Himalayan subalpine conifer forests**, Northern Triangle temperate forests, and Northeastern Himalayan subalpine conifer forests. Occupying elevations from 3,000 to 13,000 ft (900 to 3,900 m), these forests harbor remarkable diversity, especially within the broadleaf forests. Numerous biodiversity hotspots exist within these broadleaf forests, offering a haven for endemic plants and animals. A number of these endemic plants are endangered, including orchid species *Cymbidium whiteae*, *Paphiopedilum fairrieanum*, and *P. wardii*, and maple species *Acer oblongumand* and *Acer hookeri*. The broadleaf forests are home to over 500 bird species, while the subalpine conifer forests are home to over 200. Many charismatic mammals can also be found in this ecoregion; golden langur, lesser or red panda, Himalayan black bear, and clouded leopard are all native to this habitat. Unfortunately, these species are all endangered. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading; *Indica, Moving Heaven and Earth (Chapter 10*); From Ali and Menon,

Sections on Relevant Birds and Mammals.

Week 8 – 3/8 – 3/12

Synchronous: Northeastern Himalayan Subalpine Conifer Forests

Asynchronous/Expeditions: Temperate forests in the eastern Himalayas include the Eastern Himalayan broadleaf forests, Eastern Himalayan subalpine conifer forests, Northern Triangle temperate forests, and **Northeastern Himalayan subalpine conifer forests**. Occupying elevations from 3,000 to 13,000 ft (900 to 3,900 m), these forests harbor remarkable diversity, especially within the broadleaf forests. Numerous biodiversity hotspots exist within these broadleaf forests, offering a haven for endemic plants and animals. A number of these endemic plants are endangered, including orchid species *Cymbidium whiteae*, *Paphiopedilum fairrieanum*, and *P. wardii*, and maple species *Acer oblongumand* and *Acer hookeri*. The broadleaf forests are home to over 500 bird species, while the subalpine conifer forests are home to over 200. Many charismatic mammals can also be found in this ecoregion; golden langur, lesser or red panda, Himalayan black bear, and clouded leopard are all native to this habitat. Unfortunately, these species are all endangered. (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica, The Carnival of Mammals* (Chapter 11); From Ali and Menon,

Sections on Relevant Birds and Mammals.

Week 9 – 3/15 – 3/19

Synchronous: Eastern Himalayan Alpine Shrub and Meadows

Asynchronous/Expeditions: At high elevations above treeline, the Himalayas flaunt impressive subalpine meadows that erupt in color every spring as delphiniums, gentians, poppies, roseroots, louseworts, anemones, and asters bloom. These subalpine shrublands and meadows are divided into three ecoregions: Eastern Himalayan Alpine Shrub and Meadows, Western Himalayan Alpine Shrub and Meadows, and Northwestern Himalayan Alpine Shrub and Meadows. The eastern portion of the Himalayas is wetter than the western portion due to monsoon rains coming from the Bay of Bengal to the east. Accordingly, the Western and Northwestern meadows are classified as arid or semi-arid, and have a lower treeline than in the east. Similarly, alpine meadows occupy a lower elevation (between 3,000 and 5,000 meters), as compared to 4,000 to 5,500 meters in the east.

The wet eastern alpine meadows also have nearly three times the plant diversity as the western meadows, with an estimated 7,000 plant species. The dominant genus of shrub in these montane shrublands is Rhododendron, which exhibits high species turnover along the east-west extent of the ecoregions. Micro variations in topography support high levels of plant endemism in the eastern montane shrub and meadows. These high elevation meadow support snow leopards (*Uncia uncia*), blue sheep (*Pseudois nayur*), and the

Himalayan tahr (*Hemitragus jemlahicus*). (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica, Birth of the Whales* (Chapter 12); From Ali and Menon,

Sections on Relevant Birds and Mammals.

Week 10 – 3/22 – 3/26

Synchronous: Western Himalayan Alpine Shrub and Meadows

Asynchronous/Expeditions: At high elevations above treeline, the Himalayas flaunt impressive subalpine meadows that erupt in color every spring as delphiniums, gentians, poppies, roseroots, louseworts, anemones, and asters bloom. These subalpine shrublands and meadows are divided into three ecoregions: Eastern Himalayan Alpine Shrub and Meadows, **Western Himalayan Alpine Shrub and Meadows**, and Northwestern Himalayan Alpine Shrub and Meadows. The eastern portion of the Himalayas is wetter than the western portion due to monsoon rains coming from the Bay of Bengal to the east. Accordingly, the Western and Northwestern meadows are classified as arid or semi-arid, and have a lower treeline than in the east. Similarly, alpine meadows occupy a lower elevation (between 3,000 and 5,000 meters), as compared to 4,000 to 5,500 meters in the east.

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Reading: *Indica, How to Make a Man* (Chapter 13); From Ali and Menon, Sections on

Relevant Birds and Mammals.

Essay Assignment Due

Week 11 – 3/29 – 4/2

Synchronous: Northwestern Himalayan Alpine Shrub and Meadows

Asynchronous/Expeditions: At high elevations above treeline, the Himalayas flaunt impressive subalpine meadows that erupt in color every spring as delphiniums, gentians, poppies, roseroots, louseworts, anemones, and asters bloom. These subalpine shrublands and meadows are divided into three ecoregions: Eastern Himalayan Alpine Shrub and Meadows, Western Himalayan Alpine Shrub and Meadows, and **Northwestern Himalayan Alpine Shrub and Meadows**. The eastern portion of the Himalayas is wetter than the western portion due to monsoon rains coming from the Bay of Bengal to the

east. Accordingly, the Western and Northwestern meadows are classified as arid or semi-arid, and have a lower treeline than in the east. Similarly, alpine meadows occupy a lower elevation (between 3,000 and 5,000 meters), as compared to 4,000 to 5,500 meters in the east.

The wet eastern alpine meadows also have nearly three times the plant diversity as the western meadows, with an estimated 7,000 plant species. The dominant genus of shrub in these montane shrublands is Rhododendron, which exhibits high species turnover along the east-west extent of the ecoregions. Micro variations in topography support high levels of plant endemism in the eastern montane shrub and meadows. These high elevation meadow support snow leopards (*Uncia uncia*), blue sheep (*Pseudois nayur*), and the Himalayan tahr (*Hemitragus jemlahicus*). (Yale School of the Environment, Global Forest Atlas, Himalayan Ecoregions.)

Reading: *Indica, Citius, Altius, Fortius* (Chapter 14); From Ali and Menon,

Sections on Relevant Birds and Mammals.

Week 12 – 4/5 – 4/9

Synchronous: Tibetan Plateau Steppe

Asynchronous/Expeditions: Another type of montane grassland can be found just north of the Himalayan peaks within the **Tibetan plateau steppe**. The average elevation on the steppe is over 5,000 m, giving this ecoregion the fitting nickname "Roof of the World." Though the Tibetan plateau steppe contains less than 20% plant cover in most places, it hosts some of the most pristine montane grassland habitat in Eurasia. Most of the flora consists of alpine forbs, feather grasses, and cushion plants. Additionally, a number of ungulates graze within the steppe, including the Tibetan antelope (*Pantholops hodgsoni*), Tibertan wild ass (*Equus hemionus*), wild yak (*Bos grunniens*), and white-lipped deer (*Cervus albirostris*).

Reading: *Indicus, The Promised Land* (Chapter 15); From Ali and Menon,

Sections on Relevant Birds and Mammals.

Week 13 4/12 – 4/16

Synchronous: Upper and Lower Gangetic Plains moist deciduous forests

Asynchronous/Expeditions: Tropical moist deciduous forests border the Himalayas to the south, comprising the **Upper and Lower Gangetic Plains moist deciduous forests** ecoregions. These ecoregions support very dense human populations, and the alluvial plains have been intensely cultivated for years. The forests of this region can be classified as semi-deciduous, as evergreen species are found below the deciduous canopy species. Early succession forests are dominated by species such as *Bombax ceiba*, *Albizzia procera*, and *Sterculia vilosa*, which will later become dominated by later successional dipterocarp species (*Shorea robusta*). While endemism is not high in these forests, many

species are threatened, including the tiger (*Panthera tigris*), Asian elephant (*Elephas maximus*), and greater one-horned rhinoceros (*Rhinoceros unicornis*).

Reading: From Ali and Menon, Sections on Relevant Birds and Mammals.

Week 14 4/19 – 4/23

Synchronous: Terai-Duar Savanna and Grasslands

Asynchronous/Expeditions: The world's tallest grasslands are found within the **Terai-Duar Savanna and Grasslands** that are located at the base of the Himalayas. During monsoon season, rivers often flood these grasslands and deposit silt. *Saccharum spontaneum* grass is the first to colonize riparian areas that have been buried in silt. Other common grasses include *Saccharum benghalesis, Phragmitis kharka, Arundo donax, Narenga porphyracoma,* and *Themeda villosa*, which are all fire and flood resistant species. Patches of forested floodplains and tropical deciduous riverine forest are interspersed within these grasslands. This ecoregion harbors some of the highest densities of ungulates, rhinos, and tigers in Asia.

Reading: From Ali and Menon, Sections on Relevant Birds and Mammals.

Multi-Media Module Project Due

BIBLIOGRAPHY

Relevant Publication 2010 – 2020

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Allendorf, T. D., and K. Allendorf. 2012. The Role of Gender in Park-People Relationships in Nepal. *Human Ecology* 40 (5):789-796.

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Bagchi, S., R. K. Sharma, and Y. V. Bhatnagar. 2020. Change in snow leopard predation on livestock after revival of wild prey in the Trans-Himalaya. *Wildlife Biology* 2020 (1).

Beisner, B. A., A. Heagerty, S. K. Seil, K. N. Balasubramaniam, E. R. Atwill, B. K. Gupta, P. C. Tyagi, N. P. S. Chauhan, B. S. Bonal, P. R. Sinha, and B. McCowan. 2015. Human-Wildlife Conflict: Proximate Predictors of Aggression Between Humans and Rhesus Macaques in India. *American Journal of Physical Anthropology* 156 (2):286-294.

Dhyani, S., R. K. Maikhuri, and D. Dhyani. 2019. Impact of anthropogenic interferences on species composition, regeneration and stand quality in moist temperate forests of Central Himalaya. *Tropical Ecology* 60 (4):539-551.

Din, J. U., H. Ali, A. Ali, M. Younus, T. Mehmood, Y. Norma-Rashid, and M. A. Nawaz. 2017. Pastoralist-predator interaction at the roof of the world: Conflict dynamics and implications for conservation. *Ecology and Society* 22 (2).

Dunn, J. C., G. M. Buchanan, R. J. Cuthbert, M. J. Whittingham, and P. J. K. McGowan. 2015. Mapping the potential distribution of the Critically Endangered Himalayan Quail Ophrysia superciliosa using proxy species and species distribution modelling. *Bird Conservation International* 25 (4):466-478.

Everard, M., N. Gupta, C. A. Scott, P. C. Tiwari, B. Joshi, G. Kataria, and S. Kumar. 2019. Assessing livelihood-ecosystem interdependencies and natural resource governance in Indian villages in the Middle Himalayas. *Regional Environmental Change* 19 (1):165-177.

Fox, J. L., S. P. Sinha, R. S. Chundawat, and P. K. Das. 1991. STATUS OF THE SNOW LEOPARD PANTHERA-UNCIA IN NORTHWEST INDIA. *Biological Conservation* 55 (3):283-298.

Ghoshal, A., Y. V. Bhatnagar, B. Pandav, K. Sharma, C. Mishra, R. Raghunath, and K. R. Suryawanshi. 2019. Assessing changes in distribution of the Endangered snow leopard Panthera uncia and its wild prey over 2 decades in the Indian Himalaya through interview-based occupancy surveys. *Oryx* 53 (4):620-632.

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