

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
ALI	Allostatic load index
A.P.E.S.	Ape Population, Environments and Surveys
ARRC	Avoidance, Reduction, Restoration, and Conservation
asl	Above sea level
AZA	Association of Zoos and Aquariums
BAL	Bronchoalveolar lavage
Bcbva	<i>Bacillus cereus</i> biovar <i>anthracis</i>
BMP	Best management practice
BNF	Borneo Nature Foundation
BOSF	Borneo Orangutan Survival Foundation
BSGR	Beny Steinmetz Group Resources
CHIMP	Chimpanzee Health, Intervention, and Monitoring Program
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COVID-19	Coronavirus disease 2019 (infectious disease caused by the SARS-CoV-2 virus)
CTPH	Conservation through Public Health
CWAS	Cumulative welfare assessment score
DNA	Deoxyribonucleic acid
DRC	Democratic Republic of Congo
EAZA	European Association of Zoos and Aquaria
EDT	Enclosure Design Tool
ESG	Environmental, social and governance
EVD	Ebola virus disease
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
GC	Glucocorticoid
GDP	Gross domestic product
GFAS	Global Federation of Animal Sanctuaries
HDI	Human Development Index
HIV	Human immunodeficiency virus
HMPV	Human metapneumovirus
HRSV	Human respiratory syncytial virus
IFC	International Financial Corporation
IFL	Intact forest landscape
IGCP	International Gorilla Conservation Programme
IPHP	International Primate Heart Project
IPLCs	Indigenous Peoples and local communities
IUCN	International Union for Conservation of Nature

KCP	Kibale Chimpanzee Project
Lao PDR	Lao People's Democratic Republic
LWT	Lilongwe Wildlife Trust
MPXV	Monkeypox virus
MYR	Malaysian Ringgit
NAP	National Action Plan
NGO	Non-governmental organization
NGS	Next-generation sequencing
NNNP	Nouabalé-Ndoki National Park
OIE	World Organisation for Animal Health (originally founded as the Office International des Epizooties)
OVAG	Orangutan Veterinary Advisory Group
PASA	Pan African Sanctuary Alliance
PBOP	Petowal Biodiversity Offset Programme
PCR	Polymerase chain reaction
PEESTOLM	Political, environmental, economic, social, technical, operational, legal, media and communications
PPE	Personal protective equipment
PTSD	Post-traumatic stress disorder
RNA	Ribonucleic acid
RSPO	Roundtable on Sustainable Palm Oil
SAIDS	Simian acquired immunodeficiency syndrome
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SDG	Sustainable Development Goal
SEA	Strategic environmental assessment
SEAZA	Southeast Asian Zoos and Aquariums Association
SGA	Section on Great Apes
SIVcpz	Simian immunodeficiency virus in chimpanzees
SIVgor	Simian immunodeficiency virus in gorillas
SMB	Société Minière de Boké
SOCP	Sumatran Orangutan Conservation Programme
SOP	Standard operating procedure
sp.	Species (plural spp.)
SPOTT	Sustainability Policy Transparency Toolkit
TB	Tuberculosis
TNS	Sangha Trinational
TPE	<i>Treponema pallidum pertenuis</i>
UAE	United Arab Emirates
UDAW	Universal Declaration on Animal Welfare
UNESCO	United Nations Educational, Scientific and Cultural Organization
WAZA	World Association of Zoos and Aquariums
WCS	Wildlife Conservation Society
WHO	World Health Organization
WWP	Wildlife Wood Project

YEL	Yayasan Ekosistem Lestari
ZEBOV	Zaire Ebola Virus
ZIMS	Zoological Information Management Software
ZSL	Zoological Society of London

GLOSSARY

Abiotic: Not derived from living organisms.

Abscess: An enclosed, pus-filled cavity in any tissue, usually caused by bacteria.

Accidental host: An organism that does not usually allow for the transmission of a pathogen to the definitive or typical target species; also referred to as an incidental or dead-end host.

Adaptive management: An iterative process of improving the management of natural resources by incorporating monitoring results in the decision-making process.

Agonist: A substance that activates a receptor inside a cell or on its surface.

Air blast: A sudden rush of air through openings, such as tunnels, caused when unsupported rock spanning a void in an underground mining system collapses.

Air sacculitis: A common inflammatory condition of air sacs, the tiny sacs off the laryngeal tubes of apes (and many other animals) that act as resonating chambers, amplifying vocalizations.

Allelic dropout: The failure of an allele (one of two or more versions of DNA sequence) to increase the number of copies of a gene in a polymerase chain reaction (PCR).

Amplifying host: An organism in which a pathogen can multiply to high levels, which facilitates the pathogen's spread.

Anemia: A lack of red blood cells (or hemoglobin) that leads to decreased oxygen transport.

Animal reservoir: see **reservoir**.

Animal welfare: Physical and mental wellbeing of animals.

Anogenital: The area around the anus and genitalia.

Anthelmintic: Any drug that acts against infections caused by parasitic worms (helminths).

Anthropocene: Unofficially, the current geologic epoch, during which human activity started to have a significant impact on Earth's climate and ecosystems.

Anthropogenic: Caused by humans or human activity.

Anthroponosis: Infectious disease that is transmitted from humans to other animals. Related terms: anthroponoses, anthroponotic. See also: **zoonosis**.

Arboreal: Living in trees.

Asset protection zone: An area surrounding a built asset or structure, such as a residence, farm, commercial building or landmark, where the level of forest fuel has been reduced to a level that does not support intensive fire behavior. The width of the area between the at-risk asset and the forest is determined by the predicted fire behavior. Commonly referred to as APZ.

Asymptomatic: Infected with a pathogen but not showing signs of disease.

Autonomy: Self-determination of individuals.

Bacteria: Single-celled, microscopic organisms that are ubiquitous in humans, other animals and the environment, and that can be beneficial (for example by promoting digestion) or cause illness (singular: bacterium).

Best management practice (BMP): Methods or means that have been determined to be the most effective and practical means of preventing or reducing disease risks from humans to apes and vice versa.

Bimaturism: Development characterized by differing stages or timings within a species or within a sex; among orangutans, mature males are flanged or unflanged (see **flanged**).

Bioacoustics: Digital technology, including equipment and software, used to record and analyze animal sounds.

Biopsy: The removal of a small piece of tissue from a living animal for diagnostic purposes.

Biosafety: A set of measures designed to prevent the accidental spread of pathogens to humans, animals or the environment, including safe handling measures of potentially infectious substances, for example through the use of

personal protective equipment (such as gloves and masks), disinfection and garbage disposal protocols. *Biosafety* aims to protect public health and environment from accidental exposure to biological agents. See also: **Biosecurity**.

Biosecurity: A combination of management practices and protocols designed to prevent the transmission of diseases and disease-causing agents. Biosecurity deals with the prevention of misuse through loss, theft, diversion or intentional release of pathogens, toxins and any other biological materials. See also: **Biosafety**.

Biotic: Relating to living organisms.

Bloating: The accumulation of gas in the intestines, often uncomfortable or painful.

Brachiation: Arboreal locomotion that relies exclusively on the arms to propel the body forward.

Bronchoalveolar lavage (BAL): A safe, simple and inexpensive diagnostic test of the lower respiratory system, which can be performed in the field without sophisticated equipment. BAL involves instilling sterile saline via a tube into an anesthetized animal's airways. The method provides an excellent sample of epithelial lining fluid for characterization of diffuse lung diseases (such as tuberculosis on polymerase chain reaction) and airway inflammation.

Burnout: A syndrome that results from chronic, unsuccessfully managed work-related stress.

Captive facilities: Sites of wildlife captivity, such as rescue and rehabilitation centers, sanctuaries and zoos.

Cardiologist: A doctor who specializes in treating diseases of the cardiovascular system—mainly the heart and blood vessels.

Cardiomyopathy: Diseases of the heart muscle involving stretching, thickening or stiffening of the walls of the heart chambers, which affect the heart's ability to pump blood around the body.

Cardiovascular: Related to the circulatory system—the heart and blood vessels.

Cardiovascular disease: A group of disorders of the heart and blood vessels.

Carry-over: Released apes carrying human pathogens to wild apes.

Case fatality rate: In epidemiology, the proportion of individuals who die from a specified disease among all those who have been diagnosed with it during a certain time period.

Catheter: A flexible tube inserted into a vein to administer or extract fluids intravenously.

Causative agent: A (micro)organism that causes a disease.

Chlorpyrifos: An insecticide, acaricide or miticide used to protect plants against damage.

Colitis: Inflammation of the bowels or large intestine (colon).

Command and control system: A structured system used to organize functional management and leadership, as well as to provide authorities with clear lines for planning, organizing and directing operations during response and recovery at the strategic and tactical levels.

Commensal: Relating to a relationship in which one organism obtains food or other benefits from another without damaging or benefiting the host organism; an organism in such a relationship.

Compassionate conservation: A discipline that combines the fields of conservation and animal welfare.

Compounding (or cascading) risks: Interacting risks whose collective effect exceeds those associated with the individual risks.

Conservation litigation: The use of liability lawsuits to ensure that companies, organizations and people who damage the environment or biodiversity are held responsible and have to take action to remedy the damage caused.

Conservation medicine: A field that combines veterinary science, conservation biology and public health to address animal, human and ecological health holistically, rather than as siloed branches of knowledge.

Conspecific: An individual of the same species.

Core area: The portion of the home range of a group or individual that is most frequently used.

Costs: In disaster management, the estimated or known monetary value of facilities, goods, services and provision of personnel provided by an agency or organization in support of activities during preparedness, response and recovery for which the agency or organization receives no payment; may be referred to as in-kind contributions.

Cramping: The sudden, extreme, involuntary tensing of muscle that results in pain.

Crisis: A system-wide disruption that is typically new, unexpected, uncontrollable or abnormal and that requires immediate solutions or interventions involving collaboration among local stakeholders. A crisis typically affects a particular industry, population or community; local stakeholders are able to address the disruption.

Cross-reactivity: The ability of some antibodies to target or “react to” parts of different pathogens other than the one with which the antibodies typically bind. If a test is not very specific, cross-reactivity can result in a false positive. See also: **reactivity**.

Cytomegalovirus (CMV): A common virus that can cause herpes infections that may become dormant and later reactivate. In individuals whose immune systems are compromised, symptoms may include fever, jaundice and lesions, as well as neurological and respiratory issues. Humans and other primates serve as natural hosts.

Data mining: The sorting and analyzing of very large datasets to find patterns and relationships that can serve as intelligence for facilitating planning and decision-making.

Deciduous: Pertaining to trees that lose their leaves for part of the year.

Deciduous teeth: Baby teeth, also known as milk or primary teeth, which are later replaced by permanent, or adult, teeth.

Degenerative: Related to the deterioration of organs, often caused by age.

Depigmentation: Loss of color, such as of hair or skin.

Dermatophyte: A common label for a group of fungi of the *Arthrodermataceae*, which commonly cause skin disease.

Design thinking: An iterative process used to understand and redefine problems with the aim of creating innovative solutions.

Diagnostic protocol: A practical text that can guide clinical approaches and facilitate diagnosis, for example by recommending questions and examinations.

Dichromatic: Exhibiting two color variations independent of sex and age.

Dimorphic: Having two distinct forms.

Dipterocarp: A tall hardwood tree of the family *Dipterocarpaceae* that grows primarily in Asian rainforests and that is the source of valuable timber, aromatic oils and resins.

Disaster: A serious disruption of the functioning of a community or society due to an interaction of a hazardous event with conditions of exposure, vulnerability and insufficient capacity to cope with the event. The consequences include significant social, built, economic and environmental losses and impacts. Locally impacted communities are unable to cope and require external assistance and coordination.

Disease emergence: A first-time outbreak of illness in a species or area, or a rapidly increasing incidence of outbreaks, typically with reference to zoonotic infectious disease. In contrast, re-emerging (infectious) diseases are ones that appear in species or areas in which they have not been seen for a long time.

Dispersing sex: Either male or female apes who, upon reaching sexual maturity, depart from their birth area to establish their own range, leaving the opposite sex behind.

Diurnal: Daily or active during the day.

DNA: Deoxyribonucleic acid, the hereditary material in almost all organisms.

Dysbiosis: An imbalance in the gut microbial community that is associated with disease and may be due to the gain or loss of microbial community members or changes in the relative abundance of microbes.

Dyspnea: Labored breathing.

Echocardiographer: A health care professional trained to use imaging technology to help physicians diagnose heart problems in patients, specifically by operating ultrasound equipment that provides moving 2-D or 3-D images of the heart and its chambers.

Ecosystem health: A paradigm or model that integrates environmental conditions with the effects of anthropogenic activities to yield information for the sustainable use and management of natural resources. An ecosystem in good health is one whose dynamic attributes are expressed within the normal ranges of activity relative to its ecological state of development.

Ecotourism: A sustainable version of nature-based tourism that contributes to biodiversity conservation and the wellbeing of local communities.

Ecotoxicology: The study of the toxic effects of chemicals on organisms and their ecosystems.

Ectoparasite: An organism that lives off or feeds on the surface of the body, such as skin and hair, including ticks and lice.

Ectopy: A mislocation of a body part. In the heart, ectopic contractions start in an abnormal location, are irregular and are associated with decreased function.

Emergency: An actual or imminent natural or anthropogenic event that endangers or threatens life, damages infrastructure or destroys the natural environment, thus requiring significant coordinated and time-critical responses, as well as extraordinary measures to save lives, protect vulnerable individuals and limit damage. An emergency tends to be local or regional, so does not result in serious disruption to the broader community or society. Emergencies can be categorized by size of impact area, and multiple simultaneous emergencies in one area may be classified as a disaster.

Encephalomyocarditis: An acute febrile disease, especially of swine and some primates, caused by a picornavirus and marked by degeneration and inflammation of skeletal and cardiac muscle and lesions of the central nervous system.

Endangered: Threatened with extinction.

Endemic: Native to or only found in a certain place; indigenous.

Endoparasite: A parasite that lives inside its host.

Epidemic: Rapid spread of a disease that causes a high number of cases in a limited space and time, such as a sudden outbreak.

Epithelium: The outer cell layer of skin or mucosae.

Epizootic: Relating to a disease that is temporarily prevalent and widespread in an animal population; such a disease.

Ethical: Pertaining to standards of “right and wrong” imposed by an external source, e.g., a community, profession.

Ethnoprimateology: A practice that combines primatology and anthropology to view humans and other primates as living in shared, integrated ecological and social spaces.

Ethology: The scientific study of animal behavior under natural conditions.

Evapotranspiration capacity: Water demand.

Ex-situ: Outside of a natural environment; in captivity.

Facial dysplasia: A disease in which bone in the skull is replaced by softer tissue, causing abnormal growth and an altered facial appearance.

Fauna: Animals.

Fission–fusion: Pertaining to communities whose size and composition are dynamic due to the coming together (fusion) and moving away (fission) of individuals.

Flagship species: A charismatic species that is selected to serve as ambassador for the protection of an ecosystem or an area inhabited by many species that are less well known.

Flagged: Pertaining to one of two morphs of adult male orangutan, the other being “unflagged”; characterized by large cheek pads, greater size, a long coat of dark hair on the back and a throat sac used for “long calls.”

Flora: Plant life.

Folivore: Any chiefly leaf-eating animal. Related terms: folivorous, folivory.

Fomite: An object or material likely to carry infection, such as clothes.

Food security: Constant physical, social and economic access to sufficient, safe and nutritious food that meets food preferences and dietary needs for an active and healthy life.

Footprint: In relation to industrial development, the direct deforestation and disturbance area related to a project and its infrastructure.

Forest fuel: In a wildland forest fire context, the combustible materials such as fine live and dead leaves, twigs, and branches from the ground level to the treetops. Fine fuels are the primary fuel source for intense forest fires. Forest fire behavior is proportional to the level of fine fuels within the overall combustible biomass. High levels of fine fuels, which may be expressed as fuel load (weight per area, such as tons per hectare), are associated with more intensive fire behavior.

Formulation: The process of selecting the types and amounts of ingredients in an animal diet that is to contain planned concentrations of nutrients.

Frugivore: Any chiefly fruit-eating animal. Related terms: frugivorous, frugivory.

Fulminant: In medicine, rapidly progressing and severe.

- Fungi:** Spore-producing organisms that feed on organic matter—moulds, mushrooms, toadstools and yeast.
- Gastrointestinal:** Referring to the digestive system—from the esophagus, via the stomach and intestines, to the anus.
- Genome:** The complete genetic material of an organism.
- Genotypic:** Related to genetic information (see also: **phenotypic**).
- Glomerular:** Related to the kidneys' glomeruli, bundles of capillaries that transfer waste products from the blood into the urine.
- Glucocorticoids:** Anti-inflammatory steroid hormones that are involved in the metabolism of carbohydrates, proteins and fats.
- Granulomatous:** Forming nodes of immune cells in chronic inflammation.
- Guarded prognosis:** A prediction about an individual's health outcome based on insufficient information, such that the outcome is in doubt.
- Habituated:** Accustomed to the presence of humans, as achieved by frequent or prolonged exposure to people. Related term: habituation.
- Habituation:** A process by which animals are repeatedly exposed to the same stimuli, such as the presence of humans, until they no longer respond to those stimuli.
- Hazard:** A natural, socionatural or anthropogenic process, anomaly or event that is defined by location, magnitude, intensity, frequency and probability, and that has the potential to directly harm life as well as the built and natural environments and ecosystems. A hazard can cause indirect disruptions to an economy.
- Helminth:** Flat or round-bodied worm.
- Hepadnavirus:** A group of DNA viruses, such as the hepatitis B virus, that can cause liver damage.
- High-value areas:** In the forest fire context, the areas around valuable built assets including public infrastructure for transport, health and communications; private industry, such as agriculture, tourism and mining; environmental areas of significant biodiversity, and those important for endangered species, or of significant cultural value; and some managed water catchment areas.
- Histopathology:** A branch of pathology evidencing tissue changes characteristic of disease; microscopic evidence. Related term: histopathological.
- Holism or collectivism:** Approaches that value wholes, such as species and ecosystems, over individuals.
- Homeostasis:** In medicine, the state of balance among all body systems that is required for the body to function correctly.
- Home range:** An area in which individuals or groups regularly spend time and which territorial animals may defend from others.
- Hominines:** The evolutionary subfamily of great apes, including African great apes and humans. A similar Asian great ape subgroup is referred to as Ponginae.
- Hormone:** A biological messenger substance that is produced in the body and transported via the blood stream to different organs and tissues, where it influences the metabolism.
- Hybrid:** The offspring of two different species or varieties of plant or animal; something that is formed by combining different elements.
- Hybrid zone:** Area where closely related but genetically distinct populations meet, mate and give birth to cross-fertilized offspring.
- Hyperendemic:** Regarding a pathogen, persistently present at high levels in a region or population.
- Hypertension:** A condition in which the blood vessels have persistently raised pressure; also known as high or raised blood pressure.
- Hypertrophy:** Growth of muscle cells.
- Hypometabolism:** A condition marked by an abnormally low metabolic rate and decreased glucose consumption.
- Hypoplasia:** Genetic disorder that leads to underdevelopment of tissue, organs or organisms based on an insufficient number of cells.
- Hypotension:** Low blood pressure, as is commonly caused by anesthesia (because it expands the volume of the cardiovascular system).

Hypothermia: A drop in the core body temperature below the level at which the body can self-regulate.

Hypothesis: A proposed, testable explanation for an observation.

Idiopathic myocardial fibrosis: A significant increase in the collagen volume of muscular tissue of the heart due to an unknown cause.

Imidacloprid: An insecticide widely used to control pests in agriculture.

Immunocompetence: A body's ability to produce a normal immune response following exposure to an antigen.

Infanticide: The act of killing an infant.

Influenza: A contagious upper respiratory viral infection, commonly referred to as “the flu”.

In-situ: In a natural environment; in the wild.

Instrumentalism: A view that ascribes value to an individual or a collective for its extrinsic worth, disregarding or denying any intrinsic value.

Intact forest landscape: Large, connected tracts of undisturbed woodland.

Inter-: Between.

Interbirth interval: The biologically determined period of time between consecutive births.

Interception capacity: The amount of rainwater that can be retained by the leaves and branches of plants and trees, as well as the debris on the forest floor, and so does not reach the soil.

Interferon-gamma assay: Medical test used in the diagnosis of some infectious diseases, especially tuberculosis.

Interstitial: Relating to spaces between cells, tissues or organs in the body.

Intra-: Within.

Intravenous: Into or within a vein.

Intrinsic value: Worth of an individual irrespective of extrinsic valuing, such as in instrumentalism.

Isotopes: Atoms of the same element that contain the same number of protons but a different number of neutrons.

Laryngeal: Referring to the larynx (voice box).

Lesion: Abnormal tissue growth resulting from injury or disease.

Macroparasite: Parasites that are large enough to be visible to the naked eye, such as worms and ticks.

Maculo-papular: Related to skin lesions typically characterized by red, flat and raised bumps.

Mast fruiting: The simultaneous production of fruit by a large number of trees every 2–10 years, without any seasonal change in temperature or rainfall.

Metabarcoding: A method of species identification that uses a section of DNA or RNA in a way that allows for the simultaneous identification of many species within the same sample.

Metabolic syndrome: A combination of conditions that increase the risk of heart disease, stroke and diabetes.

Metazoan: A multicellular organism with differentiated cells. Parasite examples include helminths and arthropods.

Microbiome: All microorganisms in a certain habitat, such as the gut (gastrointestinal system) or skin.

Microcosm: A small subset of a whole that is generally considered representative of the whole.

Mitigation hierarchy: A tool used to limit the negative impacts of development projects on biodiversity.

Mixed methods: The combination of quantitative and qualitative data collection and analysis within the same study.

Molecular: In this volume, related to DNA- or RNA-based methods, such as polymerase chain reaction (PCR) tests.

Monogamy: The practice of having a single mate over a period of time.

Moral: Pertaining to what a person feels they ought to do—distinguishing between “good and bad” and “right and wrong”—based on guiding principles shaped by their environment and sometimes their belief system.

Moral courage: The ability to take action in line with ethical values despite the risk of adverse consequences.

Moral distress: Unease that results from discrepancies between what an individual perceives as an ethically correct action and what the individual is tasked with doing.

Moral resilience: The ability to deal with an ethically adverse situation without experiencing lasting effects of moral distress.

Moral standing or status: In ethics, an ascribed quality based on which an individual is worthy of moral consideration and moral significance.

Morbidity: Sickness. In epidemiology, the number of individuals in a population who suffer from a disease compared to the total number of individuals in the population.

Morph: A distinct form of an organism or species.

Mortality: Deaths. In epidemiology, the number of individuals in a population who die from a disease compared to the total number of individuals in the population.

Multi-agency response: In disaster management, collective work undertaken by a number of agencies, each with its own command and communications system, to deliver shared aims and objectives; as part of the response, they also pursue their own, separate priorities, which reflect individual agency strengths, including resource type and expertise.

Multimodal approach: Characterized by multiple means of communication, such as a combination of text, video, photos and audio. With respect to ape conservation, its relevance is consistency of scientific communication between various communities.

Multiple-use zones: Land characterized by a range of integrated uses, such as residential, commercial, industrial, agricultural and conservation-related.

***Mycobacterium tuberculosis* complex:** A genetically related group of bacteria that cause tuberculosis.

Nasal flora: Microorganisms in the nose.

Nasopharyngeal: Related to the area covering the back of the nose and the throat.

Natal philopatry: The tendency of some animals to remain in or return to the area of their birth.

Nature-based tourism: Travel-related experiences that are centered on wild and natural environments.

Necropsy: Examination and dissection of an animal corpse to assess health prior to death and cause of death.

Necrotizing: Related to an inflammation type defined by dead cells or tissue.

Necrotizing dermatitis: An inflammation of the skin defined by dead cells or tissue.

Nematode: A worm of the phylum *Nematoda*, commonly referred to as a roundworm.

Nephritis: An infection or inflammation of the kidney.

Nervous system: The brain and network of nerves that transmit information from the brain to the rest of the body and vice versa, controlling the entire organism, including breathing, moving, thinking and feeling.

Net gain: In an ecological context, a positive outcome for biodiversity following a development project and the application of targeted conservation measures.

Neurological: Related to the nervous system.

Next-generation sequencing (NGS): A technology that is able to run multiple parallel RNA/DNA sequences at high speed and throughput to reveal entire genomes or larger RNA/DNA sequences than is possible using standard sequencing.

Nodules: Little nodes.

No net loss: In an ecological context, an outcome that avoids an overall loss of biodiversity and ecosystem services following a development project and targeted conservation activities. This term is often used in association with the **mitigation hierarchy**.

Nucleic acid: A molecule that carries genetic information, such as DNA and RNA.

Nulliparous: Never having given birth to a live baby.

Nutritional security: See **food security**.

Omnivorous: Related to animals who eat a large variety of foods, both animal- and plant-based.

One Health: A transdisciplinary approach that addresses the interdependence of human, animal and environmental health, with the aim of producing shared optimal health outcomes through international collaboration.

One Welfare: A framework designed to help improve animal welfare, human wellbeing and the integrity of the environment by emphasizing their interconnections.

Operant conditioning: A method of learning using reward and punishment to impact behavior; i.e., behavior that is rewarded will likely be repeated and behavior that is punished is less likely to be repeated. Also known as instrumental conditioning.

Osteoarthritis: Inflammation of a bone that has spread to a joint.

Pandemic: A global epidemic.

Parasite: An organism that lives off or in another organism, to the detriment of the host organism.

Parasitemia: Parasites in the blood stream.

Pathogen: A microorganism that causes sickness or disease.

Pathogenicity: An organism's ability to cause disease.

Pelage: Fur; coat.

Personhood: The legal status of a person. Under the law, a "person" has one or more rights while a "thing" has none. Historically, some humans were classified as "things" under the law; today, personhood is not restricted to human beings.

Phage: A virus that infects bacteria.

Phenotypic: Related to the appearance or observable characteristics of an organism (related words: phenotype).

Phylogenetic: Relating to the evolutionary development, diversification and relatedness of a species or group of organisms, or to a particular feature of an organism.

Physiology: The study of how a living system works.

Pith: The spongy tissue in the stems and branches of many plants.

Planetary health: A paradigm that focuses on the health of humans and the state of the natural systems on which they depend.

Plasma: The cell-free part of blood.

***Plasmodium* sp.:** Single-celled parasites that cause malaria.

Pneumoviruses: Viruses of the family *Pneumoviridae*, which cause respiratory diseases, including common colds in humans.

Poaching: Illegal hunting, killing, capturing or taking of wildlife in violation of local or international wildlife conservation laws.

Polyandrous: Pertaining to a mating system that involves one female and two or more males.

Polygynandrous: Pertaining to an exclusive mating system that involves two or more males and two or more females. The numbers of males and females are not necessarily equal.

Polygynous: Pertaining to a mating system that involves one male and two or more females.

Polymerase chain reaction (PCR): A laboratory technique for the rapid production (amplification) of millions to billions of copies of a specific segment of DNA, which can then be studied in greater detail.

Positive reinforcement training: Use of a reward (praise, treat, prize, . . .) to encourage the repetition of desired activities/behavior.

Post-mortem: After death.

Prediabetes: A condition characterized by blood sugar levels that are higher than normal, but not high enough for a type 2 diabetes diagnosis.

Preparedness: Measures and actions taken for and by a community and community partners prior to an impact by a hazard, ensuring a timely and effective response to hazard impacts.

Preputial: Relating to the foreskin or clitoral hood.

Primary prevention: Intervention before a disease, injury or disorder occurs.

Priority biodiversity feature: Irreplaceable or highly vulnerable habitats, species, structures, functions or other natural elements needed to maintain ecological viability.

Pro-poor tourism: Travel-related experiences that generate net economic, social, environmental or cultural benefits for low-income communities.

Proprietary mixture: A combination of ingredients, often unique to a particular product, such as medication.

Proteomics: The study of proteomes, which are protein-based systems within the body.

Protozoa: Single-celled organisms.

Psychopathology: The scientific study of mental health issues and disorders.

Purulent: Containing or producing pus.

Quarantine: A state, place or period of isolation, the length of which is dictated by the time needed to detect diseases of concern. The most common period is 30 days, although a minimum of 90 days is common if tuberculosis is of concern, or 6 months for rabies.

Radiology: In this volume, X-ray and other medical imaging techniques that use radiation.

Radio telemetry: A technique employed to track the movement and behavior of animals, using the transmission of radio signals to locate a transmitter attached to the animal of interest.

Range state: A country that exercises jurisdiction over any part of the native distribution or range of a particular species or group of species.

Reactivity: In serological tests, a reaction/change in blood that has been mixed with an antigen that may indicate the presence of antibodies.

Reintroduction: The planned release of an organism into its natural habitat after life in captivity.

Renal: Concerning the kidneys.

Rescue and rehabilitation center: A facility that treats and cares for injured, orphaned or sick wild animals with the aim of restoring essential capabilities and releasing them back into their natural habitat.

Reservoir: Any living being or substance in which an infectious agent normally lives, grows and multiplies, and from where it can spill over to (other) species, where it may cause disease.

Retrovirus: A microbe that inserts DNA copies of its own RNA genome into the host cells that it invades; an enzyme called reverse transcriptase transcribes RNA into DNA.

RNA: Ribonucleic acid; genetic material that is structurally similar to DNA, although it is typically single-stranded rather than double-stranded.

Roving strategy: Actively searching for, or roaming between, females.

Sanctuary: A non-profit facility dedicated to providing care (often lifelong) for orphaned, confiscated or injured wildlife.

Secondary prevention: Screening to identify and reduce the impact of diseases, injuries or disorders in their early stages.

Semi-captive: Individuals ranging, foraging and socializing in their natural environment, with some level of human intervention such as enclosure management, shelter, supplementary feeding and veterinary care.

Sentience: The capability of animals to experience and feel different emotions, such as joy, pleasure, pain and fear.

Septicemia: Blood poisoning, especially that caused by bacteria or their toxins.

Seroconversion: A process by which the body's immune system produces specific antibodies in the blood to combat infection. These antibodies can be produced by infection or vaccination, which itself is aimed at enhancing the body's immune response to a particular infection.

Serology: The study of blood serum and other bodily fluids, with a focus on their immunological properties; testing of blood serum for the presence of antibodies.

Shared situational awareness: A common understanding among two or more people or agencies, based on three elements: the perception in time and space of the specified observations and outcomes for an area or activity (what has happened), the comprehension of what the observations and outcomes mean and a projection of that meaning into the future. Commonly abbreviated to SSA.

Silverback: An adult male gorilla who has reached maturity and developed silver hairs on the saddle of his back.

Sociality: The level to which individuals in a species or population associate with one another and form social groups.

Socionatural: Featuring both natural and anthropogenic characteristics.

Spillback: Disease transmission from any species to the species in which the disease originated. Tuberculosis, for example, was initially transmitted from humans to other species, but the disease is now spilling back into humans from these species.

Spillover event: A pathogen's jump from one species to another, where it can cause disease. A spillover can be self-limiting, not resulting in further transmission, or can result in spread of the pathogen in the new host population, which can lead to an epidemic (or pandemic) and potentially become endemic.

Spontaneous volunteers: Members of a community or the public who are not affiliated with a response or recovery agency or organization and volunteer their time and services.

Standard operating procedures (SOP): A set of written instructions describing a step-by-step process that must be taken to perform a routine activity properly.

Stochastic: Having a random probability of occurrence or pattern that cannot be predicted precisely.

***Strongyloides*:** A genus of parasitic roundworm, known as threadworm in the United States. The main species that infects humans is *Strongyloides stercoralis*, but it can affect other primates as well. The main species in primates is *Strongyloides fuelleborni*.

Subacute: Concerning the duration of a disease (between 14 and 30 days), between acute and chronic.

Subadult: Not yet having attained all adult characteristics; an animal in the subadult stage.

Substrate: Any organic substance that may be used as bedding or nesting material, insulation, food or as an absorptive layer for animal excreta.

Superinfection: A complication following or adding to a prior infection, whereby a pathogen can overgrow and overwhelm a host. Superinfections are due to antimicrobial resistance or immunosuppression.

Surge capacity: The ability to increase resources (stores, equipment, facilities, services, personnel) significantly in a short period of time to deliver a timely and effective response.

Sympatric: Pertaining to species or populations that occupy the same geographic ranges.

Syndromic surveillance: Collection and analysis of health data for the rapid detection of health threats.

Taxon (plural: **taxa**): Any unit used in the science of biological classification or taxonomy.

Terrestriality: Adaptation to living on the ground.

Tertiary education: University or other post-school studies.

Tertiary prevention: Management of the impact of an ongoing illness or injury that has lasting effects.

Tracker: An observer employed to follow the movements of a specific group of apes or other animals.

Transit facility: A site that temporarily accommodates seized and rescued wild animals, either prior to their transfer to a rehabilitation center or sanctuary, or prior to their release into natural habitat.

Translational medicine: A field that links medical research, medical practice and community to produce a holistic approach to medicine, connecting the patient to the environment.

Translocation: In conservation, the process of moving organisms (animals or plants) from one area to another, in captive or wild settings. Conservation translocations can reinforce an existing population, reintroduce one that has disappeared, or introduce a species outside its indigenous range.

Ulcerative: Related to inflammation that is defined by ulcer formation, a lesion of skin or mucosa.

Ultrasound: An imaging method and diagnostic tool that uses high-energy sound waves to produce images of tissues and organs inside the body. Unlike X-rays, ultrasound can be used to portray soft tissues in detail, such as the uterus. Also known as a sonogram.

Umbrella species: A species whose conservation leads to the protection of many other species in the same ecosystem or landscape.

Understory: The shrubby plant layer below the forest canopy.

Utilitarianism: An ethical theory that includes all sentient beings in moral consideration so as to maximize overall wellbeing.

Vascular changes: Alterations in blood vessels that could be associated with, or could lead to, disease.

Vector: An organism that carries a pathogen (on the inside or outside) and spreads it. Examples include mosquitoes carrying blood parasites from one person to another when feeding, as well as vectors that transfer pathogens mechanically, such as rodents who move from stable to stable carrying dirt under their feet.

Venous: Relating to veins.

Vicarious resilience: An experience of personal growth based on witnessing growth in others, such as among professionals.

Vicarious traumatization or compassion fatigue: An indirect traumatic reaction to the traumatic experiences of others.

Virus: An infectious organic structure whose replication depends on a living organism. Some can cause disease, many are commensals.

Wadge: A lump of fibrous fruit matter, which apes spit out after chewing the fruit to extract the juices.

Wean: To accustom a young animal to nourishment other than the mother's milk.

Wildlife tourism: Travel-related experiences that provide close contact with wild animals and nature.

Zoo: A captive facility that puts animals on display for public viewing. Zoos typically have integrated reproduction strategies, whereas sanctuaries generally prevent captive breeding.

Zoonoses: Diseases that can be spread from animals to humans and vice versa (see also: **zoonosis, zoonotic**).

Zoonosis: Infectious disease that is transmitted from animals to humans and vice versa. Related terms: zoonoses, zoonotic. See also: **anthroponosis**.

Zoonotic: Related to diseases that can be spread from animals to humans and vice versa (see also: **zoonosis, zoonoses**).

REFERENCES

- AAP (2020a). *Jaarverslag 2019*. Almere, the Netherlands: Animal Advisory and Protection (AAP). Available at: <https://www.aap.nl/wp-content/uploads/2021/11/Jaarverslag-2019-DEF-gecomprimeerd.pdf>.
- AAP (2020b). *Ook Castilla-La Mancha verbiedt circussen met wilde dieren*. Almere, the Netherlands: Animal Advisory and Protection (AAP). Available at: <https://www.aap.nl/nieuwsbericht/ook-castilla-la-mancha-verbiedt-circussen-met-wilde-dieren/>.
- AAP (n.d.). *Outplacement*. Almere, the Netherlands: Animal Advisory and Protection (AAP). Available at: <https://en.aap.eu/outplacement/>. Accessed: May, 2022.
- AAWC (2020). *4th Africa Animal Welfare Conference: Action 2020 Resolutions*. Nairobi, Kenya: Africa Animal Welfare Conference (AAWC). Available at: https://www.aawconference.org/2020/4th_Africa_Animal_Welfare_Conference_Action_2020_Resolutions.pdf.
- AAWC (n.d.). *About*. Nairobi, Kenya: Africa Animal Welfare Conference (AAWC). Available at: <https://www.aawconference.org/index.php/about-us>. Accessed: May, 2022.
- Abbott, R.C. (2020). Wildlife vaccination – growing in feasibility? *Cornell Wildlife Health Laboratory*, February 17, 2020. Available at: <https://cwhl.vet.cornell.edu/article/wildlife-vaccination-growing-feasibility>.
- Abelló, M.T., Rietkerk, F. and Bemment, N. (2017). *EAZA Great Ape TAG: Best Practice Guidelines Gorilla* (Gorilla gorilla gorilla). Barcelona, Spain: Barcelona Zoo. Available at: <https://www.eaza.net/conservation/programmes/#BPG>.
- Acevedo-Whitehouse, K. and Duffus, A.L. (2009). Effects of environmental change on wildlife health. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **364**(1534), 3429–38.
- Adamo, S.A. (2012). The effects of the stress response on immune function in invertebrates: an evolutionary perspective on an ancient connection. *Hormones and Behavior*, **62**(3), 324–30. DOI: 10.1016/j.yhbeh.2012.02.012.
- Adams, W.M. and Infield, M. (2003). Who is on the gorilla's payroll? Claims on tourist revenue from a Ugandan National Park. *World Development*, **31**(1), 177–90.
- Addison, C. and Malone, N. (2018). An experimental ethics, but an ethical experiment? Anthropological perspectives on using unproven vaccines on endangered primates. *American Journal of Bioethics*, **18**(10), 53–5. DOI: 10.1080/15265161.2018.1513592.
- Adefuye, M.A., Manjunatha, N., Ganduri, V., et al. (2022). Tuberculosis and cardiovascular complications: an overview. *Cureus*, **14**(8), e28268. DOI: 10.7759/cureus.28268.
- adnCUBA (2020). Monos del Zoológico de 26 en La Habana atacan a un periodista oficialista mientras trabajaba. *adnCUBA*, July 8, 2020. Available at: <https://adncuba.com/noticias-de-cuba/entrenamiento/monos-del-zoologico-de-26-en-la-habana-atacan-un-periodista>.
- AFAC (2017). *AIIMS: Australasian Inter-Service Incident Management System*. Melbourne, Australia: Australasian Fire and Emergency Service Authorities Council (AFAC). Available at: <https://www.afac.com.au/initiative/aiims>.
- AFP (2020). “Fin progressive” des animaux sauvages dans les cirques itinérants. *Le Point*, September 29, 2020. Available at: https://www.lepoint.fr/societe/fin-progressive-des-animaux-sauvages-dans-les-cirques-itinerants-29-09-2020-2394102_23.php.
- Agoramoorthy, G. (2010). Setting standards for evaluation of captive facilities, Southeast Asia. In *Wild Mammals in Captivity: Principles and Techniques*, ed. D. G. Kleiman, K. V. Thompson and C. K. Baer. Chicago, IL: University of Chicago Press, pp. 28–31.
- Aguilera, R., Corringham, T., Gershunov, A. and Benmarhnia, T. (2021). Wildfire smoke impacts respiratory health more than fine particles from other sources: observational evidence from Southern California. *Nature Communications*, **12**(1), 1493. DOI: 10.1038/s41467-021-21708-0.
- Ahebwa, W.M., van der Duim, R. and Sandbrook, C. (2012). Tourism revenue sharing policy at Bwindi Impenetrable National Park, Uganda: a policy arrangements approach. *Journal of Sustainable Tourism*, **20**(3), 377–94. DOI: 10.1080/09669582.2011.622768.

- AIDR (2017). *Managing Exercises Handbook 3*. Melbourne, Australia: Australian Institute for Disaster Resilience (AIDR). Available at: <https://knowledge.aidr.org.au/media/3547/handbook-3-managing-exercises.pdf>.
- AIDR (2020). *Emergency Planning*. Melbourne, Australia: Australian Institute for Disaster Resilience (AIDR). Available at: https://www.aidr.org.au/media/8313/aidr_handbookcollection_emergencyplanning_2020.pdf.
- AIDR (n.d.). *Australian Disaster Resilience Glossary*. Melbourne, Australia: Australian Institute for Disaster Resilience (AIDR). Available at: <https://knowledge.aidr.org.au/resources/adr-glossary/>. Accessed: July, 2022.
- Ainerukundo, E., Gaffikin, L. and Kalema-Zikusoka, G. (2019). Evaluation of a community-based health and conservation model at Bwindi Impenetrable National Park. In *2nd African Primatological Society Conference. Primate Conservation in Africa: Challenges and Opportunities*, ed. African Primatological Society (APS). Entebbe, Uganda: APS, p. 87. Available at: <https://apsuganda.africanprimatologicalsociety.org/book-of-abstracts/>.
- Airhart, E. (2018). Even zoos are learning the art of doomsday prepping. *Wired*, December 13, 2018. Available at: <https://www.wired.com/story/even-zoos-are-learning-the-art-of-doomsday-prepping/>.
- AITC [The Animal Issues Thematic Cluster] (n.d.). *The Animal Issues Thematic Cluster*. Available at: <https://animalissuesun.org/>. Accessed: May, 2022.
- Akinyi, M.Y., Tung, J., Jeneby, M., et al. (2013). Role of grooming in reducing tick load in wild baboons (*Papio cynocephalus*). *Animal Behaviour*, **85**(3), 559–68. DOI: 10.1016/j.anbehav.2012.12.012.
- Al-Dahash, H., Thayaparan, M. and Kulatunga, U. (2016). Understanding the terminologies: disaster, crisis and emergency. In *Proceedings of the 3rd Annual ARCOM Conference, 5–7 September 2016, Vol. 2*, ed. P. Chan and C. Neilson. Manchester, UK: Association of Researchers in Construction Management (ARCOM), pp. 1191–200.
- Allan, B.M., Nimmo, D.G., Ierodionou, D., et al. (2018). Futurecasting ecological research: the rise of technoeology. *Ecosphere*, **9**(5), e02163. DOI: 10.1002/ecs2.2163.
- Allela, L., Boury, O., Pouillot, R., et al. (2005). Ebola virus antibody prevalence in dogs and human risk. *Emerging Infectious Diseases*, **11**(3), 385–90. DOI: 10.3201/eid1103.040981.
- ALPZA (n.d.). *Acreditación*. Santiago, Chile: La Asociación Latinoamericana de Parques Zoológicos y Acuarios (ALPZA). Available at: <https://www.alpza.com/acreditacion>. Accessed: October, 2020.
- Altizer, S., Nunn, C.L., Thrall, P.H., et al. (2003). Social organization and parasite risk in mammals: integrating theory and empirical studies. *Annual Review of Ecology, Evolution, and Systematics*, **34**(1), 517–47. DOI: 10.1146/annurev.ecolsys.34.030102.151725.
- Alvarez-Berrios, N.L. and Mitchell Aide, T. (2015). Global demand for gold is another threat for tropical forests. *Environmental Research Letters*, **10**(1), 014006. DOI: 10.1088/1748-9326/10/1/014006.
- Ambassade de France (2019). *Rencontre avec Pauline Grentzinger Docteur vétérinaire au parc de la Lékédi*. Libreville, Gabon: Ambassade de France. Available at: <https://ga.ambafrance.org/Rencontre-avec-Pauline-Grentzinger-Docteur-veterinaire-au-parc-de-la-Lekedi>.
- Ameca y Juárez, E.I., Ellis, E.A. and Rodríguez-Luna, E. (2015). Quantifying the severity of hurricanes on extinction probabilities of a primate population: insights into “island” extirpations. *American Journal of Primatology*, **77**(7), 786–800. DOI: 10.1002/ajp.22402.
- Ampumuza, C. and Driessen, C. (2021). Gorilla habituation and the role of animal agency in conservation and tourism development at Bwindi, South Western Uganda. *Environment and Planning E: Nature and Space*, **4**(4), 1601–21. DOI: 10.1177/2514848620966502.
- Ancrenaz, M. (2015). *The conservation management and conservation medicine of orang-utan (Pongo pygmaeus morio) in Sabah, Malaysia*. PhD thesis. Berlin, Germany: Freien Universität.
- Ancrenaz, M. (2018). *Arcus Disease Strategy*. Unpublished work. New York, NY: Arcus Foundation.
- Ancrenaz, M., Ambu, L., Sunjoto, I., et al. (2010). Recent surveys in the forests of Ulu Segama Malua, Sabah, Malaysia, show that orang-utans (*P. p. morio*) can be maintained in slightly logged forests. *PLoS ONE*, **5**(7), e11510. DOI: 10.1371/journal.pone.0011510.
- Ancrenaz, M., Calaque, R. and Lackman-Ancrenaz, I. (2004). Orangutan nesting behavior in disturbed forest of Sabah, Malaysia: implications for nest census. *International Journal of Primatology*, **25**(5), 983–1000.
- Ancrenaz, M., Cheyne, S.M., Humle, T. and Robbins, M.M. (2020). The impact of killing, capture and trade on apes and their habitat. In *State of the Apes: Killing, Capture, Trade and Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 25–47. Available at: <https://www.stateoftheapes.com/volume-4-killing-capture-trade/>.

- Ancrenaz, M., Dabek, L. and O'Neil, S. (2007). The costs of exclusion: recognizing a role for local communities in biodiversity conservation. *PLoS Biology*, 5(11), e289. DOI: 10.1371/journal.pbio.0050289.
- Ancrenaz, M., Gumal, M., Marshall, A.J., et al. (2016). Pongo pygmaeus (errata version published in 2018). *The IUCN Red List of Threatened Species 2016: e.T17975A123809220*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-1.RLTS.T17975A17966347.en.
- Ancrenaz, M., Oram, F., Ambu, L., et al. (2015). Of Pongo, palms and perceptions: a multidisciplinary assessment of Bornean orang-utans *Pongo pygmaeus* in an oil palm context. *Oryx*, 49(3), 465–72. DOI: 10.1017/S0030605313001270.
- Ancrenaz, M., Oram, F., Nardiyono, N., et al. (2021). Importance of small forest fragments in agricultural landscapes for maintaining orangutan metapopulations. *Frontiers in Forests and Global Change*, 4, 560944. DOI: 10.3389/ffgc.2021.560944.
- Ancrenaz, M., Sollmann, R., Meijaard, E., et al. (2014). Coming down from the trees: is terrestrial activity in Bornean orangutans natural or disturbance driven? *Scientific Reports*, 4, 4024. DOI: 10.1038/srep04024.
- Anderson, D.P., Nordheim, E.V. and Boesch, C. (2006). Environmental factors influencing the seasonality of estrus in chimpanzees. *Primates*, 47(1), 43–50. DOI: 10.1007/s10329-005-0143-y.
- Ando, C., Iwata, Y. and Yamagiwa, J. (2008). Progress of habituation of western lowland gorillas and their reaction to observers in Moukalaba-Doudou National Park, Gabon. *African Study Monographs*, 39, 55–69.
- Andrews, K., Comstock, G., Crozier, G.K.D., et al. (2018). *Chimpanzee Rights: The Philosophers' Brief*. London, UK: Routledge. DOI: 10.4324/9780429461071.
- Animondial (n.d.). *Animal Protection Network*. Hove, UK: Animondial. Available at: <https://animondial.com/animal-protection-network>. Accessed: May, 2022.
- Anthes, E. (2022). When people take pandemic precautions, gorillas breathe easier. *The New York Times*, February 21, 2022. Available at: <https://www.nytimes.com/2022/02/21/health/gorillas-respiratory-illness-colds.html>.
- Antonation, K.S., Grützmacher, K., Dupke, S., et al. (2016). *Bacillus cereus* biovar *anthracis* causing anthrax in sub-Saharan Africa – chromosomal monophyly and broad geographic distribution. *PLoS Neglected Tropical Diseases*, 10(9), e0004923. DOI: 10.1371/journal.pntd.0004923.
- Ape Action Africa (n.d.). *Mefou Primate Sanctuary*. Bristol, UK: Ape Action Africa. Available at: <https://www.apeactionafrica.org/mefou-primate-sanctuary>. Accessed: October, 2020.
- Ape Alliance (2018). Chimpanzees in Chinese captive wild animal facilities. *Ape Alliance News*, August 17, 2018. Available at: <https://4apes.com/news/ape-alliance/item/1614-new-ape-alliance-report-on-chimpanzees-in-chinese-captive-wild-animal-facilities/>.
- Ape Monkey Rescue (n.d.). *Chimpanzees*. Abercraive, UK: Wales Ape and Monkey Sanctuary. Available at: <http://www.ape-monkey-rescue.org.uk/chimpanzees.html>. Accessed: December, 2020.
- A.P.E.S. (n.d.). *Meet the Primates*. Blacklick, OH: American Primate Educational Sanctuary (A.P.E.S.). Available at: <https://apesohio.weebly.com/meet-the-primates.html>. Accessed: October, 2020.
- A.P.E.S. Wiki Team (2019a). *Moyen-Bafing National Park*. A.P.E.S. Wiki. Munich, Germany: Max Planck Society for the Advancement of Science e.V. Available at: https://wiki.iucnaportal.org/index.php/Moyen-Bafing_National_Park.
- A.P.E.S. Wiki Team (2019b). *Pic de Fon Classified Forest*. A.P.E.S. Wiki. Munich, Germany: Max Planck Society for the Advancement of Science e.V. Available at: https://wiki.iucnaportal.org/index.php/Pic_de_Fon_Classified_Forest.
- Appleby, M.C. and Sherwood, L. (2007). *Animal Welfare Matters to Animals, People and the Environment: the Case for a Universal Declaration on Animal Welfare*. London, UK: World Society for the Protection of Animals (WSPA). Available at: https://www.worldanimalprotection.ca/sites/default/files/media/ca_-_en_files/case_for_a_udaw_tcm22-8305.pdf.
- Aquatic Habitats in Integrated Urban Water Management (n.d.). *Water Cycle in Urban Areas*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO). Available at: http://www.aquatic.unesco.lodz.pl/index.php?p=water_cycle. Accessed: October, 2022.
- Arandjelovic, M., Head, J., Köhl, H., et al. (2010). Effective non-invasive genetic monitoring of multiple wild western gorilla groups. *Biological Conservation*, 143(7), 1780–91. DOI: 10.1016/j.biocon.2010.04.030.
- Arandjelovic, M., Head, J., Rabanal, L.I., et al. (2011). Non-invasive genetic monitoring of wild central chimpanzees. *PLoS ONE*, 6(3), e14761. DOI: 10.1371/journal.pone.0014761.

- Archabald, K. and Naughton-Treves, L. (2001). Tourism revenue-sharing around national parks in western Uganda: early efforts to identify and reward local communities. *Environmental Conservation*, **28**(2), 135–49. DOI: 10.1017/S0376892901000145.
- Arcus Foundation (2014). *State of the Apes: Extractive Industries and Ape Conservation*. Cambridge, UK: Cambridge University Press. Available at: <https://www.stateoftheapes.com/volume-1-extractive-industries/>.
- Arcus Foundation (2015). *State of the Apes: Industrial Agriculture and Ape Conservation*. Cambridge, UK: Cambridge University Press. Available at: <https://www.stateoftheapes.com/volume-2-industrial-agriculture/>.
- Arcus Foundation (2018). *State of the Apes: Infrastructure Development and Ape Conservation*. Cambridge, UK: Cambridge University Press. Available at: <https://www.stateoftheapes.com/volume-3-infrastructure-development/>.
- Arcus Foundation (2020). *State of the Apes: Killing, Capture, Trade and Conservation*. Cambridge, UK: Cambridge University Press Available at: <https://www.stateoftheapes.com/volume-4-killing-capture-trade/>.
- Arlian, L.G., Vyszynski-Moher, D.L. and Pole, M. (1989). Survival of adults and developmental stages of *Sarcoptes scabiei* var. *canis* when off the host. *Experimental and Applied Acarology*, **6**, 181–7. DOI: 10.1007/BF01193978.
- Armstrong-Mensah, E.A. and Ndiaye, S.M. (2018). Global health security agenda implementation: a case for community engagement. *Health Security*, **16**(4), 217–23. DOI: 10.1089/hs.2017.0097.
- Arora, N., van Noordwijk, M.A., Ackermann, C., et al. (2012). Parentage-based pedigree reconstruction reveals female matrilineal clusters and male-biased dispersal in nongregarious Asian great apes, the Bornean orang-utans (*Pongo pygmaeus*). *Molecular Ecology*, **21**(13), 3352–62. DOI: 10.1111/j.1365-294X.2012.05608.x.
- ARRC Task Force (n.d.). *IUCN SSC Primate Specialist Group Section on Great Apes & Section on Small Apes ARRC Task Force. Avoid, Reduce, Restore Negative Impacts from Energy, Extractive and Associated Infrastructure Projects on Apes and Contribute Positively to their Conservation*. ARRC Task Force. Available at: <https://www.arrctaskforce.org/>. Accessed: December, 2022.
- Ashbury, A.M., Willems, E.P., Utami-Atmoko, S.S., et al. (2020). Home range establishment and the mechanisms of philopatry among female Bornean orangutans (*Pongo pygmaeus wurmbii*) at Tuanan. *Behavioral Ecology and Sociobiology*, **74**(4), 42. DOI: 10.1007/s00265-020-2818-1.
- ASP (n.d.). *Kibale Snare Removal Program*. American Society of Primatologists (ASP). Available at: <https://www.asp.org/2020/08/20/kibale-snare-removal-program/>. Accessed: October, 2022.
- ATTA [Adventure Travel Trade Association] (2020). Classic Africa Safaris reports gorilla “baby boom” in Uganda; tourism reopens. *Adventure Travel News*, September 24, 2020. Available at: <https://www.adventuretravelnews.com/classic-africa-safaris-reports-gorilla-baby-boom-in-uganda-tourism-reopens>.
- Aultman, J. (2008). Moral courage through a collective voice. *American Journal of Bioethics*, **8**(4), 67–9. DOI: 10.1080/15265160802147140.
- Aung, P., Lwin, N., Aung, T.H., et al. (2023). Confirmation of skywalker hoolock gibbon (*Hoolock tianxing*) in Myanmar extends known geographic range of an endangered primate. *International Journal of Primatology*, in press.
- Australian Government (2021). *Digital Earth Australia Hotspots*. Canberra, Australia: Commonwealth of Australia (Geoscience Australia). Available at: <https://hotspots.dea.ga.gov.au/#/>.
- Avanzi, C., del-Pozo, J., Benjak, A., et al. (2016). Red squirrels in the British Isles are infected with leprosy bacilli. *Science*, **354**(6313), 744–7. DOI: 10.1126/science.aah3783.
- Avoi, R. and Liaw, Y.C. (2021). Tuberculosis death epidemiology and its associated risk factors in Sabah, Malaysia. *International Journal of Environmental Research and Public Health*, **18**(18), 9740. DOI: 10.3390/ijerph18189740.
- AZA Ape TAG [Taxon Advisory Group] (2010). *Chimpanzee (Pan troglodytes) Care Manual*. Silver Spring, MD: Association of Zoos and Aquariums (AZA). Available at: <https://nagonline.net/wp-content/uploads/2014/05/ChimpanzeeCareManual2010-NAG-EDIT.pdf>.
- AZA Ape TAG [Taxon Advisory Group] (2017). *Orangutan (Pongo) Care Manual*. Silver Spring, MD: Association of Zoos and Aquariums (AZA). Available at: <https://ams.aza.org/iweb/upload/Orangutan%20Care%20Manual%202017-de54741f.pdf>.
- AZA Gorilla Species Survival Plan Program (2017). *Western Lowland Gorilla (Gorilla gorilla gorilla) Care Manual*. Silver Spring, MD: Association of Zoos and Aquariums (AZA). Available at: https://assets.speakcdn.com/assets/2332/gorilla_care_manual_2018.pdf.

- Baker, J., Milner-Gulland, E.J. and Leader-Williams, N. (2012). Park gazettement and integrated conservation and development as factors in community conflict at Bwindi Impenetrable Forest, Uganda: drivers of community conflict at Bwindi. *Conservation Biology*, **26**(1), 160–70. DOI: 10.1111/j.1523-1739.2011.01777.x.
- Baker, L. (2017). Translocation biology and the clear case for compassionate conservation. *Israel Journal of Ecology and Evolution*, **63**(3–4), 52–60. DOI: 10.1163/22244662-20181026.
- Baker, L. and Winkler, R. (2020). Asian elephant rescue, rehabilitation and rewilding. *Animal Sentience*, **28**(1). DOI: 10.51291/2377-7478.1506.
- Baker, S.E., Cain, R., van Kesteren, F., *et al.* (2013). Rough trade: animal welfare in the global wildlife trade. *BioScience*, **63**(12), 928–38. DOI: 10.1525/bio.2013.63.12.6.
- Balasubramaniam, K.N., Aiempichitkijarn, N., Kaburu, S.S.K., *et al.* (2022). Impact of joint interactions with humans and social interactions with conspecifics on the risk of zoonotic outbreaks among wildlife populations. *Scientific Reports*, **12**, 11600. DOI: 10.1038/s41598-022-15713-6.
- Bales, K.L. (2020). Introduction to special section on COVID-19 in primatology. *American Journal of Primatology*, **82**(8), e23174. DOI: 10.1002/ajp.23174.
- Ban Animal Trading and EMS Foundation (2020). *Breaking Point: Uncovering South Africa's Shameful Live Wildlife Trade with China*. Johannesburg, South Africa: EMS Foundation. Available at: <https://emsfoundation.org.za/the-breaking-point-uncovering-south-africa-shameful-live-wildlife-trade-with-china/>.
- Banes, G.L., Chua, W., Elder, M. and Kao, J. (2018). Orang-utans *Pongo* spp in Asian zoos: current status, challenges and progress towards long-term population sustainability. *International Zoo Yearbook*, **52**(1), 150–63. DOI: 10.1111/izy.12178.
- Barber, J.C.E. and Mellen, J. (2008). Assessing animal welfare in zoos and aquariums: is it possible? In *The Well-Being of Animals in Zoo and Aquarium Sponsored Research: Putting Best Practices Forward*, ed. T. L. Bettinger and J. T. Bielitzki. Greenbelt, MD: Scientists Center for Animal Welfare, pp. 39–52.
- Barnhill, A., Joffe, S. and Miller, F.G. (2016). The ethics of infection challenges in primates. *Hastings Center Report*, **46**(4), 20–6. DOI: 10.1002/hast.580.
- Barone, J. (2015). Gorilla doctors: these veterinarians are saving Africa's gorillas, one patient at a time. *Science World/Current Science*, **71**(7), 8–12.
- Bartlett, T.Q. (2011). The Hylobatidae: small apes of Asia. In *Primates in Perspective*, ed. C. Campbell, A. Fuentes, K. C. Mackinnon, S. K. Bearder and R. M. Stumpf. New York, NY: Oxford University Press, pp. 300–12.
- Basabose, A.K. and Yamagiwa, J. (2002). Factors affecting nesting site choice in chimpanzees at Tshibati, Kahuzi-Biega National Park: influence of sympatric gorillas. *International Journal of Primatology*, **23**(2), 263–82. DOI: 10.1023/A:1013879427335.
- Bastin, J.F., Barbier, N., Réjou-Méchain, M., *et al.* (2015). Seeing Central African forests through their largest trees. *Scientific Reports*, **5**, 13156. DOI: 10.1038/srep13156.
- Batavia, C., Nelson, M.P., Bruskotter, J.T., *et al.* (2021). Emotion as a source of moral understanding in conservation. *Conservation Biology*, **35**(5), 1380–7. DOI: 10.1111/cobi.13689.
- Batavia, C., Nelson, M.P. and Wallach, A.D. (2020). The moral residue of conservation. *Conservation Biology*, **34**(5), 1114–21. DOI: 10.1111/cobi.13463.
- Baum, S.E., Machalaba, C., Daszak, P., Salerno, R.H. and Karesh, W.B. (2017). Evaluating One Health: are we demonstrating effectiveness? *One Health*, **3**, 5–10. DOI: 10.1016/j.onehlt.2016.10.004.
- Baylet, R., Thivolet, J., Sepetjian, M., Nouhouay, Y. and Baylet, M. (1971). La tréponématose naturelle ouverte du singe *Papio papio* en Casamance [Natural open treponematosis in the *Papio papio* baboon in Casamance] [in French]. *Bulletin de la Société de Pathologie Exotique et de ses Filiales*, **64**(6), 842–6.
- BBC (2016). Twycross Zoo begins great ape heart disease study. *BBC News*, July 21, 2016. Available at: <https://www.bbc.com/news/uk-england-leicestershire-36847743>.
- BBC (2020). Rafiki, Uganda's rare silverback mountain gorilla, killed by hunters. *BBC News*, June 12, 2020. Available at: <https://www.bbc.com/news/world-africa-53024073>.
- BBC News (2002). Zoo animals killed in Prague floods. *BBC News World: Europe*, August 14, 2002. Available at: <http://news.bbc.co.uk/2/hi/europe/2193483.stm>.

- BBOP (2013). *To No Net Loss and Beyond: An Overview of the Business and Biodiversity Offsets Programme (BBOP)*. Washington DC: Business and Biodiversity Offsets Programme (BBOP). Available at: <https://www.forest-trends.org/publications/to-no-net-loss-and-beyond/>.
- BCT (2020). *Essential Conservation Fencing Infrastructure. Guidelines, Standards and Cost Benchmarks*. Lismore, Australia: NSW Government Biodiversity Conservation Trust (BCT). Available at: <https://www.bct.nsw.gov.au/sites/default/files/2020-11/BCT%20Essential%20Conservation%20Fencing%20guide%20Nov%202020.pdf>.
- Beament, E. (2020). "Ecotourism" shut down to protect mountain gorillas. *The Ecologist*, March 25, 2020. Available at: <https://theecologist.org/2020/mar/25/ecotourism-shut-down-protect-mountain-gorillas>.
- Bearder, S.K. and Martin, R.D. (1980). The social organization of a nocturnal primate revealed by radio tracking. In *A Handbook on Biotelemetry and Radio Tracking*, ed. C. J. Amlaner and D. W. Macdonald. Oxford, UK: Pergamon, pp. 633–48. DOI: 10.1016/B978-0-08-024928-5.50082-8.
- Beastall, C.A., Bouhuys, J. and Ezekiel, A. (2016). *Apes in Demand: For Zoo and Wildlife Attractions in Peninsular Malaysia and Thailand*. Selangor, Malaysia: TRAFFIC. Available at: http://www.trafficj.org/publication/16_Apes_in_Demand.pdf.
- Beausoleil, N.J., Mellor, D.J., Baker, L., et al. (2018). "Feelings and fitness" not "feelings or fitness" – the raison d'être of conservation welfare, which aligns conservation and animal welfare objectives. *Frontiers in Veterinary Science*, 5, November 27 2018. DOI: 10.3389/fvets.2018.00296.
- Beck, B. (2017). *Unwitting Travelers: A History of Primate Reintroduction*. Berlin, MD: Salt Water Media.
- Beck, B., Walkup, K., Rodrigues, M., et al. (2007). *Best Practice Guidelines for the Re-introduction of Great Apes*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/sites/library/files/documents/SSC-OP-035.pdf>.
- Becker, D.J., Albery, G.F., Kessler, M.K., et al. (2020). Macroimmunology: the drivers and consequences of spatial patterns in wildlife immune defence. *Journal of Animal Ecology*, 89(4), 972–95. DOI: 10.1111/1365-2656.13166.
- Behie, A.M., Pavelka, M.S.M., Hartwell, K., Champion, J. and Notman, H. (2019). Alas the storm has come again! The impact of frequent natural disasters on primate conservation. In *Primate Research and Conservation in the Anthropocene*, ed. A. M. Behie, J. A. Teichroeb and N. Malone. Cambridge, UK: Cambridge University Press, pp. 237–56. DOI: 10.1017/9781316662021.014.
- Behringer, V. and Deschner, T. (2017). Non-invasive monitoring of physiological markers in primates. *Hormones and Behavior*, 91, 3–18. DOI: 10.1016/j.yhbeh.2017.02.001.
- Behringer, V., Stevens, J.M.G., Hohmann, G., et al. (2014). Testing the effect of medical positive reinforcement training on salivary cortisol levels in bonobos and orangutans. *PLoS ONE*, 9(9), e108664. DOI: 10.1371/journal.pone.0108664.
- Bell, H., Kulkarni, S. and Dalton, L. (2003). Organizational prevention of vicarious trauma. *Families in Society: The Journal of Contemporary Human Services*, 84(4), 463–70. DOI: 10.1606/1044-3894.131.
- Belmaker, G. (2018). DRC breaches logging moratorium for Chinese-owned companies. *Mongabay*, 28 February 2018. Available at: <https://news.mongabay.com/2018/02/drc-breaches-logging-moratorium-for-chinese-owned-companies/#>.
- Bemment, N., ed. (2018). *Orangutan EEP Best Practice Guidelines*, 1st edn. Amsterdam, the Netherlands: European Association of Zoos and Aquaria (EAZA) Great Ape Taxon Advisory Group (TAG). Available at: <https://www.eaza.net/assets/Uploads/CCC/BPG-new-version/2018-OU-EEP-Best-Practice-Guidelines-final-NV.pdf>.
- Bennett, N.J., Roth, R., Klain, S.C., et al. (2017). Conservation social science: understanding and integrating human dimensions to improve conservation. *Biological Conservation*, 205, 93–108. DOI: 10.1016/j.biocon.2016.10.006.
- Berg, C. (2018). Restoring what we have destroyed: animal welfare aspects of wildlife conservation, reintroduction and rewilding programmes. In *Animal Welfare in a Changing World*, ed. A. Butterworth. Wallingford, UK: CABI International, pp. 68–79.
- Berga, S.L. (2008). Stress and reproduction: a tale of false dichotomy? *Endocrinology*, 149(3), 867–8. DOI: 10.1210/en.2008-0004.
- Bergl, R.A., Dunn, A., Fowler, A., et al. (2016). Gorilla gorilla ssp. diehli (errata version published in 2016). *The IUCN Red List of Threatened Species 2016: e.T39998A102326240*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T39998A17989492.en.

- Bermejo, M., Rodríguez-Teijeiro, J.D., Illera, G., *et al.* (2006). Ebola outbreak killed 5000 gorillas. *Science*, **314**(5805), 1564. DOI: 10.1126/science.1133105.
- Bertolani, P. and Boesch, C. (2008). Habituation of wild chimpanzees (*Pan troglodytes*) of the South Group at Taï Forest, Côte d'Ivoire: empirical measure of progress. *Folia Primatologica*, **79**(3), 162–71. DOI: 10.1159/000111720.
- BES [British Ecological Society] Press Office (2022). Scientists study tourists to protect great apes from disease transmission. *British Ecological Society News and Opinion*, September 5, 2022. Available at: <https://www.britishecologicalsociety.org/scientists-study-tourists-to-protect-great-apes-from-disease-transmission>.
- Bessone, M., Booto, L., Santos, A.R., Kühl, H.S. and Fruth, B. (2021). No time to rest: how the effects of climate change on nest decay threaten the conservation of apes in the wild. *PLoS ONE*, **16**(6), e0252527. DOI: 10.1371/journal.pone.0252527.
- Bettinger, T., Cox, D., Kuhar, C. and Leighty, K. (2021). Human engagement and great ape conservation in Africa. *American Journal of Primatology*, **83**(4), e23216. DOI: 10.1002/ajp.23216.
- Bettinger, T.L., Leighty, K.A., Daneault, R.B., Richards, E.A. and Bielitzki, J.T. (2017). Behavioral management: the environment and animal welfare. In *Handbook of Primate Behavioral Management*, ed. S. J. Schapiro. Boca Raton, FL: CRC Press, pp. 37–51.
- Beydoun, G., Dascalu, S., Dominey-Howes, D. and Sheehan, A. (2018). Disaster management and information systems: insights to emerging challenges. *Information Systems Frontiers*, **20**(4), 649–52. DOI: 10.1007/s10796-018-9871-6.
- Beyer, W. and Turnbull, P.C.B. (2009). Anthrax in animals. *Molecular Aspects of Medicine*, **30**(6), 481–9.
- Bhat, S.A., Mounsey, K.E., Liu, X. and Walton, S.F. (2017). Host immune responses to the itch mite, *Sarcoptes scabiei*, in humans. *Parasites & Vectors*, **10**(1), 385. DOI: 10.1186/s13071-017-2320-4.
- BIAZA (2019). *BIAZA Animal Transfer Policy (ATP)*. London, UK: British and Irish Association of Zoos and Aquariums (BIAZA). Available at: <https://biaza.org.uk/downloader/41>.
- Binding, S., Farmer, H., Krusin, L. and Cronin, K. (2020). Status of animal welfare research in zoos and aquariums: where are we, where to next? *Journal of Zoo and Aquarium Research*, **8**(3), 166–74. DOI: 10.19227/jzar.v8i3.505.
- Birke, L. (2002). Effects of browse, human visitors and noise on the behaviour of captive orang utans. *Animal Welfare*, **11**(2), 189–202. DOI: 10.1017/S0962728600028141.
- Birot, H., Campera, M., Imron, M.A. and Nekar, K.A.I. (2020). Artificial canopy bridges improve connectivity in fragmented landscapes: the case of Javan slow lorises in an agroforest environment. *American Journal of Primatology*, **82**(4), e23076. DOI: 10.1002/ajp.23076.
- Bitariho, R., Akampurira, E. and Mugerwa, B. (2020). Regulated access to wild climbers has enhanced food security and minimized use of plastics by frontline households at a premier African protected area. *Conservation Science and Practice*, **2**(10), e275. DOI: 10.1111/csp2.275.
- Bitty, E.A., Bi, S.G., Bene, J.-C.K., Kouassi, P.K. and McGraw, W.S. (2015). Cocoa farming and primate extirpation inside Cote D'ivoire's protected areas. *Tropical Conservation Science*, **8**(1), 95–113. DOI: 10.1177/19400829150080010.
- Bizimungu, J. (2020). Rwanda announces promotional prices of gorilla-trekking permits. *The New Times*, June 18, 2020. Available at: <https://www.newtimes.co.rw/news/rwanda-announces-promotional-prices-gorilla-trekking-permits>.
- Björk, J.R., Dasari, M., Grieneisen, L. and Archie, E.A. (2019). Primate microbiomes over time: longitudinal answers to standing questions in microbiome research. *American Journal of Primatology*, **81**(10–11), e22970. DOI: 10.1002/ajp.22970.
- Blackett, T.A., McKenna, C., Kavanagh, L. and Morgan, D.R. (2017). The welfare of wild animals in zoological institutions: are we meeting our duty of care? *International Zoo Yearbook*, **51**(1), 187–202. DOI: 10.1111/izy.12143.
- Blom, A. (2001a). *Ecological and economic impacts of gorilla-based tourism in Dzanga-Sangha, Central African Republic*. PhD thesis. Wageningen, the Netherlands: Wageningen University.
- Blom, A. (2001b). Potentials and pitfalls of tourism in Dzanga-Sangha. *Gorilla Journal*, **22**, 40–1.
- Blom, A., Cipolletta, C., Brunsting, A.M.H. and Prins, H.H.T. (2004). Behavioral responses of gorillas to habituation in the Dzanga-Ndoki National Park, Central African Republic. *International Journal of Primatology*, **25**(1), 179–96. DOI: 10.1023/B:IJOP.0000014649.15973.3a.
- Bloom, P. (2017). *Against Empathy: The Case for Rational Compassion*. New York, NY: HarperCollins Publishers.

- Bloomsmith, M.A., Clay, A.W., Ross, S.R., *et al.* (2020). Chimpanzees in US zoos, sanctuaries, and research facilities: a survey-based comparison of atypical behaviors. In *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, ed. L. M. Hopper and S. R. Ross. Chicago, IL: University of Chicago Press, pp. 481–508. DOI: 10.7208/chicago/9780226728032.003.0021.
- Bloomsmith, M.A., Laule, G.E., Alford, P.L. and Thurston, R.H. (1994). Using training to moderate chimpanzee aggression during feeding. *Zoo Biology*, **13**(6), 557–66. DOI: 10.1002/zoo.1430130605.
- Bloomsmith, M.A., Neu, K., Franklin, A., Griffis, C. and McMillan, J. (2015). Positive reinforcement methods to train chimpanzees to cooperate with urine collection. *Journal of the American Association for Laboratory Animal Science*, **54**(1), 66–9.
- BNF (n.d.-a). *About Us*. Kalimantan, Indonesia: Borneo Nature Foundation (BNF). Available at: <https://www.borneonaturefoundation.org/about/>. Accessed: September, 2022.
- BNF (n.d.-b). *Drones for Conservation*. Kalimantan, Indonesia: Borneo Nature Foundation (BNF). Available at: <https://www.borneonaturefoundation.org/project/drones-for-conservation/>. Accessed: September, 2022.
- BNF (n.d.-c). *Fire-Fighting & Prevention*. Kalimantan, Indonesia: Borneo Nature Foundation (BNF). Available at: <https://www.borneonaturefoundation.org/project/firefighting-prevention/>. Accessed: September, 2022.
- BNF (n.d.-d). *Understanding the Natural World is at the Heart of Effective, Sustainable Conservation Strategies*. Kalimantan, Indonesia: Borneo Nature Foundation (BNF). Available at: <https://www.borneonaturefoundation.org/scientific-research/>. Accessed: September, 2022.
- BNF (n.d.-e). *Youth Education and Empowerment for Nature Conservation on Borneo*. Kalimantan, Indonesia: Borneo Nature Foundation (BNF). Available at: <https://www.borneonaturefoundation.org/environmental-education/>. Accessed: September, 2022.
- Boesch, C., Crockford, C., Herbinger, I., *et al.* (2008). Intergroup conflicts among chimpanzees in Tai National Park: lethal violence and the female perspective. *American Journal of Primatology*, **70**(6), 519–32. DOI: 10.1002/ajp.20524.
- Boesch, C., Hohmann, G. and Marchant, L., ed. (2002). *Behavioural Diversity in Chimpanzees and Bonobos*. Cambridge, UK: Cambridge University Press. DOI: 10.1017/CBO9780511606397.
- Boesch, C., Kalan, A.K., Mundry, R., *et al.* (2020). Chimpanzee ethnography reveals unexpected cultural diversity. *Nature Human Behaviour*, **4**(9), 910–16. DOI: 10.1038/s41562-020-0890-1.
- Bologna, M. and Aquino, G. (2020). Deforestation and world population sustainability: a quantitative analysis. *Scientific Reports*, **10**, 7631. DOI: 10.1038/s41598-020-63657-6.
- BOSF (2020). *Annual Report 2019*. Bogor, Indonesia: Borneo Orangutan Survival Foundation (BOSF). Available at: <https://www.orangutan.or.id/cfind/source/files/annual-reports/bosf-annual-report-2019.pdf>.
- BOSF (n.d.). *Our Story*. Bogor, Indonesia: Borneo Orangutan Survival Foundation (BOSF). Available at: <https://www.orangutan.or.id/our-story>. Accessed: September, 2022.
- Botha, C.J., Coetser, H., Labuschagne, L. and Basson, A.T. (2015). Confirmed organophosphorus and carbamate pesticide poisonings in South African wildlife (2009–2014). *Journal of the South African Veterinary Association*, **86**(1), 1–4.
- Bowman, Q.P. and Arnoldi, J.M. (1999). Management of animal health emergencies in North America: prevention, preparedness, response and recovery. *Revue Scientifique et Technique de l'Office International des Épizooties*, **18**(1), 76–103. DOI: 10.20506/rst.18.1.1149.
- Boyer-Ontl, K.M. and Pruetz, J.D. (2014). Giving the forest eyes: the benefits of using camera traps to study unhabituated chimpanzees (*Pan troglodytes verus*) in southeastern Senegal. *International Journal of Primatology*, **35**(5), 881–94. DOI: 10.1007/s10764-014-9783-3.
- Brando, S. and Buchanan-Smith, H.M. (2018). The 24/7 approach to promoting optimal welfare for captive wild animals. *Behavioural Processes*, **156**, 83–95. DOI: 10.1016/j.beproc.2017.09.010.
- Brando, S. and Coe, J. (2022). Confronting back-of-house traditions: primates as a case study. *Journal of Zoological and Botanical Gardens*, **3**(3), 366–97. DOI: 10.3390/jzbg3030029.
- Brant, H.L., Ewers, R.M., Vythilingam, I., *et al.* (2016). Vertical stratification of adult mosquitoes (Diptera: Culicidae) within a tropical rainforest in Sabah, Malaysia. *Malaria Journal*, **15**(1), 370. DOI: 10.1186/s12936-016-1416-1.

- Brent, L. (2001). *The Care and Management of Captive Chimpanzees*. San Antonio, TX: The American Society of Primatologists.
- Bridgers, J. (2021). How has COVID19 shifted the global dialogue on animal welfare? And how to move forward to make a global convention for animals a reality. Presented at: *Expert Panel Discussion "UNCAHP a Better World for All Animals", January 15, 2021*. Global Animal Law (GAL) Association and Global Research Network (GRN) Animals and Biodiversity Think Tank Programme. Available at: <https://www.youtube.com/watch?v=xZIxZPB2uXo>.
- Brcnic, T.M., Amarasekaran, B. and McKenna, A. (2010). *Sierra Leone National Chimpanzee Census Project August 2010*. Freetown, Sierra Leone: Tacugama Chimpanzee Sanctuary. Available at: http://www.tacugama.com/wp-content/uploads/2017/12/2010_Brcnic_SLNCCP_Final_Report.pdf.
- Brockelman, W. and Geissmann, T. (2019). Hoolock leuconedys. *The IUCN Red List of Threatened Species 2019: e.T118355453A17968300*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2019-1.RLTS.T118355453A17968300.en.
- Brockelman, W., Molur, S. and Geissmann, T. (2019). Hoolock hoolock. *The IUCN Red List of Threatened Species 2019: e.T39876A17968083*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2019-3.RLTS.T39876A17968083.en.
- Broom, D.M. (1991). Animal welfare: concepts and measurement. *Journal of Animal Science*, **69**(10), 4167–75. DOI: 10.2527/1991.69104167x.
- Broom, D.M. (1999). Animal welfare: the concept of the issues. In *Attitudes to Animals: Views in Animal Welfare*, ed. F. L. Dolins. Cambridge, UK: Cambridge University Press, pp. 129–42. DOI: 10.1017/CBO9780511608476.009.
- Brouwers, S. and Duchateau, M.J. (2021). Feasibility and validity of the animal welfare assessment grid to monitor the welfare of zoo-housed gorillas *Gorilla gorilla gorilla*. *Journal of Zoo and Aquarium Research*, **9**(4), 208–17. DOI: 10.19227/jzar.v9i4.607.
- Brown, G.C. (2019). The endotoxin hypothesis of neurodegeneration. *Journal of Neuroinflammation*, **16**(1), 180. DOI: 10.1186/s12974-019-1564-7.
- Brown, K.M. and Leggat, P.A. (2016). Human monkeypox: current state of knowledge and implications for the future. *Tropical Medicine and Infectious Disease*, **1**(1), 8.
- Brown, S.L., Anderson, D.C., Dick Jr, E.J., et al. (2009). Neoplasia in the chimpanzee (*Pan spp.*). *Journal of Medical Primatology*, **38**(2), 137–44. DOI: 10.1111/j.1600-0684.2008.00321.x.
- Brown, V. (2020). Federal government gives zoos \$95 million coronavirus lifeline. *News.Com.AU*, April 28, 2020. Available at: <https://www.news.com.au/travel/australian-holidays/federal-government-gives-zoos-95-million-coronavirus-lifeline/news-story/085e372fo8a1c921b55e1c17of4ef8d1>.
- Browne, E., Driessen, M.M., Ross, R., Roach, M. and Carver, S. (2021). Environmental suitability of bare-nosed wombat burrows for *Sarcoptes scabiei*. *International Journal for Parasitology: Parasites and Wildlife*, **16**, 37–47. DOI: 10.1016/j.ijppaw.2021.08.003.
- Browning, H. and Veit, W. (2021). Freedom and animal welfare. *Animals*, **11**(4), 1148. DOI: 10.3390/ani11041148.
- Bruskotter, J.T., Vucetich, J.A., Dietsch, A., et al. (2019). Conservationists' moral obligations toward wildlife: values and identity promote conservation conflict. *Biological Conservation*, **240**, 108296. DOI: 10.1016/j.biocon.2019.108296.
- Bruyere, B., Bynum, N., Copsey, J., Porzecanski, A. and Sterling, E. (2020). *Conservation Leadership Capacity Building: A Landscape Study*. New York, NY: American Museum of Natural History. Available at: <https://www.amnh.org/research/center-for-biodiversity-conservation/resources-and-publications/conservation-action-and-planning/conservation-leadership-capacity-building-a-landscape-study>.
- Bryant, J.V., Olson, V.A., Chatterjee, H.J. and Turvey, S.T. (2015). Identifying environmental versus phylogenetic correlates of behavioural ecology in gibbons: implications for conservation management of the world's rarest ape. *BMC Evolutionary Biology*, **15**(1), 171. DOI: 10.1186/s12862-015-0430-1.
- Bryant, J.V. and Turvey, S.T. (2017). *Emergency Response Plan for the Hainan Gibbon: Report and Recommendations of the Emergency Response Plan Advisory Meeting, Haikou, Hainan, China, 8–9 September, 2016*. London, UK: Zoological Society of London (ZSL). Available at: https://gibbons.asia/wp-content/uploads/2018/08/Hainan_Gibbon_Emergency_Response_Planning_Meeting_2016_Report-2.pdf.

- Bryant, T.L. (2006). Trauma, law and advocacy for animals. *Journal of Animal Law and Ethics*, **1**, 63–138.
- Buckley, R.C., Morrison, C. and Castley, J.G. (2016). Net effects of ecotourism on threatened species survival. *PLoS ONE*, **11**(2), e0147988. DOI: 10.1371/journal.pone.0147988.
- Buddle, B.M., Vordermeier, H.M., Chambers, M.A. and de Klerk-Lorist, L.-M. (2018). Efficacy and safety of BCG vaccine for control of tuberculosis in domestic livestock and wildlife. *Frontiers in Veterinary Science*, **5**, 259. DOI: 10.3389/fvets.2018.00259.
- Bueno de Mesquita, C.P., Nichols, L.M., Gebert, M.J., *et al.* (2021). Structure of chimpanzee gut microbiomes across tropical Africa. *mSystems*, **6**(3), e01269-20. DOI: 10.1128/mSystems.01269-20.
- Building Code & Bushfire Solutions (n.d.). *Asset Protection Zone Maintenance*. Mount Kuringai, Australia: Building Code & Bushfire Solutions. Available at: <https://www.bushfirehazardsolutions.com.au/services/asset-protection-zone-maintenance/>. Accessed: July, 2022.
- Buitendijk, H., Fagrouch, Z.C., Niphuis, H., *et al.* (2014). Retrospective serology study of respiratory virus infections in captive great apes. *Viruses*, **6**(3), 1442–53.
- Bull, J.W., Suttle, K.B., Gordon, A., Singh, N.J. and Milner-Gulland, E.J. (2013). Biodiversity offsets in theory and practice. *Oryx*, **47**(3), 369–80. DOI: 10.1017/S003060531200172X.
- Buller, H., Blokhuis, H., Lokhorst, K., Silberberg, M. and Veissier, I. (2020). Animal welfare management in a digital world. *Animals*, **10**(10), 1779. DOI: 10.3390/ani10101779.
- Bunge, E.M., Hoet, B., Chen, L., *et al.* (2022). The changing epidemiology of human monkeypox – a potential threat? A systematic review. *PLoS Neglected Tropical Diseases*, **16**(2), e0010141. DOI: 10.1371/journal.pntd.0010141.
- Burt, E., Quinn, E., Quinn, R., Cranfield, M. and Sibbald, S.L. (2017). Case 3: providing continuing professional development in a developing country – the One Health initiative. In *Western Public Health Casebook 2017*, ed. A. John-Baptiste and G. McKinley. London, Canada: Public Health Casebook Publishing, pp. 43–54.
- Buttke, D.E., Decker, D.J. and Wild, M.A. (2015). The role of one health in wildlife conservation: a challenge and opportunity. *Journal of Wildlife Diseases*, **51**(1), 1–8. DOI: 10.7589/2014-01-004.
- Butynski, T.M. and Kalina, J. (1998). Gorilla tourism: a critical look. In *Conservation of Biological Resources*, ed. E. J. Milner-Gulland and R. Mace. Oxford, UK: Blackwell Science, pp. 294–313. DOI: 10.1002/9781444313598.ch12.
- C2ES (2022). *Extreme Weather and Climate Change*. Centre for Climate and Energy Solutions. Arlington, VA: Centre for Climate and Energy Solutions (C2ES). Available at: <https://www.c2es.org/content/extreme-weather-and-climate-change/>.
- Cabana, F., Jasmi, R.A. and Maguire, R. (2018). Great ape nutrition: low-sugar and high-fibre diets can lead to increased natural behaviours, decreased regurgitation and reingestion, and reversal of prediabetes. *International Zoo Yearbook*, **52**, 48–61.
- Cabezas, S., Calvete, C. and Moreno, S. (2006). Vaccination success and body condition in the European wild rabbit: applications for conservation strategies. *Journal of Wildlife Management*, **70**(4), 1125–31, 7. DOI: 10.2193/0022-541X(2006)70[1125:VSABCI]2.0.CO;2.
- Caillaud, D., Eckardt, W., Vecellio, V., *et al.* (2020). Violent encounters between social units hinder the growth of a high-density mountain gorilla population. *Science Advances*, **6**(45), eabao724. DOI: 10.1126/sciadv.abao724.
- Caillaud, D., Levréro, F., Cristescu, R.H., *et al.* (2006). Gorilla susceptibility to Ebola virus: the cost of sociality. *Current Biology*, **16**, R489–91.
- Caillaud, D., Ndagijimana, F., Giarrusso, A.J., Vecellio, V. and Stoinski, T.S. (2014). Mountain gorilla ranging patterns: influence of group size and group dynamics. *American Journal of Primatology*, **76**(8), 730–46. DOI: 10.1002/ajp.22265.
- Calvignac-Spencer, S., Düx, A., Gogarten, J.F., Leendertz, F.H. and Patrono, L.V. (2021). A great ape perspective on the origins and evolution of human viruses. *Advances in Virus Research*, **110**, 1–26. DOI: 10.1016/bs.aivir.2021.06.001.
- Calvignac-Spencer, S., Leendertz, S.A.J., Gillespie, T.R. and Leendertz, F.H. (2012). Wild great apes as sentinels and sources of infectious disease. *Clinical Microbiology and Infection*, **18**(6), 521–7. DOI: 10.1111/j.1469-0691.2012.03816.x.

- Cambre, R.C., Wilson, H.L., Spraker, T.R. and Favara, B.E. (1980). Fatal airsacculitis and pneumonia, with abortion, in an orangutan. *Journal of the American Veterinary Medical Association*, 177(9), 822–4.
- Cameron, K. and Reed, P. (2019). Ebola virus disease in great apes. In *Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 9*, ed. R. E. Miller, N. Lamberski and P. P. Calle. St Louis, MO: W.B. Saunders, pp. 233–8. DOI: 10.1016/B978-0-323-55228-8.00034-5.
- Campbell, A.F. and Sussman, R.W. (1994). The value of radio tracking in the study of neotropical rain forest monkeys. *American Journal of Primatology*, 32(4), 291–301. DOI: 10.1002/ajp.1350320406.
- Campbell, C.O., Cheyne, S.M. and Rawson, B.M. (2015). *Best Practice Guidelines for the Rehabilitation and Translocation of Gibbons*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/sites/library/files/documents/SSC-OP-051.pdf>.
- Campbell, G. (2021). Primate Specialist Group ARRC Task Force. *Oryx*, 55(4), 495–6. DOI: 10.1017/S0030605321000533.
- Campbell, T.P., Sun, X., Patel, V.H., et al. (2020). The microbiome and resistome of chimpanzees, gorillas, and humans across host lifestyle and geography. *The ISME Journal*, 14(6), 1584–99. DOI: 10.1038/s41396-020-0634-2.
- Campbell-Smith, G., Campbell-Smith, M., Singleton, I. and Linkie, M. (2011a). Apes in space: saving an imperilled orangutan population in Sumatra. *PLoS ONE*, 6(2), e17210. DOI: 10.1371/journal.pone.0017210.
- Campbell-Smith, G., Campbell-Smith, M., Singleton, I. and Linkie, M. (2011b). Raiders of the lost bark: orangutan foraging strategies in a degraded landscape. *PLoS ONE*, 6(6), e20962. DOI: 10.1371/journal.pone.0020962.
- Canfield, P.J., Vogelnest, L.J., Cunningham, M.L. and Visvesvara, G.S. (1997). Amoebic meningoencephalitis caused by *Balamuthia mandrillaris* in an orang utan. *Australian Veterinary Journal*, 75(2), 97–100. DOI: 10.1111/j.1751-0813.1997.tb14165.x.
- Cannon, J.C. (2017). Cross River superhighway changes course in Nigeria. *Mongabay*, April 28, 2017. Available at: <https://news.mongabay.com/2017/04/cross-river-superhighway-changes-course-in-nigeria>.
- Capps, B. and Lederman, Z. (2015). One Health, vaccines and Ebola: the opportunities for shared benefits. *Journal of Agricultural and Environmental Ethics*, 28(6), 1011–32. DOI: 10.1007/s10806-015-9574-7.
- Capps, B. and Lederman, Z. (2016). Responding to a public health objection to vaccinating the great apes. *Journal of Agricultural and Environmental Ethics*, 29(5), 883–95. DOI: 10.1007/s10806-016-9633-8.
- Capua, I. and Cattoli, G. (2018). One Health (r)evolution: learning from the past to build a new future. *Viruses*, 10(12), 725. DOI: 10.3390/v10120725.
- Cardiff Metropolitan University (n.d.). *International Primate Heart Project*. Cardiff, UK: Cardiff Metropolitan University. Available at: <http://primateheartproject.co.uk/>. Accessed: January, 2022.
- Carlitz, E.H.D., Miller, R., Kirschbaum, C., et al. (2016). Measuring hair cortisol concentrations to assess the effect of anthropogenic impacts on wild chimpanzees (*Pan troglodytes*). *PLoS ONE*, 11(4), e0151870. DOI: 10.1371/journal.pone.0151870.
- Carlsen, F., de Jongh, T. and Pluháčková, J. (2022). *EAZA Best Practice Guidelines Great Ape Taxon Advisory Group Chimpanzees* (*Pan troglodytes*), 1st edn. Amsterdam, the Netherlands: European Association of Zoos and Aquaria (EAZA). Available at: <https://www.eaza.net/assets/Uploads/CCC/BPG-2022/Chimpanzee-BPG22.pdf>.
- Carne, C., Semple, S., Morrogh-Bernard, H., Zuberbühler, K. and Lehmann, J. (2013). Predicting the vulnerability of great apes to disease: the role of superspreaders and their potential vaccination. *PLoS ONE*, 8(12), e84642. DOI: 10.1371/journal.pone.0084642.
- Carne, C., Semple, S., Morrogh-Bernard, H., Zuberbühler, K. and Lehmann, J. (2014). The risk of disease to great apes: simulating disease spread in orang-utan (*Pongo pygmaeus wurmbii*) and chimpanzee (*Pan troglodytes schweinfurthii*) association networks. *PLoS ONE*, 9(4), e95039. DOI: 10.1371/journal.pone.0095039.
- Carr, N. (2016). An analysis of zoo visitors' favourite and least favourite animals. *Tourism Management Perspectives*, 20, 70–6. DOI: 10.1016/j.tmp.2016.07.006.
- Carver, S., Peters, A. and Richards, S.A. (2022). Model integrated disease management to facilitate effective translatable solutions for wildlife disease issues. *Journal of Applied Ecology*, 59(12), 2902–10. DOI: 10.1111/1365-2664.14298.
- Cassella, C. (2019). Forest fires in Indonesia a decade ago may have stunted the growth of children today. *Science Alert*, February 22, 2019. Available at: <https://www.sciencealert.com/past-forest-fires-in-indonesia-may-have-stunted-the-growth-of-children>.

- Cavaliere, P. and Singer, P., ed. (1996). *The Great Ape Project: Equality Beyond Humanity*. New York, NY: Macmillan.
- CBD (2020). *Ecosystem Approach*. Montreal, Canada: Convention on Biological Diversity (CBD). Available at: <https://www.cbd.int/ecosystem/>.
- CDC (2017). *Hansen's Disease (Leprosy): Diagnosis and Treatment*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/leprosy/treatment/index.html#:~:text=Hansen's%20disease%20is%20treated%20with,This%20is%20called%20multidrug%20therapy.>
- CDC (2020a). *Anthrax: Treatment of Anthrax Infection*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/anthrax/treatment/index.html>.
- CDC (2020b). *Anthrax: Types of Anthrax*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/anthrax/basics/types/index.html>.
- CDC (2022). *Ebola (Ebola Virus Disease): History of Ebola Virus Disease (EVD) Outbreaks*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/vhf/ebola/history/chronology.html>.
- CDC (n.d.-a). *Key Achievements of the GHSA*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/globalhealth/resources/factsheets/5-years-of-ghsa.html>. Accessed: October, 2022.
- CDC (n.d.-b). *One Health Basics*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://www.cdc.gov/onehealth/basics/index.html>. Accessed: June, 2021.
- Čejková, D., Zobaniková, M., Chen, L., et al. (2012). Whole genome sequences of three *Treponema pallidum* ssp. *pertenue* strains: yaws and syphilis treponemes differ in less than 0.2% of the genome sequence. *PLoS Neglected Tropical Diseases*, **6**(1), e1471. DOI: 10.1371/journal.pntd.0001471.
- Celestino-Soper, P.B.S., Lynnes, T.C., Zhang, L., et al. (2018). Genetic analyses in a bonobo (*Pan paniscus*) with arrhythmogenic right ventricular cardiomyopathy. *Scientific Reports*, **8**, 4350. DOI: 10.1038/s41598-018-22334-5.
- Center for Global Health (2016). *Implementing the Global Health Security Agenda: Progress and Impact from U.S. Government Investments*. Atlanta, GA: Centers for Disease Control and Prevention (CDC). Available at: <https://stacks.cdc.gov/view/cdc/59125>.
- Centurión-Lara, A., Molini, B.J., Godornes, C., et al. (2006). Molecular differentiation of *Treponema pallidum* subspecies. *Journal of Clinical Microbiology*, **44**(9), 3377–80. DOI: 10.1128/JCM.00784-06.
- Cerdán, P. and Kirk-Cohen, G., ed. (2020). *How to Reduce Single-Use Plastic at your Zoo or Aquarium*. Barcelona, Spain: World Association of Zoos and Aquariums (WAZA). Available at: <https://www.waza.org/wp-content/uploads/2020/10/WAZA-short-guide-final-online.pdf>.
- Cervený, S. and Sleeman, J. (2014). Great apes. In *Zoo Animal and Wildlife Immobilization and Anesthesia*, ed. G. West, D. Heard and N. Caulkett. Ames, IA: Wiley Blackwell, pp. 573–84. DOI: 10.1002/9781118792919.ch39.
- Champion, J. (2013). *The effects of a hurricane and fire on feeding ecology, activity budget, and social patterns of spider monkeys (Ateles geoffroyi) in Central Belize*. Master's thesis. Calgary, Canada: University of Calgary. DOI: 10.11575/PRISM/28094.
- Chan, B.P.L., Lo, Y.F.P., Hong, X.-J., Mak, C.F. and Ma, Z. (2020). First use of artificial canopy bridge by the world's most critically endangered primate the Hainan gibbon *Nomascus hainanus*. *Scientific Reports*, **10**, 15176. DOI: 10.1038/s41598-020-72641-z.
- Chan, J.K.L., Marzuki, K.M. and Mohtar, T.M. (2021). Local community participation and responsible tourism practices in ecotourism destination: a case of Lower Kinabatangan, Sabah. *Sustainability*, **13**(23), 13302. DOI: 10.3390/su132313302.
- Chancellor, R.L., Rundus, A.S. and Nyandwi, S. (2017). Chimpanzee seed dispersal in a montane forest fragment in Rwanda. *American Journal of Primatology*, **79**(3), e22624. DOI: 10.1002/ajp.22624.
- Chappell, J.M. and Thorpe, S.K.S. (2021). *The Enclosure Design Tool: An Evidence-Based Framework for Improving Captive Ape Well-Being*. Unpublished data. Birmingham, UK: University of Birmingham.
- Chappell, J.M. and Thorpe, S.K.S. (2022). The role of great ape behavioral ecology in One Health: implications for captive welfare and re-habilitation success. *American Journal of Primatology*, **84**(4–5), e23328. DOI: 10.1002/ajp.23328.
- Charles-Dominique, P. (1977). Urine marking and territoriality in *Galago alleni* (Waterhouse, 1837 – Lorisoidae, Primates) – a field study by radio-telemetry. *Zeitschrift für Tierpsychologie*, **43**(2), 113–38. DOI: 10.1111/j.1439-0310.1977.tb00063.x.

- Chelluri, G.I., Ross, S.R. and Wagner, K.E. (2013). Behavioral correlates and welfare implications of informal interactions between caretakers and zoo-housed chimpanzees and gorillas. *Applied Animal Behaviour Science*, **147**(3), 306–15. DOI: 10.1016/j.applanim.2012.06.008.
- Cheng, A.C. and Currie, B.J. (2005). Melioidosis: epidemiology, pathophysiology, and management. *Clinical Microbiology Reviews*, **18**(2), 383–416. DOI: 10.1128/CMR.18.2.383-416.2005.
- Cheptoris, S. (2020). *Statement on the Rising Water Levels of Lake Victoria and the Nile System*. Kampala, Uganda: Uganda Media Centre. Available at: <https://www.mediacentre.go.ug/media/statement-rising-water-levels-lake-victoria-and-nile-system>.
- Chester Zoo (2021). *Chester Zoo Risk Assessment COVID-19 (Coronavirus)*. Chester, UK Chester Zoo. Available at: <https://cdn.chesterzoo.org/2021/04/COVID-19-RISK-ASSESSMENT-CHESTER-ZOO-2021.pdf>.
- Cheyne, S.M. (2008a). Effects of meteorology, astronomical variables, location and human disturbance on the singing apes: *Hylobates albibarbis*. *American Journal of Primatology*, **70**(4), 386–92. DOI: 10.1002/ajp.20502.
- Cheyne, S.M. (2008b). Feeding ecology, food choice and diet characteristics of gibbons in a disturbed peat-swamp forest, Indonesia. In *XXII Congress of the International Primatological Society*, ed. P. C. Lee, P. Honess, H. Buchanan-Smith, A. MaClarnon and W. I. Sellers. Edinburgh, UK, pp. 3–8.
- Cheyne, S.M. (2010). Behavioural ecology of gibbons (*Hylobates albibarbis*) in a degraded peat-swamp forest. In *Indonesian Primates*, ed. S. Gursky and J. Supriatna. New York, NY: Springer, pp. 121–56. DOI: 10.1007/978-1-4419-1560-3_8.
- Cheyne, S.M., Campbell, C.O. and Payne, K.L. (2012). Proposed guidelines for in situ gibbon rescue, rehabilitation and reintroduction. *International Zoo Yearbook*, **46**(1). DOI: 10.1111/j.1748-1090.2011.00149.x.
- Cheyne, S.M., Gilhooly, L.J., Hamard, M.C., et al. (2016). Population mapping of gibbons in Kalimantan, Indonesia: correlates of gibbon density and vegetation across the species' range. *Endangered Species Research*, **30**(1), 133–43. DOI: 10.3354/esr00734.
- Chi, F., Leider, M., Leendertz, F.H., et al. (2007). New *Streptococcus pneumoniae* clones in deceased wild chimpanzees. *Journal of Bacteriology*, **189**(16), 6085–8. DOI: 10.1128/JB.00468-07.
- Chimfunshi Wildlife Orphanage (n.d.). *Chimfunshi*. Chingola, Zambia: Chimfunshi Wildlife Orphanage Trust. Available at: <https://www.chimfunshi.de/en>. Accessed: October, 2020.
- Chimp Eden (n.d.). *Chimp Guardianship Programme*. Mpumalanga, South Africa: Chimp Eden, Jane Goodall Institute South Africa. Available at: <https://www.chimpeden.com/adoptions.html>. Accessed: October, 2020.
- Chimpanzee Conservation Center (2020). *Annual Report 2019*. High Niger National Park, Guinea: Project Primates. Available at: <https://www.projetprimates.com/wp-content/uploads/CCC-2019-Annual-Report.pdf>.
- ChimpCARE (n.d.-a). *Chimpanzees in the US*. Chicago, IL: Lincoln Park Zoo. Available at: <http://www.chimpcare.org/map>. Accessed: October, 2020.
- ChimpCARE (n.d.-b). *Welfare Assessment*. Chicago, IL: ChimpCARE. Available at: https://chimpcare.org/welfare_assessment. Accessed: May, 2022.
- Chivers, D.J. (1974). *The Siamang in Malaya: A Field Study of a Primate in Tropical Rainforest*. Contributions to Primatology 4. Basel, Switzerland: Karger.
- Chok, S., Macbeth, J. and Warren, C. (2007). Tourism as a tool for poverty alleviation: a critical analysis of “poor tourism” and implications for sustainability. *Current Issues in Tourism*, **10**(2–3), 144–65. DOI: 10.2167/cit303.
- Chomel, B.B., Belotto, A. and Meslin, F.-X. (2007). Wildlife, exotic pets, and emerging zoonoses. *Emerging Infectious Diseases*, **13**(1), 6. DOI: 10.3201/eid1301.060480.
- Choo, Y. (2011). *Orangutan behaviour in captivity: activity budgets, enclosure use and the visitor effect*. MSc thesis. Singapore: National University of Singapore.
- Choo, Y., Todd, P.A. and Li, D. (2011). Visitor effects on zoo orangutans in two novel, naturalistic enclosures. *Applied Animal Behaviour Science*, **133**(1), 78–86. DOI: 10.1016/j.applanim.2011.05.007.
- Choudhury, A. (2013). Description of a new subspecies of hoolock gibbon *Hoolock hoolock* from northeast India. *Newsletter and Journal of the Rhino Foundation for Nature in Northeast India*, **9**, 49–59.
- Christmann, P., Ayuk, E.T., Pedro, A.M.A. and Kumar, S.V. (2022). Future mineral demand: the necessary transition toward sustainability. In *Routledge Handbook of the Extractive Industries and Sustainable Development*, ed. N. Yakovleva and E. Nickless. London, UK: Routledge, pp. 101–32.

- Chua, L., Fair, H., Schreer, V., Stępień, A. and Thung, P.H. (2021). Only the orangutans get a life jacket. *American Ethnologist*, **48**(4), 370–85. DOI: 10.1111/amet.13045.
- Chua, L., Harrison, M.E., Fair, H., *et al.* (2020). Conservation and the social sciences: beyond critique and co-optation. A case study from orangutan conservation. *People and Nature*, **2**(1), 42–60. DOI: 10.1002/pan3.10072.
- Chuma, I.S., Batamuzi, E.K., Collins, D.A., *et al.* (2018). Widespread *Treponema pallidum* infection in nonhuman primates, Tanzania. *Emerging Infectious Diseases*, **24**(6), 1002–9. DOI: 10.3201/eid2406.180037.
- Chuma, I.S., Roos, C., Atickem, A., *et al.* (2019). Strain diversity of *Treponema pallidum* subsp. *pertenue* suggests rare interspecies transmission in African nonhuman primates. *Scientific Reports*, **9**, 14243. DOI: 10.1038/s41598-019-50779-9.
- Chumo, C. (2021). *ANAW and WFA Lead Global Initiative for Adoption of UN Animal Welfare Resolution*. Boston, MA: World Federation for Animals (WFA). Available at: <https://wfa.org/wfa-anaw-resolution/>.
- Cibot, M., Krief, S., Philippon, J., *et al.* (2016). Feeding consequences of hand and foot disability in wild adult chimpanzees (*Pan troglodytes schweinfurthii*). *International Journal of Primatology*, **37**(4–5), 479–94. DOI: 10.1007/s10764-016-9914-0.
- Cipolletta, C. (2003). Ranging patterns of a western gorilla group during habituation to humans in the Dzanga-Ndoki National Park, Central African Republic. *International Journal of Primatology*, **24**(6), 1207–26. DOI: 10.1023/B:IJOP.0000005988.52177.45.
- CITES (2016). *Resolution Conf 17.8 Disposal of Illegally Traded and Confiscated Specimens of CITES-Listed Species*. Geneva, Switzerland: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Available at: <https://www.cites.org/sites/default/files/document/E-Res-17-08.pdf>.
- CITES (n.d.). *CITES Trade Database*. Cambridge, UK: United Nations Environment Programme (UNEP) World Conservation Monitoring Centre (WCMC). Available at: <https://trade.cites.org/>. Accessed: December, 2020.
- CITES Secretariat (2017). *SC69 Doc. 34.1 Sixty-ninth Meeting of the Standing Committee Geneva (Switzerland), 27 November–1 December 2017. Interpretation and Implementation Matters. General Compliance and Enforcement. Disposal of Confiscated Specimens. Report of the Secretariat*. Geneva, Switzerland: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Available at: <https://stag.cites.org/sites/default/files/eng/com/sc/69/E-SC69-34-01.pdf>.
- CITES Secretariat (2021). *Revised Draft (2021) Model Law on International Trade in Wild Fauna and Flora*. Geneva, Switzerland: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Available at: https://cites.org/sites/default/files/projects/NLP/E-Model_law-revised_Oct.2021.FINAL.DRAFT.pdf.
- Clark, F.E., Fitzpatrick, M., Hartley, A., *et al.* (2012). Relationship between behavior, adrenal activity, and environment in zoo-housed western lowland gorillas (*Gorilla gorilla gorilla*). *Zoo Biology*, **31**(3), 306–21. DOI: 10.1002/zoo.20396.
- Clarke, E., Reichard, U.H. and Zuberbühler, K. (2006). The syntax and meaning of wild gibbon songs. *PLoS ONE*, **1**(1), e73. DOI: 10.1371/journal.pone.0000073.
- Clayton, J.B., Gomez, A., Amato, K., *et al.* (2018). The gut microbiome of nonhuman primates: lessons in ecology and evolution. *American Journal of Primatology*, **80**(6), e22867. DOI: 10.1002/ajp.22867.
- Clayton, J.B., Vangay, P., Huang, H., *et al.* (2016). Captivity humanizes the primate microbiome. *Proceedings of the National Academy of Sciences*, **113**(37), 10376–81. DOI: 10.1073/pnas.1521835113.
- Clegg, I. (2021). *How to Take Your Welfare Program to the Next Level: The C-Well Dolphin Assessment as an Example of a Species-Specific Tool, and AnimalCare Software's Cloud-Based Welfare Platform*. EAZA Animal Welfare Webinar 1 March 2021. Amsterdam, the Netherlands: European Association of Zoos and Aquaria (EAZA). Available at: <https://www.eaza.net/about-us/areas-of-activity/animal-welfare/animal-welfare-webinars/>.
- Clegg, I.L.K., Borger-Turner, J.L. and Eskelinen, H.C. (2015). C-Well: the development of a welfare assessment index for captive bottlenose dolphins (*Tursiops truncatus*). *Animal Welfare*, **24**(3), 267–82. DOI: 10.7120/09627286.24.3.267.
- Clifford, D.H., Yoo, S.Y., Fazekas, S. and Hardin, C.J. (1977). Surgical drainage of a submandibular air sac in an orangutan. *Journal of the American Veterinary Medical Association*, **171**(9), 862–5.
- Clifford, W. and Steedman, C. (2021). Wildlife–pet markets in a One-Health context. *International Journal of One Health*, **7**(1), 42–64. DOI: 10.14202/IJOH.2021.42-64.

- Clink, D.J., Crofoot, M.C. and Marshall, A.J. (2019). Application of a semi-automated vocal fingerprinting approach to monitor Bornean gibbon females in an experimentally fragmented landscape in Sabah, Malaysia. *Bioacoustics*, **28**(3), 193–209. DOI: 10.1080/09524622.2018.1426042.
- Cliquet, F., Müller, T., Mutinelli, F., *et al.* (2003). Standardisation and establishment of a rabies ELISA test in European laboratories for assessing the efficacy of oral fox vaccination campaigns. *Vaccine*, **21**(21), 2986–93. DOI: 10.1016/S0264-410X(03)00102-6.
- Cochrane, A. (2012). *Animal Rights Without Liberation Applied Ethics and Human Obligations*. New York, NY: Columbia University Press.
- Coe, J. and Hoy, J. (2020). Choice, control and computers: empowering wildlife in human care. *Multimodal Technologies and Interaction*, **4**(4), 92. DOI: 10.3390/mti4040092.
- Cohen, J. (2010). Chimpanzee research today. A matter of life and limb. *Science*, **328**(5974), 33. DOI: 10.1126/science.328.5974.33.
- Cohen, S.E. (2013). Sandy marked a shift for social media use in disasters. *Government Technology*, March 7, 2013. Available at: <https://www.govtech.com/em/disaster/Sandy-Social-Media-Use-in-Disasters.html>.
- Colditz, I.G. and Hine, B.C. (2016). Resilience in farm animals: biology, management, breeding and implications for animal welfare. *Animal Production Science*, **56**(12), 1961–83. DOI: 10.1071/AN15297.
- Collins, A. (2003). Health guidelines for visiting researchers in Gombe National Park to minimize risk of disease transmission among primates (updated 8/01/03). *Pan Africa News*, **10**(1), 1–3.
- Collins, A. and Goodall, J. (2008). Long-term research and conservation in Gombe National Park, Tanzania. In *Science and Conservation in African Forests: The Benefits of Longterm Research*, ed. E. Ross and R. Wrangham. Cambridge, UK: Cambridge University Press, pp. 158–72. DOI: 10.1017/CBO9780511754920.016.
- Conover, M.R. and Conover, D.O. (2022). *Human–Wildlife Interactions: From Conflict to Coexistence*, 2nd edn. Boca Raton, FL: CRC Press. DOI: 10.1201/9780429401404.
- Conservation Evidence (n.d.). *Conservation Evidence: Providing Evidence to Improve Practice*. Cambridge, UK: University of Cambridge. Available at: <https://www.conservationevidence.com/data/index?terms=prism>. Accessed: May, 2019.
- Cooke, S.J., Madliger, C.L., Cramp, R.L., *et al.* (2020). Reframing conservation physiology to be more inclusive, integrative, relevant and forward-looking: reflections and a horizon scan. *Conservation Physiology*, **8**(1), coaa016. DOI: 10.1093/conphys/coaa016.
- Cooper, J.E. and Hull, G., ed. (2017). *Gorilla Pathology and Health: With a Catalogue of Preserved Materials*. San Diego, CA: Academic Press. DOI: 10.1016/B978-0-12-802039-5.00021-4.
- Cooper, K. (2018). What does a good response to an emergency wildlife disease look like? Presented at: *WDA-A Annual Conference, Bali, Indonesia*. Wildlife Disease Association Australasia Section (WDA-A) in association with the Asian Society of Conservation Medicine.
- Corbey, R. (2005). *The Metaphysics of Apes: Negotiating the Animal–Human Boundary*. New York, NY: Cambridge University Press.
- Corlett, R.T., Primack, R.B., Devictor, V., *et al.* (2020). Impacts of the coronavirus pandemic on biodiversity conservation. *Biological Conservation*, **246**, 108571. DOI: 10.1016/j.biocon.2020.108571.
- Corrigan, A. (2010). *An Investigation into the Welfare Standards of Zoos in Malaysia*. Singapore: Animal Concerns Research and Education Society (ACRES). Available at: <http://www.zoocheck.com/wp-content/uploads/2015/06/MalaysiaZooReport2010.pdf>.
- Coscollá, M., Lewin, A., Metzger, S., *et al.* (2013). Novel *Mycobacterium tuberculosis* complex isolate from a wild chimpanzee. *Emerging Infectious Diseases*, **19**(6), 969–76.
- Coudrat, C.N.Z., Nanthavong, C., Ngoprasert, D., Suwanwaree, P. and Savini, T. (2015). Singing patterns of white-cheeked gibbons (*Nomascus* sp.) in the Annamite Mountains of Laos. *International Journal of Primatology*, **36**(4), 691–706. DOI: 10.1007/s10764-015-9849-x.
- Cox, C., Burgess, S., Sellitto, C. and Buultjens, J. (2009). The role of user-generated content in tourists' travel planning behavior. *Journal of Hospitality Marketing & Management*, **18**(8), 743–64. DOI: 10.1080/19368620903235753.
- Cox, J. and Lennkh, S. (2016). *Model Animal Welfare Act – A Comprehensive Framework Law*. Boston, MA: World Animal Net. Available at: http://worldanimal.net/images/stories/documents/Model_AWA/WAN-Model-Animal-Welfare-Act.pdf.

- Cozannet, G.L. (2007). *IGOS Geohazards: Toward an Improved use of Earth Observations for Geohazards Mitigation*. Scientific and Technical Subcommittee Session. Vienna, Austria: United Nations Office for Outer Space Affairs (UNOOSA) Available at: <https://www.unoosa.org/pdf/pres/stsc2007/tech-12.pdf>.
- Cranfield, M.R. and Minnis, R.B. (2007). An integrated health approach to the conservation of mountain gorillas *Gorilla beringei beringei*. *International Zoo Yearbook*, **41**, 110–21.
- Crissey, S., Pribyl, L., Pruett-Jones, M. and Meehan, T. (1998). Nutritional management of Old World primates with special consideration for vitamin D. *International Zoo Yearbook*, **36**(1), 122–30. DOI: 10.1111/j.1748-1090.1998.tb02894.x.
- Crockett, C.M. and Ha, R.R. (2010). Data collection in the zoo setting, emphasizing behavior. In *Wild Mammals in Captivity: Principles and Techniques*, ed. D. G. Kleiman, K. V. Thompson and C. K. Baer. Chicago, IL: University of Chicago Press, pp. 386–406.
- Crunchant, A.-S., Egerer, M., Loos, A., *et al.* (2017). Automated face detection for occurrence and occupancy estimation in chimpanzees. *American Journal of Primatology*, **79**(3), e22627. DOI: 10.1002/ajp.22627.
- Crutzen, P.J. (2006). The “Anthropocene”. In *Earth System Science in the Anthropocene*, ed. E. Ehlers and T. Krafft. Berlin, Heidelberg, Germany: Springer, pp. 13–18. DOI: 10.1007/3-540-26590-2_3.
- CSBI and TBC (2015). *A Cross-Sector Guide to Implementing the Mitigation Hierarchy*. Cambridge, UK: Cross-Sector Biodiversity Initiative (CSBI). Available at: <http://www.csbi.org.uk/our-work/mitigation-hierarchy-guide/>.
- CTPH (n.d.-a). *Alternative Livelihoods*. Entebbe, Uganda: Conservation Through Public Health (CTPH). Available at: <https://ctph.org/alternative-livelihoods-program/>. Accessed: August, 2022.
- CTPH (n.d.-b). *Bwindi Impenetrable National Park*. Entebbe, Uganda: Conservation Through Public Health (CTPH). Available at: <https://ctph.org/conservation-locations/>. Accessed: August, 2022.
- CTPH (n.d.-c). *Conservation Through Public Health*. Entebbe, Uganda: Conservation through Public Health (CTPH). Available at: <https://ctph.org/>. Accessed: August, 2022.
- CTPH (n.d.-d). *One Health*. Entebbe, Uganda: Conservation Through Public Health (CTPH). Available at: <https://ctph.org/one-health-program/>. Accessed: August, 2022.
- Cunningham, E.P., Unwin, S. and Setchell, J.M. (2015). Darting primates in the field: a review of reporting trends and a survey of practices and their effect on the primates involved. *International Journal of Primatology*, **36**(5), 911–32. DOI: 10.1007/s10764-015-9862-0.
- Curry, B.A., Drane, A.L., Atencia, R., *et al.* (2023). Body mass and growth rates in captive chimpanzees (*Pan troglodytes*) cared for in African wildlife sanctuaries, zoological institutions, and research facilities. *Zoo Biology*, **42**(1), 98–106. DOI: 10.1002/zoo.21718.
- Cusick, D. (2019). Some disaster prevention spending reaps higher rewards. *Scientific American*, June 24, 2019. Available at: <https://www.scientificamerican.com/article/some-disaster-prevention-spending-reaps-higher-rewards/>.
- CZS (n.d.). *Animal Welfare Research: WelfareTrak®*. Chicago, IL: Chicago Zoological Society (CZS). Available at: <https://welfaretrak.org/>. Accessed: May, 2022.
- D’arc, M., Ayoub, A., Esteban, A., *et al.* (2015). Origin of the HIV-1 group O epidemic in western lowland gorillas. *Proceedings of the National Academy of Sciences*, **112**(11), E1343–52.
- D’Cruze, N., Green, J., Elwin, A. and Schmidt-Burbach, J. (2020). Trading tactics: time to rethink the global trade in wildlife. *Animals*, **10**(12), 2456. DOI: 10.3390/ani10122456.
- D’Cruze, N. and Macdonald, D.W. (2016). A review of global trends in CITES live wildlife confiscations. *Nature Conservation*, **15**. DOI: 10.3897/natureconservation.15.10005.
- Daddoust, L., Asgary, A., McBey, K.J., Elliott, S. and Normand, A. (2021). Spontaneous volunteer coordination during disasters and emergencies: opportunities, challenges, and risks. *International Journal of Disaster Risk Reduction*, **65**, 102546. DOI: 10.1016/j.ijdrr.2021.102546.
- Dalkey, N. and Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*, **9**(3), 458–67.
- Dalton, J. (2020). Coronavirus: sharp rise in poaching of Africa’s mountain gorillas as people hunt more bushmeat. *Independent*, July 20, 2020. Available at: <https://www.independent.co.uk/independentpremium/world/poaching-gorillas-africa-congo-uganda-bushmeat-coronavirus-apes-a9628501.html>.

- Dampage, U., Bandaranayake, L., Wanasinghe, R., Kottahachchi, K. and Jayasanka, B. (2022). Forest fire detection system using wireless sensor networks and machine learning. *Scientific Reports*, **12**, 46. DOI: 10.1038/s41598-021-03882-9.
- Das, J., Biswas, J., Bhattacharjee, P.C. and Rao, S.S. (2009). Canopy bridges: an effective conservation tactic for supporting gibbon populations in forest fragments. In *The Gibbons: New Perspectives on Small Ape Socioecology and Population Biology*, ed. D. Whittaker and S. Lappan. New York, NY: Springer, pp. 467–75. DOI: 10.1007/978-0-387-88604-6_22.
- Daszak, P., Cunningham, A.A. and Hyatt, A.D. (2000). Emerging Infectious Diseases of wildlife – threats to biodiversity and human health. *Science*, **287**(5452), 443–9. DOI: 10.1126/science.287.5452.443.
- Daszak, P., Cunningham, A.A. and Hyatt, A.D. (2001). Anthropogenic environmental change and the emergence of infectious diseases in wildlife. *Acta Tropica*, **78**(2), 103–16. DOI: 10.1016/S0001-706X(00)00179-0.
- Daud, Z. (2019). Sepilok centre must heed the rules. *New Straits Times*, December 7, 2019. Available at: <https://www.nst.com.my/opinion/letters/2019/12/545536/sepilok-centre-must-heed-rules>.
- Davis, J.T., Mengersen, K., Abram, N.K., et al. (2013). It's not just conflict that motivates killing of orangutans. *PLoS ONE*, **8**(10), e75373. DOI: 10.1371/journal.pone.0075373.
- Dawson, C.P. (2008). Ecotourism and nature-based tourism: one end of the tourism opportunity spectrum? In *Tourism, Recreation and Sustainability: Linking Culture and the Environment*, 2nd edn, ed. S. F. McCool and R. N. Moisey. Wallingford, UK: CABI International, pp. 38–50. DOI: 10.1079/9781845934705.0038.
- de Haas, A. (2020). Transmission of diseases from humans to apes: why extra vigilance is now needed. *The Conversation*, March 24, 2020. Available at: <https://theconversation.com/transmission-of-diseases-from-humans-to-apes-why-extra-vigilance-is-now-needed-134083>.
- De Santis, O., Audran, R., Pothin, E., et al. (2016). Safety and immunogenicity of a chimpanzee adenovirus-vectored Ebola vaccine in healthy adults: a randomised, double-blind, placebo-controlled, dose-finding, phase 1/2a study. *The Lancet Infectious Diseases*, **16**(3), 311–20. DOI: 10.1016/s1473-3099(15)00486-7.
- de Silva, G.C., Regan, E.C., Pollard, E.H.B. and Addison, P.F.E. (2019). The evolution of corporate no net loss and net positive impact biodiversity commitments: understanding appetite and addressing challenges. *Business Strategy and the Environment*, **28**(7), 1481–95. DOI: 10.1002/bse.2379.
- Decision Tree Writing Group (2006). Clinical response decision tree for the mountain gorilla (*Gorilla beringei*) as a model for great apes. *American Journal of Primatology*, **68**(9), 909–27. DOI: 10.1002/ajp.20297.
- Deem, S.L. (2007). Role of the zoo veterinarian in the conservation of captive and free-ranging wildlife. *International Zoo Yearbook*, **41**(1), 3–11. DOI: 10.1111/j.1748-1090.2007.00020.x.
- Deem, S.L. (2016). Conservation medicine: a solution-based approach for saving nonhuman primates. In *Ethno-primatology: Primate Conservation in the 21st Century*, ed. M. T. Waller. Cham, Switzerland: Springer, pp. 63–76. DOI: 10.1007/978-3-319-30469-4_4.
- Deere, J.R., Parsons, M.B., Lonsdorf, E.V., et al. (2019). *Entamoeba histolytica* infection in humans, chimpanzees and baboons in the Greater Gombe Ecosystem, Tanzania. *Parasitology*, **146**(9), 1116–22. DOI: 10.1017/S0031182018001397.
- DeGrazia, D. (2016). Nonhuman primates, human need, and ethical constraints. *Hastings Center Report*, **46**(4), 27–8. DOI: 10.1002/hast.601.
- Deiner, K., Bik, H.M., Mächler, E., et al. (2017). Environmental DNA metabarcoding: transforming how we survey animal and plant communities. *Molecular Ecology*, **26**(21), 5872–95. DOI: 10.1111/mec.14350.
- Delgado, R.A. (2010). Communication, culture and conservation in orangutans. In *Indonesian Primates*, ed. S. Gursky and J. Supriatna. New York, NY: Springer, pp. 23–40. DOI: 10.1007/978-1-4419-1560-3_3.
- Delgado, R.A. and van Schaik, C.P. (2000). The behavioral ecology and conservation of the orangutan (*Pongo pygmaeus*): a tale of two islands. *Evolutionary Anthropology: Issues, News, and Reviews*, **9**(5), 201–18. DOI: 10.1002/1520-6505(2000)9:5<201::AID-EVAN2>3.0.CO;2-Y.
- Dellatore, D.F., Waitt, C.D. and Foitová, I. (2014). The impact of tourism on the behavior of rehabilitated orangutans (*Pongo abelii*) in Bukit Lawang, North Sumatra, Indonesia. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 98–120. DOI: 10.1017/CBO9781139087407.008.
- Demetria, C., Smith, I., Tan, T., et al. (2018). Reemergence of Reston Ebola virus in cynomolgus monkeys, the Philippines, 2015. *Emerging Infectious Diseases*, **24**(7), 1285–91. DOI: 10.3201/eid2407.171234.

- Dench, R., Sulistyono, F., Fahrioni, A. and Philippa, J. (2015). Evaluation of diagnostic accuracy of the comparative tuberculin skin test in rehabilitant Bornean orangutans (*Pongo pygmaeus*). *Journal of Zoo and Wildlife Medicine*, **46**(4), 833–42. DOI: 10.1638/2014-0220.1.
- Dennis, R. (1999). *A Review of Fire Projects in Indonesia (1982–1998)*. Bogor, Indonesia: Center for International Forestry Research (CIFOR). Available at: https://www.cifor.org/publications/pdf_files/firereport.pdf.
- DePaoli, A. and Johnsen, D.O. (1978). Fatal strongyloidiasis in gibbons (*Hylobates lar*). *Veterinary Pathology*, **15**(1), 31–9. DOI: 10.1177/030098587801500104.
- Desmond, J.S. and Desmond, J.A.Z. (2014). Evaluating the effectiveness of chimpanzee tourism. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 199–212. DOI: 10.1017/CBO9781139087407.014.
- Detroit Zoological Society (n.d.). *The Great Ape Heart Project*. Royal Oak, MI: Detroit Zoological Society. Available at: <https://greatapeheartproject.org/>. Accessed: January, 2022.
- Devaux, C.A., Mediannikov, O., Medkour, H. and Raoult, D. (2019). Infectious disease risk across the growing human–non human primate interface: a review of the evidence. *Frontiers in Public Health*, **7**, 305. DOI: 10.3389/fpubh.2019.00305.
- DHS (2019). *Guidelines for Managing Spontaneous Volunteers in South Australia*. Adelaide, Australia: Department of Human Services (DHS), Government of South Australia. Available at: <https://naturaldisaster.royalcommission.gov.au/system/files/2020-07/SSA.468.001.0257.pdf>.
- Di Giulio, D.B. and Eckburg, P.B. (2004). Human monkeypox: an emerging zoonosis. *The Lancet Infectious Diseases*, **4**(1), 15–25. DOI: 10.1016/S1473-3099(03)00856-9.
- Dickman, A.J. and Hazzah, L. (2016). Money, myths and man-eaters: complexities of human–wildlife conflict. In *Problematic Wildlife: A Cross-Disciplinary Approach*, ed. F. M. Angelici. Cham, Switzerland: Springer International Publishing, pp. 339–56. DOI: 10.1007/978-3-319-22246-2_16.
- Digun-Aweto, O. (2020). Taking a cue from Rwanda; replicating gorilla tourism in Nigeria. *AfricaGrowth Agenda*, **17**(2), 10–11. DOI: 10.10520/EJC-1f024f79ad.
- Dinsi, S.C. and Eyebe, S.A. (2016). *Great Ape Conservation in Cameroon: Mapping Institution and Policies. Poverty and Conservation Learning Group (PCLG) Research Report*. London, UK: International Institute for Environment and Development (IIED). Available at: <http://pubs.iied.org/pdfs/Go4017.pdf>.
- Doane, C.J., Lee, D.R. and Sleeper, M.M. (2006). Electrocardiogram abnormalities in captive chimpanzees (*Pan troglodytes*). *Comparative Medicine*, **56**(6), 512–18.
- Dobson, A.P., Pimm, S.L., Hannah, L., et al. (2020). Ecology and economics for pandemic prevention. *Science*, **369**(6502), 379–81. DOI: 10.1126/science.abc3189.
- Doran-Sheehy, D., Derby, A., Greer, D. and Mongo, P. (2007). Habituation of western gorillas: the process and factors that influence it. *American Journal of Primatology*, **69**, 1–16. DOI: 10.1002/ajp.20442.
- Doran-Sheehy, D., Mongo, P., Lodwick, J. and Conklin-Brittain, N.L. (2009). Male and female western gorilla diet: preferred foods, use of fallback resources, and implications for ape versus old world monkey foraging strategies. *American Journal of Physical Anthropology*, **140**(4), 727–38. DOI: 10.1002/ajpa.21118.
- Dore, K.M., Hansen, M.F., Klegarth, A.R., et al. (2020). Review of GPS collar deployments and performance on nonhuman primates. *Primates*, **61**(3), 373–87. DOI: 10.1007/s10329-020-00793-7.
- Dore, K.M., Riley, E.P. and Fuentes, A. (2017). *Ethnoprimatology: A Practical Guide to Research at the Human–Nonhuman Primate Interface*. Cambridge, UK: Cambridge University Press. DOI: 10.1017/9781316272466.
- Doyle, C. (2017). Captive wildlife sanctuaries: definition, ethical considerations and public perception. *Animal Studies Journal*, **6**(2), 55–85. DOI: <https://ro.uow.edu.au/asj/vol6/iss2/5>.
- Drane, A.L., Atencia, R., Cooper, S.-M., et al. (2019). Cardiac structure and function characterized across age groups and between sexes in healthy wild-born captive chimpanzees (*Pan troglodytes*) living in sanctuaries. *American Journal of Veterinary Research*, **80**(6), 547–57. DOI: 10.2460/ajvr.80.6.547.
- Drane, A.L., Atencia, R., Cooper, S.-M., et al. (2020). Evaluation of relationships between results of electrocardiography and echocardiography in 341 chimpanzees (*Pan troglodytes*). *American Journal of Veterinary Research*, **81**(6), 488–98. DOI: 10.2460/ajvr.81.6.488.

- Draper, C., Baker, L. and Ramp, D. (2015). Poster: Why compassionate conservation can improve the welfare of wild animals. Presented at: *Animal Populations – World Resources and Animal Welfare, UFAW International Animal Welfare Science Symposium, 14–15th July 2015, Zagreb, Croatia*. Wheathampstead, UK: Universities Federation for Animal Welfare (UFAW), p. 51.
- Draper, C. and Harris, S. (2012). The assessment of animal welfare in British zoos by government-appointed inspectors. *Animals*, **2**(4), 507–28. DOI: 10.3390/ani2040507.
- Draws, B., Harmann, L.M., Beehler, L.L., *et al.* (2011). Ultrasonographic monitoring of fetal development in unrestrained bonobos (*Pan paniscus*) at the Milwaukee County Zoo. *Zoo Biology*, **30**(3), 241–53. DOI: 10.1002/zoo.20304.
- Dunay, E., Apakupakul, K., Leard, S., Palmer, J.L. and Deem, S.L. (2018). Pathogen transmission from humans to great apes is a growing threat to primate conservation. *EcoHealth*, **15**(1), 148–62. DOI: 10.1007/s10393-017-1306-1.
- Dunkley, J. and Whelan, T.A. (2006). Vicarious traumatisation: current status and future directions. *British Journal of Guidance & Counselling*, **34**(1), 107–16. DOI: 10.1080/03069880500483166.
- Dunlop, A.L., Logue, K.M., Vaidyanathan, L. and Isakov, A.P. (2016). Facilitators and barriers for effective academic–community collaboration for disaster preparedness and response. *Journal of Public Health Management and Practice*, **22**(3), E20–28.
- Dunn, A., Bergl, R., Byler, D., *et al.* (2014). *Revised Regional Action Plan for the Conservation of the Cross River Gorilla (Gorilla gorilla diehli) 2014–2019*. New York, NY: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG) and Wildlife Conservation Society (WCS). Available at: <https://portals.iucn.org/library/node/44661>.
- Durham, D. (2015). The status of captive apes. In *State of the Apes: Industrial Agriculture and Ape Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 228–59. Available at: <http://www.stateoftheapes.com/themes/the-status-of-captive-apes/>.
- Durham, D. (2018). The status of captive apes: a statistical update. In *State of the Apes: Infrastructure Development and Ape Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 255–63. Available at: <https://www.stateoftheapes.com/volume-3-infrastructure-development/>.
- Durham, D. (2020). The status of captive apes: a statistical update. In *State of the Apes: Killing, Capture, Trade and Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 255–62. Available at: <https://www.stateoftheapes.com/themes/volume-4-chapter-8-campaign-for-nonhuman-rights-and-status-of-captive-apes/>.
- Durham, D. and Phillipson, A. (2014). Status of captive apes across Africa and Asia: the impact of extractive industry. In *State of the Apes: Extractive Industries and Ape Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 279–305. Available at: <http://www.stateoftheapes.com/volume-1-extractive-industries/>.
- EAGLE (2019). *The EAGLE Network Annual Report 2019*. Eco Activists for Governance and Law Enforcement (EAGLE). Available at: <https://www.eagle-enforcement.org/data/files/eagle-network-annual-report-2019.pdf>.
- Earth Systems (2015). *Mako Gold Project Environmental and Social Impact Assessment Report*. Dakar, Senegal: Earth Systems. Available at: <https://documents.pub/document/mako-gold-project-rmlcomau-mako-gold-project-esia-non-technical-summary-final.html?page=1>.
- Eberle, R., Black, D.H. and Hilliard, J.K. (1989). Relatedness of glycoproteins expressed on the surface of simian herpesvirus virions and infected cells to specific HSV glycoproteins. *Archives of Virology*, **109**(3–4), 233–52. DOI: 10.1007/BF01311084.
- Eberle, R. and Jones-Engel, L. (2017). Understanding primate herpesviruses. *Journal of Emerging Diseases and Virology*, **3**(1). DOI: 10.16966/2473-1846.127.
- Edes, A.N. (2018). *Assessing long-term stress in great apes: allostatic load in western lowland gorillas (Gorilla gorilla gorilla)*. Doctoral thesis. Columbus, OH: The Ohio State University.
- Edes, A.N., Edwards, K.L., Wolfe, B.A., Brown, J.L. and Crews, D.E. (2020). Allostatic load indices with cholesterol and triglycerides predict disease and mortality risk in zoo-housed western lowland gorillas (*Gorilla gorilla gorilla*). *Biomarker Insights*, **15**, 1177271920914585. DOI: 10.1177/1177271920914585.
- Edes, A.N., Wolfe, B.A. and Crews, D.E. (2018). Evaluating allostatic load: a new approach to measuring long-term stress in wildlife. *Journal of Zoo and Wildlife Medicine*, **49**(2), 272–82, 11. DOI: 10.1638/2016-0070.1.

- Edwards, D.P., Sloan, S., Weng, L., *et al.* (2014). Mining and the African environment. *Conservation Letters*, 7(3), 302–11. DOI: 10.1111/conl.12076.
- Edwards, S.J.L., Chatterjee, H.J. and Santini, J.M. (2021). Anthroponosis and risk management: a time for ethical vaccination of wildlife? *The Lancet Microbe*, 2(6), e230–31. DOI: 10.1016/S2666-5247(21)00081-1.
- Edwards, S.J.L., Norell, C.H., Illari, P., Clarke, B. and Neuhaus, C.P. (2018). A radical approach to Ebola: saving humans and other animals. *American Journal of Bioethics*, 18(10), 35–42. DOI: 10.1080/15265161.2018.1513584.
- Elder, A.A. (2009). Hylobatid diets revisited: the importance of body mass, fruit availability, and interspecific competition. In *The Gibbons: New Perspectives on Small Ape Socioecology and Population Biology*, ed. D. Whittaker and S. Lappan. New York, NY: Springer, pp. 133–59. DOI: 10.1007/978-0-387-88604-6_8.
- Elichai, A. (2018). How big data can help in disaster response. *Scientific American Observations*, December 13, 2018. Available at: <https://blogs.scientificamerican.com/observations/how-big-data-can-help-in-disaster-response/>.
- Ellwanger, J.H. and Chies, J.A.B. (2021). Zoonotic spillover: understanding basic aspects for better prevention. *Genetics and Molecular Biology*, 44(1, S1), e20200355. DOI: 10.1590/1678-4685-GMB-2020-0355.
- Ely, J.J., Bishop, M.A., Lammey, M.L., *et al.* (2010). Use of biomarkers of collagen types I and III fibrosis metabolism to detect cardiovascular and renal disease in chimpanzees (*Pan troglodytes*). *Comparative Medicine*, 60(2), 154–8.
- Ely, J.J., Zavaskis, T. and Lammey, M.L. (2013). Hypertension increases with aging and obesity in chimpanzees (*Pan troglodytes*). *Zoo Biology*, 32(1), 79–87.
- Emery Thompson, M., Jones, J.H., Pusey, A.E., *et al.* (2007). Aging and fertility patterns in wild chimpanzees provide insights into the evolution of menopause. *Current Biology*, 17(24), 2150–6. DOI: 10.1016/j.cub.2007.11.033.
- Emery Thompson, M., Muller, M.N., Machanda, Z.P., Otali, E. and Wrangham, R.W. (2020). The Kibale Chimpanzee Project: over thirty years of research, conservation, and change. *Biological Conservation*, 252, 108857. DOI: 10.1016/j.biocon.2020.108857.
- Emery Thompson, M. and Wrangham, R.W. (2008). Diet and reproductive function in wild female chimpanzees (*Pan troglodytes schweinfurthii*) at Kibale National Park, Uganda. *American Journal of Physical Anthropology*, 135(2), 171–81. DOI: 10.1002/ajpa.20718.
- Emery Thompson, M. and Wrangham, R.W. (2013). *Pan troglodytes* robust chimpanzee. In *Mammals of Africa. Volume II: Primates*, ed. T. M. Butynski, J. Kingdon and J. Kalina. London, UK: Bloomsbury Publishing, pp. 55–64.
- Emery Thompson, M., Zhou, A. and Knott, C.D. (2012). Low testosterone correlates with delayed development in male orangutans. *PLoS ONE*, 7(10), e47282. DOI: 10.1371/journal.pone.0047282.
- Emmons, R.W. and Lennette, E.H. (1970). Natural herpesvirus hominis infection of a gibbon (*Hylobates lar*). *Archiv für die gesamte Virusforschung*, 31(3), 215–18. DOI: 10.1007/BF01253755.
- Endangered Asian Species Trust (2020a). Endangered Asian Species Trust. *Facebook Post*, September 22, 2020. Available at: https://www.facebook.com/permalink.php?story_fbid=pfbidorcrTXsmP3mQRoWgqC29QB1fr7KmUfbKvytBjRuGeREHQsoq92imk59GML8Sa615VI&id=164617243557223.
- Endangered Asian Species Trust (2020b). Endangered Asian Species Trust 2. *Facebook Post*, September 29, 2020. Available at: https://www.facebook.com/permalink.php?story_fbid=pfbido2ZHh1AXvejtvbbzQdpwimgM8tonVDYdoUWm6UKYP3GHkmAh1WR8EnM1ThYkjcNTMdl&id=164617243557223.
- Endangered Asian Species Trust (2020c). Golden-cheeked gibbon rehabilitation. *Facebook Post*, September 9, 2020. Available at: <https://www.facebook.com/164617243557223/videos/316142682948849/>.
- Engelman, D., Yoshizumi, J., Hay, R.J., *et al.* (2020). The 2020 International Alliance for the Control of Scabies consensus criteria for the diagnosis of scabies. *British Journal of Dermatology*, 183(5), 808–20. DOI: 10.1111/bjd.18943.
- English, P. and Ahebwaa, W.M. (2018). *How can Tourism become a Driver of Economic Growth in Uganda?* Prepared for the 2018 Economic Growth Forum and National Budget Conference. S-43437-UGA-1. London, UK: International Growth Centre (IGC).
- ENISA (n.d.). *Risk Treatment*. Attiki, Greece: European Union Agency for Cybersecurity (ENISA). Available at: <https://www.enisa.europa.eu/topics/threat-risk-management/risk-management/current-risk/risk-management-inventory/rm-process/risk-treatment>. Accessed: July, 2022.
- Equator Principles (2020). *Equator Principles EP4*. Equator Principles Association. Available at: https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf.

- Erb, W.M., Barrow, E.J., Hofner, A.N., Utami-Atmoko, S.S. and Vogel, E.R. (2018). Wildfire smoke impacts activity and energetics of wild Bornean orangutans. *Scientific Reports*, **8**, 7606. DOI: 10.1038/s41598-018-25847-1.
- Erdős, L. (2019). No one loved gorillas more – the life and legacy of Diane Fossey. In *Green Heroes: From Buddha to Leonardo DiCaprio*, ed. L. Erdős. Cham, Switzerland: Springer International Publishing, pp. 117–23. DOI: 10.1007/978-3-030-31806-2_24.
- Errecaborde, K.M., Rist, C., Travis, D.A., et al. (2019). Evaluating One Health: the role of team science in multi-sectoral collaboration. *Revue Scientifique et Technique de l'Office International des Épizooties*, **38**(1), 279–89. DOI: 10.20506/rst.38.1.2960.
- Estienne, V. (2022). *Nouabalé-Ndoki National Park*. A.P.E.S. Wiki. Munich, Germany: Max Planck Society for the Advancement of Science e.V. Available at: https://wiki.iucnapesportal.org/index.php/Nouabal%C3%A9-Ndoki_National_Park.
- Estrada, A. (2013). Socioeconomic contexts of primate conservation: population, poverty, global economic demands, and sustainable land use. *American Journal of Primatology*, **75**(1), 30–45. DOI: 10.1002/ajp.22080.
- Estrada, A. and Garber, P.A. (2022). Principal drivers and conservation solutions to the impending primate extinction crisis: introduction to the special issue. *International Journal of Primatology*, **43**(1), 1–14. DOI: 10.1007/s10764-022-00283-1.
- Estrada, A., Garber, P.A., Mittermeier, R.A., et al. (2018). Primates in peril: the significance of Brazil, Madagascar, Indonesia and the Democratic Republic of the Congo for global primate conservation. *PeerJ*, **6**, e4869. DOI: 10.7717/peerj.4869.
- Estrada, A., Garber, P.A., Rylands, A.B., et al. (2017). Impending extinction crisis of the world's primates: why primates matter. *Science Advances*, **3**(1), e1600946. DOI: 10.1126/sciadv.1600946.
- Etiyibo, E. (2017). Ubuntu and the environment. In *The Palgrave Handbook of African Philosophy*, ed. A. Afolayan and T. Falola. New York, NY: Palgrave Macmillan US, pp. 633–57. DOI: 10.1057/978-1-137-59291-0_41.
- European Commission (2021). *DG ECHO Guidance Note Disaster Preparedness*. Brussels, Belgium: European Commission. Available at: https://ec.europa.eu/echo/files/policies/sectoral/dg_echo_guidance_note_-_disaster_preparedness_en.pdf.
- European Commission (n.d.). *Economics for Disaster Prevention and Preparedness*. Brussels, Belgium: European Commission. Available at: https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/european-disaster-risk-management/economics-disaster-prevention-and-preparedness_en. Accessed: July, 2022.
- Evans, T., Wingard, J. and Humle, T. (2021). The mitigation hierarchy in environmental impact assessment and related legislation as a tool for species conservation: a case study of western chimpanzees and mining development. *Biological Conservation*, **261**, 109237. DOI: 10.1016/j.biocon.2021.109237.
- Eze, M. (2010). *Intellectual History in Contemporary South Africa*. London, UK: Palgrave MacMillan.
- Fan, P.-F. (2017). The past, present, and future of gibbons in China. *Biological Conservation*, **210**, 29–39. DOI: 10.1016/j.biocon.2016.02.024.
- Fan, P.-F., Fei, H., Xiang, Z., et al. (2010). Social structure and group dynamics of the Cao Vit gibbon (*Nomascus nasutus*) in Bangliang, Jingxi, China. *Folia Primatologica*, **81**(5), 245–53.
- Fan, P.-F., He, K., Chen, X., et al. (2017). Description of a new species of hoolock gibbon (Primates: Hylobatidae) based on integrative taxonomy. *American Journal of Primatology*, **79**(5), e22631. DOI: 10.1002/ajp.22631.
- Fan, P.-F. and Jiang, X.-L. (2008). Effects of food and topography on ranging behavior of black crested gibbon (*Nomascus concolor jingdongensis*) in Wuliang Mountain, Yunnan, China. *American Journal of Primatology*, **70**(9), 871–8. DOI: 10.1002/ajp.20577.
- Fan, P.-F. and Jiang, X.-L. (2010). Maintenance of multifemale social organization in a group of *Nomascus concolor* at Wuliang Mountain, Yunnan, China. *International Journal of Primatology*, **31**(1), 1–13. DOI: 10.1007/s10764-009-9375-9.
- Fan, P.-F., Turvey, S.T. and Bryant, J.V. (2020). Hoolock tianxing (*amended version of 2019 assessment*). *The IUCN Red List of Threatened Species 2020: e.T118355648A166597159*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2020-1.RLTS.T118355648A166597159.en.

- FAO (2018). *The State of Food Security and Nutrition in the World 2018*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO). Available at: <https://www.fao.org/3/I9553EN/i9553en.pdf>.
- FAO (n.d.-a). *Conservation Agriculture*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO). Available at: <http://www.fao.org/conservation-agriculture/overview/what-is-conservation-agriculture/en/>. Accessed: August, 2021.
- FAO (n.d.-b). *Towards a New Green Revolution*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO). Available at: <https://www.fao.org/3/xo262e/xo262e06.htm>. Accessed: August, 2021.
- FAO and NACA (2001). Contingency planning. In *Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals*. FAO Fisheries Technical Paper No. 402, Supplement 1, ed. Food and Agriculture Organization of the United Nations (FAO) and Network of Aquaculture Centres in Asia-Pacific (NACA). Rome, Italy: FAO, pp. 53–62. Available at: <http://www.fao.org/3/y1238e/y1238e09.pdf>.
- Farmer, K.H. (2002). Pan-African Sanctuary Alliance: status and range of activities for great ape conservation. *American Journal of Primatology*, **58**(3), 117–32. DOI: 10.1002/ajp.10054.
- Farmer, K.H. (2012). *Building Sustainable Sanctuaries*. Cambridge, UK: Arcus Foundation. Available at: http://www.sanctuaryfederation.org/gfas/wp-content/uploads/2013/09/Arcus_Building_Sustainable_Sanctuaries.pdf.
- Farmer, K.H. (2018). *Compassionate Conservation Organizations: Challenges, Priorities and Recommended Action*. Unpublished report prepared for the Arcus Foundation.
- Farrell, M., Rando, C. and Garrod, B. (2015). Lessons from the past: metabolic bone disease in historical captive primates. *International Journal of Primatology*, **36**(2), 398–411. DOI: 10.1007/s10764-015-9831-7.
- Fasina, F.O., Fasanmi, O.G., Makonnen, Y.J., et al. (2021). The One Health landscape in Sub-Saharan African countries. *One Health*, **13**, 100325. DOI: 10.1016/j.onehlt.2021.100325.
- Fauna Silvestre de Nicaragua (2020). Fauna Silvestre de Nicaragua. *Facebook Post*, April 12, 2020. Available at: <https://www.facebook.com/eduszoo/videos/este-es-pipo-el-chimpance-del-zoo-nicaragua-es-un-gran-amigo-y-le-gusta-jugar-mu/215515939731881/>.
- Faust, C.L., McCallum, H.I., Bloomfield, L.S.P., et al. (2018). Pathogen spillover during land conversion. *Ecology Letters*, **21**(4), 471–83. DOI: 10.1111/ele.12904.
- Faust, L.J., Cress, D., Farmer, K.H., Ross, S.R. and Beck, B.B. (2011). Predicting capacity demand on sanctuaries for African chimpanzees (*Pan troglodytes*). *International Journal of Primatology*, **32**(4), 849–64. DOI: 10.1007/s10764-011-9505-z.
- Federer, K., Armua-Fernandez, M.T., Gori, F., et al. (2016). Detection of taeniid (*Taenia* spp., *Echinococcus* spp.) eggs contaminating vegetables and fruits sold in European markets and the risk for metacestode infections in captive primates. *International Journal for Parasitology: Parasites and Wildlife*, **5**(3), 249–53. DOI: 10.1016/j.ijppaw.2016.07.002.
- Fedigan, L.M. (2010). Ethical issues faced by field primatologists: asking the relevant questions. *American Journal of Primatology*, **72**(9), 754–71. DOI: 10.1002/ajp.20814.
- Feinberg, J. (1974). The rights of animals and unborn generations. In *Philosophy and Environmental Crisis*, ed. W. T. Blackstone. Athens, GA: University of Georgia Press, pp. 43–68.
- Feldmann, H. and Geisbert, T.W. (2011). Ebola haemorrhagic fever. *The Lancet*, **377**(9768), 849–62. DOI: 10.1016/S0140-6736(10)60667-8.
- FEMA (2017). *National Incident Management System*. Washington DC: Federal Emergency Management Agency (FEMA), US Department of Homeland Security. Available at: https://www.fema.gov/sites/default/files/2020-07/fema_nims_doctrine-2017.pdf.
- Ferber, D. (2000). Human diseases threaten great apes. *Science*, **289**(5483), 1277–8. DOI: 10.1126/science.289.5483.1277.
- Ferdowsian, H. (2020). The right to bodily sovereignty and its importance to mental and physical well-being. In *Neuroethics and Nonhuman Animals*, ed. L. S. M. Johnson, A. Fenton and A. Shriver. Cham, Switzerland: Springer International Publishing, pp. 255–70. DOI: 10.1007/978-3-030-31011-0_15.
- Ferdowsian, H., Durham, D.L., Kimwele, C., et al. (2011). Signs of mood and anxiety disorders in chimpanzees. *PLoS ONE*, **6**(6), e19855. DOI: 10.1371/journal.pone.0019855.

- Ferdowsian, H. and Fuentes, A. (2014). Harms and deprivation of benefits for nonhuman primates in research. *Theoretical Medicine and Bioethics*, **35**(2), 143–56. DOI: 10.1007/s11017-014-9288-2.
- Ferdowsian, H., Johnson, L.S.M., Johnson, J., et al. (2020). A Belmont report for animals? *Cambridge Quarterly of Healthcare Ethics*, **29**(1), 19–37. DOI: 10.1017/S0963180119000732.
- Fernandez-Duque, E. and Rotundo, M. (2003). Field methods for capturing and marking azarai night monkeys. *International Journal of Primatology*, **24**(5), 1113–20. DOI: 10.1023/A:1026284430453.
- Fernie, A.C. (2008). *The creation and implementation of a great ape welfare index*. Doctor of Philosophy thesis. Brisbane, Australia: The University of Queensland.
- Fernie, A.C., Tribe, A., Murray, P.J., Lisle, A. and Phillips, C.J.C. (2012). A survey of the attitudes of stakeholders in the zoo industry towards the husbandry requirements of captive great apes. *Animal Welfare*, **21**(2), 233–45. DOI: 10.7120/09627286.21.2.233.
- Ferrie, G.M., Farmer, K.H., Kuhar, C.W., et al. (2014). The social, economic, and environmental contributions of Pan African Sanctuary Alliance primate sanctuaries in Africa. *Biodiversity and Conservation*, **23**(1), 187–201. DOI: 10.1007/s10531-013-0592-3.
- Ferris, R.L., Ali, I.K.M. and West, G.D. (2021). Use of a human indirect immunofluorescence antibody assay for *Balamuthia mandrillaris* in a group of captive northwest Bornean orangutans (*Pongo pygmaeus pygmaeus*). *Journal of Zoo and Wildlife Medicine*, **52**, 310–14. DOI: 10.1638/2019-0018.
- Figley, C.R. (1995). *Compassion Fatigue: Coping with Secondary Traumatic Stress Disorder in Those Who Treat the Traumatized*. Brunner/Mazel Psychological Stress Series No. 23. Philadelphia, PA: Brunner/Mazel.
- Filippone, C., Betsem, E., Tortevoe, P., et al. (2015). A severe bite from a nonhuman primate is a major risk factor for HTLV-1 infection in hunters from Central Africa. *Clinical Infectious Diseases*, **60**(11), 1667–76. DOI: 10.1093/cid/civ145.
- Finley, N. (2019). Out on a limb: unlikely collaboration boosts orangutans in Borneo. *Mongabay Series: Great Apes*, June 12, 2019. Available at: <https://news.mongabay.com/2019/06/out-on-a-limb-unlikely-collaboration-boosts-orangutans-in-borneo/>.
- Fischer, C.P. and Romero, L.M. (2019). Chronic captivity stress in wild animals is highly species-specific. *Conservation Physiology*, **7**(1), cozo93. DOI: 10.1093/conphys/cozo93.
- Fischer, J. and Lindenmayer, D.B. (2000). An assessment of the published results of animal relocations. *Biological Conservation*, **96**(1), 1–11. DOI: 10.1016/S0006-3207(00)00048-3.
- Fitzgerald, K. (2022). *Mountain Gorilla Tourism Drives Economic Growth And Conservation*. Nairobi, Kenya: African Wildlife Foundation (AWF) Conservation Centre. Available at: <https://www.awf.org/blog/mountain-gorilla-tourism-drives-economic-growth-and-conservation>.
- Flcury, E. (2017). Money for monkeys, and more: ensuring sanctuary retirement of nonhuman primates. *Animal Studies Journal*, **6**(2), 30–54. DOI: <https://ro.uow.edu.au/asj/vol6/iss2/4>.
- Foitová, I., Cívánová, K., Baruš, V. and Nurcahyo, W. (2014). Phylogenetic relationships between pinworms (Nematoda: Enterobiinae) parasitising the critically endangered orang-utan, according to the characterisation of molecular genomic and mitochondrial markers. *Parasitology Research*, **113**(7), 2455–66. DOI: 10.1007/s00436-014-3892-y.
- Foitová, I., Koubková, B., Barus, V. and Nurcahyo, W. (2008). Presence and species identification of the gapeworm *Mammomonogamus laryngeus* (Railliet, 1899) (Syngamidae: Nematoda) in a semi-wild population of Sumatran orangutan (*Pongo abelii*) in Indonesia. *Research in Veterinary Science*, **84**(2), 232–6. DOI: 10.1016/j.rvsc.2007.04.021.
- Fontseré, C., Frandsen, P., Hernández-Rodríguez, J., et al. (2021). The genetic impact of an Ebola outbreak on a wild gorilla population. *BMC Genomics*, **22**(1), 735. DOI: 10.1186/s12864-021-08025-y.
- Formenty, P.B.H., Boesch, C., Wyers, M., et al. (1999). Ebola virus outbreak among wild chimpanzees living in a rain forest of Côte d'Ivoire. *Journal of Infectious Diseases*, **179** (S1), S120–6. DOI: 10.1086/514296.
- Fort Worth Zoo (2020). Fort Worth Zoo. *Facebook Post*, June 30, 2020. Available at: <https://www.facebook.com/FortWorthZoo/posts/we-have-10-bonobos-at-zoo-i-will-give-you-a-brief-introduction-from-oldest-to-you/10158320883452095/>.
- Four Paws International (2020a). *Annual Report 2020*. Vienna, Austria: Four Paws International. Available at: https://media.4-paws.org/e/3/o/e30e82565512c7a48099a8290231844d4a13af3/210811_FOURPAWSAnnualReport2020.pdf.

- Four Paws International (2020b). Circuses without wild animals. *Four Paws International*, March 21, 2023. Available at: <https://www.four-paws.org/campaigns-topics/topics/wild-animals/worldwide-circus-bans>.
- Fourie, C. (2017). Who is experiencing what kind of moral distress? Distinctions for moving from a narrow to a broad definition of moral distress. *AMA Journal of Ethics*, **19**(6), 578–84. DOI: 10.1001/journalofethics.2017.19.6.nlit1-1706.
- Fraser, D. (2009). Assessing animal welfare: different philosophies, different scientific approaches. *Zoo Biology*, **28**(6), 507–18. DOI: 10.1002/zoo.20253.
- Fraser, D. (2010). Toward a synthesis of conservation and animal welfare science. *Animal Welfare*, **19**(2), 121–4. DOI: 10.1017/S096272860001378.
- Freeland, W.J. (1976). Pathogens and the evolution of primate sociality. *Biotropica*, **8**, 12–24.
- Freund, C., Rahman, E. and Knott, C. (2017). Ten years of orangutan-related wildlife crime investigation in West Kalimantan, Indonesia. *American Journal of Primatology*, **79**(11), 22620. DOI: 10.1002/ajp.22620.
- Fribourg-Blanc, A. and Mollaret, H.H. (1969). Natural treponematoses of the African primate. *Primates in Medicine*, **3**(0), 113–21.
- Fribourg-Blanc, A., Mollaret, H.H. and Niel, G. (1966). [Serologic and microscopic confirmation of treponemosis in Guinea baboons]. *Bulletin de la Société de Pathologie Exotique et de ses Filiales*, **59**(1), 54–9.
- Friend, M., Hurley, J.W., Nol, P. and Wesenberg, K. (2006). *Disease Emergence and Resurgence – The Wildlife–Human Connection*. Circular 1285. Reston, VA: US Geological Survey. DOI: 10.3133/cir1285.
- Friends of Animals (n.d.). *Chimpanzee Rehabilitation Project River Gambia National Park Visitor Information Sheet*. Darien, CT: Friends of Animals. Available at: <https://www.friendsofanimals.org/program/visit-the-river-gambia-national-park/>. Accessed: October, 2020.
- Fröhlich, M., Kunz, J.A., Fryns, C., et al. (2020). Social interactions and interaction partners in infant orang-utans of two wild populations. *Animal Behaviour*, **166**, 183–91.
- Fruth, B., Hickey, J.R., André, C., et al. (2016). *Pan paniscus* (errata version published in 2016). *The IUCN Red List of Threatened Species 2016: e.T15932A102331567*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T15932A17964305.en.
- Fruth, B. and Hohmann, G. (1996). Nest building behavior in the great apes: the great leap forward? In *Great Ape Societies*, ed. W. McGrew, L. Marchant and T. Nishida. Cambridge, UK: Cambridge University Press, pp. 225–40. DOI: 10.1017/CBO9780511752414.019.
- Fruth, B., Tagg, N. and Stewart, F. (2018). Sleep and nesting behavior in primates: a review. *American Journal of Physical Anthropology*, **166**(3), 499–509. DOI: 10.1002/ajpa.23373.
- Fruth, B., Williamson, E.A. and Richardson, M.C. (2013). Bonobo *Pan paniscus*. In *Handbook of the Mammals of the World. Volume 3: Primates*, ed. R. A. Mittermeier, A. B. Rylands and D. E. Wilson. Barcelona, Spain: Lynx Edicions, pp. 853–4.
- FSC (2019). *PSU Review Report of FSC-STD-01-001 FSC Principles and Criteria for Forest Stewardship*. Bonn, Germany: Forest Stewardship Council (FSC) International Center. Available at: <https://connect.fsc.org/sites/default/files/2019-10/Review%20report%20FSC-STD-01-001.pdf>.
- FSC (2023). *FSC Principles and Criteria for Forest Stewardship. FSC-STD-01-001 V5-3*. Bonn, Germany: Forest Stewardship Council (FSC). Available at: <https://connect.fsc.org/document-centre/documents/resource/392>.
- FSC (n.d.). *Our History*. London, UK: Forest Stewardship Council (FSC). Available at: <https://fsc.org/en/our-history>. Accessed: December, 2022.
- Fujita, S. (2011). Health monitoring. In *The Chimpanzees of Bossou and Nimba*, ed. T. Matsuzawa, T. Humle and Y. Sugiyama. Tokyo, Japan: Springer, pp. 353–9. DOI: 10.1007/978-4-431-53921-6_37.
- Fuller, G., Margulis, S.W. and Santymire, R.M. (2011). The effectiveness of indigestible markers for identifying individual animal feces and their prevalence of use in North American zoos. *Zoo Biology*, **30**(4), 379–98.
- Furuichi, T. (2009). Factors underlying party size differences between chimpanzees and bonobos: a review and hypotheses for future study. *Primates*, **50**(3), 197–209. DOI: 10.1007/s10329-009-0141-6.
- Furuichi, T., Hashimoto, C., Idani, G., et al. (1999). Current situation of studies of bonobos (*Pan paniscus*) at Wamba, D.R. Congo. *Primate Research*, **15**(2), 115–27. DOI: 10.2354/psj.15.115.
- FVE (n.d.). *Code of Good Veterinary Practice*. Brussels, Belgium: Federation of Veterinarians of Europe (FVE). Available at: <https://www.eesc.europa.eu/sites/default/files/resources/docs/130-private-act.pdf>. Accessed: February, 2021.

- G1 (2020). Aos 57 anos, chimpanzé Bob recebe novo companheiro de recinto no Zoo de Curitiba. *G1*, April 2, 2020. Available at: <https://g1.globo.com/pr/parana/noticia/2020/04/02/chimpanze-bob-recebe-novo-companheiro-de-recinto-no-zoo-de-curitiba.ghml>.
- GADM (n.d.). *GADM Maps and Data*. Available at: <https://gadm.org/index.html>. Accessed: October, 2021.
- Gagliardi, A., Totino, V., Cacciotti, F., et al. (2018). Rebuilding the gut microbiota ecosystem. *International Journal of Environmental Research and Public Health*, **15**(8), 1679. DOI: 10.3390/ijerph15081679.
- GAHP (n.d.). *Anesthesia Info*. Royal Oak, MI: Great Ape Heart Project (GAHP), Detroit Zoological Society. Available at: <https://greatapeheartproject.org/resources/anesthesia-info/>. Accessed: December, 2020.
- GAIN (n.d.). *Great Ape Information Network*. Kyoto, Japan: National BioResource Project (NBRP)—Great Ape Information Network (GAIN). Available at: <http://www.shigen.nig.ac.jp/gain/index.jsp>. Accessed: October, 2020.
- GAL (2018). *UN Convention of Animal Health and Protection (UNCAHP). First Pre-Draft of the Global Animal Welfare Law Association August 23rd 2018*. Zürich, Switzerland: Global Animal Law (GAL) Association. Available at: <https://www.globalanimallaw.org/downloads/Folder-UNCAHP.pdf>.
- Gamble, K.C., North, M.C.K., Backues, K. and Ross, S.R. (2004). Pathologic review of the chimpanzee (*Pan troglodytes*): 1990–2003. Presented at: *Proceedings of the Annual Meeting of the American Association of Zoo Veterinarians, San Diego, CA, 28 August–3 September 2004*. Jacksonville, FL: American Association of Zoo Veterinarians.
- Game, E.T., Meijaard, E., Sheil, D. and McDonald-Madden, E. (2014). Conservation in a wicked complex world; challenges and solutions. *Conservation Letters*, **7**(3), 271–7. DOI: 10.1111/conl.12050.
- Ganas, J., Robbins, M.M., Nkurunungi, J.B., Kaplin, B.A. and McNeilage, A. (2004). Dietary variability of mountain gorillas in Bwindi Impenetrable National Park, Uganda. *International Journal of Primatology*, **25**(5), 1043–72. DOI: 10.1023/b:ijop.0000043351.20129.44.
- Gaskin, J.M. (2022). Encephalomyocarditis virus infection in animals. In *MSD Manual Veterinary Manual*, ed. MSD. Rahway, NJ: Merck & Co. Inc (MSD). Available at: <https://www.msddvetmanual.com/generalized-conditions/encephalomyocarditis-virus-infection/encephalomyocarditis-virus-infection-in-animals>.
- GATO (2020). Historical achievements of GATO and its following objective. *GATO News*, October 26, 2020. Available at: <https://gyvunuapsauga.lt/en/news/historical-achievements-of-gato-and-its-following-objectives/>.
- Gaveau, D.L.A., Sloan, S., Molidena, E., et al. (2014). Four decades of forest persistence, clearance and logging on Borneo. *PLoS ONE*, **9**(7), e101654. DOI: 10.1371/journal.pone.0101654.
- GCC (n.d.). *GCC Gibbons*. Santa Clarita, CA: Gibbon Conservation Center (GCC). Available at: <https://www.gibboncenter.org/list-of-gcc-gibbons.html>. Accessed: October, 2020.
- GDPC (n.d.). *Early Warning Systems*. Washington DC: Global Disaster Preparedness Center (GDPC). Available at: <https://preparecenter.org/topic/early-warning-systems/#:~:text=Early%20warning%20system%20%E2%80%93%20The%20set,possibility%20of%20harm%20or%20loss>. Accessed: July, 2022.
- Geissmann, T. (1991). Reassessment of age of sexual maturity in gibbons (*Hylobates* spp.). *American Journal of Primatology*, **23**(1), 11–22. DOI: 10.1002/ajp.1350230103.
- Geissmann, T., Grindley, M., Ngwe, L., et al. (2013). *The Conservation Status of Hoolock Gibbons in Myanmar*. Zürich, Switzerland: Gibbon Conservation Alliance. Available at: http://www.gibbonconservation.org/07_publications/book/2013_hoolock_myanmar.pdf.
- Genton, C.I., Cristescu, R.H., Gatti, S., et al. (2017). Using demographic characteristics of populations to detect spatial fragmentation following suspected Ebola outbreaks in great apes. *American Journal of Physical Anthropology*, **164**(1), 3–10.
- Genton, C.I., Pierre, A., Cristescu, R.H., et al. (2015). How Ebola impacts social dynamics in gorillas: a multistate modelling approach. *Journal of Animal Ecology*, **84**(1), 166–76.
- Georges, A.-J., Leroy, E.M., Renaut, A., et al. (1999). Ebola hemorrhagic fever outbreaks in Gabon, 1994–1997: epidemiologic and health control issues. *Journal of Infectious Diseases*, **179**, S65–75.
- Georges-Courbot, M.C., Sanchez, A.J., Lu, C.Y., et al. (1997). Isolation and phylogenetic characterization of Ebola viruses causing different outbreaks in Gabon. *Emerging Infectious Diseases*, **3**(1), 59–62.
- Gevers, D., Kugathasan, S., Denson, Lee A., et al. (2014). The treatment-naive microbiome in new-onset Crohn's disease. *Cell Host & Microbe*, **15**(3), 382–92. DOI: 10.1016/j.chom.2014.02.005.

- GFAS (2017). *Contingency Planning for Sanctuaries and Rehabilitation Centers*. Phoenix, AZ: Global Federation of Animal Sanctuaries (GFAS). Available at: <https://sanctuaryfederation.org/webinars/contingency-planning-for-sanctuaries-and-rehabilitation-centers/>.
- GFAS (2019). *Gorilla Rehabilitation and Conservation Education (GRACE) Center*. Phoenix, AZ: Global Federation of Animal Sanctuaries (GFAS). Available at: <https://sanctuaryfederation.org/sanctuaries/gorilla-rehabilitation-and-conservation-education-center-grace/>.
- GFAS (2020). *Recipients of the 2020 Carole Noon and Outstanding Sanctuary Awards Announced*. Phoenix, AZ: Global Federation of Animal Sanctuaries (GFAS). Available at: <https://www.sanctuaryfederation.org/2020/10/23/recipients-of-the-2020-carole-noon-and-outstanding-sanctuary-awards-announced/>.
- GFAS (2022). *Standards Appendix for Ape Sanctuaries*. Phoenix, AZ: Global Federation of Animal Sanctuaries (GFAS). Available at: <https://sanctuaryfederation.org/wp-content/uploads/2023/02/Ape-Standards-Appendix-2022.pdf>.
- GFAS (n.d.). *Find a Sanctuary*. Phoenix, AZ: Global Federation of Animal Sanctuaries (GFAS). Available at: <https://sanctuaryfederation.org/find-a-sanctuary/>. Accessed: December, 2022.
- GHSA (2020). *Turning Crisis to Opportunities for Workforce Development*. Global Health Security Agenda (GHSA).
- Giannetti, B.F., Agostinho, F., Almeida, C.M.V.B. and Huisingh, D. (2015). A review of limitations of GDP and alternative indices to monitor human wellbeing and to manage eco-system functionality. *Journal of Cleaner Production*, **87**, 11–25. DOI: 10.1016/j.jclepro.2014.10.051.
- Gibbon Rehabilitation Project (n.d.). *Gibbon Sponsorship Program*. Phuket, Thailand: The Wild Animal Rescue Foundation of Thailand (WARF). Available at: <https://www.gibbonproject.org/gibbon-sponsorship-program/>. Accessed: October, 2020.
- Gibbons, A. (2020). Ape researchers mobilize to save primates from coronavirus. *Science*, **368**(6491), 566. DOI: 10.1126/science.368.6491.566-a.
- Gibbs, E.P.J. (2014). The evolution of One Health: a decade of progress and challenges for the future. *Veterinary Record*, **174**(4), 85–91. DOI: 10.1136/vr.g143.
- GIBOP (2019). *Global Inventory of Biodiversity Offset Policies (GIBOP)*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://portals.iucn.org/offsetpolicy/>.
- Gibson, M. (2011). The universal declaration of animal welfare. *Deakin Law Review*, **16**(2), 539–67. DOI: 10.21153/dlr2011vol16no2art112.
- Gilardi, K.V., Gillespie, T.R., Leendertz, F.H., et al. (2015). *Best Practice Guidelines for Health Monitoring and Disease Control in Great Ape Populations*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://www.iucngreatapes.org/health-monitoring-and-disease-prevention>.
- Gilardi, K.V., Nziza, J., Ssevide, B., et al. (2022). Endangered mountain gorillas and COVID-19: One Health lessons for prevention and preparedness during a global pandemic. *American Journal of Primatology*, **84**(4–5), e23291. DOI: 10.1002/ajp.23291.
- Gilardi, K.V., Oxford, K.L., Gardner-Roberts, D., et al. (2014). Human herpes simplex virus type 1 in confiscated gorilla. *Emerging Infectious Diseases*, **20**(11), 1883–6. DOI: 10.3201/eid2011.140075.
- Gilardi, K.V. and Uwingeli, P. (2022). Keep mountain gorillas free from pandemic virus. *Nature*, **602**(7896), 211. DOI: 10.1038/d41586-022-00331-z.
- Gill, V. (2017). Endangered apes saved from pet trade. *BBC News*, November 7, 2017. Available at: <https://www.bbc.com/news/science-environment-41767347>.
- Gillespie, T.R. (2019). Guest editorial: Protecting wild primates during the novel coronavirus pandemic and beyond. *Asian Primates Journal*, **8**(1), 1.
- Gillespie, T.R. and Chapman, C.A. (2006). Prediction of parasite infection dynamics in primate metapopulations based on attributes of forest fragmentation. *Conservation Biology*, **20**(2), 441–8.
- Gillespie, T.R. and Chapman, C.A. (2008). Forest fragmentation, the decline of an endangered primate, and changes in host–parasite interactions relative to an unfragmented forest. *American Journal of Primatology*, **70**(3), 222–30. DOI: 10.1002/ajp.20475.
- Gillespie, T.R., Chapman, C.A. and Greiner, E.C. (2005). Effects of logging on gastrointestinal parasite infections and infection risk in African primates. *Journal of Applied Ecology*, **42**(4), 699–707. DOI: 10.1111/j.1365-2664.2005.01049.x.

- Gillespie, T.R., Jones, K.E., Dobson, A.P., Clennon, J.A. and Pascual, M. (2021). COVID-clarity demands unification of health and environmental policy. *Global Change Biology*, **27**(7), 1319–21. DOI: 10.1111/gcb.15508.
- Gillespie, T.R. and Leendertz, F.H. (2020). COVID-19: protect great apes during human pandemics. *Nature*, **579**(7800), 497. DOI: 10.1038/d41586-020-00859-y.
- Gillespie, T.R., Lonsdorf, E.V., Canfield, E.P., *et al.* (2010). Demographic and ecological effects on patterns of parasitism in eastern chimpanzees (*Pan troglodytes schweinfurthii*) in Gombe National Park, Tanzania. *American Journal of Physical Anthropology*, **143**(4), 534–44. DOI: 10.1002/ajpa.21348.
- Gillespie, T.R., Nunn, C.L. and Leendertz, F.H. (2008). Integrative approaches to the study of primate infectious disease: implications for biodiversity conservation and global health. *American Journal of Physical Anthropology*, **137**(S47), 53–69. DOI: 10.1002/ajpa.20949.
- Gjeltema, J., Troan, B.V., Muehlenbachs, A., *et al.* (2016). Amoebic meningoencephalitis and disseminated infection caused by *Balamuthia mandrillaris* in a western lowland gorilla (*Gorilla gorilla gorilla*). *Journal of the American Veterinary Medical Association*, **248**(3), 315–21. DOI: 10.2460/javma.248.3.315.
- Gogarten, J.F., Akoua-Koffi, C., Calvignac-Spencer, S., *et al.* (2014). The ecology of primate retroviruses: an assessment of 12 years of retroviral studies in the Taï National Park area, Côte d'Ivoire. *Virology*, **460–461**, 147–53. DOI: 10.1016/j.virol.2014.05.012.
- Gogarten, J.F., Calvignac-Spencer, S., Nunn, C.L., *et al.* (2020). Metabarcoding of eukaryotic parasite communities describes diverse parasite assemblages spanning the primate phylogeny. *Molecular Ecology Resources*, **20**, 204–15. DOI: 10.1111/1755-0998.13101.
- Gogarten, J.F., Davies, T.J., Benjamino, J., *et al.* (2018). Factors influencing bacterial microbiome composition in a wild non-human primate community in Taï National Park, Côte d'Ivoire. *The ISME Journal*, **12**(10), 2559–74. DOI: 10.1038/s41396-018-0166-1.
- Gogarten, J.F., Düx, A., Mubemba, B., *et al.* (2019a). Tropical rainforest flies carrying pathogens form stable associations with social nonhuman primates. *Molecular Ecology*, **28**(18), 4242–58. DOI: 10.1111/mec.15145.
- Gogarten, J.F., Düx, A., Schuenemann, V.J., *et al.* (2016). Tools for opening new chapters in the book of *Treponema pallidum* evolutionary history. *Clinical Microbiology and Infection*, **22**(11), 916–21.
- Gogarten, J.F., Rühlemann, M.C., Archie, E.A., *et al.* (2021). Primate phageomes are structured by superhost phylogeny and environment. *Proceedings of the National Academy of Sciences*, **118**(15), e2013535118.
- Gogarten, J.F., Schubert, G., Leendertz, F.H. and Calvignac-Spencer, S. (2019b). The chimpanzees of the Taï Forest as models for hominine microorganism ecology and evolution. In *The Chimpanzees of the Taï Forest: 40 Years of Research*, ed. C. Boesch, R. Wittig, C. Crockford, *et al.* Cambridge, UK: Cambridge University Press, pp. 366–84.
- Goldberg, T.L., Gendron-Fitzpatrick, A., Deering, K.M., *et al.* (2014). Fatal metacestode infection in Bornean orangutan caused by unknown *Versteria* species. *Emerging Infectious Diseases*, **20**(1), 109–13. DOI: 10.3201/eid2001.131191.
- Goldsmith, M. (2000). Effects of ecotourism on the behavioral ecology of Bwindi gorillas, Uganda: preliminary results. *American Journal of Physical Anthropology*, **111**(S30), 161.
- Goldsmith, M.L. (2014). Mountain gorilla tourism as a conservation tool: have we tipped the balance? In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 177–98. DOI: 10.1017/CBO9781139087407.013.
- Gonçalves, A. and Carvalho, S. (2019). Death among primates: a critical review of non-human primate interactions towards their dead and dying. *Biological Reviews*, **94**(4), 1502–29.
- Gond, V., Fayolle, A., Pennec, A., *et al.* (2013). Vegetation structure and greenness in Central Africa from Modis multi-temporal data. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **368**(1625), 20120309. DOI: 10.1098/rstb.2012.0309.
- Goodall, J. (1983). Population dynamics during a 15 year period in one community of free-living chimpanzees in the Gombe National Park, Tanzania. *Zeitschrift für Tierpsychologie*, **61**(1), 1–60. DOI: 10.1111/j.1439-0310.1983.tb01324.x.
- Goodall, J. (1986). *The Chimpanzees of Gombe: Patterns of Behavior*. Cambridge, MA: Harvard University Press.
- Goodall, J. (1998). Essays on science and society: learning from the chimpanzees: a message humans can understand. *Science*, **282**(5397), 2184–5. DOI: 10.1126/science.282.5397.2184.
- Goodall, J. (2000). *In the Shadow of Man*. New York, NY: Houghton Mifflin.

- Goodman, R.A., Bunnell, R. and Posner, S.F. (2014). What is “community health”? Examining the meaning of an evolving field in public health. *Preventive Medicine*, **67**, S58–61. DOI: 10.1016/j.ypmed.2014.07.028.
- Goodpaster, K.E. (1978). On being morally considerable. *Journal of Philosophy*, **75**(6), 308–25.
- Goodwin, H. (2007). Indigenous tourism and poverty reduction. In *Tourism and Indigenous Peoples*, ed. R. Butler and T. Hinch. Oxford, UK: Butterworth-Heinemann, pp. 84–94.
- Goodwin, H. (2014). Responsible tourism and the green economy. In *Green Growth and Travelism: Concept, Policy and Practice for Sustainable Tourism*, ed. T. DeLacy, M. Jiang, G. Lipman and S. Vorster: Routledge, pp. 133–44.
- Goodwin, H. (2016). *Responsible Tourism: Using Tourism for Sustainable Development*, 2nd edn. Oxford, UK: Goodfellow Publishers Ltd.
- Goossens, B., Kapar, M.D., Kahar, S. and Ancrenaz, M. (2011). First sighting of Bornean orang-utan twins in the wild. *Asian Primates Journal*, **2**(1), 10–12.
- Goossens, B., Setchell, J.M., James, S.S., *et al.* (2006). Philopatry and reproductive success in Bornean orang-utans (*Pongo pygmaeus*). *Molecular Ecology*, **15**(9), 2577–88. DOI: 10.1111/j.1365-294X.2006.02952.x.
- Goossens, B., Setchell, J.M., Tchidongo, E., *et al.* (2005). Survival, interactions with conspecifics and reproduction in 37 chimpanzees released into the wild. *Biological Conservation*, **123**(4), 461–75. DOI: 10.1016/j.biocon.2005.01.008.
- Gorilla Doctors (n.d.-a). *About Us*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/about-us/>. Accessed: September, 2022.
- Gorilla Doctors (n.d.-b). *Doctors and Staff*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/about-us/team/>. Accessed: September, 2022.
- Gorilla Doctors (n.d.-c). *Employee Health Program*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/saving-lives/one-health-medicine/employee-health-program/> Accessed: September, 2022.
- Gorilla Doctors (n.d.-d). *History*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/about-us/history-past-gorilla-doctors/>. Accessed: October, 2022.
- Gorilla Doctors (n.d.-e). *One Health Medicine*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/saving-lives/one-health-medicine/>. Accessed: September, 2022.
- Gorilla Doctors (n.d.-f). *UC Davis and MGVP Partnership*. Davis, CA: Gorilla Doctors. Available at: <https://www.gorilladoctors.org/about-us/uc-davis/>. Accessed: September, 2022.
- Gormus, B.J., Xu, K., Alford, P.L., *et al.* (1991). A serologic study of naturally acquired leprosy in chimpanzees. *International Journal of Leprosy and Other Mycobacterial Diseases*, **59**(3), 450–7.
- Government of Uganda (2019). *The National Environmental Act, 2019*. Uganda: National Environment Management Authority. Available at: <https://nema.go.ug/sites/all/themes/nema/docs/National%20Environment%20Act,%20No.%205%20of%202019.pdf>.
- GRACE (2019). *GRACE Awarded Accreditation by the Global Federation of Animal Sanctuaries*. North Kivu Province, Democratic Republic of Congo: Gorilla Rehabilitation and Conservation Education (GRACE). Available at: <https://gracegorillas.org/2019/09/17/grace-gfas-accredited/>.
- GRACE (2020). *GRACE 2019 Annual Report*. North Kivu Province, Democratic Republic of Congo: Gorilla Rehabilitation and Conservation Education (GRACE). Available at: <https://gracegorillas.org/annual-reports/>.
- Graczyk, T.K., Mudakikwa, A.B., Cranfield, M.R. and Eilenberger, U. (2001). Hyperkeratotic mange caused by *Sarcoptes scabiei* (Acariformes: Sarcoptidae) in juvenile human-habituated mountain gorillas (*Gorilla gorilla beringei*). *Parasitology Research*, **87**, 1024–8. DOI: 10.1007/s004360100489.
- Graef, A. (2021). Jane Goodall among 80+ leaders in animal advocacy & conservation calling for AP stylebook update. In *Defense of Animals Media Release*, March 25, 2021. Available at: <https://www.idausa.org/campaign/guardian/latest-news/jane-goodall-joins-in-defense-of-animals-call-for-ap-stylebook-update/>.
- Graham, T.L., Matthews, H.D. and Turner, S.E. (2016). A global-scale evaluation of primate exposure and vulnerability to climate change. *International Journal of Primatology*, **37**(2), 158–74. DOI: 10.1007/s10764-016-9890-4.
- Granjon, A.-C., Robbins, M.M., Arinaitwe, J., *et al.* (2020a). Estimating abundance and growth rates in a wild mountain gorilla population. *Animal Conservation*, **23**(4), 455–65. DOI: 10.1111/acv.12559.
- Granjon, A.-C., Robbins, M., Arinaitwe, J., *et al.* (2020b). Increased survey effort and intrinsic growth contribute to the largest recorded mountain gorilla population. *Animal Conservation*, **23**(4), 455–65.

- Grantham, H.S., Duncan, A., Evans, T.D., *et al.* (2020a). Anthropogenic modification of forests means only 40% of remaining forests have high ecosystem integrity. *Nature Communications*, **11**(1), 5978. DOI: 10.1038/s41467-020-19493-3.
- Grantham, H.S., Shapiro, A., Bonfils, D., *et al.* (2020b). Spatial priorities for conserving the most intact biodiverse forests within Central Africa. *Environmental Research Letters*, **15**(9), 0940b5. DOI: 10.1088/1748-9326/ab9fae.
- GRASP and IUCN (2018). *Report to the CITES Standing Committee on the Status of Great Apes*. Nairobi, Kenya, and Gland, Switzerland: United Nations Environment Programme Great Apes Survival Partnership (GRASP) and International Union for Conservation of Nature (IUCN). Available at: http://www.primatesg.org/storage/pdf/GRASP_IUCN_2018_Report_to_CITES_on_the_Status_of_Great_Apes.pdf.
- Graving, J.M., Chae, D., Naik, H., *et al.* (2019). DeepPoseKit, a software toolkit for fast and robust animal pose estimation using deep learning. *eLife*, **8**, e47994. DOI: 10.7554/eLife.47994.
- Gray, C. and Favre, D. (2022). Veterinary ethics and the law. In *Ethics in Veterinary Practice: Balancing Conflicting Interests*, ed. B. Kipperman and B. E. Rollin. Hoboken, NJ: John Wiley & Sons Inc, pp. 78–99.
- Gray, M., McNeilage, A., Fawcett, K., *et al.* (2010). Censusing the mountain gorillas in the Virunga Volcanoes: complete sweep method versus monitoring. *African Journal of Ecology*, **48**(3), 588–99. DOI: 10.1111/j.1365-2028.2009.01142.x.
- Gray, M., Roy, J., Vigilant, L., *et al.* (2013). Genetic census reveals increased but uneven growth of a critically endangered mountain gorilla population. *Biological Conservation*, **158**(Supplement C), 230–8. DOI: 10.1016/j.biocon.2012.09.018.
- Gray, S.J. (2012). *Conservation difficulties for Hylobates lar: effects the illegal pet trade has on white-handed gibbons' behavioral health and successful rehabilitation*. Undergraduate Honors thesis. Boulder, CO: University of Colorado Boulder. Available at: https://scholar.colorado.edu/concern/undergraduate_honors_theses/12579859n.
- Great Ape Project (n.d.). *World Declaration on Great Apes*. Great Ape Project (GAP). Available at: <https://www.projetogap.org.br/en/world-declaration-on-great-primates/>. Accessed: December, 2022.
- Greene, M. (2005). *Jane Goodall: A Biography*. Westport, CT: Greenwood Press.
- Greenpeace Africa (2020). 34 plastic bans in Africa: a reality check. *Greenpeace Africa*, May 19, 2020. Available at: <https://www.greenpeace.org/africa/en/blogs/11156/34-plastic-bans-in-africa/>.
- Greggor, A.L., Berger-Tal, O., Blumstein, D.T., *et al.* (2016). Research priorities from animal behaviour for maximising conservation progress. *Trends in Ecology & Evolution*, **31**(12), 953–64. DOI: 10.1016/j.tree.2016.09.001.
- Gresl, T.A., Baum, S.T. and Kemnitz, J.W. (2000). Glucose regulation in captive *Pongo pygmaeus abeli*, *P. p. pygmaeus*, and *P. p. abeli* × *P. p. pygmaeus* orangutans. *Zoo Biology*, **19**(3), 193–208.
- Grimm, D. (2020). Chimpanzee sanctuaries are under fire. Can a new science-based tool improve ape welfare? *Science*, December 2, 2020. Available at: <https://www.sciencemag.org/news/2020/12/chimpanzee-sanctuaries-are-under-fire-can-new-science-based-tool-improve-ape-welfare>.
- Gruen, L. (2015). *Entangled Empathy: An Alternative Ethic for our Relationships with Animals*. Brooklyn, NY: Lantern Books.
- Gruen, L. (2018). More risky than radical. *American Journal of Bioethics*, **18**(10), 45–7. DOI: 10.1080/15265161.2018.1513606.
- Gruen, L., Fultz, A. and Pruetz, J. (2013). Ethical issues in African great ape field studies. *Institute for Laboratory Animal Research (ILAR) Journal*, **54**(1), 24–32. DOI: 10.1093/ilar/ilto16.
- Gruen, L., Jamieson, D. and Schlottmann, C. (2012). *Reflecting on Nature: Readings in Environmental Ethics and Philosophy*, 2nd edn. New York, NY: Oxford University Press.
- Grunert, K.G., Hieke, S. and Wills, J. (2014). Sustainability labels on food products: consumer motivation, understanding and use. *Food Policy*, **44**, 177–89. DOI: 10.1016/j.foodpol.2013.12.001.
- Grützmacher, K.S., Karesh, W.B., Amuasi, J.H., *et al.* (2021). The Berlin principles on one health: bridging global health and conservation. *Science of The Total Environment*, **764**, 142919. DOI: 10.1016/j.scitotenv.2020.142919.
- Grützmacher, K.S., Keil, V., Leinert, V., *et al.* (2018a). Human quarantine: toward reducing infectious pressure on chimpanzees at the Taï Chimpanzee Project, Côte d'Ivoire. *American Journal of Primatology*, **80**(1), e22619. DOI: 10.1002/ajp.22619.
- Grützmacher, K.S., Keil, V., Metzger, S., *et al.* (2018b). Human respiratory syncytial virus and *Streptococcus pneumoniae* infection in wild bonobos. *EcoHealth*, **15**(2), 462–6. DOI: 10.1007/s10393-018-1319-4.

- Grützmacher, K.S., Köndgen, S., Keil, V., *et al.* (2016). Codetection of respiratory syncytial virus in habituated wild western lowland gorillas and humans during a respiratory disease outbreak. *EcoHealth*, **13**(3), 499–510. DOI: 10.1007/s10393-016-1144-6.
- Gryseels, S., Watts, T.D., Kabongo, J.-M.M., *et al.* (2019). A near-full-length HIV-1 genome from 1966 recovered from formalin-fixed paraffin-embedded tissue. *bioRxiv*, 687863. DOI: 10.1101/687863; t.
- Guagliardo, S.A.J., Monroe, B.P., Moundjoa, C., *et al.* (2020). Asymptomatic orthopoxvirus circulation in humans in the wake of a monkeypox outbreak among chimpanzees in Cameroon. *American Journal of Tropical Medicine and Hygiene*, **102**(1), 206–12. DOI: 10.4269/ajtmh.19-0467.
- Guarino, B. (2016). North Korea's newest zoo attraction is a chimpanzee trained to smoke cigarettes. *The Washington Post*, October 21, 2016. Available at: <https://www.4apes.com/news/item/1538-https-www-washingtonpost-com-news-morning-mix-wp-2016-10-21-north-koreas-newest-zoo-attraction-is-a-chimpanzee-trained-to-smoke-cigarettes>.
- Guatelli-Steinberg, D. (2000). Linear enamel hypoplasia in gibbons (*Hylobates lar carpenteri*). *American Journal of Physical Anthropology*, **112**(3), 395–410. DOI: 10.1002/1096-8644(200007)112:3<395::AID-AJPA9>3.0.CO;2-H.
- Guatelli-Steinberg, D., Ferrell, R.J. and Spence, J.M. (2012). Linear enamel hypoplasia as an indicator of physiological stress in great apes: reviewing the evidence in light of enamel growth variation. *American Journal of Physical Anthropology*, **148**(2), 191–204.
- Guatelli-Steinberg, D. and Skinner, M.F. (2000). Prevalence and etiology of linear enamel hypoplasia in monkeys and apes from Asia and Africa. *Folia Primatologica*, **71**(3), 115–32. DOI: 10.1159/000021740.
- Guerrera, W., Sleeman, J.M., Jasper, S.B., *et al.* (2003). Medical survey of the local human population to determine possible health risks to the mountain gorillas of Bwindi Impenetrable Forest National Park, Uganda. *International Journal of Primatology*, **24**(1), 197–207. DOI: 10.1023/A:1021410931928.
- Guimarães, V.Y., Justo, A.A., Martins, L.L., Catão-Dias, J.L. and Sacristán, C. (2020). Emerging coronaviruses in Neotropical primates: a new threat? *Revista de Ciência Veterinária e Saúde Pública*, **7**(1). DOI: 10.4025/revcivet.v7i1.55490.
- Guo, Y.-R., Cao, Q.-D., Hong, Z.-S., *et al.* (2020). The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak: an update on the status. *Military Medical Research*, **7**(1), 11. DOI: 10.1186/s40779-020-00240-0.
- Gut Aiderbichl (n.d.). *Schimpansen*. Salzburg, Germany: Gut Aiderbichl GmbH. Available at: <https://www.gut-aiderbichl.com/tiere/unseretiereo/schimpansen/>. Accessed: December, 2020.
- Guy, A.J., Curnoe, D. and Banks, P.B. (2014). Welfare based primate rehabilitation as a potential conservation strategy: does it measure up? *Primates*, **55**(1), 139–47. DOI: 10.1007/s10329-013-0386-y.
- Guyson, N. (2021). Lockdown underscores Uganda's overreliance on tourism to fund conservation. *Mongabay Series: Great Apes*, December 21, 2021. Available at: <https://news.mongabay.com/2021/12/lockdown-underscores-ugandas-overreliance-on-tourism-to-fund-conservation/>.
- GVTC (2020). *Regional EVD and COVID-19 Contingency Plans for Mountain Gorillas*. Kigali, Rwanda: Greater Virunga Transboundary Collaboration (GVTC). Available at: https://pfbc-cbfp.org/actualites-partenaires/coll%C3%A8ge-multilat%C3%A9ral.html?file=files/docs/news/6-2020/Doc%202_GVTC%20Contingency%20Planning%20Overview.pdf.
- Haberthur, K. and Messaoudi, I. (2013). Animal models of varicella zoster virus infection. *Pathogens*, **2**(2), 364–82. DOI: 10.3390/pathogens2020364.
- Haggblade, M.K., Smith, W.A., Noheri, J.B., *et al.* (2019). Outcomes of snare-related injuries to endangered mountain gorillas (*Gorilla beringei beringei*) in Rwanda. *Journal of Wildlife Diseases*, **55**(2), 298–303, 6. DOI: 10.7589/2018-01-008.
- Hahn, B.H., Shaw, G.M., De Cock, K.M. and Sharp, P.M. (2000). AIDS as a zoonosis: scientific and public health implications. *Science*, **287**(5453), 607–14. DOI: 10.1126/science.287.5453.607.
- Halifax, J. (2011). The precious necessity of compassion. *Journal of Pain and Symptom Management*, **41**(1), 146–53. DOI: 10.1016/j.jpainsymman.2010.08.010.
- Hall, C.M., Scott, D. and Gössling, S. (2020). Pandemics, transformations and tourism: be careful what you wish for. *Tourism Geographies*, **22**(3), 577–98. DOI: 10.1080/14616688.2020.1759131.

- Hall, M.J., Ng, A., Ursano, R.J., *et al.* (2004). Psychological impact of the animal–human bond in disaster preparedness and response. *Journal of Psychiatric Practice*, **10**(6), 368–74.
- Halter, C. (2018). Paul Richards and Esther Mokuwa on lessons learned during the Ebola epidemic. *KGOU*, March 16, 2018. Available at: <https://www.kgou.org/post/paul-richards-and-esther-mokuwa-lessons-learned-during-ebola-epidemic>.
- Hamard, M., Cheyne, S.M. and Nijman, V. (2010). Vegetation correlates of gibbon density in the peat-swamp forest of the Sabangau catchment, Central Kalimantan, Indonesia. *American Journal of Primatology*, **72**(7), 607–16. DOI: 10.1002/ajp.20815.
- Hamer, D.H. and Connor, B.A. (2004). Travel health knowledge, attitudes and practices among United States travelers. *Journal of Travel Medicine*, **11**(1), 23–6. DOI: 10.2310/7060.2004.13577.
- Hampton, J.O., Jones, B. and McGreevy, P.D. (2020). Social license and animal welfare: developments from the past decade in Australia. *Animals*, **10**(12), 2237. DOI: 10.3390/ani1012237.
- Han, X.Y., Seo, Y.H., Sizer, K.C., *et al.* (2008). A new *Mycobacterium* species causing diffuse lepromatous leprosy. *American Journal of Clinical Pathology*, **130**(6), 856–64. DOI: 10.1309/ajcpp72fzrrvmm.
- Han, X.Y., Sizer, K.C., Thompson, E.J., *et al.* (2009). Comparative sequence analysis of *Mycobacterium leprae* and the new leprosy-causing *Mycobacterium lepromatosis*. *Journal of Bacteriology*, **191**(19), 6067–74. DOI: 10.1128/JB.00762-09.
- Hanamura, S., Kiyono, M., Lukasik-Braum, M., *et al.* (2008). Chimpanzee deaths at Mahale caused by a flu-like disease. *Primates*, **49**(1), 77–80. DOI: 10.1007/s10329-007-0054-1.
- Hanes, A., Kalema-Zikusoka, G., Svensson, M.S. and Hill, C.M. (2018). Assessment of health risks posed by tourists visiting mountain gorillas in Bwindi Impenetrable National Park, Uganda. *Primate Conservation*, **32**, 123–32.
- Hannibal, D.L. and Guatelli-Steinberg, D. (2005). Linear enamel hypoplasia in the great apes: analysis by genus and locality. *American Journal of Physical Anthropology*, **127**(1), 13–25. DOI: 10.1002/ajpa.20141.
- Hansen, B.K., Fultz, A.L., Hopper, L.M. and Ross, S.R. (2018). An evaluation of video cameras for collecting observational data on sanctuary-housed chimpanzees (*Pan troglodytes*). *Zoo Biology*, **37**(3), 156–61. DOI: 10.1002/zoo.21410.
- Harcourt, A.H., Fossey, D. and Sabater-Pi, J. (1981). Demography of *Gorilla gorilla*. *Journal of Zoology*, **195**(2), 215–33. DOI: 10.1111/j.1469-7998.1981.tb03460.x.
- Harcourt, A.H. and Greenberg, J. (2001). Do gorilla females join males to avoid infanticide? A quantitative model. *Animal Behaviour*, **62**(5), 905–15. DOI: 10.1006/anbe.2001.1835.
- Harcourt, A.H. and Stewart, K.J. (2007). *Gorilla Society: Conflict, Compromise, and Cooperation Between the Sexes*. Chicago, IL: University of Chicago Press. DOI: 10.7208/chicago/9780226316048.001.0001.
- Hardgrove, E.H., Zimmerman, D.M., von Fricken, M.E. and Deem, S.L. (2021). A scoping review of rodent-borne pathogen presence, exposure, and transmission at zoological institutions. *Preventive Veterinary Medicine*, **193**, 105345. DOI: 10.1016/j.prevetmed.2021.105345.
- Harper, K.N. and Knauf, S. (2013). *Treponema pallidum* infection in primates: clinical manifestations, epidemiology, and evolution of a stealthy pathogen. In *Primates, Pathogens, and Evolution*, ed. J. F. Brinkworth and K. Pechenkina. New York, NY: Springer, pp. 189–219.
- Harrington, L.A., Moehrensclager, A., Gelling, M., *et al.* (2013). Conflicting and complementary ethics of animal welfare considerations in reintroductions. *Conservation Biology*, **27**(3), 486–500. DOI: 10.1111/cobi.12021.
- Harris, D.J., Ebika, S.T.N., Sanz, C.M., Madingou, M.P.N. and Morgan, D.B. (2021). Large trees in tropical rain forests require big plots. *Plants People Planet*, **3**(3), 282–94. DOI: 10.1002/ppp3.10194.
- Harrison, M., Baker, J., Twinamatsiko, M. and Milner-Gulland, E.J. (2015). Profiling unauthorized natural resource users for better targeting of conservation interventions. *Conservation Biology*, **29**(6), 1636–46. DOI: 10.1111/cobi.12575.
- Harrison, M.E., Cheyne, S.M., Sulistiyanto, Y. and Rieley, J.O. (2007). Biological effects of smoke from dry-season fires in non-burnt areas of the Sabangau peat swamp forest, Central Kalimantan, Indonesia. In *Carbon–Climate–Human Interaction on Tropical Peatland: Proceedings of the International Symposium and Workshop on Tropical Peatland, Yogyakarta, August 27–29, 2007. EU CARBOPEAT and RESTOPEAT Partnership*, ed. J. O. Rieley, C. J. Banks and G. Radjaguk. Sleman, Indonesia, and Leicester, UK: Gadjah Mada University, University of Leicester, pp. 1–5.

- Harrison, M.E., Ottay, J.B., D'Arcy, L.J., *et al.* (2020a). Tropical forest and peatland conservation in Indonesia: challenges and directions. *People and Nature*, **2**(1), 4–28. DOI: 10.1002/pan3.10060.
- Harrison, M.E., Wijedasa, L.S., Cole, L.E.S., *et al.* (2020b). Tropical peatlands and their conservation are important in the context of COVID-19 and potential future (zoonotic) disease pandemics. *PeerJ*, **8**, e10283. DOI: 10.7717/peerj.10283.
- Hartel, J.A., Oтали, E., Machanda, Z., *et al.* (2020). Holistic approach for conservation of chimpanzees in Kibale National Park, Uganda. In *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, ed. L. M. Hopper and S. R. Ross. Chicago, IL: University of Chicago Press, pp. 612–43. DOI: 10.7208/chicago/9780226728032.003.0026.
- Hasegawa, H. and Udono, T. (2007). Chimpanzee pinworm, *Enterobius anthropopithecii* (Nematoda: Oxyuridae), maintained for more than twenty years in captive chimpanzees in Japan. *Journal of Parasitology*, **93**(4), 850–3.
- Hashimoto, C. (1997). Context and development of sexual behavior of wild bonobos (*Pan paniscus*) at Wamba, Zaire. *International Journal of Primatology*, **18**(1), 1–21. DOI: 10.1023/A:1026384922066.
- Hashimoto, C. (1999). Snare injuries of chimpanzees in the Kalinzu Forest, Uganda. *Pan Africa News*, **6**(2), 20–2.
- Häsler, B., Cornelsen, L., Bennani, H. and Rushton, J. (2014). A review of the metrics for One Health benefits. *Revue Scientifique et Technique de l'Office International des Épidémiologies*, **33**(2), 453–64. DOI: 10.20506/rst.33.2.2294.
- Hassan, K.H. (2016). Ensuring animal welfare in zoos? Operations: a comparative note on Malaysian and Japanese legislation. *Mediterranean Journal of Social Sciences*, **7**(1), 328. DOI: 10.5901/mjss.2016.v7n1p328.
- Hassell, J.M., Zimmerman, D., Cranfield, M.R., *et al.* (2017). Morbidity and mortality in infant mountain gorillas (*Gorilla beringei beringei*): a 46-year retrospective review. *American Journal of Primatology*, **79**(10), e22686. DOI: 10.1002/ajp.22686.
- Haurez, B., Daïnou, K., Tagg, N., Petre, C.-A. and Doucet, J.-L. (2015). The role of great apes in seed dispersal of the tropical forest tree species *Dacryodes normandii* (Burseraceae) in Gabon. *Journal of Tropical Ecology*, **31**(5), 395–402. DOI: 10.1017/S0266467415000322.
- Haurez, B., Daïnou, K., Vermeulen, C., *et al.* (2017). A look at intact forest landscapes (IFLs) and their relevance in Central African forest policy. *Forest Policy and Economics*, **80**, 192–9. DOI: 10.1016/j.forpol.2017.03.021.
- Hawkins, S.J., Struthers, J.D., Phair, K.A., *et al.* (2021). Diagnostic evaluation of fatal *Balamuthia mandrillaris* meningoencephalitis in a captive Bornean orangutan (*Pongo pygmaeus*) with identification of potential environmental source and evidence of chronic exposure. *Primates*, **62**(1), 51–61. DOI: 10.1007/s10329-020-00860-z.
- He, B., Feng, Y., Zhang, H., *et al.* (2015). Filovirus RNA in fruit bats, China. *Emerging Infectious Diseases*, **21**(9), 1675–7. DOI: 10.3201/eid2109.150260.
- Head, J.S., Boesch, C., Makaga, L. and Robbins, M.M. (2011). Sympatric chimpanzees (*Pan troglodytes troglodytes*) and gorillas (*Gorilla gorilla gorilla*) in Loango National Park, Gabon: dietary composition, seasonality, and intersite comparisons. *International Journal of Primatology*, **32**(3), 755–75. DOI: 10.1007/s10764-011-9499-6.
- Head, J.S., Boesch, C., Robbins, M.M., *et al.* (2013). Effective sociodemographic population assessment of elusive species in ecology and conservation management. *Ecology and Evolution*, **3**(9), 2903–16. DOI: 10.1002/ece3.670.
- Heinicke, S., Mundry, R., Boesch, C., *et al.* (2019). Advancing conservation planning for western chimpanzees using IUCN SSC A.P.E.S.: the case of a taxon-specific database. *Environmental Research Letters*, **14**(6), 064001. DOI: 10.1088/1748-9326/ab1379.
- Heldstab, A., Rüedi, D., Sonnabend, W.F. and Deinhardt, F. (1981). Spontaneous generalized herpesvirus hominis infection of a lowland gorilla (*Gorilla gorilla gorilla*). *Journal of Medical Primatology*, **10**(2–3), 129–35. DOI: 10.1159/000460063.
- HELP Congo (n.d.). *Parrainage*. Lissieu, France: HELP Congo. Available at: <http://www.help-primates.org/fr/parrainage.html>. Accessed: October, 2020.
- Henao-Restrepo, A.M., Longini, I.M., Egger, M., *et al.* (2015). Efficacy and effectiveness of an rVSV-vectored vaccine expressing Ebola surface glycoprotein: interim results from the Guinea ring vaccination cluster-randomised trial. *The Lancet*, **386**(9996), 857–66. DOI: 10.1016/s0140-6736(15)61117-5.
- Henseler, M., Maisonnave, H. and Maskaveva, A. (2022). Economic impacts of COVID-19 on the tourism sector in Tanzania. *Annals of Tourism Research Empirical Insights*, **3**(1), 100042. DOI: 10.1016/j.annale.2022.100042.

- Herbinger, I., Boesch, C. and Rothe, H. (2001). Territory characteristics among three neighboring chimpanzee communities in the Taï National Park, Côte d'Ivoire. *International Journal of Primatology*, **22**(2), 143–67. DOI: 10.1023/a:1005663212997.
- Hernandez, E., Fawcett, A., Brouwer, E., Rau, J. and Turner, P.V. (2018). Speaking up: veterinary ethical responsibilities and animal welfare issues in everyday practice. *Animals*, **8**(1), 15. DOI: 10.3390/ani8010015.
- Hernández, P., Gangsei, D. and Engstrom, D. (2007). Vicarious resilience: a new concept in work with those who survive trauma. *Family Process*, **46**(2), 229–41. DOI: 10.1111/j.1545-5300.2007.00206.x.
- Herrera, J. and Nunn, C.L. (2019). Behavioural ecology and infectious disease: implications for conservation of biodiversity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **374**(1781), 20180054. DOI: 10.1098/rstb.2018.0054.
- Hewitt, G., MacLarnon, A. and Jones, K.E. (2002). The functions of laryngeal air sacs in primates: a new hypothesis. *Folia Primatologica*, **73**, 70–94.
- HHS (2012). *Emergency Management and the Incident Command System*. Washington DC: United States Department of Health and Human Services (HHS).
- Hickel, J. (2019). Is it possible to achieve a good life for all within planetary boundaries? *Third World Quarterly*, **40**(1), 18–35. DOI: 10.1080/01436597.2018.1535895.
- Hickey, J.R., Basabose, A., Gilardi, K.V., et al. (2020). Gorilla beringei ssp. beringei (amended version of 2018 assessment). *The IUCN Red List of Threatened Species 2020: e.T39999A176396749*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2020-3.RLTS.T39999A176396749.en.
- Hickey, J.R., Granjon, A.-C., Vigilant, L., et al. (2019a). *Virunga 2015–2016 Surveys: Monitoring Mountain Gorillas, Other Select Mammals, and Illegal Activities*. Kigali, Rwanda: GVTC, IGCP & Partners. Available at: http://igcp.org/wp-content/uploads/Virunga-Census-2015-2016-Final-Report-2019-with-French-summary-2019_04_24.pdf.
- Hickey, J.R., Uzabaho, E., Akantorana, M., et al. (2019b). *Bwindi-Sarambwe 2018 Surveys: Monitoring Mountain Gorillas, Other Select Mammals, and Human Activities*. Unpublished report to Uganda Wildlife Authority. Kampala, Uganda: GVTC, IGCP & Partners. Available at: <http://ir.must.ac.ug/handle/123456789/762>.
- Highland Farm (n.d.). *Gibbons in Need*. GoFundMe. Available at: <https://www.gofundme.com/f/gibbons-in-need>. Accessed: October, 2020.
- HiH (n.d.). *Health in Harmony is a Climate Solution*. Portland, OR: Health in Harmony (HiH). Available at: <https://healthinharmony.org/>. Accessed: November, 2021.
- Hill, S.P. and Broom, D.M. (2009). Measuring zoo animal welfare: theory and practice. *Zoo Biology*, **28**(6), 531–44. DOI: 10.1002/zoo.20276.
- Hilser, H. (2011). *An assessment of primate health in the Sabangau peat-swamp forest, Central Kalimantan, Indonesian Borneo*. MSc thesis. Oxford, UK: Oxford Brookes University.
- Himalayan News Service (2009). Central Zoo bans plastic bags. *The Himalayan*, June 6, 2009. Available at: <https://thehimalayantimes.com/nepal/central-zoo-bans-plastic-bags>.
- Hing, S., Narayan, E.J., Thompson, R.C.A. and Godfrey, S.S. (2016). The relationship between physiological stress and wildlife disease: consequences for health and conservation. *Wildlife Research*, **43**(1), 51–60. DOI: 10.1071/WR15183.
- Hingham, J.E.S. (2007). *Critical Issues in Ecotourism: Understanding a Complex Tourism Phenomenon*. Oxford, UK: Butterworth-Heinemann.
- Hirata, S., Morimura, N., Watanuki, K., Ross, S.R. and Goodall, J. (2020). The establishment of sanctuaries for former laboratory chimpanzees: challenges, successes, and cross-cultural context. In *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, ed. L. M. Hopper and S.R. Ross. Chicago, IL: University of Chicago Press, pp. 208–32. DOI: 10.7208/chicago/9780226728032.003.0009.
- Hobson, K. (2007). Political animals? On animals as subjects in an enlarged political geography. *Political Geography*, **26**(3), 250–67. DOI: 10.1016/j.polgeo.2006.10.010.
- Hockings, K. and Humle, T. (2009). *Best Practice Guidelines for the Prevention and Mitigation of Conflict Between Humans and Great Apes*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/efiles/documents/ssc-op-037.pdf>.

- Hockings, K.J., McLennan, M.R., Carvalho, S., *et al.* (2015). Apes in the Anthropocene: flexibility and survival. *Trends in Ecology & Evolution*, **30**(4), 215–22. DOI: 10.1016/j.tree.2015.02.002.
- Hockings, K.J., Mubemba, B., Avanzi, C., *et al.* (2021). Leprosy in wild chimpanzees. *Nature*, **598**(7882), 652–6. DOI: 10.1038/s41586-021-03968-4.
- Hockings, K.J., Yamakoshi, G., Kabasawa, A. and Matsuzawa, T. (2010). Attacks on local persons by chimpanzees in Bossou, Republic of Guinea: long-term perspectives. *American Journal of Primatology*, **72**(10), 887–96. DOI: 10.1002/ajp.20784.
- Hockings, M., Dudley, N., Elliott, W., *et al.* (2020). Editorial essay: COVID-19 and protected and conserved areas. *Parks*, **26**(1), 7–24.
- Hoffmann, C., Zimmermann, F., Biek, R., *et al.* (2017). Persistent anthrax as a major driver of wildlife mortality in a tropical rainforest. *Nature*, **548**, 82–6. DOI: 10.1038/nature23309, <https://www.nature.com/articles/nature23309#supplementary-information>.
- Hohmann, G., Robbins, M.M. and Boesch, C., ed. (2006). *Feeding Ecology in Apes and Other Primates: Ecological, Physiological, and Behavioural Aspects*. Cambridge Studies in Biological and Evolutionary Anthropology Volume 48. Cambridge, UK: Cambridge University Press.
- Homsy, J. (1999). *Ape Tourism and Human Diseases: How Close Should We Get? A Critical Review of the Rules and Regulations Governing Park Management & Tourism for the Wild Mountain Gorilla*, Gorilla gorilla beringei. Nairobi, Kenya: Report of a Consultancy for the International Gorilla Conservation Programme.
- Hooper, L.V., Littman, D.R. and Macpherson, A.J. (2012). Interactions between the microbiota and the immune system. *Science*, **336**(6086), 1268–73. DOI: 10.1126/science.1223490.
- Hopper, L.M. and Ross, S.R., ed. (2020). *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*. Chicago, IL: University of Chicago Press. DOI: 10.7208/chicago/9780226728032.001.0001.
- Horvath, L.L., Murray, C.K. and DuPont, H.L. (2003). Travel health information at commercial travel websites. *Journal of Travel Medicine*, **10**(5), 272–9. DOI: 10.2310/7060.2003.2699.
- Hosey, G. (2008). A preliminary model of human–animal relationships in the zoo. *Applied Animal Behaviour Science*, **109**(2), 105–27. DOI: 10.1016/j.applanim.2007.04.013.
- Hosey, G.R. and Druck, P.L. (1987). The influence of zoo visitors on the behaviour of captive primates. *Applied Animal Behaviour Science*, **18**(1), 19–29. DOI: 10.1016/0168-1591(87)90251-6.
- Hosey, G., Melfi, V. and Pankhurst, S. (2013). *Zoo Animals: Behaviour, Management, and Welfare*. Oxford, UK: Oxford University Press.
- Hosey, G., Melfi, V. and Ward, S.J. (2020). Problematic animals in the zoo: the issue of charismatic megafauna. In *Problematic Wildlife II: New Conservation and Management Challenges in the Human–Wildlife Interactions*, ed. F. M. Angelici and L. Rossi. Cham, Switzerland: Springer International Publishing, pp. 485–508. DOI: 10.1007/978-3-030-42335-3_15.
- Hrdy, S.B. (1979). Infanticide among animals: a review, classification, and examination of the implications for the reproductive strategies of females. *Ethology and Sociobiology*, **1**(1), 13–40. DOI: 10.1016/0162-3095(79)90004-9.
- Hsu, C.-C. and Sandford, B.A. (2007). The Delphi technique: making sense of consensus. *Practical Assessment, Research, and Evaluation*, **12**, 10. DOI: 10.7275/pdz9-th90.
- Hu, N., Guan, Z., Huang, B., *et al.* (2018). Dispersal and female philopatry in a long-term, stable, polygynous gibbon population: evidence from 16 years field observation and genetics. *American Journal of Primatology*, **80**(9), e22922. DOI: 10.1002/ajp.22922.
- Hu, T., Chitnis, N., Monos, D. and Dinh, A. (2021). Next-generation sequencing technologies: an overview. *Human Immunology*, **82**(11), 801–11. DOI: 10.1016/j.humimm.2021.02.012.
- Hubálek, Z. (2003). Emerging human infectious diseases: anthroponoses, zoonoses, and sapronoses. *Emerging Infectious Diseases*, **9**(3), 403–4.
- Hughes, A.C. (2019). Understanding and minimizing environmental impacts of the Belt and Road Initiative. *Conservation Biology*, **33**(4), 883–94. DOI: 10.1111/cobi.13317.
- Humble, T. (2015). *The Dimensions of Ape–Human Interactions in Industrial Agricultural Landscapes. Background Paper for State of the Apes: Industrial Agriculture and Ape Conservation*. Arcus Foundation. Cambridge, UK:

- Cambridge University Press. Available at: <http://www.stateoftheapes.com/wp-content/uploads/2016/03/Ape-Human-Interactions-in-Industrial-Agricultural-Landscapes.pdf>.
- Humle, T., Boesch, C., Campbell, G., *et al.* (2016a). Pan troglodytes *ssp. verus* (*errata version published in 2016*). *The IUCN Red List of Threatened Species 2016: e.T15935A102327574*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T15935A17989872.en.
- Humle, T., Colin, C., Laurans, M. and Raballand, E. (2011). Group release of sanctuary chimpanzees (*Pan troglodytes*) in the Haut Niger National Park, Guinea, west Africa: ranging patterns and lessons so far. *International Journal of Primatology*, **32**(2), 456–73. DOI: 10.1007/s10764-010-9482-7.
- Humle, T. and Hill, C. (2016). People–primate interactions: implications for primate conservation. In *Introduction to Primate Conservation*, ed. S. A. Wich and A. J. Marshall. Oxford, UK: Oxford University Press, pp. 219–40.
- Humle, T., Maisels, F., Oates, J.F., Plumptre, A. and Williamson, E.A. (2016b). Pan troglodytes (*errata version published in 2018*). *The IUCN Red List of Threatened Species 2016: e.T15933A129038584*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T15933A17964454.en.
- Hursthouse, R. (2011). Virtue ethics and the treatment of animals. In *The Oxford Handbook of Animal Ethics*, ed. T. L. Beauchamp and R. G. Frey. Oxford, UK: Oxford University Press, pp. 119–43. DOI: 10.1093/oxford-hb/9780195371963.013.0005.
- Hutchins, M., Foose, T. and Seal, U.S. (1991). The role of veterinary medicine in endangered species conservation. *Journal of Zoo and Wildlife Medicine*, **22**(3), 277–81.
- Huynh, D.V., Truong, T.T.K., Duong, L.H., *et al.* (2021). The COVID-19 pandemic and its impacts on tourism business in a developing city: insight from Vietnam. *Economies*, **9**(4), 172. DOI: 10.3390/economies9040172.
- Hvenegaard, G.T. (2014). Economic aspects of primate tourism associated with primate conservation. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 259–77. DOI: 10.1017/CBO9781139087407.020.
- Hyeroba, D., Apell, P. and Oтали, E. (2011). Managing a speared alpha male chimpanzee (*Pan troglodytes*) in Kibale National Park, Uganda. *Veterinary Record*, **169**(25), 658. DOI: 10.1136/vr.d4680.
- ICCA Consortium (2021). *Territories of Life: 2021 Report*. ICCA Consortium. Available at: <https://report.territoriesoflife.org/>.
- Idani, G. (1990). Relations between unit-groups of bonobos at Wamba, Zaire: encounters and temporary fusions. *African Study Monographs*, **11**, 153–86.
- IFAW (2018). *Disrupt: Wildlife Cybercrime*. London, UK: International Fund for Animal Welfare (IFAW). Available at: <https://www.ifaw.org/eu/resources/disrupt-wildlife-cybercrime>.
- IFC (2012). *Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources*. Washington DC: International Finance Corporation (IFC), World Bank Group. Available at: https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/PS6.
- IFC (2013). *Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets*. Washington DC: International Finance Corporation (IFC), World Bank Group. Available at: https://www.ifc.org/wps/wcm/connect/58fb524c-3f82-462b-918f-0ca1af135334/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES&CVID=kbnYgl5.
- IFC (2019). *Guidance Note 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources*. Washington DC: International Finance Corporation (IFC), World Bank Group. Available at: https://www.ifc.org/wps/wcm/connect/5e0f3coc-0aa4-4290-a0f8-4490b61de245/GN6_English_June-27-2019.pdf?MOD=AJPERES&CVID=mRQjZva.
- IFRC (2021). *Contingency Plan Guide*. Geneva, Switzerland: International Federation of Red Cross and Red Crescent Societies (IFRC). Available at: <https://www.ifrc.org/document/contingency-planning-guide>.
- IGCP (n.d.). *Certified Gorilla Friendly TM*. Kigali, Rwanda: International Gorilla Conservation Programme (IGCP). Available at: <https://igcp.org/tourism/certified-gorilla-friendly/>. Accessed: April, 2022.
- iHMP Research Network Consortium (2019). The Integrative Human Microbiome Project. *Nature*, **569**(7758), 641–8. DOI: 10.1038/s41586-019-1238-8.
- ILRI [International Livestock Research Institute] (2019). *Meat: The Future Series. Options for the Livestock Sector in Developing and Emerging Economies to 2030 and Beyond*. Geneva, Switzerland: World Economic Forum.

- Imster, E. (2018). Wildfire smoke messing with orangutans' eating and sleep. *EarthSky*, June 3, 2018. Available at: <https://earthsky.org/earth/wildfire-smoke-orangutan-health-threat/>.
- Inclean Magazine (2019). Zoos Victoria ban all single-use plastic bottles and straws. *Inclean Magazine*, May 1, 2019. Available at: <https://incleanmag.com.au/zoos-victoria-ban-all-single-use-plastic/>.
- Ingram, J. (2020). Nutrition security is more than food security. *Nature Food*, 1(1), 2. DOI: 10.1038/s43016-019-0002-4.
- Inogwabini, B.I. and Leader-Williams, N. (2012). Effects of epidemic diseases on the distribution of bonobos. *PLoS ONE*, 7(12), e51112.
- Inoue, E., Tashiro, Y., Ogawa, H., *et al.* (2013). Gene flow and genetic diversity of chimpanzees in Tanzanian habitats. *Primate Conservation*, 26(1), 67–74. DOI: 10.1896/052.026.0105.
- International Animal Rescue (2020). *Report of the Trustees and Financial Statements for the Year Ended 31 December 2019*. Uckfield, UK: International Animal Rescue. Available at: <https://register-of-charities.charitycommission.gov.uk/charity-search/-/charity-details/4029510/accounts-and-annual-returns>.
- IOC-UNESCO (n.d.). *Global Tsunami Early Warning and Mitigation Programme*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO) Intergovernmental Oceanographic Commission (IOC). Available at: <https://www.ioc.unesco.org/en/global-tsunami-early-warning-and-mitigation-programme>. Accessed: October, 2022.
- IPBES (2019). Nature's dangerous decline “unprecedented”; species extinction rates “accelerating”. IPBES [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services] *Media Release*, May 5, 2019. Available at: <https://www.ipbes.net/news/Media-Release-Global-Assessment>.
- IPBES (2020). *Workshop Report on Biodiversity and Pandemics*. Bonn, Germany: Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). DOI: 10.5281/zenodo.4147317.
- IPCC (2023). *AR6 Synthesis Report Climate Change 2023*. Geneva, Switzerland: Intergovernmental Panel on Climate Change (IPCC). Available at: <https://www.ipcc.ch/report/ar6/syr/>.
- IPPL (n.d.). *Our Gibbon Sanctuary*. Summerville, SC: International Primate Protection League (IPPL). Available at: <https://www.ippl.org/gibbon/ippls-gibbon-sanctuary/>. Accessed: October, 2020.
- IRMA (2018). *IRMA Standard for Responsible Mining IRMA-STD-001*. Initiative for Responsible Mining Assurance (IRMA). Available at: https://responsiblemining.net/wp-content/uploads/2018/07/IRMA_STANDARD_v.1.o_FINAL_2018.pdf.
- Isakov, A., O'Neal, P., Prescott, J., *et al.* (2014). Academic–community partnerships for sustainable preparedness and response systems. *American Journal of Disaster Medicine*, 9(2), 97–106. DOI: 10.5055/ajdm.2014.0146.
- Ishizuka, S., Toda, K. and Furuichi, T. (2020). Genetic analysis of migration pattern of female bonobos (*Pan paniscus*) among three neighboring groups. *International Journal of Primatology*, 41, 401–14. DOI: 10.1007/s10764-019-00106-w.
- IUCN (2012). *IUCN Red List Categories and Criteria, Version 3.1*, 2nd edn. Gland, Switzerland, and Cambridge, UK: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC). Available at: <https://www.iucnredlist.org/resources/categories-and-criteria>.
- IUCN (2014). *Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees 2015–2025*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/node/45060>.
- IUCN (2019a). *Guidelines for the Management of Confiscated, Live Organisms*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://portals.iucn.org/library/sites/library/files/documents/2019-005-En.pdf>.
- IUCN (2019b). *The IUCN Red List of Threatened Species. Version 2019-1*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://www.iucnredlist.org>.
- IUCN (2020a). *Bwindi Impenetrable National Park: 2020 Conservation Outlook Assessment*. International Union for Conservation of Nature (IUCN) World Heritage Outlook. Available at: <https://rris.biopama.org/node/20652?language=en>.
- IUCN (2020b). *Great Apes, COVID-19 and the SARS CoV-2: Joint Statement of the IUCN SSC Wildlife Health Specialist Group and the Primate Specialist Group, Section on Great Apes. March 15 2020*. Geneva, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <http://www.primatesg.org/storage/SARSCoV-2.pdf>.

- IUCN (2022). *The IUCN Red List of Threatened Species. Version 2022-1*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://www.iucnredlist.org>.
- IUCN (2023). *The IUCN Red List of Threatened Species. Version 2022-2*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://www.iucnredlist.org>.
- IUCN SSC Human–Wildlife Conflict & Coexistence Specialist Group (n.d.). *IUCN SSC Human–Wildlife Conflict & Coexistence Specialist Group*. International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC). Available at: <https://www.hwctf.org>. Accessed: September, 2022.
- IUCN SSC PSG (2020a). *COVID-19 and Great Apes: Advisory for Extractive Industry Personnel, Applicable to Energy, Extractives, Transport Infrastructure, Agro-Industry and Other Projects Operating in Great Ape Habitats*. International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: http://static1.1.sqspcdn.com/static/f/1200343/28297087/1589210933010/COVID-19_advisory_for_extractive_projects.pdf?token=vXaQFVpBmg%2FmT%2B8G%2F8vBcZ7OoQ8%3D.
- IUCN SSC PSG (2020b). *Regional Action Plan for the Conservation of Western Chimpanzees (Pan troglodytes verus) 2020–2030*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). DOI: 10.2305/IUCN.CH.2020.SSC-RAP.2.en.
- IUCN SSC PSG (n.d.). *SARS-CoV-2 & COVID-19*. Geneva, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <http://www.primatesg.org/covid-19>. Accessed: March, 2022.
- IUCN SSC PSG SGA (n.d.-a). *COVID-19 Resources*. International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG) Section on Great Apes (SGA). Available at: <https://www.iucngreatapes.org/covid-19>. Accessed: September, 2022.
- IUCN SSC PSG SGA (n.d.-b). *IUCN SSC A.P.E.S. Database*. International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG) Section on Great Apes (SGA). Available at: <https://www.iucngreatapes.org/apes-database>. Accessed: January, 2023.
- Ives, C.D. and Bekessy, S.A. (2015). The ethics of offsetting nature. *Frontiers in Ecology and the Environment*, **13**(10), 568–73. DOI: 10.1890/150021.
- J.A.C.K. Sanctuary (n.d.). *J.A.C.K. Primate Rehabilitation Centre*. Lubumbashi, DRC: Jeunes Animaux Confisqués au Katanga (J.A.C.K.). Available at: <http://www.jacksanctuary.org/>. Accessed: October, 2020.
- Jacob, S.T., Crozier, I., Fischer, W.A. II, *et al.* (2020). Ebola virus disease. *Nature Reviews Disease Primers*, **6**(1), 13. DOI: 10.1038/s41572-020-0147-3.
- Jacobson, S.L., Ross, S.R. and Bloomsmith, M.A. (2016). Characterizing abnormal behavior in a large population of zoo-housed chimpanzees: prevalence and potential influencing factors. *PeerJ*, **4**, e2225. DOI: 10.7717/peerj.2225.
- Jakob-Hoff, R.M., MacDiarmid, S.C., Lees, C., *et al.* (2014). *Manual of Procedures for Wildlife Disease Risk Analysis*. Paris, France: World Organisation for Animal Health (OIE), in association with the International Union for Conservation of Nature (IUCN) and the Species Survival Commission (SSC). Available at: <https://portals.iucn.org/library/sites/library/files/documents/2014-007.pdf>.
- Jameton, A. (1984). *Nursing Practice: The Ethical Issues*. Englewood Cliffs, NJ: Prentice-Hall.
- Jane Goodall Institute (n.d.). *Tchimpounga Chimpanzee Rehabilitation Centre*. Lynton, UK: The Jane Goodall Institute UK. Available at: <https://www.janegoodall.co.uk/our-programmes/tchimpounga-chimpanzee-rehabilitation-centre>. Accessed: October, 2020.
- Janson, C.H. and Goldsmith, M.L. (1995). Predicting group size in primates: foraging costs and predation risks. *Behavioral Ecology*, **6**(3), 326–36. DOI: 10.1093/beheco/6.3.326.
- Jayne, S.I., Field, H.E., de Jong, C.E., *et al.* (2015). Molecular evidence of Ebola Reston virus infection in Philippine bats. *Virology Journal*, **12**(1), 107. DOI: 10.1186/s12985-015-0331-3.
- Jean, S.M., Preuss, T.M., Sharma, P., *et al.* (2012). Cerebrovascular accident (stroke) in captive, group-housed, female chimpanzees. *Comparative Medicine*, **62**(4), 322–9.
- JGI (n.d.). *Project Snare Removal*. Washington DC: Jane Goodall Institute (JGI). Available at: <https://www.janegoodall.org/snare-removal-2/>. Accessed: September, 2022.
- Jim, C.Y. (1999). The forest fires in Indonesia 1997–98: possible causes and pervasive consequences. *Geography*, **84**(3), 251–60. DOI: <http://www.jstor.org/stable/40573309>.

- John, D.A. and Babu, G.R. (2021). Lessons from the aftermaths of green revolution on food system and health. *Frontiers in Sustainable Food Systems*, **5**. DOI: 10.3389/fsufs.2021.644559.
- Johns, B.G. (1996). Responses of chimpanzees to habituation and tourism in the Kibale Forest, Uganda. *Biological Conservation*, **78**(3), 257–62. DOI: 10.1016/S0006-3207(96)00044-4.
- Johnson, C.K., Hitchens, P.L., Pandit, P.S., *et al.* (2020). Global shifts in mammalian population trends reveal key predictors of virus spillover risk. *Proceedings of the Royal Society B: Biological Sciences*, **287**(1924), 20192736. DOI: 10.1098/rspb.2019.2736.
- Johnson, D.F., Druce, J.D., Birch, C. and Grayson, M.L. (2009). A quantitative assessment of the efficacy of surgical and N95 masks to filter influenza virus in patients with acute influenza infection. *Clinical Infectious Diseases*, **49**(2), 275–7. DOI: 10.1086/600041.
- Jones, I.J., MacDonald, A.J., Hopkins, S.R., *et al.* (2020). Improving rural health care reduces illegal logging and conserves carbon in a tropical forest. *Proceedings of the National Academy of Sciences*, **117**(45), 28515–24. DOI: 10.1073/pnas.2009240117.
- Jones, K.E., Patel, N.G., Levy, M.A., *et al.* (2008). Global trends in emerging infectious diseases. *Nature*, **451**(7181), 990–3. DOI: 10.1038/nature06536.
- Jones, R.C. and Greek, R. (2014). A review of the Institute of Medicine’s analysis of using chimpanzees in biomedical research. *Science and Engineering Ethics*, **20**(2), 481–504. DOI: 10.1007/s11948-013-9442-7.
- Jones, R.M. and Brosseau, L.M. (2015). Aerosol transmission of infectious disease. *Journal of Occupational and Environmental Medicine*, **57**(5), 501–8.
- Jong, H.N. (2020). Indonesia forest fires push orangutans into starvation mode, study finds. *Mongabay*, January 24, 2020. Available at: <https://news.mongabay.com/2020/01/indonesia-forest-fires-burning-orangutans-starvation-mode-borneo/>.
- Jong, H.N. (2022). Plantations threaten Indonesia’s orangutans, but they’re not oil palm. *Mongabay*, July 15, 2022. Available at: <https://news.mongabay.com/2022/07/plantations-threaten-indonesias-orangutans-but-theyre-not-oil-palm/>.
- Joppa, L.N. (2015). Technology for nature conservation: an industry perspective. *Ambio*, **44**(4), 522–6. DOI: 10.1007/s13280-015-0702-4.
- Juarez, C.P., Rotundo, M.A., Berg, W. and Fernández-Duque, E. (2011). Costs and benefits of radio-collaring on the behavior, demography, and conservation of owl monkeys (*Aotus azarai*) in Formosa, Argentina. *International Journal of Primatology*, **32**(1), 69–82. DOI: 10.1007/s10764-010-9437-z.
- Junge, R.E., Gannon, F.H., Porton, I., McAlister, W.H. and Whyte, M.P. (2000). Management and prevention of vitamin D deficiency rickets in captive-born juvenile chimpanzees (*Pan troglodytes*). *Journal of Zoo and Wildlife Medicine*, **31**(3), 361–9.
- Junker, J., Blake, S., Boesch, C., *et al.* (2012). Recent decline in suitable environmental conditions for African great apes. *Diversity and Distributions*, **18**(11), 1077–91. DOI: 10.1111/ddi.12005.
- Junker, J., Kühl, H.S., Orth, L., *et al.* (2017). *Primate Conservation: Global Evidence for the Effects of Interventions*. Cambridge, UK: University of Cambridge. Available at: <https://www.conservationevidence.com/synopsis/pdf/14>.
- Junker, J., Petrovan, S.O., Arroyo-Rodríguez, V., *et al.* (2020). A severe lack of evidence limits effective conservation of the world’s primates. *BioScience*, **70**(9), 794–803. DOI: 10.1093/biosci/biaa082.
- Justice, W.S.M., O’Brien, M.F., Szyszka, O., *et al.* (2017). Adaptation of the animal welfare assessment grid (AWAG) for monitoring animal welfare in zoological collections. *Veterinary Record*, **181**(6), 143. DOI: 10.1136/vr.104309.
- Kabano, P., Arinaitwe, J. and Robbins, M.M. (2014). A brief history of habituated gorillas in Bwindi Impenetrable National Park. *Gorilla Journal*, **48**, 7–10.
- Kagan, R., Carter, S. and Allard, S. (2015). A universal animal welfare framework for zoos. *Journal of Applied Animal Welfare Science*, **18**(S1), S1–10. DOI: 10.1080/10888705.2015.1075830.
- Kahn, M. (1992). The passive voice of science: language abuse in the wildlife profession. *The Trumpeter Journal of Ecosophy*, **9**(4), 152–4.
- Kalan, A.K., Piel, A.K., Mundry, R., *et al.* (2016). Passive acoustic monitoring reveals group ranging and territory use: a case study of wild chimpanzees (*Pan troglodytes*). *Frontiers in Zoology*, **13**(1), 34. DOI: 10.1186/s12983-016-0167-8.

- Kalema-Zikusoka, G. and Byonanebye, J. (2019). Scaling up a one-health model of conservation through public health: experiences in Uganda and the Democratic Republic of the Congo. *The Lancet Global Health*, **7**, S34. DOI: 10.1016/S2214-109X(19)30119-6.
- Kalema-Zikusoka, G., Kock, R.A. and Macfie, E.J. (2002). Scabies in free-ranging mountain gorillas (*Gorilla beringei beringei*) in Bwindi Impenetrable National Park, Uganda. *Veterinary Record*, **150**, 12–15.
- Kalema-Zikusoka, G., Rubanga, S., Mutahunga, B. and Sadler, R. (2018). Prevention of *Cryptosporidium* and *Giardia* at the human/gorilla/livestock interface. *Frontiers in Public Health*, **6**. DOI: 10.3389/fpubh.2018.00364.
- Kalema-Zikusoka, G., Rubanga, S., Ngabirano, A. and Zikusoka, L. (2021). Mitigating impacts of the COVID-19 pandemic on gorilla conservation: lessons from Bwindi Impenetrable Forest, Uganda. *Frontiers in Public Health*, **9**, December 14, 2018. DOI: 10.3389/fpubh.2021.655175.
- Kalema-Zikusoka, G. and Rwego, I.B. (2016). Mountain gorillas, tourism, and conflicts with people living adjacent to Bwindi Impenetrable National Park. In *Tropical Conservation, Perspectives on Local and Global Priorities*, ed. A. Aguirre and R. Sukumar. Oxford, UK: Oxford University Press, pp. 136–9.
- Kalter, S.S. (1989). Infectious diseases of nonhuman primates in a zoo setting. *Zoo Biology*, **8**(S1), 61–76. DOI: 10.1002/zoo.1430080508.
- Kanamori, T., Kuze, N., Bernard, H., Malim, T.P. and Kohshima, S. (2012). Fatality of a wild Bornean orangutan (*Pongo pygmaeus morio*): behavior and death of a wounded juvenile in Danum Valley, North Borneo. *Primates*, **53**(3), 221–6. DOI: 10.1007/s10329-012-0297-3.
- Kaplan, G. and Rogers, L.J. (2000). *The Orangutans: Their Evolution, Behaviour and Future*. Philadelphia, PA: Perseus Running Press.
- Kappeler, P.M. and Watts, D.P. (2012). *Long-Term Field Studies of Primates*. Berlin, Germany: Springer-Verlag.
- Karesh, W.B. and Cook, R.A. (2009). One world – one health. *Clinical Medicine*, **9**(3), 259–60. DOI: 10.7861/clinmedicine.9-3-259.
- Karlsson, M. and Edvardsson Björnberg, K. (2021). Ethics and biodiversity offsetting. *Conservation Biology*, **35**(2), 578–86. DOI: 10.1111/cobi.13603.
- Karokaro, A.S., Gokkon, B. and Suriyani, L.D. (2017). Indonesia is running out of places to put rescued animals. *Mongabay*, July 3, 2017. Available at: <https://news.mongabay.com/2017/07/indonesia-is-running-out-of-places-to-put-rescued-animals/>.
- Kaur, T., Singh, J., Tong, S., *et al.* (2008). Descriptive epidemiology of fatal respiratory outbreaks and detection of a human-related metapneumovirus in wild chimpanzees (*Pan troglodytes*) at Mahale Mountains National Park, Western Tanzania. *American Journal of Primatology*, **70**(8), 755–65. DOI: 10.1002/ajp.20565.
- Kavanagh, M. and Caldecott, J.O. (2013). Strategic guidelines for the translocation of primates and other animals. *The Raffles Bulletin of Zoology*, **29**, 203–9.
- KCP (n.d.). *Kibale Chimpanzee Project: Research, Conservation, and Education*. Veterinary Intervention. Kibale Chimpanzee Project (KCP). Available at: <https://kibalechimpanzees.wordpress.com/veterinary-intervention/>. Accessed: August, 2022.
- Keele, B.F., Jones, J.H., Terio, K.A., *et al.* (2009). Increased mortality and AIDS-like immunopathology in wild chimpanzees infected with SIVcpz. *Nature*, **460**(7254), 515–19. DOI: 10.1038/nature08200.
- Keele, B.F., Van Heuverswyn, F., Li, Y., *et al.* (2006). Chimpanzee reservoirs of pandemic and nonpandemic HIV-1. *Science*, **313**(5786), 523–6.
- Keesing, F., Belden, L.K., Daszak, P., *et al.* (2010). Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature*, **468**(7324), 647–52. DOI: 10.1038/nature09575.
- Keita, M.B., Hamad, I. and Bittar, F. (2014). Looking in apes as a source of human pathogens. *Microbial Pathogenesis*, **77**, 149–54. DOI: 10.1016/j.micpath.2014.09.003.
- Kelly, A., Osburn, B. and Salman, M. (2014). Veterinary medicine's increasing role in global health. *The Lancet Global Health*, **2**(7), e379–80. DOI: 10.1016/S2214-109X(14)70255-4.
- Kelly, T.R., Machalaba, C., Karesh, W.B., *et al.* (2020). Implementing One Health approaches to confront emerging and re-emerging zoonotic disease threats: lessons from PREDICT. *One Health Outlook*, **2**(1), 1. DOI: 10.1186/s42522-019-0007-9.

- Kernbach, M., Ramsay, C., Rohr, J.R. and Martin, L.B. (2019). Eco-immunology: past, present, and future. In *Encyclopedia of Ecology*, 2nd edn, ed. B. Fath. Oxford, UK: Elsevier, pp. 64–71. DOI: 10.1016/B978-0-12-409548-9.10890-5.
- Kik, M.J.L., Bos, J.H., Groen, J. and Dorrestein, G.M. (2005). Herpes simplex infection in a juvenile orangutan (*Pongo pygmaeus pygmaeus*). *Journal of Zoo and Wildlife Medicine*, **36**(1), 131–4.
- Kilbourn, A.M., Bosi, E.J., Karesh, W.B., Landau, M. and Taming, E. (1997). Disease evaluation of free-ranging orangutans (*Pongo pygmaeus pygmaeus*) in Sabah, Malaysia. Presented at: *Proceedings of the Annual American Association of Zoo Veterinarians Conference 1998, Houston, TX*. Jacksonville, FL: American Association of Zoo Veterinarians.
- Kilbourn, A.M., Karesh, W.B., Wolfe, N.D., et al. (2003). Health evaluation of free-ranging and semi-captive orangutans (*Pongo pygmaeus pygmaeus*) in Sabah, Malaysia. *Journal of Wildlife Diseases*, **39**(1), 73–83. DOI: 10.7589/0090-3558-39.1.73.
- Kimbrough, L. (2020). Around the world, a fire crisis flares up, fueled by human actions. *Mongabay*, September 4, 2020. Available at: <https://news.mongabay.com/2020/09/around-the-world-a-fire-crisis-flares-up-fueled-by-human-actions/>.
- King, T., Chamberlan, C. and Courage, A. (2006). *Gorilla Reintroduction, Republic of Congo. A Report for the PASA/IUCN African Primate Reintroduction Workshop, 20–22 April 2006, Apeldoorn, the Netherlands*. Brazzaville, Republic of Congo: The John Aspinall Foundation. Available at: <https://www.ppgcongo.org/reintroduction/ppg-congo-2006-gorilla-reintro-pasa-en.pdf>.
- King, T., Chamberlan, C. and Courage, A. (2012). Assessing initial reintroduction success in long-lived primates by quantifying survival, reproduction and dispersal parameters: western lowland gorillas (*Gorilla gorilla gorilla*) in Congo and Gabon. *International Journal of Primatology*, **33**(1), 134–49. DOI: 10.1007/s10764-011-9563-2.
- Kiran, D., Sander, W.E. and Duncan, C. (2022). Empowering veterinarians to be planetary health stewards through policy and practice. *Frontiers in Veterinary Science*, **9**, 775411. DOI: 10.3389/fvets.2022.775411.
- Kirby, J.N., Steindl, S.R. and Doty, J.R. (2017). Compassion as the highest ethic. In *Practitioner's Guide to Ethics and Mindfulness-Based Interventions*, ed. L. M. Monteiro, J. F. Compson and F. Musten. Cham, Switzerland: Springer International Publishing, pp. 253–77. DOI: 10.1007/978-3-319-64924-5_10.
- Klailova, M., Casanova, C., Henschel, P., et al. (2013). Non-human predator interactions with wild great apes in Africa and the use of camera traps to study their dynamics. *Folia Primatologica*, **83**(3–6), 312–28. DOI: 10.1159/000342143.
- Klee, S.R., Brzuszkiewicz, E.B., Nattermann, H., et al. (2010). The genome of a *Bacillus* isolate causing anthrax in chimpanzees combines chromosomal properties of *B. cereus* with *B. anthracis* virulence plasmids. *PLoS ONE*, **5**(7), e10986. DOI: 10.1371/journal.pone.0010986.
- Kleinschmidt, L.M., Kinney, M.E. and Hanley, C.S. (2018). Treatment of disseminated *Strongyloides* spp. infection in an infant Sumatran orangutan (*Pongo abelii*). *Journal of Medical Primatology*, **47**(3), 201–4. DOI: 10.1111/jmp.12338.
- Knauf, S., Gogarten, J.F., Schuenemann, V.J., et al. (2018). Nonhuman primates across sub-Saharan Africa are infected with the yaws bacterium *Treponema pallidum* subsp. *pertenue*. *Emerging Microbes & Infections*, **7**(1), 1–4. DOI: 10.1038/s41426-018-0156-4.
- Knauf, S., Liu, H. and Harper, K.N. (2013). Treponemal infection in nonhuman primates as possible reservoir for human yaws. *Emerging Infectious Diseases*, **19**(12), 2058–60. DOI: 10.3201/eid1912.130863.
- Knight, A. (2008). The beginning of the end for chimpanzee experiments? *Philosophy, Ethics, and Humanities in Medicine*, **3**(1), 16. DOI: 10.1186/1747-5341-3-16.
- Knight, J. (2009). Making wildlife viewable: habituation and attraction. *Society & Animals*, **17**(2), 167–84. DOI: 10.1163/156853009X418091.
- Knott, C.D. (1998). Orangutan in the wild. *National Geographic Magazine*, **2**(2), 30–57.
- Knott, C.D. (2001). Female reproductive ecology of the apes: implications for human evolution. In *Reproductive Ecology and Human Evolution*, ed. P. T. Ellison. Hawthorne, NY: Walter de Gruyter, pp. 429–63. Available at: <https://cherylknott.files.wordpress.com/2011/06/knott-2001-female-reproductive-ecology-of-the-apes.pdf>.
- Knott, C.D. (2005). Energetic responses to food availability in the great apes: implications for hominin evolution. In *Seasonality in Primates: Studies of Living and Extinct Human and Non-Human Primates*, ed. D. K. Brockman and C. P. van Schaik. New York, NY: Cambridge University Press, pp. 351–78.

- Knott, C.D., Beaudrot, L., Snaith, T.V., *et al.* (2008). Female–female competition in Bornean orangutans. *International Journal of Primatology*, **29**, 975–97.
- Knott, C.D., Kane, E.E., Achmad, M., *et al.* (2021). The Gunung Palung Orangutan Project: twenty-five years at the intersection of research and conservation in a critical landscape in Indonesia. *Biological Conservation*, **255**, 108856. DOI: 10.1016/j.biocon.2020.108856.
- Knott, C.D., Scott, A.M., O'Connell, C.A., *et al.* (2019). Possible male infanticide in wild orangutans and a re-evaluation of infanticide risk. *Scientific Reports*, **9**, 7806. DOI: 10.1038/s41598-019-42856-w.
- Knott, K. (2021). Hong Kong's leading role in the global extinction crisis, as hub of illegal wildlife trade, and the legal amendment that could change that. *South China Morning Post, Lifestyle*, April 23, 2021. Available at: <https://www.scmp.com/lifestyle/article/3130438/hong-kongs-leading-role-global-extinction-crisis-hub-illegal-wildlife>.
- Kock, R., Michel, A.L., Yeboah-Manu, D., *et al.* (2021). Zoonotic tuberculosis: the changing landscape. *International Journal of Infectious Diseases*, **113**(S1), S68–72. DOI: 10.1016/j.ijid.2021.02.091.
- Kock, R.A., Woodford, M.H. and Rossiter, P.B. (2010). Disease risks associated with the translocation of wildlife. *Revue Scientifique et Technique de l'Office International des Epizooties*, **29**(2), 329–50. DOI: 10.20506/rst.29.2.1980.
- Koepfel, L., Siems, T., Fischer, M. and Lentz, H.H.K. (2018). Automatic classification of farms and traders in the pig production chain. *Preventive Veterinary Medicine*, **150**, 86–92. DOI: 10.1016/j.prevetmed.2017.12.003.
- Köndgen, S., Calvignac-Spencer, S., Grützmacher, K., *et al.* (2017). Evidence for human *Streptococcus pneumoniae* in wild and captive chimpanzees: a potential threat to wild populations. *Scientific Reports*, **7**, 14581. DOI: 10.1038/s41598-017-14769-z.
- Köndgen, S., Kühl, H., N'Goran, P.K., *et al.* (2008). Pandemic human viruses cause decline of endangered great apes. *Current Biology*, **18**(4), 260–4. DOI: 10.1016/j.cub.2008.01.012.
- Köndgen, S., Leider, M., Lankester, F., *et al.* (2011). *Pasteurella multocida* involved in respiratory disease of wild chimpanzees. *PLoS ONE*, **6**(9), e24236. DOI: 10.1371/journal.pone.0024236.
- Köndgen, S., Schenk, S., Pauli, G., Boesch, C. and Leendertz, F.H. (2010). Noninvasive monitoring of respiratory viruses in wild chimpanzees. *EcoHealth*, **7**(3), 332–41. DOI: 10.1007/s10393-010-0340-z.
- Kooriyama, T., Okamoto, M., Yoshida, T., *et al.* (2013). Epidemiological study of zoonoses derived from humans in captive chimpanzees. *Primates*, **54**(1), 89–98. DOI: 10.1007/s10329-012-0320-8.
- Kormos, R., Boesch, C., Bakarr, M.I. and Butynski, T.M. (2003). *West African Chimpanzees: Status, Survey and Conservation Action Plan*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) World Conservation Union. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2003-059.pdf>.
- Kormos, R., Kormos, C.F., Humle, T., *et al.* (2014). Great apes and biodiversity offset projects in Africa: the case for national offset strategies. *PLoS ONE*, **9**(11), e111671. DOI: 10.1371/journal.pone.0111671.
- Köster, P.C., Lapuente, J., Cruz, I., Carmena, D. and Ponce-Gordo, F. (2022). Human-borne pathogens: are they threatening wild great ape populations? *Veterinary Sciences*, **9**(7), 356. DOI: 10.3390/vetsci9070356.
- Kralik, P. and Ricchi, M. (2017). A basic guide to real time PCR in microbial diagnostics: definitions, parameters, and everything. *Frontiers in Microbiology*, **8**, 108. DOI: 10.3389/fmicb.2017.00108.
- Krebs, B.L., Marrin, D., Phelps, A., Krol, L. and Watters, J.V. (2018). Managing aged animals in zoos to promote positive welfare: a review and future directions. *Animals*, **8**(7), 116. DOI: 10.3390/ani8070116.
- Krief, S., Berny, P., Gumisiriza, F., *et al.* (2017). Agricultural expansion as risk to endangered wildlife: pesticide exposure in wild chimpanzees and baboons displaying facial dysplasia. *Science of The Total Environment*, **598**(4), 647–56. DOI: 10.1016/j.scitotenv.2017.04.113.
- Krief, S., Escalante, A.A., Pacheco, M.A., *et al.* (2010). On the diversity of malaria parasites in African apes and the origin of *Plasmodium falciparum* from bonobos. *PLoS Pathogens*, **6**(2), e1000765. DOI: 10.1371/journal.ppat.1000765.
- Krüger, O. (2005). The role of ecotourism in conservation: panacea or Pandora's box? *Biodiversity and Conservation*, **14**(3), 579–600. DOI: 10.1007/s10531-004-3917-4.
- Kühl, H.S., Boesch, C., Kulik, L., *et al.* (2019). Human impact erodes chimpanzee behavioral diversity. *Science*, **363**(6434), 1453. DOI: 10.1126/science.aau4532.
- Kühl, H.S., Sop, T., Williamson, E.A., *et al.* (2017). The critically endangered western chimpanzee declines by 80%. *American Journal of Primatology*, **79**(9), e22681. DOI: 10.1002/ajp.22681.

- Kühl, H., Williamson, L., Sanz, C., Morgan, D. and Boesch, C. (2007). Launch of the A.P.E.S. database. *Gorilla Journal*, **34**, 20–1.
- Kuisma, E., Olson, S.H., Cameron, K.N., *et al.* (2019). Long-term wildlife mortality surveillance in northern Congo: a model for the detection of Ebola virus disease epizootics. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **374**(1782), 20180339. DOI: 10.1098/rstb.2018.0339.
- Kumar, S., Fox, B., Owston, M., Hubbard, G.B. and Dick, E.J. Jr. (2012). Pathology of spontaneous air sacculitis in 37 baboons and seven chimpanzees and a brief review of the literature. *Journal of Medical Primatology*, **41**(4), 266–77. DOI: 10.1111/j.1600-0684.2012.00547.x.
- Kumar, S., Laurence, H., Owston, M.A., *et al.* (2017). Natural pathology of the captive chimpanzee (*Pan troglodytes*): a 35-year review. *Journal of Medical Primatology*, **46**(5), 271–90. DOI: 10.1111/jmp.12277.
- Kumareswaran, K. and Jayasinghe, G.Y. (2022). Systematic review on ensuring the global food security and covid-19 pandemic resilient food systems: towards accomplishing sustainable development goals targets. *Discover Sustainability*, **3**(1), 29. DOI: 10.1007/s43621-022-00096-5.
- Kumm, H.W. and Turner, T.B. (1936). The transmission of yaws from man to rabbits by an insect vector, *Hippelates pallipes* Loew. *American Journal of Tropical Medicine and Hygiene*, **51–16**(3), 245–71. DOI: 10.4269/ajtmh.1936.51-16.245.
- Kuze, N., Dellatore, D., Banes, G.L., *et al.* (2012). Factors affecting reproduction in rehabilitant female orangutans: young age at first birth and short inter-birth interval. *Primates*, **53**(2), 181–92. DOI: 10.1007/s10329-011-0285-z.
- Labes, E.M., Hegglin, D., Grimm, F., *et al.* (2010). Intestinal parasites of endangered orangutans (*Pongo pygmaeus*) in Central and East Kalimantan, Borneo, Indonesia. *Parasitology*, **137**(1), 123–35. DOI: 10.1017/S0031182009991120.
- Labes, E.M., Nurcahyo, W., Deplazes, P. and Mathis, A. (2011). Genetic characterization of *Strongyloides* spp. from captive, semi-captive and wild Bornean orangutans (*Pongo pygmaeus*) in Central and East Kalimantan, Borneo, Indonesia. *Parasitology*, **138**, 1417–22.
- Lahm, S.A., Kombila, M., Swanepoel, R. and Barnes, R.F.W. (2007). Morbidity and mortality of wild animals in relation to outbreaks of Ebola haemorrhagic fever in Gabon, 1994–2003. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **101**(1), 64–78. DOI: 10.1016/j.trstmh.2006.07.002.
- Lainé, N. and Morand, S. (2020). Linking humans, their animals, and the environment again: a decolonized and more-than-human approach to “One Health.” *Parasite*, **27**, 55. DOI: 10.1051/parasite/2020055.
- Lambeth, S.P., Bloomsmith, M.A. and Alford, P.L. (1997). Effects of human activity on chimpanzee wounding. *Zoo Biology*, **16**(4), 327–33. DOI: 10.1002/(SICI)1098-2361(1997)16:4<327::AID-ZOO4>3.0.CO;2-C.
- Lammey, M.L., Baskin, G.B., Gliotti, A.P., *et al.* (2008). Interstitial myocardial fibrosis in a captive chimpanzee (*Pan troglodytes*) population. *Comparative Medicine*, **58**(4), 389–94.
- Landolfi, J.A., Wellehan, J.F., Johnson, A.J. and Kinsel, M.J. (2005). Fatal human herpesvirus type 1 infection in a white-handed gibbon (*Hylobates lar*). *Journal of Veterinary Diagnostic Investigation*, **17**(4), 369–71. DOI: 10.1177/104063870501700412.
- Langford, D.J., Bailey, A.L., Chanda, M.L., *et al.* (2010). Coding of facial expressions of pain in the laboratory mouse. *Nature Methods*, **7**(6), 447–9. DOI: 10.1038/nmeth.1455.
- Lankester, F., Mätz-Rensing, K., Kiyang, J., *et al.* (2008). Fatal ulcerative colitis in a western lowland gorilla (*Gorilla gorilla gorilla*). *Journal of Medical Primatology*, **37**(6), 297–302. DOI: 10.1111/j.1600-0684.2008.00287.x.
- Lappan, S. (2008). Male care of infants in a siamang (*Symphalangus syndactylus*) population including socially monogamous and polyandrous groups. *Behavioral Ecology and Sociobiology*, **62**(8), 1307–17. DOI: 10.1007/s00265-008-0559-7.
- Lappan, S. (2009). Flowers are an important food for small apes in southern Sumatra. *American Journal of Primatology*, **71**(8), 624–35. DOI: 10.1002/ajp.20691.
- Lappan, S., Malaivijitnond, S., Radhakrishna, S., Riley, E.P. and Ruppert, N. (2020). The human–primate interface in the new normal: challenges and opportunities for primatologists in the COVID-19 era and beyond. *American Journal of Primatology*, **82**(8), e23176. DOI: 10.1002/ajp.23176.
- Latip, N.A., Marzuki, A., Marcela, P. and Umar, M.U. (2015). The involvement of indigenous peoples in promoting conservation and sustainable tourism at Lower Kinabatangan Sabah: common issues and challenges. *Australian Journal of Basic and Applied Science*, **9**(7), 323–5.

- Laule, G.E., Bloomsmith, M.A. and Schapiro, S.J. (2003). The use of positive reinforcement training techniques to enhance the care, management, and welfare of primates in the laboratory. *Journal of Applied Animal Welfare Science*, **6**(3), 163–73. DOI: 10.1207/S15327604JAWS0603_02.
- Laurance, W.F. (2013). Does research help to safeguard protected areas? *Trends in Ecology & Evolution*, **28**(5), 261–6. DOI: 10.1016/j.tree.2013.01.017.
- Laurance, W.F., Croes, B.M., Tchignoumba, L., *et al.* (2006). Impacts of roads and hunting on central African rainforest mammals. *Conservation Biology*, **20**(4), 1251–61. DOI: 10.1111/j.1523-1739.2006.00420.x.
- Laurance, W.F., Sloan, S., Weng, L. and Sayer, J.A. (2015). Estimating the environmental costs of Africa's massive "development corridors". *Current Biology*, **25**(24), 3202–8. DOI: 10.1016/j.cub.2015.10.046.
- Laurance, W.F., Wich, S.A., Onrizal, O., *et al.* (2020). Tapanuli orangutan endangered by Sumatran hydropower scheme. *Nature Ecology & Evolution*, **4**(11), 1438–9. DOI: 10.1038/s41559-020-1263-x.
- Laurence, H., Kumar, S., Owston, M.A., *et al.* (2017). Natural mortality and cause of death analysis of the captive chimpanzee (*Pan troglodytes*): a 35-year review. *Journal of Medical Primatology*, **46**(3), 106–15. DOI: 10.1111/jmp.12267.
- Lavergne, A., Donato, D., Gessain, A., *et al.* (2014). African great apes are naturally infected with roseoloviruses closely related to human herpesvirus 7. *Journal of Virology*, **88**(22), 13212–20. DOI: 10.1128/jvi.01490-14.
- Lawson, B., Garriga, R. and Galdikas, B.M. (2006). Airsacculitis in fourteen juvenile southern Bornean orangutans (*Pongo pygmaeus wurmbii*). *Journal of Medical Primatology*, **35**(3), 149–54. DOI: 10.1111/j.1600-0684.2006.00153.x.
- Lécu, A. and Ball, R. (2011). Mycobacterial infections in zoo animals: relevance, diagnosis and management. *International Zoo Yearbook*, **45**(1), 183–202. DOI: 10.1111/j.1748-1090.2011.00141.x.
- Ledger, E. (2020). Mountain gorillas face extinction due to threats of both coronavirus and poaching. *Independent*, August 20, 2020. Available at: <https://www.independent.co.uk/news/world/coronavirus-mountain-gorillas-poaching-uganda-wildlife-crime-trade-a9633586.html>.
- Lee, A., Leong, M. and Dzar, A. (2020). Mariani Ramli's life mission to help gibbons sing again. *Malaysiakini*, June 8, 2020. Available at: <https://www.malaysiakini.com/news/529224>.
- Lee, E.A.A. (2012). *Social interaction and occupational enrichment in captive Bonnet macaques* (*Macaca radiata*). Undergraduate thesis. Serdang, Malaysia: Universiti Putra Malaysia.
- Lee, K. and Brumme, Z.L. (2013). Operationalizing the One Health approach: the global governance challenges. *Health Policy and Planning*, **28**(7), 778–85. DOI: 10.1093/heapol/czs127.
- Lee, R.V., Allan, W.P., Sidney, A., *et al.* (1990). Typhlitis due to *Balantidium coli* in captive lowland gorillas. *Reviews of Infectious Diseases*, **12**(6), 1052–9. DOI: 10.1093/clinids/12.6.1052.
- Leeds, A., Elsner, R. and Lukas, K.E. (2016). The effect of positive reinforcement training on an adult female western lowland gorilla's (*Gorilla gorilla gorilla*) rate of abnormal and aggressive behavior. *Animal Behavior and Cognition*, **3**(2), 78–87.
- Leempoel, K., Hebert, T. and Hadly, E.A. (2020). A comparison of eDNA to camera trapping for assessment of terrestrial mammal diversity. *Proceedings of the Royal Society B: Biological Sciences*, **287**(1918), 20192353. DOI: 10.1098/rspb.2019.2353.
- Leendertz, F.H. and Kalema-Zikusoka, G. (2021). Vaccinate in biodiversity hotspots to protect people and wildlife from each other. *Nature*, **591**(7850), 369. DOI: 10.1038/d41586-021-00690-z.
- Leendertz, F.H., Ellerbrok, H., Boesch, C., *et al.* (2004). Anthrax kills wild chimpanzees in a tropical rainforest. *Nature*, **430**(6998), 451–2. DOI: 10.1038/nature02722.
- Leendertz, F.H., Lankester, F., Guislain, P., *et al.* (2006a). Anthrax in western and central African great apes. *American Journal of Primatology*, **68**(9), 928–33. DOI: 10.1002/ajp.20298.
- Leendertz, F.H., Pauli, G., Maetz-Rensing, K., *et al.* (2006b). Pathogens as drivers of population declines: the importance of systematic monitoring in great apes and other threatened mammals. *Biological Conservation*, **131**(2), 325–37. DOI: 10.1016/j.biocon.2006.05.002.
- Leendertz, S.A.J., Gogarten, J.F., Düx, A., Calvignac-Spencer, S. and Leendertz, F.H. (2016). Assessing the evidence supporting fruit bats as the primary reservoirs for Ebola viruses. *EcoHealth*, **13**(1), 18–25. DOI: 10.1007/s10393-015-1053-0.

- Leendertz, S.A.J., Locatelli, S., Boesch, C., *et al.* (2011). No evidence for transmission of SIVwrc from western red colobus monkeys (*Piliocolobus badius badius*) to wild West African chimpanzees (*Pan troglodytes verus*) despite high exposure through hunting. *BMC Microbiology*, **11**(1), 24. DOI: 10.1186/1471-2180-11-24.
- Leendertz, S.A.J., Wich, S.A., Ancrenaz, M., *et al.* (2017). Ebola in great apes: current knowledge, possibilities for vaccination, and implications for conservation and human health. *Mammal Review*, **47**(2), 98–111. DOI: 10.1111/mam.12082.
- Lehmann, J., Korstjens, A.H. and Dunbar, R.I.M. (2010). Apes in a changing world – the effects of global warming on the behaviour and distribution of African apes. *Journal of Biogeography*, **37**(12), 2217–31. DOI: 10.1111/j.1365-2699.2010.02373.x.
- Leighton, D.S.R. (1987). Gibbons: territoriality and monogamy. In *Primate Societies*, ed. B. B. Smuts, D. L. Cheney, R. M. Seyfarth, R. W. Wrangham and T. T. Struhsaker. Chicago, IL: University of Chicago Press, pp. 135–145.
- Leighty, K.A., Valuska, A.J., Grand, A.P., *et al.* (2015). Impact of visual context on public perceptions of non-human primate performers. *PLoS ONE*, **10**(2), e0118487. DOI: 10.1371/journal.pone.0118487.
- Lempena, J. and Sal, A. (2018). *Captive Care Standards. An Overview of Standards for the Keeping of Wild Animals in Captive Care Settings in Malawi*. Lilongwe, Malawi: Lilongwe Wildlife Trust.
- Lerner, H. and Berg, C. (2017). A comparison of three holistic approaches to health: One health, ecohealth, and planetary health. *Frontiers in Veterinary Science*, **4**, September 29, 2017. DOI: 10.3389/fvets.2017.00163.
- Leroy, E.M., Kumulungui, B., Pourrut, X., *et al.* (2005). Fruit bats as reservoirs of Ebola virus. *Nature*, **438**(7068), 575–6. DOI: 10.1038/438575a.
- Leroy, E.M., Rouquet, P., Formenty, P., *et al.* (2004). Multiple Ebola virus transmission events and rapid decline of central African wildlife. *Science*, **303**(5656), 387–90. DOI: 10.1126/science.1092528.
- Lestari, A. and Puspita Ayu, K. (2020). Engaging palm oil and hot spot area to mitigate forest fires. *BIO Web of Conferences*, **20**, 01003. DOI: 10.1051/bioconf/20202001003.
- Lewis, B. and Nogueira, M. (2021). Timeline: The battle for Simandou. *MINING.COM*, January 22, 2021. Available at: <https://www.mining.com/web/timeline-the-battle-for-simandou/>.
- Liberia Chimpanzee Rescue & Protection (n.d.). *LCRP's Sanctuary and Conservation Center*. Monrovia, Liberia: Liberia Chimpanzee Rescue and Protection. Available at: <https://www.liberiachimpanzeerescue.org/our-home.html>. Accessed: March, 2021.
- Limbe Wildlife Center (2020). *Limbe Wildlife Centre Annual Report 2019*. Limbe, Republic of Cameroon: Limbe Wildlife Center. Available at: https://issuu.com/limbewildlife/docs/lwc_annualreport_2019.
- Linden, B., Foord, S., Horta-Lacueva, Q.J.B. and Taylor, P.J. (2020). Bridging the gap: how to design canopy bridges for arboreal guenons to mitigate road collisions. *Biological Conservation*, **246**, 108560. DOI: 10.1016/j.biocon.2020.108560.
- Lindshield, S., Bogart, S.L., Gueye, M., Ndiaye, P.I. and Pruetz, J.D. (2019). Informing protection efforts for critically endangered chimpanzees (*Pan troglodytes verus*) and sympatric mammals amidst rapid growth of extractive industries in Senegal. *Folia Primatologica*, **90**(2), 124–36. DOI: 10.1159/000496145.
- Lindshield, S., Hernandez-Aguilar, R.A., Korstjens, A.H., *et al.* (2021). Chimpanzees (*Pan troglodytes*) in savanna landscapes. *Evolutionary Anthropology: Issues, News, and Reviews*, **30**(6), 399–420. DOI: 10.1002/evan.21924.
- Liptovszky, M., Poitier, R., Redrobe, S., Schüle, A. and Steinmetz, H.W. (2019). *EAZA Great Ape TAG Veterinary Guidelines (July 2019)*. Amsterdam, the Netherlands: European Association of Zoos and Aquaria (EAZA) Great Ape Taxon Advisory Group (TAG).
- Listín Diario (2019). María y Linda, las chimpancés diferentes que llenan de emociones el zoológico Nacional. *Listín Diario YouTube*, December 26, 2019. Available at: https://www.youtube.com/watch?v=_UVi4uqgt3o.
- Liswanti, N., Indawan, A., Sumardjo, D. and Sheil, D. (2004). Persepsi Masyarakat Dayak Merap Dan Punan Tentang Pentingnya Hutan Di Lansekap Hutan Tropis, Kabupaten Malinau, Kalimantan Timur [Dayak Merap and Punan People's perception of the importance of forest in a tropical landscape, Malinau, East Kalimantan]. *Jurnal Manajemen Hutan Tropika*, **10**(2), 1–3.
- Litchfield, C.A. (2008). Responsible tourism: a conservation tool or conservation threat? In *Conservation in the 21st Century: Gorillas as a Case Study*, ed. T. S. Stoinski, H. D. Steklis and P. T. Mehlman. Boston, MA: Springer, pp. 107–27. DOI: 10.1007/978-0-387-70721-1_4.

- Liu, W., Li, Y., Learn, G.H., *et al.* (2010). Origin of the human malaria parasite *Plasmodium falciparum* in gorillas. *Nature*, **467**(7314), 420–5. DOI: 10.1038/nature09442.
- Lochmiller, R.L. (1996). Immunocompetence and animal population regulation. *Oikos*, **76**(3), 594–602. DOI: 10.2307/3546356.
- Löhrich, T., Behringer, V., Wittig, R.M., Deschner, T. and Leendertz, F.H. (2018). The use of neopterin as a non-invasive marker in monitoring diseases in wild chimpanzees. *EcoHealth*, **15**(4), 792–803. DOI: 10.1007/s10393-018-1357-y.
- Loken, B., Boer, C. and Kasyanto, N. (2015). Opportunistic behaviour or desperate measure? Logging impacts may only partially explain terrestriality in the Bornean orang-utan *Pongo pygmaeus morio*. *Oryx*, **49**(3), 461–4. DOI: 10.1017/S0030605314000969.
- Loken, B., Spehar, S. and Rayadin, Y. (2013). Terrestriality in the Bornean orangutan (*Pongo pygmaeus morio*) and implications for their ecology and conservation. *American Journal of Primatology*, **75**(11), 1129–38. DOI: 10.1002/ajp.22174.
- Long, K. and Robley, A. (2004). *Cost Effective Feral Animal Exclusion Fencing for Areas of High Conservation Value in Australia*. Canberra, Australia: Commonwealth of Australia. Available at: <https://www.environment.gov.au/biodiversity/invasive-species/publications/cost-effective-feral-animal-exclusion-fencing>.
- Lonsdorf, E.V., Ross, S.R. and Matsuzawa, T. (2010). *The Mind of the Chimpanzee: Experimental and Ecological Perspectives*. Chicago, IL: University of Chicago Press.
- Lonsdorf, E.V., Travis, D., Pusey, A.E. and Goodall, J. (2006). Using retrospective health data from the Gombe chimpanzee study to inform future monitoring efforts. *American Journal of Primatology*, **68**(9), 897–908. DOI: 10.1002/ajp.20296.
- Lonsdorf, E.V., Travis, D.A., Raphael, J., *et al.* (2022). The Gombe Ecosystem Health Project: 16 years of program evolution and lessons learned. *American Journal of Primatology*, **84**(4–5), e23300. DOI: 10.1002/ajp.23300.
- Lonsdorf, E.V., Travis, D., Ssuna, R., *et al.* (2014). Field immobilization for treatment of an unknown illness in a wild chimpanzee (*Pan troglodytes schweinfurthii*) at Gombe National Park, Tanzania: findings, challenges, and lessons learned. *Primates*, **55**(1), 89–99. DOI: 10.1007/s10329-013-0372-4.
- Loos, A. and Ernst, A. (2013). An automated chimpanzee identification system using face detection and recognition. *EURASIP Journal on Image and Video Processing*, **2013**(1), 49. DOI: 10.1186/1687-5281-2013-49.
- Loos, A. and Kalyanasundaram, T.A.M. (2015). Face recognition for great apes: identification of primates in videos. Presented at: *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 19–24 April 2015, Brisbane, Queensland Australia*. Piscataway, NJ: Institute of Electrical and Electronics Engineers Signal Processing Society (IEEE), pp. 1548–1552. DOI: 10.1109/ICASSP.2015.7178230.
- Lovejoy, T.E. and Nobre, C. (2019). Amazon tipping point: last chance for action. *Science Advances*, **5**(12), eaba2949. DOI: 10.1126/sciadv.aba2949.
- Lowenstine, L.J., McManamon, R., Bonar, C. and Perkins, L. (2008). Preliminary results of a survey of United States and Canadian orangutan mortalities in the North American SSP population from 1980 to March 2008. Presented at: *Proceedings of the Annual Meeting of the American Association of Zoo Veterinarians, Los Angeles, CA, 11–17 October 2008*, Jacksonville, FL: American Association of Zoo Veterinarians.
- Lowenstine, L.J., McManamon, R. and Terio, K.A. (2016). Comparative pathology of aging great apes: bonobos, chimpanzees, gorillas, and orangutans. *Veterinary Pathology*, **53**(2), 250–76. DOI: 10.1177/0300985815612154.
- Lowenstine, L.J., McManamon, R. and Terio, K.A. (2018). Apes. In *Pathology of Wildlife and Zoo Animals*, ed. K. A. Terio, D. McAloose and J. St Leger. Cambridge, UK: Elsevier Inc., pp. 375–412.
- Lu, H., Giordano, F. and Ning, Z. (2016). Oxford nanopore MinION sequencing and genome assembly. *Genomics, Proteomics & Bioinformatics*, **14**(5), 265–79. DOI: 10.1016/j.gpb.2016.05.004.
- Lu, J., Bayne, K. and Wang, J. (2013). Current status of animal welfare and animal rights in China. *Alternatives to Laboratory Animals*, **41**(5), 351–7. DOI: 10.1177/026119291304100505.
- Lucchesi, S., Cheng, L., Janmaat, K.R.L., *et al.* (2020). Beyond the group: how food, mates, and group size influence intergroup encounters in wild bonobos. *Behavioral Ecology*, **31**(2), 519–32.
- Lundmark, F., Berg, C. and Röcklinsberg, H. (2018). Private animal welfare standards – opportunities and risks. *Animals*, **8**(1), 4. DOI: 10.3390/ani8010004.

- Lyons, M., Smuts, C. and Stephens, A. (2001). Participation, empowerment and sustainability: (how) do the links work? *Urban Studies*, **38**(8), 1233–51. DOI: 10.1080/00420980125039.
- Lyra, T.M. (2006). La erradicación de la peste porcina africana en el Brasil, 1978–1984 [The eradication of African swine fever in Brazil, 1978–1984]. *Revue Scientifique et Technique de l'Office International des Épizooties*, **25**(1), 93–103.
- Mabano, A. (2013). *Impact of tourists on mountain gorilla behavior*. BSc thesis. Huye, Rwanda: National University of Rwanda.
- Macfie, E.J. and Williamson, E.A. (2010). *Best Practice Guidelines for Great Ape Tourism*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/efiles/documents/SSC-OP-038.pdf>.
- Mackenzie, J.S. and Jeggo, M. (2019). The One Health approach: why is it so important? *Tropical Medicine and Infectious Disease*, **4**(2), 88. DOI: 10.3390/tropicalmed4020088.
- MacQueen, K.M., McLellan, E., Metzger, D.S., et al. (2001). What is community? An evidence-based definition for participatory public health. *American Journal of Public Health*, **91**(12), 1929–38. DOI: 10.2105/ajph.91.12.1929.
- Maddox, T., Howard, P., Knox, J. and Jenner, N. (2019). *Forest-Smart Mining: Identifying Factors Associated with the Impacts of Large-Scale Mining on Forests*. Washington DC: World Bank. DOI: 10.1596/32025.
- Madliger, C.L., Love, O.P., Hultine, K.R. and Cooke, S.J. (2018). The conservation physiology toolbox: status and opportunities. *Conservation Physiology*, **6**(1). DOI: 10.1093/conphys/coy029.
- Maekawa, M., Lanjouw, A., Rutagarama, E. and Sharp, D. (2013). Mountain gorilla tourism generating wealth and peace in post-conflict Rwanda. *Natural Resources Forum*, **37**(2), 127–37. DOI: 10.1111/1477-8947.12020.
- Maekawa, M., Lanjouw, A., Rutagarama, E. and Sharp, D. (2015). Mountain gorilla ecotourism: supporting macro-economic growth and providing local livelihoods. In *Livelihoods, Natural Resources, and Post-Conflict Peacebuilding*, ed. H. Young and L. Goldman. Abingdon, UK: Taylor & Francis, pp. 167–86.
- Maertens, B., Gagnaire, A., Paerewijck, O., De Bosscher, K. and Geldhof, P. (2021). Regulatory role of the intestinal microbiota in the immune response against *Giardia*. *Scientific Reports*, **11**, 10601. DOI: 10.1038/s41598-021-90261-z.
- Maisels, F., Bergl, R.A. and Williamson, E.A. (2018). Gorilla gorilla (*amended version of 2016 assessment*). *The IUCN Red List of Threatened Species 2018: e.T9404A136250858*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2018-2.RLTS.T9404A136250858.en.
- Maisels, F., Plumptre, A.J. and Strindberg, S. (2021). New Grauer's gorilla estimate. *Gorilla Journal*, **63**, 6–7. Available at <https://www.berggorilla.org/en/gorillas/gorilla-numbers/gorilla-numbers/new-grauers-gorilla-population-estimate/>.
- Maisels, F., Strindberg, S., Greer, D., et al. (2016). Pan troglodytes ssp. troglodytes (*errata version published in 2016*). *The IUCN Red List of Threatened Species 2016: e.T15936A102332276*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T15936A17990042.en.
- Maki, S., Alford, P. and Bramblett, C. (1987). The effects of unfamiliar humans on aggression in captive chimpanzee groups. *American Journal of Primatology*, **12**(3), 358.
- Maldonado, O., Aveling, C., Cox, D., et al. (2012). *Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo (Kahuzi-Biega, Maiko, Tayna and Itombwe Landscape): Conservation Action Plan 2012–2022*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG), Ministry of Environment, Nature Conservation & Tourism, Institut Congolais pour la Conservation de la Nature & the Jane Goodall Institute. Available at: <https://www.iucn.org/content/grauers-gorillas-and-chimpanzees-eastern-democratic-republic-congo-kahuzi-biega-maiko-tayna-and-itombwe-landscape-conservation-action-plan-2012-2022>.
- Malhi, Y., Roberts, J.T., Betts, R.A., et al. (2008). Climate change, deforestation, and the fate of the Amazon. *Science*, **319**(5860), 169–72. DOI: 10.1126/science.1146961.
- Manansang, W. (2020). Roadmap to the 2023 goal. Progressing the SEAZA animal welfare certification program. *WAZA News*, **3** 16–17. Available at <https://www.waza.org/wp-content/uploads/2020/10/WAZA-magazine3-2020-FINAL-web.pdf>.
- Mari Saéz, A., Weiss, S., Nowak, K., et al. (2015). Investigating the zoonotic origin of the West African Ebola epidemic. *EMBO Molecular Medicine*, **7**(1), 17–23. DOI: 10.15252/emmm.201404792.

- Marks, M., Solomon, A.W. and Mabey, D.C. (2014). Endemic treponemal diseases. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **108**(10), 601–7. DOI: 10.1093/trstmh/tru128.
- Maron, M., Hobbs, R.J., Moilanen, A., *et al.* (2012). Faustian bargains? Restoration realities in the context of biodiversity offset policies. *Biological Conservation*, **155**(Supplement C), 141–8. DOI: 10.1016/j.biocon.2012.06.003.
- Marques, A., Martins, I.S., Kastner, T., *et al.* (2019). Increasing impacts of land use on biodiversity and carbon sequestration driven by population and economic growth. *Nature Ecology & Evolution*, **3**(4), 628–37. DOI: 10.1038/s41559-019-0824-3.
- Marrana, M. (2022). Chapter 3. Epidemiology of disease through the interactions between humans, domestic animals, and wildlife. In *One Health*, ed. J. C. Prata, A. I. Ribeiro and T. Rocha-Santos. Cambridge, MA: Academic Press, pp. 73–111. DOI: 10.1016/B978-0-12-822794-7.00001-0.
- Marshall, A.J., Ancrenaz, M., Brearley, F.Q., *et al.* (2009). The effects of forest phenology and floristics on populations of Bornean and Sumatran orangutans: are Sumatran forests more productive than Bornean forests? In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 97–117.
- Marshall, A.J., Cannon, C.H. and Leighton, M. (2009). Competition and niche overlap between gibbons (*Hylobates albibarbis*) and other frugivorous vertebrates in Gunung Palung National Park, West Kalimantan, Indonesia. In *The Gibbons: New Perspectives on Small Ape Socioecology and Population Biology*, ed. D. Whittaker and S. Lappan. New York, NY: Springer, pp. 161–88. DOI: 10.1007/978-0-387-88604-6_9.
- Marshall, A.J. and Leighton, M. (2006). How does food availability limit the population density of white-bearded gibbons? In *Feeding Ecology in Apes and Other Primates: Ecological, Physiological and Behavioural Aspects*. Cambridge Studies in Biological and Evolutionary Anthropology Volume 48, ed. G. Hohmann, M. Robbins and C. Boesch. Cambridge, UK: Cambridge University Press, pp. 313–35.
- Martinsen, S. and Jukes, N. (2005). Towards a humane veterinary education. *Journal of Veterinary Medical Education*, **32**(4), 454–60. DOI: 10.3138/jvme.32.4.454.
- Marx, V. (2015). PCR heads into the field. *Nature Methods*, **12**(5), 393–7. DOI: 10.1038/nmeth.3369.
- Marzec, A.M., Kunz, J.A., Falkner, S., *et al.* (2016). The dark side of the red ape: male-mediated lethal female competition in Bornean orangutans. *Behavioral Ecology and Sociobiology*, **70**(4), 459–66. DOI: 10.1007/s00265-015-2053-3.
- Marzi, A., Murphy, A.A., Feldmann, F., *et al.* (2016). Cytomegalovirus-based vaccine expressing Ebola virus glycoprotein protects nonhuman primates from Ebola virus infection. *Scientific Reports*, **6**, 21674. DOI: 10.1038/srep21674.
- Masey, F.J.F., Maron, M., Gordon, A., Bull, J.W. and Evans, M.C. (2021). Improving averted loss estimates for better biodiversity outcomes from offset exchanges. *Oryx*, **55**(3), 393–403. DOI: 10.1017/S0030605319000528.
- Masi, S., Chaffour, S., Bain, O., *et al.* (2012). Seasonal effects on great ape health: a case study of wild chimpanzees and western gorillas. *PLoS ONE*, **7**(12), e49805. DOI: 10.1371/journal.pone.0049805.
- Masi, S., Cipolletta, C. and Robbins, M.M. (2009). Western lowland gorillas (*Gorilla gorilla gorilla*) change their activity patterns in response to frugivory. *American Journal of Primatology*, **71**(2), 91–100. DOI: 10.1002/ajp.20629.
- Matos Mendes, D. (2020). Goiânia Zoo – siamangs in their islands. *Zoochat*, September 14, 2020. Available at: <https://www.zoochat.com/community/media/goiania-zoo-siamangs-in-their-islands.501054/>.
- Mätz-Rensing, K., Kunze, M., Zöller, M., *et al.* (2011). Fatal *Balamuthia mandrillaris* infection in a gorilla: first case of balamuthiasis in Germany. *Journal of Medical Primatology*, **40**(6), 437–40. DOI: 10.1111/j.1600-0684.2011.00479.x.
- Mazet, J.A.K., Genovese, B.N., Harris, L.A., *et al.* (2020). Human respiratory syncytial virus detected in mountain gorilla respiratory outbreaks. *EcoHealth*, **17**, 449–60.
- Mazimhaka, J. (2006). *The potential impact of domestic tourism on Rwanda's tourism economy*. MA thesis. Johannesburg, South Africa: University of the Witwatersrand.
- Mbaya, A.W. and Udendeye, U.J. (2011). Gastrointestinal parasites of captive and free-roaming primates at the Afi Mountain Primate Conservation Area in Calabar, Nigeria and their zoonotic implications. *Pakistan Journal of Biological Sciences*, **14**(13), 709–14. DOI: 10.3923/pjbs.2011.709.714.
- Mbayahi, A. and Kalema-Zikusoka, G. (2020). *COVID-19 and Africa's Great Apes. Challenges and Threats Amidst the COVID-19 Pandemic for Sustaining Conservation Through Responsible Great Ape Tourism*. Policy Brief. Nairobi,

- Kenya: African Civil Society Biodiversity Alliance (ACBA). Available at: https://africancba.org/download-resource-file/POLICY%20BRIEF%20ON%20AFRICA%20GREAT%20APES%20AND%20COVID-19%20ENGLISH%20%282%29_compressed.pdf.
- McBean, G. (2004). Climate change and extreme weather: a basis for action. *Natural Hazards*, **31**(1), 177–90. DOI: 10.1023/B:NHAZ.0000020259.58716.0d.
- McCarthy, M., Bigelow, J. and Taylor, M. (2018). Emergency preparedness and planning for animals: a case study in the Blue Mountains, New South Wales (NSW). *Australian Journal of Emergency Management*, **33**(4), 50–6.
- McCarthy, M.S., Lester, J.D., Howe, E.J., *et al.* (2015). Genetic censusing identifies an unexpectedly sizeable population of an endangered large mammal in a fragmented forest landscape. *BMC Ecology*, **15**(1), 21. DOI: 10.1186/s12898-015-0052-x.
- McConkey, K.R. (2018). Seed dispersal by primates in Asian habitats: from species, to communities, to conservation. *International Journal of Primatology*, **39**(3), 466–92. DOI: 10.1007/s10764-017-0013-7.
- McConkey, K.R., Nathalang, A., Brockelman, W.Y., *et al.* (2018). Different megafauna vary in their seed dispersal effectiveness of the megafaunal fruit *Platymitra macrocarpa* (Annonaceae). *PLoS ONE*, **13**(7), e0198960. DOI: 10.1371/journal.pone.0198960.
- McCormick, G.L., Shea, K. and Langkilde, T. (2015). How do duration, frequency, and intensity of exogenous CORT elevation affect immune outcomes of stress? *General and Comparative Endocrinology*, **222**, 81–7. DOI: 10.1016/j.ygcen.2015.07.008.
- McCullers, J.A. (2014). The co-pathogenesis of influenza viruses with bacteria in the lung. *Nature Reviews Microbiology*, **12**(4), 252–62. DOI: 10.1038/nrmicro3231.
- McDonald, M. and Johnson, S. (2014). “There’s an app for that”: a new program for the collection of behavioural field data. *Animal Behaviour*, **95**, 81–7. DOI: 10.1016/j.anbehav.2014.06.009.
- McInturff, A., Xu, W., Wilkinson, C.E., Dejid, N. and Brashares, J.S. (2020). Fence ecology: frameworks for understanding the ecological effects of fences. *BioScience*, **70**(11), 971–85. DOI: 10.1093/biosci/biaa103.
- McLennan, M.R. and Hockings, K.J. (2016). The aggressive apes? Causes and contexts of great ape attacks on local persons. In *Problematic Wildlife: A Cross-Disciplinary Approach*, ed. F. M. Angelici. Cham, Switzerland: Springer, pp. 373–94. DOI: 10.1007/978-3-319-22246-2_18.
- McManamon, R. and Lowenstine, L. (2012). Cardiovascular disease in great apes. In *Fowler’s Zoo and Wild Animal Medicine, Current Therapy, Volume 7*, ed. R. E. Miller and M. Fowler. St Louis, MO: Elsevier Saunders, pp. 408–15. DOI: 10.1016/B978-1-4377-1986-4.00053-6.
- McManamon, R., Swenson, R.B. and Lowenstine, L.J. (1994). Update on diagnostic and therapeutic approaches to airsacculitis in orangutans. Presented at: *Proceedings of the Annual Meeting of the American Association of Zoo Veterinarians, Pittsburgh, PA, 23–28 October 1994*. Jacksonville, FL: American Association of Zoo Veterinarians, pp. 219–20.
- McTighe, M.S., Hansen, B.C., Ely, J.J. and Lee, D.R. (2011). Determination of hemoglobin A1c and fasting blood glucose reference intervals in captive chimpanzees (*Pan troglodytes*). *Journal of the American Association for Laboratory Animal Science*, **50**(2), 165–70.
- Medkour, H., Amona, I., Laidoudi, Y., *et al.* (2020). Parasitic infections in African humans and non-human primates. *Pathogens*, **9**(7), 561. DOI: 10.3390/pathogens9070561.
- Meehan, T.P. and Lowenstine, L.J. (1994). Causes of mortality in captive lowland gorillas: a survey of the SSP population. Presented at: *Proceedings of the Annual Meeting of the American Association of Zoo Veterinarians, Pittsburgh, PA, 23–28 October 1994*. Jacksonville, FL: American Association of Zoo Veterinarians.
- Meehl, G.A., Zwiers, F., Evans, J., *et al.* (2000). Trends in extreme weather and climate events: issues related to modeling extremes in projections of future climate change. *Bulletin of the American Meteorological Society*, **81**(3), 427–36. DOI: 10.1175/1520-0477(2000)081<0427:TIEWAC>2.3.CO;2.
- Meijaard, E. (2015). Indonesia’s silent tragedy in a connected world. *Jakarta Globe*, reproduced by the Ape Alliance, October 30, 2015. Available at: <https://www.4apes.com/news/general/item/1318-erik-meijaard-indonesia-s-silent-tragedy-in-a-connected-world>.
- Meijaard, E., Albar, G., Nardiyono, *et al.* (2010). Unexpected ecological resilience in Bornean orangutans and implications for pulp and paper plantation management. *PLoS ONE*, **5**(9), e12813. DOI: 10.1371/journal.pone.0012813.

- Meijaard, E., Ni'matullah, S., Dennis, R., *et al.* (2021). The historical range and drivers of decline of the Tapanuli orangutan. *PLoS ONE*, **16**(1), e0238087. DOI: 10.1371/journal.pone.0238087.
- Meijaard, E. and Wich, S.A. (2014). *Extractive Industries and Orangutans. Occasional Paper for State of the Apes, Volume 1*. Cambridge, UK: Arcus Foundation. Available at: <https://www.stateoftheapes.com/wp-content/uploads/2014/07/Extractive-Industries-and-Orangutans1.pdf>.
- Meijaard, E., Wich, S., Ancrenaz, M. and Marshall, A.J. (2012). Not by science alone: why orangutan conservationists must think outside the box. *Year in Ecology and Conservation Biology*, **1249**, 29–44. DOI: 10.1111/j.1749-6632.2011.06288.x.
- Melin, A.D., Janiak, M.C., Marrone, F., Arora, P.S. and Higham, J.P. (2020). Comparative ACE2 variation and primate COVID-19 risk. *Communications Biology*, **3**(1), 641. DOI: 10.1038/s42003-020-01370-w.
- Mellor, D.J. (2017). Operational details of the five domains model and its key applications to the assessment and management of animal welfare. *Animals*, **7**(8), 60. DOI: 10.3390/ani7080060.
- Mellor, D.J., Beausoleil, N.J., Littlewood, K.E., *et al.* (2020). The 2020 Five Domains Model: including human–animal interactions in assessments of animal welfare. *Animals*, **10**(10), 1870. DOI: 10.3390/ani10101870.
- Mendez, A. and Houghton, D.P. (2020). Sustainable banking: the role of multilateral development banks as norm entrepreneurs. *Sustainability*, **12**(3), 972. DOI: 10.3390/su12030972.
- Meyers, W.M., Walsh, G.P., Brown, H.L., *et al.* (1985). Leprosy in a mangabey monkey: naturally acquired infection. *International Journal of Leprosy and Other Mycobacterial Diseases*, **53**(1), 1–14.
- Michel, A.L., Venter, L., Espie, I.W. and Coetzee, M.L. (2003). *Mycobacterium tuberculosis* infections in eight species at the National Zoological Gardens of South Africa, 1991–2001. *Journal of Zoo and Wildlife Medicine*, **34**(4), 364–70. DOI: 10.1638/02-063.
- Millar, K., Thorstensen, E., Tomkins, S., Mephram, B. and Kaiser, M. (2007). Developing the ethical Delphi. *Journal of Agricultural and Environmental Ethics*, **20**(1), 53–63. DOI: 10.1007/s10806-006-9022-9.
- Miller, R.E., Calle, P.P. and Lamberski, N., ed. (2023). *Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 10*. St Louis, MO: Elsevier. DOI: 10.1016/B978-0-323-82852-9.00114-3.
- Miller, R.E. and Fowler, M.E., ed. (2015). *Fowler's Zoo and Wild Animal Medicine, Volume 8*. Philadelphia, PA: Elsevier Saunders.
- Miller, R.E., Lamberski, N. and Calle, P.P., ed. (2019). *Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 9*. St Louis, MO: Elsevier. DOI: 10.1016/B978-0-323-55228-8.00148-X.
- Milstein, M.S., Shaffer, C.A., Suse, P., *et al.* (2020). An ethnographic approach to characterizing potential pathways of zoonotic disease transmission from wild meat in Guyana. *EcoHealth*, **17**(4), 424–36. DOI: 10.1007/s10393-021-01513-3.
- MINAE (2017a). *Regulations for the Implementation of the Wildlife Conservation Law No. 7317*. San José, Costa Rica: Ministerio del Ambiente y Energía (MINAE). Available at: <https://stopanimalselfies.org/wp-content/uploads/2019/10/ENGLISH-Regulation-Wildlife-Conservation-Law-Costa-Rica.pdf>.
- MINAE (2017b). *Wildlife Conservation Law No. 7317*. San José, Costa Rica: Ministerio del Ambiente y Energía (MINAE). Available at: <https://stopanimalselfies.org/wp-content/uploads/2019/10/Ley-CVS-ingles.pdf>.
- Ministry of Natural Resources Energy and Mining (2017). *National Parks and Wildlife Act*. Lilongwe, Malawi: Ministry of Natural Resources, Energy and Mining. Available at: <https://www.lilongwewildlife.org/wp-content/uploads/Malawi.Wildlife.Legislation.Digital.pdf>.
- Mirza, M.M.Q. (2003). Climate change and extreme weather events: can developing countries adapt? *Climate Policy*, **3**(3), 233–48. DOI: 10.1016/S1469-3062(03)00052-4.
- Mitani, J.C. (2009). Male chimpanzees form enduring and equitable social bonds. *Animal Behaviour*, **77**(3), 633–40. DOI: 10.1016/j.anbehav.2008.11.021.
- Mitani, J.C., Watts, D.P. and Amsler, S.J. (2010). Lethal intergroup aggression leads to territorial expansion in wild chimpanzees. *Current Biology*, **20**(12), R507–8. DOI: 10.1016/j.cub.2010.04.021.
- Mitchell, G., Tromborg, C.T., Kaufman, J., *et al.* (1992). More on the “influence” of zoo visitors on the behaviour of captive primates. *Applied Animal Behaviour Science*, **35**(2), 189–98. DOI: 10.1016/0168-1591(92)90009-Z.
- Mitman, S., Rosenbaum, M., Bello, R., *et al.* (2021). Challenges to IUCN guideline implementation in the rehabilitation and release of trafficked primates in Peru. *Primate Conservation*, **35**, 1–16.

- Mitra Setia, T., Delgado, R.A., Utami-Atmoko, S.S., Singleton, I. and van Schaik, C.P. (2009). Social organization and male–female relationships. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. S. Utami-Atmoko, T. M. Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 245–54. DOI: 10.1093/acprof:oso/9780199213276.003.0017.
- Mittermeier, R.A., Rylands, A.B. and Wilson, D.E., ed. (2013). *Handbook of the Mammals of the World. Volume 3: Primates*. Barcelona, Spain: Lynx Edicions.
- Mlengeya, T. (2000). *TANAPA Veterinary Department Annual Report 2000/2001. Respiratory Disease Outbreak in the Chimpanzee Population of Gombe National Park*. Arusha, Tanzania: Tanzania National Parks (TANAPA).
- Moberg, G.P. (1985). Influence of stress on reproduction: measure of well-being. In *Animal Stress*, ed. G. P. Moberg. New York, NY: Springer, pp. 245–67. DOI: 10.1007/978-1-4614-7544-6_14.
- Moberg, G.P. (2000). Biological response to stress: implications for animal welfare. In *The Biology of Animal Stress: Basic Principles and Implications for Animal Welfare*, ed. G. P. Moberg and J. A. Mench. Wallingford, UK: CABI International, pp. 1–21. DOI: 10.1079/9780851993591.0001.
- Modry, D., Pařčo, B., Petrželková, K.J. and Hasegawa, H., ed. (2018). *Parasites of Apes: An Atlas of Coproscopic Diagnostics*. Frankfurt Contributions to Natural History, Volume 76. Frankfurt, Germany: Editions Chimaira. Available at: <https://www.chimaira.de>.
- Moeller, A.H. (2017). The shrinking human gut microbiome. *Current Opinion in Microbiology*, **38**, 30–5. DOI: 10.1016/j.mib.2017.04.002.
- Mokuwa, E. and Richards, P. (2020). How should public health officials respond when important local rituals increase risk of contagion? Case and commentary. *AMA Journal of Ethics*, **22**(1), E5–9.
- Moloney, G.K., Tuke, J., Dal Grande, E., Nielsen, T. and Chaber, A.-L. (2021). Is YouTube promoting the exotic pet trade? Analysis of the global public perception of popular YouTube videos featuring threatened exotic animals. *PLoS ONE*, **16**(4), e0235451. DOI: 10.1371/journal.pone.0235451.
- Molyneaux, A., Hankinson, E., Kaban, M., et al. (2021). Primate selfies and anthroozoonotic diseases: lack of rule compliance and poor risk perception threatens orangutans. *Folia Primatologica*, **92**(5–6), 296–305. DOI: 10.1159/000520371.
- Monkey World (n.d.). *Meet the Primates*. Wareham, UK: Monkey World. Available at: <https://monkeyworld.org/our-primates/primate-groups/>. Accessed: October, 2020.
- Montali, R.J., Mikota, S.K. and Cheng, L.I. (2001). *Mycobacterium tuberculosis* in zoo and wildlife species. *Revue Scientifique et Technique de l'Office International des Épidémiologies*, **20**(1), 291–303. DOI: 10.20506/rst.20.1.1268.
- Monte Adone (n.d.). *Scimpanzè*. Sasso Marconi, Italy: Centro Tutela e Ricerca Fauna Esotica e Selvatica Monte Adone ODV. Available at: <https://centrotutelafauna.org/scimpanze/>. Accessed: December, 2020.
- Monto, A.S. (2002). Epidemiology of viral respiratory infections. *The American Journal of Medicine*, **112**(6), 4–12. DOI: 10.1016/S0002-9343(01)01058-0.
- Moon, S., Sridhar, D., Pate, M.A., et al. (2015). Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola. *The Lancet*, **386**(10009), 2204–21. DOI: 10.1016/S0140-6736(15)00946-0.
- Moore, J., Black, J., Hernandez-Aguilar, R.A., et al. (2017). Chimpanzee vertebrate consumption: savanna and forest chimpanzees compared. *Journal of Human Evolution*, **112**, 30–40. DOI: 10.1016/j.jhevol.2017.09.004.
- Moore, P., Prompinchompoo, C. and Beastall, C.A. (2016). *CITES Implementation in Thailand: A Review of the Legal Regime Governing the Trade in Great Apes and Gibbons and Other CITES-Listed Species*. Selangor, Malaysia: TRAFFIC. Available at: http://www.trafficj.org/publication/16_CITES_Implementation_in_Thailand.pdf.
- Moorhouse, T.P., Dahlsjö, C.A.L., Baker, S.E., D'Cruze, N.C. and Macdonald, D.W. (2015). The customer isn't always right – conservation and animal welfare implications of the increasing demand for wildlife tourism. *PLoS ONE*, **10**(10), e0138939. DOI: 10.1371/journal.pone.0138939.
- Mootnick, A.R., Reingold, M., Holshuh, H.J. and Mirkovic, R.R. (1998). Isolation of a herpes simplex virus type 1-like agent from the brain of a mountain agile gibbon (*Hylobates agilis agilis*) with encephalitis. *Journal of Zoo and Wildlife Medicine*, **29**(1), 61–4.
- Morbeck, M.E., Zihlman, A.L., Sumner, D.R. and Galloway, A. (1991). Poliomyelitis and skeletal asymmetry in Gombe chimpanzees. *Primates*, **32**(1), 77–91. DOI: 10.1007/BF02381602.

- Morcillo, D.O., Steiner, U.K., Grayson, K.L., Ruiz-Lambides, A.V. and Hernández-Pacheco, R. (2020). Hurricane-induced demographic changes in a non-human primate population. *Royal Society Open Science*, 7(8), 200173. DOI: 10.1098/rsos.200173.
- Morgan, D., Mundry, R., Sanz, C., et al. (2018). African apes coexisting with logging: comparing chimpanzee (*Pan troglodytes troglodytes*) and gorilla (*Gorilla gorilla gorilla*) resource needs and responses to forestry activities. *Biological Conservation*, 218, 277–86. DOI: 10.1016/j.biocon.2017.10.026.
- Morgan, D. and Sanz, C. (2003). Naïve encounters with chimpanzees in the Goulougo Triangle, Republic of Congo. *International Journal of Primatology*, 24(2), 369–81. DOI: 10.1023/A:1023005417897.
- Morgan, D. and Sanz, C. (2006). Chimpanzee feeding ecology and comparisons with sympatric gorillas in the Goulougo Triangle, Republic of Congo. In *Feeding Ecology in Apes and Other Primates: Ecological, Physiological and Behavioural Aspects*. Cambridge Studies in Biological and Evolutionary Anthropology Volume 48, ed. G. Hohmann, M. Robbins and C. Boesch. Cambridge, UK: Cambridge University Press, pp. 97–122.
- Morgan, D. and Sanz, C. (2007). *Best Practice Guidelines for Reducing the Impact of Commercial Logging on Great Apes in Western Equatorial Africa*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG). Available at: <https://portals.iucn.org/library/node/9059>.
- Morgan, D. and Sanz, C. (2020). *Rapport sur la biodiversité et l'importance écologique du Triangle de Djeke, République du Congo*. Brazzaville, Republic of Congo: Foundation Nouabalé-Ndoki, Wildlife Conservation Society and Goulougo Triangle Ape Project.
- Morgan, D., Strindberg, S., Winston, W., et al. (2019). Impacts of selective logging and associated anthropogenic disturbance on intact forest landscapes and apes of northern Congo. *Frontiers in Forests and Global Change*, 2, July 3, 2019. DOI: 10.3389/ffgc.2019.00028.
- Morgan, D.B., Winston, W., Ayina, C.E., et al. (2020). Forest certification and the high conservation value concept: protecting great apes in the Sangha Trinational Landscape in an era of industrial logging. In *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, ed. L. M. Hopper and S. R. Ross. Chicago, IL: University of Chicago Press, pp. 644–70. DOI: 10.7208/chicago/9780226728032.003.0027.
- Morgan, K.N. and Tromborg, C.T. (2007). Sources of stress in captivity. *Applied Animal Behaviour Science*, 102(3), 262–302. DOI: 10.1016/j.applanim.2006.05.032.
- Morgans, C.L., Meijaard, E., Santika, T., et al. (2018). Evaluating the effectiveness of palm oil certification in delivering multiple sustainability objectives. *Environmental Research Letters*, 13(6), 064032. DOI: 10.1088/1748-9326/aac6f4.
- Mori Junior, R., Franks, D.M. and Ali, S.H. (2015). *Designing Sustainability Certification for Impact: Analysis of the Design Characteristics of 15 Sustainability Standards in the Mining Industry*. Brisbane, Australia: Centre for Social Responsibility in Mining, University of Queensland.
- Morimura, N., Idani, G. and Matsuzawa, T. (2011). The first chimpanzee sanctuary in Japan: an attempt to care for the “surplus” of biomedical research. *American Journal of Primatology*, 73(3), 226–32. DOI: 10.1002/ajp.20887.
- Mörner, T., Obendorf, D.L., Artois, M. and Woodford, M.H. (2002). Surveillance and monitoring of wildlife diseases. *Revue Scientifique et Technique de l'Office International des Épizooties*, 21(1), 67–76. DOI: 10.20506/rst.21.1.1321.
- Morocco World News (2018). Animal trafficking in UAE still a major problem. *Morocco World News*, 2 August 2018. Available at: <https://www.morocoworldnews.com/2018/08/251652/animal-trafficking-uae-major-problem>.
- Morris, D.E., Cleary, D.W. and Clarke, S.C. (2017). Secondary bacterial infections associated with influenza pandemics. *Frontiers in Microbiology*, 8, June 23, 2017. DOI: 10.3389/fmicb.2017.01041.
- Morton, F.B., Todd, A.F., Lee, P. and Masi, S. (2013). Observational monitoring of clinical signs during the last stage of habituation in a wild western gorilla group at Bai Hokou, Central African Republic. *Folia Primatologica*, 84(2), 118–33. DOI: 10.1159/000350916.
- Mubemba, B., Chanove, E., Mätz-Rensing, K., et al. (2020). Yaws disease caused by *Treponema pallidum* subspecies *pertenue* in wild chimpanzee, Guinea, 2019. *Emerging Infectious Diseases*, 26, 1283–6.
- Muegge, B.D., Kuczynski, J., Knights, D., et al. (2011). Diet drives convergence in gut microbiome functions across mammalian phylogeny and within humans. *Science*, 332(6032), 970–4. DOI: 10.1126/science.1198719.

- Muehlenbein, M.P. (2013). Human–wildlife contact and emerging infectious diseases. In *Human–Environment Interactions: Current and Future Directions*, ed. E. S. Brondízio and E. F. Moran. Dordrecht, the Netherlands: Springer, pp. 79–94. DOI: 10.1007/978-94-007-4780-7_4.
- Muehlenbein, M.P. and Ancrenaz, M. (2009). Minimizing pathogen transmission at primate ecotourism destinations: the need for input from travel medicine. *Journal of Travel Medicine*, **16**(4), 229–32. DOI: 10.1111/j.1708-8305.2009.00346.x.
- Muehlenbein, M.P., Ancrenaz, M., Sakong, R., *et al.* (2012). Ape conservation physiology: fecal glucocorticoid responses in wild *Pongo pygmaeus morio* following human visitation. *PLoS ONE*, **7**(3), e33357. DOI: 10.1371/journal.pone.0033357.
- Muehlenbein, M.P., Martinez, L.A., Lemke, A.A., *et al.* (2008). Perceived vaccination status in ecotourists and risks of anthrozooses. *EcoHealth*, **5**(3), 371–8. DOI: 10.1007/s10393-008-0192-y.
- Muehlenbein, M.P., Martinez, L.A., Lemke, A.A., *et al.* (2010). Unhealthy travelers present challenges to sustainable primate ecotourism. *Travel Medicine and Infectious Disease*, **8**(3), 169–75. DOI: 10.1016/j.tmaid.2010.03.004.
- Muehlenbein, M.P. and Wallis, J. (2014). Considering risks of pathogen transmission associated with primate-based tourism. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 278–91. DOI: 10.1017/CBO9781139087407.021.
- Mugisha, L., Pauli, G., Opuda-Asibo, J., *et al.* (2010). Evaluation of poliovirus antibody titers in orally vaccinated semi-captive chimpanzees in Uganda. *Journal of Medical Primatology*, **39**(2), 123–8. DOI: 10.1111/j.1600-0684.2010.00400.x.
- Muhangi, D., Gardiner, C.H., Ojok, L., *et al.* (2021). Pathological lesions of the digestive tract in free-ranging mountain gorillas (*Gorilla beringei beringei*). *American Journal of Primatology*, **83**(8), e23290. DOI: 10.1002/ajp.23290.
- Mukanjari, S., Bednar-Friedl, B., Muchapondwa, E. and Zikhali, P. (2013). Evaluating the prospects of benefit sharing schemes in protecting mountain gorillas in Central Africa. *Natural Resource Modeling*, **26**(4), 455–79. DOI: 10.1111/nrm.12010.
- Mukherjee, N., Hugé, J., Sutherland, W.J., *et al.* (2015). The Delphi technique in ecology and biological conservation: applications and guidelines. *Methods in Ecology and Evolution*, **6**(9), 1097–1109. DOI: 10.1111/2041-210X.12387.
- Mul, I.F., Paembonan, W., Singleton, I., Wich, S.A. and van Bolhuis, H. (2007). Intestinal parasites of free-ranging, semicaptive, and captive *Pongo abelii* in Sumatra, Indonesia. *International Journal of Primatology*, **28**, 407–20. DOI: 10.1007/s10764-007-9119-7.
- Mulero-Pázmány, M. (2021). The future of technology in conservation. In *Conservation Technology*, ed. S. A. Wich and A. K. Piel. Oxford, UK: Oxford University Press, pp. 255–73. DOI: 10.1093/oso/9780198850243.003.0013.
- Munanura, I.E., Backman, K.F., Hallo, J.C. and Powell, R.B. (2016). Perceptions of tourism revenue sharing impacts on Volcanoes National Park, Rwanda: a Sustainable Livelihoods framework. *Journal of Sustainable Tourism*, **24**(12), 1709–26. DOI: 10.1080/09669582.2016.1145228.
- Munanura, I.E., Backman, K.F. and Sabuhoro, E. (2013). Managing tourism growth in endangered species' habitats of Africa: Volcanoes National Park in Rwanda. *Current Issues in Tourism*, **16**(7–8), 700–18. DOI: 10.1080/13683500.2013.785483.
- Munanura, I.E., Backman, K.F., Sabuhoro, E. and Bernhard, K.P. (2020). The potential of tourism benefits to reduce forest dependence behavior of impoverished residents adjacent to Volcanoes National Park in Rwanda. *Tourism Planning & Development*, **17**(5), 475–96. DOI: 10.1080/21568316.2019.1640282.
- Munn, J. (2006). Effects of injury on the locomotion of free-living chimpanzees in the Budongo Forest Reserve, Uganda. In *Primates of Western Uganda*, ed. N. E. Newton-Fisher, H. Notman, J. D. Paterson and V. Reynolds. New York, NY: Springer, pp. 259–317.
- Munson, L. and Montali, R.J. (1990). Pathology and diseases of great apes at the National Zoological Park. *Zoo Biology*, **9**, 99–105.
- Murata, K., Hasegawa, H., Nakano, T., Noda, A. and Yanai, T. (2002). Fatal infection with human pinworm, *Enterobius vermicularis*, in a captive chimpanzee. *Journal of Medical Primatology*, **31**(2), 104–8. DOI: 10.1034/j.1600-0684.2002.01017.x.
- Murguía, D.I., Bringezu, S. and Schaldach, R. (2016). Global direct pressures on biodiversity by large-scale metal mining: spatial distribution and implications for conservation. *Journal of Environmental Management*, **180**, 409–20. DOI: 10.1016/j.jenvman.2016.05.040.

- Murphy, H.W., Dennis, P., Devlin, W., Meehan, T. and Kutinsky, I. (2011). Echocardiographic parameters of captive western lowland gorillas (*Gorilla gorilla gorilla*). *Journal of Zoo and Wildlife Medicine*, **42**(4), 572–9. DOI: 10.1638/2010-0139.1.
- Murray, J.S. (2010). Moral courage in healthcare: acting ethically even in the presence of risk. *OJIN: The Online Journal of Issues in Nursing*, **15**(3), 2. DOI: 10.3912/OJIN.Vol15Noo3Mano2.
- Mutumbo, M., Arita, I. and Jezek, Z. (1983). Human monkeypox transmitted by a chimpanzee in a tropical rain-forest area of Zaire. *The Lancet*, **321**(8327), 735–7. DOI: 10.1016/S0140-6736(83)92027-5.
- Muyambi, F. (2005). The impact of tourism on the behaviour of mountain gorillas. *Gorilla Journal*, **30**, 14–15.
- Myers, B. and Zrinski, U. (2022). Resilient and inclusive public financial management systems enable governments to better respond to disasters. *World Bank Blogs*, March 17, 2022. Available at: <https://blogs.worldbank.org/governance/resilient-and-inclusive-public-financial-management-systems-enable-governments-better>.
- Nadler, Y. (2019). Contingency planning for all hazards and foreign animal disease. In *Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 9*, ed. R. E. Miller, N. Lamberski and P. P. Calle. St Louis, MO: W.B. Saunders, pp. 45–52. DOI: 10.1016/B978-0-323-55228-8.00009-6.
- Nagpal, R., Shively, C.A., Appt, S.A., et al. (2018). Gut microbiome composition in non-human primates consuming a western or Mediterranean diet. *Frontiers in Nutrition*, **5**. DOI: 10.3389/fnut.2018.00028.
- Nakamara, M., Hosaka, K., Itoh, N. and Zamma, K. (2015). *Mahale Chimpanzees: 50 Years of Research*. Cambridge, UK: Cambridge University Press.
- Nash, L.T., Fritz, J., Alford, P.A. and Brent, L. (1999). Variables influencing the origins of diverse abnormal behaviors in a large sample of captive chimpanzees (*Pan troglodytes*). *American Journal of Primatology*, **48**(1), 15–29. DOI: 10.1002/(sici)1098-2345(1999)48:1<15::Aid-ajp2>3.0.Co;2-r.
- Nash, R., Johnston, H., Robbins, A. and Descovich, K. (2021). The effect of enrichment filling and engagement time on regurgitation and reingestion behaviour in three zoo-housed orangutans. *Journal of Zoological and Botanical Gardens*, **2**(1), 10–20. DOI: 10.3390/jzbg2010002.
- Nasution, A., Perwitasari-Farajallah, D. and Utami-Atmoko, S.S. (2018). Declining orangutans population in the unprotected forest of Batang Toru. *Tropical Life Science Research*, **29**(2), 77–87. DOI: 10.21315/tlsr2018.29.2.6.
- Nasution, A., Perwitasari-Farajallah, D. and Utami-Atmoko, S.S. (2020). The distribution and density of Tapanuli orangutans (*Pongo tapanuliensis*) at potential corridor locations between forest fragments in Batang Toru, North Sumatra, Indonesia. *Biodiversitas*, **21**, 5382–8.
- Nater, A., Mattle-Greminger, M.P., Nurcahyo, A., et al. (2017). Morphometric, behavioral, and genomic evidence for a new orangutan species. *Current Biology*, **27**(22), 3487–98.e10. DOI: 10.1016/j.cub.2017.09.047.
- Natesan, M., Jensen, S.M.R., Keasey, S.L., et al. (2016). Human survivors of disease outbreaks caused by Ebola or Marburg virus exhibit cross-reactive and long-lived antibody responses. *Clinical and Vaccine Immunology*, **23**, 717–24.
- Nathan, S., Chieng, S., Kingsley, P.V., et al. (2018). Melioidosis in Malaysia: incidence, clinical challenges, and advances in understanding pathogenesis. *Tropical Medicine and Infectious Disease*, **3**(1), 25. DOI: 10.3390/tropicalmed3010025.
- National Research Council (US) (2001). Towards the development of disease early warning systems. In *Under the Weather: Climate, Ecosystems, and Infectious Disease*, ed. Committee on Climate, Infectious Diseases, and Human Health. Washington DC: National Academy of Sciences, pp. 86–102. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK222241/>.
- NBI (2020). Unprecedented rise in water levels of Lake Victoria. *Nile Basin Initiative News and Events*, July 20, 2020. Available at: <https://nilebasin.org/new-and-events/307-unprecedented-rise-in-water-levels-of-lake-victoria>.
- Negrey, J.D., Reddy, R.B., Scully, E.J., et al. (2019). Simultaneous outbreaks of respiratory disease in wild chimpanzees caused by distinct viruses of human origin. *Emerging Microbes & Infections*, **8**(1), 139–49. DOI: 10.1080/22221751.2018.1563456.
- Nellemann, C. and Newton, A. (2002). *The Great Apes, The Road Ahead – A GLOBIO Perspective on the Impacts of Infrastructure Development on the Great Apes*. United Nations Environment Programme (UNEP), GRID-Arendal, World Conservation Monitoring Centre. Available at: <https://wedocs.unep.org/handle/20.500.11822/7485>.
- Nelson, C., Lurie, N., Wasserman, J. and Zakowski, S. (2007). Conceptualizing and defining public health emergency preparedness. *American Journal of Public Health*, **97**(S1), S9–11. DOI: 10.2105/ajph.2007.114496.

- Nepal, S.K. and Weber, K.E. (1994). A buffer zone for biodiversity conservation: viability of the concept in Nepal's Royal Chitwan National Park. *Environmental Conservation*, **21**(4), 333–41. DOI: 10.1017/S0376892900033646.
- Newton-Fisher, N.E. (2003). The home range of the Sonso community of chimpanzees from the Budongo Forest, Uganda. *African Journal of Ecology*, **41**(2), 150–6. DOI: 10.1046/j.1365-2028.2003.00408.x.
- Ng, L.S., Campos-Arceiz, A., Sloan, S., *et al.* (2020). The scale of biodiversity impacts of the Belt and Road Initiative in Southeast Asia. *Biological Conservation*, **248**, 108691. DOI: 10.1016/j.biocon.2020.108691.
- Ngamassi, L., Shahriari, H., Ramakrishnan, T. and Rahman, S. (2022). Text mining hurricane Harvey tweet data: lessons learned and policy recommendations. *International Journal of Disaster Risk Reduction*, **70**, 102753. DOI: 10.1016/j.ijdrr.2021.102753.
- Ngamba Island Chimpanzee Sanctuary (2020). Ngamba Island Chimpanzee Sanctuary. *Facebook Post*, October 13, 2020. Available at: <https://www.facebook.com/friends-of-chimps/posts/3742243585809513>.
- Nicholls, H. (2015). Conservation biology: wild at heart. *Nature*, **528**(7583), 474–5. DOI: 10.1038/528474a.
- Nicholson, L.B. (2016). The immune system. *Essays in Biochemistry*, **60**(3), 275–301. DOI: 10.1042/ebc20160017.
- Nidom, C.A., Nakayama, E., Nidom, R.V., *et al.* (2012). Serological evidence of Ebola virus infection in Indonesian orangutans. *PLoS ONE*, **7**(7), e40740. DOI: 10.1371/journal.pone.0040740.
- Nielsen, H. and Spenceley, A. (2010). *The Success of Tourism in Rwanda: Gorillas and More*. World Development Report 2011 Background paper. Washington DC, and the Hague, the Netherlands: World Bank and the Netherlands Development Organization. Available at: <https://openknowledge.worldbank.org/server/api/core/bitstreams/27f8459f-f3b4-5e13-8cbc-bb17f7254cea/content>.
- Nielsen, H. and Spenceley, A. (2011). The success of tourism in Rwanda: gorillas and more. In *Yes Africa Can: Success Stories from a Dynamic Continent*, ed. P. Chuhan-Pole and M. Angwafo. Washington DC: The World Bank, pp. 231–49.
- Nieuwland, J. (2020). *Towards an interspecies health policy: great apes and the right to health*. PhD thesis. Leiden, the Netherlands: Leiden University.
- Nijboer, J. (2020). *Nutrition in Primates*. Rahway, NJ: MSD Veterinary Manual. Available at: <https://www.msdsvet-manual.com/management-and-nutrition/nutrition-exotic-and-zoo-animals/nutrition-in-primates>.
- Nijman, V. (2017). Orangutan trade, confiscations, and lack of prosecutions in Indonesia. *American Journal of Primatology*, **79**(11), 22652. DOI: 10.1002/ajp.22652.
- Nijman, V. (2021). Illegal and legal wildlife trade spreads zoonotic diseases. *Trends in Parasitology*, **37**(5), 359–60. DOI: 10.1016/j.pt.2021.02.001.
- Nijman, V., Geissmann, T., Traeholt, C., Roos, C. and Nowak, M.G. (2020). *Symphalangus syndactylus*. *The IUCN Red List of Threatened Species 2020: e.T39779A17967873*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2020-2.RLTS.T39779A17967873.en.
- Nishida, A.H. and Ochman, H. (2019). A great-ape view of the gut microbiome. *Nature Reviews Genetics*, **20**(4), 195–206. DOI: 10.1038/s41576-018-0085-z.
- Nishida, T. (1968). The social group of wild chimpanzees in the Mahali Mountains. *Primates*, **9**(3), 167–224. DOI: 10.1007/BF01730971.
- Nishida, T., Matsusaka, T. and McGrew, W.C. (2009). Emergence, propagation or disappearance of novel behavioral patterns in the habituated chimpanzees of Mahale: a review. *Primates*, **50**(1), 23–36. DOI: 10.1007/s10329-008-0109-y.
- Nizamuddin, Q. and Rahman, S.A. (2019). Animal welfare in Asia: specific flaws and strengths, future trends and objectives. In *Animal Welfare: from Science to Law*, ed. S. Hild and L. Schweitzer. Paris, France: La foundation Droit Animal, Ethique et Sciences, pp. 109–18. Available at: <https://www.fondation-droit-animal.org/documents/AnimalWelfare2019.v1.pdf>.
- Nizeyi, J.B., Innocent, R.B., Erume, J., *et al.* (2001). Campylobacteriosis, salmonellosis, and shigellosis in free-ranging human-habituated mountain gorillas of Uganda. *Journal of Wildlife Diseases*, **37**(2), 239–44. DOI: 10.7589/0090-3558-37.2.239.
- Nkuringo Safaris (2021). *The History of Gorilla Tourism*. Entebbe, Uganda: Nkuringo Safaris Uganda Ltd. Available at: <https://www.nkuringosafaris.com/the-history-of-gorilla-tourism/>.

- Nobel, E., Rybicki, D. and Martin, S. (2020). Wallaby Airlines hops in to help evacuate endangered wildlife from ACT fires and hot weather. *ABC News*, February 10, 2020. Available at: <https://www.abc.net.au/news/2020-02-11/wallaby-airlines-hops-in-to-help-evacuate-endangered-wildlife/11949762>.
- Nolen, R.S. (2006). Gorilla conservation project takes “one-health” approach. Benefits extend beyond endangered apes. *Journal of the American Veterinary Medical Association*, **229**(10), 1546–8.
- Norder, H., Ebert, J.W., Fields, H.A., Mushahwar, I.K. and Magnius, L.O. (1996). Complete sequencing of a gibbon hepatitis B virus genome reveals a unique genotype distantly related to the chimpanzee hepatitis B virus. *Virology*, **218**(1), 214–23. DOI: 10.1006/viro.1996.0181.
- Normand, E. and Boesch, C. (2009). Sophisticated Euclidean maps in forest chimpanzees. *Animal Behaviour*, **77**(5), 1195–201. DOI: 10.1016/j.anbehav.2009.01.025.
- Nowak, M.G., Rianti, P., Wich, S.A., Meijaard, E. and Fredriksson, G.M. (2017). Pongo tapanuliensis. *The IUCN Red List of Threatened Species 2017: e.T120588639A120588662*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2017-3.RLTS.T120588639A120588662.en.
- NPA (2020). *Third National Development Plan (NDPIII) 2020/21–2024/25*. Kampala, Uganda: National Planning Authority (NPA).
- NSW Rural Fire Service (n.d.-a). *NSW Bushfire Prone Land*. Sydney, Australia: NSW Government. Available at: <https://datasets.seed.nsw.gov.au/dataset/bush-fire-prone-land>. Accessed: July, 2022.
- NSW Rural Fire Service (n.d.-b). *Standards for Asset Protection Zones*. Granville, Australia: NSW Rural Fire Service. Available at: https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf. Accessed: July, 2022.
- Numamaker, E.A., Lee, D.R. and Lammey, M.L. (2012). Chronic diseases in captive geriatric female chimpanzees (*Pan troglodytes*). *Comparative Medicine*, **62**(2), 131–6.
- Nunn, C. and Altizer, S. (2006). *Infectious Diseases in Primates: Behavior, Ecology and Evolution*. Oxford, UK: Oxford University Press. DOI: 10.1093/acprof:oso/9780198565857.001.0001.
- Nunn, C.L., Altizer, S., Jones, K.E. and Sechrest, W. (2003). Comparative tests of parasite species richness in primates. *The American Naturalist*, **162**(5), 597–614. DOI: 10.1086/378721.
- Nuno, A., Chesney, C., Wellbelove, M., et al. (2022). Protecting great apes from disease: compliance with measures to reduce anthroponotic disease transmission. *People and Nature*, **4**(5), 1387–400. DOI: 10.1002/pan3.10396.
- Nurchahyo, W., Konstanžová, V. and Foitová, I. (2017). Parasites of orangutans (primates: Ponginae): an overview. *American Journal of Primatology*, **79**(6), e22650. DOI: 10.1002/ajp.22650.
- Nutter, F.B. (1996). Respiratory disease claims the lives of at least seven Gombe chimps. *Pan Africa News*, **31**(3), 3. DOI: 10.5134/143337.
- Nutter, F.B., Whittier, C.A., Cranfield, M.R. and Lowenstine, L.J. (2005). Causes of death for mountain gorillas (*Gorilla beringei beringei* and *G. b. undecided*) from 1968–2004: an aid to conservation programs. Presented at: *Wildlife Health in a Shrinking World: Ecology, Management and Conservation. Proceedings of the Wildlife Disease Association International Conference, Cairns, Queensland, Australia, 26 June–1 July 2005*. Lawrence, KS: Wildlife Disease Association, pp. 200–1.
- Nyhus, P.J. (2016). Human–wildlife conflict and coexistence. *Annual Review of Environment and Resources*, **41**(1), 143–71. DOI: 10.1146/annurev-environ-110615-085634.
- O’Riordan, T. and Lenton, T., ed. (2013). *Addressing Tipping Points for a Precarious Future*. London, UK: British Academy. DOI: 10.5871/bacad/9780197265536.001.0001.
- Oates, J.F., Doumbe, O., Dunn, A., et al. (2016). Pan troglodytes ssp. ellioti. *The IUCN Red List of Threatened Species 2016: e.T40014A17990330*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T40014A17990330.en.
- Odhiambo, N.M. (2021). Health expenditure and economic growth in sub-Saharan Africa: an empirical investigation. *Development Studies Research*, **8**(1), 73–81. DOI: 10.1080/21665095.2021.1892500.
- Ogie, R.I., Forehead, H., Clarke, R.J. and Perez, P. (2018). Participation patterns and reliability of human sensing in crowd-sourced disaster management. *Information Systems Frontiers*, **20**(4), 713–28. DOI: 10.1007/s10796-017-9790-y.

- Ohashi, G. and Matsuzawa, T. (2011). Deactivation of snares by wild chimpanzees. *Primates*, **52**(1), 1–5. DOI: 10.1007/s10329-010-0212-8.
- OHHLEP, Adisasmito, W.B., Almuhairi, S., *et al.* (2022). One Health: a new definition for a sustainable and healthy future. *PLoS Pathogens*, **18**(6), e1010537. DOI: 10.1371/journal.ppat.1010537.
- Olhar Animal (2020). MP investiga fuga de chimpanzé que mobilizou 40 pessoas em zoológico de Sorocaba, SP. *Olhar Animal*, November 14, 2020. Available at: <https://olharanimal.org/mp-investiga-fuga-de-chimpanze-que-mobilizou-40-pessoas-em-zoologico-de-sorocaba-sp/>.
- Olival, K.J. and Hayman, D.T.S. (2014). Filoviruses in bats: current knowledge and future directions. *Viruses*, **6**(4), 1759–88.
- Ondoua, O.G., Beodo Moundjim, E., Mambo Marindo, J.C., *et al.* (2017). *An Assessment of Poaching and Wildlife Trafficking in the Garamba-Bili-Chinko Transboundary Landscape*. Cambridge, UK: TRAFFIC. Available at: <https://www.traffic.org/site/assets/files/1591/garamba-bili-chinko-xxs.pdf>.
- Ontl, K.M.B. (2017). *Chimpanzees in the Island of Gold: impacts of artisanal small-scale gold mining on chimpanzees (Pan troglodytes verus) in Fongoli, Senegal*. PhD thesis. Armes, IA: Iowa State University. DOI: 10.31274/etd-180810-5211.
- Oosterhoff, P., Mokuwa, E.Y. and Wilkinson, A. (2015). *Community-Based Ebola Care Centers: A Formative Evaluation*. Ebola Response Anthropology Platform. Available at: http://www.ebola-anthropology.net/wp-content/uploads/2015/07/Community-Based-Ebola-Care-Centres_A-Formative-Evaluation1.pdf.
- OpenStreetMap (n.d.). *OpenStreetMap*. Available at: <https://www.openstreetmap.org/#map=5/54.910/-3.432>. Accessed: October, 2021.
- Oppenheimer, P., Clarke, E., Cupit, O., *et al.* (2021). The SPOTT index: a proof-of-concept measure for tracking public disclosure in the palm oil industry. *Current Research in Environmental Sustainability*, **3**, 100042. DOI: 10.1016/j.crsust.2021.100042.
- Oram, F. (2018). *Abundance, feeding and behavioural ecology of orangutans (Pongo pygmaeus morio) in the fragmented forests of the Kinabatangan floodplain*. PhD thesis. Kota Kinabalu, Malaysia: Institute for Tropical Biology and Conservation, University Malaysia Sabah.
- Orams, M.B. (2002). Feeding wildlife as a tourism attraction: a review of issues and impacts. *Tourism Management*, **23**(3), 281–93. DOI: 10.1016/S0261-5177(01)00080-2.
- Orangutan Appeal UK (n.d.). *Sepilok Orangutan Rehabilitation Centre*. Orangutan Appeal UK. Available at: <https://www.orangutan-appeal.org.uk/about-us/sepilok-orangutan-rehabilitation-centre>. Accessed: October, 2020.
- Orangutan Foundation (2020). Great apes also under threat from COVID-19. *Orangutan Foundation*, March 27, 2020. Available at: <https://www.orangutan.org.uk/blog/great-apes-also-under-threat-from-covid-19>.
- Orangutan Foundation International (n.d.). *Orangutan Care Center and Quarantine*. Los Angeles, CA: Orangutan Foundation International. Available at: <https://orangutan.org/occq>. Accessed: October, 2020.
- Orenstein, W.A. and Ahmed, R. (2017). Simply put: vaccination saves lives. *Proceedings of the National Academy of Sciences*, **114**(16), 4031–3. DOI: 10.1073/pnas.1704507114.
- Osofsky, S. (2016). Plan it for the apes: sound science must inform any plans to vaccinate gorillas or chimps against Ebola. *LinkedIn: Pulse*, September 2020. Available at: <https://www.linkedin.com/pulse/plan-apes-sound-science-must-inform-any-plans-gorillas-steve-osofsky>.
- Ostrom, E. and Cox, M. (2010). Moving beyond panaceas: a multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, **37**(4), 451–63. DOI: 10.1017/S0376892910000834.
- Otsuka, R. and Yamakoshi, G. (2020). Analyzing the popularity of YouTube videos that violate mountain gorilla tourism regulations. *PLoS ONE*, **15**(5), e0232085. DOI: 10.1371/journal.pone.0232085.
- OVAG (2020a). *COVID-19 Pandemic Guidelines*. Orangutan Veterinary Advisory Group (OVAG) Non Human Primate COVID-19 Information Hub. Available at: <https://www.ovag.org/>.
- OVAG (2020b). *COVID-19 Preparedness and Response Plan*. Orangutan Veterinary Advisory Group (OVAG) Non Human Primate COVID-19 Information Hub. Available at: <https://www.ovag.org/>.
- OVAG (n.d.). *Orangutan Veterinary Advisory Group*. Orangutan Veterinary Advisory Group (OVAG). Available at: <https://www.ovag.org>. Accessed: November, 2022.

- Owens, L.A., Colitti, B., Hirji, I., *et al.* (2021). A *Sarcina* bacterium linked to lethal disease in sanctuary chimpanzees in Sierra Leone. *Nature Communications*, **12**(1), 763. DOI: 10.1038/s41467-021-21012-x.
- P-WAC (2020). Live Insta avec Maurice Barthélémy. *Facebook Post*, April 2, 2020. Available at: <https://web.facebook.com/239308109568845/videos/678742962887867/>.
- Palacios, G.F., Lowenstine, L.J., Cranfield, M.R., *et al.* (2011). Human metapneumovirus infection in wild mountain gorillas, Rwanda. *Emerging Infectious Diseases*, **17**(4), 711–13.
- Pallisco (2019). *Pallisco Wildlife Team Annual Report 2019*. Internal company document seen by authors. Douala, Cameroon: Pallisco and CIFM.
- Palmer, A. (2018). Kill, incarcerate, or liberate? Ethics and alternatives to orangutan rehabilitation. *Biological Conservation*, **227**, 181–8. DOI: 10.1016/j.biocon.2018.09.012.
- Palmer, A. (2020). *Ethical Debates in Orangutan Conservation*. London, UK: Routledge. DOI: 10.4324/9780429060533.
- Palmer, C. (2010). *Animal Ethics in Context*. New York, NY: Columbia University Press.
- Palombit, R.A. (1992). *Pair bonds and monogamy in wild siamang (Hylobates syndactylus) and white-handed gibbon (Hylobates lar) in northern Sumatra*. PhD thesis. Davis, CA: University of California Davis.
- Palombit, R.A. (1994). Dynamic pair bonds in Hylobatids: implications regarding monogamous social systems. *Behaviour*, **128**(1), 65–101. DOI: 10.1163/156853994X00055.
- Palombit, R.A. (1997). Inter- and intraspecific variation in the diets of sympatric siamang (*Hylobates syndactylus*) and Lar gibbons (*Hylobates lar*). *Folia Primatologica*, **68**(6), 321–37. DOI: 10.1159/000157260.
- Panayotova-Pencheva, M.S. (2013). Parasites in captive animals: a review of studies in some European zoos. *Der Zoologische Garten*, **82**(1), 60–71. DOI: 10.1016/j.zoolgart.2013.04.005.
- PanEco (2020). *PanEco Foundation Annual Report 2019*. Berg am Irchel, Switzerland: PanEco Foundation. Available at: https://issuu.com/stiftungpaneco1/docs/engl_paneco_annual_report_2019_web_single_pages_2.
- Parc National des Virungas (n.d.). *Mountain Gorilla Sanctuary*. Virungas, DRC: Parc National des Virungas. Available at: <https://virunga.org/wildlife/primates/mountain-gorillas/gorilla-orphans/>. Accessed: October, 2022.
- Park, C. (2022). Lessons learned from the World Health Organization's late initial response to the 2014–2016 Ebola outbreak in West Africa. *Journal of Public Health in Africa*, **13**(1), 1254. DOI: 10.4081/jphia.2022.1254.
- Parsons, M.B., Gillespie, T.R., Lonsdorf, E.V., *et al.* (2014). Global positioning system data-loggers: a tool to quantify fine-scale movement of domestic animals to evaluate potential for zoonotic transmission to an endangered wildlife population. *PLoS ONE*, **9**(11), e110984. DOI: 10.1371/journal.pone.0110984.
- Parsons, M.B., Travis, D., Lonsdorf, E.V., *et al.* (2015). Epidemiology and molecular characterization of *Cryptosporidium* spp. in humans, wild primates, and domesticated animals in the Greater Gombe Ecosystem, Tanzania. *PLoS Neglected Tropical Diseases*, **9**(2), e0003529. DOI: 10.1371/journal.pntd.0003529.
- Parsons, M.B., Travis, D.A., Lonsdorf, E.V., *et al.* (2021). Antimicrobial resistance creates threat to chimpanzee health and conservation in the wild. *Pathogens*, **10**(4), 477. DOI: 10.3390/pathogens10040477.
- PASA (2009). *Primate Veterinary Manual*, 2nd edn. Portland, OR: Pan African Sanctuary Alliance (PASA). Available at: https://pasa.org/wp-content/uploads/2016/05/PASA_Vet_Manual_2009_2nd_ed_677pp.pdf.
- PASA (2016). *Operations Manual*, 2nd edn, December 2016. Portland, OR: Pan African Sanctuary Alliance (PASA). Available at: https://pasa.org/wp-content/uploads/2016/04/PASA_Operations_Manual_2016.pdf.
- PASA (n.d.-a). *Donate to Drill Ranch*. Beaverton, OR: Pan African Sanctuary Alliance (PASA). Available at: <https://pasa.org/donate-to-drill-ranch/>. Accessed: October, 2020.
- PASA (n.d.-b). *Pan African Sanctuary Alliance*. Beaverton, OR: Pan African Sanctuary Alliance (PASA). Available at: <https://pasa.org>. Accessed: November, 2022.
- Patrono, L.V., Pléh, K., Samuni, L., *et al.* (2020). Monkeypox virus emergence in wild chimpanzees reveals distinct clinical outcomes and viral diversity. *Nature Microbiology*, **5**(7), 955–65. DOI: 10.1038/s41564-020-0706-0.
- Patrono, L.V., Röhemeier, C., Kouadio, L., *et al.* (2022). Non-invasive genomics of respiratory pathogens infecting wild great apes using hybridisation capture. *Influenza and Other Respiratory Viruses*, **16**(5), 858–61.
- Patrono, L.V., Samuni, L., Corman, V.M., *et al.* (2018). Human coronavirus OC43 outbreak in wild chimpanzees, Côte d'Ivoire, 2016. *Emerging Microbes & Infections*, **7**(1), 2–5. DOI: 10.1038/s41426-018-0121-2.

- Patz, J.A., Daszak, P., Tabor, G.M., *et al.* (2004). Unhealthy landscapes: policy recommendations on land use change and infectious disease emergence. *Environmental Health Perspectives*, **112**(10), 1092–8. DOI: 10.1289/ehp.6877.
- Pauly, B.M., Varcoe, C. and Storch, J. (2012). Framing the issues: moral distress in health care. *HEC Forum*, **24**(1), 1–11. DOI: 10.1007/s10730-012-9176-y.
- Payne, J. (1988). *Orang-utan Conservation in Sabah. Report 3759*. Kuala Lumpur, Malaysia: World Wide Fund for Nature (WWF), Malaysia International.
- PCI (2022). *Reputational Risk Assessment for Animal Sanctuaries and Crisis Communications Planning Workbook*. Chicago, IL: Public Communications Inc (PCI). Available at: <https://www.pcipr.com/resources-download/>.
- Peacock, L.J. and Rogers, C.M. (1959). Gestation period and twinning in chimpanzees. *Science*, **129**(3354), 959. DOI: 10.1126/science.129.3354.959.
- Pearlman, L.A. and Saakvitne, K.W. (1995). Treating therapists with vicarious traumatization and secondary traumatic stress disorders. In *Compassion Fatigue: Coping with Secondary Traumatic Stress Disorder in those who Treat the Traumatized*. Philadelphia, PA: Brunner/Mazel, pp. 150–77.
- Pedersen, J., Sorensen, K., Lupo, B. and Marx, L. (2019). Human–ape interactions in a zoo setting: gorillas and orangutans modify their behavior depending upon human familiarity. *Anthrozoös*, **32**(3), 319–32. DOI: 10.1080/08927936.2019.1598651.
- Pederson, A.K., King, J.E. and Landau, V.I. (2005). Chimpanzee (*Pan troglodytes*) personality predicts behavior. *Journal of Research in Personality*, **39**(5), 534–49. DOI: 10.1016/j.jrjp.2004.07.002.
- Pence, D.B. and Ueckermann, E.A. (2002). Sarcoptic mange in wildlife. *Revue Scientifique et Technique de l'Office International des Épizooties*, **21**(2), 385–98.
- Penner, L.R. (1981). Concerning threadworm (*Strongyloides stercoralis*) in great apes: lowland gorillas (*Gorilla gorilla*) and chimpanzees (*Pan troglodytes*). *Journal of Zoo Animal Medicine*, **12**(4), 128–31. DOI: 10.2307/20094543.
- Pepin, J. (2021). *The Origins of AIDS*, 2nd edn. Cambridge, UK: Cambridge University Press. DOI: 10.1017/9781108767019.
- PETA [People for the Ethical Treatment of Animals] (2020). Victory for animal rights groups in “USDA blackout” lawsuits. *PeTA News Releases* July 20, 2020. Available at: <https://www.peta.org/media/news-releases/victory-for-animal-rights-groups-in-usda-blackout-lawsuits/>.
- Peters, J.C. (1966). An epizootic of monkey pox at Rotterdam Zoo. *International Zoo Yearbook*, **6**(1), 274–5. DOI: 10.1111/j.1748-1090.1966.tb01794.x.
- Petrovan, S.O., Junker, J., Wordley, C.F.R., *et al.* (2018). Evidence-based synopsis of interventions, a new tool in primate conservation and research. *International Journal of Primatology*, **39**(1), 1–4. DOI: 10.1007/s10764-018-0017-y.
- Phalan, B., Hayes, G., Brooks, S., *et al.* (2018). Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *Oryx*, **52**(2), 316–24. DOI: 10.1017/S0030605316001034.
- Phelps, J., Aravind, S., Cheyne, S., *et al.* (2021a). Environmental liability litigation could remedy biodiversity loss. *Conservation Letters*, **14**(6), e12821. DOI: 10.1111/conl.12821.
- Phelps, J., Fajrini, R., Nagara, G. and Saputra, R. (2021b). *Pioneering Civil Lawsuits for Harm to Threatened Species: A Guide to Claims with Examples from Indonesia*. UK AID, Lancaster University, Indonesian Environmental Law Institute, Auriga Nusantara, LIPI. Available at: <https://www.conservation-litigation.org/resources>.
- Phelps, J., Fajrini, R., Nagara, G. and Saputra, R. (2021c). *Policy Brief: Civil Lawsuits: A Novel Response to Illegal Wildlife Trade*. UK AID, Lancaster University, Indonesian Environmental Law Institute, Auriga Nusantara, LIPI. Available at: <https://www.conservation-litigation.org/resources>.
- Phelps, K.L. and Kingston, T. (2018). Environmental and biological context modulates the physiological stress response of bats to human disturbance. *Oecologia*, **188**(1), 41–52. DOI: 10.1007/s00442-018-4179-2.
- Philippa, J. and Dench, R.J. (2019). Infectious diseases of orangutans in their home ranges and in zoos. In *Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 9*, ed. R. E. Miller, N. Lamberski and P. Calle. St Louis, MO: Elsevier, pp. 565–73.
- Pierce, J. and Bekoff, M. (2018). A postzoo future: why welfare fails animals in zoos. *Journal of Applied Animal Welfare Science*, **21**(S1), 43–8. DOI: 10.1080/10888705.2018.1513838.

- Pigott, D.M., Golding, N., Mylne, A., *et al.* (2014). Mapping the zoonotic niche of Ebola virus disease in Africa. *eLife*, **3**, e04395. DOI: 10.7554/eLife.04395.
- Pigott, D.M., Millea, A.I., Earl, L., *et al.* (2016). Updates to the zoonotic niche map of Ebola virus disease in Africa. *eLife*, **5**, e16412. DOI: 10.7554/eLife.16412.
- Pinillos, R.G., Appleby, M.C., Manteca, X., *et al.* (2016). One Welfare: a platform for improving human and animal welfare. *Veterinary Record*, **179**(16), 412–13. DOI: 10.1136/vr.i5470.
- Plantier, J.C., Leoz, M., Dickerson, J.E., *et al.* (2009). A new human immunodeficiency virus derived from gorillas. *Nature Medicine*, **15**(8), 871–2. DOI: 10.1038/nm.2016.
- Plowright, R.K., Peel, A.J., Streicker, D.G., *et al.* (2016). Transmission or within-host dynamics driving pulses of zoonotic viruses in reservoir–host populations. *PLoS Neglected Tropical Diseases*, **10**(8), e0004796. DOI: 10.1371/journal.pntd.0004796.
- Plowright, R.K., Sokolow, S.H., Gorman, M.E., Daszak, P. and Foley, J.E. (2008). Causal inference in disease ecology: investigating ecological drivers of disease emergence. *Frontiers in Ecology and the Environment*, **6**(8), 420–9. DOI: 10.1890/070086.
- Plumptre, A., Hart, J.A., Hicks, T.C., *et al.* (2016a). Pan troglodytes *ssp.* schweinfurthii (*errata version published in 2016*). *The IUCN Red List of Threatened Species 2016: e.T15937A102329417*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T15937A17990187.en.
- Plumptre, A., Kayitare, A., Rainer, H., *et al.* (2004). *The Socio-Economic Status of People Living Near Protected Areas in the Central Albertine Rift*. Albertine Technical Reports 4. Wildlife Conservation Society (WCS), International Gorilla Conservation Programme (IGCP) and CARE International.
- Plumptre, A.J., Kirkby, A., Spira, C., *et al.* (2021). Changes in Grauer's gorilla (*Gorilla beringei graueri*) and other primate populations in the Kahuzi-Biega National Park and Oku Community Reserve, the heart of Grauer's gorilla global range. *American Journal of Primatology*, **83**(7), e23288. DOI: 10.1002/ajp.23288.
- Plumptre, A., Nixon, S., Caillaud, D., *et al.* (2016b). Gorilla beringei *ssp.* graueri (*errata version published in 2016*). *The IUCN Red List of Threatened Species 2016: e.T39995A102328430*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2016-2.RLTS.T39995A17989838.en.
- Plumptre, A., Robbins, M.M. and Williamson, E.A. (2019). Gorilla beringei. *The IUCN Red List of Threatened Species 2019: e.T39994A115576640*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2019-1.RLTS.T39994A115576640.en.
- Plumptre, A.J., Rose, R., Nangendo, G., *et al.* (2010). *Eastern Chimpanzee (Pan troglodytes schweinfurthii): Status Survey and Conservation Action Plan 2010–2020*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). Available at: <https://portals.iucn.org/library/sites/library/files/documents/2010-023.pdf>.
- Plumptre, A.J. and Williamson, E.A. (2001). Conservation-oriented research in the Virunga region. In *Mountain Gorillas: Three Decades of Research at Karisoke*, ed. K. J. Stewart, M. M. Robbins and P. Sicotte. Cambridge, UK: Cambridge University Press, pp. 361–90. DOI: 10.1017/CBO9780511661631.015.
- PMP (n.d.). *Primate Microbiome Project*. Primate Microbiome Project (PMP). Available at: <https://www.primatemicrobiome.org/>. Accessed: September, 2022.
- Polygeia (2016). *Lessons from Ebola Affected Communities: Being Prepared for Future Health Crises*. London, UK: Africa All Party Parliamentary Group (Africa APPG). Available at: <https://research.monash.edu/en/publications/lessons-from-ebola-affected-communities-being-prepared-for-future>.
- Pomerantz, O. and Terkel, J. (2009). Effects of positive reinforcement training techniques on the psychological welfare of zoo-housed chimpanzees (*Pan troglodytes*). *American Journal of Primatology*, **71**(8), 687–95. DOI: 10.1002/ajp.20703.
- Pontzer, H., Brown, M.H., Raichlen, D.A., *et al.* (2016). Metabolic acceleration and the evolution of human brain size and life history. *Nature*, **533**(7603), 390–2. DOI: 10.1038/nature17654.
- Potapov, P., Hansen, M.C., Laestadius, L., *et al.* (2017). The last frontiers of wilderness: tracking loss of intact forest landscapes from 2000 to 2013. *Science Advances*, **3**(1), e1600821. DOI: 10.1126/sciadv.1600821.
- Power, M. (1986). The foraging adaptation of chimpanzees, and the recent behaviors of the provisioned apes in Gombe and Mahale National Parks, Tanzania. *Human Evolution*, **1**(3), 251–65. DOI: 10.1007/BF02436583.

- Pozo, A.A. (2020). Las multas por maltrato animal en Castilla-La Mancha se multiplican por diez tras renovar su ley de hace 30 años. *El Diario.es*, August 3, 2020. Available at: https://www.eldiario.es/castilla-la-mancha/multas-maltrato-animal-castilla-multiplican-diez-ley-30-anos_1_6144274.html.
- Prado-Martinez, J., Sudmant, P.H., Kidd, J.M., *et al.* (2013). Great ape genetic diversity and population history. *Nature*, **499**(7459), 471–5. DOI: 10.1038/nature12228.
- Prak, D. (2020). Association Papaye International. *LinkedIn*, September 17, 2020. Available at: https://www.linkedin.com/pulse/papaye-nternational-doroth%25C3%25A9e-prak?fbclid=IwARodffPpQXETU8-pLVVQS6H-6FCUU7_HhdJUhGusFeMmcPwvfydFc8i6BME.
- Prasetyo, D., Ancrenaz, M., Morrogh-Bernard, H.C., *et al.* (2009). Nest building in orangutans. In *Geographic Variation in Behavioral Ecology and Conservation*, ed. S. Wich, S. Utami, T. Setia and C. van Schaik. Oxford, UK: Oxford University Press, pp. 269–78.
- Prinz, J. (2007). *The Emotional Construction of Morals*. Oxford, UK: Oxford University Press.
- Prisner-Levyne, Y. (2020). Trophy hunting, canned hunting, tiger farming, and the questionable relevance of the conservation narrative grounding international wildlife law. *Journal of International Wildlife Law & Policy*, **23**(4), 239–85. DOI: 10.1080/13880292.2020.1866236.
- Project Chimps (2020). *Dr Steve Ross' Project ChimpCARE Chimpanzee Welfare Assessment and Project Chimps' Response*. Morganton, GA: Project Chimps. Available at: <https://projectchimps.org/wp-content/uploads/2020/11/Ross-Assessment-Response-Final.pdf>.
- Projet Gorille Fernan-Vaz (n.d.). *Our Gorillas*. Omboué, Gabon: Projet Gorille Fernan-Vaz. Available at: <https://gorillasgabon.org/gorillas/our-gorillas/>. Accessed: October, 2020.
- Pruetz, J.D. and Bertolani, P. (2009). Chimpanzee (*Pan troglodytes verus*) behavioral responses to stresses associated with living in a savanna-mosaic environment: Implications for hominin adaptations to open habitats. *PaleoAnthropology*, 252–62.
- Pruetz, J.D. and Herzog, N.M. (2017). Savanna chimpanzees at Fongoli, Senegal, navigate a fire landscape. *Current Anthropology*, **58**(S16), S337–50. DOI: 10.1086/692112.
- Pusey, A.E., Wilson, M.L. and Collins, D.A. (2008). Human impacts, disease risk, and population dynamics in the chimpanzees of Gombe National Park, Tanzania. *American Journal of Primatology*, **70**(8), 738–44. DOI: 10.1002/ajp.20567.
- Qin, S., Golden Kroner, R.E., Cook, C., *et al.* (2019). Protected area downgrading, downsizing, and degazettement as a threat to iconic protected areas. *Conservation Biology*, **33**(6), 1275–85. DOI: 10.1111/cobi.13365.
- QRA (2011). *Rebuilding Grantham Together*. Brisbane, Australia: Queensland Reconstruction Authority (QRA). Available at: <https://www.qra.qld.gov.au/news-case-studies/case-studies/case-study-rebuilding-grantham-together-2011>.
- Quick, J., Loman, N.J., Duraffour, S., *et al.* (2016). Real-time, portable genome sequencing for Ebola surveillance. *Nature*, **530**(7589), 228–32. DOI: 10.1038/nature16996.
- Quijano, L., Keeney, A., Schnackenberg, D., *et al.* (2016). *Creating a Community Animal Disaster Plan: A Step-By-Step Guide to Building an Animal Disaster Plan and Developing the Necessary Response Capacity for Your Community*. Fort Collins, CO: Colorado State University. Available at: <https://hdl.handle.net/10217/198690>.
- Rabinowitz, P.M., Pappaioanou, M., Bardosh, K.L. and Conti, L. (2018). A planetary vision for one health. *BMJ Global Health*, **3**(5), e001137. DOI: 10.1136/bmjgh-2018-001137.
- Rack, J., Wichmann, O., Kamara, B., *et al.* (2005). Risk and spectrum of diseases in travelers to popular tourist destinations. *Journal of Travel Medicine*, **12**(5), 248–53. DOI: 10.2310/7060.2005.12502.
- Radonić, A., Metzger, S., Dabrowski, P.W., *et al.* (2014). Fatal monkeypox in wild-living sooty mangabey, Côte d'Ivoire, 2012. *Emerging Infectious Diseases*, **20**(6), 1009–11. DOI: 10.3201/eid2006.13-1329.
- Rainer, H., Lanjouw, A., Llano Sánchez, K. and Banes, G.L. (2020). Drivers of the illegal trade in great apes. In *State of the Apes: Killing, Capture, Trade and Conservation*, ed. Arcus Foundation. Cambridge UK: Cambridge University Press, pp. 96–129. Available at: <https://www.stateoftheapes.com/volume-4-killing-capture-trade/>.
- Rainfer (n.d.). *Los Primates*. Madrid, Spain: Centro de Rescate de Primates Rainfer. Available at: <http://rainfer.org/los-primates-2/>. Accessed: October, 2020.

- Rakotonanahary, R.J.L., Andriambolamanana, H., Razafinjato, B., *et al.* (2021). Integrating health systems and science to respond to COVID-19 in a model district of rural Madagascar. *Frontiers in Public Health*, **9**, July 21, 2021. DOI: 10.3389/fpubh.2021.654299.
- Ramsay, E.C., Stair, E.L., Castro, A.E. and Marks, M.I. (1982). Fatal herpesvirus hominis encephalitis in a white-handed gibbon. *Journal of the American Veterinary Medical Association*, **181**(11), 1429–30.
- Rasmussen, E.B., Newland, M.C. and Hemmelman, E. (2020). The relevance of operant behavior in conceptualizing the psychological well-being of captive animals. *Perspectives on Behavior Science*, **43**(3), 617–54.
- Razanatsoa, E., Andriantsaralaza, S., Holmes, S.M., *et al.* (2021). Fostering local involvement for biodiversity conservation in tropical regions: lessons from Madagascar during the COVID-19 pandemic. *Biotropica*, **53**(4), 994–1003. DOI: 10.1111/btp.12967.
- Read, J. (2020). Uganda reopens with extra Covid precautions to protect its mountain gorillas. *Forbes*, October 5, 2020. Available at: <https://www.forbes.com/sites/johannaread/2020/10/05/uganda-reopens-with-extra-covid-precautions-to-protect-its-mountain-gorillas/?sh=32518443efea>.
- Reddacliff, L.A., Kirkland, P.D., Hartley, W.J. and Reece, R.L. (1997). Encephalomyocarditis virus infections in an Australian Zoo. *Journal of Zoo and Wildlife Medicine*, **28**(2), 153–7.
- Redshaw, S., Ingham, V., Hicks, J. and Millynn, J. (2017). Emergency preparedness through community sector engagement in the Blue Mountains. *Australian Journal of Emergency Management*, **32** (2), 35–40. DOI: <https://knowledge.aidr.org.au/media/3657/ajem-32-02-17.pdf>.
- Refisch, J. (2021). COVID-19, climate change threaten last refuge of the mountain gorilla. *UN Environment Programme News and Stories*, September 23, 2021. Available at: <https://www.unep.org/news-and-stories/story/covid-19-climate-change-threaten-last-refuge-mountain-gorilla>.
- Refisch, J. and Jenson, J. (2016). Transboundary collaboration in the Greater Virunga Landscape: from gorilla conservation to conflict-sensitive transboundary landscape management. In *Governance, Natural Resources and Post-Conflict Peacebuilding*, ed. C. Bruch, C. Muffett and S. Nichols. London, UK: Routledge, pp. 825–41. Available at: <https://www.taylorfrancis.com/chapters/edit/10.4324/9780203109793-39/transboundary-collaboration-greater-virunga-landscape-gorilla-conservation-conflict-sensitive-transboundary-landscape-management-johannes-refisch-johann-jenson>.
- Reichard, U. (1995). Extra-pair copulations in a monogamous gibbon (*Hylobates lar*). *Ethology*, **100**(2), 99–112. DOI: 10.1111/j.1439-0310.1995.tb00319.x.
- Reid, M.J.C. (2020). Is 2020 the year when primatologists should cancel fieldwork? *American Journal of Primatology*, **82**(8), e23161. DOI: 10.1002/ajp.23161.
- Reinartz, G., Ingmanson, E.J. and Vervaecke, H. (2013). *Pan paniscus gracile* chimpanzee (bonobo, pygmy chimpanzee). In *Mammals of Africa. Volume II: Primates*, ed. T. M. Butynski, J. Kingdon and J. Kalina. London, UK: Bloomsbury Publishing, pp. 64–9.
- ReliefWeb (2015). *Joint Statement on Ebola Response and WHO Reforms*. Geneva, Switzerland: United Nations Office for the Coordination of Humanitarian Affairs (OCHA). Available at: <https://reliefweb.int/report/sierra-leone/joint-statement-ebola-response-and-who-reforms>.
- Research Animal Resources (n.d.). *Anesthesia Guidelines: Non-Human Primates*. St Paul, MN: University of Minnesota. Available at: <https://research.umn.edu/units/rar/guidelines/anesthesia-non-human-primates>. Accessed: May, 2023.
- Resolute (2019). *Mine Gold. Create Value. 2019 Annual Report*. Perth, Australia: Resolute Mining Ltd. Available at: <https://www.rml.com.au/investors/reports/annual-reports/>.
- ResponsibleSteel (2022). *ResponsibleSteel International Standard: Version 2.0*. Newcastle West, Australia: ResponsibleSteel. Available at: <https://www.responsiblesteel.org/wp-content/uploads/2022/09/ResponsibleSteel-Standard-2.0.pdf>.
- Reuter, K.E., Andriantsaralaza, S., Hansen, M.F., *et al.* (2022). Impact of the COVID-19 pandemic on primate research and conservation. *Animals*, **12**(9), 1214. DOI: 10.3390/ani12091214.
- Reuters and Gorman, S. (2021). Gorillas at San Diego Zoo Safari Park diagnosed with COVID-19. *Reuters*, January 11, 2021. Available at: <https://www.reuters.com/business/healthcare-pharmaceuticals/two-gorillas-san-diego-zoo-test-positive-covid-19-2021-01-11/>.

- Reuters Staff (2021). Gorilla loses appetite, lions develop cough after catching COVID-19 at Prague Zoo. *Reuters*, February 25, 2021. Available at: <https://www.reuters.com/article/us-health-coronavirus-czech-zoo-idUSKBN2AP2GI>.
- Richards, P. (2016). *Ebola: How a People's Science Helped End an Epidemic*. London, UK: Zed Books. DOI: 10.5040/9781350219779.
- Richardson, H. (2021). For Africa's great apes, a post pandemic future looks beyond tourism. *Mongabay*, June 9, 2021. Available at: <https://news.mongabay.com/2021/06/for-africas-great-apes-a-post-pandemic-future-looks-beyond-tourism>.
- Richeson, J.T., Hughes, H.D., Broadway, P.R. and Carroll, J.A. (2019). Vaccination management of beef cattle: delayed vaccination and endotoxin stacking. *Veterinary Clinics of North America: Food Animal Practice*, **35**(3), 575–92. DOI: 10.1016/j.cvfa.2019.07.003.
- Rideout, B.A., Gardiner, C., Stalis, I.H., et al. (1997). Fatal Infections with *Balamuthia mandrillaris* (a free-living amoeba) in gorillas and other Old World primates. *Veterinary Pathology*, **34**(1), 15–22. DOI: 10.1177/030098589703400103.
- Riede, T., Tokuda, I.T., Munger, J.B. and Thomson, S.L. (2008). Mammalian laryngeal air sacs add variability to the vocal tract impedance: physical and computational modeling. *Journal of the Acoustical Society of America*, **124**(1), 634–47. DOI: 10.1121/1.2924125.
- Rietkerk, F. and Pereboom, J.J.M. (2018). Editorial: Conservation of great apes. Zoo contributions towards improving management and well-being of great apes: augmenting knowledge to safeguard our closest relative. *International Zoo Yearbook*, **52**(1), 9–15. DOI: 10.1111/izy.12202.
- Rijksen, H.D. (1978). *A field study on Sumatran orangutans (Pongo pygmaeus abelii Lesson 1827)*. *Ecology, behaviour and conservation*. PhD thesis. Wageningen, the Netherlands: Nature Conservation Department, Agricultural University Wageningen. Available at: <https://library.wur.nl/WebQuery/wurpubs/fulltext/209957>.
- Rijksen, H.D. and Meijaard, E. (1999). *Our Vanishing Relative? The Status of Wild Orangutans at the Close of the Twentieth Century*. Dordrecht, the Netherlands: Kluwer Academic.
- Rima, B., Collins, P., Easton, A., et al. (2017). ICTV virus taxonomy profile: Pneumoviridae. *Journal of General Virology*, **98**(12), 2912–13. DOI: 10.1099/jgv.0.000959.
- Ringer, G.D. (2002). Gorilla tourism: Uganda uses tourism to recover from decades of violent conflict. *Alternatives Journal: Canadian Environmental Ideas and Action*, **28**(4), 16–19.
- Rio Tinto Simfer S.A. (2012a). *Simandou Social and Environmental Impact Assessment (SEIA)*. Volume I. Mine. Chapter 1: Introduction. Conakry, Republic of Guinea, and London, UK: Rio Tinto Simfer S.A. Available at: https://icsid.worldbank.org/sites/default/files/parties_publications/C3765/Respondent%27s%20Counter-Memorial/Pi%C3%A8ces%20factuelles/R-0140.pdf.
- Rio Tinto Simfer S.A. (2012b). *Simandou Social and Environmental Impact Assessment (SEIA)*. Volume V. Social and Environmental Management Plan. Conakry, Republic of Guinea, and London, UK: Rio Tinto Simfer S.A.
- Rioja-Lang, F., Bacon, H., Connor, M. and Dwyer, C.M. (2020a). Prioritisation of animal welfare issues in the UK using expert consensus. *Veterinary Record*, **187**(12), 490. DOI: 10.1136/vr.105964.
- Rioja-Lang, F.C., Connor, M., Bacon, H.J., Lawrence, A.B. and Dwyer, C.M. (2020b). Prioritization of farm animal welfare issues using expert consensus. *Frontiers in Veterinary Science*, **6**, 495. DOI: 10.3389/fvets.2019.00495.
- Riva, H.G., Zordan, M.A. and Sánchez, C.R. (2020). The current state of zoological medicine in zoos and aquariums in Latin America. *International Zoo Yearbook*, **54**(1), 202–18. DOI: 10.1111/izy.12251.
- Rivas, M.L., Albion, I., Bernal, B., et al. (2022). The plastic pandemic: COVID-19 has accelerated plastic pollution, but there is a cure. *Science of The Total Environment*, **847**, 157555. DOI: 10.1016/j.scitotenv.2022.157555.
- Rivera, S.N., Knight, A. and McCulloch, S.P. (2021). Surviving the wildlife trade in Southeast Asia: reforming the “disposal” of confiscated live animals under CITES. *Animals*, **11**(2), 439. DOI: 10.3390/ani11020439.
- RNZ (2020). Covid impact: Auckland Zoo receives almost \$3m from government. *RNZ [Radio New Zealand]*, September 27, 2020. Available at: <https://www.rnz.co.nz/news/national/427019/covid-impact-auckland-zoo-receives-almost-3m-from-government>.
- Robbins, A.M., Manguette, M.L., Breuer, T., et al. (2022). Population dynamics of western gorillas at Mbeli Bai. *PLoS ONE*, **17**(10), e0275635. DOI: 10.1371/journal.pone.0275635.

- Robbins, A.M., Stoinski, T., Fawcett, K. and Robbins, M.M. (2011a). Lifetime reproductive success of female mountain gorillas. *American Journal of Physical Anthropology*, **146**(4), 582–93. DOI: 10.1002/ajpa.21605.
- Robbins, M.M. (2011). Gorillas: diversity in ecology and behavior. In *Primates in Perspective*, ed. C. J. Campbell, A. Fuentes, K. C. MacKinnon, S. Bearder and R. M. Stumpf. Oxford, UK: Oxford University Press, pp. 326–39.
- Robbins, M.M. (2021). Assessing attitudes towards gorilla conservation via employee interviews. *American Journal of Primatology*, **83**(4), e23191. DOI: 10.1002/ajp.23191.
- Robbins, M.M. and Boesch, C., ed. (2011). *Among African Apes: Stories and Photos from the Field*. Berkeley, CA: University of California Press.
- Robbins, M.M. and Robbins, A.M. (2018). Variation in the social organization of gorillas: life history and socio-ecological perspectives. *Evolutionary Anthropology: Issues, News, and Reviews*, **27**, 218–33. DOI: 10.1002/evan.21721.
- Robbins, M.M., Gray, M., Fawcett, K.A., et al. (2011b). Extreme conservation leads to recovery of the Virunga mountain gorillas. *PLoS ONE*, **6**(6), 1–10. DOI: 10.1371/journal.pone.0019788.
- Robbins, M.M., Gray, M., Kagoda, E. and Robbins, A.M. (2009). Population dynamics of the Bwindi mountain gorillas. *Biological Conservation*, **142**(12), 2886–95. DOI: 10.1016/j.biocon.2009.07.010.
- Robbins, M.M., Ortman, S. and Seiler, N. (2022). Dietary variability of western gorillas (*Gorilla gorilla gorilla*). *PLoS ONE*, **17**(8), e0271576. DOI: 10.1371/journal.pone.0271576.
- Roberts, L. (2019). A prescription for Madagascar's broken health system: data and a focus on details. *Science Magazine*, February 18, 2019. Available at: <https://www.sciencemag.org/news/2019/02/prescription-madagascar-s-broken-health-system-data-and-focus-details>.
- Robertson, B.H. and Margolis, H.S. (2002). Primate hepatitis B viruses – genetic diversity, geography and evolution. *Reviews in Medical Virology*, **12**(3), 133–41. DOI: 10.1002/rmv.348.
- Robins, J.G., Husson, S., Fahrni, A., et al. (2019). Implanted radio telemetry in orangutan reintroduction and post-release monitoring and its application in other ape species. *Frontiers in Veterinary Science*, **6**, 111. DOI: 10.3389/fvets.2019.00111.
- Robson, S.L. and Wood, B. (2008). Hominin life history: reconstruction and evolution. *Journal of Anatomy*, **212**(4), 394–425. DOI: 10.1111/j.1469-7580.2008.00867.x.
- Rodriguez, M., Pascual, M., Wingard, J., et al. (2019). *Legal Protection of Great Apes & Gibbons: Compilation of Country Profiles for 17 Range Countries*. Missoula, MT: Legal Atlas, LLC. DOI: 10.13140/RG.2.2.13189.88800.
- Rodriguez-Morales, A.J. and Schlagenhauf, P. (2014). Zoonoses and travel medicine: “one world – one health”. *Travel Medicine and Infectious Disease*, **12**(6, Part A), 555–6. DOI: 10.1016/j.tmaid.2014.11.003.
- Roe, D. and Booker, F. (2019). Engaging local communities in tackling illegal wildlife trade: a synthesis of approaches and lessons for best practice. *Conservation Science and Practice*, **1**(5), e26. DOI: 10.1111/csp2.26.
- Roe, D. and Urquhart, P. (2001). Pro-poor tourism: harnessing the world's largest industry for the world's poor. Presented at: *World Summit on Sustainable Development, Johannesburg, South Africa*. International Institute for Environment and Development (IIED) in collaboration with the Regional and International Networking Group (RING).
- Roger, F., Caron, A., Morand, S., et al. (2016). One Health and EcoHealth: the same wine in different bottles? *Infection Ecology & Epidemiology*, **6**(1), 30978. DOI: 10.3402/iee.v6.30978.
- Rohr, J.R., Barrett, C.B., Civitello, D.J., et al. (2019). Emerging human infectious diseases and the links to global food production. *Nature Sustainability*, **2**(6), 445–56. DOI: 10.1038/s41893-019-0293-3.
- Romero, L.M., Dickens, M.J. and Cyr, N.E. (2009). The reactive scope model – a new model integrating homeostasis, allostasis, and stress. *Hormones and Behavior*, **55**(3), 375–89. DOI: 10.1016/j.yhbeh.2008.12.009.
- Romero, L.M. and Wingfield, J.C. (2015). *Tempests, Poxes, Predators, and People: Stress in Wild Animals and How They Cope*. Oxford, UK: Oxford University Press. DOI: 10.1093/acprof:oso/9780195366693.001.0001.
- Romero-Alvarez, D., Peterson, A.T., Salzer, J.S., et al. (2020). Potential distributions of *Bacillus anthracis* and *Bacillus cereus* biovar *anthracis* causing anthrax in Africa. *PLoS Neglected Tropical Diseases*, **14**(3), e0008131. DOI: 10.1371/journal.pntd.0008131.
- Ronfot, D. (2016). *Animals in limbo: the importance of recognizing welfare of confiscated wild animals. An investigation in Thai governmental wildlife confiscation facilities*. MA thesis. Exeter, UK: University of Exeter.

- Rose, A.L. (2011). Bonding, biophilia, biosynergy, and the future of primates in the wild. *American Journal of Primatology*, **73**(3), 245–52. DOI: 10.1002/ajp.20888.
- Rosenblum, I.Y. and Coulston, F. (1983). Impaired renal function in diabetic chimpanzees (*Pan troglodytes*). *Experimental Molecular Pathology*, **38**(2), 224–9. DOI: 10.1016/0014-4800(83)90087-4.
- Ross, S.R. (2020). Chimpanzee welfare in the context of science, policy, and practice. In *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, ed. L. M. Hopper and S. R. Ross. Chicago, IL: University of Chicago Press, pp. 552–84. DOI: 10.7208/chicago/9780226728032.003.0024.
- Ross, S.R., Hansen, B.K., Hopper, L.M. and Fultz, A. (2019). A unique zoo-sanctuary collaboration for chimpanzees. *American Journal of Primatology*, **81**(5), e22941. DOI: 10.1002/ajp.22941.
- Ross, S.R. and Leinwand, J.G. (2020). A review of research in primate sanctuaries. *Biology Letters*, **16**(4), 20200033. DOI: 10.1098/rsbl.2020.0033.
- Ross, S.R., Lukas, K.E., Lonsdorf, E.V., et al. (2008). Inappropriate use and portrayal of chimpanzees. *Science*, **319**(5869), 1487. DOI: 10.1126/science.1154490.
- Ross, S.R., Vreeman, V.M. and Lonsdorf, E.V. (2011). Specific image characteristics influence attitudes about chimpanzee conservation and use as pets. *PLoS ONE*, **6**(7), e22050. DOI: 10.1371/journal.pone.0022050.
- Ross, S.R., Wagner, K.E., Schapiro, S.J. and Hau, J. (2010). Ape behavior in two alternating environments: comparing exhibit and short-term holding areas. *American Journal of Primatology*, **72**(11), 951–9. DOI: 10.1002/ajp.20857.
- Roth, J.A. (2011). Veterinary vaccines and their importance to animal health and public health. *Procedia in Vaccinology*, **5**, 127–36. DOI: 10.1016/j.provac.2011.10.009.
- Roth, T.S., Rianti, P., Fredriksson, G.M., Wich, S.A. and Nowak, M.G. (2020). Grouping behavior of Sumatran orangutans (*Pongo abelii*) and Tapanuli orangutans (*Pongo tapanuliensis*) living in forest with low fruit abundance. *American Journal of Primatology*, **82**(5), e23123. DOI: 10.1002/ajp.23123.
- Rouquet, P., Froment, J.M., Bermejo, M., et al. (2005). Wild animal mortality monitoring and human Ebola outbreaks, Gabon and Republic of Congo, 2001–2003. *Emerging Infectious Diseases*, **11**(2), 283–90. DOI: 10.3201/eid1102.040533.
- Rowe, M.L., Whiteley, P.L. and Carver, S. (2019). The treatment of sarcoptic mange in wildlife: a systematic review. *Parasites & Vectors*, **12**(1), 99. DOI: 10.1186/s13071-019-3340-z.
- Roxana (2021). La fondation Mona: Un sanctuaire de chimpanzés en Espagne. *Sh Barcelone*, December 3, 2021. Available at: <https://www.shbarcelona.fr/blog/fr/la-fondation-mona-un-sanctuaire-de-chimpanzes-en-espagne/>.
- Royal Commission into National Natural Disaster Arrangements (2020a). Chapter 10. Community education. In *Royal Commission into National Natural Disaster Arrangements Report 28 October 2020*, ed. Royal Commission into National Natural Disaster Arrangements. Canberra, Australia: Commonwealth of Australia, pp. 245–51. Available at: <https://naturaldisaster.royalcommission.gov.au/publications/html-report/chapter-10>.
- Royal Commission into National Natural Disaster Arrangements (2020b). National information systems. In *Interim Observations 31 August 2020*, ed. Royal Commission into National Natural Disaster Arrangements. Canberra, Australia: Commonwealth of Australia, pp. 12–13. Available at: <https://naturaldisaster.royalcommission.gov.au/publications/interim-observations-1/interim-observations-4>.
- RSPO (2020). *RSPO Principle Criteria for the Production of Sustainable Palm Oil 2018, Revised 01 February 2020*. Kuala Lumpur, Malaysia: Roundtable on Sustainable Palm Oil (RSPO). Available at: <https://rspo.org/resources/?category=rspo-principle-criteria-for-the-production-of-sustainable-palm-oil-2018>.
- RSPO (n.d.). *Our Impact: Outcomes and Impacts*. Kuala Lumpur, Malaysia: Roundtable on Sustainable Palm Oil (RSPO). Available at: <https://rspo.org/our-impact/outcomes-and-impacts/>. Accessed: December, 2022.
- Ruckert, A., Zinszer, K., Zarowsky, C., Labonté, R. and Carabin, H. (2020). What role for One Health in the COVID-19 pandemic? *Canadian Journal of Public Health*, **111**(5), 641–4. DOI: 10.17269/s41997-020-00409-z.
- Rudicell, R.S., Holland Jones, J., Wroblewski, E.E., et al. (2010). Impact of simian immunodeficiency virus infection on chimpanzee population dynamics. *PLoS Pathogens*, **6**(9), e1001116. DOI: 10.1371/journal.ppat.1001116.
- Rüegg, S.R., Häslér, B. and Zinsstag, J. (2018). *Integrated Approaches to Health: A Handbook for the Evaluation of One Health*. Wageningen, the Netherlands: Wageningen Academic Publishers. DOI: 10.3920/978-90-8686-875-9.
- Runhovde, S.R. (2022). Mind the gap! Decoupling between policy and practice in the policing of illegal wildlife trade. *International Journal of Offender Therapy and Comparative Criminology*, **66**(4), 369–88. DOI: 10.1177/0306624x20967953.

- Rushmore, J., Caillaud, D., Matamba, L., *et al.* (2013). Social network analysis of wild chimpanzees provides insights for predicting infectious disease risk. *Journal of Animal Ecology*, **82**(5), 976–86. DOI: 10.1111/1365-2656.12088.
- Russon, A.E. (2004). Aristotle's rubicon. In *Orangutans: Wizards of the Rainforest*, ed. A. E. Russon. Toronto, Canada: Key Porter Publications.
- Russon, A.E. (2009). Orangutan rehabilitation and reintroduction: successes, failures and role in conservation. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 327–50.
- Russon, A.E., Kuncoro, P. and Ferisa, A. (2015). Orangutan behavior in Kutai National Park after drought and fire damage: adjustments to short- and long-term natural forest regeneration. *American Journal of Primatology*, **77**(12), 1276–89. DOI: 10.1002/ajp.22480.
- Russon, A.E., Smith, J.J. and Adams, L. (2016). Managing human–orangutan relationships in rehabilitation. In *Ethnoprimatology: Primate Conservation in the 21st Century*, ed. M. Waller. Cham, Switzerland: Springer, pp. 233–58. DOI: 10.1007/978-3-319-30469-4_13.
- Russon, A.E. and Susilo, A. (2014). Orangutan tourism and conservation: 35 years' experience. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 76–97. DOI: 10.1017/CBO9781139087407.007.
- Russon, A.E. and Wallis, J. (2014a). Primate tourism as a conservation tool: a review of the evidence, implications, and recommendations. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 313–32. DOI: 10.1017/CBO9781139087407.024.
- Russon, A.E. and Wallis, J. (2014b). Reconsidering primate tourism as a conservation tool: an introduction to the issues. In *Primate Tourism: A Tool for Conservation?*, ed. A. E. Russon and J. Wallis. Cambridge, UK: Cambridge University Press, pp. 3–18. DOI: 10.1017/CBO9781139087407.002.
- Russon, A.E., Wich, S.A., Ancrenaz, M., *et al.* (2009). Geographic variation in orangutan diets. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 135–56.
- Rwanda Development Board (2017). Increase of gorilla permit tariffs. *Rwanda Development Board*, May 6, 2017. Available at: <https://rdb.rw/increase-of-gorilla-permit-tariffs/>.
- Rwego, I.B., Isabirye-Basuta, G., Gillespie, T.R. and Goldberg, T.L. (2008). Gastrointestinal bacterial transmission among humans, mountain gorillas, and livestock in Bwindi Impenetrable National Park, Uganda. *Conservation Biology*, **22**(6), 1600–7.
- Ryan, S.J. and Walsh, P.D. (2011). Consequences of non-intervention for infectious disease in African great apes. *PLoS ONE*, **6**(12), e29030. DOI: 10.1371/journal.pone.0029030.
- Sabuhoro, E., Wright, B., Munanura, I.E., Nyakabwa, I.N. and Nibigira, C. (2017). The potential of ecotourism opportunities to generate support for mountain gorilla conservation among local communities neighboring Volcanoes National Park in Rwanda. *Journal of Ecotourism*, **20**(1), 1–17. DOI: 10.1080/14724049.2017.1280043.
- Sadler, B., Dusik, J., Fischer, T., *et al.* (2010). *Handbook of Strategic Environmental Assessment*, 1st edn. London, UK: Routledge.
- Sakamoto, M., Sasaki, D., Ono, Y., Makino, Y. and Kodama, E.N. (2020). Implementation of evacuation measures during natural disasters under conditions of the novel coronavirus (COVID-19) pandemic based on a review of previous responses to complex disasters in Japan. *Progress in Disaster Science*, **8**, 100127. DOI: 10.1016/j.pdisas.2020.100127.
- Sakulwira, K., Theamboonlers, A., Charoonrut, P., Ratanakorn, P. and Poovorawan, Y. (2002). Serological evidence of herpesvirus infection in gibbons. *BMC Microbiology*, **2**, 11. DOI: 10.1186/1471-2180-2-11.
- Sakurai, M. and Murayama, Y. (2019). Information technologies and disaster management – benefits and issues. *Progress in Disaster Science*, **2**, 100012. DOI: 10.1016/j.pdisas.2019.100012.
- Samuni, L., Preis, A., Deschner, T., Crockford, C. and Wittig, R.M. (2018). Reward of labor coordination and hunting success in wild chimpanzees. *Communications Biology*, **1**, 138. DOI: 10.1038/s42003-018-0142-3.
- Samuni, L., Wegdell, F. and Surbeck, M. (2020). Behavioural diversity of bonobo prey preference as a potential cultural trait. *eLife*, **9**, e59191. DOI: 10.7554/eLife.59191.

- Sanchez, C.R. and Hidalgo-Hermoso, E. (2022). *Mycobacterium tuberculosis* sensu stricto in African apes, what is its true health impact? *Pathogens*, **11**(5), 484. DOI: 10.3390/pathogens11050484.
- Sanchez, K.L., Greenwood, A.D., Nielsen, A., *et al.* (2022). *Plasmodium pitheci* malaria in Bornean orang-utans at a rehabilitation centre in West Kalimantan, Indonesia. *Malaria Journal*, **21**(1), 280. DOI: 10.1186/s12936-022-04290-8.
- Sánchez-Vizcaíno, F., Muniesa, A., Singleton, D.A., *et al.* (2018). Use of vaccines and factors associated with their uptake variability in dogs, cats and rabbits attending a large sentinel network of veterinary practices across Great Britain. *Epidemiology & Infection*, **146**(7), 895–903. DOI: 10.1017/S0950268818000754.
- Sandbrook, C.G. (2010). Putting leakage in its place: the significance of retained tourism revenue in the local context in rural Uganda. *Journal of International Development*, **22**(1), 124–36. DOI: 10.1002/jid.1507.
- Sandbrook, C. and Semple, S. (2006). The rules and the reality of mountain gorilla *Gorilla beringei beringei* tracking: how close do tourists get? *Oryx*, **40**(4), 428–33. DOI: 10.1017/S0030605306001323.
- Sandosham, A.A. (1951). On two helminths from the orang utan, *Leipertrema rewelli* n.g., n.sp. and *Dirofilaria immitis* (Leidy, 1856). *Journal of Helminthology*, **25**(1–2), 19–26. DOI: 10.1017/S0022149X00018927.
- Santiago-Ávila, F.J. and Lynn, W.S. (2020). Bridging compassion and justice in conservation ethics. *Biological Conservation*, **248**, 108648. DOI: 10.1016/j.biocon.2020.108648.
- Santos, W.J., Guiraldi, L.M. and Lucheis, S.B. (2020). Should we be concerned about COVID-19 with nonhuman primates? *American Journal of Primatology*, **82**(8), e23158. DOI: 10.1002/ajp.23158.
- Sapolsky, R., Romero, L.M. and Munck, A.U. (2000). How do glucocorticoids influence stress responses? Integrating permissive, suppressive, stimulatory, and preparative actions. *Endocrine Reviews*, **21**(1), 55–89. DOI: 10.1210/edrv.21.1.0389.
- Sapolsky, R., Uno, H., Rebert, C. and Finch, C. (1990). Hippocampal damage associated with prolonged glucocorticoid exposure in primates. *The Journal of Neuroscience*, **10**(9), 2897–902. DOI: 10.1523/jneurosci.10-09-02897.1990.
- Sarma, K., Krishna, M. and Kumar, A. (2015). Fragmented populations of the vulnerable eastern hoolock gibbon *Hoolock leuconedys* in the Lower Dibang Valley district, Arunachal Pradesh, India. *Oryx*, **49**(1), 133–9. DOI: 10.1017/S0030605312001299.
- Sarmiento, E.E. (1985). *Functional differences in the skeleton of wild and captive orangutans and their adaptive significance*. PhD thesis. New York, NY: New York University.
- Satchell, G.H. and Harrison, R.A. (1953). II. Experimental observations on the possibility of transmission of yaws by wound-feeding Diptera, in Western Samoa. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **47**(2), 148–53. DOI: 10.1016/0035-9203(53)90068-6.
- Saudale, V. (2015). Ministry: Indonesia has only four decent zoos. *Jakarta Globe*, February 8, 2015. Available at: <https://www.todayonline.com/world/asia/indonesia-has-only-4-decent-zoos-ministry>.
- Save the Chimps (n.d.). *Philosophy of Care*. Internal unpublished document. Fort Pierce, FL: Save the Chimps.
- Sayektiningsih, T., Sari, U.K., Yassir, I. and Ma'ruf, A. (2020). Students and orangutan conservation: high school students' perceptions of orangutan sanctuary establishment in Balikpapan Bay, East Kalimantan, Indonesia. *Buletin Eboni*, **2**(1), 35–46. DOI: 10.20886/buleboni.5570.
- Schaffner, C.M., Rebecchini, L., Ramos-Fernandez, G., Vick, L.G. and Aureli, F. (2012). Spider monkeys (*Ateles geoffroyi yucatenensis*) cope with the negative consequences of hurricanes through changes in diet, activity budget, and fission–fusion dynamics. *International Journal of Primatology*, **33**(4), 922–36. DOI: 10.1007/s10764-012-9621-4.
- Schaller, G.B. (1963). *The Mountain Gorilla: Ecology and Behavior*. Chicago, IL: University of Chicago Press.
- Schapiro, S.J., Bloomsmith, M.A. and Laule, G.E. (2003). Positive reinforcement training as a technique to alter nonhuman primate behavior: quantitative assessments of effectiveness. *Journal of Applied Animal Welfare Science*, **6**(3), 175–87. DOI: 10.1207/S15327604JAWS0603_03.
- Schaumburg, F., Mugisha, L., Peck, B., *et al.* (2012). Drug-resistant human *Staphylococcus aureus* in sanctuary apes pose a threat to endangered wild ape populations. *American Journal of Primatology*, **74**(12), 1071–5. DOI: 10.1002/ajp.22067.
- Scheffer, M., Bolhuis, J.E., Borsboom, D., *et al.* (2018). Quantifying resilience of humans and other animals. *Proceedings of the National Academy of Sciences*, **115**(47), 11883–90. DOI: 10.1073/pnas.1810630115.

- Scherl, L.M., Wilson, A., Wild, R., *et al.* (2004). *Can Protected Areas Contribute to Poverty Reduction? Opportunities and Limitations*. Gland, Switzerland, and Cambridge, UK: International Union for Conservation of Nature (IUCN). Available at: <https://portals.iucn.org/library/sites/library/files/documents/2004-047.pdf>.
- Schoenle, L.A., Downs, C.J. and Martin, L.B. (2018). An introduction to ecoimmunology. In *Advances in Comparative Immunology*, ed. E. L. Cooper. Cham, Switzerland: Springer International Publishing, pp. 901–32. DOI: 10.1007/978-3-319-76768-0_26.
- Scholfield, K.A. (2013). *Transnational (dis)connections: mountain gorilla conservation in Rwanda and the DRC*. PhD thesis. Manchester, UK: University of Manchester.
- Schovancová, K., Pomajbíková, K., Procházka, P., *et al.* (2013). Preliminary insights into the impact of dietary starch on the ciliate, *Neobalantidium coli*, in captive chimpanzees. *PLoS ONE*, **8**(11), e81374. DOI: 10.1371/journal.pone.0081374.
- Schubert, G., Achi, V., Ahuka, S., *et al.* (2021). The African network for improved diagnostics, epidemiology and management of common infectious agents. *BMC Infectious Diseases*, **21**(1), 539. DOI: 10.1186/s12879-021-06238-w.
- Schuenemann, V.J., Avanzi, C., Krause-Kyora, B., *et al.* (2018). Ancient genomes reveal a high diversity of *Mycobacterium leprae* in medieval Europe. *PLoS Pathogens*, **14**(5), e1006997. DOI: 10.1371/journal.ppat.1006997.
- Schulman, F.Y., Farb, A., Virmani, R. and Montali, R.J. (1995). Fibrosing cardiomyopathy in captive western lowland gorillas (*Gorilla gorilla gorilla*) in the United States: a retrospective study. *Journal of Zoo and Wildlife Medicine*, **26**(1), 43–51.
- Scorpion (2019). Document of strategy and action plan for Indonesian orangutan conservation 2019–2029 is launched. *Scorpionmonitor News*, 13 August 2019. Available at: <http://scorpionmonitor.org/news/document-of-strategy-and-action-plan-for-indonesian-orangutan-conservation-2019-2029-is-launched-august-12-2019-444.html>.
- SCS (2017). *NSW Rural Fire Service Fire Trail Design, Construction and Maintenance Manual*. Parramatta, Australia: Soil Conservation Service (SCS). Available at: https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0009/97569/Fire-Trail-Design-Construction-and-Maintenance-Manual-FINAL_reducedsize.pdf.
- Scully, E.J., Basnet, S., Wrangham, R.W., *et al.* (2018). Lethal respiratory disease associated with human rhinovirus C in wild chimpanzees, Uganda, 2013. *Emerging Infectious Diseases*, **24**(2), 267–74. DOI: 10.3201/eid2402.170778.
- Second Chance Chimpanzee Refuge Liberia (2020). Second Chance Chimpanzee Refuge Liberia/Save the Abandoned Chimps. *Facebook Post*, October 14, 2020. Available at: <https://www.facebook.com/abandonedchimps/posts/2806313472914574>.
- Seifert, S.N., Fischer, R.J., Kuisma, E., *et al.* (2022). Zaire Ebola virus surveillance near the Bikoro region of the Democratic Republic of the Congo during the 2018 outbreak reveals presence of seropositive bats. *PLoS Neglected Tropical Diseases*, **16**(6), e0010504. DOI: 10.1371/journal.pntd.0010504.
- Seiler, B.M., Dick Jr, E.J., Guardado-Mendoza, R., *et al.* (2009). Spontaneous heart disease in the adult chimpanzee (*Pan troglodytes*). *Journal of Medical Primatology*, **38**(1), 51–8. DOI: 10.1111/j.1600-0684.2008.00307.x.
- Seiler, N., Boesch, C., Mundry, R., Stephens, C. and Robbins, M.M. (2017). Space partitioning in wild, non-territorial mountain gorillas: the impact of food and neighbours. *Royal Society Open Science*, **4**(11), 170720. DOI: 10.1098/rsos.170720.
- Seiler, N., Boesch, C., Stephens, C., *et al.* (2018). Social and ecological correlates of space use patterns in Bwindi mountain gorillas. *American Journal of Primatology*, **80**(4), e22754. DOI: 10.1002/ajp.22754.
- Seiler, N. and Robbins, M.M. (2016). Factors influencing ranging on community land and crop raiding by mountain gorillas. *Animal Conservation*, **19**(2), 176–88. DOI: 10.1111/acv.12232.
- Seiler, N. and Robbins, M.M. (2020). Ecological correlates of space use patterns in wild western lowland gorillas. *American Journal of Primatology*, **82**(9), e23168. DOI: 10.1002/ajp.23168.
- Seimon, T.A., Olson, S.H., Lee, K.J., *et al.* (2015). Correction: Adenovirus and herpesvirus diversity in free-ranging great apes in the Sangha region of the Republic of Congo. *PLoS ONE*, **10**(11), e0142766. DOI: 10.1371/journal.pone.0142766.
- Sekerka, L.E. and Bagozzi, R.P. (2007). Moral courage in the workplace: moving to and from the desire and decision to act. *Business Ethics: A European Review*, **16**(2), 132–49. DOI: 10.1111/j.1467-8608.2007.00484.x.
- Seneviratne, S.I., Nicholls, N., Easterling, D., *et al.* (2012). Changes in climate extremes and their impacts on the natural physical environment. In *Managing the Risks of Extreme Events and Disasters to Advance Climate*

- Change Adaptation A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC)*, ed. IPCC. Cambridge, UK, and New York, NY: Cambridge University Press, pp. 109–230.
- Serckx, A., Huynen, M.-C., Bastin, J.-F., *et al.* (2014). Nest grouping patterns of bonobos (*Pan paniscus*) in relation to fruit availability in a forest–savannah mosaic. *PLoS ONE*, **9**(4), e93742. DOI: 10.1371/journal.pone.0093742.
- Sergio, F., Blas, J. and Hiraldo, F. (2018). Animal responses to natural disturbance and climate extremes: a review. *Global and Planetary Change*, **161**, 28–40. DOI: 10.1016/j.gloplacha.2017.10.009.
- Shaffer, C.A., Yukuma, C., Marawanaru, E. and Suse, P. (2018). Assessing the sustainability of Waiwai subsistence hunting in Guyana by comparison of static indices and spatially explicit, biodemographic models. *Animal Conservation*, **21**(2), 148–58. DOI: 10.1111/acv.12366.
- Sharp, P.M. and Hahn, B.H. (2011). Origins of HIV and the AIDS pandemic. *Cold Spring Harbor Perspectives in Medicine*, **1**(1), a006841. DOI: 10.1101/cshperspect.a006841.
- Shave, R., Oxborough, D., Somauroo, J., *et al.* (2014). Echocardiographic assessment of cardiac structure and function in great apes: a practical guide. *International Zoo Yearbook*, **48**(1), 218–33. DOI: 10.1111/izy.12026.
- Shchelkunov, S.N., Totmenin, A.V., Babkin, I.V., *et al.* (2001). Human monkeypox and smallpox viruses: genomic comparison. *FEBS Letters*, **509**(1), 66–70. DOI: 10.1016/S0014-5793(01)03144-1.
- Sherman, J., Ancrenaz, M. and Meijaard, E. (2020). Shifting apes: conservation and welfare outcomes of Bornean orangutan rescue and release in Kalimantan, Indonesia. *Journal for Nature Conservation*, **55**, 125807. DOI: 10.1016/j.jnc.2020.125807.
- Sherman, J., Ancrenaz, M., Voigt, M., *et al.* (2020). Envisioning a future for Bornean orangutans: conservation impacts of action plan implementation and recommendations for improved population outcomes. *Biodiversitas*, **21**(2), 456–77.
- Sherman, J., Brent, L. and Farmer, K. (2016). Poster: A picture is worth a thousand words: an analysis of animal images posted on the internet by African ape sanctuaries. Presented at: *International Primatological Society, 26th Congress, August 23, 2016, Chicago, IL*. International Primatological Society.
- Sherman, J. and Greer, D. (2018). The status of captive apes. I. Beyond capacity: sanctuaries and the status of captive apes in shrinking natural habitats. In *State of the Apes: Infrastructure Development and Ape Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 227–55. Available at: <https://www.stateoftheapes.com/themes/ch-8-the-status-of-captive-apes/>.
- Sherman, J., Unwin, S., Travis, D.A., *et al.* (2021). Disease risk and conservation implications of orangutan translocations. *Frontiers in Veterinary Science*, **8**, 749547. DOI: 10.3389/fvets.2021.749547.
- Sherwen, S.L., Hemsworth, L.M., Beausoleil, N.J., Embury, A. and Mellor, D.J. (2018). An animal welfare risk assessment process for zoos. *Animals*, **8**(8), 130. DOI: 10.3390/ani8080130.
- Shin, N.S., Kwon, S.W., Han, D.H., *et al.* (1995). *Mycobacterium tuberculosis* infection in an orangutan (*Pongo pygmaeus*). *Journal of Veterinary Medical Science*, **57**(5), 951–3. DOI: 10.1292/jvms.57.951.
- Shue, H. (1996). *Basic Rights: Subsistence, Affluence, and U.S. Foreign Policy*. Princeton, NJ: Princeton University Press.
- Shutt, K.A. (2014). *Wildlife tourism and conservation: an interdisciplinary evaluation of gorilla ecotourism in Dzanga-Sangha, Central African Republic*. PhD thesis. Durham, UK: Durham University.
- Shutt, K., Heistermann, M., Kasim, A., *et al.* (2014). Effects of habituation, research and ecotourism on faecal glucocorticoid metabolites in wild western lowland gorillas: implications for conservation management. *Biological Conservation*, **172**, 72–9. DOI: 10.1016/j.biocon.2014.02.014.
- Sierra Maestra (2020). *Zoológico de Santiago de Cuba: un atractivo ciudadano*. Havana, Cuba: Sierra Maestra. Available at: <http://www.sierramaestra.cu/index.php/especiales/32854-zoologico-de-santiago-de-cuba-un-atractivo-ciudadino>.
- Silva, C. (2018). Animal welfare law of Costa Rica. *The Costa Rica News*, September 18, 2018. Available at: <https://thecostaricanews.com/animal-welfare-law-of-costa-rica/#:~:text=The%20law%20establishes%20punishments%20of,with%20them%20or%20practices%20vivisection>.
- Sim, S.H., Ong, C.E.L., Gan, Y.H., *et al.* (2018). Melioidosis in Singapore: clinical, veterinary, and environmental perspectives. *Tropical Medicine and Infectious Disease*, **3**(1), 31. DOI: 10.3390/tropicalmed3010031.
- Sinclair, M. and Phillips, C.J.C. (2018a). International Animal Protection Society leadership: the right people for the right issues. *Animals*, **8**(6), 89. DOI: 10.3390/ani806089.

- Sinclair, M. and Phillips, C.J.C. (2018b). Key tenets of operational success in international animal welfare initiatives. *Animals*, **8**(6), 92. DOI: 10.3390/ani8060092.
- Singer, P. (2011). *Practical Ethics*. Cambridge, UK: Cambridge University Press.
- Singer, T. and Klimecki, O.M. (2014). Empathy and compassion. *Current Biology*, **24**(18), R875–8. DOI: 10.1016/j.cub.2014.06.054.
- Singleton, I., Knott, C.D., Morrogh-Bernard, H.C., Wich, S.A. and van Schaik, C.P. (2009). Ranging behavior of orangutan females and social organization. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 205–13.
- Singleton, I., Wich, S.A., Nowak, M., Usher, G. and Utami-Atmoko, S.S. (2017). Pongo abelii (errata version published in 2018). *The IUCN Red List of Threatened Species 2017: e.T121097935A123797627*. Gland, Switzerland: International Union for Conservation of Nature (IUCN). DOI: 10.2305/IUCN.UK.2017-3.RLTS.T121097935A115575085.en.
- Siregar, J.E., Faust, C.L., Murdiyarso, L.S., et al. (2015). Non-invasive surveillance for *Plasmodium* in reservoir macaque species. *Malaria Journal*, **14**(1), 404. DOI: 10.1186/s12936-015-0857-2.
- Skinner, M.F. (1986). Enamel hypoplasia in sympatric chimpanzee and gorilla. *Human Evolution*, **1**(4), 289–312. DOI: 10.1007/BF02436704.
- Sklenovská, N. and Van Ranst, M. (2018). Emergence of monkeypox as the most important orthopoxvirus infection in humans. *Frontiers in Public Health*, **6**, 241. DOI: 10.3389/fpubh.2018.00241.
- Slater, O.M., Terio, K.A., Zhang, Y., et al. (2014). Human metapneumovirus infection in chimpanzees, United States. *Emerging Infectious Diseases*, **20**(12), 2115–18. DOI: 10.3201/eid2012.140408.
- Sloan, S., Alamgir, M., Campbell, M.J., Setyawati, T. and Laurance, W.F. (2019). Development corridors and remnant-forest conservation in Sumatra, Indonesia. *Tropical Conservation Science*, **12**, 1940082919889509. DOI: 10.1177/1940082919889509.
- Sloan, S., Supriatna, J., Campbell, M.J., Alamgir, M. and Laurance, W.F. (2018). Newly discovered orangutan species requires urgent habitat protection. *Current Biology*, **28**(11), R650–1. DOI: 10.1016/j.cub.2018.04.082.
- Smiley Evans, T., Barry, P.A., Gilardi, K.V., et al. (2015). Optimization of a novel non-invasive oral sampling technique for zoonotic pathogen surveillance in nonhuman primates. *PLoS Neglected Tropical Diseases*, **9**(6), e0003813. DOI: 10.1371/journal.pntd.0003813.
- Smiley Evans, T., Gilardi, K.V.K., Barry, P.A., et al. (2016). Detection of viruses using discarded plants from wild mountain gorillas and golden monkeys. *American Journal of Primatology*, **78**(11), 1222–34. DOI: 10.1002/ajp.122576.
- Smiley Evans, T., Lowenstine, L.J., Gilardi, K.V., et al. (2017). Mountain gorilla lymphocryptovirus has Epstein-Barr virus-like epidemiology and pathology in infants. *Scientific Reports*, **7**, 5352. DOI: 10.1038/s41598-017-04877-1.
- Smith, P.C., Yuill, T.M., Buchanan, R.D., Stanton, J.S. and Chaicumpa, V. (1969). The gibbon (*Hylobates lar*); a new primate host for *Herpesvirus hominia*. I. A natural epizootic in a laboratory colony. *Journal of Infectious Diseases*, **120**(3), 292–7. DOI: 10.1093/infdis/120.3.292.
- Smithsonian Institution (2022). *What Does it Mean to be Human?* Washington DC: Smithsonian Institution. Available at: <http://humanorigins.si.edu/evidence/genetics>.
- Smits, W.T.M., Heriyanto and Ramono, W.S. (1995). A new method for rehabilitation of orangutans in Indonesia. In *The Neglected Ape*, ed. R. D. Nadler, B. F. M. Galdikas, L. K. Sheeran and N. Rosen. Boston, MA: Springer, pp. 69–77. DOI: 10.1007/978-1-4899-1091-2_8.
- SOC (n.d.). *Meet Orangutan*. East Kalimantan, Indonesia: Singtan Orangutan Center (SOC). Available at: <https://www.soc.or.id/sintang-orangutan-center/meet-orangutan/>. Accessed: October, 2020.
- SOCP (n.d.-a). *Creating New Wild Populations*. Medan, Indonesia: Sumatran Orangutan Conservation Program (SOCP). Available at: <https://www.sumatranorangutan.org/our-work/creating-new-wild-populations/>. Accessed: August, 2021.
- SOCP (n.d.-b). *Jantho Orangutan Reintroduction Centre*. Medan, Indonesia: Sumatran Orangutan Conservation Program (SOCP). Available at: <https://www.sumatranorangutan.org/our-work/creating-new-wild-populations/reintroduction/jantho/>. Accessed: September, 2022.
- SOCP (n.d.-c). *Our Work*. Medan, Indonesia: Sumatran Orangutan Conservation Program (SOCP). Available at: <https://www.sumatranorangutan.org/our-work/creating-new-wild-populations/>. Accessed: September, 2022.

- SOCP (n.d.-d). *Rehabilitation*. Medan, Indonesia: Sumatran Orangutan Conservation Program (SOCP). Available at: <https://www.sumatranorangutan.org/our-work/creating-new-wild-populations/rehabilitation/>. Accessed: September, 2022.
- Solleveld, H.A., van Zwieter, M.J., Heidt, P.J. and van Eerd, P.M. (1984). Clinicopathologic study of six cases of meningitis and meningoencephalitis in chimpanzees (*Pan troglodytes*). *Laboratory Animal Science*, **34**(1), 86–90.
- Sollund, R. (2022). Wildlife trade and law enforcement: a proposal for a remodeling of CITES incorporating species justice, ecojustice, and environmental justice. *International Journal of Offender Therapy and Comparative Criminology*, **66**(9), 1017–35. DOI: 10.1177/0306624X221099492.
- Somerville, K. (2020). Focus: Wildlife & pandemics: COVID-19, bushmeat and poaching in Africa. *Global Geneva*, September 14, 2020. Available at: <https://www.global-geneva.com/focus-wildlife-pandemics-covid-19-bushmeat-and-poaching-in-africa/>.
- Soorae, P.S., Al Hemeri, A., Al Shamsi, A. and Al Suwaidi, K. (2008). A survey of the trade in wildlife as pets in the United Arab Emirates. *TRAFFIC Bulletin*, **22**(1), 41–6.
- Southern, L.M., Deschner, T. and Pika, S. (2021). Lethal coalitionary attacks of chimpanzees (*Pan troglodytes troglodytes*) on gorillas (*Gorilla gorilla gorilla*) in the wild. *Scientific Reports*, **11**, 14673. DOI: 10.1038/s41598-021-93829-x.
- Species360 (n.d.). *ZIMS by Species360*. Minneapolis, MN: Species360. Available at: <https://zims.species360.org>. Accessed: August, 2020.
- Spehar, S.N., Sheil, D., Harrison, T., et al. (2018). Orangutans venture out of the rainforest and into the Anthropocene. *Science Advances*, **4**(6), 1–13. DOI: 10.1126/sciadv.1701422.
- Spelman, L.H., Gilardi, K.V.K., Lukasić-Braun, M., et al. (2013). Respiratory disease in mountain gorillas (*Gorilla beringei beringei*) in Rwanda, 1990–2010: outbreaks, clinical course, and medical management. *Journal of Zoo and Wildlife Medicine*, **44**(4), 1027–35. DOI: 10.1638/2013-0014R.1.
- Spenceley, A., Habyalimana, S., Tusabe, R. and Mariza, D. (2010). Benefits to the poor from gorilla tourism in Rwanda. *Development Southern Africa*, **27**(5), 647–62. DOI: 10.1080/0376835X.2010.522828.
- Spencer, J., Amony, I. and Dube, C. (2020). The impacts of mountain gorilla tourism in Uganda: can participating stakeholders benefit? In *3rd International Conference on Tourism Research, Universidad Europea de Valencia, Spain, 27–28 March 2020*, ed. J. Martí-Parreño, R. Gómez-Calvet and J. Muñoz de Prat. Sonning Common, UK: Academic Conferences and Publishing International Ltd, pp. 355–62.
- Spessa, A. and Field, R. (2015). Indonesia at risk from huge fires because of El Niño. *The Conversation*, June 16, 2015. Available at: <https://theconversation.com/indonesia-at-risk-from-huge-fires-because-of-el-nino-43072>.
- Spessa, A.C., Field, R.D., Pappenberger, F., et al. (2015). Seasonal forecasting of fire over Kalimantan, Indonesia. *Natural Hazards Earth Systems Sciences*, **15**(3), 429–42. DOI: 10.5194/nhess-15-429-2015.
- Spillmann, B., van Noordwijk, M.A., Willems, E.P., et al. (2015). Validation of an acoustic location system to monitor Bornean orangutan (*Pongo pygmaeus wurmbii*) long calls. *American Journal of Primatology*, **77**(7), 767–76. DOI: 10.1002/ajp.22398.
- Spillmann, B., Willems, E.P., van Noordwijk, M.A., Setia, T.M. and van Schaik, C.P. (2017). Confrontational assessment in the roving male promiscuity mating system of the Bornean orangutan. *Behavioral Ecology and Sociobiology*, **71**(1), 20. DOI: 10.1007/s00265-016-2252-6.
- Špinko, M. and Wemelsfelder, F. (2018). Environmental challenge and animal agency. In *Animal Welfare*, ed. M. C. Appleby, I. A. S. Olsson and F. Galindo. Wallingford, UK: CABI International, pp. 39–55. DOI: 10.1079/9781786390202.0039.
- SPOTT (n.d.). *Timber and Pulp: ESG Policy Transparency*. SPOTT. Available at: <https://www.spott.org/timber-pulp/>. Accessed: December, 2022.
- Sprague, L.D. and Neubauer, H. (2004). Melioidosis in animals: a review on epizootiology, diagnosis and clinical presentation. *Journal of Veterinary Medicine, Series B*, **51**(7), 305–20. DOI: 10.1111/j.1439-0450.2004.00797.x.
- Spruijt, B.M., van den Bos, R. and Pijlman, F.T.A. (2001). A concept of welfare based on reward evaluating mechanisms in the brain: anticipatory behaviour as an indicator for the state of reward systems. *Applied Animal Behaviour Science*, **72**(2), 145–71. DOI: 10.1016/S0168-1591(00)00204-5.
- Srivathsan, A., Lee, L., Katoh, K., et al. (2021). ONTbarcode and MinION barcodes aid biodiversity discovery and identification by everyone, for everyone. *BMC Biology*, **19**(1), 217. DOI: 10.1186/s12915-021-01141-x.

- Staube-Delgado, R. (2019). Analysing changes in disaster terminology over the last decade. *International Journal of Disaster Risk Reduction*, **40**, 101161. DOI: 10.1016/j.ijdr.2019.101161.
- Steinmetz, H.W. and Zimmermann, N.E. (2012). Computed tomography for the diagnosis of sinusitis and air sacculitis in orangutans. In *Fowler's Zoo and Wild Animal Medicine, Current Therapy, Volume 7*, ed. R. E. Miller and M. Fowler. St Louis, MO: Elsevier Saunders, pp. 422–30. DOI: 10.1016/B978-1-4377-1986-4.00055-X.
- Steinmetz, R., Srirattaporn, S., Mor-Tip, J. and Seuaturien, N. (2014). Can community outreach alleviate poaching pressure and recover wildlife in south-east Asian protected areas? *Journal of Applied Ecology*, **51**(6), 1469–78. DOI: 10.1111/1365-2664.12239.
- Stephen, C. and Karesh, W.B. (2014). Is One Health delivering results? Introduction. *Revue Scientifique et Technique de l'Office International des Épidémiologies*, **33**(2), 375–92. DOI: 10.20506/rst.33.2.2301.
- Stephens, N., Vogelnest, L., Lowbridge, C., et al. (2013). Transmission of *Mycobacterium tuberculosis* from an Asian elephant (*Elephas maximus*) to a chimpanzee (*Pan troglodytes*) and humans in an Australian zoo. *Epidemiology & Infection*, **141**(7), 1488–97. DOI: 10.1017/S095026881300068x.
- Stevens, J. (2020). *EAZA Best Practice Guidelines – Bonobo (Pan paniscus)*. Amsterdam, the Netherlands: European Association of Zoos and Aquaria (EAZA) Great Ape Taxon Advisory Group (TAG). Available at: <https://www.eaza.net/assets/Uploads/CCC/BPG-2020/Bonobo-BPG-final-version-2020.pdf>.
- Stevens, J.M., Alonso, A.S., Aerts, T. and Vervaecke, H. (2008). The behaviour of a group of chimpanzees: influence of spatial crowding and visitor numbers. Presented at: *Proceedings of the Tenth Annual Symposium on Zoo Research, Hull, UK, 15–16 July 2008*. London, UK: British and Irish Association of Zoos and Aquariums (BIAZA).
- Stewart, K. (1988). Suckling and lactational anoestrus in wild gorillas (*Gorilla gorilla*). *Journal of Reproduction and Fertility*, **83**(2), 627–34.
- Stewart, M.C. and Wilson, G.B. (2016). The dynamic role of social media during Hurricane #Sandy: An introduction of the STREMI model to weather the storm of the crisis lifecycle. *Computers in Human Behavior*, **54**, 639–46. DOI: 10.1016/j.chb.2015.07.009.
- Stibbe, A. (2001). Language, power and the social construction of animals. *Society & Animals*, **9**(2), 145–61. DOI: 10.1163/156853001753639251.
- Stoinski, T.S., Perdue, B.M., Breuer, T. and Hoff, M.P. (2013). Variability in the developmental life history of the genus *Gorilla*. *American Journal of Physical Anthropology*, **152**(2), 165–72.
- Stokes, E.J. and Byrne, R.W. (2006). Effect of snare injuries on the fig-feeding behavior of chimpanzees of the Budongo Forest, Uganda. In *Primates of Western Uganda*, ed. N. E. Newton-Fisher, H. Notman, J. D. Paterson and V. Reynolds. New York, NY: Springer, pp. 281–97. DOI: 10.1007/978-0-387-33505-6_16.
- Stop Animal Selfies (n.d.). *Home*. Costa Rica: Stop Animal Selfies. Available at: <https://stopanimalselfies.org/en/home/>. Accessed: March, 2021.
- Strindberg, S., Maisels, F., Williamson, E.A., et al. (2018). Guns, germs, and trees determine density and distribution of gorillas and chimpanzees in western Equatorial Africa. *Science Advances*, **4**(4), eaar2964. DOI: 10.1126/sciadv.aar2964.
- Strong, V.J., Grindlay, D., Redrobe, S., Cobb, M. and White, K. (2016). A systematic review of the literature relating to captive great ape morbidity and mortality. *Journal of Zoo and Wildlife Medicine*, **47**(3), 697–710. DOI: 10.1638/2015-0240.1.
- Strong, V.J., Martin, M., Redrobe, S., White, K. and Baiker, K. (2018). A retrospective review of great ape cardiovascular disease epidemiology and pathology. *International Zoo Yearbook*, **52**(1), 113–25. DOI: 10.1111/izy.12193.
- Strong, V., Moittié, S., Sheppard, M.N., et al. (2020). Idiopathic myocardial fibrosis in captive chimpanzees (*Pan troglodytes*). *Veterinary Pathology*, **57**(1), 183–91. DOI: 10.1177/0300985819879442.
- Strum, S.C. (2005). Measuring success in primate translocation: a baboon case study. *American Journal of Primatology*, **65**(2), 117–40. DOI: 10.1002/ajp.20103.
- Stuart, P., Yalcindag, E., Ali, I.K.M., et al. (2020). *Entamoeba histolytica* infections in wild and semi-wild orangutans in Sumatra and Kalimantan. *American Journal of Primatology*, **82**(5), e23124. DOI: 10.1002/ajp.23124.
- Subudhi, S., Rapin, N. and Misra, V. (2019). Immune system modulation and viral persistence in bats: understanding viral spillover. *Viruses*, **11**(2), 192. DOI: 10.3390/v11020192.

- Sumarga, E. (2017). Spatial indicators for human activities may explain the 2015 fire hotspot distribution in central Kalimantan Indonesia. *Tropical Conservation Science*, **10**. DOI: 10.1177/1940082917706168.
- Susman, R.L. (1984). The locomotor behavior of *Pan paniscus* in the Lomako Forest. In *The Pygmy Chimpanzee: Evolutionary Biology and Behavior*, ed. R. L. Susman. Boston, MA: Springer, pp. 369–93. DOI: 10.1007/978-1-4757-0082-4_15.
- Suzuki, K., Tanigawa, K., Kawashima, A., Miyamura, T. and Ishii, N. (2011). Chimpanzees used for medical research shed light on the pathoetiology of leprosy. *Future Microbiology*, **6**(10), 1151–7. DOI: 10.2217/fmb.11.97.
- Swaisgood, R.R. (2010). The conservation–welfare nexus in reintroduction programmes: a role for sensory ecology. *Animal Welfare*, **19**(2), 125–37. DOI: 10.1017/S096272860000138X.
- Szentiks, C.A., Köndgen, S., Silinski, S., Speck, S. and Leendertz, F.H. (2009). Lethal pneumonia in a captive juvenile chimpanzee (*Pan troglodytes*) due to human-transmitted human respiratory syncytial virus (HRSV) and infection with *Streptococcus pneumoniae*. *Journal of Medical Primatology*, **38**(4), 236–40. DOI: 10.1111/j.1600-0684.2009.00346.x.
- Tabor, P.D. (2011). Vicarious traumatization: concept analysis. *Journal of Forensic Nursing*, **7**(4), 203–8. DOI: 10.1111/j.1939-3938.2011.01115.x.
- Tacugama Chimpanzee Sanctuary (n.d.). *About Us*. Freetown, Sierra Leone: Tacugama Chimpanzee Sanctuary. Available at: <https://www.tacugama.com/about-us/>. Accessed: October, 2020.
- Tangtrongsup, S., Sripakdee, D., Malaivijitnond, S., Angkuratipakorn, R. and Lappin, M.R. (2019). Intestinal parasites and the occurrence of zoonotic *Giardia duodenalis* genotype in captive gibbons at Krabokkoo Wildlife Breeding Center, Thailand. *Frontiers in Veterinary Science*, **6**, 110. DOI: 10.3389/fvets.2019.00110.
- Tapanes, E., Detwiler, K.M. and Cords, M. (2016). Bat predation by cercopithecus monkeys: implications for zoonotic disease transmission. *EcoHealth*, **13**(2), 405–9. DOI: 10.1007/s10393-016-1121-0.
- Tapper, R. (2006). *Wildlife Watching and Tourism: A Study on the Benefits and Risks of a Fast Growing Tourism Activity and its Impacts on Species*. Bonn, Germany: United Nations Environment Programme (UNEP)/Convention on Migratory Species (CMS) Secretariat.
- TAWIRI (2018). *Tanzania Chimpanzee Conservation Action Plan 2018–2023*. Arusha, Tanzania: Tanzania Wildlife Research Institute (TAWIRI). Available at: https://www.researchgate.net/publication/332865978_Tanzania-Chimpanzee-Conservation-Action-Plan-2018.
- Taylor, C., Balmford, A., Buchanan, G.M., et al. (2017). Global coverage of agricultural sustainability standards, and their role in conserving biodiversity. *Conservation Letters*, **10**(5), 610–18. DOI: 10.1111/conl.12314.
- Tchakoudeu Kehou, S., Dainou, K. and Lagoute, P. (2021). The reasons great ape populations are still abundant in logged concessions: environmental drivers and the influence of management plans. *Forest Ecology and Management*, **483**, 118911. DOI: 10.1016/j.foreco.2020.118911.
- Teare, J.A. and Loomis, M.R. (1982). Epizootic of balantidiasis in lowland gorillas. *Journal of the American Veterinary Medical Association*, **181**(11), 1345–7.
- Teixeira, C.P., de Azevedo, C.S., Mendl, M., Cipreste, C.F. and Young, R.J. (2007). Revisiting translocation and reintroduction programmes: the importance of considering stress. *Animal Behaviour*, **73**(1), 1–13. DOI: 10.1016/j.anbehav.2006.06.002.
- Teo, H.C., Lechner, A.M., Sagala, S. and Campos-Arceiz, A. (2020). Environmental impacts of planned capitals and lessons for Indonesia's new capital. *Land*, **9**(11), 438. DOI: 10.3390/land9110438.
- Teo, S.Z., Tuen, A.A., Madinah, A., Aban, S. and Chong, Y.L. (2019). Occurrence of gastrointestinal nematodes in captive nonhuman primates at Matang Wildlife Centre, Sarawak. *Tropical biomedicine*, **36**(3), 594–603.
- Testamenti, V.A., Surya, M., Saepuloh, U., et al. (2020). Characterization of *Burkholderia pseudomallei* from spontaneous melioidosis in a Bornean orangutan. *Veterinary World*, **13**, 2459–68. DOI: 10.14202/vetworld.2020.2459-2468.
- Thangavelu, K., Jamir, I., Ellappan, K., et al. (2021). Comparison of MGIT 960 with Lowenstein Jensen media for recovery of mycobacteria from extrapulmonary specimens in southern India. *Journal of Clinical and Diagnostic Research*, **15**(3), DC01–4. DOI: 10.7860/jcdr/2021/47238.14603.
- The Chimpanzee Sequencing and Analysis Consortium (2005). Initial sequence of the chimpanzee genome and comparison with the human genome. *Nature*, **437**(7055), 69–87. DOI: 10.1038/nature04072.

- The Ebola Gbalo Research Group (2019). Responding to the Ebola virus disease outbreak in DR Congo: when will we learn from Sierra Leone? *The Lancet*, **393**(10191), 2647–50. DOI: 10.1016/S0140-6736(19)31211-5.
- The Republic of Rwanda (2018). *Ebola Virus Disease (EVD) Contingency Plan*. The Republic of Rwanda. Available at: https://www.preventionweb.net/files/63524_rwandaebolavirusdiseaseevdcontingen.pdf.
- Thinh, V.N., Mootnick, A.R., Thanh, V.N., Nadler, T. and Roos, C. (2010). A new species of crested gibbon, from the central Annamite mountain range. *Vietnamese Journal of Primatology*, **4**, 1–12.
- Thornton, S.M., Walker, S. and Zuckerman, J.N. (2001). Management of hepatitis B virus infections in two gibbons and a western lowland gorilla in a zoological collection. *Veterinary Record*, **149**(4), 113–15. DOI: 10.1136/vr.149.4.113.
- Thorpe, W.H. (1963). *Learning and Instinct in Animals*. London, UK: Methuen.
- Tindana, P., Molyneux, C.S., Bull, S. and Parker, M. (2014). Ethical issues in the export, storage and reuse of human biological samples in biomedical research: perspectives of key stakeholders in Ghana and Kenya. *BMC Medical Ethics*, **15**(1), 76. DOI: 10.1186/1472-6939-15-76.
- Toft, J.D., II (1982). The pathoparasitology of the alimentary tract and pancreas of nonhuman primates: a review. *Veterinary Pathology*, **19**(S7), 44–92.
- Toft, J.D., II (1986). The pathoparasitology of nonhuman primates: a review. In *Primates: The Road to Self-Sustaining Populations*, ed. K. Benirschke. New York, NY: Springer, pp. 571–679. DOI: 10.1007/978-1-4612-4918-4_45.
- Tolbert, S., Makambo, W., Asuma, S., Musema, A. and Mugabukomeye, B. (2019). The perceived benefits of protected areas in the Virunga-Bwindi Massif. *Environmental Conservation*, **46**(1), 76–83. DOI: 10.1017/S0376892918000309.
- Tong, L.J., Flach, E.J., Sheppard, M.N., et al. (2014). Fatal arrhythmogenic right ventricular cardiomyopathy in 2 related subadult chimpanzees (*Pan troglodytes*). *Veterinary Pathology*, **51**(4), 858–67. DOI: 10.1177/0300985813501333.
- Toppenberg-Pejcic, D., Noyes, J., Allen, T., et al. (2019). Emergency risk communication: lessons learned from a rapid review of recent gray literature on Ebola, Zika, and yellow fever. *Health Communication*, **34**(4), 437–55. DOI: 10.1080/10410236.2017.1405488.
- TRAFFIC (2022). Financial flows toolkit to tackle illegal wildlife trade. *TRAFFIC NEWS*, March 3, 2022. Available at: <https://www.traffic.org/news/uk-iwt-financial-flows-toolkit-launch/>.
- Travis, D.A., Lonsdorf, E.V. and Gillespie, T.R. (2018). The grand challenge of great ape health and conservation in the anthropocene. *American Journal of Primatology*, **80**(1), e22717. DOI: 10.1002/ajp.22717.
- Trayford, H.R. and Farmer, K.H. (2012). An assessment of the use of telemetry for primate reintroductions. *Journal for Nature Conservation*, **20**, 311–25. DOI: 10.1016/j.jnc.2012.07.004.
- Tremaroli, V. and Bäckhed, F. (2012). Functional interactions between the gut microbiota and host metabolism. *Nature*, **489**(7415), 242–9. DOI: 10.1038/nature11552.
- Trivedy, C. (2020). Is 2020 the year when primatologists should cancel fieldwork? A reply. *American Journal of Primatology*, **82**(8), e23173. DOI: 10.1002/ajp.23173.
- Trogisch, L. and Fletcher, R. (2022). Fortress tourism: exploring dynamics of tourism, security and peace around the Virunga transboundary conservation area. *Journal of Sustainable Tourism*, **30**(2–3), 352–71. DOI: 10.1080/09669582.2020.1857767.
- Truelove, M.A., Martin, J.E., Langford, F.M. and Leach, M.C. (2020). The identification of effective welfare indicators for laboratory-housed macaques using a Delphi consultation process. *Scientific Reports*, **10**, 20402. DOI: 10.1038/s41598-020-77437-9.
- Truman, R. (2005). Leprosy in wild armadillos. *Leprosy Review*, **76**(3), 198–208.
- Tshibangu, G.M. (2018). An analysis of strategic environmental assessment legislation and regulations in African countries. *Journal of Environmental Assessment Policy and Management*, **20**(1), 1–26. DOI: <https://www.jstor.org/stable/90020684>.
- Tsujino, R., Yumoto, T., Kitamura, S., Djamaluddin, I. and Darnaedi, D. (2016). History of forest loss and degradation in Indonesia. *Land Use Policy*, **57**, 335–47. DOI: 10.1016/j.landusepol.2016.05.034.
- Tumusiime, D. and Vedeld, P. (2012). False promise or false premise? Using tourism revenue sharing to promote conservation and poverty reduction in Uganda. *Conservation and Society*, **10**(1), 15–28. DOI: 10.4103/0972-4923.92189.
- Turnbaugh, P.J., Bäckhed, F., Fulton, L. and Gordon, J.I. (2008). Diet-induced obesity is linked to marked but reversible alterations in the mouse distal gut microbiome. *Cell Host & Microbe*, **3**(4), 213–23. DOI: 10.1016/j.chom.2008.02.015.

- Turner, W.C., Kausrud, K.L., Krishnappa, Y.S., *et al.* (2014). Fatal attraction: vegetation responses to nutrient inputs attract herbivores to infectious anthrax carcass sites. *Proceedings of the Royal Society B: Biological Sciences*, **281**(1795), 20141785. DOI: 10.1098/rspb.2014.1785.
- Tutin, C.E.G., Ancrenaz, M., Paredes, J., *et al.* (2001). Conservation biology framework for the release of wild-born orphaned chimpanzees into the Conkouati Reserve, Congo. *Conservation Biology*, **15**(5), 1247–57. DOI: 10.1111/j.1523-1739.2001.00046.x.
- Tutin, C.E.G. and Fernandez, M. (1991). Responses of wild chimpanzees and gorillas to the arrival of primatologists: behaviour observed during habituation. In *Primate Responses to Environmental Change*, ed. H. O. Box. Dordrecht, the Netherlands: Springer, pp. 187–97. DOI: 10.1007/978-94-011-3110-0_10.
- Tweh, C.G., Lormie, M.M., Kouakou, C.Y., *et al.* (2015). Conservation status of chimpanzees *Pan troglodytes verus* and other large mammals in Liberia: a nationwide survey. *Oryx*, **49**(4), 710–18. DOI: 10.1017/S0030605313001191.
- Twycross Zoo (n.d.). *Ape Heart Project*. Twycross, UK: Twycross Zoo. Available at: <https://twycrosszoo.org/conservation/research-at-twycross-zoo/ape-heart-project/>. Accessed: January, 2022.
- Tyler, A.D., Mataseje, L., Urfano, C.J., *et al.* (2018). Evaluation of Oxford Nanopore's MinION sequencing device for microbial whole genome sequencing applications. *Scientific Reports*, **8**, 10931. DOI: 10.1038/s41598-018-29334-5.
- UBOS and ICF (2018). *Uganda Demographic and Health Survey 2016*. Kampala, Uganda, and Rockville, MD: Uganda Bureau of Statistics (UBOS) and ICF. Available at: <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.
- UN [United Nations] (2019). Increased community-based engagement seen as critical to build climate action and achieve the Sustainable Development Goals. *Sustainable Development Goals*, July 19, 2019. Available at: <https://www.un.org/sustainabledevelopment/blog/2019/07/increased-community-based-engagement-seen-as-critical-to-build-climate-action-and-achieve-the-sustainable-development-goals/>.
- UN DESA (n.d.). *The 17 Goals*. New York, NY: United Nations (UN) Department of Economic and Social Affairs (DESA). Available at: <https://sdgs.un.org/goals>. Accessed: March, 2021.
- UNCST (2020). *National Guidelines for Conduct of Research During Coronavirus Disease 2019 (COVID-19) Pandemic*. Kampala, Uganda: Uganda National Council for Science and Technology (UNCST).
- UNDP (n.d.). *Human Development Index (HDI)*. United Nations Development Programme (UNDP). Available at: <http://hdr.undp.org/en/content/human-development-index-hdi>. Accessed: January, 2021.
- UNDRR (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNDRR). Available at: https://www.preventionweb.net/files/43291_sendaiframeworkfordren.pdf.
- UNDRR (n.d.-a). *Sendai Framework Terminology on Disaster Risk Reduction: Contingency Planning*. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNDRR). Available at: <https://www.undrr.org/terminology/contingency-planning>. Accessed: July, 2022.
- UNDRR (n.d.-b). *Sendai Framework Terminology on Disaster Risk Reduction: Disaster*. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNDRR). Available at: <https://www.undrr.org/terminology/disaster>. Accessed: July, 2022.
- UNDRR (n.d.-c). *What is the Sendai Framework for Disaster Risk Reduction?* Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNDRR). Available at: <https://www.undrr.org/implementing-sendai-framework/what-sendai-framework>. Accessed: July, 2022.
- UNDRR DesInventar Sendai (n.d.). *Sendai Framework for Disaster Risk Reduction. DesInventar as a Disaster Information Management System*. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNDRR). Available at: https://www.desinventar.net/what_is.html. Accessed: July, 2022.
- UNEP (2020). Virus which causes COVID-19 threatens great ape conservation. Interview with Johannes Refisch, United Nations Great Apes Survival Partnership Programme, Manager and Coordinator *UN Environment Programme News and Stories*, March 25, 2020. Available at: <https://www.unep.org/news-and-stories/story/virus-which-causes-covid-19-threatens-great-ape-conservation>. Accessed: July, 2022.
- UNEP (2022). *UNEP/EA.5/Res.1. Resolution Adopted by the United Nations Environment Assembly on 2 March 2022 5/1*. Nairobi, Kenya: United Nations Environment Assembly of the United Nations Environment Programme (UNEP). Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/39795/ANIMAL%20WELFARE%20%20%93ENVIRONMENT%20%20%93SUSTAINABLE%20DEVELOPMENT%20NEXUS.%20English.pdf?sequence=1&isAllowed=y>. Accessed: July, 2022.

- UNEP and ILRI (2020). *Preventing the Next Pandemic: Zoonotic Diseases and How to Break the Chain of Transmission*. Nairobi, Kenya: United Nations Environment Programme (UNEP) and International Livestock Research Institute (ILRI). Available at: <https://www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and>.
- UNEP-WCMC (2021a). *Protected Area Profile for Cameroon from the World Database of Protected Areas*, October 2021. Cambridge, UK: UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021b). *Protected Area Profile for Central African Republic from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021c). *Protected Area Profile for Democratic Republic of Congo from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021d). *Protected Area Profile for Indonesia from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021e). *Protected Area Profile for Republic of Congo from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021f). *Protected Area Profile for Rwanda from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021g). *Protected Area Profile for Senegal from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021h). *Protected Area Profile for Tanzania from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNEP-WCMC (2021i). *Protected Area Profile for Uganda from the World Database of Protected Areas*, October 2021. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN). Available at: <https://www.protectedplanet.net>.
- UNESCO (2020). UNESCO supports the development of a regional contingency plan for protecting mountain gorillas, conservation personnel, tourists and park adjacent communities from SARS CoV-19. *UNESCO [United Nations Educational, Scientific and Cultural Organization] Press Release*, May 4, 2020. Available at: <https://en.unesco.org/news/unesco-supports-development-regional-contingency-plan-protecting-mountain-gorillas-o>.
- UNESCO World Heritage Convention (2020). Safeguarding the endangered mountain gorilla during COVID-19 crisis. *UNESCO World Heritage Convention News*, June 23, 2020. Available at: <http://whc.unesco.org/en/news/2125/>.
- UNGA (2019). *A/74/199. Third Industrial Development Decade for Africa (2016–2025). Note / by the Secretary General*. New York, NY: United Nations General Assembly (UNGA). Available at: <https://digitallibrary.un.org/record/3824252?ln=en>.
- UNHCR (2015). *Emergency Response Planning (ERP). Draft for Field Testing. Emergency Handbook*. Geneva, Switzerland: Inter-Agency Standing Committee (IASC) United Nations High Commissioner for Refugees

- (UNHCR). Available at: https://cms.emergency.unhcr.org/documents/11982/54224/Emergency+Response+Preparedness+July+2015/cc602e5b-7084-483d-becb-ea72286cc00e#_ga=2.170040233.841944529.1658964322-1951150208.1658964322.
- UNISDR (2010). *Early Warning Practices can Save Many Lives: Good Practices and Lessons Learned*. Bonn, Germany: United Nations Secretariat of the International Strategy for Disaster Reduction (UNISDR) Platform for the Promotion of Early Warning. Available at: https://www.unisdr.org/files/15254_EWSBLLfinalweb.pdf.
- University of Birmingham (n.d.). *Enclosure Design Tool*. Birmingham, UK: University of Birmingham. Available at: <https://www.birmingham.ac.uk/schools/biosciences/research/showcase/enclosure-design-tool/index.aspx>. Accessed: May, 2022.
- University of Minnesota (n.d.-a). *Canvas Login*. St Paul, MN: University of Minnesota, College of Veterinary Medicine. Available at: <https://umnadvet.instructure.com/login/canvas>. Accessed: October, 2022.
- University of Minnesota (n.d.-b). *Non Human Primate COVID-19 Information Hub*. St Paul, MN: University of Minnesota, College of Veterinary Medicine. Available at: <https://umnadvet.instructure.com/courses/324>. Accessed: September, 2022.
- UNOOSA (n.d.). *Information Management for Disaster-Risk Reduction*. Vienna, Austria: United Nations Office for Outer Space Affairs (UNOOSA) UN-SPIDER Knowledge Portal. Available at: <http://www.un-spider.org/risks-and-disasters/disaster-risk-management/information-management>. Accessed: July, 2022.
- Unwin, S., Chatterton, J. and Chantrey, J. (2013). Management of severe respiratory tract disease caused by human respiratory syncytial virus and *Streptococcus pneumoniae* in captive chimpanzees (*Pan troglodytes*). *Journal of Zoo and Wildlife Medicine*, **44**(1), 105–15.
- Unwin, S., Commitante, R., Moss, A., *et al.* (2022). Evaluating the contribution of a wildlife health capacity building program on orangutan conservation. *American Journal of Primatology*, **84**(4–5), e23273. DOI: 10.1002/ajp.23273.
- USAID (n.d.). *Emerging Pandemic Threats*. Washington DC: United States Agency for International Development (USAID). Available at: <https://www.usaid.gov/news-information/fact-sheets/emerging-pandemic-threats-program>. Accessed: January, 2021.
- USDA (2020). *USDA to Launch Updated Animal Welfare Act Compliance Database and Public Search Tool*. Washington DC: US Department of Agriculture (USDA). Available at: https://www.aphis.usda.gov/aphis/newsroom/stakeholder-info/sa_by_date/sa-2020/sa-08/updated-awa-database.
- Utami-Atmoko, S.S., Singleton, I., van Noordwijk, M.A., van Schaik, C.P. and Mitra Setia, T. (2009). Male–male relationships in orangutans. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. S. Utami-Atmoko, T. Mitra Setia, C. P. van Schaik and M. A. van Noordwijk. Oxford, UK: Oxford University Press, pp. 225–33.
- Utami-Atmoko, S.S., Traylor-Holzer, K., Rifqi, M.A., *et al.*, ed. (2017). *Orangutan Population and Habitat Viability Assessment: Final Report*. Apple Valley, MN: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Conservation Breeding Specialist Group. Available at: <https://www.cbsg.org/sites/cbsg.org/files/documents/2016%20Orangutan%20PHVA.pdf>.
- Utermohlen, M. and Baine, P. (2018). *In Plane Sight: Wildlife Trafficking in the Air Transport Sector*. Washington DC: Center for Advanced Defense (C4ADS). Available at: <https://www.traffic.org/publications/reports/in-plane-sight>.
- UWA (2020a). *Standard Operating Procedures for Tourism Services and Research Activities in UWA Estates and the Reopening of the Protected Areas to the General Public during Covid-19 Pandemic*. Kampala, Uganda: Uganda Wildlife Authority (UWA).
- UWA (2020b). *Uganda Wildlife Authority Ranger Based Monitoring Data for 2020, Bwindi Impenetrable National Park, Buhoma, Kanungu*. Internal data seen by author. Kampala, Uganda: Uganda Wildlife Authority (UWA).
- UWA (2022). *Conservation Tariff July 2022 to June 2024*. Kampala, Uganda: Uganda Wildlife Authority (UWA). Available at: <https://ugandawildlife.org/uwa-rates/>.
- Vale (n.d.). *Biodiversity*. Rio de Janeiro, Brazil: Vale. Available at: <https://www.vale.com/web/esg/biodiversity>. Accessed: October, 2022.
- Van Hamme, G., Svensson, M.S., Morcatty, T.Q., Nekar, K.A.-I. and Nijman, V. (2021). Keep your distance: using Instagram posts to evaluate the risk of anthroponotic disease transmission in gorilla ecotourism. *People and Nature*, **3**(2), 325–34. DOI: 10.1002/pan3.10187.

- Van Herck, K., Castelli, F., Zuckerman, J., *et al.* (2004). Knowledge, attitudes and practices in travel-related infectious diseases: the European Airport Survey. *Journal of Travel Medicine*, **11**(1), 3–8. DOI: 10.2310/7060.2004.13609.
- Van Heuverswyn, F., Li, Y., Bailes, E., *et al.* (2007). Genetic diversity and phylogeographic clustering of SIVcpzPtt in wild chimpanzees in Cameroon. *Virology*, **368**(1), 155–71.
- van Noordwijk, M.A., Arora, N., Willems, E.P., *et al.* (2012). Female philopatry and its social benefits among Bornean orangutans. *Behavioral Ecology and Sociobiology*, **66**, 823–34.
- van Noordwijk, M.A., Sauren, S.E.B., Nuzuar, *et al.* (2009). Development of independence: Sumatran and Bornean orangutans compared. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford University Press, pp. 189–203.
- van Noordwijk, M.A., Utami-Atmoko, S.S., Knott, C.D., *et al.* (2018). The slow ape: high infant survival and long inter-birth intervals in wild orangutans. *Journal of Human Evolution*, **125**, 38–49. DOI: 10.1016/j.jhevol.2018.09.004.
- van Noordwijk, M.A., Willems, E.P., Utami-Atmoko, S.S., Kuzawa, C.W. and van Schaik, C.P. (2013). Multi-year lactation and its consequences in Bornean orangutans (*Pongo pygmaeus wurmbii*). *Behavioral Ecology and Sociobiology*, **67**(5), 805–14. DOI: 10.1007/s00265-013-1504-y.
- van Schaik, C.P. (1999). The socioecology of fission–fusion sociality in orangutans. *Primates*, **40**(1), 69–86. DOI: 10.1007/BF02557703.
- Varkey, B. (2021). Principles of clinical ethics and their application to practice. *Medical Principles and Practice*, **30**(1), 17–28. DOI: 10.1159/000509119.
- Varner, G. (1998). *In Nature's Interests? Interests, Animal Rights, and Environmental Ethics*. New York, NY: Oxford University Press.
- Vaz, M., Sridhar, T.S. and Pai, S.A. (2016). The ethics of research on stored biological samples: outcomes of a workshop. *Indian Journal of Medical Ethics*, **1**(2), 118–22. DOI: 10.20529/ijme.2016.032.
- Veasey, J.S. (2020a). Assessing the psychological priorities for optimising captive Asian elephant (*Elephas maximus*) welfare. *Animals*, **10**(1), 39. DOI: 10.3390/ani10010039.
- Veasey, J.S. (2020b). Can zoos ever be big enough for large wild animals? A review using an expert panel assessment of the psychological priorities of the Amur tiger (*Panthera tigris altaica*) as a model species. *Animals*, **10**(9), 1536. DOI: 10.3390/ani10091536.
- Venter, O., Sanderson, E.W., Magrath, A., *et al.* (2016). Sixteen years of change in the global terrestrial human footprint and implications for biodiversity conservation. *Nature Communications*, **7**, 12558. DOI: 10.1038/ncomms12558.
- Verburg-van Kemenade, B.M.L., Cohen, N. and Chadzinska, M. (2017). Neuroendocrine–immune interaction: evolutionarily conserved mechanisms that maintain allostasis in an ever-changing environment. *Developmental & Comparative Immunology*, **66**, 2–23. DOI: 10.1016/j.dci.2016.05.015.
- Verweij, M. and Bovenkerk, B. (2016). Ethical promises and pitfalls of One Health. *Public Health Ethics*, **9**(1), 1–4. DOI: 10.1093/phe/phw003.
- Viciunaite, V. and Alfnes, F. (2020). Informing sustainable business models with a consumer preference perspective. *Journal of Cleaner Production*, **242**, 118417. DOI: 10.1016/j.jclepro.2019.118417.
- Vidal, J. (2015). Indonesia's forest fires threaten a third of world's wild orangutans. *The Guardian*, October 26, 2015. Available at: <https://www.theguardian.com/environment/2015/oct/26/indonesias-forest-fires-threaten-a-third-of-worlds-wild-orangutans>.
- Videan, E.N., Fritz, J. and Murphy, J. (2008). Effects of aging on hematology and serum clinical chemistry in chimpanzees (*Pan troglodytes*). *American Journal of Primatology*, **70**(4), 327–38. DOI: 10.1002/ajp.20494.
- Videan, E.N., Heward, C.B., Fritz, J., *et al.* (2007). Relationship between sunlight exposure, housing condition, and serum vitamin D and related physiologic biomarker levels in captive chimpanzees (*Pan troglodytes*). *Comparative Medicine*, **57**(4), 402–6.
- Virunga National Park (n.d.-a). *The History of Virunga National Park*. Virunga, Democratic Republic of Congo: Virunga National Park. Available at: <https://virunga.org/about/>. Accessed: April, 2022.
- Virunga National Park (n.d.-b). *Virunga National Park Temporarily Closes Mountain Gorilla Tourism Due to COVID-19*. Kinshasa, DRC: Virunga National Park. Available at: <https://virunga.org/news/virunga-national-park-temporarily-closes-mountain-gorilla-tourism-due-to-covid-19/>. Accessed: April, 2022.

- Virunga National Park Congo (n.d.). *Virunga National Park Reopens for Tourism*. Virunga National Park Congo. Available at: <https://www.virungaparkcongo.com/information/virunga-national-park-reopens-for-tourism/>. Accessed: April, 2022.
- Visit Rwanda (n.d.). *Gorilla Tracking*. Kigali, Rwanda: Rwanda Development Board. Available at: <https://www.visitrwanda.com/interests/gorilla-tracking/>. Accessed: August, 2022.
- Vitone, N.D., Altizer, S. and Nunn, C.L. (2004). Body size, diet and sociality influence the species richness of parasitic worms in anthropoid primates. *Evolutionary Ecology Research*, **6**(2), 183–99.
- Vogel, E.R. (2018). Wildfire smoke could have lasting effects for endangered orangutans. *Laboratory for Primate Dietary Ecology and Physiology*, May 15, 2018. Available at: <https://erinvogelphd.wordpress.com/2018/05/15/wildfire-smoke-could-have-lasting-effects-for-endangered-orangutans/>.
- Voigt, M., Wich, S.A., Ancrenaz, M., et al. (2018). Global demand for natural resources eliminated more than 100,000 Bornean orangutans. *Current Biology*, **28**(5), 761–9. DOI: 10.1016/j.cub.2018.01.053.
- von Magnus, P., Andersen, E.K., Petersen, K.B. and Birch-Andersen, A. (1959). A pox-like disease in cynomolgus monkeys. *Acta Pathologica Microbiologica Scandinavica*, **46**(2), 156–76. DOI: 10.1111/j.1699-0463.1959.tb00328.x.
- Vucetich, J.A., Burnham, D., Macdonald, E.A., et al. (2018). Just conservation: what is it and should we pursue it? *Biological Conservation*, **221**, 23–33. DOI: 10.1016/j.biocon.2018.02.022.
- Walaga, P. and Mashoo, E. (2009). Uganda earns Shs488 billion from gorilla tourism. *The Daily Monitor*, April 20, 2009.
- Walhisumut, O. (2021). WALHI North Sumatra files lawsuit against PT. Nuansa Alam Nusantara for illegally keeping animals in a zoo without permits. *WALHI North Sumatra Press Release*, April 13, 2021. Available at: <http://walhisumut.org/2021/04/13/walhi-north-sumatra-files-lawsuit-against-pt-nuansa-alam-nusantara-for-illegally-keeping-animals-in-a-zoo-without-permits/>.
- Walker, K.K., Walker, C.S., Goodall, J. and Pusey, A.E. (2018). Maturation is prolonged and variable in female chimpanzees. *Journal of Human Evolution*, **114**, 131–40. DOI: 10.1016/j.jhevol.2017.10.010.
- Walker, S.L., Withington, S.G. and Lockwood, D.N.J. (2014). Leprosy. In *Manson's Tropical Infectious Diseases*, 23rd edn, ed. J. Farrar, P. J. Hotez, T. Junghanss, et al. London, UK: W.B. Saunders, pp. 506–18.e1. DOI: 10.1016/B978-0-7020-5101-2.00042-X.
- Wallace, R.G., Bergmann, L., Kock, R., et al. (2015). The dawn of Structural One Health: a new science tracking disease emergence along circuits of capital. *Social Science & Medicine*, **129**, 68–77. DOI: 10.1016/j.socscimed.2014.09.047.
- Wallach, A.D., Batavia, C., Bekoff, M., et al. (2020). Recognizing animal personhood in compassionate conservation. *Conservation Biology*, **34**(5), 1097–106. DOI: 10.1111/cobi.13494.
- Wallach, A.D., Bekoff, M., Batavia, C., Nelson, M.P. and Ramp, D. (2018). Summoning compassion to address the challenges of conservation. *Conservation Biology*, **32**(6), 1255–65. DOI: 10.1111/cobi.13126.
- Wallis, J. and Lee, D.R. (1999). Primate conservation: the prevention of disease transmission. *International Journal of Primatology*, **20**, 803–26. DOI: 10.1023/A:1020879700286.
- Walraven, E. and Duffy, S. (2017). Embedding animal welfare in staff culture: the Taronga Conservation Society Australia experience. *International Zoo Yearbook*, **51**(1), 203–14. DOI: 10.1111/izy.12149.
- Walsh, P.D., Abernethy, K.A., Bermejo, M., et al. (2003). Catastrophic ape decline in western equatorial Africa. *Nature*, **422**(6932), 611–14. DOI: 10.1038/nature01566.
- Walsh, P.D., Kurup, D., Hasselschwert, D.L., et al. (2017). The final (oral Ebola) vaccine trial on captive chimpanzees? *Scientific Reports*, **7**, 43339. DOI: 10.1038/srep43339.
- Waltner-Toews, D., Kay, J.J. and Lister, N.M.E. (2008). *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability*. New York, NY: Columbia University Press.
- Wang, C.-B., Zhao, L.-X., Jin, C.-Z., et al. (2014). New discovery of Early Pleistocene orangutan fossils from Sanhe Cave in Chongzuo, Guangxi, southern China. *Quaternary International*, **354**, 68–74. DOI: 10.1016/j.quaint.2014.06.020.
- WAP (2017). *A Close Up on Cruelty: The Harmful Impact of Wildlife Selfies in the Amazon*. London, UK: World Animal Protection (WAP).

- WAP (2019). *The Show Can't Go On: End the Suffering of Wild Animals at Cruel Visitor Attractions in Zoos and Aquariums*. London, UK: World Animal Protection (WAP). Available at: <https://www.changeformanimals.org/help-end-animal-abuse-in-top-zoos>.
- WAP (n.d.-a). *Animal Protection Index*. London, UK: World Animal Protection (WAP). Available at: <https://api.worldanimalprotection.org/>. Accessed: October, 2020.
- WAP (n.d.-b). *Animal Protection Index: China*. London, UK: World Animal Protection (WAP). Available at: <https://api.worldanimalprotection.org/country/china>. Accessed: October, 2020.
- WAP (n.d.-c). *Methodology*. London, UK: World Animal Protection (WAP). Available at: <https://api.worldanimalprotection.org/methodology>. Accessed: December, 2020.
- Ward, S.J., Williams, E., Groves, G., Marsh, S. and Morgan, D. (2020). Using zoo welfare assessments to identify common issues in developing country zoos. *Animals*, **10**(11), 2101. DOI: 10.3390/ani10112101.
- Warfield, K.L., Goetzmann, J.E., Biggins, J.E., et al. (2014). Vaccinating captive chimpanzees to save wild chimpanzees. *Proceedings of the National Academy of Sciences*, **111**(24), 8873–6. DOI: 10.1073/pnas.1316902111.
- Wark, J.D., Cronin, K.A., Niemann, T., et al. (2019). Monitoring the behavior and habitat use of animals to enhance welfare using the ZooMonitor App. *Animal Behavior and Cognition*, **6**(3), 158–67. DOI: 10.26451/abc.06.03.01.2019.
- Warren, C.E., Bellows, B., Marcus, R., et al. (2021). Strength in diversity: integrating community in primary health care to advance universal health coverage. *Global Health: Science and Practice*, **9**(S1), S1–5. DOI: 10.9745/ghsp-d-21-00125.
- Warren, K.S. (2001). *Orang-utan conservation: epidemiological aspects of health management and population genetics*. PhD thesis. Murdoch, Australia: Murdoch University.
- Warren, K.S., Heeney, J.L., Swan, R.A., Heriyanto and Verschoor, E.J. (1999). A new group of hepadnaviruses naturally infecting orangutans (*Pongo pygmaeus*). *Journal of Virology*, **73**(9), 7860–5. DOI: 10.1128/JVI.73.9.7860-7865.1999.
- Wasser, S.K., Sewall, G. and Soules, M.R. (1993). Psychosocial stress as a cause of infertility. *Fertility and Sterility*, **59**(3), 685–9. DOI: 10.1016/S0015-0282(16)55824-5.
- Waters, S., Hansen, M.F., Setchell, J.M., et al. (2023). *Responsible Primate-Watching for Tourists*. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG) Section for Human–Primate Interactions (SHPI). Available at: <https://humanprimateinteractions.files.wordpress.com/2023/09/responsible-primate-watching-for-tourists.pdf>.
- Waters, S., Setchell, J.M., Maréchal, L., et al. (2021). *Best Practice Guidelines for Responsible Images of Non-Human Primates*. International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Primate Specialist Group (PSG) Section for Human–Primate Interactions (SHPI). Available at: <https://www.arcusfoundation.org/wp-content/uploads/2021/09/Best-Practices-for-Responsible-Images-of-Nonhuman-Primates.pdf>.
- Watson, J.E.M., Evans, T., Venter, O., et al. (2018). The exceptional value of intact forest ecosystems. *Nature Ecology & Evolution*, **2**(4), 599–610. DOI: 10.1038/s41559-018-0490-x.
- Watters, J.V., Margulis, S.W. and Atsalis, S. (2009). Behavioral monitoring in zoos and aquariums: a tool for guiding husbandry and directing research. *Zoo Biology*, **28**(1), 35–48. DOI: 10.1002/zoo.20207.
- Watts, D.P. (1989). Infanticide in mountain gorillas: new cases and a reconsideration of the evidence. *Ethology*, **81**(1), 1–18. DOI: 10.1111/j.1439-0310.1989.tb00754.x.
- Watts, D.P., Muller, M., Amsler, S.J., Mbabazi, G. and Mitani, J.C. (2006). Lethal intergroup aggression by chimpanzees in Kibale National Park, Uganda. *American Journal of Primatology*, **68**(2), 161–80. DOI: 10.1002/ajp.20214.
- Watts, J. (2019). Chinese dam project in Guinea could kill up to 1,500 chimpanzees. *The Guardian*, February 28, 2019. Available at: <https://www.theguardian.com/world/2019/feb/28/chinese-dam-project-in-guinea-could-kill-up-to-1500-chimpanzees>.
- Waugh, W.L. and Liu, C.Y. (2014). Disasters, the whole community, and development as capacity building. In *Disaster and Development: Examining Global Issues and Cases*, ed. N. Kapucu and K. T. Liou. Cham, Switzerland: Springer International Publishing, pp. 167–79. DOI: 10.1007/978-3-319-04468-2_10.
- WAZA (2019). WAZA works. 2nd WAZA animal welfare evaluation summit. *WAZA [World Association of Zoos and Aquariums] News*, **2019**(2), 29. DOI: <https://www.waza.org/wp-content/uploads/2019/11/WAZA-magazine-02-final2.pdf>.

- WAZA (n.d.). *How to Become a WAZA Member*. Barcelona, Spain: World Association of Zoos and Aquariums (WAZA). Available at: <https://www.waza.org/members/how-to-become-a-waza-member/>. Accessed: May, 2022.
- WCS (n.d.-a). *The 2019 Berlin Principles on One Health*. New York, NY: Wildlife Conservation Society (WCS). Available at: <https://oneworldonehealth.wcs.org/About-Us/Mission/The-2019-Berlin-Principles-on-One-Health.aspx#:~:text=Fifteen%20years%20ago%2C%20the%20Wildlife,%2C%20animal%2C%20and%20ecosystem%20health>. Accessed: September, 2022.
- WCS (n.d.-b). *The Conservation, Mitigation and Biodiversity Offset (COMBO) Program*. New York, NY: Wildlife Conservation Society (WCS). Available at: <https://comboprogram.org/>. Accessed: December, 2022.
- WCS (n.d.-c). *Home*. Conakry, Republic of Guinea: Winning Consortium Simandou (WCS). Available at: <https://wcsglobal.com/en/>. Accessed: December, 2022.
- WCS (n.d.-d). *Project Description*. Conakry, Republic of Guinea: Winning Consortium Simandou (WCS). Available at: https://wcsglobal.com/en/csr_part/project-description. Accessed: June, 2022.
- Webber, B. and Vedder, A. (2001). *In the Kingdom of Gorillas*. New York, NY: Simon and Shuster.
- Weber, A., Kalema-Zikusoka, G. and Stevens, N.J. (2020). Lack of rule-adherence during mountain gorilla tourism encounters in Bwindi Impenetrable National Park, Uganda, places gorillas at risk from human disease. *Frontiers in Public Health*, **8**, February 13, 2020. DOI: 10.3389/fpubh.2020.00001.
- Wedana, M., Masnur, I., Ibrahim, S., et al. (2021). Reinforcement of an isolated Javan silvery gibbon population on Mt. Tilu, West Java. In *Global Conservation Translocation Perspectives: 2021. Case Studies From Around the Globe*, ed. P. S. Soorae. Gland, Switzerland: International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Conservation Translocation Specialist Group, Environment Agency, Abu Dhabi, and Calgary Zoo, Canada, pp. 235–40. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2021-007-En.pdf>.
- Wendler, D. (2014). Should protections for research with humans who cannot consent apply to research with non-human primates? *Theoretical Medicine and Bioethics*, **35**(2), 157–73. DOI: 10.1007/s11017-014-9285-5.
- Wenker, C., Hoby, S., Wyss, F., et al. (2019). Alveolar echinococcosis in western lowland gorillas (*Gorilla gorilla gorilla*): albendazole was not able to stop progression of the disease. *Journal of Zoo and Wildlife Medicine*, **50**(1), 243–53. DOI: 10.1638/2018-0064.
- Werdenich, D., Dupain, J., Arnheim, E., et al. (2003). Reactions of chimpanzees and gorillas to human observers in a non-protected area in south-eastern Cameroon. *Folia Primatologica*, **74**(2), 97–100. DOI: 10.1159/000070005.
- Wertheim, J.O., Smith, M.D., Smith, D.M., Scheffler, K. and Kosakovsky Pond, S.L. (2014). Evolutionary origins of human herpes simplex viruses 1 and 2. *Molecular Biology and Evolution*, **31**(9), 2356–64. DOI: 10.1093/molbev/msu85.
- Wessling, E.G., Kühl, H.S., Mundry, R., Deschner, T. and Pruetz, J.D. (2018). The costs of living at the edge: seasonal stress in wild savanna-dwelling chimpanzees. *Journal of Human Evolution*, **121**, 1–11. DOI: 10.1016/j.jhevol.2018.03.001.
- Westlund, K. (2015). Training laboratory primates: benefits and techniques. *Primate Biology*, **2**(1), 119–32. DOI: 10.5194/pb-2-119-2015.
- Weston-Murphy, H. (2015). Great apes. In *Fowler's Zoo and Wild Animal Medicine, Volume 8*, ed. R. E. Miller and M. E. Fowler. St Louis, MO: W.B. Saunders, pp. 336–54. DOI: 10.1016/B978-1-4557-7397-8.00038-4.
- WFA (2022). *Historic UN Resolution Recognizes Animal Welfare's Role in Sustainability*. World Federation for Animals (WFA). Available at: <https://wfa.org/historic-un-resolution-recognizes-animal-welfares-role-in-sustainability/>.
- WFA (n.d.). *Achieving Global Impact For Animals – Together*. World Federation for Animals (WFA). Available at: <https://wfa.org/>. Accessed: May, 2022.
- WFEN (n.d.). *Wildlife Friendly TM Tourism*. Wildlife Friendly Enterprise Network (WFEN). Available at: <https://wildlifefriendly.org/wildlife-friendly-tourism/>. Accessed: April, 2022.
- WHA (2018). *Guidelines for Management of an Emergency Wildlife Disease Response. Working Draft November 2018*. Mosman, Australia: Wildlife Health Australia (WHA). Available at: <https://wildlifehealthaustralia.com.au/WHADocuments.aspx>.
- Whitfort, A. (2019). Wildlife crime and animal victims: improving access to environmental justice in Hong Kong. *Journal of International Wildlife Law & Policy*, **22**(3), 203–30. DOI: 10.1080/13880292.2019.1677055.

- Whitham, J. and Wielebnowski, N. (2015). WelfareTRAK. A tool for capturing zookeepers' assessment of animal welfare. *CONNECT (AZA News)*, January, 16–17.
- Whitham, J.C. and Miller, L.J. (2016). Using technology to monitor and improve zoo animal welfare. *Animal Welfare*, **25**(4), 395–409. DOI: 10.7120/09627286.25.4.395.
- Whitham, J.C. and Wielebnowski, N. (2009). Animal-based welfare monitoring: using keeper ratings as an assessment tool. *Zoo Biology*, **28**(6), 545–60. DOI: 10.1002/zoo.20281.
- Whittaker, D. and Knight, R.L. (1998). Understanding wildlife responses to humans. *Wildlife Society Bulletin*, **26**, 312–17.
- Whittaker, M. and Laule, G. (2012). Training techniques to enhance the care and welfare of nonhuman primates. *Veterinary Clinics of North America: Exotic Animal Practice*, **15**(3), 445–54. DOI: 10.1016/j.cvex.2012.06.004.
- Whittier, C.A., Nutter, F.B., Johnson, P.L.F., et al. (2022). Population structure, intergroup interaction, and human contact govern infectious disease impacts in mountain gorilla populations. *American Journal of Primatology*, **84**(4–5), e23350. DOI: 10.1002/ajp.23350.
- WHO (2012). *Social and Environmental Determinants*. Geneva, Switzerland: World Health Organization (WHO). Available at: https://www.euro.who.int/__data/assets/pdf_file/0006/185217/Social-and-environmental-determinants-Fact-Sheet.pdf.
- WHO (2014). *Early Detection, Assessment and Response to Acute Public Health Events: Implementation of Early Warning and Response With a Focus on Event-Based Surveillance. Interim Version*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://www.who.int/publications/i/item/WHO-HSE-GCR-LYO-2014.4>.
- WHO (2017a). *A Strategic Framework for Emergency Preparedness*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://www.who.int/publications/i/item/a-strategic-framework-for-emergency-preparedness>.
- WHO (2017b). *WHO Simulation Exercise Manual*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://www.who.int/publications/i/item/WHO-WHE-CPI-2017.10>.
- WHO (2018). *WHO Guidance for Contingency Planning*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://apps.who.int/iris/bitstream/handle/10665/260554/WHO-WHE-CPI-2018.13-eng.pdf?ua=1>.
- WHO (2019). *Burn-Out an "Occupational Phenomenon": International Classification of Diseases*. Geneva, Switzerland: World Health Organization (WHO). Available at: https://www.who.int/mental_health/evidence/burn-out/en/.
- WHO (2020a). *Basic Documents. Forty-ninth Edition. Including Amendments Adopted up to 31 May 2019*. Geneva, Switzerland: World Health Organization (WHO). Available at: https://apps.who.int/gb/bd/pdf_files/BD_49th-en.pdf.
- WHO (2020b). *COVID-19 Public Health Emergency of International Concern (PHEIC). Global Research and Innovation Forum: Towards a Research Roadmap*. Geneva, Switzerland: World Health Organization (WHO). Available at: [https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum).
- WHO (2020c). *Global Tuberculosis Report*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://apps.who.int/iris/bitstream/handle/10665/336069/9789240013131-eng.pdf>.
- WHO (2020d). *Glossary of Health Emergency and Disaster Risk Management Terminology*. Geneva, Switzerland: World Health Organization (WHO). Available at: <https://www.who.int/publications/i/item/9789240003699>.
- WHO (n.d.). *Tuberculosis*. Geneva, Switzerland: World Health Organization (WHO). Available at: https://www.who.int/health-topics/tuberculosis#tab=tab_1. Accessed: September, 2022.
- WHO, FAO and OIE (2019). *Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries*. Geneva, Switzerland: World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (OIE). Available at: <https://www.who.int/publications/i/item/9789241514934>.
- WHO/EHA (2002). *Disasters and Emergencies Definitions Training Package*. Addis Ababa, Ethiopia: World Health Organization (WHO)/Emergency and Humanitarian Action (EHA). Available at: <https://apps.who.int/disasters/repo/7656.pdf>.
- Wich, S.A., de Vries, H., Ancrenaz, M., et al. (2009a). Orangutan life history variation. In *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*, ed. S. A. Wich, S. S. Utami-Atmoko, T. Mitra Setia and C. P. van Schaik. Oxford, UK: Oxford Academic, pp. 65–75. DOI: 10.1093/acprof:oso/9780199213276.003.0005.

- Wich, S.A., Fredriksson, G., Usher, G., Kühl, H.S. and Nowak, M.G. (2019). The Tapanuli orangutan: status, threats, and steps for improved conservation. *Conservation Science and Practice*, **1**(6), e33. DOI: 10.1111/csp2.33.
- Wich, S.A., Fredriksson, G.M., Usher, G., *et al.* (2012a). Hunting of Sumatran orang-utans and its importance in determining distribution and density. *Biological Conservation*, **146**(1), 163–9. DOI: 10.1016/j.biocon.2011.12.006.
- Wich, S.A., Garcia-Ulloa, J., Kühl, Hjalmar S., *et al.* (2014a). Will oil palm's homecoming spell doom for Africa's great apes? *Current Biology*, **24**(14), 1659–63. DOI: 10.1016/j.cub.2014.05.077.
- Wich, S.A., Gaveau, D., Abram, N., *et al.* (2012b). Understanding the impacts of land-use policies on a threatened species: is there a future for the Bornean orang-utan? *PLoS ONE*, **7**(11), e49142. DOI: 10.1371/journal.pone.0049142.
- Wich, S.A., Geurts, M.L., Mitra Setia, T. and Utami-Atmoko, S.S. (2006). Influence of fruit availability on Sumatran orangutan sociality and reproduction. In *Feeding Ecology in Apes and Other Primates: Ecological, Physiological and Behavioural Aspects*. Cambridge Studies in Biological and Evolutionary Anthropology Volume 48, ed. G. Hohmann, M. M. Robbins and C. Boesch. Cambridge, UK: Cambridge University Press, pp. 337–58.
- Wich, S.A. and Piel, A.K., ed. (2021). *Conservation Technology*. Oxford, UK: Oxford University Press. DOI: 10.1093/oso/9780198850243.001.0001.
- Wich, S.A., Singleton, I., Nowak, M.G., *et al.* (2016). Land-cover changes predict steep declines for the Sumatran orangutan (*Pongo abelii*). *Science Advances*, **2**(3), e1500789. DOI: 10.1126/sciadv.1500789.
- Wich, S.A., Usher, G., Peters, H.H., *et al.* (2014b). Preliminary data on the highland Sumatran orangutans (*Pongo abelii*) of Batang Toru. In *High Altitude Primates*, ed. N. B. Grow, S. Gursky-Doyen and A. Krzton. Cambridge, UK: Springer, pp. 265–83.
- Wich, S.A., Utami-Atmoko, S., Mitra Setia, T. and van Schaik, C.P., ed. (2009b). *Orangutans: Geographic Variation in Behavioral Ecology and Conservation*. Oxford, UK: Oxford University Press.
- Wiederholt, R. and Post, E. (2010). Tropical warming and the dynamics of endangered primates. *Biology Letters*, **6**(2), 257–60. DOI: 10.1098/rsbl.2009.0710.
- Wiedmann, T., Lenzen, M., Keyßer, L.T. and Steinberger, J.K. (2020). Scientists' warning on affluence. *Nature Communications*, **11**(1), 3107. DOI: 10.1038/s41467-020-16941-y.
- Wikelski, M. and Cooke, S.J. (2006). Conservation physiology. *Trends in Ecology & Evolution*, **21**(1), 38–46. DOI: 10.1016/j.tree.2005.10.018.
- Wilcox, B.A., Aguirre, A.A., De Paula, N., Siriaronrat, B. and Echaubard, P. (2019). Operationalizing One Health employing social-ecological systems theory: lessons from the Greater Mekong Sub-region. *Frontiers in Public Health*, **7**, 85. DOI: 10.3389/fpubh.2019.00085.
- Wildlife Rescue Center Jogja (n.d.). *Giving Day For Apes*. Wildlife Rescue Center Jogja. Available at: <https://wrcjogja.org/giving-day-for-apes-2020/>. Accessed: October, 2020.
- Wilkinson, D.A., Marshall, J.C., French, N.P. and Hayman, D.T.S. (2018). Habitat fragmentation, biodiversity loss and the risk of novel infectious disease emergence. *Journal of The Royal Society Interface*, **15**(149), 20180403. DOI: 10.1098/rsif.2018.0403.
- Williams, D.R., Clark, M., Buchanan, G.M., *et al.* (2021). Proactive conservation to prevent habitat losses to agricultural expansion. *Nature Sustainability*, **4**(4), 314–22. DOI: 10.1038/s41893-020-00656-5.
- Williams, J.L. and Behie, A.M. (2020). Northern yellow-cheeked crested gibbons (*Nomascus annamensis*) travel and scan more at the cost of rest when in the presence of tourists. *Animal Biology*, **70**(4), 427–43. DOI: 10.1163/15707563-bja10040.
- Williams, J.M., Lonsdorf, E.V., Wilson, M.L., *et al.* (2008). Causes of death in the Kasekela chimpanzees of Gombe National Park, Tanzania. *American Journal of Primatology*, **70**(8), 766–77. DOI: 10.1002/ajp.20573.
- Williamson, E.A. and Butynski, T.M. (2013a). *Gorilla beringei* eastern gorilla. In *Mammals of Africa. Volume II: Primates*, ed. T. M. Butynski, J. Kingdon and J. Kalina. London, UK: Bloomsbury Publishing, pp. 45–53.
- Williamson, E.A. and Butynski, T.M. (2013b). *Gorilla gorilla* western gorilla. In *Mammals of Africa. Volume II: Primates*, ed. T. M. Butynski, J. Kingdon and J. Kalina. London, UK: Bloomsbury Publishing, pp. 39–45.
- Williamson, E.A. and Feistner, A.T.C. (2011). Habituating primates: processes, techniques, variables and ethics. In *Field and Laboratory Methods in Primatology: A Practical Guide*, ed. D. J. Curtis and J. M. Setchell. Cambridge, UK: Cambridge University Press, pp. 33–50. DOI: 10.1017/CBO9780511921643.004.

- Williamson, E.A., Maisels, F.G., Groves, C.P., *et al.* (2013). Hominidae. In *Handbook of the Mammals of the World. Volume 3: Primates*, ed. R. A. Mittermeier, A. B. Rylands and D. E. Wilson. Barcelona, Spain: Lynx Edicions, pp. 792–854.
- Williamson, E.A., Strindberg, S. and Maisels, F. (2018). New population estimate for western lowland gorillas. *Gorilla Journal*, **56**, 18–19. DOI: <https://www.berggorilla.org/en/home/news-archive/article-view/new-population-estimate-for-western-lowland-gorillas/>.
- Williamson, E.A., Tutin, C.E.G., Rogers, M.E. and Fernandez, M. (1990). Composition of the diet of lowland gorillas at Lopé in Gabon. *American Journal of Primatology*, **21**(4), 265–77. DOI: 10.1002/ajp.1350210403.
- Williamson, L. (2001). Mountain gorilla tourism: some costs and benefits. *Gorilla Journal*, **22**, 35–7.
- Wilson, D. and Reeder, D. (2005). *Mammal Species of the World: A Taxonomic and Geographic Reference*, 3rd edn. Baltimore, MD: Johns Hopkins University Press.
- Wilson, H.B., Meijaard, E., Venter, O., Ancrenaz, M. and Possingham, H.P. (2014a). Conservation strategies for orangutans: reintroduction versus habitat preservation and the benefits of sustainably logged forest. *PLoS ONE*, **9**(7), e102174. DOI: 10.1371/journal.pone.0102174.
- Wilson, M.L., Boesch, C., Fruth, B., *et al.* (2014b). Lethal aggression in *Pan* is better explained by adaptive strategies than human impacts. *Nature*, **513**, 414–17. DOI: 10.1038/nature13727.
- Wilson, P., Weavers, E., West, B., *et al.* (1984). *Mycobacterium bovis* infection in primates in Dublin Zoo: epidemiological aspects and implications for management. *Laboratory Animals*, **18**(4), 383–7. DOI: 10.1258/002367784780865351.
- Wilson, R.P. and McMahon, C.R. (2006). Measuring devices on wild animals: what constitutes acceptable practice? *Frontiers in Ecology and the Environment*, **4**(3), 147–54. DOI: 10.1890/1540-9295(2006)004[0147:MDOWAW]2.o.CO;2.
- Winders, D.J. (2017). Captive wildlife at a crossroads – sanctuaries, accreditation, and humane-washing. *Animal Studies Journal*, **6**(2), 161–78. DOI: <https://ro.uow.edu.au/asj/vol6/iss2/9>.
- Winter, G., Hart, R.A., Charlesworth, R.P.G. and Sharpley, C.F. (2018). Gut microbiome and depression: what we know and what we need to know. *Reviews in the Neurosciences*, **29**(6), 629–43. DOI: 10.1515/revneuro-2017-0072.
- Wise, S.M. (2010). Legal personhood and the nonhuman rights project. *Animal Law*, **17**(1), 1–11. DOI: <https://www.animallaw.info/article/legal-personhood-and-nonhuman-rights-project>.
- Wise, S., Durham, D. and Banes, G.L. (2020). The campaign for non-human rights and the status of captive apes. In *State of the Apes: Killing, Capture, Trade and Conservation*, ed. Arcus Foundation. Cambridge, UK: Cambridge University Press, pp. 231–62. Available at: <https://www.stateoftheapes.com/volume-4-killing-capture-trade/>.
- Wittig, R.M., Crockford, C., Weltring, A., *et al.* (2016). Social support reduces stress hormone levels in wild chimpanzees across stressful events and everyday affiliations. *Nature Communications*, **7**, 13361. DOI: 10.1038/ncomms13361.
- Wiysonge, C.S. (2019). Vaccine hesitancy, an escalating danger in Africa. *Think Global Health*, December 17, 2019. Available at: <https://www.thinkglobalhealth.org/article/vaccine-hesitancy-escalating-danger-africa>.
- WOAH (2021). *OIE Wildlife Health Framework: Protecting Wildlife Health to Achieve One Health*. Paris, France: World Organisation for Animal Health (WOAH/OIE). Available at: https://www.woah.org/fileadmin/Home/eng/International_Standard_Setting/docs/pdf/WGWildlife/A_Wildlifehealth_conceptnote.pdf.
- Wolf, T.M., Sreevatsan, S., Singer, R.S., *et al.* (2016). Noninvasive tuberculosis screening in free-living primate populations in Gombe National Park, Tanzania. *EcoHealth*, **13**(1), 139–44. DOI: 10.1007/s10393-015-1063-y.
- Wolf, T.M., Sreevatsan, S., Travis, D., Mugisha, L. and Singer, R.S. (2014). The risk of tuberculosis transmission to free-ranging great apes. *American Journal of Primatology*, **76**(1), 2–13. DOI: 10.1002/ajp.22197.
- Wolfensohn, S., Shotton, J., Bowley, H., *et al.* (2018). Assessment of welfare in zoo animals: towards optimum quality of life. *Animals*, **8**(7), 110. DOI: 10.3390/ani8070110.
- Wong, S.L. (2020). When Covid resets ecotourism. *Earth Journalism Network*, September 8, 2020. Available at: <https://earthjournalism.net/stories/when-covid-resets-ecotourism>.
- Wood, M.E. (2002). *Ecotourism: Principles, Practices and Policies for Sustainability*. Paris, France: United Nations Environment Programme (UNEP).
- Wood, W. (1998). Interactions among environmental enrichment, viewing crowds, and zoo chimpanzees (*Pan troglodytes*). *Zoo Biology*, **17**(3), 211–30. DOI: 10.1002/(SICI)1098-2361(1998)17:3<211::AID-ZOO5>3.o.CO;2-C.

- Woodford, M.H., Butynski, T.M. and Karesh, W.B. (2002). Habituating the great apes: the disease risks. *Oryx*, **36**(2), 153–60. DOI: 10.1017/S0030605302000224.
- World Bank (2016). *The Cost of Fire: An Economic Analysis of Indonesia's 2015 Fire Crisis. Indonesia Sustainable Landscapes Knowledge Note 1*. Jakarta, Indonesia: The World Bank. Available at: <http://documents.worldbank.org/curated/en/1776101467990969768/The-cost-of-fire-an-economic-analysis-of-Indonesia-s-2015-fire-crisis>.
- World Bank (2017). *The Growing Role of Minerals and Metals for a Low Carbon Future*. Washington DC: World Bank Group. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/207371500386458722/The-Growing-Role-of-Minerals-and-Metals-for-a-Low-Carbon-Future>.
- World Bank (2018). *Closing the Potential–Performance Divide in Ugandan Agriculture*. Washington DC: World Bank Group. Available at: <http://documents.worldbank.org/curated/en/996921529090717586/Closing-the-potential-performance-divide-in-Ugandan-agriculture>.
- World Bank (2021). Safeguarding animal, human and ecosystem health: One Health at the World Bank. *World Bank*, June 3, 2021. Available at: <https://www.worldbank.org/en/topic/agriculture/brief/safeguarding-animal-human-and-ecosystem-health-one-health-at-the-world-bank>.
- World Bank Group (2018). *One Health: Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*. Washington DC: World Bank. Available at: <http://documents.worldbank.org/curated/en/703711517234402168/pdf/123023-REVISED-PUBLIC-World-Bank-One-Health-Framework-2018.pdf>.
- Wrangham, R.W. (1974). Artificial feeding of chimpanzees and baboons in their natural habitat. *Animal Behaviour*, **22**(1), 83–93. DOI: 10.1016/S0003-3472(74)80056-4.
- Wrangham, R.W. (1986). Ecology and social relationships in two species of chimpanzee. In *Ecological Aspects of Social Evolution: Birds and Mammals*, ed. D. I. Rubenstein and R. W. Wrangham. Princeton, NJ: Princeton University Press, pp. 352–78.
- Wright, E., Grueter, C.C., Seiler, N., et al. (2015). Energetic responses to variation in food availability in the two mountain gorilla populations (*Gorilla beringei beringei*). *American Journal of Physical Anthropology*, **158**(3), 487–500. DOI: 10.1002/ajpa.22808.
- WTTC (2020). *Travel and Tourism: Economic Impact*. London, UK: World Travel & Tourism Council (WTTC).
- WWF (2018). New Barclays policy to protect World Heritage sites: a welcome first step. *WWF [World Wide Fund for Nature] News*, May 1, 2018. Available at: <https://wwf.panda.org/?327030/New-Barclays-policy-to-protect-World-Heritage-sites-a-welcome-first-step>.
- Wyatt, T., Maher, J., Allen, D., Clarke, N. and Rook, D. (2022). The welfare of wildlife: an interdisciplinary analysis of harm in the legal and illegal wildlife trades and possible ways forward. *Crime, Law and Social Change*, **77**(1), 69–89. DOI: 10.1007/s10611-021-09984-9.
- Xie, L. (2021). *Valuing Inclusion and Diversity, Embracing Uncertainty: Ways Forward for Nature-based Solutions*. London, UK: The British Academy. DOI: 10.5871/bacop26/9780856726712.001.
- Xie, T., Liu, W., Anderson, B.D., Liu, X. and Gray, G.C. (2017). A system dynamics approach to understanding the One Health concept. *PLoS ONE*, **12**(9), e0184430. DOI: 10.1371/journal.pone.0184430.
- Xie, X., Li, Y., Chwang, A.T.Y., Ho, P.L. and Seto, W.H. (2007). How far droplets can move in indoor environments – revisiting the Wells evaporation-falling curve. *Indoor Air*, **17**(3), 211–25. DOI: 10.1111/j.1600-0668.2007.00469.x.
- Yaguchi, Y., Okabayashi, S., Abe, N., et al. (2014). Genetic analysis of *Enterobius vermicularis* isolated from a chimpanzee with lethal hemorrhagic colitis and pathology of the associated lesions. *Parasitology Research*, **113**(11), 4105–9. DOI: 10.1007/s00436-014-4080-9.
- Yamagiwa, J. and Basabose, A.K. (2009). Fallback foods and dietary partitioning among *Pan* and *Gorilla*. *American Journal of Physical Anthropology*, **140**(4), 739–50. DOI: 10.1002/ajpa.21102.
- Yang, X.L., Zhang, Y.Z., Jiang, R.D., et al. (2017). Genetically diverse filoviruses in *Rousettus* and *Eonycteris* spp. bats, China, 2009 and 2015. *Emerging Infectious Diseases*, **23**(3), 482–6. DOI: 10.3201/eid2303.161119.
- Yang, Y. and Jobin, C. (2014). Microbial imbalance and intestinal pathologies: connections and contributions. *Disease Models & Mechanisms*, **7**(10), 1131–42. DOI: 10.1242/dmm.016428.
- Yeager, C.P. (1997). Orangutan rehabilitation in Tanjung Puting National Park, Indonesia. *Conservation Biology*, **11**(3), 802–5.

- YEL (n.d.-a). *Environmental Education*. Medan, Indonesia: Yayasan Ekosistem Lestari (YEL). Available at: <https://www.yel.or.id/environmental-education/>. Accessed: September, 2020.
- YEL (n.d.-b). *Yayasan Ekosistem Lestari: The Foundation for a Sustainable Ecosystem*. Medan, Indonesia: Yayasan Ekosistem Lestari (YEL). Available at: <https://www.yel.or.id/en/who-we-are>. Accessed: September, 2020.
- Yersin, H., Asiimwe, C., Voordouw, M.J. and Zuberbühler, K. (2017). Impact of snare injuries on parasite prevalence in wild chimpanzees (*Pan troglodytes*). *International Journal of Primatology*, **38**(1), 21–30. DOI: 10.1007/s10764-016-9941-x.
- Yin, J., Lampert, A., Cameron, M., Robinson, B. and Power, P. (2012). Using social media to enhance emergency situation awareness. *IEEE Intelligent Systems*, November/December 2012, 52–9. DOI: https://delvalle.bphc.org/pluginfile.php/847/mod_resource/content/2/YIN-IS2012.pdf.
- Yon, L., Williams, E., Harvey, N.D. and Asher, L. (2019). Development of a behavioural welfare assessment tool for routine use with captive elephants. *PLoS ONE*, **14**(2), e0210783. DOI: 10.1371/journal.pone.0210783.
- Yu, E. and Fan, R. (2007). A Confucian view of personhood and bioethics. *Journal of Bioethical Inquiry*, **4**(3), 171–9. DOI: 10.1007/s11673-007-9072-3.
- Yu, X. and Jia, W. (2015). *Moving Targets: Tracking Online Sales of Illegal Wildlife Products in China*. Cambridge, UK: TRAFFIC. Available at: <https://www.traffic.org/publications/reports/moving-targets-tracking-online-sales-of-illegal-wildlife-products-in-china/>.
- ZAHN (2011). *Lessons Learned Annex*. Silver Spring, MD: Zoo Animal Health Network (ZAHN). Available at: https://zahp.org/wp-content/uploads/2020/11/Lessons_Learned_Chart.pdf.
- ZAHP (2017). *Contingency Planning for the Exotic Animal Industry Workbook*. Silver Spring, MD: Zoo and Aquarium All Hazards Partnership (ZAHP). Available at: <https://zahp.org/all-hazards/>.
- ZAHP (n.d.). *Is Your Facility Prepared?* Silver Spring, MD: Zoo and Aquarium All Hazards Partnership (ZAHP). Available at: <https://zahp.org/>. Accessed: November, 2021.
- Zander, K.K., Pang, S.T., Jinam, C., Tuen, A.A. and Garnett, S.T. (2014). Wild and valuable? Tourist values for orang-utan conservation in Sarawak. *Conservation and Society*, **12**(1), 27–42.
- ZBPWG (2011). *Zoological Best Practices Working Group Planning Roadmap – A Basic Guide for Emergency Planners for Managed Wildlife Facilities*. Zoo Best Practices Working Group for Disaster Preparedness and Contingency Planning (ZBPWG). Zoo Animal Health Network. Available at: <https://www.yumpu.com/en/document/read/51212560/zoological-best-practices-working-group-planning-roadmap>.
- Zenda, C. (2020). COVID-19 sees increase in wildlife poaching in Southern Africa. *Fair Planet*, September 28, 2020. Available at: <https://www.fairplanet.org/story/covid-19-sees-increase-in-wildlife-poaching-in-southern-africa/>.
- Zhang, D., Fei, H.-L., Yuan, S.-D., et al. (2014). Ranging behavior of eastern hoolock gibbon (*Hoolock leuconedys*) in a northern montane forest in Gaoligongshan, Yunnan, China. *Primates*, **55**(2), 239–47. DOI: 10.1007/s10329-013-0394-y.
- Zhang, F. and Zhu, L. (2019). Enhancing corporate sustainable development: stakeholder pressures, organizational learning, and green innovation. *Business Strategy and the Environment*, **28**(6), 1012–26. DOI: 10.1002/bse.2298.
- Zhang, L., Ameca, E.I., Cowlshaw, G., et al. (2019). Global assessment of primate vulnerability to extreme climatic events. *Nature Climate Change*, **9**(7), 554–61. DOI: 10.1038/s41558-019-0508-7.
- Zheng, L., Shen, C., Tang, L., et al. (2013). Data mining meets the needs of disaster information management. *IEEE Transactions on Human-Machine Systems*, **43**(5), 451–64. DOI: 10.1109/THMS.2013.2281762.
- Zhou, J., Wei, F., Li, M., Pui Lok, C.B. and Wang, D. (2008). Reproductive characters and mating behaviour of wild *Nomascus hainanus*. *International Journal of Primatology*, **29**(4), 1037–46. DOI: 10.1007/s10764-008-9272-7.
- Zhu, P., Garber, P.A., Wang, L., et al. (2020). Comprehensive knowledge of reservoir hosts is key to mitigating future pandemics. *The Innovation*, **1**(3), 100065. DOI: 10.1016/j.xinn.2020.100065.
- Zimmerman, D.M., Mitchell, S.L., Wolf, T.M., et al. (2022). Great ape health watch: enhancing surveillance for emerging infectious diseases in great apes. *American Journal of Primatology*, **84**(4–5), e23379. DOI: 10.1002/ajp.23379.
- Zimmermann, F., Köhler, S.M., Nowak, K., et al. (2017). Low antibody prevalence against *Bacillus cereus* biovar *anthracis* in Tai National Park, Côte d'Ivoire, indicates high rate of lethal infections in wildlife. *PLoS Neglected Tropical Diseases*, **11**(9), e0005960. DOI: 10.1371/journal.pntd.0005960.

- Zimmermann, N., Pirovino, M., Zingg, R., *et al.* (2011). Upper respiratory tract disease in captive orangutans (*Pongo* sp.): prevalence in 20 European zoos and predisposing factors. *Journal of Medical Primatology*, **40**(6), 365–75. DOI: 10.1111/j.1600-0684.2011.00490.x.
- Zinsstag, J., Schelling, E., Waltner-Toews, D. and Tanner, M. (2011). From “one medicine” to “one health” and systemic approaches to health and well-being. *Preventive Veterinary Medicine*, **101**(3), 148–56. DOI: 10.1016/j.prevetmed.2010.07.003.
- Zommers, Z., Macdonald, D.W., Johnson, P.J. and Gillespie, T.R. (2013). Impact of human activities on chimpanzee ground use and parasitism (*Pan troglodytes*). *Conservation Letters*, **6**(4), 264–73. DOI: 10.1111/j.1755-263X.2012.00288.x.
- ZooLeón (n.d.). *Mapa Zoológico de León*. León, Mexico: ZooLeón. Available at: <http://www.zooleon.org.mx/mapa-zoologico-de-leon/>. Accessed: December, 2020.
- Zoological Society of Milwaukee (n.d.). *Bonobo Species Survival Plan*. Milwaukee, WI: Zoological Society of Milwaukee. Available at: <https://www.zoosociety.org/Conservation/BonoboSSP.php>. Accessed: October, 2020.
- Zoológico de Culiacán (2020). Zoológico de Culiacán Zoo. *Facebook Post*, November 7, 2020. Available at: <https://www.facebook.com/zoologicoculiacan/posts/pfbidos9SV9rjNq33FMmQ37hjNK89qYHraKx-pU6xrNKLdN727TNGhauB6FSpvKxiy47oM5l>.
- ZSL (2016). *Boîte à outils pour la prise en compte de la faune dans les forêts de production du bassin du Congo*. London, UK: Zoological Society of London (ZSL). Available at: https://www.zsl.org/sites/default/files/media/2016-10/Toolkit%20Report-v6-2-screen-LR_o.pdf.
- ZSL (n.d.). *Wildlife Wood Project*. London, UK: Zoological Society of London (ZSL). Available at: <https://www.zsl.org/conservation/regions/africa/wildlife-wood-project>. Accessed: October, 2019.
- Zulfikri, M., Ridwan, Y. and Cahyaningsih, U. (2018). Prevalence of intestinal helminth parasites in wild and soft-release Bornean orangutan (*Pongo pygmaeus*) in Lamandau Wildlife reserve, Central Kalimantan. *IOP Conference Series: Materials Science and Engineering*, **434**(1), 012135. DOI: 10.1088/1757-899X/434/1/012135.
- Zumla, A., Valdoleiros, S.R., Haider, N., *et al.* (2022). Monkeypox outbreaks outside endemic regions: scientific and social priorities. *The Lancet Infectious Diseases*, **22**(7), 929–31. DOI: 10.1016/s1473-3099(22)00354-1.

INDEX

A

Abbott's gray gibbon (*Hylobates abbotti*) xviii, xxii, xxvi–xxvii; *see also* gibbons (Hylobatidae); *Hylobates* gibbons

abscesses 32, 36, 280, 282, 317

accreditation of captive facilities 235, 238, 244, 245, 247–248, 250, 259, 268, 304, 307

Africa, number and status of captive apes in 261–264

African apes *see* bonobos (*Pan paniscus*); chimpanzees (*Pan troglodytes*); gorillas (*Gorilla* spp.)

age-related diseases 4, 6, 37, 38–40, 277

agile gibbon (*Hylobates agilis*) xxii, xxvi–xxvii; *see also* gibbons (Hylobatidae); *Hylobates* gibbons

agriculture; *see also* domestic animals/livestock; industrial development projects; One Health strategy

and disease risk to apes 53, 54–55, 66

expected prevalence 2020–2025 and risks to apes 298–300

and habitat loss/fragmentation/degradation 28, 52, 54–55, 66, 67, 163–164, 165

human–ape conflict 30

poisoning from 287

pollution from 30

sustainable farming 56–58, 60

air sacculitis 27, 35, 277–278, 281

amplifying hosts 12, 317

anemia 30–31, 125, 317

anesthesia use 29, 115, 116, 117–118, 120, 122, 128, 139, 155, 156–158

animal reservoir *see* reservoirs, disease

animal welfare; *see also* captive ape welfare and animal trade 238

barriers and challenges 247–250

health care provision 156

indicators 250–252

legislation and regulations 100, 240–241

and release programs 239

standards of practice 235, 240–247, 259–260

tools, technology and context 252–253

understanding 234, 235–237, 259

Ankylostoma spp. 283

Anopheles mosquitoes 30, 31, 283; *see also* malaria

anthelmintic treatments 32, 124–125

anthrax 19–20, 89, 277

antibiotics 16, 17, 18, 20, 31, 69, 70, 115, 125, 155

antibodies 32, 33, 34, 36, 94, 126

ape disease and health, review of 10–15, 40–41, 276–287

captive apes, infectious diseases in 30–36

captive apes, non-infectious diseases in 36–40

key findings 15

sampling 29

wild apes, infectious diseases in 15–28

wild apes, non-infectious disease in 28, 30

Ape Heart Project (Twycross Zoo) 39, 71

arboreal locomotion 89, 205, 209, 255, 257, 317

Ascaris spp. 283

Asian apes *see* gibbons (Hylobatidae); orangutans (*Pongo* spp.)

B

Bacillus anthracis 19–20, 277

Bacillus cereus biovar *anthracis* (Bcbva) 19–20

bacterial diseases 16, 26–28, 277–282; *see also* *specific diseases*

Balantidium coli 282

Batang Toru, Sumatra xvi, 62, 299

bats 21, 22, 278

Berlin Principles of One Health 48, 49, 58, 74

best management practices (BMPs) 64, 80, 81, 91, 95, 97–100, 105; *see also* standard operating procedures (SOPs)

best practice guidelines 26, 36, 97, 98, 99, 112, 128, 181, 210, 219–220, 225

Best Practice Guidelines for Great Ape Tourism (Macfie and Williamson) 98

Best Practice Guidelines for Health Monitoring and Disease Control in Great Ape Populations (Gilardi *et al.*) 26, 98, 112

Best Practice Guidelines for Responsible Images (Waters *et al.*) 97

biopsies 29, 136, 317

biosafety practices 32, 107, 124, 133, 317–318

biosecurity practices 68, 131, 181, 189, 318

bloating 32, 282, 318

bonobos (*Pan paniscus*)

anthrax 19

cardiovascular disease 38, 71

CITES and IUCN listing xiv, xxi

climate change impacts 171, 172–173

diet xiv, xxviii, 205

distribution xiv, xx, xxi, xxiv–xxv

Ebola virus 21

habitat types xxvii, xxviii, 205

home and day ranges xxx, xxxi

human orthopneumoviruses 288

life expectancy xiv

locomotion 205

- nesting xxxi
- overview xiv
- physiology xiv
- reproduction xxxi, xxxii
- respiratory diseases 25, 35, 90
- social organization xiv, xx, xxii, 205
- socioecology xx–xxxiii
- threats to xiv
- Bornean gray gibbon (*Hylobates funereus*) xviii, xxii, xxvi–xxvii, 73; *see also* gibbons (Hylobatidae)
- Bornean orangutans (*Pongo pygmaeus*); *see also* orangutans (*Pongo* spp.); *specific subspecies*
- CITES and IUCN listing xvi, xxi
- diet xxix
- distribution xxi, xxvi–xxvii
- habitat types xxviii
- home and day ranges xxx–xxxii
- numbers xvi
- parasites 33
- physiology xvi
- reproduction xxxii
- social organization xvii
- threats to xvi
- tuberculosis (TB) 138
- weaning age xxxii
- Bornean white-bearded gibbon (*Hylobates albibarbis*) xxii, xxvi–xxvii, 73, 167; *see also* gibbons (Hylobatidae); *Hylobates* gibbons
- Borneo; *see also* Indonesia
- community engagement 73
- deforestation 67–68, 113
- forest fires 73, 165, 167, 180, 287
- human–ape conflict 120
- logging 299
- One Health ecosystem conservation 72–73
- rescue/rehabilitation centers 87, 88, 95, 112–114
- tourism 85, 87, 88, 95
- bronchoalveolar lavage (BAL) 138, 318
- buffer zones 68, 74, 75, 89, 178–179
- Bukit Baka Bukit Raya National Park, Borneo 67, 68, 72
- Bukit Lawang rehabilitation site, Sumatra 87
- Bukit Tigapuluh National Park, Sumatra 61, 62
- Burkholderia pseudomallei* 36, 280
- burnout 159, 318
- burns 284–285
- Bwindi Impenetrable National Park, Uganda 16, 59–60, 68, 85, 87, 89, 99, 108–109, 174, 176, 181
- C**
- calcium 37, 124
- Cambodia 84, 210, 266, 299
- Cameroon 19, 24, 32, 36, 199, 221–224, 225–226, 263, 264, 299
- Candidatus* *Sarcina troglodytae* 278
- canopy bridges 30, 209, 221
- Cantanhez National Park, Guinea-Bissau 18
- Cao Vit gibbon (*Nomascus nasutus*) xviii, xxiii, xxvi–xxvii, 299; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
- capacity building 65, 66, 128, 130, 184–185
- Capillaria* spp. 283
- captive ape welfare 233–261
 - assessing 199, 235–236, 248–254, 261, 310–313
 - balancing benefits/risks 156–158
 - Barber and Mellen welfare infrastructure 238
 - barriers and challenges 247–248, 250, 260, 305–309
 - Brando and Buchanan-Smith 24/7
 - framework 236
 - defining animal welfare 199, 234, 235
 - enclosure designs 237, 240, 254, 255–257, 260
 - ethics of ape care 151, 156–158
 - Five Domains Model 199, 235–236, 250
 - key findings 234–235
 - language 236, 237, 259
 - movement between facilities 233, 236, 238
 - public concern for 233, 236, 260–261
 - standards of practice
 - failure to promote good welfare 247–248, 250
 - internally developed standards 245–246, 259–260, 308–309
 - international conventions and declarations 241–244, 259
 - national legislation and regulations 240–241, 259, 303–304
 - professional associations and accreditation 244, 259, 304, 307
 - for rehabilitation and release 246–247
 - welfare continuum 236
- captive apes, status and number of 261–271
 - Africa 261–264
 - Asia 264–267
 - data limitations 270–271
 - Europe 267–268
 - key findings 235
 - Latin America 268
 - Oceania 269
 - overview 261
 - United States 269–270
- captive/semi-captive settings; *see also* captive ape welfare; captive apes, status and number of; *specific type of setting*
- accreditation 235, 238, 244, 259, 304, 307
- ape health interventions 112–114
- API scores 261–262, 264–265
- “captive facilities” defined 233, 318
- disaster management 168–170, 178, 186, 190, 195
- disease prevention strategies
 - anthelmintic treatments 32

- best management practices (BMPs) 99
- biosafety practices 32
- enclosure designs 26, 30, 52
- foraging-like “work” 37
- good hygiene 26, 36
- monitoring 26, 94
- nutritional management 36–37
- One Health approach 52, 69–70
- plastic bans 100
- quarantine 26
- staff health 26, 27
- staff PPE use 26, 27
- strict standard operating procedures (SOPs) 94
- UK Framework for Preventive Health Programming and Interventions 131–132
- vaccination 25, 126, 127
- disease risk factors
 - diets 32
 - disease reservoir population densities 31, 36
 - gut microbiome disturbances 31, 69
 - human–ape interactions 4–5, 6, 30, 78, 79, 80, 92–95, 96–97, 114
 - for illegally-trafficked apes 123–125
 - malnutrition 6, 37
 - old age 6, 38–40
 - other animals–ape interactions 4–5, 6, 31, 34
 - plastics 100
 - poor enclosure designs 94
 - poor management 94, 95
 - poor ventilation 35
 - population density 30, 31, 32, 35
 - small cages 35
 - smoke 35
 - stress 6, 30, 32, 40, 70, 83, 106, 158
 - substandard hygiene 31
- diseases/conditions in 30–40, 276–287; *see also specific condition; specific disease*
- ethics of ape care 151, 156–158
- habituation 78, 79, 82–83
- illegal captivity 40, 94, 96, 123–125, 267, 284; *see also trafficking, wild animal*
- indoor versus outdoor settings 83
- sampling/testing 29, 69–70, 137–138
- as tourist destinations 80
- welfare *see captive ape welfare*
- cardiologists 71, 318
- cardiomyopathy 37, 38, 71, 318
- cardiovascular disease 37, 38–39, 70, 71, 122, 277, 285, 318
- Central African Republic 19, 25, 89–90, 221–224, 226
- central chimpanzee (*Pan troglodytes troglodytes*)
 - xiv, xxi, xxiv–xxv, xxviii, 22, 24, 221–222, 298; *see also chimpanzees (Pan troglodytes)*
- certification schemes 181, 202, 208, 215–218, 223, 226; *see also accreditation of captive facilities*
- cestodes 32, 33
- chimpanzees (*Pan troglodytes*); *see also specific subspecies*
 - anthrax 19, 20
 - behavioral and ecological characteristics 204, 205
 - behavioral studies, landmark 115, 116
 - cardiovascular disease 37, 38, 71
 - CITES and IUCN listing xiv, xxi
 - climate change impacts 164
 - COVID-19 278
 - dental disease 40
 - diet xv, xxviii, xxix, 205
 - disease transmission to/from humans 12, 90, 91, 288
 - distribution xiv, xx, xxi, xxiv–xxv
 - Ebola virus 12, 21, 22, 137, 151
 - epizootic neurologic and gastroenteric syndrome (ENGS) 34, 278
 - facial dysplasia 30, 287
 - gastrointestinal parasites 32, 33
 - habitat types xxviii, 204, 205
 - habituation 81, 88, 90, 91
 - health interventions 117, 118, 153–156, 156–158
 - hepatitis A 279
 - hepatitis B 279
 - HIV-1 group M 12
 - home and day ranges xxix–xxx, xxxi
 - human coronavirus OC43 288
 - in human environments 2–3
 - human metapneumovirus (HMPV) 288
 - human orthopneumovirus 288
 - human rotavirus 3 288
 - human rhinovirus C 288
 - hunting other mammals 12
 - in illegal captivity 238
 - industrial impacts and mitigations 209, 210, 214, 298
 - leprosy 12, 18
 - life expectancy xv
 - locomotion 205, 208
 - malaria 30
 - meliodosis 36
 - monkeypox virus (MPXV) 10–11, 16, 36
 - nesting xxxi
 - numbers xiv–xv
 - numbers in captive settings 262, 263–264, 265, 266, 267, 268, 269, 270
 - overview xiv–xv
 - pesticide poisoning 287
 - physiology xv
 - polio 117, 151
 - poliomyelitis 281
 - renal disease 39
 - reproduction xxxi, xxxii, xxxiii
 - respiratory diseases 25, 26–27, 28, 34, 35, 90, 91, 102
 - sarcoptic mange (scabies) 16

- simian immunodeficiency viruses (SIVs)
 24–25, 281
 snare injuries 117, 153–156
 social organization xv, xx, xxii, 12, 205
 socioecology xx–xxxiii
 species xxi
 stress in captive settings 83
 territoriality 205
 threats to xv
 vaccinations 117, 126–127, 151
 vocalizations 103
 yaws (TPE) 12, 17
- China 264–265, 298, 299
 chlorpyrifos 30, 287, 318
 circuses, animal use in 267
 climate change 3, 45, 49, 109–110, 164, 167, 169, 171,
 172–173, 222–223
Clostridium tetani 278, 282
 colitis 32, 33, 69, 135, 282, 318
 collectivism 147, 148, 321
 “common cold” (human rhinovirus C) 13, 25, 278, 288
 communities, local
 conflicts with apes 78, 89, 118
 COVID-19 impacts 87, 99, 174, 176, 181, 264
 disaster management/mitigation 176, 177–178,
 181–182, 182–183, 184–185, 187–188, 192–193, 194, 196
 education and awareness programs 45, 48, 56,
 60, 65
 engagement with 48, 66
 health initiatives 53, 55–60, 62, 64–65, 67–68, 86,
 97, 137
 investing in 45, 59, 60, 178
 involvement in conservation 60, 62, 70, 73, 86, 133,
 149–150, 178, 226
 tourism benefits/costs 85–86
 compassion fatigue 159–160, 326
 compassionate conservation 7–8, 144, 146, 147–150,
 152, 160, 236, 318
 compounding risks 174–177, 318
 Congo Basin 221–224
 conjunctivitis 94
 Conservation, Mitigation and Biodiversity Offsets in
 Africa (COMBO) program 214, 320
 conservation litigation 241, 318
 Convention on International Trade in Endangered
 Species of Wild Fauna and Flora (CITES) xiv, xvi,
 xvii, xviii, xix, xx, xxi–xxiii, 123, 237, 241–244, 269
Coronaviridae 288
 COVID-19
 in apes 278
 causative pathogen 7, 45
 gorillas, risk to 35–36, 60, 181, 186
 impacts on ape rescue centers 171
 impacts on ape tourism and research 87, 98,
 174–176, 181, 264, 270
 impacts on conservation 87, 99, 174, 176, 264
 impacts on local communities 87, 99, 174, 176,
 181, 264
 impacts on understanding of animal
 welfare 259
 impacts on zoos 269
 minimizing transmission risks 60, 87, 97–98, 130,
 171, 209–210
 Non Human Primate COVID-19 Information
 Hub 66
 preparedness documents 185
 recognition as global problem 3, 45, 50
 cramping 32, 282, 318
 crop-raiding 30, 68, 78, 86, 89, 120
 Cross River gorilla (*Gorilla gorilla diehli*) xv, xxi,
 xxiv–xxv, 209; *see also* gorillas (*Gorilla* spp.);
 western gorillas (*Gorilla gorilla*)
 cross-reactivity 24, 114, 319
Cryptosporidium spp. 32
 cumulative welfare assessment score (CWAS) 310
 cysticercosis 33
 cytomegalovirus (CMV) 33, 124, 152, 319
- ## D
- data mining 187–188, 319
 DDT/pp-DDE 30, 287
 deciduous teeth 39, 277, 319
 deficiencies and imbalances, nutritional 37, 40
 deforestation 53, 54–55, 61–62, 66, 88, 102, 112, 113,
 150, 216; *see also* habitat loss/fragmentation/
 degradation; logging
 Delphi method 251, 252
 Democratic Republic of Congo (DRC)
 behavioral studies, landmark 116
 climate change impacts 171, 172–173
 community engagement 68, 137
 COVID-19 impacts 174–177, 181
 diseases in apes 17, 19, 21, 22, 25, 94, 137
 Gorilla Doctors 62–65, 115
 Gorilla Rehabilitation and Conservation
 Education Center (GRACE) 199, 257–258
 Great Ape Welfare Index (GAWI) trials 311
 Greater Virunga Transboundary
 Collaboration 176, 178, 185, 186–187, 188
 habituation 89–90
 logging 298
 mining 299
 numbers of apes in sanctuaries 263, 264
 tourism 84, 85, 174–177
 dental disease/issues 38, 39–40, 277, 285
 dependency, alcohol/drug/tobacco 40, 284
 depigmentation, skin 18, 280, 319
 dermatophytes 125, 319

- diabetes 39
 - diagnostic protocols 114, 319
 - diagnostics *see* sampling/testing
 - Dientamoeba fragilis* 282
 - diet xiv, xv, xvi, xvii–xviii, xix, xxiii, xxviii–xxix, 36–37, 171, 205
 - Dirofilaria immitis* 282
 - disaster impacts; *see also* COVID-19
 - climate change hazards 167, 168–170, 171
 - direct impacts 166–167
 - indirect impacts 167
 - multiple threats 162–164, 165, 167
 - stages 166–167
 - terminology 166
 - wildlife coping strategies 171–172, 172–173
 - disaster management; *see also* risk assessments
 - best practice guidelines 195–196
 - capacity and capability 184–185, 296
 - case studies 168–170, 174–176
 - command and control systems 182, 186, 191, 195, 196, 318
 - community engagement 192–193
 - compounding risks 174–177, 318
 - contingency plans 185–186
 - continuum of 178, 185–186
 - cost–benefit analysis 174–177
 - costs, financial 318
 - documentation 185–186, 296
 - early warning systems 188–189
 - governance 186–187
 - key findings 164–166
 - management systems 187–190, 297
 - monitoring and review 193–195
 - multi-agency response 323
 - Ngamba Island flood crisis 104–105, 168–170, 294–297
 - PEESTOLM approach 164, 172, 174
 - preparedness *see* preparedness, disaster prevention 178–181, 295–296
 - recovery 191–192
 - responses 190–191
 - risk management 172–177
 - risk mitigation 177–178
 - terminology 166
 - usage exercises 190, 297
 - volunteers, management of 191
 - disease ecology in natural habitats 102–103
 - disease emergence 48, 52, 101, 102, 150, 319
 - disease/injury prevention strategies; *see also* interventions, ape health; One Health strategy
 - best management practices (BMPs) 64, 91, 97–100
 - biosafety practices 32, 107, 124, 133, 317–318
 - biosecurity practices 68, 131, 181, 189, 318
 - canopy bridges 30, 209, 221
 - in captive/semi-captive settings *see* captive/semi-captive settings, disease prevention strategies
 - containment actions 191
 - distancing measures 60, 87, 91, 99, 103, 105, 176, 181
 - early warning systems 102, 137, 188–189, 191
 - education and public awareness 26, 48, 62, 64–65, 95, 99–100, 137, 180
 - employee health programs 28, 62, 64–65, 131
 - field laboratories 28
 - improved hygiene 26, 28, 36, 60
 - improving human health 28, 48, 53, 64–65; *see also* One Health strategy
 - integrated approaches 46–47, 110, 111
 - legislation and regulations 95, 100
 - multipronged approach 106–107
 - overview 26
 - pathogen surveillance 36
 - PPE use 26, 27, 176
 - primary prevention 144, 150, 324
 - quarantines 26, 28, 34, 87, 91, 99, 131, 181, 325
 - risk assessments 26, 53, 62, 100–101, 136, 172, 174, 290–292
 - risk mitigation 177, 181
 - screening and testing 28, 32, 34, 64, 87, 94, 99, 100, 113, 114, 131, 137–138
 - secondary prevention 144, 150, 161, 325
 - tertiary prevention 144, 326
 - vaccination *see* vaccination
 - diseases *see* Annex II; bacterial diseases; captive/semi-captive settings, diseases/conditions in; parasites; viral infections; zoonoses; *specific disease*
 - distancing measures 60, 87, 91, 99, 103, 105, 176, 181
 - Djéké Triangle, Republic of Congo 222, 223
 - DNA (deoxyribonucleic acid) 17, 69–70, 102–103, 114, 135, 137, 319
 - documentation, disaster management 185–186, 296
 - domestic animals/livestock 34, 46–47, 62, 64, 65, 67, 68, 90, 92, 240
 - drowning 170, 285
 - dysbiosis 69–70, 319
 - dyspnea 278, 279, 281, 282, 319
 - Dzanga-Sangha, DRC 89–90, 221, 222, 289
- ## E
- eastern chimpanzee (*Pan troglodytes schweinfurthii*)
 - xiv–xv, xxi, xxiv–xxv, xxvii, xxviii, 24–25, 288;
 - see also* chimpanzees (*Pan troglodytes*)
 - eastern gorillas (*Gorilla beringei*); *see also* gorillas (*Gorilla* spp.); Grauer’s gorilla (*Gorilla beringei graueri*); mountain gorilla (*Gorilla beringei beringei*)
 - distribution xv
 - habitat types xxviii
 - home and day ranges xxx, xxxi

physiology xv–xvi
 reproduction xxxi
 social organization xvi
 threats to xv
 eastern hoolock (*Hoolock leuconedys*) xvii, xxii, xxvi–xxvii; *see also* Hoolock gibbons
 Ebola virus disease (EVD) 12, 13, 14, 21–24, 126, 127, 137, 150, 151–152, 185, 192–193, 278
Echinococcus multilocularis (fox tapeworm) 33
 echocardiographers 71, 319
 ecoimmunology 139–140
 ecosystem health 44, 45, 46, 48, 55, 58, 61–65, 70, 72–73, 150, 319
 ectoparasites 11, 29, 283, 319; *see also* sarcoptic mange (scabies)
 ectopy 39, 320
 electrocution 285
 employee health programs 28, 62, 64–65, 131
 encephalomyocarditis 126, 279, 320
 Enclosure Design Tool (EDT) 52, 199, 246, 254, 255–257
 enclosure designs 26, 30, 52, 94, 237, 240, 255–257
 endoparasites 69, 320
Entamoeba spp. 32, 282
Enterobius spp. 32, 33, 283
 epizootic neurologic and gastroenteric syndrome (ENGS) 278
 Epstein–Barr virus 33
 Equator Principles 215
 ethics of ape care 142–144, 159–160
 case studies 151–152, 153–155, 156–158
 compassionate conservation 147–150
 ethical importance of apes 211–212
 “first, do no harm” approach 110, 140, 149, 152
 general considerations 145–147
 inclusivity 149
 individual and collective importance 121, 145–147, 148–149, 159, 211–212
 moral agency and moral courage 158–159, 159–160
 peaceful coexistence 149–150
 in sanctuary settings 156–158
 secondary prevention 150, 153–156
 tertiary prevention 156–158
 vaccination 123, 126–127, 151–152
 in wild settings 29, 116–117, 121, 153–155

F

facial dysplasia 30, 287, 320
 feral animals 64, 180
 field laboratories 28
 fighting, inter- and intragroup 121, 286
 filariasis 282
 “first, do no harm” approach 110, 140, 149, 152
 fission–fusion dynamics 171, 205, 320

Five Domains Model 199, 235–236, 250
 flooding 168–170, 192, 294–297
 flukes (trematodes) 283
 fomites 89, 100, 320
 food security 56–58, 126, 320
 forest fires
 impacts on apes 28, 164, 165, 166, 171, 266, 284, 287
 prevention and response strategies 73, 180, 183, 188–189, 190
 Forest Stewardship Council (FSC) 216–218, 219, 223, 226
 formulation, diet 36, 320
 fungi 3, 6, 321

G

Gabon 21, 85, 96, 263, 264
 Gaoligong hoolock (*Hoolock tianxing*) xvii, xxii, xxvi–xxvii; *see also* gibbons (Hylobatidae); Hoolock gibbons
 gastrointestinal diseases
 bacterial 34, 69, 278, 280, 281, 282
 parasitic 6, 7, 31–33, 64, 108–109, 282, 283
 Primate Microbiome Project 69–70
 viral 278, 279
 gene sequencing 135–136, 137–138
 genetic sampling 102–103
 geriatric disorders 4, 6, 37, 38–40, 277
Giardia spp. 32, 60, 125, 282
 gibbons (Hylobatidae); *see also specific genus; specific species*
 abundance estimates xii
 behavioral and ecological characteristics 205
 in captive/semi-captive settings 238, 240, 262, 265–266, 267, 268, 269–270, 279
 CITES and IUCN listing xxii
 cytomegalovirus 124
 dental disease 40
 dependency, alcohol/drug/tobacco 40, 284
 diet xxix, 205
 distribution xxii, xxvi–xxvii
 emergency response plan 176, 178, 185, 190–191
 forest fire impacts 167
 gastrointestinal parasites 32–33
 habitat types xxviii, 205
 habituation 81, 90
 health interventions 123–125
 hepatitis A 279
 hepatitis B 123, 124, 279
 herpes viruses 33, 279
 home and day range xxxi
 illegal trafficking of 123–125
 industrial impacts and mitigations 221, 299
 locomotion 205
 meliodosis 36

- overview xvii
 - parasites 124–125
 - privately-held 123–125, 238
 - rehabilitation/release 238, 240
 - reproduction xxxii
 - social organization xx, xxv, xxvii, 205
 - socioecology xx–xxxiii
 - species xxii–xxiii
 - territoriality 205, 240
 - tourism 84
 - tuberculosis (TB) 34
 - vaccinations 126
 - vocalizations 103, 167
 - glucocorticoids (GCs) 92, 136, 321
 - Gombe National Park, Tanzania 16, 24–25, 90, 91, 115, 116, 117, 281
 - Gorilla Doctors 60, 62–65, 68, 108–109, 114–115, 118, 121, 135, 151–152, 186
 - Gorilla Rehabilitation and Conservation Education Center (GRACE), DRC 199, 257–258
 - gorillas (*Gorilla* spp.); *see also specific species; specific subspecies*
 - age-related diseases 37
 - anthrax 19
 - in captive situations 257–258, 262–263, 265, 266, 267, 268, 269, 270, 279, 310
 - cardiovascular disease 37, 38, 71
 - CITES and IUCN listing xv, xxi
 - COVID-19 60, 87, 174, 176, 181, 185, 186, 278
 - dental disease 40
 - diet xvi, xxviii–xxix, 205
 - distribution xv, xx, xxi, xxiv–xxv
 - Ebola virus 12, 21, 22–23, 137
 - gastrointestinal parasites 32, 33, 108–109
 - Giardia* diseases 60
 - habitat types 205
 - habituation 81, 86, 88, 89–90, 92, 98
 - health interventions 117, 118, 119, 121, 133, 135, 151–152; *see also* Gorilla Doctors
 - hepatitis B 279
 - herpes viruses 33, 94, 279
 - home and day ranges xxx
 - human conflict with 68, 89
 - human metapneumovirus (HMPV) 25, 289
 - human orthopneumoviruses 289
 - human respiratory syncytial virus (HRSV) 25
 - industrial impacts and mitigations 209, 223–224, 226, 299
 - inter- and intragroup fighting 121
 - leprosy 12
 - life expectancy xv–xvi
 - locomotion 205
 - malaria 12
 - measles 117
 - meliodosis 36
 - monkeypox virus (MPXV) 36
 - nesting xxxi
 - numbers xv
 - obesity 37
 - overview xv–xvi
 - parasites 133, 135
 - as pets 96
 - physiology xv–xvi
 - renal disease 39
 - reproduction xxxi–xxxii, xxxiii
 - respiratory diseases 25, 90, 289
 - sarcoptic mange (scabies) 16, 59, 60
 - severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) 35–36, 60, 181
 - simian immunodeficiency viruses (SIVs) 24
 - snare injuries 121
 - social organization xvi, xx, xxii–xxiv, 22, 205
 - socioecology xx–xxxiii
 - threats to xv
 - and tourism 81, 84–85, 85–86, 86–87, 92, 95, 98, 99, 116, 176, 177–178, 181, 192
 - vaccinations 126, 151–152
 - yaws (TPE) 12, 17–18
 - Goulougo Triangle Ape Project 221–224
 - governance, disaster 186–187, 188, 190, 195, 196
 - Grauer's gorilla (*Gorilla beringei graueri*) xv, xxi, xxiv–xxv, 62–65, 94, 115; *see also* eastern gorillas (*Gorilla beringei*); gorillas (*Gorilla* spp.)
 - Greater Virunga Transboundary Collaboration 176, 178, 185, 186–187, 188
 - Guinea 17, 68, 192–193, 199, 210, 214, 227–230, 263, 264, 298
 - Guinea-Bissau 18
 - Gunung Palung National Park, Indonesia 67–68, 74, 75, 165
 - gut microbiome 6–7, 31, 32, 41, 69–70, 124
- ## H
- habitat loss/fragmentation/degradation; *see also*
 - agriculture; deforestation; industrial development projects; logging; mining; resource extraction; roads and disease ecology 101, 102
 - due to tourism 88
 - and genetic degradation 120
 - and health risks 4, 28, 30, 52, 58, 66–67, 92, 101, 102
 - leading to human–ape conflict 14, 58
 - leading to human–wildlife interactions 3, 4, 52, 58
 - and vulnerability to natural hazards 162–164
 - habituation
 - benefits versus costs 83, 84
 - best management practices (BMPs) 81
 - captive apes
 - behavioral impacts 83

- disease transmission risks 78, 79, 92–95
 - habituation process 82–83
 - human reasons for 82–83
 - reversing habituation 83
 - defining 81, 321
 - as disease risk factor 12, 62, 78, 79, 81, 88, 89, 90, 91, 92–95
 - evidence-based risk assessments 100–101, 106
 - limitations and financial costs 87–90
 - minimizing risks 79–80, 81
 - overhabituation 78, 88–89
 - reversing 83
 - wild apes
 - behavioral impacts 78, 79, 81, 87, 88
 - benefits to apes 83–84
 - best management practices (BMPs) 81
 - disease transmission risks 78, 79, 81, 88, 89, 91
 - due to tourism and research 76–77, 78
 - financial costs 89–90
 - habituation process 80–81
 - human reasons for 79, 80–81
 - increase in 89
 - length of process 81
 - negative consequences 78, 81, 87–88, 88–89
 - overhabituation 88–89
 - Hainan gibbon (*Nomascus hainanus*) xviii, xxiii, xxvi–xxvii, 176, 178, 185, 190–191, 299; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
 - health interventions *see* interventions, ape health
 - helminths 31, 32–33, 133, 135, 283, 321
 - hepadnavirus 114, 321
 - hepatitis A 94, 279
 - hepatitis B 94, 114, 123, 124, 126, 279
 - herpes viruses 33, 94, 279
 - histopathology 135, 321
 - HIV-1 12, 13, 24
 - Hoolock* gibbons; *see also* gibbons (Hylobatidae); *specific species*
 - CITES and IUCN listing xxii
 - distribution xvii, xxii, xxvi–xxvii
 - numbers xvii
 - offset legislation 214
 - physiology xvii–xviii
 - social organization xviii
 - species xxii
 - human coronavirus OC43 25, 26, 279, 288
 - human coronaviruses (HCoV) 13
 - human immunodeficiency virus (HIV) 12, 13, 24, 64
 - human metapneumovirus (HMPV) 13, 25, 26, 27, 35, 288, 289
 - human orthopneumoviruses 25, 279, 288, 289
 - human respiratory syncytial virus (HRSV) 13, 25–26, 26–27, 35
 - human rotavirus 3 25, 279, 288
 - human rhinovirus C (“common cold”) 13, 25, 278, 288
 - hunting/poaching *see* poaching/hunting
 - hydropower 205, 206, 230, 298–300; *see also* industrial development projects
 - hygiene 26, 28, 36, 60, 86, 144
 - Hylobates* gibbons; *see also* gibbons (Hylobatidae); *specific species*
 - CITES and IUCN listing xxii–xxiii
 - distribution xviii, xxii–xxiii, xxvi–xxvii
 - home and day range xxxi
 - numbers xviii
 - offset legislation 214
 - overview xviii
 - physiology xviii
 - social organization xviii
 - species xxii
 - hyperendemic regions 19, 20, 321
 - hypertension 38, 39, 71, 321
 - hypertrophy 38, 321
 - hypoplasia 39–40, 277, 321
 - hypotension 122, 321
 - hypothermia 122, 322
- |
- idiopathic myocardial fibrosis 71, 285, 322
 - imidacloprid 30, 287, 322
 - immunocompetence 90, 322
 - immunofluorescence antibody assays 32
 - India 84, 265, 266, 299
 - Indigenous Peoples and Local Communities (IPLCs)
 - see* communities, local
 - Indonesia; *see also* Borneo; Sumatra
 - agribusiness 299
 - animal welfare 247, 265
 - deforestation 112, 113
 - disaster management 180
 - forest fires 167, 180, 189
 - infrastructure development 299
 - interventions, ape health 112–114
 - lawsuit regarding captive wildlife 241
 - meliodosis 36
 - rescue/rehabilitation centers 112–114, 240, 246, 266–267
 - tourism 84
 - translocations 128–129
 - tuberculosis (TB) 34, 138
 - industrial development projects 230; *see also* agriculture; infrastructure development; mining; roads
 - biodiversity impacts 202
 - case studies 221–224, 225–226, 227–230
 - critical threat to apes 200–201
 - expected prevalence 2020–2025 and risks to apes 298–300

- future needs
 - conservationists–industrialists
 - communication 224
 - defining ape priority areas 224
 - government engagement 224, 225–226
 - policy improvements 224–225, 227–230
 - standardizing mitigation metrics 225
 - impacts on apes 206–208
 - industries in ape ranges 205–206
 - legislation and regulations 202
 - long-term research and monitoring 221–224
 - managing cumulative impacts 220–221
 - mitigation approaches 208–219, 228, 230
 - mitigation factors to consider 202–206
 - mitigation guidelines 219–220
 - mitigation hierarchy 301–302
 - mitigation issues linked to ownership change 224–225, 227–230
 - strategic environmental assessments (SEAs) 220–221
 - infanticide xxxii–xxxiii, 322
 - influenza (flu) 35, 50, 230, 280, 322
 - infrastructure development 28, 66, 88, 164, 228, 298–300; *see also* industrial development projects; roads
 - interbirth intervals xxxii, 322
 - interferon-gamma assays 137–138, 322
 - international conventions and declarations 241–244; *see also* Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); International Union for Conservation of Nature (IUCN)
 - International Primate Heart Project (IPHP) 39, 71
 - International Union for Conservation of Nature (IUCN)
 - Avoid, Reduce, Restore and Conserve (ARRC) Task Force 199, 204, 218–219, 224
 - best practice guidelines 26, 97, 98, 128, 219–220, 239, 246–247, 248, 250
 - capacity building programs 65–66
 - COVID-19 guidelines 130, 171, 176, 181
 - IUCN–CITES task force 243
 - A.P.E.S. Database 1, 219
 - Primate Specialist Group (PSG) 97, 98, 176, 215, 218, 248, 250
 - Red List xiv, xv, xvii, xviii, xix, xx, xxi–xxiii, 97, 274–275
 - Species Survival Commission, Primate Specialist Group 218
 - interventions, ape health 108–140
 - anesthesia use 29, 115, 116, 117–118, 120, 122, 128, 139, 155, 156–158
 - behavioral studies, landmark 115–116
 - best practice guidelines 112, 128
 - capacity building 128–129, 130–132
 - captive settings 112–114
 - case studies 120, 121, 123–125, 130, 131–132, 137–138
 - conservation physiology toolbox 136, 139
 - decision-making process 110, 112, 118–121, 140
 - diagnostics, improving 135–136, 137
 - duty-of-care concept 112
 - ecoimmunology 139–140
 - ethical considerations *see* ethics of ape care
 - history and evolution of 112–118
 - human-caused injuries 117, 121, 150, 153–156
 - radio telemetry 139
 - rescuing apes from illegal captive situations 118
 - risks for humans and apes 117
 - tools 127–140
 - translocations *see* translocations
 - vaccinations *see* vaccination
 - intrinsic value 147, 211, 241, 322
 - Ivory Coast 16, 17, 18, 19, 21, 25, 90, 262, 263, 264, 288
- ## J
- ## K
- Kahuzi-Biega National Park, DRC xv
 - Kalimantan, Indonesian Borneo 67–68, 72–73, 87, 88, 113, 165, 167, 180
 - Klebsiella pneumoniae* 280, 289
 - Kloss's gibbon (*Hylobates klossii*) xxii, xxvi–xxvii; *see also* gibbons (Hylobatidae); *Hylobates* gibbons
 - Koukoutamba dam, Guinea 298
- ## L
- Lao People's Democratic Republic (Lao PDR) 84, 210, 266
 - lar gibbon (*Hylobates lar*) xviii, xxii, xxvi–xxvii, 32–33; *see also* gibbons (Hylobatidae); *Hylobates* gibbons
 - legislation and regulations
 - on animal welfare 234, 240–241, 305–306
 - API scores 261–262, 263–265, 267
 - on industrial development 226, 228, 230
 - positive developments in 202, 226, 303–304
 - on protection of apes 210, 214
 - on strategic environmental assessments (SEAs) 220–221, 226, 228, 230
 - on tourism and research 98, 100
 - leprosy 12, 18, 280
 - lesions 16, 17, 18, 38, 39, 71, 125, 277, 280, 322
 - Leuser Ecosystem, Sumatra xvi, 62, 70, 229
 - Liberia 19, 192–193, 263–264
 - live ape trade *see* trafficking, wild animal
 - liver disease 38, 69, 114, 277, 279; *see also* hepatitis B
 - livestock *see* domestic animals/livestock

locomotion
 arboreal 89, 205, 209, 255, 257, 317
 terrestrial 205, 208, 326
 logging 62, 66, 67–68, 133, 164, 206, 221–224, 225–226,
 298–300; *see also* deforestation; habitat loss/
 fragmentation/degradation; resource extraction
 lymphocryptovirus 33

M

macroparasites 6, 322
 malabsorption 94, 96
 malaria 12, 30–31, 114, 283
 Malaysia 34, 36, 84, 114, 247, 265, 266; *see also* Borneo
 malnutrition 36–38, 56, 94, 96, 124, 166, 286
 management systems, disaster 187–190
 mange mites/scabies 16–17, 59, 60, 89, 94, 283
 measles 13, 64, 89, 94, 99, 117, 126, 151–152
 melioidosis (a.k.a. Whitmore's disease) 36, 280
 meningitis 94
 metabarcoding 29, 33, 322
 metabolic bone disease 37, 40
 metabolic syndrome 39, 322
 metazoan parasites 135, 322; *see also* helminths
 Mgahinga Gorilla National Park, Uganda 85, 87
 minimization step of mitigation strategy 209–210,
 212, 302
 mining 28, 30, 66, 67, 206, 210, 218, 224, 227–230,
 287, 298–300, 301–302; *see also* infrastructure
 development; resource extraction
 mitigation hierarchy 208–210, 211–212, 214, 218,
 224–225, 230, 301–302, 322
 moloch gibbon (*Hylobates moloch*) xviii, xxii,
 xxvi–xxvii; *see also* gibbons (Hylobatidae);
Hylobates gibbons
 Mondika field station, Central African Republic
 221–224
 monkeypox virus (MPXV) 6, 10–11, 13, 15–16, 36, 280
 moral agency 147, 158–159
 moral courage 145, 158–159, 159–160, 322
 moral distress 159, 160, 322
 moral resilience 145, 159–160, 322
 moral standing/status 144, 146, 323
 mosquitoes 30, 31, 170, 283
 Mountain Gorilla Veterinary Project/Gorilla Doctors
see Gorilla Doctors
 mountain gorilla (*Gorilla beringei beringei*); *see also*
 eastern gorillas (*Gorilla beringei*); gorillas
 (*Gorilla* spp.)
 behavioral studies, landmark 115
 cardiovascular disease 37
 CITES and IUCN listing xxi
 COVID-19 87, 176, 178, 181, 186
 diet xvi, xxiii

distribution xxi, xxiv–xxv
 gastrointestinal parasites 33
 habituation 81, 88, 89, 90, 98
 health interventions 114–115, 119, 121, 133, 135
 home and day range xxxi
 human metapneumovirus (HMPV) 25, 289
 human orthopneumovirus A 289
 humans, conflict with 89
 humans, interaction with 60, 98
 lymphocryptovirus 33
 numbers xv
 parasites 88, 90, 133, 135
 population growth 60, 86
 renal disease 39
 reproduction xxxiii
 respiratory diseases 90, 151–152
 sarcoptic mange (scabies) 16, 59
 social organization xxii–xxiii, xxiv
 tourism 83, 84–85, 85–86, 87, 95, 98, 116
 vaccinations 126, 151–152

Moyen-Bafing National Park, Guinea 210
 Müller's gibbon (*Hylobates muelleri*) xviii, xxii,
 xxvi–xxvii; *see also* gibbons (Hylobatidae);
Hylobates gibbons
 Myanmar 68, 265, 299
Mycobacterium leprae 18, 280
Mycobacterium lepromatosis 18
Mycobacterium tuberculosis complex 13, 28, 34–35, 114,
 137–138, 282, 323

N

nasal flora 26, 323
 national parks *see specific park*
 natural disasters *see* disaster impacts; disaster
 management
 necropsies 17, 18, 28, 29, 323; *see also* post-mortem
 examinations
 necrotizing dermatitis 17, 323
 necrotizing inflammation 32, 323
 nematodes 32–33, 135, 282, 283, 323
 nephritis 39, 277, 323
 nesting xxxi
 neurological diseases/conditions 30, 278, 287
 next-generation sequencing (NGS) 6, 135, 323
 Ngamba Island Chimpanzee Sanctuary, Uganda
 104–105, 168–170, 294–297
 Niger 262
 Nigeria 262, 263, 264
 Nigeria–Cameroon chimpanzee (*Pan troglodytes*
elliotti) xv, xxi, xxiv–xxv, 209; *see also*
 chimpanzees (*Pan troglodytes*)
 Nigerian Cross River superhighway 209
 Niokolo-Koba National Park, Senegal 301–302

- nodules 18, 280, 323
Nomascus gibbons; *see also* gibbons (Hylobatidae);
 specific species
 CITES and IUCN listing xxiii
 distribution xviii, xxiii, xxvi–xxvii
 home and day range xxxi
 numbers xviii
 offset legislation 214
 overview xviii–xix
 parasites 32
 physiology xix
 social organization xix
 species xxiii
 northeast Bornean orangutan (*Pongo pygmaeus morio*) xxi; *see also* Bornean orangutans (*Pongo pygmaeus*)
 northern white-cheeked crested gibbon (*Nomascus leucogenys*) xxiii, xxvi–xxvii, 32; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
 northern yellow-cheeked crested gibbon (*Nomascus annamensis*) xxiii, xxvi–xxvii, 210; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
 northwest Bornean orangutan (*Pongo pygmaeus pygmaeus*) xxi; *see also* Bornean orangutans (*Pongo pygmaeus*)
 Nouabalé-Ndoki National Park (NNNP), Republic of Congo 221–224
 nucleic acids 29, 135, 323; *see also* DNA (deoxyribonucleic acid); RNA (ribonucleic acid)
 nutrition 56–58; *see also* malnutrition
- O**
- obesity 36, 37, 69, 286
 ocular conditions 38, 277
 Odzala-Kokoua National Park, Republic of Congo 22–23
Oesophagostomum spp. 32, 283
 offsetting step of mitigation hierarchy 210, 212–213, 302
 One Health strategy
 aims 50
 and animal welfare 236
 Berlin Principles 48
 case studies 58, 59–60, 61–65, 65–66, 67–68, 69–70, 71, 72–73
 community health initiatives 53, 55–56, 137
 defining 44, 49, 50, 323
 globalization of principles 49–51
 health interventions 150, 151, 154
 history and evolution of 43–44, 46–47
 human behaviors and spillover risks 52–53
 and the Human–Ape Interface 51–58
 improving human health to improve wildlife health 53, 55–56, 59–60, 86
 integrated risk management 159–160, 174
 intersections and convergences of related disciplines 48–49, 49–50, 75, 236
 and land use changes 66–68
 Manhattan Principles 46
 translational medicine 70, 71
 translocation applications 133, 134
 One Welfare framework 52, 236, 305, 309, 323
 operant conditioning 29, 157, 245, 323
 Orangutan Veterinary Advisory Group (OVAG) 65–66, 69–70, 114, 128–129, 130, 185
 orangutans (*Pongo* spp.); *see also specific species; specific subspecies*
 age-related diseases 37
 air sacculitis 35, 281
 arboreal nature of xxx–xxxii
 behavioral and ecological characteristics 205
 behavioral studies, landmark 116
 cardiovascular disease 38
 CITES and IUCN listing xvi, xxi
 conflict with humans 120
 dental disease 40
 diagnostics 138
 diet xvi, xxviii, xxix, 205
 Dirofilaria immitis 282
 disease transmission from humans 94, 95, 114
 distribution xvi, xx, xxi, xxvi–xxvii
 Ebola virus 21–22, 24
 flanged/unflanged 320
 forest fire impacts 28, 164, 167
 gastrointestinal illnesses 32, 33, 69
 gut microbiome 69–70
 habitat loss/fragmentation/degradation 167
 habitat types xxviii, 205
 habituation 81
 health interventions 112–114
 hepadnavirus 114
 hepatitis B 279
 herpes viruses 33, 279
 home and day range xxx–xxxii
 illegal captivity 241
 industrial impacts 299
 interbirth interval xvii, xxxii
 life expectancy xvi
 locomotion 205
 malaria 30–31, 114
 melioidosis 36
 monkeypox virus (MPXV) 36
 nesting xxxi
 numbers xvi
 numbers in captive settings 262, 265, 266–267, 268, 269
 obesity 37
 overview xvi–xvii
 physiology xvi

Pseudomonas spp. infections 281
 release programs 246, 250, 253, 254
 renal disease 39
 reproduction xxxii, xxxiii
 respiratory diseases 27, 28, 34, 35
 smoke inhalation 28, 164
 social organization xvii, xx, xxiv–xxv, 205
 socioecology xx–xxxiii
 solitary lifestyle 12
 species xxi
 stress impacts 83, 87, 88, 92
 threats to xvi
 ticks 102
 tourism 84, 85, 88, 92
 translocations 112, 113, 120, 129, 133, 134
 tuberculosis (TB) 34, 114
 vaccinations 126
 vocalizations 103
 weaning ages xxxii
 worms 114

Orthopoxvirus see monkeypox virus (MPXV)
 osteoarthritis 37, 38, 39, 277, 324
 osteopenia 37

P

Paramyxoviridae 25, 279, 288
 parasitemia 30–31, 324
 parasites
 defining 324
 filariasis 282
 gastrointestinal 7, 31–33, 64, 69, 90, 108–109, 282
 health interventions 133, 135
 helminths 31, 32–33, 114, 124–125, 133, 135, 283, 321, 326
 host–parasite coevolutionary dynamics 140, 276
 in illegally-trafficked apes 124–125
 mange mites/scabies 16–17, 59, 60, 89, 94, 283
 Plasmodium spp. 12, 13, 30–31, 114, 283, 324
 protozoa 6, 31, 32, 282, 283, 324

Pasteurella multocida 27–28, 281
 pathogenicity 102, 135, 324
 PEESTOLM risk management approach 164, 172, 174, 290–292
 personal protective equipment (PPE) 6, 26, 27, 100, 171, 176
 personhood 146, 236, 324
 pesticides 30, 287
 pets, apes as 33, 94, 96, 118, 267
 pets, non-ape see domestic animals/livestock
 phages 41, 324
 Pic de Fon Classified Forest, Guinea 227–230
Picornaviridae 278, 288
 pileated gibbon (*Hylobates pileatus*) xviii, xxiii, xxvi–xxvii; see also gibbons (Hylobatidae); *Hylobates* gibbons
 planetary health paradigm 45, 48, 58, 110, 324;
 see also One Health strategy
Plasmodium spp. 12, 13, 30–31, 114, 283, 324
 pneumococcus (*Streptococcus pneumoniae*) 26–27, 35, 126, 281–282, 288
 pneumonia 26–27, 35, 277–278, 280, 281–282
 pneumoviruses (*Pneumoviridae*) 25, 26, 27, 35, 279, 288, 289, 324
 poaching/hunting; see also snares/traps; wild meat consumption/trade
 and ape numbers in sanctuaries 262, 263, 264
 COVID-19 impacts 60, 87, 99, 174
 deforestation impacts 88, 164
 and disease transmission 4, 14, 24, 100, 137
 roads, impact of 28, 206, 208
 sustainable hunting 58
 and tourism 85, 86
 poisoning 30, 166, 287
 polio 117, 151
 poliomyelitis 281
 pollution 30, 67, 88, 100, 167, 287
 polymerase chain reaction (PCR) tests 135–136, 137, 138, 324
 positive reinforcement training 83, 157, 258, 324
 post-mortem examinations 29, 30, 64, 115, 131, 324
 see also necropsies
 post-traumatic stress disorder (PTSD) 40, 158, 159, 284
 prediabetes 37, 324
 preparedness, disaster; see also risk assessments
 capacity and capability 184–185, 296
 case study 168–170, 294–297
 documentation 185–186, 296
 evacuation plans 190
 exercises and drills 190, 297
 governance structures 186–187
 health interventions 117–118
 management systems 187–190, 297
 monitoring/reviewing 193, 194–195
 non-human resources 185, 191
 overview 181–184
 reputational risk assessment 293
 primary prevention 144, 150, 324
 Primate Microbiome Project 69–70
 Project ChimpCARE Chimpanzee Assessment 311–312
 pro-poor tourism 85–86, 324
 proteomics 136, 324
 protozoa 6, 31, 32, 282, 283, 324
Pseudomonas spp. 281
 psychological disorders 40, 284

Q

quarantine 26, 28, 34, 87, 91, 99, 131, 181, 325

R

radio telemetry 139, 253, 325
 railways 227, 287
 recovery from disasters 168–170, 171–172, 179, 183, 191–192
 regulations *see* legislation and regulations
 rehabilitation/restoration step of mitigation 210, 302
 reintroductions 36, 62, 113–114, 134, 138, 139, 171, 239, 246–247, 250, 325
 renal disease 30, 37, 38, 39, 277, 287
 Republic of Congo 17, 21, 22–23, 137, 221–224, 263, 264
 reservoirs, disease 15, 17, 21, 24, 31, 36, 52, 126, 325
 resource extraction 60, 66, 67, 68, 75, 223; *see also* industrial development projects; logging; mining
 respiratory diseases 15, 25–28, 34–36, 41, 90, 94, 95–96, 102, 116, 151–152, 167; *see also specific disease*
 responses, disaster 168–170, 184, 186, 190–191, 193, 194–195
 retroviruses 24–25, 281, 325
 ricketts 37
 risk assessments; *see also* disaster management
 compounding risks 174–177, 318
 of Congo Basin forestry 221–224
 in contingency plans 186
 for diseases 26, 53, 62, 100–101, 136, 172, 174, 290–292
 guidance 174
 for habituation 101, 103
 for health interventions 29, 110, 112, 119, 126, 127, 131–132, 149, 152, 153–154, 156, 158
 of Ngamba Island flooding 168–170, 294–295
 PEESTOLM approach 164, 172, 174, 290–292
 for reintroductions/relocations 36, 120, 133, 134, 190–191, 212
 reputational risk assessment 293
 reviewing 193
 risk mapping 180, 195
 as start of preparedness 181, 185
 risk management 119, 133, 170, 172–178, 195, 215
 risk mapping 165, 180, 294
 RNA (ribonucleic acid) 27, 135, 325
 roads 3, 28, 30, 200–201, 202, 206, 208, 209, 222, 223, 228, 287, 298–299; *see also* infrastructure development
 Roundtable on Sustainable Palm Oil (RSPO) 216
 roundworms (nematodes) 32–33, 135, 282, 283, 323
 Rungan River Landscape, Borneo 72–73
 Rwanda
 COVID-19 impacts 174–177, 181
 Ebola virus disease (EVD) 185
 Gorilla Doctors 62, 63, 64, 114–115
 habitat loss/fragmentation/degradation 101
 habituation, rise in 89
 interventions, ape health 114–115, 117
 respiratory diseases 25, 289
 tourism 84–85, 85–86, 174–177, 192

S

Sabah, Malaysian Borneo 70, 85, 87, 88, 94, 95
Salmonella spp. 32, 281, 282
 sampling/testing 20, 29, 64, 91, 102–103, 117, 135–136, 137–138, 140
 sanctuaries; *see also* captive ape welfare; captive/semi-captive settings
 accreditation 244
 animal welfare 238, 244, 245, 246, 248, 255–257
 ape numbers/status in Africa 262–264
 ape numbers/status in Asia 266–267
 ape numbers/status in Europe 267
 ape numbers/status in the USA 270
 collaboration 257–259
 disaster management 168–170, 294–297
 disease transmission risk to/from humans 80
 diseases/conditions in 21, 36, 38
 Enclosure Design Tool 255–257
 health care provision 156–158
 operating at or over capacity 270
 reputational risk assessment 293
 Sangha Trinational (TNS) region, Congo Basin 221–224
Sarcoptes scabiei 16–17, 59, 60, 89, 94, 283, 317
 sarcoptic mange (scabies) 16–17, 59, 60, 89, 94, 283, 317
 screening 32, 62, 64, 82, 94, 100, 113, 114, 131, 137–138
 scurvy 37
 Sebangau National Park, Borneo 72, 73, 167
 secondary prevention 144, 150, 161, 325
 semi-terrestriality xxx
 Senegal 164, 301–302
 sentience 211, 212, 233, 234, 236, 237, 259, 261, 325
 septicemia 124, 277, 280, 325
 seroconversion 114, 124, 325
 serology 29, 114, 325
 severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) xi, 7, 13, 35–36, 45, 60, 66, 171, 174, 176, 181, 278; *see also* COVID-19
 shared situational awareness 187, 196, 325
 siamang (*Symphalangus syndactylus*) xix, xxiii, xxvi–xxvii, xxix, 214, 310; *see also* gibbons (Hylobatidae)
 Sibual-Buali Nature Reserve, Sumatra xvi
 Sierra Leone 192–193, 263, 264, 278
 Simandou Mine, Guinea 227–230
 simian acquired immunodeficiency syndrome (SAIDS) 24, 281
 simian immunodeficiency viruses (SIVs) 13, 24–25, 281
 smallpox 15
 smoke inhalation 28, 164, 167, 287
 snares/traps 6, 87, 115, 116, 117, 118, 121, 153–156, 174, 286
 social media 97, 103, 105, 187–188, 267, 270
 sociality/social organization xx, xxii–xxv, xxvii, 4, 11–12, 15, 21, 22–23, 25, 90, 205, 211, 325
 socioecology, of apes xx–xxxiii

- southern white-cheeked crested gibbon (*Nomascus siki*) xviii, xxiii, xxvi–xxvii, 210; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
- southern yellow-cheeked crested gibbon (*Nomascus gabriellae*) xviii, xxiii, xxvi–xxvii, 210; *see also* gibbons (Hylobatidae); *Nomascus* gibbons
- southwest Bornean orangutan (*Pongo pygmaeus wurmbii*) xxi; *see also* Bornean orangutans (*Pongo pygmaeus*)
- spillback 45, 137, 325
- spillover events
 - bi-directionality 7, 13, 14, 15
 - in captive situations 4, 6
 - defining 12, 325
 - examples 13, 18, 21, 26, 91, 137
 - risk factors 45, 53, 55, 79, 80, 92, 113, 134, 230
 - risk management 95, 97, 106–107, 137, 151
 - transmission settings 14
- standard operating procedures (SOPs) 87, 94, 95, 97, 98, 245, 246, 326
- strategic environmental assessments (SEAs) 220–221, 230
- Streptococcus pneumoniae* (pneumococcus) 26–27, 35, 126, 281–282, 288
- stress
 - to apes
 - impact on gut microbiome 70
 - impact on mental health 30, 40, 158, 284
 - impact on physical health 6, 30, 83, 87–88, 90, 106, 124
 - physiology metrics 136
 - in rehabilitation/release programs 212, 239
 - to humans working with apes 159–160
- Strongyloides* 32–33, 114, 124–125, 135, 283, 326
- Sumatra 61–62, 87, 112–114, 120, 230, 254, 299
- Sumatran orangutan (*Pongo abelii*); *see also* orangutans (*Pongo* spp.)
- CITES and IUCN listing xvi, xxi
- diet xvi, xxix
- distribution xxi, xxvi–xxvii
- habitat types xxviii
- home and day ranges xxx
- industrial impacts 299
- life expectancy xvi
- numbers xvi
- release programs 62, 254
- reproduction xxxii
- social organization xvii, xxv
- threats to xvi
- translocations 120
- weaning age xxxii
- superinfections 124, 326
- surge capacity 184, 326
- Sustainability Policy Transparency Toolkit (SPOTT) (ZSL) 226
- Sustainable Development Goals (SDGs), UN 45–46, 48–49, 75
- syndromic surveillance 28, 326
- ## T
- Tai National Park, Ivory Coast 16, 18, 19, 21, 24, 288
- Taiwan 266
- Tanjung Puting rehabilitation site, Kalimantan, Borneo 87, 88
- Tanzania 16, 24–25, 90, 91, 115, 116, 117, 262, 288
- Tapanuli orangutan (*Pongo tapanuliensis*); *see also* orangutans (*Pongo* spp.)
- Batang Toru Ecosystem 62
- CITES and IUCN listing xxi
- diet xxix
- distribution xvi, xxi, xxvi–xxvii
- habitat types xxviii
- inbreeding concerns xvi
- industrial impacts and mitigations 230, 299
- numbers xvi
- resilience xxix
- threats to xvi
- translocation risk matrix 134
- tapeworms (cestodes) 32, 33, 283
- terrestrial locomotion 205, 208, 326
- “territories of life” 68
- tertiary prevention 144, 326
- testing *see* sampling/testing; screening
- ticks 102
- tourism and research 59–60, 62–64, 77–107, 248–250; *see also* habituation
- aiding conservation 60, 83–84, 86–87, 105–106
- and animal welfare 248, 250, 303
- benefits/costs to local communities 78, 85–86
- best management practices (BMPs) 91, 97–100, 105
- COVID-19 impacts 87, 98, 174–176, 181, 264, 270
- disease prevention strategies 28, 91, 97–103, 106–107, 176, 181
- as disease risk factor 78, 89, 90, 91, 94, 95–97, 116
- evidence-based assessments 100–101
- GDP from 78, 84–85
- human fascination with apes 78
- impact on health interventions 121
- improving for ape health 103–107
- key findings on impacts of 80
- negative impacts on apes 40, 78, 81, 87, 88, 284
- photographs 97
- post-COVID recovery 192
- trafficking, wild animal 123–125, 238, 259, 263, 264–265, 266, 267, 268, 270, 303
- translational medicine 50–51, 70, 71, 326
- translocations
 - anesthesia use 120, 122

COVID-19 impacts 171
 decision-making 120
 and disease risk 69, 94–95, 118, 120
 and human–ape conflict 118, 120
 Indonesia’s plan for 129
 IUCN guidelines 128–129
 as part of disaster management 182, 189, 190–191
 rights approach to 212
 risk management 36, 133, 134, 139
 stress 40, 284
 traps/snares *see* snares/traps
 trematodes 32, 283
Treponema pallidum pertenuis (TPE) 17–18, 282
Trichuris spp. 32, 125, 283
 tuberculosis (TB) 28, 34–35, 94, 99, 114, 137–138, 282
 typhoid fever 94, 282

U

Uganda
 ape diseases/conditions found in 16, 25, 30, 59, 287, 288
 community engagement 59–60, 68, 85–86
 COVID-19 impacts 87, 174–177, 178, 181
 COVID-19 safe practices 60, 176, 181
 disaster management 168–170, 181, 294–297
 Greater Virunga Transboundary
 Collaboration 176, 178, 185, 186–187, 188
 habitat loss/fragmentation/degradation 3
 health interventions 108–109, 153–156
 human–ape conflict 89
 Ngamba Island Chimpanzee Sanctuary 168–170, 294–297
 numbers of apes in sanctuaries 263, 264
 pesticide poisoning 287
 strategic environmental assessments (SEAs) 220
 tourism 60, 84–85, 85–86, 86–87, 89, 99, 104–105, 174, 181
 ultrasound 29, 71, 115, 326
 United Arab Emirates (UAE) 118, 123–125, 265, 267
 Universal Declaration on Animal Welfare (UDAW) 243–244
 utilitarianism 146, 326

V

vaccination
 of apes 24, 25, 26, 117–118, 124, 126–127, 151–152
 of dogs/cats 65
 ethical complexities 123, 126–127, 151–152
 of humans 26, 27, 28, 55–56, 64, 176
 of non-ape wildlife 126
 varicella-zoster virus 33

vectors, disease 65, 326; *see also* reservoirs, disease
Versteria mustelae 33
 vicarious resilience 160, 326
 vicarious traumatization 159–160, 326
 Vietnam 210, 265, 266
 viral infections 15, 25–28, 33, 35–36, 277–281, 288–289
 Virunga Massif, Rwanda and DRC xxviii, 60, 87, 89, 98, 115, 188
 Virunga National Park 63, 64, 77–78, 85, 135, 174, 198
 viruses *see specific virus*
 vitamins 37
 Volcanoes National Park, Rwanda 64, 85, 101, 289

W

weaning ages xxxii
 welfare *see* captive ape welfare
 western black crested gibbon (*Nomascus concolor*)
 xviii, xxiii, xxvi–xxvii; *see also* gibbons
 (Hylobatidae); *Nomascus* gibbons
 western chimpanzee (*Pan troglodytes versus*); *see also*
 chimpanzees (*Pan troglodytes*)
 CITES and IUCN listing xxi
 disease transmission from humans 25, 26, 288
 distribution xxi, xxiv–xxv
 habitat type xxvii
 human metapneumovirus (HMPV) 25, 26
 human respiratory syncytial virus (HRSV) 25
 increased sanctuary intake of 264
 industrial impacts and mitigations 210, 227, 298, 301–302
 leprosy 18
 numbers xiv
 population declines xv
 western gorillas (*Gorilla gorilla*); *see also* Cross River
 gorilla (*Gorilla gorilla diehli*); gorillas (*Gorilla* spp.);
 western lowland gorilla (*Gorilla gorilla gorilla*)
 diet xxix
 distribution xv
 habitat types xxviii
 home and day range xxx, xxxi
 physiology xv–xvi
 reproduction xxxii, xxxiii
 social organization xvi, xxxiii
 threats to xv
 western hoolock (*Hoolock hoolock*) xvii, xxii,
 xxvi–xxvii; *see also* gibbons (Hylobatidae);
Hoolock gibbons
 western lowland gorilla (*Gorilla gorilla gorilla*);
see also gorillas (*Gorilla* spp.); western gorillas
 (*Gorilla gorilla*)
 cardiovascular disease 38
 CITES and IUCN listing xxi
 Congo Basin studies 222

- distribution xxiv–xxv
- Ebola virus 22–23
- gastrointestinal parasites 32
- habituation 81, 89–90, 92
- home and day range xxxi
- human orthopneumovirus A 289
- human respiratory syncytial virus (HRSV) 25
- individual's importance 145
- industrial impacts 299
- population estimate xv
- simian immunodeficiency virus (SIVgor) 24
- sociality/social organization 22–23
- wild meat consumption/trade 14, 56, 60, 137, 262, 263
- Wildlife Wood Project (WWP), Cameroon 199, 224, 225–226
- World Health Organization (WHO) 2, 18, 48, 50, 87, 171, 174, 187, 190, 193, 194
- World Organisation for Animal Health (OIE) 48, 50, 66, 243
- worms 32–33, 114, 124, 133, 135, 283

Y

- yaws (TPE) 12, 17–18, 89, 282
- yeast infections 125

Z

- Zaire ebolavirus (ZEBOV) 21, 278
- zoonoses; *see also specific disease*
 - defining 4, 327
 - disease transmission
 - apes-to-humans 21, 24, 89, 127, 137
 - domestic animals/livestock-to-apes 90, 92
 - humans-to-apes 12, 15, 16–17, 26–27, 32, 33, 34, 35–36, 64, 78–79, 89, 90, 91, 94, 288–289
 - other wildlife-to-apes 34, 278
 - other wildlife-to-humans 34, 36
 - One Health strategy *see* One Health strategy
 - PEESTOLM Risk Register 172, 174, 290–292
 - spillback 45, 137, 325
 - spillover events *see* spillover events
- zoos; *see also* captive ape welfare; captive/semi-captive settings
 - accreditation 244
 - animal transfer between 238
 - and animal welfare 237, 244, 247–248, 251–252, 310, 311–312
 - ape numbers/status in Africa 262
 - ape numbers/status in Asia 265–266
 - ape numbers/status in Europe 267, 268
 - ape numbers/status in Latin America 268
 - ape numbers/status in Oceania 269–270