

## ELITE TRAIT & RANDOM HABITATS

TONIGHT an ELITE TRAIT battles for their Division Title to become the FINAL ROAR! And with this Elite Trait, home habitat advantage is no longer a guarantee for the better-seeded species! For March Mammal Madness 2023, the four possible habitats that are randomized with replacement for each battle are the Tropical Rainforest, Subtropical Desert, Ephemeral Wetland, and GHOST FOREST! Forest ecosystems between the 28th parallels N & S, also known as the Tropic of Cancer (N) and the Tropic of Capricorn (S), that experience rain throughout the year, are **tropical rainforests**. Urbanization, conversion to agricultural land, & demand for lumber threaten tropical rainforests worldwide. **Subtropical deserts** are dry, hot deserts that occur outside the tropics, North of the Tropic of Cancer and South of the Tropic of Capricorn. These are some of the hottest, driest areas on earth. **Ephemeral wetlands** are when water collects during rainy seasons and then persist for some period of time before drying up at some point during dry seasons. Ephemeral wetlands support myriad species & can be crucial habitat for developmental stages of amphibians & other species.



And my personal favorite... GHOST FORESTS! **Ghost forests** are the remnants of a once living forest. The carcasses of these trees can tell the tales of rare geological events (earthquake & tsunami!), cyclical processes (migrating sand dunes across barrier islands), or reveals the consequences of global warming and sea level rise (Eastern Seaboard). Inundations of saltwater kill the trees, such that ghost forests are the "relic forestland that has been replaced by intertidal vegetation" (Kirwan & Gedan 2019).

So sit right back ON THE EDGE OF YOUR SEAT, as we once again "trip the light fantastic" in this kaleidoscope celebration of our incredible natural world!

Citation: Kirwan, M. L., & Gedan, K. B. (2019). Sea-level driven land conversion and the formation of ghost forests. *Nature Climate Change*, 9(6), 450-457.

# Elite Trait: Itty Bitty Come Back City



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**Rock Hyrax (2) vs Mara (4)** - Hyrax (*Procavia capensis*) spend up to 90% of their time resting, which takes three forms: 1) heaping; 2) huddling-similar to heaping, but animals do not lie on top of one another, and 3) solitary resting, in which there is no physical contact. "Twenty-five species of lice have been reported to infest rock hyrax." (Olds & Shoshani, 1985). That seems like a lot, but with all that heaping and huddling, there's lots of opportunity for lice transmission. The second rodent ever to make it to the Elite Trait, Mara (*Dolichotis patagonum*), it looks like a cross between a rabbit and a deer. In captivity Mara breeds like a rabbit too: Mara can have up to 4 litters a year. And like newborn fawns, mara young can walk almost immediately after birth. When running they move like tiny deer.

Tonight's random battle location is the GHOST FOREST, specifically, a palm tree ghost forest in Florida. A bit chilled, Rock Hyrax immediately finds a patch of sun and sand and stretches out, belly down. "Basking flat is when <hyrax> either lay on its side or belly, exposing the greatest area of its body to the rock surface and to solar radiation" (Brown & Downs 2007). Upon solo arrival Mara male makes an inflected 'wheet' vocalization attempting to contact his mate, but there is no sight nor smell of her; he is again a bachelor! Mara begins grazing on clumps of grass, stroll-grazing along. Hyrax is flat and sassy, soaking up sun rays until...Mara casts shade Hyrax's way. Hyrax stands up grumpily and repositions to be back in sunshine. **Harrumph!**



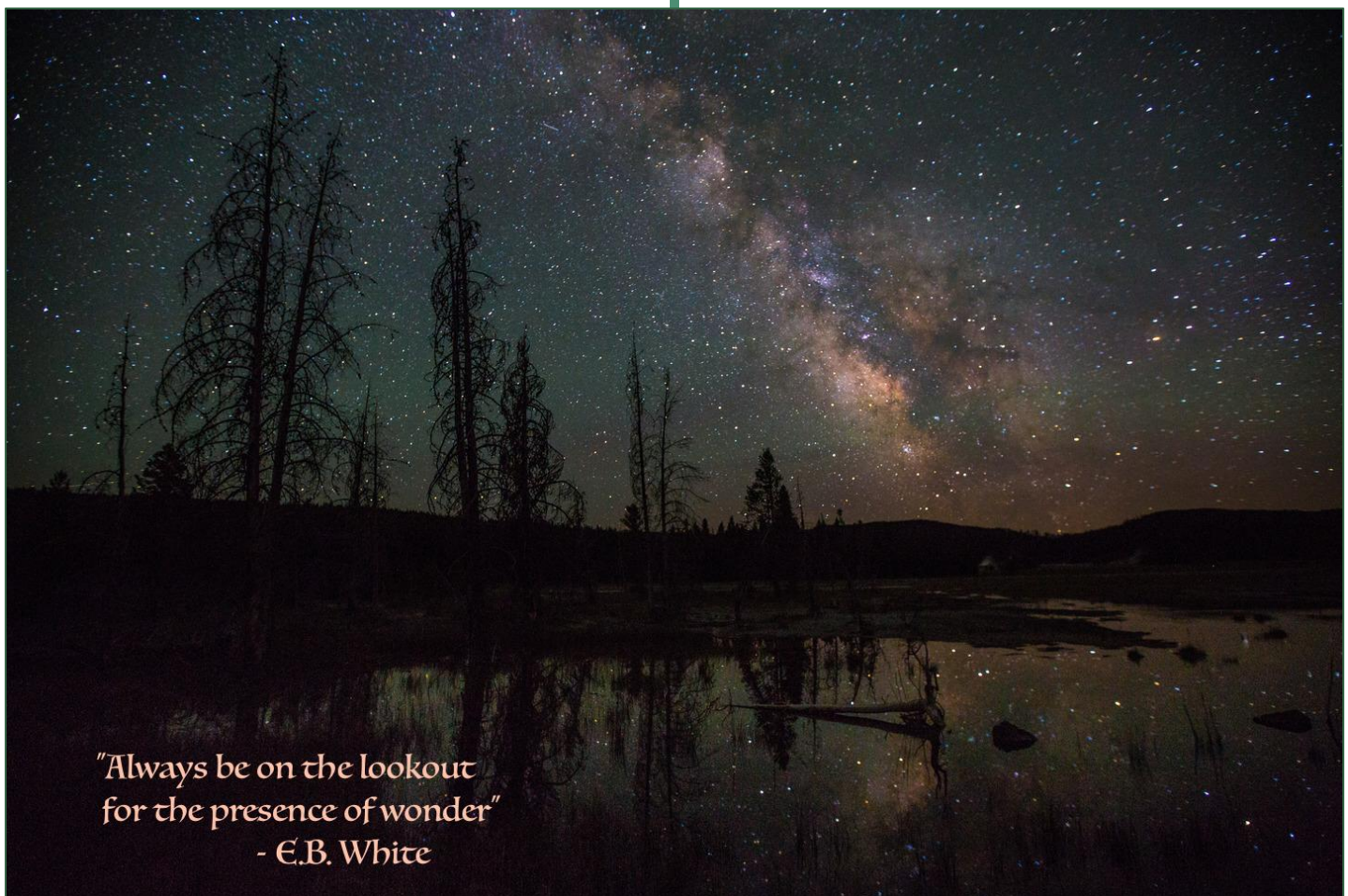
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# 2023 M M M M M

Mara keeps grazing along and unwittingly shades Hyrax again. Hyrax assumes a threat position raising the hairs of his back "accompanied by a slight retraction of the upper lip" (Olds & Shoshani 1982) as though to say "WANT A PIECE OF THESE TUSKS!?" Mara finally notices the Hyrax. Mara looks at Rock Hyrax: is this an oversized tuco tuco mixed with a big hairy armadillo?! These two mammals use Mara burrows. Bird, reptile, & mammals make extensive use of Mara burrows suggesting that Mara are ecosystem engineers.

Among Hyraxes "there is a low threshold of... aggression in adults." (Olds & Shoshani, 1982). Some might call it quarrelsome, but I expect Hyrax prefers the term "assertive." The 4kg Hyrax bluff charges at the 8kg Mara! A male Mara with a mate is more aggressive, because he has something to defend, "but bachelor males lack aggressiveness." (Genest & Dubost, 1974). Mara runs away from the Hyrax! ROCK HYRAX DEFEATS MARA! Narrated by Anne Hilborn and Katie Hinde

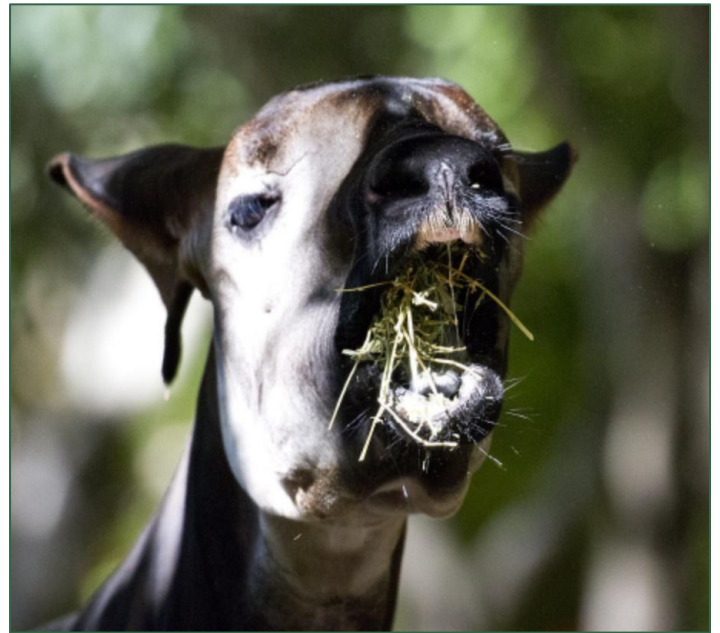


*"Always be on the lookout  
for the presence of wonder"  
- E.B. White*

# ELITE TRAIT: Mighty Stripes

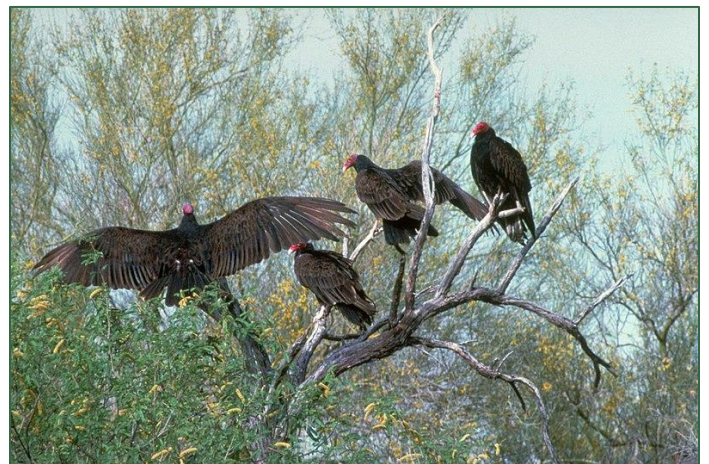
**Okapi (1) vs. Greater Kudu (2)** – Artiodactyls go HEAD to HEAD tonight! Speaking of heads, remember from Round 1: Kudu (*Tragelaphus strepsiceros*) have horns, which are not shed, and found only in males. Antlers, like in North American deer, elk, and moose, are shed. Our full-grown male Kudu horns have nearly 3 twists (4.5 ft long). Males primarily use these horns to assert dominance and win access to female mates. Kudu horns are so iconic that they are used as the logo for South African National Parks. Okapi (*Okapi johnstoni*) head ornamentation, also only found in males, does not shed. But, Okapi don't have true horns; they have ossicones. Ossicones are bony protuberances covered by skin and fur. But, tips of the ossicones are usually bare and not covered in hair, and can be used to fence with potential rivals for mates.

Tonight's randomly-selected battle habitat is... the Subtropical Desert! Our battle location is the Pitayal (a.k.a., Organ Pipe Cactus Forest, an endangered subtropical desert habitat). MMMagic brought Okapi and Kudu to the Navopatia Field Station in southern Sonora, Mexico, in an estuary of the Sea of Cortez. Okapi and Kudu are transported to the homeland of the Yaqui and Mayo people, now and since time immemorial. The Pitayal is home to ~1000 species of unique plants that collectively provide habitat for resident



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and migratory animals like shorebirds, songbirds, reptiles, and mammals. Pitayal is threatened by conversion to agriculture (row crops and cattle) and aquaculture.



# 2023 MAMMALS



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Both artiodactyls take in this strange, prickly habitat. Kudu hails from the Rift Valley of Malawi where it was warm and wet. Okapi is a rainforest specialist and our female Okapi has never experienced such a dry environment compared to the Congo Basin. Male Kudu detects an aroma....What's that smell? It smells... good... Kudu populations near the equator are reproductively active near the end of the rainy season, which is <checks notes> NOW!

Our male Kudu has detected the enticing scent of a receptive female. Okapi females can be reproductive every 15 days year-round and 'tis the season for our female Okapi. Her estrogen levels have been increasing and she shows signs of receptivity such as increased activity and posturing. Male Kudu breathes deeper, curling his

lip up to pull in all the scents. This is called Flehmen response and is a means of pheromone detection, especially scents indicating mating receptiveness, within a species. The smell isn't \*quite\* right, but male Kudu follows it right to female Okapi! She's a bit bigger than him, her fur is different in color and texture, and her stripes are in the wrong place. But male Kudu isn't picky.

The motivation to pass on his genes via reproduction, known as direct fitness, is compelling. Male Kudu, like many male mammals, are never certain of paternity or fatherhood. And since in mammals, males do not gestate or lactate, for many species the best way to increase fitness is to mate with as many females as possible (but check out the Dad Bods Division for other adaptive dad strategies!). Female mammals bear the major costs of reproduction: gestating, birthing, and lactating for months or sometimes years. Female Okapi gestation averages 440 days and young are weaned between 6 months and a year. Because of these high costs, female Okapi will be picky about her mate. Male Kudu faces female Okapi and slowly approaches her. Ruminating on her last meal from the Congo, Okapi turns and walks away. Male Kudu follows. As part of Kudu courtship, males follow females, issuing a low-pitched call as they pursue. Female Okapi, while receptive, knows the difference between an Okapi and a <whatever this is>, and she, of course, is quite picky about any potential mates.

# ELITE TRAIT: Mighty Stripes

Okapi kicks at male Kudu. Male Kudu is not deterred and continues to pursue female Okapi. Male Kudu comes up the side of Okapi and stands in front of her. He attempts to neck wrestle to form a pair bond. Female Okapi is having none of it. MMMagic did NOT bring them to the Yaqui Flower World where all animals are friends (or more than friends). Female Okapi throws her head side-to-side as a warning, then HEAD-SLAPS

male Kudu with the side of her head to give a full contact blow to his neck!! To shut down the Kudu fully, female Okapi lays down on the ground. FINALLY getting the message, Kudu retreats into the cactus forest to forage and await a lady more receptive to him. OKAPI BEATS GREATER KUDU!!! Narrated by Dr. Jessica Light, Dr. Patrice Connors, Dr. Brian Tanis, Dr. Tara Chestnut, and Dr. Katie Hinde.



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# ELITE TRAIT: Dad Bods

**Emperor Penguin (1) vs. Wolverine (3)** – These contenders may be in the Dad Bods division, but don't forget it takes two to tango! Though male Emperor Penguins (*Aptenodytes forsteri*) shoulder all egg incubation duties, females return around hatching time to relieve the fasting male and care for the newborn chick. Faced with a large group of similarly tuxedoed males, female penguins rely on vocalizations to find their mate and chick. Emperor Penguins' "two voice" system increases call complexity and allows individuals to recognize each other. In female Wolverines (*Gulo gulo*), reproductive success in a given year is shaped by a combination of winter food availability and the energetic cost of reproductive effort during the previous year. The average wolverine litter has 3 kits, which are born in a snow den. Kits are weaned around 3 months of age and become independent around 6 months. Wolverine have longer fur in winter. Longer hair insulates better against colder temperatures, but insulates a bit too well in warmer climates. This is one reason why many mammals molt their fur seasonally.

Tonight the random battle location is... GHOST FOREST! Specifically, the Neskowin Ghost Forest on the Oregon Coast that is best viewed in January, February, and March at low tide... which is happening **right now**. Wolverine pads along the



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beach amongst all that remains of a Sitka Spruce temperate rainforest inundated by saltwater 1300 years ago. A "megathrust earthquake" in the "Cascadia Subduction Zone" caused a "Holocene Paleotsunami" that sent "catastrophic marine inundations" 1km inland & 27 feet above sea level, leaving behind salt and sand that killed the forest (Peterson et al. 2010; Nelson et al. 2020).



# 2023 MARCH MAMMAL MADNESS

Wolverine is very comfortable in today's mid-40s misty weather... Especially as Wolverine's body temperature is a bit higher than usual from the extra energy he's burning to digest a full belly from gorge-feeding on Greater Rhea only last night (Diet-Induced Thermogenesis, meat sweats is real). Emperor Penguin is also thermally comfortable in this haunting remnant forest. Standing still, beak turned upward in the late afternoon mist, the Emperor Penguin is barely distinguishable among the ancient spruce stumps. Until his waddling Emperor Penguin walk gives his location away to the Wolverine, 100m away.



Due to Wolverine's circumpolar distribution in the Northern Hemisphere and Emperor Penguin's circumpolar distribution in the Southern Hemisphere, each has pretty much no frame of reference for the other. But Wolverine is no stranger to shorebirds and their eggs, and with the great curiosity of his mustelid kind, Wolverine ambles toward the Emperor Penguin to see what

it's all about... Closer... Closer... Closer... CLOSER! WOLVERINE IS 30m AWAY! Emperor Penguin just stands there watching the Wolverine approach. "Because emperor penguins are not threatened by any predators on land and do also not compete against each other for territories, evolutionary development of energy-consuming threatening behaviours would be of no use for the species" (Rümmeler et al. 2021). But now that Wolverine is only 20m away, Emperor Penguin is getting a bit concerned and he starts agitatedly flipper-flapping! The flipper-flapping causes Wolverine to slow his roll, but stays on curious target... Wolverine is now 10m away. TOO CLOSE! Emperor Penguin waddle walks away from the intruder, flipper-flapping as he heads for the breaking waves of the Pacific Ocean! Wolverine watches with bemusement at the ocean-bound waddling and flipper-flapping Emperor Penguin, but is little inclined to give chase. Kill frequency in predators is determined by the size of a recent meal and the "gastric capacity" of the predator. Wolverine is still digesting rhea and has no room tonight for another avian meal. **WOLVERINE DISPLACES EMPEROR PENGUIN!** Narration by Dr. Lara Durgavich & Dr. Katie Hinde.



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# Elite Trait: Animal Engineers

**Golden Eagle (1) vs. Homo habilis (3)** – In urban, suburban, and agricultural settings, humans may use rat poison (rodenticides) to control rodent populations, but accumulating exposure up the food chain can cause fatal illness (toxicosis) in Golden Eagles (*Aquila chrysaetos*) and other predators. Golden Eagles may bleed out - aka experience "life-threatening hemorrhage following minor trauma or exertion during routine activities" due to how "anticoagulant rodenticides interfere with the activation of vitamin K-dependent clotting factors in the liver" (Niedringhaus et al. 2021). *Homo habilis* emerged as a species during a time of global cooling & drying that expanded the grassland habitats of east Africa. Cooler, and more variable climates, had an effect on the evolution of early *Homo*. *Homo habilis*' ancestors have been targets of raptor attacks! The Taung baby (*Australopithecus africanus*) fossil skull shows



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puncture marks in their eye sockets (orbits) in the same place that modern eagles have left their talon marks in monkeys.



Tonight's randomly-generated environment for this battle is... Subtropical Desert! Specifically, Uluru Kata-Tjuta National Park, at the juncture of the Great Sandy and Tanami deserts. Yankunytjatjara and Pitjantjatjara people have been the stewards of this land since time immemorial. Although Golden Eagles live in subtropical deserts like the Sonoran desert in Mexico, combatant Golden Eagle is a non-migratory resident in Scotland and has no familiarity with this landscape. Golden Eagles are fascinating as these birds can demonstrate very different behaviors with some being migratory, resident, or nomadic. But the openness of this desert works well for Golden Eagle who soars using less energy on an updraft of sweet thermals, using her eagle eyes to look for a tasty treat. Golden Eagle spots some movement near a jumble of rocks... a rabbit?



# 2023 MARCH MAMMAL MADNESS

Having just been at the Top End of the Northern Territories eating Cathedral Termite, MMMagic brings *Homo habilis* just a hop, skip, and a jump southward to Uluru. Still grasping his dingo ulna, *Homo habilis* knows that replenishing his full Oldowan tool kit is high priority, and scans for appropriate rocks amidst the red sands and scrub-brush shaped by managed mosaic fire regimes. *Homo habilis* approaches a jumble of rocks. Golden Eagle streaks earthward, toward the movements of a fuzzy creature behind the rock jumble! *Homo habilis* is bent down, using the dingo ulna to leverage around the various jumbled rocks for any useful for his tool-making purposes. *Homo habilis* is getting hot in Australia under the sun, especially with the damaged ozone layer from modern human activities.

GOLDEN EAGLE CLOSES in TALONS OUT JUST AS...

*Homo habilis* straightens up his back, possibly wipes sweat from his brow (as it's a hot and heavy debate on whether *Homo habilis* could sweat)...

SEEING THE STREAKING EAGLE, *HOMO HABILIS* FLINCHES BACKWARDS!

SEEING THE FULL SIZE OF *HOMO HABILIS*, EAGLE ABORTS ATTACK!!

FLINCHING BACKWARDS, *HOMO HABILIS* STUMBLES ON HIS BIPEDAL FEET, ARMS WINDMILLING!!

Golden Eagle has landed on the jumble of rocks and looks at *Homo habilis* crumbled unconscious on the ground, a smear of blood on a large rock near his head.

Golden Eagle has landed on the jumble of rocks and looks at *Homo habilis* crumbled unconscious on the ground, a smear of blood on a large rock near his head. Golden Eagle flight-hops toward unmoving *Homo habilis*. *Homo habilis* remains still. Golden Eagle flight-hops landing with her impressive talons next to *Homo habilis*' head and those vulnerable orbits...

ALL THIS ACTION HAS ATTRACTED ATTENTION FROM THE LOCAL APEX PREDATOR... DINGOES! Unconscious, *Homo habilis* is unable to apply any dingo safety training. And even standing at his full height, his small stature all alone on the landscape... As the dingo pack takes full advantage of the incapacitated hominin, Golden Eagle catches an invasive rabbit, contributing to Uluru's rabbit eradication program, ongoing since 1989. GOLDEN EAGLE DEFEATS *HOMO HABILIS*!!!! Narrated by Dr. Marc Kissel and Dr. Katie Hinde.



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## Rock Hyrax (2) vs Mara (4)

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## Golden Eagle (1) vs. *Homo habilis* (3)

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## #2023MMM ELITE TRAIT EMOJI



**READ ALL ABOUT IT** by Katie Hinde, Margaret Janz, Melanie Beasley, Chloe Josefson, Anali Perry, Emily Rocha, & Abbie Thacher.





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