



**Compendium  
of the  
10th Annual  
March Mammal Madness  
Tournament  
2022**

**Proceedings of the  
Noble Zoological Society**  
Series C Performance Sciences

Peropitheque  
Lagotriette  
Orang outan  
Gibbon  
Ouciti  
Semnopitheque  
Cynocephale  
Maki  
Hyène  
Loup  
Roussettes  
Hérisson  
Renard  
Lion  
Guépard  
Tigre  
Civette  
Mangouste  
Moufette  
Lynx  
Genette  
Martre  
Coati  
Loutre  
Ours brun  
Ours blanc

**Recommended Citation:** Hinde K, CEG. Amorim, CN Anderson, M. Beasley, AF Brokaw, L Brubaker-Wittman, J Brunstrum, N Burt, M Casillas, A Chen, T Chestnut, R Coffman, PK Connors, M Dasari, J Dietrick, CF Ditelberg, J Drew, L Durgavich, B Easterling, K Faust, J Gabrys, Y Haridy, C Henning, I Hecht, A Hilborn, M Janz, EK Karlsson, J Kissel, M Kissel, J Kobylecky, J Krell, DN Lee, KM Lesciotto, KL Lewton, JE Light, J Martin, R. Moore, A Murphy, W Nickley, A Núñez-de la Mora, O Pellicer, V Pellicer, AM Perry, C Rudzis, SG Schuttler, M Sinnot, AC Stone, B Tanis, N Upham, F Villanea, J Weber, M Wilson, E Willcocks. 2023. Compendium of the 10th Annual March Mammal Madness Tournament 2022. Proceedings of the Noble Zoological Society Series C Performance Sciences. 1: 1-86. <https://hdl.handle.net/2286/R.2.N.183021>



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‘Describing at Large

**Their True and Lively Figure, their several Names, Conditions, Kinds, Virtues (both Natural and Fanciful), Countries of their Species, their Love and Hatred to Humankind, and the wonderful work of Natural Selection in their Evolution, Preservation, and Destruction.**

Interwoven with curious variety of **Creative Narrations** out of Academic Literatures, Scholars, Artists, Scientists, and Poets. Illustrated with diverse Graphics and Emblems both pleasant and profitable for Students of all Faculties and Professions.’

The above description satirically adapted from, and with apologies to: Edward Topsell. 1658. History of Four-footed Beasts and Serpents. Collected out of the writings of Conradus Gesner and Other Authors. Printed by E. Cote for G. Sawbridge, T. Williams and T. Johnson. London. Available in 2023 at [PublicDomainReview.org](https://PublicDomainReview.org)



Cover Image: Adolphe Millot' Illustrations for Le Larousse Pour Tous. 1909; public domain.  
This Page: Serval & Least Chipmunk Illustrations Olivia Pellicer

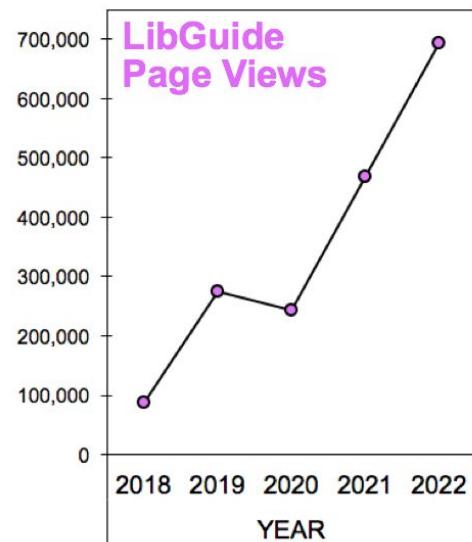
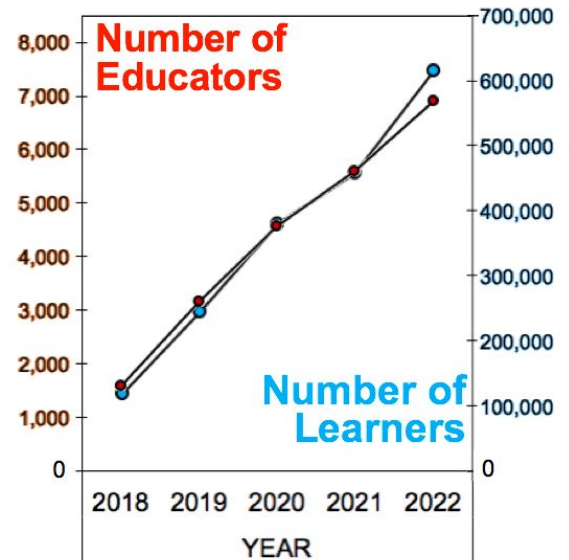
# Letter from the Director

Thank you players, educators, students, and everyone for participating in, as one twitter user phrased it, this "delightfully bonkers" performance science. The 10th Annual March Mammal Madness was an incredible year of amazing science, riveting battles, phenomenal artwork, and the delightful *Communitas* that is the heart of this tournament.

Together in 2022, we explored numerous ecosystems globally, before reaching the random habitats of the advanced rounds- the Savanna, Montane, Forest, Sea Ice, and everyone's favorite, the Kelp Forest. #2022MMM could best be described as an entirely uncontroversial tournament that some fans are calling "the best one yet!"

But for sure 2022 was definitely our *biggest* year yet- nearly 7000 educators reported plans to share the MMMaterials with 615,000+ learners. The traffic to the Library Guide has made the ASU March Mammal Madness LibGuide the 32<sup>nd</sup> most popular of 750,000 guides in the US.

Humans are psychologically and cognitively adapted for fireside story-telling, shared experiences, artistic imagery, and jokey-joke-joke-jokes. The teaching and learning about animals and plants is intrinsic to our species. Sharing knowledge about the natural world is part of what makes humans human.



Thank you for being a part of this tournament; cheering, jeering, crying, whining, and, above all, laughing through the triumphs, retreats, carnage, and the *occasional* deus-ex-machina. Because points are just a number but "If you're learning, you're winning." And here's to celebrating a DECADE OF WINNING in 2023!

Prof Katie Hinde  
MMM Founding Director  
Arizona State University

# March Mammal Madness Team Members 2013-2022

## ART TEAM



**Charon Henning, BIS**  
March Mammal Madness  
Art Director



**Mary Cassilas, BS**  
Science Teacher  
& Illustrator  
Combatant Art



**Olivia Pellicer, BFA**  
Character Animator  
Combatant Art



**Cyn Rudzis**  
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**Valeria Pellicer, BFA**  
Science Illustrator  
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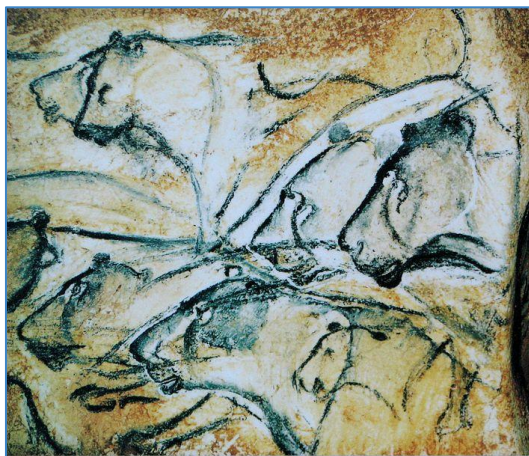
**Will Nickley, MFA**  
Department of Design  
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Bracket Design



**Albert Chen, PhC**  
Milner Center of Evolution  
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Combatant Phylogeny



**Katie Hinde**  
Arizona State University  
Logos & Layout



**Lionesses** painted in the Chauvet Cave (Ardèche, France). This is a replica of the painting from the Brno museum Anthropos (Czech Republic).



**Jeanne Dietrick**  
Director/Writer/Puppeteer  
BE Creative LLC  
MC Marmot



**Brain Easterling**  
Producer/Editor/Puppeteer  
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MC Marmot

# curricula & library sciences team



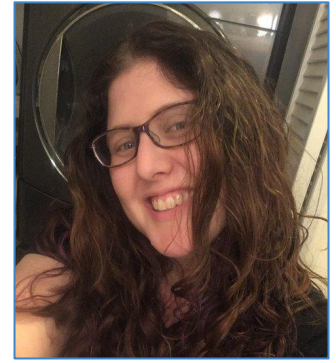
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**Stephanie Schuttler, PhD**  
NC Museum of  
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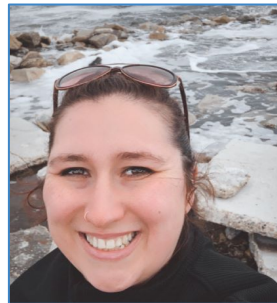
**Emma Wilcocks, BS**  
Environmental Health,  
Harvard Schl Public Health  
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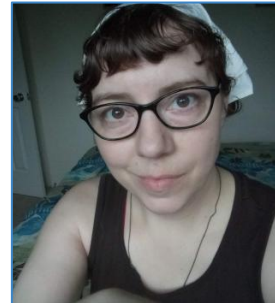
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MMMIetsgo!



**Kate Lesciotto, PhD**  
College Osteopathic Medicine  
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Sports Summaries



**Jessica Martin, BA**  
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Sports Summaries



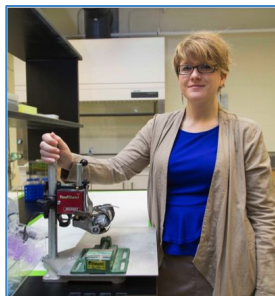
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**Melanie Beasley, PhD**  
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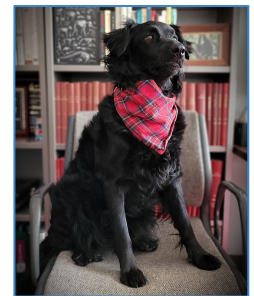
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MMM Trading Cards



**Ms. Jennifer Gabrys**  
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MMM Trailer



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MMM Presentation



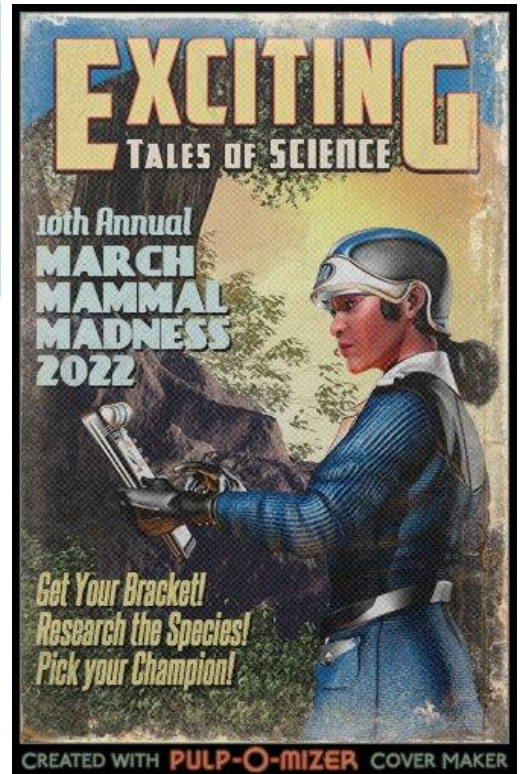
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**Melissa Wilson, PhD**  
School of Life Sciences  
Arizona State University



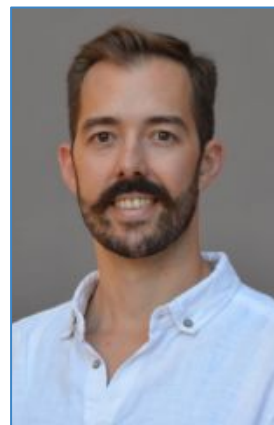
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**Patrice Connors PhD**  
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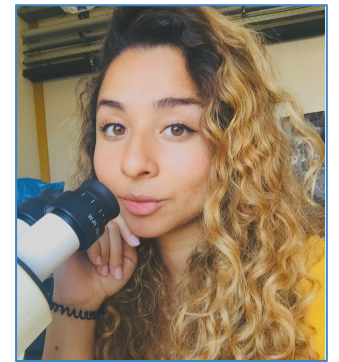
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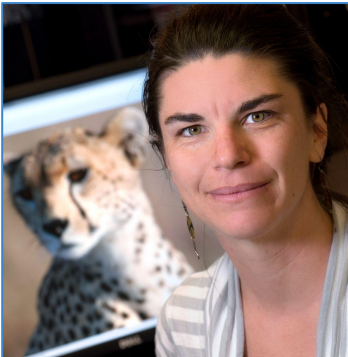
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Dept of Anthropology  
Appalachian State U



**Danielle Lee PhD**  
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Dept of Biological Sci  
SIE-Edwardsville

Excuse me, I was told there would be  
**CARNAGE**  
 MARCH MAMMAL MADNESS

# NARRATOR TEAM



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**Kwasi Wrensford**  
Mammalogist  
Integrative Biology  
UC Berkeley



Dramatization of 2015 Quokka vs. Numbat Battle  
Stephanie Meredith, Harvard Natural History Museum

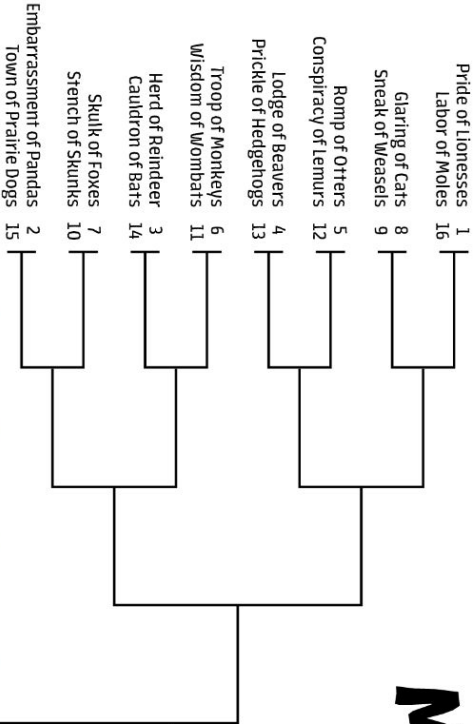


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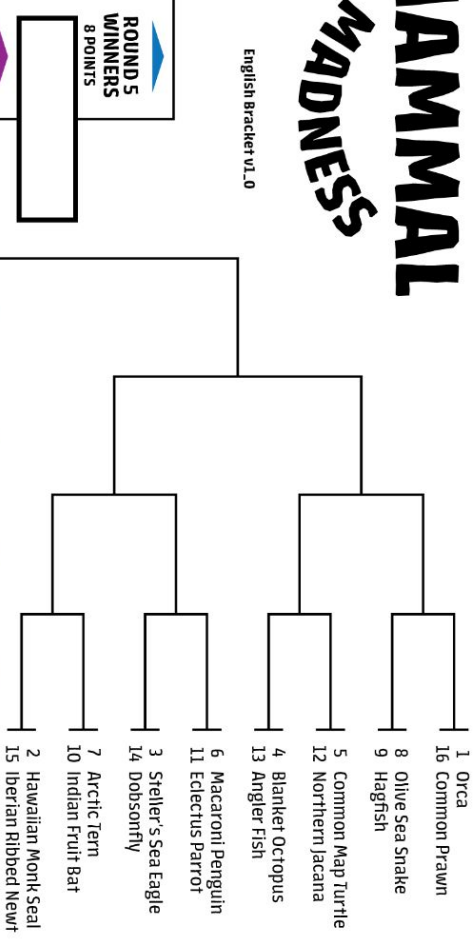
ALL TOURNAMENT INFO:  
[libguides.asu.edu/MarchMammalMadness](http://libguides.asu.edu/MarchMammalMadness)  
 NOTE: MMM includes many non-mammal species

# 10th ANNUAL 2013-2022 MARCH MAMMAL MADNESS

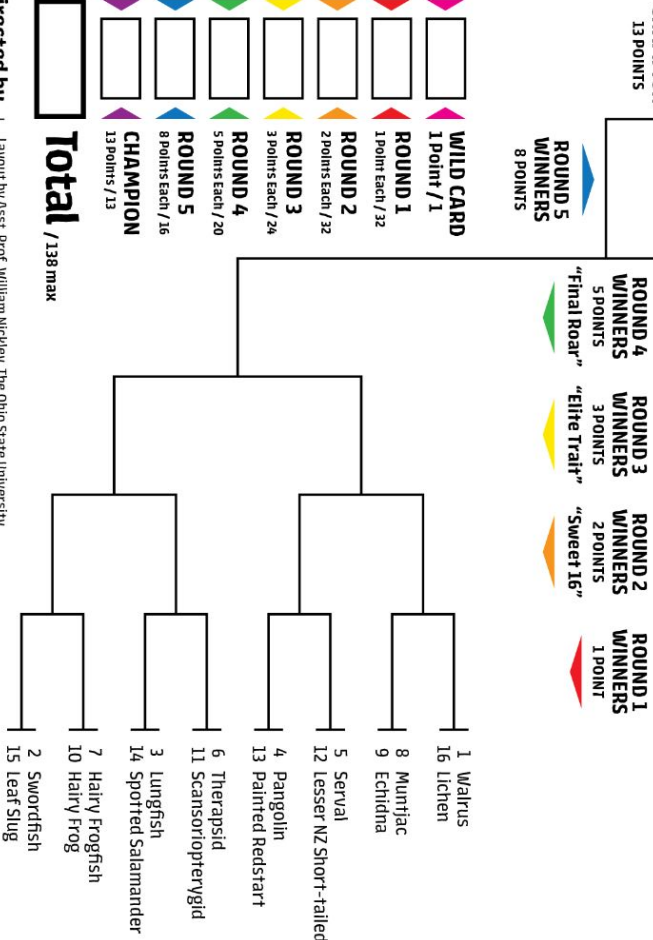
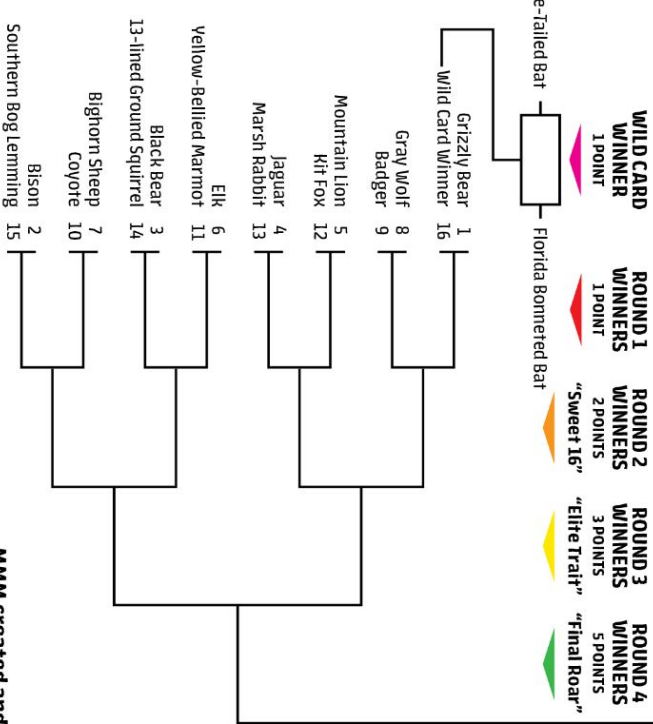
## MAMMAL COLLECTIVES



## QUEENS OF THE SEA & SKY



## WILD NORTH AMERICA



MMM created and directed by  
 Professor Katie Hinde, Arizona State University

English Bracket v1.0

WILD CARD  
 1 Point / 1

ROUND 1  
 1 Point Each / 32

ROUND 2  
 2 Points Each / 32

ROUND 3  
 3 Points Each / 24

ROUND 4  
 5 Points Each / 20

ROUND 5  
 8 Points Each / 16

CHAMPION  
 13 Points / 13

Total / 138 max

Layout by Assn. Prof. William Nickley, The Ohio State University  
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 Typeset in Iostana Nilu Pro. Designed by Bruno Jara & Luciano Vergara. From Lathotype Foundry.

## WHY NOT BOTH?

# Pre-Season Highlights!



**MMM\_Kid Narrator**  
 @mmm\_kid Follows you  
 Guest Kid Narrator for 2022  
 Cover image by Delam2, pub  
 Joined March 2022

**ASU Library**  
 @ASULibraries

Our library servers are a bit stunned with the #2022MMM onslaught - please have patience! MMMaterials will load eventually!



**Prof. Katie Hinde** @Mamm  
 Watch this INCREDIBLE #2022!  
[youtu.be/kWR4CdKf64](https://youtu.be/kWR4CdKf64)  
 (& then access the bracket &  
[keep.lib.asu.edu/items/163](https://keep.lib.asu.edu/items/163))

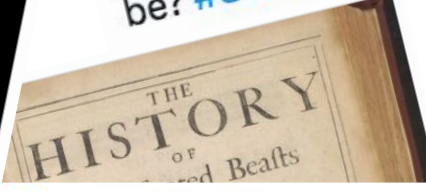
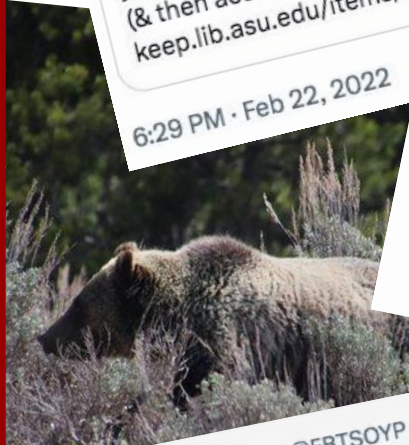
6:29 PM · Feb 22, 2022

**asia murphy phd (look! colonialism!)** @am\_anatjala · Mar 9, 2022  
 Tonight in #MMMAfterDark: Yellow-footed Antechinus (Antechinus flavipes) vs Indo-Pacific Bottlenose Dolphin (Tursiops aduncus)!

**asia murphy phd (look! colonialism!)** @am\_anatjala · Mar 9, 2022  
 co-written by yours truly and @AnneWHilborn #MMMAfterDark



**Primatweeps** @primatweeps  
 Hello everyone! Time combatant is for #2022  
 #PrimatePlaytime with a twist! We'll be back in the next few hours!  
 be? #SciCommCrest



**ExploringByTheSeat** @EBTSOYP · Feb 11, 2022  
 Get your brackets ready! Feb 25th we've got an epic all day festival with @2022MMMlets go featuring stories and humour from 10 years of wildlife loving madness!  
 Register on our newsletter and learn more about how you can take part at [libguides.asu.edu/marchmammalmad...](https://libguides.asu.edu/marchmammalmad...)  
 #2022MMM #mammals

**Prof. Katie Hinde** @Mammals\_Suck · Mar 7, 2022  
 Tonight's hurlyburly is written in part from the dubious knowledge of Edward Topsell's History of Four-Foot'd Beasts (1607) & History of Serpents (1608) for 1658's then definitive 1000-page barn-burner natural history compendium #YeOldeTimeyBattle #ExhibitionCrest #2022MMM



**Dominic Garcia-Hall** @domhall  
 Welcome to a once-a-year's #GuessTheCrest



Yep, today's crest is a combatant in the pinnacle of #SciComm epics! An avian infiltrator in March

THE FOLLOWING NARRATIONS HAVE BEEN RATED

**#CARNAGE**

SOME TWEETS CONTAIN NATURE, RED IN TOOTH & CLAW, DESCRIPTIVE ACCURACY

BY THE TAXON STORY ASSOCIATION OF AMERICA, INC.

MARCH MAMMAL MADNESS 2022

[es.asu.edu/marchmammalmadness](https://es.asu.edu/marchmammalmadness)

## SCIENCING MMM

Through the years, folks have found out this Battle MMMeal comes with a side of science fries & a cool refreshing science. The thought experiment of #2022MMM does not force the animals to BATTLE like Gladiators, but rather contrives encounters where the animals arrive with their full suite of physical and behavioral traits... and that includes adaptations to AVOID contact combat. Fighting is RISKY- risk of immediate death, slow death from infection, slow death from starvation if an injury interferes with foraging, eating, hunting, or escaping. The more closely matched combatants are, the greater their risk of losing for either of them or EVEN THE WINNER being injured.

AND everything takes energy- chasing prey, running from predators, battling competitors, sometimes A LOT OF ENERGY! And while yes for herbivores energy grows on trees, the time of chewing & enzymes for digesting are limited & finite.

Across many animal species, natural selection has favored animals whose traits enable them to effectively respond to the situation- a rudimentary cognitive architecture for rapidly weighing risks, benefits, & costs of a contest, conflict, context, or predator-prey situation. This is even the case typically for species with combat weapons. "Species that bear weapons almost always perform displays before engaging in physical contact" in contest competition (Palaoro & Peixoto 2021).



Buiobuione / Wikimedia Commons / CC-BY-SA 4.0

# SCIENCING MMM

Also, anti-predator vigilance interferes with foraging, fleeing takes energy, & adaptive anti-predator strategies account for short-term risk in locations of high long-term risk... (Dröge et al 2017; Stankowich & Blumstein 2005).

Among carnivores, myriad adaptations for avoiding direct competition for prey (niche partitioning) or suppressing competition (competitive exclusion) can dramatically shape ecosystems (Karanth et al. 2017; Hunter & Caro 2008). Oh and when animals are fighting (& romancing)... **DISTRACTIONS INCREASE THIRD PARTY PREDATION!** (Ota 2018). Natural selection has favored awesome adaptations for those who fight, flee, hide, peek, retreat & sneak away to live another ah, amount of time to achieve reproductive success & thereby contribute traits to subsequent generations iteratively over evolutionary timescales

So **BUCKLE UP BUTTERCUPS**, this is March Mammal Madness! Sometimes it's **CARNAGE**, sometimes it's **BASIC**, sometimes it's **UPSET CITY** where the grass is green and gulls are pretty... But always, as we sleuth the B-sides & dusty deep tracks of natural history, March Mammal Madness is here, from tangled bank to misty mountains to salty shore, to trip the **LIFE** fantastic through the splendor of our natural world. **If you're learning, you're winning.**

## CITATIONS:

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Hunter J, Caro T. Interspecific competition and predation in American carnivore families. *Ethology Ecology & Evolution*. 2008. 20(4):295-324.

Karanth KU, Srivathsa A, Vasudev D, Puri M, Parameshwaran R, Kumar NS. Spatio-temporal interactions facilitate large carnivore sympatry across a resource gradient. *Proceedings of the Royal Society B: Biological Sciences*. 2017. 284(1848):20161860.

Ota, K. (2018). Fight, fatigue and flight: narrowing of attention to a threat compensates for decreased anti-predator vigilance. *Journal of Experimental Biology*, 221(7), jeb168047.

Palaoro AV, Peixoto PE. The importance of animal weapons and fighting style in animal contests. *bioRxiv*. 2021. 1:2020-08.

Stankowich T, Blumstein DT. Fear in animals: a meta-analysis and review of risk assessment. *Proceedings of the Royal Society B: Biological Sciences*. 2005. 272(1581):2627-34.



# 10th Annual 2022 MARCH MAMMAL MADNESS

March 14, 2022

If you're learning, you're winning!

Since 2013

## A WILD CARD BATtle for the Ages!

The wild card match-up to launch the 10th Annual March Mammal Madness tournament was **Florida Bonneted Bat vs Mexican Free-tailed Bat**. The Florida Bonneted Bat (FBB) is a bonny brunette beauty, with large forward drooping ears shaped like a bonnet. The FBB is found only in the southern part of Florida and is North America's rarest bat. It's also the third largest bat in the United States, with a 20 inch wingspan and reaching almost 50 grams in size. With only a 12-inch wingspan, the Mexican Free-tailed Bat is smaller, with long narrow wings that aid long-distance migration to home cave in Carlsbad Caverns National Park. Male Mexican free-tailed

bats woo mates as they migrate in March, singing complex songs from temporary roosts. Tonight's battle took place in the skies over Big Cypress National Preserve in southwestern Florida, where the FBB has just emerged from its daytime roost. The Mexican Free-tailed Bat (aka Carl) finds itself in warm, humid Florida instead of cool, dry New Mexico. Carl hears the calls of the FBB and tries to thwart its opponent by jamming the other's sonar. Unphased, the FBB captures a juicy moth before an owl comes out of nowhere, drawn by the FBB's low frequency calls. FBB and owl tumble away into the night and the MEXICAN FREE-TAILED BAT ADVANCES!! Narration & Summary by Alyson Brokaw, PhD.



USFWS/Ann Froschauer / Wikimedia Commons / Public Domain CC1.0



March 16, 2022

If you're learning, you're winning!

Since 2013

## ROUND 1: QUEENS OF THE SEA & SKY

**Orca (1) v. Common Prawn (16)** - Though they're often called a "Killer Whale," orcas are actually dolphins! Orcas got the misnomer because they hunt large whales, such as the blue whale. Orcas are easily recognizable by their distinctive black and white coloring. An orca's teeth curve back and can be up to 13 cm in length (My, what big teeth you have!). But wait! Don't scrimp on the shrimp - common prawns don't have big teeth, but they are in an order of crustaceans that all have ten legs: the decapods. Common prawns are found in coastal areas of Northern Europe; the females are larger than males and take longer to mature.



USFS / Wikimedia Commons / Public Domain CC1.0

And the common prawn had its work cut out for it today! MMMmagic transported our common prawn to the waters of the Puget Sound in the Pacific Northwest, where an orca matriarch is leading her pod in pursuit of the salmon. As an apex predator, the orca isn't particularly interested in our shrimpy friend; but at an average depth of 140 meters, our common prawn was feeling "out of its depth" and it used its 10 legs to scuttle-swim away. **ORCA OUTLASTS COMMON PRAWN!** Narrated by Marc Kissel & summarized by Jessica Martin.

**Hawaiian Monk Seal (2) v. Iberian Ribbed Newt (15)** - The Hawaiian monk seal is an endangered, non-migratory seal found only in the Hawaiian Archipelago. Adult Hawaiian monk seals are dark gray to brown on their back and light gray to yellowish brown on their belly. Female Hawaiian monk seals are a "big deal" since they're often larger than males and can reach up to 600 pounds! Meanwhile, our chunky (for a newt) friend the Iberian ribbed newt is found in Spain, Portugal, and Morocco. They're brown-gray in color and have orange-ish poison glands along their ribs that can stick out when threatened. Yikes! The Iberian ribbed newt lives in small or temporary ponds with deep, calm water - when ponds dry, newts migrate across land when it's raining to find a new pond. Our new(t) friend finds itself on a remote beach on Kaua'i, one of the oldest islands of the Hawaiian archipelago, where our monk seal is camped out on a rocky beach at low tide. As our ribbed newt appears on the rocks it notices gulls and other predators that often eat newts circling overhead, so it quickly makes its way to a dark hole in a rock that looks safe but is the mouth of the yawning

# ROUND 1: Queens of the Sea & Sky



USFW / Wikimedia Commons / Public Domain CC 1.0

seal! The newt deploys her last anti-predator defense: she flattens her body, secretes a sticky substance, and rotates her ribs to protrude out of her body. The protruding ribs deliver venom to the monk seal, who spits the newt out and straight into some rocks. As the newt loses its vision and the monk seal's head begins to wobble, the RIBBED NEWT PERISHES AS HAWAIIAN MONK SEAL ... ADVANCES? Narrated by Tara Chestnut & summarized by Jessica Martin.

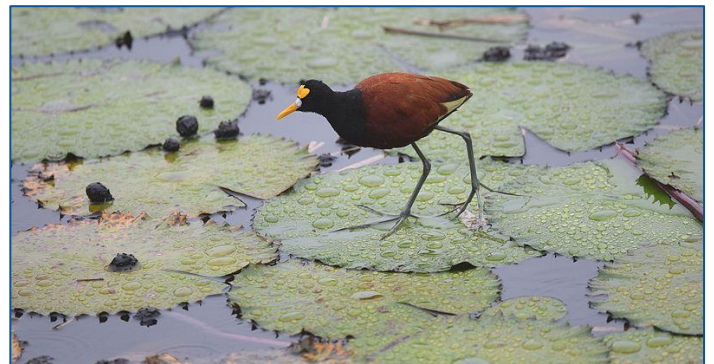
## Common Map Turtle (5) v. Northern jacana (12)

Map turtles get their common name and their scientific name, *Graptemys geographica*, from the lines on their bodies which look like the topographic contour lines on a map. Map turtle females can grow to be twice as large as males. Since bite force increases with body size, females can pack more wallop. The Northern Jacana ranges throughout Central America and the Caribbean. The Northern Jacana female has a territory that includes multiple males half her size that do the parental care of chicks.

Map turtle has home habitat advantage along the lower Lamoille River in Vermont at the turtles hibernation grounds. Alarmed at being alone, the jacana quickly searches for her peeps by walking on the reedy banks with the help of her elongated toes, which displace her weight so that she doesn't sink. As the jacana searches, the map turtle suddenly rises from the depths of the river where it has been submerged for the past 5 months! Startled by the turtle, the jacana takes to the air to find her way home. COMMON MAP TURTLE DEFEATS NORTHERN JACANA! Narrated by Brian Tanis and Mauna Dasari & Summarized by Jessica Martin



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A. Reago & C. McClarren / Wikimedia Commons / CC-BY-SA 2.0



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# ROUND 1: Queens of the Sea & Sky

**Macaroni penguin (6) vs. Eclectus parrot (11)** - In this Aves vs. Aves battle, the first is the lovely and hydrodynamic Macaroni penguin. Her name refers to her eccentric yellow crest that offsets her black and white body. She outweighs her male counterparts during breeding, making her a real Queen of the Polar Seas. Eclectus parrot is also smaller than our macaroni penguin - about a hundred times smaller, in fact! She's a tropical parrot whose mostly red feathers, with purple and orange highlights, are quite distinct from the mostly green males of her species. For once the female is the plumage bird!



Jason Auch (L) Crisco 1492 (R) Wikimedia Commons / CC-BY-SA 2.0/4.0

Our birds find themselves on South Georgia Island in the southern Atlantic Sea - quite a shock to eclectus parrot. This island is much colder than she's used to - with average temperatures around 0 degrees celsius. The parrot searches for a place to

warm up while macaroni penguin decides to celebrate the end of a successful breeding season to leave the turf for some surf and a fresh seafood dinner.. Our penguin dives into the water... right into the clutches of a leopard seal! Eclectus parrot has beaten the odds and finds shelter from the storm.. **ECLECTUS PARROT OUTLASTS MACARONI PENGUIN!** Narration by Dr. Patrice K. Connors & Summarized by Margaret Janz

**Blanket Octopus (4) v. Angler Fish (13)** The Blanket Octopus is 150cm in width and spends her days feeding on pteropods and small fishes. Basking in sunny waters exposes the octopus to the threat of tropic birds from above, and blue sharks from below. The octopus's opponent for this evening is the Angler fish, which has traveled over a kilometer up from the depths of the ocean. The Angler fish is 15cm and has a remarkable ability to expand its jaws to eat, and normally uses bioluminescent bacteria in her lure (called an esca) to entice prey to the doom of her gape. The angler fish has a tremendous ability to expand their jaws; food is rare in the deep cold depths and one must be prepared to eat whatever they can get.

Our battle takes place 100km east of Picard Island, part of the Aldabra Atoll in the Indian Ocean, where the sun is bright and the water is both clear and warm. Unaccustomed to the brightness now that she's closer to the surface, the angler fish is disoriented and suddenly finds herself in the tight embrace of the blanket octopus. **BLANKET OCTOPUS DEFEATS ANGLER FISH!** Narrated by Josh Drew & Summarized by Jessica Martin



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# ROUND 1: Queens of the Sea & Sky



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**Arctic Tern (7) vs Indian Fruit Bat (10)** Arctic Terns have the longest migration of any bird, chasing an endless temperate summer traversing 40,000-60,000 miles globe from Arctic summer to Antarctic summer each year. Arctic Terns experience 80% of the Earth's yearly sunlight. These white and silver birds have a gold medal in protecting their nests: their aggressive dives have drawn blood and repelled polar bears. The Indian fruit bat live across southern Asia and can be found in Pakistan, Sri Lanka, southern China, Borneo, Malaysia, & India! Indian fruit bats are also dedicated mothers who nurse up to two pups at a time, carrying them continuously the first few weeks after birth. From mom's foraging and their strong sense of smell, young learn to identify delicious fruits, like figs.

March kicks off the migration period for our Arctic tern, who's flying North over the South Atlantic on

her way to Svalbard. MMMagic, the Indian fruit bat and her week old pup are transported from a snugly warm bedtime to a cold, bright free fall over the ocean! Mom wastes no time sending out distress calls which seem to bring in... a friend perhaps? SWOOSH. Nope, our Arctic tern is focused on reaching her Northern breeding & nesting grounds for the short window she has to reproduce. **INDIAN FRUIT BAT OUTLASTS THE ARCTIC TERN!** Narration by Alyson Brokaw & Katie Hinde & Summarized by Margaret Janz



Shantanu Kuveskar / Wikimedia Commons / CC-BY-SA 3.0

**Steller's Sea Eagle (3) vs Dobsonfly (14)** - Steller's Sea Eagle -not to be portmanteau'd to seagull please- is the heaviest of eagles, with females weighing in at 9 kg, 50% heavier than males. Steller's sea eagles sport a large, yellow hooked beak that's great for eating fish. These birds



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# ROUND 1: Queens of the Sea & Sky

are typically found in northeast Asia where some consider them to be keystone species. Confronting the Sea Eagle is our 14 seed, the Dobsonfly. Although the Sea Eagle might have a few (many) stoatweights on this insect, the fly has quite a few teeth on this bird. Dobsonfly larvae and adult females can draw blood with their impressive bite.



Jambomambo13 / Wikimedia Commons / CC-BY-SA 3.0

Our combatants today are near the Kennebec River in Maine, USA. That's correct, the 2022 Sea Eagle combatant is that famous vagrant kicking it in New England. Dobsonfly is feeling pretty good about finding a salmon carcass to land on. Soon though the Sea Eagle lands on the very same fish! Dobsonfly is startled but not defenseless. She emits a foul smelling anal spray. But the eagle is undeterred and rips into her good fish dinner, with dobsonfly seasoning. STELLER'S SEA EAGLE TEARS APART DOBSONFLY! Narration by Chris Anderson & Summarized by Margaret Janz.

**Olive Sea Snake (8) v. Hagfish (9)** - In the shallow, tropical waters around Indonesia, Papua New Guinea, New Caledonia, and Australia we find the Olive Sea Snake. These snakes are large, robust, and well-muscled. The females of this species are larger than the males, reach up to 5.5 feet and can target bigger, more challenging prey. The Hagfish is of an ancient lineage from early in vertebrate evolution. Other than part of the skull, this eel-like fish is notably boneless, jawless, and sightless. Hagfish are sexually dimorphic with the females generally larger than males to reach just over two feet long. Hagfish are widely found across coastal areas of temperate ocean waters.

Tonight our combatants are in the Great Barrier Reef Marine Park near the carcass of a Humphead wrasse. the hagfish prefers colder water and the sea snake often avoids the sandy open areas, the wrasse carcass is a siren call as food for hagfish and bait for the fish Sea Snake hunts. With her attention focused on the hard work of knotting her entire body to bite into the carcass, the hagfish doesn't realize that the sea snake is present until the snake bites down on her tail and delivers venom.



Sylke Rohrlach / Wikimedia Commons / CC-BY-SA 2.0



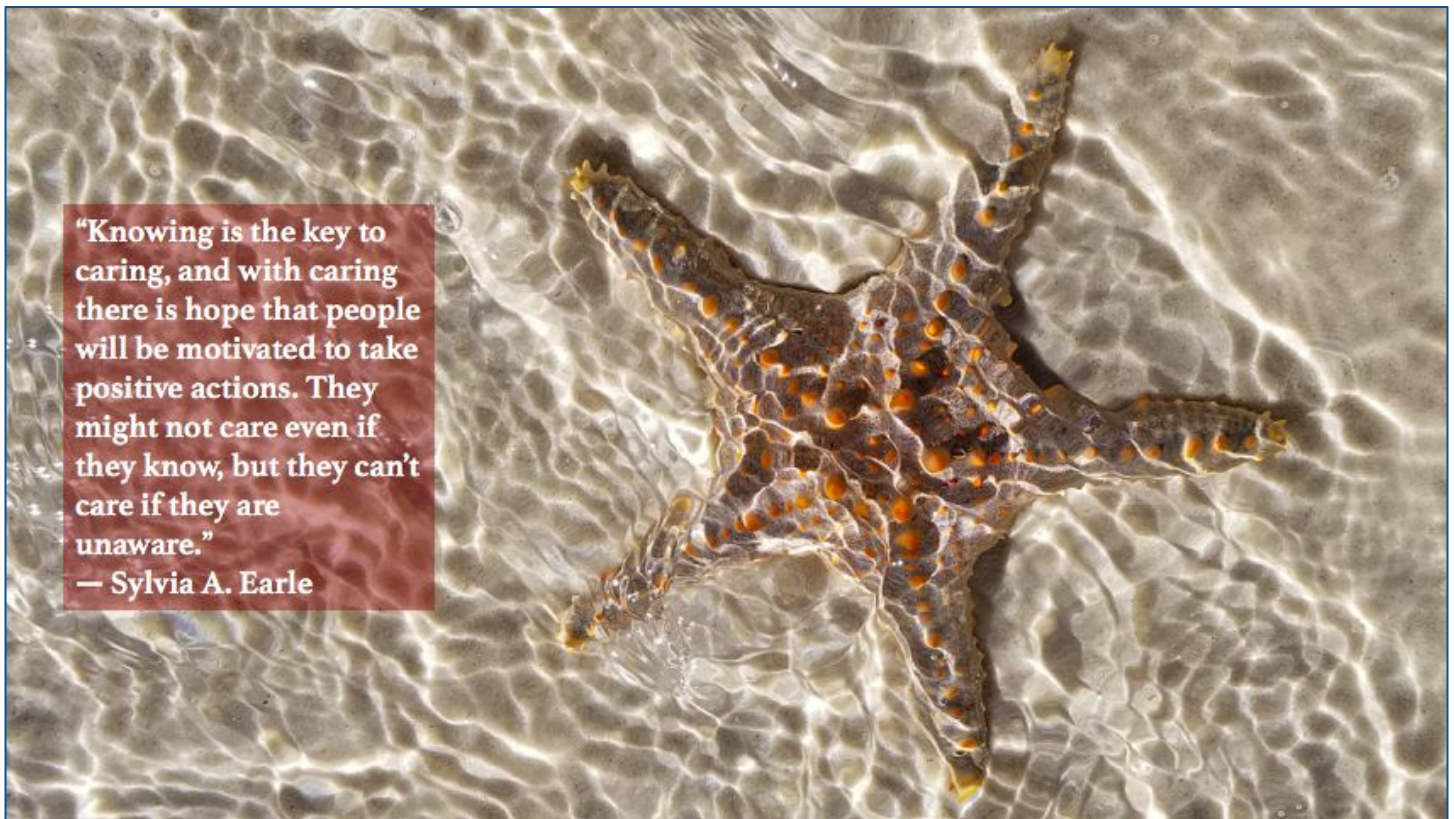
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# ROUND 1: Queens of the Sea & Sky

As a counter-defensive, the hagfish releases slime to jam up the snake's breathing gills, but the sea snake can hold its breath for two hours and isn't deterred. Despite the hagfish's slime capabilities, she's no match for the sea snake venom; after sliming lose the mortal coils of the snake, Hagfish drifts to the ocean floor and with the last of her energy she burrows into the sandy substrate and the OLIVE SEA SNAKE SLAYS PACIFIC HAGFISH! Narrated by Katie Hinde & Summarized by Jessica Martin



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"Knowing is the key to caring, and with caring there is hope that people will be motivated to take positive actions. They might not care even if they know, but they can't care if they are unaware."  
— Sylvia A. Earle

Katie Hinde / Sea Star in Queensland, Australia / CC-BY-SA 3.0



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## ROUND 1: WHY NOT BOTH?!?

**Walrus (1) v. Lichen (16)** - Walruses are pinnipeds: carnivorous marine mammals that are adapted for life at sea. Translated from Latin, pinniped means "fin foot." Most marine mammals often have a thick layer of fat (aka blubber) that keeps them warm in the water; however, some marine mammals like sea otters have a dense coat of hair. When it comes to walruses, they have both blubber and fur! In the spirit of "why not both," the Lichen is often described as a composite of 2 organisms that include a fungus and an algae (or cyanobacteria). Recently, Dr. Lichen Toby Spribille revealed that lichen isn't always a one lichen-one fungus arrangement.

Tonight our rivals find themselves at Round Island, part of the Walrus Islands State Game Sanctuary managed by the Alaska Dept. of Fish and Game. Our lichen dispersed as they can on the wings, er, foot of a bird, in this case, on the toes of a Pelagic Cormorant. As the lichen drops from the bird into the walrus colony, where our hulk of a walrus is in a bit of a bluster with another male. Walrus snort growls, sending the lichen wafting up in the air... to be sucked into the offshore air current, out to sea. WALRUS BLOWS LICHEN TO SEA! Narrated by Tara Chestnut & Summarized by Jessica Martin



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**Swordfish (2) vs Leaf Slug (15)**. Swordfish live in temperate and tropical waters from ocean surface to over a mile deep! To see the scarce food in these depths, they have massive eyes that require a lot of fuel. Many other fish at these depths are ectothermic (cold-blooded), and swordfish are too. But to keep their big eyes and sharp minds humming, they've adapted to be endothermic in these areas as well. Their brain and eyes can even be 10-15C warmer than the ambient temperature! That's one way to have heat vision! The Leaf slug has adapted a rather interesting diet: they eat animals, plants, AND when food is scarce they can rely on... photosynthesis. The Leaf Slug normally grazes algae like a typical heterotroph, AND can sequester the chloroplasts from that algae and put them to work internally FOR the slug's benefit in an adaptation named kleptoplasty.

These two combatants are meeting off Montauk Long Island, where swordfish enthusiastically dive for squid. Leaf slug is less impressed with the location, finding it cold and dark. Photosynthesis is much more effective in shallower waters. "Who put all these squid here?" slug

# ROUND 1: WHY NOT BOTH?

thinks as the swordfish comes slashing to strike squid with its bone hard sword. The impact of the rapid thrashing of the Swordfish liquifies the sea slug. **SWORDFISH DEFEATS LEAF SLUG!**  
Narrated by Josh Drew & Summarized by Margaret Janz



Alif\_abdulrahman Wikimedia Commons CC-BY-SA 3.0

**Lungfish (3) v. Spotted Salamander (14)** – The Australian lungfish (*Neoceratodus forsteri*) is thought of as a “missing link” showing the transition from water to land and is one of the most ancient still living (extant) vertebrates. Unlike the five other extant species of lungfish, Australian lungfish breathe air optionally (aka facultative air-breathing) with their one lung, but under normal conditions they get the oxygen they need from their gills. The Spotted Salamander (*Ambystoma maculatum*) is an amphibian that is widely distributed throughout the US and prefers to live in burrows underground. In the spring, salamanders make their way back to the vernal pool they were born in to start the breeding season.

Vernal pools are temporary habitats that form each spring due to rain or snow melt. Fish can't live in these vernal pools so the salamander eggs are safe from fish predation. The salamander eggs have a special algae that grows inside the eggs to help maintain a thick jelly coat that prevents water and oxygen from getting in, but also photosynthesizes more oxygen for the developing embryo. This makes the spotted salamander the only vertebrate - that we know of- with living microbes inside their cells.

The combatants find themselves under the light of the full moon at the Burnett River in Southeastern Queensland after a recent deluge of rain. A massive female lungfish is hungry and swims towards one of the banks where an Australian banyan is growing. At approximately 4 feet long, she has likely lived for the better half of a century and she is looking for some tasty ripe figs. In the buttress roots of the banyan, a 9 inch long salamander was on her way to lay eggs in her local vernal pool. While trying to get her bearings, the salamander is suddenly yanked backwards! The lungfish has mistaken the glint of the salamander tail for a fig. The spotted salamander sheds its tail by autotomy! The lungfish spits out the unexpected tail and swims off in search of a sweeter meal. **SPOTTED SALAMANDER OUTLASTS LUNGFISH!**  
Narrated by Mauna Dasari & Summarized by Melanie Beasley

Mitch Ames  
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# ROUND 1: WHY NOT BOTH?

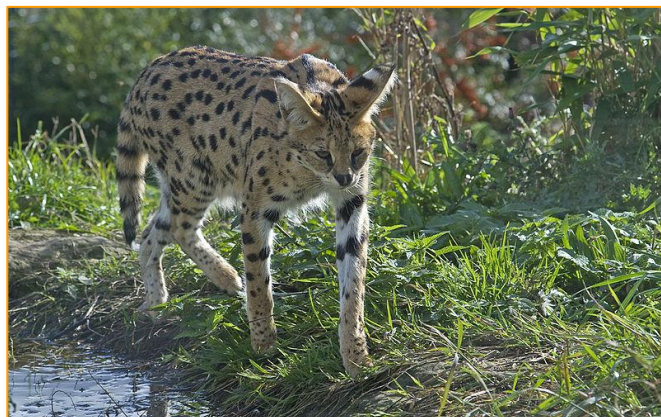
**Pangolin (4) v. Painted Redstart (13)** - Weighing in at 35kg, the giant ground pangolin is the largest of the pangolins, and makes its home in forests and savannas in Central and West Africa. While pangolins are the only mammals covered in scales, they also have sparse fur on their underside. Sadly, these remarkable mammals are endangered by poaching. Meanwhile, in the mountains of Central America and up into SW United States, we find the painted redstart. This small bird uses a dual approach method to hunting: flushing and pursuing. The painted redstart will fan out its white outer tail feathers to startle insects (flushing) and then race after them (pursuing). Flashing the tail feathers triggers an anti-predator flee response...but the insects are directed right into the danger zone: the painted redstart's face!



Andy Reago & Chrissy McClarren Wikimedia CC-BY-SA 2.0

Our pangolin vs redstart battle takes place in a daytime, forest-edge habitat in Cameroon (as pangolins can be active both at night and during the day, because why not both?). The painted redstart is perched on a tree trunk flushing and pursuing insects; at the base of the tree, our pangolin is ripping up an old log full of yummy ants. With its robust forelimbs, the pangolin sends a piece of

wood flying toward the redstart, who is forced to take off and forage in safety. PANGOLIN DEFEATS PAINTED REDSTART! Narrated by Kristi Lewton & Summarized by Jessica Martin



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**Serval (5) v. Lesser New Zealand Short-tailed Bat (12)** – The serval (*Leptailurus serval*) is a 30-40 lb cat with dorsal stripes and spotty bodies found often closely associated with wetlands across sub-Saharan Africa. The genus name is derived from Greek meaning 'fine, delicate cat' and has the longest legs relative to body size of any cat. The lesser New Zealand short-tailed bat (*Mystacina tuberculata*; 'pekapeka' in Maori) is one of only two extant, native terrestrial mammals that is endemic to the islands of New Zealand. Though capable of flight, Pekapeka has "astonishing rodent-like agility on the ground" (Daniel 1979) with small talons on the inside curves of their thumbs & feet that give them a run-like gait. The Pekapeka do about 40% of their foraging on the ground with their tiny, sharp, insect-adapted teeth surrounding an



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# ROUND 1: WHY NOT BOTH?

extensible tongue tipped with hairlike papillae for lapping up nectar.

The combatants meet in a gentle rain as the sun has just disappeared behind the uKhahlamba Drakensberg Mountains, South Africa. Serval tiptoes around a vlei (shallow, seasonal lake) in the middle of its home territory, hunting for rodents. Pekapeka, newly arrived to this place, is unphased by the cool, wet weather, similar to that of its temperature rainforest home. March is peak courtship season for the Pekapeka, who scrambles over to a nearby log to broadcast his high energy, multisyllabic song. Serval's large, oval ears twitch at the unusual sound. Ears forward, Serval begins to crouch, moving forward by slowly lifting one leg at a time, tail a "constant, nervous twitter" (Geertsma 1976). THUD! Spotted paws land a little too close to the Pekapeka, who launches into the sky from all four limbs. But the Serval pivots and springs straight up into the air, batting the Pekapeka back to the ground. Pekapeka tries to scramble away through the grass, but his wing sticks out at an awkward angle, crawling through the thick, damp grass impossible. Serval's canines crush through the Pekapeka's skull! SERVAL SNACKS ON THE LESSER NEW ZEALAND SHORT-TAILED BAT (PEKAPEKA)! Narrated by Alyson Brokaw & Summarized by Melanie Beasley

**Therapsid (6) v. Scansoriopterygid (11)** - The small *Yi qi* belongs to the family Scansoriopterygidae. *Yi qi* means "strange wing" in Mandarin. Scansoriopterygidae is made up of 4 species of climbing and gliding dinosaurs, only two of these species developed a gliding membrane

(patagium). *Yi qi* had both a membrane-based wing AND feathers. New studies reveal that it was unlikely that *Yi qi* was a flier, but rather an "obligate glider" (Dececchi et al. 2020).



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# ROUND 1: WHY NOT BOTH?

*Lystrosaurus maccaigi* is an extinct non-mammalian Therapsid. *Lystrosaurus maccaigi* belong to the group which hosts the origin of true mammals but they themselves are not directly related to mammals. *Lystrosaurus maccaigi* is a Dicynodont aka 'two-dog-tooth', due to their prominent two tusks. Dicynodonts had a toothless beak that like a turtle or triceratops, so they are the only group to have BOTH a beak AND tusks. Their tusks were ever-growing and when damaged the tusks could heal (Whitney et al. 2019).

MMMagic transports *Yi qi* to the ever-warming late Permian, 255 million years ago in what is today Karoo National Park, South Africa. The Permian plants and animals are foreign to *Yi qi*, who is ~100-million-years away from home. As a glider *Yi qi*'s instinct is to climb high in the tropical lushness of a large glossopteris seed tree fern. *Yi qi* begins to preen its feathered body, but it hears a high-pitched rattle and sees a large shadow. It's a Meganisoptera! Resembling a dragonfly, the late Permian griffen fly has a wingspan as big as *Yi qi*'s! Startled, *Yi qi* glides to the ground landing in some muddy tracks that makes *Yi qi*'s membrane muddy and feathers sticky. *Yi qi* climbs up a swaying *Dicroidium* (a shrub like seed fern) to preen its feathers again but the swaying intensifies. CRACK! A large, fanged beak pushes through the foliage and crops the entire branch beside *Yi qi*! Its *Lystrosaurus maccaigi* out for a snack! *Yi qi* goes to glide, but its membrane and feathers are muddy and *Yi qi* only falls to a lower branch. *Lystrosaurus maccaigi* spots the struggling *Yi qi* and *Lystrosaurus*' large beak wraps around the muddy

feathered body of *Yi qi*! CRUNCH CHOMP GULP! The glider is opportunistically eaten by the largely herbivorous *Lystrosaurus*. THERAPSID SNACKS ON SCANSORIOPTERYGID! Narrated by Yara Haridy & Summarized by Melanie Beasley

**Hairy Frogfish (7) vs Hairy Frog (10).** Fair warning: This matchup gets a little... hairy. Actually, it won't be hairy at all as neither of these combatants actually has true hair. The hairy frogfish gets their name from the spinule structures that cover their body camouflage as it moves through rocky, sandy, or coral reef habitats by walking on its fins along the seafloor. The hairy frog gets a hairy appearance from the modified gills, called papillae, that males develop during breeding season. Hairy frogs spend more time in the water during breeding season & the papillae increase oxygen uptake so that males can engage in energetically expensive activities like mating & egg guarding. In this region the rainy season has recently begun and hairy frog is not so hairy at the moment.

Tonight the Hairy Frog is MMMagicked to Cameroon's coastal waters much deeper than a frog's used to. As the frog swims he notices a wriggling worm nearby... It's a lure that frogfish has on their front-most dorsal fin! Within 6 milliseconds of predatorily approaching the worm the hairy frog has been sucked into hairy frogfish's mouth! Our hairy frog contracts his muscles to break bones in his feet, allowing his 'claws' to emerge through his skin #SNICKT





# ROUND 1: WHY NOT BOTH?

but too late- GULP- hairy frogfish esophageal sphincter springs closed as the hairy frog is doused in digestive fluids of the hairy frogfish's stomach. HAIRY FROGFISH CONSUMES HAIRY FROG! Narrated by Lara Durgavich & Summarized by Margaret Janz



Jens Peterson Wikimedia Commons CC-BY-SA 3.0

**Muntjac (8) v. Echidna (9)** – The muntjac (*Muntiacus muntjak*) is a small deer weighing up to 21 kg found throughout South/Southeast Asia from lowland rainforests to hilly Himalayan slopes. The muntjac has antlers AND tusks! Antlers are great defensive shields in male-male combat. But big antlers are very easy to get tangled in vegetation, which you don't want to do when you're a small forest-dwelling snack for tigers. And leopards. Dholes. Jackals. The list goes on. Meanwhile, tusks are the best for a vicious offense, slicing & stabbing (& not getting tangled in undergrowth). But they can't protect you from another muntjac's tusk. So BOTH.

Weighing 4-5 kg, the short-beaked echidna (*Tachyglossus aculeatus*) is a common mammal throughout much of Australia. The echidna lays eggs (not-so-mammalian trait) and produces milk (distinctly mammalian trait). Echidnas are classified in the order Monotremata, which means "one hole". This refers to a cloaca (found in reptiles & birds), which is a single opening for all things waste & reproduction related.

The combatants meet in the morning on the home turf of the muntjac at Ujung Kulon National Park on the Island of Java, Indonesia. Muntjac is resting from a bout of pre-dawn browsing. Thunder rumbles above the lowland rainforest canopy, while a nearby river, fed by yesterday's storms, roars. Muntjac keeps his ears pricked for any prowling predators while chewing regurgitated leaves. Short-beaked Echidna ambles through the screen of grass surrounding Muntjac. Muntjac leaps up, prepared to bolt, a dog-like bark in his throat, when he realizes that it is no predator, but something rather small & spiky. Short-beaked Echidna freezes, sensing a threat, then shoves its face into the soft ground. Echidna projects its large, modified hair-spines while hunkering close to the ground, protecting its soft underbelly. Echidna's spines remind the deer of the Indian porcupine, a species Muntjac has learned to avoid. Muntjac departs the field of battle. ECHIDNA OUTLASTS MUNTJAC! Narrated by Asia Murphy & Patrice Kurnath Connors & Summarized by Melanie Beasley



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# ROUND 1: WHY NOT BOTH?

“The earth is what we all have in common, that it is what we are made of and what we live from, we therefore cannot damage it without damaging those with whom we share it. There is an uncanny resemblance between our behavior toward each other and our behavior toward the earth... the willingness to exploit one becomes the willingness to exploit the other.” –Wendell Berry



Katie Hinde / Cedar Mesa, Utah / CC-BY-SA 3.0

## Harpy Eagle Eyes

In honor of the 10th Annual March Mammal Madness, the wonderful Jeremy Fisher recorded a music video for the song parody "[Harpy Eagle Eyes](#)" from the 2021 "Battle" between Harpy Eagle and Red Kangaroo. In addition to his wonderful albums for all ages, in recent years Jeremy has expanded to do more content geared toward K-3 kids, including virtual school visits and 30-60 minute interactive concerts. Check out his [Website](#) & [YouTube Channel](#)!

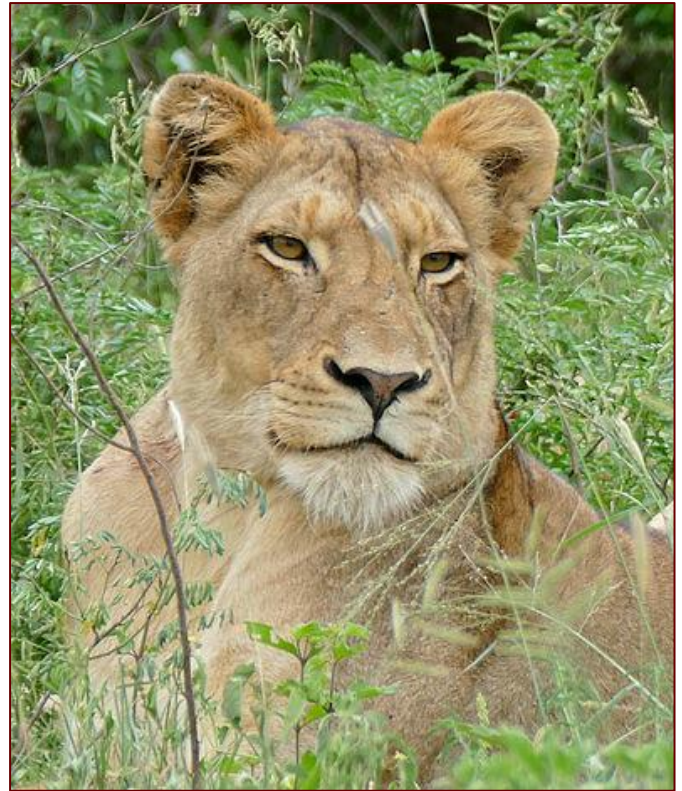


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# ROUND 1: MAMMAL COLLECTIVES

**Pride of Lioness (1) vs Labor of Moles (16) -**  
The hairy mole is not a very social animal. They prefer to spend time alone, digging tunnels and consuming worms, insects, spiders, slugs, and other creepy crawlers. Moles have adapted well to underground life (fossorial) of digging in darkness- they have reduced eyes and 6-digits on their hands. Unlike moles, lionesses are quite social, living in cooperative social groups with their sisters, their cubs, and some unrelated adult males that have shorter tenure in the pride. The lionesses are the heart of the pride, though, and tend to stay in their natal pride (the pride they are born into). Living in prides involves a lot of sharing, but working together allows lionesses to bring down much larger prey.

Our battle takes place in Botswana's Okavango Delta, the ancestral home of the Baswara people. March is the end of the rainy season, much hotter than the cool temperatures the mole is used to in the eastern U.S., where their mating season has just begun. As the lionesses rest under a tree, one notices a kerfuffle nearby where two moles are fighting in an aardvark burrow. The exertion has the mole breathing heavily, despite having modified hemoglobin which means they can survive in very low oxygen, high carbon dioxide underground environments. The lioness wanders over and paws at the mole, who tries to retreat back to the dark cool underground world. The

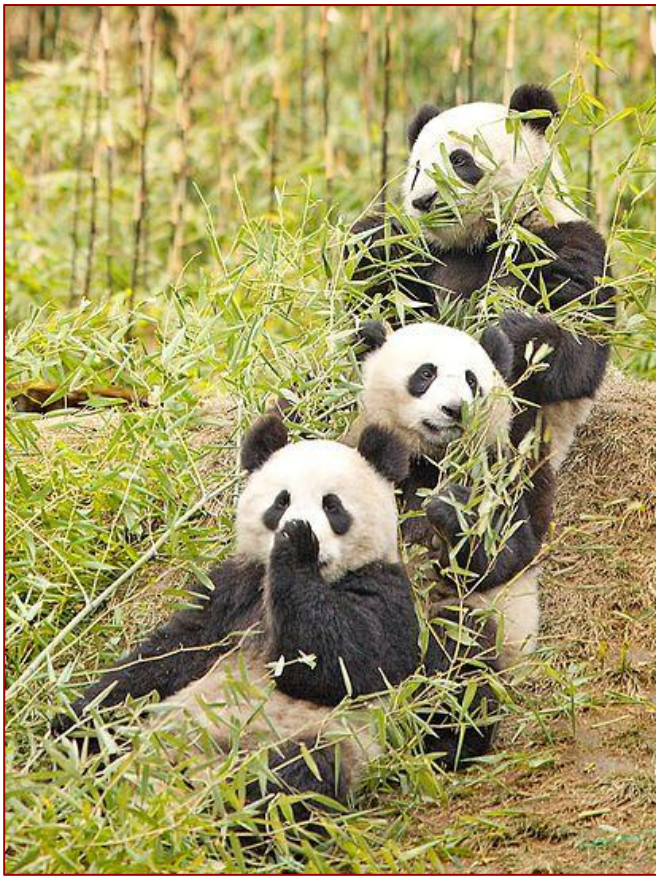


Bernard Dupont / Wikimedia Commons / CC-BY-SA 2.0

lioness pats again, and the mole's cylindrical shape means he rolls easily. She sniffs deeply at this plush object and sneezes at the unfamiliar odor. The mole again tries to retreat, but the lioness pats with her claws outstretched and again sends the mole rolling, bleeding through his velvety fur. Before he stops rolling the lioness pounces, landing with a lot of weight on both paws, squishing the mole badly. To not lose or share her mole meal as another lion approaches, lioness snaps up the mole, shearing his flesh with her carnassials. PROUD LIONESS LABORIOUSLY GULPS DOWN MOLE! Narration written by Anne Hilborn & Summarized by Margaret Janz

# ROUND 1: MAMMAL COLLECTIVES

**Embarrassment of Pandas (2) vs Town of Prairie Dogs (15)** - The bold coloring of pandas and their lumbering, adorable appearance make them very popular but they aren't usually found in large groups. As a herbivorous bear that consumes a lot of fiber, Giant Pandas have a 'mix of herbivore and carnivore traits' (Nie et al. 2019). Aspects of their skull, teeth, jaw muscles, & hands help them eat bamboo, but their digestive tract, enzymes, & gut microbes are still very similar to carnivores.



Chi King / Wikimedia Commons / CC-BY-SA 2.0

The also adorable black-tailed prairie dogs are diurnal rodents that live in grassland areas of North America and weigh under 3lbs. Black-tailed prairie dogs maintain elaborate underground burrow systems of up to 30 feet of tunnels, nesting chambers, & mounds with dozens of entrances. Their large influence on the local ecosystem makes them a keystone species. Family groups (coterie) in these towns are closely-related natal females who inherit the burrow intergenerationally, 1-2 unrelated males, & their young. Coterie intensely defend their territories from incursions by neighbors, and hundreds to thousands of prairie dogs can live in towns of adjacent coterie burrows.

Tonight's battle occurs in the largest remaining continuous habitat of the giant panda and UNESCO World Heritage Site- the Wolong Nature Reserve in the Qionglai Mountains of China. March is the beginning of the Giant Panda breeding seasons that lasts until May. An adult male giant panda dines & reclines in a bamboo patch while more than 100 feet away, well out of sight in the montane forest, a female giant panda is similarly engaged. The town of prairie dogs are MMMagicked to the moist bamboo forest, without their elaborate and safe burrow systems. A juvenile prairie dog spots one of our giant pandas and sounds an alarm call. Usually within feet of their bolt hole, hundreds of prairie dogs begin rapidly searching for any subterranean hiding place! Indeed, female black-footed prairie dogs have never been away from their burrow their entire lives & become frantic.



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# ROUND 1: MAMMAL COLLECTIVES

One prairie dog female gives a territorial bark "jump-yip" as an unrelated female bumps into her and "starts a chain reaction of jump-yips among black-tailed prairie dogs of the home and adjacent coterie" (Hoogland 1996). The giant panda is overwhelmed by the rodent intensity and stands up to depart for a more mellow scene, unintentionally squishing a prairie dog. The panda's lumbering movements escalate the terror of the prairie dogs who now scatter away from the bamboo grove in all directions, desperate to find anything reminiscent of home. Soon the panda is again alone in the grove, unsure of what just happened. He awkwardly wipes off the remnants of what he'd stepped in. EMBARRASSMENT OF PANDAS DEFEATS TOWN OF PRAIRIE DOGS! Narration written by Marc Kissel & Katie Hinde & summarized by Margaret Janz

**Herd of Reindeer (3) v. Cauldron of Bats (14)** - Iconic of the "North Pole," *Rangifer tarandus* have a circumpolar distribution, grazing and browsing the Arctic tundras, boreal forests, and mountains of both North America and Europe. Although the same species, *R. tarandus* are called caribou in North America, and referred to as reindeer (from Old Nordic) in Europe. For safety, reindeer can form herds and in spring, reindeer "ride the green wave" of nutritious plants north as the snow melts, as herds converge into "super herds" with hundreds of thousands of individuals. Herds of reindeer this large, however, are rare; in Norway today there are only ~25,000 total reindeer counting both wild & semi-domestic. Additionally these gregarious "superherds" move in tandem, but

are not socially bonded mega units. Reindeer are culturally important for nomadic subsistence Eurasians such as the Sámi in Norway, Finland, Sweden and Russia. Today in Norway, reindeer herding & husbandry is still recognized and protected as a Sámi livelihood. Rather than large herds, the big-eared woolly bats (*Chrotopterus auritus*) form colonies of roughly 3 to 8 individuals. The big-eared woolly bat is the second largest bat in the western hemisphere and has a 2 foot wingspan.



Mathew Schwartz / Wikimedia Commons / CC-BY-SA 3.0

Our bats find themselves transported via MMMagic to the snowy plains of Dovrefjell-Sunndalsfjella National Park in North-central Norway above a herd of reindeer. Confused by their surroundings, the bats circle the herd as reindeer forage for lichen beneath the snow. The reindeer aren't worried about the bats, but they are worried about the sudden appearance of a lynx. A predator warning bellow springs the reindeer into action- creating a chaotic, swirling 'cyclone' of deer to disorient & confuse predators. Failed in ambush, the Lynx slinks



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# ROUND 1: MAMMAL COLLECTIVES

away. Though the predatory threat is seemingly now gone, the reindeer "hoof it" slightly North to bed down away from a known predator presence... as the bats still flap above the field of battle CAULDRON OF BATS OUTSTAYS HERD OF REINDEER! Narration written by Alyson Brokaw and summarized by Jessica Martin.

**Lodge of Beavers (4) vs. Prickle of Hedgehogs (13)** - A Lodge of Eurasian beaver (*Castor fiber*) includes a socially monogamous male & female pair and their young from the previous 1-2 years. Adult Eurasian beavers, the second largest of all rodents, can weigh up to ~80lbs (13-35kg) and are nearly 4.5 feet long (73-135cm)! The much smaller desert hedgehogs (*Paraechinus aethiopicus*) weigh under two pounds (400-700 grams) & are shorter than a foot long (14-23cm). Desert hedgehogs are distributed across Northern Africa & the Arabian peninsula. March is Desert Hedgehog mating season in Qatar and the usually solitary female has two unfamiliar males trying to



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court her as she attempts to go about her foraging. MMMagic transports the three of them to Beaver Dam Pond! The beaver family are noshing on aquatic vegetation near their lodge within the Saur River of Southeast Norway when they catch a whiff of a prickle of Desert Hedgehogs in their territory. The hedgehogs are well-known travelers within their desert ecosystem, but this lush habitat is very different from the xeric lands they came from. They have poor eyesight and are sniffing on their own for juicy bugs to devour. Eurasian beaver are very territorial. Beaver spring into action when they catch a whiff of the unfamiliar intruders. The big male swims over to the bank where the hedgehogs are approaching. The quills on hedgehogs' backs protect them from predators like owls & eagles, but it better watch out for the large razor-like incisors of the beavers. With the young safely atop the mound and the adult female beaver swimming nearby, the male beaver raises its heavy rudder-like tail up and slams it down hard against the surface of the water making a loud SLAP to warn intruders away. The female hedgehog immediately takes off running into the forest. The males go into defensive mode, tucking their tiny faces into their chests and curling into balls exposing their spiny backsides. Without a follow-up contact attack, the hedgehogs uncurl & once again chase after lady love. LODGE OF BEAVERS DEFEATS PRICKLE OF HEDGEHOGS! Narration written by Daniellee Lee & Summarized by Margaret Janz



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# ROUND 1: MAMMAL COLLECTIVES

**Romp of Otters (5) v. Conspiracy of Lemurs (12)** - Mongoose lemurs are found exclusively on the island of Madagascar, and this species in particular is found in the dry forests and scrubland of Northwest Madagascar. These lemurs live in small groups of a pair bonded male and female and their offspring. Unusually for primates, mongoose lemur activity patterns shift seasonally. They tend to be nocturnal during the dry season (May-Nov.) & diurnal during the colder wet season. Scientists call this variable activity pattern 'cathemerality'. Another animal that forms monogamous pairs for breeding, the smooth-coated otter lives in aquatic habitats in India and Southeast Asia. Highly social, smooth-coated otters often live in groups of nearly a dozen individuals.

Tonight, a mongoose lemur family of 5 suddenly finds themselves in a mangrove stand in Kuala Selangor on the west coast of Malaysia. The lemurs see our otter group in the water, hunting, and mistake it for their tree-climbing predator- the fossa. But the tree canopy isn't continuous and they can not arboreally flee! The group of otters is busy cooperatively hunting fish, swimming in a 'V' formation with the largest otters in the center, undulating to scare and disorient fish into jumping out of the water (van Helvoort et al 1996). Quickly catching the fish, the otters swim to shore and begin playing with their food- tossing the fish up a little and catching them head first to swallow in one piece! Food time was such fun the otters begin playing! Otters are rolling and chasing... and romping right off the battlefield! CONSPIRACY OF LEMURS OUTLASTS ROMP OF OTTERS! Narration written by Lara Durgavich and summarized by Jessica Martin.



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# ROUND 1: MAMMAL COLLECTIVES

**Glaring of Cats (8) v. Sneak of Weasels (9)** - The Black-Footed Cat, or *Felis nigripes*, is Africa's smallest cat, tipping the scale at less than 4bs. Secretive and solitary, this itty bitty kitty is an expert at hunting small mammals and birds with an average rodent capture every 50 minutes in a night of solitary hunting. The Amazon weasel (*Neogale africana*) is smaller than the black-footed cat, but is South America's largest weasel found along the Amazon river and its tributaries. Similar to other weasels and its relative the American mink, Amazon weasel has a long, slinky body with short legs and reddish brown coat.



Jonathan Kriz / Wikimedia Commons / CC-BY-SA 2.0

Tonight's battle takes place in South Africa's Karoo semi-desert, in the clearing outside Black-footed Cat's den. Den sites are fewer than they once were as black-footed cats rely on springhare burrows for dens, but humans perceive the rodent springhare to be a problem for agriculture & suppress the population. A few weeks ago Black-Footed Cat's deteriorating den, an old springhare burrow, had collapsed. Her two kittens, a typical litter size, did not survive. So she found a new den site until the next opportunity to mate. A lone aardwolf trots into the scene... toward the entrance of Black-Footed Cat's den... as three sets of weasel eyes watch from a scrub-shrubbery. The aardwolf gets closer to the Black Footed Cat's den... it's at the entrance... & slips into the earthen abode! Adapted to the rivers & wetlands, the Amazon Weasels are ill-prepared for the semi-desert. Two weasels slither long & low across the slope to the den entrance, up over a rock & begin climbing a karee tree. Following the others, the slowest weasel ends up nose-to-nose with the black-footed cat, the felid sprints toward her den entrance... darts directly into the den... And squeezes past the aardwolf in the larger outer chamber to find her own sleeping spot further in the den system! The insectivorous aardwolf and the rodent-hunting Black-Footed Cat are not in competition or conflict and can, seemingly, hunker down as perfect strangers in shared den systems... beyond the field of battle. **SNEAK OF WEASELS OUTLASTS GLARING OF CATS!** Narrative written by by Katie Hinde and summarized by Jessica Martin



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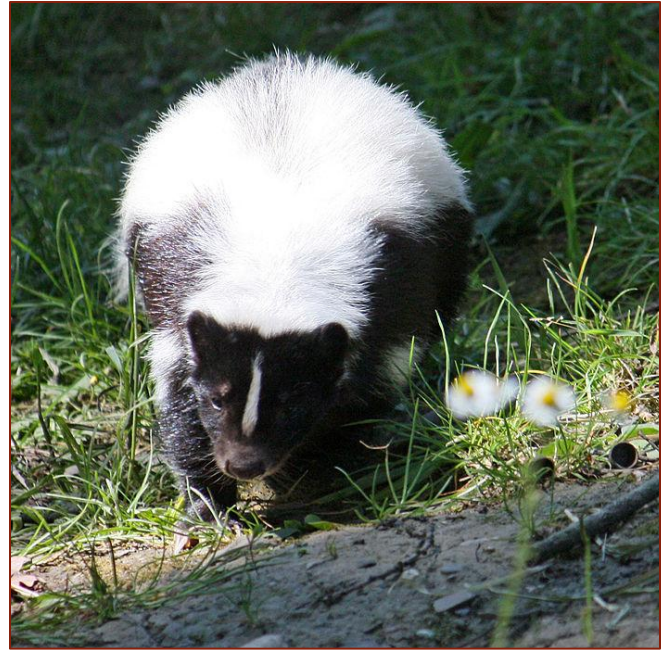
# ROUND 1: MAMMAL COLLECTIVES

## Skulk of Foxes (7) v. Stench of Skunks (10) -

Today's skulk is made up of bat-eared foxes (*Otocyon megalotis*). These small foxes weigh 3-5 kg and are found in grasslands and scrublands in southern and eastern Africa. The bat-eared fox's social lives- occasional sister wives, allogrooming, & inter-group sharing of termite nests- lends itself well to ending up in a skulk... and disease transmission, including canine distemper & rabies. This is a reminder to not feed wildlife. In addition to making them unafraid of people, which will only get them in trouble, concentrated food sources can lead to a bunch of sick animals! Our second combatant is the hooded skunk (*Mephitis macroura*) which is also small (about 2 kg) and found in grasslands, deserts, and pine forests in the Southwest US, Mexico, and Central America.



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The hooded skunk is MMMagically transported to the Serengeti National Park, Tanzania where it is following the scent of nearby termites. The skunk passes deathly quiet dens, entrances open in a pitch-black, silent wail. The skunk ignores picked over fox bones. Their waddling gait kicks up dust, exposing stickily-dried scraps of pale brown fur, bitten out in clumps. When the skunk arrives at the multiple small dirt mounds that mark active termite nests, it finds three other hooded skunks. Although not terribly sociable, skunks will tolerate co-feeding when there is enough food to go around. The Stench is complete. Also at the feeding ground is a family of seven foxes consisting of a vixen her kits, and her recently died sister's kits. The vixen, mistaking the hooded skunks for honey badgers,



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# ROUND 1: MAMMAL COLLECTIVES

gets up, her front paws crossed. The vixen takes a few stumbling steps away. Abruptly, her spit-covered haunches collapse into the ground. Hooded skunks & foxes aren't strangers & rarely enemies, so the skunks move closer. One skunk moves too close. A kit lifts its nose moon-wards as if trying to touch its head to its back, paws a-tremble. Another arches its back & tail aggressively. But this kit doesn't flatten its ears, in normal bat-eared escalation. Instead kit charges, wet jaws snapping! The hooded skunk turns just in time, avoiding a bit to the face... but the kit snaps down on skunk's fluffy tail. The hooded skunk stamps, lifting its tail high, preparing to spray...!

The fox kit abruptly turns away, instead attacking their sibling, who is still frozen, twitching, in its eerie silent howl position. The fox kit jawlocks onto the sib's muzzle & yanks them out of their stupor. A deep hissing-growl sounds, warning of danger, and calling the kits to the vixen. Together, the skulk of foxes stumble or limp from the termite nests, ceding the battleground. The stench of skunks remain, tails held warily high, a banner of white- but on one tail drips of blood red glow in the moonlight. STENCH OF SKUNKS SURVIVES SKULK OF FOXES!  
Narration and summary written by Asia Murphy.



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# ROUND 1: QUEENS of the SEA & SKY

**Orca (1) vs Olive Sea Snake (8)** - Orca pods are some of the most stable social bonds of mammals where all pod members are linked through maternal descent. Our cetacean matriarch leads the Southern Resident pod of multiple adults, sub-adults, & young. Olive Sea Snakes are highly adapted to marine environments, moving through coral reefs using a paddle-like tail that has special photoreceptors to avoid light & potential predation (negative phototaxis). Tonight's battle is west of the Salish Sea of the Pacific Northwest. Our matriarch orca & her pod are on the hunt for chinook salmon. The matriarch is actually a GRANDMOTHER! No longer reproducing(as one of the few mammal species that have post-

reproductive lifespan), orca grandmother presence can increase the survival of her grandcalves. Orca guides young members of her pod to hunt using echolocation! MMMMagic transports our Olive Sea Snake to the cold Pacific waters (~47F). Olive Sea Snake prefers much warmer water, around 70F of the tropical coral reefs. But of greater concern is the school of chinook salmon approaching fast! The school of large fish (each > 20 lbs) surrounds Olive Sea Snake & she can't undulate her body & paddle-like tail fast enough to escape. Olive Sea Snake is stuck amidst the school.

Click... Click... Click... click.click.click. BZZZ!! The Matriarch Orca & her pod used echolocation to find the salmon! The pod plows through the school, chomping fish as they go. Matriarch Orca makes a meal of a particularly large salmon, with a side-dish of olive sea snake. **ORCA DEVOURS OLIVE SEA SNAKE!** Narration written by Jessica Light & summarized by Margaret Janz



Callan Carpenter / Wikimedia Commons / CC-BY-SA 4.0

# ROUND 2: QUEENS of the SEA & SKY

**Steller's Sea Eagle (3) v. Eclectus Parrot (7)** - Male and female parrots look so different that naturalists in the 19th century thought they were different species. Female parrots are vermilion and blue and they sit in tree hollows, so their colors contrast with the green leaves and signal that the tree is occupied; male parrots spend more time foraging and their shiny green color helps them blend into the leaves and camouflage them from predators. Steller's Eagle is known for its snow-capped wings, and there are only about 6,000 of these birds left. They eat fish, but for some their diet consists mostly of birds. "The Steller's eagle's strong, very curved bill is the perfect implement for food ripping and tearing large carcasses into small pieces that are easy to swallow," (Ladyguin, 2000). This battle takes place in the southern Kuril Islands north of Japan, where our eagle has been returned from her poorly-navigated fly-about the US Eastern Seaboard. The sea eagles are headed north from Japan on their way to their summer breeding grounds in Kamchatka. The Kuril Islands are part of the Pacific's Ring of Fire where steep cliffs host a huge array of nesting seabirds in the summer. The sea eagle uses her sharp eyes to search for a meal as she soars over the cliffs, but the cold March weather means that there aren't many birds looking to breed, so the eagle heads out over the sea ice in search of fish. Against the gray backdrop the eagle sees a flash of movement, and though she likely can't see the parrot's colorful plumage, the ridges above the eagle's eyes help her in hunting by shading the sunlight. The parrot is accustomed to dense forests, but there's no vegetation here to



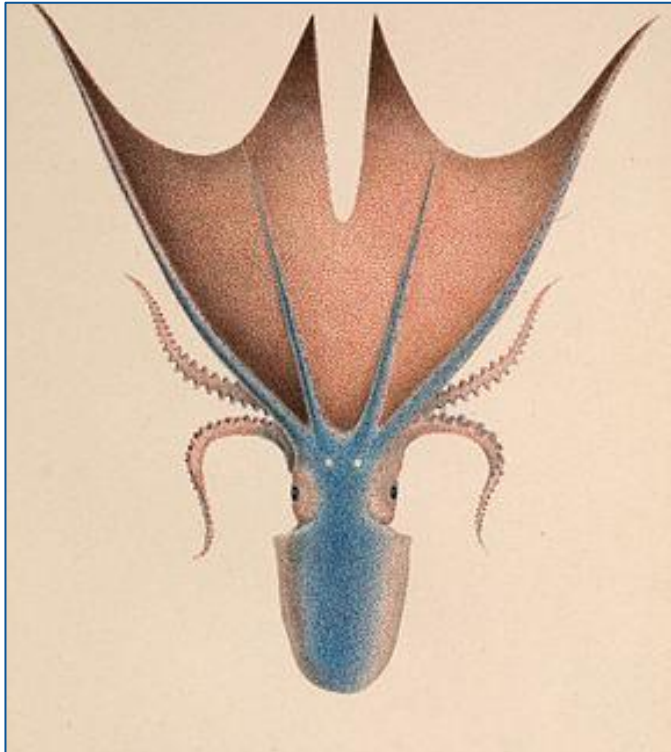
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hide or forage in. The bitter March winds blow her out over the sea and her chilled flight muscles struggle to keep her aloft. The parrot tries to turn into the wind and get back to land, but sees too late a massive bird above her. These parrots rely on flocking as an anti-predator defense but this parrot is all alone; the sea eagle dives and punctures the parrot's chest with talons before landing on the sea ice to tear into her meal with her strong, curved beak. **STELLER'S SEA EAGLE DEVOURS ECLECTUS PARROT!** Narration written by Anne Hilborn and Marc Kissel, Summarized by Jessica Martin



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# ROUND 2: QUEENS of the SEA & SKY



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## Blanket Octopus (4) vs Common Map Turtle (5)

- The 6.5 foot long Blanket Octopus female is named for the dramatic, fleshy 'cape' that covers her tentacles. The cape is not present on males of the species, which are also almost 100 times smaller than females. Blanket Octopus spends its 3-5 year lifespan among the coral reefs of tropical & subtropical oceans, where it eats mostly fish. The Common, or Northern, Map Turtle is extremely shy, likely to take to the water at the first hint of danger. And the water is where Map Turtle finds herself today, in the reef system of Dry Tortugas National Park. The water here is warmer, deeper, and saltier than she is used to, and the salty

water improves her buoyancy! Blanket Octopus, right at home here and floating gracefully, spies the bewildered Map Turtle & moves closer. Could this be another easy meal? Her 'blanket' rolled beneath her outstretched arms, Octopus glides toward the Turtle. Map Turtle begins to swim to the surface, but Blanket Octopus is quickly closing the distance between them. Abruptly, Blanket Octopus finds herself being pulled backward & upward, away from the confused turtle! Blanket Octopus unfurls her cape to intimidate the unseen source of danger behind her, but it does no good. For Blanket Octopus's invisible assailant is none other than...Florida Man! Florida Man is illegally night-fishing inside the National Park & has inadvertently snagged Blanket Octopus on his line! Blanket Octopus is pulled toward the water's surface & away from the field of battle, calmly Map Turtle swims- slightly more easily- toward the shore. COMMON MAP TURTLE OUTLASTS BLANKET OCTOPUS! Narration written by Lara Durgavich & Katie Hinde; summarized by Margaret Janz.

## Hawaiian Monk Seal (2) v. Indian Fruit Bat (10)

- Female monk seals typically give birth to pups with jet black fur in late March and early April, which means that peak pupping season is upon us. "One can expect seal to be continually searching out food & safe habitats to rest." Seal "apparently takes lengthy excursions out of the 200 fathom region," (Brillinger et al. 2008) which is more than 1200 ft below the surface of the sea. Scientists are working to save the



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# ROUND 2: QUEENS of the SEA & SKY



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endangered Hawaiian monk seal and report that their numbers are increasing. On the other hand we have the Indian Fruit Bat, who favors green infrastructure over roosting in batcaves. Males prepare tents by chewing up to 300 tree stems into “partially flattened, bell shaped cavities” for females to roost in (Balasingh, 1995). Studies have shown that females choose among males (and their leaf-tent constructions) using chemical cues from saliva markings and wing-fanning..

Tonight's battle location is near the Penguin bank off the southwest coast of Molokai. Our monk seal is 1,000 feet below the surface and, having snatched a lobster snack, is heading back to the surface. She has held her breath to forage and now must return to the surface for air. One foot below the surface, MMMagic transports Indian Fruit Bat adjacent to the Hawaiian monk seal. Exhausted from her flying and pup care and not an adept

swimmer, the fruit bat paddles. The monk seal needs to surface and her slip stream displaces the bat toward the surface, but the bat’s mouth & nostrils can’t reach the air. The fruit bat has become tangled underneath a floating mass of derelict fishing gear adrift in the ocean. As the Hawaiian monk seal swims curiously over, the wake rolls the fishing gear over so that the bat is now on top and can finally take a breath of air! The monk seal sees the head of a baby bat pop up from mom’s back, but doesn’t see... that the derelict fishing gear is fitted with a satellite tracking device so researchers can later retrieve it to understand the movement of ocean litter. The derelict fishing gear with bat and baby on board drifts from the field of battle and HAWAIIAN MONK SEAL OUTLASTS INDIAN FRUIT BAT! Narration by Tara Chestnut and Alyson Brokaw, Summarized by Jessica Martin



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# ROUND 2: WHY NOT BOTH?!

**Walrus (1) vs Echidna (9)** - Short-beaked Echidna lays eggs AND makes milk, & has modified hair-spines for defensive purposes. Baby echidnas are called puggles and drink milk that momma echidnas ooze out of milk patches inside mom's pouch. Echidnas hunt for earthworms & insects using a range of senses, including "mechanoreceptors" in their large, front paws that detect movement from low frequencies produced by insect prey. Walrus sports blubber AND fur. Their skin was described as "one inch thick, lined by blubber or a layer of fat one inch & a half thick" (Gilpin 1869). Their hair is light yellowish green. They also have ginormous tusks for both defensive & offensive purposes. Walrus tusks are also great for getting onto land, by digging them into the ground & pulling the pinniped forward, as well as for making breathing holes in sea ice.

Due to the low concentration of sea ice this year in the Bering Sea, tonight we find Walrus on the Chukchi Sea shoreline. Echidna feels VERY out of place, so deploys the "sit and spine" defense. Walrus, meanwhile, prepares to enter the cold waters again to hunt for bottom dwelling mollusks, with an undulating locomotion toward the water... CRUNCH!!!! Walrus crushes echidna and doesn't even notice because of those inches of skin & blubber that also help keep him warm. Unfortunately, 20% of all echidna mortality in Australia is the result of roadkill, so it appears Echidna faced a similar fate tonight from Walrus's long-haul heavy load along an Alaskan shoreline "Ice Road." WALRUS SQUASHES ECHIDNA! Narration written by Patrice Kurnath Connors; summarized by Margaret Janz.



Budd Christman NOAA / Wikimedia Commons / CC 1.0

**Pangolin (4) v. Serval (5)** - Pangolins are anteaters, termed myrmecophagous (myrmeco = ant, phagous = eats) for species that exclusively eat ants and termites. Pangolins have large claws that they use to dig into logs and termite mounds, and a tongue that is so long it extends into the abdomen. They protrude their tongue into cavities in logs and termite mounds to access the insects, and since eating ants doesn't require teeth pangolins don't have any. Like most felids, servals are solitary and seem to avoid interactions with each other, although their ranges can overlap. Servals scent mark their territory with urine as a way of telling other servals to stay away. When they do encounter another serval they display, but don't appear to fight. On an encounter between two servals: "[one] started racing and bouncing around, at times all 4 legs in the air, tail up and arched over his back ... [the other] ... also assumed the same posture, until they suddenly stopped in front of each other. [The servals] uttered a continuing



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# ROUND 2: WHY NOT BOTH?!

low mewing sound, and threw their heads up and down, showing the teeth,” (Geertsema, 1976).

Our battle takes place in Mpem et Djim National Park in Cameroon. Servals have recently been recorded in this park for the first time, extending their known range. They’ve only been recorded at night, and are sympatric with the giant pangolin. It’s the middle of the night and the pangolin is looking for a termite mound while the serval is hunting African grass rats, which are a favorite snack and sometimes makes its home under termite mounds. The serval can hear something moving both above and below ground - our pangolin has just found a magnificent termite mound. He takes a swipe at the mound, disturbing the burrow of an African grass rat beneath it. As the grass rat makes a break for it, the serval leaps and lands on the rat with its forepaws. With its snack secured, the serval trots off and leaves the pangolin to slurp up ants. PANGOLIN FEEDS AND DEFEATS SERVAL! Narration written by Kristi Lewton; summary by Jessica Martin.



Hans Hillewaert / Wikimedia Commons / CC-BY-SA 3.0

**Swordfish (2) v. Hairy Frogfish (7)** - Swordfish are very aggressive in their interactions with other fish, mammals, humans, boats, etc. A shark coming upon a juvenile swordfish doesn’t even get a chance to bite off more than it can chew. Our other combatant, the Hairy Frogfish, has a worm lure they use to attract prey but wiggling it about & can inflate their lure up to 35% bigger depending on circumstances..

This battle finds the hairy frogfish around 80m down in the Indian Ocean where it blends in with some spiky urchins and waddle-walks while a school of fish forage nearby. The sand near the frogfish explodes as a variegated lizardfish that has been camouflaged in the sand ambush nabs a smaller fish from the school. Fish dart here and there to avoid the chomping predator until, like the drifting sand cloud, everything begins to settle. The variegated lizardfish, which is nearly twice the size of the frogfish, settles back into its ambush spot in the sand near the frogfish. In the still cloudy water, the frogfish barely has time to see a shadow as the swordfish blazes in, attempting to cut the variegated lizardfish in half. The lizardfish was too fast for the now annoyed swordfish, however, and as the swordfish slowly swims away the two halves of the hairy frogfish settle onto the sandy sea floor. SWORDFISH SLICES HAIRY FROGFISH! Narration written by Asia Murphy; summary by Jessica Martin.

**Therapsid (6) vs. Spotted Salamander (14)** - Last week, the Therapsid *Lystrosaurus maccaigi* chomped using their combo of teeth AND beak.



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# ROUND 2: WHY NOT BOTH?!

Actual Living Scientists Megan Whitney & Christian Sidor looked at growth patterns inside those tusklike teeth & noticed repeated periods of stress, more common in populations closer to the poles. This suggests *Lystrosaurus* used “an array of metabolic adaptations” to survive and thrive in colder regions including torpor- lowering their metabolic activity (Whitney and Sidor 2020). This makes *Lystrosaurus* among the oldest examples for hibernation! Our other combatant, the Spotted Salamander, pulled off a major upset (& their own tail) to advance in MMM. They can regrow their lost appendages, but as an adult it takes 255-300 days in a quality environment. So that missing tail is gone for a while. Spotted salamanders spend much of their time underground, sometimes digging their own burrows and sometimes using small mammal burrows! Burrow availability seems to be a driving force in salamander dispersal and competition within the species.

Our battle takes place 255 million years ago in the Karoo Basin of what is now South Africa. It's late March in the southern hemisphere, that means the days are shorter & it's getting colder. *Lystrosaurus* feels cold & begins to dig a place for torpor. With robust forelimbs & smaller legs, morphologists speculated *Lystros* were adapted for digging, but it wasn't until a specimen was found within a fossil burrow that it was confirmed! Having just traveled

*“With every drop of water you drink, every breath you take, you're connected to the sea. No matter where on Earth you live.”*  
- Sylvia Earle



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# ROUND 2: WHY NOT BOTH?!

through space & time, Spotted Salamander wants a warm, safe place to regrow their tail. Thankfully they spy a fresh hole in the ground, a perfect spot to lay low! Some *Ambystoma* salamanders can be found in strong association with burrowing mammals like the Black tailed Prairie dogs, implying that pre-made burrows and loose soil outweighs the noisy mammalian neighbors. Burrow sharing between mammals & amphibians goes way back to at least the Triassic

The salamander moves deeper into the burrow, which seems quiet & warm but far too large for a 9-inch salamander. They move to the side to dig into the dirt wall. SPLAAAT! The cozy *Lystrosaurus* -100 times larger than spotted salamander- rolls over while resting and flattens the salamander into sticky goo. THERAPSID SQUISHES SPOTTED SALAMANDER! Narration by Brian Tanis and Yara Haridy; summary by Margaret Janz.



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# ROUND 2: MAMMAL COLLECTIVES

## Pride of Lionesses (1) vs. Sneak of Weasels (9).

This Sneak of Weasels is made of *Mustela africana*, but they're actually from the Amazon. Their name is a classic example of a scientific mix up and poor record keeping. But they'll still be comfortable in the hot, wet Okavango River in southwest Africa - these weasels can swim. Lionesses are big, muscly, & they often harass & kill other carnivores, even smaller ones, in intraguild predation. Collective living means prides battle for access to territories & resources. People think male lions do all the fighting, but females fight as well, so they can & will hold their own in tonight's battle. Our Pride is headed to a particularly soggy marsh on the Okavago. Currently it's about 4 am in the Delta. Lions get a good portion of their hunting & territorial boundary enforcing done at night and our Pride is having a territorial boundary dispute with another pride! Lionesses enforce their territories by roaring and occasionally by brawling, and lionesses may be able to tell from territorial roaring how many individuals are in another pride. The Sneak has had some unfortunate MMMagic luck and finds themselves right between these rival prides. Weasels try to swim away from the impending kerfuffle. The other pride charges forward. The weasels are swimming but struggling to keep heads above water with all the sloshing. Our Pride is holding their ground. A

charging lioness runs right over one of the weasels, drowning and/or mangling the mustelid to death. The other two weasels are still trying to escape, but another lioness slaps one down with her huge paw. Our MMM pride is rallying, sending the other pride on the run! One of our lionesses is chasing them down, leaving 3 lionesses on the battlefield with one weasel. A rival lion tackles one of ours and they land right on top of the lone weasel. This doesn't bode well. But hold on! The weasel's head is up, the lions must've just missed him. Two of our remaining three lionesses chase off an interloping lioness. One of our lionesses is still in the marsh with one weasel, who has definitely seen better days. And the lioness is running after the final interloper from the other pride! Both lionesses are sprinting away...running full speed over the weasel, who



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# ROUND 2: MAMMAL COLLECTIVES

goes down into the water. Maybe he's just swimming away underwater... For a moment it looks like he's surfacing, but no, the last weasel has fallen. PRIDE OF LIONESSES DEMOLISHES SNEAK OF WEASELS! Narration written by Anne Hilborn and Asia Murphy; summarized by Margaret Janz



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**Wisdom of Wombats (11) v. Cauldron of Bats (14)** - Wombats are not only one of the largest burrowing animals, they're also unique in that they're herbivores. Most large burrowing animals also eat diets that provide more immediate energy, like insects, but grass takes tons of energy to digest. Their harsh environment makes burrows key to survival. To dig wombat style, dig several strokes with one forefoot, then switch. Then, lie on your side and scratch at the roofs/walls to make the space bigger. Doing this, wombats can dig 1m in a night! Because these burrows take so much work, they don't mind rotating: wombats will use different burrows in their overlapping territories so

they can cover different parts of their range. Matthews & Green (2012) even found one individual using 14 burrows! Also, in extreme conditions wombats also won't throw out other wildlife - during the 2020 Australian wildfires, other wildlife took shelter inside or in the entrance of wombat burrows. Big-eared wooly bats are primarily carnivorous, but they aren't above snacking on some plants if the opportunity arises. Piper, Solanum, and Cercropia fruits have all been found in wooly bat poo. Preferring the night and dark spaces below ground, like caves, bats have long been associated with death and the underworld. The Mayan god of the underworld Camazotz is depicted with the large ears and pointed nose leaf of bats like big-eared wooly bats. Speaking of dead things ... While no bats are known to scavenge, eating dead things (necrophagy) by wild whip scorpions (amblypygids) is facilitated by sharing temple habitats (Trujillo et al, 2021).

These combatants face off in Wollemi National Park in New South Wales, Australia, which is part of the Greater Blue Mountains area and a designated UNESCO World Heritage site. Our female wombat has emerged from her burrow with her latest offspring following closely, though the subadult joey is nearly her size and cramping her style. Our family of bats, which has been transported to Australia, alights on the branches of a nearby Wollemi Pine and tries to listen for the sounds of potential nearby snacks over the screeching of two male wombats vying for the Mama Wombat's attention. The screeching stops suddenly as the defeated



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# ROUND 2: MAMMAL COLLECTIVES

wombat suitor runs off, and the sound of a foraging antechinus can be heard in the leaf litter. The juvenile bat descends from its branch and lands on the antechinus. The triumphant suitor wombat returns. His ability to chase away the competition piques Momma Wombat's interest. She turns to the joey and chases him back toward the burrow, biting its backside to let it know it is on its own now. The bat readies for the killing blow to the antechinus, but misses and the antechinus manages to wiggle free and dart into a nearby burrow; the bat makes an awkward attempt to follow only to be trampled by the jogging wombat juvenile. The male and female wombat begin grazing, side by side. The remaining bats take flight, leaving the field of battle. WISDOM OF WOMBATS CRUSHES CAULDRON OF BATS! Narration written by Alyson Brokaw and Mauna Dasari; summarized by Jessica Martin

**Lodge of Beavers (4) v. Conspiracy of Lemurs (12)** - Beavers are a keystone species and are often referred to as 'ecosystem engineers' because of the important role they play in managing water flow and creating wetlands. Yet by the early 20th century, the Eurasian beaver had been hunted almost to extinction. Beavers can hold their breath for 15 minutes. This is a definite advantage for their semi-aquatic lifestyle. Even baby beavers, called kits, take to the water quickly and learn to swim within hours of being born. The mongoose lemur lives in groups that have small home ranges that often overlap with neighboring groups. Scent marking is an important method of communication both within and between groups. Female

mongoose lemurs are dominant to males and have preferential access to the best foods. Both females and males are particularly fond of nectar, which makes them important pollinators of certain flower species.

Today's encounter takes us to the East Carpathians Biosphere Reserve, which encompasses parts of Poland, Slovakia, and Ukraine, where beavers have been reintroduced to a former natural habitat (Zygmunt, 2013). MMMagic transports the conspiracy of lemurs into the treetop that a beaver is busy felling. Primates are no strangers to swaying treetops. When Hurricane Maria hit Puerto Rico in 2017, the rhesus macaques on nearby Cayo Santiago not only weathered the storm but emerged with the future



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# ROUND 2: MAMMAL COLLECTIVES

broader social networks. Similarly, lemurs on Madagascar are regularly exposed to and survive monsoons and cyclones, although their vulnerability to storms may increase in as “extreme climatic events” become more common. The sudden arrival of this conspiracy of lemurs into the treetop is enough to unbalance the beaver-chewed tree they now occupy and, with scared lemurs leaping from its branches, the tree falls with a resounding crash. After a quick regrouping at the base of another tree, the lemurs go off to look for safer vantage points, bounding away from the battlefield. **LODGE OF BEAVERS TOPPLES CONSPIRACY OF LEMURS!** Narration written by by Lara Durgavich; summarized by Jessica Martin

**Embarrassment of Pandas (2) v. Stench of Skunks (10)** - Pandas are not gregarious so being 100 meters away from another panda is often as good as it gets. Unlike all other bears, Pandas have vertical pupils like the eyes of a cat, which is thought to help them see better in the dark but similar to daytime foragers like the black bear, pandas can see red, green, and blue colors. Skunks aren't a tight knit group but will tolerate co-feeding scenarios. The bold black and white coloration (aposematic) of hooded skunks is a warning to predators to stay away but it only works when they've encountered a skunk before and learned their lesson. Skunks are safer when more are around to "teach" these lessons. When the spray of chemical defenses might not be enough, hooded skunk will also hide among cholla cacti to avoid predation.

Tonight's battle occurs in the forests of China's Qinling Mountains, where the Panda enjoys home habitat advantage. Situated between two populated river valleys, humans have used horses to pack goods through the Qinling Mountains for centuries. Panda arrives at the scene to find a large pile of fresh horse manure along a small pathway. Panda carefully sniffs the manure, then belly flops into the pile, blissfully rolling and smearing horse fresh feces all over his body for 8 minutes. Pandas will seek out and roll in horse manure to buffer against cold temperatures because chemicals in it block temperature receptors in Panda (Zhou et al. 2020). MMMagic transports the Stench of Skunks nearby and they spot something black and white through the bamboo! Thinking it's another skunk who found some insects to eat, the skunks pitter patter over to find Panda rolling around in the manure. The skunks scurry over to the manure pile that has also attracted tasty, poo-loving invertebrates. Panda, intrigued by the skunks, gets his face down close and is sprayed by a volatile mixture of 7 organic-sulfurous chemicals (thiol). Skunk spray isn't just foul smelling, it also burns mucus membranes of the eyes, nose, and throat and can even cause destruction of red blood cells. Giant Panda experiences tremendous pain! Vomiting and unable to see, the Panda slips on some manure and tumble-crashes through the bushes, rolling down a hill away from the battle. **STENCH OF SKUNKS DEFEATS EMBARRASSMENT OF PANDAS!** Narration written by Brian Tanis; summarized by Melanie Beasley.



# ROUND 2: WILD NORTH AMERICA

**Grizzly Bear (1) vs. Gray Wolf (8).** Visitors to national parks are often very eager to see wild animals, particularly Grizzly bears. "In Yellowstone National Park, 81% of visitors listed grizzly bears as one of the top five animals they wanted to see on their trip... while in Denali National Park, seeing a grizzly bear contributed most to visitor wildlife viewing satisfaction" (Elmeligi et al., 2021). Parks have to both manage the ecosystem needs of bears (and other wildlife) and support visitors' goals for recreation, as well as keep bears & visitors safe. To better understand visitors' attitudes, researchers in Banff National Park asked trail users about their support of different management decisions under different circumstances and found they were most supportive of closing trails when a Grizzly bear sow & her cubs were in the vicinity. Visitors supported restricting trail use that best protect the bears typical, behavioral use of their preferred habitats (Elmeligi et al., 2021). Folks have been remarking on the use of a citation for some of Round 1's play-by-play, but the finding that a wolf WAITS to ambush a medium-sized mammal is so cool! In the cooperative hunt, wolves are chasing predators that outrun & exhaust hoofed mammal prey, a "cursorial" hunting tactic of "niche separation" from large ambush felids. Felids are notable for their "wait & predate" ambush tactics and indeed their ability to out-compete canids in these predatory tactics likely played a selective role that favored coursing adaptations in canids in North America.

Transported via MMMagic, our Grey Wolf from Superior National Forest in the US Great Lakes

region, finds himself in Banff National Park in the Canadian Rockies. The air is fragrant with "winter kill" carcass and the cawing of scavenging ravens. Large ungulates perish in the winter from injury, illness, & starvation, leaving "winter kill" carcasses that can be scavenged by wolves, wolverines, & ravens. Some carcasses buried in snow emerge with the spring thaw... just as Grizzlies emerge from their hibernation dens. Displacing the ravens, Grey Wolf stands on the carcass ready to rip into the defrosting meat... but another smell lingers in the scene... something bearly familiar... But grizzly bears were hunted & pushed out of Minnesota decades ago; the only bear this Grey Wolf knows is the more manageable black bear (wolf packs can kill black bears in Minnesota).



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# ROUND 2: WILD NORTH AMERICA

Growling at the lone Grey Wolf, Grizzly Bear lumbers into the scene from a nearby nap in between bouts of feeding. Grey Wolf skitters away from the carcass as Grizzly approaches. He stands on the carcass, ripping away flesh. Grey Wolf, watching the Grizzly closely for any escalation of aggression, Wolf cringe slinks toward the bear and the carcass until he is MERE FEET FROM MIGHTY GRIZZLY'S JAWS & CLAWS! Grey Wolf tears a meat strip from the winter-kill ungulate, and for a moment in time "bear and wolf are feeding on same kill at same time" as can happen in ~6% of wolf-bear encounters. Wolf tears another mouthful and backs away as hid carnassials shear the meat in his mouth. Grizzly uses the distance between them to charge at the Wolf, stopping short of bite range! Grey Wolf runs away from the carcass & the bear, who briefly gives chase... but the wolf has now fled far from the battlefield. After all, over 90% of Grizzly & Wolf encounters end with no fatalities and fewer than 5% involve wolves successfully defending a kill against a bear. GRIZZLY BEAR DISPLACES GRAY WOLF! Narration written by Katie Hinde; summarized by Margaret Janz



E & P Bauer USFW / Wikimedia Commons / CC 1.0

**Black Bear (3) vs Wapiti Elk (6).** Black Bears were once widespread in North America, but have been extirpated from large portions of their historical range. Actual Living Scientist (and narrator of this battle) Jessica Light has looked at Black Bear distributions in Texas, but the range of Black Bears has been expanding in other parts of the continent. The population introduced to Hot Springs National Park has been successfully expanding across Arkansas and into Missouri. Wapiti is another species that was once common throughout North America prior to local extirpations (mostly via hunting & habitat loss) and has been rebounding where reintroduced, including in Arkansas along the Buffalo National River.

When MMMagic transports our Wapiti from Great Smoky Mountains National Park to Hot Springs National Park in Arkansas, Wapiti is ready to roll. It's dusk and both Black Bear and Wapiti are hangry. Springtime ushers in new plant growth, perfect for our herbivorous (plant-eating) Wapiti & our omnivorous (I'll eat anything) Black Bear. In fact, Black Bear springtime diet is primarily plants, especially in summer. Wapiti has stumbled upon a particularly productive patch of young grass to graze on. Wapiti are ruminants; they have a multi-chambered stomach full of microorganisms that help pull all the nutrients out of whatever Wapiti eats. Nearby, Black Bear also has found his own spot to graze, but these springtime grasses are not very nutritious and he doesn't have all those digestive system microorganisms. Black Bear needs more and



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# ROUND 2: WILD NORTH AMERICA

better to support his growing girth. Black Bear huffs over to Wapiti, lunging to scare him off of this prime grassy real estate. He is not at all dissuaded by Wapiti's significantly larger size. Wapiti takes a step back, lifts his head high and eyes the Black Bear, measuring up the threat. Black Bear doesn't wait and aggressively lunges at Wapiti again, stomping the grasses. Wapiti is having none of this brash Black Bear bluff. Wapiti snorts a strong exhale and stomps his forefeet, smashing more young plants, & charges at Black Bear, who doesn't flinch. He and Wapiti circle each other. Neither are willing to give up precious calories to the other, but they are tearing up more grass as they aggressively lunge back and forth. Breathing heavily, Black Bear & Wapiti pause and continue to eye each other while contemplating their limited, precious resource. Wapiti stomps his feet, ready for more. Black Bear has taken on Wapiti before, but rarely full-grown bulls... Black Bear rethinks a battle with Wapiti over this patch of grass, which is now all ripped up. Black Bear retreats in search of healthier and less actively defended fields! **ELK DISPLACES BLACK BEAR!** Narration written by Jessica Light; summarized by Margaret Janz.

**Bison (2) v. Bighorn Sheep (7)** - While they might seem docile, they can run up to 37 mph and have been known to swim rivers that are more than half a mile wide. They spend most of their day either grazing, ruminating, or “loafing”. Bison have a 4-compartment stomach that allows them to better digest grasses and chew their food up to 70 times (at the rate of one chew a second).

Care-giving by non-parents (alloparental care) varies in Bighorn Sheep. In some herds (such as ones in Pecos Wilderness, NM), lambs only suckle milk from their moms, but in other herds (such as ones in National Bison Range, MT) lambs are able to nurse from their mom and other females. As lambs, Bighorn Sheep engage in rowdy play with head butting, neck wrestling, and front leg kicks. Males especially play at the elements of the adult male CLASH battle - the lambs rearing up on extended legs and then head butting their playmate.



Cary Bass-Deschenes / Wikimedia Commons / CC-BY-SA 2.0

This battle takes place in Badlands National Park in South Dakota, where over-hunting of bison and bighorn sheep by settlers, in part to intentionally deplete traditional food resources of Indigenous people, eliminated the species locally. Before Europeans, an estimated 30 million bison roamed in the American West; by the late 1800s, fewer than 1,000 were left in



# ROUND 2: WILD NORTH AMERICA

North America. Species management and recovery began in earnest when 50 bison were relocated to the Badlands National Park in 1964. The return of bison on tribal lands aims to recover essential ecosystem and cultural roles, including the release of dozens of bison on the Rosebud Sioux Indian Reservation several months ago (Shamon et al. 2022). Also in 1964, bighorn sheep were translocated from Pike's Peak in Colorado and released into Badlands National Park, with another release of sheep from New Mexico in 2004. MMMadness has translocated another new bighorn sheep to Badlands National Park for this battle, and our sheep arrives amongst a bighorn sheep herd full of bachelors who are grazing near a lone male bison. Although the bighorn sheep hierarchy was established during the fall rut, the males continue to skirmish, posture, and CLASH even in the spring. Resident alpha male bighorn sheep sizes up the new interloper as the bison continues to focus on his grazing. Our Bighorn Sheep and the resident alpha turn and walk away from each other, but within just a few steps both sheep turn to face each other, take a threat jump, then lunge into the clash of their massive horns. As the sheep prepare to clash again, tourists pull over on the shoulder of the road and hike onto the grassland to get a better look at the bison. For decades, the bison herds were in the deep back country of Badlands National Park, until 2019 when some bison were relocated to areas for easier visitor viewing. Upon arrival at the park, the visitor guide explains how important it is to give the animals room so that they can engage in their natural behaviors without disruption and so that the

animals don't engage in their, ahem, natural defensive behaviors when feeling threatened. Our bighorn sheep is from Bighorn Canyon National Recreation Area, and as namesake of the canyon he's a bit more accustomed to being the center of visitor attention; however, the resident bighorn are not, and move away from the tourists. The bison is still grazing with his head down when a visitor gets way too close. Aggravated, the bison snorts and then pivots to slow trot away from the tourists, our bighorn sheep, and the battlefield. **BIGHORN SHEEP OUTLASTS BISON!** Narration written by Marc Kissel & Katie Hinde; summary by Jessica Martin.



Katie Hinde / CC-BY-SA 3.0

**Jaguar (4) v. Mountain Lion (5)** – In Brazil, discussion-based animal learning in the classroom had better impacts on attitudes about not killing jaguars than passive learning OR materials distributed by conservation groups within the community. When kids share with their parents about what they are learning



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# ROUND 2: WILD NORTH AMERICA

it improves their fathers' attitudes about not killing jaguars as well. While lactating, lady Jaguars will hide their infant, possibly as a counter tactic to prevent infanticide by male Jaguars who show up wanting to engage in courtship or mating behavior with the lady Jaguar. Mother cougars can disable fawns so that young kittens can take turns with their siblings to gain experience biting, clawing, and dragging preferred prey (Elbroch & Quigley, 2012). Last week a cougar was struck on the Pacific Coast Highway within the Santa Monica Mountains region. The Infrastructure Investment and Jobs Act passed in 2021 includes \$350 million toward reducing the one million wildlife-vehicle collisions that occur each year. Please take a moment to call your state and federal officials to ask them to support improvements of wildlife crossings and protection of wildlife. Now onto the battle of the felids!

The combatants meet for battle in Calakmul Biosphere Reserve on the Yucatan Peninsula, a world heritage site that includes the Ancient Maya

City of Calakmul, Campeche. It's twilight at the aguada, one of the many waterholes within the park, where in the deathly quiet jaguar is poised in ambush and cougar stalks. Jaguar jumps. Cougar leaps. Each with strong forepaw and blade claws slice the muscles of their target's shoulders. Jaguar's large, robust canines penetrate the target's skull by the ears. Cougars sharp canines lacerate and crush the neck muscles, trachea, and jugular. In the night, the two felids lock gazes... Jaguar has a white-lipped peccary in his jaws; Cougar has a white-tailed deer in his jaws. The near equally-matched skills of each felid combatant share their habitat because of niche separation with prey preferences that reduces competition: Cougar's for deer and Jaguar's for peccary. Uncomfortable in the open glen, Cougar drags the deer 75 feet away from the battlefield to gorge before covering the leftovers with leaves, bark, and other biomaterials from the forest floor to save for later. **JAGUAR OUTLASTS MOUNTAIN LION!!** Narration written by Katie Hinde, summary by Melanie Beasley.



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March 30, 2022

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# SWEET SIXTEEN

## Queens of the Sea & Sky

**Orca (1) v. Common Map Turtle (5)** - This battle takes us to the Salish Sea of the Pacific Northwest, where our Matriarch Orca and her pod are swimming and always hunting. Each Orca must eat 8-25 adult salmon daily to meet its energy requirements. The Matriarch Orca and her pod are well known; people have been studying this population since roughly 1976 following a significant reduction in the population due to whale captures for marine park exhibitions in the 1960s and 1970s. Whale captures for human entertainment are increasingly blocked and repudiated, but this Orca population isn't out of the woods because they're highly dependent on chinook salmon, a threatened salmon in the Puget

Sound. As our matriarch Orca guides her pod across potential foraging grounds, echolocating for salmon, MMMagic transports our large queen Map Turtle about 30 feet in front of the Orca pod. Common Map Turtles are the most abundant and widespread of all map turtle species in North America, but the Puget Sound in Washington state is NOT their preferred habitat. Orcas eat sea turtles, so the matriarch swims under the Map Turtle and begins prodding and spinning the turtle with the front of her face (rostrum). The matriarch Orca turns the turtle upside down as she continues to spin it; Orcas often play with their food, sometimes for as long as an hour. Matriarch Orca nose-butts, spins, and dives, her play behavior gets a little excessive. With teeth and bite forces that can kill other whales, she accidentally punctures our turtle's shell and smooshes internal organs. **ORCA SMOOSHES COMMON MAP TURTLE!** Narration written by Jessica Light; summarized by Jessica Martin.



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# SWEET 16: QUEENS of the Sea & Sky

**Hawaiian Monk Seal (2) v. Steller's Sea Eagle (3)** - The National Oceanic and Atmospheric Administration's Hawaiian Monk Seal population monitoring program in the NorthWest Hawaiian Islands has been counting monk seals throughout their range since 1982, tracking individual life histories. Monk seals live throughout the Hawaiian Islands; the seals on the main islands are able to get better food, and more food, but also experience greater human impacts like zoonotic parasite transmission such as *Toxoplasmosis gondii*. Researchers have found that *T. gondii* infection is nearly always lethal for Hawaiian Monk seals. Our other combatant is the Steller's Sea Eagle, which as a species has had reported cases of lead poisoning caused by consumption of lead bullets and slugs left in the environment by careless hunters. Tonight's battle takes place in the Papahānaumokuākea Marine National Monument



Jambomambo13 / Wikimedia Commons/ CC-BY-SA 3.0



NOAA / Public Domain

and gives the Hawaiian Monk Seal home habitat advantage. Inlets surrounding the atoll of Kānemiloha'i are home to the largest sub-population of monk seals and an important breeding site. Our particular Steller's Sea Eagle has found itself MMMagically transported to a sandy inlet of our atoll - a Hawaiian monk seal breeding site. Our sea eagle spots a Hawaiian monk seal pup and approach swoops. The monk seal mother is alerted to the danger and vocalizes, scooting toward the sea eagle. Sea eagle is momentarily intimidated by the barking mother monk seal and lands away to assess the scene better. The Hawaiian Monk Seal shepherds her pup into the water... only for a lurking Galapagos shark, a major predator of monk seals in this area, to attack the momma monk seal! With the momma seal dispatched, the sea eagle is free to clean up the pup. **STELLER'S SEA EAGLE DEFEATS HAWAIIAN MONK SEAL!** Narration written by Chris Anderson; summarized by Jessica Martin.



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# SWEET 16: WHY NOT BOTH?!



Rachad sanoussi / Wikimedia Commons / CC-BY-SA 4.0

**Walrus (1) v. Pangolin (4)** - Pangolins are often described as the most trafficked animal because of its value for cultural practices and traditional medicine. Local knowledge provides evidence of awareness of pangolin populations and conservation efforts. Pangolins are quite secretive and finding them walking transects or setting cameras can be exceptionally challenging, but trained detection dogs can provide a paw to help find them. Though scientists have evaluated whether we can help release wild Pangolins from hunting pressure by creating captive breeding/farming programs, it seems the answer is a hard no. In a similar vein, though we've learned of many conservation successes that involve reintroductions, the walrus isn't one of them.

Walrus are extinct in Southeast Canada, and the Canadian government determined that recovery is not feasible because they likely wouldn't stay put, and it could cause conflicts with the clam industry. Current threats to the walrus include disappearing sea ice and increased shipping traffic and fossil fuel exploration. Assessing walrus populations is difficult and requires teamwork; scientists collaborate with Indigenous hunters to deploy satellite transmitters to track walrus movements between Canada and Greenland. Tonight's battle location is Svalbard, a Norwegian archipelago between mainland Norway and the North Pole - specifically, Indre Wijdefjorden National Park, which is a walrus hotspot. The islands are mountainous with glacier carved fjords, and 60% of land is covered with glaciers. Low-growing plants sprout where permafrost seasonally thaws. Svalbard is also home to the Global Seed Vault, which protects our food supply against diversity loss. Current sea ice conditions are favorable for our walrus, who has just eaten and is bobbing in the slushy drift ice toward the edge of an ice shelf. Pangolin has been transported here to the edge of the ice shelf, but before it can get its bearings a dark mass rises from the edge of the ice and two glistening tusks dig deep into the ice. Startled, the pangolin curls into a tight ball. Walrus heaves himself up on the ice and the pangolin curls tighter, making it nearly impossible to pull the pangolin open. Walrus approaches this new object with curiosity and grasps Pangolin with his dexterous flippers, pulling the ball toward his



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# SWEET 16: WHY NOT BOTH?!

mouth... but the pangolin is far too large to be prey. However, the Pangolin makes a great plaything, so the Walrus press-slides the “ball” on the ice and flipper-twirls it. Walrus presses down slightly off-kilter, slip-shooting Pangolin from the walrus' grasp and skittering off the ice and beyond the field of battle. **WALRUS OUTPLAYS PANGOLIN!** Narration written by Tara Chestnut and Katie Hinde; summarized by Jessica Martin.



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**Swordfish (2) v. Therapsid (6)** – The Swordfish is a high-level predator with extensive prey needs, so swordfish often patrolling waters alone (doesn't share prey well with others). With their distinctive bill and large size, Swordfish have been targeted by humans for millennia as part of fisheries in Stone Age (Paleolithic) Europe and hunted by harpoon continuously for over 1000 years in the Mediterranean. These fishers have gained intimate knowledge of their behavior, including mating behavior. When a female swordfish is getting ready to breed, she will start a basking behavior

where she sits at the surface and waits for a patrolling swordfish male to recognize this signal. The mighty tooth/beak combo of the Therapsid *Lystrosaurus maccaigi* finds itself in the cool waters of the Northwestern Atlantic... an ocean which didn't even exist until 180 million years ago, almost 20 million years AFTER the *Lystrosaurus maccaigi* went extinct. During the late Triassic, the water was up to 8°C warmer than now, today's waters are quite chilly to the Therapsid. As early as 1902, it was suggested that with *Lystrosaurus*' large lungs and squat body, their strong legs helped it keep its head afloat for an aquatic lifestyle. Newer analyses suggest that *Lystrosaurus* might have been a burrowing animal (fossorial). But in tonight's battle, the strong legs of *Lystrosaurus* are helping it paddle towards anything solid it can see to help keep it afloat... unfortunately the nearest solid thing is the fin and tail of the basking lady Swordfish! #RuhRoh. This is a fairly common behavior in marine settings with animals aggregating around solid structure; in fact, modern fishers use suspended pieces of plastic as a fishing technique called a FAD (fish aggregating device). The Swordfish doesn't want company as its waiting for a mate and feeling threatened she lashes out using her innate behavior to seek out vulnerable parts of their attackers. A flash of pain as the *Lystrosaurus* feels a piercing behind its eye and the meter long sword plunges deep into the skull, pithing the *Lystrosaurus*. **SWORDFISH DEFEATS THERAPSID!** Narration written by Josh Drew; summarized by Melanie Beasley.



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# SWEET 16: MAMMAL COLLECTIVES



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**Stench of Skunks (10) v. Wisdom of Wombats (11)** – The omnivorous habits of hooded skunks can make them be viewed as pests to humans because they are so abundant throughout their range of Mexico and Central America. Often living close to humans, skunks are a concern for animal to human rabies transmission, highlighting the importance of wildlife disease surveillance and safe, trained, permitted handling of wildlife. Common wombats face many human-based threats such as roadkill, a worldwide problem for wildlife. A possible solution for wombats in Australia are light and sound-based 'virtual fences'. The stench of skunks have home habitat advantage as the combatants meet in the oceanside grasslands on a tiny peninsula just south of Laguna Superior, in Oaxaca, Mexico. The skunks recently raided a nearby farm for eggs. The Skunk raises the egg up before throwing it back down between its back legs to happily lap up a meal of broken egg yolk. The enamored wombat pair have taken a strange detour

from Australia but this Mexican grassland shares many similarities with home. Having succeeded in contest competition, the male Wombat tries to make his move, but the female Wombat breaks away, running in wide circles and figure 8s. Lady Wombat slows down just enough for her gentleman suitor to catch up to her and the Gentleman Wombat lunges, teeth bared and tries to BITE HER BUTT! Lady Wombat kicks out with her hind legs and resumes the playful chase with the Gentleman Wombat... right off the field of battle. STENCH OF SKUNKS OUTLASTS WISDOM OF WOMBATS! Narration written by Alyson Brokaw, summary by Melanie Beasley.



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**Pride of Lionesses (1) v. Lodge of Beavers (4)** – Lions prefer to prey on "species within a weight range of 190–550 kg. The most preferred weight of lion prey is 350 kg " especially oryx, buffalo, wildebeest, giraffe, and zebra (Hayward & Curley 2005). Prey preference for lions is 10 times the size of the other combatants, the Lodge



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# SWEET 16: MAMMAL COLLECTIVES

of Beavers. Restoring beaver populations is key for improving resilience to the climate crisis because the ponds created by Beaver lodge dams slow water flow, help refill water tables, and buffer ecosystems from flood damage. ALSO, the way beavers chew trees effectively prunes foliage growth for bushy, shady shrubbery-like trees along shores and banks that support various life stages of insects, amphibians, birds, and fish. In the Eocene 56-34 million years ago, the family Castoridae had many species but by 2.5 million years ago there were few species in Eurasia: the genera *Castor* and THE GIANT BEAVER TROGONOTHERIUM (some giant beavers tipped the scales at 220 lbs!).

The combatants meet on the home turf of the Lionesses in the Okavango Delta. The Lionesses are getting HANGRY- mole meals and weasel sneaks do not a full stomach make! The Lionesses set out into the twilight for a hunting foray. MMMagic transports the Lodge of Beavers to NW Botswana, where the Okavango River flows from the highlands of Angola splitting into myriad braided rivers and streams to form a complex wetland of islands, marshes, lakes and lagoons. While once widespread throughout much of Eurasia, Beavers never ecosystem engineered in Africa, so the Lodge of Beavers gets busy making new heath & home. Mama Beaver and a juvenile gnaw on some nearby sycamore fig trees, similar in ways to their preferred willow trees at home. Large Papa Beaver is in the shallows, investigating fig sticks for how well they'll work for territorial displays. Standing on back legs, holding a FIG STICK in his forepaws, Papa Beaver slams the branch against the water surface, making splashes

The rainy season is winding down and 230kg sable antelope forage, as 50-100kg warthogs trot about and a troop of baboons wades to a grove of preferred sleeping trees. From the tall marsh grasses, the Lionesses survey the scene of possible prey. One lioness thinks "Sable antelope is the right size, but the weaponry is daunting" (Hayward & Curley 2005). Another lioness muses how leopards more typically slum it with the monkeys. Last lioness thinks "warthogs are slow, less vigilant, they aren't packing a lot of meat but will do in a pinch" (Hayward & Curley 2005).



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Then the #3 Lioness spots large Papa Beaver, wonders what he is, stalks closer, and urinates in the water. Her pee drifts on the water toward swimming Mama Beaver and although beavers were never in Africa, lions once widely roamed Eurasia. Mama Beaver responds to the smell of predator urine, even for long extirpated predators, and tail slaps the water surface to alert her family. Mama Beaver immediately dives down after tail slapping. Now alerted, the Beavers on land rush



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# SWEET 16: WILD NORTH AMERICA

into the water as the Lionesses halfheartedly charge because really, this isn't the prey the lionesses are looking for. Together the Lodge of Beavers swim out to a deeper Okavango River channel and off the field of battle, beyond the claw reach of the lionesses! PRIDE OF LIONESSES OUTLASTS LODGE OF BEAVERS! Narration written by Katie Hinde; summarized by Melanie Beasley.



NPS - Jacob W. Frank / Public domain

**Elk (6) v. Bighorn Sheep (7)** – It is the battle of the canadensis (Latin for Canada) between Wapiti Elk (*Cervus canadensis*) and Bighorn Sheep (*Ovis canadensis*)! Although these large mammals share the same species epithet and belong to the order Artiodactyla, Wapiti Elk belong to the family Cervidae, while Bighorn Sheep are reppin' Bovidae. Both Cervidae and Bovidae have head ornamentation, but cervids have antlers that are grown, shed, and regrown annually by males, while bovids have unbranched horns in both males and emales that never shed. Wapiti Elk has home court

habitat advantage in the Great Smoky Mountains National Park to battle the Bighorn Sheep. Wapiti Elk is out for an early evening graze, in the quiet springtime before summer visitors arrive. In 2021 there were 14 MILLION visitors to the Great Smoky Mountain National Park. MMMagic brings Bighorn Sheep into the meadow near the grazing Elk. Bighorn Sheep steps closer to Wapiti Elk and displays his horns in an inter-species social interaction. Wapiti Elk makes no obvious response, possibly not at all aware of Bighorn Sheep and continues grazing. Bighorn Sheep steps closer still, shakes his head and displays his horns again, attempting to impress? intimidate? Wapiti Elk. Elk continues grazing and casually steps in the direction of Bighorn Sheep...



Membeth / Wikimedia Commons / CC0



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# SWEET 16: WILD NORTH AMERICA

fearing his bluff has been called by the MUCH bigger elk, Bighorn Sheep skitters away to then walks with slightly more dignity off the field of battle! After all, species smaller than Wapiti Elk typically dominate interspecies interactions with Bighorn Sheep, including mule deer, pronghorn, & aoudad. WAPITI ELK DISPLACES BIGHORN SHEEP!!! Narration written by Jessica Light and Katie Hinde; summarized by Melanie Beasley.

**Grizzly Bear (1) v. Jaguar (4)** - In the Rocky Mountains, grizzlies have lower reproductive rates compared to populations elsewhere partially due to food scarcity, i.e. no rich streams of salmon or large herds of ungulates. Jaguars overlapped with the Mexican Brown Bear as recently as the mid-20th century in northern Mexico. However, this particular Jaguar is from the Yucatan and has no personal or recent ancestral experience with grizzlies. As the day breaks, a Canada Pacific train hauls cargo of wheat and barley from Calgary to the port of Vancouver. West of Banff, Grizz is wandering the railroad tracks searching for some of the estimated 110 tons of grain that spill from rail cars per year in the area. Head low looking for tasty treats, Grizz misses when Jaguar is MMMagicked nearby. Jag sees an unfamiliar Grizz and crouches down to slink obliquely downwind of the Grizz hoping to catch an identifying scent of this big burly. Jaguar steps onto the railway tracks that start to vibrate. Jaguar freezes because he's picking up some bad vibrations, bruin's giving him excitations. Suddenly around the corner comes the train! Grizz has encountered trains before, so he breaks right into the screen of trees. Jaguar is naive



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to trains and turns to run away from it as fast as possible on the clearest route... directly down the tracks! Jaguar is an ambush predator, adapted for explosive bursts of speed, not maintaining speed over long distances. The train is not a predator per se, but at an untiring 60 km/hour the train bears down on Jaguar as the felid makes a desperate last second swerve only to have the very front of the engine smash into his hind legs. Jaguar is thrown 20 feet, with a snapped spine. Grizzly now scavenges the jaguar's carcass as he has with train-fatality elk and black bear. This very opportunistic omnivore chomps down happily on the easy meal. GRIZZLY BEAR SNACKS ON TRAIN MANGLED JAGUAR! Narration written by Anne Hilborn; summarized by Melanie Beasley.



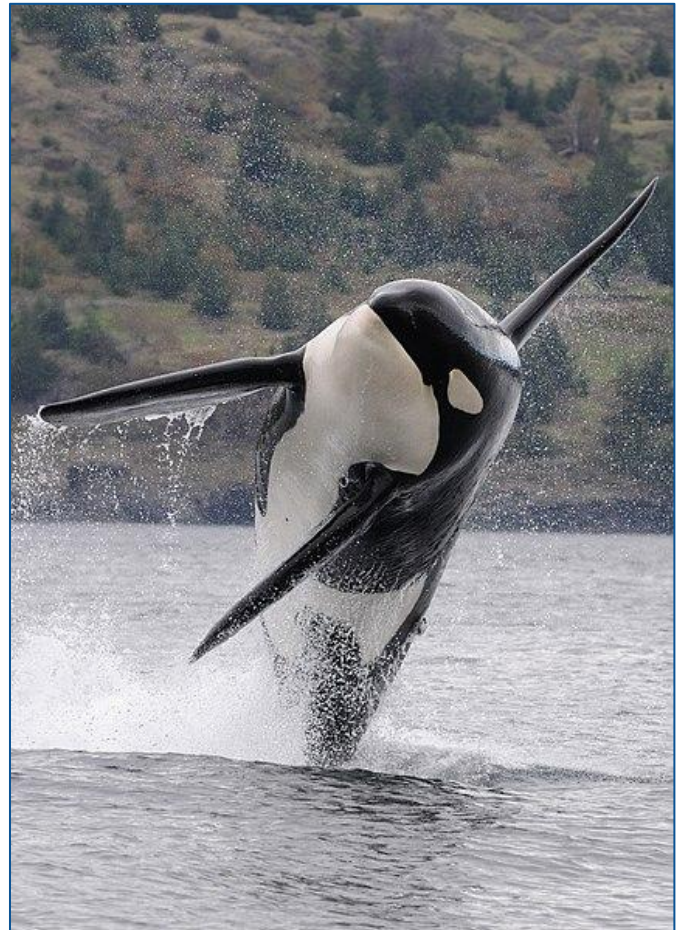
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# ELITE TRAIT

## Queens of the Sea & Sky

### Orca (1) v. Steller's Sea Eagle -

Steller's Sea Eagle population recovery has been a conservation success, achieved through regulation of lead shot use in Sika deer hunting (these deer carcasses are an important part of the sea eagle's winter diet). The increased population of Steller's Sea Eagles is now shaping the behaviors of prey seabirds, such as cormorants, kittiwakes, & slaty-backed gulls. Few orca calves in the Puget Sound Southern Resident Orca pod survive because of poor body condition from reduced Chinook salmon, exposure to environmental pollutants, & disruptions from boats. MMMagic transports the combatants to their random battlefield of the KELP FOREST. Our combatant Grandma Orca was swimming below her sickly grandcalf and the combatant Stellar's Sea Eagle was hunting seabirds when all three (sickly calf included) were transported to the invasive kelp *Undaria pinnatifida* forest in Nuevo Gulf, Patagonia, Argentina several hundred miles North of the giant kelp forests of Tierra del Fuego. Orcas are not novel in this ecosystem, the local orcas are notable for their impressive beaching behavior to successfully bite-grab sea lions and elephant seals on the shore! Additionally, the gulfs of Península Valdés in Patagonia are important calving grounds for the Southern Right Whale (*Eubalaena australis*) who migrate from their feeding areas to birth and raise young in these warmer waters.



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With the Southern Right Whales not arriving until May, the hungry Kelp Gulls start circling above the Grandma Orca and her sickly grandcalf. The Kelp Gulls begin diving to perform their parasitic eating behavior-successively ripping strips of skin and & fat from the backs of the Orcas with their beaks creating large, long wounds. Kelp gulls attack mama & calf S. right whales in these waters, requiring immune response, depleting energy, AND impacting nursing, playing, & resting. Attacks & wounds deteriorate whales,

# ELITE TRAIT: QUEENS of the Sea & Sky



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especially calves, sometimes to death. Grandma Orca dives down to escape the attacking Kelp Gulls but her grandcalf is too weak to follow and remains at the surface being attacked, making infant distress calls. Steller's Sea Eagle takes aim at a low flying Kelp Gull and prepares for predation on the wing. Grandma Orca surges from the water to drive away the attacking seabirds and her jaws snapping tight on Steller's Sea Eagle legs! With a whoosh, Grandma Orca plunges BACK INTO THE WATER, dragging Sea Eagle into the briny deep. Sea Eagle surfaces sucking air in "great distress" having been released by the Orca underwater. Grandma Orca surfaces, and 'makes several passes close to the <Sea Eagle> approaching it from underwater and then surfacing right beside it as though to seize it but instead swimming by leaving the <Sea Eagle> floundering in her bow wave'. "The larger whale dives vertically and with her tail

flukes" flicks the <Sea Eagle> 12 feet out of the water. The Sea Eagle slowly floats back to the surface with "a broken neck" to never battle again. Grandma Orca turns her attention to the now floating Kelp Gulls, able to "capture them at a rate of 1-2 every 10 minutes," if they insist on staying around. Quotes adapted from Williams et al. 1990. ORCA FLUKE FLICKS STELLER'S SEA EAGLE! Narration written by Katie Hinde; summary by Melanie Beasley.

## WHY NOT BOTH?!

**Walrus (1) vs. Swordfish (2).** This is it: the Assault in the Arctic, the Tussle in the Tundra, the Frigid Fracas, the battle between two battle-tested gladiators. Gladiator is an apt name for swordfish as its scientific name -*Xiphias gladius*- translates into "Sword swords" in Greek and Latin respectively. Because of their size, coastal habitat, and obviously cool head armament, swordfish have featured heavily in Indigenous stories from around the globe, including in California, Chile, Denmark and Maine. The walrus has been, and remains, an important part of Arctic people's economy & culture since time immemorial, but overfishing of walruses by whalers had major impacts on the food sovereignty of these Indigenous peoples. Today, Indigenous people from the Inupiaq, Yup'ik, and St. Lawrence Island Yupik sustainably harvest walrus, working with US Federal agencies on a culturally respectful

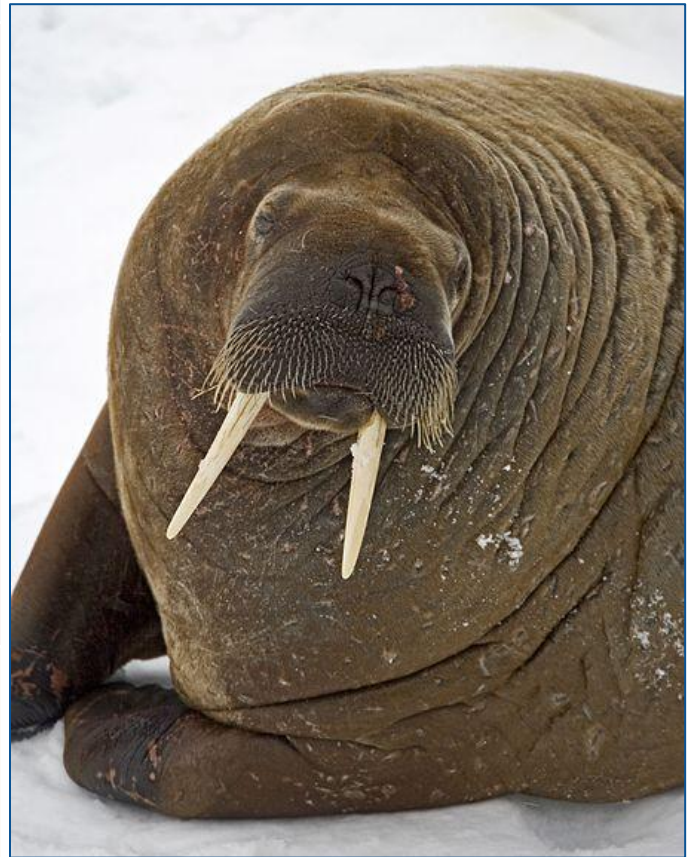


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# ELITE TRAIT: WHY NOT BOTH?!

management plan grounded in Indigenous sovereignty. The goal of this management is to "Encourage self-regulation of walrus hunting & management of walrus... who use and need walrus to survive" as an "essential cultural, natural, & subsistence resource to the Alaskan coastal communities" (Kaweak, 2018). Walrus management is done through the Kawerak, an organization that centers Alaska Native people & their governing bodies for self-determining and guiding their communities' future. Tonight's randomized battle location is THE SEA ICE! Swordfish is transported away from Long Island non-iced sea into the Walrus's home turf near St. Lawrence Island in Alaska's Bearing Sea. Tonight the swordfish is cold and well out of her comfort zone. She's used to subtropical to temperate water. Thankfully her warm blood adaptation is keeping her brain and eyes warm. These waters are also home to another fish that has endothermy: the salmon shark. While the salmon shark swims deep and quiet, and the swordfish basks unaware, the walrus is sitting on sea ice digesting another meal of benthic invertebrates. Salmon sharks, like most sharks, are neophilic: they like new things, and that swordfish looks tasty. The walrus sits, a bit of clam still stuck in its feeding-tube-like mouth. The salmon shark lunges and the swordfish uses its breaching behavior to escape, launching out of the water and into the air...where Swordfish inadvertently stabs the walrus in the head! The swordfish extricates itself from the walrus, BUT SNAPS OFF THE DISTAL BLADE OF ITS SWORD BILL!! The dying walrus slips from the

sea ice to the mouth of the salmon shark. The swordfish swims off injured, but victorious. **SWORDFISH DEFEATS WALRUS!** Narration written by Josh Drew; summarized by Margaret Janz.



Mike Dunn / Wikimedia Commons / CC-BY 2.0

**Pride of Lionesses (1) vs. Stench of Skunks (10).** Lions today occupy only a fraction of their historic range, but still live in diverse habitats including savannah, semi-deserts, and even wetlands. Prey abundance & proximity to water are 2 key factors that drive habitat preference.



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# ELITE TRAIT: MAMMAL COLLECTIVES



Human encroachment remains a leading cause of habitat loss & occasionally leads to conflict. Like lions, hooded skunks prefer to live in woodland near water, where they make their dens in rocky crevices on slopes and cliffs, using spaces less preferred by the larger striped skunks that overlap their range. Tonight's random battle location is...a MONTANE FOREST located in the Sierra Nevadas of California. Hooded skunks can live at elevations of about 10,000 feet so the Stench is no stranger to the landscape. African lions, on the other hand, are not typically a high-altitude cat. In a rare exception, lions in the Kafa Biosphere in Ethiopia live at about 8,850 feet, but average temperatures there are warmer. The lionesses pad through the pine forest avoiding lingering snow drifts, angling toward a jumble of fallen granite rocks from which to peruse the landscape. Circling a large boulder the size of a small boulder, the pride comes face-to-face with the Stench! INSTANT UNCOORDINATED MELEE!

Skunks, in no way cooperative or connected, SCATTER as Lionesses reflexively predator pounce & pursue independently of one another! Two skunks run to the jumbled granite rocks by the cliff and scurry beyond the reach of a chasing lioness. One skunk commando-crawls through narrow rock crevices away from the lioness. Another lioness steps off the torso-crushed skunk who didn't even have time to warn about defensive farts before full felid fury landed on him! ONE LIONESS & ONE SKUNK REMAIN... The Last Lioness's paw has pinned the Skunk's rear-end and tail to the forest floor, rendering the skunk unable to assume spray position. Wait a minute... it's the same skunk whose tail was bitten by the rabid bat-eared fox exactly 11 days ago in the #RabiesBabies battle round 1! The trapped skunk does its best to twist at its attacker. Furious flecks of spittle fly as Skunk BITES Lioness's FACE! Luckily for lioness though, the skunk... IS NOT RABID! Rabies incubation periods are 12-300+ days for skunks and their chance of getting rabies bitten on a peripheral body part, such as a foot, is ~10%. The Last Lioness counter-attacks, delivering a quick killing bite to Skunk's skull, discarding the carcass, and ending the last lingering Stench. PRIDE OF LIONESSES DEMOLISHES STENCH OF SKUNKS! Narration written by Laura Durgavich and Katie Hinde; summarized by Margaret Janz.

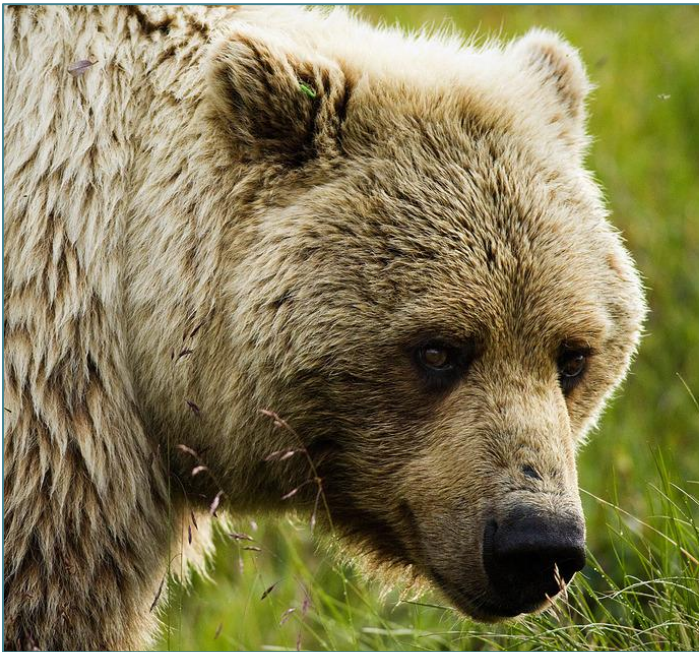


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# ELITE TRAIT: WILD NORTH AMERICA

**Grizzly Bear (1) vs. Wapiti Elk (6).** Grizzly Bears live at higher latitudes in North America, Asia & Europe, in habitats that range from forests to coast lines. Grizzlies are opportunistic omnivores who are often at the top of the food chain - in fact, besides us hominins, Grizzlies have no predators within their ecosystems. Grizzly homerange size is totally dependent on food availability, which means human encroachment on bear habitat leads to Grizzlies visiting town dumps and sampling domesticated livestock. Wapiti Elk have a similar geographic range to Grizzly Bears, preferring familiar forested habitats. As ruminating herbivores and primary consumers, Elk can greatly impact plant communities while also being an important food source to secondary and tertiary consumers. Elk have a distinctive musky odor.



Nathan Kostegian / NPS / Public Domain

Tonight's randomly selected battle location is the KELP FOREST! These forests of predominantly kelp (large brown algae seaweed) and are found in temperate & polar waters along coastlines. They represent some of the most bioproductive ecosystems on the planet. However, the most recent IPCC report states that kelp & other seaweeds are undergoing mass mortalities from high temperature extremes; they are stationary and cannot adapt quick enough to deal with the rapidly increasing temperature of the Earth. Our battle tonight is in Tongass National Forest, Chichagof Island (Shee Kaax in Tlingit language, who are the 'People of the Tides'). Chichagof Island has the highest Grizzly Bear densities globally. An extremely low tide exposes the normally submerged kelp forest. Small gas-filled bulbs called 'pneumocysts' that buoy the kelp towards the water's surface go POP, POP, POP as Grizzly Bear walks across the exposed sea bed. Grizzly Bear paws through the kelp dislodging tube worms. Grizzly suddenly catches the distinctive whiff of delicious elk! Wapiti Elk has been transported just upwind of Grizzly Bear. Unlike ursid cousin Black Bear, Grizzly WILL attack full-grown Elk, especially isolated individuals. Jaguar was a bit too splattered to provide Grizzly with a decent meal, so the bear is ready for a big snack. Elk spots Grizzly & stares at him in shock: new environment, all alone, and a novel predator. No Grizzly roam the Great Smoky Mountains and naive Elk are often easy prey.



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# ELITE TRAIT: WILD NORTH AMERICA

ELK BOLTS! Elk can rely on their speed to out-run predators, up to 45 miles to hour! Grizzly sprints off after Elk with a sudden burst of speed. Elk & Grizzly are running at full speed along the edge of the surf! Grizzly lunge-grabs at Elk's haunches, but Elk turns sharply into the water as a last resort to evade the attack. Grizzly rushes into the shallow water after Elk! Grizzlies are fast sprinters, but their speed does not guarantee success. In the Kelp Forest, Grizzly's wide paws mean friction & traction: Grizzly is gaining ground! Elk cuts right around a large barnacle-laden rock & Grizzly cuts left. Bear heads-off Elk & traps him against the rock. The tide is coming in & Elk has nowhere to go! Without prominent antlers, Elk has no good means to

dissuade this aggressive predator. Elk rears up on his hind legs as Grizzly rushes forward, jaws wide. Grizzly clamps onto the throat of Elk CRUNCHING DOWN with massive force! Elk flails his forelimbs & makes contact! CRACK!!! Elk's hoof smashes into Grizzly Bear's face, bashing in his right eye. Grizzly Bear's bite remains tight as the Elk breathes his last breath. Grizzly drags Elk to shore, rolls him over onto his side & rips open his abdomen. Blood from Grizzly Bear's eye injury drips onto the carcass of the Elk as Grizz digs into his hard-earned feast. GRIZZLY BEAR DEVOURS ELK! Narration written by Patricia Kurnath Conner, Tara Chestnut, Jessica Light, & Katie Hinde; summarized by Margaret Janz



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# FINAL ROAR!

## Orca vs. Swordfish

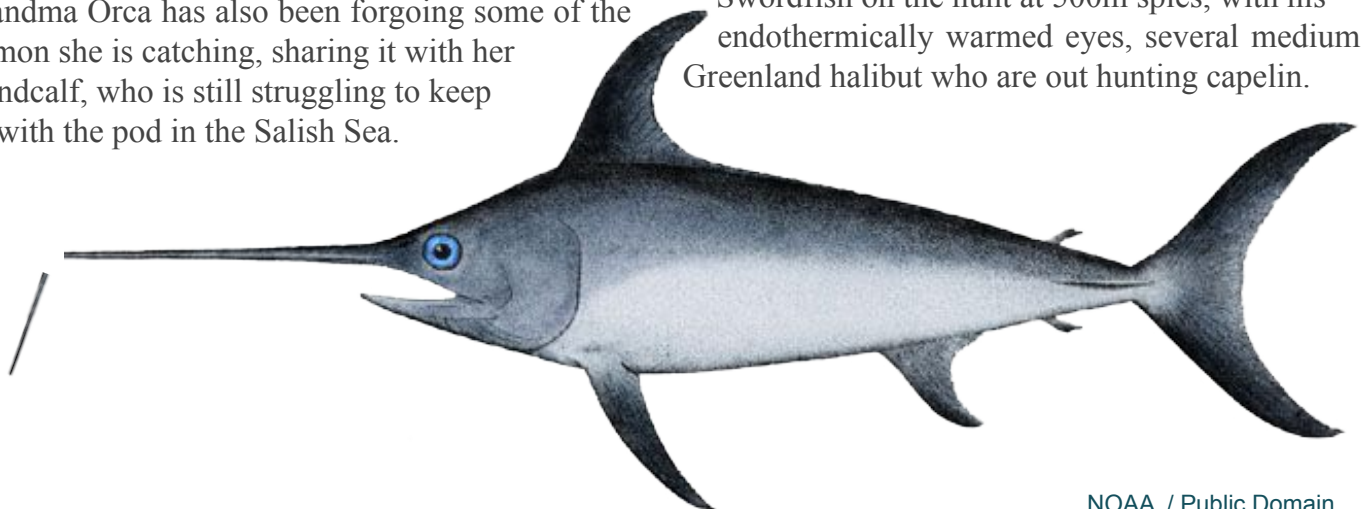
TONIGHT Queen of the Sea GRANDMA ORCA battled Why Not Both?! SWORDFISH! On the road to the Final Roar, the Swordfish's unintentional stab of its bill to the Walrus' head has left him with part of his bill snapped off. Swordfish, however, has already begun to slowly regrow his lost bone with remarkable adaptations for regeneration BUT not the same osteocyte adaptation that mammals have for repairing bones! The Orca's Route to the Roar has been much easier, but some incidental back-gouging gulls gave Grandma Orca the hurt in the last round. While the Orca has easily displaced and dispatched her 2022MMM opponents, the declining chinook salmon numbers in the Salish Sea, along with boating noise and environmental pollution, that endangers the resident orca pods. Grandma Orca has also been forgoing some of the salmon she is catching, sharing it with her grandcalf, who is still struggling to keep up with the pod in the Salish Sea.



Christopher Michael / Wikimedia Commons / CC-BY 2.0

Both the Grandma Orca, weighing in at well over 10,000lbs and 24 feet long, and the 15-foot-long Swordfish are hunting in their respective home habitats when MMMagic transports them both to the random habitat of... SEA ICE! Specifically, the combatants now find themselves in the Cumberland Sound on southern Baffin Island, Canada. Swordfish drops to the deeper depths he prefers for hunting about 425-490 meters down. Swordfish, like many species, have a diel vertical migration, where they move into shallower waters at night but hunt at deeper depths during the day.

Swordfish on the hunt at 500m spies, with his endothermically warmed eyes, several medium Greenland halibut who are out hunting capelin.



NOAA / Public Domain

# FINAL ROAR! ORCA vs. SWORDFISH

Odd that the capelin are not swimming away, but in the sea you don't pass up easy food so Swordfish swishes quick to the mighty meat morsel suspended in the water column, a meal that will take no effort or risk damaging his healed sword. Swordfish rushes in to swallow the meat in his toothless maw... and is HOOKED on a long line from a power winch for fishing. Whhhhrrrrrr the long line is being mechanically retracted by the winch mounted on ice. Swordfish thrashes against the hook tethering him to the line as he rises higher and higher in the water column. Thrashing to be

free, Swordfish is all of a sudden RIPPED FROM THE HOOK BY THE TOOTHED WHALE JAWS OF GRANDMA ORCA! After all, Southern resident Orca are most likely to branch out from their preferred salmon to consume larger pelagic fish in late March & early April. AND Orca routinely rob fisher folk of their long-line Swordfish elsewhere in their range. This swordfish more than makes up for all of the salmon meals Grandma Orca skipped to share with her grandcalf. ORCA EATS SWORDFISH!! Narration written by Josh Drew and Katie Hinde; summary by Melanie Beasley

# FINAL ROAR! GRIZZLY vs. LIONESSES

Tonight the WILD North America GRIZZLY BEAR takes on the Mammal Collectives PRIDE OF LIONESSES! The Grizzly bear (*Ursus arctos*) is wounded from its last encounter. The oozy right eye wound is causing adaptive sickness behavior from immune cell signaling in his brain and causing him to be a behavior minimalist: low energy and unmotivated so he can hunker down and heal. Grizzly is caught in a paradox: adaptive sickness behavior telling him to lay low and heal, but current body condition from hibernation weight loss is compelling him to eat. In a compromise response, grizzly sets out for some easy scavenging. On average, lionesses make a kill every 1.8 nights, but our lionesses have had little

opportunity for their regular activities during our 2022 MMM. Cave lions (*Panthera leo spelaea*) and cave bears (*Ursus spelaeus*) both lived in Pleistocene Eurasia, with fossil evidence that lions entered caves to kill and consume hibernating cave bears, as some wolves do today. For our combatant Lionesses, the rainy season is winding down and the pride set out for an evening hunting prowl amongst the waterlogged marshes of Okavango Delta when...

MMMagic transports both the lionesses and the grizzly bear to the random habitat of the... SAVANNA! Specifically to the Moru Kopjes area of the grasslands of the Southern Plains in



# FINAL ROAR! GRIZZLY vs. LIONESSES

Serengeti National Park, where there are great clouds of dust on the horizon. It's April, and the Wildebeest are moving North from the southern calving grounds they occupied to give birth to their young and graze. They're accompanied by many zebras in an inter-species co-mingling herd. A zebra lags a bit due to a hoof injury. Two of our lionesses are crouched nearby and, though they've been stalking this zebra for a while, they don't move. They seem to be waiting for a signal. Then, the two lionesses burst out of their crouches and the zebra takes off! Despite its limp, the zebra is faster and will be able to escape if it can just hold its speed. If it was just the two lionesses, the zebra may be able to escape with ease, but the lionesses have a coordinated ace up their sleeve: the third and last lioness of the pride! The last lioness bursts from her hiding spot just before the zebra overtakes her and leaps the six feet separating, landing on the zebra's



Bernard Dupont / Wikimedia Commons / CC-BY-SA 2.0



USFW / Public Domain

back. The impact hits the zebra so hard that both animals fall to the ground and roll along the shore of the waterhole. Catching up, the other two lionesses set to helping: one lioness hangs onto the zebra's haunches to keep the animal down, careful to avoid the dangerous, kicking back legs; the second lioness locks onto the zebra's nose, helping the last lioness, who has moved to the zebra's neck, to suffocate the animal.

Winded from their exertions and covered in blood, the Lionesses dig into their meal next to one of the rock catchment water holes as other scavengers, like jackals and vultures, arrive to await their turn at the carcass. However, one dominant scavenger has no intention of waiting for a turn. Grizzly bear's keen sense of smell has quickly brought him to the site of the lioness' kill. The massive Grizzly Bear is well adapted physically and behaviorally to.



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# FINAL ROAR! GRIZZLY vs. LIONESSES

steal the prey of other apex predators, a tactic known as kleptoparasitism. “As the largest terrestrial scavengers, bears are potentially one of the most important mammalian kleptoparasites: and “prey loss to dominant scavengers is a widespread phenomenon among felids worldwide” (Krofel et al. 2012). The Grizzly Bear charges at the Lionesses, scattering the jackals and vultures, but lions routinely take over kills and displace African wild dogs, cheetahs, and hyenas, making them the typically dominant kleptoparasite in this ecosystem. Currently in possession of the zebra kill and unwilling to let it go, the Lionesses fan out to confront the would-be thief of their dinner. The Grizzly growls and lunges at the closest Lioness, but the second Lioness slashes his now vulnerable left flank and he spins to lunge at her instead. The Last Lioness circles around Grizzly’s blindside

and attacks from behind, leaping onto the Grizzly’s back and digging in with her claws as though attacking an elephant or cape buffalo. The Last Lioness attempts to deliver a powerful killing bite to the Grizzly’s nape and sever the spine, but is thwarted by the mighty Grizzly’s hump. The Grizzly quickly spins and swipes out with a paw, rearing up to his full 9 foot standing height as the Last Lioness leaps clear of his back. The Lionesses regather to face the Grizzly, who is once again advancing on their kill... the Lionesses back up closer and closer to the watering hole... Grizzly charges... directly into the watering hole to submerge and cool his overheating body. Suddenly, Grizzly surges from the waterhole and bites down on the throat of the zebra carcass to drag it away and the Lionesses bite down on the haunches and pull... and WRRRRCH!!!! The zebra head and upper neck tears away from the zebra body! The Lionesses stand over their kill as the grizzly carries the purloined head away from the waterhole to consume beyond the field of battle. Much like the massive, long limbed, short-faced *Agriotherium africanum* that disappeared from Africa during the Pliocene, Ursidae once again encountered defeat on the savanna. PRIDE OF LIONESSES DEFEATS GRIZZLY BEAR!

Narration written by Katie Hinde, Asia Murphy, and Marc Kissel; summary by Jessica Martin



Mike Squeaky Marmot / Wikimedia Commons / CC-BY-SA 2.0



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# FINAL ROAR! GRIZZLY vs. LIONESSES



“For tens of thousands of years, human creativity has manifested in artistic representations of animals. From the 35,000 years-old cave painting of a babirusa in Sulawesi, Indonesia to the depictions of extinct marsupial megafauna Thylacoleo carnifex by Aboriginal Australians, human artists have exquisitely portrayed the physical & behavioral traits of sympatric species... In more recent centuries, scientific illustration, clay & glass models, & museum taxidermy became common approaches to making life-like the animal kingdom. Within this human tradition, March Mammal Madness has been greatly enhanced by the ongoing contributions of an incredible artistic team. Indeed, through their illustration & our narrative, these stories of science are crafted, & made indelible in our ‘hearts’ & minds.” -Hinde et al. 2021, eLife

SO APPRECIATE YOUR ARTISTS! Buy them a cuppa at their Kofi, or become patrons of their work, or just send them a note of appreciation...

## Art Team Role Call!

The amazing Valeria Pellicer @Vpellicerart  
<https://ko-fi.com/veppart>  
<https://www.vpellicerart.com>

The incredible Olivia Pellicer @Opellisms  
<https://ko-fi.com/opellisms>  
<https://www.opellisms.com>

The spectacular Mary Casillas @maryccasillas  
<https://ko-fi.com/marycasillas>  
<https://www.marycasillas.wix.com/paintings>

AND THE INIMITABLE MMM Art Director  
Charon Henning @TheOddAngel  
<https://ko-fi.com/oddangel>  
<https://www.charonhenning.com>

And keep an eye on the Society6 shop for artwork to arrive THIS WEEK!  
<https://society6.com/mammalmadness>



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# CHAMPIONSHIP Orca vs. Lionesses

In the FINAL BATTLE of 2022 March Mammal Madness, Grandma Orca faces the Pride of Lionesses. In Alaska, other marine mammals interact peacefully with fish-eating, resident ecotype Orcas. Minke whales and Dall's porpoises will swim alongside resident Orcas. The porpoises & resident orca calves sometimes play together. Sadly, "the Salish Sea was once the primary source of orcas for aquariums; from 1964 to 1976, more than 50 southern resident killer whales (SRKW) were taken into captivity and sold to oceanariums and marine mammal parks throughout the world. In 1970, a killer whale named Tokitae (also Sk'aliChelh-tenaut), was captured from Penn Cove on Whidbey Island and sold to the Miami Seaquarium. For over 51 years, she has lived in the smallest orca tank in North

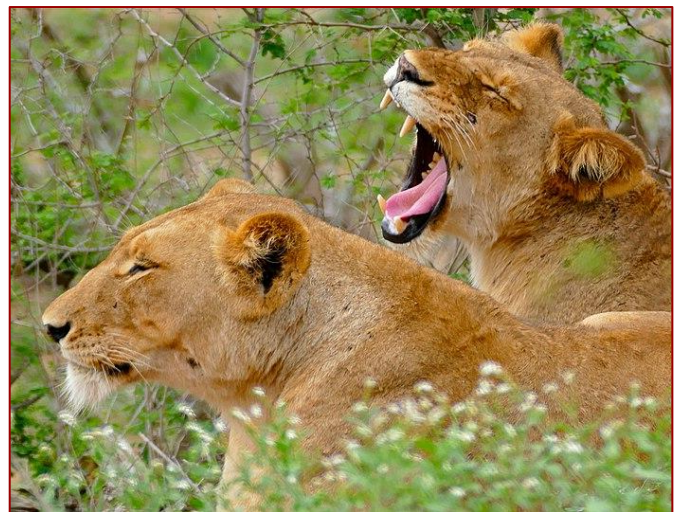
America. She is the last surviving SRKW in captivity. For members of the Lummi Nation, whose kinship with the SRKW runs deep through their language and culture, Tokitae's captivity is painful — she is a kidnapped relative, and they want to bring her home." [THIS FRIDAY 4/8/22 YOU CAN HELP!](#)

Virtually join Former Lummi Nation Chairman Jay Julius, Lummi fisher Ellie Kinley, cetacean expert Jeff Foster & Bonnie Swift for a panel discussion about the campaign to bring Tokitae home to Salish waters (FREE FOR YOUTH).

Since 1994's Lion King, decline in prey abundance and habitat reduction has dropped the wild lion population down to fewer than 25,000 (~50%). Groups like [Warrior Watch](#) work to ensure there are local benefits for protecting lions. In 2017, the International Union for the Conservation of Nature [announced](#) an expansion of the [Save Our Species Initiative](#) to help connect carnivore



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# CHAMPIONSHIP: ORCA vs LIONESSES



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conservation efforts & support sustainable coexistence with humans across Africa. In the 1972 natural history classic "The Serengeti Lion: A Study of Predator-Prey Relations," George B. Schaller describes how lions within a pride are able to share LARGE kills, but conflicts over small prey can get very aggressive, as described in this scene: "A female catches a gazelle and runs with it across a shallow creek and along a thicket for 200 m, closely pursued by three lionesses. She retreats under a bush and growls while facing the others. They hesitate. Suddenly a male bounds up, crashes into the bush, and attempts to take the carcass... The female retains her hold on it, and for 15 minutes—growling, pushing, & pulling—the two crouch side by side without eating. Suddenly the body rips in half and each obtains a share."

The combatants are MMMagically transported to the randomized habitat of the... KELP FOREST!

Specifically, the Protection Island Aquatic Reserve with mixed areas of Kelp Beds and Sea Grass and the bird and marine mammal rookeries of Protection Island. Two lionesses begin walking along the salty beach, while the Last Lioness lifts her head to smell the breeze and listen. Back on Namibia's Skeleton Coast, "the first record of lions returning to the ocean came early in 2002, when three lionesses from the Hoaruseb Pride started exploring the coastline... and swimming to islands" (Stander 2019). None of the felids notice the orca who "patrols the beach by closely following the contour of the shoreline within 15-25 feet" of the Lionesses (McInnes et al. 2020). The Lionesses begin "exploring the intertidal zone and investigating items in shallow water" (Stander 2019). From down the beach the Lionesses freeze as "a low-frequency growling builds up to a roar" (Sabinsky et al. 2017).



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# CHAMPIONSHIP: ORCA vs LIONESSES



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Just beyond the shallows, a rippling wake signals the immediate acceleration of the orca toward the roar. The Lionesses go into their stalking crouch slowly moving up and over beach logs toward "Kanem Point, the westernmost tip of the island" to a preferred harbour seal (*Phoca vitulina*) haul out beach (McInnes et al. 2020). "The first confirmed evidence of lions utilizing marine food items along the Skeleton Coast came in March 2006 when lionesses from the Hoaruseb pride were observed feeding on a Cape fur seal on a beach" (Stander 2019).

The three lionesses sprint to attack the Harbour seals and simultaneously Orca "rushes the beach, running aground" (McInnes et al. 2020). The beach erupts in predator-induced pandemonium! Some harbour seals "flee up the beach and others entering the water" (McInnes et al. 2020)! Two lionesses follow seals fleeing up the beach, but the Last Lioness pursues a seal into the intertidal zone. Orca "arches his body and swing his flukes to maneuver himself off the beach into deeper water" (McInnes et al. 2020). This is a mammal-eating

Bigg's transient orca! He rejoins his pod to rush-push water at the fleeing seal and now swimming Last Lioness into deeper water above the Kelp Forest. Transient orca's sister and mother converge "to feed on the seal, then rising vertically out of the water ("spy-hopping") and slapping their flukes on the surface" in the excitement of the successful hunt (McInnes et al. 2020).

The mammal-eating Biggs transient orca male grasps Last Lioness's back leg, and wrenching her knee, drags her below, playing with his prey. Two lionesses pace in the shallows of the intertidal zone staring at the sea, contact and recruitment



Yathin S Krishnappa / Wikimedia Commons/ CC-BY-SA 3.0

roaring for their missing sister! Biggs transient orca releases Last Lioness and lets her swim to the surface, gasping her breath. Then Bigg's transient orca surfaces and rush swims adjacent to the lion paddling toward shore, sending her careening in his wake. Bigg's transient orca, swings back his fluke to thrash-toss Last Lioness like "a soccer ball" (Ferguson et al. 2012),



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# CHAMPIONSHIP: ORCA vs LIONESSES



[Learn more about the resident Salish Sea orcas](#) from Ed Young.

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but GRANDMA ORCA COLLIDES INTO TRANSIENT ORCA AND BITES HIS FLANK!

For Protection Island sits in the Salish Sea, familiar home of Grandma Orca and her resident pod that are dominant to the transient orca pod. "A whole bunch of southern residents have suddenly surfaced in the middle of the group of transients" as the thrashing orcas fluke up white water (Pailthorp 2021). Transient pods typically avoid Resident pods, and altercations are extremely rare, but perhaps Grandma Orca is particularly aggressive toward the mammal-predator orcas as a pre-emptive strike in defense of the vulnerable grandcalf (speculation from Ford & Ellis 1998). Grandma Orca leads a phalanx of resident orcas to drive the fleeing transients closer to the beach! Grandma Orca on target toward transients surges past swimming Last Lioness, and Grandma Orca's slipstream tumbles the Last Lioness back underwater into the tangled Kelp Forest. Fearing the risk of a beach stranding, the Bigg's transient orcas break west from Protection Island, "swimming at high speeds, known as porpoising, out to the deeper waters" of the Strait of Juan de Fuca (Ford & Ellis 1998).

Submerged in the twisty kelp, Last Lioness struggles to kick free with her wrenched leg and manages to extricate herself from the kelp and surfaces with a gasp! Grandma Orca and the resident orca pod are hot on the flukes of the transient orcas as both pods "leave at full sprint for a mile and a half at 30 miles an hour or better", well beyond the field of battle (Pailthorp 2021). At Protection Island, protective Grandma Orca saved the Last Lioness, even if incidentally, before departing the field of battle in pursuit of possible threats to her pod. In the intertidal zone, Last Lioness limps toward her sisters, broken kelp twisted around her body. Rushing to their briefly lost sister, the Lionesses reunion in the sea surf involves rubbing heads together and licking each other's faces. **PRIDE OF LIONESSES ARE THE 10th ANNUAL MARCH MAMMAL MADNESS CHAMPIONS!** Championship narration written by Katie Hinde, Marc Kissel, Mauna Dasari, Asia Murphy, and Tara Chestnut; summary by Melanie Beasley.



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\*For several of the #2022MMM battles, the citation lists were not able to be included in this booklet due to the linear construct of time. Citations for those battles can be tracked down at the March Mammal Madness LibGuide via the Play-by-Play files. Thank you for your understanding.

# Open Educational Resources

<https://libguides.asu.edu/marchmammalmadness>

## **Materials for EVERYONE**

Brackets in English & Spanish, One Page & JUMBO	Will Nickley
Events Calendar	Katie Hinde
Contributor Guide Booklet	Katie Hinde
Collector Cards Individual Files	Ian Hecht
Trading Card Template for Research Individual Files	Ian Hecht
Collector Cards Packet	Ian Hecht
Research Cards Packet	Ian Hecht
Tournament Trailer	Jennifer Gabrys
Combatant Information Slides in English & Spanish	Jenna Kissel

## **Lesson Plans, Presentations, & Worksheets**

Pre-Tournament Life Sciences Lesson Plan in English & Spanish	K. Hinde & Stephanie Schuttler
Tournament Events Life Sciences Lesson Plan in English & Spanish	K. Hinde & Stephanie Schuttler
Tournament Events Worksheets in English & Spanish	K. Hinde & Stephanie Schuttler
ECOSYSTEMS Middle School Lesson Plan	Katie Hinde
ECOSYSTEMS Middle School Lesson Presentation	Katie Hinde
ECOSYSTEMS Middle School Lesson Worksheets	Katie Hinde
ECOSYSTEMS High School Lesson Plan	Katie Hinde
ECOSYSTEMS High School Lesson Presentation	Katie Hinde
ECOSYSTEMS High School Lesson Worksheets	Katie Hinde
Visual Arts Lesson Plan in English & Spanish	Katie Hinde
Haiku Lesson Plan in English & Spanish	Katie Hinde
Post-Tournament Language Arts Lesson Plan	Tara Chestnut, Marwa Mahmoud, & Katie Hinde
4th Grade Every Kid Outdoors Lesson Plan	Tara Chestnut, Marwa Mahmoud, & Katie Hinde

## **Extra Materials for Educators**

Pro-Tips Guide for Teachers	Katie Hinde
Intro Slide Deck	Katie Hinde
Certificate Template	Katie Hinde
Online Bracket & AutoScorer	Jeff Brunstrum
Contest Manager	Jeff Brunstrum

\*Spanish Translations provided by Prof. Alejandra Núñez-de la Mora

Read More: Hinde K, CEG. Amorim, AF Brokaw, N Burt, M Casillas, A Chen, T Chestnut, PK Connors, M Dasari, J Dietrick, CF Ditelberg, J Drew, L Durgavich, B Easterling, C Henning, A Hilborn, EK Karlsson, M Kissel, J Kobylecky, J Krell, DN Lee, KM Lesciotto, KL Lewton, JE Light, J Martin, A Murphy, W Nickley, A Núñez-de la Mora, O Pellicer, V Pellicer, AM Perry, SG Schuttler, AC Stone, B Tanis, J Weber, M Wilson, E Willcocks, CN Anderson. 2021. [March Mammal Madness and the Power of Narrative in Science Outreach](https://doi.org/10.7554/eLife.65066). eLife. 10:e65066. DOI: <https://doi.org/10.7554/eLife.65066>

**HAPPY VALENTINE'S DAY**



**Ladies  
who  
ROAR  
together  
intimidate  
their  
neighbors**

**I'll stand  
I'll stand  
I'll  
stand  
so  
close  
to  
you**



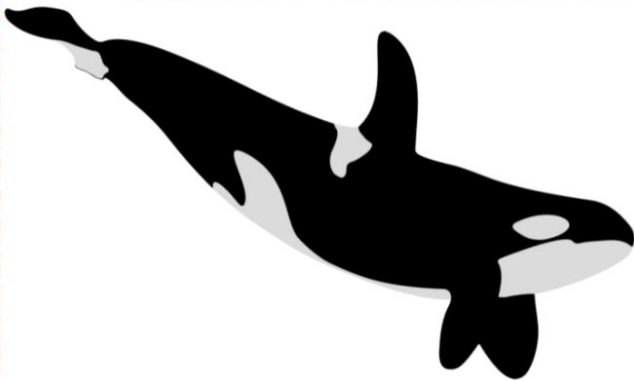
**& allopreen yer ticks!**

**I'd leave torpor  
for you**



**♥ MARCH  
MAMMAL  
MADNESS**

**I find your acoustically  
distinct vocalizations**



**Socially Engaging!**

*After assessing my options...*



*Bleat my  
Valentine*

*Tis the  
season*



*to expand my  
home range  
to overlap  
with yours*

**I DON'T SEE A COMMUNAL  
DEN IN OUR FUTURE...**

**EVER.**



# MARCH MAMMAL MADNESS

Valentines created by Professor Katie Hinde, Arizona State University.

## EXPLANATIONS & CITATIONS

**BADGER** In SE Wyoming, male badgers increase their home ranges to 2.5x larger during the breeding season. Goodrich & Buskirk. 1998. Spacing and ecology of North American badgers (*Taxidea taxus*) in a prairie-dog (*Cynomys leucurus*) complex. *J Mammalogy* 79:171-179.

**HEDGEHOG** 'Breeding begins shortly after emergence from winter-time torpor.' Pettett et al. 2018. A comparison of the ranging behaviour & habitat use of the Ethiopian hedgehog (*Paraechinus aethiopicus*). *Scientific Reports*. 8:1-10

**HOODED SKUNK** Even during the breeding season, male and female hooded skunks do not share a den. They like their own space. (Same, skunks, *SAME*). Ten & Larivière. 2001. *Mephitis macroura*. *Mammalian Species*. 686:1-3.

**LIONESSES** In Serengeti National Park, Tanzania, recordings of lionesses roars were played to other lionesses to observe the response. "Defending adult females were less likely to approach playbacks of three intruders than of a single intruder and on occasions when they did approach three intruders they made their approach more cautiously." McComb et al. 1994. Roaring and numerical assessment in contests between groups of female lions, *Panthera leo*. *Animal Behaviour* 47: 379-387

**MACARONI PENGUIN** On Marion Island in the Indian Ocean between South Africa and Antarctica "Paired birds stood very close, if not in actual contact, allopreened each other, and acted in concert to display aggressively to intruding penguins" Brooke ML. 1985. The effect of allopreening on tick burdens of molting eudyptid penguins. *The Auk*, 893-895.

**ORCA** 'The presence of "rarely sighted" pods, sighted in fewer than 5% of encounters, increased social behavior.' Pods have their own acoustically distinct sounds they make which may be important for finding mates that aren't relatives. Olsen et al. 2020. 2020 Social behavior increases in multipod aggregations of southern Alaska resident killer whales (*Orcinus orca*). *Marine Mammal Science* 36.4: 1150-1159.

**PANDA** Before courtship behavior, pandas like to assess several potential mates. Once they decided, they'll approach their chosen mate bleat, shake their head, and stare. Pandas, keeping it awkward. Peng et al. 2009. Mate choice in giant panda (*Ailuropoda melanoleuca*). *Belgian Journal Zoology*. 139: 87-92.



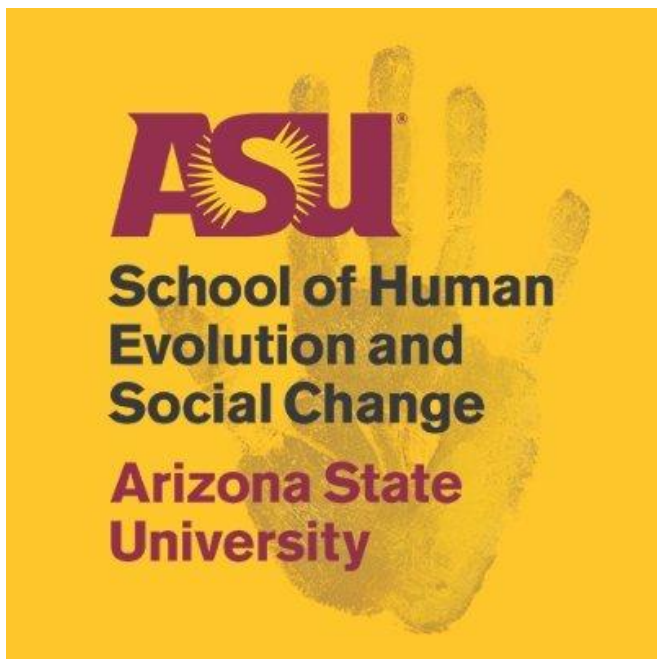
[libguides.asu.edu/MarchMammalMadness](http://libguides.asu.edu/MarchMammalMadness)

\*Giraffe is not a 2022 combatant, this artwork is just awesome. Clipart available at Etsy.

**March Mammal Madness** extends our very special thanks to these organizations for their celebration of the tournament through the years.



Annually since 2017, Oxford University Press, in collaboration with March Mammal Madness, has curated a special collection of articles of combatants freely available to the general public. The [Journal of Mammalogy](#) and [Mammalian Species](#) have been predominantly featured in these collections, but 2022 included articles from such wonderfully named journals as The Auk, Mutagenesis, and Journal of Molluscan Studies.



The [2022 March Mammal Madness FESTIVAL!](#)  
Celebrating 10 Tournaments with the teaMMM and Jesse Hildebrand.



American Society of  
Mammalogists  
IMAGE LIBRARY



Longtime enthusiastic participants in the tournament, in 2021 AMNH hosted the [March Mammal Madness Museum Tour](#) with scientists Mary Blair and Anthony Caragiulo