# TELLING SPECIES STORIES: VISUALIZING FUTURES FOR NORTH AMERICAN HABITAT DIORAMAS

WORKSHOP SUMMARY OCTOBER, 2024

#### **Convenors:**

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#### **Facilitators:**

Sabrina Careri (Workshop Lead) Nathalie Attallah Ivan Shen Jenna Wu

'Telling Species Stories' took place on the first day of the 2024 Student Conference on Conservation Science (October 9), at the American Museum of Natural History, in New York City.







American Museum of Natural History

## **WORKSHOP OVERVIEW:**

In the last century, thousands of visitors have observed the habitat dioramas within the American Museum of Natural History with intrigue and awe. These illuminated spectacles were so lifelike, depicting actual places in space and time — telling their stories — that viewers were able to experience not only the habitats, but also animal behavior. Their vivid stories influenced public opinion about the value of these places and their need for conservation. To this day, what many viewers do not realize is that the magic of the habitat dioramas, their powerful impact, is enabled through the capacity to visualize them — through the careful construction of spatial illusion produced by a curved background painting, with elements collected from specific sites, and taxidermied specimens from biomes around the world.

More recently, habitat dioramas have been the subject of critiques that challenge the diorama's staged visions and the separation, behind panes of glass, of ourselves from nature. Moreover, the species and habitats depicted are out of sync with the effects of climate change and biodiversity loss. However, these remarkable dioramas have enduring qualities that can further serve to educate and empower the public to (re)consider our changing place in nature and our relationship with other species.

#### All we need are new stories, and the capacity to visualize them.

This workshop focused on collaborative and co-creative exercises to develop these science-supported "stories"— scenarios based on current conservation science and speculation — for four selected habitat dioramas. With these future "scenarios" one could imagine changes to these diorama habitats, for example, considering their environmental stressors, along with adaptations under climate change and biodiversity loss, and importantly, could speculate on their futures through new concepts, for example, design interventions and conservation efforts, some of which are being initiated and realized today. In this way, the workshop goal was to contemplate new stories which might shape public discourse, and inspire visitors as they leave the museum with more than empathy, but also agency and renewed empowerment to engage with new natures, through changing stories of our time.

#### **Purpose:**

Dioramas are illusive, spatial devices that "transport" viewers to another space, and possible time. The purpose of this workshop was to collectively visualize new stories and to develop possible future scenarios for the species and the landscapes presented in the selected dioramas. These speculative futures can serve as the basis for public education programming, and potentially, through the development of technology-supported projections that foster civic discourse on and public engagement in conservation science.

#### Goal:

Based on current conservation science and practices of visualization, workshop participants speculated and experimented with conceptual futures to present a single compelling narrative for one of the selected dioramas. Participants were assigned to a team; each team worked with one of the four selected dioramas.







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# 01: AMERICAN BISON AND PRONGHORN EXHIBIT



#### <u>Team:</u>

Nathalie Attallah (Facilitator)

Ana Porzecanski /AMNH Director of the Center for Biodiversity & Conservation Albeliza Perez / AMNH Sr. Manager of Youth & Workforce Development Brett Peterson / AMNH Director of Media and Interactives Eozin Che / AMNH Lead Creative Technologist Indah Sari / AMNH Fellowship Shannon Shaw / U.S. Coast Guard Academy

#### Process:

The bison team began by becoming familiar with the diorama, where everyone shared their thoughts and reflections. This quickly opened discussions around the history of the diorama, the untold stories, and the colonial and dominant narratives it portrayed. The team completed this exercise as a mind-map to break down barriers around the 'making' of the diorama early on. This process helped the team to develop a diagram that presents relationships and hierarchy between ideas discussed.

Everyone in the group expressed an interest in telling a different story, particularly addressing the missing narratives in this diorama. To do so, the team started with a warm-up exercise in which the team members adopted personas that reflected their individual skills and interests. This approach helped the group quickly understand each other's strengths, facilitating a more cohesive and effective collaboration process within a short time frame, and contextualizing expertise beyond their professional roles. Once roles were established, the team dove into brainstorming potential stories they wanted to depict for the bison, on a large, communal sheet of paper where everyone had the opportunity to write down their thoughts. This process allowed each participant to contribute their ideas visually, sparking connections and encouraging group dialog to build on each other's contributions.

#### Outcome:

A shared commitment to complexity and layered storytelling quickly emerged, with the group reimagining

the diorama not as a static scene but as a "dreamscape" rather than a fixed landscape as a backdrop to a moment in time. This perspective allowed for storytelling that was multitemporal and fluid, creating room for stories from varied pasts, possible futures, and layered narratives to coexist. The dreamscape concept opened up possibilities for engaging with not only the scene behind the glass but also the glass itself, using it as a projection space to tell new stories.

In exploring how to move through these layered stories, the group suggested using sound as both a transitional element and a connector. The idea of a polyphonic soundscape — a layered, resonant soundscape — emerged as a means to help the audience navigate from one story to the next. Ultimately, this collaborative vision led to the creation of five distinct stories, contributing to the complexity and richness of this reimagined diorama. The five stories were as follows:

- **1. Missing Stories** Visitors would first view the original diorama, but it now would be accompanied with sounds including those of drumming to signify the indigenous population of this land that relied on the bison, as well as the bustling sounds of nature, like munching, insects, bison hooves, etc.
- 2. Silent Prairie The next story centers on a single bison standing alone, without the landscape accompanying it. This is intended to illustrate the bison as taxidermy, as dead to tell the story and violent history of the killing of the bison and the Indigenous population. The sounds here are of winds, marching boots, and horse hooves, and a 'reservation' sign is in view.
- **3. Oil Agriculture** The next story depicts a population of bison on private ranches, and an oil rig machine in sight which almost resembles an animal presented with sounds of pumping. This story represents the complexities around land use in an era of resource extraction, between native bison habitats and industrial development, as well as a longing for more of a harmonious relationship with nature amid rapid technological / industrial advancements.
- **4. Many Dreamy Futures** The story then presents visitors with a young person's bedroom and the bison diorama is only seen as a poster. The sounds here are of muffled music playing followed by a pause, then transitioning into three possible future outcomes.

#### 5. Only three of Many Possibilities -

- a. Sustainable-future A present future of sustainable technologies, where variations of windmills and solar panels are integrated in the landscape. The bison are presented in greater numbers, where there are signs of biodiversity coming back in the region. Sounds here include the humming from the machines, along with sounds of nature.
- b. Eco-techno-future A heavily technological future, but one that co-exists with nature. The scene depicts drones, biodiversity technologies that roam the landscape, and machinery which feels organic, mossy, or "of-the-land." There is a sense of abundance in the landscape. The sounds here are similar to 5a) but amplified, richer, and the humming of machines sounds more like nature.
- c. Landback The team chose to keep this future open-ended, writing only the word "Landback" as both a call to action and an invitation for further engagement. This choice served two purposes: first, as a direct signal for the necessity of returning land stewardship to Indigenous people, and second as a recognition that such a future could be authentically imaged through deep, sustained collaboration beyond this group.



Bison Team Final Presentatior

A DREAM IT DOESN'T HAVE TO BE "REAL" La WHO IS THE "DREAMER Multiple stories overlayed (dreams) Textural overlap multiple stories dt once Fontostical silent disco-like experience the cowbird as our tour quide The newers takes on \$ characters in the diorama I become bison, bid, grass.

Bison Team Dream Concept



Bison Team Final Storyboard

## 02: WOLF EXHIBIT



#### Team:

Sabrina Careri (Facilitator) Carlotta Gessler / Brown University Debra Everett-Lane / AMNH Director of Exhibition Permanent Hall Strategy Dani Pergola / Columbia University Emma MacGregor / U.S. Coast Guard Academy Julia Smachylo / University of Connecticut Shawn Fujioka / Columbia University

#### **Process:**

The wolf team began by analyzing the existing diorama through answering the questions of who, what, why and so what? Through this guided conversation, each team member was able to present their initial impressions, and then as a team, attempted to rationalize why and in what ways, these emotions were evoked. Throughout this process, the team members were encouraged to write and draw onto a shared worksheet - a highly collaborative exercise to develop a tapestry or canvas that represents the group's shared ideas. From this, the team's investigation can be summarized into the following four avenues:

- **1. Exploration of Atmosphere** The team was interested in visual hierarchy and how the specific choice of cool colors, in a remote environment intentionally depicted a "chilling" landscape for the wolf. Many of the team members utilized icy imagery and snowflake motifs to present this, and emphasized how this atmosphere evokes mystery and a sense of distance from the wolves.
- 2. Symbolism of Wolves in Dominant Culture The team discussed the rich symbolism of wolves in dominant cultural narratives, exploring themes and meanings behind 'wolf packs,' fairytale stories, cultural representations, and the archetype of the 'lone wolf.' Discussing these ideas aided the team in compartmentalizing the story being depicted in the diorama, and how these ideas may be manifested in the future story.

- evil; lone wolf vs. wolf pack; wild vs. domestication; myth vs. reality, and more.
- came as a revelation or surprise to many of the team members.



Rather than opposing these ideas, the team wished to build upon them, enhancing their complexity to foster a richer understanding of wolf narratives within the context of climate change and biodiversity loss. To do so, the team chose to depict two future story scenarios - one that is a more positive portrayal, and one that is more negative. This approach aims to educate diorama viewers on the very real impacts of climate change, as well as the environmental stressors that impact this species.

Above all else, the team wanted to present a narrative that would leave museum visitors with a sense of hope to inspire climate action, and environmental stewardship and agency. The team imagined that the new narrative would emphasize a positive portrayal, and the negative portrayal would be presented as an alternative scenario, depicted as a video overlay using projection mapping technologies that would eventually disappear, or could be showcased along side of the main positive representation.

**3.** Conflict and Contrast - The team identified that ideas of conflict and contrast permeate dominant wolf narratives. This realization was central to the conversation. The team was intrigued by this idea and how it was manifested through symbolic representation and in common cultural storytelling practices. These ideas explored relationships of: predator vs. prey; winter vs. summer; good vs.

4. Species Pairs - The discussion also investigated dynamics between species pairs as they relate to wolf narratives. Here, the team focused on the power of presenting wolves in relationships, for instance: between the two wolves in the context of their ecological interactions in the scene currently depicted; the predator-prey relationship between the wolf and the deer; and the (nonrepresented) relationship between humans and wolves (one team member noted the irony between the fear of the wolf, and how dogs, which have come from wolves, are known to be "man's best friend"). Given that (as reported by the AMNH program staff) most visitors overlook the description and that there is no deer evident in the existing diorama, the deer relation in the diorama description

Wolf Team Collaboration Process on Shared Poster Sheet

The new narrative intends to educate visitors on changing climates, within the context of restorative science-based efforts, aiming to highlight dependency and the relationship between humans and wolves as a species pair. In this future scenario human intervention is critical. During the discussion, the team also spoke about how regeneration efforts could be informed with input from indigenous communities. This future story depicts a compelling argument for positive intervention, suggesting that in order to achieve the presented positive outcome, we (as a society) must modernize ideas around the wolf.





Wolf Team Final Collaborative Poster Sheet 1

Wolf Team Final Collaborative Poster Sheet 2

#### Outcome:

The negative depiction showcases future conditions if action and human agency is not taken to mitigate the impacts of climate change. This scenario takes place in a future where Gunflint Lake Superior National Forest has transformed into an urban development with extreme density, fragmenting the once connected habitat. This scenario centers on a young coyote-wolf hybrid - suggesting that hybrid species are dominant (a form of genetic bottlenecking as a result of the environmental stressors). The young coyote-wolf is alone, and appears significantly leaner, losing the density of wolf muscle and fur.

These impacts have affected the predator prey relationships in the ecosystem. This scene takes place on a summer middle to late afternoon, illustrating that the coyote-wolf has resorted to hunting at unusual times. In the scene, a deer is also depicted, but is physically separated from the coyote-wolf, by a large road that has replaced Gunflint Lake. A human hunter is also present in the scene, where one can defer that notions of fear and evil are still associated with the species, and / or that the hybrid-species is dominating the ecosystem as a result of missing predator species, requiring wildlife management strategies. The environment also depicts acts of human influence in the form of deforestation and a smoggy environment.

The positive future scenario still centers around the young wolf, but it is joined by a wolf pack, where the pup is much larger than its coyote-wolf counter park. This scene takes place at dusk or dawn during the spring, which is more typical. Technology used in the diorama would support real-time simulations, which emphasize where nature is regrowing. Symbolism of regeneration is critical to this scenario, representing a positive narrative about wolves that is often overlooked today - that these animals serve as a powerful reminder of conservation's impact, as a species that has rebounded from endangerment.



Above all else, diorama visitors would be immersed in a story of science and restoration efforts. This positive scenario depicts actions of landscape care (e.g., tree replanting, debris clearing, (re)introduction of beneficial species, science-research practices, etc.). Conservation is central to the narrative, where for example, some of the wolves are shown wearing a radio collar. Likewise, positive human involvement / intervention is also understood through native plant restoration boxes, the foreground picnic tables, and the background renewable energy infrastructure. Illustrating human agency in making a meaningful difference was central to the new narrative, all the while still depicting signs of climate change.

Wolf Team Final Storyboard



## **03: JAGUAR EXHIBIT**



#### <u>Team:</u>

Ivan Shen (Facilitator) Alex Perez / AMNH Manager of Computational Thinking Clara LittleJohn / U.S. Coast Guard Academy Nicholas Herrera / Biology Valentina Pisciotti / Universidad de los Andes Sophia Montalvo / Columbia University Sophie Lukavsky / University of Vermont

#### **Process:**

The jaguar team began with information sharing by discussing their views on the jaguar's formal characteristics, and then on the complex histories embedded in the dioramas. This diverse mix allowed each participant to speak from their own field, contributing uniquely to the conversation. Steps included:

- insights about the historical context in relation to when the dioramas were created.
- broke the ice, leading everyone to draw freely.

• Brainstorming - Each participant shared insights on their views of the diorama, adding depth to our shared understanding on jaguar ecology and conservation. For example, one team member shared their knowledge about jaguar habitat, and contrasted it to where the jaguar was situated in the diorama. Another team member (who has a background in environmental conservation), introduced the group to some known environmental threats, while another team member provided insight on the influences of architecture on the environment in relation to the jaguar. During the discussion, the team was also encouraged to think beyond the formal content of the diorama, and they shared

• **Post-it Activity** - To encourage open contributions, participants jotted ideas on post-its. Initially, members hesitated to draw until team member Valentina boldly started, and facilitator, Ivan joined in with an intentionally poor jaguar sketch (which humorously resembled a monkey). This moment • Idea Development - Through discussions, the team naturally landed on an interactive game idea that would invite museum visitors to make choices impacting conservation outcomes in real time. Alex noted the museum's computational team is exploring similar visitor interactions. The complexity of real-world conservation became evident, as the team realized decisions must account for multiple, sometimes conflicting outcomes (e.g., coexistence initiatives might clash with farming needs). This approach reinforced that a sequence of well-informed decisions would be required.



Jaguar Team Brainstorming Post-it Boards

#### Outcome:

The new narrative presents an interactive game using QR codes and AR, enabling visitors to make conservation choices (e.g., creating wildlife corridors or building highways), with immediate, real-time consequences displayed on their phones. Through this experience, visitors would encounter the intricacies of conservation, including both immediate and cumulative effects of each decision. Rather than a single decision leading to one outcome, the game would illustrate a complex sequence toward achieving coexistence, underlining the layered challenges in biodiversity conservation. At the end of the workshop, this concept was presented in the form of a story board, sketching out what people might expect to see as consequences of their choices.

The final presentation included two elements. The first element was modernizing the existing diorama to better portray up-to-date conditions on the jaguar population and its habitat threats. This included additions to the diorama such as an airplane in the sky, a winding road in the valley with cars, and some small manmade structures. These additions are intended to give visitors a relatable image in a contemporary context.

With this more contemporary portrayal of the species, the second element to the proposal was to display this new future narrative via interactive gaming technologies, using QR codes and AR, which will ultimately enable visitors to make conservation choices (e.g., visitors can choose to add a highway, that also has wildlife corridor infrastructure). These choices that the visitors make will result in immediate, real-time consequences displayed on their phones.

Through this experience, visitors would encounter a series of hypothetical questions, leading to both immediate and cumulative effects of each decision. Rather than a single decision leading to one outcome, the game would illustrate a complex sequence toward achieving co-existence between the jaguar and human population, underlining the layered challenges in biodiversity conservation. The jaguar team imagined that providing visitors with agency to make decisions, they are encouraged to play in larger decision-making roles, such as that of a policy maker, and understand the complexity and impacts of biodiversity conservation efforts.

At the end of the workshop, this concept was presented in the form of a story board, by sketching what visitors might expect to see as consequences of their conservation choices. The team chose to present three likely scenarios that a visitor may choose by collaging different elements. These scenarios included elements of the existing diorama, but with additions such as a highway and wildlife overpass, an urban development, and / or fragmented forest ecosystems.



Jaguar Team Process Sticky-board Game Development



Jaguar Team Final Presentation Interactive Game Outcome

Jaguar Team Final Presentation Interactive Game Options

## 04: MUSK OX EXHIBIT



#### Team:

Jenna Wu (Facilitator) Annalise Biesterfeld / Northwestern University Camille Morin / Canadian Museum of Nature Carlee Lingle / US Coast Guard Academy Martha Groom / University of Washington Vivian Trakinski / AMNH Staff (first half)

#### **Process:**

The musk ox team began with active discussion on the group's individual understandings of the musk ox: its relationship to local indigenous peoples, its symbolic and practical significance to human lifestyle and culture, as well as its success in both native and introduced populations worldwide. The musk ox, despite decline due to hunting, has shown resilience in certain introduced populations such as those in Scandinavia, providing some hope for the future diorama(s) for the species.

This process began by team members mind-mapping and writing a single word that represented the existing and future realities of the musk ox, to provide structured participation within the group. Each team member was then encouraged to sketch at least one element that the future exhibit should encompass. From there the discussion was structured into the following key questions: What does the team know about the existing musk ox populations and their potential futures?; What are the positive opportunities for the musk ox and its relationship to humans?; What futures are missing and what does the team absolutely feel cannot be missing from our future visualization of the species?; How are the stories displayed?; And lastly, How are the stories experienced? To answer these questions the team diagrammed their ideas individually and then presented their thoughts to each other. After each drawing session, the team would engage in 5 -15 minute discussion where the team members were encouraged to describe their thought process.

#### Outcome:

The group tended to focus primarily on anticipated development of human culture and development in

Nunavut, such as likely competition between oil and gas or geothermal plant establishment. Another focus was potential sustainable marketing opportunities for elements such as the undercoat of the musk oxotherwise known as giviut- to bring increased cultural popularity and relevance to the species in its future depictions. One group member with a background in environmental biology brought up the crucial need to maintain genetic diversity across different musk ox communities for its success, drawing archipelago diagrams at a nationwide scale to call attention to the need for wildlife bridges. The archipelago catalyzed a discussion: how does the team show multiple futures of the musk ox, and how might different communities' environments differ to make the collective worldwide population stronger? This served as the foundation for the stories presented.



All team members collectively decided there needed to be immersive elements, ranging from 360 donut-shaped dioramas that visitors could circumvent and enter to view from within; to timed projections displaying various futures; to mirrored dioramas, one in its original form and one its future "parallel universe" musk ox scene.

The new narrative developed presented mirrored dioramas with added interactive effects for the visitors: a gentle touch on the glass to illustrate geothermal plant development, stomping to make oil drilling appear; a placed hand towards the ground to show snow melting, temperature rise and musk ox disappearance; and blowing on the glass to emulate cool winds and return of the permafrost to the landscape. In summary, the collection of the four scenarios presented were as follows:

Musk Ox populations.

- ultimately allowing for increased genetic diversity across groups.
- landscape and loss of snowcover and permafrost.

Musk Ox Team Collective Responses to Discussion Questions

1. Resource Development and Musk Ox in Nunavut - The group chose to focus primarily on anticipated development of human culture and development in Nunavut, such as likely competition between oil and gas or geothermal plant establishment, and their relative developmental effects on

2. Climate Change and Musk Ox Genetic Diversity - The next story centers around change in seasonality from a global perspective - a reduction of number of seasons, to generally warmer seasons - as forming greater opportunities for land bridges between Musk Ox communities,

**3.** Musk Ox in a Warmer Climate - A third story displays Musk Ox in a much hotter climate overall, depicting less Musk Ox than in the existing AMNH diorama, in addition to shrubification of the

**4. Human-Musk Ox Symbiosis in the North** - More permanent and dense human communities having migrated northward into Musk Ox territory, displaying examples of potential symbiosis: opportunities for husbandry, the qiviut product market, a level of manufactured migration to maintain genetic diversity, and architecture embedded into the ground (inspired by Icelandic Turf Homes).



Musk Ox Team Story 1: Resource Development and Musk Ox in Nunavut



Musk Ox Team Story 2: Climate Change and Musk Ox Genetic Diversity



Musk Ox Team Story 3: Musk Ox in a Warmer Climate



Musk Ox Team Story 4: Human-Musk Ox Symbiosis in the North



Musk Ox Team Final Presentation

# **DISCUSSION & NEXT STEPS**

Museums around the world are navigating the momentous challenge of rethinking their beloved diorama exhibits, while still preserving the essential elements that create the cherished appeal, which has captivated visitors for generations. This is because, despite these enduring qualities, habitat dioramas today are also subject to debate for being out of sync with environmental realities. As museums revisit and reflect on the relevance of the dioramas, the intent is to reassess how these displays can be used to: address and cope with the effects of climate change; provide agency around biodiversity loss and recovery; and address colonial legacies, activating decolonization and equity strategies. This begins with identifying, revealing, and including the missing perspectives and voices. As new technologies emerge, further challenging museums for opportunities to consider more modern ways to present these stories, there is also evidence that visitors still desire analog exhibits, as a chance to be free from screens and digital devices.

Based on current conservation science, Telling Species Stories invited SCCS participants to collectively visualize new stories and possible future scenarios for the species and landscapes presented in the bison, wolf, jaguar, and musk ox habitat dioramas, located in the AMNH Hall of North American Mammals. Despite coming from a diverse array of professional backgrounds, we created a common language and harnessed the varying skill sets by experimenting with methods, from round-table questions and sticky storms, to sketching and storyboarding, and mind mapping. Together, we speculated, blue-skied and imagined conceptual futures, presenting highly collaborative new and diverse compelling narratives, at the end of the workshop day. This process revealed common themes of complexity and change; agency and voice; presenting a multiplicity of outcomes; and new strategies for storytelling which blend analog and digital.

The success of this workshop reveals that there is evidence of a growing appetite for new stories to be presented in habitat dioramas, and likely an opportunity to present these stories in a hybrid way, to build on the analog and highlight new revelations, voices, scenarios with digital components. Telling Species Stories represents the first step to address these challenges and opportunities, and provides the basis for this discussion. The next steps will emerge from these discussions and likely be led from the people involved. We hope to hear from you as the stories continue to emerge and unfold.

Julia Czerniak & Nina-Marie Lister With Sabrina Careri

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