

Knowing Misha the Polar Bear: Multi-naturalism, biography, and conservation in Svalbard

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Date of Submission: 28th November 2020



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This thesis is submitted to the degree of Doctor of Philosophy in Polar Studies

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Declaration:

I submit this thesis for the degree of Doctor of Philosophy. This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. It does not exceed the prescribed word limit for the relevant Degree Committee.

.....
Henry Anderson-Elliott

Knowing Misha the Polar Bear: Multi-naturalism, biography, and conservation in Svalbard.

Henry Luke Anderson-Elliott

Abstract:

This thesis is about the human engagements with wildlife in the Anthropocene. Specifically, following the work of Lorimer on encountering and conceptualising wildlife in this putative epoch, it explores the idea of 'knowing polar bears' in Svalbard. By this I refer to how, through a succession of different interactions within a dynamic actor-network, human actants come to understand Svalbard polar bears. I acknowledge that these encounters are not valueless, instead they are culturally, socially, and politically situated in significant disciplinary, epistemological, and technological histories and imaginaries. It is through and between these multi-species entanglements that different 'becomings' and 'worldings' are produced. Put simply, there are multiple different conceptions of what polar bears *are* here, produced in relation to the multiple different 'ways of knowing'. Primarily, I wanted to ground this approach within work on wildlife conservation, to ask how polar bear conservation as a discipline both affects and is affected by the regimes/societies of 'knowing polar bears' in Svalbard. This is a question of how the species is framed, purified, narrated, and perceived and also how those conceptions are 'made to matter' within the management, legislative, and conservation contexts. To engage with these questions, I propose an ethnographic approach to working with these groups of participants, all of whom make a claim that their work with polar bears impacts or contributes towards conservation and/or environmental aims.

At the same time, this work has been deeply influenced by my personal attempts to know one individual Svalbard bear – Misha, Frost, or N23992 depending on who narrates her. This extraordinary bear has emerged in nearly every single context, from Norwegian Polar Institute (NPI) datasets to Netflix documentaries and everything in between, demonstrating the extraordinary multiplicity of our engagements with her species even through the life of a single animal. In addition, I propose the development of Krebber and Roscher's *Animal Biography* to reflexively engage with knowing and telling non-human life with an appreciation of agency, authorship, and affect. I am interested in how each society of actants comes to know this bear, and how she is co-shaped through their varied technological and epistemological encounters. Exploring her life in this way not only shows how polar bears as a species are understood, but also how bears are 'individuated', as well as the impacts that these transformations and affective atmospheres have upon her ecology, physiology, and even ethology. From the early development of the institutions of polar bear science in the 1960s/70s, the politicization of polar bear icons and climate change in the 1990s, the emergence of scientific protocols and standardized data-collections and analyses, to thousands of wildlife photographs and hundreds of hours of nature documentaries, I explore the multi-naturalism of this Svalbard bear through the work of those that know her. In each context, she is a different polar bear to different people, representing different roles, cares, concerns, and futures. Ultimately, I ask, what is a polar bear in Svalbard, and what is it that we are really conserving?

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This section will have to do a lot of work, not least because of the exemplary support I have received over the past 4-and-a-bit years, but also because of the extraordinary global context that provided the backdrop to its final year. 2020 has been unique and challenging: something which only serves to increase my immense gratitude to everyone who has made this possible.

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For Elly

Table of Contents

| | |
|---|-----|
| List of Figures..... | 10 |
| Introduction..... | 12 |
| Chapter 1. Literature Review – Multi-Natural Wildlife Conservation in the Anthropocene | |
| 1.1 Introduction..... | 21 |
| 1.2 Welcome to the Anthropocene..... | 23 |
| 1.3 The Periodicity of the Anthropocene..... | 25 |
| 1.4 Moving away from ‘Nature’..... | 28 |
| 1.5 Being cautious with multi-naturalism in the Anthropocene: The case for ethnography..... | 30 |
| 1.6 Science, Scientists, and Actor-Network Theory..... | 32 |
| 1.7 Film and Photography: Capturing Affective ANT..... | 38 |
| 1.7.1 Towards ‘Capture’..... | |
| 1.8 Knowing Polar Bears: Multi-Natural Conservation in the Anthropocene..... | 44 |
| 1.9 Conclusions: “ <i>Imagining Extinction Conservation</i> ”..... | 47 |
| Chapter 2. Animal Biography as Methodology | |
| 2.1 Introduction..... | 51 |
| Where/Who are we now? | |
| Introduction I: Living With(out) Polar Bears | |
| Introduction II: Thinking about ‘ <i>Individuation</i> ’ | |
| Introduction III: Animal Biography | |
| 2.2 A History of Animal Biography | 63 |
| 2.2.1 Animal Biography and Natural History | |
| 2.2.2 Named Animal Biographies | |
| 2.3 Towards an Animal Biography This Polar Bear..... | 70 |
| 2.3.1 Biography for Conservation | |
| 2.3.2 Scientific epistemology and biographical thought | |
| 2.3.3 Polar Bear Families: Considering Kinship | |
| 2.3.4 The Productive Awkwardness/Absurdity of Animal Biography | |
| 2.3.5 Zoobiography | |
| Chapter 3. N23992, a Scientific Polar Bear | |
| 3.0 The Birth of N23992..... | 84 |
| 3.1 Introduction: Knowing N23992..... | 88 |
| 3.2 “ <i>Polar Bears have always been politicized</i> ” | 92 |
| 3.3 The First Scientific Polar Bear Capture: Eastern Svalbard, 1966..... | 94 |
| 3.4 Cold War Politics and the PBSG: Satellite tags and sovereignty claims | 102 |
| 3.5 Encountering N23992..... | 106 |

| | |
|--|-----|
| 3.5.1 Cyborgs, Telemetry, and Mobility | |
| 3.5.2 “You are what you eat”: Fragmented polar bear bodies, pollutants, and diet | |
| 3.5.2.1 Stable Isotopes and Polar Bear Diets | |
| 3.5.2.2 “ <i>One of the most polluted animals in the world</i> ” | |
| 3.6 N239992 as a ‘conservable polar bear’ | 125 |
| 3.6.1 Living with Polar Bears | |
| 3.6.2 Living with Scientists | |

Chapter 4. On Frost, Film, and Photography

| | |
|---|-----|
| 4.1 ‘Living on thin ice’: \$1,100.00 | 133 |
| 4.2 Introduction: Moving image methodologies, Misha, and learning bears | 137 |
| 4.2.1 Nature Film beyond representation | |
| 4.2.2 Filming Bears in Svalbard | |
| 4.3 Polar Bears and Climate Change | 145 |
| 4.3.1 An Ecosystem Approach | |
| 4.3.2 Chuck Monnett | |
| 4.3.3 Individual Polar Bear Images | |
| 4.4 Film as Conservation | 155 |
| 4.4.1 Problem Science: “ <i>Let this polar bear be</i> ” | |
| 4.4.2 The Planet Earth effect: Film as conservation voice | |
| 4.5 Polar Bear Stories on Film | 164 |
| 4.5.1 Frost | |
| 4.5.2 Misha/Frost as a “Very good polar bear mother” | |
| 4.5.3 Misha: The most-viewed polar bear in the world | |
| 4.6 Misha as a ‘Good Bear’ | 183 |
| 4.6.1 The Death of Lucky | |
| 4.7 Conclusions | 190 |

Chapter 5. Caring for Captive Polar Bears: Power, (Re)production, and Performance

| | |
|---|-----|
| 5.1 Introduction | 192 |
| Introduction I: Two Trains and a Bus to the Bears in South Yorkshire | |
| Introduction II: What am I doing here? A zoobiography of conservation cares | |
| 5.2 Diplomatic Polar Bears: Captive Politics and Economies | 203 |
| 5.2.1 Polar Bears as Gift Exchange in the Middle Ages | |
| 5.2.2 Panda Diplomacy and More-than-human politics | |
| 5.2.3 Tracking polar bear skins – Captivity and Commodity | |
| 5.3 Becoming Real Polar Bears | 214 |
| 5.3.1 Polar bears in the UK: Phasing out and phasing back | |
| 5.3.2 Making Real Polar Bears | |
| 5.3.2.1 The Importance of Cubs and Priority Bears | |

| | |
|--|-----|
| 5.3.2.2 No Milk | |
| 5.3.2.3 'Normal' Polar Bears | |
| 5.3.2.4 Male Mothers and Human-Bear Families | |
| 5.4 A Captive Sub-Population? Novel Ecologies, Spectacle and Choreography..... | 228 |
| 5.4.1 Framing Polar Bear-ness | |
| 5.4.2 From Natural to Novel: Multi-species enclosures | |
| 5.4.3 Choreographing Polar Bears: a twentieth sub-population? | |
| 5.4.4 Victor – 1998-2020 | |
| 6.0 Conclusions | |
| 6.1 'Known Svalbard Polar Bears' | 246 |
| 6.2 Methodology and Misha..... | 247 |
| 6.3 Scientific Polar Bears: <i>N23992 as a 'conservable bear'</i> | 249 |
| 6.4 Misha and Frost: <i>A polar bear on film</i> | 251 |
| 6.5 <i>Choreographing Polar Bears in Captivity?</i> | 253 |
| 6.6 Meeting Misha? | 255 |
| Appendices | 259 |
| List of Interviewees and Interviews | |
| Bibliography | 261 |

List of Figures

Introduction

Fig. 1: My first polar bear sighting, 2017, taken on a phone camera through binoculars.

Fig. 2: Polar bear on the baggage carousel at Longyearbyen Airport, H. Anderson-Elliott, 2017

Chapter 2: *Animal Biography as Methodology*

Fig. 3: *Due North*, View over Longyearbyen, Platåberget and Adventfjord, H. Anderson-Elliott, 2017

Fig. 4: *Eisbärenfamilie*, Polar bear family in Tempelfjord, R. Stange, 2013

Fig. 5: *Misha and her two cubs hunting in Tempelfjord*, J. Roberts, 2014

Fig. 6: Victor at YWP, following my command to point, H. Anderson-Elliott, 2018

Chapter 3: *N23992, A Scientific Polar Bear*

Fig. 7: Map of the North of Spitsbergen, www.mapsland.com, 2019

Fig. 8: NPI helicopter chasing a polar bear, Svalbard, J. Aars from Larsen & Stirling, 2009, p.8

Fig. 9: *The governor's ship 'Nordsyssel'*, Svalbard, summer 1966 [copyright T. Larsen]

Fig. 10: Thor Larsen and Albert Erickson with the first captured polar bear, Svalbard, summer 1966, [copyright T. Larsen]

Fig. 11: Bear researchers at Cape Churchill, Canada, 1967, T. Larsen from Larsen & Stirling, 2009, p.7

Fig. 12: Polar bear radio collars and ear tags, J. Aars & M. Andersen from Swenson et. al. 2013

Fig. 13: Map of GPS tracking data for N23992, March '17 to April '18, J. Aars, NPI, toposvalbard.npolar.no, 2018

Fig. 14: Misha and her cubs feeding in Tempelfjord, Polar X Productions, 2013

Fig. 15: An NPI researcher samples a tranquilized bear, Magnus Andersen, NPI, 2014

Chapter 4: *On Frost, Film, and Photography*

Fig. 16: *The Wildphoto Gallery*, Longyearbyen, Visit Svalbard website, 2019

Fig. 17: *'Living on Thin Ice'*, O. J. Liødren, 2011

Fig. 18: *'The Ghost of a Polar Bear'*, R. Mangersnes, 2015

Fig. 19: Still of mother bear from BBC *'Planet Earth'*, Episode 1, 2006, BBC Earth YouTube, 2019

Fig. 20: Dead polar bear at Austfjordneset, Sysselmannen via Svalbardposten, 2016

Fig. 21: Still from *'Queen Without Land'* of Asgeir drawing Frost, A. Helgestad, 2017

Fig. 22: *Famously thin polar bear on Svalbard*, K. Langenberger, 2015

Fig. 23: Still of Frost and her two cubs in Billefjorden 2013, *'Queen Without Land'* 2017, A. Helgestad

Fig. 24: Still of Frost feeding on a seal carcass, *'Queen Without Land'* 2017, A. Helgestad.

Fig. 25: Still of Frost sliding towards the camera 2013, *'Queen Without Land'* 2017, A. Helgestad

Fig. 26: Still of Frost after capture with a collar, *'Queen Without Land'* 2017, A. Helgestad

Fig. 27: Still of Lucky and Light playing, *'Queen Without Land'* 2017, A. Helgestad, 2013

Fig. 28: Still of Frost playing with her cubs 2013, *'Queen Without Land'* 2017, A. Helgestad

Fig. 29: Still of Frost holding her cubs 2013, *'Queen Without Land'* 2017, A. Helgestad

Fig. 30: Still of Frost leading her cubs away from a male 2013, *'Queen Without Land'* 2017, A. Helgestad

Fig. 31: Still from BBC *'The Hunt'*, BBC Earth Youtube, 2015

Fig. 32: Still from BBC *'The Hunt'*, Episode 2, *'In the Grip of the Seasons'*, BBC Earth Youtube, 2015

Fig. 33: Still from *'The Journey Home'*, featuring Misha, YouTube, 2018

Fig. 34: Promotional material from Netflix's *'Our Planet'* series, Netflix Website, 2019

Fig. 35: Footage from 'Our Planet' Antarctica sequence showing landscape in Fig. 30, nationalobserver.com, 2019

Fig. 36: Still of Frost and her two cubs in front of Villa Fredheim in Tempelfjord, 'Queen Without Land' 2017, A. Helgestad, 2013

Fig. 37: Misha stalks a seal distracted by the camera, J. Roberts, 2014

Fig. 38: Still of Lucky in 'The Happiest Polar Bear', R. Mangersnes, 2015

Fig. 39: Lucky killed by the Sysselmannen's office, Lucky's dead body, and the Norwegian prime minister unveiling Lucky's taxidermic afterlife 'Nina', A. Lyssand in LA Times, Sysselmannen, and H. Gulati via Facebook, 2015/16

Chapter 5: Caring for Captive Polar Bears: Power, (Re)production, and Performance

Fig. 40: Meat and feeding charts at YWP, H. Anderson-Elliott, 2017

Fig. 41: The polar bear paddocks at YWP Project Polar, H. Anderson-Elliott, 2017

Fig. 42: Nissan, Pixel, Victor, and Nobby, H. Anderson-Elliott, 2017

Fig. 43: Nobby skirts the edge of the enclosure whilst Nissan swims, H. Anderson-Elliott, 2017

Fig. 44: Victor walks a path in paddock 3, H. Anderson-Elliott, 2017

Fig. 45: Victor on the far side of paddock 1, H. Anderson-Elliott, 2017

Fig. 46: My reflection in the eye of Nissan, H. Anderson-Elliott, 2018

Fig. 47: Mao and Nixon (White House Press, 1972, Wikimedia Creative Commons) & Ling-Ling and Hsing-Hsing, (Jessie Cohen, 1985, Fair Use from Wikipedia)

Fig. 48: Chi-Chi the panda at London Zoo, Christine Matthews, 1967, (Creative Commons)

Fig. 49: A Canadian polar bear skin for sale in Svalbard, H. Anderson-Elliott, 2017

Fig. 50: Following bear tracks at Hornsund, H. Anderson-Elliott, 2017

Fig. 51: Maternity den constructed at Vienna Zoo, H. Anderson-Elliott, 2018

Fig. 52: Frank Vigh-Larson feeding Siku, Scandinavian Wildlife Park, Denmark, YouTube, 2018

Fig. 53: Crowds watching Nissan at YWP, H. Anderson-Elliott, 2018

Fig. 54: Hurtigruten passengers watching polar bears on the ice, Svalbard, H. Anderson-Elliott, 2017

Fig. 55: Nobby in the wood chippings at YWP, H. Anderson-Elliott, 2017

Fig. 56: YWP April fool: The pink polar bear, YWP Website, 2017

Fig. 57: Pixel the polar bear, H. Anderson-Elliott, 2018

Fig. 58: Victor through the fence of paddock 1, H. Anderson-Elliott, 2018

Fig. 58: Water pumping and filtration room at Vienna Zoo, H. Anderson-Elliott, 2018

Fig. 60: Pixel sitting underneath the walkways at YWP, H. Anderson-Elliott, 2018

Fig. 61: The keeper area behind the YWP polar bear housing area, H. Anderson-Elliott, 2018

Fig. 62: Victor puts his head into the training box, H. Anderson-Elliott, 2018

Fig. 63: Victor follows my command to point, H. Anderson-Elliott, 2018

Fig. 64: Command and response with Victor, H. Anderson-Elliott, 2018

Fig. 65: Victor behind to stand using the fence, H. Anderson-Elliott, 2018

Conclusions

Fig. 66: The search ends. Polar bear prints on the sea ice ahead. H. Anderson-Elliott, 2018

Fig. 67: My portrait of Misha the polar bear, H. Anderson-Elliott, 2020

Introduction

I – Never Meeting a Polar Bear?

For the first 24 years of my life I assumed that I had never met a polar bear. Throughout the entire process of planning, proposing, presenting, discussing, and executing this work, that has been by far the most common question I have been asked. At first, perhaps unsurprisingly with the slight lack of confidence of an early-career researcher, this struck me as a subtle test of credentials – a mode of gatekeeping whereby one's claim to expertise was attributed to research 'out there' 'in the field'. Meeting a polar bear was an experiential threshold, unlocked by a particular manner of encounter with another species, primarily in its natural habitat. As my answers transitioned, from '*no*', to '*not yet*', to '*not in the wild*', and finally to '*yes*', followed eventually by '*about 27*', so too the sense of how it was made to matter transitioned too. As this project has progressed, and I have grown with it, that question now affects me totally differently. What is it to meet a polar bear? All too often, the question is posed as analogous with 'seeing' – to have achieved an unmediated line-of-sight, an unbroken view of a living polar bear, perhaps enabling it to do the same to you? In the manner that it is asked, it is not a gauntlet to prove one's authenticity as a 'polar bear researcher', but a prompt for storytelling: to assess how one person's lived, remembered, and recounted experience of polar bears can impact others. They too are asking what is it like to meet a polar bear, and at the same time it asks of me, what does this mean?

At 6:20 a.m. on August 19th, 2017, I encountered my first polar bear in its natural environment whilst working on board a Hurtigruten tourist ship called the MS Fram that was circumnavigating Svalbard. At 6:15 in the morning I woke up to sound of the ship's captain announcing the sighting over the tannoy system. I immediately grabbed my camera, coat, and binoculars, and ran shoeless out of the door as my cabin-mate cursed and rolled back asleep in the next bunk. On deck, huddles of bed-headed and shivering tourists were gesturing towards a slim patch of ice amongst the rocks of the shoreline in the middle distance. At its furthest edge it was just possible to make out a cream-coloured lump. The lump would occasionally raise its head and sniff the air, triggering a wave of murmurs and camera shutter-clicks from its admirers. I too attempted a photograph, only able to zoom far enough by placing my phone against one side of my binoculars and steadying the improvised contraption on the railings. As I did so, the bear rose, stretched and stood there, seemingly looking at the enormous vessel that had, engines off, endeavoured to stealthily float towards it. The photograph I took was, at the time, a sort of trophy, attaining significance as a marker of whatever form of encounter had taken place. But, as I returned to bed, I was deeply unsure what it had been. How had this affected me, or, perhaps more importantly, not affected me. What was I looking for?



Fig. 1 My first polar bear sighting, Svalbard, taken on a phone camera through binoculars. (H. Anderson-Elliott, 2017)

This thesis is about the human engagements with wildlife in the Anthropocene epoch. It traces the extraordinary jolt to our imagination that this term provokes and asks us to explore the consequences that this has for how we live with other non-human species. With the challenge that this term ‘Anthropocene’ poses for the antiquated and eroding notions of modernity and ‘Nature’, I am interested to examine the multi-natural, the hybrid, and the emergent. What are the polar bears of the Anthropocene, how are they understood, valued, and even co-produced through the extraordinary range of mediations that enable us to encounter them? My meetings with polar bears are far more diverse than a limited range of ‘sightings’, they stretch back to before this research began, and inhabit an extensive actor-network of different actants, technologies, and imaginations. I am interested in how these modes of encounter shape the very idea of polar bear – asking questions about how we come to know polar bears in Svalbard. What are these meetings, where do they occur, and how do they influence our cares, concerns, and hopes for the future of living with other creatures?

II – Arrivals in Svalbard: William Barentsz and the ‘Rape of Spitsbergen’

It feels a conventional impulse to begin discussing the human interactions with polar bears on Svalbard at ‘the beginning’: perhaps the pioneering meetings as recounted in the journals of 16th century European explorers. However, my engagement with the 3 Arctic voyages of Dutch navigator Willem Barentsz is less about setting an historical scene as it is about highlighting the significance of Svalbard’s early human exploitation for our contemporary geopolitical and ecological imaginations. In briefly returning to Barentsz, we are reminded of the placement of the Arctic as a peripheral hinterland to the imperial hearts of Europe/North America, one whose ‘productive’ ecosystems have long been governed by cycles of economic extractivism. So too, the developing roles of science and natural history at the core of these demonstrations of empire and their classificatory/descriptive/cartographic regimes helps

us to foreground themes of the chapters that follow – to better understand the role of polar bears and their ecosystems as incidental gatekeepers to these socio-political worlds.

In 1594, Barentsz set sail from the Netherlands in command of *the Mercury*. This was the first of three ill-fated voyages north, the final of which would claim his life on June 20th 1597 after the frozen Kara Sea forced them to overwinter in an improvised hut on Novaya Zembla ¹. His Dutch funders were motivated by their search for a north-eastern Arctic passage that would provide a lucrative trading route to Cathay, China, and the east. Their voyages were chronicled in great detail by the ship's carpenter, Gerrit de Veer, in an illustrated account titled *a True Description of three voyages by the north-east toward Cathay and China* ². On July 9th, 1594, de Vere recounts, they had their first encounter with a 'white beare'. After trying to enter their rowboat she was shot with a musket and began to swim away. The men then followed her and looped a rope around her neck, hoping to "[shew] her for a strange wonder in Holland" ... "not having seen the like beare before" ³. She then turned and swam again towards their boat, lifting herself into the stern with her front paws. Dismayed, the men scrambled for safety and "thought they had truly met their end" ⁴, but to their fortune (or her misfortune) the rope that was around her neck caught on the hook of the rudder, preventing her from advancing, and affording the bravest of them enough time to step forward and "thrust her in the body with a half pike" until she died ⁵.

The bear's violent end was immortalised in place, as Barentsz named the nearby 'Beare Island' in recognition of their encounter with a gatekeeper at the threshold to the north ⁶. Above them, hidden in the sky by the light of the perpetual summer sun, the constellation of the great bear never set below the horizon. 'Arctic' itself derives from the Greek *Arktos* for bear, the "land where *Ursa Major*... shines down from the zenith of the northern sky" ⁷. Whilst Barentsz intended route to China was thrice thwarted by the multi-year sea ice, his company is accredited with the first cartographic record of the Spitsbergen archipelago in June 1596 ⁸. Making anchor at (now) 'Magdalena Bay' to the NW, amongst the walrus bones of 'Tusk Bay' (as they then found fit to call it), Barentsz laid a box declaring formal Dutch possession ⁹.

¹ Conway (1906)

² De Veer, G. (1853) '*A True Description of three Voyages by the North-East toward Cathay and China*', Reprint, Cambridge: Cambridge University Press, (2010).

³ *ibid*

⁴ *ibid*

⁵ *ibid*

⁶ Conway (1906)

⁷ Davids, R. (1982) *Lords of the Arctic: a journey among the polar bears*, Macmillan co., London, p.17

⁸ Conway (1906)

⁹ *ibid*

In the decades that followed, both Dutch and English vessels returned to these waters in great abundance “*encouraged by the hopes of profit*” ¹⁰. In the early 1600s, Sir Thomas Smythe – former London sheriff and governor of the East India Trading Company – through his involvement with his grandfather’s Muscovy Company sent four voyages to investigate the trade-route opportunities and resources. The vessel ‘*Speed*’ twice returned to Spitsbergen in 1604, first encountering vast beaches of walrus and then learning to kill them in great numbers. By their third voyage in 1606, they killed 600-700 walrus in under 6 hours, and in doing so rendered over 22 tons of oil ¹¹. In 1610, the vessel ‘*Amitie*’, captained by Jonas Poole, began to harvest an even wider range of species, killing 120 walruses, 51 reindeer, 30 polar bears, and took with them 3 live bear cubs, 1 narwhal horn, and much whale bone ¹². Such was their material success that another voyage was immediately commissioned for the following year, 1611, and attention gradually shifted towards the whales that were abundant in the coastal waters ¹³. Throughout the rest of the 17th century, the whaling industry exploded – led by Dutch, English, and Pomor ships – so much so that in 1697 alone 1,968 whales were killed producing 63,883 casks of oil and blubber ¹⁴. For centuries there followed further exploitation: Norwegian and Pomor trapping for fox and polar bear furs; sealing; the hunting of seabirds; and the collection of eider ducks, their egg and down-collection for European markets. In 1921, Scottish naturalist Seton Gordon encountered two Norwegian hunters with over 15,000 eggs – what he deduced to be the last Svalbard “*species that could be destroyed for profit*” ¹⁵. All around him lay the discarded bones and infrastructures of centuries of what McGhee terms ‘*the rape of Spitsbergen*’ ¹⁶: ‘walrus graveyards’ covering hundreds of meters of beach with shattered skulls, their front halves and tusks missing, and an ecosystem “*stripped of...whales, bear, reindeer, foxes*” ¹⁷. Several hundred years before, Thomas Pennant wrote fancifully of Spitsbergen’s “*discordant notes of myriads of sea-fowl, the yelping of Arctic foxes, the snorting of the Walruses, [and] the roaring of the Polar Bears*” ¹⁸. 150 years later, sitting in Isfjord, Gordon notes that the landscape was “*ethereal ... devoid of life, [whilst] everywhere was the silence that broods ceaselessly about the lands that approach the Pole*” ¹⁹.

¹⁰ Pennant (1784) p.LXXXI

¹¹ McGhee, R. (2006) *The Last Imaginary Place: A Human History of the Arctic World*, Oxford: Oxford University Press, p.174.

¹² Conway (1906)

¹³ McGhee (2006)

¹⁴ Conway (1906)

¹⁵ Ibid p.186

¹⁶ Ibid p.173

¹⁷ ibid

¹⁸ Pennant (1784) p.LXXX

¹⁹ McGhee (2006) p.186

Svalbard's extraordinarily exploitative past, felt through the enormous depletion of biotic resources by the advent of the 20th century, is also continually manifest in our contemporary Arctic imaginaries. It is still cast as a peopleless periphery, a simultaneous wilderness and resource-rich landscape (from animal fats and pelts to hydrocarbon fuels). It is a space paradoxically bound up in narratives of climatic collapse and the pervasive anthropogenic impacts upon the bio- and cryosphere, as well as a place of contested sovereignty/rights and a key site for the new Nordic 'opportunistic adaptation'²⁰ - ice melt opening up the region's new fossil fuel deposits²¹. The archipelago provides an extraordinary microcosm for wider global issues: a militarily and politically strategic site throughout the 20th century²²; an area with some of the highest rates of sea ice retreat²³; and concurrently the chosen destination for numerous filmmakers, photographers, and tourists to document both images of anthropogenically-forced climatic change and paradoxical landscapes of untouched wilderness. Sea ice is situated at the intersection of incredibly complex ecologies – climatic change, environmental anxieties, the same oceanic and atmospheric flows that carried 16th century whalers northwards and that now carry with them industrial pollutants, scientific research programmes, contested resources, and sovereignty claims. The polar bears that rely upon it – their ecosystem and the societies that study them – come to inhabit this uncomfortable liminal space of politics and precarity. How they come to be known through the practices of the scientific research community – the purification of their habitats, mobilities, and ethologies – indeed the development of those very protocols, is therefore tightly bound with these wider geopolitical issues: from climatic mitigation, to energy exploration, and Arctic governance.

Arriving in Longyearbyen in 2017, I descended the stairs from the packed commercial airline onto the empty expanse of tarmac on the shoreline of the furthest western tip of Adventfjord. Entering the main terminal hall, I am confronted by another polar bear. It stands still in the centre of the baggage carousel, taxidermied and mounted on a tiny white plastic plinth, like a receding iceberg floating on the steel plated surface, as piles of luggage orbit around it. In front of it a small sign warns the arrivals: "*Do not touch the polar bear. Walking on belt is prohibited. The area has camera surveillance.*" It stands here as

²⁰ Kristoffersen, B. (2015) 'Opportunistic Adaptation: New Discourses on Oil, Equity, and Environmental Security, in *The Adaptive Challenge of Climate Change* pp.140-159, DOI: 10.1017/CBO9781139149389.009.

²¹ Goldman, R. (2017) 'Russian Tanker Completes Arctic Passage Without Aid of Icebreakers', *New York Times* 25/08/17, Online, Available at: [<https://www.nytimes.com/2017/08/25/world/europe/russia-tanker-christophe-de-margerie.html>] Accessed 02/02/2019.

²² Singh, E. C. (1980) *The Spitsbergen Question: United States Foreign Policy, 1907-1935*, Universitetsforlaget, Tromsø; Østreng, W. (1977) *Politics in High Latitudes – The Svalbard Archipelago*, transl. Christopherson, R. I., London, C. Hurst & Co.

²³ Isaken, K. et. al. (2016) Recent Warming on Spitsbergen – Influence of atmospheric circulation and sea ice cover, *Journal of Geophysical Research: Atmospheres*, **121**(20); Voiland, A. (2017) *NASA Earth Observatory, Losing Ice in Svalbard*, Online, Available at: [<https://earthobservatory.nasa.gov/images/92325/losing-ice-in-svalbard>] Accessed: 01/04/2020.

a stark reminder of hunting pasts – of the material wealth of animal skins and bodies that drew centuries of Europeans northwards in search of profit – just as it performs a referential role for the placement of polar bears at the forefront of our Arctic imaginations.



Fig.2 Polar bear at the arrivals entrance to the Longyearbyen terminal, (H. Anderson-Elliott, 2017)

III – The importance of ‘Knowing’

After the acknowledgement that our interconnected Anthropocene world both facilitates and is formed across a diverse range of different encounters, next I ask how we are to come to ‘know’ these creatures that we meet here. Broadly, this is a question of what we come to understand a polar bear to be – conceptions that can be multiple, based on a wide range of different actants, their disciplines, tasks, and epistemologies. This enfolded process – ‘knowing polar bears’ – is the subject of this thesis. After Lorimer, it asserts that there is *“no single Nature or mode of Natural knowledge to which environmentalists can make recourse”* ²⁴, and neither does it subscribe to Berger’s discussion of knowing as an index of power that pushes non-humans further away ²⁵ - these “dreams of mastery” ²⁶. In its place, by ‘knowing’ I refer to the assemblage – *“the material ecology of bodies, technologies, texts, and other materials through which knowledge is produced”* about polar bears ²⁷. So too, it is about the ‘more-than-representational’, about affective encounters, and the embodied, skilful tasks and practices *“through which natures are known”* ²⁸.

²⁴ Lorimer, J. (2015) *Wildlife in the Anthropocene: Conservation after Nature*, University of Minnesota Press, London, p.2

²⁵ Berger, J. (2009) *Why we look at animals?* Penguin, London, p.27

²⁶ Lorimer (2015) p.2

²⁷ Ibid p.10

²⁸ Ibid p.9 & p.5/6

To examine how polar bears are known in Svalbard, I will approach a wide range of actants and their societies – scientists, filmmakers, photographers, managers, etc. This is primarily an ethnographic study of multi-naturalism. I will ask how their methods of engagement with polar bears are grounded in different epistemological and technological histories, coded with different politics, and what sort of work is done here. How they know polar bears – what a polar bear is, how/where it lives, moves, eats, does – are matters of biology, ecology, biogeography, physiology, etc. but also concurrently matters of storytelling, affect, and how polar bears are made to matter in different contexts. Through these successive mediations, I will not only try to understand how polar bears are known and what this means, but also how I have come to meet many different bears, with different lives, ecologies, futures, and significances. It is perhaps fitting, as *part I* of this introduction came to understand, that for the majority of this work I endeavour to know a polar bear that I have never met face-to-face – a female named Misha, Frost, or N23992 depending upon who is telling her story. This female Svalbard bear is a polar bear of the Anthropocene, whose extraordinary (or perhaps decidedly ordinary) life can tell us so much about how we live with Svalbard polar bears – In Longyearbyen, In Tromsø, or even in Cambridge.

IV – ‘Conservation after the Anthropocene’

Whilst considering how Svalbard polar bears (and Misha, Frost, or N23992) are ‘known’ is the primary aim of this thesis, it is also crucial to outline how I am approaching the significance of these knowings and becomings. In doing so, I will be thinking with Lorimer’s work on ‘conservation after the Anthropocene’, exploring new ontologies of wildlife and a *‘politics of conservation that cannot make recourse to Nature’* in this multi-natural world ²⁹. In doing so, I propose that the networks of ‘knowing polar bears’ are unavoidably and inexorably bound to modes of their conservation. Here, conservation is understood itself as a collection of practices – *“modes of biopolitics [that shape] future worlds through the operations of assemblages of scientific knowledge”* ³⁰. I also subscribe to Adams’ notion of conservation as a value judgement made about the relationship between humans and nature[s] ³¹. By examining the tasks, actants, technologies, and engagements involved in knowing polar bears, I am also asking about the sorts of polar bears that come to inhabit our conservation imaginations. Put simply, what are we conserving, and why? As *‘conservation after the Anthropocene is performative, actively shaping subjects and ecologies in relation to the knowledge by which it is informed’*, these enfolded

²⁹ *ibid* p.6

³⁰ *ibid*

³¹ Adams, W. M. (2002) ‘Conservation and Development’, in Sutherland B. (ed) (2002) *Conservation Science and Action*, Blackwell, Oxford.

actor-networks that I explore are also worldings – co-producing different polar bears, ecologies, and futures.

Svalbard is a fascinating and unique context to both ask and answer these questions. As Europe's only non-Russian polar bear sub-population, it sits at the nexus of numerous disciplinary, technological, scientific, legislative, and political, pasts, presents, and futures. After the lengthy period of exploitation³², it was also here that polar bear hunting was prohibited in 1973, subsequently heralding in a new era of polar bear/human relations³³. Svalbard was the site for some of the earliest field pilots for the development and implementation of a standardized polar bear science methodology in the 1960s³⁴ – whilst the 1973 Oslo agreement was being drawn up and the IUCN Polar Bear Specialist Group was in its infancy. It was off the East coast that the first polar bear was tranquilized from the deck of the governor's vessel in 1965³⁵, as well as the site where some of the most famous film footage and photographs of the species have been captured throughout the 21st century³⁶. Almost every piece of polar bear footage featuring in mainstream wildlife documentaries over the past 10-15 years was captured on the archipelago, from BBC's *Planet Earth* in 2006 to Netflix's *Our Planet* in 2019. The individual bear that this thesis follows, also features in many of those films, as well as being part of the long-term scientific monitoring programme that is undertaken here by the Norwegian Polar Institute (NPI). All of these different engagements with this bear are enfolded within these extensive assemblages of knowing polar bears – from the lengthy histories and epistemologies of scientific data collection (from corporeal biopsies to GPS tracking), to the advances in image-capture technologies and the narrative spectacles educed from their edits.

This thesis is an ethnography of those actants that encounter this Svalbard polar bear (and other bears), and who also claim that their work is a contribution (directly or more indirectly) to the conservation of the species. In each of these contexts, I will ask how different versions of a polar bear come to be known – constituted amidst these embodied histories, institutional/disciplinary epistemologies, and range of translations/purifications³⁷. With the resulting exploration of how a polar bear can be multi-natural, I examine the multitude of different ways that their conservation is made to matter.

³² Conway, M. (1906) *No Man's Land: A History of Spitsbergen from its Discovery in 1596 to the beginning of the Scientific Exploration of the Country*, D. Antikvariat, C. Nyegaard.

³³ Agreement on the Conservation of Polar Bears (1973) Oslo, November 15th, Online: Available at: [<http://pbsg.npolar.no/en/agreements/agreement1973.html>], Accessed 22/11/2016.

³⁴ Larsen, T. S. (01/032018) *Research Interview*, Skype, SPRI, Cambridge.

³⁵ *ibid*

³⁶ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen

³⁷ Latour, B. (1999) *Pandora's Hope: Essays on the Reality of Science Studies*, Harvard University Press, London: Latour's writings on 'purification' are not only a valuable conceptual touchstone for this work, but also re-vitalised in relation to contemporary tropes of Arctic "impurity", in Chapter 3.

Names and naming are an important theme of this work and must be addressed. Throughout this thesis, this individual Svalbard polar bear is referred to by a multitude of different names: Misha, Frost, N23992, and The Tempelfjord Bear. In each context, the application of a name is an enactment³⁸ of this bear – an epistemological and biographical claim to know her. Within my writing, I endeavour to refer to this bear with whatever name is given to her within that specific context. In doing so, I attend to the questions of voice, power, and agency that underpin her multi-naturalism.

In the chapters that follow I will outline:

First, the development and implementation of their scientific research methods and protocols, the role of technological mediations in how polar bears are enfolded into a research regime, and how N23992 (the alphanumerical code that this bear was given on her first capture) and her parallel endangerment is understood through the knowledge priorities and parameters of this programme.

Second, the film footage and photographs that feature Misha/Frost, how the images that are captured are used to tell particular stories about polar bears and their futures, and their role in co-producing particular ideas of polar bear that we hope to make live.

Finally, the institutional keeping of polar bears in captivity, with particular focus on 4 polar bears at the Yorkshire Wildlife Park (YWP), exploring the role of these architectures, environmental histories, and choreographies on the development of our imaginaries of polar bear conservation, and the conceptualisation of our shared futures.

Through these successive meetings with this Svalbard bear (and with other polar bears along the way) I am guided by a few core research questions: what is a polar bear here, to whom, how is it individuated, and what can these creatures tell us about our conservation futures and imaginations?

These aims are then supplemented by more specific lines of enquiry: What relevance does the telling of the lives of individual(ized) animals have for how we conceptualise their species? How do field scientists come to 'know' a polar bear through the tasks of capture and sampling? What kind of polar bear is enacted through the work of Svalbard filmmakers and photographers? How do we come to understand and shape the lives of captive polar bears in the UK? How do these multiple encounters and entanglements produce a multi-natural conceptualisation of the polar bear, and how we might this be made to matter for how we choose to live together?

³⁸ Mol, A. (2002) *The Body Multiple: Ontology in Medical Practice*, Duke University Press, Durham. Mol's term is central to this work, and is further elaborated in Chapter 1 that follows.

Chapter 1: Literature Review - *Multi-Natural Wildlife Conservation in the Anthropocene*

1.1 Introduction

This chapter comprises my literature review, a systematic engagement with different disciplinary and theoretical writings. The purpose of this section is to set out the conceptual parameters of my thesis, in doing so outlining important precedents, terminology, and philosophical tenets that not only influenced how I have come to think about polar bears and their conservation, but have also actively shaped my approach. It builds on an ontological and methodological progression that I developed during my MPhil thesis on the conservation of Scandinavia Brown Bears in Sweden³⁹, rooted in Anthropology⁴⁰, Animal Studies⁴¹, seminal works about humans and nature⁴², and the rapidly expanding field of the Environmental Humanities⁴³.

It begins in the ‘Anthropocene’ – our present global, environmental, and ecological, condition⁴⁴ – and with the challenge that it represents to our assumptions that structure the “modern” and its “modernity”⁴⁵. In particular, I will show how the Anthropocene concept has unseated the “*modern figure of Nature that has become so central to Western environmental thought, politics and action*”⁴⁶,

³⁹ Anderson-Elliott, H. (2016) *The Conservation of Brown Bears (Ursus arctos) in Scandinavia: Identifying Hybrid Wildlife in Anthropocene Science*, MPhil Thesis, Cambridge University, Cambridge.

⁴⁰ Latour (1999); Vetter, J. (2011) Labs in the Field? Rocky Mountain Biological Stations in the Early Twentieth Century, *Journal of the History of Biology*, **45**: 587-611; Traweek, S. (1992) *Beamtimes and Lifetimes: The World of High Energy Physicists*, Harvard University Press, U.S.A.; Jones, J. S. & Watt, S. (eds) (2010) *Ethnography in social science practice*, Routledge, London; Blok, A. & Jensen, T. E. (2011) *Bruno Latour: Hybrid Thoughts in a Hybrid World*, Routledge, London.

⁴¹ Tønnessen, M. et. al. (eds) (2015) *Thinking about animals in the age of the Anthropocene*, Lexington Books, London; Brunner, B. (2007) *Bears: A Brief History*, Yale University Press, New Haven; Wolch, J. & Emel, J. (1998) *Animal Geographies: Place Politics, and Identity in the Nature-Culture Borderlands*, Verso, London.

⁴² Haraway, D. (1991) *Simians, Cyborgs, Women: The Reinvention of Nature*, Free Association Books, London; Haraway, D. (2008) *When Species Meet*, Posthumanities Volume 3, University of Minnesota Press, London; Lorimer (2015)

⁴³ Robin, L. (2017) *Environmental Humanities and Climate Change: understanding humans geologically and other life forms ethically*, Lecture to Joint Centre for History and Economics, Cambridge University, 30/10/17; Heise, U. (2016) *Imagining Extinction: The Cultural Meanings of Endangered Species*, University of Chicago Press, London; Van Dooren, T., Kirksey, E. & Münster, U. (2016) Multispecies Studies: Cultivating Arts of Attentiveness, *Environmental Humanities*, **8**:1; Heise, U. K., Christensen, J. & Niemann, M. (eds) (2017) *The Routledge Companion to the Environmental Humanities*, Routledge, London; Slovic, S., Adamson, J. & Masami, Y. *Routledge Environmental Humanities Series*.

⁴⁴ Macfarlane, R. (2016) ‘What Have We Done?’, *The Guardian*, Saturday 02/04/2016; Bonneuil, C. & Fressoz, J-B. (2016) *The Shock of the Anthropocene: The Earth, History and Us*, Verso, London; Steffen et. al. (2011) The Anthropocene: Conceptual and Historical Perspectives, *Phil. Trans. Of the Roy. Soc. A*. **369**: 1938, p.842.

⁴⁵ Latour, B. (2013) *Facing Gaia: Six Lectures on the Political Theology of Nature*, The Gifford Lecture on Natural Religion, in Bonneuil & Fressoz (2016); Latour, B. (1993) *We Have Never Been Modern*, Harvard University Press, Cambridge MA.

⁴⁶ Lorimer (2015) p.1

and is instead characterised by a dynamic and integrated multi-naturalism⁴⁷ in place of the collapsing and antiquated nature-culture dualism⁴⁸. The outcome is the diagnosis of a radically networked world, Ellis's "*human systems with natural systems embedded within them*", whereby the Cartesian figure of singular and external 'Nature' is pervaded by enfolding and co-producing natural-cultural hybrids⁴⁹. Following this, I will assess the consequences of this context for how we as humans come to 'know wildlife', after Lorimer's suggestion for an alternative 'ontology of wildlife' as a collection of multiple discordant natures⁵⁰. I will use Latour's Actor Network Theory (ANT) to approach 'humans and polar bears in the Anthropocene', proposing to explore the diverse assemblages of entanglements, contact zones, and distributed agencies that constitute their co-shaping encounters⁵¹. I will propose that it is through these encounters that our understandings of wildlife are produced, becoming together with new ways of living in the world⁵².

Latourian ANT focuses anthropological investigation on the 'excluded third'⁵³ – the technologies, tasks, and labours that aid the transmission of objects and concepts through the network, and the transformations and translations that they instigate⁵⁴. This chapter will also emphasise the centrality of such tasks and materials in the production of multi-natural polar bears – from the technologies of scientific monitoring and filmmaking/ photography, to their epistemic communities, histories, and practices. In doing so, I will foreground the notion that polar bears in the Anthropocene are multiple (or rather multiplicitous) – hybrid, natural-cultural, cyborgian creatures that are different things to different people⁵⁵. I will propose that these Anthropocene polar bears inhabit novel ecologies and exhibit novel ethologies, and that our exploration of their worlds requires an attentiveness to affect⁵⁶,

⁴⁷ Lorimer (2015); Star, S. L. & Griesemer, J. R. (1989) Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkley's Museum of Vertebrate Zoology, 1907-39, *Social Studies of Science*, **19**:3, 387-420. Star and Griesemer's paper sets an important foundation for critical engagement with multiple actors and viewpoints.

⁴⁸ Haraway (2008); Collard, R. C. (2014) Putting Animals Back Together, Taking Commodities Apart, *Annals of the Association of American Geographers*, **104**: 151-165; Ingold, T. (2000) *The Perception of the Environment: Essays in Livelihood, Dwelling, and Skill*, London: Routledge.

⁴⁹ Bonneuil & Fressoz (2016) p.9; Latour (1999); Haraway (2008)

⁵⁰ Lorimer (2015) p.2

⁵¹ Blok & Jensen (2011); Deleuze, G. & Guattari, F. (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*, University of Minnesota Press, Minneapolis; Ellis, R. & Waterton, C. (2005) Caught between the cartographic and the ethnographic imagination: the whereabouts of amateurs, professional, and nature in knowing biodiversity, *Environment and Planning D: Society and Space*, **23**, 673-693.

⁵² Lorimer (2015) p.7

⁵³ Blok & Jensen (2011) p.16

⁵⁴ Latour (1999) p.58, Brown, S. D. (2002) Michel Serres: science, translation and the logic of the parasite, *Theory, Culture, and Society*, **19**(3): 1-27.

⁵⁵ Haraway (1991); Lorimer (2015); Bonneuil & Fressoz (2016); Waterton, C., Ellis, R. & Wynne, B. (2013) *Barcoding Nature: Shifting Cultures of Taxonomy in an Age of Biodiversity Loss*, Routledge, Abingdon.

⁵⁶ Hodgetts, T. & Lorimer, J. (2018) Animals' Mobilities, *Progress in Human Geography*, 1-23.

choreography, spectacle, and imaginaries⁵⁷. At the conclusion of this progression, therefore, I pose questions about what this understanding of polar bears means for the ethics and ecologies of their conservation⁵⁸. What is a polar bear in the Anthropocene, who/how do we ‘know’ them⁵⁹, and what is it that we are really conserving?

1.2 Welcome to The Anthropocene

As Bonneuil and Fressoz explain: “*the Anthropocene... is our epoch and condition*”⁶⁰. It is here that my work begins, in the power and promise of this term. The Anthropocene was coined by Paul Crutzen, an atmospheric chemist, at a conference on the Holocene in Mexico City, 1999⁶¹. In doing so, he hoped to provocatively foreground the pervasive anthropogenic impacts upon Holocene Earth – such are the extent of our changes to the Earth system that we might propose a new epochal transition, one undeniably and unavoidably ‘*Anthropo*’. Bonneuil and Fressoz go on to highlight the roots of this thinking in the works of 18th century Italian geologist Antonino Stoppani (1873) and Russian-Soviet geochemist Vladimir Vernadsky (1920), whose concepts of ‘*man-as-telluric power*’ and the ‘*biosphere*’ had begun to acknowledge the traces of human activity in Earth processes still conventionally considered to be ‘Natural’⁶². These anthropogenic forces, claims Steffen⁶³, even rival the great geological ‘forces of nature’ – an acknowledgement of the imaginative erosion of the ‘great divide’ that the epoch presupposes⁶⁴. As such, the Anthropocene is “*the most decisive philosophical, religious, anthropological, and ... political concept yet produced as an alternative to the very [notion] of “Modern”*”⁶⁵. It is this bifurcation that I will focus on here⁶⁶, the challenge that the Anthropocene poses to our ways of “living in the world”⁶⁷ and our ontological understandings of that very world.

⁵⁷ Jasanoff, S. (2015) *Future Imperfect: Science, Technology, and the Imaginations of Modernity*, Manuscript Online, Available at: [<http://iglp.law.harvard.edu/wp-content/uploads/2014/10/Jasanoff-Ch-1.pdf>] Accessed 04/01/2020.

⁵⁸ Bennett, N. J. et. al. (2016) Mainstreaming the Social Sciences in Conservation, *Conservation Biology*, **31**:1, p.56-66; Heise (2016); Tønnessen et. al. (2015); Van Dooren, T. (2014) *Flight Ways: Life and Loss at the Edge of Extinction*, Columbia University Press, NY; Adams, W. M. (2017) Geographies of Conservation II: Technologies, Surveillance and Conservation by Algorithm, *Progress in Human Geography*, DOI: 10.1177/0309132517740220. These significant texts guide critical scholarship on conservation approaches, ethics, and challenges in a changing landscape.

⁵⁹ Lorimer (2015)

⁶⁰ Bonneuil & Fressoz (2016) p.xi

⁶¹ Macfarlane (2016)

⁶² Bonneuil & Fressoz (2016) p.4

⁶³ Steffen et. al. (2011) p.842

⁶⁴ Latour, B. & Weibel, P. (eds) (2005) *Making Things Public: Atmospheres of Democracy*, MIT Press, Cambridge; Ingold (2000)

⁶⁵ Latour (2013)

⁶⁶ Bonneuil & Fressoz (2016)

⁶⁷ Macfarlane (2016)

Amidst the popular coverage and frequent use of the term – from book titles to news report segments⁶⁸ – it is just as important to highlight what the Anthropocene is not, as well as the work that it can do. The Anthropocene is not a revolution, not a fundamental metaphysical progression that ‘places a bomb’ under all contemporary environmental and ethical thought⁶⁹. Nor is it truly an “event... of bifurcation”⁷⁰ so much as it is a re-imagination of our shared pasts, presents, and futures in the face of what has always been. To repeat Latour’s famous epithet: ‘*we have never been modern*’⁷¹, humans and nature are not, nor have ever been, separate⁷². Their unification within the branching networks of the a ‘new’ Anthropocene epoch is not a re-unification, not an attempt to recapture a romanticised Eden of a pre-industrial condition before the alienating regime of global capitalism, so much as a “*jolt to the imagination*” that “*does huge work both for us and on us*”⁷³.

Many social theorists have proposed ontologies to capture the interconnectedness of what is now understood to be our Anthropocene reality, and to help imagine a hybrid world that is “conceived conjointly”⁷⁴ with a “*society structured by nature and a nature structured by the social*”⁷⁵. From Deleuze’s ‘assemblages’, to Latour’s ‘actor networks’, and even Tsing’s imaginative use of Deleuze & Guattari’s ‘rhizomes’⁷⁶, they represent our renewed efforts to capture the makings of our messy ‘worlds in process’⁷⁷, no longer easily reducible to a human subject and a universal, classifiable, ‘Natural’ object. I will re-emphasise my use of these theories in later sections (in particular ANT and the importance of its origins in STS), for as Crutzen began to remind us back in 1999, humans and nature(s) are constantly bound together in co-shaping entanglements⁷⁸.

As I will discuss throughout this chapter, polar bears are a unique and fascinating species to examine within this context. Both their present and future, and notably the discourses that surround them, are fundamentally of the Anthropocene – they are creatures whose Arctic ecology is made the metaphor for the most overt and easily publicizable symptom of the epoch, that is to say anthropogenic GHG

⁶⁸ BBC News Report (2019) *The Human Impact on the Earth: Are we in the Anthropocene?* Online, Available at: [https://www.bbc.co.uk/programmes/p06x3jg8], Accessed: 06/06/2019; Lorimer (2015)

⁶⁹ Candea, M. & Alcayna-Stevens, L. (2012) Internal Others: Ethnography of Naturalism, *Cambridge Anthropology*, **30**: 2, pp.36-47; Latour, B. (2009) Perspectivism: ‘Type’ or ‘Bomb’, *Anthropology Today*, **25**: 2, pp.1-2.

⁷⁰ Bonneuil & Fressoz (2016) p.19

⁷¹ Latour (1991)

⁷² Heise (2016)

⁷³ Macfarlane (2016) p.3

⁷⁴ Tønnessen et. al. (2015)

⁷⁵ Bonneuil & Fressoz (2016) p.33

⁷⁶ Tsing, A. L. (2015) *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, Princeton University Press, Princeton.

⁷⁷ Van Dooren et. al. (2016) p.12

⁷⁸ *ibid*

emissions and consequential climatic changes and global warming. Yet, although climatic change was likely the context for Crutzen's initial comments, the condition of the Anthropocene runs much deeper, following flows of matter and energy throughout the earth system, at scales from macro to micro ⁷⁹. In Svalbard, where I base this study, these networks and shared histories bely any antiquated notions of 'remoteness' or 'wilderness' and locate the archipelago firmly as a place of interconnectivity. From centuries of human hunting and whaling, brought here by the same Atlantic currents that upwell a rich nutrient environment; and trapping huts built with driftwood timbers washed west from Siberian rivers; and teams of Norwegian scientists and filmmakers using a mixture of Cold War and novel technologies to try and survey and capture polar bears; to a population of animals highly contaminated with industrial pollutants and micro-plastics manufactured and emitted thousands of miles away, this is a place defined by its entanglements. Thinking with the Anthropocene affords us the opportunity to completely re-think the basic ethics that organize relations between humans and other species. As Robert Macfarlane attests, it "*lays bare some of the complex cross-weaves of vulnerability and culpability*" that exist in our enfolded natural-cultural earth system ⁸⁰. It therefore not only impacts how we think about the world and its ecologies, but also (i) forces us to re-examine how we come to know it – the epistemologies, institutions, and tasks that facilitate our production of knowledge, (ii) makes us reconsider the ethics of our interventions and politics based on these knowledges, and (iii) encourages new ways of living in the world, and what that might mean for the creatures we share it with.

1.3 The Periodicity of the Anthropocene

The Anthropocene concept, therefore, does a lot of work for the methodological and conceptual progress of this thesis. As this chapter will continue to set out, a lot of the work that the term does for my research concerns the ontopolitics that accompanies the recognition of the end of the modern condition ⁸¹, whereby I interrogate the interconnected worlds of humans and polar bears, the production of knowledge, and how they may come influence forms of governance. At the same time, it is also important to recognise how I am approaching the periodicity of the Anthropocene, and how contrasting temporal distinctions can come to impact how we conceive of the forces and materials of the epoch. If, as I argued above, polar bears are inherently creatures of the Anthropocene, how therefore do I situate this study within the temporalities and periodicities of the epoch, and what do those decisions do for how we come to further understand the species.

⁷⁹ Bonneuil & Fressoz (2016) p.33

⁸⁰ Macfarlane (2016) p.2; Haraway (2008)

⁸¹ Chandler, D. (2018) *Ontopolitics in the Anthropocene: An Introduction to Mapping, Sensing, and Hacking*, Routledge, London.

When is the Anthropocene? My discussion here, reflecting the earliest debates surrounding the term itself, begins by examining the geological and environmental pasts that evidence “globally synchronous markers” for widespread anthropological impacts ⁸². Lewis and Maslin’s 2015 *Nature* paper assesses the different anthropogenic signatures of the geological record that might provide adequate justification for the demarcation of a new epoch ⁸³. Following Paul Crutzen’s foundational papers on the subject ⁸⁴, they hope to identify sufficient material within the stratigraphic layers of rock, glacial ice, or marine sediment to narrow down the vast number of prospective Anthropocene start dates which, they state, confuse the literature. They jettison theses such as from Glikson ⁸⁵, who proposes that the Anthropocene’s beginnings can be attributed to the mastery of fire >1.8 million years ago leading to gradual rises in CO₂ and methane emissions from the onset of Neolithic farming; as well as from Archaeologists like Balter ⁸⁶ who hope to focus on long-term human impacts rather than sudden planetary change. Equally, they also dispute the widely-held assumption (including by Crutzen and colleagues) that the Industrial Revolution is another obvious moment to label as an Anthropocene beginning ⁸⁷ because such dates are not derived from any globally synchronous markers that meet the criteria for other epochal definitions ⁸⁸. In their place, Lewis and Maslin propose two potential moments, derived from records of well-mixed atmospheric gases in numerous ‘correlated auxiliary stratotypes’: the ‘Orbis’ spike dip in CO₂ around 1610, and the bomb spike peak in ¹⁴C in 1964.

Both of these dates resonate for my discussion of Svalbard’s political and environmental history, in doing so foregrounding the potential of thinking with the Anthropocene for my subsequent discussion of polar bear science and conservation. The Orbis spike dip in atmospheric CO₂ in 1610, so named after the Orbis hypothesis that describes the beginning of the modern ‘world-system’, is theorized to have resulted from the enormous death rates that followed the expansion of sea-trade routes joining the Old and New worlds ⁸⁹. c.50 million people were killed, largely as a result of the rampant spread of smallpox. Many of these communities were agricultural, and their abandoned farms became re-

⁸² Lewis, S. L. & Maslin, M. A. (2015) Defining the Anthropocene, *Nature*, **519**, 171–180.

⁸³ *ibid*

⁸⁴ Crutzen, P. J. & Stoermer, E. F. (2000) The Anthropocene. *IGBP Global Change Newsl.* **41**, 17–18.

Crutzen, P. J. (2002) Geology of mankind. *Nature* **415**, 23.

⁸⁵ Glikson, A. (2013) Fire and human evolution: the deep-time blueprints of the Anthropocene. *Anthropocene* **3**, 89–92.

⁸⁶ Balter, M. (2013) Archaeologists say the ‘Anthropocene’ is here—but it began long ago. *Science* **340**, 261–262.

⁸⁷ Steffen et. al. (2011); Steffen, W., Crutzen, P. J. & McNeill, J. R. (2007) The Anthropocene: are humans now overwhelming the great forces of nature. *Ambio* **36**, 614–621.

⁸⁸ Lewis & Maslin (2015)

⁸⁹ *Ibid*; Wallerstein, I. (1974) *The Modern World-System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*, Academic Press; Diamond, J. (1997) *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 Years*, Chatto and Windus.

covered by trees which drew large quantities of CO₂ from the atmosphere ⁹⁰. This period, throughout the 16th and into the 17th century, also corresponds to the European ‘discovery’ of Svalbard, and the northern push of maritime powers towards new resource frontiers. Situating Svalbard’s early extractive history in tandem with the Anthropocene’s onset is not only significant for how we should approach our ongoing relationship with Svalbard’s natural ecology (and the intense period of hydrocarbon extraction from both marine animal bodies and geological seams throughout these formative centuries), but also, vitally, allows us to conceive of the Anthropocene from the onset as more than merely a geological event ⁹¹. As Lewis and Maslin begin to allude to, the use of the Orbis Spike “*implies that colonialism, global trade, and coal brought about the Anthropocene*”, central to which are deeply unequal power relations. I am reminded also of the work of Kathryn Yusoff, who emphasises that the Anthropocene as “*planetary analytic*” so often “*fails to do the work to properly identify its own histories of colonial earth-writing*” ⁹². The 1610 rubric tells a story beyond geological perspectivism, towards a politically-infused discourse, laced with power, precarity, and different modes of geopolitical mattering ⁹³.

Lewis and Maslin’s second date, 1964, is also significant for the discussion of Svalbard polar bears. The bomb spike peak in ¹⁴C “*tells a story of an elite-drive technological development that threatens planet-wide destruction*”. Here, rather than an Anthropocene that is redolent of colonial expansion and extractivism at the onset of centuries of European-polar bear encounters in Svalbard, the isotopic record of nuclear-test fallout contextualises the development of the polar bear science discipline at the height of Cold War tensions. It was two years later, in 1966, that the first polar bear was captured and sampled by the fledging polar bear science community off Eastern Svalbard, kickstarting the deployment of a range of military surplus technologies for the collection of data that would pave the way to a landmark agreement in Oslo in 1973. This is an Anthropocene story that conjoins the atomic and the global, again placing human activity at the heart of world-shaping and world-ending forces. Polar bears – from the political motivations of the US and USSR that led to the establishment of the scientific infrastructures of their study; to the pollutant contamination of their bodies as a result of nuclear, industrial and extractive cultures – are a species inexorably intertwined with this (as with many others) iteration of the Anthropocene. So too, it is their iconization as symbols and sites of climate

⁹⁰ Franco, M. (2015) ‘Orbis Spike’ in 1610 marks humanity’s first major impact on planet Earth [online] Available at: < <https://www.cnet.com/news/orbis-spike-in-1610-marks-date-when-humans-fundamentally-changed-the-planet/> > [Accessed 18/07/2021].

⁹¹ Lewis & Maslin (2015)

⁹² Yusoff, K. (2018) *A Billion Black Anthropocenes or None*, University Of Minnesota Press.

⁹³ *ibid*

change messaging that would catalyse the very discussions leading up to the suggestion of an Anthropocene at all throughout the late 20th and early 21st centuries.

It is through these periodicities – two different visions of the Anthropocene and its accompanying materialities – that the concept lends itself to the methodological and conceptual basis of this thesis. It provides a productive lens through which to explore the development of human relationships to Svalbard polar bears, and, as this chapter will continue to discuss, a theoretical jolt to our ontological imaginations.

1.4 Moving away from ‘Nature’

As Jamie Lorimer explains in his 2015 publication, *Wildlife in the Anthropocene*, the “modern figure of Nature” with the capital ‘N’ has become entirely “central to Western environmental thought, politics, and action”⁹⁴. Throughout the scientific revolution and its subsequent intellectual traditions, ‘Nature’ continued to establish itself as the rhetorical shorthand for “all the variable relations between organisms, environments, and other organisms”⁹⁵. It denoted all the variation of life beyond the human subject, for all that was human was not natural and vice versa. As Bonneuil & Fressoz state, the steady disciplinary progressions of the Earth Sciences, Geology, Natural History, etc. that were in progress during the 18th and 19th centuries: “from Buffon to Lyell and Darwin, ...[had] extended terrestrial time to hundreds of millions of years, creating a context that was seemingly external, almost immobile and indifferent to human tribulations”⁹⁶. This fundamental separation between humans and non-humans, society and Nature, is described by Latour and Weibel as ‘the Great Divides’⁹⁷ (or Ingold’s Axis of Dualisms⁹⁸) and understood to be a core tenet of modernity. From the 19th to 20th centuries, early guises of environmentalism began to emerge from this division and even advocated its preservation⁹⁹. John Muir, the Sierra club, and the ‘wilderness’ thinking of the turn of the century aimed to protect the singular figure of wild Nature from the ravages of human exploitation. It was Thoreau’s *Walden Pond*¹⁰⁰, God’s creation that needed to be insulated from the ‘Machine in the Garden’¹⁰¹, the advancing

⁹⁴ Lorimer (2015) p.1

⁹⁵ Williams (1983) *Keywords: A Vocabulary of Culture and Society*, Fontana Paperbacks, London, p.224

⁹⁶ Bonneuil & Fressoz (2016) p.9

⁹⁷ Latour & Weibel (2005)

⁹⁸ Ingold (2000)

⁹⁹ Fox, S. R. (1981) *The American Conservation Movement: John Muri and His Legacy*, University of Wisconsin Press, Wisconsin.

¹⁰⁰ Thoreau, H. D. (1854) *Walden; Or Life in the Woods*, Reprint, New York, Dover Publications Inc. (1995).

¹⁰¹ Marx, L. (1964) *Machine in the Garden*, in Russell, E. (2001) *Environmental History: Uniting History and Biology to Understand Life on Earth*, New York: Cambridge University Press.

stream train of destructive industrialisation and global capitalism¹⁰². Demotically, it is here that we can find the basic ethos of our nascent environmental cares and concerns – protect Nature from humans.

The Anthropocene concept unseats this ‘great divide’, emphasising the reality of our natural-cultural interconnectivity to “*see across the discredited breach*”¹⁰³. It acknowledges, as Ellis explains, that our conception that the world is composed of Natural systems interrupted by human disturbances is not only inaccurate but also misleading¹⁰⁴. For the politics and action that follows (in our contemporary environmentalism) the pervasive nature-society binary is inappropriate – characterised by tropes of fenced reserves and ‘wilderness areas’ that we now understand face threats beyond their spatially-policed boundaries. As Haraway urges, we must come to embrace the “*clear-sighted recognition of connection*”, re-tell shared histories and ecologies, where humans are deeply entangled with all life on earth¹⁰⁵. It was never possible to keep them apart.

However, it is not just my aim to highlight the literature and theorists that have argued for the erosion of this outdated concept. At the same time, it is also imperative to problematise how things became to be understood as ‘Natural’ in the first place¹⁰⁶ – framing our understanding of the world as inexorably bound up with progressions in human thought, science, and our institutional/epistemological “networks of knowing [N]ature well”¹⁰⁷. Out of the “discredited breach”, therefore, emerge new questions – of power, representation, intervention, purification, and politics¹⁰⁸. After ‘Nature’, for so long presumed to be a universal truth gradually uncovered by the work of Cartesian science¹⁰⁹, we now move towards a world where multiple natures are possible. Inseparable from our values and assumptions, these ‘multiple discordant natures’ are inundated with ‘ecologies of becomings’¹¹⁰. They are hybrid, natural-cultural, and co-produced through the very same networks that make a claim to ‘know’ them¹¹¹. The Anthropocene is multi-natural, characterised by multiple perspectives and

¹⁰² Thoreau (1854)

¹⁰³ Haraway (1991) p.152

¹⁰⁴ Bonneuil & Fressoz (2016) p.9

¹⁰⁵ Haraway (1991) p.152

¹⁰⁶ Stokland, H. B. (2013) Molecularising Nature: How Scandinavian Wolves Became Natural, *FORUM: University of Edinburgh Postgraduate Journal of Culture and Arts*, Issue 16: Spring 2013.

¹⁰⁷ Ellis & Waterton (2005) p.1; Latour, B. (1987) *Science in Action*, Harvard University Press.

¹⁰⁸ Hacking, I. (1983) *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*, Cambridge University Press, Cambridge; Haraway (2008); Latour (1991)

¹⁰⁹ Scott, C. (1996) Science for the West, Myth for the Rest? The case of James Bay Cree Knowledge Production, in Nader, L. (ed) *Naked Science: Anthropological Enquiry into Boundaries, Power and Knowledge*, Routledge, London.

¹¹⁰ Lorimer (2015) p.7/8

¹¹¹ Haraway (1991); Haraway (2008)

possibilities rather than fixed beings and relations ¹¹². As such, it has enormous significance for how we imagine, live alongside, and might work to ‘conserve’ non-human species.

1.5 Being cautious with multi-naturalism in the Anthropocene: The case for ethnography

The Anthropocene concept and its multi-naturalism must be wielded carefully. Here, I will explain the need for caution to avoid the pitfalls of a relativist free-for-all, and begin to develop the justifications for an ethnographic approach (to the study of wildlife conservation in the Anthropocene) after Bruno Latour ¹¹³ and Candea & Alcayna-Stevens ¹¹⁴. This sets the stage for my study of multi-natural polar bears; the actants, tasks, and contact zones that co-shape them; and the changing ethics of their conservation. As Collard urges, we must pay close attention to the “*contours and subjects of these natures [and] their ecological and ethical states*”, and be careful that the collapse of the nature-culture dualism doesn’t preclude “*nonhuman animals’ wildness and the violence that can attend its attrition*” ¹¹⁵.

The philosophical and theoretical shifts put in motion by ‘thinking with the Anthropocene’ are often (and mistakenly) characterized as an ‘ontological turn’ ¹¹⁶. This ‘bomb’ – to borrow Latour’s metaphor – rips apart the single knowable universe and replaces it with multiple hybrid worlds. Nature devolves to multiple natures. Where previously the work of an anthropologist was to “*suspend our naturalist assumptions... to take seriously other ontological possibilities, such as animism*” ¹¹⁷, the temptation is now to assert that we were “*never quite naturalist to begin with*” ¹¹⁸. Much of this critique has focussed on the work of ‘Western natural science’ as the archetype of this former naturalist ontology, with its echoes of Cartesian mechanistic Nature, representational politics, and its unerring pursuit of uncovering pre-existing universal truths ¹¹⁹. If the Anthropocene is truly an ‘ontological turn’, how then should we approach ‘naturalists’, ‘Western scientists’ – those for whom “*the notion of truth embodied in what they took to be science was incompatible with subjectivism*” ¹²⁰ – and their histories, traditions, and institutions, if naturalism itself never truly was? For the anthropologist, this is indeed a ‘disquieting suggestion’ (after Macintyre’s allegorical allusion to Miller’s (1959) *A Canticle for Leibowitz* and its post-

¹¹² Van Dooren et. al. (2016); Latour (2009); Anderson-Elliott (2016)

¹¹³ Latour (1999)

¹¹⁴ Candea & Alcayna-Stevens (2012)

¹¹⁵ Collard (2014) p.151

¹¹⁶ Candea & Alcayna-Stevens (2012); Henare, A., Holbraad, M. & Wastell, S. (eds) (2007) *Thinking Through Things: Theorizing Artefacts Ethnographically*, Cambridge University Press, Cambridge.

¹¹⁷ Candea & Alcayna-Stevens (2012) p.36

¹¹⁸ Ibid p.36

¹¹⁹ Scott (1996); Candea & Alcayna-Stevens (2012)

¹²⁰ Ibid p.36

apocalyptic dismantling of the sciences)¹²¹. It disenfranchises many of the sites and actors of ‘knowing wildlife’ rendering them untenable, conceptual spaces fading into a receding horizon¹²². How then do I approach the study of polar bears and what their conservation means in a multi-natural world?

This thesis will follow the suggestion of Candea & Alcayna-Stevens – influenced in turn by Latour’s *Circulating Reference*¹²³, as well as Yates-Doerr and Mol¹²⁴ – to approach naturalism(s) ethnographically¹²⁵. Rather than asserting that we have never been naturalist, this approach assumes that naturalism was not what we thought it was¹²⁶. Drawing on tools from STS and ANT (that I will expand upon in the next section), instead of an ontological schema, naturalism can be viewed as a particular type of achievement – one of unity¹²⁷. We can take seriously the ways in which different understandings of the world are conceived (‘nature’ from *natura* (L), and *nasci* – to be born¹²⁸), enacted, sustained, and fade away in “common, day-to-day, socio-material practices”¹²⁹. This chapter (and my methodology that follows) will foreground the importance of the material assemblage –the mediations, purifications, and encounters that occur here¹³⁰ – as well as of ‘fields’¹³¹, ‘societies’¹³², and ‘expert knowledge’ production¹³³. Here, knowing polar bears is an active and immersive process, the negotiated product of different actants, engagements, spaces, bodies, and tasks¹³⁴, that I will approach the study of ethnographically.

This is also a productive form of multi-naturalism, neither absolutist in its universalism nor destructive in its relativism. It bears great resemblance to Karen Barad’s ‘agential realism’ which posits that whilst “*tables, atoms, and cauliflowers are very much real, they are also shaped by modes of understanding*

¹²¹ Macintyre, A. (2007) *After virtue: A study in moral theory*, 3rd edition, University of Notre Dame Press, Indiana.

¹²² Candea & Alcayna-Stevens (2012)

¹²³ Latour (1999)

¹²⁴ Yates-Doerr, E. & Mol, A. (2012) Cuts of Meat: Disentangling Western Nature-cultures, *The Cambridge Journal of Anthropology*, **30**: 2, pp.48-64.

¹²⁵ Candea & Alcayna-Stevens (2012) p.39; Van Dooren, T. & Rose, D. B. (2016) Lively Ethnography: Storying Animist Worlds, *Env. Hum.* **8**(1), 77-94.

¹²⁶ *ibid*

¹²⁷ *Ibid* p.40

¹²⁸ Williams (1983)

¹²⁹ Mol, A. (2002) *The Body Multiple: Ontology in Medical Practice*, Duke University Press, Durham, p.6; Candea & Alcayna-Stevens (2012) p.39.

¹³⁰ Latour (1999); Lorimer (2015); Haraway (2008)

¹³¹ Casadevall, A. & Fang, F. C. (2015) Field Science – the Nature and Utility of Scientific Fields, *American Society for Microbiology*, DOI: 10.1128/mBio.01259-15.

¹³² Trawick (1988)

¹³³ O’Neill, S. J. et. al. (2008) Using Expert Knowledge to Assess Uncertainties in Future Polar Bear Populations Under Climate Change, *Journal of Applied Ecology*, **45**, 1649-59.

¹³⁴ Latour (1999); Van Dooren et. al. (2016)

and engagement”¹³⁵. We are “meeting the universe half-way”¹³⁶. How we come to understand other species (be they cauliflowers or polar bears), speak/write about them (then upon which we base our interventions), are precisely the moments of unity (assumed to be redolent of naturalism) that result from the purifying work of different actants¹³⁷ – the specific methods of ordering that occur in the dynamic repertoires that we call ‘the West’¹³⁸. In doing so, we enact multiple natures. Multiple perspectives are possible, and the ethnographer focuses his/her attention on the ‘makings’ of these numerous ‘worlds in progress’ – the active socio-material sites of practice where these achievements are reached¹³⁹. Therefore, this thesis will incorporate the stories and tasks of a diverse range of actants – from scientists and technicians, photographers and filmmakers, to wildlife managers and zookeepers – told through a wide range of different materials.

My research is therefore an exercise in taking seriously multiple perspectives¹⁴⁰. It aims to demonstrate that numerous conceptualisations of the polar bear can exist in space and time, whilst also overlapping, interacting, and contesting – even within/through the life of a single animal. As Candea and Alcayna-Stevens conclude, we should multiply our world with the ‘possible worlds’ of others, “*worlds which do not rely on our verification, critique or assent*”¹⁴¹. We should be attentive to the actants that co-shape these worlds and the species that inhabit them, to their productions of knowledges, their multi-natural encounters, and the enfolding of human and non-human lives/deaths. Viewing the polar bear as multiplicitous opens up many possibilities for how we frame ‘wildlife’ in the Anthropocene¹⁴², and ultimately, as I will come to discuss towards the end of this chapter, what it means to conserve them.

1.6 Science, Scientists, and Actor-Network Theory

The theoretical engagement with the Anthropocene concept that I have illustrated so far, is bound up with a shared attempt to re-position the ‘natural-sciences’ away from a universal truth claim and towards an achievement of unity¹⁴³. Thinking with the work of Latour¹⁴⁴, Jasanoff¹⁴⁵, Shapin and

¹³⁵ Van Dooren et. al. (2016) p.12

¹³⁶ Barad, K. (2007) *Meeting the Universe Half Way: Quantum Physics and the Entanglement of Matter and Meaning*, Duke University Press: NC.

¹³⁷ Latour (1999), Latour (2015) p.7

¹³⁸ Yates-Doerr & Mol (2012)

¹³⁹ Candea & Alcayna-Stevens (2012)

¹⁴⁰ Haraway (1991), Van Dooren et. al. (2016) p.8

¹⁴¹ Candea & Alcayna-Stevens (2012) p.41

¹⁴² Lorimer (2015)

¹⁴³ Van Dooren et. al. (2016); Latour (1999); Candea & Alcayna-Stevens (2012)

¹⁴⁴ Latour (1999)

¹⁴⁵ Jasanoff (2015)

Schaffer ¹⁴⁶, and Traweek ¹⁴⁷, this thesis will follow their lead in ‘starting with the sciences’ for my examination of how human actors come to ‘know polar bears’. As Van Dooren rightly expresses: “*the natural sciences are far from being the only way to know and understand the lives of other species*” ¹⁴⁸, yet at the same time they present the most profound opportunity to explore questions of knowledge co-production, the perceived establishment of truths, achievements of authority, and expertise ¹⁴⁹. As Jasanoff continues, “*scientific knowledge, in particular, is not a transcendent mirror of reality. It both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions ... all the building blocks of what we term the social*” ¹⁵⁰.

Here, therefore, I will continue to develop a theoretical basis for engaging ethnographically with the “purifying work” of natural scientists ¹⁵¹. I acknowledge the role of science in “*produc[ing] the relevant entities and objects which accordingly take part in public life*” ¹⁵², and the “*painstaking and creative efforts*” that they undertake to know the world ¹⁵³. As Asdal continues: “*Nature becomes knowable through the intermediary of the sciences; it has been formed through networks of instruments, it is defined through the intervention of professionals, disciplines, and protocol*” ¹⁵⁴. Science is not only social, but political, complicit in the co-production of natures ¹⁵⁵. This understanding will help to answer the question of how scientists, as one of multiple groups of Svalbard actants, come to conceptualise polar bears, and how their knowledge about the world impacts how we choose to live in it ¹⁵⁶.

In order to engage methodologically with the branching multi-natural architecture of the Anthropocene, Latour’s Actor Network Theory (ANT) provides a conceptual basis. As I briefly explained in the introduction to this section, ANT describes a ‘material-semiotic’ network through which objects and concepts flow and interact in co-shaping relational encounters ¹⁵⁷. Influenced by Gilles Deleuze and Félix Guattari, ANT continues to destabilize ideas of “transcendence” that produced the Cartesian

¹⁴⁶ Shapin, S. & Schaffer, S. (1985) *Leviathan and the Air-pump – Hobbes, Boyle, and the Experimental Life*, Princeton University Press, Princeton.

¹⁴⁷ Traweek (1988)

¹⁴⁸ Van Dooren et. al. (2016) p.8

¹⁴⁹ Jasanoff (2015) p.16, Shapin & Schaffer (1985)

¹⁵⁰ Jasanoff (2015) p.4

¹⁵¹ Latour (1999)

¹⁵² Asdal, K. (2008) Enacting Things through Numbers: Taking nature into accounting, *Geoforum* **39**, 123-132, p.2

¹⁵³ Blok & Jensen (2011) p.27

¹⁵⁴ Asdal (2008) p.2

¹⁵⁵ Lorimer (2015); Stokland (2013); Blok & Jensen (2011); Asdal (2008)

¹⁵⁶ Jasanoff (2015) p.4

¹⁵⁷ Latour (1987); Latour, B. (2005) *Reassembling the Social: an Introduction to Actor-Network Theory*, Oxford University Press, Oxford; Blok & Jensen (2011); Mol, A. (2010) Actor-Network Theory: sensitive terms and enduring tensions, *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, Sonderheft, **50**: 253-269; Mol’s work here is particularly illuminating on the enriching and generative potential of ANT as more than a theory.

dualisms of nature/culture, body and mind ¹⁵⁸, yet at the same time the ‘theory’ (a term Mol unpacks ¹⁵⁹), developed in Paris during the 1980s along with Michel Callon and John Law, is a call for further generative and transformative works. As an Anthropologist, Latour is interested in what he terms the “excluded third” or “middle kingdom” ¹⁶⁰ a collection of messengers and mediators. His *“intellectual universe is populated by go-betweens”*, the technicians and tasks that facilitate the flows of things through the network, and instigate their *translations* (after Serres ¹⁶¹), *transformations* and *transmutations* ¹⁶². Crucially, the worldings that ANT describes are non-representational, precisely because if you prescribe to representation you are side-lining the importance of ‘doing’ and ‘making’, the material assemblage, and silencing the mediations and inscriptions of technologies, tasks, and actants ¹⁶³. Latour aimed to *“de-naturalize scientific forms of knowledge”*, to eliminate *“meta-languages”* and approach all life (and indeed non-life) on a single ‘plane of immanence’ ¹⁶⁴. Therefore, as Dominique Henri explains in her discussion of polar bear-Inuit relations and management in Nunavut, ANT *“provides an approach to studying how social orderings are contingently achieved through the enlistment of human and nonhuman actors or actants in relationships called actor-networks”* ¹⁶⁵.

Concurrently, the theoretical foundation of this thesis is also firmly about ‘enactment’ ¹⁶⁶. Annemarie Mol’s concept provides a term without the baggage of an extensive academic history, and in doing so perfectly describes *“the multiple doings and beings”* of (in her original application) a single disease ¹⁶⁷. So too, it is the perfect term with which to explore the understanding of the multi-naturalism of the polar bear, whereby different versions of polar bear are “enacted” by the different situational actants that I describe. Thus there are multiple polar bears, contingent on the co-presence of multiple different actors, and *“connected through certain translation processes and practices”* within the Actor-Network ¹⁶⁸. Enactment also *“allows us to look at practices while looking at humans and objects”*, whilst spreading the *“activity of knowing”* across a diverse array of materials, sites, and actors ¹⁶⁹. The term ‘enactment’ therefore recurs throughout this study, but, contrary to Mol’s usage, does not totally

¹⁵⁸ Blok & Jensen (2011) p.14

¹⁵⁹ Mol (2010)

¹⁶⁰ Ibid p.16

¹⁶¹ Brown (2002)

¹⁶² Latour (2009), Blok & Jensen (2011) p.16

¹⁶³ ibid

¹⁶⁴ Deleuze & Guattari (1987); Blok & Jensen (2011) p.16

¹⁶⁵ Henri, D. (2012) *Managing Nature, Producing Cultures: Inuit Participation, Science and Policy in Wildlife Governance in the Nunavut Territory, Canada*, DPhil in Geography and the Environment, Oxford University, Oxford.

¹⁶⁶ Mol (2002)

¹⁶⁷ Ibid, Schwertl, M. (2016) “We have a situation here!”: On enactment as a middle ground between practice and performance, *Cultural Analysis*, Volume 15(1).

¹⁶⁸ Mol (2002); Schwertl (2016)

¹⁶⁹ ibid

supersede the use of production and performance. I still find place for these terms, as does Maria Schwertl in her discussion of Engin Isin's ENACT project about acts of European citizenship. In chapter 5, I am particularly interested by performance, not as a foil to enactment, but as a means of engaging with the habitual reinforcement of different iterations of polar bear life in the micro-contexts of captive sites, whilst at the same time staying within the "realm of making" whereby these performances remain constitutive of the polar bear ¹⁷⁰.

Technology and technological objects are also therefore of utmost significance here. As Jasanoff explains, they too are deeply "enmeshed in society" as well as being vital nonhuman components of the tasks of scientific investigation, and, consequentially, the actor network ¹⁷¹. Much of Latour's practical application of ANT to his anthropological fieldwork, thinking primarily of his research with pedologists in Amazonia in *Pandora's Hope* ¹⁷², dwells on the function of technological application as complicit in the translation of the world into words. He finds productive material in the methodological steps of these natural scientists, the extraction and cataloguing of soil samples, the use of the pedocomparator, and how these methods fit with individual, institutional, and disciplinary protocols ¹⁷³. In the same way, the contemporary study of wildlife throughout the 20th and 21st centuries has become more and more entangled with technological advancements, and in particular: "*tracking and surveillance technologies are shaping conservation in a range of ways of importance to geographers*" ¹⁷⁴. In 1959, the Craighead brothers began a project in Yellowstone National Park using re-purposed military transmitters and receivers to radio-collar grizzly bears ¹⁷⁵. In 2016, my masters thesis examined the use of GPS-collars, radio transmitter implants, reveal readers, and data modelling in the Scandinavian Brown Bear Research Project – aiming to understand the intersection of science, technology, knowledge production, nature-cultures, and brown bear conservation/management policy advice ¹⁷⁶. These developments are not unique to these contexts, as conservation organisations worldwide have been leading users of technological advancements "*in pursuit of more robust evidence-*

¹⁷⁰ Schwertl (2016)

¹⁷¹ Jasanoff (2015) p.3; Latour (1999); Blok & Jensen (2011)

¹⁷² Latour (1999)

¹⁷³ *ibid*

¹⁷⁴ Adams (2017) p.9

¹⁷⁵ Benson, E. (2010) *Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife*, The John Hopkins University Press, Baltimore.

¹⁷⁶ Anderson-Elliott (2016)

based ...decisions”¹⁷⁷. As Adams highlights, there has been a “wider digital re-shaping of conservation ideas and practice”¹⁷⁸, as technologies offer new capacities for observation and individuation¹⁷⁹.

It is using these concepts, tools, and the application of ANT that I will approach my (and the scientists’) study of polar bears in Svalbard. I will follow Latour’s use of the ‘hybrid’ as a ‘quasi-object’ that “ties social relations together” and into Haraway’s understanding of hybrids and cyborgs in the discussion of non-human animals and wildlife research. The cyborg is an impactful figure for this research – helping to understand our contemporary technological, bodily, and social realities¹⁸⁰. Here, technology and polar bear meet in the enfoldings of the flesh¹⁸¹, a productive ‘contact zone’ that touches upon the “entanglement of human and animal life-worlds”¹⁸². I am fascinated by the role of technology as a mediator for the notion of ‘access’, extending the “capacity of humans to observe and record the presence of other organisms... to perceive and observe their lives”¹⁸³. This is not only a means of access into non-human life worlds (collars on polar bears, cameras on the back of whalesharks to hitch a ride into their societies¹⁸⁴), but also to different ‘ways of knowing’ that these ‘ways of sensing/seeing’ facilitate¹⁸⁵. The ‘cyborg’ resonates here (particularly for my discussions of polar bear science) with its origin story in the military-industrial complex of the Cold War – a context that provided much of the raw materials (in the form of army surplus) for the progression of bear monitoring practices, whilst also opening the door conceptually for the erosion of long-held Western dichotomies (nature/culture,

¹⁷⁷ Adams (2017) p.2/3; Sutherland, W. J., Pullin, A. S., Dolman, P. M. & Knight, T. M. (2004) The need for evidence-based conservation, *Trends in Ecology and Evolution*, **19**: 305-308; Adams, W. M. & Sandbrook, C. (2013) Conservation, Evidence, and Policy, *Oryx*, **47**: 329-335.

¹⁷⁸ Adams (2017) p.2; Arts, K., Van der Wal, R. & Adams, W. M. (2015) Digital technology and the conservation of nature, *Ambio* **44** (Sup. 4): S661-S673. DOI 10.1007/s13280-015-0705-1; Van der Wal, R. & Arts, K. (2015) Digital conservation: An introduction, *Ambio* **44** (Sup. 4) DOI: 10.1007/s13280-015-0701-5; Verma, A., Van der Wal, R. & Fischer, A. (2016) Imagining Wildlife: New technologies and animals censuses, maps, and museums, *Geoforum* **75**: 75-86.

¹⁷⁹ Adams (2017); Lorimer (2015)

¹⁸⁰ Barla, J. (2017) ‘Cyborg’, Online: [Available at: <https://newmaterialism.eu/almanac/c/cyborg.html>] Accessed 12/09/21.

¹⁸¹ Haraway (2008); Haraway (1991)

¹⁸² Boonman- Berson, S., Turnhout, E. & Carolan, M. (2016) Common sensing: human-black bear cohabitation practices in Colorado, *Geoforum* **74**, 192-201, p.194; Hinchcliffe, S. & Whatmore, S. (2006) Living Cities: towards a politics of conviviality, *Sci. Cult.*, **15**(2), pp.123-138; Latimer, J. & Miele, M. (2013) Naturecultures? Science, affect and the non-human, *Theory, cult. Soc.*, **30** (7/8), pp.2-31; Locke, P. (2013) Explorations in ethnoelephantology: social, historical, and ecological intersections between Asian elephants and humans, *Environ. Soc.: Adv. Res.*, **4**, pp.79-97.

¹⁸³ Adams (2017) p.3

¹⁸⁴ Pagano, A. M., Atwood, T. C., Durner, G. M. & Williams, T. M. (2019) The seasonal energetic landscape of an apex marine carnivore, the polar bear, *USGS*, DOI: 10.1002/ecy.2959; Hayward, E. (2010) Fingeryeyes: Impressions of Cup Corals, *Am. Anthr. Asso.* DOI: 10.1111/j.1548-1360.2010.01070; National Geographic (2017) ‘Putting a Camera on a Whaleshark, *Crittercams, Expedition Raw Series*, Online, Available at: [<https://video.nationalgeographic.com/video/expedition-raw/00000152-8423-de97-ad5b-bdff6c8a0000>] Accessed 01/06/2018.

¹⁸⁵ Berger (2009)

human/animal, etc.)¹⁸⁶. In addition to the devices of scientific monitoring, I will talk further about camera technologies in the next section. In these moments, we must also acknowledge the interest that technology and wildlife has garnered amongst animal geographers¹⁸⁷ and for the ‘geographies of conservation’¹⁸⁸ – how do these “prosthetic devices” translate and transform the very ideas, intimacies, bodies and ethologies of polar beariness¹⁸⁹? As Adams highlights, quoting from Bear 71: it is “*hard to say where the wired world ends and the wild world begins*”¹⁹⁰.

Alongside the re-imagination of the scientific process – its technologies, tasks, and knowledge productions – we must also re-imagine the ‘scientist’ in the Anthropocene. During my masters research on the conservation of brown bears in Sweden, I approached the role of scientists and researchers in the Scandinavian Brown Bear Research Project as ‘bodies in encounters’ – thinking with Lorimer’s assertion that the figure of the scientist was never ‘brain-in-a-vat’ with ‘disembodied vision’¹⁹¹. Scientists are not figures who can, as Barbara Smuts states, “query but not be queried”¹⁹², they are gatekeepers, actants, and vital nodes within the actor network of knowing wildlife¹⁹³. Not only must we consider scientists to be deeply politically and socially embedded – relating and translating broader societal concerns, reflecting and responding to pervasive anxieties, and influencing/permeating daily lives of most of the world’s population – but they are themselves part of complex societies. As Traweek discusses in her examination of the knowledge productions and labour in a research community of high-energy physicists, these groups present novel material for anthropological study – turning away from a colonial focus on small non-Western communities towards “people with power”¹⁹⁴. A “*community is a group with a shared past, [the] hope to have a shared future*”, Traweek continues, as well as a “*means of acquiring new members, and ... some means of recognizing and maintaining differences between themselves and other communities*”¹⁹⁵. This definition is particularly pertinent for the community of polar bear researchers that this thesis will work to understand. As well as the tasks, translations, and technologies of their scientific lab/fieldwork; and the social/familial dynamics of the group and its impacts upon method, lineage, and issue prioritization; I will also be attentive to their role in the

¹⁸⁶ Barla (2017)

¹⁸⁷ Hodgetts & Lorimer (2018); Buller, H. (2015) *Animal Geographies II: Methods, Progress in Humans Geography*, **39**: 374-384; Benson (2010); Howell, P. (2017) ‘Animals Agency History’, *Natures Cultures Knowledges Seminar Series*, Department of Geography, University of Cambridge, 03/02/2017.

¹⁸⁸ Adams (2017); Arts et. al. (2015)

¹⁸⁹ Adams (2017) p.3; Lorimer (2015); Lorimer, J. (2007) *Nonhuman Charisma, Env. And Planning D: Society and Space*, **25**, 911-932.

¹⁹⁰ Adams (2017) p.1

¹⁹¹ Lorimer (2015) p.9

¹⁹² Haraway (2008) p.24

¹⁹³ Star & Griesemer (1989) p.3

¹⁹⁴ Traweek (1988) p.5

¹⁹⁵ Ibid p.6

establishment of ‘polar bear science’ as a scientific field ¹⁹⁶. Here are even broader questions about gender, power, and promise. After Casadevall and Fang, “*relatively little has been written about [the] emergence, composition, structure and function [of ‘fields’] in the scientific enterprise*”, their interaction with diagnoses of ‘expert knowledge’ ¹⁹⁷, and even how they can “*sustain dogmas that hinder progress*”

¹⁹⁸.

1.7 Film & Photography: Capturing Affective ANT

My aim for this thesis is not to merely to apply ANT to the domain of the sciences, as is frequently the norm, but also to apply it to more diverse heterogeneous actors and their own institutional and disciplinary forms of technological mediation, translation, and enactment ¹⁹⁹. This is a question of being attentive to multiple possible worldings, negotiated throughout a more complex and wider-reaching actor network. It traces more of the multi-species architectures, sites, and spaces of knowing polar bears, and the transformations that occur within/between them. Film and photography have been much-theorised in academic and philosophical literature ²⁰⁰, both in terms of their impacts on our perceptions of, and relationships to, the world, as well as more specifically of the life-worlds of other species ²⁰¹. Whilst the use of visual surveillance in conservation science research itself has been examined ²⁰², I wish to dwell more on the use of film in wildlife documentary/nature photography – a subject which has also garnered significant attention amongst ecocritical media, cultural, and visual studies scholars ²⁰³. The filmic world is a comparable ‘society’ of actants – technicians and camera operators – and another viable ethnographic site.

¹⁹⁶ Casadevall & Fang (2015)

¹⁹⁷ O’Neil et. al. (2008)

¹⁹⁸ Casadevall & Fang (2015) p.1

¹⁹⁹ Latour (1999); Latour (2009); Haraway (2008); Mol, A. (2002)

²⁰⁰ Berger (2010); Archibald, K. (2017) ‘Arctic Capital: Managing polar bears in Churchill, Manitoba’, in Dean, J. Ingram, D. & Sethna, C. (eds) *Animal Metropolis: Histories of Human-Animals Relations in Urban Canada*, University of Calgary Press, Calgary, pp.255-283, p.256; Sontag, S. (1977) *On Photography*, Delta, New York; Haraway, D. (1989) *Primate Visions: Gender, Race, and Nature in the World of Modern Science*, Routledge, London; Mitman, G. (2009) *Reel Nature: America’s Romance with Wildlife on Film*, Weyerhaeuser.

²⁰¹ Lorimer, J. (2010) Moving Image Methodologies for more-than-human geographies, *Cultural Geographies*, **17**(2), 237-258; Adams (2017); Bagust, P. (2008) Screen Natures: special effects and edutainment in ‘new’ hybrid wildlife documentary, *Continuum: Journal of Media & Cultural Studies*, Vol **22**, 2, 213-226; Bousé, D. (2003) False Intimacy: close-ups and viewer involvement in wildlife films, *Visual Studies*, **8**(2), 123-132.

²⁰² Adams (2017)

²⁰³ Bousé, D. (1998) Are Wildlife films really ‘Nature Documentaries’? *Critical Studies in Media Communication*, **15**, 116-140; Bousé (2003); Bagust (2008); Weik von Mossner, A. (2014) *Moving Environments: Affect, Emotion, Ecology, and Film*, Wilfred Laurier University Press; Chris, C. (2006) *Watching Wildlife*, Uni. Of Minnesota Press; Mitman (2009).

At the same time, my approach to wildlife image-worlds within this thesis must acknowledge a fractious theoretical rift. This discrepancy arises between the late 20th century cultural- and eco-critical engagements with wildlife filmmaking/photography and their conventions of representation ²⁰⁴, and the growing interest in the non-representational ²⁰⁵, notably recent work to explore the role of affect and emotion in the production and reception of film ²⁰⁶. In approaching this tension, I echo Dewsbury, Harrison, Rose and Wylie when they state their “*firm belief in the actuality of representation*” to characterise their non-representational theory (NRT) ²⁰⁷. Representations can still be taken seriously, not as examples but as exemplary - as processes of “*incessant presentation, continually assembling and disassembling*” ²⁰⁸. Approaching representations of wildlife in this way vitally does not preclude an engagement with works that address the complex socio-political and ideological foundations that catalysed the development and evolution of photographic and filmic modes of encountering and engaging with non-human life ²⁰⁹. Instead, redolent of a similar productive discrepancy in my approach to the natural(ist) sciences and the multi-natural worlds that they co-produce, we can engage with representation(alists) as part of a larger performative whole. Representations do not carry messages, but are actions in and of themselves ²¹⁰.

This thesis must therefore also address affect. I understand affect as a way to “*conceptualize the world beyond its representation through a variety of mediatory forces*” that simultaneously aims to capture the “*set of ever-changing processes [that] human and nonhuman bodies undergo as they experience, encounter, and perform life among other bodies*” ²¹¹. Geographies of affect have burgeoned in the 21st century alongside NRT and emotional geographies, and their significance for the progressions of geographical thought are the subject of much work ²¹². Affect is about bodily co-existence – existing ‘between’ and not ‘within’ – the shared capacity to affect and be affected by other bodies describes

²⁰⁴ Berger (2010); Chris (2006)

²⁰⁵ Thrift, N. (2007) *Non-representational theory: space, politics, affect*, London: Routledge; Lorimer, H. (2008) Cultural geography: non-representational conditions and concerns, *Progress in Human Geography*, **32** (4) 551-559;

²⁰⁶ Weik von Mossner, A. (2014) *Moving Environments: Affect, Emotion, Ecology, and Film*, Wilfred Laurier University Press

²⁰⁷ Dewsbury, J. D., Harrison, P., Rose, M. & Wylie, J. (2002) Enacting Geographies. *Geoforum* **33**(4): 437–440.

²⁰⁸ *ibid*

²⁰⁹ Chris (2006)

²¹⁰ Dewsbury et. al. (2002)

²¹¹ O’Grady (2018) *Geographies of Affect*, DOI: 10.1093/OBO/9780199874002-0186.

²¹² *Ibid*; Thrift, N. & Dewsbury, J-D. (2000) Dead Geographies - And How to Make Them Live, *Env. and Planning D: Soc. And Space*, 18(4), 411-432; Anderson, B., and P. Harrison. *Taking-Place: Non-Representational Theories and Geography*. Farnham, UK: Ashgate, 2010; Clough-Ticineto, P., and J. Hailey, eds. *The Affective Turn: Theorizing the Social*. Durham, NC: Duke University Press, 2007.

the making and re-making of life through the performances that those bodies enact and are caught up in ²¹³. How then, to incorporate affect into this part of my work on polar bears and film?

After Sage, Vitry and Dainty, I am interested by the notion of an ‘Affective Actor-Network Theory’ ²¹⁴. In their ‘cross-fertilization’ of ANT with Deleuze’s readings of Spinoza, they hoped to highlight the “*profound role of affects in the circulation of technologies and of technologies in the circulation of affects*” ²¹⁵. Whilst their work, an analysis of the growth of zero-carbon homes in the UK and the role of affect within the proliferation of such technologies might seem like an odd theoretical impetus, I have found ‘affective actor-networks’ an extremely useful concept to think with. Within the context of my thesis, it helps to situate the socio-technical foundation of film and photography within a network of lived encounters. Beyond representations, the production of (moving) images of polar bears (as enactments) is a reciprocal moment. Acknowledging affect articulates the making of films and photographs about polar bears, through the deployment of technologies and the actants that wield them, as a relational and bodily encounter. It is not simply one-directional – following the light from the surface of the bear through the lens, into the camera, through editing software and post-production, through broadcast, emitted through the collection of pixels of our TV screens, and onto our retinas – but the filmic process is reciprocal, impacting bear lives and bodies as much through the physical moment of encounter as it does through the more nebulous shifts in public perceptions, emotions, and actions ²¹⁶.

In my discussions of wildlife film and photography in chapter 4 of this thesis, I am interested in the entirety of the creative process. In this section, will go on to propose a basis for framing the initial ‘capture’ of (moving) images, attentive to the devices that underpin this work and their socio-technical histories, in relation to my ongoing engagement with ANT and the societies of knowledge production about polar bears. In chapter 4, I will then go on to examine some of the artefacts that are produced – the images and films that are made of Svalbard polar bears – and what they can elucidate about our ongoing relationship to their species. The polar bears that are enacted through filmic cultures live on beyond their broadcast, circulate, and continually produce worlds.

²¹³ O’Grady (2018)

²¹⁴ Sage, D., Vitry, C. & Dainty, A. (2019) Exploring the Organizational Proliferation of New Technologies: An Affective Actor-Network Theory, *Organization Studies*, **41**(3), 345-363.

²¹⁵ Ibid

²¹⁶ A critical examination of the dynamic affective encounters enabled through the natural history documentary films that features this bear and how they impact broader publics and public perceptions is beyond the scope of this thesis, but a productive space for future work.

1.7.1 Towards 'Capture'

Photography and film, in particular once turned towards the subject of wildlife, have extensive disciplinary, social, and technical histories. Both Donna Haraway and Susan Sontag outline the gendered and uneasy history of photographic life – the framing and memorializing of nuclear families, the imaginary possessions of unreal pasts, and the immortality of image-worlds ²¹⁷. Haraway continues to explore the rendering of anthropocentric heteronormative tropes in the portraiture of Gorillas in Fossey's *Gorillas in the Mist* ²¹⁸, whereby the photographic form, resembling the style of Alfred Brehm's 19th century engraving "*Gorilla Family*" ²¹⁹, constructs these primates as the "*ideal patriarchal, heterosexual, reproductive family ... the embodiment of both individuation and community*" ²²⁰. The irony of her assertion that these portrayals "*bypass the conflict-laden realm of history*" is that their creation is itself deeply historically embedded into networks of semiotics and signification ²²¹. "*The camera remains firmly in the hands of men*" ²²². These histories make the 'capture' of wildlife images (both moving and still) an extremely compelling site for ethnographic, geographical, and STS study. They share an extensive technical history, the development of practical techniques, tasks, methods, genres, conventions, styles, lenses, chemicals, angles, frame rates, etc. that all co-evolve with, and co-shape, the very discipline.

In this realisation we again find grounds for approaching wildlife photographic/filmic work with the methodology of Latourian ANT – an engagement with the actants, technologies, and tasks of image capture. As Blok & Jensen said of the sciences, these are the "*painstaking and creative efforts*" as part of this intermediary engaged in making (N)ature(s) knowable, "*formed through networks of instruments [and] the intervention of professionals*" ²²³. In and through successive acts of material translation different image-polar bears (moving and still) are mobilized within the network. This work is also a purification, not by natural scientists (their lab technicians, toxicologists, geneticists, statisticians) but by camera operators, producers, and editors ²²⁴. Their co-productions and distributions also become embroiled in comparable battles for authenticity, veracity, and expertise ²²⁵. Documentary filmmaker

²¹⁷ Sontag (1977); Haraway (1989)

²¹⁸ Fossey, D. (1983) *Gorillas in the Mist*, Houghton Mifflin Company, New York.

²¹⁹ Reynolds, V. (1967) *The Apes*, Dutton, New York; Haraway (1989)

²²⁰ Ibid p.147

²²¹ Benedictus, L. (2016) 'Planet Earth II and the bloodthirsty evolution of the nature documentary', *The Guardian*, Online, available at: [www.theguardian.com/tv-and-radio/2016/nov/01/planet-earth-ii-david-attenborough-bloodthirst-evolution-of-the-nature-documentary] Accessed: 01/11/2016; Bousé (1998)

²²² Haraway (1989) p.150

²²³ Asdal (2008) p.2; Blok & Jensen (2011) p.27

²²⁴ Latour (1999)

²²⁵ Amelunxen, H. V. (1997) *Photography after photography: The terror of the body in digital space*, Online, Available at: [www.angelfire.com/pr/photoplay/Ajmelunxen.htm] Accessed: 03/08/18; Berger (2010)

and critic Paul Rotha asserted that nature documentary lacked the level of “*creative dramatization of actuality*” to truly account for its inclusion as a documentary form ²²⁶, whereas ex head of the BBC Natural History Unit Christopher Parsons states that all “*principles of film form and construction apply just as much to wildlife film as to any other kind of film*” ²²⁷. Like the Cartesian misconceptions of scientific objectivism, ‘professional’ images of wildlife also become subsumed by the presumption of ‘reality reproduction’ – the capacity to actively and accurately produce a ‘mirror of Nature’ ²²⁸. On the contrary, as I have already outlined, I will approach these ‘image-makers’ as complicit in the enactment of multiple natures ²²⁹, rather than the uncovering of one unified ‘Nature’. Like the mythology of the objective scientific enterprise, wildlife film and photography constitute a form of power-laden, techno-centric engagement with worlds-in-process around us ²³⁰.

After Donna Haraway and Eva Hayward, I will also frame the taking of wildlife imagery as ‘*contact zones*’ with ‘*fingery-eyes*’ ²³¹ – haptic-optic interactive touch between ‘cameras and critters’ ²³². These moments of “*mutually constituting*” contact are nodes in the actor-network ²³³ and sites characterised by material-semiotic multi-species encounters with huge importance for how we come to know wildlife ²³⁴. As Adams highlights, it is interesting to note how these ‘camera’ technologies “*enable the creation and commodification of spectacular nature ... to create a spectacle of non-human lives*” ²³⁵. This, akin to my previous discussions of the scientific practice, is the crux of my understanding of wildlife film and photography. The role of technologies, purifications, and ‘knowledge production’ in our formation of ways of living in the world. Not only does image-capture, as Adams continues, “*frame affective relations between humans and non-human nature*” influential for the work of conservation, but it is actively enrolled in affective encounters that co-shape those very natures ²³⁶.

²²⁶ Rotha, B. (1952) in Bousé (1998) p.118

²²⁷ Parsons, C. (1971) *Making Wildlife Movies: A Beginners Guide*, Stackpole Books, Harrisburg, PA, p.164; Bousé (2003) p.124

²²⁸ Bousé (1998)

²²⁹ Bousé (2003); Mol (2002)

²³⁰ Van Dooren et. al. (2016) p.12; Lorimer (2015)

²³¹ Haraway (2008); Hayward (2010); Pratt, M. L. (1992) *Imperial eyes: Travel writing and transculturation*, Routledge, London.

²³² Ibid p.4/6

²³³ Latour (1999); Latour (2005)

²³⁴ Lorimer (2015); Pratt (1992); My engagement with Pratt’s work here is less about her political ecology and more with her role in theorizing the colonial ‘contact zone’ – a notion that is relevant to filmic enterprises just as it is in her analysis of travel writing.

²³⁵ Adams (2017) p.1/6l; Igoe, J. (2010) The spectacle of nature in the global economy of appearances: Anthropological engagement with spectacular mediations of transnational conservation, *Critique of Anthropology*, **30**, 375-397; Igoe, J., Neves, K. & Brockington, D. (2010) A spectacular eco-tour around the historic bloc: theorising the convergence of biodiversity conservation and capitalist expansion, *Antipode*, **42**, 486-512.

²³⁶ Adams (2017) p.6

Continuing to think with the writings of Donna Haraway and Susan Sontag, I think that there is still work to be done here with the idea of ‘capture’ – to address the sometimes problematic histories and ethics of the term, and to make that trouble productive ²³⁷. Archibald is critical of the use of ‘capture’ in reference to ‘photographing the animal’, assuming that the (neo)colonial attitude of ‘collection’ that it encapsulates discourages a more complex interaction with the natural world ²³⁸. Sontag too discusses the use of capture in her criticism of the persistent societal assumption that cameras can “capture” reality, an idea which she warns side-lines the inherent aggression and violence of the photographic act ²³⁹. Whereas “*the industrialization of camera technology*” promised to “*democratize all experiences*” in their translation into images ²⁴⁰ – a theme still evident through the tropes of revealing the ‘private lives/spaces’ of other species, and even Netflix’s 2020 aim to finally ‘lift the veil of darkness’ on non-human animals at night – the history of “capture” is neither democratic nor benign. Instead, as Haraway continues, it represents a continuation and expansion of the rhetoric of ‘the hunt’, for “*the guns were pushed behind and the camera pushed forwards*” ²⁴¹. Still the idea of ‘capture’ remains problematic, for as she explains in reference to the first photographic “collecting safaris” in the 19th century, “*cameras were a nearly useless encumbrance, incapable of capturing the goal of the hunt – life*” ²⁴². So what then can we attribute ‘capture’ to, if it is neither life, nor reality?

It is in this discrepancy that I find most promise. The discomfort and awkwardness of what we mean (and have meant) by capture makes us attentive to the affective dimensions of image-making, and the technologies and tasks of their production. ‘Capture’ here is again much more about the doing and the making, and less about representation ²⁴³ – another multi-natural achievement of unity that tells us much about the socio-cultural values that led to this form of purification ²⁴⁴, as well as the societies through which images then circulate. Returning to Latour ²⁴⁵ and Adams ²⁴⁶, this re-affirms the placement of our academic focus in the realm of ethnography, in particular the work involved in these inscriptions, translating worlds into pixels, and their capacity to create spectacle ²⁴⁷.

²³⁷ Haraway (1989); Sontag (1977)

²³⁸ Archibald (2017)

²³⁹ Sontag (1977)

²⁴⁰ *ibid*

²⁴¹ Haraway (1989) p.34

²⁴² *Ibid* p.43

²⁴³ Bousé (2003) p.123

²⁴⁴ Blok & Jensen (2011)

²⁴⁵ Latour (1999)

²⁴⁶ Adams (2017)

²⁴⁷ Igoe (2010)

I will also ask how these alternative processes of knowledge production inform, and are informed by, our relationships to polar bears. How does this co-shaping also determine what we understand their conservation to look like? This is perhaps most pertinent in the contemporary use of the species as a climate metaphor, but it is also rooted in longer histories and human-animal kinship, conception, and imagination. Initially I wanted to call these ‘virtual bears’, but I felt that this terminology did not do enough work to foreground the materiality at the heart of the actor network, nor the living breathing bears at the centre of these encounters. Instead, befitting the age, they might be understood to be ‘digital’ – provoking new questions and vocabularies. What are these hybrid photo-bears of our image worlds, what are the digital worlds that they inhabit, and how are their lives and futures affected by the roles that they play on our screens?

1.8 Knowing Polar Bears: Multi-Natural Conservation in the Anthropocene

With these types of questions, this literature review reaches a critical juncture, and a moment to take stock. So far, I have set out a progression of readings, theories, and ways of thinking that builds a framework for approaching the notion of ‘knowing polar bears’. It began with the identification of the Anthropocene, not as a fundamental ontological revolt, but as a decisive philosophical and political moment that can do huge work both for us and on us ²⁴⁸. I proposed we follow Latour’s assertion that the Anthropocene unseats the “Modern”, in doing so bridging the now “discredited breach” of the ‘great divide’ between humans and nature ²⁴⁹. After Haraway ²⁵⁰, Lorimer ²⁵¹, and Van Dooren ²⁵², using ‘the Anthropocene’ instead prompts us to think with multiple discordant natures rather than a singular figure of external and universal Nature. This hybrid multi-naturalism is inseparable from our ways of knowing (and living in) the world. Here, I used the work of Candea and Alcayna-Stevens ²⁵³, Yates-Doer & Mol ²⁵⁴ and Latour’s ²⁵⁵ development of Actor-Network Theory (ANT), to propose approaching multi-naturalism ethnographically, and to foreground the importance of the ‘doings’ and ‘makings’ (beyond representation) at the heart of knowing polar bears. It is through these networks, institutions, and individuals that different natures are enacted, different understandings of polar bear are purified. Finally, I outlined two primary groups of actants – natural science and scientists, and wildlife filmmakers and photographers – that represent productive sites for ethnographic work. Then, I began to think with

²⁴⁸ Bonneuil & Fressoz (2016); Latour (2013); Macfarlane (2016)

²⁴⁹ Haraway (1991) p.152; Bonneuil & Fressoz (2016)

²⁵⁰ Haraway (1991); Haraway (2008)

²⁵¹ Lorimer (2015)

²⁵² Van Dooren et. al. (2016)

²⁵³ Candea & Alcayna-Stevens (2012)

²⁵⁴ Yates-Doer & Mol (2012)

²⁵⁵ Latour (1999); Latour (2005)

the work of Traweek ²⁵⁶, Casadevall & Fang ²⁵⁷, Star & Griesmer ²⁵⁸, Boonman-Berson ²⁵⁹, Adams ²⁶⁰, Haraway ²⁶¹, Sontag ²⁶², not only about framing the historically/politically embedded roles of both science and image-capture in the production of knowledge (specifically about non-humans), but also about the significance of individual tasks and technologies, as well the societies of actants in which they circulate. Hence we reached the point of asking what kinds of bears we would find here?

Concurrently, in this section I will suggest the significance of this theoretical progression (of coming to re-frame how we ‘know polar bears’ and our understandings of them as a species) for the work of ‘wildlife conservation’. ‘Conservation’ has already figured sporadically throughout my writing, but I have yet to address the term in any greater length. Whilst this is not a manifesto for how my research can be operationalised – which I believe to be well beyond the scope of my enquiry – it is my hope that it can raise further questions. These are not only about the kinds of impacts that knowing wildlife in this way might have upon conservation as a discipline, but also about the very nature(s) of conservation as an enterprise itself, as well as its enfolded role in actively co-producing those very natures. As Lorimer rightly explains: “*A hybrid discordant ontology of wildlife has important epistemological and political considerations for conservation*” ²⁶³.

After Adams, I start by considering ‘conservation’ to be an explicit value judgement made about the relationships between humans and nature(s) ²⁶⁴. It describes a set of practices, imaginations, and choreographies about the world we want to live in and the species/ecologies/ecosystems with which we want to share it. Four years ago, this research began as an exercise in ‘Conservation Social Science’, after Bennett et. al.’s *Conservation Biology* publication *Mainstreaming social sciences in Conservation* ²⁶⁵, hoping to integrate more social sciences into a discipline formerly dominated by the natural sciences. Since then, it has begun to sit more firmly in the Environmental Humanities ²⁶⁶, with an

²⁵⁶ Traweek (1988)

²⁵⁷ Casadevall & Fang (2015)

²⁵⁸ Star & Griesemer (1989)

²⁵⁹ Boonman-Berson et. al. (2016)

²⁶⁰ Adams (2017)

²⁶¹ Haraway (1989)

²⁶² Sontag (1977)

²⁶³ Lorimer (2015) p.9

²⁶⁴ Adams (2002)

²⁶⁵ Bennett et. al. (2016)

²⁶⁶ Rose, D. B., Van Dooren, T., Chrulw, M., Cooke, S., Kearnes, M. & O’Gorman, E. (2012) Thinking through the Environment, Unsettling the humanities, *Env. Hum.* **1**; O’Gorman, E., Van Dooren, T., Münster, U., Adamson, J., Mauch, C., Sörlin, S., Armiero, M., Lindström, K., Houston, D., Augusto, P. J., Rigby, K., Jones, O., Motion, J., Muecke, S., Chang, C., Lu, S., Jones, C., Green, L., Matose, F., Twidle, H., Schneider-Mayerson, M., Wiggin, B. & Jørgensen, D. (2019) Teaching the Environmental Humanities: international perspectives and practices, *Env. Hum.* **11**(2). These texts have been instrumental in situating my work within an interdisciplinary area of critical environmental scholarship.

acknowledgement that many of the ‘environmental issues’ it was concerned with are “*inescapably entangled with human ways of being in the world, and broader questions of politics and social justice*”²⁶⁷. My approach to ‘conservation’ itself, therefore, increasingly becomes more reflexive. What began as an aim to highlight the paucity of discussions where “*conservationists ... argue about their practices without discussing the values underlying their positions*”²⁶⁸, has expanded to show the impoverished nature of the uptake of humanities scholarship as a whole, the “narrow conceptualisation of human agency, social and cultural formation, ... and the entangled relations between human and nonhuman worlds”²⁶⁹. The calls within the Environmental Humanities for more “integrated and conceptually sensitive” approaches²⁷⁰ helps to further situation ‘conservation’ as inseparably bound up with the Actor Networks of knowledge production, and the ways of knowing wildlife that they produce.

Just as Latour, in *New Literary History*, describes his red tuna-sushi-political web, whereby “biodiversity” sits at the surprising intersection of “political institutions devoted to their protection ... the great chain of predators and prey ... Japanese consumers, activists, and even President Sarkozy” [and his regulation of Mediterranean fishing fleets]²⁷¹, polar bears inhabit equally branched and diverse ecologies. Just as I began to ask what sort of polar bears we might find here – co-produced within and between these sites, entanglements, materials, bodies, and politics – it is clear that I am also asking simultaneous questions about conservation. These processes of knowledge production and co-shaping (enacted by scientists, photographers, etc.) are also those which define many of the objects of conservation work, in turn guided by and guiding a different set of institutions, legislation, practices, and imaginations. By asking how we ‘know polar bears’, I am also asking what constitutes a ‘conservable bear’ – both in terms of the knowledge requirements of a ‘governable bear’ (what do we consider that we need to know to make certain kinds of decisions), as well as a ‘desirable bear’ (what do we want), in terms of its spectacle, charisma, and capacity for storytelling.

Further questions result from this realisation, and these will re-occur throughout this thesis. Are the actants who lay a claim to knowing polar bears (scientists, technicians, photographers etc.) also those that claim to be conserving them? What do their multiplicitous conceptualisations of the species mean for the ‘polar bear’ that we hope and aim to conserve? Is it possible to take multi-naturalism seriously in conservation? Or to put it all simply, what are we conserving, and why?

²⁶⁷ Rose et. al. (2012) p.1

²⁶⁸ Hunter, M., Redford, K. H. & Lindenmayer, D. B. (2014) The Complementary Niches of anthropocentric and Biocentric Conservationists, *Conservation Biology*, **28**, 641-645.

²⁶⁹ Shove, E. (2010) Beyond the ABC: Climate change policy and theories of social change, *Env. and Planning A*, **42**(6); Rose et. al. (2012)

²⁷⁰ *ibid*

²⁷¹ Waterton, Ellis, & Wynne (2013)

1.9 Conclusions: “*Imagining Extinction Conservation*”

As I set out in the previous section, 1.7, the foundation for my asking these kinds of questions – ‘what are we conserving and why’ – has well-established roots within and between numerous academic, literary, and philosophical traditions. It emerges from fundamental shifts in thinking surrounding the Anthropocene ²⁷², multi-naturalism ²⁷³, hybrids, cyborgs ²⁷⁴ and, at its most basic level (in terms of basis rather than simplicity) how we as humans produce and mobilize knowledge about other non-human species. It encapsulates the progression of ‘knowing polar bears’ that I hoped to foreground: the importance of the tasks, technologies, and encounters with/where different actants come to momentarily understand polar bears; the institutions, individuals, and societies in which this work occurs; their politics, histories, values, and (disciplinary/personal) traditions; the ‘translations’ and ‘purifications’ instigated by those actants as different objects/concepts are mobilized through the actor-network. I went on to assert that the multiple understandings of the polar bear that are enacted here (by scientists (ecologists, toxicologists, statisticians), technicians, photographers, filmmakers etc.) are inexorably bound up with the cares and concerns of ‘polar bear conservation’. Whilst calling these actants ‘conservationists’ and this entire exercise an ‘ethnography of conservation’ would be problematic (as I will come to discuss in the chapters that follow), my framing of ‘knowing polar bears’ in this way does demonstrate the process whereby different understandings of the species become the objects of conservation work/discourse. The aim is to highlight that the polar bears here are not fixed and external, but dynamic, multiple, and socially/culturally situated.

In conclusion, I will think a little more about these ‘polar bears of conservation’ and what they can tell us about ourselves as humans and our shared future, as well as continuing to locate these lines of enquiry within corresponding literature. Primarily, this follows the two strands of what constitutes a ‘conservable bear’ that I defined previously. The first is the concept of a ‘governable’ or ‘manageable’ polar bear. During my MPhil thesis on brown bear conservation in Scandinavia (itself an exercise in planning the methodology and methods of this subsequent PhD project) I considered the application of Foucauldian “governmentality” to these questions of wildlife conservation and management ²⁷⁵. Just as Lorimer discusses biopolitics and the “*rise of a set of powerful knowledge practices that construct standardized models ... and inform technologies that discipline individual adherence to these*

²⁷² Macfarlane (2016); Bonneuil & Fressoz (2016)

²⁷³ Lorimer (2015); Haraway (2008)

²⁷⁴ Van Dooren et. al. (2016); Haraway (1991)

²⁷⁵ Asdal (2008); Foucault, M. (1991) ‘Governmentality’, trans. Braidotti, R., revised by Gordon, C. in Burchell, G., Gordon, C. & Miller, P. (eds) *The Foucault Effect: Studies in Governmentality*, pp.87-104, University of Chicago Press, Chicago.

subjectivities”²⁷⁶, I draw links between the ways that we come to know polar bears and how we as humans then came to police the boundaries of that particular ‘known’ species concept and our relationship to it.

This describes the idea that coming to know polar bears (particularly from the standpoint of the scientist) and all the tasks, technologies, and translations that it involves, was also a process whereby different disciplinary parameters are set. By this, I refer to both the outlining of more conventional knowledge requirements (what do we need to know about the lives/ecologies/bodies of the polar bear in order to act/intervene), as well as the more subjective judgements about what constitutes ‘normal polar beariness’ (what should a polar bear look like, how should it behave, and where should it be?). These are questions about the ethological and ecological designations of how we live with nonhumans. Whilst in this thesis I am leaning away from the Foucauldian rhetoric of discipline and domination, the notion of making bears ‘governable’ is an valuable lens through which to think about the links between the production of knowledge, nature-cultures, and the performance of conservation, as well as the institutional and legislative landscape that exists here. As Ursula Heise explains, even “*biodiversity laws clearly demonstrate just how much conservation is... a product of the cultural imagination rather than just of scientific investigation*”²⁷⁷.

The second aspect of the ‘conservable bear’ revolves around what is perceived to be ‘desirable’. Whilst this clearly interlinks with some of the biopolitical concerns of the ‘governable’, by this I refer to a far broader consideration incorporating aspects of spectacle, charisma, and affect. In conservation discourse, this perspective has historically lost out to the functionality of the first – defined by approaches that espouse ecosystem services, ecological function, and other demonstrably measurable parameters of biodiversity value. For the bears, as I will discuss in chapters 4 and 5, these measures frequently take the form of inferring and ensuring reproductive recruitment success. Instead, a wider understanding of ‘desirable’ questions the sort of polar bear that we want to make live – how our different socio-cultural productions of knowledge come to inform conservation practices and the imagined pasts, presents, and futures upon which they rest. This is as much about storytelling as it is about population ecology. Following Ursula Heise’s publication *Imagining Extinction: The cultural meanings of endangered species*²⁷⁸, I hope that analysing what constitutes a ‘conservable polar bear’ will open up the same types of question that she poses. What stories do we tell about them, what do

²⁷⁶ Lorimer (2015) p.13

²⁷⁷ Heise (2016)

²⁷⁸ *ibid*

the images we use hide/reveal about them, how do these materials relate to broader social conflicts and cultural values – human dimensions of our sense of self, identities, origins, and horizons ²⁷⁹?

Heise herself focusses her discussion on the concept of endangerment and what it might mean to transition into ‘extinction’ in its many forms ²⁸⁰. She proposes that cultural scholars should be paying close attention to the wealth of cultural material about extinction: “*Coffee-table books, TV documentaries, and endangered species laws are all in different ways shaped by ... broader narratives, and these objects themselves contribute to perpetuating or subtly changing the stories*” ²⁸¹. For the polar bear, I have on occasions wondered whether I am engaging in an exercise in eulogising, exploring the multi-natural breadth of understandings of what we stand to lose – just as Heise presents different forms of the same extinction storylines: ‘*Saving X*’, or ‘*The Last of Y*’ ²⁸². However, it is clear that the polar bear is a species at a different juncture whose ‘endangerment’ is understood very differently from that of other large carnivores like the Iberian Lynx or the Red Wolf. Whilst its ecology and decline are bound with narratives of global environmental and climatic catastrophe, biodiversity crisis, and the anthropogenic accountability for ‘extinctions’, ‘extinction’ itself is not yet in the equation for the polar bear’s future ²⁸³. Instead, as indicated by my alterations to Heise’s pivotal theme in the subtitle, this is more an enterprise of ‘imagining conservation’ – a gestural allusion to the opposite side of the same coin. It is an active engagement with different modes of living with polar bears, what conservation looks like, and what is deemed a success?

These ideas form an undercurrent to the entire thesis, and guide it as some of my primary research questions. They are relevant to all my chapters – in the analysis of: the tasks and technologies of the scientific research in Svalbard (chapter 3); the image-worlds and enactment of polar bears by Svalbard photographers and filmmakers (chapter 4). It links together the production of knowledge, our multiple understandings of the polar bear, and our conservation values. However, they are perhaps most relevant to my final thematic chapter (5) where I discuss captive bears in the European zoo environment, another set of sites and spaces where ‘knowing polar bears’ is embedded and negotiated.

This aspect of my ethnography is a provocative wild experiment ²⁸⁴, designed to test the logical boundaries of the ideas I have been working with here. The same foundational themes and literature

²⁷⁹ Ibid; Rose, D. B., Van Dooren, T. & Chrulow, M. (2017) *Extinction Studies: Stories of Time, Death, and Generations*, Columbia University Press, Columbia.

²⁸⁰ Heise (2016)

²⁸¹ ibid

²⁸² ibid

²⁸³ Clark, D. (14/05/2018) *Research Interview*, Skype, SPRI, Cambridge.

²⁸⁴ Lorimer (2015)

are applicable here too, some to an even greater extreme: the stark natural-cultural hybrids of the Anthropocene, enfolded socio-political and ecological histories, odd dystopian architectures where numerous natures become known through a selection of imageries, technologies, and encounters. After Kareiva, it is interesting to think with the idea of ‘domestication’ in a space where the term is popular, whilst at the same time consider where the boundaries of (wild)life exist in a world whose future planetary ecology is already pervasively re-shaped by humans²⁸⁵. I will also draw upon the work of Hobbs et. al.²⁸⁶ and Mooallem²⁸⁷ asking whether we can apply ‘novel ecosystems’ and ‘novel ecologies’ work to the surreal spaces and “performance art” of the zoo environment. For the polar bears in these institutions, it is perhaps not so much about ‘saving species’ as it is about the stories that we tell around the idea of saving them - a practice of choreographing our imaginations of conservation, our roles in the lives of nonhumans, and their roles in ours. As Heise concludes, *“even though these efforts are often undertaken in the name of nature and the restoration of wild things that used to be, they more closely resemble a collective construction of alternative natures that obeys cultural impulses more than scientific ones”*²⁸⁸.

Here, once more, is the crux of my thesis, played out again in zoos and wildlife parks across Europe, over 2000km further south than the focus of the majority of my research. In asking what we can learn from these bears, I hope to again echo Heise’s assertion that *“studying the imaginative webs that surround endangered species will... be helpful in thinking about conservation ... in the future”*²⁸⁹. In this context, and the others throughout my entire thesis, I propose that we need to find new and “affirmative visions of the future”²⁹⁰, re-framing how these diverse, interconnected sites and practices of ‘knowing polar bears’ come to shape their very lives, natures, and how we imagine their conservation.

²⁸⁵ Kareiva, P., Watts, S., McDonald, R. & Boucher, T. M. (2007) Domesticated Nature: Shaping Landscapes and Ecosystems for Human Welfare, *Science* **316**(5833): 1866-9; Heise (2016)

²⁸⁶ Hobbs, R., Higgs, E. & Hall, C. (2013) *Novel Ecosystems: Intervening in the New Ecological World Order*, Wiley, London; Hobbs, R. J., Higgs, E. & Harris, J. A. (2009) Novel Ecosystems: implications for conservation and restoration, *Trends in Ecology and Evolution*, **24**(11), 599-605.

²⁸⁷ Mooallem, J. (2013) *Wild ones: A Sometimes dismaying, weirdly reassuring story about looking at people looking at animals in America*, Penguin, New York.

²⁸⁸ Heise (2016)

²⁸⁹ *ibid*

²⁹⁰ *ibid*; Guha, R. & Martínez-Alier (1997) *Varieties of Environmentalism: Essays North and South*, Earthscan, London.

Chapter 2: Animal Biography as Methodology

Where/Who are we now?

In the first chapter, I set out a progression of theoretical steps that aimed to highlight how I intend to approach ‘knowing polar bears’ and their conservation. I followed Latour’s claim that we have *never been modern* away from a universalist single Nature into a discussion of the actor-networks and assemblages that constitute a multi-natural world ²⁹¹. Here, I was wary of the consequences of an absolutist ‘ontological turn’ towards total unmediated relativism ²⁹². With this in mind, I advocated an ethnographic approach to (multi-) naturalism, after Candea and Alcayna-Stevens ²⁹³, and Yates-Doerr & Mol ²⁹⁴. I proposed to multiply our perspectives of polar bears, understanding wildlife as a hybrid natural-cultural construct at the heart of an entangled actor-network of different actants (all claiming to know and/or conserve the polar bear). I asked us to take seriously these multi-natural polar bears in conservation work, through an engagement with the various cultural, political, and virtual ecologies that they inhabit. This is not just a question of how myself and different actors (scientists, filmmakers, managers etc.) come to know polar bears, but also how they are made governable through the “differentiated collection of practices that constitute... conservation” ²⁹⁵. What is a polar bear, and what is it that we are really conserving? Here, I set about developing a methodology to answer these questions.

Introduction I: Living With(out) Polar Bears

“While history is dominated by attempts that try to standardize, de-individualize and automatize the behaviour of animals, it also proves to be littered with records of the exceptional lives of unusual animals.”

– Krebber & Roscher (2018) p.10

It was never my intention nor imagination that this work would be so affected by an individual bear, let alone turn to thinking with ‘biography’. As it was proposed, my research was interested in polar bears as an entire species, situating them within the diverse more-than-human cosmopolitanisms of conservation work ²⁹⁶. I developed the framework for a multi-sited ethnography to examine the

²⁹¹ Latour (1991); Latour (1999); Deleuze & Guattari (1987)

²⁹² Candea & Alcayna-Stevens (2012); Henare et. al. (2007)

²⁹³ Candea & Alcayna-Stevens (2012)

²⁹⁴ Yates-Doerr & Mol (2012)

²⁹⁵ Lorimer (2012) Multi-natural Geographies for the Anthropocene, *Progress in Human Geography*, **36**(5), 593-612, p.599.

²⁹⁶ Barua, M., Beisel, U. & Ginn, F. (2014) Flourishing with Awkward Creatures: Togetherness, Vulnerability, killing, *Environmental Humanities*, **4**, pp.113-123; Lorimer (2012)

translations ²⁹⁷, purifications ²⁹⁸, and engagements of/with polar bears that occurred throughout these networks – from Svalbard, to Tromsø, to Yorkshire. This ethnography was intended to develop a holistic representation of polar bears and their spaces. It would be attentive to the agency and ethology of animals themselves (even if effaced) ²⁹⁹, how bears and bear lives became enfolded within these hybrid, technological, and multispecies assemblages ³⁰⁰. However, whilst I wanted to make these bears and their bodies present, I was also producing what Lorimer terms a *typological essentialism* (after Ansell-Pearson ³⁰¹), whereby all differences of individuals are subsumed within the identity of the species and thus rendered equivalent ³⁰². At the time this felt unavoidable without ever having met (or more specifically, never individualized) a polar bear. But this changed in 2017 with my *not* meeting another polar bear.

* * *

In the morning of 31st August, I made the decision to hike from the house I had rented on Vei 234 in Longyearbyen up onto the plateau ‘Platåberget’ to the southwest of the town. Starting from the eastern edge, the street dips down to a row of bridges that traverse the bursting late-summer stream of brown meltwater that cuts the town in two, flowing into Adventfjord from the glacial peaks of Nordenskiöld to the south. From there, smaller streets and paths weave up the western bank, past the Sysselmannen’s office, under the dilapidated pylons leading to disused Mine Number Two, and up to a first ridge of frozen tundra grass in the shadow of the plateau. The northern slope, the only route up from the Longyearbyen-ward-side is steep and frozen. In the shadowy troughs the rocks are stuck fast, and slick with black ice. On the sunny outcrops they are wet and loose, shifting under each footfall and sinking into saturated moss and mud. My ascent is an all-fours scramble, always leaning slightly to the left to prevent my rifle from clumsily swinging to the ground. The intermittent path itself is a well-worn stream channel for the melting snow above. The relief of the top is repeatedly delayed, hidden by a succession of unsighted ridges cradling deep ice-edged snow pockets. Lines of ptarmigans flank the cliff edge, stark white bellies between their brown backs and the long shadows at their feet.

To the northwest of the plateau is Longyear airport, and, weather-permitting, daily flights take off and ascend east along Adventdalen before curling southwards. On this day, the governor’s helicopter rises

²⁹⁷ Blok & Jensen (2011)

²⁹⁸ Latour (1999)

²⁹⁹ Howell (2017)

³⁰⁰ Haraway (2008); Lorimer (2015); Van Dooren et. al. (2016)

³⁰¹ Ansell-Pearson, K. (1999) *Geminal Life: The Difference and Repetition of Deleuze*, New York, Routledge.

³⁰² Lorimer (2012) p.600

from beyond the edge and moves north, staying low over the estuary out towards the abandoned houses at Hiorthhamn on the opposite side of the water. Reaching the beach, it banks left and traces the shoreline out to Revneset where the slope of Louisfjellet meets *Isfjord* and my line of sight ends. It patrols this edge a few times, looping back, hovering, before moving off around the headland. Further on, in the centre of the plateau at Ninavarden is a memorial to its namesake, Nina Jeanette Olaussen, a young unarmed hiker who was killed at this place by a polar bear on March 30th 22 years previously. I pause a minute, and imagine bears not here.



Fig.3 Due North, *Platåberget* in the mid-left, *Longyearbyen* below, and *Hiorthhamn* under the rainbow to the right (H. Anderson-Elliott, 2017)

This non-encounter has proved extraordinarily significant. The governor's office for Nature Management (Miljøvernavdelingen) was responding to reports of a female polar bear and her two year-old cubs approaching Longyearbyen from the north. They had reached Revneset where they were investigating cabins, drawn by the smell of breakfasting tourist groups and the frozen carcass of a reindeer. The helicopter was sent to scare them away, shepherding them back along the coast and up into neighbouring fjords. Back in Longyearbyen over the coming days, photographs from the tourist groups at Revneset trickled back through social media. Meanwhile, this adult female polar bear made her presence felt in the interviews with every participant that I spoke with, all recounting their experiences of knowing this local bear. She is the Tempelfjord isbjørn to inhabitants of the town (tourism workers and guides) and the managers of the Governor's office, Misha or Frost to the filmmakers and photographers, and N23992 to the scientists at the Norwegian Polar Institute (NPI) in Tromsø. To me, I know her as Misha after she was first introduced to me by that name by filmmaker Jason Roberts, and I continue to refer to her as such during my own personal accounts of searching for this bear.

I found this process extremely affecting. Here, it seemed, was an invitation to individuate a polar bear – to explore the awkward and contradictory world of trying to get to know a living animal. Standing at

Ninavarden on the plateau, I was reminded that bear-as-individual is so often a posthumous distinction, made at necropsy to determine why a single bear broke so lethally from the collective (most-frequently for the bear itself). Instead, this lively potential was deeply unusual, so much so that I felt the need to notify my colleagues and family that such an opportunity seemed to be emerging. Meanwhile, more and more participants would continue to offer up the same incitement: “I know this bear”.

In his chapter in the publication *Animal Biography*, Matthew Chrulew discusses the Swiss biologist Heini Hediger’s deeply affecting encounter with a “biting monitor” that he was keeping as a zoo specimen³⁰³. It would forever change the way he wrote, both from the debilitation of his wrist injury and his altered way of thinking. “With a defiant bite, this anonymous yet singular lizard left its trace and marked those of its keeper. It entered into Hediger’s auto-zoography, and thus into the annals of animal behavioural science”³⁰⁴. Here was both a scientist and a discipline imprinted and influenced by the life of a single animal, whose individuality “breaks to the surface in spontaneous eruptions”³⁰⁵. So too, Misha has left tracks and traces throughout my research. Not only in Longyearbyen in 2017, but both before and after that non-encounter she has led me through the field – through other encounters, moments of co-production, bodies, contact zones, stories told, and the networks of polar bear ‘lives lived’ and of their ‘lives conserved’. She is a living and ‘vital subject’³⁰⁶, not only grounding my discussions of the multi-naturalism of polar bear conservation through her interactions with nearly every one of its actants, but also posing questions of agency and animality through her own subjective experiences.

In May 2018 I tried and failed again to find her, taking snowmobiles east along Adventfjord and up to her last known GPS position beamed from the collar around her neck. Still with her two 2016/17 cubs, she was reported to be down the eastern end of Tempelfjorden by the glacier front, where she often finds refuge. Like Peter Matthiessen’s snow leopard, in his book of the same name³⁰⁷, this Svalbard polar bear is a paradox of absence and presence. She forces me to re-imagine what it means to be affected by, as well as to live with(out), polar bears³⁰⁸. I am also reminded of Mira Shah’s account of

³⁰³ Chrulew, M. (2018) ‘Living, biting monitors, a morose howler monkey and other infamous animals: Animal Biographies in Ethology and Zoo Biology’, Chapter 2, in Krebber, A. & Roscher, M. (2018) *Animal Biography: Re-framing Animal Lives*, Palgrave Macmillan, London, p.32.

³⁰⁴ Ibid p.32

³⁰⁵ Krebber, A. & Roscher, M. (2018) *Animal Biography: Re-framing Animal Lives*, Palgrave Macmillan, London, p.17.

³⁰⁶ Castellano, K. (2018) Anthropomorphism in the Anthropocene: Reassembling Wildlife Management Data in *Bear 71, Environmental Humanities*, **10**(1), p.171-186.

³⁰⁷ Matthiessen, P. (1979) *The Snow Leopard*, Chatto & Windus, London.

³⁰⁸ Despret, V. (2004) the body we care for: figures of anthropo-zoo-genesis, *Body & Society*, **10**, 111-134; Despret, V. (2015) Thinking like a rat, *Angelaki*, **20**, 121-134; Despret’s work has here been instrumental in reconsidering the role of animals and animal subjectivity in the research process.

Animal Life Stories in primatological narratives of fieldwork ³⁰⁹. “There are key primate individuals” she states, “that – without ever having met them – I know quite immediately” ³¹⁰. Just like chimpanzees Flo, David, and Evered, polar bear Misha/Frost/N23992 demonstrates the ‘awkward’ nature of knowing animals ³¹¹. Bound up in this awkwardness is her elusiveness within the challenging Svalbard terrain, the continued collation of individuality with broader *species* traits, the multiple stories and storytellers who narrate her, misidentification, as well as the trouble of knowing (as Hediger would attest to) ‘species that bite’ ³¹².

“These explorations may be the result of a well-designed research program or a mere coincidental stumbling over a life influencing other lives.”

– Krebber & Roscher (2018) p.18

From this moment on Platåberget in 2017, as well as from well before then, this Svalbard bear has emerged as a fully entangled participant within my research. She is a uniquely ubiquitous polar bear, inhabiting both my work and my imaginations of polar bear-ness for years previously. She has been filmed and photographed extensively, gracing the screen for ITV, National Geographic, and numerous other nature documentaries and films. She was part of the BBC’s 2015 series *The Hunt*, which has sat on DVD on my bookshelf from before I started this project. She is one of numerous anonymous polar bear data-points that underpin nearly a decade of scientific publications/reports from NPI, WWF, and the IUCN Polar Bear Specialist Group. In late 2018, a colleague at SPRI placed a postcard on my desk, purchased from the gift shop of the museum downstairs. Taken by Rolf Stange in 2013, it shows a photograph of a polar bear and a single young cub. It is unmistakably Misha – who I have learned to recognise by her facial markings, her distinct long beard, her low back and her rounded rump – with one of her two cubs born over the 2012/13 winter. Her life (that I believe she still lives) is enfolded within my examination of polar bear conservation in Svalbard, as are the lives/deaths of her cubs, her technological traces, scientific datasets, her ethology, ecology, and future.

³⁰⁹ Shah, M. (2018) ‘Animal Life Stories; or, the making of animal subjects in primatological narratives of fieldwork, chapter 7, in Krebber, A. & Roscher, M. (2018) *Animal Biography: Re-framing Animal Lives*, Palgrave Macmillan, London.

³¹⁰ Ibid p.147

³¹¹ Barua et. al. (2014); Lorimer, J. (2014) On Auks and Awkwardness, *Environmental Humanities*, **4**, p.195-205.

³¹² Barua et. al. (2014); Chrulew (2018)



Fig.4 Eisbärenfamilie, *Polar Bear Family*, Taken in Tempelfjord, (Source: R. Stange 2013, www.spitsbergen-svalbard.com)

Introduction II: Thinking about ‘Individuation’

Briefly, before I continue to propose a methodology to bridge the multi-naturalist approach of my framework for ‘knowing polar bears’ with my engagement with the life of this Svalbard bear, it is important to clarify a theoretical basis for the individuation of animals in this way. What is the significance and meaning of an ‘individual polar bear’? The answer is conceptually thicker than simply a ‘single life’, and highlighting this richness is key to affirming its value in my development of a more-than-human ethno-bio-graphical methodology.

Various fields and disciplines have begun to apply the term ‘individuation’ to the context of non-human animals – in doing so, primarily concerning themselves with what makes a single animal “different” or “unique”. Much of this work, as one might imagine, has occurred in what Venn ³¹³ terms broadly “*monocausal paradigms*” such as genetics ³¹⁴, or socio-biology ³¹⁵, as well as considerations of

³¹³ Venn, C. (2010) Individuation, Relationality, Affect: Rethinking the human in Relation to the Living, *Body & Society*, **16**(1), 129-161, p.129.

³¹⁴ de Bivot, B. L., Buchanan, S. M. & Kain, J. S. (2015a) Neuronal control of locomotor handedness in *Drosophila*, *PNAS*, DOI: 10.1073/pnas.1500804112; de Bivot, B. L. et. al. (2015b) Behavioural idiosyncrasy reveals genetic control of phenotypic variability, *PNAS* **112**(21), 6706-6711; Singer, E. (2015) ‘Roots of animals’ individuality revealed with ‘groundhog day’ experiments’, *Quanta Magazine* 01/06/15, Online, Available at: [<https://www.scientificamerican.com/article/roots-of-animals-individuality-revealed-with-groundhog-day-experiments/>], Accessed: 05/02/20.

³¹⁵ McIntosh, R. P. (1995) H. A. Gleason’s ‘individualistic concept’ and theory of animal communities: a continuous controversy, *Biology Rev. Camb. Philo. Soc.*, **70**(2), 317-57.

personality ³¹⁶, physiology ³¹⁷, or neurobiology ³¹⁸. Other contemporary engagements with the individuation of non-humans have turned towards the troubling ‘mass’ of the farm ³¹⁹ and other sites of mass-producing life in “undifferentiated multitudes”. In each context, ‘individuation’ has been applied to determine the “ways in which each single body takes on the form and life that it does” ³²⁰. At the same time, as Buller reminds us, it asks us to consider when and how it matters – different forms of “affective relationality” that arise both from moments where individual animals break from the collective, and from our interactions that acknowledge and account for them ³²¹.

Individuation itself has its roots in early 20th-century psychoanalysis ³²². C. G. Jung originally defined it as a “process of differentiation” from the “norms and values of the society in which the individual is immersed” ³²³. Philosophical debate has raged about the limits and conceptions of this process, from Deleuzian *singularity* to Foucauldian *specificity*, about whether it is intrinsically self-defined to the exclusion of all others, or inversely defined by its confrontation of limits set through relations with others ³²⁴. This distinction has also spilled over into the fields of Anthropology, and concurrently into the theoretical engagement with non-humans ³²⁵.

Stiegler is insistent in his distinction *in kind* between human and animal individuation, based on the complex human archive of inscriptive technologies and our capacity to read, view, and hear works from the past ³²⁶. Here however, my consideration of these emergent and enfolding forms of non-human

³¹⁶ Goursoot, C., Düpjan, S., Kanitz, E., Tuchscherer, A., Puppe, B. & Leliveld, L. M. C. (2019) Accessing Animal Individuality: links between personality and laterality in pigs, *Current zoology*, **65**(5), p.541-551; Yerkes, R. M. & Yerkes, A. W. (1917) ‘Individuality, Temperament, and Genius in Animals: Research that lets us appreciate human individuality’, *Natural History Magazine ‘Picks from the past, 1917’*, Online, Available at: [https://www.naturalhistorymag.com/picks-from-the-past/21446/individuality-temperament-and-genius-in-animals] Accessed: 15/02/20.

³¹⁷ Careau, V., Thomas, D. K., Humphries, M. M. & Réale, D. (2008) Energy metabolism and animal personality, *Oikos*, **117**, 641-653.

³¹⁸ Freund, J., Brandmaier, A. M., Lewejohann, L., Kirste, I. & Kritzler, M. et. al. (2013) Emergence of individuality in genetically identical mice, *Science*, **340**: 756-760.

³¹⁹ Buller, H. (2013) Individuation, the Mass and Farm Animals, *Theory, Culture and Society*, DOI: 10.1177/0263276413501205.

³²⁰ Colebrook, C. (2018) ‘Fragility’, Chapter 16, in Turner, L., Sellbach, U. & Broglio, R. (eds) (2018) *The Edinburgh companion to Animal Studies*, Edinburgh University Press, Edinburgh, p.252.

³²¹ Buller (2013)

³²² Tricario, G. (2016) The individuation process in post-modernity, *Psychological Perspectives*, **59**, 461-472; Jung, C. G. (1921) Definitions. *Collected Works of C. G. Jung*, Vol. 6. *Psychological Types*, Bollingen Series XX, Princeton University Press, Princeton, NJ.

³²³ Tricario (2016) p.461

³²⁴ Hallward, P. (2010) The limits of individuation, or how to distinguish Deleuze and Foucault, *Angelaki: Journal of Theoretical Humanities*, **5**(2), 93-111, p.93.

³²⁵ Ingold (2000); Boonman-Berson et. al. (2015); Venn (2010)

³²⁶ Stiegler, B. (2015) *States of Shock: Stupidity and Knowledge in the Twenty-first Century*, trans: Ross, D., Polity, Cambridge, in Turner et. al. (2018) p.252.

individuation is contingent on these very human archives, for, as my literature review aimed to highlight, they are bound in actor-networks contingent on the same histories of technologies and inscriptions ³²⁷. After Ingold ³²⁸ and Boonman-Berson ³²⁹, I acknowledge that *“humans and ... animals undergo developments in a wider field of relationships: between humans, between animals, between humans and animals as well as with the landscape in which both dwell”* ³³⁰. My approach to individuation is therefore after Foucault, as Venn explains, exploring the complex modes of becoming, rejecting the *“anthropocentric divide between humans and animals”*, and focussing on *“relationality and affect”* ³³¹. In the continued application of this social theory to animals, I hope to enrich and expand my multi-species ethnography. I am interested in how each of the actants and participants that I research come to individuate the bear – how they approach and engage with her as a distinct and differentiated life.

Individuation is not identification, yet the two share a complex relationship. Identification is commonplace within the societies of polar bear actants – researchers, filmmakers, guides, etc. – the arrival at a conclusion that one bear is *that* one bear rather than all the others. There are taxonomic echoes here too, for identification also alludes to the subscription of a single animal to a certain species concept and its distinction from other similar species. Frequently it is accompanied by a nomenclature, most recognizably in the Linnaean binomial tradition, but also with more familiar and anthropomorphized names – Misha, Frost – or alphanumerically ordered codes – N23992. To name is certainly a pathway to individuation, but it is also vital here to acknowledge the fraught relationship with the propensity for *misidentification*. The name Misha is itself a product of this – a male name for a female bear. Yet, at the same time, misidentification remains a productive if awkward concept, for it emerges most frequently from a profound desire to identify, and crucially, from the social, cultural, and political impetuses for ‘individuation’ – i.e. why would that bear as an individual matter. This is the crux of this thesis - how polar bear-as-individual is made to matter within the societies and traditions that the actants live and work within. This individuation of polar bears is therefore culturally-situated, underpinned by the varied histories, technologies, disciplines, and imaginations of ‘polar bear societies’.

At the same time, I am intrigued by the paradox of non-human individuation in the context of wildlife conservation. Except for in rare and specific circumstances, perhaps in the cases of what Webster and

³²⁷ Turner et. al. (2018)

³²⁸ Ingold (2000)

³²⁹ Boonman-Berson et. al. (2015)

³³⁰ Ibid p.194

³³¹ Venn (2010) p.129

Erickson term ‘endlings’ ³³² (such as Sudan the northern white rhino or Martha the passenger pigeon) where the life of a single animal is bound inexorably to that of its species, individuation has little overlap with conservation concerns. Particularly for this bear, I believe she herself cannot be ‘conserved’. Instead, my foregrounding of individuation is a provocative and productive exercise in exploring human/bear relations – helping to outline what questions to ask, and how to engage with non-human worlds. The next challenge, therefore, is to further develop a methodology and vocabulary to capture the nuances of knowing this Svalbard bear.

Introduction III: Animal Biography

This chapter proposes to develop the use of *animal biography* as a means to approach my examination of polar bear conservation in Svalbard, and as a methodology which has the capacity to incorporate the ideas of ‘individuation’, ‘multi-naturalism’, and ‘knowing wildlife’ that I have been building on. I will explore the potential of thinking biographically, how it can guide a novel and modest engagement with both human actants and more-than-human life, as well as the generative potential of its frictions, imperfections, and inheritances.

As Krebber and Roscher summarize, the conventional narrative structures of biography have begun to be challenged in the wake of “new historicism and new criticism” ³³³. Not only does this allude to the ontological and epistemological shifts underpinning what Éric Baratay explains as the need to “consider animals as individuals and thus to write their lives” ³³⁴, but also the biographical form itself. As my initial exposure to this bear in 2017 attests, animal biography does not have a conventional chronological sequence ³³⁵. The story I tell (and am told) weaves between different temporalities just as it does different materials. Some biographies are re-constructed from the inside out: N23992 represents a data-bear re-constituted from analysed samples of hair, blood, faeces, urine, teeth, and tissue, after she was tranquilized and captured by NPI; others are told with the photon-thin layer of light bouncing from Misha’s surface into the lens of a camera ³³⁶, through editing software at the BBC’s natural history unit in Bristol, and onto the TV screens in our living rooms. Biography is attentive to editing and authorship, “reflecting upon the process of mediation that is inherent to the narration and production of the biography (and, indeed, all knowledge)” itself ³³⁷. As an approach, it therefore enables an engagement with multi-natural perspectives, as well as the enacted ideas of polar bear that live through

³³² Webster, R. M. & Erickson, B. (1996) The Last Word, *Nature*, **380**: 386.

³³³ Krebber & Roscher (2018) p.13

³³⁴ Chrulew (2018) p.36

³³⁵ Krebber & Roscher (2018) p.13

³³⁶ Baker, S. (2006) ‘What can dead bodies do?’, in Snæbjörnsdóttir, B. & Wilson, M. (2006) *Nanoq: Flat out and bluesome: A cultural life of polar bears*, Black Dog Publishing, London, p.149.

³³⁷ Krebber & Roscher (2018) p.16/17.

the articulations of multiple biographers. Multiple stories of this bear are possible, whilst all grounded in the life of one material-semiotic polar bear ³³⁸ individuated in different ways.

“...the biographed is always the product of the biographer, while the perspective of the biographer and biographed cannot be neatly separated.”

– Krebber & Roscher (2018) p.17

I find it useful to think with Turnbull’s discussions of hodology ³³⁹ and Deleuze’s concept of traces ³⁴⁰ whilst searching for this bear within the actor-networks and assemblages of polar bear conservation. They facilitate the handling of different knowledge traditions, as well as the performative dimensions of those knowledges’ creation ³⁴¹. I am also drawn to their rhetoric of ‘tracking’ varied polar bear paths through different spaces – as they cross boundaries, borders, and over multi-species grids ³⁴². After Fredrik Barth ³⁴³, I am reminded of his framing of ethnicity and boundary-making whereby discrete categories of identity are maintained through the inclusion/exclusion of participation. This is not only interesting to think about in reference to the ‘societies’ of biographers (scientists, photographers, etc.) and their productions of knowledge/expertise, but also, as Stokland’s work on wolves attests ³⁴⁴, what is at stake from the resultant biopolitical management of non-humans whose mobilities become subjected to different inclusive/exclusive biogeographies.

I am also guided in part by Matthew Chrulew’s pressing “animal question”: “who are they, these animals, today?” ³⁴⁵. These considerations are incorporated within the biographical imagination I propose, which enables an exploration of the different ethologies, ecologies, and ethnographies that make up this polar bear life ³⁴⁶. What is the polar bear, and where can I find it? In this way, Pierre Bourdieu’s critique of the “illusion of biography”, which posits the difficulty of “trying to recreate a life without taking recourse to its many defining relations and structures” actually becomes a reflective strength of the approach ³⁴⁷. This Svalbard bear is “placed at the heart of encounters, interspecific

³³⁸ Middelhoff, F. (2018) ‘Recovering and Reconstructing Animal Selves in Literary Autozoographies’, chapter 4, in Krebber & Roscher (2018), p.76.

³³⁹ Turnbull, D. (2007) Maps, Narratives and Trails: Performativity, Hodology and Distributed Knowledge in Complex Adaptive Systems – An Approach to Emergent Mapping, *Geographical Research*, **45**(2), 140-149.

³⁴⁰ Deleuze & Guattari (1987); Van Dooren (2014)

³⁴¹ Turnbull (2007)

³⁴² Castellano (2018)

³⁴³ Barth, F. (1969) *Ethnic Groups and Boundaries*, Little, Brown and Company, Boston.

³⁴⁴ Stokland (2013)

³⁴⁵ Chrulew (2018) p.36; Chrulew, M. (2016) ‘Animals as Biopolitical Subjects’, p.222-238, in Chrulew, M. & Wadiwel, D. (eds) (2016) *Foucault and Animals*, Brill, Leiden.

³⁴⁶ Boonman-Benson et. al. (2015) p.193; Hodgetts & Lorimer (2018)

³⁴⁷ Bourdieu, P. (1986) ‘L’illusion biographique’, *Actes de la recherche en sciences sociales*, **62**(1), 69-72; Krebber & Roscher (2018) p.13.

companionships, [and] hybrid communities”, and her biography is entwined with the conversations of knowing wildlife ³⁴⁸.

However, it is vital not to side-line discussions of animal agency. Krebber and Roscher state that “animal biographies remain external to the cognitive experience of the animals’ worlds and their relations to it” ³⁴⁹. Whilst I will argue against this assertion, it is an easy assumption to make in light of the historically representational bias of biographical writings, the often-anthropomorphizing gaze of animal individuality, and the indifference of animals to constructing their lives in biographical terms ³⁵⁰. The importance of names and naming that I alluded to earlier in chapter 1 illustrates these tendencies. Whether referred to as Misha, Frost, N23992, or the Tempelfjord isbjørn, the practice of naming (something which the bear herself has no interest in nor knowledge of) is emblematic of the inherent power dynamics of voice and authorship. They also exist with a framework of signification ³⁵¹. Voice and name are assumed to go hand in hand, as in the case of #NoNameBear – a social media campaign led by *Animals Asia* to save a bile-farmed moon bear. Her namelessness is presented as a direct result of her marginalization, “she is so insignificant, [she] doesn’t even have a name” ³⁵², and even a barrier to her beariness: “she’ll be a bear again” ³⁵³. Elena Passarello also highlights the politics of names in her brief experimental chapter on Cecil the Lion: “Dr. Walter Palmer: ... “*Obviously, if I’d have known this lion had a name ... I wouldn’t have taken it... Nobody in our party knew, before or after, the name of this lion*” ” ³⁵⁴. Therefore, by reproducing the polar bear names used by different participants/ biographers, I must be careful not to anthropomorphize this Svalbard bear and in doing so reproduce the effacing of her agency ³⁵⁵. To the contrary, I believe that *animal biography* can be attentive to the various different forms of animal agency outlined by Kean and Howell in the introduction to their Routledge edited volume on *Animal-Human History*. Agency and biography are inextricably linked ³⁵⁶, and I wish to show how animals’ experiences are enfolded within the telling of their lives through mutual becomings ³⁵⁷.

³⁴⁸ Chrulew (2018) p.36; Baratay, R. (2017) *Biographies animals: Des vies retrouvées*, Seuil, Paris.

³⁴⁹ Krebber & Roscher (2018) p.11

³⁵⁰ *ibid*

³⁵¹ Shah (2018) p.147

³⁵² Animals Asia, (2018) Twitter Account, Online, Available at:

[https://twitter.com/AnimalsAsia?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1054571962981384192&ref_url=https%3A%2F%2Fwakelet.com%2Fwake%2Fb55eaa72-5053-4b9e-a961-8ecdb0c4f6be]

Accessed: 04/10/18.

³⁵³ *ibid*

³⁵⁴ Passarello, E. (2017) *Animals Strike Curious Poses: Essays*, Random House, London, p.217.

³⁵⁵ Kean, H. & Howell, P. (2019) *The Routledge Companion to Animal-Human History*, Routledge, Abingdon.

³⁵⁶ Krebber & Roscher (2018) p.13

³⁵⁷ Castellano (2018)

Primarily, my use of biography will be open to the flourishing of more-than-human experiences within the encounters I am exploring (i.e. within scientific research, management, filming, photography, etc.)³⁵⁸. Two integral concepts for this work are provided by Hodgetts and Lorimer³⁵⁹ with their paper on animals' mobilities, and Boonman-Benson et. al.³⁶⁰ with their discussion of 'common sensing' black bears in Colorado. Thinking with these theories, I will open up space for the expression of this bear's own subjective experience in the research process. This is a challenging enterprise: "without having to read [her] mind"³⁶¹. It requires skillful practices of thinking like³⁶², being affected by³⁶³, and sensing bears beyond our photo-visual bias³⁶⁴. I will explore the atmospheres that surround the human engagements with the bear³⁶⁵, and develop a more nuanced understanding of how the numerous attempts to biography her (including my own), and their processes or individuation, impact upon her life as it is lived. Her novel home range, her predation behaviours, the deaths and taxidermy of her cubs, the trauma of her sedation and sampling, her periodic habituation to filmmakers and photographers, the intrusions of tourists, her 'management' from the governor's helicopter – ethologically and ecologically she is deeply affected by the human narratives that she embodies, as well as the tasks/technologies involved in telling those stories.

Animal Biography is a multifaceted and multi-disciplinary methodology that underpins my research process. It does a lot of conceptual legwork. It enables an engagement with multi-naturalism and multiple perspectives; it is attentive to multiple forms of agency, voice, and authorship; it embodies more-than-human ethologies and ecologies; and it enables self-reflection upon the challenges and awkwardness of knowing wildlife. At its heart, it not only demonstrates how the bear has been made knowable/conservable/governable by her biographers, but it opens up an awareness of how she has been affected by those claims, as well as showing how I (and my research) have been affected by her.

³⁵⁸ Hodgetts & Lorimer (2018)

³⁵⁹ *ibid*

³⁶⁰ Boonman-Benson et. al. (2016)

³⁶¹ Krebber. & Roscher (2018) p.11

³⁶² Despret (2015)

³⁶³ Despret (2004)

³⁶⁴ Boonman-Benson et. al. (2016)

³⁶⁵ Lorimer, J., Hodgetts, T. & Barua, M. (2018) Animals' atmospheres, *Progress in Human Geography*, DOI: 10.1177/0309132517731254; McCormack, D. P. (2014) *Refrains for Moving Bodies: Experience and Experiment in Affective Spaces*, Duke University Press, Durham.

2.2 A History of Animal Biography

As Krebber and Roscher outline, “*far from being just a (post)modern sentimental interest, individual animal lives, both real and fantastic, seem to have captivated the human imagination for a long time*”³⁶⁶. It is important to examine the historical emergence and evolution of ‘animal biography’, not only as a genre but also as a way of thinking about and engaging with non-human animals. My discussion here of varied forms of ‘animal biography’, from the contexts of early-modern natural history and classification, to more personalized literary and scientific accounts, is not a chronology, but instead demonstrates the enormous range of ways that animals are individuated and how those tropes do different kinds of work. This sets the foundation for my own application of the term, and how it is grounded self-reflectively in the politics and loaded terminologies of its past. It not only acknowledges the potential of thinking biographically about animal lives, but also re-enforces its promise as a methodological engagement with human/wildlife entanglements.

2.2.1 Animal Biography and Natural History

Some of the first occurrences of the term ‘animal biography’ emerge in 19th and early 20th century natural history³⁶⁷. The prolific writer, cleric, and polymath Reverend William Bingley published six editions of his *Animal Biography* between 1802 and 1824, the year after his death³⁶⁸. With various subtitles, such as *Popular Zoology*, or *Authentic Anecdotes of the Lives, Manners, and Economy, of the Animal Creation, Arranged According to the System of Linnaeus*, these editions were well received as popular contributions to the canon of descriptive Georgian natural history³⁶⁹. In this guise, animal biography closely adheres to the etymology of *biography* itself (1680s), from the Latinate *biographia*, through the classical Greek *bios* for “life”, and later Greek *graphia* for “record, account”³⁷⁰. The natural historian, tasked therefore with ‘writing the lives’ of the animal creation, uses biography as a term to collate individuality into broader illustrations of the species concept³⁷¹. There is a felt discontinuity here with the notion of individuation, that polar bears as individuals might matter solely to provide identifiable characteristics of a more aggregate species unit³⁷² rather than, as Krebber and Roscher

³⁶⁶ Krebber & Roscher (2018) p.10

³⁶⁷ R. L. (1908) ‘Three Animal Biographies’, *Nature* **77**, p.393-4, DOI: 10.1038/077393a0.

³⁶⁸ Bingley, W. (1820) *Animal Biography, or Popular Zoology, illustrated by Authentic Anecdotes of the economy, habits of life, instincts, and sagacity, of the Animal Creation, Volume I: Mammiferous Animals*, F. C. & J. Rivington, London. Online, Available at: [https://books.google.co.uk/books?id=nzITAAAAQAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false] Accessed 04/03/2019.

³⁶⁹ Stephen, L. (ed) (1886) ‘Bingley, William’, *Dictionary of National Biography*, Smith, Elder & Co., London.

³⁷⁰ Etymology Online (2019) ‘Biography’ Online, Available at: [<https://www.etymonline.com/word/biography>] Accessed: 27/02/2019; Krebber & Roscher (2018) p.11

³⁷¹ Lorimer (2012); Shah (2018)

³⁷² Lorimer (2012)

continue: "[to] capture our experience of other animals as individuals" ³⁷³. I argue that there is a more complex relationship here, and that this tension is also key to the acknowledgment of animal biography's important relationship with agency, (bio)power, and histories of domination.

Rev. Bingley's own account of *The White, or Polar Bear* ³⁷⁴ is littered with observations on the exploits of individual "charismatic or confounding creatures" ³⁷⁵ all endowed with gendered pronouns ³⁷⁶. He recounts the experience of "a Greenlander and his wife" whose boat is boarded by a bear, who then proceeds to "[sit] calmly where he first alighted, and like a passenger suffers himself to be rowed along" ³⁷⁷. Equally, he is impressed by the immense attraction and devotion of males to their mates, claiming to have "seen one of them, when a female was killed, come and put his paw over her, and... suffer himself to be shot rather than quit her" ³⁷⁸. However, these characterful portrayals of beariness are again less about individual disaggregation and more of a testament to universally held characteristics of their species. These bear moments are archetypal - anecdotal extrapolations for broader classificatory generalisms that themselves contribute to the totalizing gaze of early-modern natural history.

It is in these examples that early applications of animal biography are to be understood as a taxonomic tool. As Mira Shah explains, before some of the revolutionary advances in wildlife monitoring technologies in the 1960s (with the Craighead brothers and their VHF telemetry-collared Yellowstone grizzlies ³⁷⁹), much of the species-level research was garnered from the observation of individuals ³⁸⁰ without the capacity for a population-level panopticon. "Individuals are followed, observed, documented, and described" she continues, "to gain epistemological insight into the species" ³⁸¹. With an "overriding focus on the taxonomic or social collective" ³⁸², both Shah and Birke argue that these scientific accounts of animals' lives have actually "worked towards an 'obscuring of individuality'" ³⁸³. The parallel processes of identification and naming (in the Linnaean binomial tradition) were seemingly indifferent to "who or what they [were] as individuals" ³⁸⁴. However, the impetus for early-modern natural history, despite its descriptive classificatory aims, to still champion thick descriptions of animal

³⁷³ Krebber & Roscher (2018) p.11

³⁷⁴ Bingley, W. (1805) *Animal Biography, or Popular Zoology*, F. C. & J. Rivington, London.

³⁷⁵ Chrulew (2018) p.32

³⁷⁶ Shah (2018)

³⁷⁷ Bingley, W. (1805) p.281

³⁷⁸ Ibid p.284

³⁷⁹ Benson (2010)

³⁸⁰ Shah (2018)

³⁸¹ Ibid p.148

³⁸² Birke, L. (1994) *Feminism, Animals, and Science: The Naming of the Shrew*, Buckingham & Philadelphia: Open University Press.

³⁸³ Shah (2018) p.148

³⁸⁴ Birke (1994); Shah (2018) p.148

ethology and encounters maintains a disjunct relationship between the individual and the collective ³⁸⁵. It is here, in this awkward contradiction, that I find most promise in thinking and working biographically. It allows for an exploration of animal life at the level of the individual whilst at the same time contextualizing why they are made to matter within the broader ecologies that they inhabit.

Polar bears were attributed a binomial classification in 1773 by English Royal Navy Officer and explorer Constantine J. Phipps on an unsuccessful expedition towards the North Pole ³⁸⁶. The giving of this name – *Ursus maritimus* – is an overtly political act, connected to the contemporary gesturing of empire and mastery that were themselves postured through the navy's role in cartography, geography, exploration, and natural history – from Captain Cook to Phipps' close friend and shipmate Joseph Banks ³⁸⁷. As I discussed above, this nomenclature also represents an effacement of individuality under a species-level collective, a 'typological essentialism' ³⁸⁸. However, another singular polar bear features centrally in this history, and in doing so continues to enrich our understanding of the significance of telling animal lives and the crossweaves between both biography and individuation. The midshipman on the HMS *Carcass*, one of two ships that formed Phipps' expedition, was a 14-year-old Horatio Nelson ³⁸⁹. Documented in a biography of his own life by Clarke and McArthur in 1810, the teenage Nelson had a famous encounter with a polar bear after he and a shipmate had stolen from the ship during their night-watch to try and hunt one ³⁹⁰. Whilst they were unsuccessful in their attempts to shoot their "*shaggy antagonist*", the episode became immortalized through Richard Westall's oil painting *Nelson and the Bear*, and subsequent engraving by John Landseer, as part of the hagiographic material documenting the origin story of a prestigious national figure ³⁹¹. Nelson is painted bravely beating the bear with the butt of his rifle, "*coatless, gloveless and wearing buckled shoes*" ³⁹². It is hard not to echo Savours' title identifying 1773 as an 'interesting moment', not just for geography but also for this assessment of the histories of telling animal lives. Whilst Phipps' voyage was the defining threshold for the description of polar bears and their collation under the term of *Ursus maritimus*, here was an individualized bear that broke from the collective – not only as a result of its own violent agency, and not even solely in the eyes of Nelson

³⁸⁵ Terrall, M. (2017) Narrative and natural history in the eighteenth century, *Studies in History and Philosophy of Science, Part A*, **62**, pp.51-64; Farber, P. (1982) The Transformation of Natural History in the Nineteenth Century, *Journal of the History of Biology*, **15**, 1, pp.145-152.

³⁸⁶ Phipps, C. J. (1774) *A Voyage Towards the North Pole: undertaken by his majesty's command*, J. Nourse, London; Conway, M. (1906)

³⁸⁷ Phipps, C. J. (1774); Conway, M. (1906)

³⁸⁸ Lorimer (2012)

³⁸⁹ Conway, M. (1906); Savours, A. (1964) 'A very interesting point in geography': The 1773 Phipps Expedition towards the North Pole, *Arctic*, **37**: 4, pp.402-428.

³⁹⁰ Ibid p.416

³⁹¹ Ibid p.416

³⁹² Royal Museums Greenwich (2020) [online archive] <https://collections.rmg.co.uk/collections/objects/155287.html> [Accessed 02/09/2020].

himself whose lusting for its skin to give to his father speaks to the economies of non-human capital of the time (particularly in the Arctic around Svalbard)³⁹³, but as a literary foil to the character endowment of a naval hero. Once again, here is a mode of individuation that is driven by the cultural and political ethos of the times – sitting between the desire for holistic epistemological dominion over natural systems and the narrative power of single animals³⁹⁴. It also shows an acknowledgment of the role of authorship, the agency of the observer as well as the observed³⁹⁵, and the power of naming.

These tensions speak to the promise of thinking biographically for my exploration of human/wildlife assemblages. These formative early modes of animal biography are intrinsically bound up with the taxonomic concerns of binomial natural history, whilst at the same time engage productively with the lives of individual animals³⁹⁶. The frequent effacement of their agency (and, ironically, individuality) is achieved not with musket shot, but through their being identified and enrolled in the generalized nomenclature of species-level units. Animal biography is here deeply entangled in long histories of human imagination, enterprise, and convention – in the disciplinary practices and embodied learnings of its proponents, as well as with the epistemologies and ontologies of their societies and beliefs. It is a practice that speaks both to the vitality of animal worlds and to the representational power of the value-laden human schemes that wish to orchestrate their place in the order of things.

2.2.2 Named Animal Biographies

As I discussed above, the allocation of animal names is both loaded and political. It is an inherent biographical mode of identification (not only as members of a species i.e. *Ursus maritimus*, but also for singular creatures) that signifies further work being undertaken beneath the surface to subscribe the named subject to different modes of individuation. Naming is a precursor to making animals matter in human societies. For my discussion of animal biography as a methodology, it is vital to appreciate the power of the allocation of polar bear names – whether Misha, Frost, or N23992 – in enfolding polar bear lives into different worlds. Here, I contextualize this interest with an exploration of two other examples of animal biography – firstly that of Jumbo the elephant who was posthumously biographed by his keeper Matthew Scott at the end of the 19th century³⁹⁷, and secondly ‘Bear 71’: an interactive online documentary by Leanne Allison and Jeremy Mendes that documents “*the story of a female*

³⁹³ Conway, M. (1906)

³⁹⁴ Bates, M. (1954) *The nature of natural history*, Scribners.

³⁹⁵ Fleischner, T. L. (2011) *The Way of Natural History*, Trinity University Press; Fleischner, T. L. (2002) Natural History and the Spiral of Offering, *Wild Earth*, **11**: 3/4, pp.10-13.

³⁹⁶ Terrall, M. (2017)

³⁹⁷ Scott, M. (1885) *Autobiography of Matthew Scott Jumbo's Keeper, Also Jumbo's Biography, by the Same Author*, Andesite Press (2015), London.

grizzly bear monitored by wildlife conservation officers from 2001-2009” in Banff National Park, Canada³⁹⁸. These two contrasting accounts continue to demonstrate the different tropes of individuation that exist within the writing and telling of named animal lives, and what this can teach us about being attentive to the multiple ways of knowing non-human others.

Éric Baratay asserts that a shift towards a consideration of animals as ‘true individuals’ occurred in mid twentieth-century literature³⁹⁹, where “*biographies of ordinary animals*”⁴⁰⁰ emerged as a genre comparable to that of human biographies: to “*reconstruct the historical possibilities of one ... life in the past*”⁴⁰¹. However, one of the most significant examples of this impetus for “*atypical [animal] individuality*” occurred several decades earlier with the 1885 publication of the ‘*Autobiography of Matthew Scott, Jumbo’s Keeper...: Also Jumbo’s Biography, by the Same Author*’⁴⁰². Jumbo, the popular name of an orphaned calf of a hunted Sudanese African bush elephant (*Loxodonta africana*), was an immensely famous animal attraction across Europe and America. His enormous size (which led to his etymological legacy) resulted in various stints at major European zoos (German *Menagerie Kreutzberg*, the Parisian *Jardin des Plantes*, and London’s *Regent’s Park Zoo*), before being sold to P. T. Barnham’s circus in February 1882 for £2000⁴⁰³. ‘The Biggest Elephant in the World’ exclaimed their poster⁴⁰⁴. After his death in 1885, hit by a railway car outside St. Thomas, Ontario, Scott published what he described as a “*depart[ure] from the ordinary mode of book-making*”⁴⁰⁵. As he seemed aware, his short volume of two sets of chapters, each devoted to its respective human/elephant subject, raises interesting questions about voice and agency. This form of animal individuation, “*narratives written by humans about named animals*” and “*their endowment with character and personality*”, is addressed by Kean and Howell as an exemplar of ‘ascribed agency’⁴⁰⁶. The reader cannot ignore that “*humans are speaking for these animals*”, and in doing so effacing their agency⁴⁰⁷. Whilst Scott’s dedication to the book asserts that: “*If “Jumbo” could but speak, I know he would endorse what I say here*”⁴⁰⁸, Jumbo’s own dumbness is reminiscent of Erica Fudge’s discussion of the textual constraints of animal history

³⁹⁸ Allison, L. & Mendes, J. (2012) *Bear 71*, National Film Board of Canada, Online: Available at: [<https://bear71vr.nfb.ca/>] Accessed: 02/02/2018]; Castellano (2018)

³⁹⁹ Baratay (2017)

⁴⁰⁰ Chrulew (2018) p.36

⁴⁰¹ Krebber & Roscher (2018) p.11

⁴⁰² Scott, M. (1885)

⁴⁰³ Chambers, P. (2008) *Jumbo the greatest elephant in the world*, Steerforth Press, Hanover, N. H.

⁴⁰⁴ *ibid*

⁴⁰⁵ Scott, M. (1885) p.41

⁴⁰⁶ Kean & Howell (2019)

⁴⁰⁷ Monica Mattfield quoted in Kean & Howell (2019) p.9

⁴⁰⁸ Scott (1885)

⁴⁰⁹, as well as Margo DeMello's consideration of how to tell animal life stories when "*they cannot speak, much less write*" ⁴¹⁰. Animal biography is here another conflicting and reflexive enterprise – to write an animal's life (in a medium exclusive to a different species) has the power to efface and to silence. Yet, at the same time, it uncovers and exposes much about our multi-species relationships. 'Jumbo' was less an archetype of his species (as might be encapsulated by his other binomial name) as he was an analogue for human traits, ethics, and dreams, which he is told to have performed with almost moralistic significance ⁴¹¹. It is suitable that his biography is paired with that of his keeper/author, for he, like other named individual animals, is situated at a rich intersection of narratives that "[shift] *back and forth... between human and animal*" ⁴¹².

My second example, Bear 71, represents a totally different form of animal biography, and a radically different way of approaching forms of individuation of animal lives, told through a contrasting set of media ⁴¹³. *Bear 71* is an online interactive multimedia documentary, composed around a dotted multi-species grid where the viewer can guide/click themselves autonomously through the forest, and concurrently through the life and death of a single female grizzly bear ⁴¹⁴. The rendered 'forest' grid is populated by other single-pixel creature-avatars, 'Moose 88', 'Bobcat 41', animated by video clips from trail cameras that situate both them and us within the landscape of Banff National Park (recently also released in VR). Overlaid atop this digital ecology is an episodic story, which traces the monitored life of Bear 71 – from her tranquilization and capture in 2001 to her death after being struck by a train 8 years later ⁴¹⁵. The documentary segments are voiced by the bear herself in a mode of autothanatography: "*a narrative mode with a first-person, omniscient narrator who is already dead*" ⁴¹⁶. Whilst we are aware of its construction, of the human voice granted to bear life/death, this awkward and 'impossible' mode of authorship is an vital counter-discourse to the predominant mode of bear individuation that the documentary foregrounds ⁴¹⁷. Bear 71's numerical denomination is testament to its subscription to the "*framing of wildlife data as aggregate information a species population*" ⁴¹⁸,

⁴⁰⁹ Fudge, E. (2002) 'A left-handed blow: writing the history of animals', in Rothfels, N. (ed) (2002) *Representing Animals*, Indiana, Bloomington, IN. p.3-18; Howell (2017) p.7

⁴¹⁰ DeMello, M. (2018) 'Online Animal (Auto-) Biographies: What does it mean when we "give animals a voice", chapter 13' in Krebber, A. & Roscher, M. (2018) *Animal Biography: Re-framing Animal Lives*, Palgrave Macmillan, London, p.290; DeMello, M. (2012) *Speaking for Animals: Animal Autobiographical Writing (Routledge Advances in Sociology)*, London, Routledge.

⁴¹¹ Chambers (2008)

⁴¹² Terrall (2017) p.51

⁴¹³ Allison & Mendes (2012)

⁴¹⁴ *ibid*

⁴¹⁵ *ibid*

⁴¹⁶ Castellano (2018) p.172

⁴¹⁷ *ibid*

⁴¹⁸ *ibid* p.171

where her role is simply as the 71st of many bears the contribute datasets, media appearances, and (crucially) cubs, to the ongoing conservation and management of her whole species.

There are echoes here of animal biography as natural history – of the effacing aggregation of individuals into species collectives ⁴¹⁹. Yet, Allison and Mendes’ autothanatography of Bear 71 is an invitation to attune with this singular story, to ‘become-with’ this grizzly bear and how she is ‘known’ ⁴²⁰. It is attentive to the production of knowledges and embodied/ascribed forms of animal agency, as well as to affect, atmospheres ⁴²¹, and more-than-human lifeworlds. At the same time, through its reanimation of the tensions between the life of an individual and our broader conservation logics, for as Biermann and Mansfield attest: “*managing individual lives is meaningless in responding to the crisis of biodiversity*” ⁴²², it once again highlights how modes of individuation in our telling and re-telling of animal life are made to matter within the contexts, spaces, and societies of human actants. Animal biography, in its rich and polysemous history, is an ideal lens through which to explore these entanglements.

⁴¹⁹ Terrall (2017)

⁴²⁰ Castellano (2018)

⁴²¹ Lorimer, Hodgetts & Barua (2018)

⁴²² Castellano (2018) p.174

2.3 Towards an Animal Biography of This Polar Bear

2.3.1 Animal Biography and Conservation

In this section I will develop my own *animal biography* approach, outline key ethnographic sites, and highlight how it can make new inroads into the way that we study human/wildlife interactions. This is in many ways a wild experiment ⁴²³, exploring different ways that human societies in Svalbard live with(out) polar bears, and the roles of different modes of individuation for how each context of actants engages with the species. My methodology continues to build on the existing history of animal biographies, attentive to the persistent tropes of telling animals lives, as well as a modest engagement with the many and different authors and forms of agency. In particular, I wish to elucidate the benefits of the application of *animal biography* in my exploration of polar bear conservation, following Bennett's call for "*unique and important contributions to society's understanding of the relationships between humans and nature*" ⁴²⁴. As I outlined previously, there is an awkward tension in advocating an engagement with individual animals for studying conservation when "*managing individual lives is meaningless in responding to the crisis of biodiversity*" ⁴²⁵. However, in my foregrounding of individuation, *animal biography* questions how polar bears are made to matter amid our contemporary ecological anxieties, as well as a means to examine the complex networks of political ecologies and bodies that exist here. The discontinuity between the individual and the collective continues to be productive and does enormous amounts of work for our understanding of how we perceive, value, and live with polar bears.

The bear is an extraordinary and unwitting protagonist for this thesis, representing a truly unique opportunity to engage with questions of knowledge production through a biographical lens. The development of this ethnographic methodology and the centrality of biographical individuation was, in fact, a response to the richness of her stories. She is a multi-natural polar bear, with different roles/significance for different people. Her life, as it is told and re-told by a network of varied conservation actants (or 'biographers') comprises a collection of epistemologies, perspectives, and criteria that not only influence how she is made 'manageable' (or 'conservable'), but also actively foment different widely-held understandings of her species and our shared future. Framing her through *animal biography* opens up important conversations about voice, authorship, and representational power (as well as their corresponding silence, erasure, and disenfranchisement), whilst also

⁴²³ Lorimer (2015)

⁴²⁴ Bennett et. al. (2016) p.4

⁴²⁵ Castellano (2018) p.174; Biermann, C. & Mansfield, B. (2014) Biodiversity, Purity, and Death: Conservation Biology as Biopolitics, *Environment and Planning D: Society and Space*, **32**, 257-273.

concurrently taking seriously the lived experience and ethology of the bear herself ⁴²⁶. Through my ethnography of those that ‘know’ her, I am not only asking how they have come to individuate her as a single polar bear within their complex societies, as well as how these entanglements influence our understanding of polar bear ‘conservation’, but it is also a parallel invitation to ‘become with’ her ⁴²⁷. In doing so, I will attune to her ‘being a polar bear’ – to the atmospheres ⁴²⁸, affective intensities, and mobilities ⁴²⁹ of her “multi-species lifeworld” ⁴³⁰. Rather than proposing a new ethic, I hope to find different responsibilities and accountabilities ⁴³¹ from within this vital and “lively story” ⁴³² – to show what this Svalbard bear can teach us about wildlife conservation in the Anthropocene ⁴³³. In the following sections, I continue to set out some of the primary themes and sites of my biographical engagement with this polar bear’s life, and those that tell it. I propose: to approach scientific epistemologies with a biographical lens; to be attentive to bear families, lineages, and kinship; to stay with the awkward frictions and tensions of animal biography and to render them productive; and to consider zoos as valuable sites for the potential of biographies and human-nonhuman encounters.

2.3.2 Scientific epistemology and biographical thought.

Chapter 3 that follows will go on to examine this Svalbard polar bear as she is known by the Norwegian Polar Institute (NPI): as the alphanumeric code N23992. Here, I will examine N23992’s role as a scientific research polar bear – her relationship to scientific modes of ‘knowing polar bears’ and the resultant publications, management policies, and conservation strategies that are produced through a network of institutions, individuals, and technologies ⁴³⁴. At the same time, I wish to frame this as a biographical endeavour.

My discussion of *Bear 71* highlighted the epistemological work undertaken by wildlife/conservation science to produce and disseminate knowledge about non-human others ⁴³⁵. This follows Lorimer’s understanding that “*conservation proceeds through an assemblage of the bodies, technologies, texts, and other materials through which knowledge is produced and ordering takes place*” ⁴³⁶. Just like Bear

⁴²⁶ DeMello (2012)

⁴²⁷ Castellano (2018) p.184; Haraway (2008)

⁴²⁸ Lorimer, Hodgetts, & Barua (2018)

⁴²⁹ Hodgetts & Lorimer (2018)

⁴³⁰ Van Dooren (2014); Middelhoff (2018) p.76

⁴³¹ Haraway (1991); Castellano (2018) p.173; Van Dooren (2014)

⁴³² Castellano (2018) p.172

⁴³³ Lorimer (2015)

⁴³⁴ Lorimer (2015)

⁴³⁵ Castellano (2018)

⁴³⁶ Lorimer (2015)

71, N23992 has a long (and ongoing) history of scientific capture, sampling, tagging, monitoring, and data-collection that situates her at the centre of the dynamic actor-network of ‘polar bear science’⁴³⁷. Thinking with the frameworks of Latourian circulating reference, translations, and purifications, I am interested to examine the tasks of scientific researchers in Svalbard from the Norwegian Polar Institute Polar Bear Programme (and as subpopulation of the IUCN PBSG) that co-produce and re-produce N23992 as a data ‘polar bear’. Crucially, I will also strive to re-frame this data with my attentiveness to N23992 as an individual polar bear. This not only concerns how these societies of scientific exploration actively individuate her, how she is made to matter here and how, but it also echoes Castellano’s discussion of *Bear 71* as an “*affective, active, singular creature*”⁴³⁸ – more than a data-machine. In this way, my biographical lens, drawing on the environmental humanities as well as elements of STS and ANT approaches, shows the ‘flourishing’ of an individual polar bear from within aggregate datasets⁴³⁹. I will track N23992’s traces through the captures, samples, datasets, and publications of NPI, whilst also being attentive to her physiology and ethology. Therefore, I can demonstrate how she is known by the scientific community, what this means for the way that her species is framed and managed, as well as attuning to her experience of living with scientists.

*“The fictionalized autobiography of bear 71’s life does not begin with her birth but, suggestively, with her drugging and tagging by park service rangers”*⁴⁴⁰ explains Castellano. Equally, N23992’s scientific life is not conventionally chronological, rather beginning at her first capture in Wijdefjorden at 13:00 on 6th April 2009, and since then being told through a hybrid collection of materials – bodily samples, statistical analyses, and satellite GPS signals. This scientific examination is itself a biographical enterprise in how N23992’s life can be told, ‘born’ at capture, logged as data, and politically/ethically mobilized through her incorporation into Svalbard-wide datasets, NPI publications, WWF reports, and PBSG action plans. Part of her dies with her battery-life, but most of her persists, and will do after her bodily death. However, whilst this alone is interesting – the circulating reference of an individual bear through the canons of polar bear conservation science and management policy – N23992 is not merely a “*passive object of knowledge*”⁴⁴¹. She has “*actively contributed through [her] actions, physical traits, and [her] nonhuman charisma to the stories told about [her]*”⁴⁴². Crossing, combining, and colliding in her ‘corporeal story’⁴⁴³ are a whole range of complex inheritances: “*assemblages of theories,*

⁴³⁷ Latour (1999)

⁴³⁸ Castellano (2018) p.172

⁴³⁹ Ibid p.171; Barua et. al. (2014); Cuomo, C. (1998) *Feminism and Ecological Communities: An ethic of flourishing*, Routledge: London.

⁴⁴⁰ Castellano (2018) p.173

⁴⁴¹ Kean & Howell (2019) p.10

⁴⁴² ibid

⁴⁴³ Haraway (2008)

technologies, laws, territories and practices from past eras with different politics and ecologies” that she comes to embody ⁴⁴⁴. With her GPS radio-collar, accelerometer, temperature gauge, and ear-tags, she is a cyborgian polar bear living at the intersection of the histories of Cold War technologies, tranquilizing drugs, and wildlife monitoring ⁴⁴⁵. Castellano explains how *Bear 71* “lived her life under near-constant surveillance”, whilst different methods of data collection (hair snags, collars, etc.) trick her silently into “confession” ⁴⁴⁶. So too, in the scientific life of N23992, there is an interesting paradox of co-authorship and coercion, accessed through biography’s acknowledgement of different forms of agency ⁴⁴⁷. It is not only a story of scientific representations and purifications (the ascription and effacing of agency), but also of opposition and elusiveness (proactive animal agencies) – the shared violence of data-collection and N23992’s resistance against the reductionist gaze of scientific monitoring ⁴⁴⁸.

This appreciation of the power dynamics and agencies in play during the scientific narrative of N23992’s life can therefore lead into a discussion of biopolitics and governmentality in polar bear ‘management’ on Svalbard. As Lorimer states: “*it is not analytically, ecologically or politically sufficient ... to simply identify hybridity*”, and instead I will consider how N23992 is calibrated into a wider biopolitical network of polar bear behaviour, discipline, and punishment ⁴⁴⁹. This step is tentative, and I acknowledge that this is an area that requires further work in the future to fully unpick the enrolment of a local population of bears into modes of management whereby humans and bears can be allowed to live together in Svalbard. Demotically, it is a question of what (as well as how and where) should Svalbard polar bears be? Here, N23992 inhabits an iteration of Svalbard that stretches between the geospatial monitoring data that she fixes herself from her radio-collar, and the policy whitepapers and directives that are handed down from the Norwegian Environmental Ministry, through NPI at the directorate level, and upheld by the Sysselmannen (the Governor of Svalbard). I am interested in the different encounters that these groups have with N23992, and how those are managed and choreographed – from the violence of scientific sedation, downloading her GPS position on a screen, the helicopter used to scare her away from Longyearbyen, the removal of a whale carcass that draws her near to human settlements, and rubber “bullets of disciplinary power” ⁴⁵⁰. However, beyond merely showing the human values and judgments expressed through these actions, my animal biography endeavours to

⁴⁴⁴ Lorimer (2012) p.606

⁴⁴⁵ Benson (2010)

⁴⁴⁶ Castellano (2018) p.174

⁴⁴⁷ Kean & Howell (2019)

⁴⁴⁸ Kean & Howell (2019); Castellano (2018) p.172

⁴⁴⁹ Lorimer (2012) p.598; Whatmore, S. (2002) *Hybrid Geographies: Natures, Cultures, Spaces*. London, SAGE.

⁴⁵⁰ Castellano (2018) p.177

enhance our “attentiveness to the singular experiences of [the] bear” ⁴⁵¹. In doing so, it will be “*shifting the logic of conservation from the biopolitical management of a species to the suffering and experiences of singular animal while at the same time placing that animal within a multispecies community*” ⁴⁵². N23992 is not only logged as data, but her enrolment in the network of polar bear conservation and management results in the modification of her behaviours. This ethological impact is something I will discuss at greater length in the below section on ‘awkwardness’ – and is emblematic both of the role of scientific monitoring in ordering a category of ‘polar bear’ that is ‘conservable’ and ‘wild’, as well as the affective intensities of their actions upon her habitual experience of being a polar bear.

2.3.3 Polar Bear Families: Considering Kinship

My biography of this bear will pay close attention to the familial – foregrounding ideas of kinship and lineage ⁴⁵³. I will be attentive to these different forms of relatedness – their importance and application both for the work of polar bear conservation and for Misha/Frost’s life (and how she is told) – to re-imagine the way that we come to know polar bears. In part, this is another exercise in refracting the species concept, understanding that “*species are not always the right units for telling the life of the forest*” ⁴⁵⁴, or in this case the Arctic. Families and kinship invite me as a biographer to follow different impulses and instincts, to understand the “*complex histories and inheritances that draw us into responsibility and relationship with others*” ⁴⁵⁵. More than anything, pathways of ‘relatedness’ have guided my ethnographic engagement with Svalbard bears, both bringing to the fore the question of what it is to ‘know’ a bear biographically, as well as the significance of these different human/bear epistemologies for how with live together. This section demonstrates the value of asking what it means to be related: exploring this polar bear’s family, scientific data-lineages, academic communities, ‘becoming’ polar bears, and my own experiences trying to get to know polar bear individuals. It is not only about the significance of stories that are told (some of the histories and cultures of bear family anthropomorphism ⁴⁵⁶), but also about how to approach the telling of stories (the novel and ‘uncanny’ ecologies that draw humans and bears together as kin) ⁴⁵⁷. Ultimately, kinship allows an even deeper

⁴⁵¹ Ibid p.172

⁴⁵² ibid

⁴⁵³ Feely-Harnik, G. (2001) ‘The Ethnography of Creation: Lewis Henry Morgan and the American Beaver’, in Franklin, S. & McKinnon, S. (eds) (2001) *Relative Values: Reconfiguring Kinship Studies*, Duke University Press, London, p.54; Franklin, S. & McKinnon, S. (eds) (2001) *Relative Values: Reconfiguring Kinship Studies*, Duke University Press, London; Van Dooren et. al. (2016)

⁴⁵⁴ Castellano (2018) p.180; Waterton et. al. (2013)

⁴⁵⁵ Van Dooren (2014); Castellano (2018) p.183

⁴⁵⁶ Bieder (2005)

⁴⁵⁷ Hobbs et. al. (2013); Ghosh, A. (2016) *The Great Derangement: Climate Change and the Unthinkable*, Chicago, University of Chicago Press; Brunner (2007)

exploration of accountabilities in wildlife conservation: from imagining extinction ⁴⁵⁸ to shared moments of human and polar bear grief.

Image redacted due to Copyright

Fig.5 Misha and her two cubs hunting in Tempelfjord, (Source: Polar X, 2014)

Thinking with ‘lineage’ is a productive lens through which to frame the scientific data collected by NPI on the Svalbard polar bear subpopulation. With datasets following matriarchal successions of bears, and relatedness measures gleaned from female mitochondrial DNA markers, tracing the inherent familial relations of polar bear research helps to situate N23992 within a more intimate actor-network. There are mothers and cubs tranquilized and captured together, aerial surveys to count winter maternity dens, and a reproductive focus in population status trends ⁴⁵⁹. Lineage is significant within the praxis of monitoring and research, a means of recruiting polar bears into the long-term dataset, and itself a reflection of the biological recruitment within the population. It structures our encounters with and understandings of polar bear populations and underpins numerous management challenges for the Svalbard subpopulation. In this way, ‘the familial’ underpins our conservation logics.

However, I am equally interested by the emergence of comparable lineages within the self-professed ‘polar bear families’ of researchers and scientists. Eggunyu, Clark and Bradford’s study of relationship and publication patterns in the polar bear science community exposed an enormously hierarchical

⁴⁵⁸ Heise (2016)

⁴⁵⁹ Norwegian Polar Institute, MOSJ (2020) *Environmental Monitoring in Svalbard and Jan Mayen*, Online: Available at: [<http://www.mosj.no/en/about/>] Accessed throughout 2017/8/9]

structure, characterised by a core succession of 10 individuals without whom the network collapses ⁴⁶⁰. Here, I encounter a form of lineage and kinship that structures another facet of how polar bears are ‘known’ – one that operates as a form of gatekeeping that authorizes and promotes certain voices and their approaches. Just as the bear teaches her cubs to hunt and to exploit certain resources, we see the transmission of knowledge and practices between an informal network of polar bear science and its development in the 1960s and 1970s. The researchers themselves are territorial, sometimes aggressive – embattled communities facing threats, not from climate change and habitat loss, but from the political divisiveness and personal attacks of a parallel climate denial countermovement. My biography of this bear not only traces her relationships to other Western Svalbard polar bear families, but also to the scientific successions of “bear people” who study her, and in doing so places her at the heart of a diverse and revealing political ecology.

Considering polar bear kinship also opens up other ethnographic sites, and other spaces and contexts where the individuation of bears is made to matter in new and important ways. Whilst writing about ‘families’ is on the surface a conventional biographical impulse, the non-human family draws us into more uncanny intimacies ⁴⁶¹, finding both reflections of our human selves as well the often-silenced narratives of animal emotion and attachment. My animal biography, with particular attention to this bear’s relationship with her two 2012/13 cubs, will not only tell a more intimate story of wildlife conservation and management on Svalbard, but also demonstrates the central role of the family for how other actants tell the lives of polar bears.

The notion of bear families is loaded with a long history of anthropomorphism that underpins early expressions of human-bear kinship ⁴⁶², and shows us a lot about the way that human societies and cultures value and perceive bears. Here too is another form of biographical ‘ascribed agency’ that effaces bear experience ⁴⁶³. There is an irony here, of my own interest in bears and my role as an ethnographer. Rather like Treadwell, who “*longed for a kinship with bears... likely born of hearing a multitude of unrealistic stories about humans connecting with these animals*” ⁴⁶⁴, I must acknowledge my own conditioning to the anthropomorphized idea of bear that inhabits many European childhoods ⁴⁶⁵. From taxonomic museum displays that assembled nuclear units of ‘mummy, daddy, and baby bear’

⁴⁶⁰ Egunyu, F., Clark, D. & Bradford, L. (2018) Polar bear science: characterizing relationship patterns and identifying opportunities, *Polar Geography*, **41**(1), p.39-54.

⁴⁶¹ Ghosh (2016)

⁴⁶² Bieder (2005); Brunner (2007)

⁴⁶³ Howell (2017)

⁴⁶⁴ Brunner (2007) p.180

⁴⁶⁵ Ibid; Bieder (2005)

⁴⁶⁶, to the socialized accounts of romantic bear ‘couples’ from 18th century explorers ⁴⁶⁷, the idea that bears reflected the traditional family has been entrenched in popular imaginations ⁴⁶⁸. Charles Feazel terms these exercises in ‘symbolic kinship’, the belief in permeable species boundaries between humans and bears, both informed by and itself informing a “*socialization of biological processes*” ⁴⁶⁹. Anthropomorphic familial kinship is an important consideration for my biography, particularly for my work with filmmakers and photographers who have produced some of the most widely-viewed (re)tellings of Misha’s life. These renderings – and the way that they individuate polar bears, how they narrate them and give meaning to their habitual behaviours – are deeply influential for how diverse publics engage with the whole species and their conservation ⁴⁷⁰.

Working with these themes – bound up with my development of animal biography and a focus on means of individuation – enables a fascinating new exploration of the lives of polar bears and their researchers, enacted through a livelier register ⁴⁷¹. It shows how various attempts to know polar bears are already permeated by different kinships and attachments, as well as how they in turn produce further relationships – bear-to-bear, bear-to-human, and human-to-human. It draws the focus of my ethnographic work into new and important political ecologies: networks of scientific methods, visual cultures, and epistemic societies, as well as their histories and their atmospheres. At the same time, it makes my work attentive to the more-than-human – to the bear’s own ethology and embodied knowledges. Thinking with these more affective relationships enables her to tell a different story of behavioural change, emotion, and mourning – shifting the logics of conservation away from her belonging to a subpopulation or species whole, and towards a more intimate understanding of loss. Paying attention to the familial can deepen our understanding of how we live with polar bears.

2.3.4 The Productive Awkwardness/Absurdity of *Animal Biography*

The use of a biographical methodology in the environmental humanities is not without its difficulties. Krebber and Roscher allude to Pierre Bourdieu’s visceral critiques of the genre, quoting him and his assertion that “*the nature of biography is still to be regarded as undetermined*” – defined by an

⁴⁶⁶ Brunner (2007); Snæbjörnsdóttir, B. & Wilson, M. (2006) *Nanoq: Flat out and bluesome: A cultural life of polar bears*, Black Dog Publishing, London.

⁴⁶⁷ Perry, R. (1966) *The World of the Polar Bear*, Cassell, London, p.18, p.134

⁴⁶⁸ Chambers, D. (2001) *Representing ‘the family’*, Sage, London.

⁴⁶⁹ Feazel, C. T. (1990) *White Bear: Encounters with the Master of the Arctic Ice*, New York; Schneider, D. (1984) *A Critique of the Study of Kinship*, University of Michigan Press, Ann Arbor.

⁴⁷⁰ Snow Bears (2019) BBC Documentary, Online: Available at: [https://www.bbc.co.uk/programmes/b09m1vpg] Accessed 12/2019; Mills (2012)

⁴⁷¹ Van Dooren et. al. (2016)

ambiguous relationship between the biographer and the biographical subject that leads to the artificial creation of meaning ⁴⁷². This does, perhaps, downplay Bourdieu's total rejection of any analytical relevance to biography, denouncing it as an 'absurdity' due to the illusory adherence to a whole stream of subjectivisms that construct narratives, pre-suppose significance, and produce a teleological fallacy ⁴⁷³. He even rejects it as an area of knowledge entirely, decrying the efforts to understand the life of a subject "*whose constancy is probably just that of a proper name*" through a succession of events, rather than making recourse to the whole matrix of different relations that in truth, define it ⁴⁷⁴.

Animal biography, and the "*incorpora[tion] of animals into these biological frameworks*", does by its very nature exacerbate many of Bourdieu's critiques – most obviously the fraught relationship between the writer and the subject. Yet, it is these very discrepancies and illusions that also fills animal biography with so much promise, that, when approached with an ethnographic impetus – even heuristic and hermeneutic strategies – give it such enormous "*experimental potential*" ⁴⁷⁵. Many of Bourdieu's critiques, paradoxically, highlight areas where animal biography finds very productive ground, so much so that Krebber and Roscher find it unclear as to whether he offers "*an invitation or a warning*" to the expansion of biography to non-humans ⁴⁷⁶. The animal biography that I propose – as a method, a genre, and a site of ethnographic enquiry – is attentive to the crossweaves of agency, voice, meaning, and narrative that Bourdieu finds so absurd. It should not be treated as a collection of epistemological problems, but as a window into multi-natural epistemological worlds – a collection of stories, actants, and knowledges not unlike the matrix of relations that Bourdieu himself espouses. These are productive frictions.

Throughout my research I have been repeatedly forewarned about the feasibility of telling an individual bear's life. This tension, sitting between the parallel practices of identification and individuation, is a trope that persists throughout this work, and provides a significant and important contribution to how we must come to consider (concurrently) the constraints and complexities of animal biographies. Photographer Rolf Stange (who captured the image in Fig.3) is cautious about claiming accurate identification of the Tempelfjord isbjørn, explaining: "*you can just guess if it may or may not be a certain*

⁴⁷² Krebber & Roscher (2018) p.13; Bourdieu, P. (2005) 'The Biographical Illusion' in Evans, J., Gay, P. Du, & Redman, P. (eds.) *Identity: A Reader*, pp.299-305, Thousand Oaks, CA: Sage; Pereira, A. (2018) Notes on Facing *The Biographical Illusion* Without Getting Lost in the Process, *IAFOR Journal of Arts and Humanities*, 5:1, pp.3-22.

⁴⁷³ *ibid*

⁴⁷⁴ Bourdieu, P. (2005) 'The Biographical Illusion' in Evans, J., Gay, P. Du, & Redman, P. (eds.) *Identity: A Reader*, pp.299-305, Thousand Oaks, CA: Sage, p.302; Pereira (2018)

⁴⁷⁵ *Ibid* p.21

⁴⁷⁶ Krebber & Roscher (2018) p.13

bear"⁴⁷⁷. What he refers to is the propensity for the misidentification of polar bears, particularly within the image-worlds of film and photography, for stories told about bear individuals to be illustrated with images of multiple or other bears. With polar bear lives, individuation and the desire to make individuals matter still occurs without correct identification – a contradiction that outlines the challenging/promising affordances of non-human biography. Krebber and Roscher describe biography as "*partial, interrupted and sketchy*"⁴⁷⁸, full of misconception, miscommunication, and "*speculative spaces*"⁴⁷⁹. I intend to embrace the dissonant and the unconventional. In doing so, I have been considering the 'awkwardness' of biography - "*a rich, polysemous term through which we might specify and explore creatures and modes of multispecies relations*"⁴⁸⁰. The awkwardness posed in trying to know and biography this polar bear is a productive and important acknowledgement. Here, the consideration of the prevalence of mistake, misidentification, and even hidden forms of violence in how humans have told her life, demonstrate not only the co-shaping roles of the biographer and the biographed, but also how these narratives are intrinsically tied to the complex ecologies of our multispecies relations. In foregrounding the ambiguousness of the relationship between biographer and their subject, the prevalence of affect and atmosphere in these inter-connected networks, and the awkwardness of knowing non-human lives, my methodology is attentive to the 'absurdity' of animal biography. It asserts that these tensions, contradictions, and discrepancies in our telling of polar bear lives provide an extraordinary opportunity to explore the enfolded complexity of our multispecies networks. Put simply, animal biography provides a means to reflexively approach living with polar bears.

2.3.5 Zoobiography

Finally, I propose work in one other ethnographic site. At first glance, the keeping of polar bears in captivity across zoos and wildlife parks is a context that fits the rubric of the rest of the thesis. From the royal menageries of Plantagenet kings, to the conservation-oriented institutions of the 21st century, captive spaces have facilitated "*unprecedented proximities to exotic animals*"⁴⁸¹. Within these sites, it seems unsurprising that I might choose to study issues of representation and wildlife conservation – following burdened histories of colonialism and cultures of collection into the emergent contemporary

⁴⁷⁷ Stange, R. (03/12/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁴⁷⁸ Ibid p.14

⁴⁷⁹ Kean & Howell (2019) p.10

⁴⁸⁰ Garlick, B. (2016) 'Awkward Biopolitics: Ospreys conservation, pesticides and biosecurity on Speyside, 1963-1968', *Cultural and historical geographies seminar*, 101 Hardy Building, Department of Geography, Cambridge University; Barua et. al. (2014); Lorimer (2014) p.195

⁴⁸¹ Chrulew (2018) p.39

programmes of captive breeding and re-release⁴⁸². Many of the individuals in zoos also sit at the fraught intersection of different modes of individuation. They are made to matter both as anthropomorphised charismatic creatures of care and as generalised guarantors – as representative specimens of their entire species’ taxonomic characteristics and as living arks for the potential preservation of their wild(er) futures⁴⁸³. For polar bears, however, the role of captive individuals is more awkward and undetermined. The re-release of captive-bred polar bears is unviable⁴⁸⁴, not least due to the indelible challenges of widespread habitat losses in the Arctic, and their resultant contribution to discussions of ‘conservation’ become more convoluted. Captive bears, therefore, perform even more interesting and complex roles in our conceptions of, and engagements with, their species, as well as in our imagination of our shared futures.

Perhaps unsurprisingly, captive institutions have also been prominent sources of individualized animal biographies⁴⁸⁵. Chrulew collates the potential for zoos and zoo biology to “*give rise to new animal stories*” into his proposal of a *zoobiography*. His term alludes to the “*distinctive forms of knowledge, encounter and writing*” that these institutions enable, as well as to “*emergent animal subjectivities*” so to demonstrate the novel opportunities that zoos offer for the telling of non-human lives. Equally, *zoobiography* addresses different practices of care, the need for individualized life history (preferences, needs, attachments, personality) for the appropriate keeping of an animal, captive individuals’ roles as political spokespersons, and the exertion of zoo biopower in “*making animals live*”⁴⁸⁶. Whilst my animal biography has so far been proposed with a focus on this Svalbard polar bear, her family, and her biographers, I will conclude by developing a zoobiography of my own. In particular, I will focus my attention on a small cast of captive polar bears: *Victor*, *Pixel*, *Nissan*, and *Nobby* at the Yorkshire Wildlife Park (YWP); as well as drawing on the lives of *Victoria*, *Arktos*, *Walker*, and *Hamish* at the Highland Wildlife Park; *Knut* from Berlin; and *Siku* at the Scandinavian Wildlife Park, Denmark. The lives of these bears are not totally divided from that of Misha. Some of them have starred alongside her in nature documentaries, films, and other media – cut into the same ‘bear story’ to complete sequences of behaviours not captured in the wild. Many of their zoos were historically supplied with orphaned bear cubs from hunted Svalbard females, highlighting what Van Dooren terms the “*strange juxtaposition of care and violence*”⁴⁸⁷.

⁴⁸² *ibid*

⁴⁸³ Velvin, E. (1915) *Portraits at the Zoo*, London: Hodder and Stoughton; Chrulew (2018)

⁴⁸⁴ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁴⁸⁵ *Ibid* p.39

⁴⁸⁶ *Ibid* p.39/40; Hediger, H. (1985) ‘A lifelong attempt to understand animals’, in Dewsbury, D. A. (ed) (1985) *Leaders in the study of animal behaviour: Autobiographical perspectives*, Lewisburg, Bucknell University Press.

⁴⁸⁷ Castellano (2018) p.177; Van Dooren (2014)

My *zoobiography* of the four YWP bears is another “wild” experiment’ in the environmental humanities⁴⁸⁸. My work here enables a re-exploration of many of the tropes of knowing polar bears that were elucidated in this bear’s *animal biography*, as well as allowing me to delve deeper into questions about what constitutes both conservation and wildness. The lives of these four bears (and parts of the seven others) show us even more about kinship and relatedness, the scientific epistemology of framing ‘data bears’, and the awkwardness of knowing polar bears in this “*segregated yet nonetheless permeable mode of living alongside*” them⁴⁸⁹. At the same time, my own attempts to get to know these bears raise further questions about novel ecologies, choreography, and charisma in ‘conservation’ work. In my zoobiography of these bears, I will show how they are co-produced and co-authored through the biopolitical economies of zoo life, but also how they resist against the universalizing ‘spectacles’ of how polar bears are perceived – from wildness to whiteness.



Fig.6 Victor at Yorkshire Wildlife Park follows my signal command to point, (H. Anderson-Elliott, 2018)

My zoobiography will be attentive to some of the emergent, novel kinships and attachments that are produced in these sites. These are forms of multispecies intimacy that continue to challenge our understandings of what it is to ‘live with’ and ‘know’ other animals. Returning briefly to Matthew Scott’s biography of Jumbo the elephant, he expresses how he has “*been more than a father to him...perform[ing] the duties and bestow[ing] the affections of a mother*”⁴⁹⁰. In my examination of polar bear husbandry, I encounter numerous examples of ‘male mothers’, human-bear milk-givers, and

⁴⁸⁸ Lorimer (2015); Lorimer’s concept of wild experiment is productive here for examining how certain sites and activities constitute experiment modes of conducting science and politics.

⁴⁸⁹ Chrulew (2018) p.39

⁴⁹⁰ Scott (1885) p.21

different performances of ‘bear people’ within the ‘uncanny intimacies’ of captive lives ⁴⁹¹. There are also novel bear-to-bear attachments, homosexual (and in some cases incestuous) attachments that challenge many of the heteronormative and nuclear notions of bear family that underpin their popular anthropocentric portrayals ⁴⁹². Through my examination of these nature-cultures and kinships, I will ask questions about the formulation of different notions of polar beariness that populate our imaginations, institutions, and intentions. Much of the rhetoric used here follows the reproductive economies of captivity – the focus on cub births and the European Breeding Programme – and I am interested to follow this same impetus to discuss what sort of bears we are producing here. Like the Greek myth of bear origin (etymologically *Ursus* after *Orsos* from *Os* for ‘mouth’) whereby the mother licked her cubs, born as amorphous masses, into the shape of bears ⁴⁹³, captive institutions actively shape polar bears – their ecologies, ethologies, and stories. My zoobiography of these bears asks what sort of bears they are, as well as about their relationship to wildness, wilderness, and to conservation.

After Hobbs, Higgs and Hall, and their 2013 publications on *Novel Ecosystems*, I would also like to incorporate the notion of the ‘novel’ into my zoobiography of the YWP bears ⁴⁹⁴. In particular, I am interested by the novel ecosystem and novel ecology of the enclosure itself, an extremely diverse multi-species community of birds, mammals, amphibians, fish – many native to the UK, others invasive, some human, and others (including the bears) introduced intentionally. Many of these species are able to permeate the boundary fences (either due to their wings, keys, or small size) into the surrounding areas, and they all interact in emerging relationships certainly unlike anything else in the UK. I would like to compare the situatedness of Victor, Pixel, Nissan, and Nobby with that of the Svalbard bear, all as individual bears placed within multispecies assemblages, and think with a more open-ended ethic about the application of different wildlife imaginations/geographies.

The next and final aspect to my zoobiography is an appreciation of the novel ethologies and behaviours exhibited by the four captive polar bears in YWP. Whilst a lot of these have already been covered through my proposal to look at the different kinship interactions, ecologies, and multispecies communities at YWP, here I am referring to a set of interactions described by YWP as ‘training behaviours’. These trained bear actions (and corresponding rewards) are a means to assess the health of the bears and collect ‘voluntary’ scientific samples of hair and blood, without the need for sedatives or more ‘invasive’ methods. Through my participant observation of these keeper-bear exchanges, and

⁴⁹¹ Ghosh (2016)

⁴⁹² Chambers (2001); Mills (2012)

⁴⁹³ Brunner (2007); Bieder (2005)

⁴⁹⁴ Hobbs et. al. (2013)

my own experience in running these training behaviours with Victor, I examine the bears' roles in the choreographing of conservation ⁴⁹⁵. By this I intend two meanings, firstly their performative 'voluntary' cooperation in these gestural encounters and other explicit behavioural modifications, and secondly their integration into the *"awkward affective economies and politics of animal captivity"* and *"conservation pedagogy"* ⁴⁹⁶. How do the lives of Victor, Pixel, Nissan and Nobby illustrate a natural-cultural hybridization of polar bear, zoo biopolitics, and imagined conservation pasts/presents/futures? At the same time, how can I get to know these bears, and what ethically is at stake in the telling of their lives?

⁴⁹⁵ Lorimer (2015)

⁴⁹⁶ Lorimer (2012) p.202

Chapter 3: N23992, A Scientific Polar Bear

3.0 The Birth of N23992

The 6th April, 2009, and the Norwegian Polar Institute's (NPI) polar bear research programme are preparing for another day out over the ice for their annual capture-release fieldwork. They load the Airbus H125 helicopter LN-OMB with their kitbags, emergency survival gear, sample cases, and tranquilizer rifles on the tarmac at Longyearbyen airport before taking off and banking left out over Isfjord. They head North, flying low and scanning the frozen fjord systems beneath them for any signs of motion, moving into areas that they had yet to cover during this field season.

By early afternoon they find themselves right at the North edge of Spitsbergen, South East of the island of Moffen, which is cut in half by the 80th parallel and where Atlantic Walrus haul out during late summer. Now in spring, the Svalbard shoreline is met by the sea ice extending down from higher latitudes. At its fullest winter extent this sea ice area engulfs Nordaustlandet, spreading south down the lengths of Wijdefjorden and Hinlopen Strait all the way to the SE islands of Kong Karls Land, Edgeøya and Hopen where the Svalbard bears have historically made their maternity dens. Three years earlier in 2006, record lows meant that the ice never reached Hopen⁴⁹⁷, and neither did many of the bears.



Fig.7 Map of the North of Spitsbergen, showing the tiny island Muffen to the NW, Wijdefjorden running N-S, Ny Friesland in the Centre, and Kong Karls Land to the far east. Longyearbyen is out of picture to the south, beneath Billefjord. [Source: <https://www.mapsland.com/europe/svalbard/large-detailed-map-of-svalbard-with-relief-and-other-marks>]

⁴⁹⁷ National Snow & Ice Data Centre (2006-9) Monthly Archives, Online, Available at: <http://nsidc.org/arcticseaicenews/2009/04/> Accessed: 10/11/2019.

This April, at least, the platform is relatively solid. Ice spreads out to the northern horizon out of the helicopter's left window, and to their right Wijdefjorden too is frozen solid between the cliff faces and hillsides of Andrée Land and Ny Friesland. As they follow the shoreline along, around the bay of Mosselbukta where the snow hides the ruins of A.E. Nordenskiöld's 1871 winter shelter, they spot a polar bear on the landward side. They instruct the pilot to bring the helicopter around and approach her even lower. As they do, her initial curiosity gives way and she begins to run, turning her head back over her shoulders as she sprints. The lead scientist takes the rifle from its case and loads a prepared tranquilizer dart into the barrel – 1200mg of Telazol[®] diluted to a concentration of 200mg/ml ⁴⁹⁸. As he does so, he pulls the slide door to his right open, draws back the rifle hammer and takes aim at the rump of the bear below. The bang is lost in the noise of the blades, the dart hits and snags underneath the bear's skin, delivering its dosage. Sliding the door closed again the helicopter banks away and up, watching the bear intently all the while. It slows to a walk, still looking up at the helicopter that hovers nearby, and steadily sinks to its haunches before lying down. It loses control of its hind legs first, and eventually its head, slumping onto the snow. They land nearby, and, judging that the tranquilizer has taken sufficient effect, slowly approach the polar bear on foot.

Image redacted due to Copyright

Fig.8 The NPI helicopter chasing and tranquilizing a bear in Svalbard (Photograph: Jon Aars)
[Source: Larsen & Stirling 2009, page 8]

⁴⁹⁸ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge; Larsen, T. S. (1971) Capturing, Handling, and Marking Polar Bears in Svalbard, *The Journal of Wildlife Management*, **35**(1): pp.27-36; Derocher, A. E. (2016) Polar Bear Capture & Handling Standard Operating Procedure, *University of Alberta Research Ethics Office, Animal Policy and Welfare Program*, [pdf].

The bear is a young subadult female in good condition, and they roughly estimate her to be around 4 years old. They quickly check her vital rates to ensure no complications before moving her into the sternal recumbent position to aid her breathing and checking that her airways are clear. They find and recover the dart, in doing so ascertaining the amount of the drug that have been administered and whether they will need to supplement the dosage. They mark the time: 13:00, and the precise location with their GPS: 79.861N 15.905E. Pulling back her lips they place her tongue safely inside her mouth, and then examine the pink gums. Seeing no tattoo marking they deduce that this is the first time that this bear has ever been captured, and so they tattoo her with the alphanumeric code that will forever identify her in their database: N23992 ⁴⁹⁹.

With the initial stages of the capture protocol complete, they open the sample case and set about collecting the standardized samples and measurements from N23992, continuing to note all of the details into the data sheet. They record her length (194cm), girth (114cm), head length/width, weight (200kg), tooth wear, and note one fresh cut and two old scars. They pull some hair, extract vials of blood, take a biopsy of fat, and, with a first-time handled bear, pull a rudimentary molar tooth in order to accurately deduce her age. They note other characteristics too: her lack of milk production (she has yet to mother any litters), her labia development and normality, and use an ultrasound to measure her fat thickness (30.8mm) ⁵⁰⁰. Slowly, she begins to regain consciousness and bodily function, with a gradual recovery that is typical to the drug, Telazol®. Whilst still immobile, she begins to move her head, blinking, sniffing, and protruding her tongue from her mouth. Her back rises and falls with each breath whilst the scientists pack up their kit around her, trudge back towards the waiting helicopter, and fly off.

Mark re-capture methodology is the gold standard of scientific research, Ian Stirling explains to me: *“I don’t think there is anything that gives you anywhere near the amount of information per dollar spent on a whole variety of aspects of polar bear biology that are critically important”* ⁵⁰¹. It is through interactions like this that polar bears become ‘known’ by the scientists and scientific programmes that study them. Whilst this bear was born 4 years before in the 2005/6 winter, this engagement witnesses the birth of N23992, a research-bear, who will be monitored now by NPI for the rest of her life. She

⁴⁹⁹ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁵⁰⁰ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁵⁰¹ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

would be captured 4 more times: in 2010, 2011, 2014, and 2017, fitted with a Telonics ear-tag in the following spring, and a Telonics GPS radio-collar in 2017 ⁵⁰².

N23992 is part of an assemblage of scientific monitoring. Hers is not a life that is told with a traditional chronology, it is mediated through the networks and channels of technologies that enfold with her – through their materials and temporalities. Her body and physiology is fragmented, with the extraction of a vestigial tooth, blood/hair/fat samples, as well as the allocation of a DNA score UrsM419 and subsequent micro-satellite analyses, allowing for the subsequent reconstruction of her life before this encounter, her family history, precise age, and even the constitution of her diet. Her novel mobilities are brought into focus – the circulation and seasonality of bears, samples, and scientists within that assemblage. At the same time, these researchers situate her within the context of interconnected anthropogenic impacts – industrial pollutant levels, climatic changes and altering sea ice conditions – and track her digital traces to explore her changing use of the Svalbard landscape ⁵⁰³. This capture, however, is also an end point. It represents the end of her ‘wild’ life, the conception of a novel cyborgian body, ecology, and corresponding ethology – her enrolment into digital ecologies. For her five cubs over the coming decade, they too would become recruited into this network of ‘knowing polar bear lives’, and for one of them, it would also bring about her death. Just as this chapter is about our knowing and living with bears, so too it is about how bears live with scientists.

⁵⁰² Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁵⁰³ Ibid; Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø; Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

3.1 Introduction: Knowing N23992

This chapter examines the relationship between polar bears, technologies, and scientists – framing their collective entanglements within the assemblage of polar bear knowledge, science, conservation, and management. Pivotal, I explore the role of the Norwegian Polar Institute's (NPI) research programme, as the IUCN PBSG (Polar Bear Specialist Group) subpopulation for the Svalbard and Barents Sea region, in 'knowing polar bears'. By this, I refer to the epistemological tasks of ordering that constitute different modes of knowledge production and dissemination around the species ⁵⁰⁴. Primarily, therefore, I am interested in the role of technological instrumentation in the mediation of human/polar bear encounters. Following from Latour, this impetus instinctively asks questions about purification using Actor-Network Theory – the successive translations that occur within the scientific field and lab tasks of NPI ⁵⁰⁵. I ask how the researchers 'capture' the polar bear, not only in the physical acts of the primary capture-re-capture method, but also through their purifications and enactments⁵⁰⁶. The task of 'knowing polar bears' therefore circulates through the actor-network of samples, datasets, analyses, scientists, and publications that are constitutive of the research project, and their 'reference' to the polar bear upon which it depends ⁵⁰⁷.

This chapter asks a progression of core of research questions: What is at stake, politically and ecologically, through the production of knowledge about polar bears through scientific monitoring? How did the protocols and methodologies of scientific sampling develop, in what contexts, and what does this mean for how polar bears are enacted? How is polar bear N23992 enacted through these encounters with the scientists of the Norwegian Polar Institute? How do scientists come to conceptualise the polar bear as a result of these enactments, and how does this render them 'conservable'?

Whilst thinking about the role of technologies within the assemblage of knowing wildlife, there are broader political and historical contexts that must not be side-lined. These histories were not only instrumental in the material development of applied autonomous communication techniques – from transistors to geostationary satellite networks – but also vital to the concurrent re-shaping of identities and imaginaries. This chapter will be attentive to the enfolded histories of military and wildlife-monitoring technologies ⁵⁰⁸, the geopolitical contexts of Cold War and space-race enterprises that

⁵⁰⁴ Castellano (2018); Lorimer (2015)

⁵⁰⁵ Latour (1999)

⁵⁰⁶ Ibid; Latour (2005); Mol (2010)

⁵⁰⁷ Latour (1999)

⁵⁰⁸ Benson (2010)

shaped 20th century approaches to polar bear fieldwork research. At the same time, these technocentric solutions to the knowledge deficiencies of polar bear biology and ecology were also themselves the intermediaries for the development of the sociality of ‘polar bear science’ as a society of actants and motivations – as well as its institutional formalization through the development of the IUCN Polar Bear Specialist Group (PBSG) in the 1970s ⁵⁰⁹. Collaborative work at field sites in Svalbard became the basis for interpersonal relationships, the transfer and development of standardized data collection techniques, and consequently the foundation for purifications of polar bear ecology. By foregrounding the first Norwegian live polar bear scientific capture in 1966 – a key moment of experimental learning – I not only highlight the formative character of an inherently technocratic society, but also the central role of polar bear handling encounters in the admission of group membership and the authenticity of subsequent knowledge production.

These are not only questions of science and technology, but also fundamentally of gender and power – a history of primarily white, male researchers and parallel lineages of primarily female polar bears. Capturing female bears was also technologically motivated – GPS collars sometimes would slip off male bears, and reproduction enabled a process of natural sample recruitment when females were captured alongside litters of cubs ⁵¹⁰. Here, therefore, are fascinating instances of co-production between co-shaping technologically-fixed societies of polar bears and polar bear scientists. It not only asks us what constitutes ecological and epistemic communities, and how their socialities are both brought together and sustained, but also highlights questions of intervention, representation, and agency ⁵¹¹. I am interested by the dual narratives of ‘mother’ and ‘hunter’ that constitute ‘successful’ reproductive bear lives, as well as notions of kinship and inheritance amongst researchers. At the same time, I wonder if there is something of Haraway’s ‘*Teddy Bear Patriarchy*’ here, the conjoined flows of masculinity, domination, and the writing of non-human life ⁵¹². My examination of the assemblage of bears, technologies, and scientists is also attentive to these questions of authorship. Is N23992 a co-participant in the telling of these cyborgian stories – part of the hidden labour of female bears and female bodies – like the “*unnamed hand*” of Carl Akeley’s concealed stenographer/biographer ⁵¹³? As Haraway continues, “*biography is woven into and from a social and political tissue*” and “*the product[s] of particular technologies*” ⁵¹⁴.

⁵⁰⁹ Larsen & Stirling (2009)

⁵¹⁰ Derocher (2012)

⁵¹¹ Hacking (1983)

⁵¹² Haraway (1989)

⁵¹³ Ibid p.46

⁵¹⁴ Ibid p.35

Centrally, this chapter is about understanding polar bear N23992. This nominal change – from the Svalbard bear to N23992 – is also representative of the chain of transformation, of the extraction of ‘references’ that attest to her translation and purification within the tasks of the scientific process. N23992 is not just a polar bear but a cyborg, a set of processes, and an achievement of technological/epistemic histories, cultures, and societies. I hope to demonstrate how she inhabits a branching and dynamic digital ecology. This digital ecology is not merely ‘virtual’, not a simulacrum – it is real and material. Searching for N23992 is a question of understanding polar bear mobilities, and locating her at the intersection of numerous global networks of circulation – atmospheric, communicative, climatic, and chemical. There is marked temporal seasonality here too: the annual variation of bear metabolism; the corresponding annual cycle of ice melt and re-freeze; the 3-4-year reproductive cycles of female bears; the spring capture season of NPI’s field researchers; and the 1-2-year battery lives of Telonics iridium GPS collars. Understanding the spatiotemporal cycles of polar bear movement figures centrally in NPI’s ecological research programme, dating back to the foundational concerns of the community in the 1960s and 70s – *“it is all about understanding the development and the mechanisms in the population”*, explains Andersen ⁵¹⁵. Where/when do polar bears move? Yet, understanding these as ‘mobilities’ (as opposed to movements) ⁵¹⁶ acknowledges that polar bear journeys (and the modes of storytelling) are shaped by the atmospheres of our shared encounters. I follow how NPI identify N23992 as an onshore ‘local’ bear, whose small coastal home range is becoming increasingly distinct from the patterns of offshore bears that follow the sea-ice. With this shift come novel ethologies, entanglements, opportunities, and accountabilities – reflected in the conservation and management challenges of living with local bears. I will ask how N23992 is individuated here, and how the application of technologies to elucidate her mobilities are themselves complicit in how we come to imagine our shared futures.

As N23992 is increasingly framed as a node within global networks of connectivity and exchange, so we are forced to conceive of the fragility (or perhaps porosity) of her ecosystem, and her relationship to our modes of understanding and imagination. In this chapter, this provocative jolt comes in the form of the occurrence of high levels of persistent organic pollutants (POPs) in the Svalbard polar bear population. ‘Impurity’ itself is a fascinating counterpoint to purification, a conceptual and political friction that does a lot of work here. Not only do pollutants actively make the objective deductions of NPI’s research programme more difficult – disrupting bear ecology/biology/physiology right down to the molecular level, in feedback loops yet to be fully understood – impurities actively disrupting purification, but they also force us to rethink our pervasive imaginaries. N23992 as a polluted bear

⁵¹⁵ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵¹⁶ Hodgetts & Lorimer (2018)

body, linked to global networks of chemical flow (themselves the products of manufacturing and transportation industries that both clothed and carried me, the ethnographer, to Svalbard), asks us to move beyond Edenic notions of the pristine Arctic and the polluter. These are enfolded worlds, and tracing N23992's life, her digital ecology, her place in Arctic food webs, and her corporal story ⁵¹⁷, is how I will to navigate them. As the scientists from NPI ascertain biological data from her bodily samples, the collection of which is also facilitated by the injection of a short-term chemical immobilization, I ask what N23992 tells about her Arctic world, its future, and her species.

Here, and in conclusion, I am reminded of the work of Michael Bravo as he recalls the polar Hyperboreans – “[of] *liminal strange* [and] *monstrous powers*” – whose view from the “*northern outer edge of the world*” plays a formative role in the conception of Ancient Greece ⁵¹⁸. So too, N23992 is far from being a passive victim at the hinterland of our European metropolis ⁵¹⁹. Instead, through her very membership to the peripheral and through her cyborgian mobilities, she plays a central role in the telling of our climate futures and our current ecological crises, as well as the mobilization of different management and conservation strategies ⁵²⁰. At the same time, she is herself constitutive of our imaginations of Northernness, our shared ecologies, and our Arctic dreams.

⁵¹⁷ Haraway (2008) p.4

⁵¹⁸ Bravo (2019) *North Pole: Nature and Culture*, Reaktion, London, p.43

⁵¹⁹ Howell (2017)

⁵²⁰ Asdal (2008); Barry (2001); There is further work to be done here that builds on the writings of Peder Anker (2020), and connects the history of Svalbard and polar bear monitoring to notions of northern identity and Norwegian environmentalism. Anker traces Norwegian modes of environmental and ecological thought as they have navigated different intellectual inputs (from Carson's *Silent Spring* to Rio's Earth Summit in 1992, and the growth of Deep Ecology), and proposes how their unique outlook is deeply tied to a belief in the power of the periphery.

3.2 “Polar bears have always been politicized”

Thor Larsen is one of the ‘grand old men’ of polar bear research. *“Thor... is still very much alive”* joked one researcher as he proposed I speak with him... *“he might be willing to give you some perspectives...right back to the international agreement because he was involved in that, one of the few.”* His career began at the University of Oslo in 1965, and was one of only 8 polar bear scientists present during the negotiation, proposal, and signing of the International Agreement on the Conservation of Polar Bears in Oslo, 1973⁵²¹. This landmark piece of legislation not only prohibited the trapping of bears in Svalbard, but also laid the foundations for decades of scientific monitoring of the species – its institutions, infrastructures, communities, methodologies, and politics. This context is vital for understanding N23992 as a ‘tagged’ bear – the significance of capturing and handling bears and the importance of her scientific enrolment in regimes of knowledge production. At the same time, N23992’s role as a polar bear of science must also be framed with respect to the politicization of her entire species – from conflict with trappers, and Cold War tensions, to climate change concerns.

We spoke via Skype on the 1st March, 2018. I was keen to hear his experience with the early formation of the agreement and the role of polar bears in a mid-20th century international political climate, as well as the history of polar bear scientific captures. *“I wonder if I should take you even further back”* he suggests, *“since you are a humanist [sic] working with social sciences, and I am biologist [sic], and when I started my research in 1966, 65-66 ... we had a very special situation in Svalbard that was very different”*⁵²². *“I was interested in research on polar bears, and I was a young researcher living in Oslo, and polar bear hunting was very very controversial”*. *“You had trappers ... in Svalbard, they were staying there for a year or so trapping polar bears and sending the hides back in Tromsø”*. This long tradition of hunters and sealers produced *“a conflict between north and south, between hunting and conservation”* ... *“it was me as a researcher against [these] old timers who knew everything and shouldn’t be told anything by a young scientists”*. *So, it has to do with science and ordinary people, it has to do with South verses North, ‘people in Oslo ... shouldn’t have a say in what or how we manage polar bears in Svalbard’ ... research against hunting”*⁵²³.

These conflicts were deeply felt, so much so that Larsen’s position as a researcher was perceived as a direct challenge to livelihoods and knowledges of the trappers. *“It was very very hefty, I can tell you*

⁵²¹ Beumer, L. (2017) ‘50 Years of Polar Bear Research: Interview with two scientists’, *Polar Connection, Polar Research and Policy Initiative*, Interview Series, 27/02/17, Online, Available at: [http://polarconnection.org/polar-bear-interview/] Accessed 05/08/18.

⁵²² Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵²³ *ibid*

that ... it was so bad sometimes that I got letters, anonymous letters, and I was blasted in the newspapers for what I was doing, that I didn't know what I was doing, I didn't know what I was talking about." Just before the agreement was signed in 1973, and polar bear hunting in Svalbard was set to be banned, he asked for a town meeting in Longyearbyen to explain. *"The settlement there was about 800 people ... I gave my lecture in the church there, and several hundred people came". "They were ready to crucify me, and to nail me to the wall... because there was such an aggression for anything which had to do with stopping the polar bear hunting". "There was a lot of opposition to the protection in these years, and then you got the agreement in '73 and ... everyone in Svalbard seem[ed] to accept it, it took only 2 or 3 years". "The reason for that is that Longyearbyen and Svalbard have a limited social history (perhaps social memory), most people are there for a short time ... so the antagonism which you had in the 1960s, before you got the agreement, is completely gone ... it was an interesting social observation."*⁵²⁴.

Larsen's initial anecdote conveys so much about the role of polar bears in the socio-political domain of scientists, research, and policy. It alludes to contrasting knowledge claims, linked to notions of expertise, a very personal politics, and an accompanying territoriality, catalysed by the enactment of a research protocol where bears were being captured, not by trappers, but by scientists. As Doug Clark, from the University of Saskatchewan, explains: *"polar bears have always been politicized... I'm pretty sure this applies in every country"*⁵²⁵. Their capture, as this chapter will continue to explore, is a decisive moment within this transformation.

⁵²⁴ *ibid*

⁵²⁵ Clark, D. (14/05/2018) *Research Interview*, Skype, SPRI, Cambridge.

3.3 The First Scientific Polar Bear Capture: Eastern Svalbard, 1966

In 1966, Thor Larsen, then a researcher with a scholarship from the Norwegian Research Council, accompanied by colleagues from the Norwegian Polar Institute, University of Minnesota, and University of Pennsylvania, set out on the sea East of Svalbard intent on trialling methods for polar bear tranquilization and sampling ⁵²⁶. The four bears they would capture that year would be amongst the first ever captured with the aim of scientific data collection, and heralded a new era, not only for Svalbard, but also for polar bear science and research worldwide. Various attempts were made throughout the 1960s to trial such methods ⁵²⁷. In 1965, efforts by fixed-wing aircraft in Alaska were considered a failure ⁵²⁸. In Canada, foot snares and helicopters were used to some effect ⁵²⁹, and later, the Russians would immobilize some females in dens on Wrangel Island ⁵³⁰. However, it was this first Svalbard expedition in summer 1966, and three subsequent expeditions 1967-69, that would initiate a much more standardized sample methodology, much of which still remains in place today.

The impetus behind this trial came the year before. In July 1965, the U.S. Secretary of the Interior under President Lyndon B. Johnson, Stewart L. Udall, and Alaskan Senator Edward L. (Bob) Bartlett called for “an international conference of Arctic Nations” to collaborate on scientific knowledge about the polar bear and discuss “future courses of action” ⁵³¹. This conversation had begun 7 months earlier, with Senator Bartlett quoted in the New York Times on December 27th 1964 that he would press for an “international treaty to protect the polar bear” about which he had “worried for years”, following three years of correspondence with Alaskan Department of Fish and Game ⁵³². On 6th September 1965, 46 participants from the five Arctic nations: USA, Canada, Denmark, Norway, and the Soviet Union, as well as Switzerland - all a collection of politicians, managers, conservationists, and researchers - converged on Fairbanks, Alaska ⁵³³. This was to be the First Scientific Meeting on the Polar Bear, and after 4 days

⁵²⁶ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵²⁷ Larsen (1971)

⁵²⁸ Flyger, V., Schein, M. W., Erickson, A. W. & Larsen, T. S. (1967) Capturing and Handling polar bears – a progress report on polar bear ecological research, *Trans. N. Am. Wildl. And Nat. Resources Conf.* **32**: 107-119; Larsen (1971)

⁵²⁹ Jonkel, C. (1967) Life history, ecology and biology of the polar bear, autumn 1966 studies, *Canadian Wildl. Serv. Progr. Notes* **1**, pp8.

⁵³⁰ Uspenski, S. M. & Kistschinski, A. A. (1970) ‘Polar Bear Research and Conservation Measure in the U.S.S.R.’, *Report to the Second International Working Meeting of Polar Bear Specialists*, Morges, Switzerland, 8pp. Mimeo.

⁵³¹ Larsen, T. S. & Stirling, I (2009) ‘The Agreement on the Conservation of Polar Bears – its History and Future’, *Norsk Polarinstitutt, Rapportserie NR*, **127**, Mars, p.5

⁵³² New York Times (1964) ‘Protection asked for polar bears’, NYT Archive, Online, Available at: [<https://www.nytimes.com/1964/12/27/archives/protection-asked-for-polar-bears-airborne-hunters-threaten-survival.html>] Accessed: 25/08/17.

⁵³³ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge; Larsen & Stirling (2009) p.5

they released a “Statement of Accord Approved by the Delegates”, that expressed the collective concerns over inadequate scientific knowledge to inform management of the species⁵³⁴.

Senator Bartlett was personally aggrieved by the widespread practice of hunting polar bears for sport from light aircraft in Alaska, with the price of a “guaranteed kill” outing as low as US\$500⁵³⁵. Various other global threats were also outlined, from this increased hunting pressure to the “effects of transboundary pollution”, and the increasing access to the Arctic facilitated by post-WW2 technological advances⁵³⁶. But the primary concern was more practical. “*I was not there but I had a colleague who was*”, explains Larsen, “*and the outcome ... was that they don’t know enough, we don’t have enough knowledge*”⁵³⁷.

“*The range states and IUCN met to discuss the fate and future of the polar bears*”, Larsen explains⁵³⁸. There were huge differences in opinion, the Russians claiming a single common pan-Arctic population, and others who advocated for distinct populations in more localized ranges⁵³⁹. Common, however, was a lack of data and evidence, something that they all agreed had to be addressed and resolved, for the answering of this question had enormous significance for the management of the species (in particular the impact of regional hunting quotas)⁵⁴⁰. Larsen approached the director of the Norwegian Polar Institute and asked to pursue some work on polar bears, in particular with a regard to initiating a live capture and marking programme for data about population size, migration and boundaries, and harvest pressure. His request was granted, as long as he targeted his research of bears in Svalbard as his PhD. He agreed⁵⁴¹.

Larsen had read in the newspapers about the work of A. M. Harthoorn in South Africa, who had used a synthetic opioid M99 (Etorphine) recently produced by MacFarlan Smith in Edinburgh to tranquilize elephants⁵⁴². The advantage of M99 was that its potency enabled the use of a low volume in a small syringe that could be adapted into a dart, and Larsen purchased a supply from Reckitt & Sons Ltd.⁵⁴³. He also received advice from Albert Erickson at the University of Minnesota and Vagn Flyger of

⁵³⁴ *ibid*

⁵³⁵ New York Times (1964)

⁵³⁶ Larsen & Stirling (2009) p.5

⁵³⁷ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵³⁸ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵³⁹ Larsen & Stirling (2009)

⁵⁴⁰ *ibid*

⁵⁴¹ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁴² Bentley, K. W. & Hardy, D. G. (1963) New potent analgesics in the morphine series, *Proceedings of the Chemical Society*, **220**, 189-228.

⁵⁴³ Larsen (1971)

Pennsylvania, who had extensive experience tranquilizing black bears and grizzlies in the U.S. ⁵⁴⁴. Larsen had worked with Flyger's colleague Marty Schein the year before in Point Barrow, Alaska, and would now embark again on the Svalbard voyage. Odd Lønø, a friend and researcher in Norway, suggested to Larsen that they should use the same method as was used by the trophy hunters in Svalbard – using a boat in the drift ice to shoot bears at close range from the deck. NPI negotiated with the Svalbard Governor to gain access to his ship “Nordsyssel”, a 93-foot wooden-bodied ice-going vessel, for 5 days during the summer to test the technique ⁵⁴⁵.



Fig.9 (left): The Svalbard Sysselmannen's (Governor) vessel, 'Nordsyssel', and three polar bear scientists with a tranquilized bear, Svalbard, summer 1966 [Source: copyright Thor Larsen]

They took Nordsyssel East, into the pack ice at the edge of the archipelago between Kong Karls Land to the north and Hopen to the south. The message came from the bridge that a polar bear was out on the ice to the left. Gradually they drew alongside, and with a powder-loaded syringe gun fired a dart from around 20m into its rump. It was a young single female, not particularly large, and without cubs ⁵⁴⁶. The drug took hold very fast, and the bear slumped onto the ice. Carefully, they approached. The drug was

⁵⁴⁴ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁴⁵ *ibid*

⁵⁴⁶ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

effective, but the bear was still possible to wake with loud noises or pain, as they would later learn when dropping a metal bucket on the deck the following summer⁵⁴⁷. Al Erickson began to demonstrate the sampling and marking protocol. The bear was fitted with a Monel Metal cattle tag (No. 49, National Band and Tag Co., U.S.A.), as well as a red aluminium tag (PCR 1, Salt Lake Stamp Co.) in its ear, inscribed with “Reward 20\$ Norsk Polarinst., Oslo”⁵⁴⁸. A black numerical tattoo with an N prefix was punched on the inside right and left upper lips with pliers⁵⁴⁹. Next, a 250-cc blood sample was drawn from the femoral vein the bear’s back leg, later to be separated centrifugally to isolate the plasma and cells for freezing⁵⁵⁰. Larsen wanted to assess possible genetic differences between Svalbard bear and other populations, as well as testing for persistent pollutants. Teeth wear was analysed to help assess age, and later in 1967 a pre-molar tooth would be pulled for more precision⁵⁵¹. The last two digits of the bear’s code were then painted in ‘Nyanzol A’ dye on the hip fur, other hair was pulled, and finally they administered an antidote M285 (Nalorphine or Cyprenorphine) of a morphine antagonist to counteract the M99⁵⁵². They stayed with the bear until she woke, and watched as she receded across the ice. With the successful capture and handling of three more bears, they agreed that they should roll out the programme at a greater scale the following year, even bringing with them metal cages so that they could carry the polar bears into the boat for longer observations of drug recovery⁵⁵³.

These were the “*pioneer days*”, says Larsen, for the first time in Svalbard’s history a polar bear had been shot, not with a high-powered rifle, but with a tranquilizer dart. This female bear, and the three others in 1966, were the first to be enrolled into the long-term monitoring programme⁵⁵⁴. Larsen and colleagues trialled many of the techniques and methods that were used in 2009 to capture, tag, and sample N23992, (still used to this day) and crucially helped to situate polar bears within a new network of knowledge claims, industrial/agrarian/military histories, and technological imaginaries.

⁵⁴⁷ *ibid*

⁵⁴⁸ Larsen (1971)

⁵⁴⁹ *ibid*

⁵⁵⁰ *ibid*

⁵⁵¹ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁵² Larsen (1971)

⁵⁵³ Larsen, T. S. ((17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁵⁴ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.



Fig.10 (above): Thor Larsen (left) and Albert Erickson (right) with the first polar bear to be immobilized and captured on Svalbard, summer 1966 [Source: copyright Thor Larsen]

Speaking with me in September 2019, Larsen emphasised the near-familial relationships between researchers that was apparent throughout the early polar bear (and bear species cousin) science community ⁵⁵⁵. Just as a population of sampled polar bears was starting to be fixed in Svalbard – mothers captured with cubs, and cubs re-captured as adults, etc. – a comparable lineage of polar bear scientists was developing across biological research institutions. Just as mother bears teach their cubs to hunt, often inheriting similar home ranges as they grow, this community of male polar bear researchers embodied personal networks of knowledge transmission, learning, and development. This is a marked moment of co-production, as the assemblage of female bears and male researchers (as illustrated above: Fig.11) is fixed at the moment of capture – this ‘handling’ is transformative for both parties. The mentors were Al Erickson (pictured) and Vagn Flyger, whose teachings were vital to the development of these capture protocols, whilst Chuck Jonkel was instrumental in the application of sub-population-wide surveys ⁵⁵⁶. Their knowledge is still passed on today.

⁵⁵⁵ *ibid*

⁵⁵⁶ *ibid*

Image redacted due to Copyright

Fig.11 “Early research cooperation... at Cape Churchill in Canada, 1967”. I cannot help but think of the hidden technologies that were so instrumental in the formation of this community. (L) V. Flyger, F. Craighead, A. Erickson, J. Craighead, C. Jonkel, T. Larsen, and unknown assistant. Photo: T. Larsen, [Source: Larsen & Stirling 2009, p.7]

In 1967, Jonkel invited Larsen and other international colleagues to Canada to participate in a field-based workshop in James Bay near Churchill on the application of standard telemetry techniques ⁵⁵⁷. With them were the Craighead twins, John Johnson and Frank Cooper Jr., who are accredited with one of the most profound progressions in the study of large carnivores ⁵⁵⁸. In 1959, spurred by recent technological advancements (on the back of Cold War military and space-race surpluses) such as the transistor (as well as gyroscopic and tracking mechanisms that represented a crossover between communications and micro-electronics research that would continue into the 1980s ⁵⁵⁹), they had developed small battery-powered radio-transmitters to attach with collars to Yellowstone Grizzly bears ⁵⁶⁰. With the analysis of new FORTRAN programming, they could convert these signals they received (which had already undergone modulation onto a carrier wave and de-modulation upon receipt) into ecological datasheets, coded onto punch cards and then “*fed into the university’s mainframe computers*” ⁵⁶¹. The Craigheads also had a ‘first bear’, a female denoted as ‘Number 40’ in their book

⁵⁵⁷ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁵⁸ Benson (2010); Harmond, R. (2005) ‘Craighead, Frank Cooper, Jr.’ in Carnes, M. C. (ed) *American National Biography, Supplement 2*, Oxford University Press, Oxford, pp.112-114.

⁵⁵⁹ Mackenzie, D. A. (1990) *Inventing Accuracy: Historical Sociology of Missile Guidance*, MIT Press: Cambridge.

⁵⁶⁰ Benson (2010)

⁵⁶¹ Ibid p.36

Track of the Grizzly ⁵⁶². She was the “*first free-roaming grizzly sow to be tracked by radio ... debut[ing] as a free-roaming electronic instrument of science*” ⁵⁶³.

The Craigheads’ work on radio-telemetry would also ignite further advances in satellite telemetry methods, paving the way for the deployment of polar bear radio-collars in the late 70s and 80s, which was then followed by GPS collars in the early 2000s. Larsen first attempted the application of a radio-collar himself in 1979 with Jonkel and Christian Vibe on the FRAM 1 ice drift station on the floes off the East Greenlandic coast ⁵⁶⁴. Mitch Taylor was also instrumental in this early development (with applicable experiences from his service in Vietnam) and after Larsen departed from polar bear research in 1985, the crude and heavy instruments continued to incrementally improve towards the lighter-weight multi-function GPS devices placed on N23992 ⁵⁶⁵.

The enfolded material and intellectual histories that contextualize the establishment of a monitored Svalbard polar bear population (and its parallel community of scientific researchers) not only helps us to understand the basis for our practices of writing and understanding bear lives, but the very communities themselves stem from the development of these technologies. (Further sociological study on these early years of this society of scientists would be welcomed). In the 1960s and 70s, the attitudes to the application of such technologies and sampling techniques prescribed to the notion of the bears as “*instruments of science*” – less “*living being[s]*” and more “*data machine[s]*” ⁵⁶⁶. Tags and collars were instruments of objective knowledge production, described by Benson as “*perfect symbol[s]*” of the human “*efforts to come to terms with our knowledge of nature’s order [and] our power over it*” ⁵⁶⁷. However, moving beyond this rather mechanistic and reductionist ecology, I propose re-framing and re-imagining this early development of polar bear science as a diverse assemblage of “*bodies, technologies, texts, and other materials through which orderings take place*” ⁵⁶⁸. It is within the assemblage that I locate N23992, a bear enrolled into the monitoring programme 53 years later. She inhabits novel political, material, and digital ecologies – rooted in imaginations of the Arctic as a site of sovereignty claims and international conflict; in the growing ethics of wildlife management and 20th century environmentalism; and the technological advancements of military surveillance and the space race, complicit in the purification of her body, behaviour, and ecology into a set of scientific ‘polar bear’ parameters.

⁵⁶² Craighead, F. C. Jr. (1982) *Track of the Grizzly*, Random House, London.

⁵⁶³ Ibid (1979 edition) in Benson (2010) p.60/61

⁵⁶⁴ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁵⁶⁵ Ibid

⁵⁶⁶ Benson (2010) p.60/61, p.31

⁵⁶⁷ Ibid p.2

⁵⁶⁸ Lorimer (2015) p.10

* * *

“What is your thesis about again?” asks Larsen. I explain about the bear, and in particular the propensity for different groups and different actors to tell remarkably different stories about the same animal. *“Of course they do”*, he replies, laughing, *“there are very many other experiences”* ⁵⁶⁹.

⁵⁶⁹ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

3.4 Cold War Politics and the PBSG: Satellite tags and sovereignty claims

Many people I interviewed during this research also spoke to the socio-political context of the mid-late-20th century and its links to the progression of polar bear research methodologies. *“How many times have you mentioned 1973 by now?”* joked Doug Clark, *“I almost gave you a glib answer when you asked [about the agreement], and said, ‘well, what I remember of the OPEC oil crisis is... I’m not saying this to be goofy or anything, but 1972 is when US oil production peaked ... you know, the early ‘70s were the apogee of state power in the Western world ... [and] the ‘60s was ... the steepest portion of the curve of technological development”* ⁵⁷⁰. As a result, *“the reach of nation states into the Arctic”* was beginning, as well as *“into wildlife fields as the nascent environmental and conservation movement was getting going”* ⁵⁷¹.

In Svalbard specifically, after an intensive industrial period many of the Arctic species were in trouble, everything from *“barnacle geese up to polar bears”* ⁵⁷². Pål Prestrud worked in the Norwegian Ministry for the Environment in the 1980s advising on polar matters, and looks back at the preceding decades. *“There was a very strong ... attitude in the ministry, and also among people and the politicians, to protect polar bears and to protect their environment”*. *“Are polar bears important to Norway?”* I asked. *“Yeah I think it was important”* he replies, *“but when we ask in what way ... I think it was important for Norway to show that it ... really cares about the environment in the Arctic, after it has been [sic] a period of heavy exploitation and reduction in many important species”* ⁵⁷³.

However, one international relationship was more pervasive than others during the formation of a polar bear research programme, and also sets an important precedent for the understanding of N23992, tagged bears, and Arctic geopolitics. *“Those early years”* explains Larsen, *“was in the Cold War conflict between the West and the Soviet Union, which surely affected our work”* ⁵⁷⁴. Enormous efforts were made during this period to try and insulate the fledgling world of polar bear science from the overbearing climate of hostility. During the first meeting in Fairbanks, an initial proposal to “cooperate on research between the participating nations” ⁵⁷⁵ was rejected by the Soviet Union, who preferred that all nations do their own research in their own areas of jurisdiction. In response to this initial setback, the International Union for the Conservation of Nature and Natural Resources (IUCN), based

⁵⁷⁰ Clark, D. (14/05/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁷¹ *ibid*

⁵⁷² Prestrud, P. (02/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁷³ *ibid*

⁵⁷⁴ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁷⁵ Larsen & Stirling (2009) p.5

in Switzerland, suggested that they act as an intermediary, distributing research submitted to it and orchestrating data exchange. In doing so, IUCN would also establish a customary species ‘specialist group’ – a group of expert scientists and managers to play an advisory role to parties, governments, and international institutions. Their offer was unanimously endorsed – catalysed by IUCN’s explicitly de-politicized and un-bureaucratic position, working internationally without political interests or agendas ⁵⁷⁶.

Membership to the IUCN’s new ‘Polar Bear Specialist Group’ (PBSG) was also to be insulated from the whims and wishes of national governments, explains Larsen ⁵⁷⁷. Whereas conventionally, the IUCN would instruct steering committees and chairs to nominate their own members, the PBSG was staffed by intentionally bypassing the state governments with private letters to scientists ⁵⁷⁸. *“They knew, IUCN, that if they wrote some letter... to the Russian [sic] government ... they would get two bureaucrats”* continues Larsen. *“They wanted [S. M.] Uspensky and [A. G.] Bannikov, the two distinguished professors and researchers on polar bears, so they sent out personal invitations... and I got a personal invitation, not through the ministry or anything like that”* ⁵⁷⁹. This group that resulted was both small and intimate, and also entrenched some of the enduring characteristics of polar bear science – it’s ‘lineage’ of experts, trusted methods of knowledge production, and authority. *“We were working together in the field, we were just like a family”* continues Larsen. In 1968, the group met for the first time in Morges, Switzerland, at the IUCN headquarters. 8 researchers were in attendance, and the decision was made to have a closed meeting to maximise the openness of the discussion. *“We threw out everybody, including the director general of IUCN (only an IUCN translator was permitted)”* ⁵⁸⁰. Both Uspensky and Bannikov arrived at the meeting being followed by someone from the Soviet embassy watching over them. Whilst he ate outside, they closed the doors. *“It was very special”*, said Larsen.

However, the politics of polar bears could never truly be left at the door, even despite the impetus to develop *“an exemplar of successful science-based wildlife conservation”* ⁵⁸¹. In 1973, all of the range state delegations arrived in Oslo for the final negotiations of an agreement that would cement the previous 8 years of discussion into a legislative basis for protecting polar bears across the Arctic. The day before the meetings began, Larsen invited some of his familiar Russian colleagues to dinner at his house along with other PBSG members. Across his dining room table, Sabah Uspensky was matter-of-

⁵⁷⁶ *ibid*

⁵⁷⁷ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁷⁸ Larsen & Stirling (2009)

⁵⁷⁹ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁸⁰ *ibid*

⁵⁸¹ Egonyu et. al. (2018) p.1

fact about the Soviet stance. *“We don’t care about polar bears”* he said. The Russians had protected polar bears and outlawed hunting back in 1956, and as such there was no reason that the USSR should continue with the agreement for that reason ⁵⁸². Instead, they hoped to pursue an agreement which *“told the international community that ... the five Arctic nations ... held sovereignty rights over the Arctic and its resources”* ⁵⁸³. *“Polar bears serve as the ideal platform because there are no controversial issues or anything like that, it could actually be the ... stepping-stone for an international agreement between the range states, which would be the first in its place”* ⁵⁸⁴. After dinner, Larsen immediately phoned his friends in the ministry of foreign affairs and the ministry of the environment to explain that the Soviets wanted an agreement for those reasons and advised that that they should take it. The next morning, negotiations began in the knowledge that everyone around the table wanted the same outcome.

At the close of the Oslo meetings, on 15th November 1973, the “Agreement on the Conservation of Polar Bears” was signed by Norway, USA, Canada, and Denmark (the Soviets would sign later as they lacked the authorization at the time) ⁵⁸⁵. Within this extremely concise document were enshrined some of the fundamental characteristics of polar bear conservation that they wished to promote ⁵⁸⁶. Yet, despite the agreement promoting an objective scientific focus, particularly through the organization of the PBSG under IUCN’s explicitly apolitical stance, it had already incidentally cemented various idiosyncrasies that would come to determine the future role of the polar bear as a ‘politicized’ creature. The USSR viewed polar bears and their scientific study as an uncontroversial subject matter through which to explore claims to the Arctic region. *“Research has been used for establishing international claim,”* explains Andrew Derocher, it is *“a component of sovereignty claim”* ⁵⁸⁷. How, therefore, should we situate N23992? In Norway, the long-term polar bear monitoring programme on Svalbard has an element of territoriality, ensuring the maintenance of rights outlined in the 1920 Svalbard Treaty. Every bear captured by the Norwegian Polar Institute is physically tattooed an alphanumeric code, all of which begin with ‘N’ for Norway ⁵⁸⁸. N23992 is a Norwegian polar bear: Norway 23992.

This Svalbard/Barents Sea subpopulation, of which N23992 is a part, is also a shared population with Russia, crossing over territorial waters to the East of the Archipelago. In April 2010, Vladimir Putin assisted scientists from the Russian Geographical Society in tagging a sedated polar bear on Franz Josef

⁵⁸² Ibid; Larsen & Stirling (2009) p.11

⁵⁸³ Ibid

⁵⁸⁴ Larsen, T. S. (01/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁸⁵ Larsen & Stirling (2009) p.12

⁵⁸⁶ Agreement on Conservation of Polar Bears (1973) Oslo, November 15th, Online: Available at: [<http://pbsg.npolar.no/en/agreements/agreement1973.html>], Accessed 22/11/2016.

⁵⁸⁷ Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁵⁸⁸ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

Land, proclaiming it to be the “real Lord of the Arctic”⁵⁸⁹. Less than three years earlier in 2007, a Russian submersible planted the national flag on the seabed underneath the North Pole to demonstrate the northernmost extent of the continental shelf that they had claimed in 2001⁵⁹⁰. In 2015, NPI’s lead scientist Jon Aars was forced to alter a population survey after the Russian government rescinded their permit to fly over Russian waters and over to Franz Josef Land. The decision came in the wake of increasing tensions after Deputy Prime Minister Dmitry Rogozin visited Svalbard in violation of his travel ban stemming from ongoing sanctions after the annexation of Crimea in 2014⁵⁹¹. Under the PBSG’s classification this particular subpopulation remains data-deficient – the production of knowledge around polar bears being inhibited by the gesturings of international geopolitical disputes which are themselves bound up and encoded into the tasks of ecological ordering that these research institutions represent. Polar bears – their capture, sampling, and study – have always been emblematic of more than simply polar bears.

⁵⁸⁹ Oliphant, R. (2010) ‘Putin gets to grips with polar bear during visit to Russian outpost’, *The Independent*, Online, Available at: [<https://www.independent.co.uk/news/world/europe/putin-gets-to-grips-with-polar-bear-during-visit-to-russian-outpost-1958704.html>] Accessed, 15/07/2019.

⁵⁹⁰ Gorst, I. (2007) ‘Russia plants flag on North Pole seabed’, *The Financial Times*, Online, Available at: [<https://www.ft.com/content/12294b00-40e7-11dc-8f37-0000779fd2ac>], accessed 02/07/2019.

⁵⁹¹ BBC News (2015) ‘Norway in Arctic dispute with Russia over Rogozin visit’, Online, Available at: [<https://www.bbc.co.uk/news/world-europe-32380101>], Accessed, 25/03/2018.

3.5 Encountering N23992

In late 2017, after my non-encounter with this polar bear across the other side of Adventfjord at the end of August, I contacted Jon Aars, the leading scientist at the Norwegian Polar Institute's polar bear programme, to ask about this bear that was seen close to Longyearbyen. He explained how she had been near here a lot in 2017, as well as being captured for the 5th time on March 28th in Ekmanfjord (78.938/16.456) on the opposite North side of Isfjord. She was very well known to him as polar bear N23992 ⁵⁹². "*We don't give them names like 'Henry'*", he explained, but this "*is like a polar bear name, with 'N' for Norway*" ⁵⁹³.

He emailed across 'N23992', an XLS file that contains five extracted lines of capture data (one for each capture), genetic data, and any other measurables from within NPI's long-term monitoring database. These, and two lines of toxicology results from 2010/2017, represent the totality of the data collected on N23992. Here, it seems, I am faced with the purification of a polar bear as enacted within the repertoires and syntaxes of the Western scientific tradition ⁵⁹⁴. Whilst many might assume N23992 to be instinctively of 'the West' ⁵⁹⁵ (perhaps subjugated/appropriated in the border war of machine and organism ⁵⁹⁶), it is really the interplay of technological mediation and her peripherality that make her fundamentally constitutive of 'North' as well as her mobilities between Svalbard and the technological hubs of industrial Europe – just as the Ursa Major (Arktos) shaped the Arctic imaginaries of medieval explorers led by astronomical navigation. N23992 is Haraway's cyborg – "*theorized and fabricated hybrids of machine and organism...a condensed image of both imagination and material reality*" ⁵⁹⁷. She (SEX f)⁵⁹⁸ has undergone transformation and translations, her corporeality and mobility enfolded into a network of 'knowing polar bears'. This XLS file is more than just a record of the traces she left through these encounters. Within it contains, and from it emanates, the presence of a bear. She is not held here, but rather co-shaped, the product of enfolded techno-scientific worlds, histories, and ecologies. It is interesting that Haraway's "*cyborg incarnation is outside salvation history... perhaps a world without genesis, but maybe also a world without end*" ⁵⁹⁹. So too, N23992's cyborgian conception allows

⁵⁹² Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁵⁹³ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁵⁹⁴ Latour (1999); Yates-Doerr & Mol (2012)

⁵⁹⁵ Scott (1996); Haraway (2008); Yates-Doerr & Mol (2012)

⁵⁹⁶ Haraway (2016) p.7

⁵⁹⁷ Ibid p.7

⁵⁹⁸ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁵⁹⁹ Haraway (2016) p.7

us to move beyond Edenic visions of the Arctic – attuning instead to expressions of more-than-human agency.

Looking at her XLS file, I am in a ‘contact zone’⁶⁰⁰, not the form of encounter with the bear that might have been possible were I across the other side of Adventfjord that day in August 2017, but with her data-bear-counterpart. Navigating entanglements with polar bears requires different specific forms of disciplinary knowledge and training – whether at capture, in a chance wild encounter, or within the database. N23992 presents a challenge to my embodied ways of seeing and thinking. This section follows my encounter with N23992 as I learn to re-trace the purifying tasks of ‘scientific objectivism’. I aim to understand the relationship between this polar bear near Longyearbyen and N23992, how a polar bear becomes ‘known’ and is then mobilized towards management/bio-political ends. In doing so, I will re-frame N23992 as the ‘socio-material stuff of practice’⁶⁰¹, a polar bear that inhabits the nexus between technological advances in wildlife monitoring, prescribed political management objectives, and the imagined landscapes of Svalbard’s future. What sort of bear is N23992 that lives here, in this digital ecology, and what can she tell us about the values of wildlife conservation that both mould her and are moulded by her”?

3.5.1 Cyborgs, Telemetry, and Mobility

Jon Aars was able to locate and identify N23992 with the help of a Telonics Iridium GPS radio-collar that was fitted during her capture in March that year, and programmed to transmit 12 positional fixes per day at intervals of 2 hours⁶⁰². This would be the first time that she was given a collar, having been fitted with a Telonics Konv. TAW-4610H ear tag during her second capture on 16th April 2010 (with 6 hours on and 66 hours off). She also had with her two cubs of the year, a female N26297 and a male N26298

⁶⁰³.

⁶⁰⁰ Haraway (2008)

⁶⁰¹ Candea & Alcayna-Stevens (2012); Yates-Doerr & Mol (2012)

⁶⁰² Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁰³ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

Image redacted due to Copyright

Fig.12 The GPS collar models used by NPI. The transmitter is located at the top behind the neck, whilst an accelerometer is often encased in the plastic on the side. On the right, it is fitted to a tranquilized bear – an intervention that changes both collar and bear – from machine and organism to cyborg. [Source: M. Andersen. NPI, in Swenson et. al. 2013]

N23992 is a cyborgian polar bear ⁶⁰⁴, a ‘four-dimensional being’ in continual data exchange ⁶⁰⁵, and a hybrid of organism and machine. She is a “*telecommunications packing*” polar bear ⁶⁰⁶, and a node in the actor-network of polar science in Svalbard. Reminiscent of Eduardo Kac’s 1997 artwork ‘time capsule’, whereby he surgically implanted a microchip into his ankle ⁶⁰⁷, N23992’s technological ‘organs’ are enfolded both within and onto her flesh ⁶⁰⁸. Unlike Kac, however, N23992 is visibly transformed, with her collar and dye marking both extremely notable even from afar. But she is not herself a data-machine, as initially proposed by the Craigheads in 1979 ⁶⁰⁹, and as discussed at greater length in chapter 1 ⁶¹⁰. Instead, her cyborg corporality enables us access to her natural-cultural polar bear ‘body in technology’ ⁶¹¹, as well as raising new questions about the violence of her capture and the radio collar that coerces an unspeaking animal into “confession” ⁶¹². Locating N23992 within the datasets of NPI (corresponding to the reports of the bear at Hinlopen) is an encounter across distance. It aims to grapple within the lived experience of the bear through her technological traces.

⁶⁰⁴ Haraway (1991)

⁶⁰⁵ Scott, L. (2015) *The Four-Dimensional Human: Ways of being in a digital world*, Penguin Random House, London.

⁶⁰⁶ Haraway (2008) p.13

⁶⁰⁷ Kac, E. (1997) *Time Capsule*, Online, Available at: [www.ekac.org/timec.html] Accessed: 09/04/2020.

⁶⁰⁸ Haraway (2008)

⁶⁰⁹ Craighead (1982)

⁶¹⁰ Haraway (2008); Riskin, J. (2003) The defecating duck, or, the ambiguous origins of artificial life, *Critical Inquiry*, 29(4), 599-633; Koestler, A. (1967) *The Ghost in the Machine*, London: Hutchinson & Co. Ltd; Russell (2011); Merleau-Ponty, M. in Haraway (2008) p.249

⁶¹¹ Ihde, D. in Haraway (2008) p.249

⁶¹² Castellano (2018) p.174

represents the polar bear's 'mobilities' (as opposed to movements) ⁶¹⁵. As Hodgetts and Lorimer emphasise, the use of an apostrophe here (animals' mobilities) helps to "*foreground a distinction between considerations of how animals have been spaced by humans, and animals' own lived geographies and experiences*" ⁶¹⁶. Whilst NPI scientists utilize the map as a tool of purification ⁶¹⁷, it also encodes more information about the politics (and ethics) of that animal movement ⁶¹⁸ – how a cyborg polar bear navigates the atmospheres of its newly 'wired wilderness' ⁶¹⁹, where even the data collected from the collar feeds directly back into her use of space through management responses ⁶²⁰. I also wonder of N23992's awareness of her 'confession' ⁶²¹ – she is surely aware of the collar, as she was of her capture, but does she behave any differently now, or notice the apparent ease with which she is tracked by her human neighbours?

Amazingly, N23992's data suggests that she is a 'local bear'. NPI have noticed that there is an increasing separation between bears that spend their lives onshore (and in coastal fjord systems) and those that follow the offshore sea ice to the N and NE ⁶²². N23992 has, relative to a generalized understanding of polar bear ecology, a very small home range, clustered around the western and northern fjords of Isfjord – Tempelfjord, Billefjord, and Ekmanfjord (where she was captured in 2017) ⁶²³. Larsen explained to me that other 'local bears' have been recorded as the Svalbard research and monitoring programme modernized. There is "*one local population in the bottom of Storfjorden...on the east of the main island... in a bottle there*" as well as "*in the north west corner of Spitsbergen*" ⁶²⁴. Since the banning of hunting in 1973, there has been an even more marked locational (and corresponding life history) change. We have "*seen a huge shift in where the bears are*", explains Jon Aars, pointing towards the wealth of locational data that has informed this deduction: "*we have had at least 10 collars on average per year... about 300 collars [over] the last... few decades*" ⁶²⁵. "*A lot of what we learn about polar bears is due to those collars*" ⁶²⁶. "*Some bears in Svalbard establish themselves in an area*" and their cubs "*will continue to stay in that area, ...they tend to inherit their mother's movements and behaviour*" ⁶²⁷. As the

⁶¹⁵ Hodgetts & Lorimer (2018)

⁶¹⁶ Ibid p.1

⁶¹⁷ Latour (1999)

⁶¹⁸ Bull, J. (2011) *Animal Movements – Moving Animals: Essays on Direction, Velocity and Agency in Humanimal Encounters*, Uppsala University: Centre for Gender Research; Adey, P. (2017) *Mobility*, London: Routledge.

⁶¹⁹ Benson (2010)

⁶²⁰ Hodgetts & Lorimer (2018)

⁶²¹ Castellano (2018)

⁶²² Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶²³ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶²⁴ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

⁶²⁵ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁶²⁶ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁶²⁷ Andersen, M (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

population rebounded, bears began to move back into areas that were previously heavily hunted. One bear, a 12-year-old female coded N23811, has developed a home range encompassing only the fjord of Hornsund to the south, even more local than most ⁶²⁸.

Around Longyearbyen, N23992 is frequently referred to as the ‘Tempelfjord-’ or ‘Billefjord-bear’ after the two fjords where she is encountered most within her range ⁶²⁹. Whilst the GPS data suggests the greatest use of Ekmanfjord during 2017/18, it is in Tempelfjord and Billefjord that she would come across the most human traffic, on the highly-travelled route between Longyearbyen and Pyramididen ⁶³⁰. At the south western edge of Tempelfjord, right on the coast (and at winter on the sea-ice edge) stands the old hut of Hilmar Nøis, Norway’s most prolific trapper and hunter, who at the beginning of the 20th century killed over 300 Svalbard polar bears here ⁶³¹. It is in the shadow of this history, and facilitated by its close, that N23992 has established herself in this area. Many of these ‘local bears’ are enrolled into the monitoring programme, as are their parents and offspring, as their locality increases the likelihood of encountering NPI researchers ⁶³². This deepens my ideas of co-production, that an increasingly distinct sub-sub-population of bears - whose ecology is so closely tied to the history of human activity, resource extraction, and legislation - should also be shaping our conceptions of bear ecology. Polar bears, humans, science, and technology enfold together in the writing of our shared futures.

There are further inferences that can be read through N23992’s GPS traces, which aid the scientists in their exploration of her ecology, and concurrently deepen our understanding of her mobility. Ethologically, the clusters of activity on the fjord sea-ice and at the landward ends tell particular stories. For this entire year, N23992 was accompanied by her two cubs-of-the-year, N26297 (f) and N26298 (m). These fjord ends, often where the sea ice meets the receding glacier fronts (such as Turnabreen in Tempelfjord) make for suitable nursery areas. The fjords themselves have a large population of ringed and bearded seal that rest on the ice around breathing holes. Partially, this frequency is as a result of fewer bears in the area, historically either dead or staying clear of trappers, and more recently as a result of high tourist activity ⁶³³. N23992 has learned to capitalize on this abundance of prey and teaches

⁶²⁸ WWF *Species Tracker* (2019) Online, Available at: [<https://arcticwwf.org/species/polar-bear/tracker/>] Accessed: 09/10/19.

⁶²⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen

⁶³⁰ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶³¹ *Museum Nord* (2020) Online, Available at: [<https://www.museumnord.no/en/everyday-heroes/an-entire-life-trapper-island-svalbard/>] Accessed: 09/04/2020.

⁶³² Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

⁶³³ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

her cubs to do the same (her previous cubs from 2012/13 exhibited similarly adept hunting skills). Perhaps she herself was taught by her mother, who has a similar but less pronounced spatial territory ⁶³⁴. N23992 has a reputation as an excellent hunter ⁶³⁵, as well as simultaneously as a ‘good mother’, a product of age and experience ⁶³⁶. I find this interplay of the trophic and the maternal particularly striking – just like images of cubs and mothers feeding together, stained red – at the awkward intersection of killing and care, and their disjuncture with gendered presumptions of much of our natural history. N23992’s specialized skills may prove even more important (for her and her cubs) as the reduction of ice area and coastal break-up results in lower hunting success across the entire population ⁶³⁷.

Image redacted due to Copyright

Fig.14 N23992 and her cubs feeding in Tempelfjord, 2013 [Source: Polar X Productions]

N23992 made two noteworthy journeys during this period. Soon after her capture in spring 2017, she took her cubs on a loop northward, crossing Dickson Land to meet the southern tip of Wijdefjorden and following it up along the western edge of Ny Friesland. They stayed for days at the mouth of Wijdefjorden, adjacent to the bay of Mosselbukta where N23992 was first captured back in 2009, and moved as far up as the island of Møffen to the north ⁶³⁸. Møffen is a flat outcrop, famous as an Atlantic Walrus haul out. Drawn by their pungent smell, N23992 briefly investigated the island, but would unlikely be capable of tackling a walrus, and, from the little time the family spent there, found no

⁶³⁴ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶³⁵ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø; Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁶³⁶ Cubaynes, S. et. al. (2019) Modelling the demography of species providing extended parental care: A capture-recapture approach with a case study on Polar Bears (*Ursus martitimus*), *BioRxiv*, DOI: 10.1101/596437.

⁶³⁷ Hamilton, C. H. et. al. (2017) Arctic predator-prey system in flux: climate change impacts on coastal space use by polar bears and ringed seals, *Journal of Animal Ecology*, **86**(5).

⁶³⁸ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

opportunity. N23992 had previously made a similar journey north in 2014, then with one of her two cubs from 2012/13 ⁶³⁹. This journey, as I will discuss later, directly followed the deadly trauma of her family's capture that year. The GPS points transmitted from her collar not only fixed her location, but also the embodied landscapes of polar bear memory, and even grief.

N23992 also moved further south during August and September 2017, across Sassendalen and down towards Adventfjord where she was spotted near Longyearbyen ⁶⁴⁰. She rounded Louisfjellet to the headland at Revneset, where a tourist group renting a cabin had spied her and her cubs scavenging on a reindeer carcass. They continued east down the valley at Adventdalen, before turning back south-west, and re-joining the coastline on the southern shore of Isfjord near Grumant. They soon returned to Longyearbyen, where they would be scared away by the governor's helicopter (who had been alerted by live location updates from her collar), as I looked on unaware from atop Platåberget ⁶⁴¹.

This second route also reflects an aspect of N23992's mobility. She has also become renowned for opportunistically breaking into cabins, unafraid of human presence and adapting to novel food opportunities in closer proximity to towns ⁶⁴². Her annual journeys reflect a learned pattern of opportunism, reacting to the changing abundance and availability of prey species and scavenging. Magnus Andersen suggests that N23992 is also well known for visiting barnacle geese colonies, as "*an example of a bear who utilizes some of these alternative resources*" ⁶⁴³. She has been sighted frequently at nesting sites near Ny Ålesund, where ecologists Jouke Prop and Maarten Loonen from the University of Groningen have undertaken studies of the geese colonies ⁶⁴⁴. Her affective presence is not only felt in her own datasets, but also across multi-species purifications of the broader Svalbard ecosystem – part and parcel of an adapting and morphing systems ecology driven by ice melt, shifting seasonality, and corresponding ursine ethologies.

N23992's 13-month data life performs a range of referential roles. She is recruited into a population-wide survey of polar bear locations – data made available through the capture and collaring of individuals that enables NPI a spatio-temporal perspective on polar bear lives lived, accessed through a succession of proxies and epistemologies that translate this locational data into bear ecology. Other

⁶³⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁶⁴⁰ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁴¹ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁴² Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Strøm, O. (14/11/2017) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁴³ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁴⁴ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

data points from single females can also be ‘read’: enabling NPI to assert whether they have become pregnant, entered a maternity den, where the majority of denning sites are, their use of space, and even delineation of sub-populations ⁶⁴⁵. This data has numerous management applications. It is used: to assess spaces that are important for vulnerable bear families (Tempelfjord is often closed to traffic when N23992 is with young cubs); to understand predator-prey dynamics and responses in a changing Arctic ⁶⁴⁶; and even to warn human settlements of bear proximity to ensure the safety of both ⁶⁴⁷. Yet, this collection of applications also serves to demonstrate the broader capacity of GPS telemetry and spatial data-points to illustrate the more politically and ethically diverse dimensions of polar bear’s mobility. N23992 is here situated within a diverse Svalbard landscape, at the nexus of local polar bear/human histories, learned bear behaviours, technological traces, digital ecologies, wildlife management protocols, and the steady creep of climatic impacts. She is not merely a ‘bear of science’, but a polar bear shaped by, and living in, the assemblage.

* * *

In late April 2019 I received another update. Jon Aars and NPI re-encountered N23992’s son, N26298. He had only recently broken from the family, and was captured in Yoldiabukta (78.535, 14.281), close to where they had spent much of 2017 in Ekmanfjord, north of Isfjord. He was in fine condition, 188kg, 196cm, with *“another young female and several ringed seal kills around”* ⁶⁴⁸. However, their meeting prompted a warning from Magnus Andersen. *“The young bears are quite... vulnerable to human/bear interactions ... at least one of [N23992’s] cubs has been shot after it... left [her], another has been moved away by a helicopter, and there are some other family members further back in history”. “Of course, ... they are in this area with quite a lot of people, and young bears, once they are abandoning their mother, have a pretty high chance of ... getting into trouble”* ⁶⁴⁹. It seems that through the same networks of kinship, learning, and care, flow entangled vulnerabilities in these proximate/local ecologies.

⁶⁴⁵ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁶⁴⁶ Ibid; Hamilton et. al. (2017)

⁶⁴⁷ Svalbard Governor’s Office for Nature Management (04/09/2017) *Research Interview*, Longyearbyen.

⁶⁴⁸ Aars, J. (2017) *Personal Communication via email*

⁶⁴⁹ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

3.5.2 'You are what you eat': Fragmented polar bear bodies, pollutants, and diet

I find 'fragmentation' a powerful idea – that in the tasks of the scientific process, in the chain of transformation, that the corporeal is not merely reduced or purified, but fragmented through space and time. N23992, as mediated by her GPS collar's data signals, is a bear that is fixed as a succession of two-hourly time-stamped co-ordinates, as well as with corresponding temperature measures (a combination of external temperatures and bear body heat, moderated by its behaviour) and activity proxies from an accelerometer that records different patterns of movement. Concurrently, N23992 is also materially fragmented through the extraction of a range of bodily samples that then become the 'guarantors' of polar bear life history, behaviour, and health status. These are not just traces, but also tissue. In these ways, the breaking down, division, analysis, and later re-constitution of N23992 in the fieldwork, lab work, and data spreadsheets of the NPI polar bear programme reflects Latour's circulation of reference ⁶⁵⁰. Just as the pedologists in Boa Vista extract their references to the Amazon rainforest – plants and soils detached and classified, to be later reassembled according to new principles – during her 5 captures, the NPI researchers extracted references to this polar bear that would come to stand for her as they circulate through the networks of scientific practice ⁶⁵¹. This section explores the role of those bodily samples in the (re-)construction of this polar bear. It traces how N23992 (a hybrid data-bear counterpart) passes through different cognitive and disciplinary worlds – each of which translates a different story about the bear's life, future, and conservation.

Here, I will focus on two particular aspects of N23992 that are constructed through the extraction and analysis of blood/tissue samples. These are: the use of fatty acid signatures to deduce diet, and the analysis of blood toxicology for the presence of pollutants. In doing so, I try to better understand the life of N23992 as told through her corporeality ⁶⁵² – a polar bear that inhabits an assemblage of disciplinary histories, novel behaviours, industrial emissions, and shifting Arctic ecologies. I am interested by the disjuncture of purification and impurity, the flows and relationships between the micro and the macro, as I am by the productions of different knowledge traditions. Ultimately, I hope to show how N23992 can return to the ice – demonstrating the role that a scientifically 'purified' polar bear can play in the management and conservation of her 'wild' cousins – and the stories she tells us about the Arctic.

⁶⁵⁰ Latour (1999) p.35

⁶⁵¹ *ibid*

⁶⁵² Haraway (2008)

3.5.2.1 Stable Isotopes and Polar Bear Diets

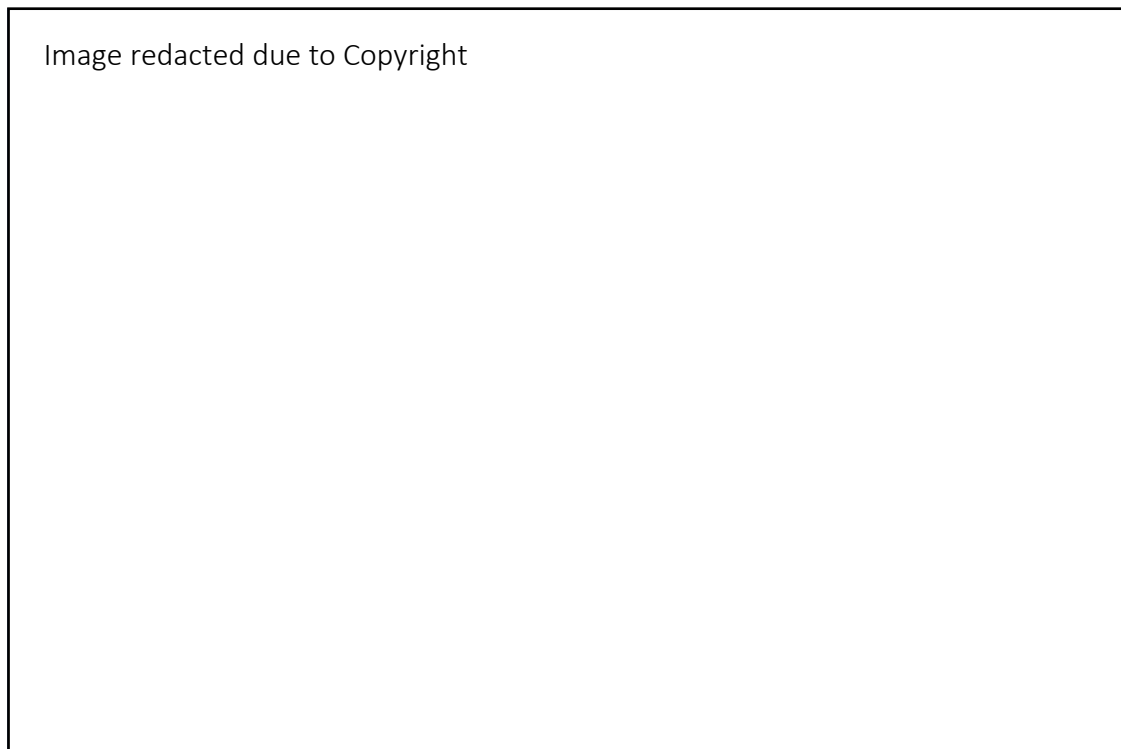


Fig.15 An NPI researcher gathers samples from a tranquilized polar bear during a joint WWF/NPI/Canon expedition on Svalbard in 2014 [Source: Magnus Andersen, NPI]

At the site of her capture, the NPI researchers pull vials of blood from N23992's femoral vein in her back leg, just as per the protocol established by Al Erickson in 1966⁶⁵³. An adipose-tissue sample is then collected using a 6mm biopsy punch. This instrument cores out a small plug of polar bear flesh, of all the layers from hair and skin to muscle, taken around 15cm laterally from the base of the tail⁶⁵⁴. As they carefully cache and label these samples, transferred into a sample case to be flown back to NPI's seasonal Longyearbyen scientific station, they have extracted their reference to N23992. The foil-wrapped tissue sample was frozen in the field, whilst the blood sample is put into a centrifuge to separate out the plasma from the red blood cells before also being frozen⁶⁵⁵, each vial marked with the alphanumeric codes-names of the individual that they purport to contain. Once separated from the original body of the bear, whose evolutionary adaptations enable the mediation of body

⁶⁵³ Larsen (1971)

⁶⁵⁴ Thiemann, G. W., Iverson, S. J. & Stirling, I. (2006) Seasonal, sexual and anatomical variability in the adipose tissue of polar bears (*Ursus maritimus*), *Journal of Zoology*, London, **269**: 65-76; Thiemann, G. W. (2006) *Continental scale variation in polar bear (Ursus maritimus) diets and the fatty acid signatures of their marine mammal prey*, Dissertation, Dalhousie University, Halifax, Nova Scotia, Canada; Thiemann, G. W., Iverson, S. J. & Stirling, I. (2008) Polar bear diets and arctic marine food webs: Insights from fatty acid analysis, *Ecol. Monogr.* **78**(4), 591-613; Ramsay, M. A., Mattacks, C. A. & Pond, C. M. (1992) Seasonal and sex differences in the structure and chemical composition of adipose tissue ion wild polar bears (*Ursus maritimus*), *Journal of Zoology, London*, **228**: 533-544.

⁶⁵⁵ WWF Species Tracker (2014) [online] Available at: [<https://wwf-ap.org/tracker/polar-bear/>]; Larsen (1971)

temperature in the high Arctic, the preservation of this vital matter must now happen cryogenically - frozen to extend its scientific life.

In the NPI scientific offices, in Tromsø, Jon Aars explains the analyses that these samples facilitate, and what they can tell us about the polar bear from which they were taken. The tissues of the bear contain in them, largely unaltered, particular chemical components that are derived from the foods that they have been consuming ⁶⁵⁶. With a carnivorous species like the polar bear, or even 'lipivorous' given its subsistence on the fat of marine mammals, the different lipid/fatty acid molecules present in the bear's own fat tissues correspond to the prey species that it has eaten (mainly in the form of triacylglycerols – three fatty acid molecules on a glycerol backbone) ⁶⁵⁷. The relative proportions of 70 identifiable acids in the polar bear's tissue sample can be broken down into a profile that forms a unique 'signature' ⁶⁵⁸. This signature reflects the proportion of different species that have composed that bear's diet ⁶⁵⁹ – with variations in fatty acid composition between ringed seals, bearded seals, and harbor seals (a species whose northerly expansion into Svalbard waters reflects the warming climate of the region and exhibits a much higher % mass of fatty acid 18:1n-9) ⁶⁶⁰. Whilst these tissue analyses are used to great effect in the Canadian Arctic ⁶⁶¹, used to determine the diets of 1738 individuals over a 30-year timeframe, in Svalbard different analyses are done to determine diet with the use of stable isotopes ⁶⁶².

N23992's blood samples are analyzed for different stable isotopes. After collection (without the addition of anticoagulant), and separation with centrifuge, her blood was freeze-dried and then homogenized into a fine powder (this process is outsourced by NPI to labs throughout Scandinavia) ⁶⁶³ ⁶⁶⁴. Using an elemental analyser and a continuous-flow isotope-ratio mass spectrometer, different values of $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ are outputted, as well as being statistically corrected for the effects of sex and location ⁶⁶⁵. The variation in levels of these two stable isotopes enable them to determine the diet composition of N23992, what food sources she has consumed from different trophic levels, and how

⁶⁵⁶ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø; Thiemann et. al. (2008); Bentzen, T. W. et. al. (2007) Variation in winter diet of southern Beaufort Sea polar bears inferred from stable isotope analysis, *Canadian Journal of Zoology*, **85**: 596-608.

⁶⁵⁷ Derocher, A. E., Wiig, Ø. & Andersen, M. (2002) Diet composition of polar bears in Svalbard and the western Barents Sea, *Polar Biology*, **25**: 448-452; Polar Bear Special Group, PBSG (2019) Online, Available at: [PBSG.npolar.no/en/] Accessed 10/04/2020.

⁶⁵⁸ Thiemann et. al. (2008)

⁶⁵⁹ Ibid; Derocher, A. E. et. al. (2002)

⁶⁶⁰ Iverson, S. J. et. al. (2004) Quantitative fatty acid signature analysis: a new method of estimating predator diets, *Ecological Monographs*, **74**: 211-235.

⁶⁶¹ Thiemann et. al. (2008)

⁶⁶² Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁶⁶³ Bentzen et. al. (2007)

⁶⁶⁴ Larsen (1971); WWF Species Tracker (2014)

⁶⁶⁵ Bentzen et. al. (2007)

those change over time ⁶⁶⁶. Whilst the variations observed in $\delta^{13}\text{C}$ levels are difficult to synthesize – influenced not only by prey availability but also by the parts of that animal consumed (be it fat or muscle) ⁶⁶⁷ – lower values tend to correspond to a higher-fat diet, often associated with ringed seals. Rising $\delta^{13}\text{C}$ measures might indicate the reduction of fat consumption ⁶⁶⁸.

More certain is the relationship between $\delta^{15}\text{N}$ values and the consumption of lower trophic level prey. Lower $\delta^{15}\text{N}$ values in polar bear red blood cells corresponds to a higher consumption of these food sources – either scavenged whale carcasses (as indicated in the Bentzen Alaskan study ⁶⁶⁹), or goose eggs, reindeer meat, and other terrestrial species ⁶⁷⁰. N23992 exhibited little variation in $\delta^{13}\text{C}$ values (-20.21 in 2010, and -20.12 in 2017), and a slight increase in $\delta^{15}\text{N}$ values (15.20‰ in 2010, and 16.35‰ in 2017) ⁶⁷¹. With these individual samples, N23992 here contributes to a much broader database about the changing diets of these local Svalbard bears. Their low $\delta^{15}\text{N}$ values (comparable to a mean of c.19.7‰ in Alaskan bears studied in 2003/4, ⁶⁷²) indicate high use of these scavenged/terrestrial prey species – ecological adaptations that are also noticeable in the observational accounts of these local bears ⁶⁷³, from reindeer ⁶⁷⁴ and goose eggs ⁶⁷⁵ to whale carcass scavenging ⁶⁷⁶. These studies formed the basis for much of what I was told about N23992's shifting ecology and ethology – but also represent different references to her mobility. With shifting polar bear ranges, onshore bears like her begin exploiting new resources and new diets, a trophic web that is, consequently, deduced from their blood samples.

3.5.2.2 “One of the most polluted animals in the world”

I spoke to Heli Routti, another researcher at the Norwegian Polar Institute in Tromsø, who specializes in ecotoxicology and the study of anthropogenic pollutants that occur in Arctic food webs. “Polar bears

⁶⁶⁶ Bentzen et. al. (2007); Thiemann et. al. (2008)

⁶⁶⁷ Tieszen, L. L. et. al. (1983) Fractionation and turnover of stable carbon isotopes in animal tissues: implications for $\delta^{13}\text{C}$ analysis of diet, *Oecologia (Berl.)* **57**: 32-37; Kurlle, C. M. & Worthy, G. A. J. (2002) Stable nitrogen and carbon isotope ratios in multiple tissues of northern fur seal *Callorhinus ursinus*: implications for dietary and migratory reconstructions, *Mar. Ecol. Prog. Ser.* **236**: 289-300; Bentzen et. al. (2007)

⁶⁶⁸ Bentzen et. al. (2007)

⁶⁶⁹ *ibid*

⁶⁷⁰ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁷¹ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁷² Bentzen et. al. (2007)

⁶⁷³ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁷⁴ Derocher, A. E., Wiig, Ø. & Bangjord, G. (2000) Predation of Svalbard reindeer by polar bears, *Polar Biology* **23**, 675-678.

⁶⁷⁵ Prop. J., Aars, J., Bårdsen, B.-J. et. al. (2015) Climate change and the increasing impact of polar bears on bird populations, *Interdisciplinary climate studies*, **3**, 33.

⁶⁷⁶ Helgestad, A. (2019) *Personal Communication via email*

are one of the most polluted mammal species”, she explains, sometimes with levels of persistent organic pollutants as high as human communities living directly in the proximity of the factories that manufacture the chemicals ⁶⁷⁷. Other human populations have roughly 1% of the same concentrations, a comparison that serves to demonstrate the remarkable quantity that accumulate in polar bears ⁶⁷⁸. That’s part of an Arctic paradox, she continues, a region so remote that can be so affected by global pollution. Their aim, she explains, is to understand polar bear pollutant trends; their correlation to emissions, different bear ecologies, and climate change; as well as beginning to frame the effects that they might have upon the bears – from the molecular to the physiological ⁶⁷⁹.

In order to conduct these analyses, the toxicology research utilizes the same standardized samples extracted during the NPI field season capture-release programme – primarily blood and fat, as well as hair ⁶⁸⁰. The samples are then frozen (immediately after extraction for fat and at the end of each day after being centrifuged for blood) before being stored for transfer to a variety of labs in mainland Norway at the end of the field season (dependent on the type of analyses required for a particular research pathway/question) ⁶⁸¹. Svalbard is, perhaps to its misfortune, an excellent location to study pollutants. Firstly, it is located at the nexus of oceanic and atmospheric currents that carry persistent chemicals from Northern Europe and America. Secondly, not only does the existence of the long-term polar bear monitoring programme facilitate the access to numerous individuals (of the top trophic species), but also the presence of ‘local bears’ like N23992 results in a high proportion of re-captures, very useful for the temporal perspectives of the studies and reducing the high variation between individuals ⁶⁸². However, the same lack of human hunting that makes Svalbard an attractive subpopulation for much of the scientific research (on a group of bears without this influencing factor) makes for a different range of available samples. Whilst there is an enormous range of potential research pathways, some studies aren’t possible without a liver biopsy, for example, Routti explains, unlike the samples available from Greenlandic and North American bears whose hunters collect a wide range of bodily samples ⁶⁸³ ⁶⁸⁴. The irony is unmistakable, the research intending to understand

⁶⁷⁷ Routti, H. (2018) *Research Interview*; Routti, H. et. al. (2017) Emission changes dwarf the influence of feeding habits on temporal trends of per- and polyfluoroalkyl substances in two Arctic top predators, *Environmental Science & Technology* **51**, 11996-12006. 10.1021/acs.est.7b03585.

⁶⁷⁸ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁷⁹ Ibid; Routti, H. et. al. (2019) State of knowledge on current exposure, fate and potential health effects of contaminants in polar bears from the circumpolar Arctic, *Science of the Total Environment* **664**, 1063-1083. <https://doi.org/10.1016/j.scitotenv.2019.02.030>.

⁶⁸⁰ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁸¹ *ibid*

⁶⁸² *ibid*

⁶⁸³ *ibid*

⁶⁸⁴ Routti, H. et. al. (2019)

pollutants for the continued protection of a species seemingly altered by the infrequency of its access to dead bear bodies.

I asked Routti whether she has used N23992 as one of the bears incorporated into the toxicology research. Quickly, she searched through the database and found her. N23992's samples had been analysed twice, once in 2010 and most recently after her capture in 2017⁶⁸⁵. Only adult female bears are enrolled within the study. Routti explains that this choice is to ensure as much standardization as possible in order to maximize the effectiveness of what is an expensive process⁶⁸⁶. However, I can't help but recall the societal history of the PBSG and the lineages of female bears that underpin the development of the monitoring programme. So too, with the reproductive focus of our wildlife conservation and management ethics, it is perhaps unsurprising to find a predisposition for the impacts of anthropogenic impurities on the physiological potentialities of female bodies.

With other local female bears (like N23688, an older bear captured and analysed in this research pathway 7 times since 2002), N23992 contributes to a temporal sequence of pollutant data (measured in ng/g lipid weight in her blood plasma)⁶⁸⁷. Tracing the changing quantities of each pollutant and correlating with other ecological data (particularly between 'local' and 'offshore' bears) allows Routti to make inferences about the mechanisms and factors resulting in highly polluted bears⁶⁸⁸. Initially, NPI had hypothesized that higher levels of PFAAs (perfluoroalkyl acids) in the offshore bears could be correlated with their higher levels of movement, as well as a narrower high-trophic-level marine diet⁶⁸⁹. This assumption was based on stable isotope analyses that found local bears to have a wider variety of prey species, some from lower trophic levels, whereas the offshore bears rely more heavily on seals that may more effectively transfer pollutants to the top predator (through biomagnification)⁶⁹⁰.

⁶⁸⁵ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge; Data provided by H. Routti from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]; Lippold, A. et. al. (2019) Temporal trends of persistent organic pollutants in Barents Sea polar bears (*Ursus maritimus*) in relation to changes in feeding habits and body condition, *Environmental Science & Technology* **53**, 984-995. 10.1021/acs.est.8b05416.

⁶⁸⁶ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁸⁷ Lippold, A. et. al. (2019); Data provided by H. Routti from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁸⁸ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁶⁸⁹ *ibid*

⁶⁹⁰ Hop, H. et. al. (2002) Food web magnification of persistent organic pollutants in poikilotherms and homeotherms from the Barents Sea, *Envir. Sci. Tech.* **36**: 2589-2597; Tartu, S. et. al. (2017a) Sea ice-associated decline in body condition leads to increased concentrations of lipophilic pollutants in polar bears (*Ursus maritimus*) from Svalbard, Norway, *Science of the Total Environment*, **576**: 409-419; Tartu, S. et. al. (2018) Choose your poison – Space-use strategy influences pollutant exposure in Barents Sea polar bears. *Environmental Science & Technology* **52**, 3211-3221. 10.1021/acs.est.7b06137.

In 2010, N23992 demonstrated generally average or below average levels of PFAAs – stable, non-metabolizable, anthropogenic chemicals called perfluoroalkyl acids that are commonly used in the production of stain repellents, paints, pesticides, and even Gore-Tex (due to their water and oil repellence) ⁶⁹¹. From 2010 to 2017, her second analysis, she also demonstrated a net reduction in PCB levels – persistent lipophilic pollutants called poly-chlorinated biphenyls. This, however, is nothing compared to the reduction in PCB levels experienced by N23688 (the older female), whose first analyses in 2002 exhibited levels with an order of magnitude 10 times greater than her most recent concentrations ⁶⁹². N23992 did exhibit a marked increase in her levels of HCB between 2010 and 2017 – a volatile organic compound, hexachlorobenzene, released during fuel combustion and fungicide use ⁶⁹³. Banned in all of Europe since 1998, HCB is one chemical that emphasizes the complexity of the mechanisms resulting in pollutant occurrence in the food web ⁶⁹⁴. Van Beest ⁶⁹⁵ and Blevin ⁶⁹⁶ found little evidence to link polar bear home range size with POP concentration in the blood, whilst Tartu ⁶⁹⁷ corroborates the hypothesis that diet (particularly sea-ice prey) increases PFAS exposure, as does fasting (although not due to exposure but the excretion of PFASs in the body during fasting) ⁶⁹⁸ the presence of young cubs, and maternal transfer (for the lipid-soluble POPs rather than the non-soluble

⁶⁹¹ Data provided by H. Routti from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]; Tartu, S. et. al. (2017b) Diet and metabolic state are the main factors determining concentrations of perfluoroalkyl substances in female polar bears from Svalbard, *Environmental Pollution*, **229**: 146-158; Routti et. al. (2017); Wang, Z. et. al. (2014) Global emission inventories for C-4-C-14 perfluoroalkyl carboxylic acid (PFCA) homologues from 1951 to 2030, Part I: production and emissions from quantifiable sources. *Environment International* **70**, 62-75. 10.1016/j.envint.2014.04.013; Wang, Z. et. al. (2017) Toward a comprehensive global emission inventory of C4–C10 perfluoroalkanesulfonic acids (PFASs) and related precursors: Focus on the life cycle of C8-based products and ongoing industrial transition. *Environmental Science & Technology* **51**, 4482-4493. 10.1021/acs.est.6b06191.

⁶⁹² Data provided by H. Routti from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁶⁹³ Data provided by H. Routti from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]; Tartu et. al. (2017a); Pouch, A., Zaborska, A. & Pazdro, K. (2018) The history of hexachlorobenzene accumulation in Svalbard fjords, *Environment Monitoring and Assessment*, **190**: 360.

⁶⁹⁴ Scottish Environmental Protection Agency (2020) Online, Available at: [http://apps.sepa.org.uk/spripa/Pages/SubstanceInformation.aspx?pid=59] Accessed, 05/06/2019.

⁶⁹⁵ Van Beest, F. M. et. al. (2016) Spatiotemporal variation in home range size of female polar bears and correlations with individual contaminant load, *Polar Biology*, DOI: 10.1007/s00300-015-1876-8.

⁶⁹⁶ Blévin, P. et. al. (2020) Pelagic vs coastal – Key drivers of pollutant levels in Barents Sea polar bears with contrasted space-use strategies. *Environmental Science & Technology* **54**, 985-995. <https://doi.org/10.1021/acs.est.9b04626>.

⁶⁹⁷ Tartu et. al. (2017a)

⁶⁹⁸ Routti, H. et. al. (2010) Hormone, vitamin and contaminant status during the moulting/fasting period in ringed seals (*Pusa [Phoca] hispida*) from Svalbard, *Comp. Biochem. Physiol. A. Mol. Integr. Physiol.* **155**: 70-76; McKinney, M. A., Letcher, R. J. & Aars, J. (2011) Regional Contamination versus regional dietary differences: understanding geographic variation in brominated and chlorinated contaminant levels in polar bears, *Environ. Sci. Technol.* **45**: 896-902. Helgason, L. B. (2013) Seasonal emaciation causes tissue redistribution and an increased potential for toxicity of lipophilic pollutants in farmed arctic fox (*Vulpes lagopus*), *Env. Toxicol. Chem.* **32**: 1784-1792; Tartu, et. al. (2017a); Blévin, et. al. (2020)

PFASs)⁶⁹⁹. Whilst the rates of emission of these pollutants is undoubtedly key (as is their legislation by bodies such as the UNEP Stockholm Convention on POPs)⁷⁰⁰, there are also under-represented feedback loops that make a comprehensive understanding of POP dynamics very difficult⁷⁰¹. Not only are there demonstrable links between the reduction of sea ice, polar bear body condition, and their lipophilic persistent organic pollutant concentration⁷⁰², but global ice melt is also complicit in the re-release of previously cached POPs, explaining some of the recurrence of previously banned chemicals.

Even more difficult, Routti continues, is determining what effects these pollutants might have on polar bears: their biology, ecology, physiology, reproduction, and survival. Not only do the pollutants never occur in isolation, thus resulting in an exponential increase in the potential combinations and relative concentrations, but also interact on a molecular level with numerous nuclear receptors and even more cellular systems, very few of which are adequately understood⁷⁰³. In both laboratory mammals and studies with polar bears, PFAS retention was correlated with “*disrupting the hormone and lipid homeostasis, a reduction in body weight, increased liver weight*”, and higher mortality⁷⁰⁴. Most of the work predicting their effects on polar bears is done with correlative studies, Routti continues, because the specific mechanisms are hard to prove⁷⁰⁵. What actually makes the bear sick or not is so hard to evaluate, yet the likelihood of increased energetic stresses as a result of pollutant-interrupted hormone functions, fat production and storage, and reproductive complications, promotes grounds for precautionary politics⁷⁰⁶.

There are striking networks of circulation here that further cement my conceptualization of N23992 as a polar bear connected to a dynamic global assemblage. Initially, I was interested to examine her placement in different Arctic food webs, and how her changing diet was a product of her mobility, contingent itself upon different histories and landscapes of human/bear entanglements, hunting, resource extraction, and monitoring. But now, these mobilities and trophic architectures tap N23992 into a wider flow of persistent pollutants – themselves present in the Arctic as a result of atmospheric

⁶⁹⁹ Knott, K. K. et. al. (2012) Lactational transfer of mercury and polychlorinated biphenyls in polar bears, *Chemosphere*, **88**, 395-402; Frouin, H. et. al. (2012) Transfer of PBDEs and chlorinated POPs from mother to pup during lactation in harp seals *Phoca groenlandica*, *Sci. Total Environ.* **417**: 98-107; Tartu, et. al. (2017a)

⁷⁰⁰ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁰¹ *ibid*

⁷⁰² Tartu et. al. (2017a)

⁷⁰³ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁰⁴ Guruge, K. S. et. al. (2006) Gene expression profiles in rat liver treated with perfluorooctanoic acid (PFOA), *Toxicol. Sci.* **89**, 93-107; Jensen, a. A. & Leffers, H. (2008) Emerging endocrine disruptors: perfluoroalkylated substances, *Int. J. Androl.* **31**, 161-169; Lau, C. et. al. (2007) Perfluoroalkyl acids: a review of monitoring and toxicological findings, *Toxicol. Sci.* **99**, 366-394; Tartu, et. al. (2017b) p.147

⁷⁰⁵ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁰⁶ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

patterns of circulation and even the recurrence of previously cached POPs released from melting multi-year ice. Such impurities pose important questions about how we conceptualize polar bears, as well about our modes of knowledge production, and our resultant Arctic imaginaries. In particular, it seems that impurity actively disrupts ‘purification’ – muddying the waters of scientific certainty (or at least correlation), as well as the corresponding social constructions of polar bears as a charismatic species of the ‘pristine Arctic’.

One aspect I have found particularly interesting is the popular traction gained by the gendered notion that anthropogenic pollutants have resulted in a high proportion of ‘hermaphroditic’ bears ⁷⁰⁷. In 1998, a study conducted by Øystein Wiig, Andrew Derocher, and colleagues from NPI and Alaska, identified two pseudo-hermaphroditic female polar bears (“with aberrant genitalia morphology”) in Svalbard and proposed the potential links between either excessive androgen excretion by the mother or endocrine disruption from pollutants ⁷⁰⁸. Into the 21st century, the notion that ‘1 in 50’ female Svalbard polar bears had both male and female sex organs became a common shorthand for our pervasive impacts on Arctic wildlife ⁷⁰⁹. Jon Aars explains that the concept has been misrepresented: “*What has been termed hermaphrodite bears has been a bit misunderstood through the media ... we have never had [these] ... what we do know is that ... you also find that sort of thing [pseudo-hermaphroditism] in natural animal populations where you have no high levels of pollutants*” ⁷¹⁰. Whilst it has been recorded at quite high levels in Svalbard, there is also no evidence that these females have any lower level of reproduction ⁷¹¹. Instead, this trope reflects the same socio-cultural framework of values that contextualizes a contemporary understanding of pollutants and their occurrence in the Arctic. It not only subscribes to notions of ‘naturalness’ and ‘wilderness’, but also expresses the challenges that are presented to those heteronormative categories by their corporeal penetration by anthropogenic pollutants.

Routti concludes by explaining how she considers herself at the intersection of various scientific traditions – ecologists, statisticians, chemists, molecular biologists (across institutions from Tromsø to Bergen to Trondheim) – all of whom are engaged in knowing N23992 and the other bears sampled in her population ⁷¹². N23992 is therefore located at the centre of numerous disciplines, epistemologies, and values, and how they come to influence the nature of the polar bear that is both knowable and

⁷⁰⁷ Osborne, D. (2006) ‘Toxic waste creates hermaphrodite arctic polar bears’, *The Independent*, Online, Available at: [<https://www.independent.co.uk/environment/toxic-waste-creates-hermaphrodite-arctic-polar-bears-5336813.html>] Accessed, 07/10/18.

⁷⁰⁸ Wiig, Ø. et. al. (1998) Female Pseudohermaphrodite polar bears at Svalbard, *Journal of Wildlife Diseases*, **34**(41) pp.792-796, p.792.

⁷⁰⁹ Osborne (2006)

⁷¹⁰ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø; Routti, H. et. al. (2019)

⁷¹¹ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁷¹² Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

conservable. At the same time, she is connected to even broader technological, social, and political histories: from the legislative landscapes of the 1973 agreement, the IUCN PBSG, and the instigation of subsequent action plans (CAP/NAP) that outline requisite knowledge objectives for the effective conservation of the species; to the development of both the telemetric and molecular techniques that enable N23992's present, past, and future to be deduced from her GPS traces, bodily samples, stable isotope profiles, and pollutant concentrations. Drawing upon the analyses I have described, this is what I will focus upon for the conclusion of this chapter: to better understand the relationship between N23992 and the idea of a 'conservable bear'. How do the scientific tasks and processes that she has undergone inform (and are informed by) broader management/conservation goals, and what do they tell us about the future of her Arctic home?

3.6 N23992 as a ‘conservable polar bear’

The aim of this chapter was to examine the scientific engagements with polar bear N23992 – a cyborgian, fragmented, data-bear whose monitoring, sampling, and analyses contribute to the understanding of the Svalbard subpopulation, and in particular the ecology of local bears of which she is a prime example. It aimed to situate her within the epistemological histories and communities of polar bear science: the development of the long-term scientific programme in the 1960s, the politicization of polar bear monitoring leading up to the 1973 agreement, the deployment of standardized sampling protocols for the deduction of polar bear biology/ecology, and the relationships between wildlife management and the technological advancements of Cold War military surveillance and the space-race. Ultimately, it sought to explore how N23992 has been ‘purified’ through the tasks of scientific practice, how a polar bear life is ‘translated’ into the databases and publications of NPI, the PBSG, and the discipline of polar bear science. This impetus examines how N23992 becomes ‘known’ – the extraction of references; the significance of her GPS datapoints, isotope profiles, and pollutant contaminant loads on the framing of her life, reproduction, behaviour, space use, and predation. It is about her placement within the assemblage of technologies, bears, and scientists, as well as her mobilities. I explored the co-production of her as a local bear – whose home range has been partly created through the banning of hunting in 1973, who exploits novel and opportunistic food sources, and whose body is enfolded with the technological organs of her four-dimensional existence. N23992’s monitoring raises important questions about power, representation, and gender in our perceptions of the natural world, out geopolitical visions, and our Arctic imaginaries.

Finally, here I want to explore the significance that N23992 (and how she is ‘known’) holds for the management of her as an individual, for the local bears as a group, and for the conservation of her species. This will examine the relationship between the existing legislative framework that prescribes knowledge aims, management criteria, and research priorities, and the resultant ways that polar bears are framed, so to be effectively enrolled within this institutional/infrastructural regime. In their engagements with N23992, how does NPI make her manageable, and what does a conservable polar bear look/act like? Through this process, I question the complicity of both science and policy in the active formation of particular ideas and expressions of polar bear-ness, as well as of our shared futures.

3.6.1 Living with Polar Bears

"I would say that the main reason why we have the polar bear programme is, originally very much connected to the management of polar bears" Jon Aars explains to me ⁷¹³. *"We [at NPI] are a directorate, so we are ... asked by our ministry 'can you give us some information on this issue', right now it is obviously polar bears and climate"* continues Magnus Andersen, *"we are asked to ... give scientific objective information on that"* ⁷¹⁴. What the two NPI scientists are describing is the process whereby different research pathways and parameters are set. Issues are both led by 'management' (here used to refer to the Env. Ministry) and by the progress of the science itself, Aars says, the institute is then *"supposed to create knowledge"*, and then it is this other directorate (a management department within NPI) which is actually using that knowledge ⁷¹⁵. What the scientists are actually doing with the bears, the sampling protocols and programme operations, remains constant, and so do many of the knowledge requirements – *"we are just trying to understand how the polar bear population is responding to its environment, ... both physical and biological... to its habitat, [and].. to the prey species"* ⁷¹⁶.

There are two interesting things to unpack here. Firstly is the relationship between 'known' bears and the management of their species. The aim of the NPI programme is understood by those who work within it to be explicitly a process of knowledge creation, to frame the ecological dynamics of polar bears in Svalbard so that mechanisms impacting the population can be evaluated and even mitigated. Their interaction with bears like N23992 is understood as intentionally de-politicized – *"this is where the system in Norway is really good"* Andersen explains, *"because it is very unpolitical, ... our ministry is ... very aware of this problem with mixing politics and science ... they go very far in trying to separate the two"* ⁷¹⁷. This is the same discourse as was emphasized to me by Dag Vongraven, in whose role as chair of the PBSG and manager in NPI had aimed to promote the primacy of scientific objectivism in part to insulate the discipline from the contentious and charged conflicts of climate change proxy. Secondly, is the use of the term 'management' to refer to the practices of mediation of all human-polar bear engagements on Svalbard – a process that is prescribed by the Norwegian Environmental Ministry, and to a certain extent the proceedings of the PBSG, advised by NPI's scientific programme, operationalized in its management division, and enacted day-to-day by the Sysselmannen. 'Conservation' is a term that is almost entirely absent within the Svalbard context. This omission

⁷¹³ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁷¹⁴ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷¹⁵ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø; Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷¹⁶ *ibid*

⁷¹⁷ *ibid*

(replaced by ‘management’) is largely only semantic, used in much of the literature to distinguish between smaller objectives (such as the protection of crucial denning habitat) that might be viewed as a management issue, and the larger-scale aims of ‘conservation’ that represents the accumulative effects of those individual tasks ⁷¹⁸. Conservation is certainly not absent in Svalbard. However, at the same time, the particular character of the ‘management’ rhetoric is symptomatic of a broader Norwegian strategy for polar bear/human co-existence that has been produced through the syntaxes of the Environmental Ministry ⁷¹⁹. In doing so, they determine much about what Svalbard polar bears should be, and consequently what their conservation should look like.

The Norwegian Environmental Ministry is the nationally responsible agency for species and habitat management in Svalbard ⁷²⁰, whereas the Norwegian Polar Institute operates on the directorate level in an advisory role (for Arctic and Antarctic issues) ⁷²¹. Information flows between them in both informal and formal capacities ⁷²² – formally through a succession of annual meetings, letters from the Ministry, as well as policy white papers (which are themselves informed by the scientific publications and recommendations that return from NPI). For polar bears specifically, there are individuals at every level (the Environment Agency and both the NPI scientific department and management department) that are members of the PBSG, therefore responsible for integrating the international cares and concerns that are outlined in the Range States meetings ⁷²³, as well as further collaborations with other stakeholders like WWF ⁷²⁴. Dag Vongraven explains more about the institutional and infrastructural coordination of polar bear research: “*when I started at [NPI] in 1997... our daily work ... as managers is very much steered by the actual wording of the papers coming from the ministry*” ⁷²⁵. In the early 2000s, the Ministry expressed their desire to “*keep Svalbard as one of the best managed wilderness areas in the world*” ⁷²⁶. The phrase was “*very frustrating*”, Vongraven explains, as it posed numerous challenges, not least how to operationalize it. “*There are some people at the director’s level [in the management family], that are really old fashioned, traditional’ with the attitude that ‘people are bad’*”, he continues

⁷¹⁸ Polar Bear Range States (2015) *Circumpolar Action Plan (CAP) Conservation Strategy for Polar Bears: A product of the representatives of the parties to the 1973 Agreement on the Conservation of Polar Bears.*

⁷¹⁹ Norsk Miljødirektoratet (2013) *Norsk Handlingsplan for Isbjørn*, M-16, [pdf]; Vongraven, D. et. al. (2012) A circumpolar monitoring framework for polar bears (CAFF), *Ursus Monograph Series*, 5.

⁷²⁰ Ekker, M. (15/03/2018) *Research Interview*, BAS, Cambridge.

⁷²¹ Vongraven, D. (10/08/2017) *Research Interview*, Polaria Café, Tromsø.

⁷²² Ekker, M. (15/03/2018) *Research Interview*, BAS Cambridge; Vongraven, D. (10/08/2017) *Research Interview*, Polaria Café, Tromsø; Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁷²³ Vongraven, D. (10/08/2017) *Research Interview*, Polaria Café, Tromsø; Ekker, M. (15/03/2018) *Research Interview*, BAS, Cambridge.

⁷²⁴ WWF Report (2013) *Safer People – Safer Polar Bears: Recommendations to the Norwegian Management on how to reduce human-polar bear conflict on Svalbard*, WWF- Norway, Oslo.

⁷²⁵ Vongraven, D. (10/08/2017) *Research Interview*, Polaria Café, Tromsø.

⁷²⁶ *ibid*

– alluding to the notion that wildlife management was best done by separating humans and ‘nature’⁷²⁷. For the Sysselmannen, the Svalbard governor, this trope has resulted in the application of strict engagement criteria between humans and bears (as outlined in the Svalbard Environmental Protection Act), predicated on avoiding ‘disturbance’, judged to be the bear reacting to the presence of humans by changing its course or behaviour⁷²⁸. Heavy fines are imposed for breaching these terms, investigated by designated field officers that oversee tourism and other activities in the numerous Svalbard ‘Management Areas’⁷²⁹. These regulations seem totally contradictory to what I have been outlining for the rest of the chapter: that N23992 is enfolded within a networked assemblage of actants, materials, histories, and politics.

Before I return to discuss the importance of the notion of ‘best managed wilderness’ for the choreographing of human/bears interactions in Svalbard, there are other pieces of international legislation that are crucial for understanding why N23992 (and other sampled bears) has been interpreted through the particular scientific parameters that were described in the rest of this chapter. Put simply, why is she purified through these methodologies, and what are the consequences? Specifically, I will focus on the Circumpolar Action Plan (CAP)⁷³⁰, agreed in the PBSG range states meeting 2009 before being compiled in 2015, and the Conservation of Arctic Flora and Fauna Circumpolar Monitoring Framework for Polar Bears (CAFF CMF)⁷³¹, published in the *Ursus Monograph Series 5* (2012), and co-authored by many of the scientists I have spoken to during this research. These advisory documents perform two primary roles, to make strategic recommendations for the monitoring of polar bears across their 19 subpopulations for the best interests of their global management and policy responses (CAFF CMF)⁷³², and a multi-tiered conservation strategy outlining individual key objectives, guiding principles, threats, as well as national and international jurisdictions/responsibilities (CAP)⁷³³. Together, they propose a targeted science- and knowledge-based adaptive management strategy where the CAFF CMF’s tiered monitoring framework identifies knowledge gaps and means to close them, and the CAP’s key objectives apply that knowledge to “*secure the long term persistence of polar bears in the wild*”⁷³⁴.

⁷²⁷ *ibid*

⁷²⁸ Svalbard Governor’s Office for Nature Management (04/09/2017) *Research Interview*; Svalbard Environmental Protection Act (SEPA) (2001) Online, Available at: [https://www.regjeringen.no/en/dokumenter/svalbard-environmental-protection-act/id173945/] Accessed: 13/04/2020.

⁷²⁹ Svalbard Governor’s Office for Nature Management (2017) *Research Interview*

⁷³⁰ Polar Bear Range States (2015)

⁷³¹ Vongraven et. al. (2012)

⁷³² *ibid*

⁷³³ Polar Bear Range States (2015)

⁷³⁴ *Ibid*, p.XII

Since 2009, therefore, N23992 has been enrolled in these networks. The way that she is understood as a polar bear has conformed to the objectives of the PBSG (first proposed in the 1973 treaty and steadily updated, up to the CAP and the CAFF CMF), the rhetoric of the Environmental Ministry, the guidelines of the Sysselmannen (adhering to the SEPA), and the methodologies of NPI. As part of the Barents Sea sub-population, she falls into the CAFF CMF category of a 'divergent sea ice eco-region with high risk from climate change', high pollution, as well as high access and a high quality of baseline data ⁷³⁵. The population she is a part of receives a high monitoring intensity to assess the recommended parameters such as: subpopulation size and trends, reproduction, survival, habitat change, conflicts, distribution, health and pollutants, behavioural changes, etc. including the effects that monitoring itself might have on the bears ⁷³⁶. Both the technologies that are placed on/inside her and the samples that are extracted from her perform a transformative role, to develop N23992 into a Euclidean polar bear that can continually update her datasets to inform the knowledge parameters of the CAFF CMF. In doing so, by translating N23992 in this way, NPI also operationalizes her to fulfil the objectives of the CAP, utilizing her GPS coordinates to exert disciplinary measures on her use of space and to mitigate potentially damaging interactions with human communities (scaring her away from Longyearbyen, removing a whale carcass etc.), and assessing her own delineations of 'essential habitat' for the control of human traffic in those areas. Beyond just N23992, the outcome of NPI's long term monitoring programme in Svalbard has been to develop an entire lineage of monitored bears, all identifiable by their alphanumerical codes, immortalized within the database. These polar bears represent a 'manageable' population, all enrolled into the actor-network of knowing the species. The genetic sequencing work at NPI (using Nitro-markers) has identified continual matriarchal lineages of bears in the study, whose repeated captures have then enabled the monitoring of their offspring, and so on. At the same time, a parallel community of polar bear scientists has developed alongside the bears that they sample: *"it's like a pedigree, or whatever you call it ... like a family tree"* ⁷³⁷, passing on the epistemologies, methods, and tasks of the monitoring programme just as N23992 teaches her cubs to exploit the resources of particular Isfjord systems. This is the co-production of polar bear societies, ironically defined by encounter, enfolding, and entanglement, as opposed to dualistic divide.

There remains here a glaring contradiction. It is clear to trace the development of N23992 (both in terms of her technological hybridization and her transformation into data) in conjunction with the objectives of the PBSG, CAP, and the knowledge protocols of the CAFF CMF. She is emblematic of an

⁷³⁵ Vongraven et. al. (2012)

⁷³⁶ *ibid*

⁷³⁷ Andersen, M. (15/03/2018) *Research Interview*, Skype, SPRI, Cambridge.

institutional desire to ‘know’ Svalbard bears for their effective conservation ⁷³⁸ – to summarize their ecology and responses to their environment ⁷³⁹. The data that she and other bears have helped to fix has contributed to reports and directives for global pollutant restrictions (UNEP), climatic impacts on Arctic food webs, changing reproductive rates and denning locations ⁷⁴⁰, all of which have circulated back into the conservation of the species through national and international management policies ⁷⁴¹. How then does this combine with the rhetoric of ‘best managed wilderness’ that represents a standing rationale of the Norwegian Environmental Ministry and influences the management regime from the Sysselmannen’s office? In the next chapter I will delve further into the popularized notion of Svalbard wilderness and the semiotic currency of polar bears for film and photographic storytelling. Yet, in the context of the scientific research programme, the engagements with N23992 and the other Svalbard bears is, I argue, antithetic to the notion of wilderness. This acknowledgment is vital for an appreciation of how conservation values are inherently tied to the practices of research that inform them. N23992 is part of the assemblage – her life, mobility, and future is intimately tied to fundamentally global networks of circulation.

The concerns that guide NPI’s investigations are founded on global political and social anxieties. N23992 is a polar bear inhabiting different political and digital ecologies: contaminated with industrial pollutants (PCBs, HCBs, PFASs) that inhibit and alter her cellular processes and hormonal homeostasis; exploiting novel food sources, from different trophic levels, seals adapting to human/bear presence/absence, and even directly from cabins; fitted with a radio-collar, ear-tags, and an accelerometer; and deeply affected by anthropogenic GHG emissions and associated climate change that is drastically altering the sea ice dynamics of her western Spitsbergen home range. Here is no wilderness, but an enfolded multi-species landscape. NPI’s work, whilst labouring under the pretence of apolitical science, is more a negotiated practice of ‘living with polar bears’ - the cyborgs that circulates through their offices, spreadsheets, labs, reports, and publications. These polar bears are not passive objects of science, but co-participants, moulding shared worlds and societies through their historically, politically, and ethically integrated mobilities. In this way, N23992 becomes a ‘conservable bear’ – not an external creature uncovered through the deployment of an objective scientific protocol, but one that is actively enacted through the tasks of her monitoring and analysis, their histories and technologies.

⁷³⁸ Polar Bear Range States (2015)

⁷³⁹ Aars, J. (10/08/2017) *Research Interview*, NPI Offices, Tromsø.

⁷⁴⁰ Norwegian Polar Institute, MOSJ (2020)

⁷⁴¹ Polar Bear Range States (2015); Vongraven et. al. (2012); WWF Report (2013); Wiig, Ø. Et. al. (2015) IUCN Red List, *Ursus maritimus*, polar bear, *The IUCN Red List of Threatened Species*, ISSN 2307-8235/T22823A14871490; Norsk Miljødirektoratet (2013)

3.6.2 Living with Scientists

On the 4th April, 2014, N23992 was captured for the third time by NPI researchers during their routine fieldwork season. It was 10:30 in the morning that she was spotted in Billefjord, at the heart of her home range, with her two yearling cubs. Born over winter 2012/13, these cubs were her second and third (of five so far), the litter before the two that were with her in 2017 ⁷⁴². N23992 was tranquilized from the helicopter, and both of her cubs were given a smaller dose before being given their own scientific polar bear names for the first time – N26207 and N26208 ⁷⁴³. Aars and Andersen continued to collect the standardized samples from N23992, recorded the precise location (78.620N, 16.479E), and trudged back to the helicopter to continue with their day of captures.

Over the same period, N23992 was being monitored by another group of people. Jason Roberts, a filmmaker and producer from Longyearbyen, and his colleague Oskar Strøm, had been following the family of bears for a week and filming them for a range of projects, documentaries, and tv shows ⁷⁴⁴. They know her by another name – Misha, the local bear. The day after their capture, one of her cubs, N26207, lay down on the ice and refused to move. After a few hours it became clear – she was dead. Misha’s behaviour drastically altered. The family had been hassled recently by the presence of a large male bear who had trailed them intermittently. She was keen to carry on out of the area, but N26207 wouldn’t move. She began to nuzzle her cub on the ground, trying to get her to stand. Leaving her where she was, Misha walked further into Billefjord and killed a ringed seal. She dragged the carcass all the way back to N26207, hoping that eating would revive her, but she continued to lie there motionless. The family stayed in the area for the next few days, until on the 7th, the Sysselmannen’s office arrived to take N26207 away for a necropsy (having been alerted by Roberts). Misha became even more visibly distressed now unable to find her cub at all, running in circles and frantically pacing, before fleeing north up to Wijdefjord with N26208 in tow ⁷⁴⁵. N26207 was judged to have died from multiple organ failure, perhaps as a reaction to the tranquilizing drug she had been administered ⁷⁴⁶.

Misha’s despair over her dead cub is seemingly obscured in the datasets for N23992. I too felt a sense of cautiousness in writing this episode, attentive to the anthropomorphism of bear lives and the potential pitfalls of thinking that a bear thinks like a human. But in doing so, I hope to highlight her own

⁷⁴² Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁷⁴³ Data provided by J. Aars from the Norwegian Polar Institute (NPI) Polar Bear Programme database – [xls file on N23992]

⁷⁴⁴ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁷⁴⁵ *ibid*

⁷⁴⁶ *ibid*

affective experience of living with humans, for otherwise the atmospheres of these encounters, and her outpouring of more-than-human grief, remains lost in these translations. I look again at her XLs file, but it is silent – and finally I wonder if, with time, I could educe these stories from between its cells?

Chapter 4: On Frost, Film, and Photography

4.1 '*Living On Thin Ice*' - \$1,100.00

By the centre of Longyearbyen town, near the junction where the roads down from Nybyen intersect the main East-West road from the airport to the mines, a row of grey wooden shopfronts houses the WildPhoto Travel Office. This is the Svalbard headquarters for a photo-travel company of the same name, run by photographers Roy Mangersnes and Ole J. Liodden, that specialises in high-end expeditions for amateurs to encounter and capture wildlife. Attached to the office is a small gallery, proudly proclaimed as the northernmost photo gallery in the world at 78,22°N, showing 30 prints of the best of Mangersnes' and Liodden's work.

The room is a simple rectangle of white walls and ceiling panels, divided up into a circular visitor's route by large white wooden screens, on all of which are mounted two framed prints lit in spotlights from carefully placed rigs above. The blankness of the room emphasises the careful curation of the photographs, small outwards-facing windows offering momentary glimpses into the Arctic that surrounds the building, the town, and the island in successive steps of imagination. At the same time, they hang like trophies from a different 'shoot': wildlife, landscapes, and light all immobilized in time and extracted from space.




Image redacted due to Copyright

Fig.16 The Wildphoto gallery in Longyearbyen. [Source: Visit Svalbard website, Copyright: Wildphoto 2019]

Unsurprisingly for Svalbard, polar bears figure heavily amongst these images. As I slowly follow them around the room, two in particular stand out. The first is a portrait shot of a bear on an ice flow, sitting on its haunches and looking back over its shoulder at the camera, elevated presumably from the deck of a ship. The bear's footprints are clearly visible from climbing atop the flow in the foreground and trace a meandering route to where she now sits. Beyond her, a patchwork of ice and dark water

stretches out to a clouded horizon. Beneath the frame the words: *“Living on thin ice”*. The second is entitled *“The ghost of a polar bear”*: a young bear lies with her front paws over the carcass of a bearded seal that she has partially cached underneath the snow. She lifts her head, framed entirely by the low orange sunlight, so that her shadow is cast onto her own breath hanging in the air.

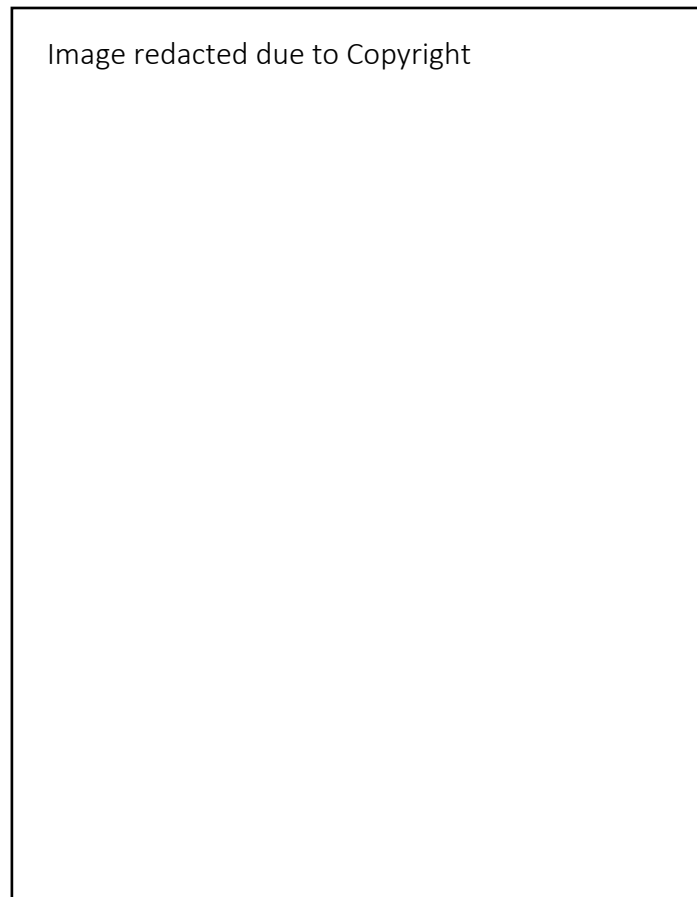


Fig.17 *Living On Thin Ice*, by Ole J Liodden – Captured in 2011, the image won the category of ‘animals in their environments’ at the *BBC Wildlife Photographer of the Year* awards 2012. Reproduced with the permission of O. J. Liodden.

I met with both Liodden and Mangersnes whilst I was in Longyearbyen in 2017, at the Wildphoto gallery and in the café of the hotel down the road. Polar bears are *“a very highly symbolic species”*, explains Liodden about the prevalence of bears in Arctic photographic work⁷⁴⁷. *“The Arctic king”* is not only used as a metonym for climate change, but also holds its own mystical quality. Notable is his desire for photographing the species to become an exercise in ‘conservation’, a practice that has the capacity to instigate change⁷⁴⁸. *“A picture is much stronger than a ... scientific report ... for most people they don’t understand the language, but a picture can communicate on a different level”*⁷⁴⁹. He believes that

⁷⁴⁷ Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁷⁴⁸ *ibid*

⁷⁴⁹ *ibid*

through the deployment of photography not only can much broader publics be engaged with issues of climatic change, species decline, and over harvest, but he even frames it as a process of “*modern trophy hunting*”⁷⁵⁰. Photography has the capacity to generate enormous revenue, whilst at the same time the image ‘trophies’ that are brought back can be used to venerate the life, not death, of the animal. However, Liodden is also aware of his photography’s complicity in the evocation and enactment of particular visions of the polar bear, not through any heavy image manipulation, but through the learned allusions and tropes that are brought to life by the circulation of these photographs. One of his best images, “*Living on thin ice*” (above), is even in part a playful nod to this narrative potential. “*When people see the image, they think that it demonstrates the reduction in ice extent*”, he explains, “*but it’s actually showing a quite good habitat for polar bears ... they are not seeking the thickest ice, they are seeking the drifting ice*”. The thin ice is truly where they live. The use of this image in climate change campaigning could be “*a little bit misleading*”, he continues, but much of that rests on the loaded values and assumptions of the audience⁷⁵¹. Here, we begin to see the enormous potential of different modes of image-capture as subjects of examination. They not only enable an engagement with a wealth of storytelling, about polar bears, about ourselves, and about our shared futures, but also constitute dynamic modes of human-nonhuman encounter within diverse networks of actants and materials.

I asked Roy Mangersnes whether he had met or worked with Misha or the Tempelfjord isbjörn, the local bear that so many people around Longyearbyen had spoken about and interacted with. Although familiar, he had not encountered her an enormous amount, but a friend and filmmaker Asgeir Helgestad had been following her on and off since 2013, naming her ‘Frost’. Knowing this, Mangersnes was aware that he had indeed encountered one of her cubs from 2012/13. “*The first cub was killed by scientists ... the tranquilizer*”, he confirmed, whereas the second was in a number of images he had taken in 2015. “*I have a photo of her in my gallery now*” he continued, “*one picture, orange, with her laying on the ice ... I call it ghost of a polar bear*”. “*It’s kind of a double meaning ... with that image, and the polar bear being killed*”⁷⁵². Another of Misha’s family, that I had been searching for, was already dead.

⁷⁵⁰ Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁷⁵¹ *ibid*

⁷⁵² Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

Image redacted due to Copyright

Fig.18 *The Ghost of a Polar Bear*, by Roy Mangersnes – Captured in 2015. It features Misha's cub 'Lucky' in Tempelfjord, lying on top of a seal carcass. This photograph also won numerous awards and accolades in Norway and Internationally. Reproduced with the permission of R. Mangersnes.

4.2 Introduction: Moving Image Methodologies, Misha, and Learning Bears

This chapter will continue to explore the life of Misha the polar bear (also known here as ‘Frost’ by Asgeir Helgestad), as well as 4 of her cubs (from 2012/13 and 2016/7) as they are encountered, framed, and enacted through the work of photographers and filmmakers that have captured images in Svalbard. I am interested to examine the roles and motivations of photography and film as self-proclaimed tools of conservation, not only through their affective logics of the images that they broadcast, but also through the cares and concerns of the society of actants involved ⁷⁵³. In doing so, I will look at film and photography as means of enacting polar bears, exploring the craft of image-making, editing, storytelling and their resulting evocations. For Misha, there is created a notable tension between the life/story of an individual bear as told on screen, the species-life of the polar bear for which she frequently becomes a guarantor, and her own lived experience encountering photographers and filmmakers. I will show how Misha is understood as a ‘good bear’, as well as engaging with the paradoxical questions about wildness, authenticity, and habituation that are inherent here - both within our discussions of her individuated life and the wider frictions associated with the televisual natural history genre. Ultimately, this chapter will discuss what is at stake during Misha’s photographic and film career – the ‘polar bears’ that are enacted here, the conservation values that are espoused, and the atmospheres that actively shape and re-shape her and the lives/deaths of her cubs.

This chapter continues to be guided by a core set of research questions: How have images of (particularly individualized) polar bears garnered such immense political traction? How does the history of natural history genre help us to understand the tensions of wildlife on film? How is Misha/Frost enacted by the productions that feature her – what version of a polar bear do they capture, co-shape, and release into digital circulation? How do these enactments of Misha/Frost impact upon our conceptualisation of polar bears and conflict with other enactments of N23992? How do the tasks and makings of the filmic encounter impact upon Misha’s life – her behaviours, ecologies, and future?

In doing so, this chapter is a continuation of the animal biographical approach that I outlined in my methodology and have been gradually building upon throughout the thesis ⁷⁵⁴. It acknowledges the work of filmmakers and photographers as bear biographers, engaged in the embodied practices of ‘knowing polar bears’, and the production and dissemination of those different knowledges. At the same time, animal biography is also attentive to issues of agency and affect, demonstrating how Misha is changed by the stories and narratives told about her and the tasks/technologies involved in their

⁷⁵³ Lorimer (2010)

⁷⁵⁴ Krebber & Roscher (2018)

tellings/becomings. It is littered with frictions, imperfections, and misidentification - generative tensions in my understanding of how humans engage with, individuate, and imagine polar bears, and how polar bears live with us.

I will also borrow both vocabulary and approach from Lorimer's *moving image methodology* that offers new ways to 'engage with nonhuman difference' in the 'age of the screen' ⁷⁵⁵. It demonstrates how geographers and the environmental humanities can begin to unpack the work done by the circulation of imagery and the power and promise that it holds ⁷⁵⁶. Polar bears embody many of the similar characteristics to the elephants that Lorimer uses as his example – "*mobile, mutable, and emotional*" creatures (albeit not capable of the same levels of tactile companionship) ⁷⁵⁷. In particular, I am interested in tracing Misha's digital life, whereby the boundary between image and the imagined thing becomes blurred ⁷⁵⁸. Rather than exploring her imagery as simply construction, the moving image methodology proposes we account for the performative, haptic, and affective dimensions that are key both to the attitudes and imaginations that they evoke, and also to our interventions and politics. Here, there is a symmetry with the STS approach I employed in chapter 3 – exploring the technological mediations of filmic and photographic enterprises, as well as their technicians and practitioners, in the enactment of polar bears ⁷⁵⁹. I will examine Misha's ecology and ethology in the 'audio-visual age' ⁷⁶⁰. This is not only an exploration of the narratives and evocations of the productions that feature her (what sort of polar bear do they animate), but also of the camera's presence – how the actual process of filming exerts atmospheres that change how Misha and her family live their lives ⁷⁶¹. This chapter is therefore also fundamentally about skills and societies. It asks how the mediations of image-capture, editing, and dissemination enact different versions of the polar bear ⁷⁶², and it turns how these enactments demonstrate competing ideologies, contradictory knowledge claims, and are even complicit in acts of hidden violence.

⁷⁵⁵ Lorimer (2010) p.237; Ibid p.240; Thrift, (2007)

⁷⁵⁶ Lorimer (2010) p.237

⁷⁵⁷ Ibid p.238

⁷⁵⁸ Ibid p.240; Shapiro, M. (1999) *Cinematic political thought: narrating race, nation and gender*, Edinburgh University Press, Edinburgh.

⁷⁵⁹ Mol (2002)

⁷⁶⁰ Ibid p.240; Shapiro (1999)

⁷⁶¹ Hodgetts & Lorimer (2018)

⁷⁶² There is further work to be done here that was beyond the scope of this thesis. It would be very interesting to try and situate the attitudes and motivations of different societies/communities of actants within the disciplinary progress of Norwegian Environmental History. The work of *Peder Anker* and *Dolly Jørgensen* in particular provides a needed perspective on the interlaced pasts and presents of Norwegian environmental imaginations and ecological intellectual traditions.

4.2.1 'Nature Films' beyond representation

This chapter must also be grounded within the wealth of work about the history and development of the natural history filmmaking. Gregg Mitman's seminal publication *Reel Nature* documents the birth and rise of the nature film phenomenon, whilst also identifying the tensions that are inherent to the genre⁷⁶³. In the foreword, William Cronon speaks to the experiential and emotional power of "virtual nature", stating that such renderings of animal life also have profound consequences for environmental politics, reminding us of the deep entanglements that exist between the virtual and the real⁷⁶⁴. Mitman continues to situate the contemporary prevalence of digital animals within the histories of the pre-digital nature film – from the investigations of the physiology of animal movement in the 1880s⁷⁶⁵, to the melodramatic hunting films of the "naturalist-photographers" (such as Cherry Kearton and William Burden) who aimed to sate the consumptive desires of early 20th century New York audiences⁷⁶⁶. Here, the deployment of motion-capture technologies spread beyond the world of scientific instrumentation, and, slowly eclipsing the gun in the hands of the archetypal Rooseveltian wilderness explorer, became the tool of choice for 'capturing' and returning snippets of the 'wilderness experience' to "*soothe the antimodernist anxieties found within the industrialized metropolis*"⁷⁶⁷. In front of these newfound audiences, the 'nature film' as a genre became gripped by a deep and underlying contradiction. Moving images were at once a rare opportunity to study and elucidate the worlds of living wild animals, and a novel media of mass communication and entertainment with an incredible capacity for enthrallment and profit. This tension, Mitman argues, typifies the natural history genre to the present day – the difficult boundaries of authenticity and artifice, of science and fiction⁷⁶⁸.

Scholars like Cynthia Chris suggest that the 'nature film' genre provides a fascinating subject matter for the examination of the evolution of cultural attitudes towards wildlife⁷⁶⁹. Proposing anthropomorphic and sociobiological frames of analysis, she asserts that the "*wildlife genre is...a prism through which we can examine investments in dominant ideologies of humanity and animality, nature and culture, sex, and race*"⁷⁷⁰. Different storytelling tropes (such as those concerning familial life and heteronormativity) artfully overlayed across elements of scientific natural history both claim to teach us about the animals

⁷⁶³ Mitman (2009)

⁷⁶⁴ Ibid, p.xii

⁷⁶⁵ Mitman (2009) p.8: French physiologist invented the chronophotographic gun to record the motion of birds in flight, in 1882, and in 1887, American photographer Eadweard Muybridge exposed the true nature of a horse's gallop wherein all four feet lift off the ground.

⁷⁶⁶ ibid

⁷⁶⁷ Ibid p.25

⁷⁶⁸ ibid

⁷⁶⁹ Chris (2006)

⁷⁷⁰ Ibid, p.xiv

that we see on-screen, whilst also, simultaneously, explain to us about our human selves ⁷⁷¹. For my analysis of polar bears that follows, these important eco-critical texts do pose pivotal questions for how I should approach the creation of images, the stories that they tell, our understandings of bears that result, and the impetus towards different modes of environmental politics that they provide. There is, however, a glaring methodological inconsistency that I also began to address in chapter 1. The works of Chris and Mitman clearly approach film and photography as “conventions of representation”, whereby articulations of animal life are constructed through the generation of representations of those animals. How then, should I proceed to explore the world of film and photography through a non-representational lens, whilst still ‘taking representation seriously’ ⁷⁷²?

As I proposed in chapter 1, I understand these representations of polar bears not as carriers of meaning, but as actions in and of themselves. It is through the deployment of a multitude of different technologies – moving and still-cameras, editing softwares, play-back screens, etc. – that this society of actants enacts many different versions of Misha the polar bear ⁷⁷³. These are not inert and interpretable representations – not the filmic equivalent of taxidermic preservation ⁷⁷⁴ – but means of (re-)animation. Video clips of polar bears are both generated amidst and generative of multiple moments of encounter, where both human and bear lives and shaped and re-shaped. Here, we are open to an environmental politics which is amenable to multi-naturalism as well as acknowledging the role of storytelling within the enactment of our valued pasts and desired futures.

Within this non-representational approach I am also attentive to affect, in particular as outlined by Weik von Mossner in her publication on *‘Moving Environments’*. She proposes that emotion is the “*basic mechanism that connects us to our environment, shapes our knowledge, and motivates our actions*” ⁷⁷⁵. This affective response to different cinematic spectacles (the way that images “move us”) lives on and circulates through different personal and socio-cultural networks long after the viewing process itself. Whilst a comprehensive analysis of the emotional resonance of different films of Misha is beyond the scope of this thesis, affect is taken seriously as a fundamental mechanism through which different values and assumptions about her and her species are shaped.

⁷⁷¹ Ibid, p.x

⁷⁷² Dewsbury et. al. (2002)

⁷⁷³ Mol (2002)

⁷⁷⁴ Mitman (2009) discusses how many of the early nature film expeditions were motivated by similar desires as collection hunting safaris which returned with specimens for museum dioramas.

⁷⁷⁵ Weik von Mossner (2014) p.6

4.2.2 Filming Bears in Svalbard

Svalbard polar bears have long figured in our imaginations and ‘screen natures’⁷⁷⁶ – perhaps every major wildlife documentary featuring the species in the 21st century was filmed on the archipelago. Jason Roberts, Ole Liodden, and many others, attribute this to the unique behavioural adaptations of Svalbard bears, that since the banning of all hunting here in 1973 have been gradually exhibiting less and less fear of humans⁷⁷⁷. This reality makes the bears easier to film and photograph behaving ‘naturally’⁷⁷⁸, and changes the character of the Images that are taken. “*If you want to photograph polar bears go to Churchill, Baffin, or Kaktovik*” explains Mangersnes, “*but if you want to photograph wild polar bears you go to Svalbard*”⁷⁷⁹. Their prevalence within film and photography leads to extensive digital lives, mobilizing and flourishing where other bears cannot⁷⁸⁰.

Image redacted due to Copyright

Fig.19 Still from BBC Planet Earth, 2006, where “*polar bear cubs take their first tentative steps*”. This bear (also known as N23688 to NPI) is emblematic of the digital afterlives of Svalbard bears [Source: BBC Earth YouTube, NHU]

In the spring of 2006, another Svalbard polar bear and her two cubs were emerging from their den in the East of the archipelago and onto the TV screens of millions of people with the release of BBC’s landmark series *Planet Earth*. The use of this bear’s footage demonstrates the contemporary

⁷⁷⁶ Bagust (2008)

⁷⁷⁷ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁷⁷⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁷⁷⁹ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁷⁸⁰ Lorimer (2010) p.244

‘iconization’ of polar bears as analogous to climate change (something that is addressed in the following section), as outlined by Dorothea Born in her critical engagement with National Geographic imagery⁷⁸¹. Through steps of anthropomorphism and association, polar bears were cast as ‘ambassadors’ for the melting Arctic ecosystem, enacted as vulnerable climate victims from their “*first tentative steps*”⁷⁸². The ‘Planet Earth bear’ also featured in chapter 3 under a different name. She was also known as N23688, the older female that I used as a comparison for N23992’s pollutant contaminant load. I was able to identify her through drawing together the different knowledge traditions of the filmmakers that followed her and the scientists who had sampled and collared her. Determining that both N23688 and the “Planet Earth bear” were the same animal was made certain when both stories combined on June 13th, 2016. The bear and one of her cubs were approaching a trappers cabin at Austfjordneset on the South Eastern edge of Wijdefjorden. One of the two human inhabitants at the time had shot a deterrent at her from the roof of the cabin in an attempt to make her flee, but he had accidentally loaded his rifle in the wrong order and instead of rubber bullets fired a live round, killing her⁷⁸³. The governor investigated the incident, recorded her tag number (N23688) and then also euthanized her cub that would not have survived⁷⁸⁴. The ‘Planet Earth bear’, she was “*the mother...who was shot at Austfjordneset, quite old*” confirmed Oskar Strøm⁷⁸⁵. Even after her demise, her datasets and the 2006 video clip continue to circulate – a digital⁷⁸⁶ (after)life totally unaware of her bodily death.

⁷⁸¹ Born, D. (2018) Bearing Witness? Polar Bears as Icons of Climate Change Communication in *National Geographic, Environmental Communication*, **13**(5).

⁷⁸² *ibid*

⁷⁸³ Stange, R. (2016) ‘Female polar bear and cub shot at Austfjordneset’, Online, Available at: [<https://www.spitsbergen-svalbard.com/2016/07/01/female-polar-bear-and-cub-shot-at-austfjordneset.html>] Accessed: 10/02/2018.

⁷⁸⁴ *ibid*

⁷⁸⁵ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁷⁸⁶ I find the use of ‘digital’ here ironic. Planet Earth was one of the first major series at the transition of video technology (away from super 16mm film and towards Panasonic VariCams), but the edit (of this and subsequent series) was adapted to make the resultant image quality more akin to that of real film, to align with the expectations and preferences of consumer demand. The digital imitating analogue.

Image redacted due to Copyright

Fig.20 The body of N23688, The Planet Earth Bear on the shore at Austfjordneset. I find the comparison of pose, between her dead corpse and the 2006 sequence (Fig.20), quite arresting – her fur stained with blood belying the awkward conflation of violence, care, and coexistence. I think too of the contradictory motivations and atmospheres that surrounded the generation of both images, and about the birth/death of cubs that occurred in conjunction (Source: Syssemmannen, via. Svalbardposten)

This chapter also relies upon the process of ‘learning bears’. Here I refer to three practices: (i) my own experience of recognising Misha and following her digital traces; (ii) the evocation of polar bears that Misha’s film footage enables, and (iii) how Misha and particularly her cubs learn to ‘become bears’ (amid past/present human presences/absences). These three versions of ‘learning bears’ are central to the co-shaping encounters that occur within this chapter – outlining how Misha is enacted within the networks of film and photography.

I spoke with Asgeir Helgestad, a Norwegian filmmaker who has been following and filming Frost (his name for this bear) as well as her cubs (‘Light’ and ‘Lucky’ 2012/13, ‘Snow’ and ‘Ice’ 2016/17). Through him and his film, *Queen with no Land*, I have attempted to learn his ‘professional/skilled vision’ (thinking in part with Christina Grassini’s work on “*learning how to look at the world*”⁷⁸⁷), becoming able to identify this bear from her face, distinctive low back, rounded rump, and notable ‘beard’ of hair, as well as her behaviours and locations. These embodied knowledges are crucial to my efforts to track Misha through the digital ecologies of film and photography, to recognise: the stories that she inhabits; the impacts that they have upon her and her cubs; and the enfolded worlds of film, conservation, and polar bear lives.

⁷⁸⁷ Grassini, C. (2018) Skilled Vision, *The international Encyclopedia of Anthropology*, DOI: 10.1002/9781118924396.wbiea165.

Image redacted due to Copyright

Fig.21 A still from Asgeir Helgestad's film *Queen with no Land*. In this scene, Helgestad draws Frost to demonstrate her most recognisable characteristics. Through this 'skilled vision', I learned to identify Misha in her digital ecology. [Source: A. Helgestad, 2017]

4.3 Polar Bears and Climate Change

This section is very significant for how we come to understand the power and promise of polar bear imagery. It sets out, in a progression of steps, how polar bears and their ecologies have become so intertwined with our societal climatic cares and concerns. It outlines (i) how the specific wording of the 1973 Agreement set a precedent for a radically new way of conceiving of the connectivity of Arctic life; (ii) how a highly-politicized controversy in 2006 led to the intensification of this debate, and (iii) how images became the primary mechanism through which the competing enactments of polar bears were shaped and circulated. In doing so, it provides an important foundation for how we must consider the acts, technologies, and ramifications of image-making, and how these particular enactments of polar bears are made to matter politically.

4.3.1 “An Ecosystem Approach”

“Certainly the politics of polar bear conservation have been both a plus and a minus over the years” claims Ian Stirling diplomatically ⁷⁸⁸. Stirling is another ‘grandfather’ of the polar bear science discipline, who began working on the Canadian polar bear population in the 1970s. He explains that the willingness of the Arctic five to develop the original agreement in 1973 enabled management and conservation decisions to be made with the contribution of all participant nations and with the best available scientific knowledge. *“The whole process was largely driven by science and by questions”* – the archetype of any research programme ⁷⁸⁹.

In June 1988, Dr. James E. Hansen of NASA stood in front of a congressional committee and, for the first time on such a stage, explained the link between global warming and the build-up of atmospheric CO₂ and greenhouse gases ⁷⁹⁰. *“Global Warming has Begun, Expert Tells Senate”* ran the New York Times headline. The emergence of ‘climate change’ into scientific and popular consciousness in the late 1980s and into the 1990s would drastically alter the entire landscape of polar bear science, and force them to ask different questions. It would herald seismic shifts in how their research findings, data collection, and even careers would be problematized, politicized, scrutinized, critiqued, wielded, and made to matter. At the same time, underpinned by the very language of the agreement, wheels were set in motion that would cast polar bears as emotive climate icons within the ever-expanding worlds of nature film and photography.

⁷⁸⁸ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁸⁹ *ibid*

⁷⁹⁰ Shabecoff, P. (1988) ‘Global Warming has Begun, Expert Tells Senate’, *Special to the New York Times*, June 24th 1988, Online, Available at: [<https://www.nytimes.com/1988/06/24/us/global-warming-has-begun-expert-tells-senate.html>] Accessed: 18/11/18.

“*Serious scientists tend to be quite a conservative lot*”, Stirling continued, and so the polar bear science community was not immediately drawn onto the ‘bandwagon’. It was really into the early to mid 1990s that the realisation occurred that climate was really becoming a significant factor ⁷⁹¹, and many of the researchers of the PBSG experienced an incremental process of ‘experimental learning’ as they began to identify trends in their own sub-populations ⁷⁹². Climate change was only slowly prioritized, assessed Andrew Derocher. Even with Jon Aars at NPI and Steve Amstrup in Alaska/PBI there has only been a gradual shift in focus over the years ⁷⁹³. In 1993, Stirling and Derocher published a now seminal paper on ‘Possible Impacts of Climate Warming on Polar Bears’ ⁷⁹⁴. At first, they considered their paper a set of predictions for the “*deep future*”, for a “*generation of scientists away, maybe even two wildlife generations away*” ⁷⁹⁵. As Doug Clark surmised: “*climate change was beginning to get on people’s radars*”, and they were considering that there “*might be an effect here, ... in another hundred years we might have to worry about it*” ⁷⁹⁶. The paper followed contemporary scholarship about GHG emissions and consequential climate warming ⁷⁹⁷ and outlined a range of possible scenarios for polar bears ⁷⁹⁸. They asserted that reduced sea-ice and prolonged ice-free periods would result in nutritional stresses, worsening body conditions, lower reproductive rates, and reduced cub survival ⁷⁹⁹. Desirable breeding habitat would be harder to find, with the added possibility of winter rainfall and den collapses ⁸⁰⁰. The biological productivity of the region would reduce, now understood to be closely tied to sea ice micro-conditions ⁸⁰¹, ultimately reducing the abundance and availability of prey species ⁸⁰². Bear-human interactions would increase, but bear tourism and hunting quotas would likely decline, in particular along the southern edges of the polar bear’s range ⁸⁰³. Whilst they admit it was a “*fairly simple paper*” ⁸⁰⁴, not only do all of their predictions now ring true, but they even drastically underestimated the rate

⁷⁹¹ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁹² Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁹³ *ibid*

⁷⁹⁴ Stirling, I. & Derocher, A. E. (1993) Possible Impacts of Climate Warming on Polar Bears, *Arctic Institute of North America*, **46**, 3, pp.240-245.

⁷⁹⁵ Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁹⁶ Clark, D. (29/05/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁷⁹⁷ Etkin, D. A. (1990) Greenhouse Warming: Consequences for Arctic Climate, *Journal of Cold Regions Engineering*, **4**(1), 54-66; Parkinson, C. L. & Kellogg, W. W. (1979) Arctic sea ice decay simulated for a CO₂-induced temperature rise, *Climate Change*, **2**, 149-162; Roots, E. F. (1989) Climate Change: High-latitude regions, *Climate Change*, **15**, 223-252.

⁷⁹⁸ Clarkson, P. L. & Irish, D. (1991) Den collapse kills female polar bear and two newborn cubs, *Arctic*, **44**, 83-84.

⁷⁹⁹ Stirling & Derocher (1993)

⁸⁰⁰ *Ibid*; Clarkson & Irish (1991)

⁸⁰¹ Hyman, R. (2018) ‘Polar Sea Ice leads to more Productive Oceans’, *Science*, AAAS, DOI: 10.1126/science.aat8140.

⁸⁰² Stirling & Derocher (1993)

⁸⁰³ *ibid*

⁸⁰⁴ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

of change ⁸⁰⁵. Their conclusion is also notable: *“If climatic warming occurs, the polar bear is an ideal species through which to monitor the cumulative effects in arctic marine ecosystems because of its position at the top of the arctic marine food chain”* ⁸⁰⁶.

This comment echoes a key passage of the 1973 agreement. Article II calls for “sound conservation practices based on the best available scientific data” as well as “appropriate action” from all Parties “to protect the ecosystems of which polar bears are a part” ⁸⁰⁷. This statement is emblematic of an ‘ecosystem approach’, which was significant within the canon of international law ⁸⁰⁸. *“It was one of the first treaties to recognise that if you were interested in the health of a particular species you also had to think about the ecosystem”* ⁸⁰⁹. Basic ecological knowledge is vital for conservation, explains Stirling (stressing the importance of an ecosystem framework) and the relationships between bears, seals, and sea ice conditions are fundamental and poorly-understood dynamics. Most importantly, he concludes, *“ecosystems are as healthy as their top predators”* ⁸¹⁰. The placement of the polar bear at the top of the Arctic food chain further cements their role as the guarantor of its future.

When it was published, Stirling and Derocher’s landmark paper pointed to inferences that were not yet observable in polar bear populations, but instead were predicated on what was seen in the sea ice ⁸¹¹. The entire Arctic ecosystem was under the microscope. However, as these effects began to be exhibited in/by the bears themselves it further cemented the realisation that polar bears were rapidly becoming a proxy for climate change. *“I don’t think polar bear biologists individually or as a group ever took the decision that polar bears should be a poster child for climate change,”* explains Stirling, *“it was only one aspect where you could clearly and simply demonstrate a particular negative effect on a particular species, but it was never intended to be the banner that it has become”* ⁸¹². Derocher describes them as incidental or “accidental” icons. A combination of their specific narrow ecological niche, ‘sea-ice dependent top predator subsisting on seal blubber’, and the depth and detail of the long-term monitoring programmes instigated during 1965-1973 had left them ‘primed’ ⁸¹³. Very little long-term monitoring was happening with most species in the Arctic beyond mere abundance, so there was very

⁸⁰⁵ Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸⁰⁶ Stirling & Derocher (1993) p.245

⁸⁰⁷ Agreement on Conservation of Polar Bears (1973) Oslo, November 15th, Online: Available at: [<http://pbsg.npolar.no/en/agreements/agreement1973.html>], Accessed 22/11/2016.

⁸⁰⁸ Banks, N. (05/12/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸⁰⁹ *ibid*

⁸¹⁰ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸¹¹ Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸¹² Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸¹³ Derocher, A. E. (16/01/2018) *Research Interview*, Skype, SPRI, Cambridge.

little else that could have demonstrated the complexity of changes at different levels, from abundance all the way through body condition, reproduction, and survival rates ⁸¹⁴. “*It was that chain of events that allowed polar bears to come forward*” says Derocher, “*I would argue that had people been studying Beluga whales with that degree of intensity, maybe they would have become the harbinger of change and sort of... the icon or poster species*”. “*I think because... the international agreement was well set up, the information was there, and it is the easiest story to tell*” ⁸¹⁵. The protocols established in the 1960s and 70s, motivated by inadequate knowledge on this charismatic and popular arctic icon, were then complicit in providing the epistemological basis for these ‘known’ criteria to be mobilized as broader climate proxies. Knowledge about bears is both produced by and for the participation in contemporary climate politics – something which would come to deeply influence the perception and imagination of the entire species.

4.3.2 Chuck Monnett

Just as the aforementioned Planet Earth was released on the BBC in 2006, so too the notion of ‘polar bears as (incidental) icons’ was beginning to gain popular traction in wider photographic and filmic media at the time. That same year, Al Gore’s *Inconvenient Truth* produced an animated polar bear failing repeatedly to find solid sea ice, before swimming off into an iceless ocean and an uncertain future ⁸¹⁶. In doing so, the polar bear’s role as climatic metaphor was rubber-stamped, viscerally and visually bound to its sea-ice ecosystem and the brutal realities of a warming world. However, Davis Guggenheim’s directorial choice was itself the product of a succession of events that resulted in images of individual polar bears garnering such immense significance. This progression is vital to contextualise how images of the Svalbard bear within this thesis (as Misha or Frost) are captured and disseminated.

In September 2004, Charles Monnet and his colleague Jeffrey Gleason, wildlife biologists specializing in the Arctic for the BOEMRE (U.S. Bureau of Ocean Energy Management, Regulation and Enforcement), were flying a light aircraft along the Alaskan Beaufort Sea coastline. They were undertaking a routine aerial survey of bowhead whales that had been taken annually since 1987 ⁸¹⁷. They also recorded the abundance of other wildlife, noting a wealth of information such as the date, time, location, behaviour, habitat, sea ice coverage, etc. ⁸¹⁸. In the month of September alone, 1987-2003, 315 live polar bears

⁸¹⁴ *ibid*

⁸¹⁵ *ibid*

⁸¹⁶ *An Inconvenient Truth* (2006) [online] Guggenheim, Davis, U.S. Lawrence Bender Productions, [2010] YouTube.

⁸¹⁷ Monnett, C. & Gleason, J. S. (2006) Observations of mortality associated with extended open-water swimming by polar bears in the Alaskan Beaufort Sea, *Polar Biology*, **29**(8) pp.661-687.

⁸¹⁸ *Ibid* p.683

had been observed, 12 (3.8%) of which had been swimming in the open water ⁸¹⁹. During this September in 2004, they observed 51 live polar bears, 10 (19.9%) of which were in open water ⁸²⁰. For the first time in 16 years, they also identified 4 polar bear carcasses floating in the open water near Kaktovik ⁸²¹. Presumably, they assessed, the bears had drowned following a recent storm between 10th and 13th September ⁸²².

Monnett and Gleason wrote up their findings and distributed their manuscript to Andrew Derocher and Ian Stirling for commentary. “I ... sent him comments” Derocher explained to me via email, and “suggested he reduce speculation and stick more to the observations” ⁸²³. Monnett himself expressed his own caution in the framing of this polar bear event due to the “prevailing views” of the Bush administration ⁸²⁴. In 2006, their peer-reviewed publication appeared in *Polar Biology* ⁸²⁵. They had concluded that the four drowned polar bears they had observed represented an underestimate of the number of bears likely affected by the windstorm, and that other carcasses might have been missed (from 457m altitude), drifted outside the study area, or sunk ⁸²⁶. They also pointed towards the regression of sea ice, further swimming distances, and higher nutritional demands as possible compounding factors, as well as highlighting the potential for further negative impacts from global climate change ⁸²⁷ that “may pose one of the greatest conservation challenges to the management of polar bears” ⁸²⁸. Finally, they encouraged caution for open water anthropogenic activities, such as transportation and oil and gas development ⁸²⁹. Their paper was widely picked up, not least by Al Gore and Davis Guggenheim, who not alluded to their discovery with the animated swimming bear in *An Inconvenient Truth* but also directly referred to their work.

⁸¹⁹ Ibid p.681

⁸²⁰ Ibid

⁸²¹ Ibid

⁸²² Derocher, A. E. (24/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁸²³ Derocher, A. E. (2018) *Personal Communication via email*

⁸²⁴ Goldenberg, S. (2011) ‘Arctic scientist suspended over ‘integrity issues’’, *The Guardian*, Online, Available at: [https://www.theguardian.com/environment/2011/jul/29/arctic-scientist-charles-monnett-suspension] Accessed: 07/08/2018.

⁸²⁵ Monnett & Gleason (2006)

⁸²⁶ Ibid p.685

⁸²⁷ Stirling, I., Lunn, N. J. & Iacozza, J. (1999) Long-term trends in the population ecology of polar bears in western Hudson Bay in relation to climatic change, *Arctic*, **52**, 294-306; Derocher, A. E., Lunn, N. J. & Stirling, I. (2004) Polar Bears in a Warming Climate, *Integr Comp Biol*, **44**, 163-176.

⁸²⁸ Norris, S., Rosentrater, L. & Eid, P. M. (2002) Polar Bears at Risk: a status report, *WWF International Arctic Programme*, Oslo; Hassol, S. J. (2004) *ACIA-Impacts of a warming Arctic: Arctic climate impact assessment*, Oxford, CUP; Monnett & Gleason (2006) p.681

⁸²⁹ Ibid p.687

What followed was a whirlwind of events and legal proceedings. On July 18th, 2011, BOEMRE placed Dr. Monnett on administrative leave whilst an investigation was carried out into his “integrity” by the Department of the Interior’s Office of the Inspector General ⁸³⁰. Whilst BOEMRE director Michael Bromwich’s office denied it was anything to do with “scientific integrity” ⁸³¹, and Melissa Schwartz, the deputy chief of staff and communications director for BOEMRE dismissed speculation that it had anything to do with his 2006 article on polar bears, Monnett’s lawyer Jeff Ruch (Public Employees for Environmental Responsibility, PEER) ⁸³² suggested that Monnett’s work and reputation were being scrutinized as part of a “witch hunt” and at the behest of oil companies pushing to drill in the Arctic ⁸³³. Monnett had previously done research on the environmental impacts of oil in the Arctic, in the wake of the Exxon Valdez disaster, with an ecological study on sea otters, and was also interested in modelling the recruitment of polar bears from Canada in the event of another major Alaskan spill. Later in 2011, PEER released a transcript of an interview of Dr. Monnett on February 23rd, conducted by Special Agent Eric May and Special Agent Lynn Gibson, both of the Department of the Interior, Office of Inspector General. The transcript shows an interview undertaken as part of an administrative investigation explicitly into “scientific misconduct” ⁸³⁴, focussing heavily on Monnett’s research methods – “*basically wrong numbers*” ⁸³⁵ – as well as specifically on the discovery in 2004 of the polar bear carcasses ⁸³⁶. In particular, they also question the validity of the report’s claim that no dead bears had been seen by the BWASP survey prior to 2004 ⁸³⁷. This information had come to Monnett from his predecessor Dr. Steve Treacy, who re-iterated his position in an interview with the New York Times: “*I don’t remember anything in the way of dead polar bears*” ⁸³⁸.

Despite the adamant declarations from the BOEMRE that Dr. Monnett’s suspension and investigation were not politically motivated, Derocher disagrees. After the paper was published some U.S. climate denial senators took great umbrage with it, “*almost 100% because it shows up in Al Gore’s ... film*”, he says. “*They went after the paper and thus the [two] authors*” ⁸³⁹. During the investigation, Senator James Inhofe (Rep. Oklahoma), the then ranking member of the Senate Committee on Environment and Public

⁸³⁰ Goldenberg (2011)

⁸³¹ *ibid*

⁸³² Goldenberg (2011)

⁸³³ *ibid*

⁸³⁴ *Interview of Charles Monnett* (23/02/2011) OI-CA-10-0361-I, [pdf], transcribed by Miller, C. March 11th 2011.

⁸³⁵ *ibid*

⁸³⁶ Goldenberg (2011)

⁸³⁷ Barringer, F. (2011) ‘Report on Dead Polar Bears gets a Biologist Suspended’, *The New York Times*, Online, Available at: [<https://www.nytimes.com/2011/07/29/science/earth/29polar.html>] Accessed 03/02/2018.

⁸³⁸ *ibid*

⁸³⁹ Derocher, A. E. (2018) *Personal Communication via email*

Works (and polar-bear-tie-flaunting, snowball-bringing, vocal climate change denier ⁸⁴⁰), wrote a letter asking for more information from BOERME about the inquiry ⁸⁴¹. He cited the referencing of Monnett's article to the committee in 2008 as evidence for the listing of polar bears under the Endangered Species Act, and what he saw as the "onerous regulations to oil and gas development in 187,000 square miles" in Alaska as a result ⁸⁴². Any accusations against Monnett would have "far reaching consequences" ⁸⁴³, and were already being used by Fox News and other right-wing media to destabilize climate science ⁸⁴⁴. Monnett himself commented on this connection: "*We got blasted... really hard, by the agency when, when this finding came out*" ⁸⁴⁵. "*They don't want any impediment to ... what they view as their mission, which is to ... drill wells there ... put areas into production*" ⁸⁴⁶. "*We work for an agency that is, especially then, extremely hostile to the concept of climate change*" ⁸⁴⁷. The following year, Dr. Monnett was publicly cleared of any scientific misconduct and awarded a \$100,000 settlement ⁸⁴⁸. He was re-issued with a conservation award that his name was removed from, and also agreed to not work for the Department of the Interior for 5 years ⁸⁴⁹. The damage, however, had already been done ⁸⁵⁰. "*Monnett had health issues and suffered greatly under the whole process*" explains Derocher, "*he is an honourable and thinking individual that always put wildlife and science first*" ⁸⁵¹.

4.3.3 Individual Polar Bear Images

This intense episode highlights the extraordinary context in which polar bears, their study, and their conservation now find themselves in the 21st century. Polar bears, and the knowledge generated about them, constitute a battle ground for far greater political and ideological debates, between growing environmental concerns, extractive neoliberal regimes, and their respective Arctic imaginaries. Concurrently, there is enormous cultural and social capital surrounding the link between polar bears

⁸⁴⁰ Woolf, N. (2015) 'Republican Senate environment chief uses snowball as prop in climate rant', *The Guardian*, Online, Available at: [<https://www.theguardian.com/us-news/2015/feb/26/senate-james-inhofe-snowball-climate-change>] Accessed 15/02/2018.

⁸⁴¹ Morell (2011)

⁸⁴² Morell (2011)

⁸⁴³ Senator Inhofe, J. in Morell (2011)

⁸⁴⁴ Fox News (2011) 'Watchdog says merit of polar bear paper questioned', Online, Available at: [<https://www.foxnews.com/us/watchdog-says-merit-of-polar-bear-paper-questioned>] Accessed 07/02/2018.

⁸⁴⁵ *Interview of Charles Monnett* (23/02/2011) p.94

⁸⁴⁶ *Interview of Charles Monnett* (23/02/2011) p.92

⁸⁴⁷ *Interview of Charles Monnett* (23/02/2011) p.85

⁸⁴⁸ Revkin (2011)

⁸⁴⁹ Greenfield-Boyce, N. (2013) 'Polar Bear researcher gets \$100,000 in Settlement with Feds', *NPR*, Online, Available at: [<https://www.npr.org/2013/12/04/248674546/polar-bear-researcher-gets-100-000-in-settlement-with-feds?t=1585913183003>] Accessed 06/02/2018.

⁸⁵⁰ *ibid*

⁸⁵¹ Derocher, A. E. (2018) *Personal Communication via email*

and climate. This relationship draws polar bear scientists into even more personal battles, with those that seek to destabilize them, their careers, and their work as a proxy to climate denial ⁸⁵². Equally fascinating, in particular from the perspective of this thesis and the methodology of polar bear biography, is the consistent emergence of individual(ized) bears at the heart of these stories. Throughout the iconization of the species, images of individual bears in filmic and photographic media are increasingly circulated as means of enrolling bears into climate narratives. It would be easy to lapse into representational language here – based on the idea that images of polar bears constitute messages and carry meaning. However, I maintain that the image-worlds of polar bears are interlaced with diverse modes of encounter – mutually-constitutive moments. Polar Bear image-capture, moving and still, constitutes another mechanism through which polar bears are enacted.

In this section, I briefly outline a succession of polar bear image ‘moments’ that held (and still hold) immense epistemic portent. These images of single bears were frequently the catalyst for (or illustration of) the telling of climatic or politicized narratives: deployed to emphasise salient details about the lives, mobilities, and (sometimes) deaths ⁸⁵³ of their protagonist as expressions of wider ecological or environmental realities. These images do not carry meaning themselves, but instead constitute a succession of acts and encounters that occur within a network of bears, bodies, cameras, photographers, media, and viewers. As I discussed in chapter 2, the focus on individuals may speak to the emotive, empathetic, or generative capacities of the ‘animal story’ ⁸⁵⁴. Ironically, it is significant that individual bears are almost never a valid sample size, from the scientific standpoint of the foundational principals of the PBSG, whilst at the same time remain the primary means of the popular engagement with the entire species. The digital lives of these individual bears guide global perspectives on their species and its future.

When the suspension of Dr. Monnett was being covered in the mainstream media during 2011, the New York Times published a new photograph of a polar bear swimming in choppy waters, with no ice in frame, immediately reminiscent of the storm-struggling climate-victim narrative. It transpired that the photograph, taken by WWF’s Geoff York, and the individual bear it contained, were also part of a “spin cycle” ⁸⁵⁵. The water against which the bear was struggling was “*roiled by the downwash from the photographer’s helicopter*” ⁸⁵⁶, and the New York Times were forced to publish a clarification. Here,

⁸⁵² Harvey, J. A. et. al. (2018) Internet Blogs, Polar Bears, and Climate-Change Denial by Proxy, *BioScience*, **68**(4), pp.281-287.

⁸⁵³ Hodgetts & Lorimer (2018)

⁸⁵⁴ Krebber & Roscher (2018); Lutts, R. H. (1998) *The Wild Animal Story*, Philadelphia, Temple University Press.

⁸⁵⁵ Revkin (2008) *Subsequent Followup*; Revkin (2011)

⁸⁵⁶ *ibid*

again, we find the same conflict between scientific population trends, climate change forecasting, individualised bears, and the narratives and feelings evoked through the circulation of their images.

In mid-August 2015, another photograph was widely circulated online and in the print news media. It showed an emaciated polar bear climbing onto an ice floe in the seas around Svalbard. Taken by German photographer and guide Kerstin Langenberger, it immediately became a story of the fast-retreating sea ice and lack of food around the archipelago, likely as a result of climatic change. Geoff York was quick to refute that a single polar bear image was adequate evidence to deduce climate conclusions⁸⁵⁷, yet even despite such moderations the image continues to gain immense traction online under such headings as “*how polar bears are being affected by climate change*”⁸⁵⁸.



Fig.22 The photograph taken in Svalbard that became analogous with the climate emergency. (Source: Kerstin Langenberger, 2015)

In 2017, in a café in central Longyearbyen, I met with Jason Roberts of *Polar X* Productions. Since moving to Svalbard from his native Australia, Roberts has worked on nearly every major filming project involving polar bears on the archipelago. He remembers this individual bear from over 2014/2015 when they were filming for the BBC series *The Hunt*. “*I know exactly which bear it was, she was a fucking useless hunter, absolutely, and she was skinny as hell ... we called her thin Lizzie*”⁸⁵⁹. She was actually used for one of the major sequences in the programme, Jason explains, and he worries about her use as a symbol of climate: “*I’m not disagreeing ... it’s better than the other way where no-one believes ... but the truth is something different*”⁸⁶⁰.

⁸⁵⁷ Aghbali, A. (2015) ‘Photographer of ‘horribly thin’ polar bear hopes to inspire climate change fight’, *CBC News*, Online, Available at: [<https://www.cbc.ca/news/trending/thin-bear-photo-kerstin-1.3232725>] Accessed: 23/10/18.

⁸⁵⁸ *Online Content* (2017/02/05) Available at: [<https://me.me/i/this-photo-by-kerstin-langenberger-shows-how-polar-bears-are-8977412>] Accessed: 10/12/17.

⁸⁵⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁶⁰ *ibid*

A similar episode again repeated in 2018, when footage taken by photographers Paul Nicklen and Cristina Mittermeier in the Canadian Arctic was distributed by National Geographic and watched by over 2.5 billion people ⁸⁶¹. It showed an even more starving and emaciated polar bear shortly before death with the caption “*this is what climate change looks like*”, intended to “*communicate the urgency of climate change*” ⁸⁶². After quite considerable condemnation, National Geographic were forced to roll back their language, without adequate proof that this individual bear was dying as a direct result of climate change. Here is another example of how polar bears are enacted through the creation, distribution, and circulation of individual images – bodily death and emaciation as symptoms of the climate emergency ⁸⁶³.

From late 2018 to 2019, images of other polar bear anomalies dominated the news. Over the new year, dozens of bears ‘invaded’ the town of Belushya Guba towards the south of Novaya Zemlya, raiding dumpsters and breaking into buildings ⁸⁶⁴. In June 2019, a single young female polar bear was spotted and photographed in Norilsk in northern Siberia, hundreds of miles further south than her customary range ⁸⁶⁵. Whilst both events were reported with close references to the climate crisis, their validity was still questioned, with some even suggesting that the young bear in Norilsk may have originated from captivity rather than migrated south ⁸⁶⁶. The lives/biographies behind these individual(ized) bear-moments are still considered to hold the key to the authenticity of the knowledge produced about them. Their images enter into wide circulation – reproduced, re-captioned, and re-animated – gatekeepers to, and incidental icons of, geopolitical, environmental, and socio-cultural disputes. Polar bear pictures, and the societies of their production, are immensely powerful.

⁸⁶¹ *The Sun* (2018) ‘Starving Polar Bear Fake’, Online, Available at: <https://www.thesun.co.uk/news/6923730/starving-polar-bear-fake-national-geographic-arctic/> Accessed: 10/02/2019.

⁸⁶² Mittermeier, C. quoted in *The Sun* (2018)

⁸⁶³ Harvey et. al. (2018)

⁸⁶⁴ Steer, G. (2019) ‘Emergency declared as dozens of polar bears invade Russian town’, *Time Magazine*, Online, Available at: <https://time.com/5526741/polar-bears-russia/> Accessed: 04/05/2019.

⁸⁶⁵ *The Guardian* (2019) ‘Stricken polar bear turns up in Siberian city, hundreds of miles from home’, Online, Available at: <https://www.theguardian.com/world/video/2019/jun/19/polar-bear-found-hundreds-of-miles-from-home-in-russian-industrial-city-video> Accessed: 10/10/2019.

⁸⁶⁶ *The Metro* (2019) ‘Lost polar bear who wandered into suburbs may have been dumped by poachers’, Online, Available at: <https://metro.co.uk/2019/06/20/lost-polar-bear-wandered-suburbs-may-dumped-poachers-10018961/> Accessed: 15/08/2019.

4.4 Film as Conservation

"[He] doesn't care that much... and [Him], he is fucking politician, and I would say that to his face"

– Anonymous participant, 2017

This section is derived from a range of semi-structured interviews conducted with leading members of the polar bear film and photography industries that operate/have worked in Svalbard. The interview transcripts were then coded by hand to elucidate many of the shared cares, concerns, and attitudes of that community: towards polar bears in Svalbard, their conservation, and our relationship to them. What emerged were a set of consistent discourses – criticism of scientific operations, conflicts about the technologies and methods deployed on bears, personal criticism of the environmental motivations of individuals with the scientific community, and finally a belief that photography and film are both more impactful forms of ‘conservation’ work when undertaken in Svalbard ⁸⁶⁷. Here, there is a question about where and how polar bear conservation should take place, and associated ideas of agency and ‘voice’ promoted through the notion of ‘speaking for the bears’. At the heart of these conflicting perspectives is a fundamental misalignment in the way that polar bears are ‘known’ – through what mechanisms, encounters, and technologies; as individuals vs. populations; as emotional or objective – and their significance for the kind of polar bears that they want to live here.

4.4.1 Problem Science: *"let this polar bear be"*

There is a sense of disappointment and frustration with the scientific research programme in Svalbard, connected to their perceptions both of threats and of knowledge needs. *"I just wonder what's the good of it"*, Roberts explains to me, *"like so much science in the world... it won't lead to any further protection on Svalbard, we know everything, Svalbard is fully protected"* ⁸⁶⁸. This is a common theme – *"I had hope... that the research and the scientists was kind of the solution to conserve the polar bears"* begins Liodden, but like many he has become disaffected by what he views as invalid motivations from that community ⁸⁶⁹. *"A scientist never knows enough"* explains Amundsen, echoing Roberts who states that what is good for human knowledge is not always also good for the bears ⁸⁷⁰. *"How will tagging seven*

⁸⁶⁷ Here, and throughout this chapter I use the term ‘film’ to refer to the industry of moving images of wildlife and their deployment in the telling of stories. However, there is more work behind this term too that would benefit from further attention. Film is also material; another means of inscription and an enterprise whose technological progress develops hand-in-hand with cultures of image consumption and collective ‘ways of seeing’. These enfolded histories of material craft, imagination, and politics are rich sites of future work.

⁸⁶⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁶⁹ Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁸⁷⁰ Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

*polar bear females save them in a warmer climate?” asks Mangersnes, “the ice will melt... what are you doing to do? It is very visible science... it seems like actually doing something”*⁸⁷¹.

Much of this debate, as I will discuss, reflects different understandings of what ‘conservation’ does and should entail. Liodden, Mangersnes, and Roberts all make numerous comments about the application of scientific expertise in Northern Canada for the setting of regional bear hunting quotas – a huge area of contention that is not covered in my work on Svalbard. *“Scientific research is about how to kill as many polar bears as possible...to manage for maximum sustainable yield”*⁸⁷². Regardless of my scope, it is a continuation of this same perception of science as a tool for compartmentalising polar bears into ‘manageable units’ that evokes a conflict with their perception of the species in Svalbard. Whereas NPI’s long-term monitoring programme, as I covered in chapter 3, explicitly aims to facilitate continual access to an evolving database of bear data that can be drawn upon for ecological, biological, and political problem-solving, the film and photographic community sees scientific engagements at antithetic to the idea of polar bear that they themselves value. For them, not only do these actions not constitute conservation work, but they actively impede upon the very enactment of the polar bear that they advocate ‘saving’. This conflict I will continue to unpack.

“You start to forget that animals and nature are not just a number, but they are individuals, and it’s wild”

– Roy Mangersnes, 2017

On the more cynical end of this criticism, there is a perceptive that *“long-term scientific studies”* amount to little more than *“long-term jobs”*⁸⁷³. This comment is echoed by four other participants: *“two people get their salary paid for it, that’s about the only good of it”*, even proposing ‘arrogance’ in repeating the process *“year after year after year after year”*⁸⁷⁴. *“Aren’t they in the position that they know enough now”* reiterates Amundsen, *“the science done here is not going to lead to conservation”*^{875 876}.

Whilst writing this I have grappled with the costs of airing these firmly held and often very personal criticisms, and I do so not to sow discord within these groups (many of whom assure me that they are already outspoken about their ideals) but instead to highlight two fundamental points. The first is the self-evident highly emotional register that polar bears invoke in those that work with them - the species

⁸⁷¹ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁸⁷² Anonymous Participant

⁸⁷³ Anonymous Participant

⁸⁷⁴ Anonymous Participant

⁸⁷⁵ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁷⁶ Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

means a lot within this community – and secondly, more significantly, is how the source of these disagreements is rooted in criticising interactions with the animal that are assumed to alter it in ways that are incommensurable with their work (as photographers/filmmakers) and their values. “*I don’t like the collars at all*” states Mangersnes, “*and I have a problem seeing the need for [them]*”⁸⁷⁷. All of the participants share this view, supported in part by the ‘*don’t they know enough*’ narrative, and contributing to two further grievances.

The first is enfolded within a general concern for the welfare of the animals themselves: “*chasing after them and tranquilizing them, putting collars on them and pulling out teeth ... basically raping the bear*”, protests Roberts “*... they [the scientists] say they don’t feel it... tattooed to hell, and teeth pulled, and blood, blubber, and skin samples pulled off you, you’re gonna [sic] feel it... and you’re also going to remember that experience*”⁸⁷⁸. This quibble is also re-expressed using the Sysselmannen’s legislative language of ‘disturbance’ (SEPA), asserting that “*those who have the possibility to disturb the polar bear most, are those who should take care of [it]*”⁸⁷⁹. Instead, they are shot with the “poison”⁸⁸⁰, and subjected to an ordeal that causes them great stress⁸⁸¹. “*For heaven’s sake, let this polar bear be*”⁸⁸². For Misha, as many of my participants remind me, it was a scientific capture in 2014 that led to the death of her first 2012/13 cub.

Secondly, the collar is assumed to alter the bear, not only physically but also in the imagination of the viewer (although the two are intrinsically linked). This is not unlike my discussion (in chapter 3) of how the collar performs the function of a technological organ that transforms the captured animal into a ‘four-dimensional data-bear’⁸⁸³. Likewise, this perceived transformation is loaded with particular held assumptions about the nature of the bear, which here conflict with those of the scientific programme. All the photographic participants express their dislike of capturing bears with collars: “*It’s like being in a circus*” says Mangersnes, “*it’s like a polar bear with a pink coat, it’s not natural*”⁸⁸⁴. Many of these photographic perspectives are founded on similar conceptions of ‘wilderness’⁸⁸⁵ that litter human engagements with polar bears: “*you are out there, there is nothing, there is completely wild nature, and*

⁸⁷⁷ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁸⁷⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁷⁹ Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

⁸⁸⁰ *ibid*

⁸⁸¹ *Ibid*; Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁸⁸² Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

⁸⁸³ Scott (2015)

⁸⁸⁴ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen; Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁸⁸⁵ Cronon, W. (1995) *The Trouble with Wilderness; or, Getting Back to the Wrong Nature*, in *Uncommon Ground: Rethinking the Human place in Nature*, New York: W. W. Norton & Co., 69-90.

... there is a bear there ... and it has a big collar”⁸⁸⁶, “[Clients] come up here and they see their first polar bear, and it has a big collar around the neck and a number on the bum ... they thought that this was unspoiled, that this was wild...”⁸⁸⁷. To them, collars are not only intrusive but also visual reminders of human interference on a landscape and species that symbolises the exact opposite.

However, the more that we unpack this conflict, the more nuanced the relationship between polar bear, human, and ‘wild’ becomes. For Jason Roberts and other film production teams, collars on the local bears mean that they are no longer viable for their work – “It is a real pain, [when] such a beautiful bear as Misha that’s so easy to work with ... has a collar on” he explains, rendering her useless for 90% of the work that they coordinate⁸⁸⁸. After her capture on 28th March 2017, Misha was fitted with this collar as well as being spray-painted ... “A billiard ball number across [her] arse, and looking like shit”⁸⁸⁹. “I was a little bit pissed off when I was out there filming her” explains Asgeir Helgestad, who had personally asked NPI not to re-capture Frost that year due to his ongoing film work⁸⁹⁰. “I was so sad to see what they had done to her and I promised to tell the world about it” he added. Helgestad goes further saying “I asked them not to ... not just because I wanted to show pristine wilderness, but because I do believe that these collars make the lives of bears difficult even if behavioural differences may not appear in the numbers that NPI produces”⁸⁹¹. “We can’t work with it” continues Roberts, not only because of the visual changes – “you don’t want to watch a BBC David Attenborough natural history sequence, and this thing is walking around” – but also because of the changes to the behaviour of the bear. “The bear’s that have been tranquilized by science generally are scared to hell, it’s like being shot with a gun ... you are scared of humans and so very hard to work with”⁸⁹². This realisation is particularly interesting, as it acknowledges the centrality of the storytelling process within these human (filmic) engagements with polar bears. The wilderness narrative is not only supported by the spectacle of the bear – its physical characteristics of whiteness (with no collar or spray-paint) – but also through the ability of the film crew to work with it (being able to remain in close proximity for extended periods without fear/aggression/response). A level of habituation to humans is ironically a pre-requisite to the bear’s role as wilderness icon within these interactions, something I will return to in section 5.5 ‘Misha as a good bear’. Roberts himself is aware of this paradox as he criticises the same use of the wilderness narrative by the Norwegian environmental ministry: “it’s all bullshit ... they come out with this word

⁸⁸⁶ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁸⁷ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁸⁸⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁸⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁹⁰ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁸⁹¹ Helgestad, A. (2020) *Personal Communication via email*

⁸⁹² Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

“urørt villmark” ... untouched wilderness ... what the fuck are you talking about? It’s a contradiction... I passed 9 bears on the way, 8 of them have got ear tags” ⁸⁹³.

Polar bears are enacted in multiple ways, whether the scientific conclusions in chapter 3 or the narratives of film and photography that I will continue to cover here. In each context, underlying disagreements are fostered around how those animals are ‘known’ – not just through those stories that are told, but also as a succession of tasks/technologies involved in their telling. Polar bears and humans are enfolded within these dynamic entanglements where the very ‘idea of bear’ is continually enacted through these successive engagements. When these communities talk about ‘conservation’, these concerns are at the very centre of their value systems. It is through these processes of storytelling that they both learn and identify the sort of polar bear that they would like to (make) live, and also find other formulations of bear incommensurable with their own, based on different iterations of narrative, spectacle, ecology, and ethology. This draws back to some of my central research questions: what is a polar bear, to whom, and what is it that we are really conserving?

4.4.2 The Planet Earth effect: Film as conservation voice

Throughout my interviews a similar question continued to occur as a natural progression from the emergent discussions – is there even any polar bear conservation happening in Svalbard? This question, and how it was subsequently answered by different participants, is crucial to understanding the different perspectives that exist towards the species here, and what this means for how their future is imagined. Universally, I was informed by scientists, filmmakers, and photographers alike that conservation was a term not traditionally present in the lexicon of polar bear/human interactions on Svalbard, and that since the treaty in 1973 that outlawed their hunting the species has already been adequately ‘protected’. Part-and-parcel with this perspective is the acknowledgement that in Svalbard the greatest threat posed to polar bears is from anthropogenic global warming and resultant habitat loss, the accountability for which is assumed to rest beyond the boundaries of individual states, and certainly beyond the territory of Svalbard. In this thesis, I argue the contrary, that conservation is inherently present here in ways underacknowledged. Svalbard bears, like Misha, play fundamental roles in shaping how diverse publics further south conceptualise their entire species across the whole Arctic. After their new ‘capture’ they inhabit extensive digital worlds through which they circulate and are continually enacted and re-shaped to influence attitudes and behaviours. Assessing the influence of these digital bears is beyond the scope of this enquiry, but exploring their emergence, bodies, and lives is not.

⁸⁹³ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Cronon (1995)

Misha is perhaps the single most-viewed polar bear ever – an individual who, likely unwittingly, has been enacted more, played more roles, and told more stories than any other polar bear throughout history. Through these collections of voices, edits, and images, ‘polar bear conservation’ as a set of imaginations and value judgements is negotiated. She is vital to what human groups wish to preserve about her species’ future, as well as what we might come to mourn. Here, I will continue to discuss how the Svalbard filmmakers and photographers consider their work to be conservation-oriented, before delving deeper into the multiple natures and multiple bears that they produce in the next section.

For the majority of my (film/photography) participants, the idea that science and the long-term scientific monitoring programme were not truly ‘conservation-focussed’ is an extension of a semantic distinction that they make between ‘conservation’ and ‘management’. “Environmental management” is often highlighted here as a bureaucratic and political enterprise ⁸⁹⁴, used to refer to the day-to-day work of the Svalbard authorities in mediating human and polar bear contact, as well as the role that the monitoring programme plays in providing requisite (often locational) information ⁸⁹⁵. For Roberts and Strøm, they feel that the aims of the Sysselmannen here correspond to the Norwegian Environmental Ministry’s promotion of the idea of ‘untouched wilderness’, in doing so strongly policing all human-bear interactions to ensure what is considered adequate separation (under the no-disturbance policy of the SEP) ⁸⁹⁶. In late 2017, when Misha’s collar data showed her to be near Longyearbyen, the management protocol of the Svalbard governor’s office resulted in her and her cubs being chased from the area with a helicopter. A year later in 2018, a dead whale carcass that Misha and her cubs were feeding on nearby in Isfjord was removed, towed out into the middle of the fjord, and sunk with a detonator ⁸⁹⁷. For Helgestad and Roberts, who were working with Frost/Misha at the time, these actions constitute an immense ‘disturbance’ of the very same nature that the authorities themselves heavily dissuade ⁸⁹⁸. Not only that, but the radio-collars and transmitters that are complicit in the management of bears by NPI and the Sysselmannen’s office to them represent a hypocritical intrusion into the body and nature of the bear, depriving her of her wildness, autonomy, and

⁸⁹⁴ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Liødden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁸⁹⁵ I acknowledge that here is another allusion to Environmental History that deserves of greater attention in future work. This rhetorical jostling alludes to broader discussions about attitudes of human/nature entanglements, rooted in 19th and 20th century ecology, conservation ethics, and our natural economies – from Henry David Thoreau to Aldo Leopold, and their telling in the works of David & Donald Worster.

⁸⁹⁶ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁸⁹⁷ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁸⁹⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

‘naturalness’. This is *“nothing to do with conservation”*, complains Roberts ⁸⁹⁹. The sort of bears that are enacted within the scientific and management programmes are in conflict with the ‘idea of polar bear’ that this group values.

On the contrary, these participants have an unerring belief that film and photography have far more beneficial functions for the lives of the bears that they capture ⁹⁰⁰. Rather than recruiting polar bears into the scientific and monitoring regimes – responsible for data collection, collaring, behavioural controls, and what they perceive to be no more than ‘management’ – the work that they perform is considered a less intrusive and more impactful form of human-polar bear interaction. This is a relatively new development within the industry, explains John Aitchison. Many of the traditional nature documentaries from the last few decades either avoided explicit mention of environmental issues or compartmentalised them into removable segments depending on their audiences ⁹⁰¹. In the 21st century, however, and in Svalbard in particular, the idea that cameras can be used as tools of socio-political change is growing fast. *“Conservation is affected by film”* exclaims Roberts, they have *“indescribable power”* to *“change perspectives... of the public”* ⁹⁰². We know for sure, continues Strøm, that *“natural history programmes... have an impact on what people think and what people learn about wildlife”* ⁹⁰³. *“What I say is that the science done here is not gonna lead to... conservation”* says Roberts, but another mega production, another planet earth, that will ⁹⁰⁴. *“Hundreds of millions of people [watch these programmes] ... this [is] going to have a major impact on what people know ... what kind of knowledge they have and what kind of ... steps they want to be a part of to help the conservation of these animals and these creatures and the nature around them”* ⁹⁰⁵.

It is interesting to explore these attitudes in relation to the aforementioned notion that Svalbard is a site where conservation is largely absent. This remains paradoxically both true and false. The work of film and photography is explicitly about capturing, transporting, and mobilizing these bears into different external contexts where they, and the stories they purport to embody, can affect others. *“Photography is the only non-intrusive way to bring the animal back with you”* explains Galitz, echoing Liodden’s views on photography as a contemporary analogue to trophy hunting ⁹⁰⁶. *“I think it’s*

⁸⁹⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁰⁰ Ibid; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Mangersnes, R.

(03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen; Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁹⁰¹ Aitchison, J. (20/07/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹⁰² Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁰³ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁰⁴ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁰⁵ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁰⁶ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

absolutely true” agrees Aitchison, *“that people were going there for that very specific reason because of the bears and bringing something back, and that still happens”* ⁹⁰⁷. The subsequent circulation of these bears has huge influence. For many within this group, such photographic and filmic bears are powerful tools of storytelling ⁹⁰⁸, gatekeepers to different banks of information ⁹⁰⁹, with the capacity to *“get out there in the public domain”* ⁹¹⁰. These bears, like Misha, have digital ecologies that stretch far beyond her localized Western-Spitsbergen home range. Like the planet earth bear, killed three years ago, they have screen lives and after-lives that immortalize them – bound to repeat emerging from her maternal den forever (as first broadcast in 2006) every time strengthening continually-evolving notions about what polar bears mean to us, and what we stand to lose.

To my participants, this process of capturing the bear and releasing her into the ‘world of the screen’ constitutes a form of conservation: *“I think that it should be quite important to ... bring information about polar bears, and about fascination for nature and about climate change... out to the world”* ⁹¹¹, *“You’re doing a lot more good than all the science publications”* ⁹¹². Concurrently, there is a tendency for these participants to assume a particular role. Four of them refer to the idea of becoming ‘ambassadors’ (a contested term more frequently used in the context of Antarctic ‘wilderness stewardship’ ⁹¹³) for Arctic issues, polar bears, and conservation, using their photography and film as tools to try to affect social and political change at multiple scales, from schools to the UN ⁹¹⁴. Not only this, but in two cases they even claim to speak for the bears – *“I am their voice”* says Galitz ⁹¹⁵, and Helgestad explains, *“I said, Frost, I will tell your story”* ⁹¹⁶. Here, Svalbard bears are mobilized into multiple global political contexts – as icons of climate change and species endangerment, for example – yet it is the parallel perception of their individuality, personality, and vulnerability that lends these

⁹⁰⁷ Aitchison, J. (20/07/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹⁰⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁹⁰⁹ Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen.

⁹¹⁰ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹¹¹ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹¹² Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹¹³ Maher, P., Steel, G. & McIntosh, A. (2003) Antarctica: Tourism, Wilderness, and “Ambassadorship”, in *Science and Stewardship to Protect and Sustain Wilderness Values: Seventh World Wilderness Congress Symposium*, USDA Proceedings, p.204-210; Powell, R. B., Kellert, S. R. & Ham, S. H. (2008) Antarctic tourists: ambassadors or consumers? *Polar Record*, **44**:3, pp.233-241.

⁹¹⁴ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds; Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen; Liodden, O. J. (14/08/2017) *Research Interview*, Wildphoto Gallery, Longyearbyen; Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹¹⁵ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

⁹¹⁶ *Queen Without Land* (2017) [Online] Asgeir Helgestad, Norway: Arctic Light Productions, [2018] vimeo private link.

narratives resonance. There are pertinent questions here about voice, power, and agency, and how those dynamics are enfolded within the tasks of enacting polar bears.

I am interested by the claims made by filmmakers and photographers to producing a form of ‘conservation’ in their own right, although not perhaps in the way that they themselves promote. Once again, this is about how bears are known, and through what mechanisms. Rather than seeing the capture of film and images of polar bears as a process that uncovers/reflects a somehow more ‘wild’ or more ‘natural’ beariness (something that is seen to be damaged by the scientific monitoring), here too is a process of co-production whereby different understandings of polar bears are formed at the intersection of wildlife, technology, and values. Just as I framed the production of the scientific bear N23992 in chapter 3, here I hope to approach Frost/Misha’s life on film as another hybrid evocation of polar bear. Once again, she means something different to different Svalbard actants, and addressing and exploring this plurality is a vital pre-requisite to adequately appraising what conservation really means – what sort of polar bear do we want to live with in the world? Furthermore, I am interested in Misha’s own lived experience as a polar bear, and the influence that these stories exert upon her.

“It’s a double-sided sword in a way, because obviously we have to admit that all activity [here] ... is affecting wildlife”

– Roy Mangersnes (2017)

4.5 Polar bear stories on film

Misha is probably the single wild polar bear that has been filmed most and viewed by more people than any other bear throughout history, explain two of my participants who have worked with her the longest ⁹¹⁷. In this section I will explore the stories that are told about this bear in some of the most widely distributed film productions that feature her footage – what sort of polar bear does she become and how is she ‘known’. This is a question of evocations and enactment, the performative and affective dimensions of polar beariness that are made to live, and what these lives told on screen can tell us about the idea of bear that we encounter, imagine, value, and hope to conserve ⁹¹⁸. Through the practices of editing, narration, framing, and even computer animation, Misha is brought to life as a digital polar bear – her ecology, behaviours, emotions, and future unfold before us. In contrast to the scientific polar bear of chapter 3, this version of Misha asks us to conceive differently of encounters – to sense vulnerability and loss through the anthropomorphised narratives of polar bear families, and in doing so ignoring the mediations that convey them.

Image redacted due to Copyright

Fig.23 Frost (Misha) and her two cubs from 2012/13, spring 2013 in Billefjord, [A. Helgestad, *Queen Without Land*, 2017]

The telling of these stories is central to the animal biographical approach that I have been adopting. These ‘screen natures’ of Misha generally reflect the more traditionalist tropes of the ‘animal story’ that first catalysed the use of individual(ized) animal lives at the heart of broader natural world/environmentalist messaging ⁹¹⁹. She is cast in different roles, performing parts of other composite bears, all whilst inhabiting manipulated stretched temporalities. Yet, it is through the processes of telling these stories, the cameras that capture her and the narrators that speak for her, that unseen atmospheres are exerted that actively alter this bear’s mobilities – the ‘real, material’ polar bear at the

⁹¹⁷ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹¹⁸ Bagust (2008); Lorimer (2010)

⁹¹⁹ Bagust (2008)

centre of this network of narratives ⁹²⁰. This idea is the core of my chapter and approach. Here too – in, through, and ‘behind the scenes’ of these evocations – these human actors are engaged in negotiating what polar bears are, impacting not only the imagination of their desired conservation futures, but also the lives of those very bears. What we learn that they are, and what they learn to be, are deeply interconnected.

“After all, film and television ‘overwhelmingly [have] come to mediate our relationship with animals and the natural world’”

– Mitman, 1999, p.206, in Mills, 2012, p.102

4.5.1 Frost

Asgeir Helgestad, the filmmaker behind ‘Dronning Uten Land’ (*Queen Without Land*), knows the local bear who lives around Billefjord and Tempelfjord by a different name. *“I gave her the name Frost”* he explains is his voiceover to his documentary, which has now been distributed worldwide to Norway, US, UK, France, Central/South America, Ireland, Germany, Austria, Spain, Poland, South Korea, and Sweden ⁹²¹. *“I will tell you what happened to Frost in the first 4 years since [I first met her]”* he continues, *“it is a story about a gorgeous bear and a world melting away under her feet”* ⁹²². Whether ‘Misha’ or ‘Frost’, the names that we give to bears matter. They help to keep track of the stories that are told and who is telling them, windows to biography. Names are also testament to memory, they gesture not only towards identity and individuation, but also to encounters and entanglements.

I spoke with Helgestad in 2018, and asked him to recount his experiences with Frost, when he had encountered her and what those interactions had been like. He first met her on April 9th 2013 whilst he was in Svalbard shooting various different animals for a NRK (Norwegian TV) production ⁹²³. He came across a female bear with her two young cubs around Adolfbukta in Billefjorden, and began to film them from a distance. She was understandably cautious, her cubs only having emerged from their den less than a month before, and after gathering some footage from a distance, Helgestad moved on towards Pyramiden ⁹²⁴. When he returned along the same route in the evening, she had killed a ringed seal, and her and her cubs had almost finished eating the carcass. *“I wanted to give her two daughters names expressing hope ... so they became ‘Light’ and ‘Lucky’”* he explains ⁹²⁵. This time, he was able to

⁹²⁰ Hodgetts & Lorimer (2018)

⁹²¹ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹²² *Queen Without Land* (2017)

⁹²³ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹²⁴ *ibid*

⁹²⁵ *Queen Without Land* (2017)

get closer than before whilst Frost was occupied eating, and watched as the two cubs played together beside her on the ice ⁹²⁶.

Image redacted due to Copyright

Fig.24 Frost eats a ringed seal carcass whilst Lucky and Light play, Billefjord, 2013, (A. Helgestad, *Queen Without Land*, 2017)

Helgestad was deeply affected by these encounters. *“In the years I have worked as a cameraman, I have met many wild animals, but none has touched me as strongly as her”*, he explains in the voiceover to his film, where he continues to recount these meetings ⁹²⁷. *“I could not stop thinking about Frost, there was something special about her ... so I went looking for her again”* ⁹²⁸. He didn’t meet her again for three weeks, when he had been asked to capture some footage of bears for a feature film called *Operation Arctic*. In that time, he had heard from locals in Longyearbyen that she was still in the area ⁹²⁹. After four days of searching he came across her tracks and once again encountered the family. *“Even though I didn’t know her well...it was like meeting an old friend”* he said ⁹³⁰. Her cubs had continued to grow, and he stayed with them for nearly a week, filming all the while. This time, Frost behaved quite differently, largely uninterested in, and unreactive to, his presence, although sometimes curious. At one point, whilst Helgestad was filming the three bears above him on a hillside, she began to propel herself towards him, sliding down on her stomach to get as close as possible ⁹³¹.

⁹²⁶ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹²⁷ *Queen Without Land* (2017)

⁹²⁸ *ibid*

⁹²⁹ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹³⁰ *Queen Without Land* (2017)

⁹³¹ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

Image redacted due to Copyright

Fig.25 Frost and her two cubs slide down the slope towards where Helgestad is filming, 2013, (*Queen Without Land*, 2017)

Over the next few years, he continued to find out as much as he could about Frost and her cubs. His attentiveness and willingness to be affected also gave way to moments of grief. He heard the news that, in 2014, Light had died just after being tranquilized by NPI, and that Lucky was then killed in 2015 (an event that I will return to in this chapter) ⁹³². With both of the cubs dead, he hoped to see Frost with another litter soon. On 26th December, 2016, he capture footage of her on a trigger camera outside a cabin near Tempelfjord, recognising her immediately. She looked healthy and well-fed but was not in a maternity den this year – perhaps next year, he thought ⁹³³. In early 2017, Helgestad learned that she had indeed had two more cubs, a male and a female, that were with her towards the northern side of Isfjord ⁹³⁴. Shortly after their capture by NPI on March 28th, he met the new family for the first time. “*I don’t know if I can explain how happy I was to meet [her] again*” he explained, yet at the same time was dismayed that she had been radio-collared and marked ⁹³⁵. “*She was sprayed with a huge number*” he tells me, “*on her whole back, plus another spray with a different colour*” ... “*they even sprayed one of the cubs in the head ... it is a little disrespectful in many ways*” ⁹³⁶. He continued to film her over the coming months, again in 2018, and again after the family had split up in 2019 – careful to limit his time and to keep his distance. All of these shoots have informed his work, his documentary (and a planned follow-up project) that tells the story of ‘Frost’s’ life, a polar bear living at the heart of Svalbard’s slow climate disaster ⁹³⁷.

⁹³² Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹³³ Ibid; *Queen Without Land* (2017)

⁹³⁴ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹³⁵ *Queen Without Land* (2017)

⁹³⁶ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹³⁷ Mathismoen, O. (2018) ‘Naturfotograf Asgeir Helgestad: Jeg tror ikke folk har forstått dette helt, men Arktis er nok tapt’, *Aftenposten*, Online, Available at: [<https://www.aftenposten.no/a-magasinet/i/9m1dqw/naturfotograf-asgeir-helgestad-jeg-tror-ikke-folk-har-forstaatt-dette-helt-men-arktis-er-nok-tapt>] Accessed: 10/01/19.

This film is fascinating to this thesis for a variety of reasons. Unlike so many of the media projects that use imagery of polar bears, Helgestad is motivated by accurate identification for his individuation. Frost is always the same animal, never confused with other polar bears or compromised in the editing room to tell stories that become a composite tale of numerous bears that have been filmed. This presents a unique opportunity to explore the role of this bear on film, and to ask what sort of polar bear is Frost? Through the story of Frost's life, the *'Queen without Land'*, I will continue to educe new human relationships to Svalbard polar bears – their significance, affordances, evocations, and meanings⁹³⁸.

The central characterisation of Frost within the *Queen without Land* is as a polar bear who inhabits a melting world, whose future is as unsure and uncertain as the shifting ice beneath her feet. Here, through the condensing of 4 years of her life into 1 hour and 10 minutes, Frost stands as a climate analogy, a polar bear who embodies many of the political and scientific tropes that I outlined in chapter 3. "The Frost family is aware that Svalbard nature is changing rapidly" comments Mathismoen in his Aftenposten review, "It rains midwinter, fjords are without ice all year, temperature changes are measured 80 meters deep in the tundra"⁹³⁹. However, Frost is also more than simply a climatic analogy, she also enables us to encounter Svalbard as a whole, as the culmination and guarantor of the archipelago's entire ecological system. Just as Stirling described the historical progression of polar bear science, advocating for an 'ecosystem approach' that places the species at the heart of complex Arctic food webs, Helgestad frames Frost as an emblem of Arctic futures⁹⁴⁰. "The whole ecosystem [is] going wrong because of the ice melting" he laments, "[I] think it is too late to protect the Arctic as we know it today"⁹⁴¹. Frost's ecology, as outlined in *Queen Without Land*, demonstrates these changes – the variation in ringed seal denning and distribution, their connection to fish numbers, to other marine species, and fundamentally to the sub-ice algal blooms which form the "foundation of almost all life in Svalbard"⁹⁴². As more and more fjords become increasingly ice-free, in particular on the West coast that Frost calls home, the entire productivity of Svalbard reduces. At the top of this trophic pyramid, Frost's uncertain future is inexorably tied to the realities and consequences of anthropogenic global warming for the entire Arctic.

The source of this knowledge about Frost's ecology is acknowledged by Helgestad to be the scientific research done by NPI's monitoring programme, mentioned through allusions to her capture and

⁹³⁸ Anderssen, E. & McPhearson, T. (2018) Making sense of biodiversity: the affordances of systems ecology, *Front. Psychol.* DOI: 10.3389/fpsyg.2018.00594; Lorimer (2010)

⁹³⁹ Mathismoen (2018)

⁹⁴⁰ Stirling, I. (04/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁹⁴¹ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge; *Queen Without Land* (2017)

⁹⁴² Mathismoen (2018)

sampling ⁹⁴³. “I found out that Frost had been through this process four times in her life” he explains, “amongst the researchers she is known as number [N]23992” ⁹⁴⁴. Yet at the same time, this particular epistemological tradition is presented with some criticism, not only subtly held accountable for the death of Light in 2014, but also (through the presentation of images of Frost with her collar and spray-paint) framed as complicit with the transformation of ‘Frost’ into a different sort of bear. “I was quite surprised to see that she had a big radio collar around her neck ... I was wondering if this was necessary” he questions ⁹⁴⁵. This commentary is a continuation of the photographic criticism of the practice of radio-collaring outlined in the previous section, re-emphasised by Mathismoen’s contribution that through his film “[Helgestad] proves what the researchers write in their dry reports” ⁹⁴⁶. Once again, we return to the crux of how this bear is known, and a misalignment of values, spectacles, and future directions. To Helgestad, the issue is clear, “they [the scientists] cannot produce ice... their core problem here is that it is melting ... the whole world needs to change their attitudes” ⁹⁴⁷. “Research has given us important knowledge, but I question their practices” ⁹⁴⁸. His film, and Frost’s role within it, is a call for socio-political action.

Image redacted due to Copyright

Fig.26 Frost with her new radio collar and spray-painted marking in spring 2017, (A. Helgestad, *Queen Without Land*, 2017)

⁹⁴³ Norwegian Polar institute MOSJ (2020)

⁹⁴⁴ *Queen Without Land* (2017)

⁹⁴⁵ *Queen Without Land* (2017)

⁹⁴⁶ Mathismoen (2018)

⁹⁴⁷ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹⁴⁸ *ibid*

4.5.2 Misha/Frost as a “Very good polar bear mother”

Fundamental to this particular aim and motivation (told in a register that is perceived to be lacking from the scientific narrative) is Frost’s emotional life – her relationships to her cubs, their personalities, and their family bond⁹⁴⁹. “*Frost was the most amazing mum I had ever seen*” explains Helgestad’s voiceover, “*all [the] time playing with her two daughters*”⁹⁵⁰. Her exemplary motherhood is emphasised time and again, as a “*warm and caring mother*”, and a “*very good polar bear mother*”⁹⁵¹.

Motherhood is biologically fundamental to polar bear development. Few other mammalian species (or species at all for that matter) invest so much time and energy into the raising of their offspring, with polar bear cubs staying with their mother for two years, undergoing enormous physical and behavioural transformations⁹⁵². From when they are born – hairless, blind, and weighing under 1kg in the maternal snow-den – to when they are weaned after their third spring⁹⁵³, Misha’s cubs are her primary focus. Whilst this familial care is common to all polar bear mothers, Misha’s notable skill as a seal-hunter is discussed by many of my participants as something which makes her a ‘particularly’ good mother⁹⁵⁴. Many of her cubs – Lucky, before her death, and her two cubs recently weaned in 2019 – exhibit comparable hunting successes, utilising the same fjord systems and seal populations that she herself exploits⁹⁵⁵. For Frost, in *Queen Without Land*, her devoted, caring, and “amazing” motherhood has performative significance beyond the survival of her cubs⁹⁵⁶. It is attributed as a valued and admirable quality, an ideological virtuousness that strengthens the viewer’s empathetic association across species boundaries, as well as instigating greater emotional investment in the future of this family unit. Her skill as a mother also helps to externalise the threats that they face. As we watch Lucky and Light roll around playing under her gaze, we are prompted to imagine their vulnerability, from passing males bears and from the climate change that alters their home, as well as the vulnerability of this whole family. Frost’s role of ‘mother’ also serves to temper her ecological reality as a predator and accomplished killer. “*I was very excited about how this dangerous predator played and comforted the kids*” Helgestad explains “*she showed me aspects of polar bear life I had never seen before*”⁹⁵⁷. Even as Lucky and Light continue

⁹⁴⁹ Chambers (2001)

⁹⁵⁰ *Queen Without Land* (2017)

⁹⁵¹ Mathismoen (2018)

⁹⁵² Derocher, A. E. (2012) *Polar Bear: A complete guide to their biology and behaviour*, Baltimore, John Hopkins University Press.

⁹⁵³ *ibid*

⁹⁵⁴ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

⁹⁵⁵ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹⁵⁶ *Queen Without Land* (2017)

⁹⁵⁷ *ibid*

to mock-fight with their paws stained with the blood of a seal kill, this ‘private life’ gesturally side-lines violence to emphasise the emotive familial characteristics of innocence and play.

“The projection of an image of what people think bears are about is tempered by those truths that the biologists tell us are truths, but that doesn’t stop the audience looking at bears and thinking whatever their preconceptions of bears are ... it’s easier to get people to empathize with a female bear who’s got to feed her cubs if she’s got to kill something”

– John Aitchison (2019) *Research Interview*

Image redacted due to Copyright

Fig.27 Lucky and Light roll around in play 2013, (A. Helgestad, *Queen Without Land*, 2017).

Image redacted due to Copyright

Fig.28 Frost plays with her cubs, 2013, as they try to jump on her back, (A. Helgestad, *Queen Without Land*, 2017).

The ‘familialization’ of bear species is a long-standing trope within human societies, who have continually ‘socialized’ these creatures with “inescapable anthropomorphism”⁹⁵⁸. Perceived behavioural and anatomical similarities have always populated bear animal stories with human traits, trials, and tribulations – from the ancient Greeks to Netflix⁹⁵⁹. As one of my participants solemnly points out, if you have ever had the misfortune to see a bear without its skin, it looks an awful lot like a human

⁹⁵⁸ Feely-Harnik (2001) p.54; Snæbjörnsdóttir & Wilson (2006) p.17

⁹⁵⁹ Bieder (2005); Randa (1986); Brunner (2007)

⁹⁶⁰. “It is hard not to assign human attributes to the polar bear” explains Davids ⁹⁶¹, and in doing so (search for) project something of ourselves onto them – “the mutual relations of humans and animals” ⁹⁶².

Animal ‘families’ are a common way that this is achieved, casting non-humans into familiar familial roles, and with them the assumption that we can come to recognise comparable relations and kinships – the ‘naughty’ son ⁹⁶³, the ‘loving’ mother ⁹⁶⁴. At the turn of the 20th century, these imaginations were played out in the taxonomic arrangements and dioramas of Natural History Museums, as “*human nuclear famil[ies] served as a popular model for displays, prompting scenes featuring Papa, Mama, and Baby Bear together*” ⁹⁶⁵. Whilst contemporary visual media has made strides to sideline some of these more overtly ‘unnatural’ ecologies – in particular emphasising the very real danger that *Papa Bear* would kill and eat *Baby Bears* – there remains a set of recurring animal behavioural traits that not only come to represent universal characteristics of the species whole, but also reflect human values. Mills emphasises the proclivity of heteronormativity within wildlife documentaries, emphasising the historical context of pre-Cold War McCarthyist America where 1950s nature films opted to uncover traditionally ‘nuclear families’ existing in nature ⁹⁶⁶. In doing so, they wanted to prove the natural occurrence of American values whilst at the same time amplifying a “rhetoric of protection and unity” to stave off the growing threat of Soviet communism ⁹⁶⁷. Bear families here foreground moralistic Judaeo-Christian norms expressed in non-human worlds. I am not for a second suggesting that Frost’s role as an “*amazing polar bear mother*” remains a rebuttal against the rising tide of communism, but her on-screen life re-animates long-established tropes that remain significant in the discourses we use to talk about bears, bear families, and their futures, as well as how we choose to enact them.

In previous chapters I spoke about different forms of relationships that underpin bear/human societies. In particular, I mentioned the significance of matriarchal lineage for the scientific analysis/structuring of polar bear populations and data, the role of ‘family’ for enrolling new bear cubs into the monitoring programme, and a comparable male lineage of scientists who underpin the development of their epistemological tradition. By contrast, the kinship embodied by Frost is a more emotive form of companionship told through visual cues. In *Queen Without Land* we see Frost ‘breastfeeding’ lucky and

⁹⁶⁰ Derocher, A. E. (24/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

⁹⁶¹ Davids (1982) p.2

⁹⁶² Feely-Harnik (2001) p.58

⁹⁶³ *Snow Bears* (2017) [Online] Philip Dalton, UK: BBC, [2018] BBC iPlayer.

⁹⁶⁴ *Queen Without Land* (2017)

⁹⁶⁵ Brunner (2007) p.204/5

⁹⁶⁶ Mills (2012)

⁹⁶⁷ Mills (2012)

light, a practise that has been repeatedly anthropomorphised as bears do so sitting on their hind legs and hold their cubs to their chest, as well as wrestling together on the ground in a ‘cute’ and ‘comedic’ embrace. Through these spectacles we are able to continue reading their polar bear behaviours through various normalised human constructs, then justifying those constructs via the very image-worlds that we produce to evoke them ⁹⁶⁸. In Frost and her cubs, we see so much of ourselves, at the same time remaining convinced that these traits are not carried to this engagement by us but instead emanate from their very ‘nature’ ⁹⁶⁹. In these engagements we find an intimacy, not only between the on-screen family, but in the empathetic notion that we are not so very different. It heightens our concern for their wellbeing as we are shown changes to their Arctic home, and amplifies the grief we feel for their deaths. *“That is what I am trying to show”* explains photographer and cameraman Roie Galitz, *“polar bears being like us, they are them but they are us, we are protecting them because they are us”* ⁹⁷⁰. *“Protecting polar bears means protecting ourselves”* ⁹⁷¹.

Image redacted due to Copyright

Fig.29 Frost holds her cubs, 2013, (A. Helgestad, *Queen Without Land*, 2017).

Image redacted due to Copyright

Fig.30 Frost leads her cubs away from the danger of a male bear, (A. Helgestad, *Queen Without Land*, 2017).

⁹⁶⁸ Ibid p.112

⁹⁶⁹ Elliot (2001)

⁹⁷⁰ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

⁹⁷¹ ibid

However, Bousé describes this emotional intimacy as a “false intimacy”, an untenable and unrealistic emotive ‘closeness’ to an individual and a species whose ecology prohibits such companionship – a “species that bites” ⁹⁷². This feeling is facilitated by the telescopic zoom of film cameras that enable our gaze access beyond the distance that would usually illicit a fright or flight response, as well as by the persistent presence of the camera operators that capture them. Bousé continues to question whether this close-up access can really “*reveal an animals emotional state, or merely invite us to project our emotions onto it*” ⁹⁷³. Here, again, I find the crux of this thesis. Through these filmic/photographic ecologies – the life of Frost – how well do I really know this bear? What kind of polar bear have I learned her to be through the stories that are told using her images, and what of her have they taught me to value?

4.5.3 Misha: The most-viewed polar bear in the world

Over the same period that Asgeir Helgestad had been following Frost and her two cubs, Lucky and Light, compiling footage for his film, numerous other filmmakers, camera operators, and photographers also had interactions with this polar bear family. Many of the programmes that then feature them were orchestrated by Longyearbyen-based production company *Polar-X* (formerly *Jason Roberts Productions*), whose namesake founder has made a career of providing operational support and guidance to projects in search of polar bear footage. In their opinion, Svalbard remains the best place in the world to film polar bears ⁹⁷⁴, and Misha is by far one of the best bears to work with ⁹⁷⁵. Roberts first explained his long-term interactions with her when we met in Autumn 2017: “*Yeah, shit loads, bucket loads, we filmed them the whole time... they are in loads of different big productions*” ⁹⁷⁶. These pieces of footage then enter into wider circulation, being used and re-used in numerous television shows. “*They pop up years after*” Roberts continues, “[they] *become this symbol of climate change*” ⁹⁷⁷. *Polar-X* is one of very few groups that spend extended periods with the polar bears – “*8 months of the year ... our filming periods are 6 weeks at a time, watching them and being with them*” he says ⁹⁷⁸. “*We*

⁹⁷² Bousé (2003); Barua et. al. (2014)

⁹⁷³ Bousé (2003) p.123

⁹⁷⁴ Roberts, J. (15/10/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁷⁵ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁷⁶ *ibid*

⁹⁷⁷ *ibid*

⁹⁷⁸ Roberts, J. (15/10/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

don't leave a bear, if we have a 'workable bear' we will stay with it" ⁹⁷⁹. He is therefore in a unique position to explain the wealth of different programmes that Misha has featured in, and help to uncover more stories that are told about/through her, about the polar bear as a species, and about the Arctic and their shared future. *"I think she must be the most filmed polar bear in the world"*, concludes Helgestad ⁹⁸⁰.

Roberts has known Misha as a 'local bear' since 2012. Now *"she is an older bear ... she's not the youngest"* he explains, *"2012 was the first time [we filmed her]... then really... 2013 was a hell of a lot with her"* ⁹⁸¹. By this time, Misha was now 6/7 years old. She had been captured three times by NPI already, in 2009 up in Wijdefjorden, 2010 at Gipshukodden on the headland between Tempelfjord and Billefjord, and 2011 in Billefjord itself. She had firmly established herself in the Isfjord area that everyone who knows her (the Tempelfjord/Billefjord-bear) had come to associate as her home range. In March/April 2013, when she emerged with her cubs, Lucky and Light, and spent a lot of their time in those same fjord systems, she was an extremely attractive prospect for filmmakers. It was then that Helgestad first encountered her, as well as Rolf Stange (the photographer whose image was being sold in the SPRI giftshop when I began this research), and over the same period she was filmed to feature on a number of major TV stations. She was filmed a lot for "BBC changing worlds, which ended up being called *'Earth's Greatest Spectacles'*" Roberts recalls, and for *'Life at the Extreme'* with Davina McCall on ITV, as well as for National Geographic's *'Predators'* series, and a Hollywood feature film called *'Midnight Sun'* ⁹⁸². The following year, before Light's death, the family were also filmed for the BBC's natural history documentary *'The Hunt'*, which would air in November 2015, seven months after the death of Misha's second cub, Lucky ⁹⁸³. In 2016, Misha was filmed considerably less, although partially I suspect that without her cubs (whose age and size is a helpful measure) she was less recognisable to some. In 2015, some photographers claimed to have encountered her with another set of cubs, but this is a case of mistaken identity, as Misha only separated from Lucky earlier that year and would not have given birth. When she finally did emerge with a new pair of cubs in 2017, she was captured and collared by NPI, which resulted in her becoming less 'photogenic' and an 'unworkable bear' for many of the filmmakers. However, in 2018, she was filmed once more by a team from Netflix and Silverback to feature in the *'Our Planet'* series in 2019 ⁹⁸⁴.

⁹⁷⁹ *ibid*

⁹⁸⁰ Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

⁹⁸¹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁸² *ibid*

⁹⁸³ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁸⁴ *ibid*

With all of these suggestions from Roberts and his colleague Oskar Strøm, as well as the knowledge I had gleaned from Helgestad about learning to recognise Misha from her physical characteristics – beard, low back, rounded rump, facial shape – and information from other dated photographs about her condition, coat colouration, and location (identifying notable fjords and landmarks in the backdrops), I set about searching for Misha within the sequences of all these programmes. Many of these are episodes, films, and footage that I have seen before. Some I am very familiar with. However, I now watch them anew with a different vision, and notice different bears. In some of the programmes that Roberts mentioned I cannot find Misha – wondering whether the information I have received is correct, or whether she simply didn't make the sequences from the editing room. But occasionally, I glimpse her for a moment. Unlike 'Frost', the stories that are told here do not rely on identification for their individuations. Whilst they feature individual bears, rather than named protagonists they are more guarantors, examples of more universally-held species traits that they are enlisted to produce. In each case, the factual documentaries from the BBC, ITV, National Geographic, emphasise the biological adaptations of polar bears that suit them to the Arctic ice, the very same adaptations that bind them to their ecosystem and thus inexorably to the melting of their home. Here, we find echoes of the 'ecosystem approach', and of the same tropes and narratives that thrust polar bears into politicised ecologies of GHG emissions and anthropogenic climate change. But what is Misha's role here, and what version of a polar bear is enacted through these societies of image-capture and broadcast?

Sequences of the 'family unit' is used as an ending point – as in ITV's *Life at the Extreme*, or BBC's *The Hunt*, Episode 2 '*In the Grip of the Seasons (Arctic)*' – whereby the presenter (Davina McCall), the narrator (David Attenborough), and the viewers, together enter into a moment of reflective calm after the epic tales of hunting, survival, and 'extremity' that characterises the rest of the episodes⁹⁸⁵. In *The Hunt*, as a thin female bear steps up onto an iceberg in slow motion, raised up against the horizon like Caspar David Friedrich's *Wanderlust*, the dramatic music swells and Attenborough reflects on the small margins of error and survival: "*all she can do, is keep trying*"⁹⁸⁶.

⁹⁸⁵ *Life at the Extreme* (2016) [Online] ITV, UK: Plimsoll Productions, [2019] YouTube; *The Hunt* (2015) [Online] BBC, UK: Silverback Films, [2019] Netflix.

⁹⁸⁶ *ibid*

Image redacted due to Copyright

Fig.31 Still image from BBC's *The Hunt*, Ep.2 [Source: BBC NHU]. This bear was also well known to Roberts, and was named Skinny Lizzy, thought to be the same bear as featured later in the famous emaciated image, 2015.

Equally on ITV, the presenter's endurance of the 'extreme cold' in this 'polar desert' provides the viewer a human yardstick to marvel at the bears' adaptations, all the while deprived of the closeness and access we are gradually taught to crave. "*The thing is about wild animals*" she explains, "*is that most of the time you can't get very close to them*" ⁹⁸⁷. But finally, in the arc of the episode, with her we find ourselves out on the ice with Misha, Lucky, and Light. Gently emotive music starts as we watch the cubs play in the snow, whilst just out of shot Misha eats on a seal kill. "*That's so beautiful*" she concludes, "*seeing that is hard to beat*" ⁹⁸⁸. As Misha lies down on the ice, and the family scene lulls, we are reflective with her, not only on the last 37 minutes of television we have viewed, but about the future – for us, for her, and what it means for polar bears. Misha and her cubs once invite us to encounter certain forms of polar beariness: ones of vulnerability, innocence, and even a form of 'wild' purity. Over on BBC, Misha and her cubs, now a year older, are performing the exact same role ⁹⁸⁹. This time in one single shot, a 13-second still camera frame, the two cubs roll on their backs whilst Misha walks into view and greets them, sniffing and nuzzling. Attenborough's narration, with orchestral music slowing in the background, concludes the story of the Arctic's drastic annual seasonal changes that underpin the episode. As summer draws to a close, "*the sea ice is starting to form*", "*a floating continent... about to materialise*" as "*the land becomes white once more*" ⁹⁹⁰. With this notion, the three white bears on

⁹⁸⁷ *Life at the Extreme* (2016)

⁹⁸⁸ *ibid*

⁹⁸⁹ *The Hunt* (2015)

⁹⁹⁰ *ibid*

screen (filmed in spring rather than late summer as suggested ⁹⁹¹) are paradoxically permanent and fragile. The programme's motivation has not been to highlight the dramatic climatic crisis faced by Arctic species, instead to demonstrate their awe-inspiring beauty ⁹⁹². Yet, despite the stoicism of this family unity, together still after the tribulations of the winter darkness, spring melt, and frugal summer, we can't help but imagine the threats they face. In Misha and her cubs, their faces framed by telescopic zoom lenses, their mannerisms slowed by reduced framerates, turning to gaze into our screens, we think we see a little of ourselves.

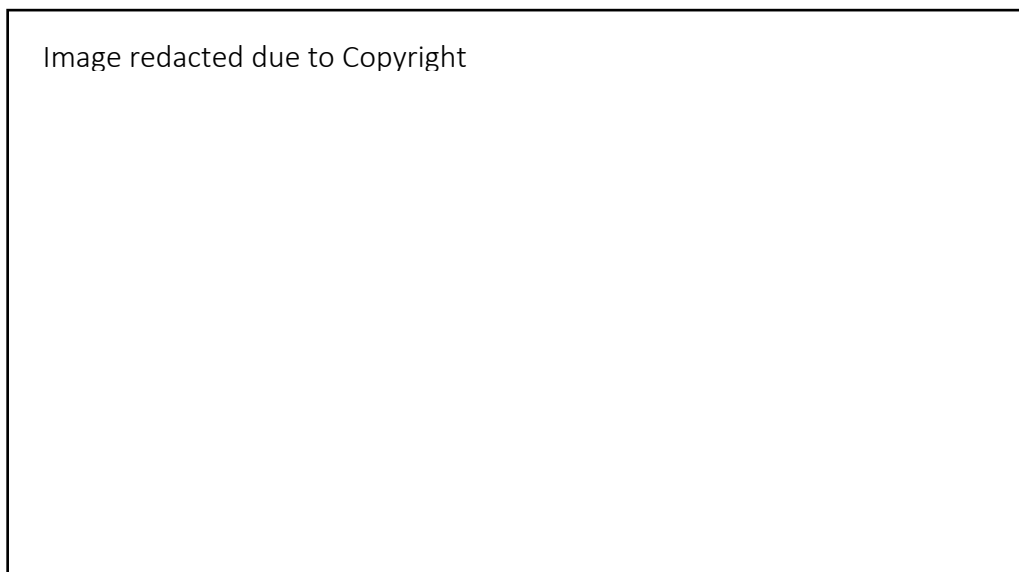


Fig.32 Still from the ending of BBC's *The Hunt*, Ep. 2 *In the Grip of the Seasons*. Misha and her cubs lie on the sea ice. [Source: BBC NHU]

In the programmes that do not claim to be based on the same level of factual authenticity the same familial tropes can be observed, to an even more exacerbated extent. In *Midnight Sun*, a feature film also known as *The Journey Home*, footage of Misha is again cut into a story about a mother bear, reunited with her lost cub thanks to the improbable exploits of a plucky teenage boy ⁹⁹³. Here, the storytelling devices are even more egregious, and in doing so illuminate far more about the polar bears "of the mind" ⁹⁹⁴. Misha's footage is cut with that of at least two other bears: another wild female moving amongst the ice floes, and a captive trained female called 'Agee', owned and hired out by Mark Dumas in the United States ⁹⁹⁵. Agee performs physical movements that could not be prompted from wild bears, such as standing on command and 'roaring' at the passing helicopter, and other fanciful

⁹⁹¹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

⁹⁹² *The Hunt* (2015)

⁹⁹³ *The Journey Home* (2014) [Online] Spottiswoode, R. & Quilici, B., Italy/Canada: Hyde Park Entertainment, [2018] YouTube.

⁹⁹⁴ Berger (2009)

⁹⁹⁵ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

expressions of stereotypical polar beariness⁹⁹⁶. She is joined in these scenes, spliced together in the CGI edit room to avoid any need to share the set for fear Agee would kill it, with a Chinese polar bear cub named Pissau, who is also coaxed into anthropomorphised motions – standing to ‘wave’ to the boy and ‘smiling’ at the sight of his mother⁹⁹⁷. Finally, a shot of Misha is inserted with one of Lucky or Light (the other has been edited out), rolling around in an embrace⁹⁹⁸. Again, Misha as ‘the polar bear family’ is used as an emotive prompt, anthropomorphically inducing empathy through a falsely intimate recognition of human traits.

Image redacted due to Copyright

Fig.33 Still from the end of *The Journey Home* 2018, scene featuring Misha and one of her cubs (Lucky or Light) in 2013, (Source: *The Journey Home*, YouTube)

John Aitchison, an experienced cameraman who has worked on numerous wildlife films for the BBC Natural History unit, explains that in the factual documentaries (as in feature films) the production process has decided upon stories it hopes to tell even before footage is gathered. Whilst those sequences may not actually be captured⁹⁹⁹, it reflects the presence of mediation and construction in the presentation of polar bear narratives¹⁰⁰⁰. *“Film is made up of snatches of reality”* continues Aitchison, *“those images are representative of something, but they are joined together in a way that also makes them representative of something else”*¹⁰⁰¹. *“It is a construct ... it isn’t reality, it’s not a webcam, it’s not a live feed, unedited... it’s been through a filter... it’s been chosen and crafted and condensed”*¹⁰⁰². A huge number of scale changes have occurred, *“someone has chosen what you film,*

⁹⁹⁶ *The Journey Home* (2014)

⁹⁹⁷ *The Canadian Press* (2014) ‘Chinese polar bear cub lands starring role in Canadian film’, [Online] Available at: [www.cbc.ca/news/canada/Chinese-polar-bear-cub-lands-starring-role-in-canadian-film-1.2787980], Accessed: 10/10/17.

⁹⁹⁸ *The Journey Home* (2014)

⁹⁹⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰⁰⁰ Aitchison, J. (20/07/2018) *Research Interview*, Phone, SPRI, Cambridge.

¹⁰⁰¹ *ibid*

¹⁰⁰² *ibid*

when you go, what you say about it, whether it has music on it or not, which shots to use and which ones to leave out, and which order to put them in” ¹⁰⁰³. Misha is not only an individual polar bear used to demonstrate biological commentaries of “*bears do this*” (much of the information for which is advised by cooperating scientific partners and their work with bears like N23992), but is also part of a particular “*interpretation of the world*” where polar bears “*in our imaginations as much as anything ... are symbols ... beyond being an animal they’re symbolic of something else*” ¹⁰⁰⁴.

Finally, I learned from Roberts that Misha had featured in Netflix’s *Our Planet* series, filmed on the ice in spring 2018 when her new cubs were both yearlings, and released in 2019 ¹⁰⁰⁵. Scanning the first episode ‘*One Planet*’, Misha’s face is recognisable to me as the mother bear with her two cubs that are narrated my Attenborough to be at risk of “*growing up underweight*” with the reduction in annual sea ice extent ¹⁰⁰⁶. “*Within the lifetime of these cubs, the Arctic in summer could be largely free of sea ice*” ¹⁰⁰⁷. However, her radio collar (that I know she was wearing over the period she was filmed) is missing. In an email follow-up, Roberts confirms my suspicion that it had been edited out in postproduction ¹⁰⁰⁸. Whilst this programme, in contrast to previous documentaries that feature Misha, places environmental messaging at the heart of its aims, the spectacle of a polar bear still conforms to certain ideals – a wild and majestic creature devoid of such blatant images of human interference. In the title card, Misha is edited even further. One of her cubs is removed, the other is placed much closer by her side, and together they are projected onto a small ice ledge in front of a receding glacier (a landscape that is actually from their Antarctic footage of penguins). Here is perhaps the most overt example of her role on film – an embodiment of changing climate, virtuous yet vulnerable motherhood, and an archetypal example of the glorified scenic imagination of polar bear that we stand to lose. “*We are all affected*” concludes Aitchison “*by how things are rendered and how they can be*” ¹⁰⁰⁹.

¹⁰⁰³ *ibid*

¹⁰⁰⁴ *ibid*

¹⁰⁰⁵ Roberts, J. (2018) *Private Communication via email*

¹⁰⁰⁶ *Our Planet* (2019) [Online] *Sophie Lanfear*, UK: Silverback/Netflix/WWF, [2019] Netflix.

¹⁰⁰⁷ *Our Planet* (2019)

¹⁰⁰⁸ Roberts, J. (2018) *Private Communication via email*

¹⁰⁰⁹ Aitchison, J. (20/07/2018) *Research Interview*, Phone, SPRI, Cambridge.

Image unprintable due to third-part copyright.

A copy is available here:

https://eco-age.com/wp-content/uploads/2019/04/screenshot_2019-04-05_10.41.27.png

Fig.34 One of the promotional banner images for Netflix's *'Our Planet'* series, a CGI composition featuring Misha and only one of her 2017 cubs, removed from the original footage and superimposed on this glacial backdrop.

Image unprintable due to third-party copyright.

A copy is available here:

https://grist.org/wp-content/uploads/2019/04/ourplanet_frozenworlds_16_sophielanfear-e1554421581988.jpg

Fig.35 The original landscape, an Antarctic scene complete with penguins, into which Misha has been edited.

The CGI construction of an entirely fictitious composition of Misha is a fittingly metonymic for the practice of capturing polar bear images and their subsequent re-release into circulation in new digital ecologies and 'screen natures' ¹⁰¹⁰. For John Berger, in his seminal collection *Why Look at Animals*, these "*animals of the mind have been co-opted into other categories [...] into the family and into the spectacle [...] so that 'animal' has lost its central importance*" ¹⁰¹¹. So too, they are marginalized, split into the 'existential dualism' of 'animal as individual' and 'animal as its species' ¹⁰¹². Whereas these animals are made more visible through the work of film and photography, they disappear in other ways, through

¹⁰¹⁰ Bagust (2008)

¹⁰¹¹ Berger (2009) p.25

¹⁰¹² *ibid*

their transformation into spectacle ¹⁰¹³. Although their domain is entirely visible, it can never be entered by the spectator. Instead, it is entered due to technological ‘clairvoyance’ – a collection of devices that “carry with them the numerous indications of their normal invisibility” ¹⁰¹⁴. As Berger highlights with his reference to Frédéric Roffo’s work *La Fête Sauvage*, each photograph lasts for less than three hundredths of a second – a fraction of time totally invisible as it is “beyond the capability of the human eye” ¹⁰¹⁵. So too, the slow-motion framerates of contemporary nature docs produce a ‘visible domain’ invisible without this technological mediation. Within these digital ecologies, Misha cannot observe us, she can never meet our gaze. The anthropomorphism that we use to try and educe proximity and intimacy is uneasy, claims Berger, and makes her a prisoner of human situations – the socialized lives they perform ¹⁰¹⁶.

Whilst exploring these evocations of Misha and her family is vital to developing an understanding of how we come to know polar bears, and the sorts of bear that are made to live, there is a fundamental omission. What impacts do the atmospheric and performative dimensions of these interactions exert on the life of the bear herself? Again taking lead from Berger, can we start to ‘look between the frames’ of this film and photographic work to intuit a part of the visible not meant for us ¹⁰¹⁷. This goes beyond the stories that are told about Misha and examines how the tasks of their telling also impact upon her lived experience. What sort of polar bear is enacted here, through the co-shaping encounters of the filmic practice?

¹⁰¹³ Ibid; Igoe (2010)

¹⁰¹⁴ Berger (2009) p.27

¹⁰¹⁵ Ibid p.27

¹⁰¹⁶ ibid

¹⁰¹⁷ ibid

4.6 Misha as a 'Good Bear'

One of the reasons that Misha has become such a ubiquitous polar bear on film is her denomination as a 'good bear'. "*She is one of the few bears that I always remember as being the easiest*" explains Roberts, "*not aggressive, not scared, not worried about you, just goes about her own business ... you could not get a better specimen to work with*" ¹⁰¹⁸. This rhetoric of 'good bear' is common amongst all the photographers and filmmakers, as opposed to the alternative "butt bears" ¹⁰¹⁹. Some bears don't want any attention, explains Roie Galitz, and so will walk away and you "*only see their butts*" ¹⁰²⁰. "*If you see pictures of polar bears' bums, then someone did something wrong*" adds Mangersnes ¹⁰²¹. By contrast, the ideal circumstance for gathering all forms of footage should be that the bears are both as relaxed and as comfortable as possible in your presence ¹⁰²². Misha is the perfect example of a "brilliant" photo bear, whose tolerance of the presence of humans has propelled her filmic career ¹⁰²³. "*There are few bears that you can ever meet like that*" says Roberts, who don't react at all, doesn't try to stalk or hunt the crew, and builds no tension ¹⁰²⁴. For the preference of film producers, this behaviour is vital. Birger Amundsen assisted Hugh Miles and Mike Salisbury during their BBC filming expeditions to Svalbard in the 1980s, and explains how fundamental it was to "[film] *the polar bear in the natural way of behaving, so we don't want the polar bear to look at the camera*" ¹⁰²⁵. In order to adequately capture scenes of 'pristine nature' and 'untouched wilderness', the subject could not be seen to be affected by the presence of the camera. The then claim was that they are trying to "*put [themselves] in the situation so that the polar bear behaves naturally*" ¹⁰²⁶. Here is a trope that has carried through to present day filming work – Misha is a 'good bear' because she just starts "being a polar bear", shows no sign of knowing you are there, and exhibits "natural behaviour" ¹⁰²⁷. This is a reminder of Berger, thrusting Misha into a visible world using technological devices that conceal their own visibility ¹⁰²⁸.

Whilst Strøm is cautious to generalise about the behavioural traits of bears and their reactions, each having its own individual characteristics, much of Misha's 'goodness' is viewed as a product of her

¹⁰¹⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰¹⁹ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

¹⁰²⁰ *ibid*

¹⁰²¹ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹⁰²² *Ibid*; Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰²³ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

¹⁰²⁴ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰²⁵ Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

¹⁰²⁶ *ibid*

¹⁰²⁷ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen; Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰²⁸ Berger (2009)

location and history. From “*working with bears in other places*”, he continues, the Svalbard bears clearly exhibit different behaviours. In particular, the bears around Isfjord and Longyearbyen area are accustomed to the presence of people ¹⁰²⁹. Tempelfjorden is a heavily trafficked fjord on the route to Pyramiden and the north of Spitsbergen, where, by the late spring, the sea ice is scored by thousands of snowmobile tracks. “*Any bear with a home range around Longyearbyen will be quite relaxed*” confirms Roberts, outlining the irony at the heart of the ‘good bears’ ¹⁰³⁰. For Misha to be relaxed enough around camera crews for the sequences she is captured in to exhibit ‘natural’ or ‘wild’ behaviour, she must be paradoxically accustomed to them. She is “*more habituated to people*”, and thus enables a “*good working relationship*” ¹⁰³¹. Facilitating her role on film as a guarantor of wild polar beariness, propped up by tropes of whiteness and pristineness, is her frequent exposure to human actors – a novel ecology in a Svalbard landscape that has come to emblemise the exact opposite.

Image redacted due to Copyright

Fig.36 Misha, Lucky, and Light, in front of Villa Fredheim in Tempelfjord, 2013. (A. Helgestad, *Queen Without Land*, 2017)

These behavioural traits run deep, rooted in histories of human/bear engagement, for Svalbard is no wilderness. At the mouth of Tempelfjord sits the old trapping hut Villa Fredheim, where prolific Norwegian trapper Hilmar Nøis hunted over 300 bears at the beginning of the 20th century ¹⁰³². It is in the shadow of this history that Misha has made her home range, as bears have begun to repopulate the west coast after the banning of hunting in 1973 ¹⁰³³. A major part of that reason is the high frequency of seals (bearded and ringed) that haul out in Tempelfjord due to the comparatively low frequency of bears. Historically due to hunting and contemporarily due to the tourist routes, polar bears have tended to avoid this particular area: “[they] *tend to move along... because they find it a little bit too noisy and too busy*” ¹⁰³⁴. The “*seals realised that this was a fjord system that was very safe*” explains Strøm, “*I have been to almost every fjord system in the winter... I haven’t been able to find so many seals*

¹⁰²⁹ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰³⁰ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰³¹ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰³² Museum Nord (2020) [online] Available at: [<https://www.museumnord.no/en/>] Accessed: 14/10/2019.

¹⁰³³ Larsen, T. S. (17/09/2019) *Research Interview*, Skype, Oxford.

¹⁰³⁴ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

lying on the ice as in Tempelfjorden" ¹⁰³⁵. When Misha moved into the area, she also showed a complete disregard for the snowmobile traffic and learned to be very successful hunting these seals. *"I saw her once catch... 5 or 6 seals in 7 or 8 days ... more seals than they could eat"* continues Strøm, and she would come back year after year, as would her cubs as they were weaned ¹⁰³⁶. However, the presence of the camera also exerts its own atmosphere upon her mobilities and her learned ethologies. *"Normally people don't see the photographer ... but I always see them"* explains Amundsen, *"I always see... the invisible cameraman"* ¹⁰³⁷. This is most notable for Misha's hunting technique. *"They use us to help them hunt"* explains Roberts, highlighting how Misha uses the camera crew to distract the seals and to take away their attention whilst she approaches it and attacks from behind ¹⁰³⁸. Reminiscent of African lions hunting at night by the light of Safari vehicle headlights, here is an overtly anthropogenically-influenced behavioural adaptation, ironically enacted during an interaction where we claim to covertly access polar bear life worlds to tell their wild lives.

Image redacted due to Copyright

Fig.37 Misha hunting a Tempelfjord seal that is clearly distracted by the camera taking the photo, (Source: Polar X, 2014)

At a pre-release production meeting for the Netflix *Our Planet* series in the Cambridge Conservation Initiative (CCI) during early 2018, the importance of *"never before filmed behaviours"* was emphasised for popularizing new wildlife documentaries ¹⁰³⁹. However, it isn't often that the role of the camera itself in eliciting these behaviours is discussed. Roberts is very forthright about the potential implications of long-term filming on bear behaviour. *"[Misha] used to run up and be excited to see us, like she was bored"* he explains, *"so when we came back she would remember, and then you get into the arguments and the nitty-gritty issues of are we doing wrong? Is she being habituated?"* ¹⁰⁴⁰. When

¹⁰³⁵ *ibid*

¹⁰³⁶ *ibid*

¹⁰³⁷ Amundsen, B. (17/08/2017) *Research Interview*, MS Fram, Longyearbyen.

¹⁰³⁸ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰³⁹ Davis, G. (2017) 'Briefing on a partnership between WWF-Netflix-Silverback to produce a natural history series', *Cambridge Conservation Initiative*, Cambridge, 31/10/17.

¹⁰⁴⁰ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

she was with her cubs, Lucky and Light, from their emergence in spring 2013, he and other filmmakers spent the majority of their lives in frequent contact. “*We have ... maybe a little bit of responsibility in there*” he suggests, “*there is definitely an air of habituation there ...[they were] so bloody used to us ... then they don’t really see us humans as dangerous*”¹⁰⁴¹. Included here is a discussion of Misha’s proclivity for breaking into cabins, which she has learned sometimes contain food, but always smell like they do. Roberts and Strøm are frustrated that the stringent management policy on bear interactions in Svalbard (motivated by aforementioned adherence to ideas of ‘best management wilderness’) requires the Syssemmannen to handle these conflicts. However, the delay between break-in and fear response (usually a helicopter used to scare her away) makes it impossible for Misha to learn their association. “*How the fuck is Misha going to understand what she’s doing right and wrong?*” says Roberts¹⁰⁴². As a result, investigating cabins remains on her learned pattern of food opportunism.

However, whilst Misha is an excellent example of a ‘good bear’, whose mobilities are deeply affected by human influence, not least in her capture and circulation in film and photography, there are numerous other examples of local bears with comparable behavioural traits. One such bear was brought to my attention in early 2018 during an interview with Roie Galitz, who had spent much of spring 2015 filming his “favourite bear”, a female with a home range around Billefjord who was very relaxed around people¹⁰⁴³. He also mentioned how he had re-encountered her in late 2017, eating a reindeer carcass just outside Longyearbyen. This second bear was Misha, and so this became my assumption about the first. However, whilst she has a similar physical appearance and very similar temperament, this cannot be the case. The bear that Galitz filmed in 2015, which later featured in the BBC ‘dramatized’ documentary *Snow Bears* (the genre so named as an admission of the heavily edited storyline featuring numerous bears cut into a single-family narrative)¹⁰⁴⁴, had two cubs at the time. Misha had only just split with Lucky and was alone during that year. Yet crucially, this second bear was still talked about in Longyearbyen as a Misha – referred to by Roberts and Strøm as Misha 2 (hard to distinguish from ‘Misha too’)¹⁰⁴⁵. Partially of course, this is misidentification, but there is also a more fundamental trope that underpins this nomenclature. Here, ‘Misha’ has become a more universal archetype, like the bear roles she plays on film, a particular type of local bear with a particular type of behaviour. Misha is synonymous with ‘good bear’, and the Misha I have been trying to know, is just one, living at this intersection between storytelling technologies, wilderness imaginations, and our human/non-human encounters.

¹⁰⁴¹ *ibid*

¹⁰⁴² *ibid*

¹⁰⁴³ Galitz, R. (18/06/2018) *Research Interview*, Skype, Mickleton, Cotswolds.

¹⁰⁴⁴ *Snow Bears* (2017)

¹⁰⁴⁵ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

4.6.1 The Death of Lucky

Whilst unafraid, Misha's cubs have always shown a huge amount of curiosity towards people¹⁰⁴⁶. This had begun to make some of the filmmakers nervous, not for their own safety, but for that of the bears¹⁰⁴⁷. In 2018, Helgestad explained that it was almost impossible to observe Frost with her two newest cubs, as they (and particularly the male) would come running towards his snowmobile, his head held high and inquisitive¹⁰⁴⁸. Three years earlier, after the death of Light, Roberts expressed his concern for Misha and Lucky. "*In 2014, [after] the sister was killed by the polar institute, ... I said, Misha and that other cub will be killed at a cabin or tent site*" he explains. "*I wanted it on record to say that the other cub will be dead within two years' time ... because it had not learned to be scared of any people or anything*"¹⁰⁴⁹.

Less than a year later, on March 18th Oskar Strøm was returning from Tempelfjord on snowmobile when he encountered a group of Czech tourists heading out to camp in preparation for the full solar eclipse the following day¹⁰⁵⁰. He impressed upon them the need for caution, as there were known to be a few polar bears in the area at the time. One of these was Lucky. She had recently returned from Wijdefjorden (where Misha had led her the year before after Light's death) and was now weaned and independent¹⁰⁵¹. A week earlier, she had been encountered by photographer Roy Mangersnes who had observed her as she hunted 3 seals in 4 days, demonstrating the same adeptness at hunting as her mother¹⁰⁵². He watched on as she cached their carcasses and then started to play with a block of ice, rolling up and down a slope, jumping off and nosediving into the snow. He compiled this footage into a short piece for Wild Planet magazine entitled: *The Happiest Polar Bear*¹⁰⁵³.

¹⁰⁴⁶ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Helgestad, A. (18/09/2018) *Research Interview*, Phone, SPRI, Cambridge.

¹⁰⁴⁷ *ibid*

¹⁰⁴⁸ *ibid*

¹⁰⁴⁹ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰⁵⁰ *ibid*

¹⁰⁵¹ *ibid*

¹⁰⁵² Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹⁰⁵³ Mangersnes, R. (2016) 'The Happiest Polar Bear', *Wild Planet Photo Magazine*, Issue 27, January 2016 [Online] Available at: [<https://wildplanetphotomagazine.com/2015/the-happiest-polar-bear/>] Accessed: 18/11/2018.

Image redacted due to Copyright

Fig.38 Lucky in *'The Happiest Polar Bear'*, playing with a block of ice, (Source: R. Mangersnes, 2015)

"A few days after these pictures were taken, [Mangersnes] heard a very different story with a tragic ending" the Article continues¹⁰⁵⁴. On March 19th, Lucky discovered the camp of the Czech tourists. Led by her curiosity she pushed her way past the trip wire and into the tent of a man asleep. *"She never really had any kind of aggressive behaviour"* says Strøm, whilst Roberts asserts that *"he didn't know which bear it was ... if he had run up and given the bear a hug, the bear would have played with him, that was the type of bear it was"*¹⁰⁵⁵. Awoken by Lucky, and she surprised by him, the man sustained scratches to the chest and forearms, and another member of his camp shot Lucky in the leg¹⁰⁵⁶. She fled into the water. *"I think if she was hunting it would have been a different story"* explains Mangersnes, *"but I can understand you get a bit stressed when you wake up with a polar bear on your chest"*¹⁰⁵⁷. Later that day, the Sysselmannen's office tracked down Lucky and euthanized her because of her injuries, and the body was taken back to Longyearbyen for a necropsy¹⁰⁵⁸. The news had already reached Roberts and Strøm that Misha's second cub was dead, and soon it reached Mangersnes too, who was in Stavanger in the South of Norway¹⁰⁵⁹. He released one final photograph – 'The ghost of a polar bear'. Lucky's body was sent to a taxidermist, and in April 2016, a stuffed polar bear was unveiled by the Norwegian Prime Minister in the lobby of the Department of Defence. Re-named once more as 'Nina', there she remains. Roberts' reflection on her death now seems even more resonant: *"they don't really know the bigger picture, they don't understand where that bear comes from, what it's history is"*¹⁰⁶⁰.

¹⁰⁵⁴ *ibid*

¹⁰⁵⁵ Strøm, O. (04/09/2017) *Research Interview*, Kulturhuset Café, Longyearbyen; Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰⁵⁶ *ibid*

¹⁰⁵⁷ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹⁰⁵⁸ Roberts, J. (15/10/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹⁰⁵⁹ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹⁰⁶⁰ Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Longyearbyen.

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Fig.39 (Clockwise from top L) Lucky's death in 2015 (Source: Svalbard Governor), and her dead body at the docks (Source: Svalbard Governor) and 'Nina' the polar bear at the Oslo Ministry of Defence, 2016 (Source: Norwegian Ministry of Foreign Affairs @PMofficeNorway)

4.7 Conclusions

This chapter has continued to explore the lives of this Svalbard polar bear, her cubs from 2012/13 Lucky and Light, as well as her cubs from 2017/18, and how they have been told/known through the work of filmmakers and photographers working in Svalbard and the productions that they have distributed. In doing so, I emphasised the numerous ‘roles’ that she has played, and how these notions of polar beariness present a particular imagination of the future. Photography and film are contemporarily deeply influential mechanisms whereby we (as engaged general publics) explore (and are granted some form of access to) the lifeworlds of animals. However, they are also often unproblematised forms of production, whereby these ‘ideas of bear’ are produced, enacted, and circulated through invisible technologies and technicians, reinforcing existing cultural tropes about nonhuman lives and nonhuman families. These polar bears of the spectacle are important for the narratives that underpin their protection – what are we really conserving, and why?

Misha is an extraordinary bear, probably the most ubiquitous polar bear in the world – filmed and viewed by more people than any other wild bear (to account for the exception of Knut and other captive ‘animal superstars’). However, she is perhaps not the best-recognised, a result of her recession into other characters and the use of her footage to tell stories about composite generalised ‘polar bears’ on tv documentaries. As Asgeir Helgestad’s ‘Frost’, she tells the story of an individuated Svalbard bear in a melting Arctic landscape at the forefront of the climate emergency. On the BBC, ITV, National Geographic, and Netflix, she reinforces various anthropomorphic representations as a vulnerable, loving, and excellent mother attempting to bring up her cubs in the changing north. She is a symbol of the wild and the pristine, and a guarantor, not only of her entire species, but for the entire Arctic ecosystem. Through our encounters with her, we intuit themes associated more broadly with polar bears – climate change and ice melt – whilst at the same time recognise a little of ourselves in their overtly anthropomorphic gestures.

Here we find contrasting epistemological traditions and technologies from the scientists at NPI that know this bear as N23992. Each group is engaged in biographing this animal, telling the life of a polar bear as either: a purified data-bear, a live-updating geo-fixed monitoring cyborg, an emotive familial spectacle, a wilderness icon, or a generalised climatic analogy. Notably, some of these ideas conflict – incommensurable stories told about the same creature. At the same time, Misha exhibits remarkable novel ecologies and ethologies – a polar bear that lives at the intersection of these different worldings – whose home range is a product of multispecies interactions, turn-of-the-century trappers, 1970s international legislation, and inter-generational non-human learning. She is a bear that not only embodies these numerous different roles, but has been deeply affected by their telling. She is

physiologically altered by capture, tagging, and collaring; Light's death resulted from a drug complication; the atmospheres exerted by film cameras and their presence have influenced where she hunts, how she hunts, and habituated her towards humans; Lucky's killing resulted from her confidence and curiosity around people. Are, therefore, the imaginations of Misha as produced by film and photography fundamentally flawed – speculative fabrications of a non-existent polar bear whose non-existence continually recedes as she becomes more amenable to being 'captured' for the digital world that she inhabits? Through the litany of imagery that shows her, Misha is a bear whose life is burdened with the imagination of her decline, an ode to her species' prospective disappearance through a collection of eulogistic scenes that highlight what we stand to lose.

Chapter 5: Caring for Captive Polar Bears: Power, (Re)Production, and Performance

5.1 Introductions

Introduction I – Two Trains and a Bus to the Bears in South Yorkshire

October 26th, 2017. The number 58c bus to Branton is a relatively straightforward journey, weaving its way out of the city centre, past the Harworth Comrades of the Great War Social Club, past the empty racecourse grandstands, and then ducking into the backstreets of suburban South Yorkshire. In the early morning the upper deck is packed with shouting kids throwing pens and cursing, whilst disgruntled pensioners cradle their shopping bags below. In the seats in front of me a teenager pulls out a cigarette lighter and starts melting a hole in the plastic handle between illegible Tipp-Exed graffiti. Most of these passengers are deposited in crowds outside school gates, or gingerly disembark at the public library, until the near-empty bus crosses over the M18 and out of Doncaster. I press the stop button just before the Branton post office, as instructed by the driver, and step off onto a quiet village road. About a hundred yards further on is a right turning onto a small lane, ‘*No Through Road*’ signs flanking the way, and a smaller sign underneath: ‘*Yorkshire Wildlife Park, pedestrian access only*’. Another hundred meters down the lane, after a row of bungalows with dog muzzles barking through metal gateposts, it narrows further, tarmac turning dusty. The hedgerows are overgrown hawthorn laced with brambles, seemingly propped up by the skeletons of summer cow parsley and ash saplings. They hide fields of horses and the stables to the right, smelling strongly of straw and manure. A pair of chaffinches startles from the right and bob down the road ahead. In the distance a lion bellows.

Arriving at the wildlife park I take a shortcut path to the left, around the edge of the gift shop and towards the central courtyard of the old farm buildings that now house the information centre, ticket offices, shops, and cafés. As I pass the automatic door the sensor triggers, sliding open to reveal a wall of plush polar bear toys, lined up in perfect rows along well-curated shelves.

After picking up my visitor’s badge, the information centre radios the ‘carnivore team leader’ to come and meet me, and I follow her through the entrance turnstiles and right through a locked gate to the offices, sheds, and storerooms in a row of portakabins behind the lions’ housing area. One of these rooms is a small square edged by metal surface-tops, stacked with tools, medicines, tapes, closed boxes, and vinyl gloves. The wall is plastered with charts and boards with different animals’ diets and keeper reminders. “Feline Body Condition Guidelines” identifies a visual key for assessing big-cats from “very-thin” to “obese”, provided by the Felid Taxon Advisory Group (TAG). Above that is a table of “Meerkat and Mongoose Diet”. Dominating the wall are two whiteboards with hand-written records of each large carnivore by name, and a daily update of meat in kg. Inset is another table of “POLARS”, a week of meat

values for the bears (from 25kg – 45kg), with 1 box of fish on Monday and Tuesday, and 8 trout on Friday. To the right, fixed by a magnet to the wall in the corner, is a photograph of two polar bear cubs playing together.



Fig.40 Meat and diet charts for the polar bears and other large carnivores at YWP, (H. Anderson-Elliott, 2017)

Outside, she opens the slide-bolt to a nearby shipping container and I'm immediately hit by the pungent waft of rotting flesh. She grabs two chunks from a plastic tub immediately inside the door and places them at the base of a bucket she has been carrying. "Horse today". The bears will eat a whole range of different meats that are donated from farms and stables or purchased by the park – mainly horses and cows (never called beef). However, they turn their nose up at sheep – an uneaten carcass once floated up from the bottom of the lake a few days later after it was used as a swimming toy. "We had to get it out, that was pretty horrible, but food for the carp". The keepers try to 'naturalize' this diet with a seasonal variation in quantities corresponding to the changes in the bears' appetites, as well as adding a high-Magnesium supplement developed in Minnesota. With the bucket loaded we begin walking up through the rest of the park, past a sunken enclosure where a troupe of Gelada baboons are huddled inside a wooden enclave, and skirting the African Hunting Dogs. Down the centre of their paddock is a zip-wire that they sometimes use to attach a ribcage so that the dogs can chase after it in a simulated mock-hunt. After weaving along a woodland path, we come out onto a wider walkway flanked by young pine trees in front of an enormous stretch of fence. Overhead is a big sign: "Project Polar". As the path ascends, the whole of the 10-acre enclosure comes into view.

This huge area is divided into three large paddocks each surrounding deep man-made lakes. The first two are adjacent, split by the visitor pathway that runs down the centre on a raised bank, and the third is further down on the right like an extension to the second. At their intersection, the three paddocks are connected by enclosed bear-walkways that flow through a central housing block and underneath the visitor path, allowing the keepers to close off different sections with sluice gates and keep the bears apart if needed. The enclosures vary in topography and substrate; with raised grassy hills up to the level of the visitors, gravel banks, and three artificial cave shelters all facing the walkway. With some small exceptions, behind the banks or behind bits of undergrowth, the entirety of the area is visible from this height, a near-panopticon designed by the YWP Collections Manager to maximize the experience of bear-human encounter for both species that primarily inhabit it. As we walk further on, three gulls, a jackdaw, and a kestrel that were perched on the wooden posts take flight and ride the wind off and up to the left.



Fig.41 Looking backwards up the walkway. Paddock 3 is immediately on the left. Paddock 2 is the other side of the central fence beyond the water and before the woodland. The housing unit is the grey block on the right next to the smaller fenced holding area. Paddock 1 is beyond the housing unit, the other side of the path from paddock 2. (H. Anderson-Elliott, 2017)

As we approach, I spot the four bears one-by-one. I have seen bears in captivity once before, as well as in the wild now, but the experience is still arresting. Male polar bears in particular are enormous, comfortably standing at my shoulder height on all fours. Over to the right, Nissan is splashing in the lake in paddock 2, playing with a white plastic container that he drags underwater and jumps on as it pops to the surface. He gets out to pounce on it from an island in the middle, paddling the water with

his paw as it floats just out of reach, to the chuckles of three long-lensed amateur cameramen lining the fence. Pixel is lying strewn on top of a bank in paddock 1, he raises his head slightly and sniffs the air, curling up his lips and twisting his snout towards the walkway, eyes closed, as if to divine our arrival, or perhaps that of the bucket of horse meat. Victor, the largest and oldest bear with folds of skin hanging underneath his chin, walks along a well-worn bear-path that skirts the lakeshore in paddock 1 and off towards the housing unit. A minute later, two camera flashes behind a gate we have already passed in the corner of paddock 2 reveal Nobby. He is rolling in the wood chippings right by the fence, stained entirely brown. “Is that a brown bear or a young one?” asks a visitor as we pass. “Neither, he is just dirty” she responds.



Fig.42 Top L: Nissan paddles in paddock 2, Top R: Pixel sniffs at us in paddock 1, Bottom L: Victor treads the path along the water in paddock 1, Bottom R: Nobby rolls in the wood chippings in paddock 2, (Anderson-Elliott, 2017)

All four of the bears had arrived in Yorkshire over the past 6 years, with Victor the first being shipped over from Ouwehands zoo in Rhenen, Holland, in August 2014. He was the first polar bear back in England after collections were phased out through the 1990s. His older sister, Victoria, lives in the Highland Wildlife Park in Scotland (since 2015). Now 20 years old, he was born in Rostock Zoo, Germany, on December 18th 1998 to two parents originally from Amsterdam, before being moved to Ouwehands when he reached maturity in 2002. Whilst in Holland he was a stud of the EEP (European Endangered Species Programme) captive breeding programme, fathering ten cubs throughout the EAZA (European Association of Zoos and Aquariums) population of polar bears. His impact on the genetic pool of

European captive bears is recorded in the EAZA studbook, currently held in Amsterdam – which holds complete records of every individual, their genetic sequence, life history, medical history, and condition. Due to his high genetic input, he is now retired, a low-value ‘surplus’ bear to the EEP, who can no longer contribute to the diversity of the population. In March 2015, Victor was joined at YWP by Pixel, his grandson – born on November 16th 2012 to one of Victor’s sons from Ouwehands and a Canadian female from Quebec who had been introduced at Europa Park, Holland. Because of his lineage, Pixel is also ‘surplus’. Between October 2015 and June 2016, Victor and Pixel were joined by Nissan and then Nobby. These young bears were both born in 2013, at Izevsk Zoo, Russia, and Munich Zoo respectively. Nissan’s mother is suspected to be wild-caught from Wrangel Island, and he narrowly avoided a career in a Russian circus ¹⁰⁶¹.

YWP have not experienced any serious problems with keeping four males together, often seen as an unusual grouping, but the dynamic is certainly hierarchical. As Victor walks through the housing unit and under the walkway and into paddock 2, Nobby notices from the wood chips and starts to walk the opposite way around the lake to avoid him, staying close to the fence. “Victor can be a bit of bully, he likes to chase Nobby” ¹⁰⁶². Pixel rises from his mound and joins paddock 2 as well. Victor comes close to him. Despite being his grandfather, Victor has a strong attachment to Pixel, rather like how a male will trail and guard a female during the breeding season. To try and calm these stereotypes, he was fitted with a slow-release Suprelain implant (that had worked on leopards) to try and reduce his testosterone levels. Whilst he was under general anaesthetic for this procedure in 2016, the keepers were checking on his feet, which have developed a number of open abscesses between his toes. In Ouwehands he was primarily kept on concrete, frequently used to simulate ice in zoo enclosure displays, and it is hypothesized that the new exposure to a high level of allergens from the plants in the YWP paddocks causes a reaction ¹⁰⁶³.

¹⁰⁶¹ Data Provided by *Carnivore Team Leader*, (2018) Yorkshire Wildlife Park (YWP), Branton, Yorkshire.

¹⁰⁶² Anonymous Participant

¹⁰⁶³ Data Provided by *Carnivore Team Leader*, (2018) Yorkshire Wildlife Park (YWP), Branton, Yorkshire.



Fig.43 Nobby, in brown, runs around the top of the paddock 2 to escape Victor, whilst Nissan watches on from the water, (H. Anderson-Elliott, 2017)

Running along the edge of the inner fence, separating the walkway from the main fence to paddock two, there is a line of the kind of informational posters that are commonplace in zoo exhibits. “Meet Pixel” one exclaims. “Meet Victor” another, and at the bottom “Victor’s Guilty Pleasure... Peanut butter sandwiches! (a very occasional treat)”. “We have the same birthday!” shouts one visitor in palpable glee. Other posters outline general facts about polar bears, their size, diet, habitat, threats, and conservation status. “Save Our Sea Ice” is titled another; a plea seemingly direct from these bears, yet on behalf of polar bears everywhere. The facility is supported by Polar Bears International (PBI) who provide much of this information as well as a TV screen with a video on loop – explaining key issues in polar bear conservation and research, overlaid over footage of bears onshore in Canada during the summer. Further on near the exit, another larger placard explains the enclosures ‘re-creation’ of this same Canadian summer habitat, reassuring that it is perfectly ‘natural’ for the bears to experience comparable Yorkshire temperatures and ice-free periods. In one, a photograph of Victor is superimposed onto a Canadian landscape. As Pixel ambles slowly through into paddock 3, a lapwing takes laboured flight with strokes of its square wings and barrels over my head to the area of wetland beyond the park fence.

After a few more hours watching the bears I take a walk around the rest of the park, passing Amur tigers, Amur leopards, and two extremely vocal giant otters. Soon, I return to project polar in reverse on my way back towards the entrance and, eventually, to try and catch the 17:10 bus from the opposite

end of Brockholes Lane. Standing at the centre the walkway, Victor approaches me from the back of paddock 3, following a muddy path down the centre of the gravel. A kid to my right leans over the fence and starts shouting: “Victor! Victoor!”, beckoning. A keeper swiftly asks him not to: “Victor knows his name, and sometimes we need him to come when we call, so we don’t want him to think there isn’t a reward for coming”. He passes right underneath us, through the caged tunnels and out into paddock 1 to join Nissan and Pixel who are tucking into the chunks of horsemeat.



Fig.44 Victor along the gravel bear-paths leading through paddock 3 towards the housing unit, (H. Anderson-Elliott 2017)

As he circuits the water, the afternoon sun breaks from beneath a bank of clouds behind me and projects my shadow forwards, through the fence, and out across the copper-bathed rocks of the near shore. Without breaking stride, he walks right through me and off to the other side of the lake. But for a moment, we meet.



Fig.45 Victor over the other side of paddock 1, my shadow in the foreground, (H. Anderson-Elliott, 2017)

Introduction II: What am I doing here? – A *zoobiography* of conservation cares

At first glance, putting in work at YWP is a logical continuation of this thesis – another core setting for human/(wild)life encounter that fits the rubric of a site of representation. At the same time, zoo institutions are also frequently framed as nodes of ‘conservation’, where actions and motivations *now* align with global anxieties over the futures of the wild counterparts to their living collections. These captive ‘cousins’ are themselves presented as ‘species guarantors’ – both in the sense that they embody the notion of an encounter their whole species, as well as encapsulating the genetic potential for a living ‘ark’ whereby their capacity for reproduction holds the key for their species’ Earthly survival and possible re-introduction into ‘wilder’ ecologies. The first of these two versions also alludes to other preconceptions of the zoo environment that we carry with us in our visitations. They are places of empire mapped across capture, haunted by histories of domination and domestication. They are frequently critiqued for their antithesis to ‘wildness’, and the representative work that they cannot fulfil as stand-ins for said wild. Now, in returning to these places myself as the ethnographer, these varied and entangled histories must also be offset against my own personal affection for zoos, and I am forced to question what it is that I will find here beyond the nostalgia of visits to ZSL zoos with my father. For polar bears, it is widely held that zoos are not in fact sites of their conservation, incapable of addressing the primary cause of their anticipated decline (climate-induced habitat loss). What then can these spaces and their charges tell us? Instead, therefore, walking down the path from the Branton bus stop to YWP, I am reminded of a moment on top of Platåberget outside Longyearbyen where much of this investigation began. Here too is a comparable opportunity to individuate – to approach the biography

of polar bears, and explore their societies, histories, and ecologies. So too, it is an opportunity to situate these encounters in longer histories of entanglement – the sites and architectures of human/ more-than-human coexistence and their complex geographies and practices of care.

This chapter is guided by some central research questions, whilst also playing off the themes that have evolved throughout my previous empirical chapters: What is the significance, and political history, of captive bears? How do captive European polar bears trace paths back to Svalbard, and what can this tell us about the commodification of bear bodies? How do captive spaces and relations subvert some of the familial dynamics of our filmic enactments of ‘wild’ bear lives? How do captive institutions enact polar bears – and how do these practices highlight some of the tensions about authenticity and conservation outcomes?

This chapter follows the thinking of ‘zoobiography’ outlined in my methodology, in response to the use of that term by Matthew Chrulew¹⁰⁶⁴. In particular, I wanted to be attentive to the “*distinctive forms of knowledge, encounter and writing*” that these institutions enable, and their role in telling stories about animals, humans, and conservation¹⁰⁶⁵. Here, I trace my own attempts to get to know the four captive bears at the Yorkshire Wildlife Park, Victor, Pixel, Nissan, and Nobby. My exploration will outline the frictions and awkwardness of trying to ‘be with’ these bears: the spatial zoo-politics of enclosures and fences; shared languages and silent rifts; performative choreographies; and different narratives, spectacles, and imaginations. The discussions in this chapter pose the question of ‘*what are these bears?*’ as I try to better understand the tasks, economies, and reproductions involved in co-producing polar bears in captivity and ‘making them live’¹⁰⁶⁶. Through successive visits, days of observation, photographs, feedings, and even taking the ‘training behaviours’, I am interested in the numerous relationships and attachments that they develop. These are not only between the four bears, but visitor-bear, keeper-bear, between them and other captive individuals in Europe, between them and their wild ‘cousins’, as well as what ‘relationship’ I am able to have with them. These are again questions of knowledge and individuation – how polar bears in captivity are made to matter within these sites and societies, and what that can tell us about our enfolded multi-species cares and concerns.

Whilst they have remained in their 10-acre enclosure just south of the B1396 for the entire 3 years since I first met them, in tracking the significance of their lives they have led me to Vienna for the inaugural captive Polar Bear Conservation Science meeting at Tiergarten Schönbrunn, into breeding

¹⁰⁶⁴ Chrulew (2018)

¹⁰⁶⁵ Ibid p.39

¹⁰⁶⁶ Krebber & Roscher (2018)

histories and ZIMS reports, and into meetings with other bears. These include *Siku* in Denmark, *Knut* in Berlin and in Yoko Tawada's *Memoirs of a Polar Bear*¹⁰⁶⁷, *Agee* from the U.S., *Victoria* in Scotland, and even trace a path back to *Misha* and her cubs.

Through the lives of these bears, and those of other humans and non-humans that they draw into their networks, I am able to explore a huge variety of new themes, all of which are equally integral to how 'polar bears' (and their 'conservation') are understood, performed, imagined, and valued. These bears maintain their politicized importance, but through subtly different institutional landscapes than outlined in chapter 3. They are 'ambassadors' for national and international interests, citizens of both the UK and of the Arctic with numerous European affiliations and lineages. They too cross borders and carry with them promises of Arctic access and climate awareness. Much of this diplomatic currency is embodied in their corporeality. Like the Svalbard bear at the heart of the rest of this thesis, their physical wellbeing, toxicology, physiology and reproductive capacity tell stories of Arctic health, loss, as well as conservation hope. I am interested in the male mothers and novel families, ecologies, and enclosures that constitute captive bear lives. The new attachments, kinships, and circulations that emerge force us to re-imagine what it means to be a polar bear and what it is to be human. Bound up in these modes of thinking about the novel nature-cultures of the Yorkshire bears is an attentiveness to the wild/domestic dualism: varied perceptions and productions of spectacle¹⁰⁶⁸, whiteness, and naturalness that authorize different ideas of bears and (un)desirable conservation futures. So too, the work done by the institutions of the EAZA and EEP, and outlined in Vienna, asks further questions about the relevance of these individuals for the scientific 'ways of knowing' polar bears in the wild that were addressed in chapter 3. This evolving programme of research rests primarily on trained behaviours that the bears 'voluntarily participate' in, presenting their paws, jaws, rumps, and various other bodily positions on command to the gesture of their keeper. Finally, my own performance of these behaviours with Victor opens up new questions about the choreographies of conservation, and the different modes of human-polar bear interaction and agency that constitute them.

¹⁰⁶⁷ Tawada, Y. (2017) *Memoirs of a Polar Bear*, London: Portobello Books.

Yoko Tawada's 2017 novel has been deeply formative for my writing in this thesis. Her work reoccurs throughout this chapter. *Memoirs of a Polar Bear* is a bold and experimental work that traces the lives of three related polar bears (grandmother, mother, son) in captivity in the USSR, East Germany, and 21st century Berlin. Tawada's writing is autobiographical from the perspectives of these bears, playing with biographical form, as well as themes around authorship, voice, agency, and translation that are also central concerns of this thesis.

¹⁰⁶⁸ Iggoe (2010)



Fig.46 Me reflected in the eye of Nissan the bear (H. Anderson-Elliott, 2018)

5.2 Diplomatic Polar Bears: Captive Politics and Economies

In this section I will outline some of the earliest origins of captive polar bears in Europe. At the same time, this is a discussion of how captive bears attain and embody different sorts of value. I will trace the emergence of bears as diplomatic creatures, deployed to exert different forms of (soft) political power ¹⁰⁶⁹, whilst at the same time briefly exploring how these diplomatic economies led to a more popular commodification of bears and bear bodies ¹⁰⁷⁰. These themes are an important precursor (and counterpoint) to contextualizing the contemporary roles and narratives held/told by the YWP bears. It also provokes consideration of the histories, architectures, and expressions of power embodied by zoo spaces, as well as my later discussions of their re-framing as institutions of ‘husbandry’, climate change awareness, conservation, and ‘voluntary’ research.

5.2.1 Polar Bears as Gift Exchange in the Middle Ages

In his 2017 publication, *Ice Bear: The Cultural History of an Arctic Icon*, Michael Engelhard “traces and illuminates [the] intertwined history” of humans and polar bears, exploring modes of human storytelling and how they matter ¹⁰⁷¹. In his chapter on *The Bear as Early Commodity*, he proceeds to outline a progression of examples where polar bears were gifted internationally to “grease diplomatic gears and careers” ¹⁰⁷². This acknowledgement follows T. J. Oleson’s 1950 Article on *Polar Bears in the Middle Ages*, that explained how polar bears were “prized out of all proportion to their intrinsic value”, resulting in “very considerable value as diplomatic instruments” ¹⁰⁷³. “It is not generally known how eagerly the princes of Europe desired to possess polar bears, nor that the Icelanders and their compatriots in Greenland trapped these animals and by presenting them to kings gained royal favour” ¹⁰⁷⁴. This represents another ‘bear politics’ – comparable to the tropes and narratives embodied by bear lives/deaths in the climatic contemporary contexts of my previous chapters – a more-than-human mode of international diplomacy.

In 1056, a white bear captured in Greenland was presented to Henry III, Emperor of Germany, by Ísleifur Gissurarson the first Bishop of Iceland after the adoption of Christianity in 1000 AD, in

¹⁰⁶⁹ Anderlini, J. (2017) ‘How the Panda became China’s diplomatic weapon of choice’, *The FT*, Online, Available at: [<https://www.ft.com/content/8a04a532-be92-11e7-9836-b25f8adaa111>] Accessed: 17/04/20.

¹⁰⁷⁰ Bieder (2005); Brunner (2007)

¹⁰⁷¹ Engelhard, M. (2017) *Ice Bear: The Cultural History of an Arctic Icon*, London: University of Washington Press.

¹⁰⁷² *ibid* p.38

¹⁰⁷³ Oleson, T. J. (1950) ‘Polar Bears in the Middle Ages’, *The Canadian Historic Review*, **31**(1), 47-55.

¹⁰⁷⁴ *Ibid* p.47

acknowledgement of his German education and appointment by the archbishop of Bremen ¹⁰⁷⁵. It was “the most costly and remarkable present possible”, and Engelhard attests that “any bear different enough to be considered a worthy gift for a king was probably a polar bear” ¹⁰⁷⁶. Other early Greenlandic bears were also offered to facilitate Scandinavian ecclesiastical appointments. “Einar, the envoy of Greenland, gave a white bear to King Sigurd of Norway” in return for his help in the selection of a bishop to Greenland ¹⁰⁷⁷.

The practice of gifting bears had also reached England by the 13th century. In 1251, King Henry III was presented a “pale” bear by King Haakon Haakonsson (IV) of Norway that was kept in the royal menagerie established by John I in the Tower of London ¹⁰⁷⁸. This polar bear, and others to follow, were enjoyed as a prestigious status symbol of English monarchs. In a royal decree the following year, 1252, the sheriffs of London were asked to pay the sum of four pence per day for its care, “to provide a chain and muzzle to hold the said bear while [it was] fishing or washing himself, in the river Thames” ¹⁰⁷⁹, demonstrative of Henry’s “special interest” in this creature ¹⁰⁸⁰. Thirty-Five years later, the Tower’s records show “payment for the transport of [another] white bear”, likely a replacement for the first ¹⁰⁸¹. “Lynn” was supposedly named after Lyngen Fjord near Tromsø from where she was shipped, and points towards her capture further north ¹⁰⁸². Engelhard suggests that she might have been captured in Svalbard, but with no European mention of Spitsbergen until William Barentsz in 1596, it is unlikely she was encountered there, but many well have been born there. Some 300 years later, crowds in Spitalfields, London, were enthralled by a cart in Queen Elizabeth I’s parade that carried two polar bears ¹⁰⁸³.

¹⁰⁷⁵ Engelhard (2017) p.38; Fischer, J. (1903) *The discoveries of the Norsemen in America with special relation to their early cartographical representation*, St. Louis B. Herder, 102-104.

¹⁰⁷⁶ Engelhard (2017) p.38/39

¹⁰⁷⁷ Engelhard (2017) p.38; Fischer (1903)

¹⁰⁷⁸ Engelhard (2017) p.38/39; Perry Ponders Blog (2015) ‘The Tower of London was Home to a Polar Bear’, Online, Available at: [www.perryponders.com/2015/03/23/tower-of-london-was-home-polar-bear/] Accessed: 17/04/20; Bennett, E. T. (1829) *The tower menagerie: comprising the natural history of the animals contained in that establishment; with anecdotes of their characters and history*, Chiswick: Charles Whittingham.

¹⁰⁷⁹ Engelhard (2017) p.39

¹⁰⁸⁰ *ibid*

¹⁰⁸¹ *Ibid* p.39/40; Bennett (1829); Thomas, P. D. (1996) ‘The Tower of London’s Royal Menagerie’, *History Today*, 30.

¹⁰⁸² Engelhard (2017)

¹⁰⁸³ Engelhard (2017) p.40; Davey, R. & Jay, T. S. (1895) *Furs and Fur Garments*, London: International Fur Store, 49.

The role of polar bears in the gift economies of medieval Europe was one of ‘soft (perhaps even shaggy¹⁰⁸⁴) power’ – gestures from the periphery to the colonial, monarchical, and ecclesiastical heartlands¹⁰⁸⁵. They carried with them a curiosity for, and valuation of, ‘the exotic’, as well as denominations of power and domination, from hinterland to colonizer. The bear itself – its body, strength, whiteness, and beastliness – are all significant for these captive economies and political ecologies¹⁰⁸⁶. These gestures were also transferred and translated to subsequent institutions of captivity and display. After a number of serious and fatal incidents in the Tower, many of which involved the removal of limbs from members of the public at the hands of a lion or a display of ‘dining apes’, in 1831-1832 the entire royal menagerie was moved to a newly opened facility in Regent’s Park – London Zoo¹⁰⁸⁷. In lieu with parallel European institutions, such as the Vienna Tiergarten Schönbrunn (1752) and later Berlin Zoological Garden (1844), the role of the metropolitan captive animal space was one of empire – mapped across the architectures of Georgian/Victorian animal enclosures and the ecologies of their captives. The contemporary practices of care in these same enclosures must therefore be considered with respect to the legacy of these political significances – bears that are both more-than and less-than bears.

5.2.2 Panda Diplomacy and More-than-human Politics

“I changed the channel and found myself looking at two panda bears. Two politicians stood outside their cages shaking hands. I found these panda bears meddling in human politics improper. But then I occurred to me that I, too, was involved in politics, so in that sense I was no better than these pandas”

– Tawada, Y. (2017) p.59

There is much that my work with captive polar bears can learn from an exploration of the roles of pandas in 20th and 21st century international diplomacy. As Tawada’s polar bear protagonist (the grandmother of Berlin zoo’s *Knut*) alludes to above, the prevalence of panda bears in forms of human politics and discourse is a widely-held trope, discussed at length in literature, political commentary, and geography alike¹⁰⁸⁸. It draws upon the aforementioned histories of international animal gift exchange,

¹⁰⁸⁴ Savours (1964); Jørgensen, D. (2020) *The Shaggy Saviour of Northern Norway*, Online Seminar, The Arctic Environmental Humanities Workshop Series, Frederick S. Pardee Center for the Study of the Longer-Range Future & Scott Polar Research Institute, 1st Sept. 2020.

¹⁰⁸⁵ BBC Civilisations (2018) ‘*Fantastic Beasts: Lavish animal gifts throughout history*’, Online: at: [<https://www.bbc.co.uk/programmes/articles/3GS6rgDSLqsSX4bmhrbJKnN/fantastic-beasts-lavish-animal-gifts-throughout-history>] Accessed: 21/09/20.

¹⁰⁸⁶ Bieder (2005)

¹⁰⁸⁷ *Perry Ponders Blog* (2015)

¹⁰⁸⁸ McGeown, K. (2005) ‘China’s Panda Ambassadors’ *BBC News*, Online, Available at: [<http://news.bbc.co.uk/1/hi/world/asia-pacific/4508873.stm>] Accessed: 18/04/20; Hartig, F. (2013) Panda diplomacy: The cutest part of China’s public diplomacy, *The Hague Journal of Diplomacy*, 8(1), pp.49-78; Barua,

whilst at the same time re-framing the affective roles of nonhuman behaviour in the gesturings of state power, sovereignty, and global concerns. Here, I will briefly demonstrate how pandas can help us think differently, not only about individuation in captive spaces, but also about spectacle, charisma, and the choreographies of conservation. With an appreciation of my biographical lens, captive pandas can elucidate the labours of care and its political reciprocities.

In February 1972, during his landmark visit to China, President Nixon was told by Chairman Mao that two pandas would be gifted to the United States as a “*high-profile symbol of diplomatic rapprochement*”¹⁰⁸⁹. Ling-Ling and Hsing-Hsing arrived in the U.S. in April of that year, welcomed by the First Lady: “*On behalf of the people of the United States, I am pleased to be here and accept the precious gift of the panda – pandas*”¹⁰⁹⁰. President Nixon decided that these “*furry ambassadors*”¹⁰⁹¹ should be taken to Washington’s National Zoo “*under security measures as tight as if they had been Chairman Mao [himself]*”¹⁰⁹². Whilst not the first, Ling-Ling and Hsing-Hsing were the highest-profile individuals in China’s fledgling “Panda Diplomacy”¹⁰⁹³. Between 1958 and 1982, China gifted a total of 23 pandas to 9 recipient nations¹⁰⁹⁴ – both the key cultural icon of China and the perfect cute, cuddly symbol of friendship, peace, and goodwill¹⁰⁹⁵. These pandas and their physiology, therefore, carry with them the health of US-Chinese international relations – foreign dignitaries with immense political and financial capital. 1.1m visitors came to view Ling-Ling and Hsing-Hsing in the first year after their posting, and after their deaths in 1992 and 1999, private Washington donors raised \$18m for the privilege of receiving their successors in 2000¹⁰⁹⁶.

M. (2019) Affective economies, pandas, and the atmospheric politics of lively capital, *Transactions of the Institute of British Geographers*, DOI: 10.1111/tran.12361.

¹⁰⁸⁹ Burns, R. (2016) ‘When Ling-Ling and Hsing Hsing arrived in the U.S.’ *The New York Times*, Online, Available at: [<https://www.nytimes.com/2016/02/07/nyregion/the-pandas-richard-nixon-obtained-for-the-us.html>] Accessed: 18/04/20.

¹⁰⁹⁰ *ibid*

¹⁰⁹¹ McGeown, K. (2005)

¹⁰⁹² Burns (2016)

¹⁰⁹³ Hartig (2013); Burns (2016); McGeown (2005)

¹⁰⁹⁴ Magnier, M. (2006) ‘Attack of the Pandas’, *LA Times*, March 21st, 2006.

¹⁰⁹⁵ McGeown (2005)

¹⁰⁹⁶ *ibid*



Fig.47 Mao Zedong and Richard Nixon, China, 1972 (White House Press, Wikimedia Creative Commons), Ling-Ling and Hsing-Hsing in Washington's National Zoo (J. Cohen, 1985, *Fair Use* from Wikipedia)

Pandas, however, also speak to more covert demonstrations of Chinese political will. In 2005, Beijing announced that it would be gifting two giant pandas to Taiwan, after a visit from the Taiwanese opposition leader Lien Chan ¹⁰⁹⁷. This was “*a way for Beijing to say it cares about the people of Taiwan, and at the same time remind them that they are also Chinese*” ¹⁰⁹⁸. Most significant, however, was the parallel assessment provided by CITES and the UN who judged that Taiwan was a province of China and therefore required no documentation for “*internal or domestic trade*” ¹⁰⁹⁹. Bears propagating across borders again has semiotic significance. Tuan-Tuan and Yuan-Yuan, after the Mandarin *tuányuán* for *reunion*, were initially rejected by the independence-supporting DPP-led government of the ROC (as a move to distance from the PRC) under the pretence that captive Pandas would be sad ¹¹⁰⁰, before being accepted in 2008 after a change of government ¹¹⁰¹.

Even more important from the position of this work is the capacity for these political and diplomatic concerns to be embodied by the individuated characters, physiologies, and behaviours of the pandas themselves. Whilst they “*are unlikely to be aware of the political fanfare ... pawns in a political game... merely swapping one zoo for another*” ¹¹⁰², the bears carry with them expectations to participate in the (re)productive and charismatic economies of this zoocentric mode of international relations. Ming-Ming, a female sent to London Zoo to mate with male Bao-Bao (loaned to London for two years

¹⁰⁹⁷ *ibid*

¹⁰⁹⁸ *ibid*

¹⁰⁹⁹ *Taipei Times* (2008) ‘Panda Diplomacy: CITES secretary says panda transport need not be reported’, Online: Available at: [<https://www.taipeitimes.com/News/taiwan/archives/2008/12/24/2003431927>] Accessed 18/04/20.

¹¹⁰⁰ Spencer, R. (2006) ‘We’re not wild about your pandas, China told’, *The Telegraph*, Online: Available at: [<https://www.telegraph.co.uk/news/worldnews/asia/taiwan/1513878/Were-not-wild-about-your-pandas-China-told.html>] Accessed: 18/04/20.

¹¹⁰¹ *Taiwan News* (2008) ‘SEF rejects CITES’ interpretation of ‘domestic transfer’ of pandas’ December 24th, 2008, Online, Available at: [<https://www.taiwannews.com.tw/en/news/821012>] Accessed: 18/04/20.

¹¹⁰² McGeown (2005)

between 1991 and 1993), was recalled to China after the two fought – resulting in no cubs and a variety of injuries and surgeries ¹¹⁰³. “*Some pandas*” reflected a BBC news reports “*proved less diplomatic than their donors had originally intended*” ¹¹⁰⁴. Here, we see the centrality of cub breeding to the game of panda bear political posturing. This aim is twofold – a performative reflection on the reproductive economies of ex-situ conservation work where captive breeding is the cornerstone of panda survival ¹¹⁰⁵, as well as another mode of production of this financially lucrative form of lively capital ¹¹⁰⁶. Whilst these themes are easily elucidated, there is greater complexity here. With an ethnographic engagement with these captive spaces, their actants, husbandry tasks, and kinships, it is possible to explore how these global anxieties are coded within the complex and unusual practices of care and attachment that these institutions facilitate.

No more so is this made evident than with the life of Chi-Chi, “*England’s best loved zoo animal*” ¹¹⁰⁷, who died at London zoo on July 22nd, 1972. Before arriving in Regent’s Park in September 1958, Chi-Chi had already undertaken stints at Moscow Zoo (at the bequest of Kliment Voroshilov, Marshal of the Soviet Union), East Berlin, Frankfurt, and Copenhagen ¹¹⁰⁸, as well as being rejected by U.S. customs due to a trade embargo on Chinese goods ¹¹⁰⁹. In 1964, her unsuccessful breeding trip to Moscow caused a brief diplomatic incident “*exacerbating the Sion-Soviet dispute*” ¹¹¹⁰, and her death led Prime Minister Edward Heath to China in search (in part) of her replacements, the first of 26 visits he would make during his lifetime ¹¹¹¹. Chi-Chi was then immortalized, both as a taxidermic display in the London Museum of Natural History and as the WWF logo (an adaptation of a drawing by Sir Peter Scott) ¹¹¹², further entrenching the role of panda lives at the heart of conservation imaginations. However, despite

¹¹⁰³ Ibid; *BBC News* (2012) ‘Male Giant Panda, Bao Bao, dies at Berlin Zoo’, Online, Available at: [https://www.bbc.co.uk/news/world-asia-pacific-19346997] Accessed: 18/04/20; Schoon, N. (1993) ‘London’s giant pandas play the mating game: Neither is in the first flush of youth and when introduced, Bao Bao have Ming Ming a mauling’, *The Independent*, Online, Available at: [https://www.independent.co.uk/news/uk/londons-giant-pandas-play-the-mating-game-neither-is-in-the-first-flush-of-youth-and-when-introduced-1473085.html] Accessed: 18/04/20.

¹¹⁰⁴ McGeown (2005)

¹¹⁰⁵ Pandas International (2020) ‘*Captive Breeding Program*’, [Online] available at: [https://www.pandasinternational.org/program-areas-2/captive-breeding-program/] Accessed 22/09/20; *China Highlights* (2020) ‘Giant Panda Captive Breeding’, Online, Available at: [https://www.chinahighlights.com/giant-panda/breeding.html] Accessed 18/04/20.

¹¹⁰⁶ Barua (2019)

¹¹⁰⁷ *Wikipedia* (2020) ‘Chi Chi (giant panda)’, Online, Available at: [https://en.wikipedia.org/wiki/Chi_Chi_(giant_panda)#cite_note-goodzoos-2] Accessed: 18/04/20.

¹¹⁰⁸ Ibid; Morris, R. & Morris, D. (1984) *The Giant Panda*, London: Peter Smith Publisher Ltd.

¹¹⁰⁹ Chinoy, M. (1975) ‘Everything you always wanted to know about Pandas’, *New China*, 1(1), 16.

¹¹¹⁰ McGeown (2005)

¹¹¹¹ *China Daily* (2005) ‘Edward Heath, old friend of China, dies at 89’, Online, Available at: [http://www.chinadaily.com.cn/english/doc/2005-07/19/content_461306.htm] Accessed: 18/04/20.

¹¹¹² *Wikipedia* (2020); Barua (2019)

her immense public popularity, she had failed to breed – a fact which is attributed to her sexually imprinting on her human keepers who had maintained a high-intensity of interaction throughout her life ¹¹¹³. The complex crossweaves of affection and more-than-human care produced new affective atmospheres, responsible for altering Chi-Chi's participation in both inter-panda and international relations, and demonstrates once again the rich entanglements and political ecologies of captive bear lives.



Fig.48 Chi-Chi at Regent's Park Zoo, London (Copyright: Christine Matthews, 1967, Creative Commons License)

5.2.3 Tracking Polar Bear Skins: Captivity and Commodity

Returning to the cultures of European royal gift exchange, whilst live polar bears were undoubtedly prized as status symbols of inordinate value, there also endured a widespread trade in hunted bear pelts ¹¹¹⁴. In the 16th century, Queen Mary I's court was presented with a 'dazzling' polar bear skin (by either the explorer Sebastian Cabot or the Duke of Muscovy) ¹¹¹⁵, and such furs were also favoured by Scandinavian bishops to keep their feet warm in church ¹¹¹⁶. Bear skins are vibrant, perhaps vital, matter ¹¹¹⁷. Although a product of death, mythologies about bear spirits and strength clinging to their skins

¹¹¹³ Nicholls, H. (2010) *The Way of the Panda: the curious history of China's political animal*, Profile Books, London.

¹¹¹⁴ Engelhard (2017)

¹¹¹⁵ Engelhard (2017) p.40

¹¹¹⁶ Bieder (2005); Engelhard (2017)

¹¹¹⁷ Bennett, J. (2010) *Vibrant Matter: A political ecology of things*, Duke University Press, NC; Khan, G. A. (2012) Vital Materiality and Non-Human Agency: An Interview with Jane Bennett. In: Browning G., Prokhovnik R., Dimova-Cookson M. (eds) *Dialogues with Contemporary Political Theorists*. International Political Theory series. Palgrave Macmillan, London. https://doi.org/10.1057/9781137271297_3.

occur across European, American, and Arctic cultures alike ¹¹¹⁸, and much has been written about the taxidermic re-animation of animal matter ¹¹¹⁹. After Dolly Jørgensen's incorporation of discussions of the properties of musk ox wool and the history of northern economies surrounding the species' domestication, I will consider the challenging materiality offered by polar bear fur and what it can teach us ¹¹²⁰. By tracing their different histories, bear skins can lead us into new assemblages and understandings – telling us about the violent pasts of contemporary captive communities; the spectacle of bear 'whiteness'; and a re-ignition of international political disputes, their border and boundaries.

During my first trip to Svalbard in 2017 I visited a shop called Skinnboden Arctic Products. Through piles of sealskins, fur-lined jackets, and fox-pelt scarves, on the back wall between two black bears, a grizzly, and three wolves, are two polar bear skins adorned with taxidermy heads. *"A magnificent polar bear skin is both a wise investment and a treasure for the home"* claims their website – '\$12,000' ¹¹²¹. With hunting outlawed in Svalbard since 1972, and all bodies of killed bears the property of the governor, these bears have been shipped from Canada where hunting is more widespread. On the same day, I met again with Jason Roberts. Half-way through our interview he received a phone call from an Oslo number and briefly exchanged heated words in Norwegian. He hung up and swore at the phone in his hand. *"That call there was unbelievable, I don't know if you could hear my voice change, I was f**king furious"* ¹¹²². The caller was working for a private Chinese customer trying to source 300 polar bear skins for an order, nearly *"a third of the whole Arctic quota"* ¹¹²³. *"I've never had a call like that before"*, he continues, *"if Norway said no, ... we do not allow import or export of polar bears into Norway, it doesn't matter if Canada or Greenland hunts, it stops one market, but Norway is not willing to do that"* ¹¹²⁴. Polar bears move across borders even after death, and these migrations are deeply politicized in different ways to those of their living relatives. *"All international trade in polar bear parts is surveyed and regulated by CITES"* which lists them on Appendix II ¹¹²⁵. In both 2010 and 2013, the CITES CoP

¹¹¹⁸ Bieder (2005); Engelhard (2017)

¹¹¹⁹ Brice, J. (2014) Killing in more-than-human-spaces: Pasteurisation, Fungi, and the Metabolic Lives of Wine, *Environmental Humanities*, 4(1), 171-194; McHugh, S. (2018) 'Taxidermy's Literary Biographies,' Chapter 8, in Krebber & Roscher (2018) p.173; Skabelund, A. (2018) 'A Dog's Life: the Challenges and Possibilities of Animal Biography', chapter 5, in Krebber & Roscher (2018) p.107; Snæbjörnsdóttir & Wilson (2006).

¹¹²⁰ Jørgensen, D. (2020)

¹¹²¹ Visit Svalbard (2020) 'Skinboden Arctic Products', Online, Available at: [<https://en.visitsvalbard.com/things-to-do/shopping/skinboden-arctic-products-p3501003>] Accessed: 18/04/20.

¹¹²² Roberts, J. (29/08/2017) *Research Interview*, Kulturhuset Café, Tromsø.

¹¹²³ ibid

¹¹²⁴ ibid

¹¹²⁵ Wiig, Ø. et. al. (2015); Scanlon, J. E. (2013) 'CITES and Polar Bear' *Keynote Address*, International Forum on Conservation of Polar Bears and Jubilee Meeting of the Parties to the 1973 Agreement on the Conservation of Polar Bears, Moscow, Russian Federation, 4-6th December, Online, Available at: [https://cites.org/eng/news/sg/2013/20131204_polar-bear.php] Accessed 18/04/20.

decided on proposals to upgrade the polar bear onto Appendix I, and on both occasions decreed that the criteria for inclusions were not met ¹¹²⁶. As such, the polar bear remains on Appendix II with international trade continuing under state authorization ¹¹²⁷. I was told by one of my participants that Norway had previously pushed to end the trade in skins from Canada at a PBSG meeting, but that after a closed session towards the end of the day the decision was reversed ¹¹²⁸. 21st century skins remain a lucrative economy for many northern communities (in Canada and Greenland) ¹¹²⁹, and in so doing remain entangled with the same diplomatic and political cares/concerns as their 16th century cousins.



Fig.49 A Canadian polar bear skin at *Skinboden* in Longyearbyen, Svalbard, (H. Anderson-Elliott, 2017)

However, the circulation of skins and of live cubs are also inseparable, a fact which highlights the intertwined histories of captive care (even conservation), kinship, and violent commodification. Some of the contemporary North American skins harvested leave behind cubs ¹¹³⁰ and some of these individuals make their way into the zoo population. In 1988, hunter Gene Rex Agnaboogok shot a female bear after falling waist-deep into her den ¹¹³¹. The cubs, a male and a female, were rescued and sent south by airplane. The male, subsequently named ‘Nanuq’, would go on to father a famous cub ‘Nora’ born at the Columbus zoo and later moved to Oregon zoo ¹¹³². More than an incidental bycatch, during the 16th and 17th century European exploitation of Svalbard’s newly-discovered natural resources, the skins of mother bears were actively used to facilitate the transport of their live cubs. On May 30th, 1609, English whaler Jonas Poole shot and killed a “*shee-Beare*” at Bear Island to the south

¹¹²⁶ *ibid*

¹¹²⁷ *ibid*

¹¹²⁸ Anonymous Participant

¹¹²⁹ Dowsley, M. (2010) The Value of a Polar Bear: Evaluating the Role of a Multi-use Resource in the Nunavut Mixed Economy, *Arctic Anthropology*, **47**: 1, pp.39-56.

¹¹³⁰ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹³¹ Williams, K. (2017) ‘The Loneliest Polar Bear’, *The Oregonian*, Online, Available at: [https://projects.oregonlive.com/projectnora/1-3/], Accessed: 06/10/19.

¹¹³² *ibid*

of Spitsbergen ¹¹³³. Her cubs – where he saw most value for “*showbiz and profit*” – then clung to the skin of their mother on the journey home, avoiding the need to cage or restrain them ¹¹³⁴. Poole’s polar bears then re-appeared in London in 1611 with a royal decree allowing impresario Philip Henslowe to keep two white bears at Bankside, and Engelhard suggests that *Antigonus*’s famed “*Exit, pursued by a bear*” in Shakespeare’s *The Winters’ Tale* may even have been a role first played by one of these Svalbard bears ¹¹³⁵.

The burgeoning commercial animal trades that followed Barentz’s initial ‘discovery’ of Spitsbergen in 1596 was therefore instrumental in the development of centuries of bear mobilities ¹¹³⁶ – the southward flows of dead skins, live cubs, as well as (less frequently) live adults and sub-adults ¹¹³⁷. Throughout this process, Marvin explains, these bears underwent transformation ¹¹³⁸. Not only does making bears captive “*reduce them*” ¹¹³⁹ as a result of their confinement, coercion, behavioural change, but also transforms them “*on the conceptual level*” as they cross into a “*human cultural realm*” ¹¹⁴⁰. There are awkward and uncomfortable dual processes here: the violent commodification of bear materiality, the spectacle of their white fur and its role in their valuation; as well as the enfolded practices of care, keeping, and kinship for the impressionable cubs that cling to the scent of their dead mothers. As these captive cubs were gradually incorporated into European collections, and those collections became bound up in the development of the architectures and institutions of zoological parks/gardens at the heart of metropolitan spaces, and as those sites and their *raisons d’être* became increasingly conservation-oriented against the backdrop of growing climatic and extinction anxieties, some of the gaze and spectacle evoked through these historical engagements, economies, and entanglements with polar bears remains ¹¹⁴¹. We must remember, acknowledge, and be attentive to these convoluted and commodified pasts, to identify the residual and enduring power and politics of these spaces, of our captive keeping practices, and the role of non-humans in these societies of (re)production.

¹¹³³ Engelhard (2017) p.40/41; Purchas, S. (1625) *His Pilgrimes in Fiue Bookes*, vol. 3, London: Henry Fetherstone, p.502.

¹¹³⁴ Engelhard (2017) p.40/41

¹¹³⁵ Ibid; Ravelhofer, B. (2002) Beasts of Recreation: Henslowe’s White Bears, *English Literary Renaissance* 32(2), p.287-323.

¹¹³⁶ Hodgetts & Lorimer (2018)

¹¹³⁷ Engelhard (2017)

¹¹³⁸ Ibid; Marvin, G. (2006) ‘Perpetuating Polar Bears: the cultural life of dead animals’ in Snæbjörnsdóttir & Wilson (2006), London: Black Dog Publishing.

¹¹³⁹ Engelhard (2017) p.42

¹¹⁴⁰ ibid

¹¹⁴¹ Berger (2010)

In 1610, Jonas Poole and company once again set off north in command of the *Amity*. Passing Bear Island, they spied land near the southern tip of Spitsbergen ¹¹⁴². A small party went to shore and, upon returning with a reindeer antler, they named the fjord Hornsund. In 2017, I landed at Hornsund whilst working on the tourist boat the MS Fram. Then late summer, the snow-cover had long melted, and the brown mud of the shoreline was spotted with tufts of rusty moss. Along the water's edge great chunks of clear glacial ice had washed up, crowding the beach, creaking as they melt and cracked apart. Further round the beach there were polar bear tracks trailing away. Where the earth is dry the edges have broken and crumbled losing shape, but where it's wet, they held in perfect five-toed impressions. I followed the prints further on still, past the scattered skeleton of a long-dead seal, joined by those of an arctic fox, and begin to think on where they lead. They traced a path between myself, the researcher, and a wild polar bear some days ahead, but also backwards from this place, into the violent histories of Svalbard bear hunting and captured cubs, and finally turn southwards, toward a population of captive polar bears whose predecessors once made such trails on this shoreline.



Fig.50 Following the Hornsund bear tracks. My footprints on the left, bear on the right, (H. Anderson-Elliott, 2017)

¹¹⁴² Conway (1906)

5.3 Becoming Real Polar Bears

5.3.1 Polar Bears in the UK: phasing out and phasing back

Throughout the late 20th century and into the early 21st, the tide began to turn on keeping polar bears in the United Kingdom, and they were slowly to be phased out of zoo populations ¹¹⁴³. London Zoo, that had seen the birth of two cubs, Brumas in 1949 and Pipaluk in 1967, closed its famous Mappin Bear Terrace in 1985, and the surviving Pipaluk was sent to Poland where he would die 4 year later ¹¹⁴⁴. Millie and Jason, the last polar bears to be born in England at Flamingo Land in 1992, were tranquilized at the age of 18-months and sent to Japan ¹¹⁴⁵. Mercedes, the female bear formerly of Edinburgh zoo, was put to sleep in 2011 suffering with arthritis, after already being moved to the Highland Wildlife Park when her partner, Barney, choked to death on a plastic bag thrown into their enclosure in 1996 ¹¹⁴⁶. Much of this impetus, as “zoos appeared to realise that the game was up” ¹¹⁴⁷, came as a result of welfare campaigns (Born Free Foundation) and public pressure to close the concrete-walled bear-pit facilities woefully inadequate for the needs of these animals ¹¹⁴⁸. Repeated stereotypies - pacing, swimming, and swaying - belied the spectacle of true polar bears to the paying public, instead betraying “disturbed beast[s]” ¹¹⁴⁹. It was only at the superior enclosure of the Highland Wildlife Park that the population hung on, where Walker, a young male transferred from a Dutch Zoo in 2010, remained alone until he was joined by another male Arktos from Hanover Zoo in 2012 ¹¹⁵⁰.

However, the decline of the captive polar bear population didn’t last, and its recovery shines a light upon the changing landscape of zoo institutions in the UK and Europe, as well as on the recurrence of new forms/import of polar bear economies, capital, and politics ¹¹⁵¹. 1992 saw the founding of two pivotal inter-zoo organizations, EAZA (European Association of Zoos and Aquaria), and the EEP (European Endangered Species Programme), the former focused on cooperating with captive

¹¹⁴³ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge; Cutting, A. (29/10/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁴⁴ Zoological Society of London (2019) ‘Famous animals’ [Online] Available at: [<https://www.zsl.org/famous-animals>] accessed 05/04/19.

¹¹⁴⁵ Barkham, P. (2018a) ‘Why I pity Britain’s latest polar bear cub to be born in captivity’, *The Guardian*, Online, Available at: [<https://www.theguardian.com/commentisfree/2018/jan/04/britain-polar-bear-cub-captivity-highland-wildlife-park>] Accessed 04/02/18.

¹¹⁴⁶ *BBC News* (2015) ‘Polar bear Mercedes put to sleep’, Online, Available at: [<https://www.bbc.co.uk/news/uk-scotland-highlands-islands-13094316>] Accessed: 10/04/18.

¹¹⁴⁷ Barkham (2018a)

¹¹⁴⁸ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁴⁹ Barkham (2018a); Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁵⁰ Barkham (2018a); *Highland Wildlife Park* (2019) Online, Available at: [<http://www.highlandwildlifepark.org.uk/animals-attractions/animals/polar-bear/>] Accessed: 10/10/2019.

¹¹⁵¹ Engelhard (2017)

institutions “*towards the goals of education, research, and conservation*”¹¹⁵², and the latter creating a range of integrated species-specific breeding programmes¹¹⁵³. It was also in the 1990s, as I outlined in chapter 3, that the scientific frameworks of polar bear conservation were beginning to turn towards climate change as the primary threat to the wild survival of the species¹¹⁵⁴. Concurrently, zoo institutions (in the UK and Europe) were in a process of re-invention under the guidance of EAZA, with a legally mandated requirement for ‘conservation’ impacts¹¹⁵⁵, and the perception that captive institutions could provide vital support for in-situ species conservation and habitat protection, through funding streams, research, education, and the preservation of viable ex-situ populations¹¹⁵⁶. The Yorkshire Wildlife Park, founded in 2009, is symptomatic of the new wave of zoo institutions in the UK, with membership of the EAZA, (successfully reproductive) participation in numerous EEP programmes, and a high priority for animal welfare.

In September 2013, EAZA launched its 11th two-year campaign (always focused on a threatened species or environment with the explicit aims of promoting awareness, fundraising, and lobbying national governments and organizations)¹¹⁵⁷. This iteration, *Pole-to-Pole*, was about the “*Ambassadors of the Poles...about penguins, about polar bears*”¹¹⁵⁸. Its logo sported a polar bear, and the campaign hoped to raise awareness of issues threatening the Arctic and its species, as well as use educational zoo frameworks to facilitate behavioural change towards CO² emission reduction¹¹⁵⁹. The following year, 2014, Victor arrived at YWP, heralded as the arrival of “*England’s only polar bear*”¹¹⁶⁰. In 2015, his older sister Victoria joined Walker and Arktos at the Highland Wildlife Park in Scotland, the “*UK’s only female polar bear*”, carrying with her hopes of the EEP for the birth of a cub¹¹⁶¹.

Polar bears were migrating back to the UK from mainland Europe, but both the bears themselves, and the spaces they would inhabit, had undergone transformation. Their mobilities remain politicized –

¹¹⁵² European Association of Zoos and Aquaria (EAZA) (2019) Online, Available at: [<https://www.eaza.net/about-us/>] Accessed: 08/10/19.

¹¹⁵³ European Association of Zoos and Aquaria (EAZA) Breeding Programmes (2019) Online, Available at: [<https://www.eaza.net/conservation/programmes/>] Accessed 10/04/2020.

¹¹⁵⁴ PBSG (2020); Stirling & Derocher (1993)

¹¹⁵⁵ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁵⁶ EAZA (2019); Draper, C. (2018) *Research Interview*

¹¹⁵⁷ Wikipedia (2019) ‘European Association of Zoos and Aquaria’ [Online] Available at: [https://en.wikipedia.org/wiki/European_Association_of_Zoos_and_Aquaria] Accessed 10/10/2019.

¹¹⁵⁸ *Pole to Pole* (2019) Online, Available at: [<http://www.poletopolecampaign.org/>] Accessed 04/10/2019.

¹¹⁵⁹ *ibid*

¹¹⁶⁰ *Daily Mail* (2014) ‘Britain’s only polar bear Victor arrives at his new home’, Online, Available at: [<https://www.dailymail.co.uk/news/article-2727861/It-s-long-way-t-Arctic-Britain-s-polar-bear-Victor-arrives-new-home-Yorkshire.html>] Accessed 17/04/2018.

¹¹⁶¹ Highland Wildlife Park (2015) ‘*UK’s only female polar bear to arrive in Scotland*’ [online] Available at: [<http://www.highlandwildlifepark.org.uk/news/article/1609/uk-s-only-female-polar-bear-to-arrive-in-scotland/>] (Accessed 15/08/17).

emblematic not only of global anxieties but also of national posturing and identity. Yoko Tawada explains that: *“for polar bears, national identity has always been a foreign concept. It’s common for them to get pregnant in Greenland, give birth in Canada, then raise the children in the Soviet Union. They possess no nationality, no passport. They never go into exile and cross national borders without a visa”* ¹¹⁶². However, for these captive bears, similar to N23992 tattooed with an ‘N’ prefix for Norway, their ‘nationality’ is at the forefront of their identities ¹¹⁶³. Victoria is a ‘Scottish’ bear, not only an Arctic ambassador tasked with raising awareness for climatic change and habitat loss, but also a European citizen ¹¹⁶⁴. Victor was for a time the *‘only English bear’*, before being joined by Pixel, Nissan, Nobby, (and later Rasputin). In October 2015, whilst Nissan was in transit to YWP from Moscow, his lorry was briefly boarded by migrants at Calais ¹¹⁶⁵ – a bear whose political import enables smooth and legal transit where human counterparts cannot. In late November 2017, Scotland outlined its new Arctic Strategy at the close of the Arctic Circle Forum, to foster strong relationships as the *“closest neighbour to the Arctic States”* with *“shared interests and challenges from renewable energy and climate change targets to social policies and improved connectivity”* ¹¹⁶⁶. Unbeknownst to this, a few days later, Victoria entered her specialty designed maternity den at the Highland Wildlife Park, and speculation of her pregnancy began ¹¹⁶⁷. As Nicola Sturgeon outlined the Scottish perspectives on the ‘New North’, reminding us that Scotland is closer to the Arctic than to London ¹¹⁶⁸, Victoria’s decision to make a ‘home’ in the highlands also fomented this emerging sense of Scottish Arctic membership.

“I’ve read several times in the newspaper that I was born in Berlin. I also often read that my mother was born in Canada and raised in the GDR. Still, people kept saying I was from the North Pole, probably because of my snow-white fur.”

– ‘Knut’ in Tawada, Y. (2016) p.250

¹¹⁶² Tawada (2017) p.86

¹¹⁶³ Derocher, A. E. (24/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁶⁴ WWF (2017) ‘Polar Bear Sighted on Scottish Island, Online, Available at: [https://www.wwf.org.uk/updates/polar-bear-sighted-scottish-island] Accessed 10/05/2017.

¹¹⁶⁵ BBC News (2015) *Calais migrants interrupt polar bear’s trip to Yorkshire Wildlife Park*, [Online] available at: [https://www.bbc.co.uk/news/uk-england-south-yorkshire-34531581] (Accessed: 10/10/2017).

¹¹⁶⁶ Scottish Government (2017) Online, Available at: [https://news.gov.scot/news/arctic-strategy-for-scotland] accessed 22/04/2019.

¹¹⁶⁷ *The Press and Journal* (2017) ‘Is the UK’s only female polar bear pregnant?’ Online, Available at: [https://www.pressandjournal.co.uk/fp/lifestyle/animals/1382885/uks-female-polar-bear-pregnant/] Accessed 01/02/2018.

¹¹⁶⁸ Sturgeon, N. (2017) *Arctic Circle Forum, Scotland and the New North*, [Online] Available at: [https://www.youtube.com/watch?v=Acdt6VGvkFQ] Accessed: 23/04/2018.

5.3.2 Making Real Polar Bears

In the spring of 2018, the four YWP bears led me briefly to Vienna, where the carnivore team leader from Yorkshire and other members of the captive polar bear community were convening for the first European Workshop on Polar Bears and Conservation Science. This inaugural event run by PBI (Polar Bears International) would lay the foundation for greater inter-institutional collaboration on all aspects of husbandry, breeding, training methods, and research in support of in-situ conservation work on polar bears in the Arctic. Delegates from 10+ zoos across 10+ countries and 30+ polar bears were represented, as well as numerous other researchers, vets, and observers like myself.

The Tiergarten Schönbrunn, Zoo Vienna, is the World's oldest zoo still in existence, established in 1752 in the gardens of the Schönbrunn Palace. It has housed polar bears on and off for almost as long, the first arriving from the menagerie at the Neugebäude Imperial Palace in 1781. April 14th 2018, I enter the park in the early morning sunlight from the northwest corner, and begin to meander my way south the short distance to the Zoo gates. The high sculpted hedges and the avenues of lime and plain trees buffer the traffic noise from the congested commuters on the Hietzinger Hauptstraße, and the gardens are near-deserted. The zoo itself is structured around a central pavilion, with adjacent avenues lined with cages branching from its centre, before sprawling into newer and more 'naturalized' exhibits further east. Some of the older housing units have been adapted or expanded for the benefit of their occupants. In another, a commemorative bronze statue of a lion stares forlornly from behind the narrow bars of a 20ft domed cage. Further down the avenue, two young pandas sit with their backs to the Perspex viewing window inset into the wall of their bamboo garden. Beside the door is an intimate wooden box on display for all to see and peer inside: "Wurfhöhle von Panda FU HU" (maternity den of panda FU HU), where their mother Yang Yang had previously given birth.

The workshop itself is held inside the upstairs conference area of the new elephant house. The room is heavy with the smell of dung and straw, and echoes with the monotony of chewing. On a big projector screen at the head of an empty room a PowerPoint slide is loaded with a picture of a polar bear traversing sea ice in the distance, its footprints leading off towards the horizon. Over the zoo tannoy is a hurried announcement in German, and then in English: *"please refrain from using scooters inside the zoo, and please remember, do not feed the animals"*.

In this section I will draw upon my time in Vienna and in Yorkshire to discuss the 'production' of captive polar bears. This is primarily a question of reproduction, and the broad reproductive focus of the captive population management from EAZA and the EEP. It will discuss the raising of polar bear cubs in captivity and the multispecies families and 'male mothers' involved in helping polar bears become 'real polar

bears’. Bound up in this examination are the considerations of spectacle, authenticity, and whiteness – echoes of colonial economies past and the physiological traits of polar bear ‘value’ – as well as the negotiated biopolitical practices of making polar bears live ¹¹⁶⁹. Ultimately, this is a question of our understandings and co-productions of beariness, as well as of ourselves, the labours of bear/human husbandry, and the enrolment of their bodies into our ‘conservation’ imaginations.

5.3.2.1 The Importance of Cubs and Priority Bears

Thomas Hildebrandt, the University Professor at the Leibnitz Institute for Zoo and Wildlife Research, Berlin, for two decades had been inundated with requests to assess the lack of successful polar bear reproduction in the zoo population. Even against a normal expected fertility rate for a low-frequency species like a polar bear, the EEP in Europe and the sister SSP in North America have reported very low numbers of successes ¹¹⁷⁰. In 2017, the AZA (American Association of Zoos and Aquaria) reported no successful births (one cub death), and cub survival remains one of numerous systemic and chronic issues ¹¹⁷¹. In his ultrasound study of 15 captive European polar bears, Hildebrandt reported significant pathology, from cysts and dormant ovaries, uterine infections (perhaps resulting from temporary contraceptive treatments as polar bear population were being ‘phased out’), to 50% of males experiencing at least one testicle in the abdominal cavity (and poor condition as well) ¹¹⁷², with some developing into tumours. Polar bears struggle to breed in captivity.

Speaking to the Vienna conference group, he asked: “*are we not overconfident in our reproductive techniques*”, what about genetic diversity, the behaviour of natural mate choice, and what impacts will these have on conception and maternal ethology? ¹¹⁷³. His comments reflect an enormous reproductive focus from within the captive polar bear institutions. There is a “*tendency to focus on reproductive rates and diagnosis*” with the ultimate aim of bolstering the captive breeding of the population ¹¹⁷⁴. I have already outlined some justifications for this, many of which are coded by PBI into this very meeting. Polar bears carry with them political and financial capital, not only with the potential to dramatically

¹¹⁶⁹ Foucault., M. (1997) ‘The Birth of Biopolitics’, 73-79 in *Ethics, Subjectivity, and Truth*: Rabinow, P. & Faubion, J. D. (eds.) New Press.

¹¹⁷⁰ Hildebrandt, T. (2018) *Ultrasound-based health and reproductive assessment in male and female polar bears in human care*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 13/04/2018.

¹¹⁷¹ Shellabarger, W. (2018) *Brief overview of the veterinary and disease opportunities for ex-situ populations to inform in-situ research*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018.

¹¹⁷² Hildebrandt (2018)

¹¹⁷³ *ibid*

¹¹⁷⁴ Shellabarger (2018)

increase zoo profits and visitation ¹¹⁷⁵ (and consequently the funds channelled to in-situ research), but also perform the role of ‘educative climate ambassadors’ ¹¹⁷⁶. As with the wild research programmes in Svalbard ¹¹⁷⁷, the assumption is that healthy and numerous polar bear cubs can only be good for ‘conservation’. José Kok, the chair of the EAZA bear TAG (Taxon Advisory Group) reiterated these priorities: we need to *“come together to discuss the role of the Polar Bear EEP, what to do with the captive species and populations ... engage the public with climate change, raise funds and focus on research, for healthy populations – demographically and genetically... we need to improve cub survival”*

¹¹⁷⁸.

In order to address issues of low conception and reproduction rates, Dr. Johanna Painer from the University of Veterinary Medicine, Vienna, has been working on improving the protocol for ‘*electro-ejaculation*’ and artificial insemination with two bears, Eva and Wilbur, at Orsa Bear Park in central Sweden ¹¹⁷⁹. She loaded a short video clip and the audience murmured. With Wilbur tranquilized on his back, a short 5cm broad probe was inserted to electro-massage his prostate, assisted with the imaging of a rectal ultrasound transect. As his back legs lurched violently, a stallion catheter collected the “high concentration of sperm” which was immediately transferred into a thermal box to keep warm. The sample was then artificially inseminated into Eva after two drugs had been administered to trigger follicle growth and ovulation (naturally stimulated during mating). Her hymen was sliced with a knife, and the insemination performed. Over winter, Eva made herself a den in the bank of the naturalistic snow-mountain her enclosure. With no camera or microphone access she was completely unmonitored. 45 days later she emerged alone – it was a pseudo-pregnancy, and the procedure had failed ¹¹⁸⁰.

At the close of her presentation, one of the audience members asked a question about the studbook data. *“Wilbur is ranked at 9 in the EEP, but this female is not important, why don’t you [swap] her out?”* ¹¹⁸¹. Each of the polar bears in the breeding programme is ranked according to the level of expression of their genetic diversity in the broader zoo population. *“Have you checked the pedigree?”* asked

¹¹⁷⁵ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁷⁶ Tawada (2017); Yorkshire Wildlife Park (2020) [Online] Available at: [https://www.yorkshirewildlifepark.com/animals/polar-bears/] Accessed 18/04/2020.

¹¹⁷⁷ NPI MOSJ (2020)

¹¹⁷⁸ Kok, J. (2018) *EAZA Bear TAG/Polar bear EEP update, current Ex-situ research being conducted*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018.

¹¹⁷⁹ Painer, J. (2018) *Electro-ejaculation, hormone treatment and artificial insemination in polar bears – treatment of (idiopathic) seasonal alopecia in a polar bear*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018.

¹¹⁸⁰ *ibid*

¹¹⁸¹ Anonymous Participant

another ¹¹⁸². Eva is Victor's sister, sharing a mother, and his long career as a breeding stud has left their genes highly-represented in the European population. Like Victor (a surplus 'intact' post-breeding male) she is a 'low priority'.

5.3.2.2 No Milk

Polar bear milk is not only vital for the development of their cubs, but also a unique and complex substance, changing in composition to reflect the needs of a growing bear. *"We cannot sample wild females with new-born cubs"* explains Derocher, *"but we know from captive polar bears that colostrum (milk produced in the first hours or days after birth) is high in solids and contains antibodies that are important for protecting the cub"* ¹¹⁸³. *"Polar bears have the richest milk of the bears"* he continues, which *"can be 46% fat, is low in lactose (a sugar) but high in specialized sugars called oligosaccharides, which... have an antibacterial role"* ¹¹⁸⁴. The practice of nursing is itself important for family bonds, and the cubs will continue to suckle for 2 and a half years ¹¹⁸⁵ in addition to their widening diet.

"I have tried the occasional drop of polar bear milk. It has a rich, marine, earthy, chalky taste with a finish vaguely reminiscent of fish."

– Derocher, A. (2012) p. 180

Frank Vigh-Larson is the Director of the Scandinavian Wildlife Park in Kolind, Denmark. In 2011, Ilka, a resident female at the park became pregnant for the sixth time in her life. Twice in Kolmården Wildlife Park in Sweden, where she herself was born, and three times now in Kolind, Denmark, she had lost every single one of her litters ¹¹⁸⁶. During their necropsies, none of the cubs had any milk in their stomachs. Concerned that the same would happen, Frank had installed microphones in the specially-made breeding den in a secluded area of her enclosure. Whilst few parks favoured the more 'naturalized' denning option, allowing the bears to dig their own in suitable substrates, highly-regulated dens are more prevalent – complete with cameras, microphones, temperature gauges, for 24/7 monitoring and surveillance. In Vienna, we were led inside the enclosure to a seemingly military concrete cell, whilst the Highland Wildlife Park constructed an enclosed wooden structure with a long entrance ¹¹⁸⁷.

¹¹⁸² Anonymous Participant

¹¹⁸³ Derocher (2012) p.180

¹¹⁸⁴ ibid

¹¹⁸⁵ ibid

¹¹⁸⁶ Vigh-Larsen, F. (2018) *Siku – the story of a successful hand-rearing of a polar bear cub*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018.

¹¹⁸⁷ *Britain's Polar Bear Cub* (2018), [Online] Alex Tate, UK: STV Productions, [Channel 4] 2018.

On November 22nd, 2011, Ilka gave birth, and over the den microphones Frank listened for the tell-tale sounds of a cub feeding, a contented clicking or rattling noise. Instead, the cub wailed and screamed, and they concluded that again Ilka was producing no milk ¹¹⁸⁸. A 2003 study from Oxford University deduced that infant mortality amongst captive polar bears was a staggering 65% ¹¹⁸⁹, further compounded by small litter sizes (over 50% of females having only 1 cub compared to the wild norm of twins) ¹¹⁹⁰. Between 2008 and 2018, nearly 20% of cubs died on the very first day ¹¹⁹¹. After 2 days of screaming Frank decided to act, creeping into the den to tranquilize Ilka and remove her cub, that he named *Siku* ¹¹⁹².



Fig.51 The maternity den constructed in the Tiergarten Schönbrunn in Vienna, complete with CCTV, drainage (for cleaning out of season), and microphones to pick up cub/mother vocalizations, (H. Anderson-Elliott, 2018)

In Vienna, Frank had come to present his experiences with Siku: “*the... successful hand-rearing of a polar bear cub*” ¹¹⁹³. His story highlights two extremely interesting tropes, both his definition of ‘success’ resulting in a “normal polar bear”, and the performative navigation of the awkward human-bear relationships that ensue from his surrogacy ¹¹⁹⁴. Even more stark maternal rejections had happened

¹¹⁸⁸ Vigh-Larsen, F. (2018)

¹¹⁸⁹ Barkham (2018a)

¹¹⁹⁰ Kok (2018); Derocher (2012)

¹¹⁹¹ Kok (2018)

¹¹⁹² Vigh-Larsen, F. (2018)

¹¹⁹³ *ibid*

¹¹⁹⁴ *ibid*

with Knut, of Berlin, and with Nora, the female cub from Portland – where both of their mothers abandoned them, in the open of the enclosure and in the den respectively ¹¹⁹⁵. Amy Cutting, who oversees polar bears at Oregon Zoo in Portland, echoes Frank’s rhetoric of a “normal bear” ¹¹⁹⁶. Being raised by two ‘human mothers’ ¹¹⁹⁷, Nora still “*needed to learn how to be a bear*”. This again reminds me of Robert Bieder’s recounting of an Ancient Greek myth that bear cubs were born as amorphous lumps before their mother licked them into the shape of a bear ¹¹⁹⁸. So too, without the nurturing milk from their mothers, how can these captive polar bear cubs become real bears? “*We didn’t want another Knut with Siku*”, concludes Frank, the cautionary tale of a bear that thought of himself as a “*small furry human*” ^{1199 1200}.

“In Russia there was a professor who put on a bearskin and spent two years in the wilderness with two baby bears whose mother had been shot by a hunter. He became a mother bear... if I too want to be a proper bear mother, I’ll have to ... teach you to swim”

– ‘Matthias the Keeper’, Tawada, Y. (2016) p.219/220

5.3.2.3 ‘Normal’ Polar Bears

The concept of a ‘normal’ or ‘real’ bear is reminiscent of Misha’s status as a ‘good bear’ or ‘photo bear’. This assertion is two-fold, that a polar bear should both look (in spectacle) and behave (in ethology) “*like a polar bear*” does ¹²⁰¹. Here is an embodied taxonomic category of ‘bearness’, and the adherence of bears and bear bodies to those standardized ideals. These are the ‘good’, ‘normal’ bears – otherwise referred to with the rhetoric of ‘natural’ or ‘real’. Concerned that Siku would not be “normal”, Frank had developed a hand-rearing protocol to ensure that he would be able to successfully socialize with other bears at the park ¹²⁰². This was the first priority for Siku’s hope of becoming a real bear.

The day after he was removed from his mother Ilka’s den and adopted by Frank, he finally had his first feed of milk (a formula mixed by the keepers to attempt to match the high-fat and nutrient content of colostrum). They were relieved to finally hear the clicking sound of contentment as he filled his stomach, and with it the accompanying hope that he would survive ¹²⁰³. From then on, for the first three months of his life, Siku was kept in Frank’s home on site at the Scandinavian Wildlife Park. Their highest

¹¹⁹⁵ Williams (2017)

¹¹⁹⁶ Cutting, A. (29/10/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹¹⁹⁷ Williams (2017)

¹¹⁹⁸ Bieder (2005)

¹¹⁹⁹ Vigh-Larsen, F. (2018)

¹²⁰⁰ Barkham (2018a)

¹²⁰¹ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge; Roberts, J. (29/08/2018) *Research Interview*, Kulturhuset Café, Longyearbyen.

¹²⁰² Vigh-Larsen, F. (2018)

¹²⁰³ *ibid*

priority was to limit the number of people that interacted with him, and other than Frank and two other vets/keepers from the park, the only other person granted face-to-face access was a nature photographer that they had hired to handle the entirety of the publicity ¹²⁰⁴. When Danish TV stations, the BBC, and numerous other journalists arrived at the zoo, they were all told that any footage that they would like was only to be captured by the same photographer. Beyond the walls of Frank's apartment, and its five living occupants, 73 million people viewed Siku's early life on TV screens and computers worldwide ¹²⁰⁵. They fawned at his cuteness, and marvelled at Frank's devotion. *"The tiny creature's online popularity follows on from that of German polar bear cub Knut, who became an internet phenomenon four years ago at Berlin zoo"* ¹²⁰⁶. Knut was been swamped by photographers and journalists. They jostled for position around the edge of his enclosure, just as they would do later in front of the glass case in the natural history museum that housed his dead body. Here was a parallel experience that Frank laboured hard to avoid.

"I'm not a mother bear who's been shot, lying on the ground. Don't worry, I am perfectly all right. No bullets, just flashbulbs – I'm not so easy to do in," Matthias said, his face filled with creases Knut was unable to interpret"

– Tawada, Y. (2016) p.176

Siku put on weight fast. Feeding from the syringe in Frank's hands, he grew from his 1.8kg at two-days-old to 3.2kg within a month ¹²⁰⁷. This represented a good healthy weight gain, with young cubs in the wild sometimes seen outside the den from 3.0 kg onwards ¹²⁰⁸. Whilst they likely did not survive, for Siku's age, this was excellent progress. As he gained strength he became more and more playful, clawing to get to his milk. Rather like Nora, he was given a 'buddy bear' soft toy to sleep on, and the two would stay intertwined on the bed in the apartment whilst Frank rose every 2 hours to feed him ¹²⁰⁹.

¹²⁰⁴ Vigh-Larsen, F. (2018)

¹²⁰⁵ ibid

¹²⁰⁶ *The Daily Mirror* (2011) 'Abandoned polar bear cub Siku is set to be YouTube sensation' Online, Available at: [<https://www.mirror.co.uk/news/uk-news/abandoned-polar-bear-cub-siku-187505>] Accessed: 10/10/2019.

¹²⁰⁷ Vigh-Larsen, F. (2018)

¹²⁰⁸ Derocher (2012)

¹²⁰⁹ Vigh-Larsen, F. (2018)

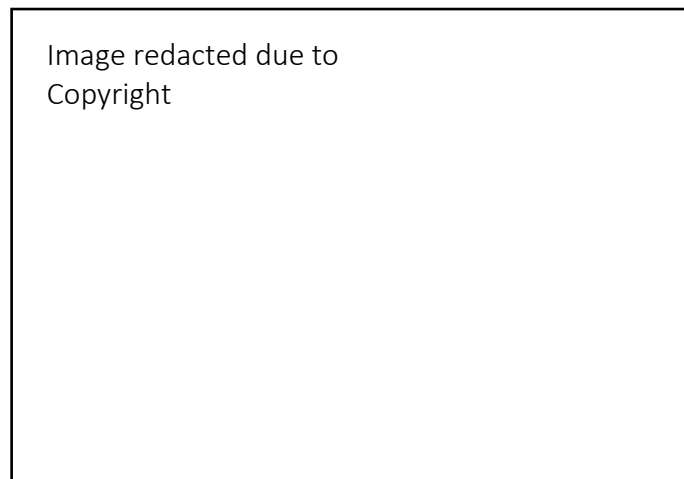


Fig.52 Frank holding and feeding Siku, a few weeks old, at the Scandinavian Wildlife Park, Denmark (Scandinavisk Dyrepark YouTube channel ¹²¹⁰)

Frank was adamant that Siku should also not be for profit, and this represented another requirement in the protocol of shaping his ‘natural’, ‘normal’ polar beariness ¹²¹¹. In that first year, Frank was approached by a Hollywood director who wanted Siku to star in a film, cut into sequences with a wild bear and her cub. Frank declined – not only would Siku never be used for independent financial gain but to do so would also violate the access protocol he had put in place to try as best as possible to cap his habituation to humans ¹²¹². The film in question was *The Journey Home*, or *Midnight Sun*, starring Misha as the female mother bear and Lucky (and Light) as her cub. A ‘good bear’ is paradoxical. For Misha and her cubs, ‘good bear’ required an acclimatization to human presence to that they would ‘behave like normal bears’ for the camera. Whilst for Siku, limited human interaction was key for him to stand the highest chance of socializing with the other captive bears. “*A bear raised by humans... would lack the ability to find his place in bear society*” ¹²¹³. For Lucky – Misha’s cub and ‘the happiest polar bear in the world’ – the combination of her curiosity and lack of fear for people was deadly. Now she is a ghostly presence re-named ‘Nina’, taxidermised in the Norwegian Defence Ministry, Oslo.

5.3.2.4 Male Mothers and Human-Bear Families

“Everyone Knows you’re Knut’s mother.”

“Why am I the mother and not a father?”

“Yes, that’s what you are: his male mother. You’re a motherly man.”

– Tawada, Y. (2016), p.188

¹²¹⁰ Scandinavisk Dyrepark (2011) *Siku the Danish Polar Bear Cub in Scandinavian Wildlife Park*, [Online] Available at: [<https://www.youtube.com/watch?v=Uqs71Q4kmxI>] Accessed 20/10/2018.

¹²¹¹ Vigh-Larsen, F. (2018)

¹²¹² *ibid*

¹²¹³ Tawada (2017) p.244

Frank was keen to “*try and be a real polar bear surrogate mother*” to Siku, and as such would “*try to mimic what a polar bear mum would do*” ¹²¹⁴. As well as keeping Siku in his apartment, sleeping alongside him, feeding milk him every two hours, and providing 24/7 care, as Siku grew, much of this surrogacy became a performative embodiment of ‘polar bear mother’. As Siku began to venture outside for the first times, Frank would crawl with him on all fours, encourage him to investigate logs and rocks by nosing them and sniffing ¹²¹⁵. They would gradually explore what would become his outdoor enclosure, accustomising him to the sounds and smells, and even re-uniting with Ilka his bear-mother through the fence of her housing unit. Siku was cautious, peering at Ilka from behind his human-mother, with one paw on his back ¹²¹⁶.

As Frank demonstrates, the polar bear mother has an extremely important formative role in the development of her cubs. There are clear parallels here with wild bears – not only in the provision of milk in the den, but also in behavioural nurture ¹²¹⁷. Misha and her cubs share the same comparatively unique localized home range and exploit similar opportunities for food. When she was weaned, Lucky had immediately returned to Tempelfjord where she had observed her mother hunting seals for the previous two year. She was greatly successful, observed catching 3 seals in the space of a week leading up to her death, matching the hunting prowess of her mother before her. Captive institutions, by comparison, offer novel and hybrid familial roles involved in shaping polar bear lives in different ways. Just as with Knut and his keeper, Pipaluk at London Zoo (whose bear-parents shared their names with his human keepers) ¹²¹⁸, Nora and her ‘Nora Moms’ ¹²¹⁹, Frank and Siku emblemized a multispecies form of kinship explicitly oriented towards the production of a ‘normal’ bear. Now seven years old, and socializing well with the other bears at the park, Siku represents a ‘successful story’ of ‘normal’ polar bear rearing. His mother Ilka, was treated with Domperidone in 2012 (Motilium TM) to stimulate increased milk production, and consequently succeeded in raising her own cubs, Nanu and Nuno. By his own objectives, Frank had achieved everything he had set out to do. Siku became an ambassador for “his wild counterparts” and was “adopted” by Polar Bears International, deployed via webcam to raise awareness of climatic change and carbon emissions ¹²²⁰. Together, they represent the complex novel and political ecologies of polar bear captivity institutions – the enfolded roles of the performative, nurture, care, and kinship in the (re)productive economies of ‘real’ beariness.

¹²¹⁴ Vigh-Larsen, F. (2018)

¹²¹⁵ *ibid*

¹²¹⁶ *ibid*

¹²¹⁷ Derocher, A. E, (2018) *Private Communication via email*

¹²¹⁸ ZSL (2019)

¹²¹⁹ Williams (2017)

¹²²⁰ Vigh-Larsen, F. (2018)

Siku's success, however, was foreshadowed another perceived failure. On 19th of March 2011, Knut drowned in a pool in his Berlin enclosure after suffering a seizure as a result of encephalitis inflaming his brain. His life, and death, it transpires, was not recorded in the ZIMS (Zoological Information Management Software) records: the centralized database of all captive polar bears (and all wild animals under human care) used by institutions worldwide. Knut represented an odd and awkward liminal creature, a bear whose habituation and handling is now viewed as a cautionary tale for the development of 'normal' bear-to-bear sociable animals, whilst at the same time became a profound cultural icon for the city of Berlin and an international animal 'superstar'. Over his short life he was inordinately profitable – earning millions of dollars from visitation fees and merchandise to film and media rights – so much so that the Neumünster zoo that houses Knut's father and maintains formal 'ownership' over Knut, sued the Berlin Zoo for their share¹²²¹. Knut had also featured heavily in climate change messaging, starring in campaigns for the German Environmental Ministry and sharing a Vanity Fair cover with Leonardo Di Caprio¹²²². Yet, at the most basic level, Knut struggled for identity – a bear whose individuation through the societies of human care and concern powerfully affected his lived experience. *"Ever since my birth I'd had little to do with Nature"* muses Tawada's autobiographical Knut¹²²³ in ironic affirmation of another mode of ascribed animal agency, whereas *Der Spiegel* more demotically claimed that *"he doesn't realize he's a polar bear"*¹²²⁴. Motherhood and milk is again cast as the determining factor in the (re)production of a real bears: *"If everything has proceeded according to the natural order, I'd have found a maternal body at the centre of our den"* Tawada's Knut continues, *"I survived because Matthias gave me milk in a plastic bottle"*¹²²⁵.

Three years earlier, in 2008, Thomas Dörflein (the real-life counterpart to Tawada's keeper character 'Matthias') was found dead at his Berlin home after suffering a heart attack. *Der Spiegel* reported that the zoo director Bernhard Blaszkiewicz had banned Dörflein from direct contact with Knut, after the young bear was growing too large and too dangerous to handle¹²²⁶. The article concluded: *"In the wild, young polar bears play with their mothers until the age of three. But even a one-year-old bear can be*

¹²²¹ Forbes (2008) *Zoos Fight for Knut Loot*, 10th July, 2008.

¹²²² Connolly, K. (2007) Rejected at birth, Knut becomes Berlin zoo's bear essential, *The Guardian* [Online] Available at: [<https://www.theguardian.com/world/2007/mar/24/animalwelfare.germany>] Accessed 04/09/17; Vanity Fair (2007) 'Leo and the Bear' [Online] Available at: [https://www.vanityfair.com/news/2007/05/knut_slideshow200705] Accessed 28/09/2020.

¹²²³ Tawada (2017) p.245

¹²²⁴ *Der Spiegel* (2008) 'Knut Pining for his Lost Friends', [Online] Available at: [<https://www.spiegel.de/international/zeitgeist/polar-bear-missing-human-contact-knut-pining-for-his-lost-friends-a-543145.html>] Accessed 28/09/2020.

¹²²⁵ Tawada (2017) p.245

¹²²⁶ *Der Spiegel* (2007) 'Knut Ban for Berlin Zookeeper Thomas Dörflein', [Online] Available at: [<https://www.spiegel.de/international/zeitgeist/no-more-bear-hugs-knut-ban-for-berlin-zookeeper-thomas-doerflein-a-517033.html>] Accessed: 15/07/2019.

too dangerous for humans"¹²²⁷. In death, Knut and Dörflein represent a darker side to the multispecies kinship of the zoo environment – the affective relations that pervade practices of care through the raising of productive polar bears. It asks us what it is to raise a polar bear cub – the parameters, power, and accountabilities that exist here – and what they stand for: both in relation to our violent pasts, political presents, and future hopes.

* * *

In the conference room in Vienna, the audience breaks up into smaller groups to discuss separate issues of husbandry: from raising cubs, to foot sores, to research priorities. After finishing my notes on Frank's talk, I join the edge of a circle discussing comparisons between Siku and Knut. *"I'm just here to listen"*, I explain when asked. *"He is here to study us!"* jokes Frank. Beside me, Lydia Kolter, one of the longest-tenured and most well respected bear biologists and ursid curators in the world, asks how I'm finding the day. *"Everyone has been so accommodating"* I reply. *"Yes"* she says, *"these are bear-people, their character is different"*.

¹²²⁷ *Der Spiegel* (2007)

5.4. A Captive Sub-Population? Novel Ecologies, Spectacle, and Choreography

In the final section of this chapter, I return my attention to YWP and propose an open-ended wild experiment ¹²²⁸. Through my interactions with these four polar bears I further explore notions of spectacle and authenticity, with particular emphasis on photographic framing, imagery, and ‘whiteness’ ¹²²⁹. I then proceed to discuss these bears and their existence within the multi-species community of their enclosure, in doing so reflecting on the sorts of spaces, places, and ecologies that are produced through our practices of husbandry. I continue to think with ‘novel ecosystems’ ¹²³⁰, to further contextualize captive polar bears into a proposed (and provocative) sub population, re-approaching many of the tropes explored through my discussions of the Svalbard bear and polar bear conservation in the wild. Finally, with a personal account of performing the ‘training behaviours’ with Victor, I draw upon the concept of ‘choreographies’ ¹²³¹, both to describe the physical dance of encounters that YWP enables, as well as to frame a wider understanding of our engagements with polar bears. What are these captive bears, and what is their relationship to conservation?

5.4.1 Framing Polar Bears

23rd August, 2018, I was once again back at the Yorkshire Wildlife Park for the fourth time, walking up the entrance ramp to Project Polar against a tide of pushchairs and school holiday traffic. The path is busier than I have ever seen. The right-hand fence overlooking paddock two is lined with three dense rows of people, shifting and jostling for the best view, elbowing into gaps vacated at the front. Unable to see what they are looking at, I continue towards the housing unit where I am due to meet the keepers, and turn back. Nissan and Nobby are play-fighting 30ft from the walkway. Rearing up on their hind legs, they pause and lean towards each other as if waiting for the moment that they topple forwards, before half-heartedly coming together, mouths open and grunting, their enormous pads pushing off each other’s shoulders. Returning to all fours, Nissan walks forwards and Nobby retreats backwards in mirrored step, before rising up again. As they stand, a cacophony of camera shutters, clicks, and flashes erupts from the crowd at the fence. They remind me of the rows of tourists along the bow of the Hurtigruten in Svalbard, repeatedly triggering souvenir photo-bears onto memory cards and phone image libraries. “*It’s nice to see that,*” reflects the keeper – people like to capture those behaviours.

¹²²⁸ Lorimer (2015)

¹²²⁹ Snæbjörnsdóttir & Wilson (2006)

¹²³⁰ Hobbs et. al. (2013)

¹²³¹ Lorimer (2015); Lorimer (2012); Hodgetts & Lorimer (2018)



Fig.53 The crowd gathers at the fence to watch Nissan in the wood chips, Paddock 2, (H. Anderson-Elliott, 2018)



Fig.54 The Hurtigruten passengers watch a polar bear on the sea ice in the distance, (H. Anderson-Elliott, 2017)

The four bears of YWP are an overt spectacle, living breathing imagery and metonymy with the capacity to transport their viewers ‘to the Arctic’ ¹²³². Those who come to see them, like the passengers on the ship, are searching for and expecting something. One of the themes, which emerged throughout my conversations with Svalbard photographers and filmmakers alike, was ‘whiteness’, and this is reflected in the captive population also. The conditions of captivity frequently erase whiteness, without year-round ice and snow, in addition to wet weather and mud; the bears are more frequently brown. *“The spectators of course expect a polar bear to be white as snow”* ¹²³³.

¹²³² Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹²³³ Tawada (2017) p.196



Fig.55 Nobby in the corner of paddock 2, stained brown with mud and wood chippings, (H. Anderson-Elliott, 2017)

In Svalbard, Roy Mangersnes explains how many tourists are shocked by the yellowness of polar bears, and that the perception of whiteness is parallel to tropes of Arctic ‘wilderness’ and ‘purity’ ¹²³⁴. Amongst the captive population, some of the discoloration can be a reflection of condition – either of the animals themselves or of their enclosure. Lewin and Robinson outline the ‘greening’ of three bears in the San Diego Zoo in 1978 as a result of algae growing inside the hollow medullae of their hairs ¹²³⁵. Green bears have been observed in other zoos worldwide and often correlates with nitrogenous waste in their water pools ¹²³⁶. Hair loss, mange, and abscesses are frequently a reaction to allergens encountered outside the Arctic ¹²³⁷. However, some discoloration is incidental. In 2016, 13-year old Eva at Orsa Bear Park turned temporarily blue whilst trying to scratch herself on fruiting blueberry bushes ¹²³⁸. In 2017, the YWP released an April fool that a diet of Salmon had turned the bears pink ¹²³⁹. Other bears, like their monitored Svalbard cousins, are sprayed with temporary hair dyes, either as a means of numbering or as a tool to assess the rate of hair growth (measured as the dye grows out from the root) ¹²⁴⁰. Regardless of the context, the whiteness of the polar bear is often considered directly analogous to their

¹²³⁴ Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹²³⁵ Lewin, R. & Robinson, P. (1979) The greening of polar bears, *Nature* 278, 445-447.

¹²³⁶ Ibid; Cadigan, T. N. (2017) Polar bears aren’t actually white, and sometimes they can turn green, *Business Insider*, Online, Available at: [<https://www.businessinsider.com/what-color-is-polar-bear-fur-2017-12?r=US&IR=T>] Accessed: 10/04/2020.

¹²³⁷ Wilkins, K. & Cracknell, J. (2018) ‘Cases of atopic dermatitis like lesions on bears in Europe and the USA’, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 13/04/2018

¹²³⁸ Painer (2018)

¹²³⁹ Yorkshire Wildlife Park (2017) [Online] Available at: [<https://www.yorkshirewildlifepark.com/tickled-pink-for-yorkshire-wildlife-park-polar-bears/>] Accessed 10/10/19.

¹²⁴⁰ Bechshoft, T. (2018) ‘Developing and validating minimally invasive measures of health and toxicology, opportunities envisioned, including universal necropsy sampling protocols’, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018

authenticity, and at the root of their claim to polar-bearness. Other controversial incidents have occurred where the whiteness of a bear is disrupted by graffiti ¹²⁴¹. Whiteness is therefore primarily a means through which we tell stories about bears – an engagement loaded with the embodied histories of bear trapping and the fur trade – and at the same time a requirement of those living bears to fit into our categories, imaginations, and schemes of valuation.

“A brown [polar] bear is a happy bear”

– D. Ordonneau, (2018)¹²⁴²

Image redacted due to Copyright

Fig.56 Yorkshire Wildlife Park’s 2017 April fool (<https://www.yorkshirewildlifepark.com/tickled-pink-for-yorkshire-wildlife-park-polar-bears/>) [Source: Yorkshire Wildlife Park Press]

During each visit to YWP I have always taken numerous photographs, and the camera has become a vital research tool. It provides a material lens with which to frame my own imagination of these encounters, and results in the production of an image that sits at the intersection of my perception, the body of the bear, and the boundaries of the enclosure. Through the course of my visits, I can trace the evolution of my thinking through these photographic libraries. Initially, I subconsciously tried to capture images of the bears that removed them from their setting, frequently framed against the backdrop of water or sky that could produce an ambiguity. In Vienna, Dorothee Ordonneau espoused the benefit of a long waterfall in the *Cerza Lisieux* bear paddock, Normandy: in the photographs “*it sometimes looks as if it is the ice*” ¹²⁴³. These photo-bears become gatekeepers to an imagined Arctic

¹²⁴¹ BBC News (2019) ‘Polar bear spray-painted with T-34 baffles Russia wildlife experts’, [Online] Available at: [<https://www.bbc.co.uk/news/world-europe-50643315>] Accessed 28/09/2020; Paddy Power (2018) *Paddy Power: The truth about why we sprayed a polar bear*, [Online] Available at: [<https://www.youtube.com/watch?v=SdrpPtDznOY>] Accessed 28/09/2020.

¹²⁴² Ordonneau, D. (2018) ‘*Polar Bear Project 2018 Cerza Lisieux*’, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 13/04/2018

¹²⁴³ ibid

that they themselves embody. Many of the amateur photographers who visit YWP share this aim, albeit non-explicitly. There is a propensity for long lenses and high-powered zooms to capture portraits. Here is another false intimacy, projecting the encounter across the boundary into close proximity with the bears. The low fences and raised walkways facilitate these meetings, and the concurrent transformation of these four polar bears into vessels of storytelling.

Early in 2018, I borrowed a long lens from another visitor, and took the below photograph of the aptly named 'Pixel', framed against the surface of the lake in paddock 1. I circulated this image widely, personally and professionally. It's proximity, with a visibly toothed 'creature that bites' ¹²⁴⁴, and accompanying locational ambiguity both validated and re-situated myself as a researcher within legitimizing polar bear encounters.



Fig.57 My image of Pixel the polar bear, (H. Anderson-Elliott, 2018)

Towards the end of the same year, I stood on the other side of the fence from Victor. At only 20ft away, this point was one of the closest distances you could get to the bears, aside from the tunnels underneath the walkway and the covered keeper area of the housing block. Victor stands still, his breath holding in the winter cold, raising his nose and sniffing. He is far more noting of my presence than Pixel was above, even without turning towards me. He doesn't need to look. More and more, I have come to question what these creatures are, through a mixture of my better understanding of their personalities and characters, and a greater appreciation of the different values enfolded in their lives. I raise the camera and start to take some photographs. As I do, the sun breaks through behind me and illuminates the upper rungs of the wire fencing. The automatic lenses on my camera whirl onto the

¹²⁴⁴ Barua et. al. (2014)

foreground, the fence springs forwards, and the polar bear fades out of focus behind. The two images speak to the evolution of my thinking in this space, to the way that the bears are individuated here, as well as to my role as the biographer/ethnographer.



Fig.58 My photograph of Victor near the entrance to Paddock 1, (H Anderson-Elliott, 2018)

5.4.2 From Natural to Novel: Multi-Species Enclosures

In contemporary captive polar bear institutions of the EAZA and EZA, YWP included, ‘naturalization’ and ‘enrichment’ are promoted values. The two are also interrelated. The latter refers to the subjective experience of the bears themselves, and ensuring that they have what is judged to be sufficient stimulation. In Yorkshire, enriching activities often involve the giving of objects to play with – traffic cones, tyres, blocks of ice etc. – or the strategic placement/hiding of food inside boxes or specially made containers for the bears to seek out. ‘Naturalization’ is a tenet that guides some of these decisions, under the pretence that the most enriching activities might be those that mimic or enable wild behaviours – searching for food, breaking into food stores (like a seal den, or perhaps a cabin), swimming, playfulness etc. However, enrichment can also come from human interaction, and many of the bears form strong bonds with their keepers as well as seemingly seeking out company. Chris Draper, of Born Free Foundation, is critical of these semantics, in particular as a justificatory scheme for the keeping of polar bears in captivity at all. Without a total replication of their wild environment, suitable prey options (ethical questions aside), and adequate space, he questions the very category of creature that these institutions produce¹²⁴⁵. *“You could end up very quickly with something that looks like a polar bear, smells like a polar bear, shits like a polar bear, but it is not really a functional polar bear”*¹²⁴⁶. *“And if we are talking about conservation, surely the preservation of ecosystems is what we are wanting to*

¹²⁴⁵ Draper, C. (20/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹²⁴⁶ *ibid*

get to, and if this individual in captivity is functionless ... then it is not a polar bear" ¹²⁴⁷. Once again, the complex interchange of ethology and spectacle within these novel architectures is viewed as the guarantor of 'true' or 'real' beariness.

The (re)construction of a captive polar bear ecosystem is something that I have found extremely interesting. In Normandy, at the *Cerza Lisieux*, the polar bears are placed in proximity to the Arctic foxes, architecturally alluding to the spatiality of global biomes and inter-species relationships within them ¹²⁴⁸. This form of proximate animal semiotics is reminiscent of Carl Hagenbeck's ambitious Arctic panoramas at the beginning of the 20th century ¹²⁴⁹. At Schönbrunn Zoo (the German 'Tiergarten' or 'Tierpark' itself a reference to Hagenbeck's original design and lasting impact) in Vienna they have purposefully created multi-species enclosures, housing various animals that share their wild habitats, and sometimes which enter symbiotic or parasitic exchanges. Barbary macaques sit on the backs of the Barbary sheep – "*sometimes they drink the milk of the female goats*" explains a tour guide. The polar bear enclosure in Vienna is a relatively new multi-million euro development, opened in 2014 and named *Franz Josef Land*. Inside and underground it is a precisely monitored and self-contained atmospheric unit. Concrete corridors for bears and humans interweave but never meet. The walls and ceilings are lined with pipes, flowing water from the outdoor pools through a succession of vats and filters, salinity and temperature monitors, pressure gauges and turbines. It is a surreal and extraordinary industrial complex, meter needles quiver and dials flash. Above, a single icicle hangs from the plastic cap on the side of a cooling unit.

This ecosystem, fittingly produced by a company called "Wasser-Wärme-Umwelt" ('Water-Warmth-Lived Environment'), is reminiscent of other historical assemblages of central- European zoological gardens and their parallel development of engineering technologies. These were, and remain, sites of expressions of power – the collection and display of organisms from the periphery organised within the taxonomic imaginaries and architectures of Linnaean systems under the patronage of the aristocracy. In particular, King Frederick William IV of Prussia had installed a 7600 m³ water tank on the Ruinenberg hill (1748) to supply his water features in nearby Sanssouci Park, as well as pioneering ideas of steam-power that would later be influential to the development of British steam engines that drove much of the industrial revolution ¹²⁵⁰. The interplay of the subterranean civil engineering projects, industrial

¹²⁴⁷ *ibid*

¹²⁴⁸ Ordonneau (2018)

¹²⁴⁹ Zeitler, A. & Breuer, R. (2019) 'Carl Hagenbeck: The inventor of the modern animal park', *DW*, Online, Available at: [<https://www.dw.com/en/carl-hagenbeck-the-inventor-of-the-modern-animal-park/a-49106027>] Accessed 21/04/2020.

¹²⁵⁰ Wise, N. M. & Wise, E. M. (2002) Reform in the Garden, *Endeavor*, **26**: 4, pp.154-159; Wise, N. M. & Wise, E. M. (2004) Staging an Empire, in Daston (Ed.) *Things that talk: object lessons from art and science*, (pp.101-145)

modernization, scientific thought, and the power-laden spectacle of European zoological display is felt here in these corridors ¹²⁵¹.



Fig.59 The primary underground water filtration and pump room of the Vienna Schönbrunn polar bear enclosure, (H. Anderson-Elliott, 2018)

The Yorkshire Wildlife Park *Project Polar*, by contrast, was designed with the bears' welfare front and foremost. Its architecture revolves around healthy monitoring, upkeep, and enrichment, as well as emphasizing 'naturalization' in its replication of a Canadian summer landscape. However, unlike many other traditionally concrete-heavy bear enclosures, this 'habitat' is a remarkably diverse hybrid novel ecosystem, at the intersection of Yorkshire UK wetlands, adjacent pine forest, anthropogenic management, and ursine ethology.

With the bear's morning and evening feed come a crowd of blackhead and common gulls that have learned to anticipate the timings of those feeds. They flock around Nissan as he buries his head in a cardboard box of fish they themselves failed to open, waiting their turn, as magpies and jackdaws boldly creep towards the scraps he spreads. Two kestrels nest in the nearby wood, and stare from atop the fenceposts for discarded morsels. In winter, the great tits morbidly suck the blood from fresh carcasses placed around the paddocks. Before the YWP keepers could let the bears into the most recently built paddock three, they had to wait for a flock of lapwing chicks to fledge and take flight. A nesting mallard wasn't so lucky, and the bears enjoying hunting ducklings from underwater to the distress of the onlookers from the walkway. They even displayed a collaborating hunting technique, one bear visibly herding the ducks towards its concealed partner on the other side of the lake. A pair of pied wagtails

New York: Zone Books; Wise, N. M. & Smith, C. (1989) *Work and Waste: Political Economy and Natural Philosophy in Nineteenth Century Britain* (I), *Hist. Sci* xxvii, DOI: 10.1177/077327538902700302.

¹²⁵¹ Wise & Wise (2002)

have made a nest the roof of the housing block and have successfully reared offspring for their second year. Inside the enclosure the keepers have seen grass snakes, owls, stoats and weasels, moorhens, oystercatchers, red kites and buzzards. Once, an American Mink kit was seen emerging from a burrow on the tiny island in the middle of the water in paddock 2, before quickly being dragged back inside by its mother. One keeper suggests that an invasive species might not be viewed very favourably by the park's management – if they managed to survive the polar bears, I added.

The placement of four polar bears in the heart of the Yorkshire countryside, just south of the B1396, raises innumerable questions about our interaction with and perception of conservation futures, as well as the parallel narratives surrounding our spaces of captivity and display. This is the only area in England with this specific biotic community, and yet one which imaginatively and ethically alludes to a totally different landscape and latitude. The enclosure's only four occupants that cannot propagate beyond the bars are viewed by some as the antithesis to 'wild' and in opposition to 'naturalness'. Biologically they are unproductive – whilst even the role of reproductive females for the conservation of wild bears is contested, all the YWP bears are males 'surplus' to the needs of the EEP – yet they are made variably productive, both for the local ecology and for the popularity of the exhibit. I cannot help but think that their presence, and the atmospheres they exude, wilds this corner of Branton just as they (re)wild our Arctic dreams.

5.4.3 Choreographing Polar Bears: a twentieth subpopulation?

In chapter 4, I discussed the atmospheric and performative natures of different knowledge claims surrounding Misha/Frost, and how these assemblages began to anticipate and "[order] *the worlds they purported to represent*" ¹²⁵². Within this consideration is an important framing of 'conservation choreographies' – taken here to refer to how the collection of practices, assumptions, technologies, and classifications required to 'know polar bears' becomes enfolded into processes of co-production, where polar beariness itself is (perhaps unwittingly) shaped through those encounters.

Captive institutions are an even more explicit performance of conservation choreographies. They aim to reflect and replicate different values and spectacles so to reproduce 'normal' and 'real' polar bears, whilst at the same time engaging in novel practices, ecologies, and intimacies. Here, I will outline stark moments of choreography surrounding polar bear training behaviours. Not only do these behaviours (on the part of myself, keepers, and Victor) constitute a very real performance, but they also represent

¹²⁵² Lorimer (2012) p.600

a way that these polar bears become situated amongst networks of conservation imaginations, bear bodily wellbeing, keeper-bear relationships, and their ‘wild cousins’.

On December 13th, 2018, I met up with the YWP Carnivore Team Leader on the walkway above the project polar housing block to observe and participate in the polar bear training. These training behaviours are becoming a more widespread practice amongst captive polar bear institutions, as well as with other large carnivores – bears and cats in particular. In Vienna, the new *Franz Josef Land* enclosure’s housing unit was adapted to enable the keepers and bears to begin training. Other keepers at the workshop – from France, Portland, Berlin, and many others – were discussing their early successes with training, and their plans to develop enclosures to better cater for these interactions. YWP has been a leader in this field, hosting the *First European Bear Husbandry Training Workshop* in October 2017.

Through a gate in the side of the walkway, metal steps start to snake down onto the bear’s level in the housing block, then up and over their caged walkways – interlaced spaces that never meet. As we go, Victor enters the unit and walks right underneath my feet, following us inside. “*He finds the process very enjoyable*” she explains, “*we see it as another form of enrichment for them*”. Victor was accustomed to some training during his time at Ouwehands Zoo before arriving in Yorkshire. He barely noticed a transition from German to English, and has continued to grow even more responsive to commands.



Fig.60 Pixel sitting inside the bear walkways that connect the housing block with all three paddocks, directly underneath the keeper walkway, (H. Anderson-Elliott, 2018)

Through a number of locked gates and moving out of sight of the main public walkway, the back of the housing block is a long concrete area running parallel to the bars of the bears' indoor area and under the cover of the roof that juts out overhead. On the other side is the fence of the smaller holding bay. Two yellow lines run lengthways like a train station platform to indicate a safe distance. The housing unit itself is divided into three separate concrete rooms split by metal sluice gates. Each one has a taller human gate leading into it from the keeper area with a big yellow warning sign - *"Do you know where the bears are?"* Gold padlocks hang from every fixture.



Fig.61 The keeper area between the housing block (R) and the holding paddock (L), (H. Anderson-Elliott, 2018)

Towards the centre there is a single c.3ft square caged box attached to the side of the bars. It can be removed and re-affixed at slightly different elevation: one at paw-height and one at bear-head-height. As we approach, Victor is already there with his head placed inside the box. *"That's a well-trained bear"* I joke, but there is another reason. The box is only spot from which the bears can gain a good view of the entire keeper area, an incursion out of the unit and into a different shared space. In Portland, an entire bear-size box allows their occupants to venture almost entirely into the keeper's area, something that they find fascinating. These architectures are about facilitating exchange across the boundary of the fence. The bars are vital to the relationship that is being fostered, but at the same time they need to be permeable – if not to an entire bear, then to parts of it, as well as to sights, sounds, and smells. I try to take a close-up photograph of Victor, but once again can't get the automatic lens on my camera to focus beyond the bars.



Fig.62 Victor puts his head inside the box to watch our approach, (H. Anderson-Elliott, 2018)

Training for certain behaviours began as a method to assess the bears' health and wellbeing at close quarters without the need to constantly resort to tranquilizing them. A full sedation is a laborious, expensive, and stressful experience for the animals and keepers alike, and the less-frequently they are required the better. Victor did need to be tranquilized earlier in 2018 for a batch of allergy tests – a procedure that made front-page news across the UK ¹²⁵³. For all other less invasive procedures and checks, training behaviours are a remarkable solution. They consist of gestural commands, which prompt Victor to present a certain body part, position, or movement, followed by a confirmatory single blast on a whistle and a treat as reward. These behaviours are reinforced almost every day.

The first commands are simple 'points'. Balling my hand into a fist, I place it against the side of the fence at around my shoulder height. Extremely quickly Victor responds, pressing his nose against the same spot, touching against my hand between the bars. After holding the pose, and with a single blast of the whistle to recognise the success, I reach into a bucket to the side and squeeze a frozen mackerel through the bars into his waiting open mouth. I repeat this command four or five times at different points around the housing unit. When Victor strains his head upwards it allows the keepers to examine the hair on his neck, and sometimes to take a sample. When my fist is placed against the box, he once again places his whole head inside, each time rewarded with a whistle and a fish. With his head 'docked', the keepers can administer eye and ear drops, and check any injuries without any danger.

¹²⁵³ Berg Olsen, M. (2018) 'Victor the polar bear gets tested for pollen allergy', *The Metro*, Online, Available at: <https://metro.co.uk/2018/08/16/victor-polar-bear-gets-tested-pollen-allergy-7846295/> Accessed 21/04/2020; BBC News (2018) 'Yorkshire Wildlife Park polar bears given pollen allergy tests', Online, Available at: <https://www.bbc.co.uk/news/uk-england-south-yorkshire-45207746> Accessed: 21/04/2020.



Fig.63 Victor follows my command to point, placing his nose against the bars, (H. Anderson-Elliott, 2018)

Next, commands become more specific. Holding my hand up and opening it, as if imitating an animal opening its mouth, Victor follows suit. Holding this pose, the keepers can examine his teeth, a common malady amongst captive bears, although actual dental work still requires immobilization (for good reason). A whistle and a fish quickly follow. Then, holding my arms wide and outstretched, Victor backs up sideways and pushes his entire body against the fence. This enables easier access to any of the hair on his body, being able to reach without being near his mouth. Sometimes Victor is so keen for a treat that he performs different behaviours that I have not asked for. He starts to walk backwards away from the fence – he was taught to back away from closing sluice gates to avoid attacking them – but his efforts are met with silence. Instead, I crouch down and touch my right hand to the fence again, only about 1ft off the ground. Victor walks forwards and presents the opposite foot, his left, hooking his claws through the bars and holding it there. With the box fixed at its lower position, this command prompts him to place his foot inside for examinations, and he is getting very close to allowing blood to be drawn. All the while, he never meets my gaze, and I find it very difficult to look him in the eye. Our bodily languages are very different, and although he responds extremely quickly to any gesture I give, it takes me a while to realize that he is focusing on me at all.



Fig.64 (L) I demonstrate the command and (R) Victor presents his paw, (H. Anderson-Elliott, 2018)

Whilst these behaviours and interactions are vital for monitoring the bears and their health, they also have growing application for scientific research. This unprecedented and daily access to the same individuals is totally impossible with wild polar bears. The longest-term research programmes may have re-encountered the same bear 7 or 8 times at most. N23992 has been captured 5 times to-date, equating to five sets of bodily samples. Her GPS collar was running for 13 months before the battery died. Victor has been watched every day for twenty years, and will be until after his death. The appetite for this intensity of monitoring is rapidly growing, but most interesting is the intersection between captive research and wild conservation efforts. This is the primary interest of PBI in captive institutions like YWP, and the impetus behind the Vienna conference: *“How zoo bears have contributed to the understanding of their wild counterparts”* ¹²⁵⁴.

The husbandry behaviours that I performed with Victor can easily be adapted to research, and open up a wide bank of available information. Between 2014-2016, Anthony Pagano of the Alaska Science Centre and the US Geological Survey used video footage gathered from a camera attached to a polar bear collar to study foraging behaviours, activity patterns, energetic rates and nutritional demands ¹²⁵⁵. The research, published in *Science* in early 2019, indicated that polar bears have far higher metabolic rates and energetic demands than previously assumed, and that reductions in sea ice were greatly

¹²⁵⁴ Owen, M. (2018) *‘How zoo bears have contributed to the understanding of their wild counterparts, physiological ecology, behavioural and sensory ecology, reproductive physiology, technology’*, Conference Presentation, The First European Workshop on Polar Bears and Conservation Science, Vienna Tiergarten Schönbrunn, 12/04/2018

¹²⁵⁵ Pagano et. al. (2019)

exacerbating these demands ¹²⁵⁶. The research, funded by PBI, WWF, and the USGS Changing Arctic Ecosystems Initiative amongst others, was also in collaboration with Megan Owen at the San Diego Zoo ¹²⁵⁷. The collars were initially tested on Tuki the polar bear in SD, and it was through this more intensely monitored test period that a lot of the data collected from wild bears could be both calibrated and validated. Other attachments on the collar such as the accelerometer could be compared with visual observations of movement (swimming, sleeping, running etc.) to better calculate metabolic rates associated with different activities and their corresponding readings. These readings also incorporated data from zoo bears in Portland, where scientists had developed a water treadmill to assess the energy demands of swimming ¹²⁵⁸.

Many other research pathways are also expanding – from assessing polar bear sensory modalities to the scent communication encoded in footprints ¹²⁵⁹. Another interesting avenue is the use of hair samples, like those collectable from Victor during the training behaviours. One measure of stress is to assess the cortisol levels expressed in the transect of a hair. With access to frequent samples, and a detailed understanding of growth rates (often marked with the use of a hair dye), the stress physiology of polar bears can be extrapolated into a metric that can be used to assess the stress levels of wild bears from a single sample ¹²⁶⁰. This can further the understanding of ‘disturbance’, in particular from noise, and its impacts of cub survival. In all of these contexts, the zoo population has immense value for the development and extrapolation of research parameters, as well as the capacity to translate this work into meaningful conservation outcomes ¹²⁶¹. All of these pathways begin with the performance of the training behaviours.

Back in Vienna during dinner, I proposed a provocative idea. The 125 captive bears in Europe, and their US counterparts, constitute an entirely new subpopulation. Their propagation through space is remarkably different – coaxed into crates and loaded onto planes. Genetically, the captive subpopulation is relatively discrete, with historical roots in Svalbard and other areas with high rates of hunting and capture. In the future, there is talk of increasing that exchange through the insemination of wild-gathered sperm into captive females to broaden the genetic pool. With this in mind, the mate selection and reproduction of the captive subpopulation is another novel ecology – determined through studbook calculations of ‘priority’ and ‘surplus’ and exercised through orchestrated meetings, surgical

¹²⁵⁶ *ibid*

¹²⁵⁷ Owen (2018)

¹²⁵⁸ Cutting, A. (29/10/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹²⁵⁹ Owen (2018)

¹²⁶⁰ *ibid*

¹²⁶¹ Owen (2018)

implantation, and frequent multi-species adoptions. The captive bears hybridized with humans: they inherit names and show intimacy; male mothers become the primary milk givers and performatively shape polar beariness along standardized behavioural metrics of 'normality'. This is the most intensely monitored subpopulation of polar bears in the world, but perhaps also the least understood. The bears inhabit and co-produce novel ecologies and exhibit novel ethologies. Yet at the same time there is an aspirational journey northwards, a return migration of dual significance: both in the (probably unrealistic) dreams of re-population and re-introduction, but also in the Arctic imaginaries that they provoke. In that sense, the captive population is even more performative: choreographed bear lives that flow through hybrid entanglements. They are polar bears that are tasked with representing and rehearsing more universal perceptions of their species.

In Yorkshire, there is one final trained behaviour to observe with Victor. Using a large blue rubber ball attached to the end of a pole, the keeper reaches up and places it against the highest bars of the fence. Victor stares up for a moment and laboriously stands to his feet, placing the pads of his paws flat against the gate. At full height, he stands nearly 10 feet tall, and towers over us. This pose, far more than the others, is immediately reminiscent of historical images of dancing bears. The training behaviours have sometimes been considered controversial – one Czech keeper at the 2017 workshop decried it as *"Western culture showing off"*¹²⁶². But encoded within this discomfort is the core discussion of this chapter – the merging of contrasting images, spectacles, and the corresponding histories of care and concern, violence and domination. All captive bears exist on a spectrum from exhibition to experimentation, a dichotomy reflected in the Svalbard population too. They also embody a fundamental question about the types of bears and beariness that we co-produce through our desire to 'save them' – what is it that we are really conserving?

¹²⁶² Anonymous Participant



Fig.65 Victor begins to stand against the fence, (H. Anderson-Elliott, 2018)

5.4.5 Victor – 1998-2020

In late August 2020, YWP released that news that Victor had died. After a “*short illness*”, and subsequent diagnosis of terminal kidney failure, he “*had to be euthanised*”¹²⁶³. I found his death deeply affecting – not least because of my own odd multi-species affection that I had developed for a bear I had spent so long observing, but also as a result of the discomfort with which I read the rhetoric with which he was eulogised across national newspapers. First, was the ease with which zoo animals are “*made to die*”, to twist Foucault’s famous epithet on biopower¹²⁶⁴. After years of debate surrounding the expressions of forms of animal agency¹²⁶⁵, the decision to end a captive nonhuman’s life remains an uncomfortable accountability that accompanies their seeming domination¹²⁶⁶. The writings that followed cast Victor in various overtly anthropomorphised roles – as a proud and prodigious father-figure whose prolific breeding success had led to a much-earned ‘retirement’ at YWP, and, consequently, as another “*great ambassador for his species*”¹²⁶⁷. Here, in these appropriated and gendered human equations for the valuation of lives lived and ascribed modes of bear agency, Victor’s death is negotiated amid the convoluted world of nonhuman care as we collectively assuage our

¹²⁶³ Slawson, N. (2020) Oldest Polar Bear in the UK dies aged 22, *The Guardian* [Online] Available at: [https://www.theguardian.com/world/2020/aug/22/oldest-polar-bear-in-uk-dies-aged-22] Accessed: 29/09/2020.

¹²⁶⁴ Foucault (1997)

¹²⁶⁵ Howell (2017)

¹²⁶⁶ Ingold (2000)

¹²⁶⁷ Slawson (2020); BBC News (2020) Yorkshire Wildlife Park: UK’s oldest polar bear dies, [Online] Available at: [https://www.bbc.co.uk/news/uk-england-south-yorkshire-53873525] Accessed: 29/09/2020.

societal guilts. *"I hope he had a good life"*, wished my supervisor, in an email addressing his passing – a question I am aware I cannot answer. Victor's life was not without suffering. In various of his zoo enclosures he exhibited classic stereotypies, repetitive behaviours indicative of stress, whilst his feet were a constant source of concern as he adapted to the biotic allergens of YWP after so long spent on disinfected concrete substrates painted to resemble ice. His life, it seems to me, cannot be assessed, despite our collective reasoning and our desire for meaning, closure, and narrative. Victor's story is one inexorably bound with the anxieties of our Anthropocene world – a polar bear whose enrolment within (and reflection of) our institutions and societies of their keeping, 'conservation', and care, came to embody a complex and dystopian multi-species future. For three years I have asked what it might be to know him, relate to him, and individuate him, and what those discussions might herald for our practices of living in the world. Death is perhaps a logical end to biography, accompanied by an admission of the varied forms of multi-species grief that attend to the ending of a life and all that was embodied there.

6.0 Conclusions

6.1 'Known Svalbard polar bears'

This thesis has been an exercise in framing and re-framing polar bear conservation and crucially the very polar bears that are at the heart of those aims, communities, networks, and imaginations. At its crux, it questioned how we (as a group of engaged human actants who make a claim to know polar bears in Svalbard for their 'conservation') come to understand what polar bears are. Not only that, but I sought to problematise how those diverse and multi-natural conceptions are bound up with (that is to say both producing and produced by) (a) our technologies, methodologies, and epistemologies of enquiry, (b) our natural-cultural preconceptions, anxieties, and senses of self/other, and (c) our hopes and aims for the future, and the orchestration of corresponding ecologies/spectacles. Put simply, it hoped to demonstrate that there are multiple ways of 'knowing polar bears' that also correspond to different ways of living with them in the world and how they are enacted ¹²⁶⁸. In each context, what we come to consider successful or desirable 'conservation' – the decisions to preserve/protect/produce particular ecologies, ethologies, physiologies, and spectacles of 'polar beariness' – depends on a complex and networked 'polar bear society': its history, individuals, politics, and future.

Initially, I outlined a set of theoretical steps that provided a basis for broadly approaching 'knowing wildlife' in this way. It is grounded in work on the Anthropocene ¹²⁶⁹ and the Environmental Humanities ¹²⁷⁰ that unseats our previously held assumptions of "modernity" and the "modern" ¹²⁷¹. We must acknowledge that 'Nature' and 'Culture' are not separate, and never have been. In their place, we are asked to imagine a dynamic and integrated multi-naturalism ¹²⁷² beyond the outdated 'great divide' ¹²⁷³. Without this universal and external singular 'Nature', our attention is drawn to the 'ecologies of becomings' ¹²⁷⁴ and questions of power, purification and politics around the construction of these multiple natures ¹²⁷⁵. In particular, I was interested in how multiple constructions of 'polar bear' (multiple 'natures') are enacted in "*common, day-to-day, socio-material practices*" ¹²⁷⁶. This attentiveness followed calls from Latour ¹²⁷⁷, Mol ¹²⁷⁸, and Candea and Alcayna-Stevens ¹²⁷⁹ for an

¹²⁶⁸ Lorimer (2015)

¹²⁶⁹ Bonneuil & Fressoz (2016); Tønnessen et. al. (2015); Lorimer (2015); Steffen et. al. (2011)

¹²⁷⁰ Robin (2017); Heise (2016); Van Dooren et. al. (2016); Heise et. al. (2017)

¹²⁷¹ Latour (1993); Lorimer (2015)

¹²⁷² ibid

¹²⁷³ Latour & Weibel (2005)

¹²⁷⁴ Lorimer (2015) p.7/8

¹²⁷⁵ Haraway (2008); Hacking (1983); Latour (1991)

¹²⁷⁶ Candea & Alcayna-Stevens (2012) p.39

¹²⁷⁷ Latour (1999)

¹²⁷⁸ Mol (2002)

¹²⁷⁹ Candea & Alcayna-Stevens (2012)

ethnographic approach to (multi-) naturalism, using tools from STS and ANT to focus on the actants, spaces, and tasks engaged in ‘knowing polar bears’, and how their resultant ecologies are made to matter ethically and politically. I proposed to follow the work of polar bear scientists, filmmakers, and photographers, as well as managers and politicians, to explore how polar bears became knowable through the intermediaries of their “*professionals, disciplines, and protocol[s]*”¹²⁸⁰. Approaching multi-naturalism in this way facilitates discussions about truths, authority, and expertise – how different ideas of ‘polar bear’ are fixed in different data- and digital-ecologies through the purifying work of these communities¹²⁸¹. These I identified as the enfolded actor-networks of knowing polar bears¹²⁸² – diverse societies of actants, values, and stories. Here too, therefore, are a collection of competing enactments of the polar bear, whereby they are mobilized, co/re-produced in numerous contexts and alongside corresponding institutional structures/societies. This thesis did not aim to distil or re-distil the social construction of bears, but instead to demonstrate how they coexist ‘in tension’¹²⁸³ – a generative, modest, and attentive multi-naturalism.

With this theoretical framework, I hoped to demonstrate how our human understandings of the polar bear as a species is deeply entangled with our modes of knowledge production – notably scientific research and image-capture – that are themselves grounded in extensive technological histories. At the same time, after Lorimer, I wanted to suggest how this “*ontology of wildlife has important epistemological and political considerations for conservation*”. Using Adams’ definition of conservation as an explicit value judgement made about the relationships between humans and nature[s]¹²⁸⁴, I proposed that the ways that polar bears in Svalbard come to be ‘known’ are therefore inseparable from how we come to imagine, choreograph, and legislate their ‘conservation’. This prompted my core research questions: what do these multiple conceptions of the polar bear mean for what we hope and aim to ‘conserve’? What do we think polar bear conservation in Svalbard means? What are we really conserving, how, and why?

6.2 Methodology and Misha

Methodologically, these questions and the theoretical context that instigated them provide different challenges and opportunities. As primarily ethnographic research, the data collection focussed on

¹²⁸⁰ Asdal (2008) p.2

¹²⁸¹ Latour (1999)

¹²⁸² Latour (2005); Mol (2010)

¹²⁸³ Turnbull, D. (2006) Multiplicity, Criticism and Knowing What to do Next: Way-finding in a Transmodern World. Response to Meera Nanda’s *Prophets Facing Backwards*, *Social Epistemology*, **19**: 1, pp.19-32.

¹²⁸⁴ Adams (2002)

extensive semi-structured interviews, participant observation, as well as photography, some assessment of priorities/epistemologies in scientific literature and conservation/management policy, and a moving-image method ¹²⁸⁵. In addition to the practical application of these methods, I found it useful to think and work with a broader methodological consideration that helped to focus research questions and handle inherent complexity. After Krebber and Roscher ¹²⁸⁶, I proposed a use of *animal biography*. I suggested how thinking biographically could simultaneously engage ethnographically with human actants and more-than-human lives, as well as finding generative potential in awkward frictions ¹²⁸⁷. This concept is attentive to how different groups and communities tell/know polar bear lives, whilst acknowledging different forms of authorship, agency, affect, and voice. A key aspect of animal biography is the notion of ‘individuation’ ¹²⁸⁸, how a polar bear is made to matter ‘as an individual’ within the societies of actants that engage with them, and, ultimately, make a claim to their conservation.

At the core of this work is an animal biography of a single polar bear known as either Misha, Frost, or N23992, who developed into the more-than-human protagonist of my research. She is an extraordinary bear that has had a very wide range of different engagements with different human actants. ‘Individuation’ has been central to my exploration of these interactions, allowing for a nuanced perspective on a single bear breaking away from the collective in various contexts. After first hearing about her in 2017, trying to follow her life through the intermediaries of the people who know her has guided my research ever since. In each instance, she, her life, and how she is individuated, constitute very different understandings of what a ‘polar bear’ is, and how that is made to matter in different political and ethical contexts. Whether as a coded data-bear within the wider sub-population, framed through a range of bodily samples and GPS fixes to educe pollutant contaminant loads and life history; or as a named and anthropomorphised photo-bear playing the role of a different kind of protagonist in nature documentaries and climate change messaging, she represents the multi-naturalism at the heart of our entanglements with wildlife ¹²⁸⁹. At the same time, her parallel experience of living with humans has drastically altered her life – her behaviour, physiology, and ecology. Not only do the human interactions with polar bears account for how we conceptualise their species and develop the priorities of our conservation imaginations, but also the atmospheres created during the tasks of telling those stories ¹²⁹⁰ (be it scientific fieldwork, film or photographic image-capture) also actively co-produce the

¹²⁸⁵ Lorimer (2010)

¹²⁸⁶ Krebber & Roscher (2018)

¹²⁸⁷ Lorimer (2014)

¹²⁸⁸ McIntosh (1995)

¹²⁸⁹ Lorimer (2012)

¹²⁹⁰ Hodgetts & Lorimer (2018)

very polar bears that they purport to ‘know’. This is the crux of my methodology, an animal biography, or ‘*knowing Misha*’: multi-natural polar bears, affect, and wildlife conservation.

6.3 Scientific Polar Bears: *N23992 as a ‘conservable’ bear*

In this chapter I explored how polar bears in Svalbard then come to be ‘known’ through the tasks of the Norwegian Polar Institute’s (NPI) polar bear research programme. I started by exploring the historical development of their modes of examination – the pioneering voyages of Thor Larsen and company in 1965/6 to the East of Svalbard, and their efforts to capture-recapture the first polar bear of the fledgling programme ¹²⁹¹. This experimentation, along with the subsequent international cooperation instigated by the creation of the PBSG, was influential in the establishment of standardized scientific protocols that are largely intact today. At the same time, the deployment of particular technologies and the corresponding knowledge aims to which they hoped to contribute, also cemented different imaginations of wildlife, their ecologies, ethologies, and their conservation – rooted in these socio-technical histories.

To further elucidate this relationship between the tasks of scientific enquiry and the resultant ways that polar bears become ‘known’, I followed this bear’s ‘scientific life’ as polar bear N23992. From the moment of her first scientific capture in 2009, at which point she was inscribed with this alphanumerical code and enrolled within the NPI programme, I examine the many and varied transformations, translations, and purifications that she undergoes ¹²⁹² – from ‘wild’ polar bear into samples, datasets, results tables, reports, and publications. Here too was a question of how an individual polar bear is made to matter, notably within the population-wide survey of her species and their future. An individualized bear is here a single data-point contribution to broader trends and relationships within and between the Svalbard subpopulation, her GPS movements and bodily measurements attaining analytical significance as parts of a statistically modelled whole. Yet, at the same time, I discussed the impacts of these entanglements upon the life of N23992 as an individual, what sort of polar bear she becomes, and what these contradictions and tensions can tell us about the sorts of polar bears that are made to live.

N23992 is a cyborgian polar bear, her body enfolded with various technological organs of monitoring that place her in continual data-exchange with satellites overhead, and with the computers at NPI’s offices in Tromsø ¹²⁹³. The GPS radio-collar that she has worn since 2017 fixed hourly locations for over

¹²⁹¹ Larsen, T. S. (01/03/2017) *Research Interview*, Skype, SPRI, Cambridge.

¹²⁹² Latour (1999); Yates-Doerr & Mol (2012)

¹²⁹³ Haraway (2008)

a year, not only enabling a detailed (plot) purification of her annual movements, but simultaneously connecting her to an extensive history of military tracking and surveillance that, through the innovation of the Craighead brothers ¹²⁹⁴, had made massive inroads into wildlife management ¹²⁹⁵. She is a four-dimensional being ¹²⁹⁶, inhabiting both the pixels on our screens and the ice of Western Spitsbergen. On the surface, her movements, when collated with other tagged bears, enable the analysis of the spatial dynamics of the Svalbard subpopulation, and helped to identify a biogeographical split between ‘local’ and ‘ice-floe’ bears. But for N23992 herself, these GPS fixes are more than mere movements, they are ‘mobilities’, coded with the ethics and politics of living with polar bears in Svalbard ¹²⁹⁷. They demonstrate different patterns of polar bear learning, ethology, and ecology – clusters of activity and opportunity gleaned from seasonal cycles as well as human influences – visiting and re-visiting huts, bird colonies, and fjords with a high-frequency of seals. They also facilitate the management of bear/human spaces: alerting the Svalbard governor’s office when N23992 is approaching too close to settlements and initiating a response to scare her away.

Further data is gleaned from N23992 at capture, where bodily samples are extracted under tranquilizer. New stories are educed from centrifuged vials of blood, stable isotope analyses, and toxicology screenings, of a polar bear adapting to different food sources and contaminated with numerous widespread organic industrial chemicals ¹²⁹⁸. Their impacts on bear biology are largely unknown ¹²⁹⁹, but these corporeal stories have great significance for how N23992 is perceived. She is a bear of the Anthropocene, deeply entangled within the emerging actor networks of human-wildlife interactions, nature-cultures, and hybrids ¹³⁰⁰. Through successive acts of violence over the course of a decade – shooting her with a dart as she flees from a helicopter, immobilising her and coercing her body into ‘confession’ ¹³⁰¹ – the attempts to ‘know’ N23992, as an individual and as part of the population, actively co-produce a new bear. In the efforts to make N23992 ‘conservable’, her very physiology, mobility, and even ethology, has been deeply influenced by her role in this regime of living with and understanding polar bears. Her life is testament to the enactment of a polar bear: its practices, politics, and precarity.

¹²⁹⁴ Benson (2010)

¹²⁹⁵ Adams (2017)

¹²⁹⁶ Scott (2015)

¹²⁹⁷ Hodgetts & Lorimer (2018)

¹²⁹⁸ Routti, H. (19/11/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹²⁹⁹ *ibid*

¹³⁰⁰ Haraway (2008); Haraway (1991)

¹³⁰¹ Castellano (2018)

6.4 Misha and Frost: a polar bear on film

Misha has also encountered many filmmakers and photographers. Svalbard is an immensely popular destination for these industries, facilitated by the Oslo Agreement in 1973 and the decades of bear population recovery without the pressures (and learned fears) of hunting (that persists through the protected rights of Indigenous take in Greenland, Northern Canada, and Alaska) ¹³⁰². In this chapter, I examined Misha's role on film: how she is enrolled into the telling of particular stories about polar bears and their future; further discussions about the importance of individuation and how Misha as an individual is made to matter; and how the tasks of telling these stories on film have actively shaped how she lives her life. For my multi-natural understanding of Misha, many of these narratives demonstrate the incompatibility of different versions of the same polar bear – be it N23992, Misha, or Frost – and how they represent numerous potential futures for how we might approach the conservation of her species.

Initially, it might seem an unconventional group to approach for an ethnography of polar bear conservation. However, despite the potential gatekeeping of the polar bear science community, this parallel group of image-makers also lays some claim to be working for some form of 'conservation' – expressed through different metrics, methodologies, and epistemologies. Notably, they are vocally critical of the perceived transformation to the polar bear that is instigated by its enrolment into NPI's scientific programme. To them N23992 is no longer truly 'wild', perhaps not even a real polar bear anymore, partly as a result of the visible technological changes to her (particularly how the radio-collar is captured on film), and partly as a result of a more subconscious alteration to the very idea of her. In contrast, they make a comparable claim to 'know' her, shot instead with zoom-lenses, and captured instead within images. The mass distribution of their work has also prompted their claims that they have an even greater (if indirect) impact on the conservation of the species, influencing public opinion and support for measures to mitigate GHG emissions.

Through their work, I searched for Misha, gradually learning to identify her through a mixture of unique physical characteristics and the collation of other forms of data across time/space (i.e. dates, locations, age/size of her cubs). In each instance, I was fascinated to see the particular stories and forms of encounter that her images elicit, and what they could tell us about our human relationship to her species. From the BBC, to ITV, to National Geographic, to Netflix, Misha has featured in hours of film, and thousands of frames and photographs. This was a question of 'evocations' – what sort of polar bear was made to live through these engagements ¹³⁰³?

¹³⁰² Mangersnes, R. (03/09/2017) *Research Interview*, Radisson Blue, Longyearbyen.

¹³⁰³ Anderssen & McPhearson (2018); Lorimer (2010)

Misha was frequently, and most popularly, filmed with cubs (most notably with her 2012/13 cubs 'Lucky' and 'Light'), and in these sequences there are common tropes. She is often praised as a 'good polar bear mother', an exemplary individual for the survival and education of her cubs. Here, she is overtly anthropomorphised, narrated in human terms to allow viewers to empathise with the familial scenes that are unfolding on screen. Downplaying the often-brutal reality of her predation as a 'creature that bites'¹³⁰⁴, her family unit is presented as fragile and embattled – not only against the threat of unpredictable, lusty, and infanticidal males, but also against the ever-present backdrop of her melting Arctic home. At the same time, the images of Misha teach us what to value, a creature emblematic simultaneously of wilderness and our extraordinary capacity to erode it. In the pristine whiteness of her pelt, and the picturesque backdrops, we don't see the industrial pollutants in her bloodstream, the tattoo on the inside of her lip, we don't even see the radio-collar as it was edited out by Netflix for *'Our Planet'*, we don't see the camera operator, and we are urged to ignore that she does.

The camera has long demanded authority as an instrument to capture reality¹³⁰⁵, but, as Aitchison highlights, "*film is made up of snatches of reality*", images that are constitutive of something joined together to produce something else entirely¹³⁰⁶. Editing and modes of authorship are widespread and underacknowledged throughout Misha's footage, and are both important for understanding how she is individuated. Frequently, the films, programmes, and sequences that feature her make a claim to following an individual bear, both for the continuity of their narrative and to maximise viewer empathy with a continuous protagonist. More often than not, images of Misha are spliced with those of 5-10 other bears, stitched together in a manner that makes them seem like an individual animal. Less frequently, editing and computer animation/manipulation is used even more overtly to manufacture particular scenes, images, and corresponding feelings. There is a paradox here, that the individuation of a polar bear is crucial to the emotive register of the programmes, yet it is secondary to the requirement for said polar bear to also perform the role of an 'every-bear' – a generalized guarantor of their entire species – a role that must be choreographed precisely with the use of multiple individuals. How we view this hybrid bear is itself bound with the values, held assumptions, and cultural preconceptions of our relationships to wildlife (and to ourselves), incidentally the very same impetuses that influenced its creation. Misha is one of Berger's animals "of the mind"¹³⁰⁷, a reflection of the polar bear in our imaginations.

¹³⁰⁴ Barua et. al. (2014)

¹³⁰⁵ Sontag (1977)

¹³⁰⁶ Aitchison, J. (20/07/2018) *Research Interview*, Skype, SPRI, Cambridge.

¹³⁰⁷ Berger (2009)

Beyond the screen, behind the scenes, this bear's interactions with filmmakers and photographers has deeply influenced her life and those of her cubs. The atmospheres that they exert and their pervasive impacts upon her behaviours and mobilities further complicate notions of individuation. Whilst a polar bear 'as an individual' matters to the narrative arcs of documentary film sequences, ironically being created from a composite of multiple bears in order for that 'individual' to fit the collective narratives that are required of polar bear-ness, at the same time these very tasks are responsible for altering the 'real' material-semiotic polar bear at the heart of these engagements. Misha is well-accustomed to human presence and unafraid of camera crews. It is this habituation that earns her the title of 'good bear' – a bear that will continue to behave 'naturally' around people so that the sequences captured can be representative of 'real', 'wild' behaviours. At the same time, her very ecology is altered by frequent contact with humans, from the fjords she prefers, the seals she hunts, the opportunistic food sources she investigates, to her actual hunting strategies, this bear inhabits a dynamic and continually re-shaped digital Svalbard. Not only that, but the inherited behaviours of her cubs have led to instances of conflict and resulted in the death of 'Lucky' (one of her 2012/3 cubs that appeared most on film from 2013-15). In 2020, one of her later cubs pursued a dogsled near Bolterdalen and was only scared away when the driver hit him on the nose with a rope ¹³⁰⁸. Many of the filmmakers fear for the bears' future, concerned that she too will end up shot.

This chapter, therefore, explored another mode of co-production and enactment, whereby the ways that we tell stories about polar bears are also bound up in the active formulation of different bear bodies, ecologies, and behaviours. Even through the work of actants who make a claim to know bears for 'conservation', making and circulating different loaded perspectives of the species – tropes of wilderness preservation and wildlife anthropomorphism – the process of capturing these photo-bears not only exposes the complex cross-weaves of vulnerability, culpability, and accountability in our relationships to wildlife ¹³⁰⁹, but also demonstrates the multiplicity of different ways that polar bears are conceptualised, individuated, and ultimately made to matter. How we hope/choose to live with them in the world is negotiated in and between these messy networks.

6.5 *Choreographing Polar Bears in Captivity?*

This final chapter represented a divergence from some of the settings and actants of the rest of the thesis, but in doing so was intended as a 'wild experiment' ¹³¹⁰, testing and exploring some of the

¹³⁰⁸ Helgestad, A. (2020) *Personal Communication via email*

¹³⁰⁹ Macfarlane (2016)

¹³¹⁰ Lorimer (2015)

themes of the rest of my work on ‘knowing polar bears’ in a more extreme, dystopian, and anthropocentric world. Here, I spent time at the Yorkshire Wildlife Park during 2018/19 observing, participating with, and studying their four captive polar bears – Victor, Pixel, Nobby, and Nissan. It was my intention to explore spaces of captive husbandry and their cultures of (re)production, in doing so diverging from some of the more conventional understandings of these institutions as defined by domestic/wild dualisms. I also did not approach YWP primarily as a site of ‘conservation’ in the way that zoos/wildlife parks so often are, through the potential for breeding and re-release of their charges, a framework that is largely invalid for polar bears. Instead, here was a site that helped us to re-define the ethics, politics, and narratives of encounter, and the futures that they foreshadow.

Methodologically, this chapter was a zoobiography, after Krebber and Roscher ¹³¹¹, asking what these institutions and settings could teach us about how we know, (re)produce, and ‘make live’ their non-human inhabitants. Following the history, establishment, and controversy of these spaces, and specifically the housing of polar bears in the UK, I examined further ‘roles’ that they play in novel modes of encounter and the political lives of their housing institutions, nations, and even of their wild cousins. These were questions of ‘choreographing polar bears’ – the specific architectures, interactions, and spectacles that are produced here, and what more they can tell us about our relationship to this species and the imagination of our shared future.

Most interesting to me was the proliferation of a rhetoric of ‘real’ or ‘normal bears’ within and between captive institutions during their discussions of appropriate husbandry protocols. Historically, the perception of normality followed the deployment of particular spectacles – all too frequently the gestural allusion to ‘natural habitats’ with white-painted concrete ice-floes and Arctic murals ¹³¹². However, with the pressure of animal welfare groups and the corresponding re-invention of the zoo space, institutions like YWP focus more on behavioural ‘naturalization’ concepts, aiming to reduce visible stereotypies, actively ‘enrich’ the lived experience and curiosity of the bears, as well as promoting socialisation between them, and between them and their keepers. Through my observations at YWP, as well as further interviews and conference-attendances, I explored what it meant to make real/normal bears, and what it took to create them. What emerged was a surreal world of human-bear surrogacy, fostering, performance, inter-species learning, communication, and milk-giving. From captive mother bears producing no milk, to male human ‘mothers’ crawling on all-fours to encourage their charges to behave ‘like a bear’. I was also fascinated by the YWP ‘training behaviours’, that produced a common language of gestures and signs to enable keepers to assess bear health, gather

¹³¹¹ Krebber & Roscher (2018)

¹³¹² Engelhard (2017)

scientific samples, and administer medicines, without the need for tranquilizers. Within these extraordinary entanglements, I found even more compelling examples of human-wildlife co-production, and even more overt instances of how our imaginations of polar bears, their bodies, behaviours, and futures, actively influences the types of bears that we make live here.

How we come to 'know' polar bears is intimately bound up in the wealth of our engagements with their individuals, spaces, and species – from scientific research methodologies; to film and photographic images; to the inroads of political cares and concerns; even to the keeping, breeding, and fostering of them in captivity. Consequently, it is through these actor-networks that polar bears themselves are produced, live, and are made to matter.

6.6 Meeting Misha?

Throughout this work I have always wanted to meet this bear. I have been aware that for years I have been studying, searching for, and speaking about a polar bear that I had never met face-to-face. At the same time I was unsure what meeting really means, whether throughout the years of tracking her; wishing her survival as I checked the codes of bears killed on Svalbard; and yearning to find more, learn more, and hear more about her; I had in fact been harking after a falsehood – a form of closeness that not only is untenable across our species boundary, but an intimacy that does not exist. I asked myself frequently about the agency of caring for a non-human who is, I'm fairly certain, totally unaware of my existence, as well as the legitimacy of claiming some authority over the authorship of her life. By encountering her physically, I remain unsure what I would be hoping to find, and perhaps more interested to acknowledge what I would not find – affirming even further the extraordinary engagements that I have had with wildlife in the digital ecologies of our Anthropocene age. At the same time, over the past 5/6 years I have felt a deepening affect, what others have described to me as the becomings of a 'bear-person', not only a form of institutional or disciplinary identity that is fostered from existing in one's subject-matter, but an even more enfolding sense of personal identity. Finding her felt significant, if not for her, or even for this thesis, but, as I have come realise, for me.

In May 2018, whilst in Longyearbyen on my second fieldwork trip, I decided to make an effort to meet her. I could not justify spending more than a day for this aim, burdened by the very great costs (financially and physically) of travelling in Svalbard, and the increasing list of interviews I needed to complete in a dwindling number of days. On two snowmobiles, a small group of three of us set out from Longyearbyen in the early morning, helped by the 24 hours of daylight and a sledge loaded with enough provisions if we became stuck anywhere along the way. By this time in the late spring, as the melt is

beginning across the usual tourist routes, the sea ice is scored with thousands of snowmobile tracks, like motorway thoroughfares across the expansive fjord systems. Over the week preceding I had heard from both Jon Aars at NPI and Asgeir Helgestad that this bear was spending most of her time at the far end of Tempelfjord near the glacier front, with her yearling cubs from the winter of 2016/17. Approaching the mouth of the fjord from the south, we paused on the landward ridge next to Villa Fredheim, and scanned for any signs of movement. As our engines spluttered into silence, three ringed seals lifted their heads momentarily from the ice, and the nearest one slowly slipped back into the water through an invisible breathing hole. Gradually over the coming hours, we slowly crisscrossed our way down the length of Tempelfjord, pausing frequently to search. The silence was nearly total, save for the seabirds clinging to the cliffs on the southward side. As we went, we tested the ice thickness every 100 meters or so, digging a hole with a hatchet until we reached seawater and assessing whether the depth is longer than the hatchet handle. Less than that and our snowmobiles could fall through. As we progressed, and the hours of watching and waiting passed, our measures of the ice thickness gradually decreased until finally it became ill-advised that we continue.

We never found her. On the ice beside us, polar bear tracks trudged off past the hole we had dug, and off out of sight, where we could not follow.



Fig. 66 The search ends. Polar bear prints continue off across the fjord ice in front of us where we can no longer follow with our snowmobiles. (H. Anderson-Elliott, 2018)

Over the next two years, I kept in steady contact with my participants, hearing their updates about Misha, Frost, or N23992, however they know her. They met her cubs, captured them, discussed her

future, noted her appearances in other documentaries, and sent over their most recent photographs. However, as the Coronavirus spread inexorably around the globe, so these networks of keeping tabs on Misha became steadily weaker and more distant. Under lockdown, the Svalbard governor prohibited all non-essential activity and travel around the archipelago, filming trips were cancelled, and permits revoked. Gradually, this information dried up, and disappeared. Misha's radio-collar battery died over two years ago, and she is due re-capture by NPI, but I am unsure if that will go ahead. Jason Roberts has been unable to work, and Asgeir Helgestad has been denied in his application to continue filming 'Frost' for the sequel of his documentary. Apparently, she has two new cubs, he explains, from hearsay and some photographs he had seen. But to me, she has almost totally disappeared. A polar bear once so ubiquitous that I found her on a postcard sold in the museum giftshop underneath my department is now almost entirely absent. I wonder now, what this makes her. Whether she is finally 'wild', still healthy, or even there at all.



Fig. 67 Portrait of Misha the Polar Bear, (H. Anderson-Elliott, 2020)

Appendices

I: List of Interviews and Interviewees:

1. **Dr. Jon Aars**, Senior Research Scientist at Norwegian Polar Institute (NPI),
Interview: NPI offices, Tromsø, 10/08/2017
2. **John Aitchison**, Wildlife Camera Operator, Photographer, and Author
Interview 1: Phone Interview, SPRI, Cambridge, 17/02/2017
Interview 2: Phone Interview, SPRI, Cambridge, 20/07/2018
3. **Birger Amundsen**, Photographer, Writer and Journalist, Author of *Uten Nåde*
Interview: Onboard MS Fram, North of Spitsbergen, 17/08/2017
4. **Dr. Magnus Andersen**, Scientific Research Department, Norwegian Polar Institute, NPI
Interview: Skype Interview, SPRI, Cambridge, 15/03/2018
5. **Prof. Nigel Bankes**, Faculty of Law, University of Calgary
Interview: Skype Interview, SPRI, Cambridge, 05/12/2018
6. **Leanne Clare**, Senior Manager of Communications, WWF Arctic Programme
Interview: Zoom Interview, SPRI Cambridge, 13/11/2018
7. **Prof. Doug Clark**, Associate Professor, School of Environment and Sustainability, University of Saskatchewan
Interview 1: Skype Interview, SPRI, Cambridge, 14/05/2018
Interview 2: Skype Interview, SPRI, Cambridge, 29/05/2018
8. **Amy Cutting**, Animal Curator, Oregon Zoo, Portland
Interview: Skype Interview, SPRI, Cambridge, 29/10/2018
9. **Prof. Andrew Derocher**, Professor of Biological Science, University of Alberta
Interview 1: Skype Interview, SPRI, Cambridge, 16/01/2018
Interview 2: Skype Interview, SPRI, Cambridge, 16/01/2018
Interview 2: Skype Interview, SPRI, Cambridge, 24/07/2018
10. **Dr. Chris Draper**, Head of Animal Welfare and Captivity, Born Free Foundation
Interview: Skype Interview, SPRI, Cambridge, 20/11/2018
11. **Morten Ekker**, Senior Advisor, Norwegian Directorate for Nature Management
Interview: British Antarctic Survey (BAS), Cambridge, 15/03/2018
12. **Roie Galitz**, Wildlife Photographer
Interview: Skype Interview, Mickleton, Cotswolds, 18/06/2018
13. **Asgeir Helgestad**, Filmmaker, Producer and Photographer, Arctic Light AS
Interview: Phone Interview, SPRI, Cambridge, 18/09/2018
14. **Dr. Thor Larsen**, Senior Researcher, Norwegian University of Life Sciences, NMBU
Interview 1: Skype Interview, SPRI, Cambridge, 01/03/2018
Interview 2: Skype Interview, Oxford, 17/09/2019

15. **Ole J. Liodden**, Photographer and Co-Founder of Wildphoto Travel
Interview: Wildphoto Gallery, Longyearbyen, 14/08/17

16. **Paul Lutnæs**, Senior Advisor for Nature Management, Svalbard Governor's Office
Interview: The Governor's Offices, Longyearbyen, 04/09/2017

17. **Roy Mangersnes**, Photographer and Co-founder of Wildphoto Travel
Interview 1: Radisson Blue Café, Longyearbyen, 03/09/2017
Interview 2: Skype Interview, SPRI, Cambridge, 16/01/2018

18. **Simon Marsh**, Animal Collections Manager, Yorkshire Wildlife Park, YWP
Interview: Phone Interview, SPRI, Cambridge, 28/11/2018

19. **Dr. Pål Prestrud**, Director, Centre for International Climate and Environmental Research, Oslo
Interview: Skype Interview, SPRI, Cambridge, 02/03/2018

20. **Jason Roberts**, Producer, Filmmaker, Founder of Polar X Productions,
Interview 1: Kulturhuset Café, Longyearbyen, 29/08/2017
Interview 2: Skype Interview, SPRI, Cambridge, 15/10/2017

21. **Dr. Heli Routti**, Scientific Research Department, Norwegian Polar Institute, NPI
Interview: Skype Interview, SPRI, Cambridge, 19/11/2018

22. **Rolf Stange**, Photographer, Author, Guide
Interview: Skype Interview, SPRI, Cambridge, 03/12/2018

23. **Prof. Ian Stirling**, Adjunct Professor, University of Alberta
Interview: Skype Interview, SPRI, Cambridge, 04/07/2018

24. **Oskar Strøm**, Head of Logistics, Polar X productions
Interview 1: Kulturhuset Café, Longyearbyen, 04/09/2017
Interview 2: Skype Interview, SPRI, Cambridge, 14/11/2017

25. **Dag Vongraven**, Senior Advisor at the Norwegian Polar Institute (NPI) & Co-chair of the IUCN Polar Bear Specialist Group (PBSG),
Interview 1: Polaria Café, Tromsø, 10/08/2017
Interview 2: Café near NPI Offices, Tromsø, 11/08/2017

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