No Man's Land

The American military landscape as the new American park

by

Emily Guo

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AUTHOR‘S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Military landscapes are seldom seen as ecologically diverse territories, full of life. Yet, there is growing evidence that these volatile lands are finding a second life as animal refuges, born out of necessity under the growing effects of the Anthropocene and sixth wave of mass extinction. It is the very nature of the military landscape – weaponized, contaminated, protected – that deters regular human activity and allows this new, damaged Nature to appear. These new cyborg landscapes tell a story of a post-human future where new ecological relationships are formed between the military artefacts and the animals that inhabit the land. These artefacts range from chemical contamination to landmines, nuclear fallout to defensive perimeters. Although this is a worldwide phenomenon, the thesis focuses on the United States in recognition of their $598.5 billion military-industrial complex that places them at the forefront of this investigation. *No Man's Land* presents two test sites to illustrate these new complex relationships: Johnston Atoll (closed/abandoned) and Rocky Mountain Arsenal Wildlife Refuge (closed/reused). By recognizing the ecological importance of these landscapes, the thesis argues to re-introduce these territories back into the American imagination as the 'involuntary park' – a kind of posthumanist National Park. A series of interventions have been proposed to leverage human engagement by reaching out to the civilian public under the guise of 'voluntourism' to further encourage animal occupation. The thesis aims to interrogate the contradictory nature of these landscapes and question their future in an increasingly anthropocentric world.

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For all the animals in the world.

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INTRODUCTION

INTRODUCTION

I am the Lorax, I speak for the trees.
I speak for the trees, for the trees have no tongues.
And I'm asking you, sir, at the top of my lungs.
Oh please do not cut down another one.[1]

Dr. Seuss
The Lorax

In 2011, human population surpassed 7 billion people. If current trends continue, it is predicted by the United Nations that we will reach 9.5 billion by 2050, and over 11 billion in 2100. This enormous growth has been ongoing since the 1950's and the subsequent consequences have prompted a reaction from the scientific community to propose a new geological epoch: the Anthropocene. As a result, social discourse has expanded to encompass territories not previously considered in our understanding of urbanization, driven by the advancement of technology and the rapid increase in globalization.[2] Capitalistic activities such as agricultural development, resource extraction, energy infrastructure, and more must now be considered more actively as the majority of the Earth's biomes have been turned towards anthropogenic use.[3]

As a result, humans are requiring more and more land to keep up with the demands of this growing population. In turn, the natural world is struggling to survive as untouched nature is growing increasingly rare. Our idea of "pure nature" must now be challenged, as more writers and researchers like William Cronon, Timothy Luke, and Erle Ellis reframe our relationship to our landscapes. As a result of this increase in development, the animal is forced to adapt. The ensuing habitat loss *(figure 0.2)* has become the primary threat against 85% of all threatened species[4] and is a major reason we are undergoing a sixth wave of mass extinction.[5] This biodiversity loss has pushed us into the zone of "high risk" in one of nine planetary

figure 0.1 (Previous) Peter van der Borcht the Elder, ***The Difficulty of Ruling Over a Diverse Nation,*** 1578.

1 Dr.. Seuss, *The Lorax* (New York: Random House, 1971),
2 Neil Brenner, "Theses on Urbanization," *Public Culture* 25 (1) (January 2013), 109, doi: 10.1215/08992363-1890477.
3 Erle C. Ellis, Kees Klein Goldewijk, Stefan Siebert, Deborah Lightman and Navin Ramankutty, "Anthropogenic transformation of the biomes, 1700 to 2000," *Global Ecology and Biogeography* 19 (2010): 589, doi: 10.1111/j.1466-8238.2010.00540.x.
4 WWF, *Living Planet Report 2016* (Gland: WWF International, 2016): 20.
5 Johan Rockström et al., "Planetary Boundaries: Exploring the Safe Operating Space for Humanity," in *Ecology and Society* 14, no. 2 (2009): 32, https://www.ecologyandsociety.org/vol14/iss2/art32/.

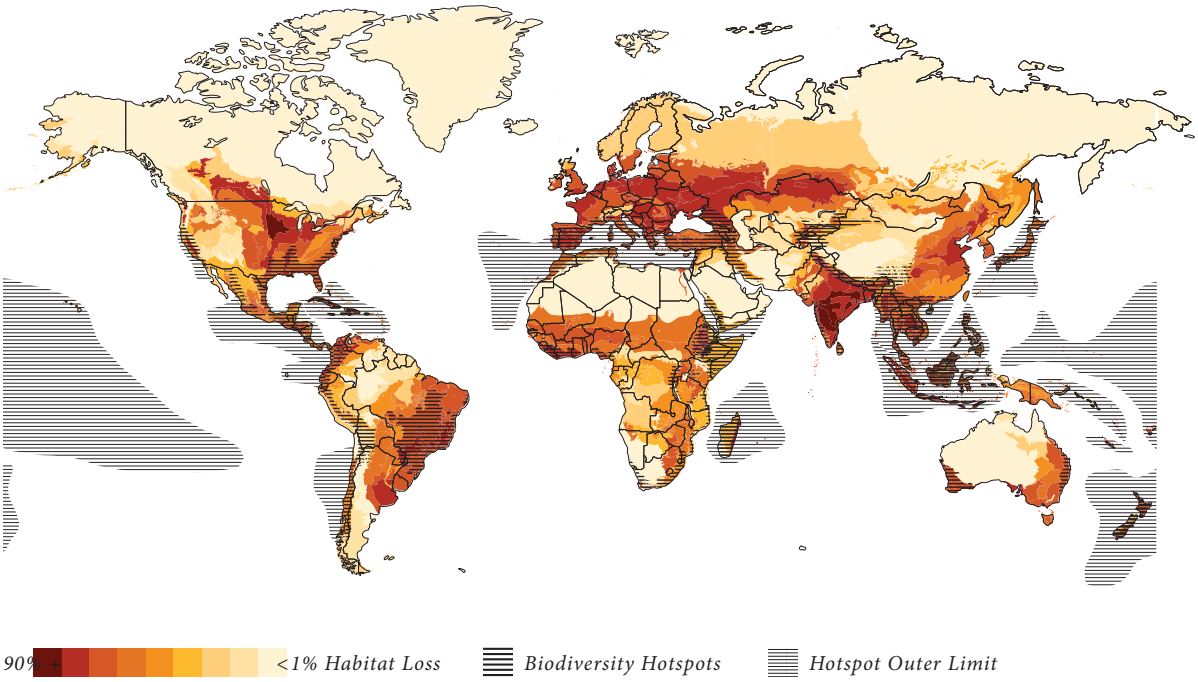

figure 0.2 Habitat loss around the world.

boundaries *(figure 0.3)*, a concept that identifies the necessary processes for continued human survival.[6] Historically, loss at this scale over time could indicate irreversible consequences to our physical and biotic environment, ie. the dinosaurs that allowed the rise of the mammal.[7] Therefore, these conditions place the animal as the primary stakeholder against human development.

This new wave of extinction should come at no surprise given the position the animal has in our society as the "other". This is especially notable in the West, where urbanization "was based historically on a notion of progress rooted in the conquest and exploitation of nature by culture."[8] Words we use when describing urbanization betray this anthropocentric view, since the transformation of "empty" land to produce "improved land" disregards the animals that already occupied that land.[9] "[J]udgements of "higher and best use" reflect profit-centered values and interests of humans alone, ignoring not only wild or feral animals but ... pets, lab animals, and livestock who live and die in urban space shared with people."[10]

These beliefs are founded in our cultural ontology. The placement of the animal outside of humanity's moral community[11] is established early on in the Bible:

> *27 So God created mankind in his own image,*
> *in the image of God he created them;*
> *male and female he created them.*
> *28 God blessed them and said to them, "Be*
> *fruitful and increase in number; fill the earth*
> *and subdue it. Rule over the fish in the sea and*
> *the birds in the sky and over every living creature*
> *that moves on the ground.*[12]

This is the status quo that is ingrained into our culture. Gregory Bateson further argues that

> *If you put God outside and set him vis-a-vis*
> *his creation and if you have the idea that you*
> *are created in his image, you will logically and*
> *naturally see yourself as outside and against the*
> *things around you. And as you arrogate all mind*
> *to yourself, you will see the world around you as*
> *mindless and therefore not entitled to moral or*
> *ethical consideration. The environment will seem*
> *to be yours to exploit. Your survival unit will be*
> *you and your folks ... against the environment of*
> *other social units, other races and the brutes and*

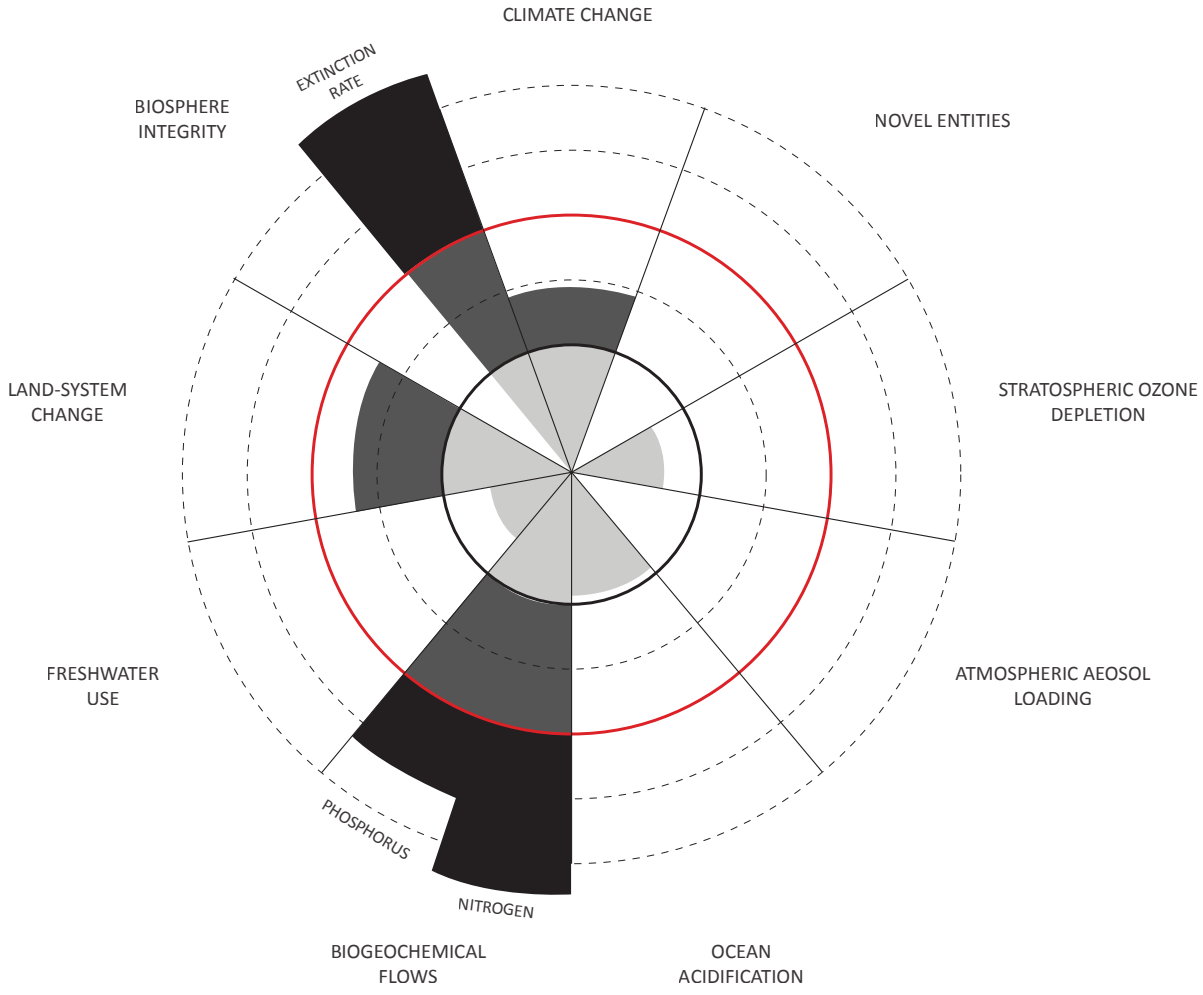

figure 0.3 The planetary boundary concept proposed by the Stockholm Resilience Centre. A crossing in any of the nine boundaries from a zone of low risk to a zone of high risk could cause irreversible environmental changes.[13] Three variables within two planetary boundaries have already entered beyond the zone of high risk threatening the health of the planet. The loss of biosphere activity in the form of biodiversity loss comes as a direct result of human activity, understood as the 6th wave of mass extinction.

6 Rockström et al., "Planetary Boundaries: Exploring the Safe Operating Space for Humanity" 32.
7 Ibid.
8 Jennifer R. Wolch, "Zoopolis," *Capitalism Nature Socialism* vol. 7, 2 (1996): 21.
9 Wolch, "Zoopolis," 22.
10 Ibid.
11 William Lynn, "Animals, Ethics, and Geography," in *Animal Geographies*, ed. Jennifer Wolch and Jody Emel. (London: Verso, 1998), 287.
12 Gn. 1:27-28, *Bible: New International Version*.
13 Rockström et al., "Planetary Boundaries: Exploring the Safe Operating Space for Humanity" 32.

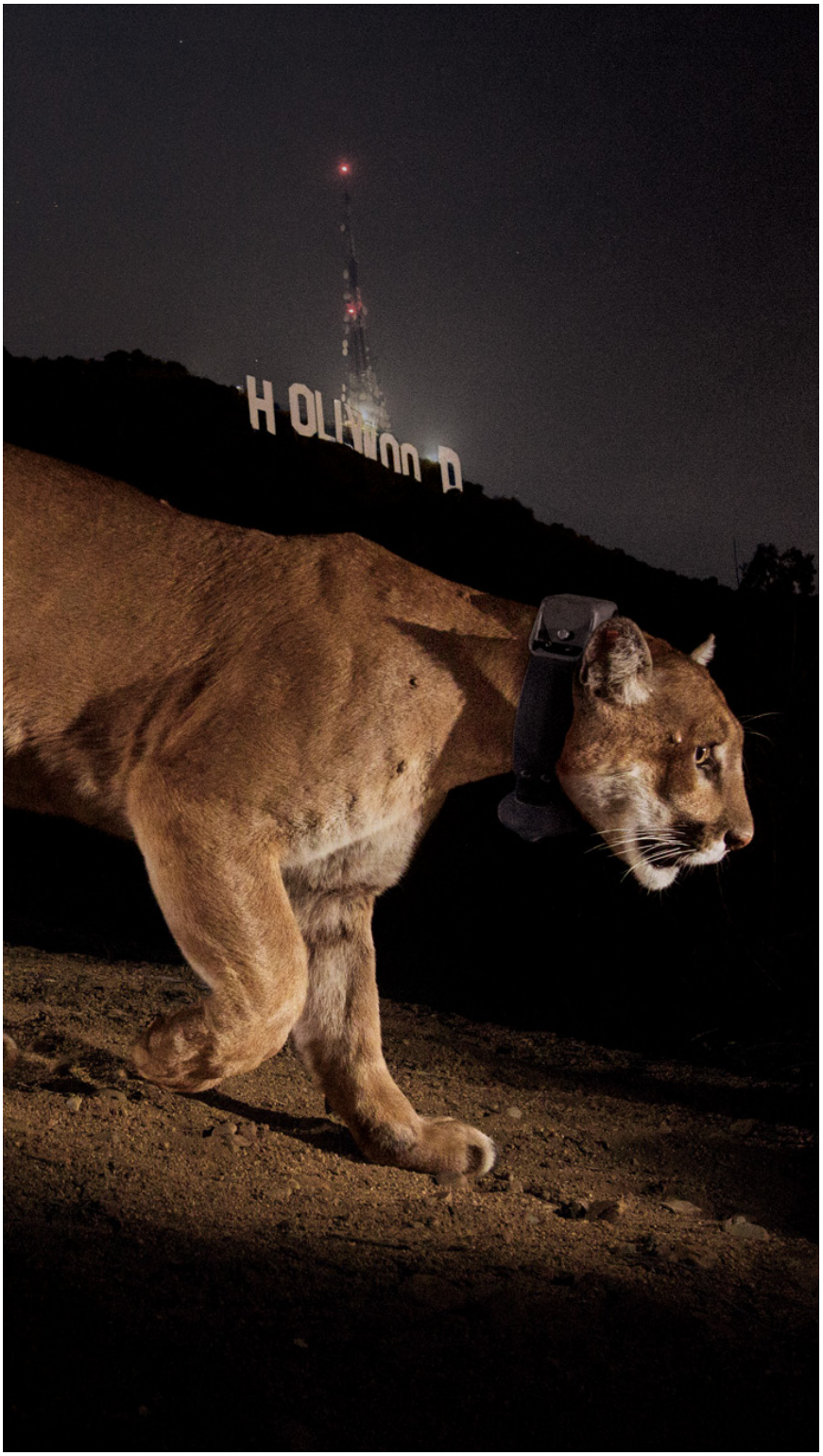

figure 0.4 Steve Winter, ***Photograph of cougar near the Hollywood symbol***, 2013.
It may be surprising to learn that wild animals are closer than expected as a result of urban expansion. In this photo, a cougar is photographed on the edge of Hollywood, indicating ever prominent tension between our two worlds.

vegetables.[14]

By relegating the animal as the other (without even mentioning the differences among humans), the colonization of the wild "pure nature" has been allowed to dominate since the industrial revolution. Today, the continued exploitation of both animal and land has become a necessity for our own survival as we attempt to keep up with the demands of the growing human population.

These conditions have created a situation in which the animal has to find refuge, often in less than desirable places *(figure 0.4)*. Damaged and polluted landscapes are filling the voids between landscapes inhabitable for the estranged animal. These are the in-between, the un-wanted, and the discarded lands in the eyes of the human. This new landscape typology has emerged out of necessity in the 21st century. They go by many names: the accidental nature reserve, an unintentional landscape[15], novel ecosystems[16], or the involuntary park[17]. What they have in common is the phenomena they display. They represent a new posthuman nature, a cyborg landscape that becomes a symptom in this increasingly anthropocentric world.

Evidence of animal occupation of these landscapes can be found around the world as nature attempts to reclaim what it's lost. These instances can be distilled into two catalytic categories: negligence (driven by contamination, economic depopulation, landfill) ***or*** military activity (driven by political conflict or base occupation) as the source of creation *(figure 0.5)*. Contaminated areas such as Chernobyl *(figure 0.6)*, landfills such as the Leslie St. Spit *(figure 0.7)*, or militarized borders such as the Iron Curtain turned European Green Belt *(figure 0.8)* showcase the variance of possible site conditions that act as an extension of the global condition. In some cases, the ecological diversity has been acknowledged and the site is "resolved" in its transformation (ex. European Green Belt), but for many, their status remains "unresolved" - or even "threatened". However, what is clear through a global analysis of this phenomenon is the identification of military activity as the largest creator of these new landscapes.

The following chapters seek to understand the military landscape as an involuntary park with a focus on the American military-industrial complex as the site for interrogation. A design exercise is carried out on two testing grounds and argues for these landscapes to occupy a new position in the American military and landscape imagination as a 21st century posthumanist National Park™ in response to the growing pressures of the Anthropocene. It is in this expanded context that the animal becomes the primary stakeholder against human progress, and it is within each site that this tension culminates. As Gregory Bateson suggest, "if an organism … sets to work with a focus on its own survival[,] … its 'progress' ends up with a destroyed environment. If the organism ends up destroying its environment, it has in fact destroyed itself."[18]

I want to make clear that the thesis is not arguing for continued military activity in any form, but is instead taking a neutral position highlighting an already existing landscape trend. Throughout history, military activity has been a part of our societies, and in the foreseeable future, military activity will continue to create new cyborg landscapes. By arguing to reintroduce these lands back into the American landscape imagination, perhaps these lands will find a second life more suited for our posthuman world and capture our collective imagination.

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14 Gregory Bateson, "Form, Substance, and Difference," in *Steps to an Ecology of Mind* (Northvale: Jason Aronson Inc., 1987): 468.

15 The unintentional landscape is defined as "an aesthetic encounter with nature that has not been purposively created." Matthew Gandy, "Unintentional Landscapes," *Landscape Research* 41 (2016): 433, doi: 10.1080/01426397.2016.1156069.

16 A novel ecosystem is what the ecological community refers landscapes altered by human agency within the Anthropocene. Richard J. Hobbs, Eric S. Higgs, and Carol Hall, *Novel Ecosystems: Intervening in the New Ecological World Order*, (Hoboken: Wiley-Blackwell, 2013), cover.

17 Bruce Sterling, "Viridian Note 00023: The World is Becoming Uninsurable, Part 3," Viridian Design, accessed December 19, 2016, http://www.viridiandesign.org/notes/1-25/Note%2000023.txt.

18 Bateson, "Form, Substance, and Difference," 457.

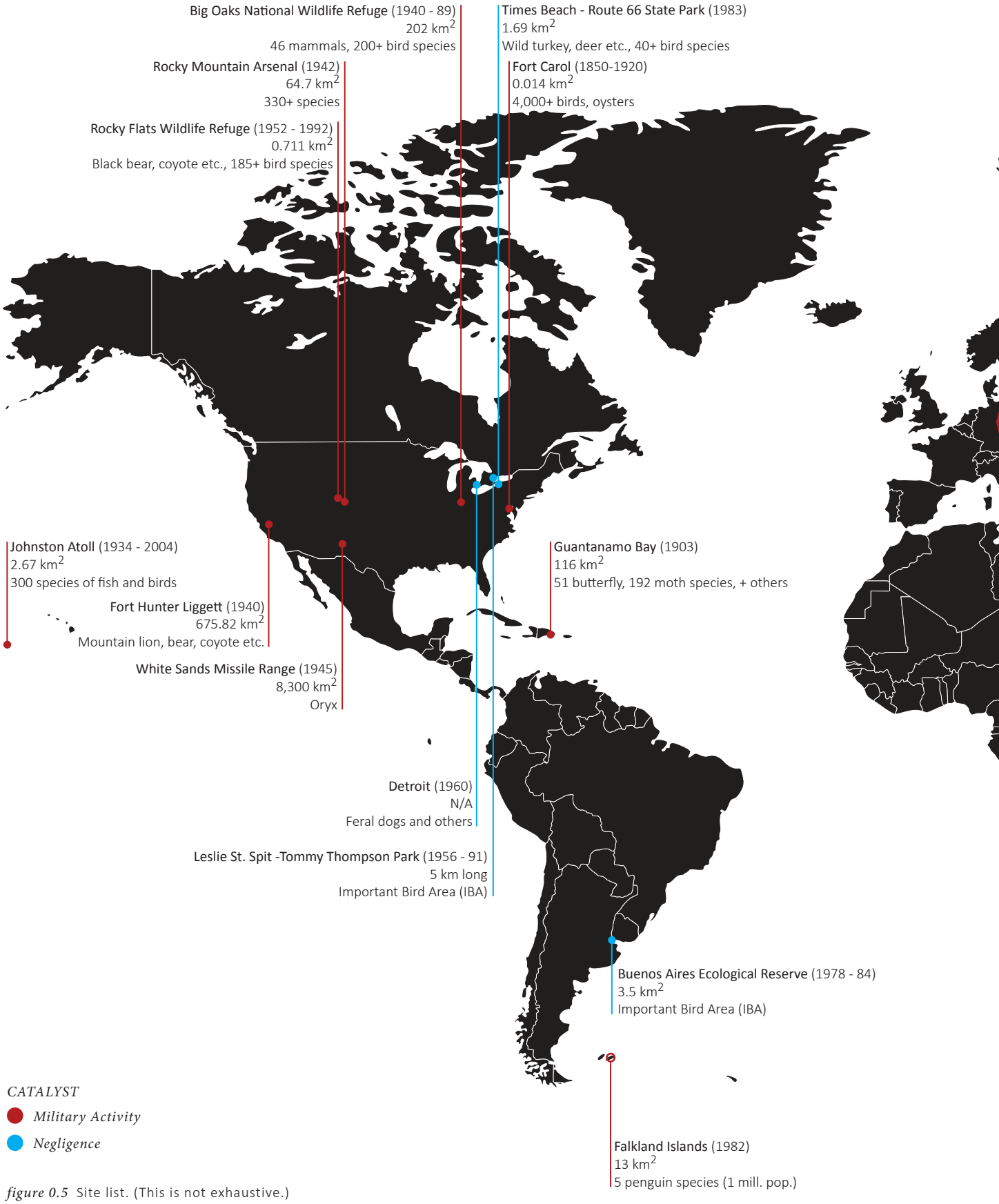
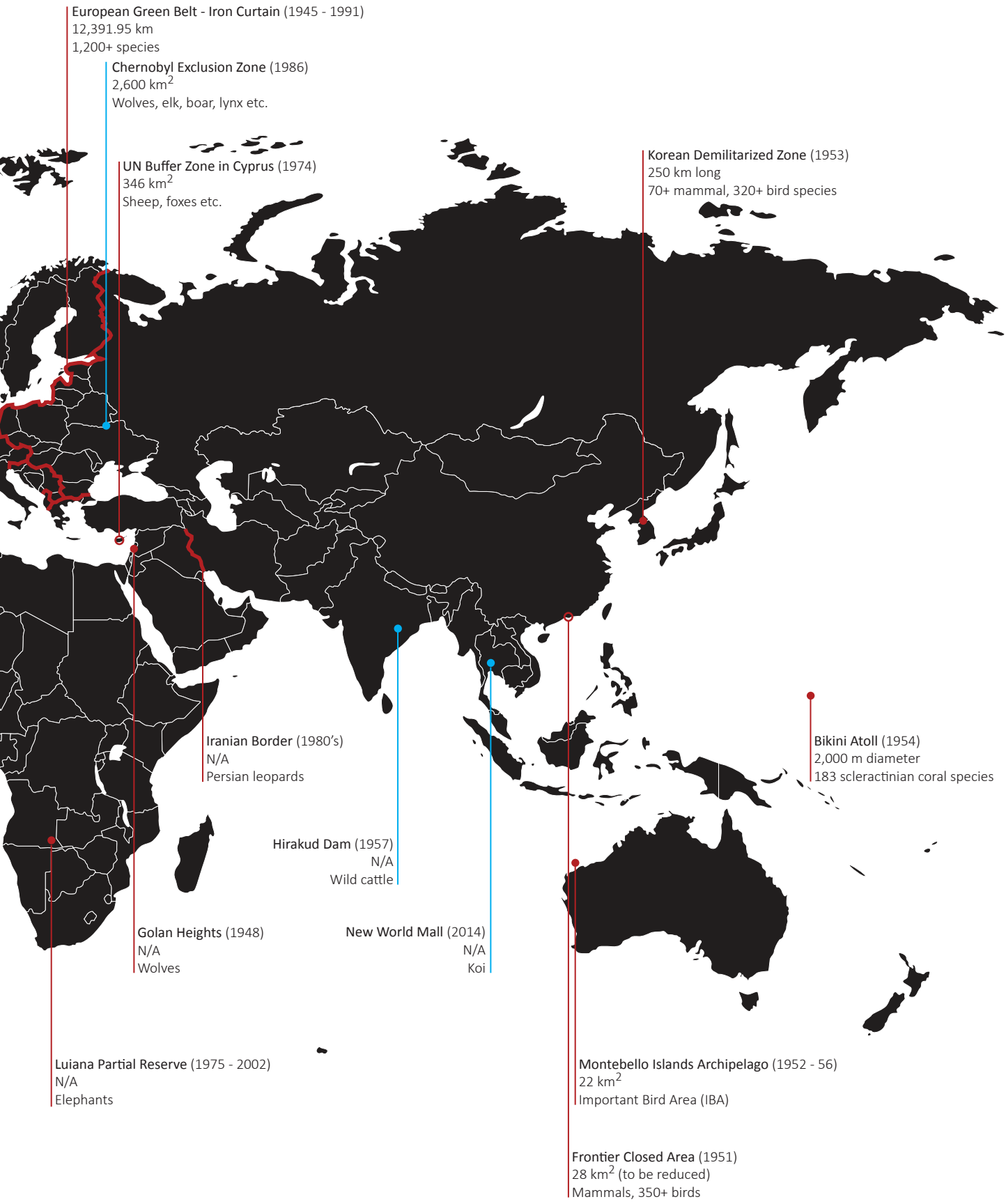


figure 0.5 Site list. (This is not exhaustive.)


European Green Belt - Iron Curtain (1945 - 1991)
12,391.95 km
1,200+ species
Chernobyl Exclusion Zone (1986)
2,600 km2
Wolves, elk, boar, lynx etc.
UN Buffer Zone in Cyprus (1974)
346 km2
Sheep, foxes etc.
Korean Demilitarized Zone (1953)
250 km long
70+ mammal, 320+ bird species
Iranian Border (1980's)
N/A
Persian leopards
Bikini Atoll (1954)
2,000 m diameter
183 scleractinian coral species
Hirakud Dam (1957)
N/A
Wild cattle
Golan Heights (1948)
N/A
Wolves
New World Mall (2014)
N/A
Koi
Luiana Partial Reserve (1975 - 2002)
N/A
Elephants
Montebello Islands Archipelago (1952 - 56)
22 km2
Important Bird Area (IBA)
Frontier Closed Area (1951)
28 km2 (to be reduced)
Mammals, 350+ birds

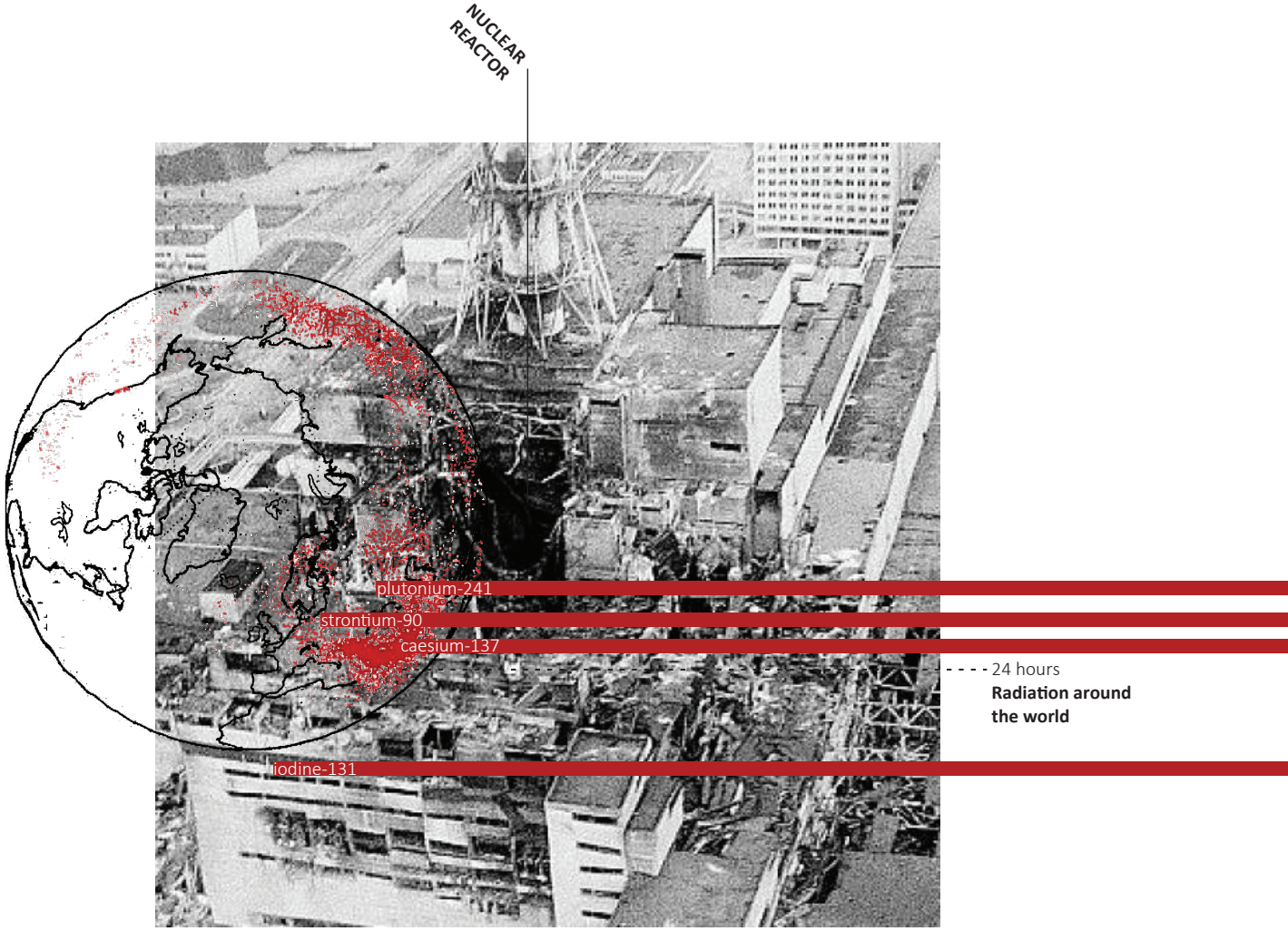


figure 0.6

CHERNOBYL (51°23'23.47"N 30°5'38.57"E)

The cities of Chernobyl and Pripyat in the Ukraine was the site of an accidental nuclear explosion in 1986 that left nuclear radiation that rendered both cities uninhabitable. Within 5 days, radiation traveled to many European countries by wind, setting off an alarm in Sweden.[19] Many of the radioactive chemicals remain to this day in the immediate vicinity of the reactor.

19 World Information Service on Energy, "Chernobyl: Chronology of a Disaster," *Nuclear Monitor* 724 (March 2011): https://www.nirs.org/wp-content/uploads/mononline/nm724.pdf.

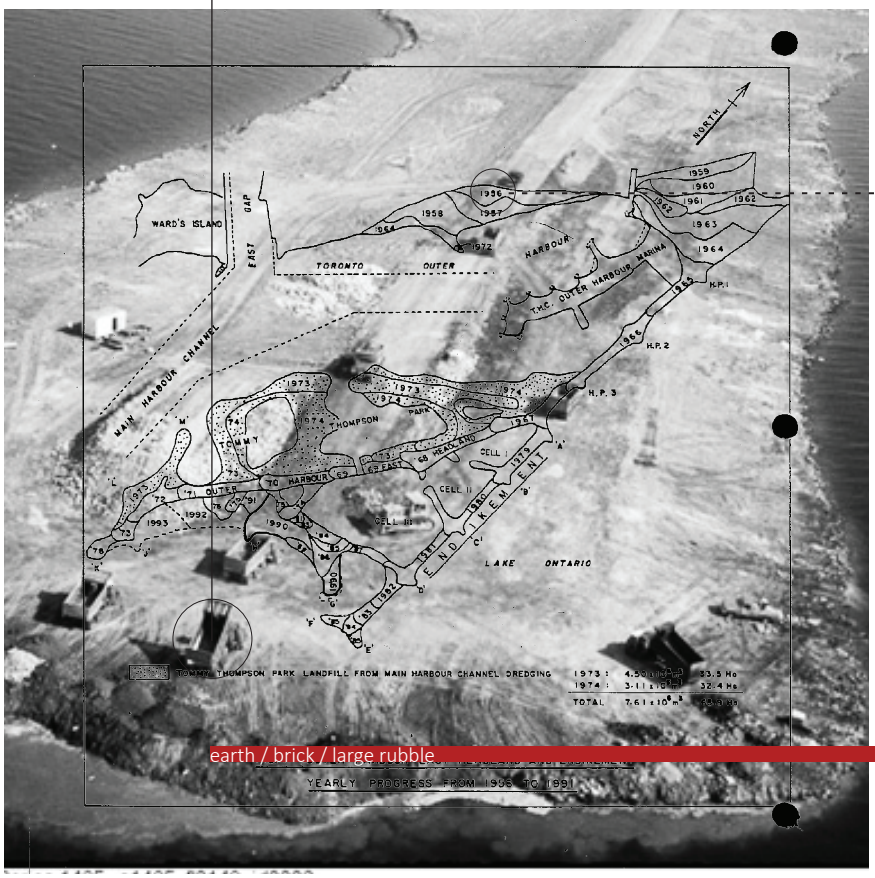
Gray Wolf */Canis lupus/*

100 - 10,000 kBq
Contamination Density

Due to the remaining radiation, development on the site has stalled and many native animals such as bison, gray wolf, and foxes have been able to reclaim the land.[20] Due to site conditions, many have been monitored to record radioactive contamination that has affected their appearance and behaviour. However, new development this past year poses a threat to their continued occupation as a $1.2 billion solar farm starts construction.

20 John Wendle, "Animals Rule Chernobyl Three Decades After Nuclear Disaster," *National Geographic*, April 18, 2016, https://news.nationalgeographic.com/2016/04/060418-chernobyl-wildlife-thirty-year-anniversary-science/.

TORONTO HARBOUR COMMISSIONERS: LANDFILL PROGRAM



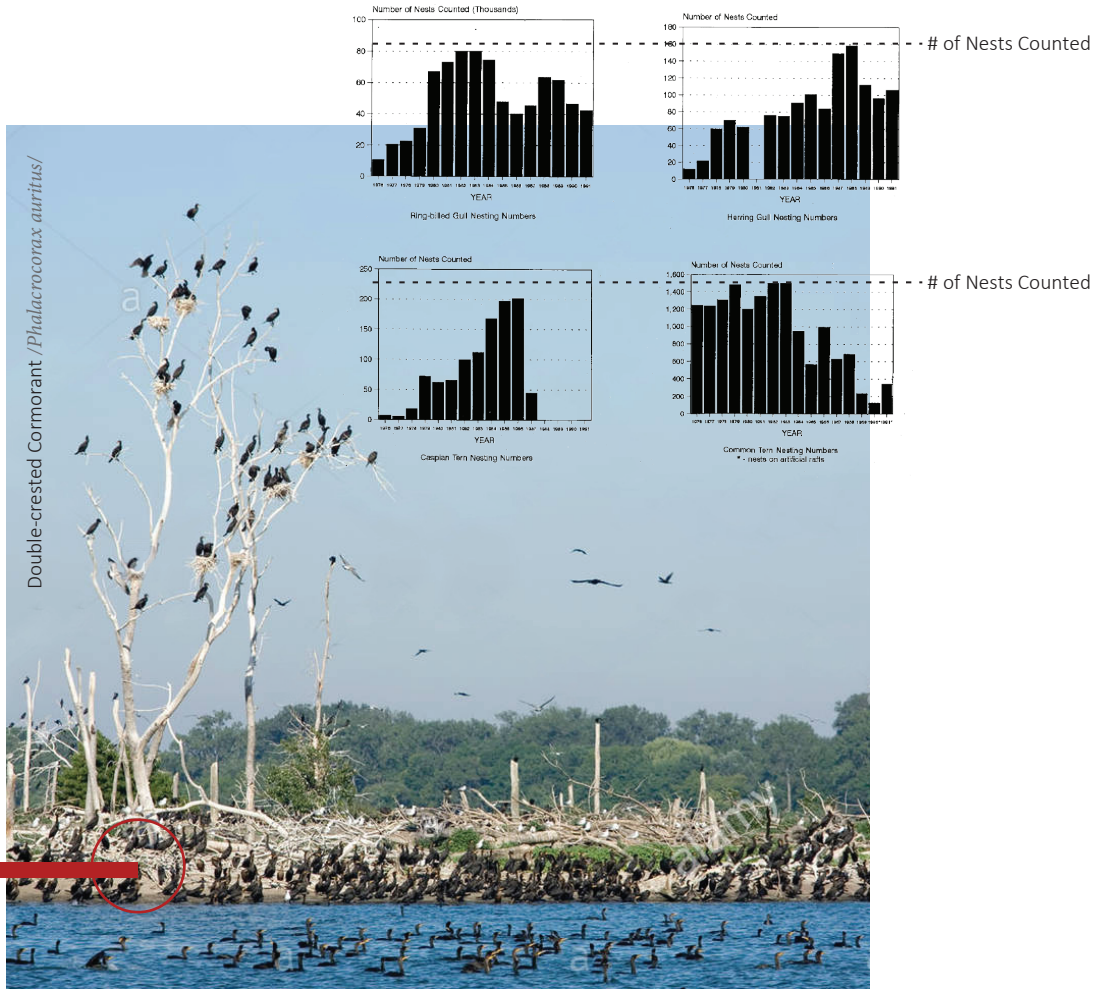
4.3 million truckloads
23 million m^3 of material
6.4 million m^3 of dregeate
1956 - 1991

earth / brick / large rubble

figure 0.7

LESLIE ST. SPIT (43°37'4"N 79°20'33"W)

A man-made landfill located at the south of Toronto, Ontario originally conceived as a breakwater to expand harbour capacity. Eventually need for an expanded harbour disappeared, but the dumping of landfill continued as the city grew.



TOMMY THOMPSON PARK

In 1985, a portion of the Spit was designated an environmentally sensitive area and Important Bird Area (IBA) as increasing numbers of wildlife were sited, most noticeably in the form of over 300 bird species.[21] This area came to be Tommy Thompson Park.

21 "Wildlife," About Tommy Thompson Park, Tommy Thompson Park, accessed January 20, 2018, https://www.tommythompsonpark.ca/about/#wildlife.

figure 0.8

IRON CURTAIN

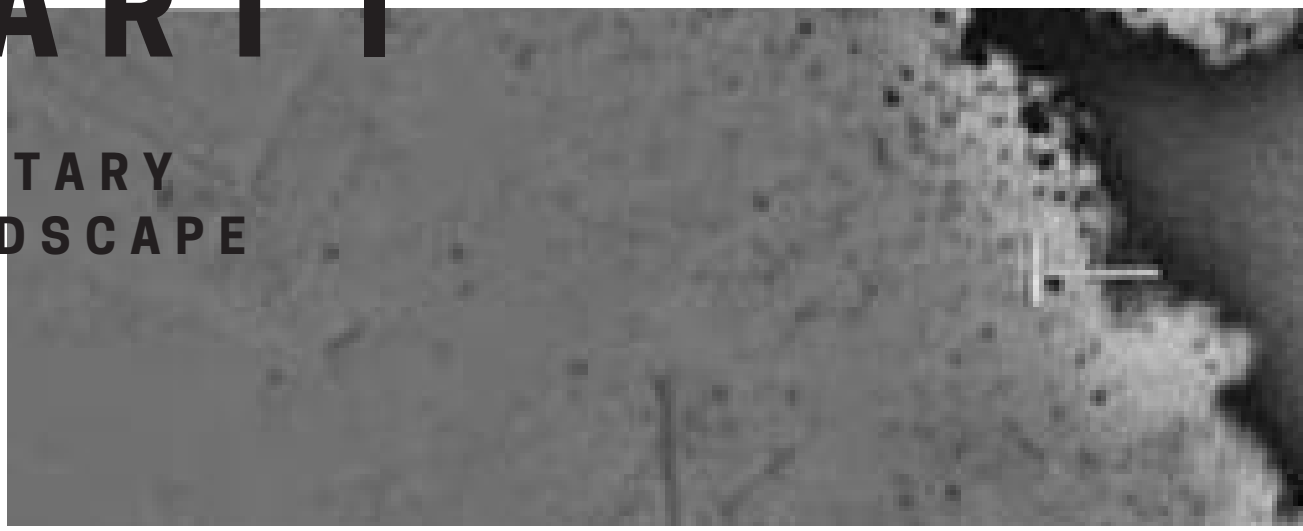
The Iron Curtain was a military border that divided members of the Warsaw Pact and NATO during the Cold War from 1947 to 1991. This boundary physically formed a series of border defenses enacted by each country, including Germany's Berlin Wall.

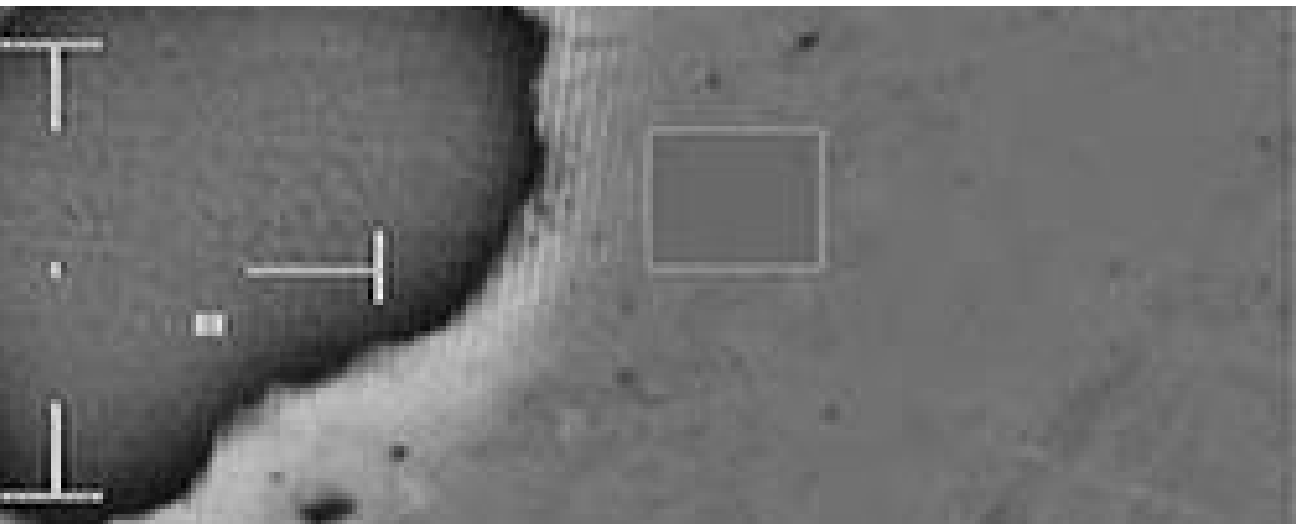
EUROPEAN GREEN BELT

After aerial photography observed the incredible ecological preservation along the old Iron Curtain border, the area was designated the European Green Belt. This recognized ecological barrier spans 12,5000 km across Europe and serves as a haven for many endangered species.

PART I

THE MILITARY LANDSCAPE





PART I: THE MILITARY LANDSCAPE

If things are not profitable, useful, or of immediate and measurable benefit, they are often deemed to belong to the domain of the romantic and deluded. Philosophers and thinkers of the past two centuries have argued that this situation is symptomatic of a larger anthropocentric obsession with power and domination.[22]

James Corner
Taking Measures Across the American Landscape

THE GLOBAL CONDITION

For many, the image of the military is informed through our consumption of media content that depicts military activity as that of power and violence. We, as a culture, have many feelings surrounding this idea of the military: government-funded propaganda disguised as 24/7 newsreels tout patriotism and exploits our collective fear, while every-day consequences remind us of our remorse. Therefore the primary military imagination is an extension of the media that forms a homogenic warzone in a foreign country, and the primary military body is that of the soldier. What is over-looked and not as understood, however, is "the idea of landscape as an extension of the military imagination".[23] On one hand, there is a degree of separation employed by the military when understanding landscape, much like that of a video game. Compare the screen of the British Reaper drone system *(figure 1.10)* to that of the popular video game ***Call of Duty*** *(figure 1.11)*. Images of both systems codify and make abstract the landscape as symbolic items: threats, potential threats, defensive potential, targets, landmarks etc.[24]

On the other hand, if we are able to extend the military imagination beyond the confines of its traditional territory, we can begin to understand its landscapes as a cyborg born out of the coupling of technology and ecology *(figure 1.12)*. After all, it has already shown itself to be a major participant of this landscape type where adverse human activity has allowed the animal to return (refer back to *figure 0.5*). No longer relegated to science fiction, the cyborg has entered into our increasingly anthropogenic world out of necessity. Technology and capitalism continue to progress and drive the world's activity through urbanization and politics that, inevitably, drive militarization. Leftover technological pollutants

figure 1.9 (Previous) British Royal Air Force Tornado GR4s screenshot.

22 James Corner, *Taking Measures Across the Americans Landscape* (New Haven: Yale University Press, 1996): xviii.
23 Matthew Flintham, "The Military-Pastoral Complex: Contemporary Representations of militarism in the Landscape," *Tate Papers* no.17 (Spring 2012), http://www.tate.org.uk/research/publications/tate-papers/17/military-pastoral-complex-contemporary-representations-of-militarism-in-the-landscape.
24 Flintham, "The Military-Pastoral Complex: Contemporary Representations of militarism in the Landscape."

figure 1.10 British Royal Air Force Tornado GR4s screenshot.

figure 1.11 ***Counter Strike*** screenshot.

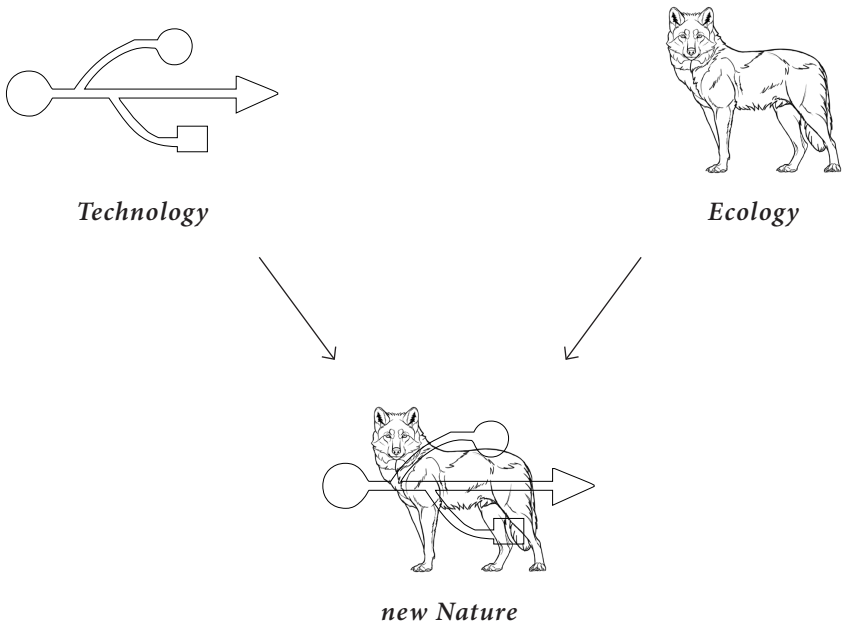


figure 1.12 The cyborg coupling of technology and ecology.

end "pure nature" and allow a new Nature to emerge, exemplifying the nature of the cyborg.

It is precisely the essence of these militarized landscapes, weaponized and protected, that encourages this coupling between those technological pollutants and new ecological occupiers. This perverse irony is where the cyborg is deployed. It finds its natural home within the dialog of the military, because:

> *modern war is a cyborg orgy, coded by C³I, command-control-communication-intelligence, an $84 billion item in 1984's US defence budget. [Donna Harraway makes the] argument for the cyborg as a fiction mapping our social and bodily reality as an imaginative resource suggesting some very fruitful couplings. … In the traditions of 'Western' science and politics – the tradition of racist, male-dominant capitalism; the tradition of progress; the tradition of the appropriation of nature as resource for the production of culture; the tradition of reproduction of the self from the reflections of the other – the relationship between organism and machine has been a border war.*[25]

However, the military landscape includes many forms beyond the active warzone. Every territory can be categorized into two basic typologies: a military base ***or*** a site of political conflict (figure 1.13). Both typologies carry within them a different set of conditions. A military base is often defined by a rigid boundary enclosed by a physical barrier separating inside from outside and occupied by clear parties, whereas a site of political conflict is much looser in its definition of both boundary and affiliation. For example, a military base is typically occupied by one or two countries and one or two branches of military at a time with clearly marked entry and exit points, while a site of political conflict may be occupied by more than one country (or parties within a country) with unstable boundary delineations. Annual changes in government spending and the unpredictable nature of international relationships contribute to the growth or decline of these sites.

25 Donna Haraway, "A Cyborg Manifesto: Science, technology and socialist-feminism in the late twentieth century." in *The Cybercultures Reader*, ed. David Bell and Barbara M. Kennedy (New York: Routledge, 2000), 292.

Military

Military Bases

RMA National Wildlife Reserve
Rocky Flats Wildlife Refuge
White Sands Missile Range
Montebello Islands Archipelago
Bikini Atoll (figure 1.16)
Guantanamo Bay
Big Oaks National Wildlife Refuge
Johnston Atoll
Fort Carroll
Fort Hunter Ligett

Political Conflict

European Green Belt
Iranian Border
UN Buffer Zone in Cyprus
Frontier Closed Area
Korean DMZ
Berlin Wall
Falkland Islands
Luiana Partial Reserve
Golan Heights

figure 1.13 Military typologies and subsequent examples.

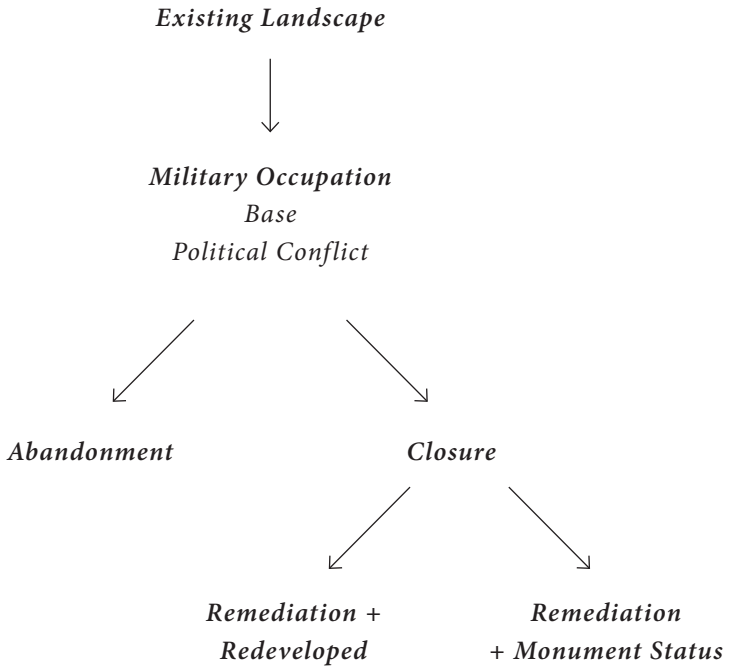


figure 1.14 A generic military landscape life cycle. Ecological occupation begins during active military activity where typical human occupation is kept at bay by technological pollutants.

figure 1.15 A hydrogen bomb test conducted on Bikini Atoll in the Marshall Islands by the United States, 1946.

The fundamental temperament of the military landscape should therefore not be understood as a static object, but a dynamic landscape that undergoes a life cycle of occupation influenced by these ever-changing factors ***(figure 1.14)***. Once military occupation begins, technological interventions pollute the landscape and alter its existing ecosystem, beginning its transformation into a cyborg landscape. As these new technologies become a part of the ecosystem, new links are created between organism and technology by disrupting existing ecological relationships. Tension between the two comes to a head at the end of military life, when the landscape faces one of three outcomes: abandonment, redevelopment, or gains monument status. In many cases, the potential for economic gain drives action or inaction.

Take, for instance, the Falkland Islands near Argentina ***(figure 1.16)***. It was the location of a 10-week war between Argentina and the U.K. left behind many artefacts, facilitating the preservation of its beaches as habitats for penguins. Or, consider the case of the demilitarized zone established between North and South Korea ***(figure 1.17)***, where the active conflict continues to protect many endangered species within its borders. Its extensive defenses ensures no development, preserving its habitat.

At first glance, we may only understand these landscapes as a series of technological pollutants: infrastructure, personnel, or any other manifestations. But when ecological relationships are eked out, clear cause and effect actions can be seen. The presence of these pollutants begins to protect the animal. But we must understand these relationships beyond the human realm; we must understand the animals' environment. This is what biologist Jakob von Uexkull calls the Umwelt:

> *The animal's environment, which we want to investigate now, is only a piece cut out of its surroundings, which we see stretching out on all sides around the animal – and these surroundings are nothing else but our own, human environment. … Every subject spins out, like the spider's threads, its relations to certain qualities of things and weaves them into a solid web, which carries its existence.*[26]

For both the Falkland Islands and the Korean DMZ, talk about their futures contain complications. Any decision is weighed with human sentiment and political concerns, factors that impede any potential action. But this type of meaning does not even register on the animals' ***umwelt***. The landmine is of no interest to the Falkland penguin, it does not realize it is part of its' environment. Likewise to the Korean crane, the barbed wire fence is an object in its environment, stripped of meaning and utility. This dual understanding of both human and non-human species gives us new understanding so we can begin to speculate their uncertain future.

26 Jakob von Uexkull, *A Foray Into the Worlds of Animals and Humans* (Minneapolis: University of Minnesota Press, 2010), 53.

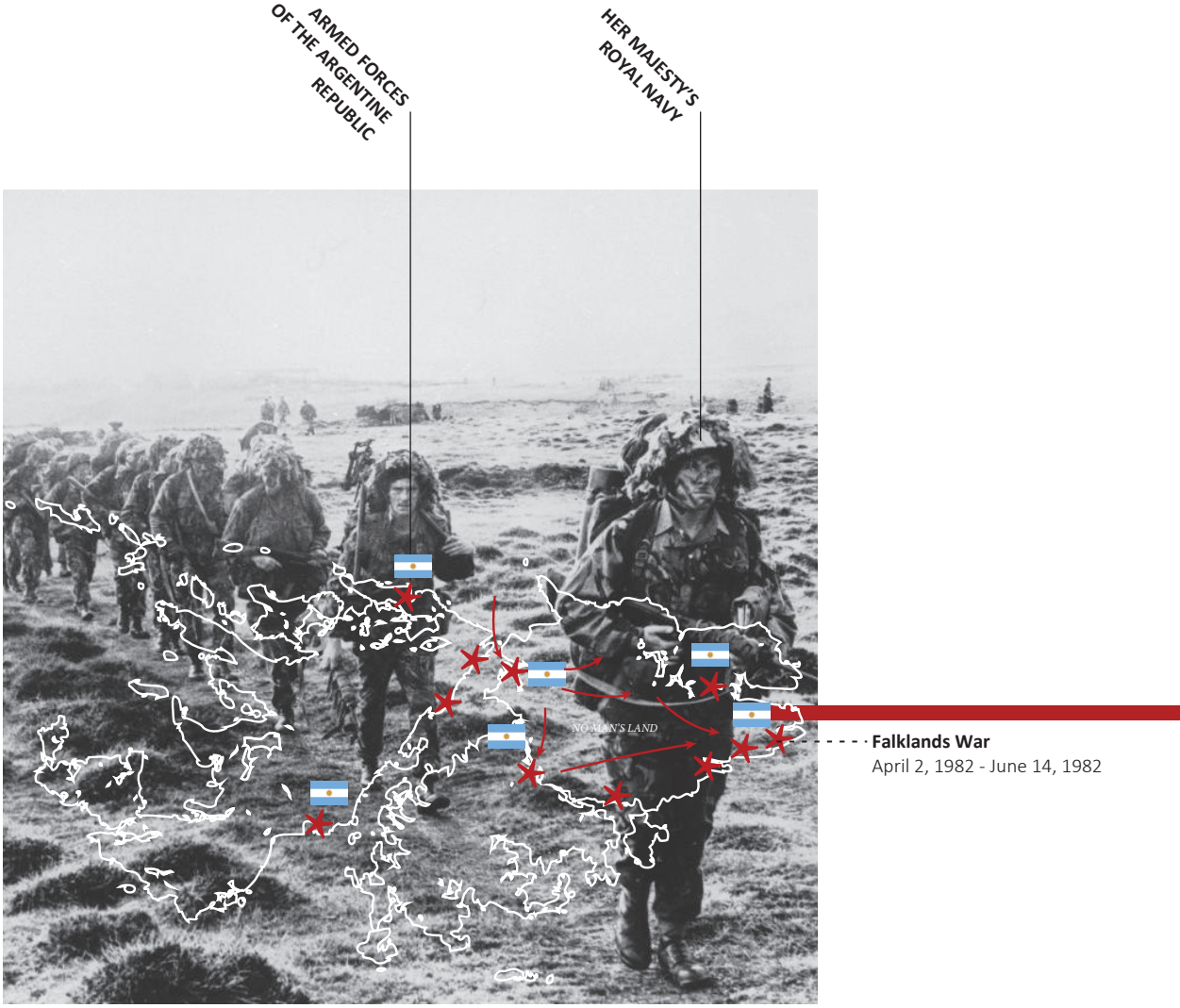


figure 1.16

FALKLAND ISLANDS (51°33'48"S 59°49'14"W)

In 1982, a ten-week war took place between Argentina and the United Kingdom over two British overseas territories, in which 40,000 landmines were left behind on its beaches.[27]

27 Fran Abrams, "Falklands plagued by '40,000' landmines," *The Indepenent*, March 29, 1998, http://www.independent.co.uk/news/falklands-plagued-by-40000-landmines-1153399.html.

While the political conflict has been over for 36 years, only a small attempt at de-mining as been made in areas that greatly affect humans. However, due to the difficulty of this task, many beaches were left as minefields, allowing five species of penguin to flourish as they weigh too little to set them off. The beaches remain in a unique state of balance, asking from us to consider the landmine equally important to the ecosystem as the grass on land and fish in the sea. It has essentially been abandoned and its cyborg nature has been allowed to remain.

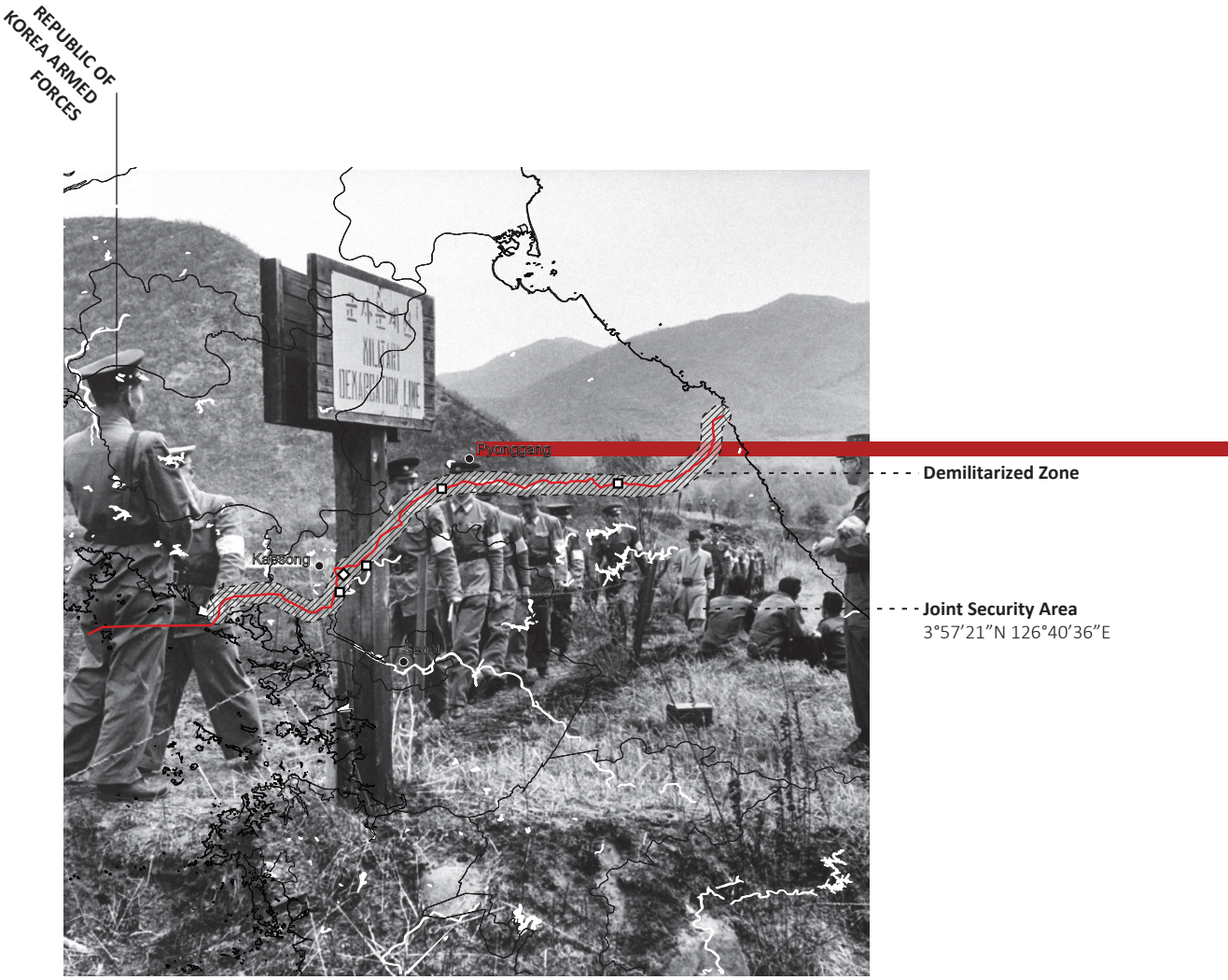
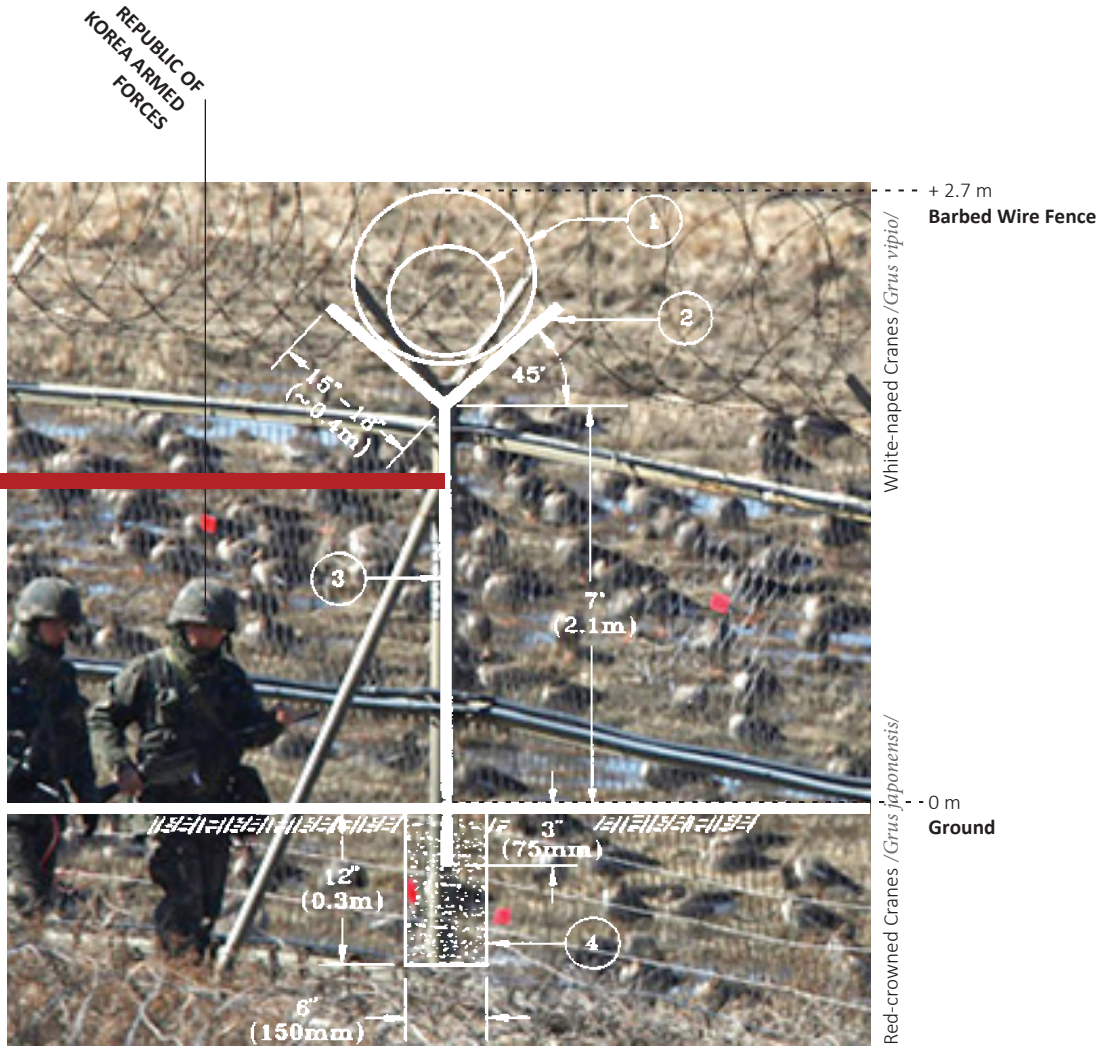


figure 1.17

KOREAN DEMILITARIZED ZONE (38°N)

The Korean War left a rumoured 1,000,000 (1 million) land mines[28], fences, barbed wire, and heavily armed military personnel. These defense infrastructures remain to this day, creating one of the most heavily guarded and dangerous area on our Earth.

28 Do Je-hae, "1 million mines hidden inside DMZ," *Korea Times*, August 10, 2015, http://www.koreatimes.co.kr/www/news/nation/2016/09/116_184550.html.



These extreme defensive measures has let the area, like the European Green Belt, remain undeveloped for the last 60 years as the conflict between North and South Korea continues. This has allowed it to serve as an involuntary park for many endangered Asian species including the Amur goral (Naemorhedus caudatus), Asiatic black bear (Ursus thibetanus), and red-crowned cranes (Grus japonensis).[29] Their continued existence relies on the persistence of the political conflict between the two nations, leading activist groups to champion for the site to be designated a national park or UNESCO site, gaining alternative protective measures.

29 Jane J. Lee, "Pictures of Wildlife in Korea's Demilitarized Zone," *National Geographic*, August 19, 2013, https://news.nationalgeographic.com/news/2013/08/pictures/130820-wildlife-korea-dmz-war-culture-biology-science/.

I am happy to pay my respects to the two groups whose authority and guidance I have always willingly recognized: the professional geographers of this country and the general officers of the United States Army.[30]

John Brinckerhoff Jackson
Discovering the Vernacular Landscape

THE AMERICAN MILITARY-INDUSTRIAL COMPLEX

Although this is a global phenomenon, special attention must be paid to the United States of America in recognition of their massive military-industrial complex, worth $611 billion in 2016. This was more than the next seven highest spending countries combined *(figure 1.18)*.[32] In 2018, the projected budget has increased to $700 billion following the approved ***National Defense Authorization Act*** this past September in 2017.[32] This immense wealth is pooled into five branches of the Department of Defense: Office of the Secretary of Defense, Joint Chiefs of Staff, Department of the Army, Department of the Navy, and Department of the Air Force *(figure 1.19)*. To the global community, this increase in spending indicates a continued emphasis on a strong American military presence.

This is historically consistent for the United States who has always demonstrated this attitude. But in the last 15 years, this presence has expanded dramatically as evidenced in the ever-increasing spending patterns of the U.S. government spurred on by the War on Terror. Estimates from the NATO Watch Committee

figure 1.18 Military spending by country, 2016.

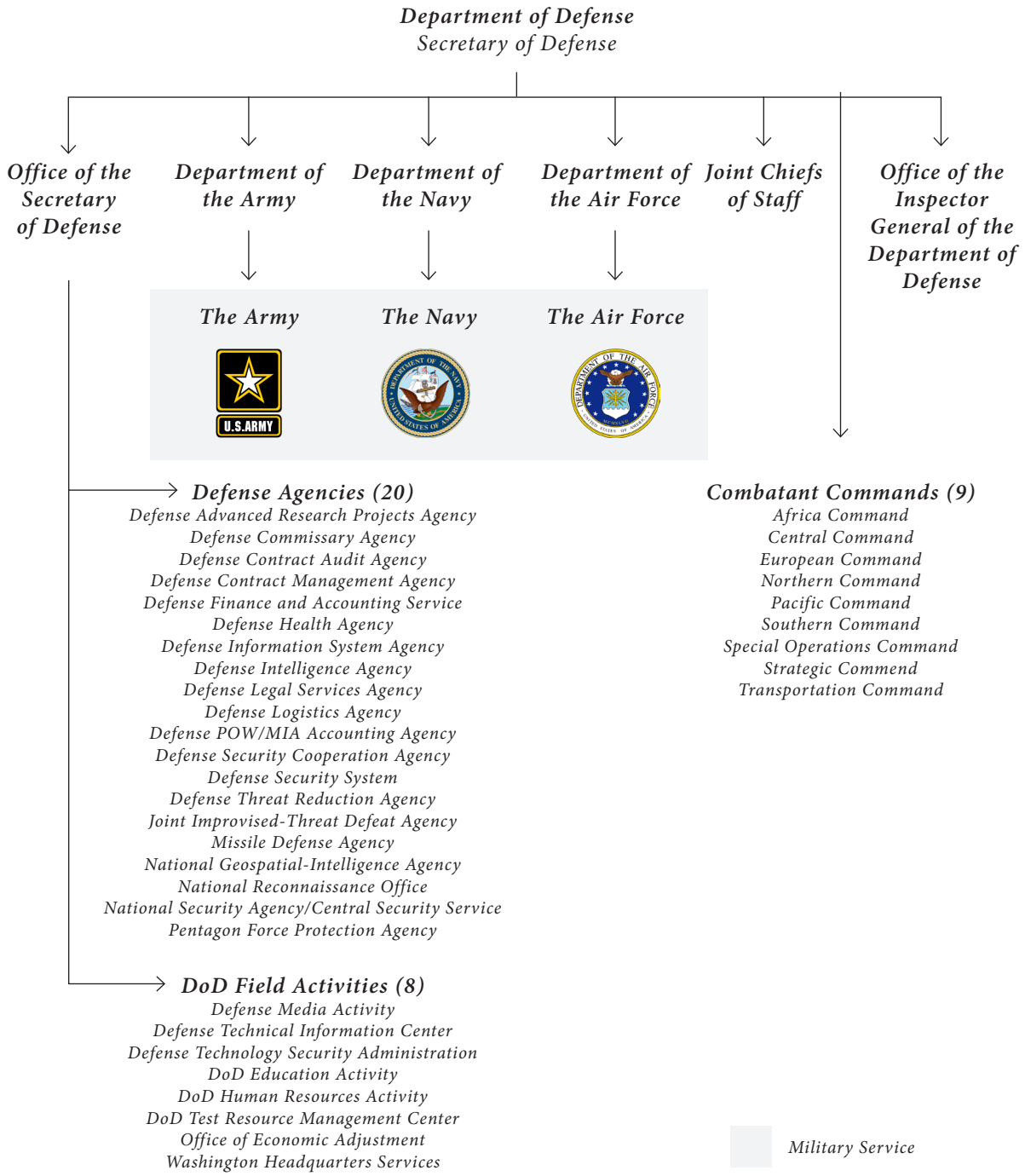


figure 1.19 Department of Defense (DoD) organizational structure.

30 John Brinkerhoff Jackson, "Landscape as Seen by the Military," in *Discovering the Vernacular Landscape* (New Haven: Yale University Press, 1984), 133.
31 "Current Military Spending Versus NATO 2 Per Cent," Stockholm International Peace Research Institute, April 24, 2017, https://www.sipri.org/sites/default/files/Media-backgrounder-current-military-spending-vs-NATO-2-per-cent.pdf, 3.
32 H.R.2810, 115th Cong, (2018), https://www.congress.gov/bill/115th-congress/house-bill/2810.
33 Jules Dufour, "The Worldwide Network of US Military Bases," in *Global Research* (2017): I, https://www.globalresearch.ca/the-worldwide-network-of-us-military-bases/5564.

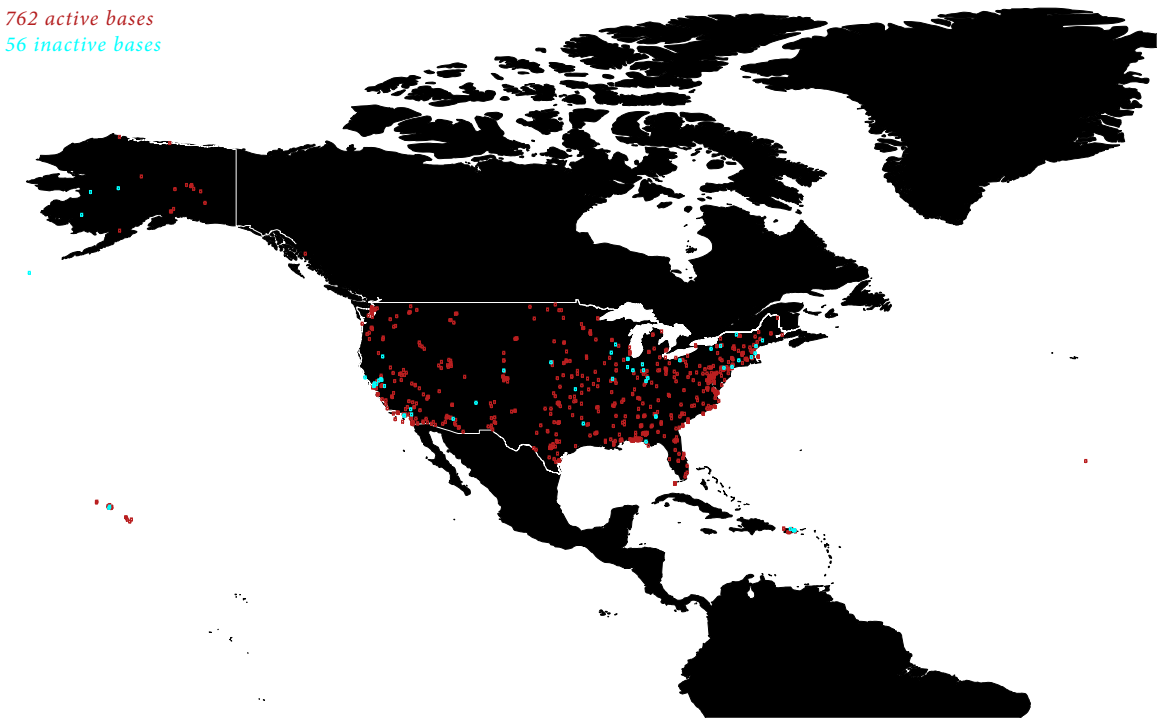


figure 1.20 American military bases on U.S. soil, 2016.

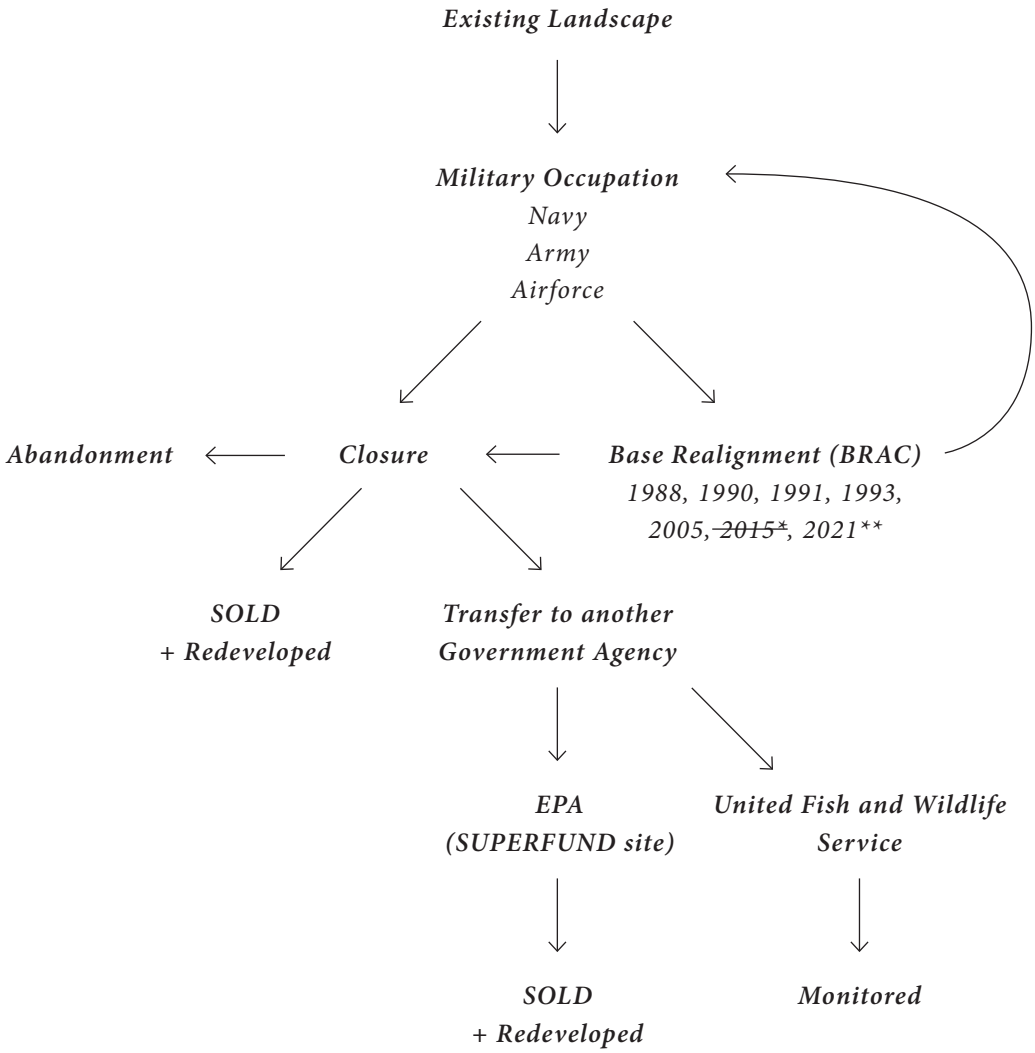
and the International Network for the Abolition of Foreign Military Bases indicate between 700 and 800 U.S military bases worldwide spanning 63 countries to effectively create an empire.[33] This is a world domination strategy employed by the U.S. to control the world economy and take over its natural resources[34] driven by the traditions laid out by Haraway: "the tradition of racist, male-dominant capitalism; the tradition of progress; the tradition of the appropriation of nature as resource for the production of culture."[35]

This does not escape the continental United States itself. It alone contains an estimated 762 active military bases *(figure 1.20)* that operate within this larger global network. Their uses have not changed much throughout history. They provide an area for training, preparation, and the stockage of military equipment and appear as air force bases, army/land bases, navy bases, or communication/spy bases. Because this military base typology is more commonplace, it will be profiled going forward with a focus on the United States.

Each one of the 762 bases undergoes a specific life cycle *(figure 1.21)*, in which four outcomes are possible:

1. The Base Realignment and Closure process (BRAC) prompts an evaluation of the future of the base, and it is either closed or another branch of the military occupies the same land (ex. Navy to Air Force). Must be approved by congress, and is therefore not reliable.
2. The base gets sold and redeveloped.
3. The base is transferred to another government body. If there is any ecological damage it becomes a Superfund site that is managed by the Environmental Protection Agency (EPA), another federal agency. Once the site is cleaned, it gets sold and redeveloped.
4. The base is recognized for its ecological importance and is transferred to the United States Fish and Wildlife Service.

What this cycle betrays is a lack of required military accountability to the landscapes they've damaged. Because of a lack of funds, the military often defaults to the EPA.[36] This seems a rather



* BRAC cancelled
** BRAC proposed

figure 1.21 The military landscape life cycle based on the actions taken by the United States of America.

34 Dufour, "The Worldwide Network of US Military Bases."
35 Haraway, "A Cyborg Manifesto," 292.
36 Richard A. Wegman Jr. and Harold G. Bailey, "The Challenge of Cleaning up Military Wastes When U.S. Bases are Closed," in *Ecology Law Quarterly* vol. 21, 4 (September 1994): 868, https://doi.org/10.15779/Z38HG0H.

figure 1.22 Albert Bierstadt, ***Looking down Yosemite Valley, California***, 1865.

telling oversight given the bloated budget of the Department of Defense.

However, there is the rare occasion where the landscape is recognized for its ecological diversity and is allowed to continue to exist as a refuge under the jurisdiction of the U.S. Fish and Wildlife Service. This is the outcome to the old Jefferson Proving Ground, now known as Big Oaks National Wildlife Refuge, the Rocky Flats Plant turned wildlife refuge, and the Rocky Mountain Arsenal turned wildlife refuge, to name a few. But this outcome is problematic as well. Once the decision is made, its cyborg ontology becomes threatened because humans always attempt to transform the land back into Eden, back into "pure nature", through restoration ecology. But this goes against the essence of the cyborg. The cyborg, the "illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism, … are often exceedingly unfaithful to their origins. Their fathers, after all, are inessential."[37] They cannot return to the Garden of Eden, as our very idea of nature is out-dated. To do so, a new cyborg would be constructed, one that conforms to an idea of nature that no longer exists but is more palatable to the civilian. Its uncomfortable history is given a makeover and is repackaged for the human user under the guise of being pristine. Nonetheless, it is still a cyborg.

The historical washing of these deeply damaged sites betrays a misunderstanding of the current state of the world they and a yearning for the world that once was. In the 21st century, writer Timothy Luke notes that Nature has become

> *a construct; it never has been pristine or worked upon de novo, because its apprehension always is the consequence of cultural relations in society and technology. … What now is taken to be 'nature' is largely human created (anthropogenic), not only in theory but also in practice.*[38]

As we enter into a posthuman period, the parameters in which we operate must adapt. That is, we must be cognizant of the conditions before and after human influence and acknowledge not only the biological world that we inhabit, but the technological world as well.[39]

But this myth of the old "nature" continues to stubbornly persist in the West outside the academic discourse of landscape and architecture. Sanitized nature photographs are embedded in the American landscape vernacular founded on decades of idyllic romanticism of the American wilderness *(figure 1.22)*. This wilderness is what inspired President Franklin Roosevelt to advance the newly founded National Parks Service to protect 150 national forests, 51 federal bird reserves, 4 national game preserves, 5 national parks, and 18 national monuments in 1906.[40] Today, the NPS has grown to protect 401 designations, totalling 84 million acres *(figure 1.23)*.

On December 4, 2017, President Donald Trump signed presidential proclamations that rescinded national monument protections on two of those designations in Utah: the Bears Ears National Monument and the Grand Staircase-Escalante National Monument *(figure 1.24)*. In his official statement, the president argues that he is"giving back" the land to the people,

> *[b]ecause some people think that the natural resources of Utah should be controlled by a small handful of very distant bureaucrats located in Washington. And guess what? They're wrong. … They don't know your land, and truly, they don't care for your land like you do. But from now on, that won't matter. I've come to Utah to take a very historic action to reverse federal overreach and restore the rights of this land to your citizens.*[41]

The areas affected total 1.9 million acres. By removing these protections, Trump has

37 Haraway, "A Cyborg Manifesto," 293.
38 Timothy Luke, "At the end of Nature: cyborgs, 'humachines', and environments in postmodernity," *Environment and Planning* A, vol. 29, (1997): 1375.
39 Cary Wolfe, *What is Posthumanism?* (Minneapolis: University of Minnesota Press, 2010), xv.
40 "Theodore Roosevelt and Conservation," National Park Service, accessed January 17, 2018, https://www.nps.gov/thro/learn/historyculture/theodore-roosevelt-and-conservation.htm.
41 Donald Trump, "Presidential Proclamation Modifying the Bears Ears National Monument," *White House*, December 4, 2017, https://www.whitehouse.gov/presidential-actions/presidential-proclamation-modifying-bears-ears-national-monument/.

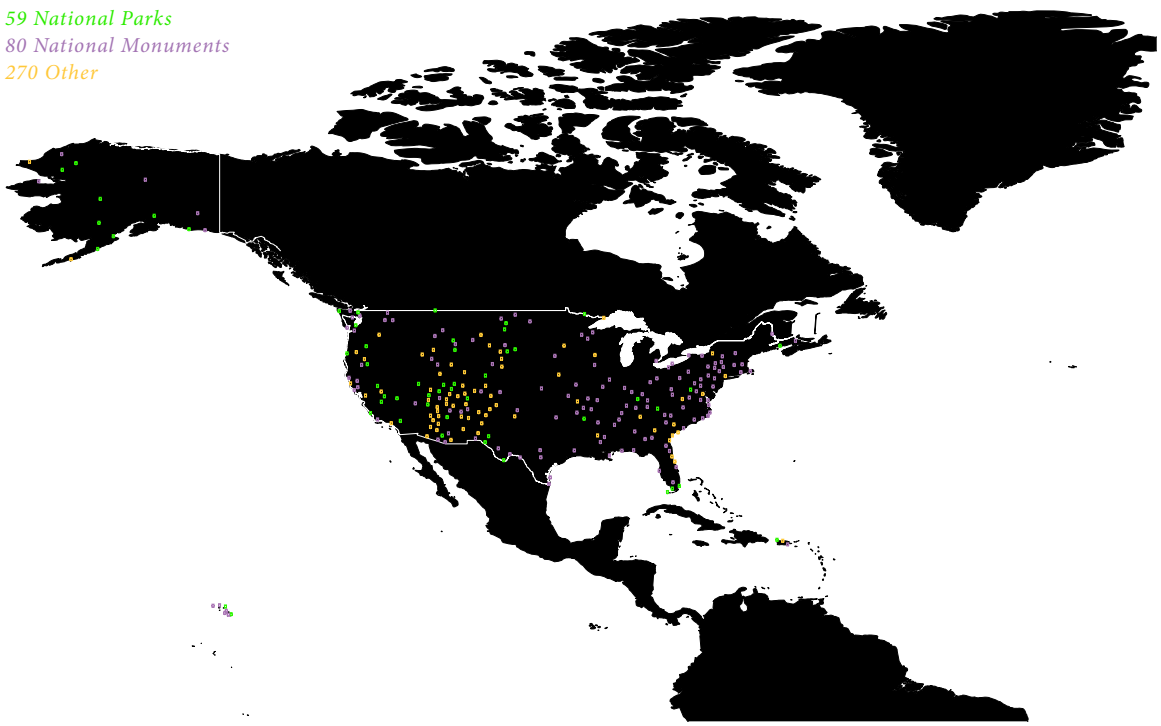


figure 1.23 U.S. National Parks System, 2016.

opened up the land to development, most likely in the form of resource extraction or agricultural practices. This action marked an unprecedented threat to the nation's existing protected landscapes. Suddenly, their continued protections are no longer a guarantee for preservation.

Donald Trump's statement also reveals in its language this yearning for the old "nature", one that is created by the hands of God. The imagery he conjures up is reminiscent of the past: when the American West was being settled under the guise of American progress *(figure 1.25)*, a problematic time in American history.

> *With your help in treating our natural bounty with respect, gratitude, and love, we will put our nation's treasures to great and wonderful use. Families will hike and hunt on land they have known for generations, and they will preserve it for generations to come. Cattle will graze along the open range. Sweeping landscapes will inspire young Americans to dream beyond the horizon. And the world will stand in awe of the artistry God has worked right here in your great state.*[42]

In our current anthropogenic time, this approach to our lands is dangerous. We cannot use capitalistic or political responsibility as an excuse to put ethics over profit.

In this sudden time of uncertainty, the military landscape may offer a solution to the growing pressures from all fronts that threaten the continued survival of the animal and our Earth's health. These involuntary parks already

> *bear some small resemblance to the twentieth century's national parks, those government-owned areas nervously guarded by well-indoctrinated forest rangers in formal charge of Our National Heritage (C) (TM).*[43]

Both the military base and the national park are controlled by a branch of the federal government; both have explicit and bounded edges with controlled entry; both are guarded and protected territories. Mass migrations are being witnessed as animals are squeezed out of hiding; many are finding refuge (as evidenced) in these less than desirable, and oftentimes dangerous, places. Perhaps we require a new

figure 1.24 Tweet by President Donald Trump.

42 Trump, "Presidential Proclamation Modifying the Bears Ears National Monument."
43 Sterling, "Viridian Note 00023: The World is Becoming Uninsurable, Part 3."

figure 1.25 John Gast, ***American Progress,*** 1872.

type of park that more actively argues for continued animal occupation, an idea that is not without some precedent. Germany has already proposed turning 62 of their defunct military bases into wildlife sanctuaries in the past few years.[44]

Consider a case study: Guantanamo Bay Naval Base (figure 1.26-1.31). The base has been an incredibly contentious site since the War on Terror began in 2001 and the detention camp (not the actual military base) was opened, and which remains in active conflict today. Although the detention camp takes up a tiny portion of the base, its reputation has coloured the entire site as a result of its controversial role in the War on Terror and polarizing opinions from both Democrats and Republicans. Its rumours of torture and connection to terrorism have become synonymous to its name. Yet, almost ironically, many scientists have called for the site to be transformed into a research facility in response to its surprisingly diverse ecology.[45] In any decision regarding the outcome of the base, political, economic, and human desires must be taken into consideration, without the same courtesy extended to the animal body. For over 150 species of butterfly and moth found here, human complexity does not register on the animal's environment, its ***umwelt***.[46]

In considering its future, certain questions must be asked as you examine the following case study:

1. How do we treat ex-military sites today?
2. How do we treat address the military pollutants left, and what are their legacies?
3. Where does the animal body fit into our consideration of these territories?
4. What is their future in a posthuman society?

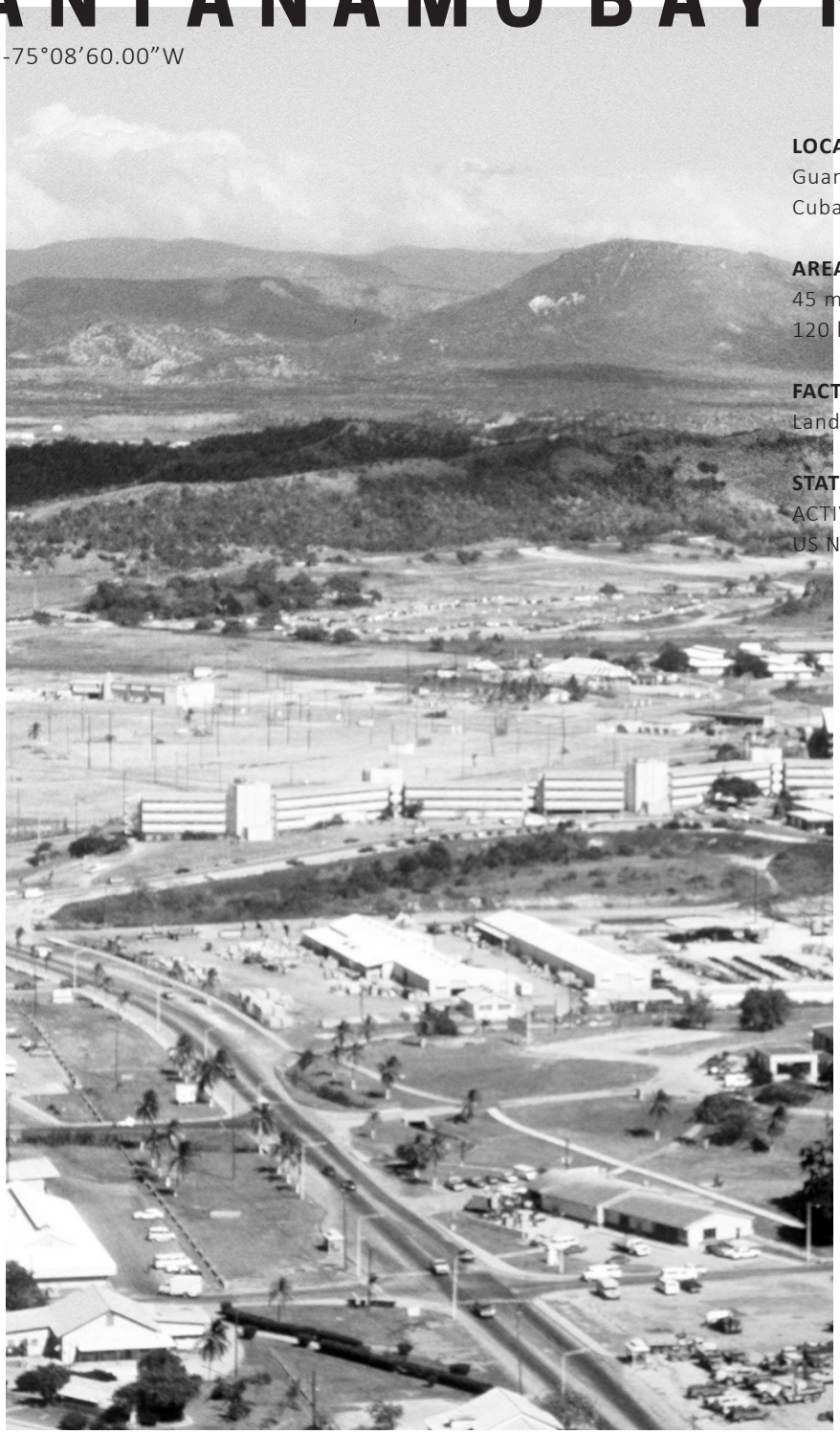
While the current agenda of the United States federal government in 2018 is antithetical to the concerns raised by the thesis and these sites, their futures will continue to remain a concern to the state of the world to come. The unprecedented decisions being made under this administration may only stall the inevitable need to confront the consequences of our increasingly anthropogenic world. They are driven by a short-term approach of instant gratification driven by an "out of sight, out of mind" attitude that will only pacify the problem. As the effects of global warming become more difficult to ignore, so too will these new cyborg landscapes. Without change to our politics, we will only accelerate their creation. Only under a new leadership will the goals of the thesis be included in the conversation.

44 Zachary D. Boren, "Germany is turning 62 military bases into wildlife sanctuaries," *The Independent*, June 19, 2015, http://www.independent.co.uk/news/world/europe/germany-is-turning-62-military-bases-into-wildlife-sanctuaries-10332109.html.
45 Casey Williams, "Scientists Want to Turn Guantanamo Bay Into A Research Park," *Huffington Post*, March 25, 2016, http://www.huffingtonpost.ca/entry/guantanamo-bay-environmental-research_us_56f190a9e4b084c67221bd4c.
46 Uexkull, *A Foray Into the Worlds of Animals and Humans*, 53.

CASE STUDY:

GUANTANAMO BAY NAVAL

19°53’59.99”N -75°08’60.00”W



LOCATION
Guantanamo Bay,
Cuba

AREA
45 mile^2
120 km^2

FACTORS
Landmine

STATUS
ACTIVE;
US NAVY

BASE

SITE

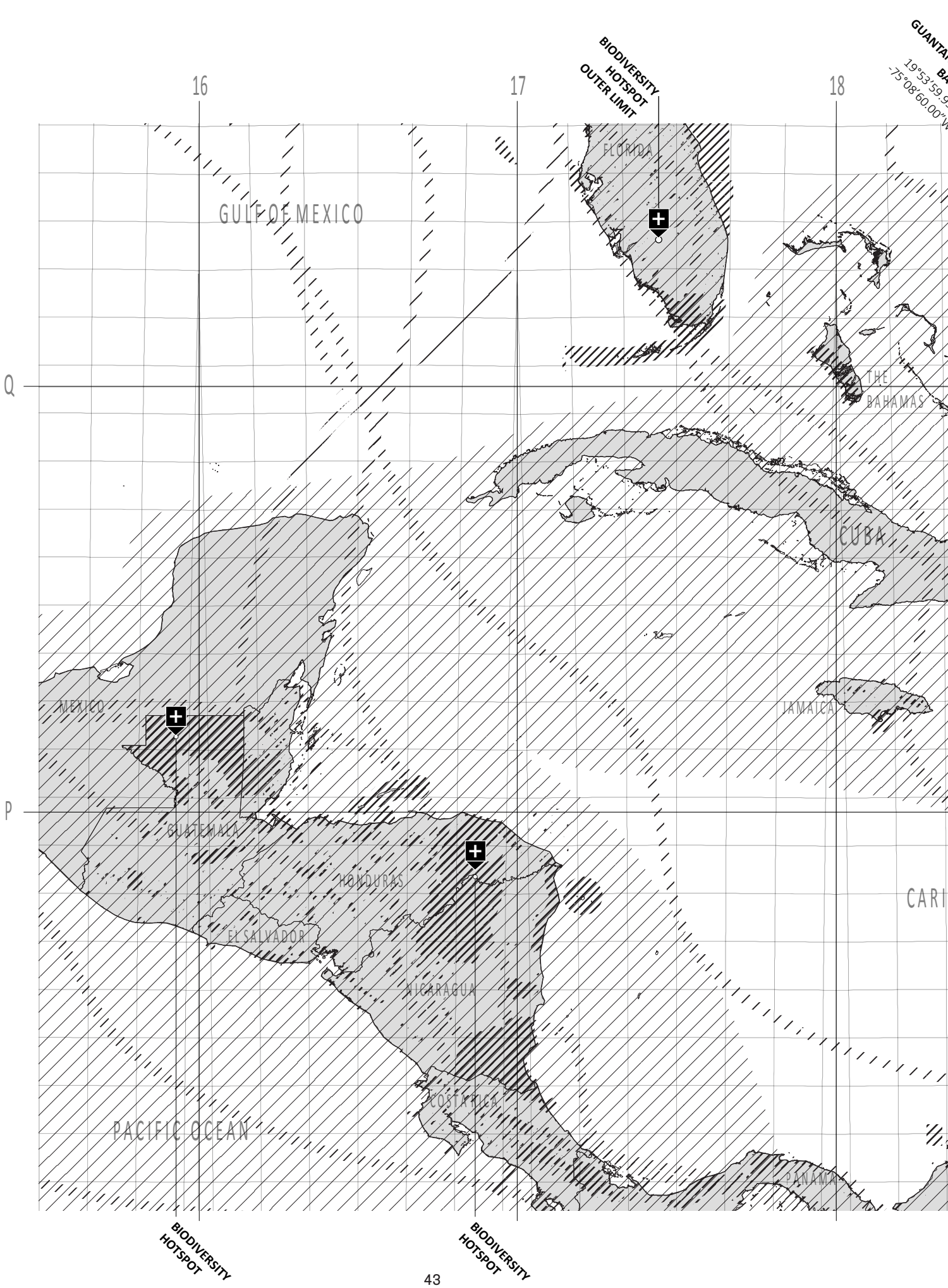
Guantanamo Bay, also known as Guantanamo Bay Naval Base, is a piece of land in Cuba occupied by American troops. Although it is considered U.S. soil, its legal standing is contested by the Cuban government since its lease was signed in 1903. In 2002, the Guantanamo Bay Detention Camp (GTMO) opened, adding to the contentious nature of the site. The name itself, Guantanamo Bay, has become synonymous to the prison located on the U.S. naval base and instantly conjures up images of torture, prisoner, and war. It has emotionally scarred the landscape alongside its many physical technological pollutants.

Both countries, through the U.S Army and the Cuban Revolutionary Armed Forces, have contributed technological pollutants to the mountainous landscape in the form of landmines and defensive infrastructure that have physically altered the ecology of the site. However, existing alongside these objects are families of both military personnel and Cuban refugees who have made a life on this land.

The site continues to exist in its current condition of occupation and contention with both military and non-military activity. Due to the size of the site, many areas remain undeveloped allowing many animals to find refuge on Guantanamo's untouched landscape. This ecological diversity has been recognized by many scientists who are now stationed on the base conducting research. Many have spoken out about turning the site into a research park.

Guantanamo Bay is currently in the ***OCCUPIED*** stage of occupation.

figure 1.26 ***(Opposite)*** Birds eye view of Guantanamo Bay Naval Base, 1995.


16
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BIODIVERSITY HOTSPOT OUTER LIMIT
GUANTA
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GULF OF MEXICO
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JAMAICA
GUATEMALA
HONDURAS
EL SALVADOR
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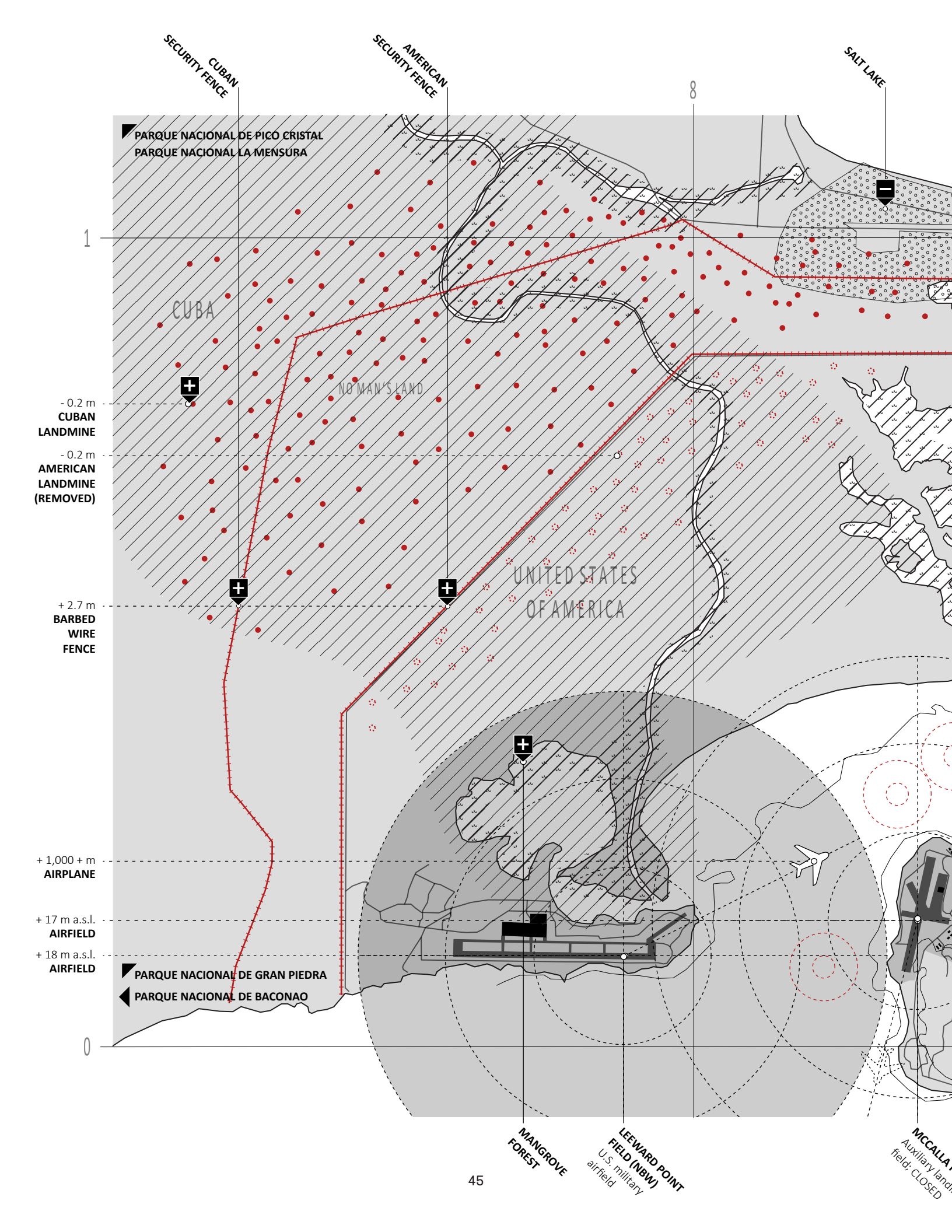
figure 1.27 Extended Context.


CUBAN SECURITY FENCE
AMERICAN SECURITY FENCE
SALT LAKE
8
1
PARQUE NACIONAL DE PICO CRISTAL
PARQUE NACIONAL LA MENSURA
CUBA
NO MAN'S LAND
UNITED STATES OF AMERICA
- 0.2 m
CUBAN LANDMINE
- 0.2 m
AMERICAN LANDMINE (REMOVED)
+ 2.7 m
BARBED WIRE FENCE
+ 1,000 + m
AIRPLANE
+ 17 m a.s.l.
AIRFIELD
+ 18 m a.s.l.
AIRFIELD
PARQUE NACIONAL DE GRAN PIEDRA
PARQUE NACIONAL DE BACONAO
0
MANGROVE FOREST
LEEWARD POINT FIELD (NBW)
U.S. military airfield
MCCALLA
Auxiliary landing field; CLOSED

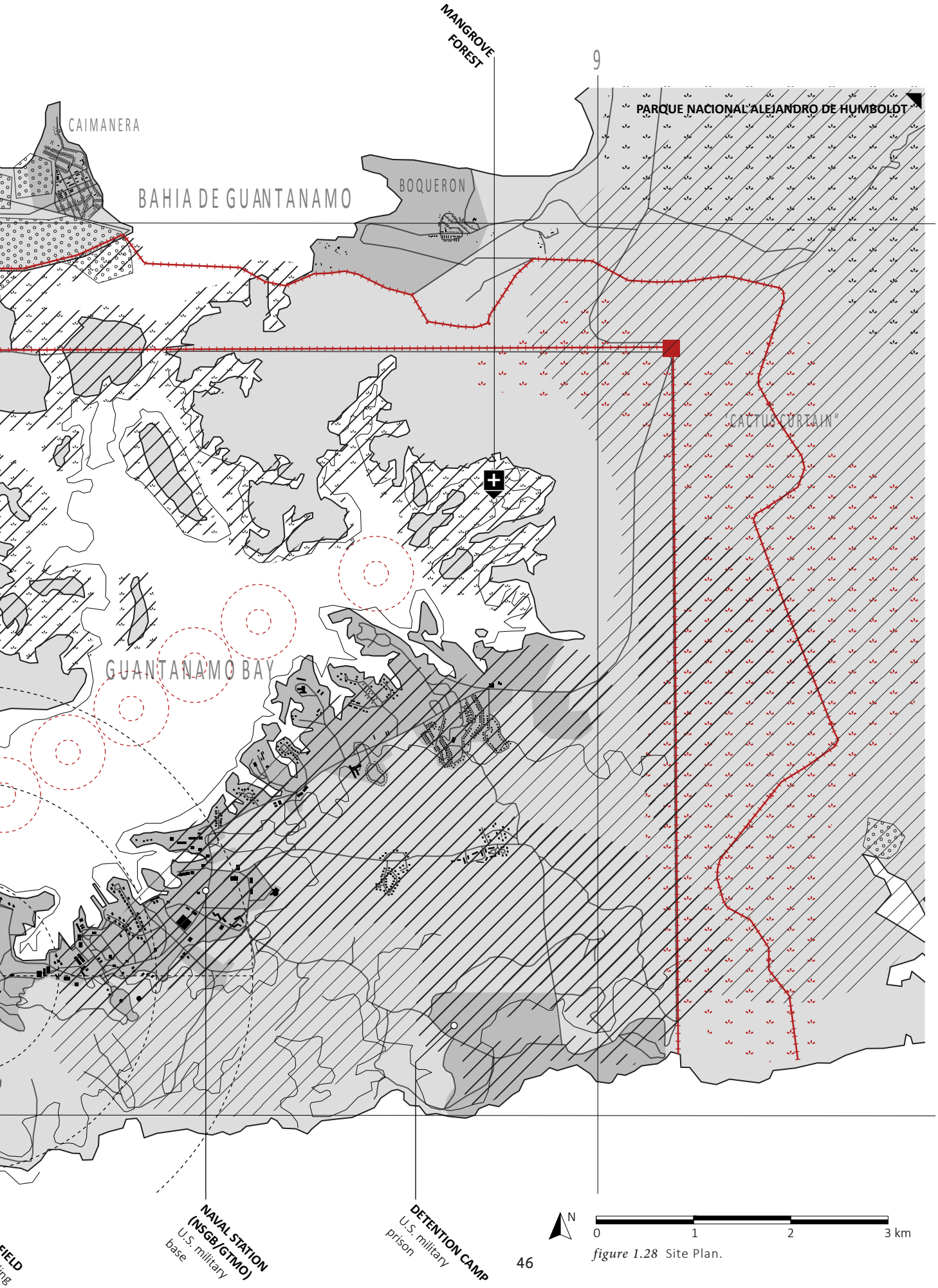


figure 1.28 Site Plan.

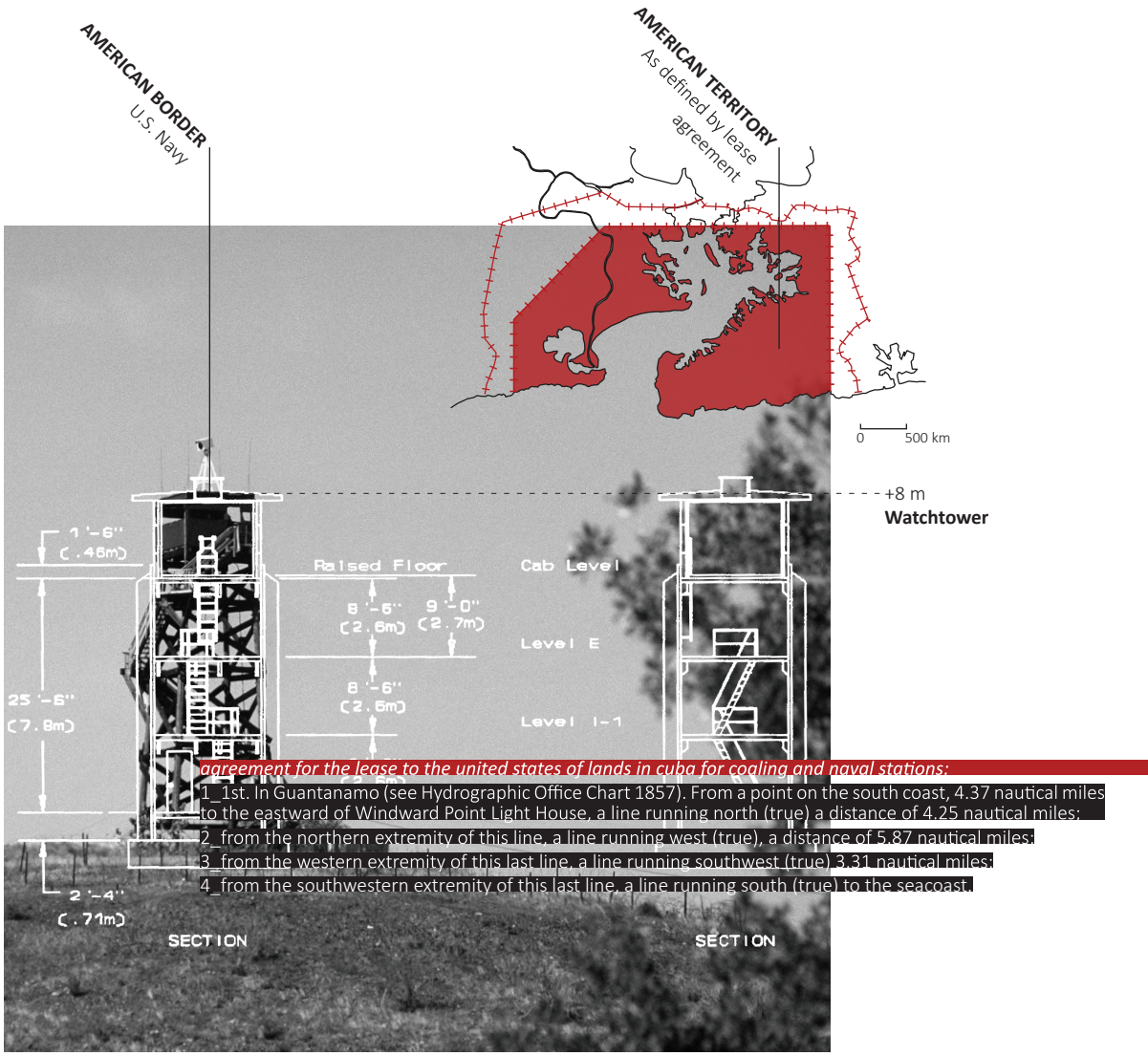


figure 1.29

BORDER

Although there is an official lease between Cuba and the U.S., the American occupation of the land is not without contention between both parties. While America continues to maintain a strong military presence in Guantanamo Bay under the conditions of the lease issued after the Spanish-American war under the guise of maintaining Cuban independence, Cuba objects to their occupation as 'illegal'. To point, while the U.S. pays their annual agreed amount of $4,085 USD / year, Cuba has refused to cash a single check (except 1 by mistake).[47]

47 Jennifer K. Elsea and Daniel H. Else, *Naval Station Guantanamo Bay: History and Legal Issues Regarding Its Lease Agreements,* R44137 (Place of Publication: Congressional Research Service, 2016): 6, https://fas.org/sgp/crs/natsec/R44137.pdf.

ENERGY

Sitting on top of the tallest ridge in Guantanamo Bay are four wind turbines built in 2005 as part of a renewable energy project that seeked to reduce imported fuel on remote military sites. It was estimated that these turbines would generate 3,800 kW of electricity saving taxpayers $1.2 million in annual energy costs and 650,000 gallons of diesel per year, a quarter of power needed during peak operations.[48] The Department of the Navy put this project forward as goodwill towards their commitment to energy conservation and environmental stewardship, although economic savings seems to be its main driver.

48 "U.S. Naval Station, Guantanamo Bay, Cuba," Federal Energy Management Program, Office of Energy Efficiency & Renewable Energy, accessed January 29, 2018, https://energy.gov/eere/femp/downloads/us -naval-station-guantanamo-bay-cuba.

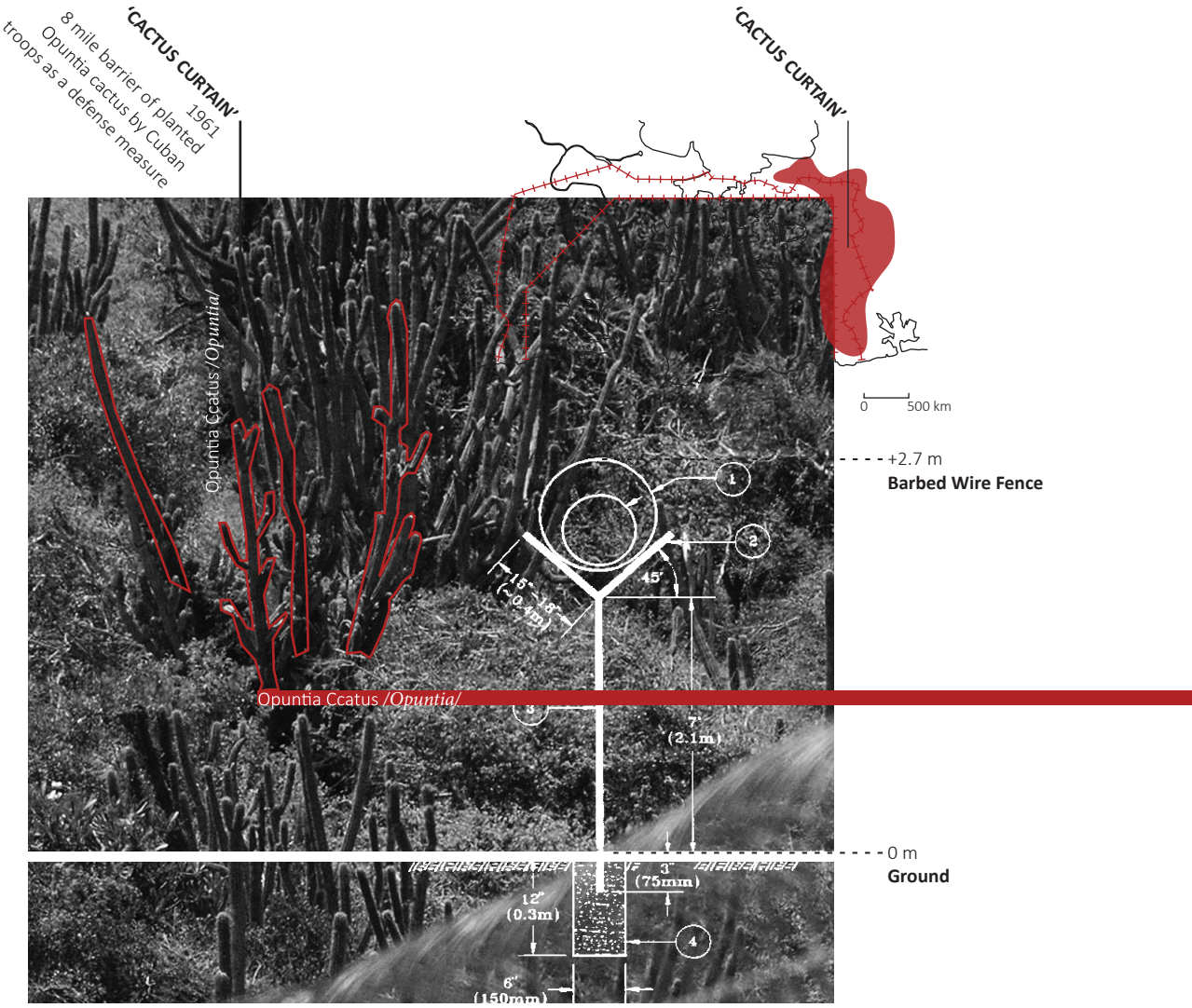
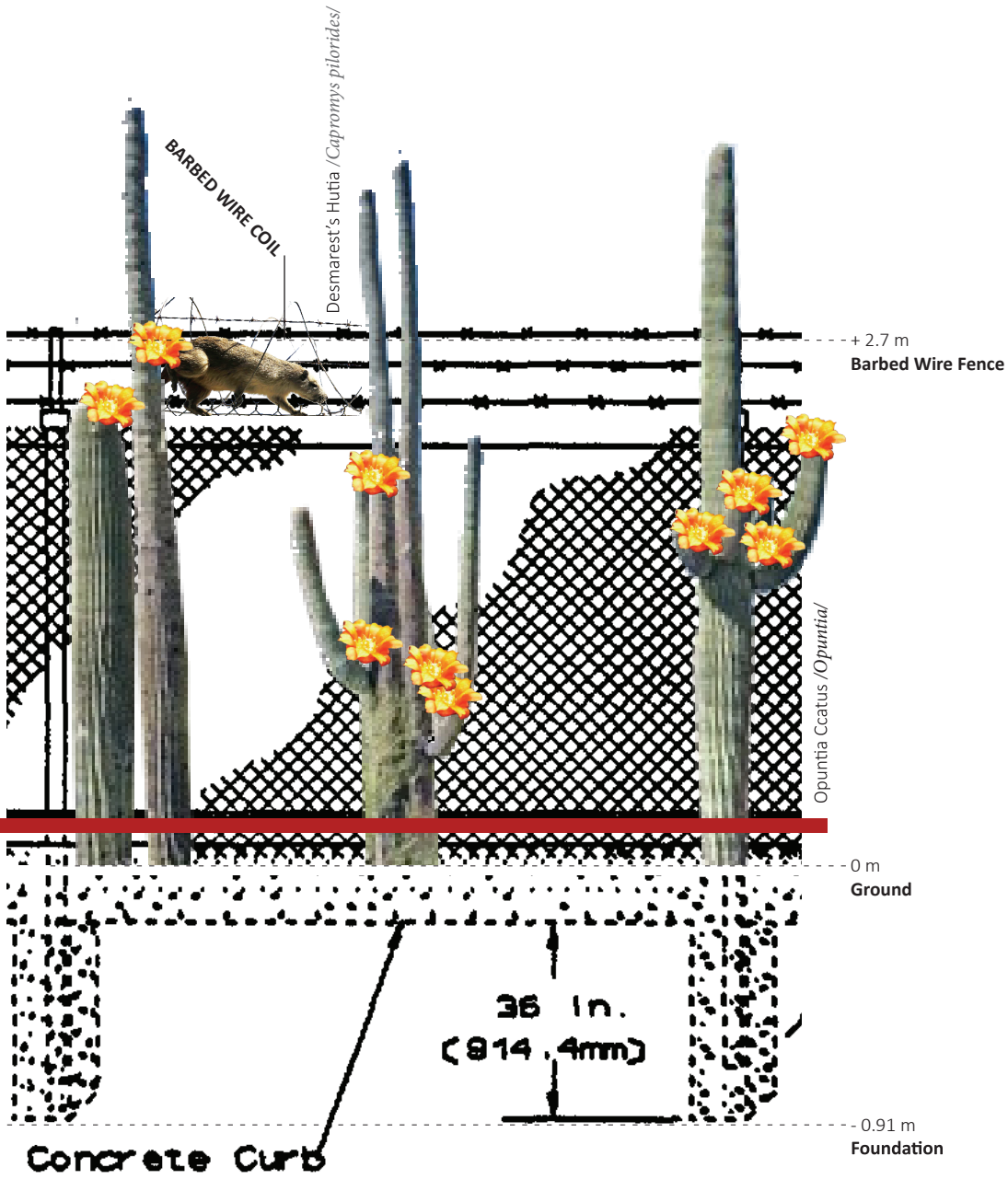


figure 1.30

BORDER

The 'Cactus Curtain' is a 13 km long barrier of Opuntia Cactus planted by the Cuban Revolutionary Armed Forces in 1961 as a defensive measure against Cubans seeking refuge on U.S. soil following the Cuban Revolution.[49] Its name is an allusion to the Iron Curtain, the Bamboo Curtain, and the Ice Curtain, all demarcating political boundaries between nations. The cacti stand alongside both the Cuban and American barbed wire fence and occupy the no man's land in between as well.

49 "Cactus Curtain," Guantanamo Public Memory Project, accessed January 20, 2018, http://gitmomemory.org/place/cactus-curtain/.



CACTUS CURTAIN

While the infrastructure of the fence and cacti do act as a physical barrier against the human body, it is not so formidable to the animals found on the site. The Desmarest's Hutia, known colloquially as the banana rat, has found safety on the American side of the fence instead of being hunted for meat on the Cuban site. There are even areas where the rock iguana, a threatened species, has protections against harm - wherein any human that harms them will be fined.

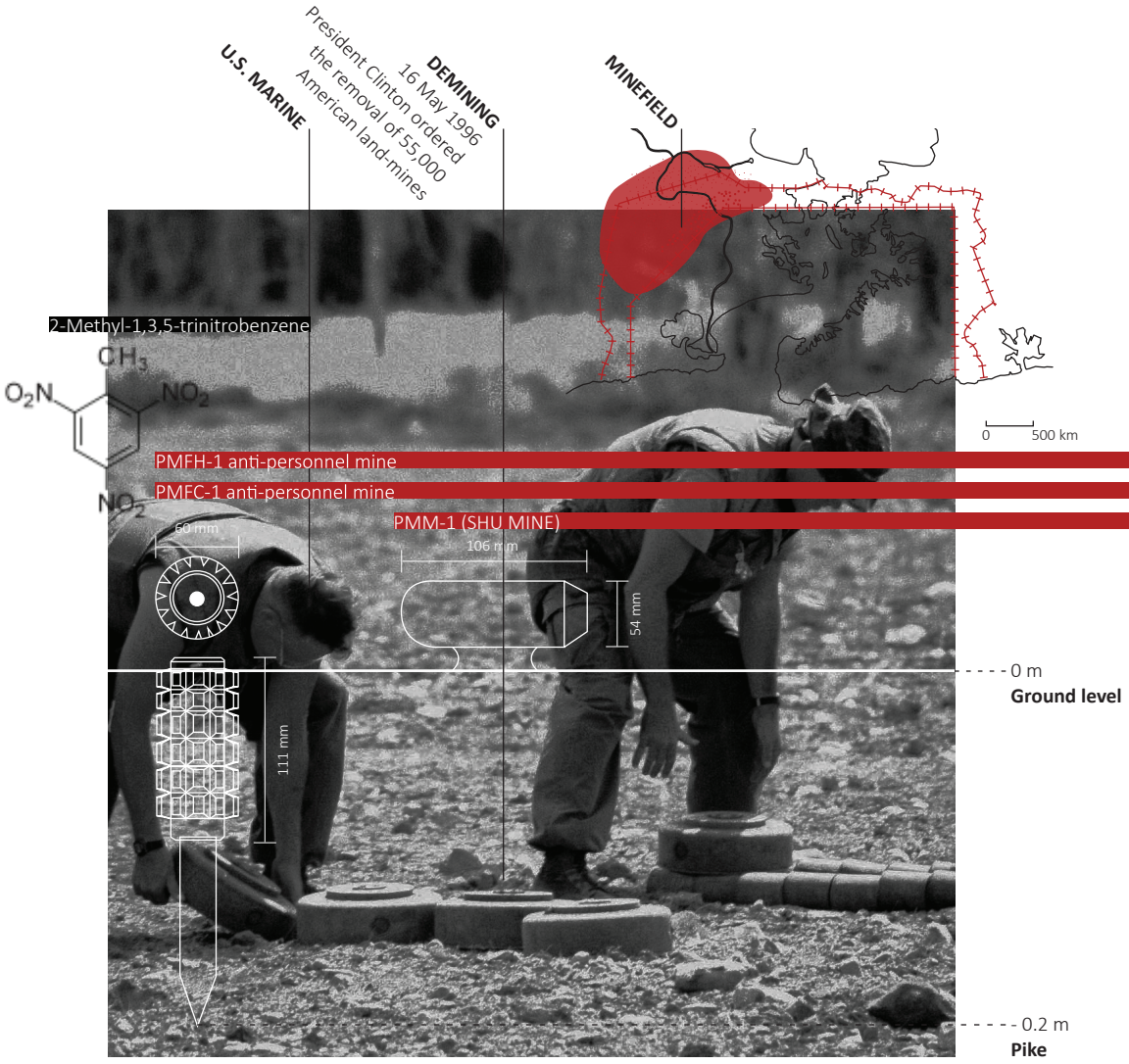
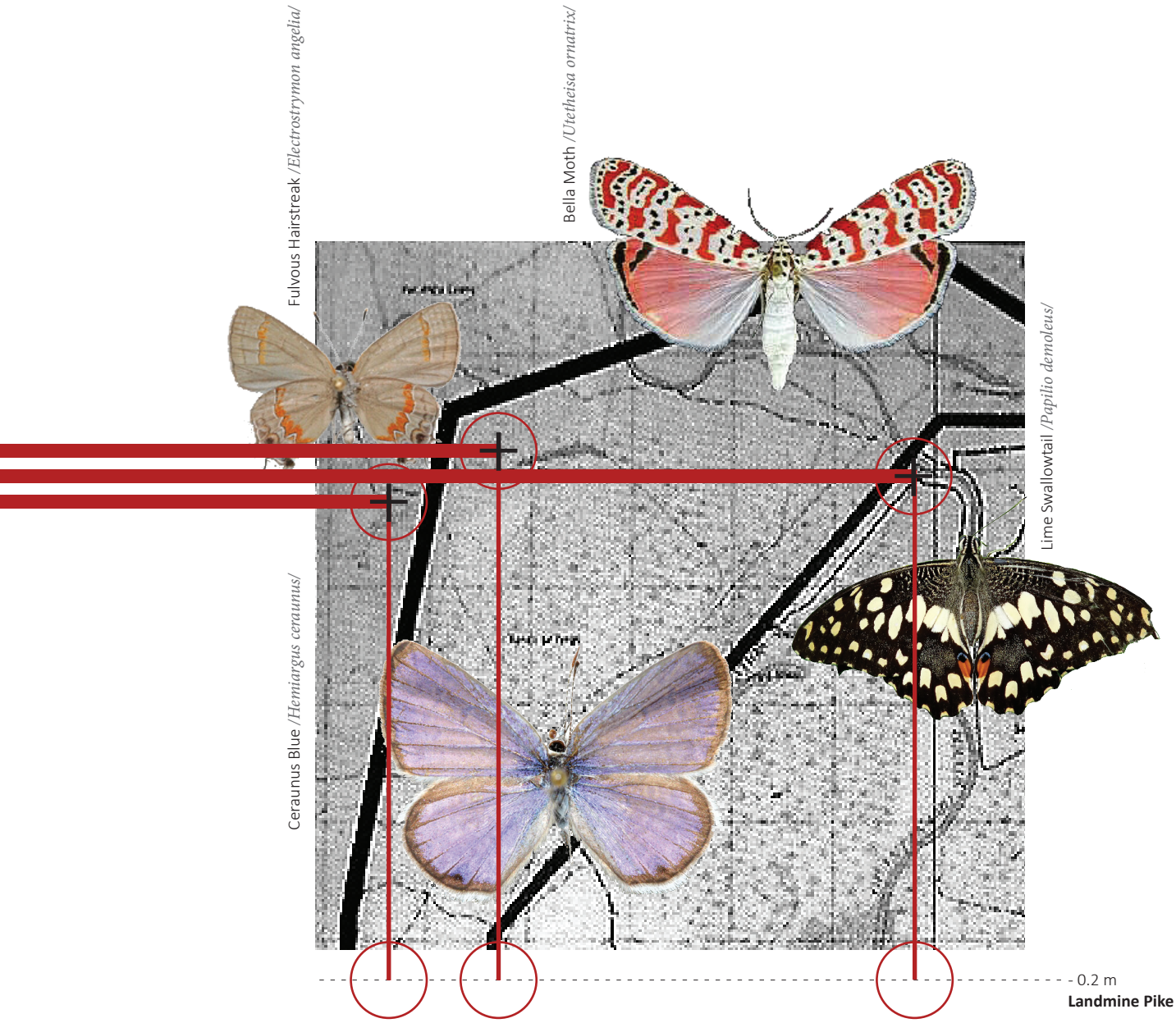


figure 1.31

LANDMINE

Between both the U.S. and Cuba, there was a combined 125,000+ anti-personnel mines planted on both sides of the border. On May 16, 1996, President Bill Clinton ordered through a Presidential policy statement the removal of "more than 50,000 mines ... deployed on the U.S. side of the buffer zone back in 1961" and replace them with "layered defense measures including some sound and motion sensors which will provide the appropriate security under the present circumstances."[50] By 1999, all American mines were removed. Cuba has not reciprocated, stating they will only remove their mines once the U.S. withdraws from their occupation of the bay.

50 "Mine Ban Policy," Landmine & Cluster Munition Monitor, accessed January 20, 2018, http://archives.the-monitor.org/index.php/publications/display?url=lm/1999/cuba.html.



BUTTERFLY DIVERSITY

Due to the ongoing military occupation of the landscape, the majority of the U.S. leased land has been allowed to remain undeveloped. This has allowed the land to become an area of refuge for 41 species of butterfly and 192 species of moth[51] who are able to fly above and over all these technological pollutants. The juxtaposition between this emotionally scarred and contentious landscape and the diversity found on it makes especially poignant the irony of the landscape and the history of Guantanamo Bay.

51 Katina Prokos, "UF Guantanamo Bay Lepidoptera study sets baseline for future research," *Florida Museum,* September 6, 2012, https://www.floridamuseum.ufl.edu/pressroom/2012/09/06/uf-guantanamo-bay-lepidoptera-study-sets-baseline-for-future-research/.

PART II

TESTING GROUNDS

1 3 of 6

- SOLID WASTE MANAGEMENT UNIT-XXX
- AREAS OF INTEREST

NO.	DATE	DESCRIPTION	BY	DATE	APPD
		REVISIONS			

Washington Demilitarization Company
TOOELE, UT
CONTRACT NO. DAAA09-97-C-0001

P M C D

JACADS
JOHNSTON ISLAND
JOHNSTON ATOLL CHEMICAL AGENT DISPOSAL SYSTEM

SHEET REV. NO.

AREA DECOMMISSIONING MATRIX
WORK AREA SCOPE
SHEET 2 OF 6

SCALE	FILE NO.	DATE	DWG NO.	REV
1"=750'-0"			SA-JCC-0058	P4

PART II: TESTING GROUNDS

Tourism and war appear to be polar extremes of cultural activity - the paradigm of international accord at one end and discord at the other. The two practices, however, often intersect: tourism of war, war on tourism, tourism as war, war targeting tourism, tourism under war, war as tourism are but a few of their interesting couplings.[52]

Diller + Scofidio
Back to the Front: Tourisms of War

DESIGN OBJECTIVES

The placement of the animal as the primary stakeholder in the Anthropocene and the rise of a new cyborg landscape calls for a proposal: to create a new series of parks akin to the National Park System fit for a posthuman 21st century that argues for continued animal occupation. Within this is the choice to remove the responsibility from the Department of Defense in regard to their dismal track record and a rejection of the myth of "pure nature". Looking back to 1988 where the first round of the Base Realignment and Closure (BRAC) commission was seen, only 3% of the contaminated sites had been completely cleaned up within 5 years with a budget of $164,773,000.[53] [54] In 2018 the requested budget for the next round of closures in 2021 is $255,867,000[55], less than that of 1988 given inflation. Given these trends, the thesis chooses instead to engage elsewhere.

In discussing the idea of a new National Park System, many issues must be considered. What notion of agency does the design necessitate and who is it for? How much or how little design is needed to be successful? What does it mean to design for non-human species?

The thesis raises the question of the very role and limits of design and dealing with human and non-human species: most critically, in asking itself why intervention is necessary in the first place. The argument could be made for leaving these involuntary parks alone and allowing their existence to continue without further human intervention. Over time, natural processes could remediate and reclaim these lands if left to their own devices. The end result would not be a return to "pure nature", but a reclaimed nature accepting of its cyborg devices. This, in my opinion, is an apathetic response in a time

figure 2.32 (Previous) Johnston Atoll Chemical Agent Disposal System drawing.

52 Diller + Scoffidio, "Introduction," in *Back to the Front: Tourisms of War* (France: F.R.A.C. Basse-Normandie, 1994), 19.
53 Wegman Jr. and Bailey, "The Challenge of Cleaning up Military Wastes When U.S. Bases are Closed," 868.
54 Department of Defense, "DoD Base Realignment and Closure," (May 2017): 10, http://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2018/budget_justification/pdfs/05_BRAC/FINAL_FY18_BRAC_Summary_Book.pdf
55 Department of Defense, "DoD Base Realignment and Closer," 9.

figure 2.33 Zootopia Render, ***BIG***, 2014.

where action is needed. Even the government designation of these territories as national parks, refuges, or animal sanctuaries has already been shown to be unstable. Therefore design intervention is needed, not only to ensure protection for the animal but also to actively stimulate continued animal occupation by demanding human cooperation. After all, our futures are intrinsically linked under the Anthropocene.

The design for these involuntary parks can begin from one of two places: top-down (large to small scale) or bottom-up (small to large scale). If we consider a top-down approach, a cohesive methodology is executed driven by bureaucratic concerns with funding and land ownership over a system of sites. However, what is lacking is the specificity afforded by a bottom-up approach, where the individual site is understood by its local conditions (climate, military activity, post- vs. pre-military status) and the concerns of the stakeholders can be directly addressed. Despite the precision afforded by this approach, the system as a cohesive whole is neglected. For this reason, a combination method must be employed that sets up a unifying methodology with design objectives (top-down) that allows room for a highly calibrated response at the bottom (bottom-up). Then, the design objectives are as follows:

1. Strengthen ecological connections and needs by encouraging colonization by the animal.
2. Ensure flexibility in response to site-specific needs and conditions.
3. Consider material cycles.
4. Consider growth over time.

Contrary to the methodology of restoration ecology and similar ventures, the design objectives for these landscapes are more aggressive. It is not the primary goal to "cleanse" these lands of their technological pollutants, but instead, to acknowledge their role in allowing the animal to return by offering protection against new human intervention. However, the design does not want to forbid human involvement. Rather, the thesis argues for a design where human engagement (driven by the sense of environmental responsibility) is

figure 2.34 Gitta Gschwendtner, ***Animal Wall***, 2009.

leveraged through the trend of "ecotourism" or "voluntourism" overseen by the Department of the Interior (aka the Department of Everything Else)[56] at the behest of the animal. But we must view the human as a tourist to these designs, and much like the soldier on the military landscape, is a "marked" body

> *unable to blend into the crowd. They are foreign bodies, like diverse strains of biological invaders in a resistant organism – facing anything from xenophobic suspicion to out-right contempt. … [T]hey are both living symbols of another nationalism.*[57]

But how does one design for non-human species? A leap of the imagination is required when pursuing any cross species project. Existing disciplines of architecture with this focus suggest a variety of different approaches in designing for the animal user with various levels of success. However, the trouble with the majority of these projects is the promotion of a human-only aesthetic consideration. This removes the design from the desires of their intended primary user and instead remains in the human realm. This can be seen everywhere from zoos to a contemporary favourite, the pet house. Languages used in these types of project are reminiscent to that of the problematic "old nature", often showing dubious utopic visions as seen in BIG's Zootopia *(figure 2.33)*. Contrast this approach to projects like the Animal Wall by Gitta Gschwendtner *(figure 2.34)* that point to an attempt to connect and reintegrate the animal back into our urban fabric. In designing the wall, Gitta consulted with ecologists to develop homes for the displaced bats and birds that catered to their ecological needs.

Still, perhaps more relevant are what writers such as Donna Haraway, Cary Wolfe, and Jakob von Uexkull have written in an attempt to bridge the gap between our two worlds. Uexkull's ***umwelt***, mentioned earlier, is most important to

56 "History," Highlights of Interior History, National Parks Service, last modified May 17, 2001, https://www.nps.gov/parkhistory/online_books/utley-mackintosh/index.htm.
57 Diller + Scoffidio, "Introduction," 24.

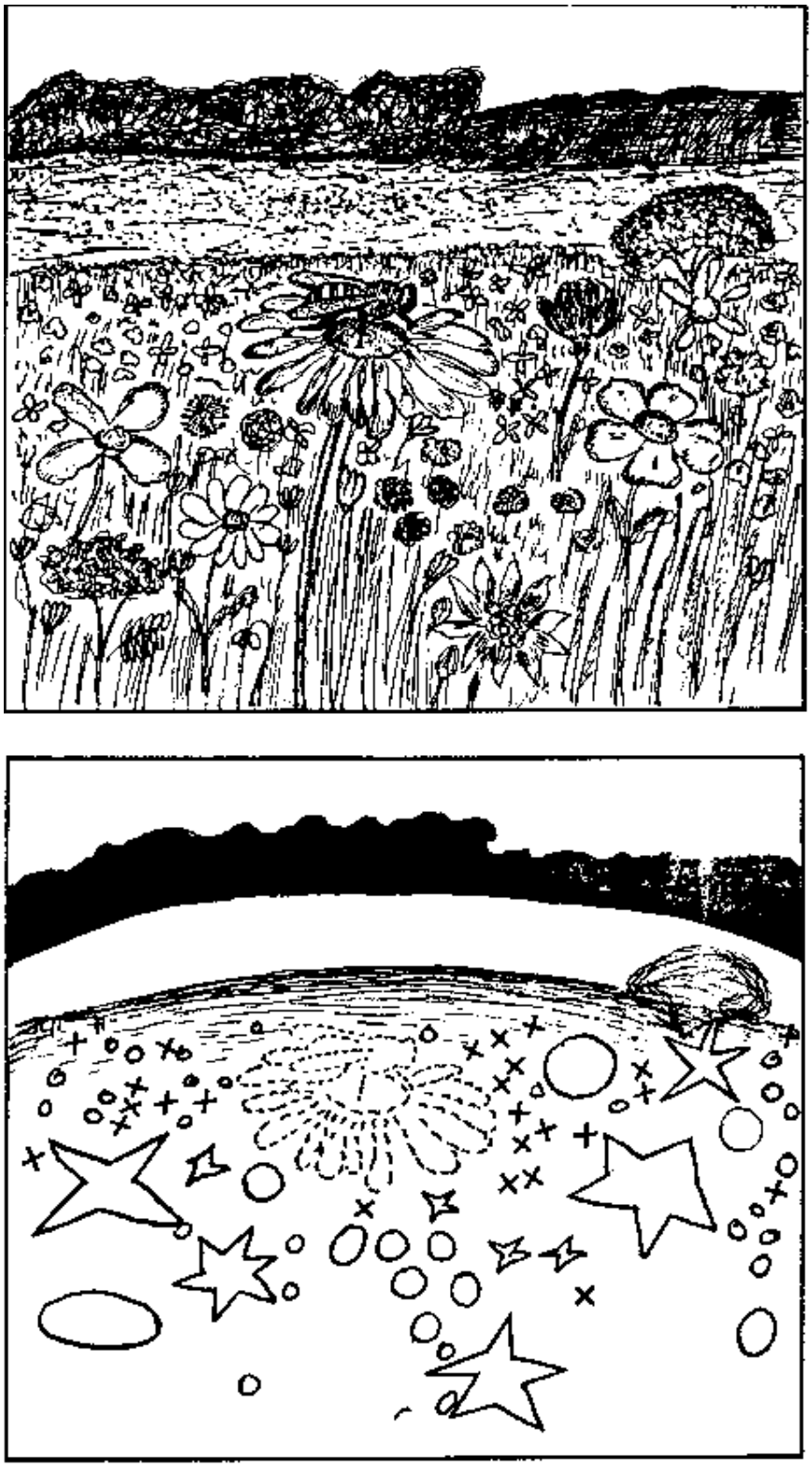


figure 2.35 Surroundings (top) and environment (bottom) of the bee.

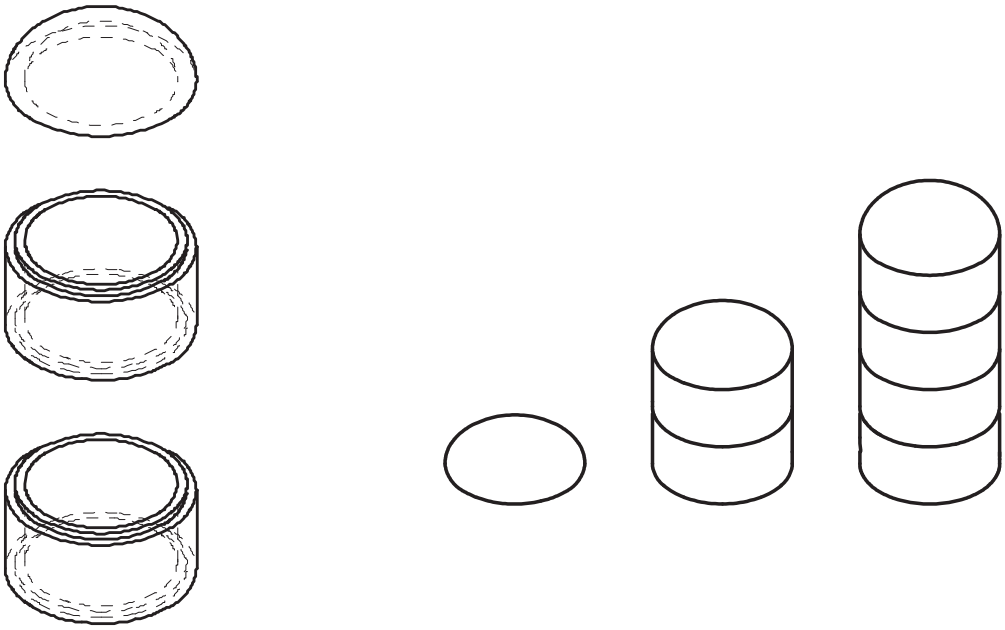


figure 2.36 Monument modularity and potential arrangements.

understand. It is made up of three spaces: the effect space, tactile space, and visual space.[58] This concept is illustrated in his example of the bee *(figure 2.35)* and its understanding of its environment versus its understanding of its surroundings.If we apply this thinking towards an intervention with the goal of enabling animal colonization, certain design qualities must shift in importance. Aesthetics must be downplayed to emphasize more sensory qualities: materials should be chosen based on tactility, olfaction, and visual stimulants that speak to the animal's *umwelt*.

Therefore, each monument's materiality is chosen based on specific needs of its function, ranging from textured concrete to a biodegradable material. Whenever possible, however, textured concrete is the default material for two reasons. The first was in consideration of construction methods. All monuments were designed to be modular, allowing height and size to be adaptable based on need *(figure 2.36)*. By dictating size and shape, formwork could be made that would allow the construction of these monuments easily done by a group of volunteers. The quick and easy-to-create nature given by concrete would allow them to be constructed in any place, as well as sustain any weather conditions. The second consideration was its weight. Each monument makes a statement within the landscape. By making each structure out of a heavy and contrasting material, the monuments stand as a testament to the animals' occupation, symbolically acting as a claim to the land.

The goal of the design objectives is to set a unifying methodology that can be taken on all military cyborg landscapes with room for specific calibration in the aforementioned monuments. In order to show the flexibility of the design objectives, the thesis explores two distinct site conditions with different degrees of remoteness and species: Johnston Atoll *(figure 2.37)* and the Rocky Mountain Arsenal Wildlife Refuge *(figure 2.38)*.

58 Uexkull, *A Foray Into the Worlds of Animals and Humans*, 53.

figure 2.37 Johnston Atoll, North Pacific Ocean.

figure 2.38 Rocky Mountain Arsenal Wildlife Refuge, Denver, Colorado.

The first, Johnston Atoll, is a collection of small islands in the Pacific Ocean established as a Naval refuelling station. Due to its extreme isolation, it is currently abandoned by the military with minimal oversight from the U.S. Fish and Wildlife Service. In contrast, the second site, the Rocky Mountain Arsenal Wildlife Refuge is an old military manufacturing plant located in Denver, Colorado. Its proximity to its urban surroundings offers a completely different site condition to that found on the Atoll, demanding different considerations to the design.

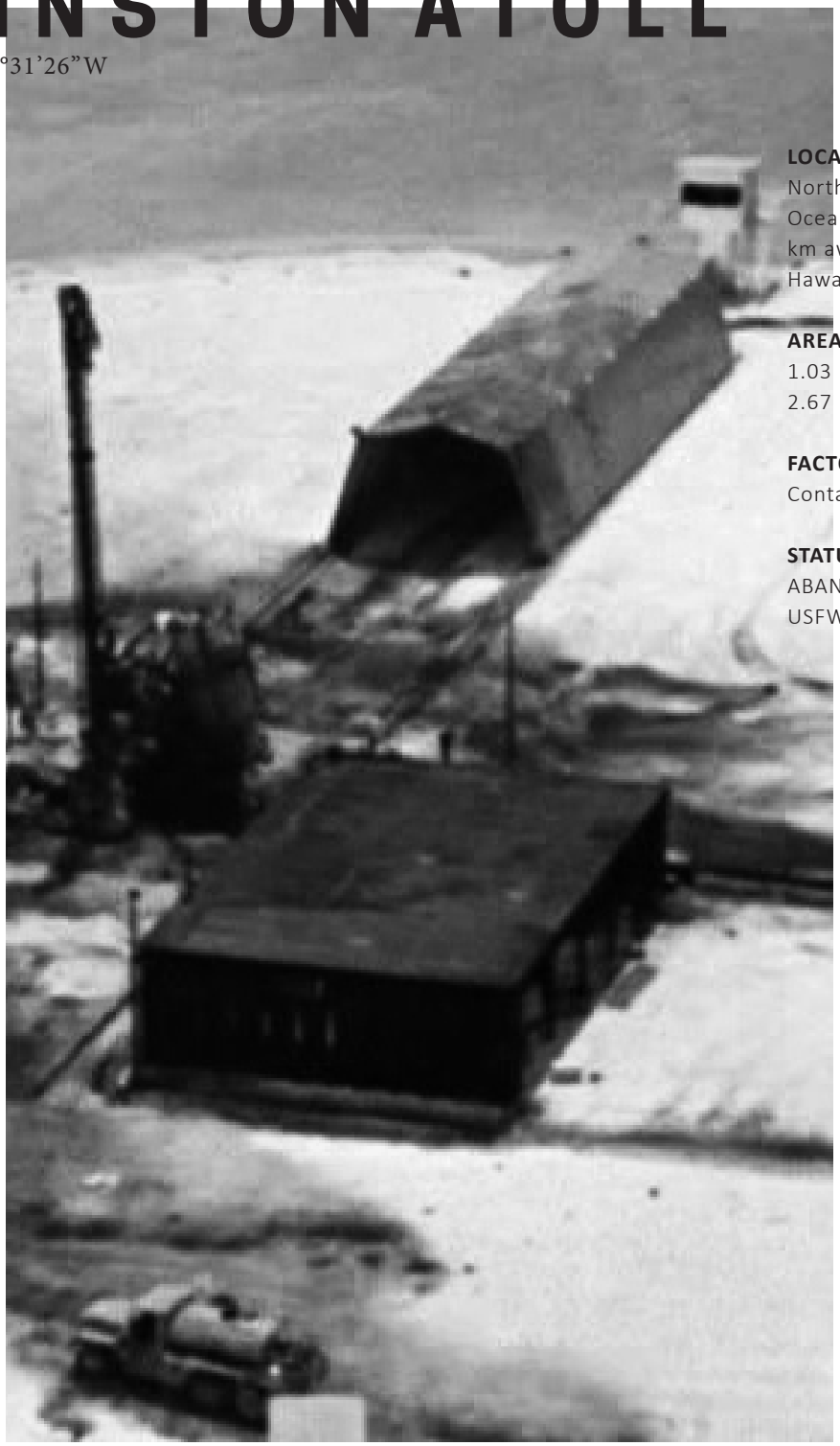
The basic structure of each masterplan follows a large zoning plan and three typologies of intervention customized with input from ecologists that directly engage specific species on each site. The varying factors and site conditions that influence the design are understood through an analysis of the following:

1. Site history of military occupation, activity, and important events.
2. Catalogue of technological pollutants left by military activity.
3. Identification of species and the areas they occupy.
4. Site specific challenges.

Through investigative mapping, a comprehensive understanding of the sites' cyborg nature is gained and its new technological-ecological links are further explored, leading to a specific design intervention. The goal of this exploration is to extend both the military and landscape imagination to a common ground and carve a new niche for these territories.

TEST SITE 001:
JOHNSTON ATOLL

16°44’13”N 169°31’26”W



LOCATION
North Pacific Ocean (1,325 km away from Hawaii)

AREA
1.03 mile^2
2.67 km^2

FACTORS
Contamination

STATUS
ABANDONED; USFWS

SITE

Johnston Island, or Kalama Atoll to Native Hawaiians, is a 13 km^2 atoll located in the Pacific Ocean. Its 4 islands are currently unincorporated territory of the United States and has been under the control and jurisdiction of the U.S. Fish and Wildlife Service since 2003. Prior to this, the islands were occupied by multiple branches of the U.S. military in which many technological pollutants have been left behind due to intense military activity.

In 1926, the atoll was "discovered" by Americans and designated a federal bird refuge and used for its guano deposits. In 1934, President Roosevelt placed the islands under the control of the U.S. Navy, but maintained its refuge status.[59] Thus began its 69 years of military occupation. Between 1934 and 2003 *(figure 2.41)*, the islands were used for many activities, including a naval refuelling depot, airbase, chemical weapons storage and disposal site, nuclear and biological weapons testing, and space recovery. Many of these activities were incredibly harmful to the existing environment and remain present to this day, altering the atolls' ecological network. The main island, Johnston Island, quadrupled over 20 years, while 2 new islands, Akau and Hikina, were created.[60]

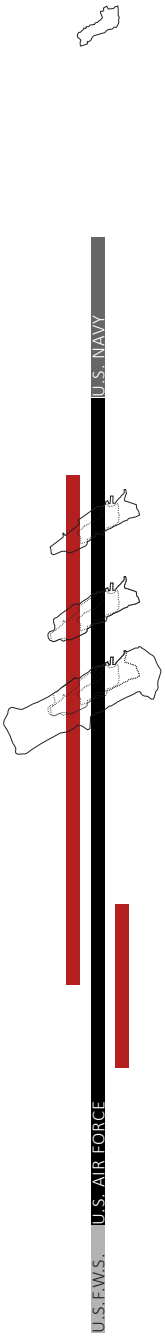
Due to its extreme isolation and military pollutants, the site remains UNRESOLVED while attracting a diverse number of species, making it a cyborg landscape. Following its abandonment by the military, the majority of the buildings have been demolished.

figure 2.39 ***(Opposite)*** A failed Thor missile launch during OPERATION "BLUEGILL PRIME".

59 "About the Refuge," Johnston Atoll, U.S. Fish and Wildlife Service, accessed January 20, 2018, https://www.fws.gov/refuge/Johnston_Atoll/about.html.
60 U.S. Fish and Wildlife Service, "About the Refuge."

figure 2.40 Aerial view of the island.

HISTORY



1796
Discovery.

1858
Claimed by the *U.S*. and the *Kingdom of Hawaii* under the *Guano Islands Act.*

1890
Executive Order 4467: Established as a *Wildlife Refuge* due to its diversity.

— **1934**
Executive Order 6935: Under control and jurisdiction of the *U.S. Navy.*

1941
Executive Order 8682: Restricted airspace access.

— **1948**
Control transferred to *U.S. Air Force.*

— **1958**
Operation "Hardtack" nuclear test series.
Island growth.

1962
Island growth.

1964
Island growth.

1965
Project 112 and *Project SHAD* biological warfare testing.

1971
Chemical weapon storage.

— **1972**
Operation "Pacer Ivy" Agent Orange brought to site from South Vietnam.

— **1975**
End of nuclear testing.

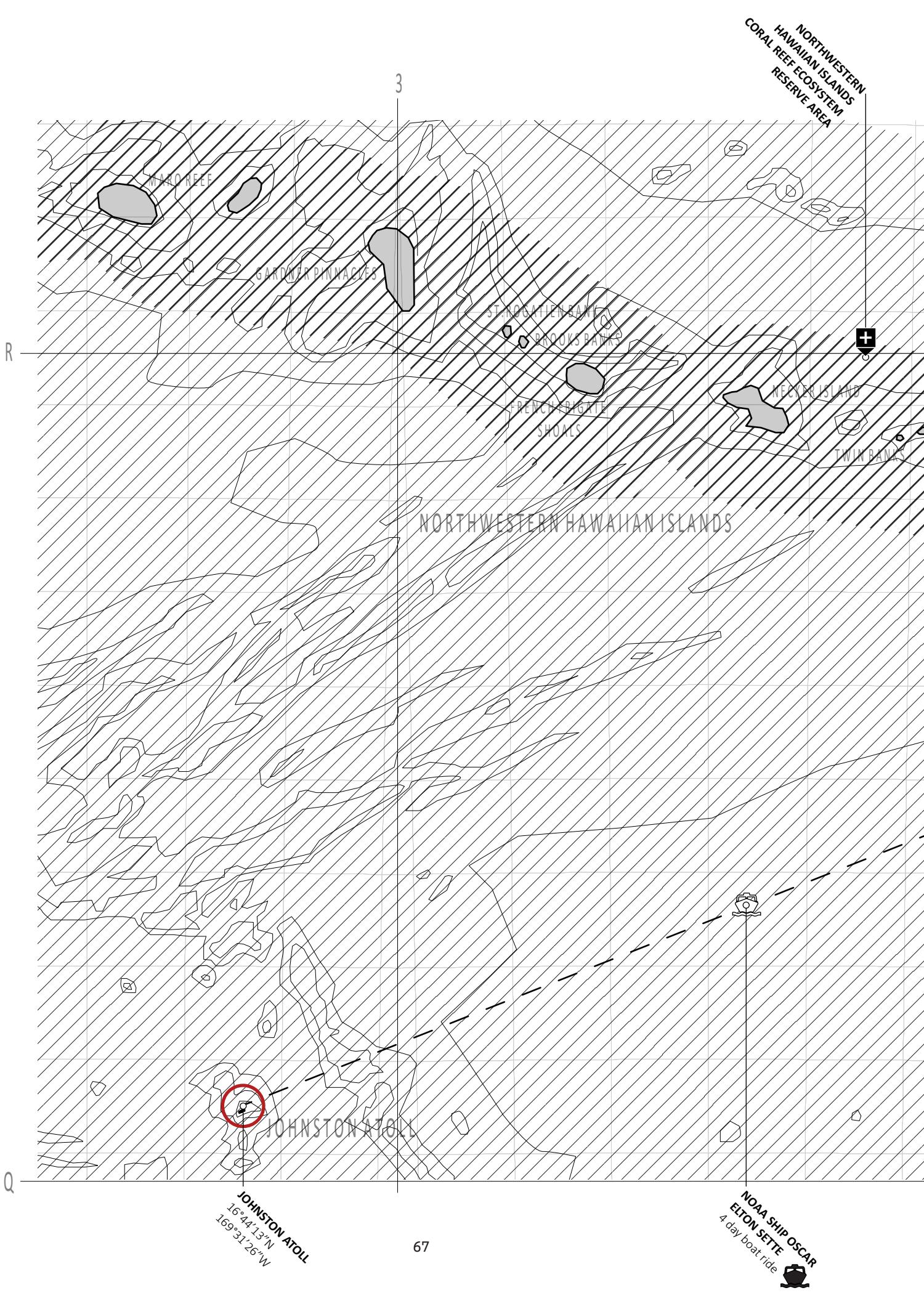
— **1977**
Operation "Pacer Ho" Agent Orange destroyed.

2001
Chemical weapon demilitarization mission.

— **2003**
Closure of base and removal of most structures under the *U.S. Fish and Wildlife Service.*

— **2017**
CURRENT DAY.

figure 2.41 Chronological timeline.


NORTHWESTERN HAWAIIAN ISLANDS CORAL REEF ECOSYSTEM RESERVE AREA
3
R
Q
MARO REEF
GARDNER PINNACLES
ST. ROGATIEN BANK
BROOKS BANKS
FRENCH FRIGATE SHOALS
NECKER ISLAND
TWIN BANKS
NORTHWESTERN HAWAIIAN ISLANDS
JOHNSTON ATOLL
JOHNSTON ATOLL
16°44'13"N
169°31'26"W
NOAA SHIP OSCAR ELTON SETTE
4 day boat ride

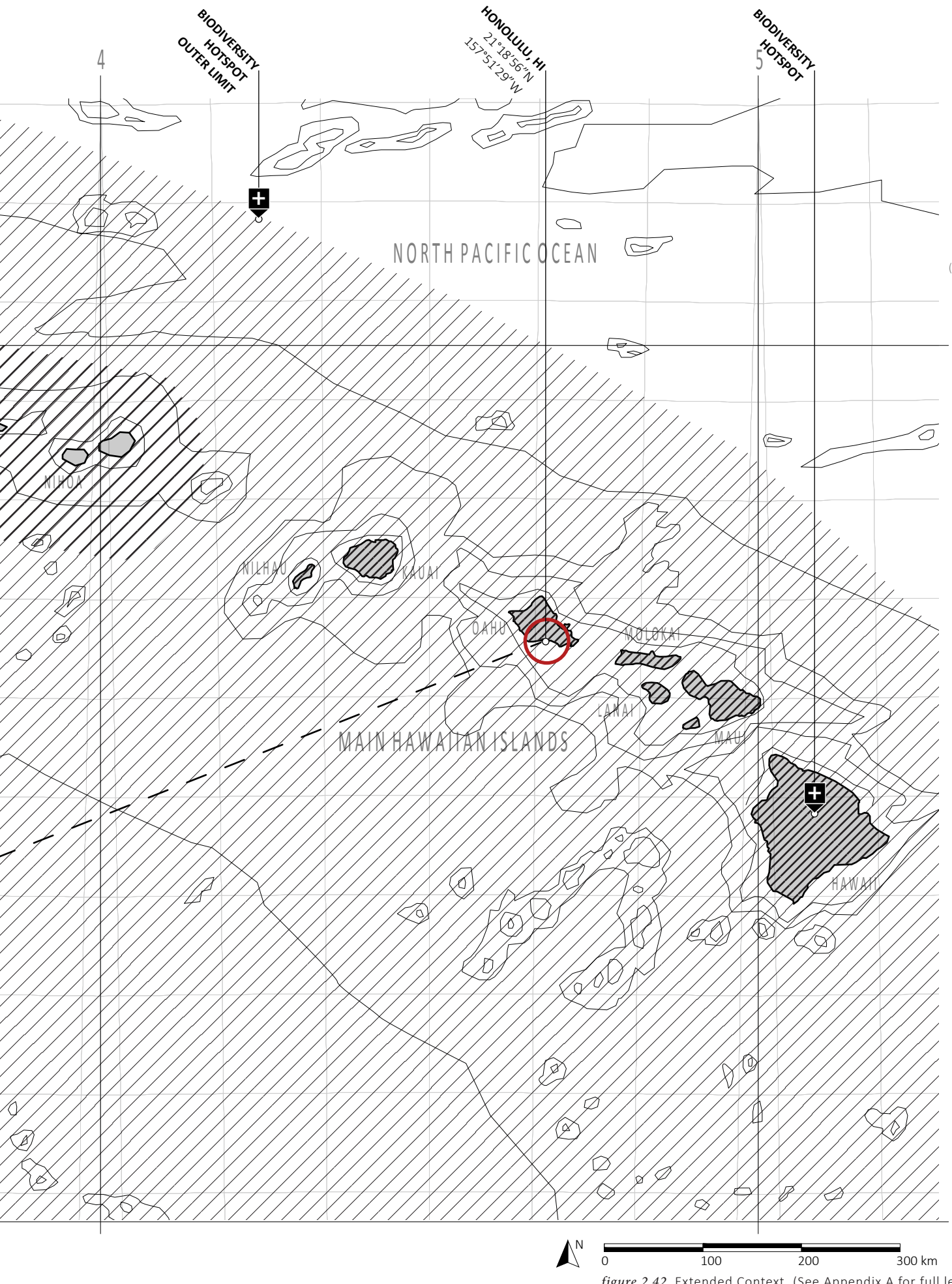
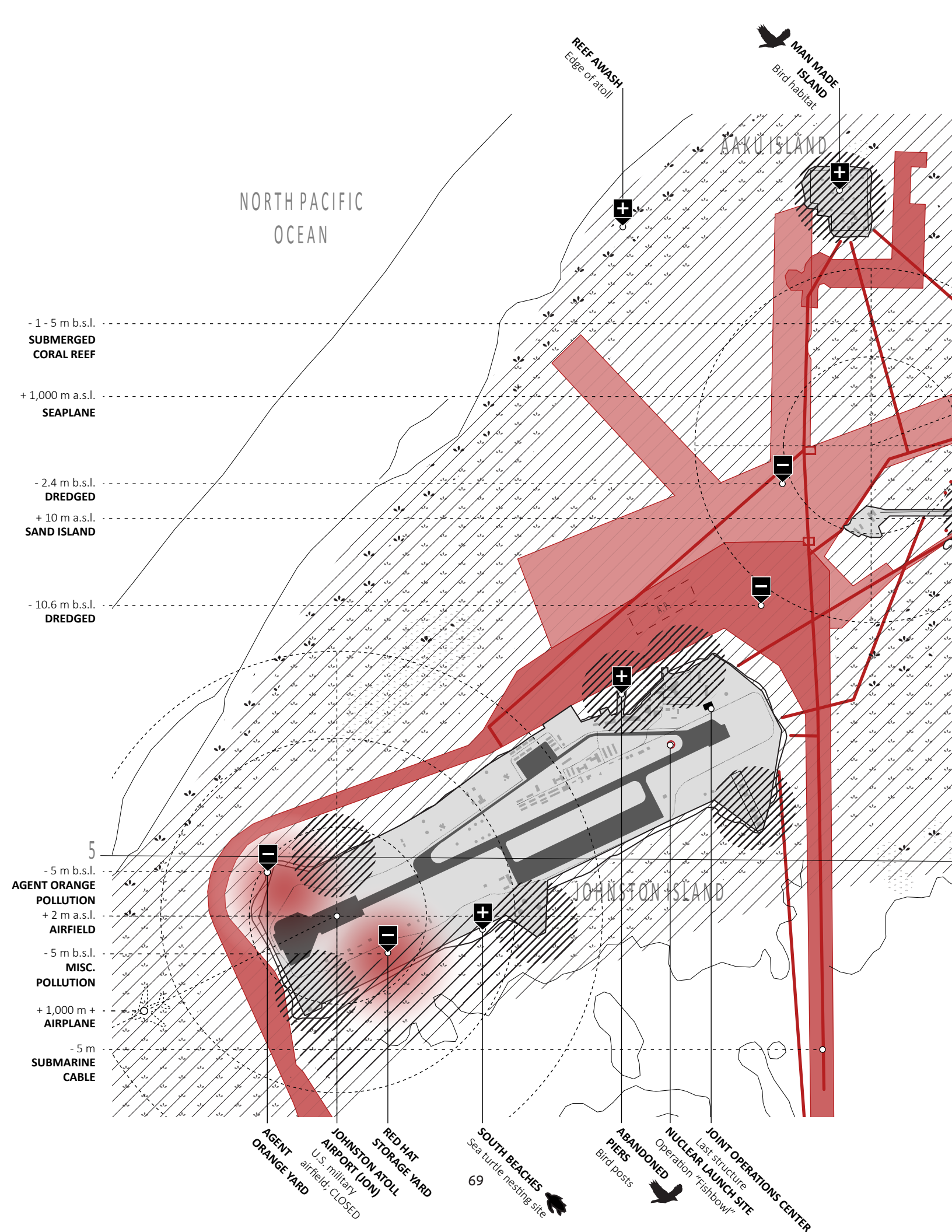


figure 2.42 Extended Context. (See Appendix A for full legend)


REEF AWASH
Edge of atoll
MAN MADE ISLAND
Bird habitat
AAKU ISLAND
NORTH PACIFIC OCEAN
- 1 - 5 m b.s.l.
SUBMERGED CORAL REEF
+ 1,000 m a.s.l.
SEAPLANE
- 2.4 m b.s.l.
DREDGED
+ 10 m a.s.l.
SAND ISLAND
- 10.6 m b.s.l.
DREDGED
5
- 5 m b.s.l.
AGENT ORANGE POLLUTION
+ 2 m a.s.l.
AIRFIELD
- 5 m b.s.l.
MISC. POLLUTION
+ 1,000 m +
AIRPLANE
- 5 m
SUBMARINE CABLE
JOHNSTON ISLAND
AGENT ORANGE YARD
JOHNSTON ATOLL AIRPORT (JON)
U.S. military airfield: CLOSED
RED HAT STORAGE YARD
SOUTH BEACHES
Sea turtle nesting site
ABANDONED PIERS
Bird posts
NUCLEAR LAUNCH SITE
Last structure Operation "Fishbowl"
JOINT OPERATIONS CENTER

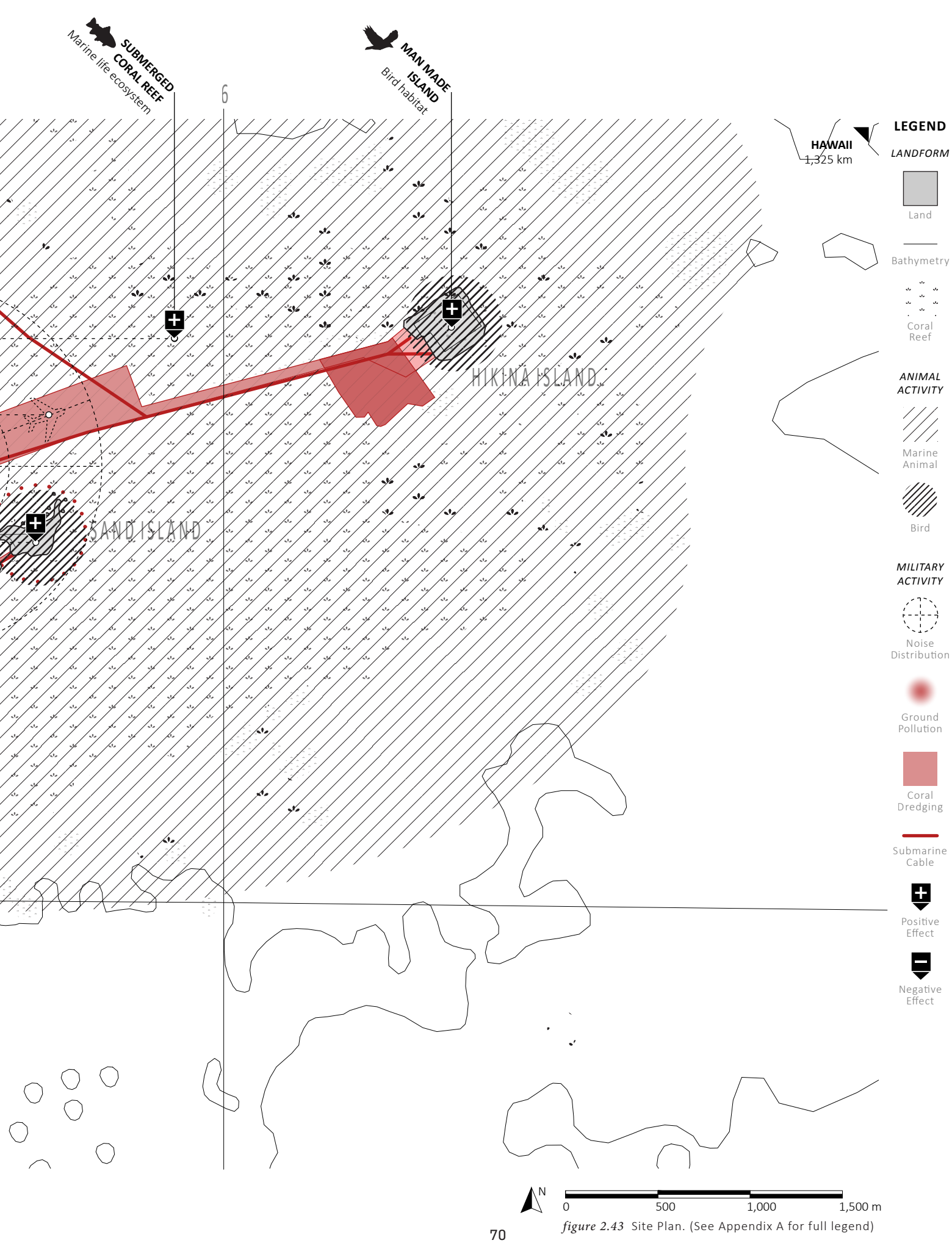
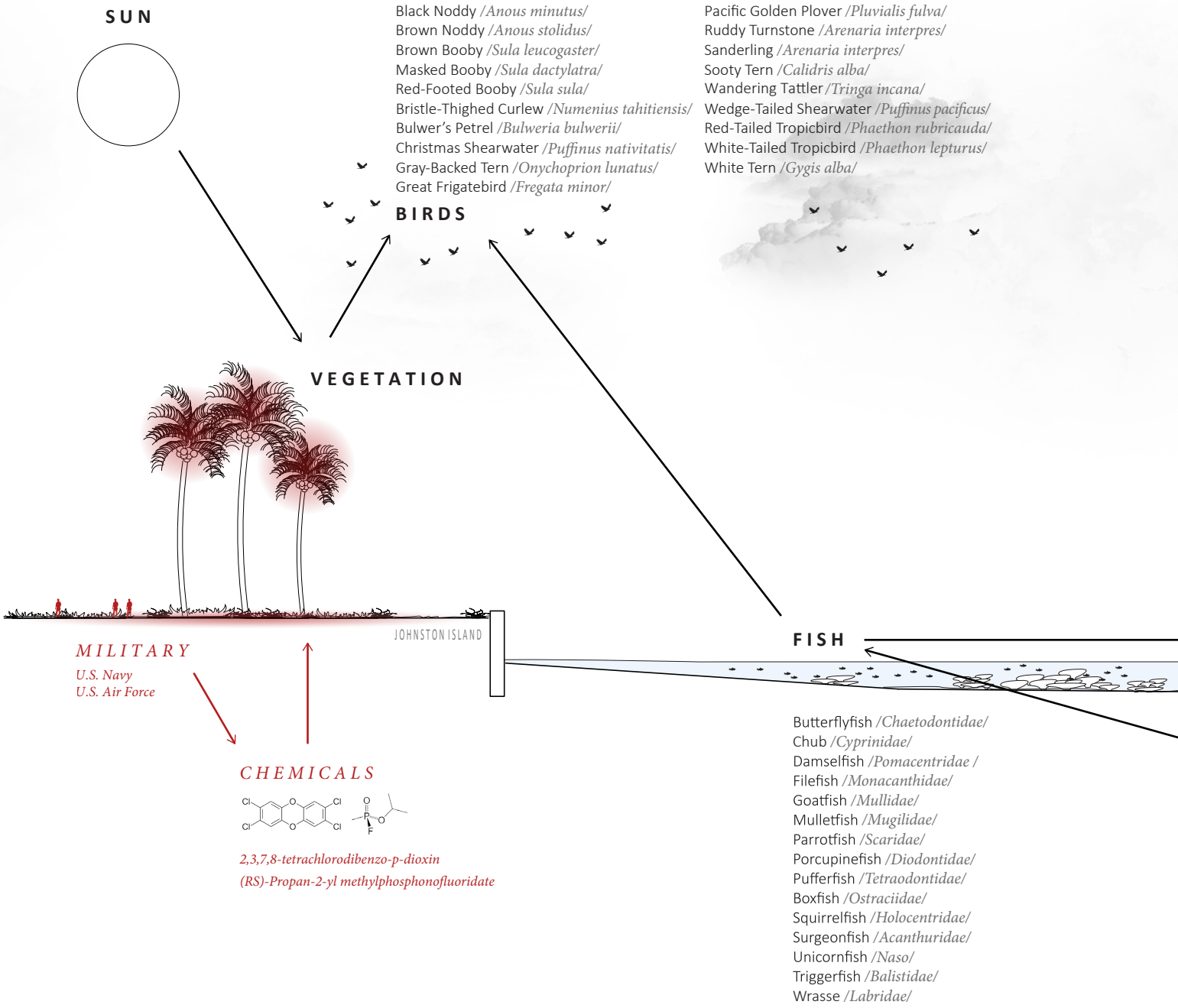


figure 2.43 Site Plan. (See Appendix A for full legend)

figure 2.44 Ecological Section.



ECOSYSTEM

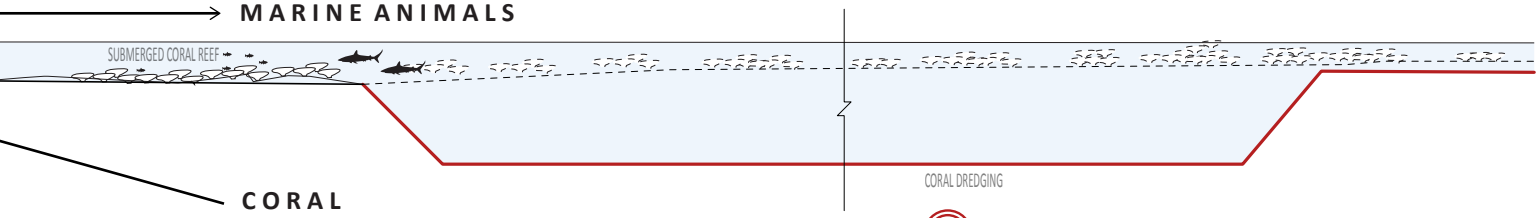
On that first 'discovery' in 1926, the land was declared a reservation for the protection of native birds due its proclivity to a bird breeding ground and stop for migrating species. The area boasts an incredibly rich marine life, with over 20 species of seabirds and 17 families of fish.[61]

CLIMATE [62]
Avg. Hi: 84.1 F / 28.9 C
Avg. Low: 75.4 F / 24.1 C
Avg. Precipitation: 26.41 in / 670.81 mm
Avg. Snowfall: 0 in / 0 mm

BIOME
Tropical, Water Column

(FISH)
Grey Reef Shark */Carcharhinus amblyrhynchos/*
Spotted Eagle Ray */Aetobatus narinari/*
Giant Moray Eel */Gymnothorax javanicus/*
Peppered Moray Eel */Gymnothorax pictus/*
Whitemouth Moray Eel */Gymnothorax meleagris/*
Snake Eel */Myrichthys magnificus/*
(MAMMALS)
Bottlenose Dolphin */Tursiops/*
Spinner Dolphin */Stenella longirostris/*
Hawaiian Monk Seal */Monachus schauinslandi/*
Humpback Whale */Megaptera novaeangliae/*
Cuvier's Beaked Whale */Ziphius cavirostris/*

MARINE ANIMALS



CORAL
Table Coral */Acropora/*
Acropora Coral */Acropora/*
Montipora Coral */Montipora/*
Cauliflower Coral */Pocillopora/*
SPS Coral */Porites/*
Pavona Coral */Pavona/*
Leptoseris Coral */Leptoseris/*
Leptastrea purpurea Coral */Leptastrea purpurea/*
Cyphastrea ocellina Coral */Cyphastrea ocellina/*
Psammocora Coral */Psammocora/*
Oulangia bradleyi Coral */Oulangia bradleyi/*
Psammocora Coral */Psammocora/*
Fungia seutaria Coral */Fungia (Pleuraetis) seutaria/*
Cyeloseris vaughani Coral */Cyeloseris vaughani/*
Fire Coral */Millepora tenera/*
Lace Coral */Distiehopora violaeea/*
Rose Lace Coral */Stylaster/*

MILITARY INSTALLMENT
Submarine Cable
Coral Dredging

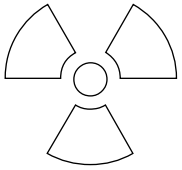
figure 2.45 Inspection of failed nuclear test, OPERATION BLUEGILL PRIME on July 25, 1962.

61 (Previous) Ibid.
62 (Previous) "Johnston Island WSO Air, Pacific Ocean," Western Regional Climate Center, accessed January 20, 2018, https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?pijohn.

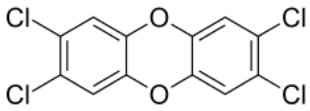
TECHNOLOGICAL POLLUTANTS

On Johnston Atoll, six sources of technological pollutants have been catalogued *(figure 2.46)*: nuclear testing, chemical weapons, coral dredging, island building, submarine cables, and infrastructure. They have left artefacts, and as a result, have altered the landscape. Most notably, the extensive coral dredging has left a large swath of ocean desert that is evident even in satellite imagery.

Refer to the chronology, plans, and section *(figure 2.41, 2.42, 2.43, 2.44)* to see specific cause and locations effected by these remaining artefacts. The resulting new cyborg landscape can be understood in the following collages *(figure 2.47, 2.48, 2.49)* where the new technological-ecological links are further explored.

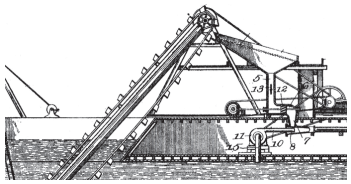


i. Nuclear Testing

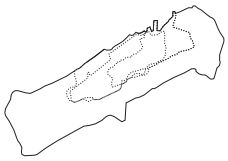


2,3,7,8-tetrachlorodibenzo-p-dioxin

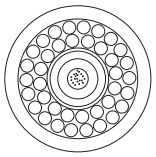
ii. Chemical Weapons



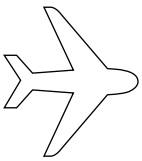
iii. Coral Dredging



iv. Island Building



v. Submarine Cable



vi. Infrastructure

figure 2.46 Technological pollutants found on Johnston Atoll.

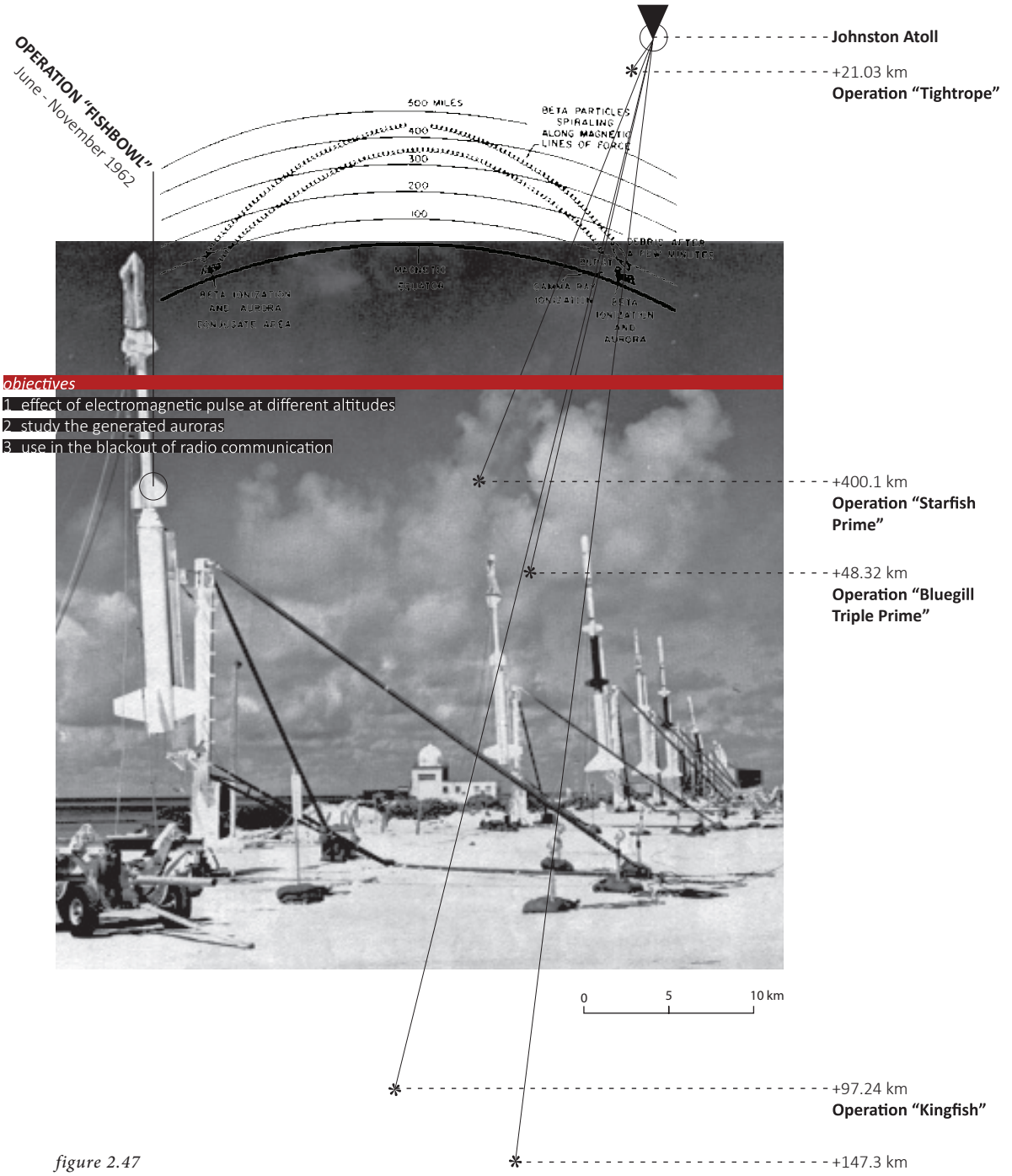


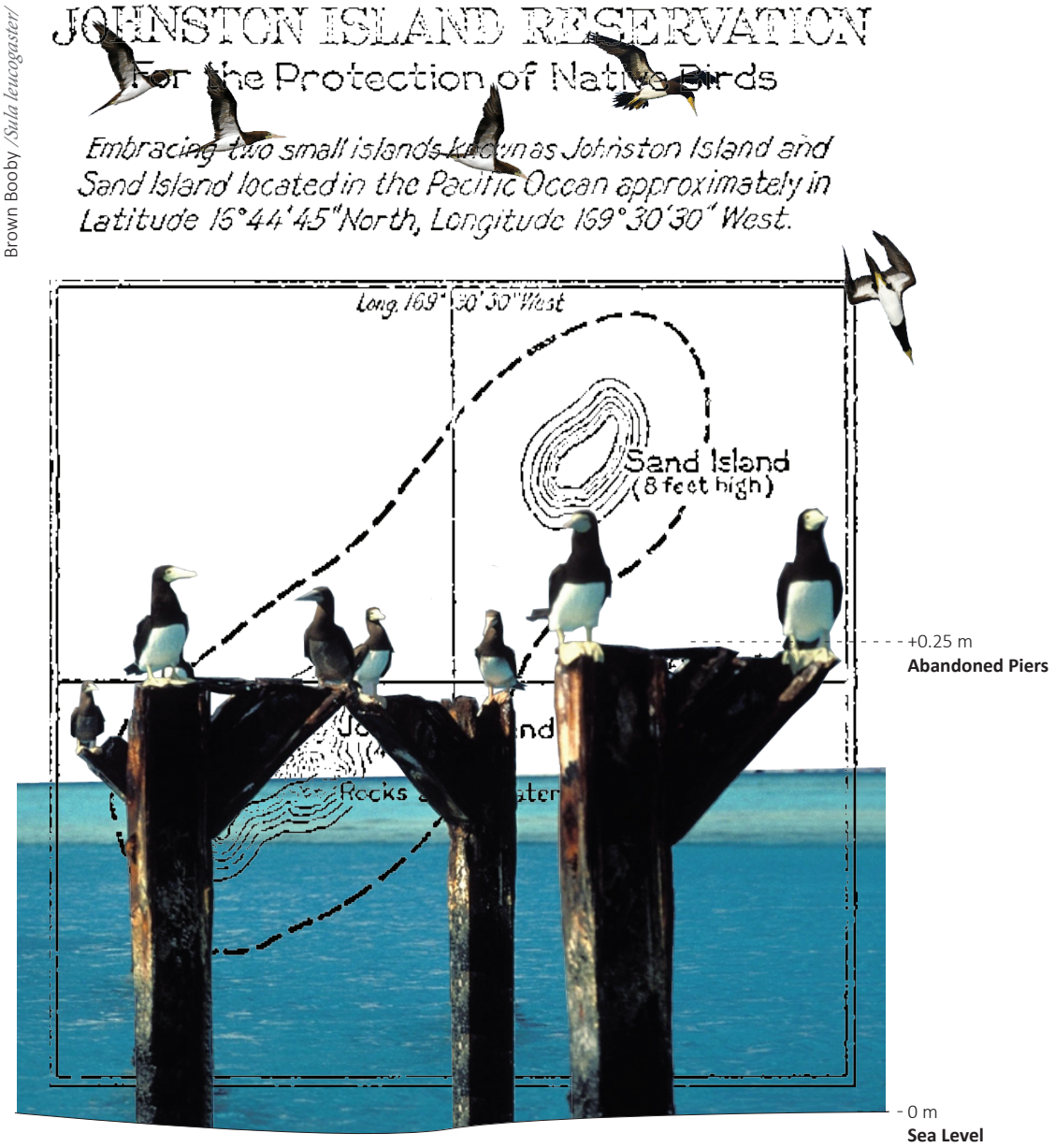
figure 2.47

NUCLEAR TESTING

In 1962, 11 high-altitude nuclear tests were conducted in OPERATION "FISHBOWL" as part of the larger OPERATION "DOMINIC". The tests were Thor missile launched warheads detonated at extremely high altitudes to study the effects of high yield explosions.[63] Of these 11 tests, 5 were successful, and the failed launches left considerable damage on the landscape.

63 "Operation Dominic," Nuclear Weapon Archive, last modified January 3, 2005, http://nuclearweaponarchive.org/Usa/Tests/Dominic.html

Brown Booby /*Sula leucogaster*/



BREEDING GROUND

"It is hereby ordered that two small islands known as Johnston Island and Sand Island, located in the Pacific Ocean, approximately in latitude 16° 44' 45" North and longitude 169° 30' 30" West from Greenwich, as segregated by the broken line shown upon the diagram hereto attached and made a part of this order, be and the same are hereby reserved and set apart for the use of the Department of Agriculture as a refuge and breeding ground for native birds.
It is unlawful for any person to hunt, trap, capture, willfully disturb or kill any bird of any kind whatever, or take the eggs of such bird within the limits of this reserve, except under such rules and regulations as may be published by the Secretary of Agriculture.

This reservation to be known as Johnston Island Reservation."[64]

64 Executive Order 4467, 3 *Code of Federal Regulations*, June 29, 1926.

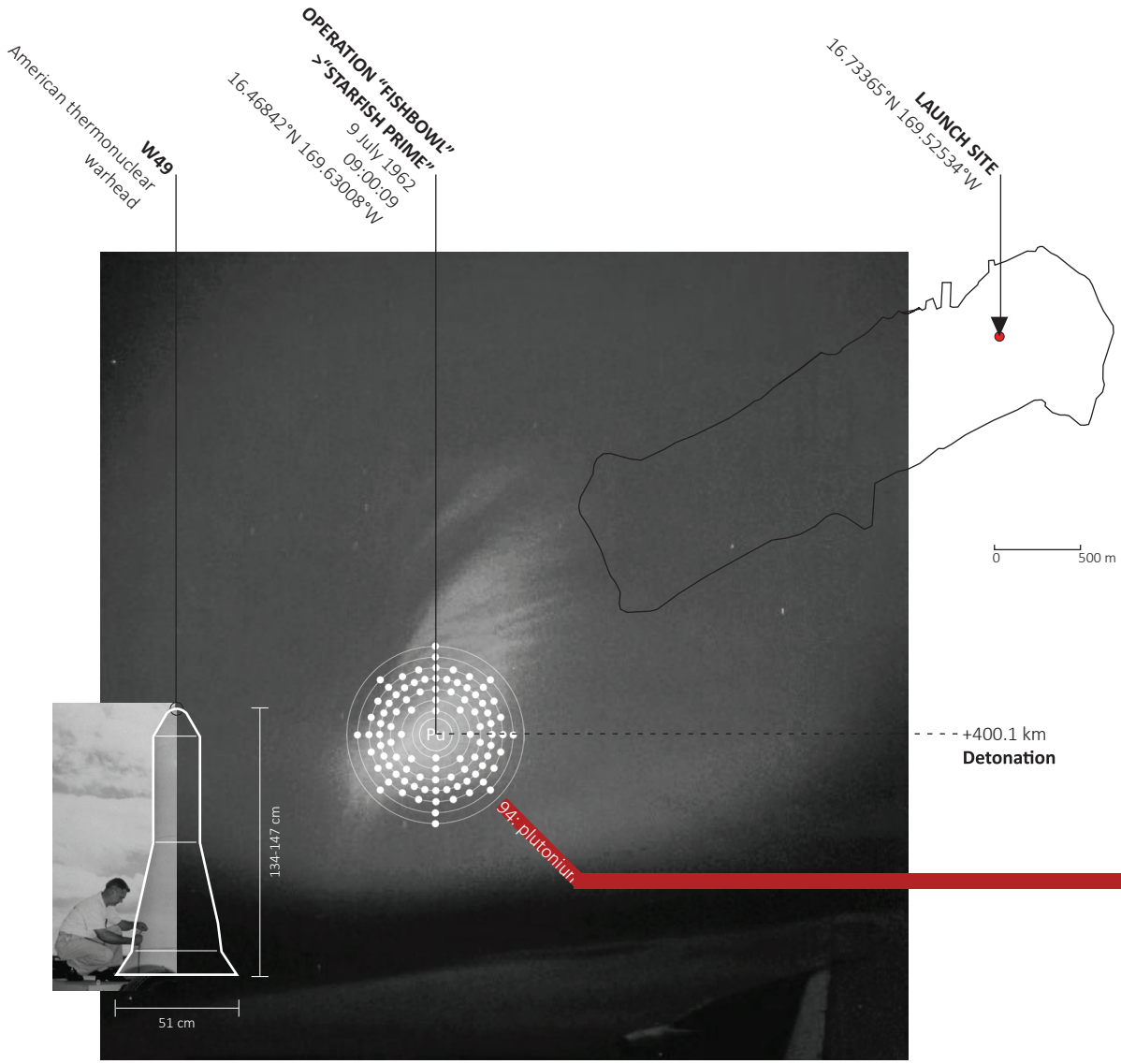
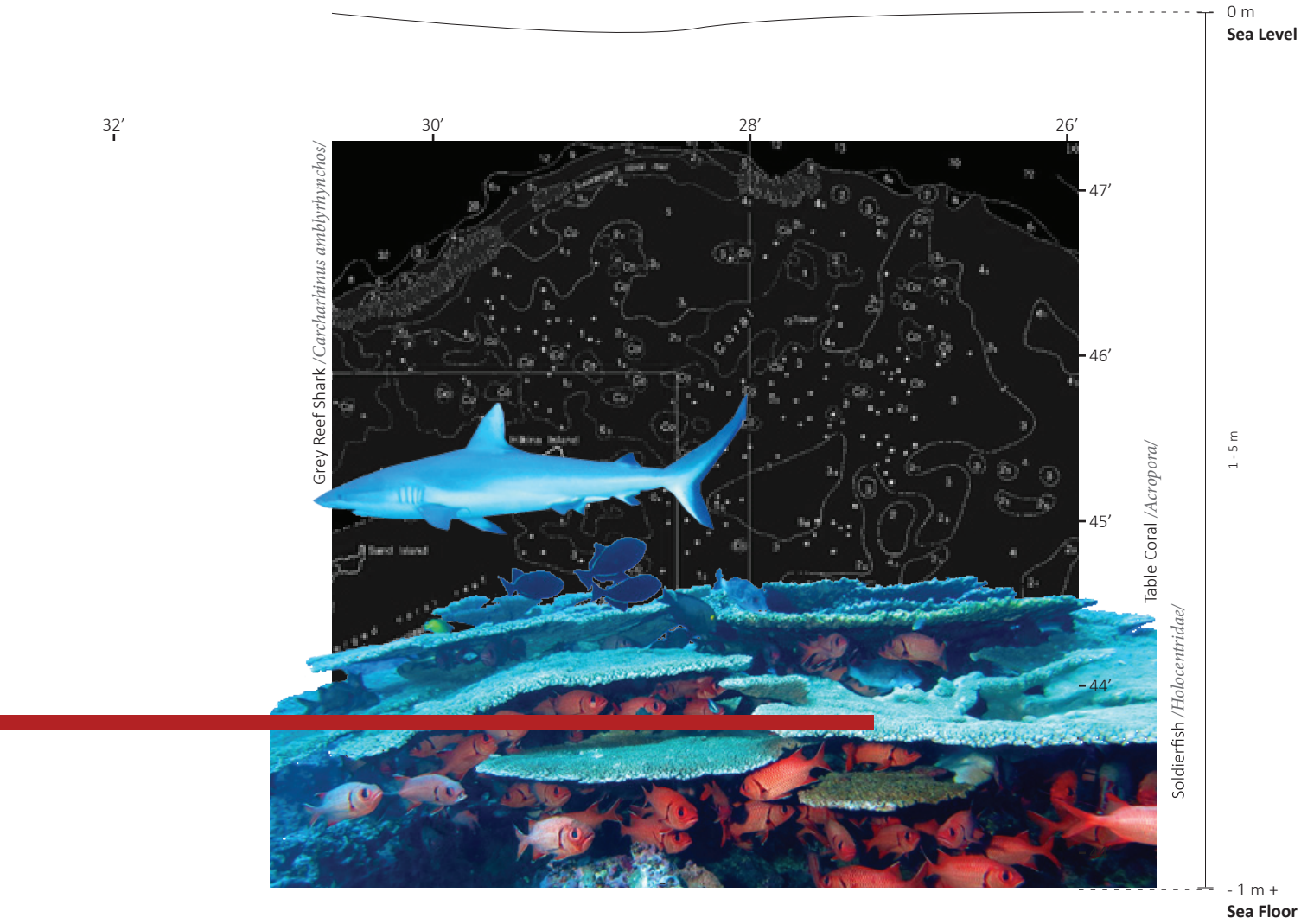


figure 2.48

NUCLEAR TESTING

The successful launch of "STARFISH PRIME", a 1.4 megaton high-altitude nuclear explosion as part of the larger OPERATION "FISHBOWL", caused an electromagnetic pulse larger than expected. It caused electrical damage in Hawaii, approximately 1,400 km away, and left a radiation belt of plutonium in the atmosphere that persisted for many months after.[65] A report written in 2010 by the United States Defense Thread Reduction Agency details the satellite damage caused by the artificial radiation belt against the use of EMP attacks.

65 Nuclear Weapon Archive, "Operation Dominic."



MARINE LIFE

The dense coral reef and shallow waters within the atoll contribute to its intense biodiversity both above and below sea level by supporting over 300 fish species and 54 coral species. However, during military occupation, intense coral dredging removed existing reef to establish boat and seaplane passages that left an ocean desert that remains barren to this day.

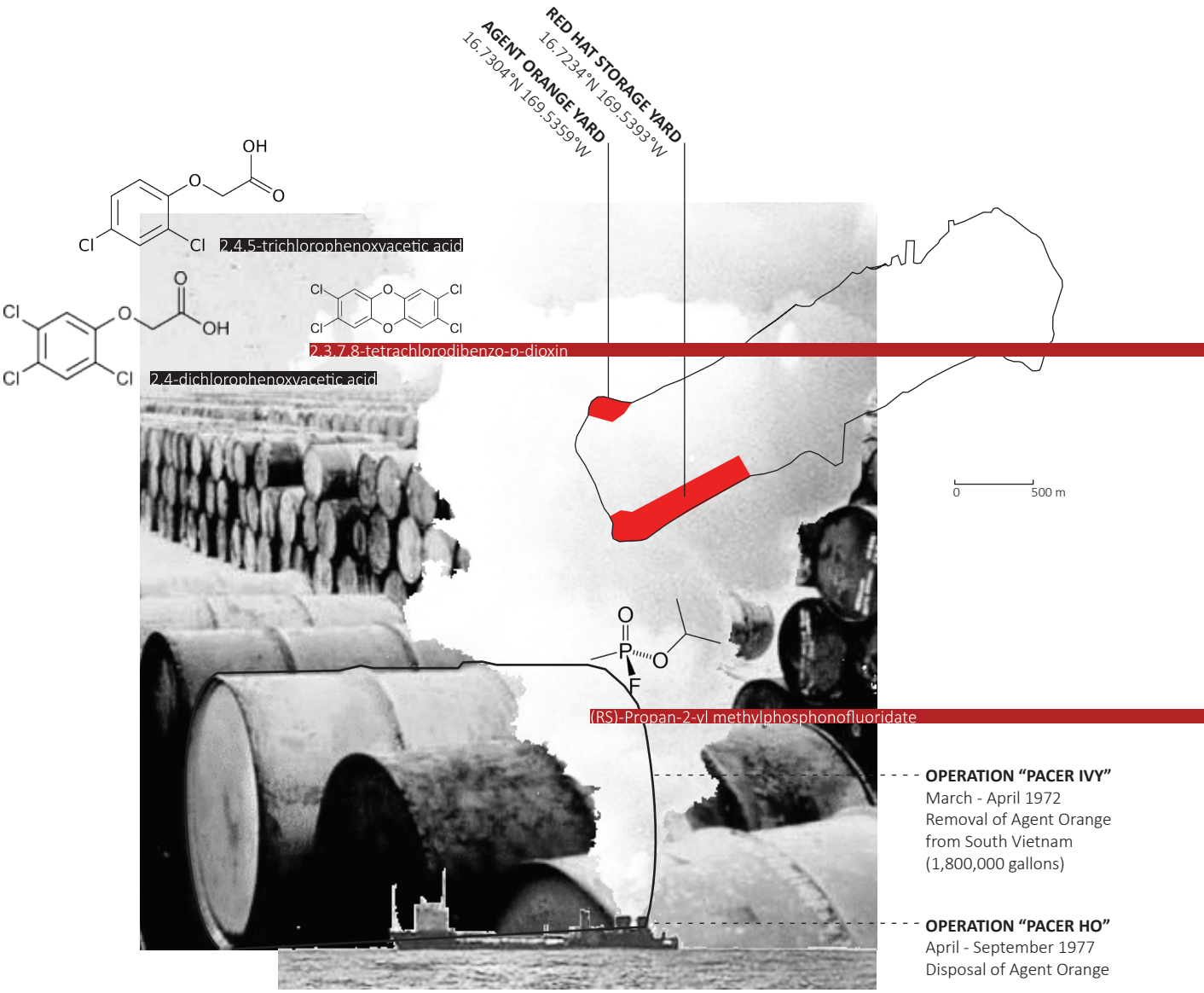
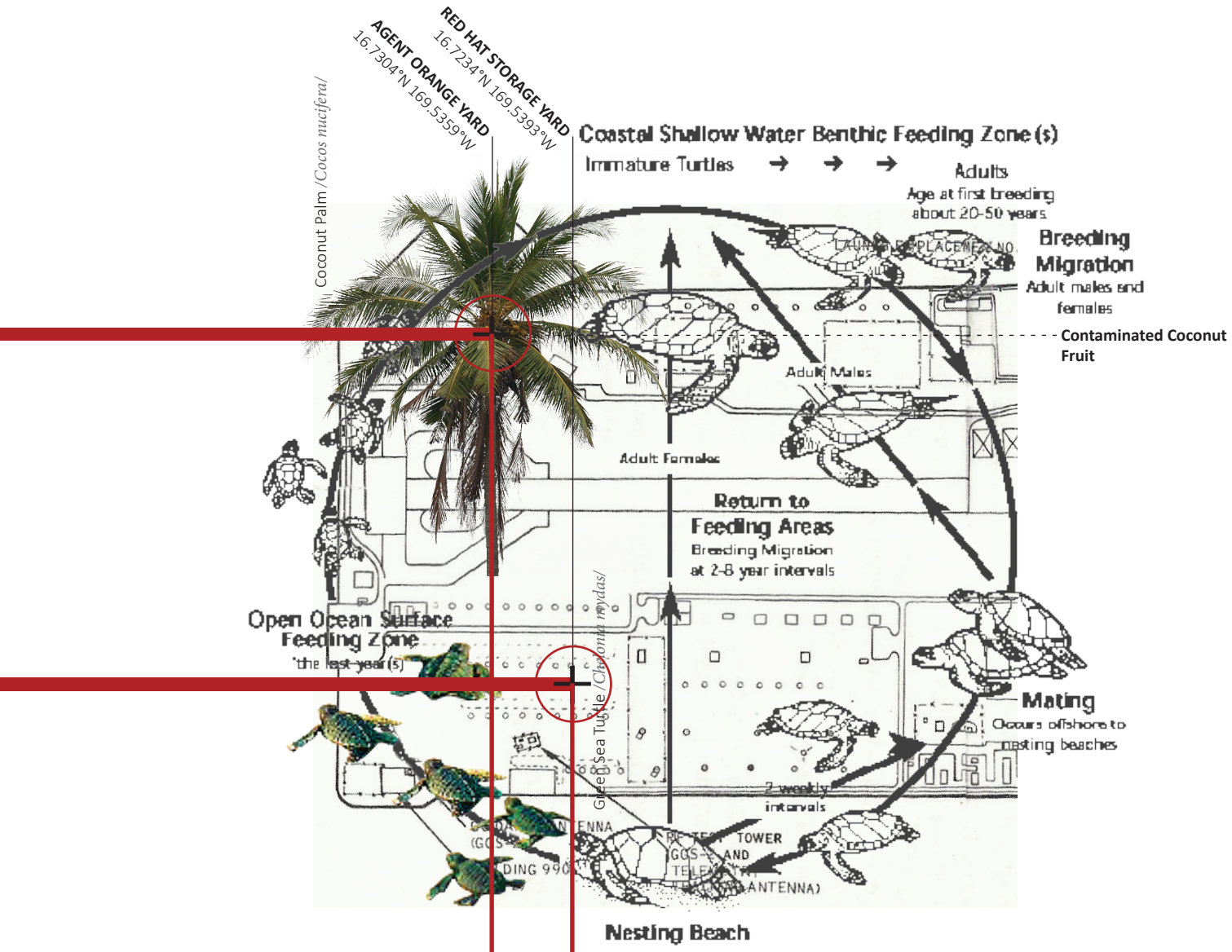


figure 2.49

AGENT ORANGE

Leaking Agent Orange barrels were stored on Johnston Island from 1972-77 under Operation "Pacer IVY" in an aim to remove the chemical from Vietnam following its official ban at the end of the Vietnam War. In 1977, the later Operation "Pacer HO" was carried out by the U.S Air Force to incinerate 8.5 million drums of Agent Orange aboard the M/T Vulcanus through three separate burnings, but TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin) still remains in the soil on Johnston Atoll.[66]

66 Alvin L. Young, "Removal from Vietnam and Final Disposition of Agent Orange," in *The History, Use, Disposition and Environmental Fate of Agent Orange* (New York: Springer, 2009), 144.



NESTING SITES

Along the broken sea wall on the South-West portion of the island are beaches where green sea turtles come to nest. Between the months of June and September, the turtles migrate back to these beaches they were born to mate and lay a new batch of eggs in the sand. After 50-70 days pass, all eggs begin to hatch at the same time one night. This begins the incredible event in which hundreds of baby sea turtles begin their march towards the sea beneath the palm trees. Some of these trees, the ones that bear coconut fruit, contain contaminants from previous Agent Orange pollutants.

INTERVENTION

The site presents 2 major challenges:

i. its remote location;
ii. lack of existing resources.

The interventions center around an experience provided by the site modelled after 'voluntourism' type experiences capitalizing on human contribution. A 2-week excursion *(figure 2.51, 2.52)* is planned around the sea turtle life cycle, where, one night in October all the sea turtle eggs hatch and the babies begin their march towards the ocean. This date is picked as a result of species monitoring and will change by a few days every season. Due to the sites extreme isolation, this is the only time during the year that the site is 'active', and all supplies must be brought by boat, as there is no fresh water source on the islands.

The site is zoned into sections derived from the existing infrastructure (ie. roads and runway) to target a specific zone each year, allowing the site to slowly grow ecologically over time by encouraging ecological occupation in damaged areas. Because the coral dredging has left many zones an ocean desert, they become the majority of the targeted areas.

3 types of interventions are proposed on the following pages *(figure 2.53, 2.54, 2.55)*:

[TYP: HABITAT (WATER)]
[TYP: HABITAT (WATER/ISLAND]
[TYP: SOIL]

Individually, they each target specific species needs. The first two typologies are found in the water, and the third is found on land. Materiality and size is picked based on those needs. To cut down on material needed to be brought in by boat, the majority of the construction materials are sourced from the island itself. Through the act of demolishing existing infrastructure (ie. the roads and seawall), material can be recycled into the monuments. As well, naturally created organic garbage is composted and returned to the land through an intervention typology.

Specific tools will be needed to support these activities: Quonset huts, a military tent that is easy to construct, are provided for shelter; night vision goggles are used to witness the sea turtle hatching at night.

The following 3 interventions seeks to repair and build up the ecological relationships of the site by emphasizing visitor (human) involvement. Adhering the landscape strategy proposed at the beginning of the chapter in which the monuments are built and then placed in the landscape, Johnston Atoll will grow ecologically over time *(figure 2.50)*.

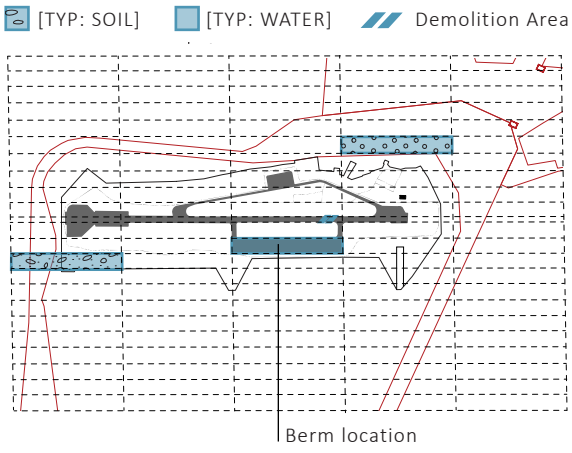


figure 2.50 Site growth over time.

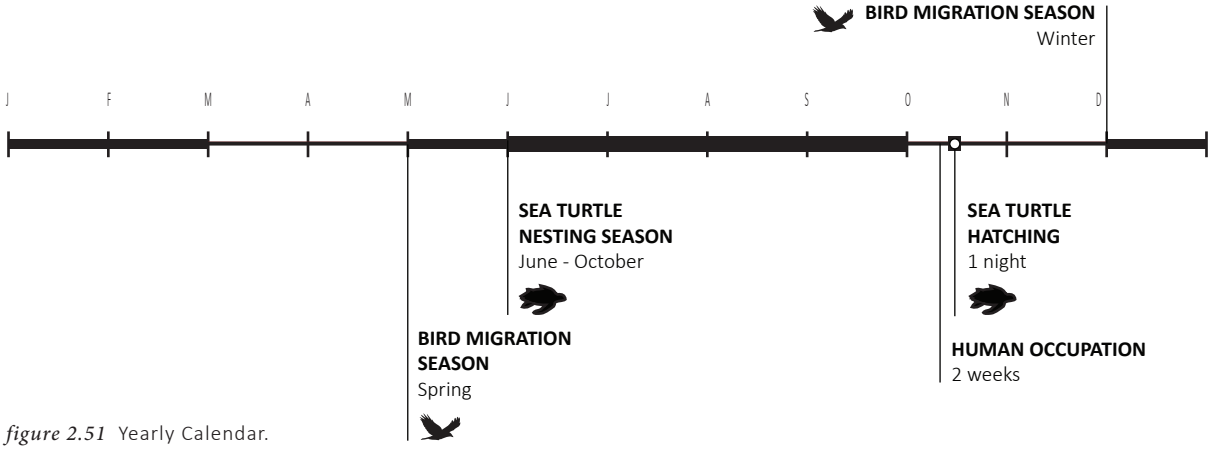


figure 2.51 Yearly Calendar.

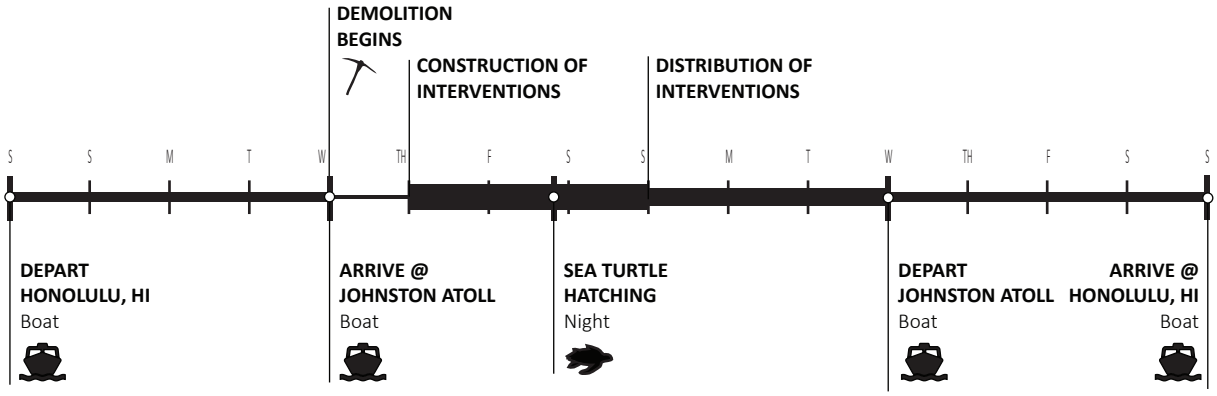
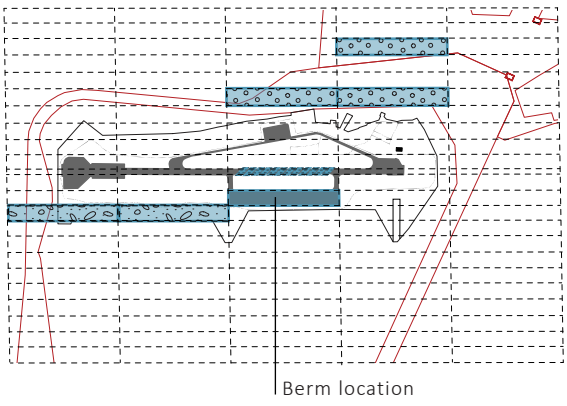
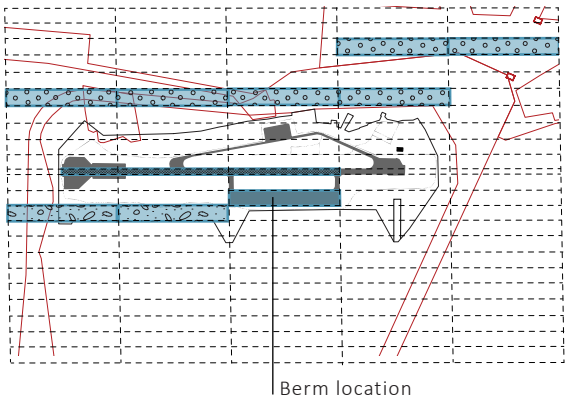


figure 2.52 Weekly Calendar.



5 year

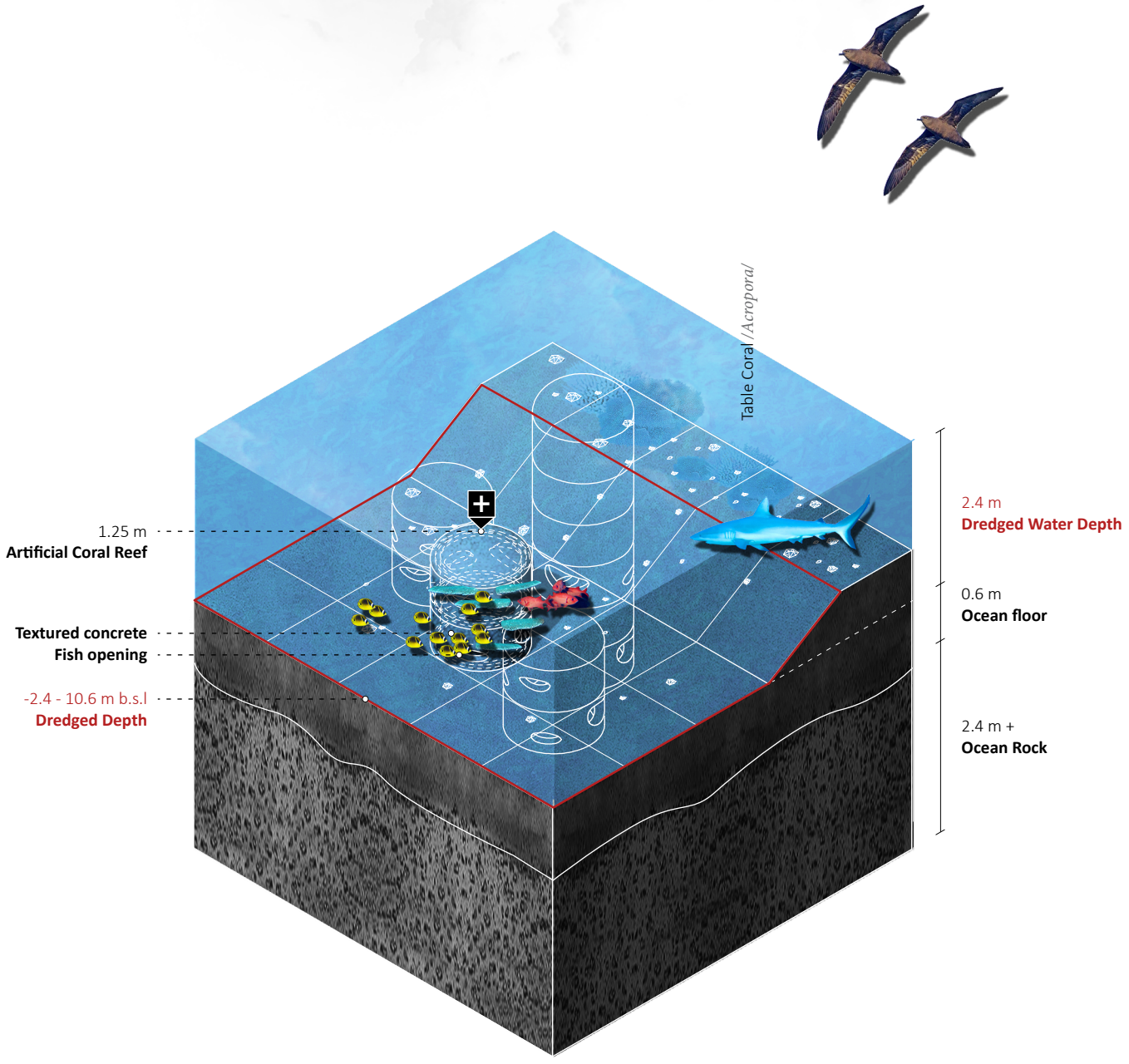


20 year

figure 2.53

TYP:HABITAT(WATER)

This typology tackles the ocean desertification that has occurred due to coral dredging and is built on the idea of an artificial coral reef. Its material, a rough, textured concrete, comes from various locations around the site where visitors have demolished existing infrastructure (sea wall, paving, existing buildings) and cast over the course of 4 days. The texture of the concrete encourages floating coral particulates that drift by in the current to attach and colonize, thereby becoming the catalyst of this new micro-ecosystem. Fish and other marine life begin to find food and shelter within the structures' openings that are calibrated to specific species size. Its height, stacked below the water, does not allow any birds to land, but the presence of the fish will ultimately attract their presence. As this monument aggregates with the next typology, these ecological densities grow over time.



DISCLAIMER: The thesis notes that concrete artificial coral reefs are encouraged to be made of a PH balanced concrete. However, for the purposes of the narrative, the thesis chooses to design with recycled concrete.

COLONIZERS:

+ CORAL

Table Coral */Acropora* sp./
Acropora Coral */Acropora* sp./
Montipora Coral */Montipora* sp./
Cauliflower Coral */Pocillopora* sp./
SPS Coral */Porites* sp./
Pavona Coral */Pavona* sp./
Leptoseris Coral */Leptoseris* sp./
Leptastrea purpurea Coral */Leptastrea purpurea/*
Cyphastrea ocellina Coral */Cyphastrea ocellina/*
Psammocora Coral */Psammocora/*
Oulangia bradleyi Coral */Oulangia bradleyi/*
Psammocora Coral */Psammocora/*
Fungia seutaria Coral */Fungia (Pleuraetis) seutaria/*
Cyeloseris vaughani Coral */Cyeloseris vaughani/*
Fire Coral */Millepora tenera/*
Lace Coral */Distiehopora violaeea/*
Rose Lace Coral */Stylaster* sp./

+ FISH

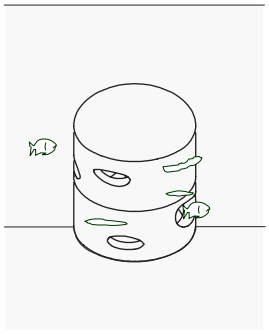
Butterflyfish */Chaetodontidae* sp./
Chub */Cyprinidae* sp./
Damselfish */Pomacentridae* sp./
Filefish */Monacanthidae* sp./
Goatfish */Mullidae* sp./
Mulletfish */Mugilidae* sp./
Parrotfish */Scaridae* sp./
Porcupinefish */Diodontidae* sp./
Pufferfish */Tetraodontidae* sp./
Boxfish */Ostraciidae* sp./
Squirrelfish */Holocentridae* sp./
Surgeonfish */Acanthuridae* sp./
Unicornfish */Naso* sp./
Triggerfish */Balistidae* sp./
Wrasse */Labridae* sp./

− MILITARY

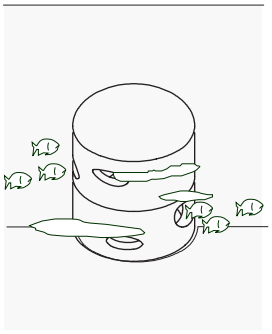
Coral Dredging
Infrastructure (Pavement)

GROWTH:

1 YR



5 YR



10 YR

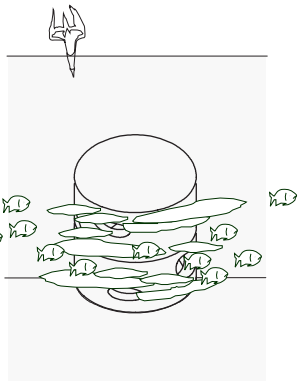
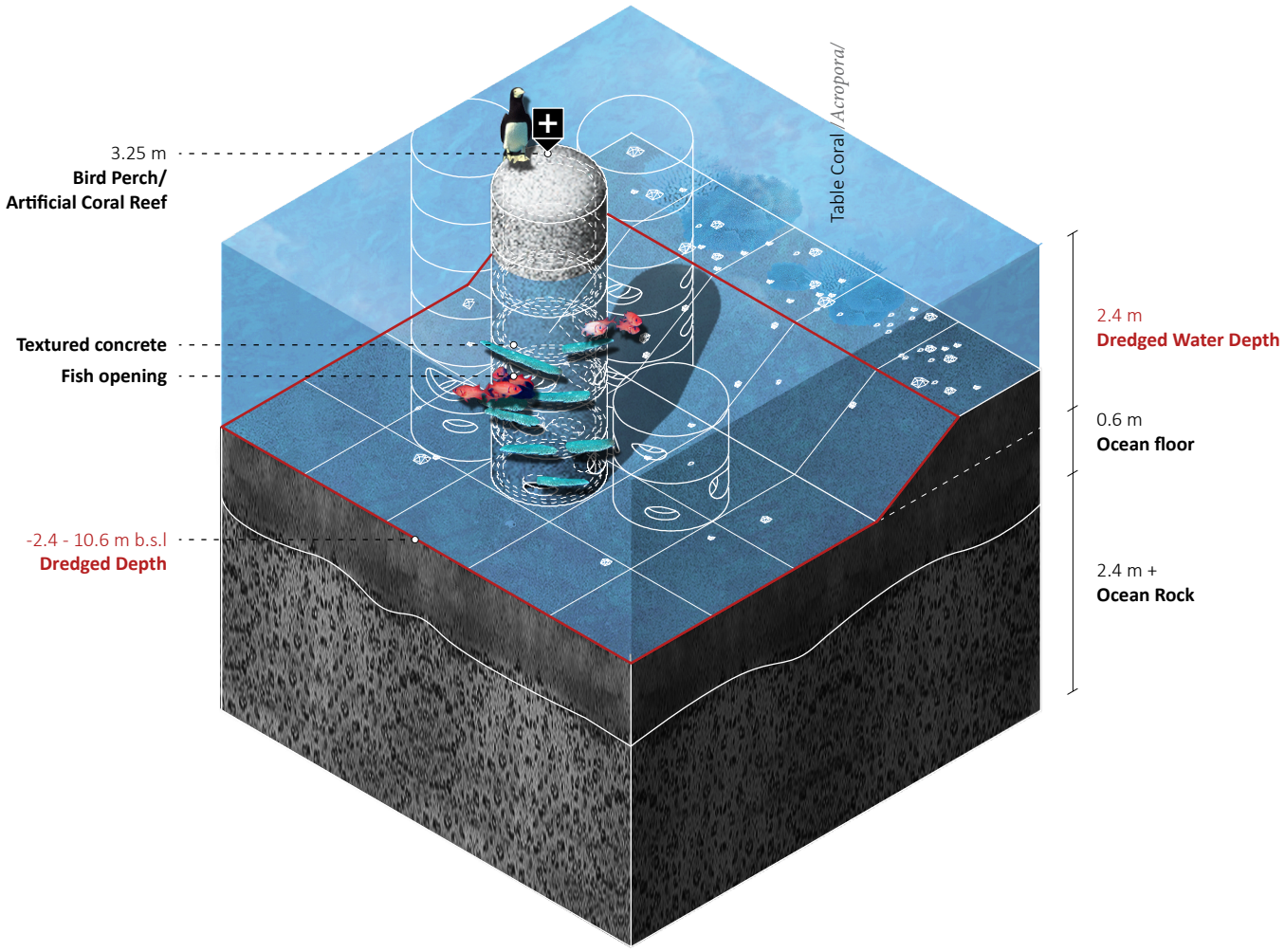


figure 2.54

TYP:HABITAT(WATER/ISLAND)

Much like the previous typology, this typology tackles the ocean desertification that has occurred due to coral dredging and is built on the idea of an artificial coral reef. Its material and behaviour is the same as the previous typology: [TYP: HABITAT (WATER)] wherein a micro-ecosystem of coral reef and marine life is created. However, instead of sitting below the water, this monument is stacked to a height above the water creating a small island that allows birds to land. As this monument aggregates, clusters of small islands are formed that encourage birds to rest on them while hunting for fish in the waters below. As they aggregate with the previous typology, these ecological densities grow over time.



DISCLAIMER: The thesis notes that concrete artificial coral reefs are encouraged to be made of a PH balanced concrete. However, for the purposes of the narrative, the thesis chooses to design with recycled concrete.

COLONIZERS:

+ CORAL

Table Coral */Acropora* sp./
Acropora Coral */Acropora* sp./
Montipora Coral */Montipora* sp./
Cauliflower Coral */Pocillopora* sp./
SPS Coral */Porites* sp./
Pavona Coral */Pavona* sp./
Leptoseris Coral */Leptoseris* sp./
Leptastrea purpurea Coral */Leptastrea purpurea/*
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Oulangia bradleyi Coral */Oulangia bradleyi/*
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Cyeloseris vaughani Coral */Cyeloseris vaughani/*
Fire Coral */Millepora tenera/*
Lace Coral */Distiehopora violaeea/*
Rose Lace Coral */Stylaster* sp./

FISH

Butterflyfish */Chaetodontidae* sp./
Chub */Cyprinidae* sp./
Damselfish */Pomacentridae* sp./
Filefish */Monacanthidae* sp./
Goatfish */Mullidae* sp./
Mulletfish */Mugilidae* sp./
Parrotfish */Scaridae* sp./
Porcupinefish */Diodontidae* sp./
Pufferfish */Tetraodontidae* sp./
Boxfish */Ostraciidae* sp./
Squirrelfish */Holocentridae* sp./
Surgeonfish */Acanthuridae* sp./
Unicornfish */Naso* sp./
Triggerfish */Balistidae* sp./
Wrasse */Labridae* sp./

BIRDS

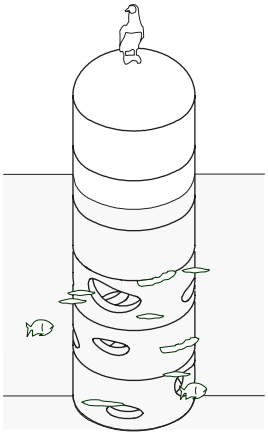
Black Noddy */Anous minutus/*
Brown Noddy */Anous stolidus/*
Brown Booby */Sula leucogaster/*
Masked Booby */Sula dactylatra/*
Red-Footed Booby */Sula sula/*
Bristle-Thighed Curlew */Numenius tahitiensis/*
Bulwer's Petrel */Bulweria bulwerii/*
Christmas Shearwater */Puffinus nativitatis/*
Gray-Backed Tern */Onychoprion lunatus/*
Great Frigatebird */Fregata minor/*
Pacific Golden Plover */Pluvialis fulva/*
Ruddy Turnstone */Arenaria interpres/*
Sanderling */Arenaria interpres/*
Sooty Tern */Calidris alba/*
Wandering Tattler */Tringa incana/*
Wedge-Tailed Shearwater */Puffinus pacificus/*
Red-Tailed Tropicbird */Phaethon rubricauda/*
White-Tailed Tropicbird */Phaethon lepturus/*
White Tern */Gygis alba/*

− MILITARY

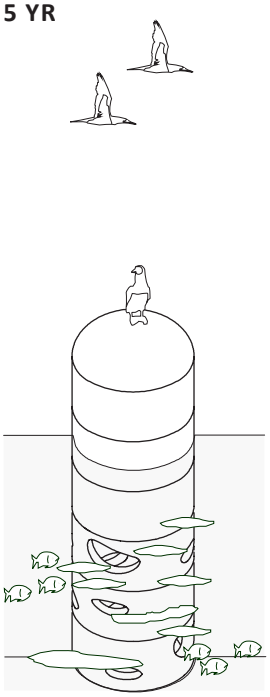
Coral Dredging
Infrastructure (Pavement)

GROWTH:

1 YR



5 YR



10 YR

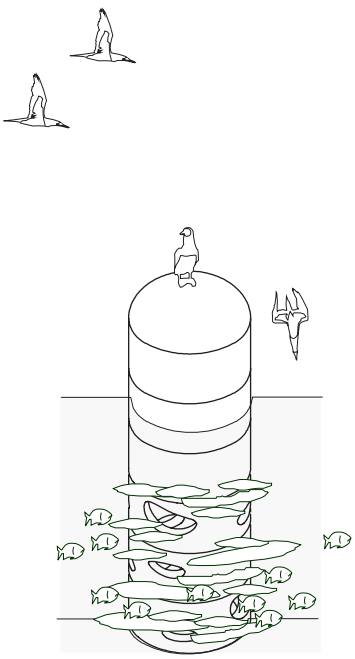
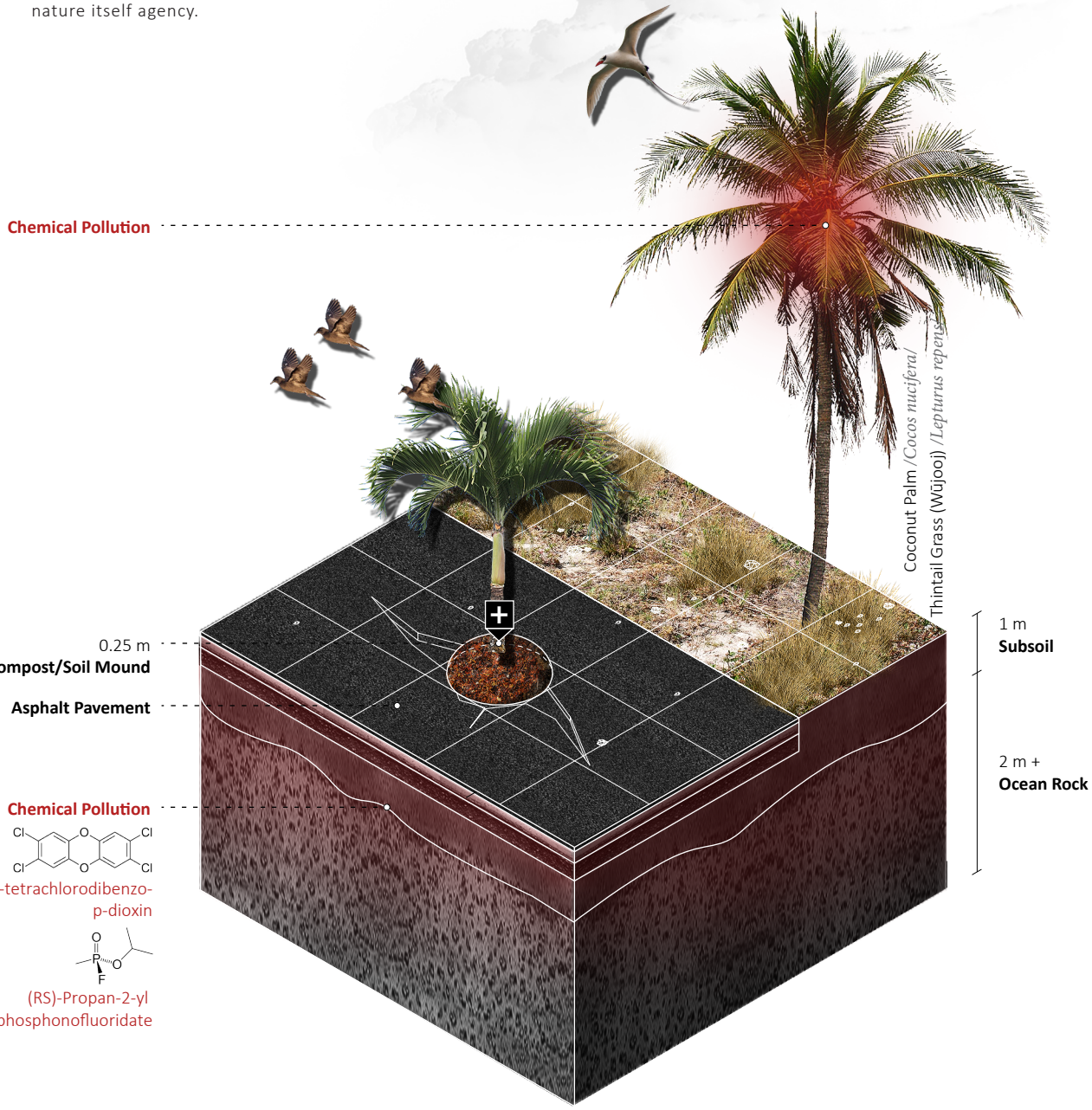


figure 2.55

TYP:SOIL

This typology tackles the dismantling of the built infrastructure and chemical pollution left on site due to the storage of chemical weapons and nuclear testing. Its material is the naturally generated by-product from the 2-week human occupation in the form of compost, that is mixed with local soils and seed plants to create these compost mounds. Once moulded, this monument can be installed in two types of locations: on existing infrastructural pavement targeted for demolition, or on soil. The inherent moisture and musk of the compost pile will attract scavengers that will help with the distribution of its latent nutrients and seeds around the island. Over time, these monuments will break down into the landscape and new vegetation will appear, attracting the many nesting bird species found on the islands and slowly cleaning the soil of its pollutants. If installed on pavement, the roots system of any palm tree that might grow will begin to crack the asphalt as well, allowing nature itself agency.



COLONIZERS:

+ VEGETATION

Beach Naupaka */Scaevola taccada/*
Bermuda Grass */Cynodon dactylon/*
Bird of Paradise */Strelitzia reginae/*
Cactus */Opuntia cochenillifera/*
Chinese Banyan */Ficus microcarpa/*
Coconut Palm */Cocos nucifera/*
Cook Pine */Auraucaria columnaris/*
Crab Grass */Digitaria sanguinalls/*
Drumstick Tree */Moringa oleifera/*
Euphorbia */Euphorbia lactea/*
False Kamani */Terminalia catappa/*
Hedge Cactus */Cereus uruguayanus/*
Hibiscus */Hibiscus* sp./
Indian Almond */Terminalia catappa/*
Indian Fleabane */Pluchea* sp./
Ironwood */Casuarina equisetifolia/*
Klu */Acacia farnesiana./*
Kou */Cordia subcordata/*
Naupaka */Scaevola sericea/*
Mango Tree */Mangifera indica/*
Mexican Fan Palm */Washingtonia robusta/*
Milkweed */Calotropis gigantea/*
Norfolk Island Pine */Araucaria heterophylla/*
Oleander Tree */Nerium oleander/*
Orchid */Epidendrum* sp./
Otaheite Gooseberry */Phyllanthus acidus/*
Pickle Tree */Averrhoa bilimbi/*
Plumeria */Plumeria obtusa/*
Pritchardia Palm Tree */Pritchardia* sp./
Sago Palm */Cycas circinalis/*
Scrambled Egg Tree */Senna surattensis/*
Sea Grape */Coccoloba uvifera/*
Slender Mimosa */Desmanthus pernambucanus/*
Sour Bush */Pluchea carolinensis/*
Thintail Grass (Wūjooj) */Lepturus repens/*
Tree Heliotrope */Tournefortia argentea/*
Trumpet Tree */Tabebuia aurea/*
Vitex */Vitex trifolia/*

BIRDS

Black Noddy */Anous minutus/*
Brown Noddy */Anous stolidus/*
Brown Booby */Sula leucogaster/*
Masked Booby */Sula dactylatra/*
Red-Footed Booby */Sula sula/*
Bristle-Thighed Curlew */Numenius tahitiensis/*
Bulwer's Petrel */Bulweria bulwerii/*
Christmas Shearwater */Puffinus nativitatis/*
Gray-Backed Tern */Onychoprion lunatus/*
Great Frigatebird */Fregata minor/*
Pacific Golden Plover */Pluvialis fulva/*
Ruddy Turnstone */Arenaria interpres/*
Sanderling */Arenaria interpres/*
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Wandering Tattler */Tringa incana/*
Wedge-Tailed Shearwater */Puffinus pacificus/*
Red-Tailed Tropicbird */Phaethon rubricauda/*
White-Tailed Tropicbird */Phaethon lepturus/*
White Tern */Gygis alba/*

− MILITARY

Infrastructure (Pavement)
Chemical Pollution

GROWTH:

1 YR

5 YR

10 YR

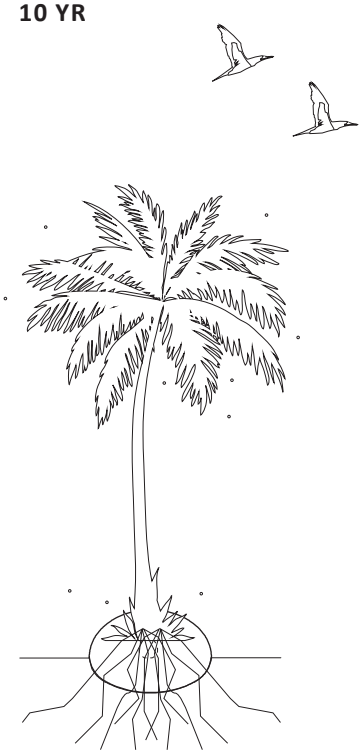
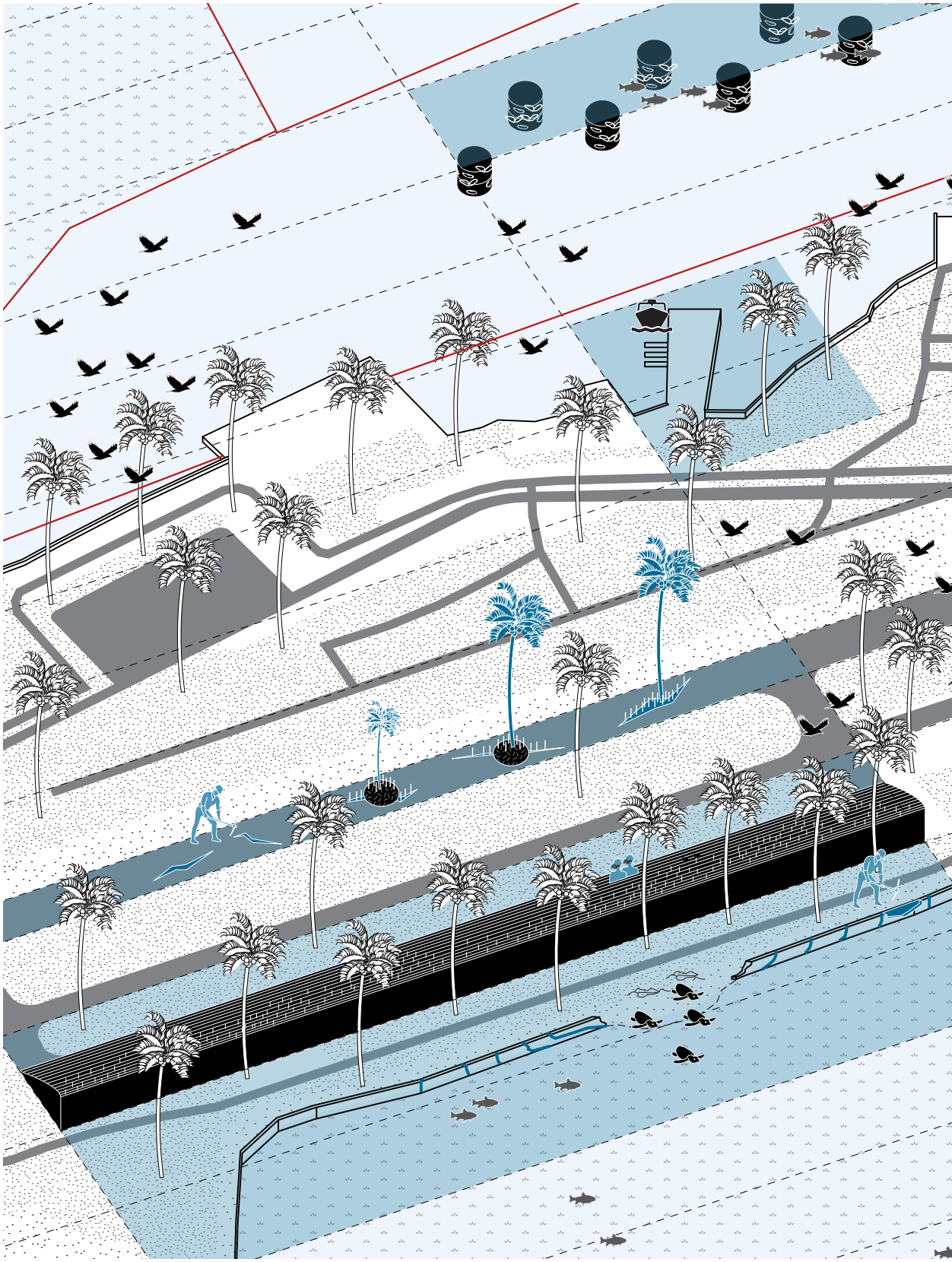
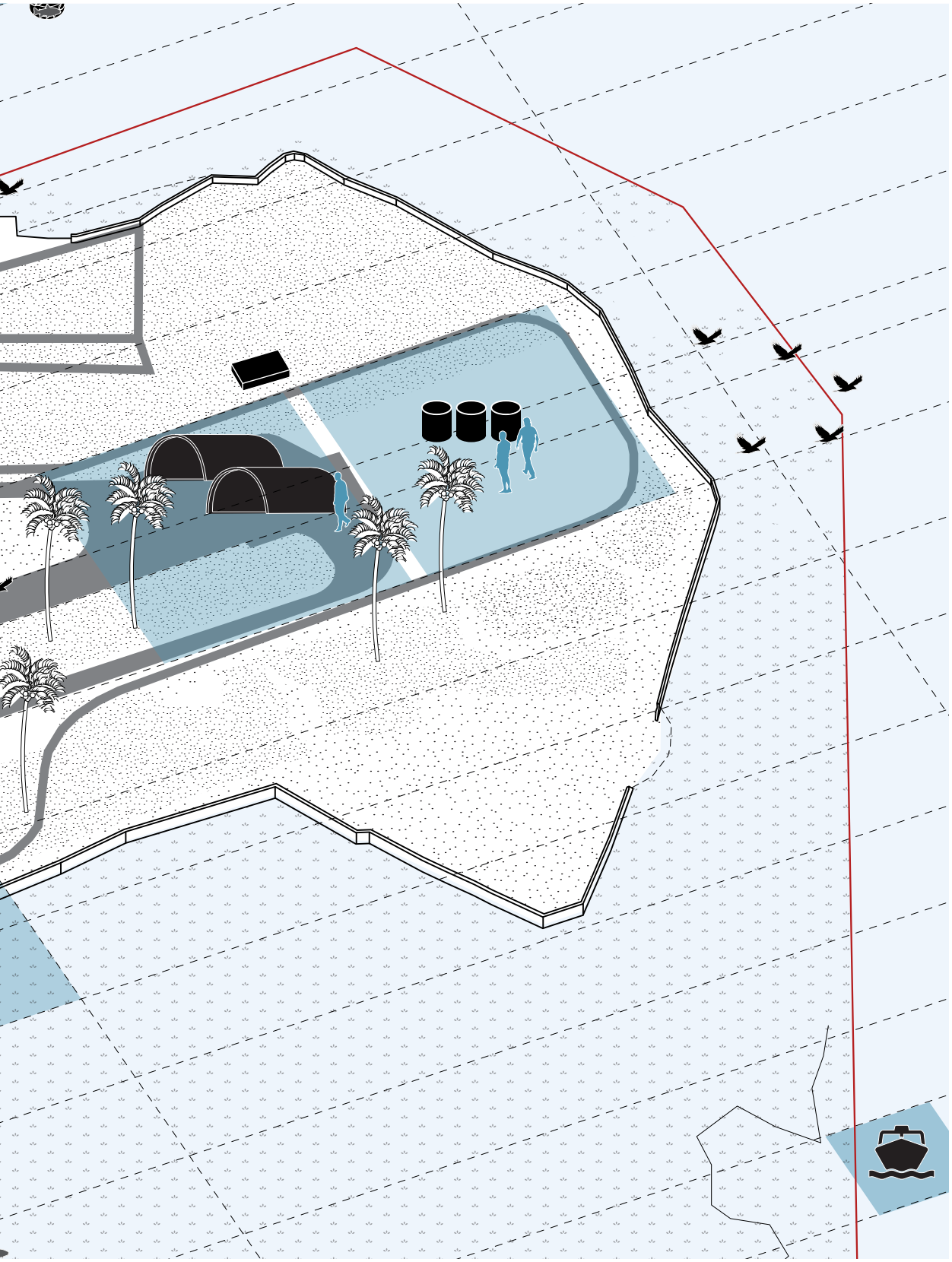


figure 2.56 Site Axonometric. (N.T.S)





LEGEND

Sandy Beach

Shrub

Coral Reef

1 JOURNEY

The journey begins with a 4 day boat ride aboard the NOAA *OSCAR ELTON SETTE* from Honolulu, HI to Johnston Atoll.

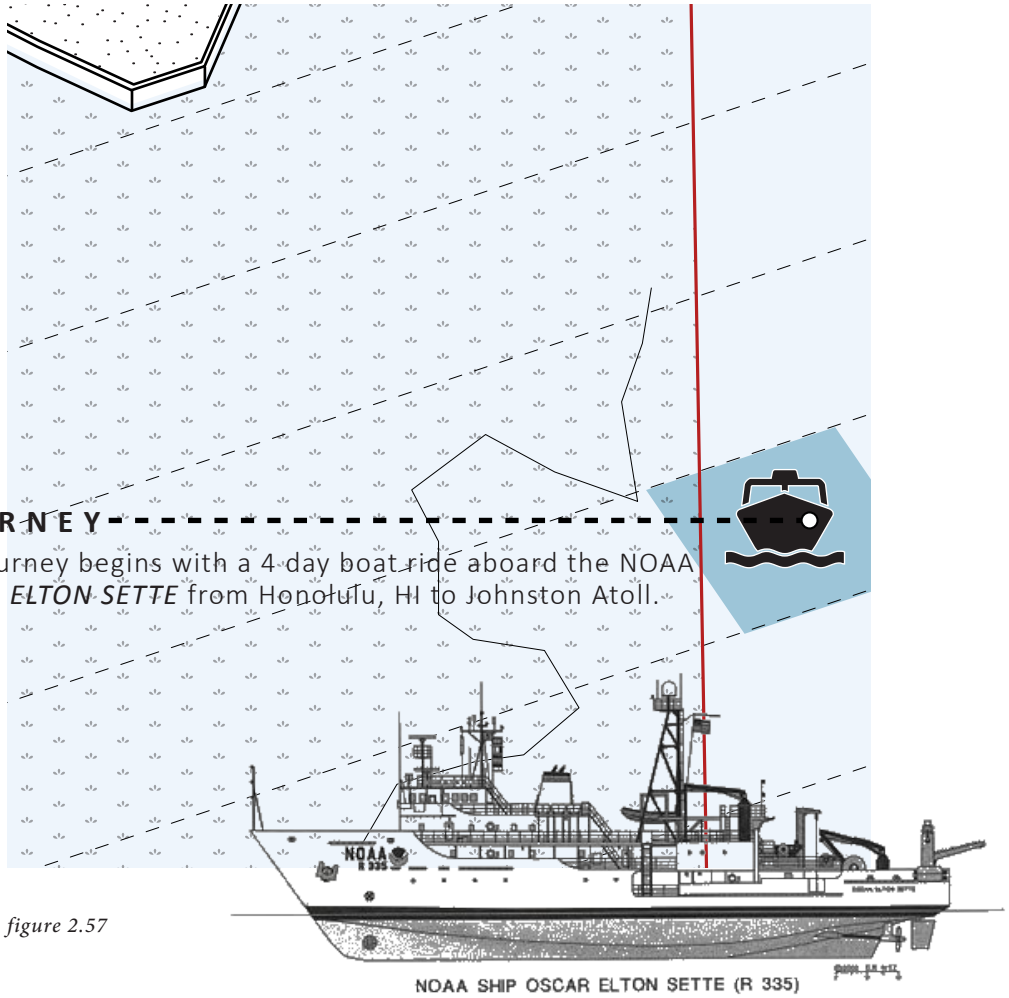


figure 2.57

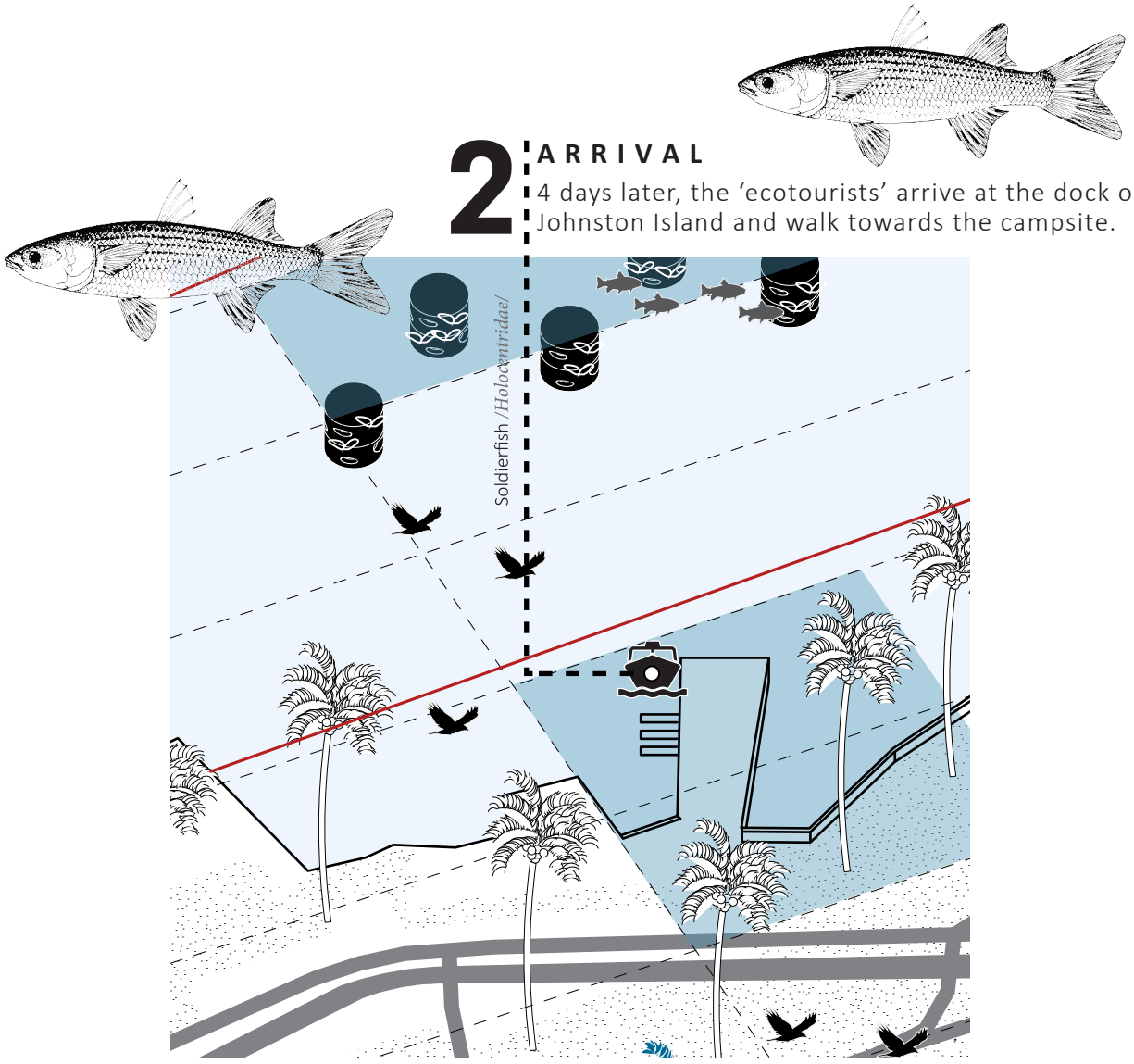

2
ARRIVAL
4 days later, the 'ecotourists' arrive at the dock on Johnston Island and walk towards the campsite.
Soldierfish /Holocentridae/

figure 2.58

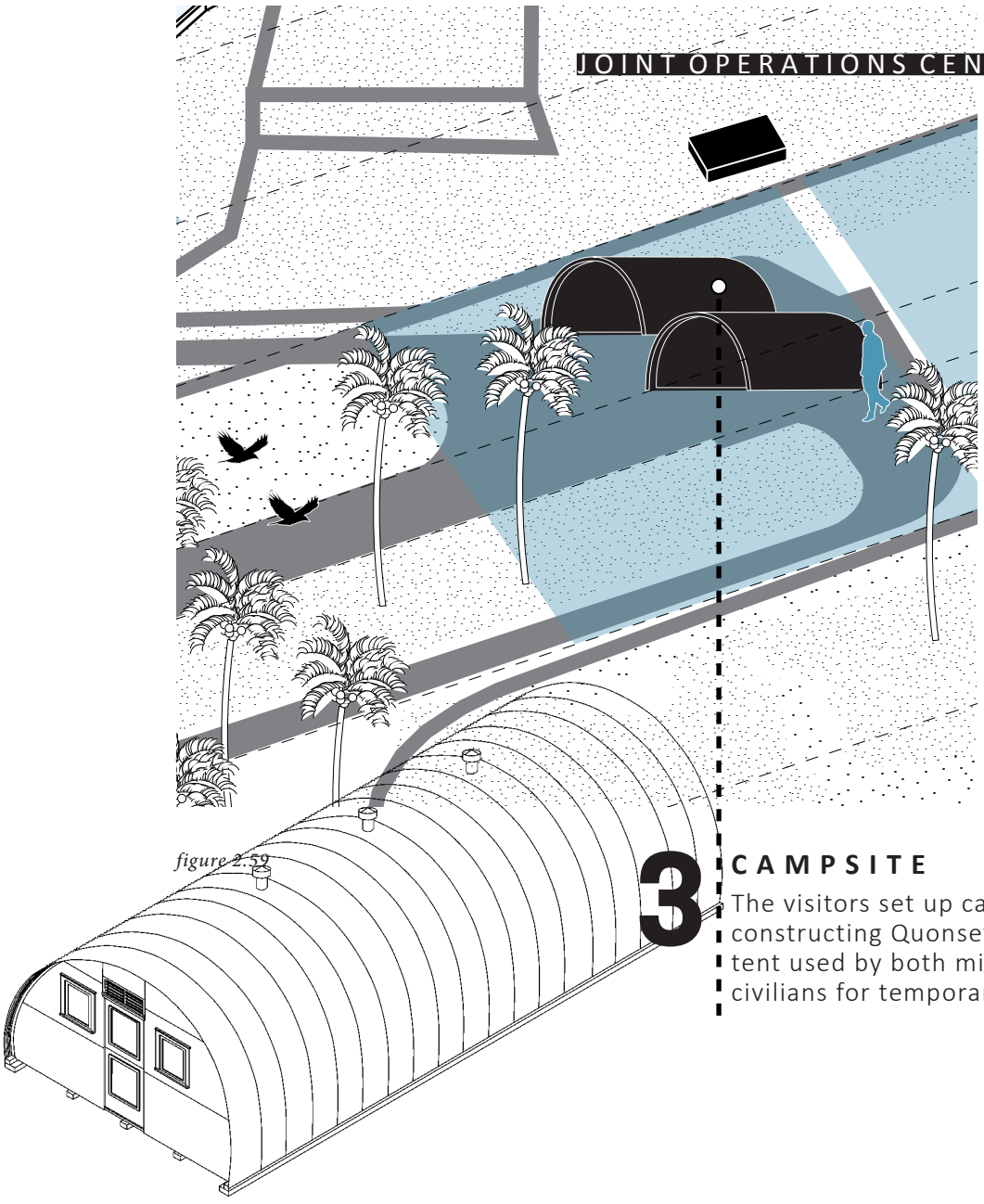
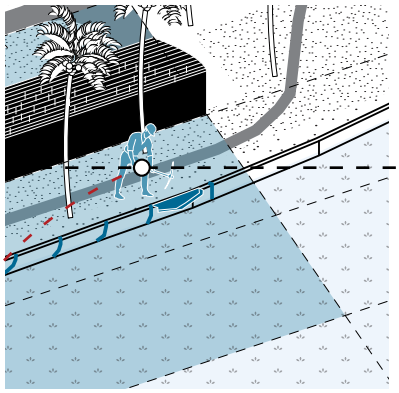


figure 2.59

3

CAMPSITE

The visitors set up camp by constructing Quonset huts, a tent used by both military and civilians for temporary shelter.



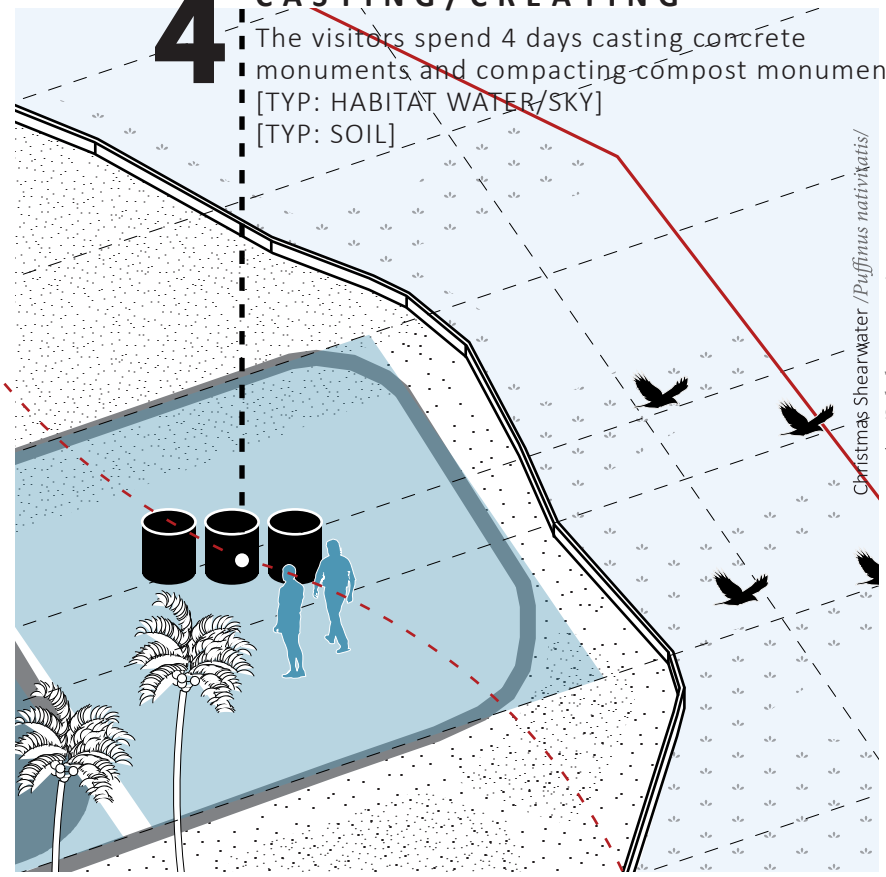
4.1

DEMOLITION

Some of the concrete aggregate comes from the demolition of existing infrastructure, like the ***ROADS***.

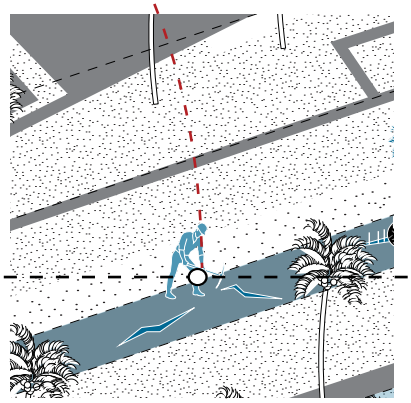
4 CASTING/CREATING

The visitors spend 4 days casting concrete monuments and compacting compost monuments.
[TYP: HABITAT WATER/SKY]
[TYP: SOIL]



Christmas Shearwater */Puffinus nativitatis/*
Brown Booby */Sula leucogaster/*

figure 2.60



4.2

DEMOLITION

Some of the concrete aggregate comes from the demolition of existing infrastructure, like the *SEA WALL*.

5.1

INTERVENTION
[TYP: HABITAT WATER/SKY]

After casting, visitors take the boat out and distribute the intervention in the dredged areas in a zone-by-zone basis.

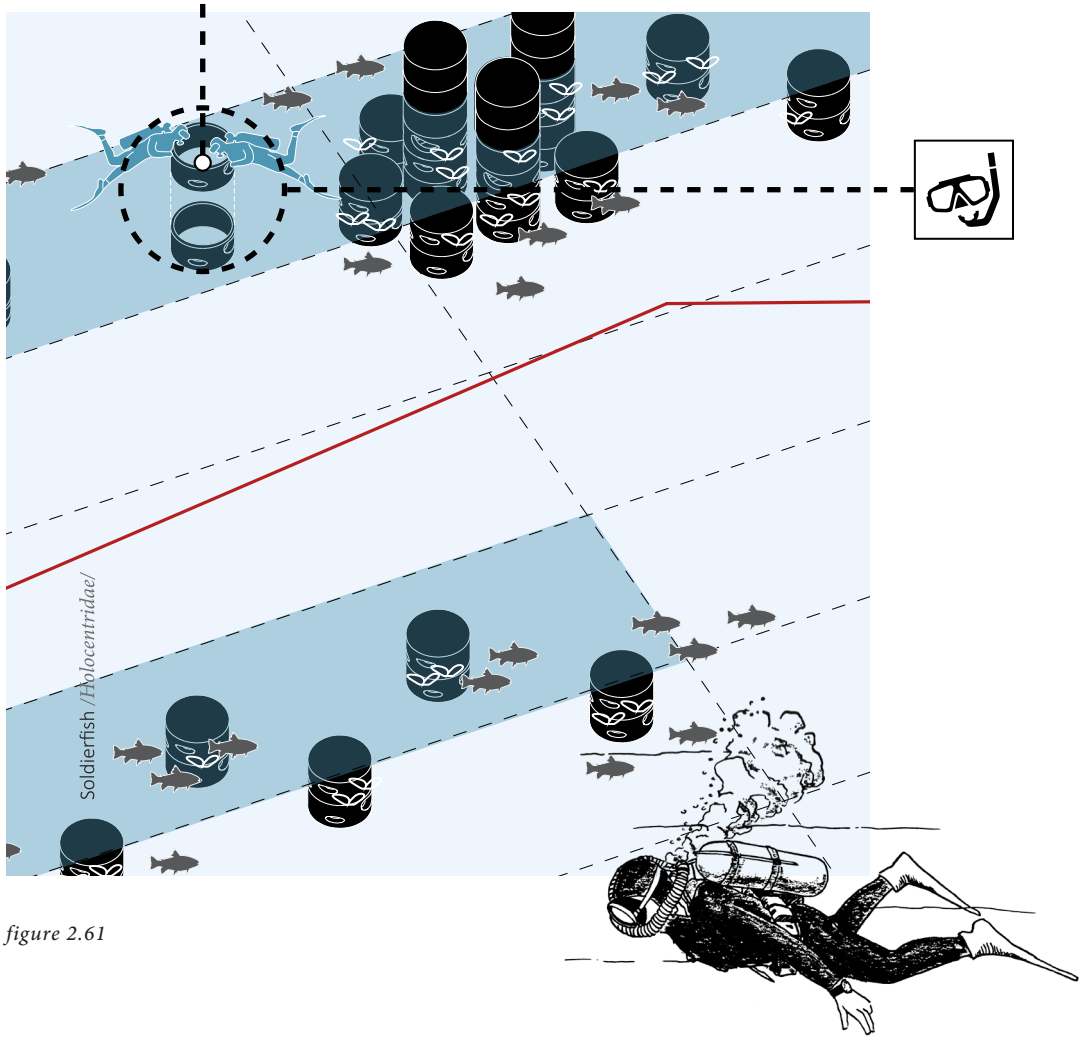


figure 2.61

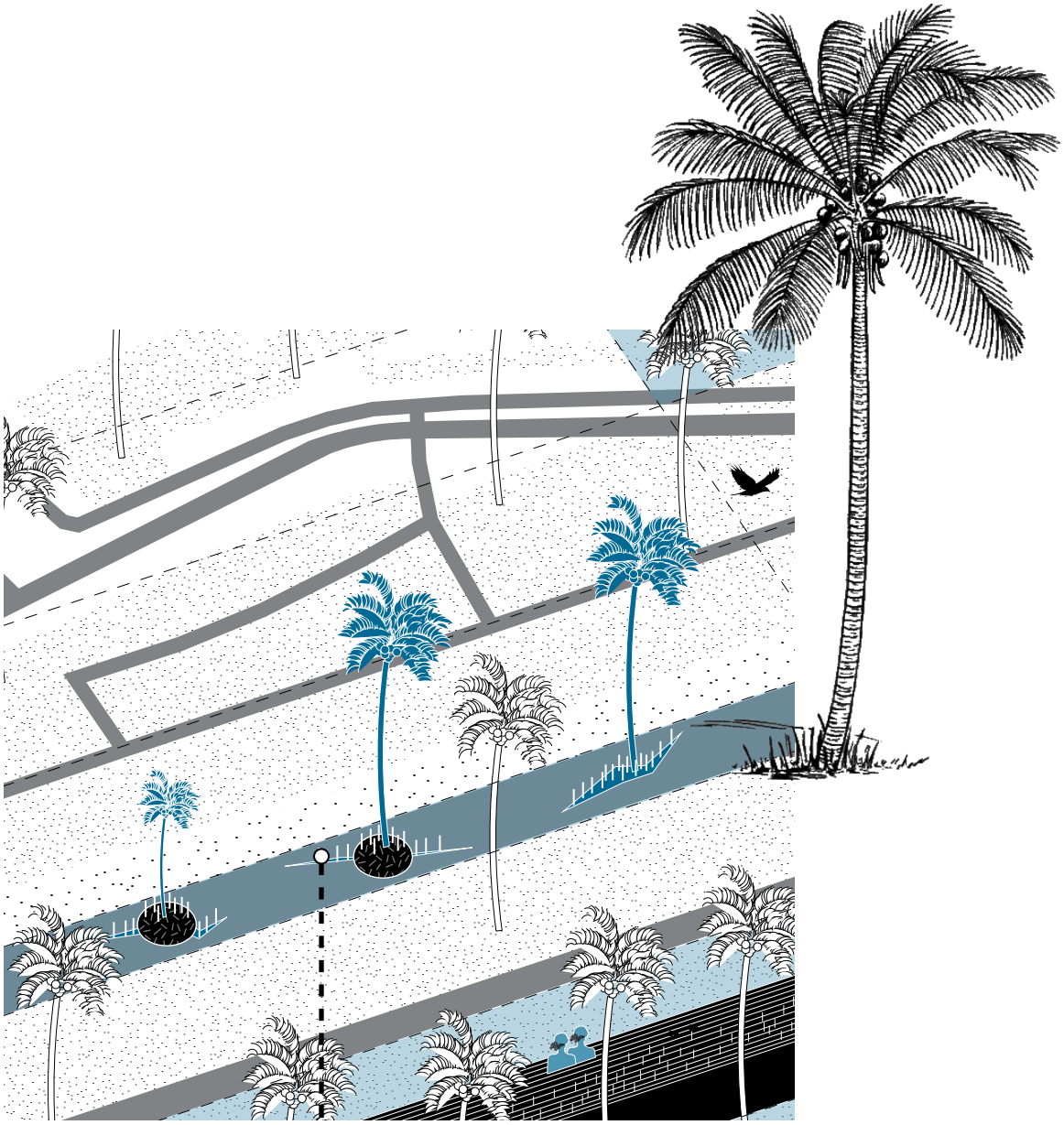


figure 2.62

5.2

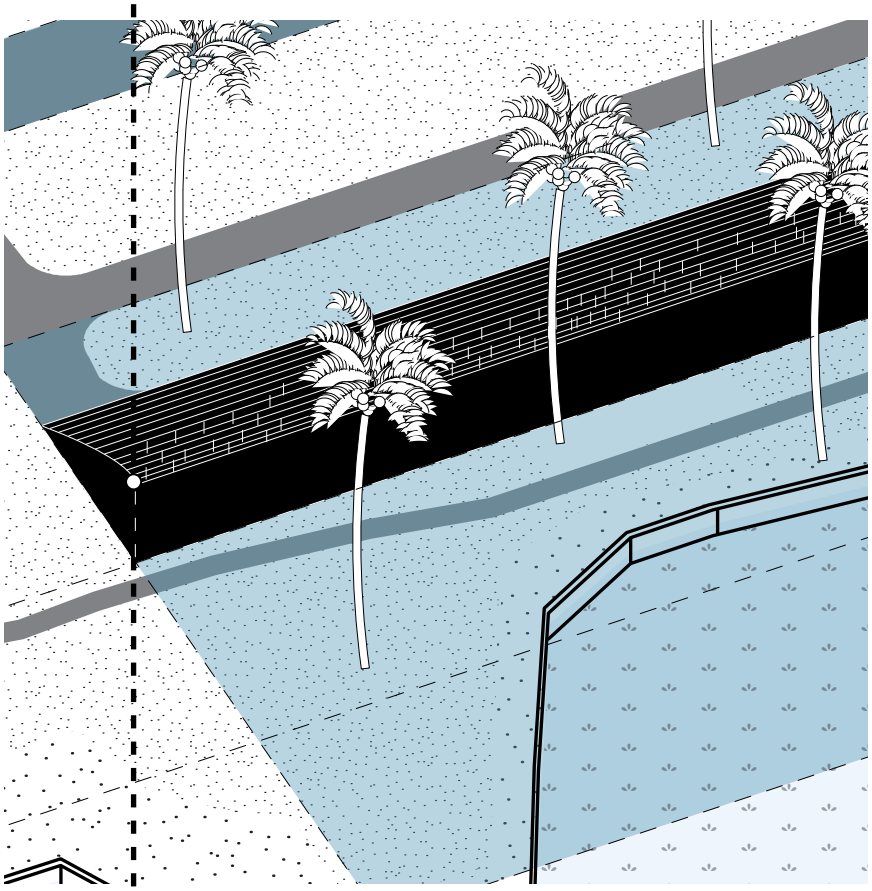
INTERVENTION [TYP: SOIL]

After compost is collected after each stay, a soil/ compost mixture is created with local grass or palm tree seeds are placed where demolition took place earlier in the week.

6

LAND FORMING

A berm is built along one of the old airplane strip to separate the beached area from the rest of the island. It doubles as a noise barrier from the human campsite and a viewing platform for viewing the sea turtle hatchings.



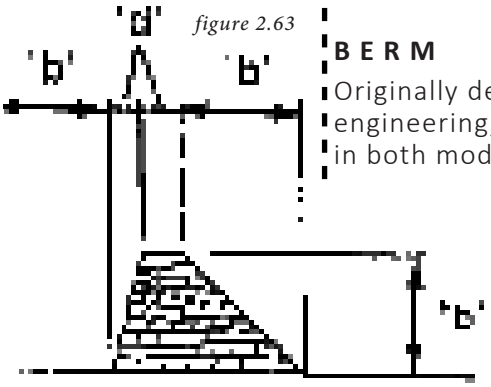


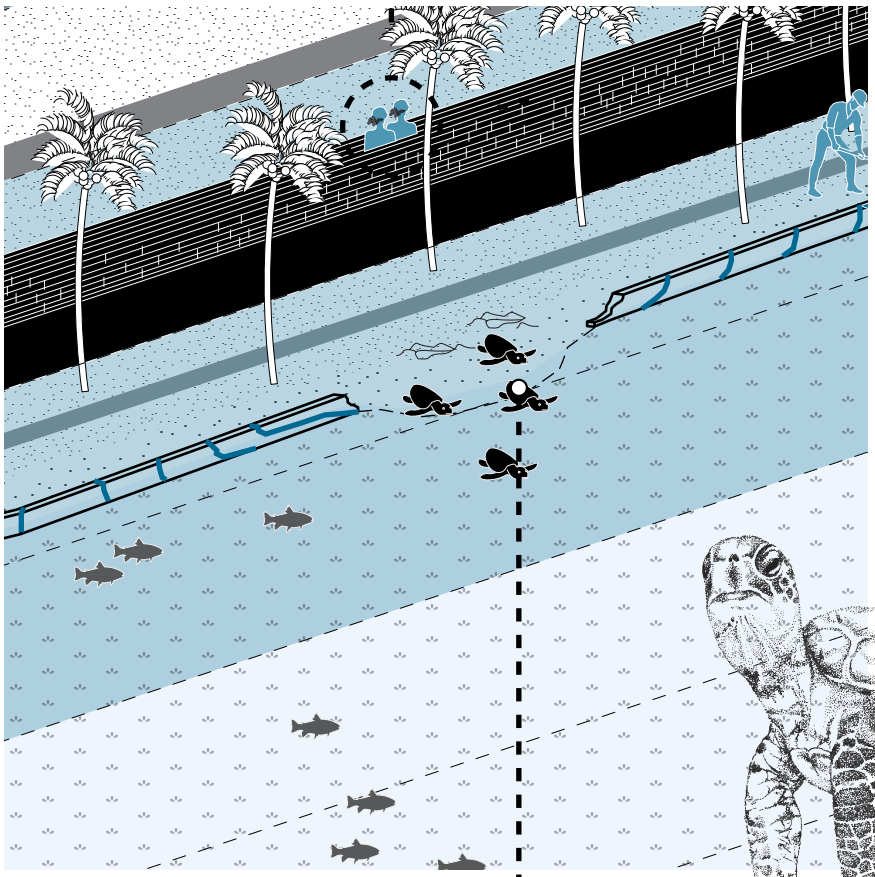
figure 2.63

BERM

Originally developed in medieval military engineering, the berm has since found many uses in both modern military activity and general use.

ATN NVG7-2

Night vision technology was first invented by the military for World War II. It has since entered civilian use.



Green Sea Turtle */Chelonia mydas/*

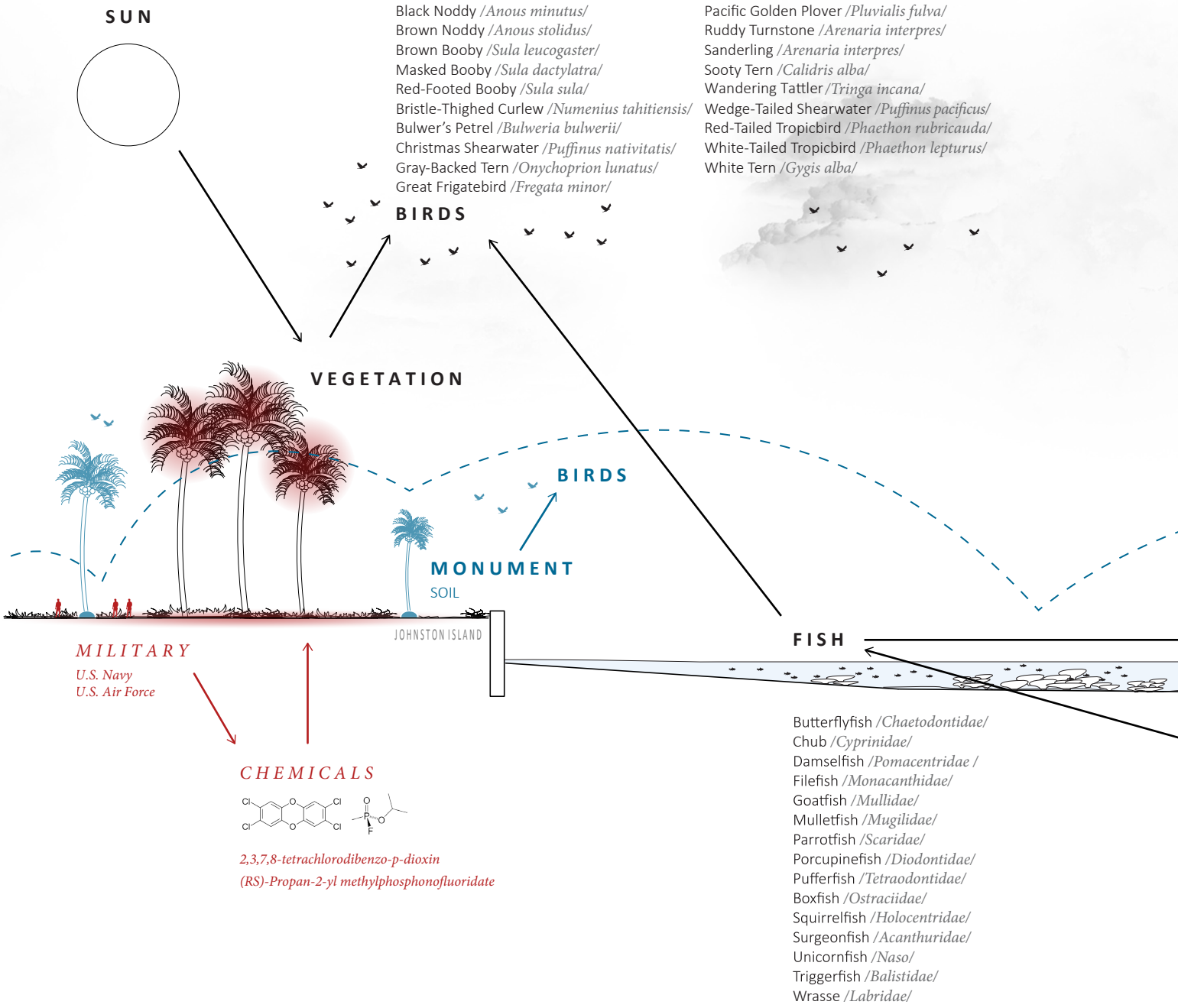
figure 2.64

7

SEA TURTLE HATCHING

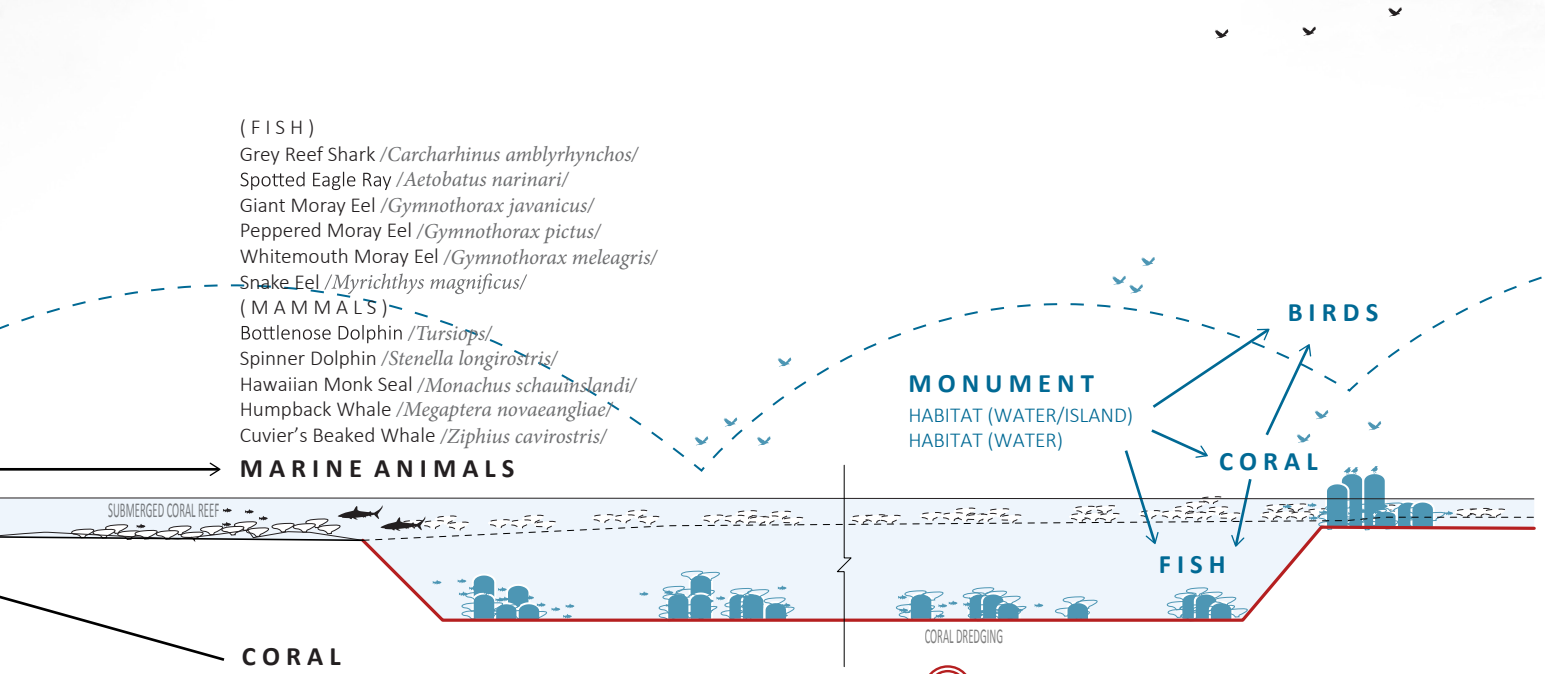
One night, after observation, the green sea turtle eggs begin to hatch in unison. This event is the climax of the visit for the tourists, who wear night vision goggles to watch this migration into the water. Due to the demolition of the sea wall, beaches are expanded to allow the turtle's easier access.

figure 2.65 Ecological Section (after).



ECOSYSTEM-AFTER

The added interventions create new nodes in the cyborganic ecosystem and integrate within existing relationships. Seen in blue, the aggregated monuments create new concentrations of ecological activity that advocate for further colonization.



(FISH)
Grey Reef Shark */Carcharhinus amblyrhynchos/*
Spotted Eagle Ray */Aetobatus narinari/*
Giant Moray Eel */Gymnothorax javanicus/*
Peppered Moray Eel */Gymnothorax pictus/*
Whitemouth Moray Eel */Gymnothorax meleagris/*
Snake Eel */Myrichthys magnificus/*
(MAMMALS)
Bottlenose Dolphin */Tursiops/*
Spinner Dolphin */Stenella longirostris/*
Hawaiian Monk Seal */Monachus schauinslandi/*
Humpback Whale */Megaptera novaeangliae/*
Cuvier's Beaked Whale */Ziphius cavirostris/*

MARINE ANIMALS

CORAL

Table Coral */Acropora/*
Acropora Coral */Acropora/*
Montipora Coral */Montipora/*
Cauliflower Coral */Pocillopora/*
SPS Coral */Porites/*
Pavona Coral */Pavona/*
Leptoseris Coral */Leptoseris/*
Leptastrea purpurea Coral */Leptastrea purpurea/*
Cyphastrea ocellina Coral */Cyphastrea ocellina/*
Psammocora Coral */Psammocora/*
Oulangia bradleyi Coral */Oulangia bradleyi/*
Psammocora Coral */Psammocora/*
Fungia seutaria Coral */Fungia (Pleuraetis) seutaria/*
Cyeloseris vaughani Coral */Cyeloseris vaughani/*
Fire Coral */Millepora tenera/*
Lace Coral */Distiehopora violaeea/*
Rose Lace Coral */Stylaster/*

MILITARY INSTALLMENT
Submarine Cable
Coral Dredging

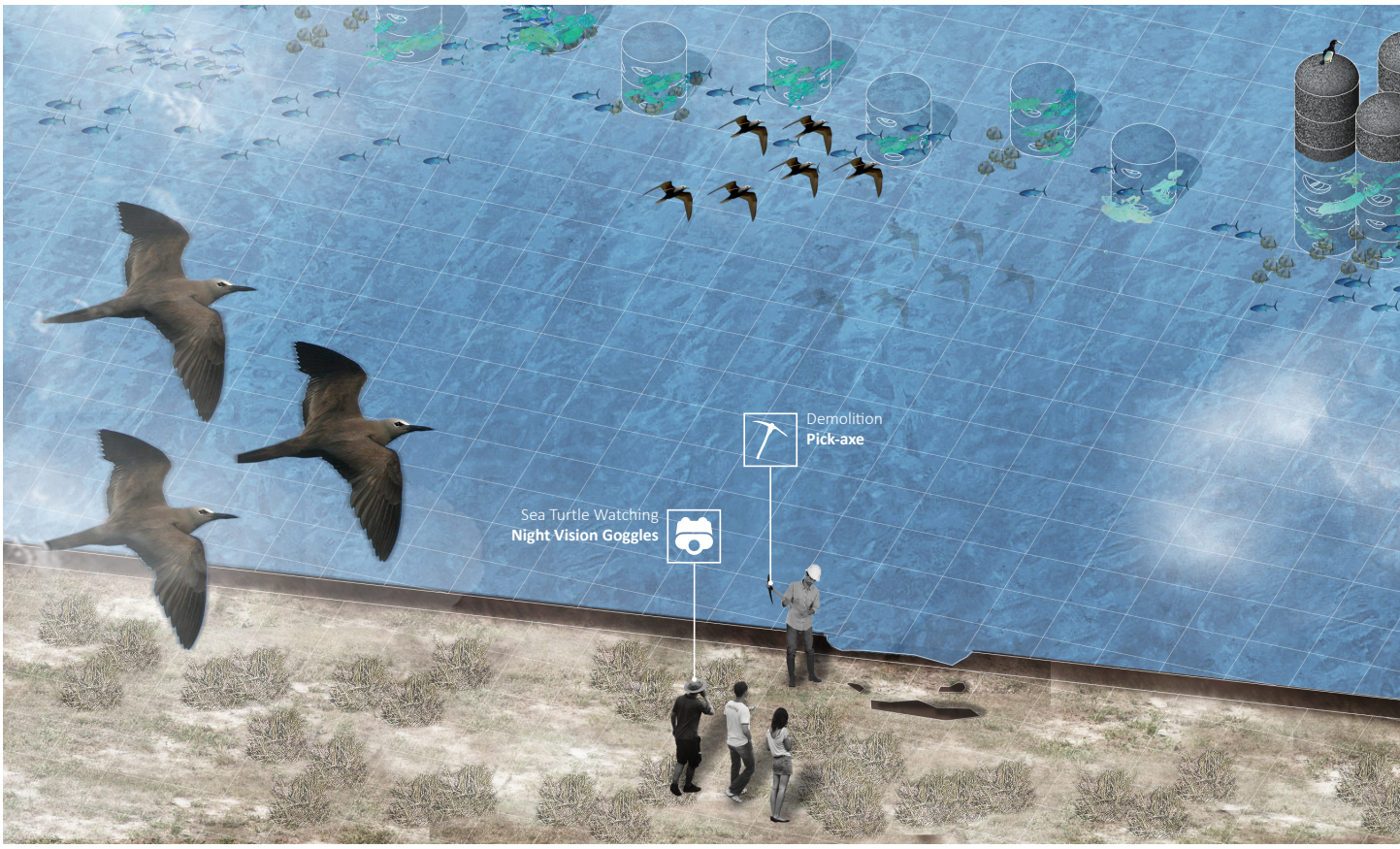
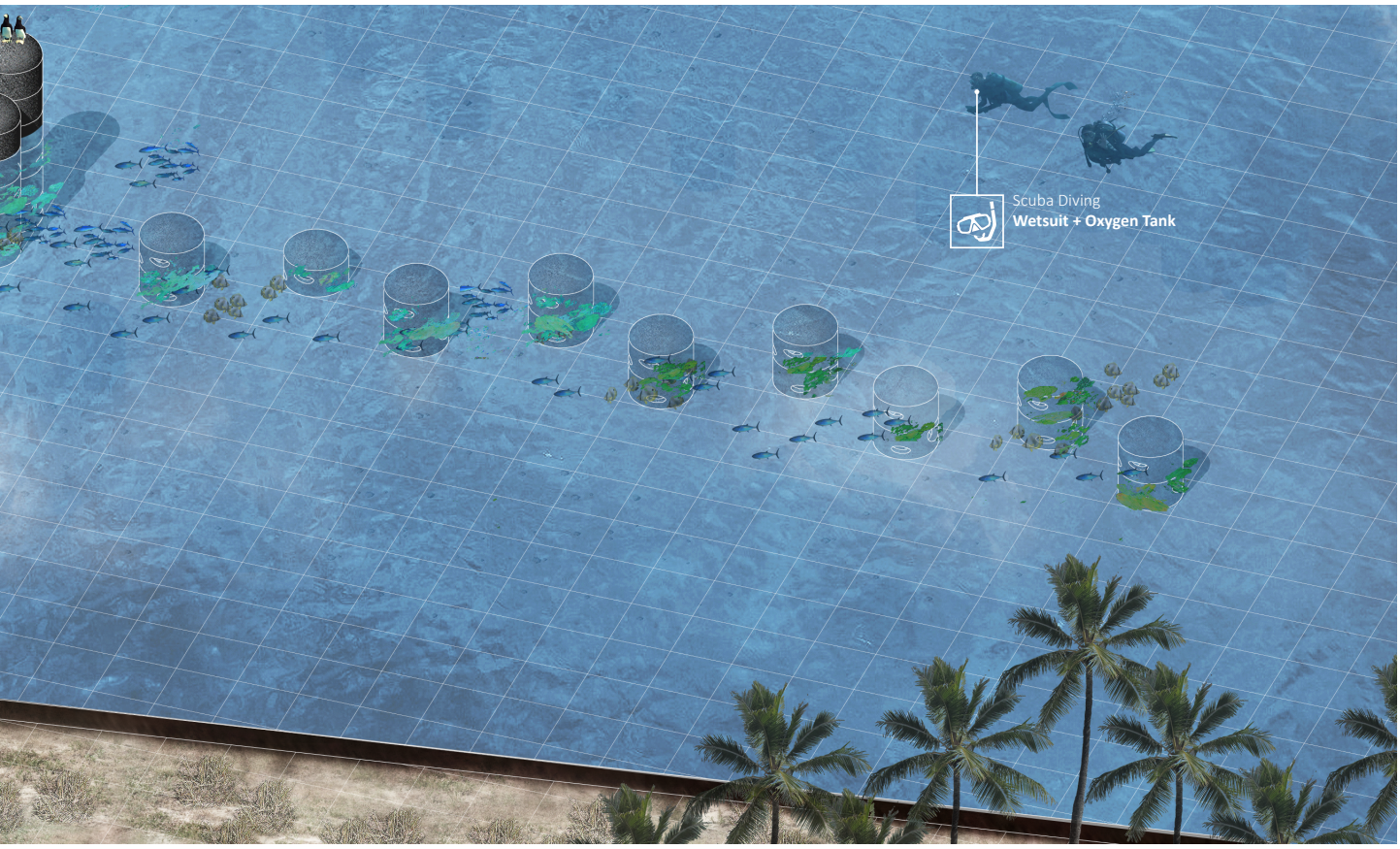


figure 2.66 Render.


Scuba Diving
Wetsuit + Oxygen Tank

TEST SITE 002:

ROCKY MOUNTAIN ARSENA

39°50’0”N 104°50’30”W

LOCATION
Adams County,
Colorado

AREA
25 mile^2
64.7 km^2

FACTORS
Contamination

STATUS
ABANDONED;
RE-DEVELOPED
(USFWS)

L

SITE

The Rocky Mountain Arsenal Wildlife Refuge is a national refuge maintained by the U.S. Fish and Wildlife Service located on the border of Denver, CO. However, the site was originally an arsenal opened by the U.S. Army to manufacture chemical weapons in World War II. Near the end of the war, the army leased out parts of their facilities to private industries like Shell Oil Company who manufactured pesticides and herbicides.

The processes undergone on this site - the manufacturing and demilitarization of weapons, the manufacturing of pesticides, and the dumping required for both, left behind one of the most polluted landscape in America. The state of Colorado sued both the government and Shell over their responsibility to the land and won $2 billion to be put towards re-mediation. However, because the site was allowed to remain undeveloped before and during remediation efforts, animals began to re-occupy the landscape. Once this was noted, President George W. Bush established the land as a wildlife refuge in 1992, and a cleanup program was initiated by all 3 bodies (U.S Army, Shell Oil Co., and USFWS) between 1992-2010.[67] This saw the demolition of most buildings on the site.

The Rocky Mountain Arsenal National Wildlife Refuge is currently in the ***RE-DEVELOPED*** stage of occupation. The continued presence of its various pollutants maintains the refuge's status as a cyborg landscape.

figure 2.67 ***(Opposite)*** Civilians watch a simulated atomic bomb explosion set off by the Army Chemical Corps.

67 "About the Refuge," Rocky Mountain Arsenal, U.S. Fish and Wildlife Service, accessed January 28, 2018, https://www.fws.gov/refuge/Rocky_Mountain_Arsenal/about.html.

figure 2.68 U.S. Army, *AERIAL VIEW OF SOUTH PLANT FROM EAST*, 1970

HISTORY

1939
Beginning of World War II.

1942
Arsenal constructed as a chemical weapons manufacturing centre and under operation of the ***U.S. Army.***

1946
Leased facilities to private industries to produce pesticide.

1949
End of World War II.

1969
Weapons manufacturing ended and demilitarization of weapons begins.

1982
End of private industries leasing facilities.

1983
Civil Action No. 83-C-2386: State of Colorado v. U.S.A., Shell Oil Company, et al.

1984
Investigation of site contamination begins.

1985
Closure of arsenal.
End of demilitarization activity.
Re-mediation of the site begins.

1986
Ecological diversity first observed with a winter communal roost of bald eagles.

1987
Placed on *National Priorities List (NPL)* and officially listed as a *SUPERFUND* site.

1992
Rocky Mountain Arsenal National Wildlife Refuge Act: Established as Wildlife Refuge under the jurisdiction of the *U.S. Fish and Wildlife Service*.

2003
Environmental Protection Agency (EPA) certified 3.8 km^2 clean.

2004
Environmental Protection Agency (EPA) certified 20.45 km^2 clean.
Rocky Mountain Arsenal National Refuge formally opened.

2007
16 American bison introduced to refuge.

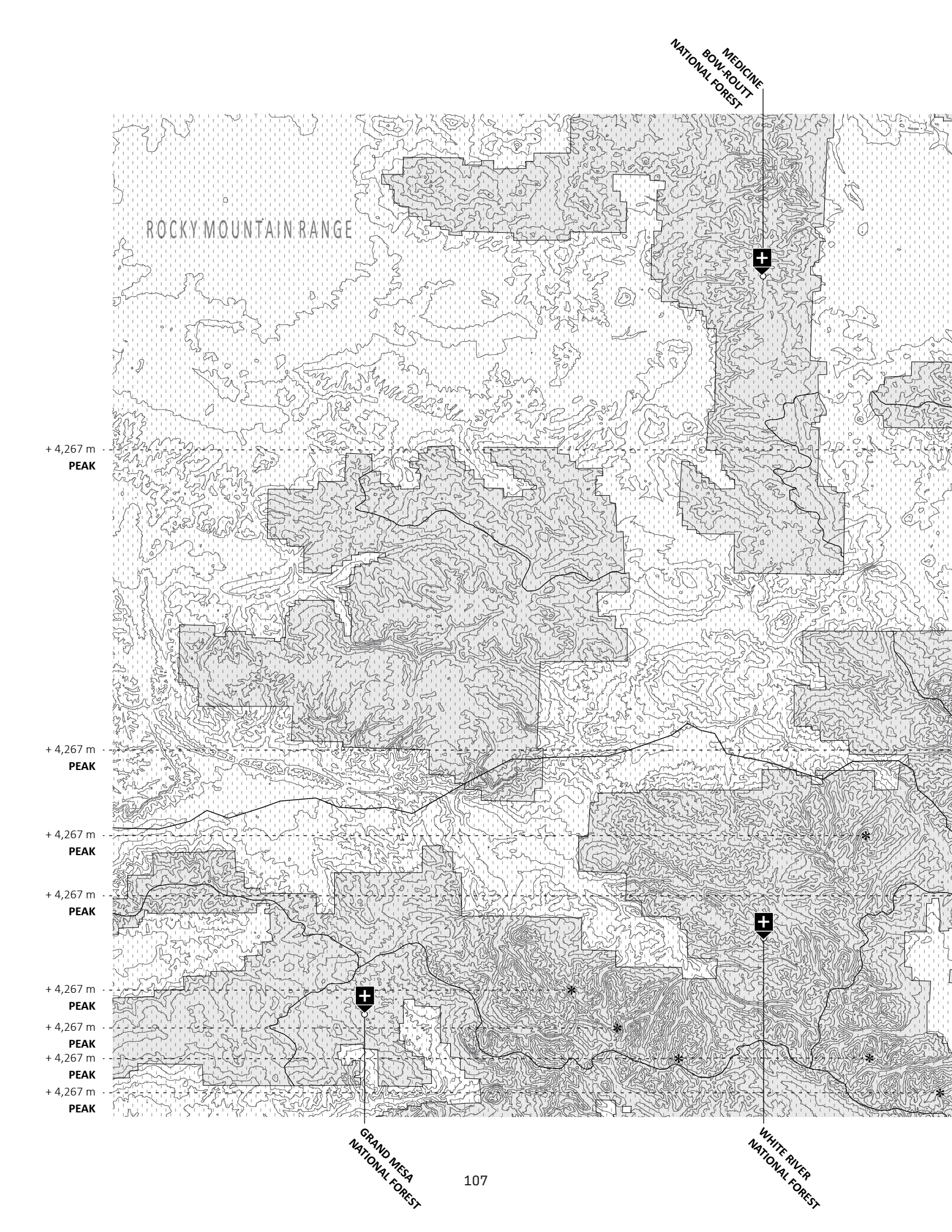
2006
Environmental Protection Agency (EPA) certified 29.94 km^2 clean.

2010
Environmental Protection Agency (EPA) certified remaining 10.51 km^2 clean.

2017
CURRENT DAY.

U.S. ARMY
EPA
U.S.F.W.S.

figure 2.69 Chronological timeline.


MEDICINE BOW-ROUTT NATIONAL FOREST
ROCKY MOUNTAIN RANGE
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
+ 4,267 m PEAK
GRAND MESA NATIONAL FOREST
WHITE RIVER NATIONAL FOREST

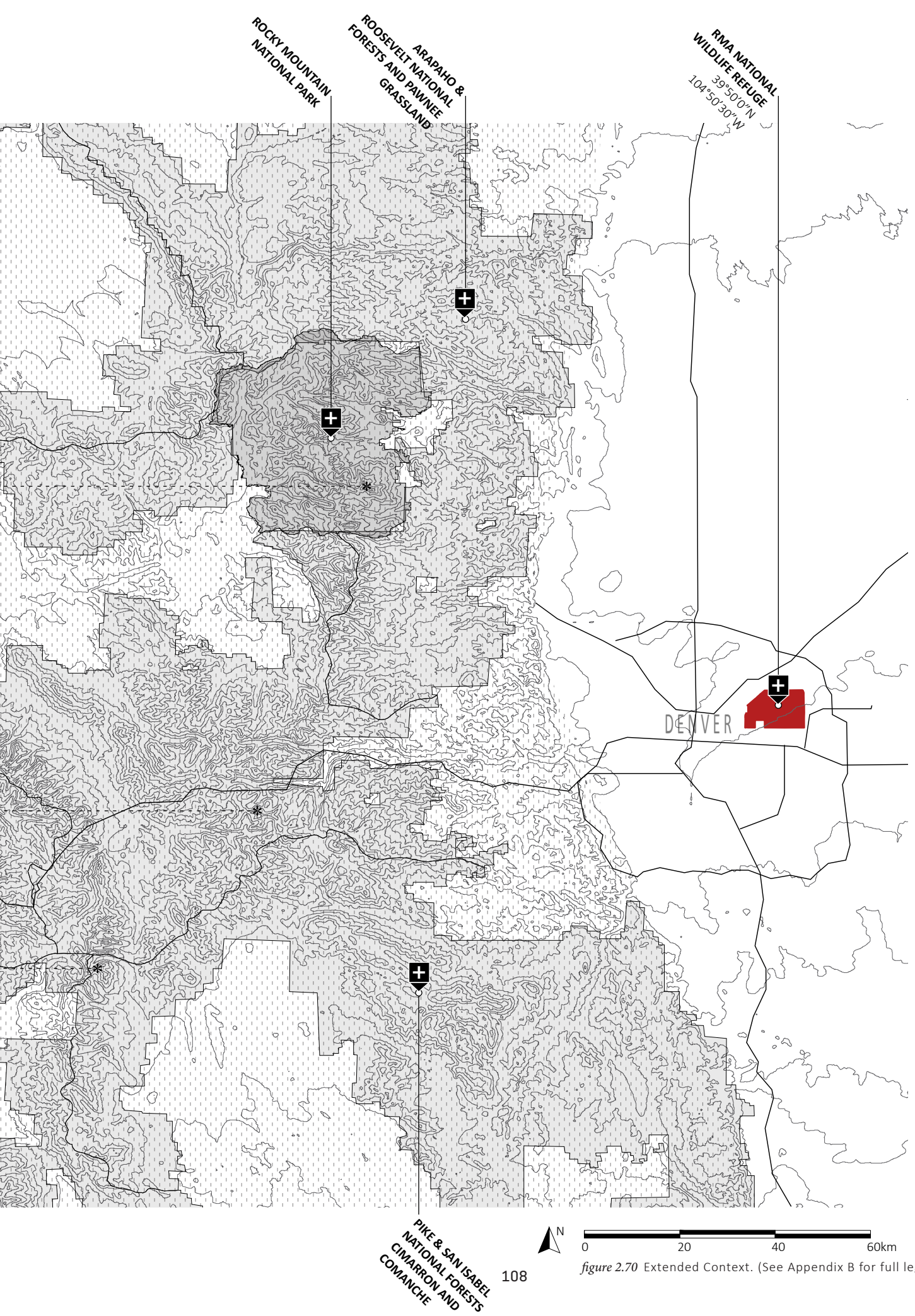


figure 2.70 Extended Context. (See Appendix B for full legend)

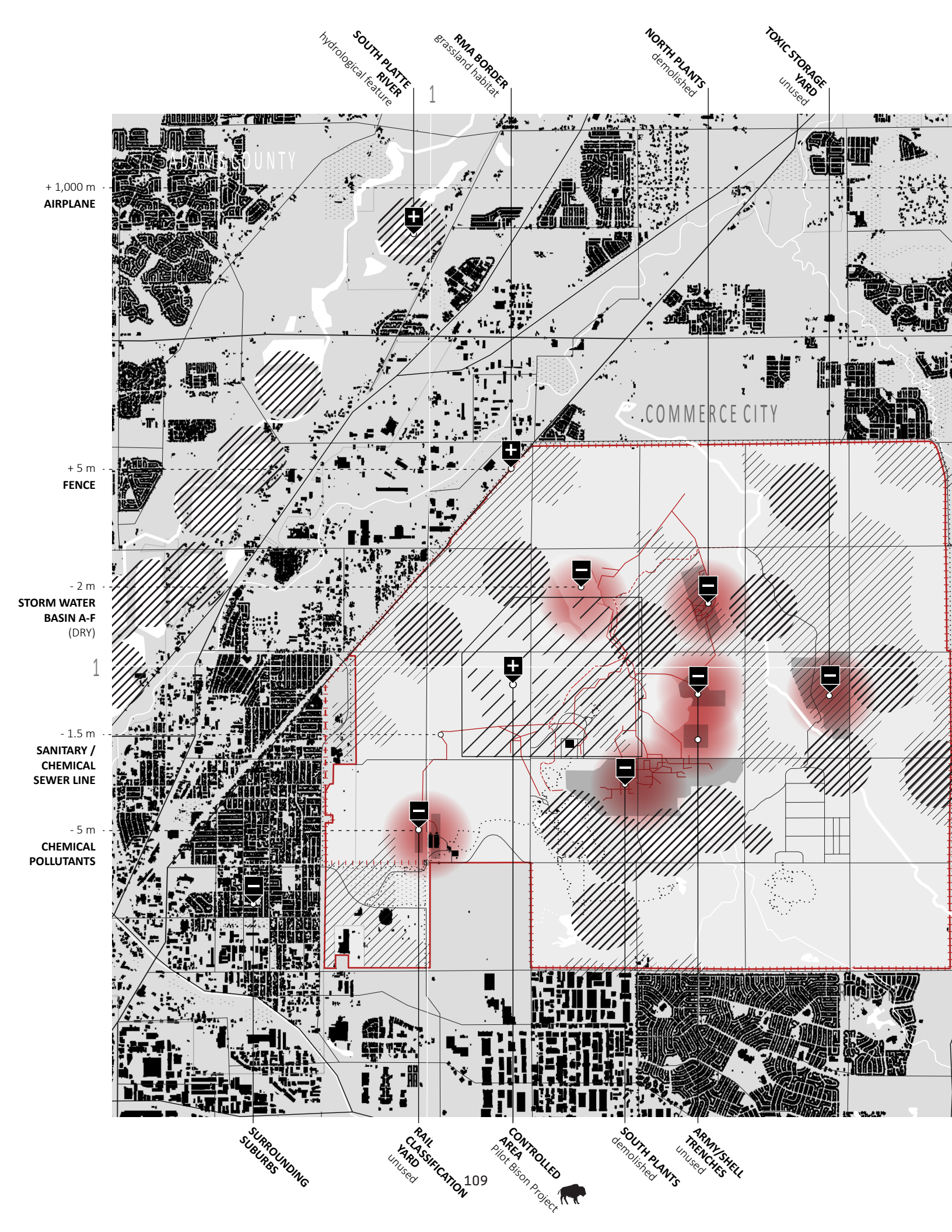

SOUTH PLATTE RIVER
hydrological feature
RMA BORDER
grassland habitat
NORTH PLANTS
demolished
TOXIC STORAGE YARD
unused
ADAMS COUNTY
COMMERCE CITY
+ 1,000 m
AIRPLANE
+ 5 m
FENCE
- 2 m
STORM WATER BASIN A-F
(DRY)
- 1.5 m
SANITARY / CHEMICAL SEWER LINE
- 5 m
CHEMICAL POLLUTANTS
SURROUNDING SUBURBS
RAIL CLASSIFICATION YARD
unused
CONTROLLED AREA
Pilot Bison Project
SOUTH PLANTS
demolished
ARMY/SHELL TRENCHES
unused

figure 2.71 Site Plan. (See Appendix B for full legend)

ECOSYSTEM

After the arsenal closed, its intense chemical contamination held off new development, allowing the land to become overgrown. The first animal to be noted on the site was the bald eagle in 1986, and after an investigation by the USFWS, over 330 species were found to be living on the site.[68]

CLIMATE [69]
Avg. Hi: 63.5 F / 17.5 C
Avg. Low: 40.5 F / 4.7 C
Avg. Precipitation: 12.5 in / 317.5 mm
Avg. Snowfall: 53.8 in / 1366.5 mm

BIOME
Grasslands

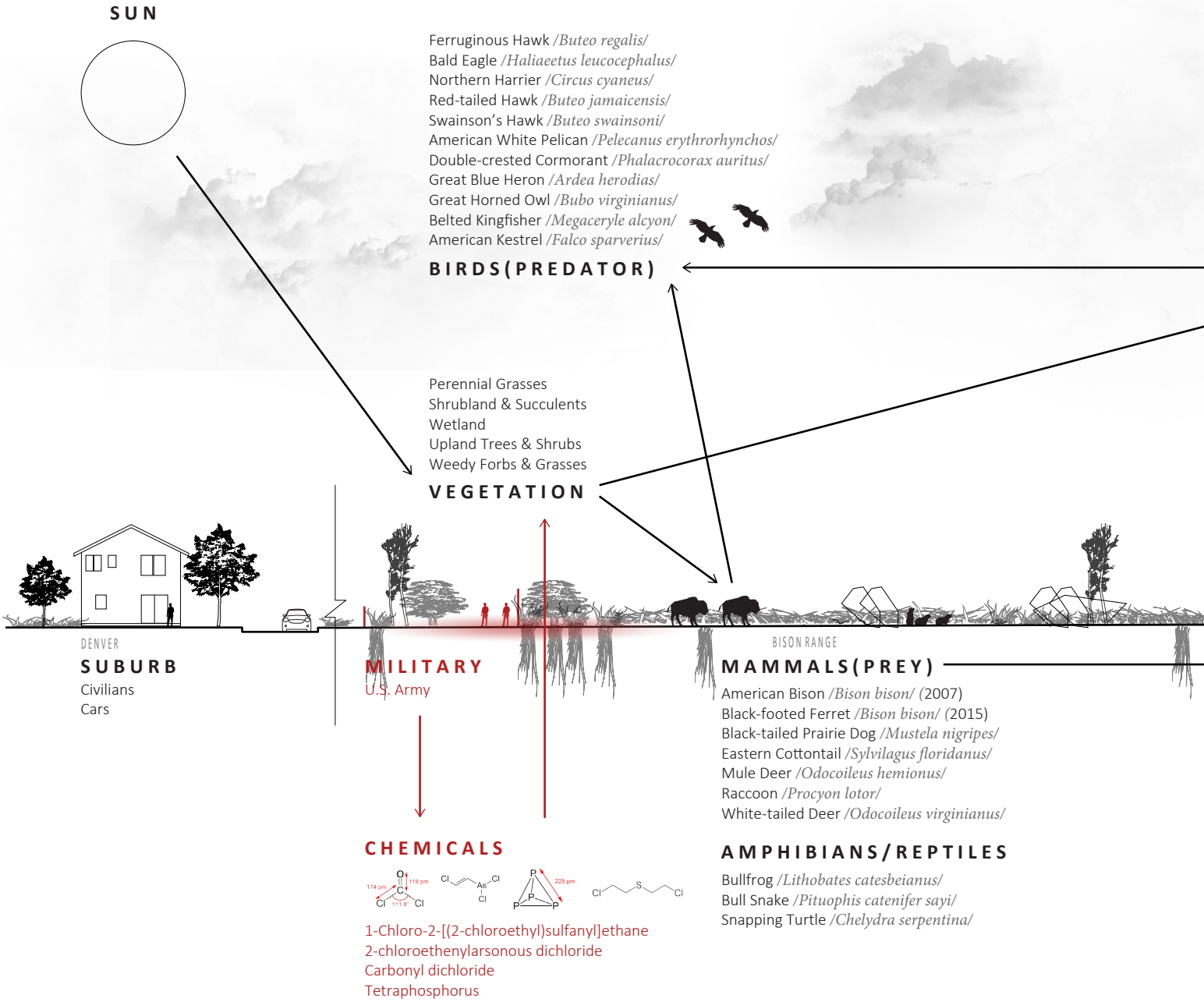


figure 2.72 Ecological Section.

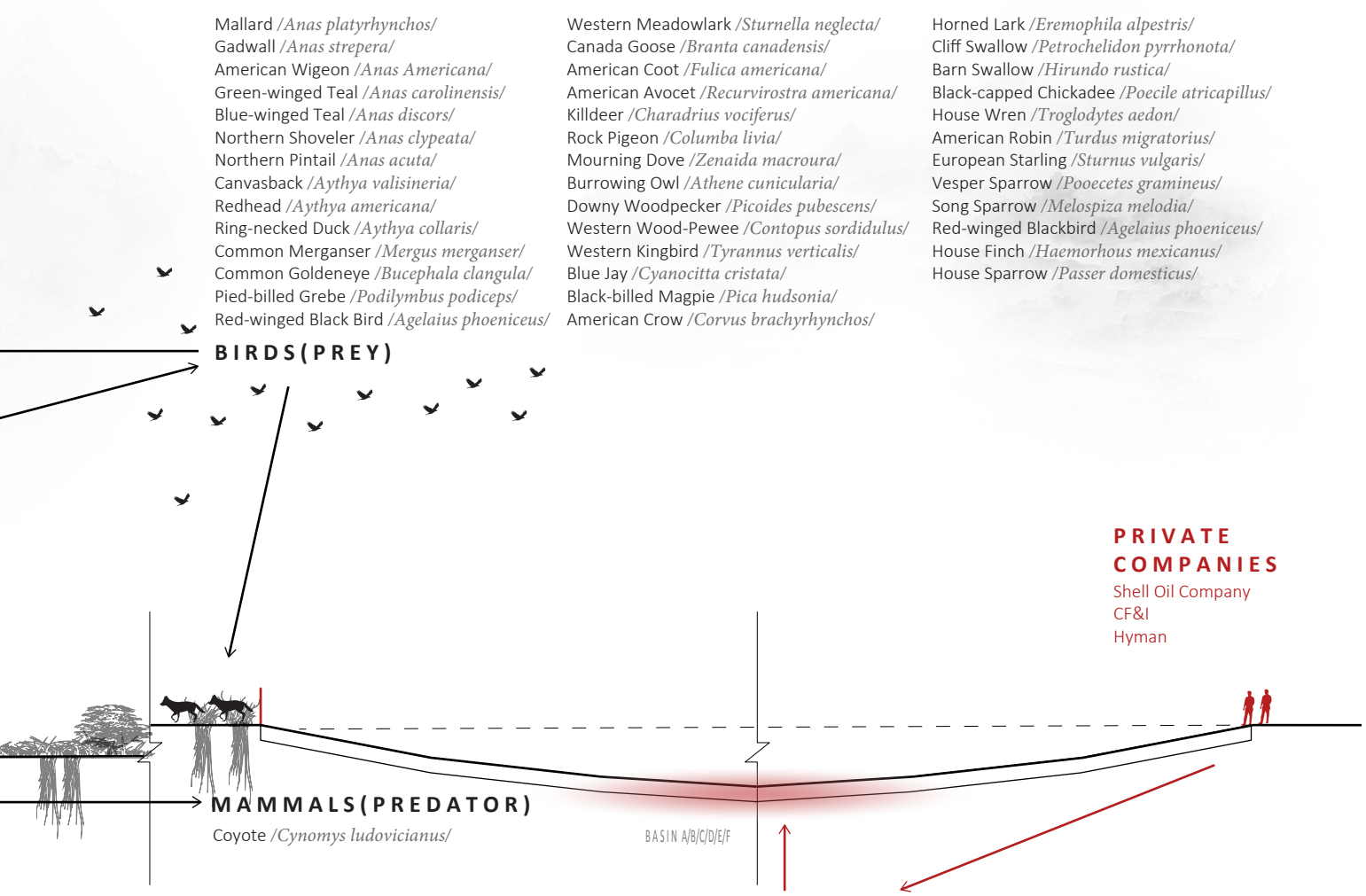


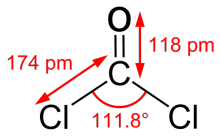
figure 2.73 Historic American Engineering Record, Creator, ***Rocky Mountain Arsenal, Storage Tank, December Seventh Avenue & D Street, Commerce City, Adams County, CO***, 1968.

68 U.S. Fish and Wildlife Service, "About the Refuge."
69 "Denver WSO City, Colorado," Western Regional Climate Center, accessed January 21, 2018, https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?codenc.

TECHNOLOGICAL POLLUTANTS

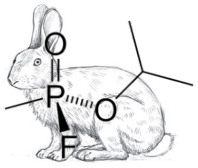
On the Rocky Mountain Arsenal Wildlife Refuge, four types of pollutants have been catalogued as a result *(figure 2.74)*: chemical weapons manufacturing, chemical weapons demilitarization, pesticide and herbicide manufacturing, and infrastructure. They have left artefacts, and as a result, have altered the landscape. Most notably, the contaminated run-off from its manufacturing processes have rendered the majority of the site uninhabitable (to human).

Refer to the chronology, plans, and section *(figure 2.69, 2.70, 2.71, 2.72)* to see specific cause and specific locations effected by these remaining artefacts. The resulting new cyborg landscape can be understood in the following collages *(figure 2.75, 2.76, 2.77)* where the new technological-ecological links are further explored.

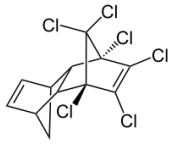


Carbonyl dichloride

i. Chemical Weapons (manufacturing)

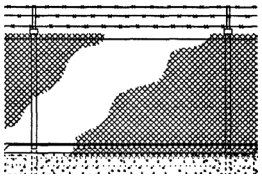


ii. Chemical Weapons (demilitarization)



1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene

iii. Pesticide and Herbicide (manufacturing)



iv. Infrastructure

figure 2.74 Technological pollutants found on the Rocky Mountain Arsenal.

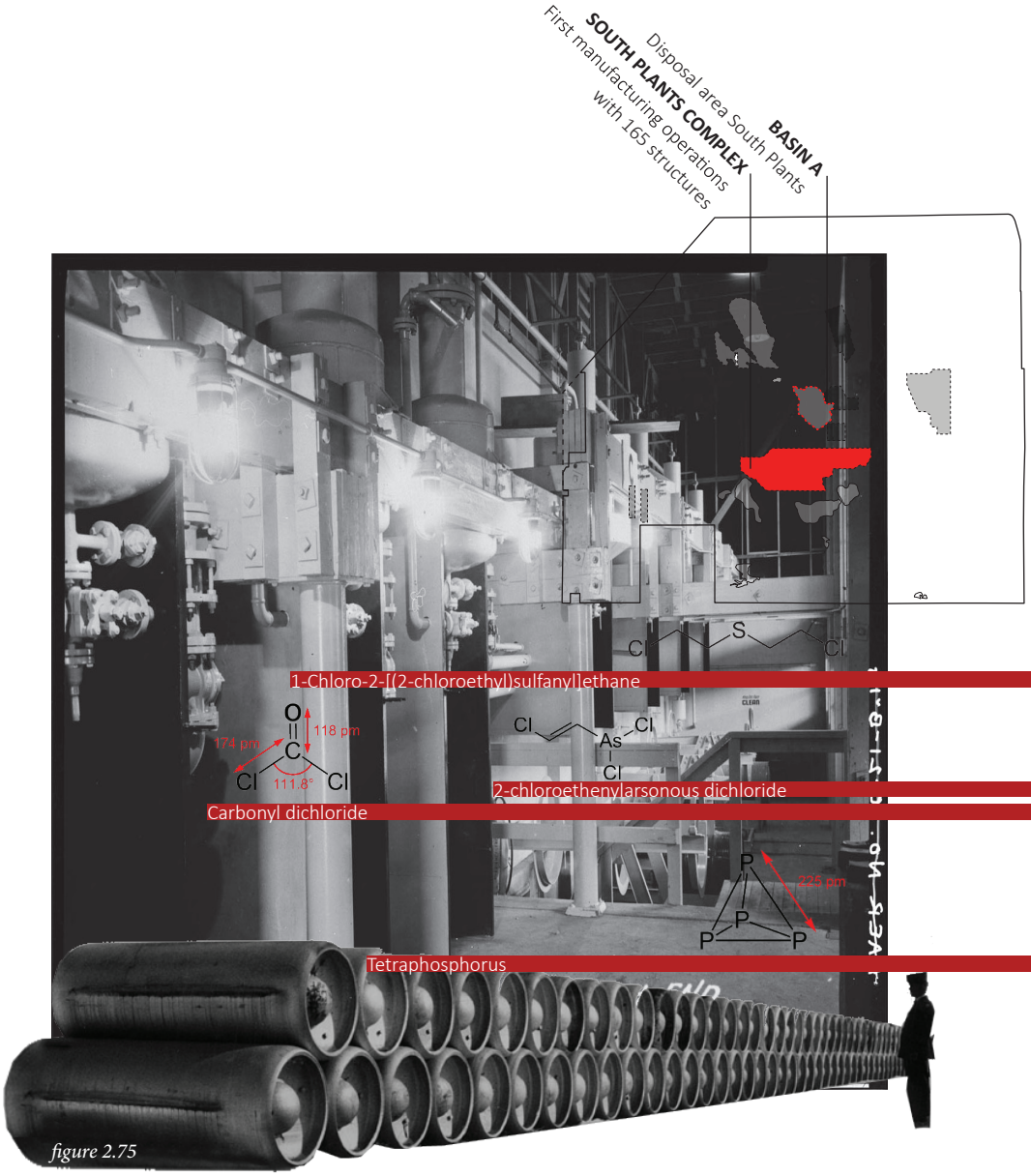
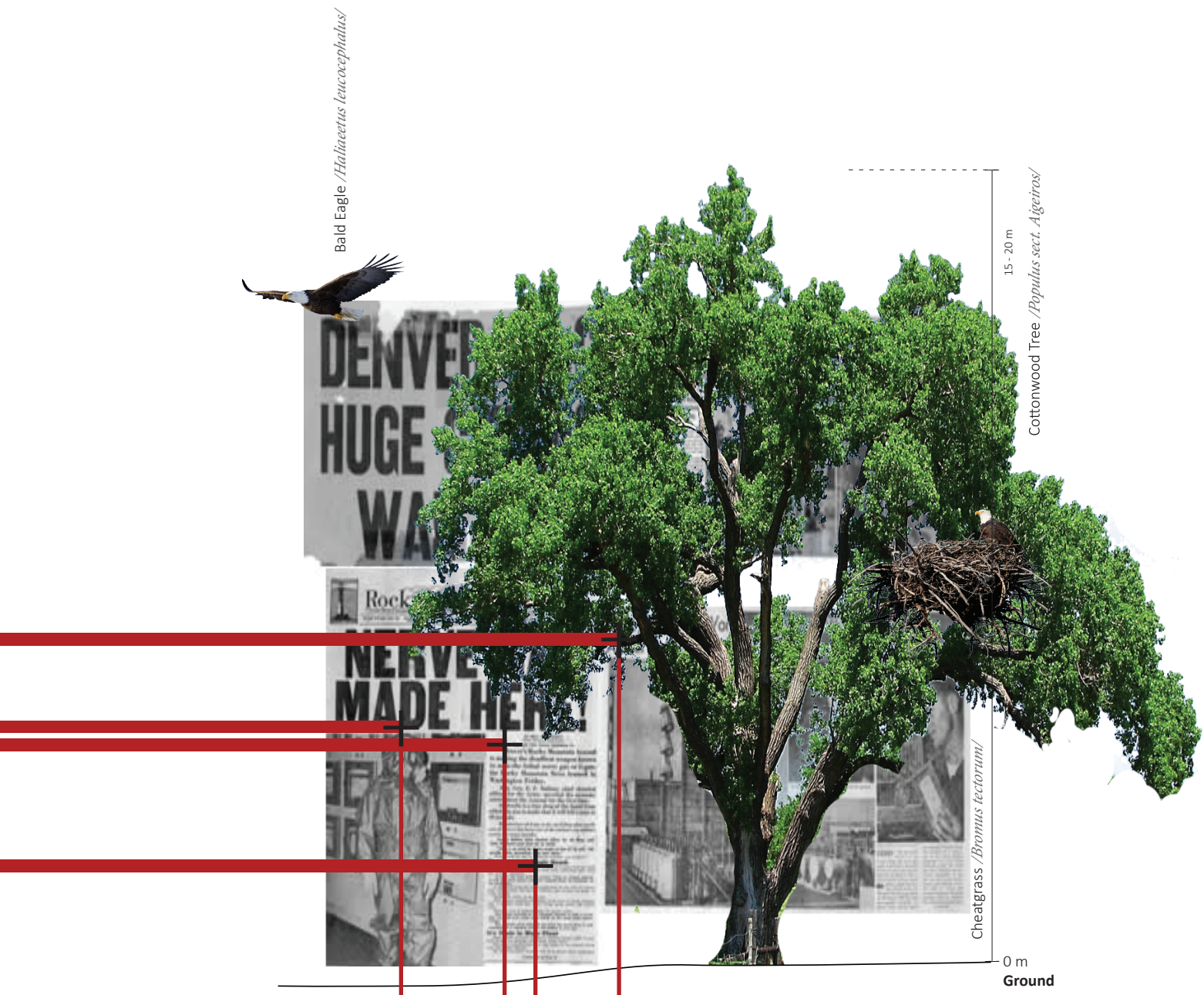


figure 2.75

CHEMICAL WEAPONS

Shown above is the filling room inside the South Plants Complex where mustard, lewisite, phosgene, white phosphorus, chlorine, incendiary mixtures, and explosives were produced and filled into bombs.[70] Once the army stopped manufacturing chemical weapons in 1969, the plant was used for demilitarizing the same chemical weapons by emptying and burning the nerve agents and any contaminated item. Through this process, waste contamination was distributed across the site alongside the 87,000+ gallons that were leaked or spilled in the South Plants and surrounding basins.[71]

70 Colorado Natural Resource Trustees, "2. Site Description," in *Natural Resource Damage Assessment for the Rocky Mountain Arsenal*, (Colorado, 2007), 2-8, https://www.colorado.gov/pacific/sites/default/files/HM_RMA-Assess-Plan-Chapter-2-Site-Description.pdf.
71 Colorado Natural Resource Trustees, "2. Site Description," 2-9.



EAGLE NESTING

The first animal to be noted on the site of the inactive arsenal in 1986 was the bald eagle[72], then considered an endangered species. Now, the established refuge protects their nesting and winter roosting habitat within its 15,000 acres of prairie and lakes that attracts over 280 other species of bird, including the burrowing owl (*Athene cunicularia*) and ferruginous hawk (*Buteo regalis*).[73]

- 5 m +
Soil level

72 U.S. Fish and Wildlife Service, "About the Refuge."
73 "Wildlife & Habitat," Rocky Mountain Arsenal, U.S. Fish and Wildlife Service, accessed January 28, 2018, https://www.fws.gov/refuge/Rocky_Mountain_Arsenal/wildlife_and_habitat/index.html.

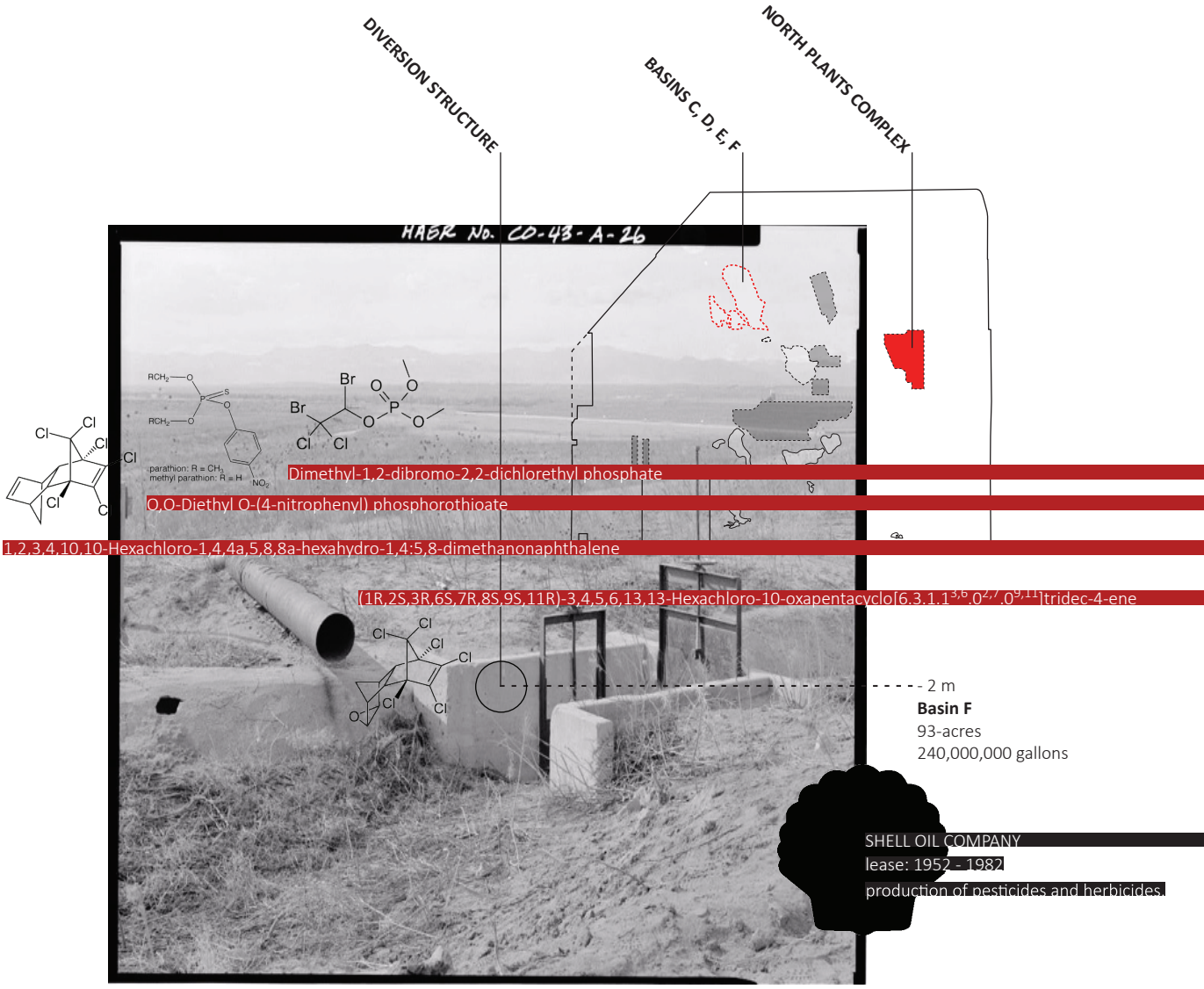
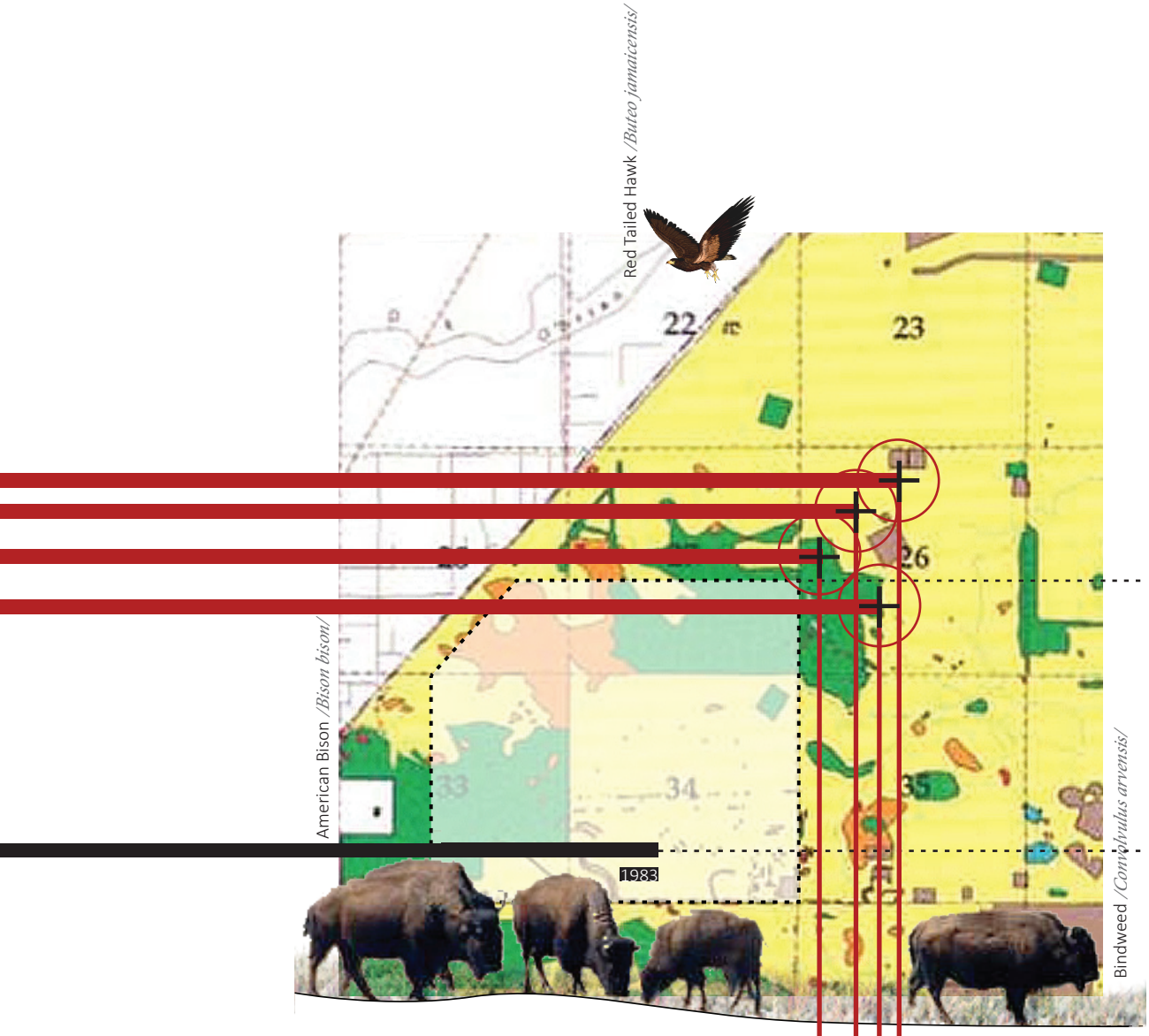


figure 2.76

PESTICIDE

From 1952 to 1982 the army leased out some of their facilities to Shell Oil Company who manufactured and processed a number of pesticides, insecticides, and herbicides including but not limited to: aldrin, chlorodane, endrin, isodrin, methyl parathion, bidrin, dibrom, ciodrin, azodrin, atrazine, and phosdrin.[74] Through the manufacturing process, Shell had released an estimated 150,112 tons of contaminants into the site, compared to the army's estimated 26,405 tons.[75] The majority of the run-off from the North Plants Complex found itself in basins C, D, E, and F to the West.

74 Colorado Natural Resource Trustees, "2. Site Description," 2-11.
75 Ibid, 2-9.



REWILDING

American Bison were re-introduced to a controlled site in 2007 in an attempt to "REWILD" the landscape under the U.S. Fish and Wildlife Service PILOT BISON PROJECT. The idea behind this project was to restore an important ecological relationship between the bison (extinct previously on the site) and the grassland that would promote stronger growth.[76] The money to clean up this and other portions of the site was settled in the CIVIL ACTION NO. 83-C-2386, in which the state of Colorado sued the government and Shell Oil for $2 billion over their responsibility for the chemical pollution that rendered the site uninhabitable.

76 "U.S. Fish and Wildlife Service to Establish Pilot Bison Project At Rocky Mountain Arsenal National Wildlife Refuge," U.S. Fish and Wildlife Service, accessed January 28, 2018, https://www.fws.gov/mountain-prairie/pressrel/07-01.htm.

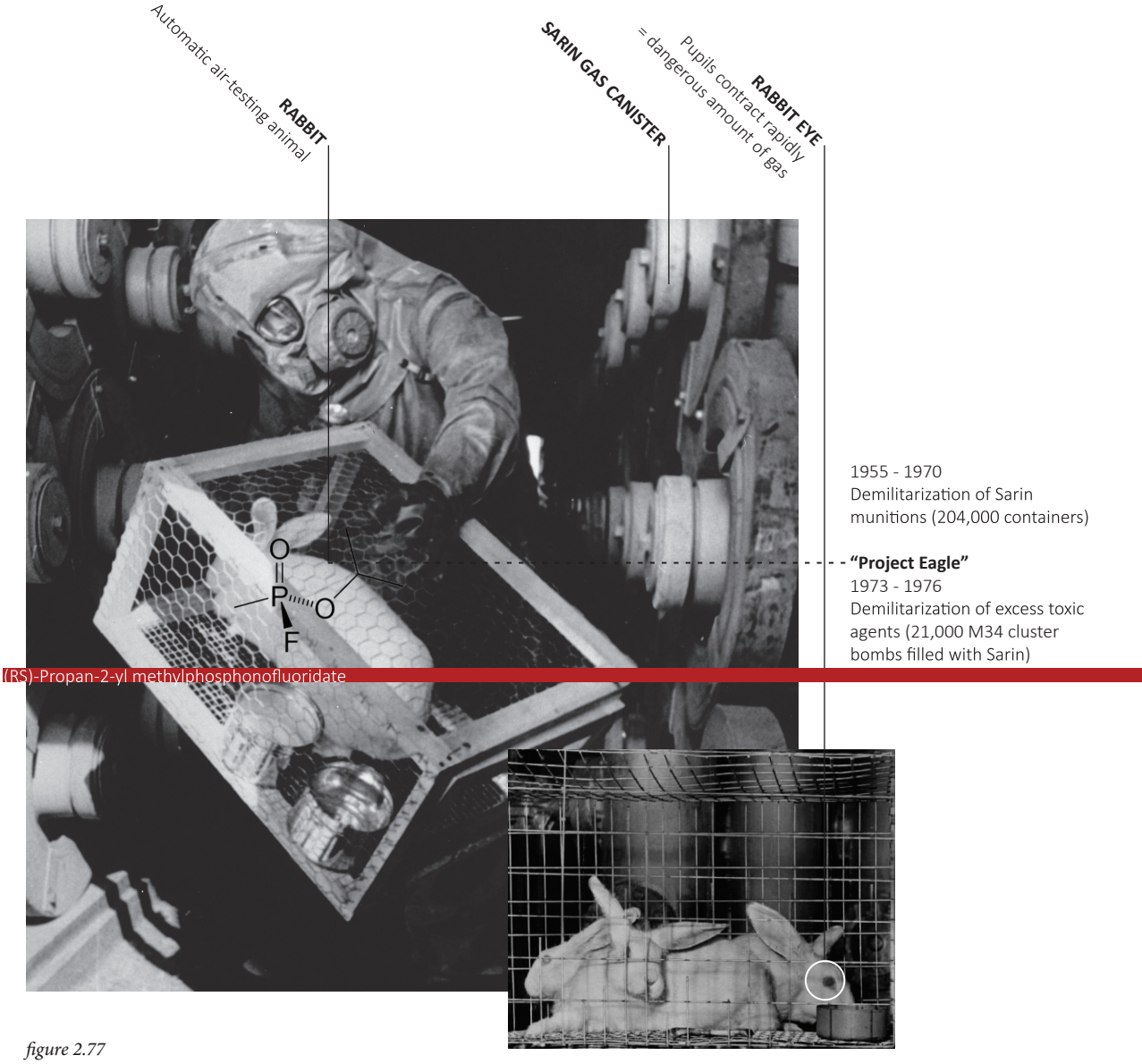
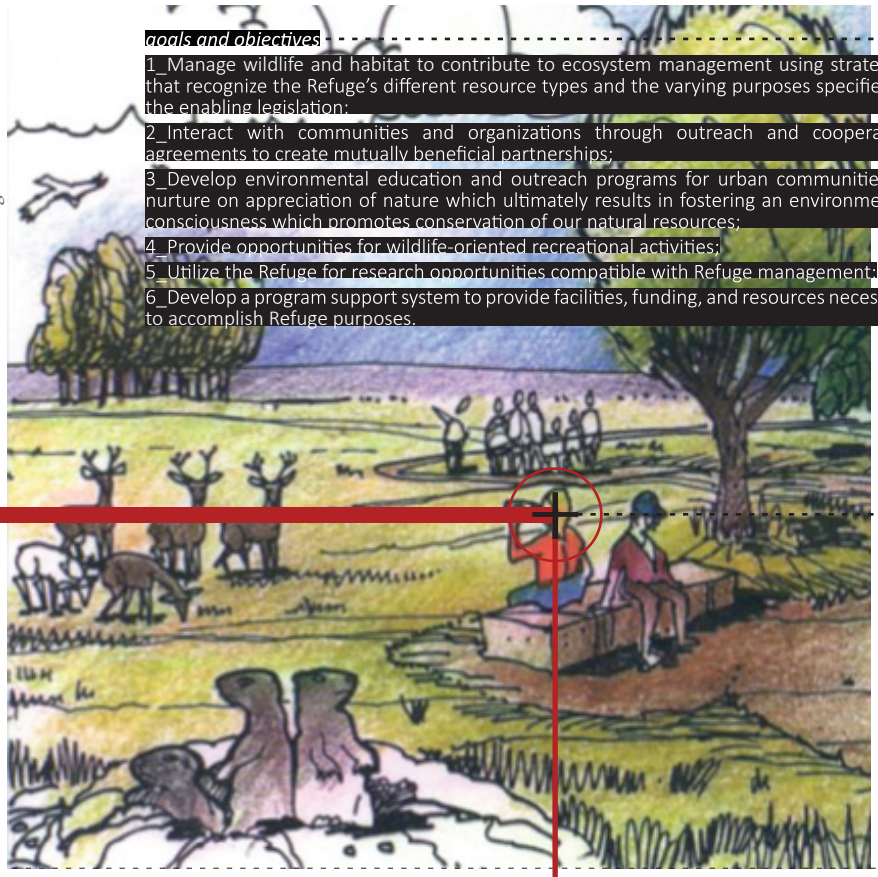


figure 2.77

DEMILITARIZATION

Following the closure of the arsenal in 1958, the army began to officially demilitarize their stock of munitions stored at the arsenal even though they began the process in 1947. Hundreds of thousands of munitions were demilitarized in this effort: 1958 - 1976, 88,000+ mustard filled munitions and 3,407 mustard-filled one-ton containers were incinerated; 1955 - 1970, 204,000+ Sarin-filled munitions were demilitarized; 1973 - 1976, 21,000+ Ms4 cluster bombs filled with Sarin were drained.[77] In order to ensure safety during this procedure, rabbits were used to measure Sarin leaks triggered by their pupils contracting rapidly.

77 Colorado Natural Resource Trustees, "2. Site Description," 2-9.



White-tailed Deer */Odocoileus virginianus/*

Black-tailed Prairie Dog */Cynomys ludovicianus/*

goals and objectives

1_Manage wildlife and habitat to contribute to ecosystem management using strategies that recognize the Refuge's different resource types and the varying purposes specified in the enabling legislation;

2_Interact with communities and organizations through outreach and cooperative agreements to create mutually beneficial partnerships;

3_Develop environmental education and outreach programs for urban communities to nurture on appreciation of nature which ultimately results in fostering an environmental consciousness which promotes conservation of our natural resources;

4_Provide opportunities for wildlife-oriented recreational activities;

5_Utilize the Refuge for research opportunities compatible with Refuge management;

6_Develop a program support system to provide facilities, funding, and resources necessary to accomplish Refuge purposes.

COMPREHENSIVE MANAGEMENT PLAN
1996
The initial proposed plan to transform the military site to an urban wildlife refuge.

DRAFT COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT
May 2015
An updated conservation plan to continue ecological preservation and improve access to the refuge.

0 m
Ground

REMEDIATION

Following the 1992 Rocky Mountain Arsenal National Wildlife Refuge Act, an extensive management plan was put forward to begin the transformation of the site from military use to an urban wildlife refuge under the jurisdiction of the U.S. Fish and Wildlife Service. The vision proposed through their illustrations show a utopia where animal and human would coexist in close quarters that erases all traces of previous military activity.

- 5 m +
Soil level

INTERVENTION

The site presents 2 major challenges:

i. dense surrounding urbanization;
ii. lack of existing resources.

The interventions center around an experience provided by the site in the form of workshops that engage the surrounding public akin to 'voluntourism'. However, instead of a long excursion as in the last case, it is more concentrated activities that last a few hours. A program is created that operates alongside the existing refuge programs *(figure 2.79, 2.80)*.

The site is zoned into sections derived from the existing road grid laid out by the military to allow a targeted approach. In the summer/fall months, prescribed burns are done on zones of the site to heal the grasslands ecosystem, weather permitting. When a burn is scheduled, an invitation is sent to the surrounding neighbourhoods to come watch. Smoke masks are distributed to onlookers to protect them from smoke inhalation and allow them to watch comfortably.

As well, a compost collection center is set up that allows the public to drop off their compost weekly, that is then distributed around the site in the form of an intervention.

3 types of interventions are proposed *(figure 2.81, 2.82, 2.83)*:

[TYP: SOIL]
[TYP: SALT]
[TYP : HUMAN]

Individually, they each target specific species needs. The first 2 speak to the animals' senses through its materiality and olfactory qualities. The third, however, is for the human. Given the urban situation of the site, providing a typology made for the human acknowledges their presence in the extended habitat. After all, they are a part of the ecosystem.

The proposed interventions seeks to repair and build up the ecological relationships of the site by emphasizing visitor (human) involvement. Following the landscape strategy proposed at the beginning of the chapter in which the monuments are built and then placed in the landscape, the Rocky Mountain Arsenal will grow ecologically over time *(figure 2.78)*.

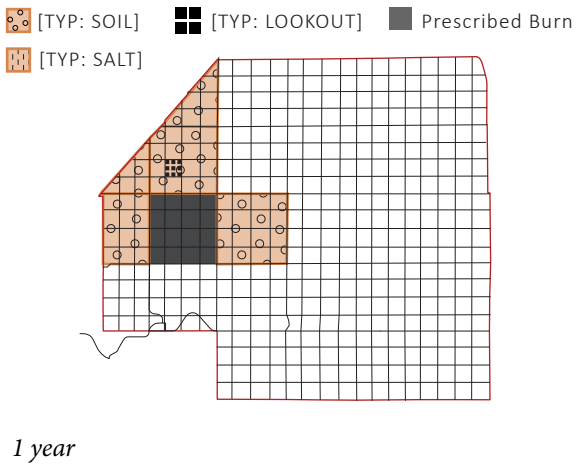


figure 2.78 Site growth over time.

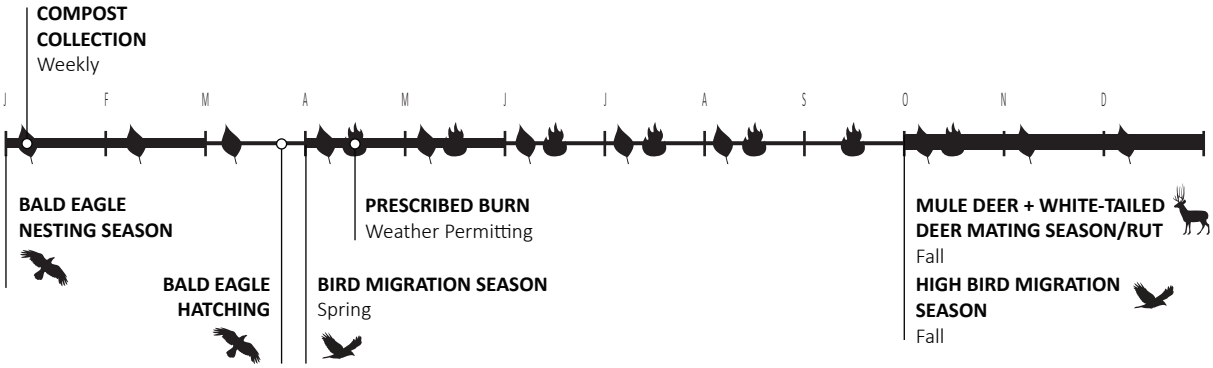


figure 2.79 Yearly Calendar.

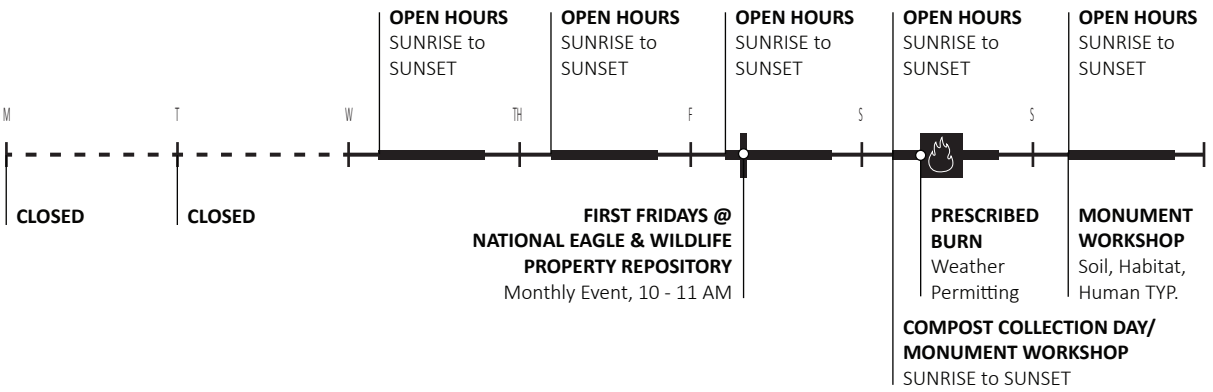
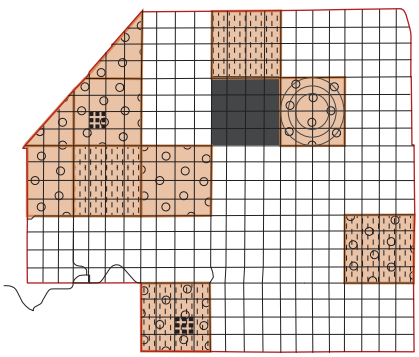
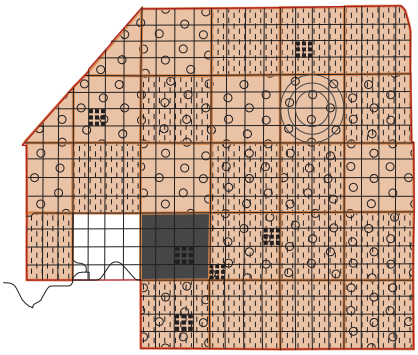


figure 2.80 Weekly Calendar.



5 year

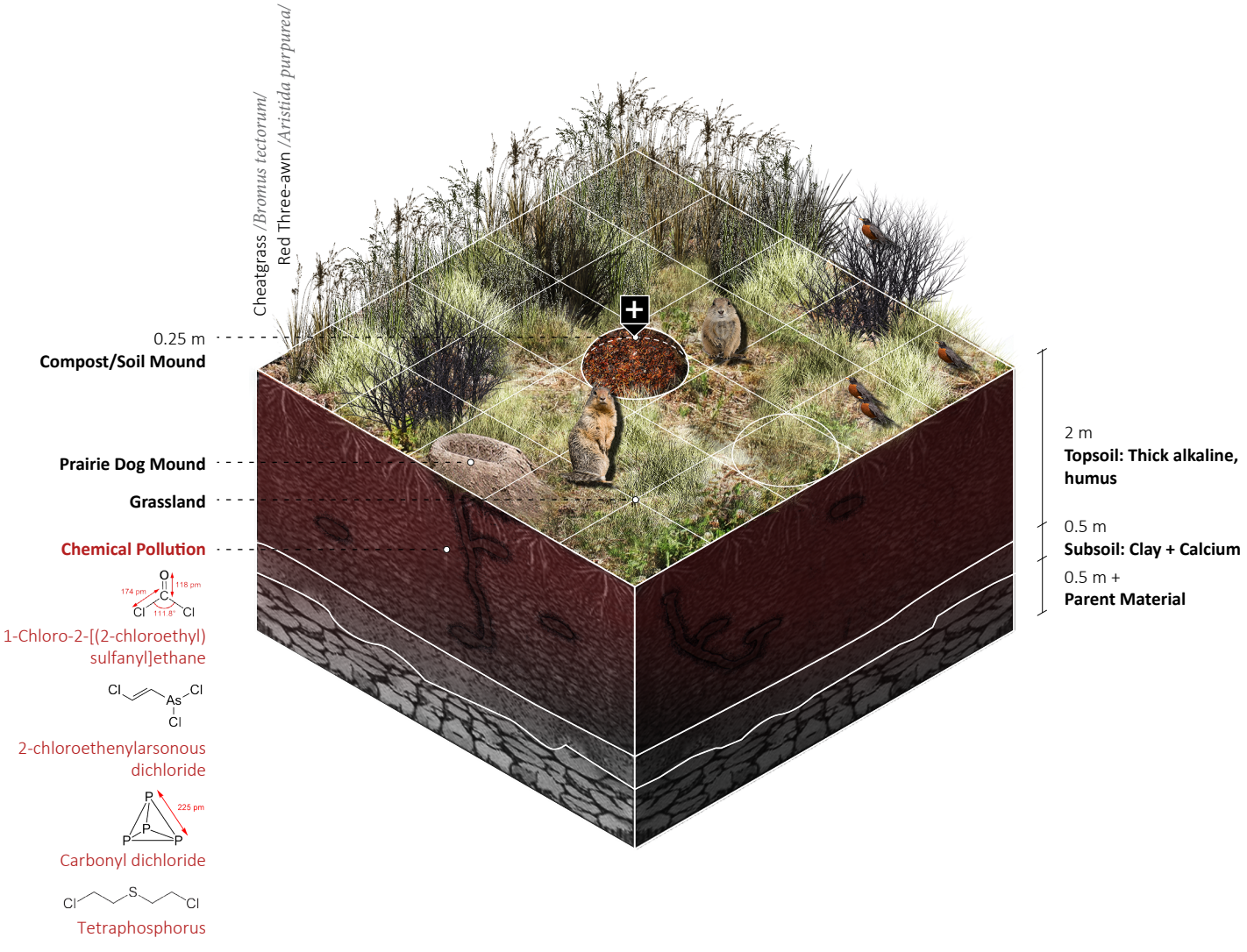


20 year

figure 2.81

TYP:SOIL

This typology tackles the chemical pollution left on the site due to the manufacturing of chemical weapons. Its material is compost crowdsourced from the surrounding neighbourhoods through a collection program set up at the refuge, introducing outside nutrition into the damaged soils. Through a workshop where locals can volunteer, the compost is mixed with local soils and seed plants into a mound that is then distributed around the site or is brought home by the volunteer. The inherent moisture and musk of the compost pile will attract scavengers that will help with the distribution of its latent nutrients and seeds around the island, and over time, the monuments will break down into the landscape as new vegetation. This, in turn, will attract many birds and small mammals as a source of shelter or food while slowly cleaning the soil of its pollutants. When installed around existing prairie dog colonies, the mounds act as additional topography to their benefit.



COLONIZERS:

VEGETATION

Perennial Grasses
Shrubland & Succulents
Wetland
Upland Trees & Shrubs
Weedy Forbs & Grasses

BIRDS

Mallard */Anas platyrhynchos/*
Gadwall */Anas strepera/*
American Wigeon */Anas Americana/*
Green-winged Teal */Anas carolinensis/*
Blue-winged Teal */Anas discors/*
Northern Shoveler */Anas clypeata/*
Northern Pintail */Anas acuta/*
Canvasback */Aythya valisineria/*
Redhead */Aythya americana/*
Ring-necked Duck */Aythya collaris/*
Common Merganser */Mergus merganser/*
Common Goldeneye */Bucephala clangula/*
Pied-billed Grebe */Podilymbus podiceps/*
Red-winged Black Bird */Agelaius phoeniceus/*
Western Meadowlark */Sturnella neglecta/*
Canada Goose */Branta canadensis/*
American Coot */Fulica americana/*
American Avocet */Recurvirostra americana/*
Killdeer */Charadrius vociferus/*
Rock Pigeon */Columba livia/*
Mourning Dove */Zenaida macroura/*
Burrowing Owl */Athene cunicularia/*
Downy Woodpecker */Picoides pubescens/*
Western Wood-Pewee */Contopus sordidulus/*
Western Kingbird */Tyrannus verticalis/*
Blue Jay */Cyanocitta cristata/*
Black-billed Magpie */Pica hudsonia/*
American Crow */Corvus brachyrhynchos/*
Horned Lark */Eremophila alpestris/*
Cliff Swallow */Petrochelidon pyrrhonota/*
Barn Swallow */Hirundo rustica/*
Black-capped Chickadee */Poecile atricapillus/*

MAMMALS

American Bison */Bison bison/*
Black-footed Ferret */Mustela nigripes/*
Black-tailed Prairie Dog */Mustela nigripes/*
Eastern Cottontail */Sylvilagus floridanus/*
Raccoon */Procyon lotor/*
White-tailed Deer */Odocoileus virginianus/*

MILITARY

Chemical Pollution

GROWTH:

1 MTH | **6 MTH** | **5 YR**

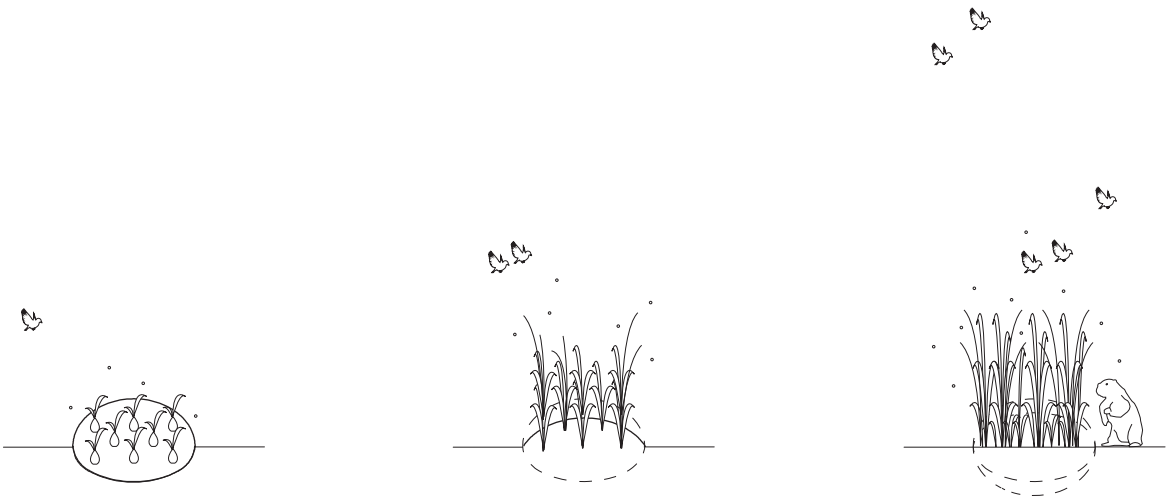
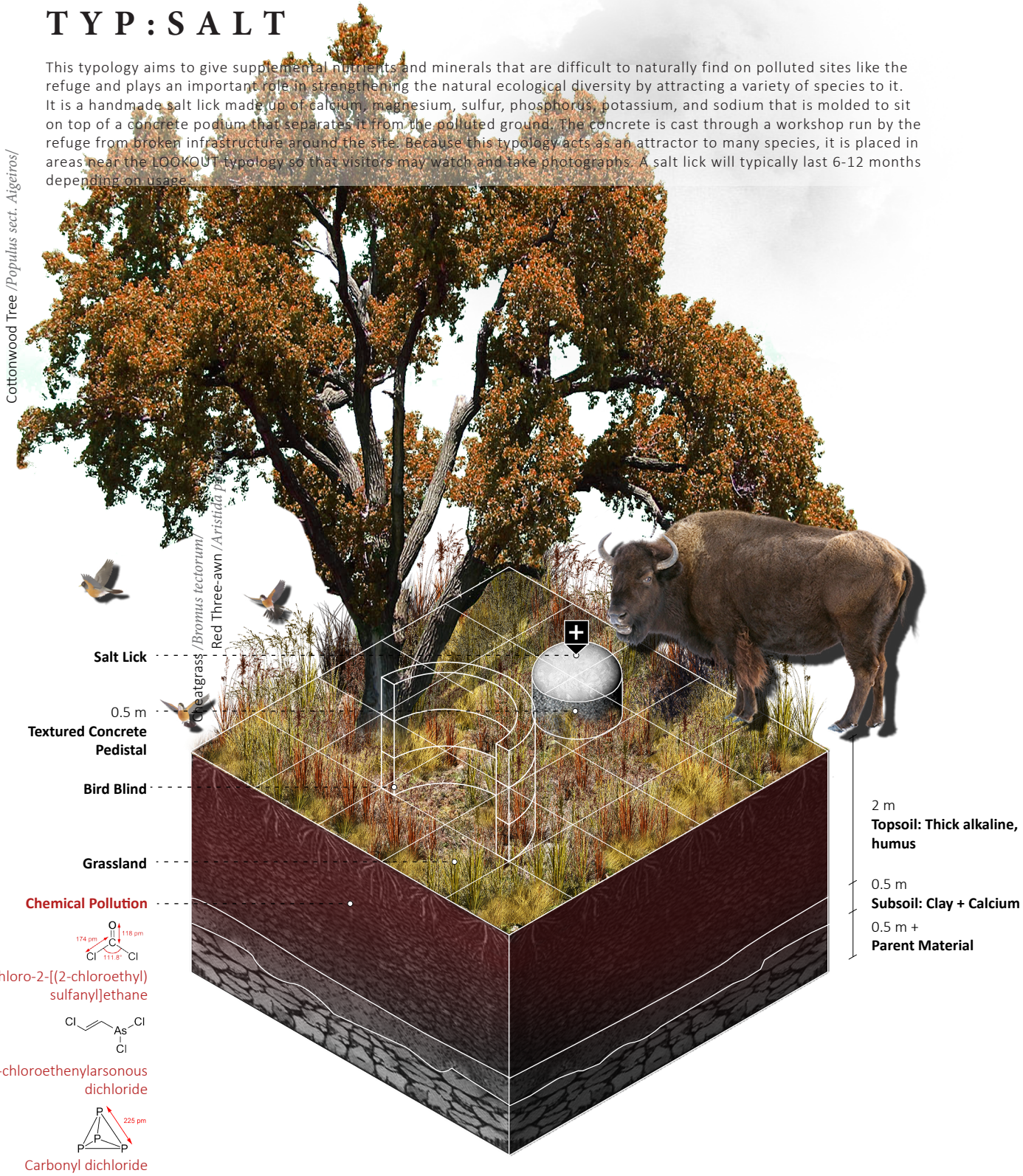


figure 2.82

TYP:SALT

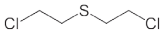
This typology aims to give supplemental nutrients and minerals that are difficult to naturally find on polluted sites like the refuge and plays an important role in strengthening the natural ecological diversity by attracting a variety of species to it. It is a handmade salt lick made up of calcium, magnesium, sulfur, phosphorus, potassium, and sodium that is molded to sit on top of a concrete podium that separates it from the polluted ground. The concrete is cast through a workshop run by the refuge from broken infrastructure around the site. Because this typology acts as an attractor to many species, it is placed in areas near the LOOKOUT typology so that visitors may watch and take photographs. A salt lick will typically last 6-12 months depending on usage.



1-Chloro-2-[(2-chloroethyl) sulfanyl]ethane

2-chloroethenylarsonous dichloride

Carbonyl dichloride



Tetraphosphorus

COLONIZERS:

+ MAMMALS

American Bison */Bison bison/*
Black-footed Ferret */Mustela nigripes/*
Black-tailed Prairie Dog */Mustela nigripes/*
Eastern Cottontail */Sylvilagus floridanus/*
Raccoon */Procyon lotor/*
White-tailed Deer */Odocoileus virginianus/*
Coyote */Cynomys ludovicianus/*

− MILITARY

Infrastructure (Pavement)

GROWTH:

1 MTH **6 MTH** **1 YR**

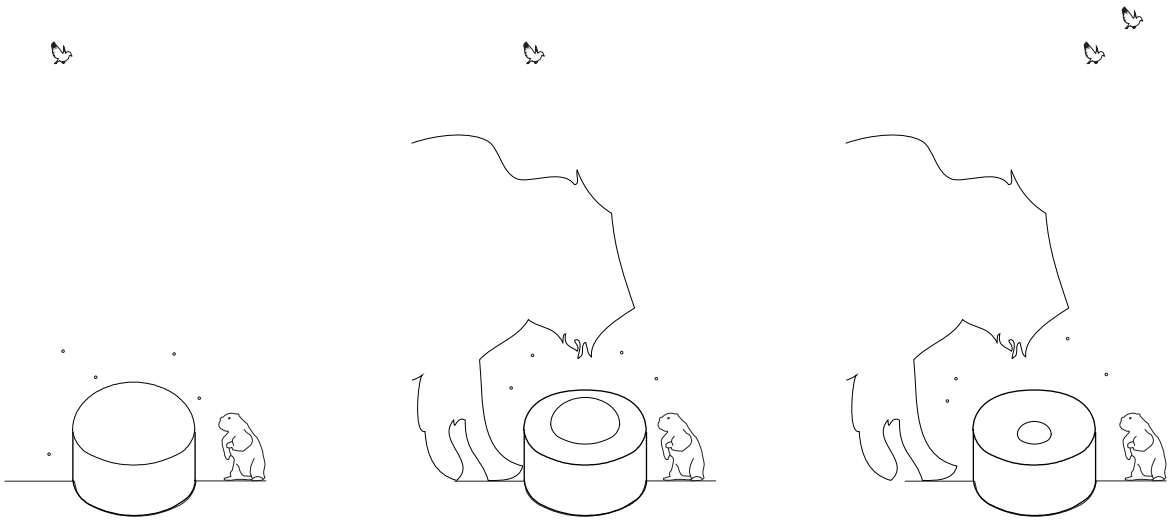
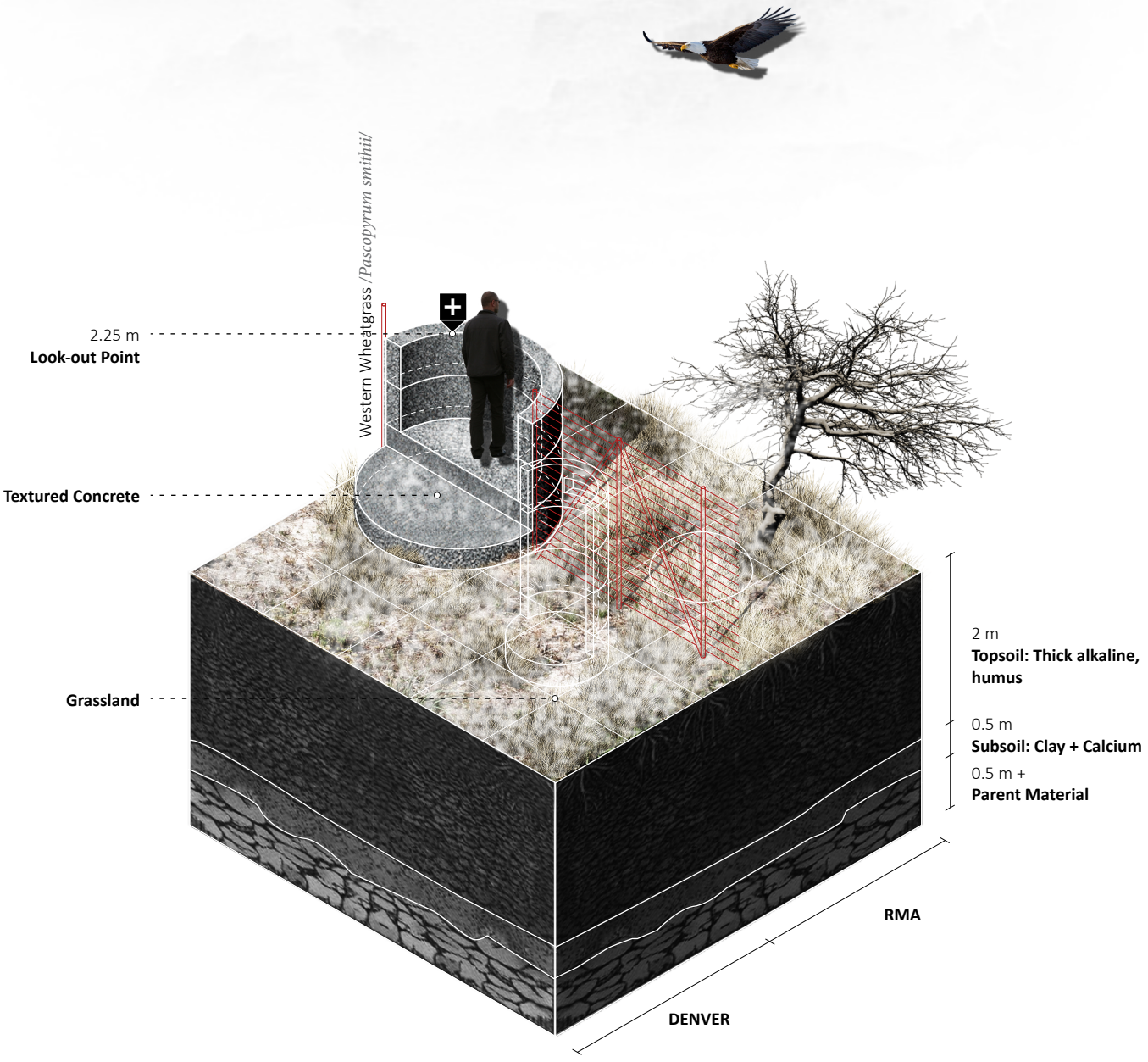


figure 2.83

TYP:HUMAN(LOOKOUT)

This typology aims to provide protection and gathering points for human visitors both in and around the perimeter of the site. There are 2 main uses: viewing decks placed outside the fence for visitors to gather whenever there is a prescribed burn, and walls scattered around the site that act as bird blinds to allow visitors to view the animals without disturbing them. The placement of the second type can be teamed up with the SALT and SOIL typology to encourage a concentration of species. These structures are made of a rough concrete that is cast in modules through a workshop run by the refuge from broken infrastructure around the site, and comes in many shapes depending on need. Their stark contrast to the landscape indicates their role as a place to gather on the site, and draws people together.



COLONIZERS:

MAMMALS

Human Being */Homo sapiens/*

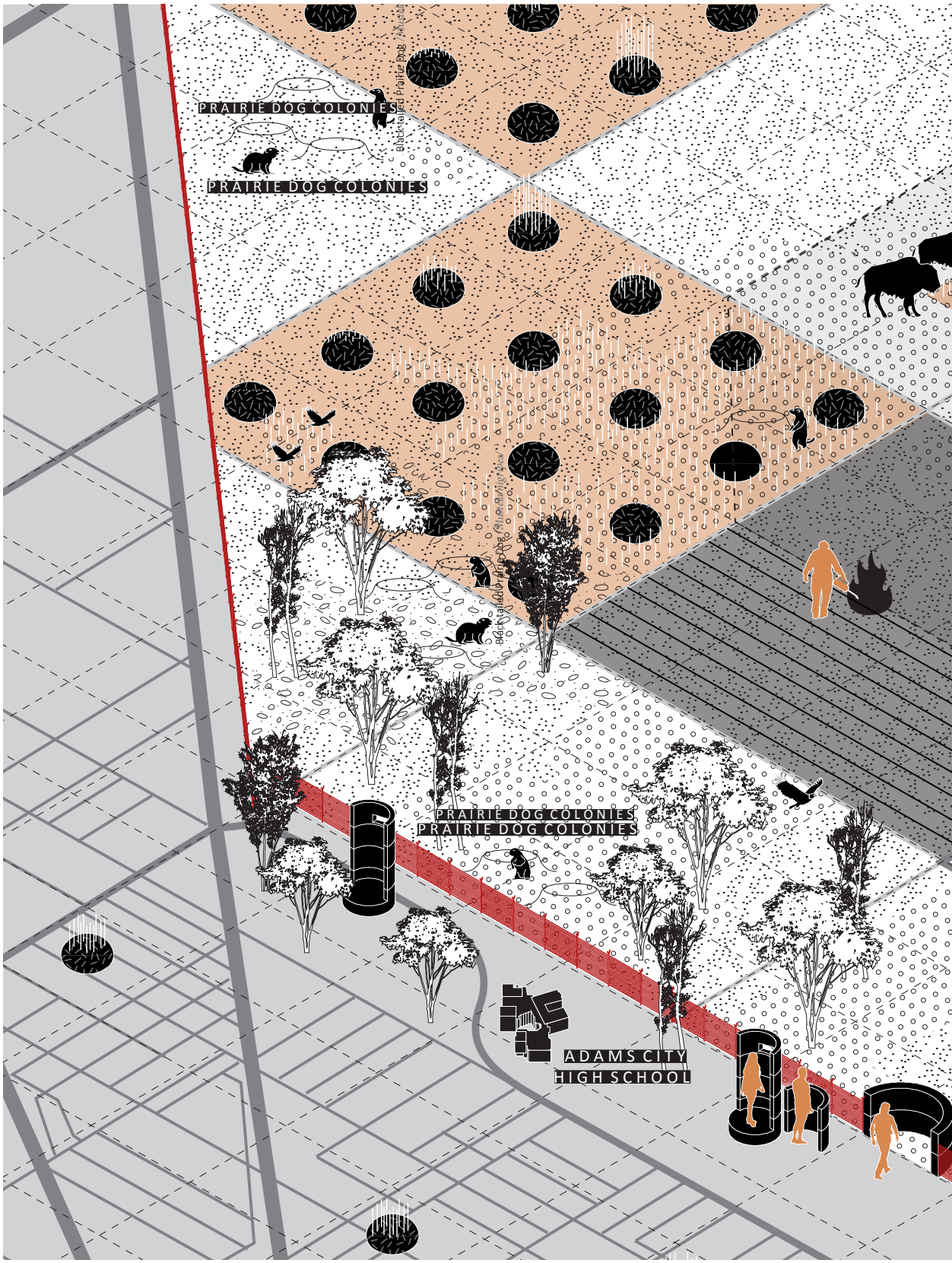
MILITARY

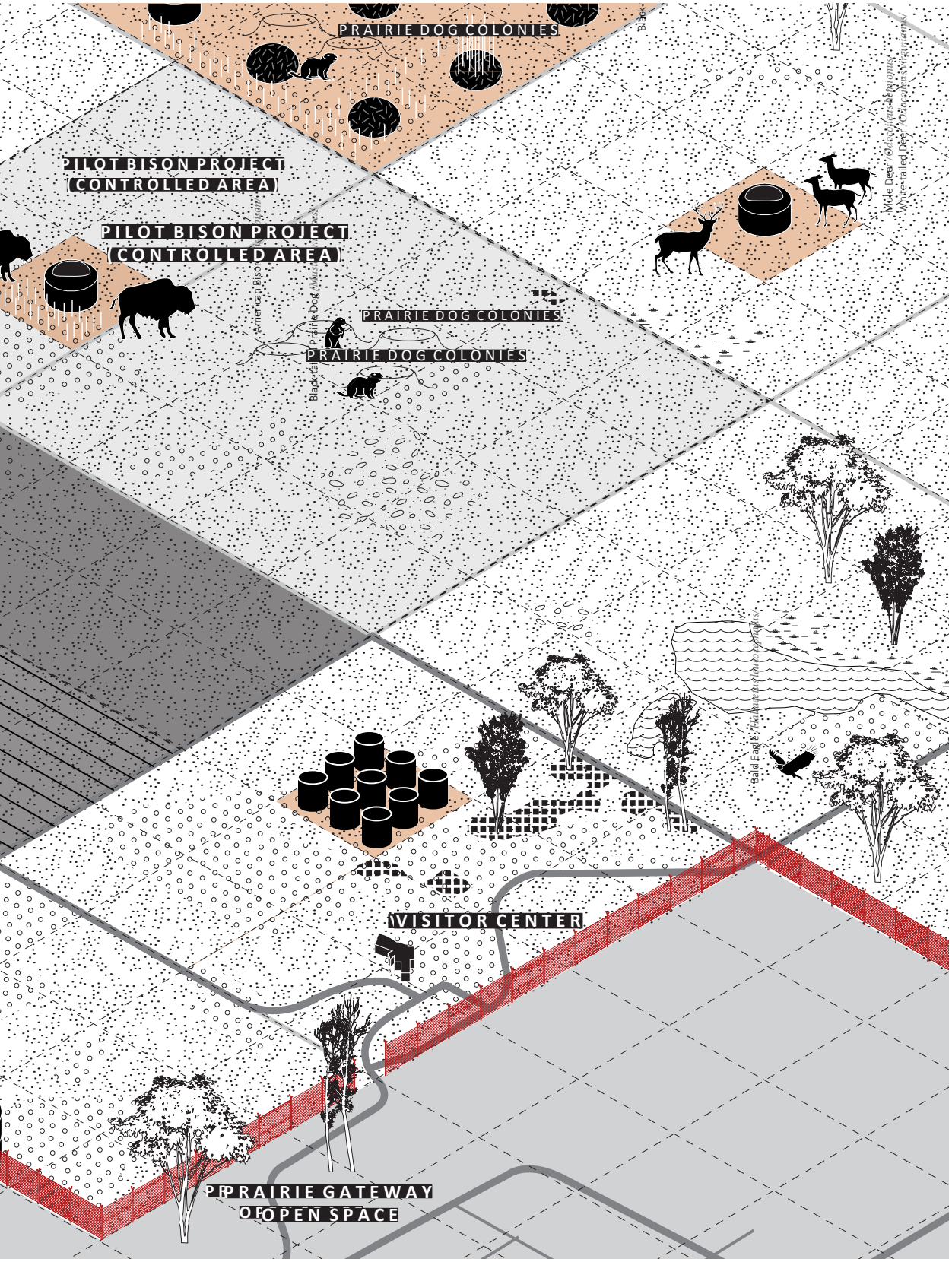
Infrastructure (Fence)
Infrastructure (Pavement)

GROWTH:

N/A - This typology does not change over time, it will only weather.

figure 2.84 Site Axonometric.





LEGEND

- Weedy Forbs and Grasses
- Wetlands
- Shrubland/ Succulents
- Upland Trees
- Native Perennial Grasses
- Water
- Suburb

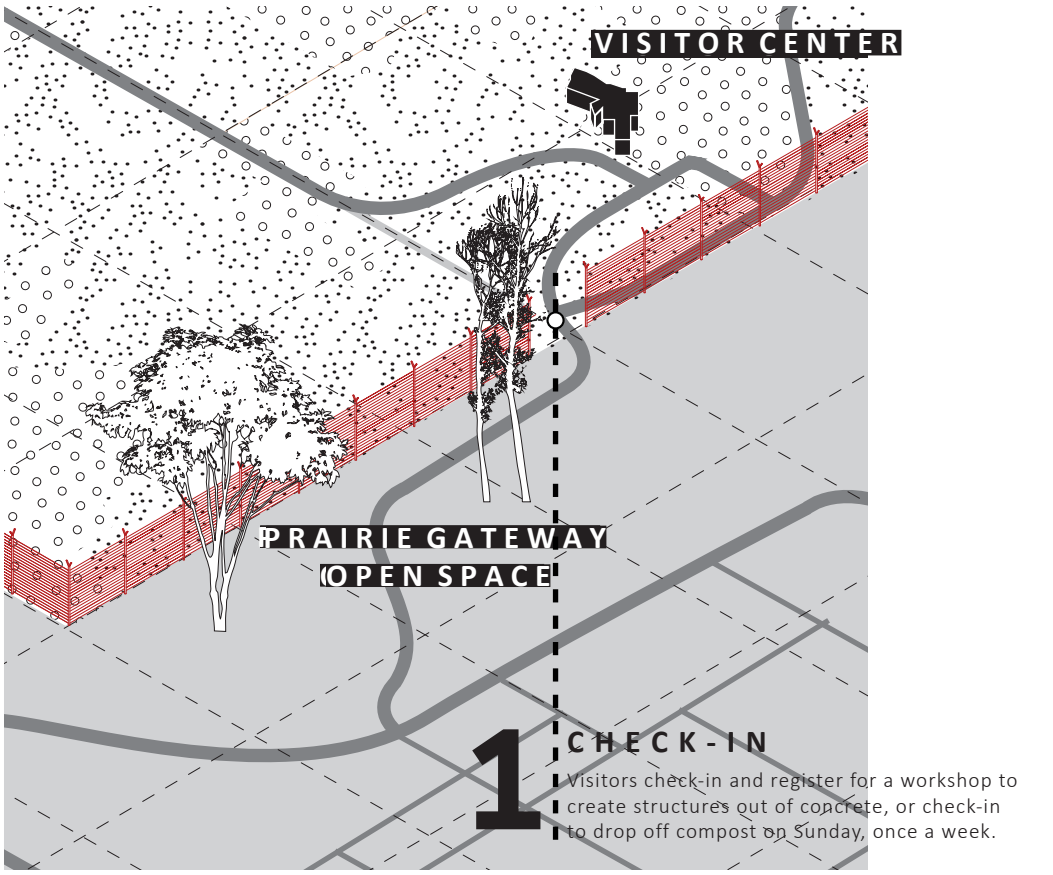

VISITOR CENTER
PRAIRIE GATEWAY
OPEN SPACE
1
CHECK-IN
Visitors check-in and register for a workshop to create structures out of concrete, or check-in to drop off compost on Sunday, once a week.

figure 2.85

2 CASTING/CREATING

Visitors drop off compost and can create mounds [TYP: SOIL] to distribute around the site on a hike, or taken home to distribute in their gardens. Here, they may also cast a concrete intervention [TYP: SALT] [TYP: HUMAN].

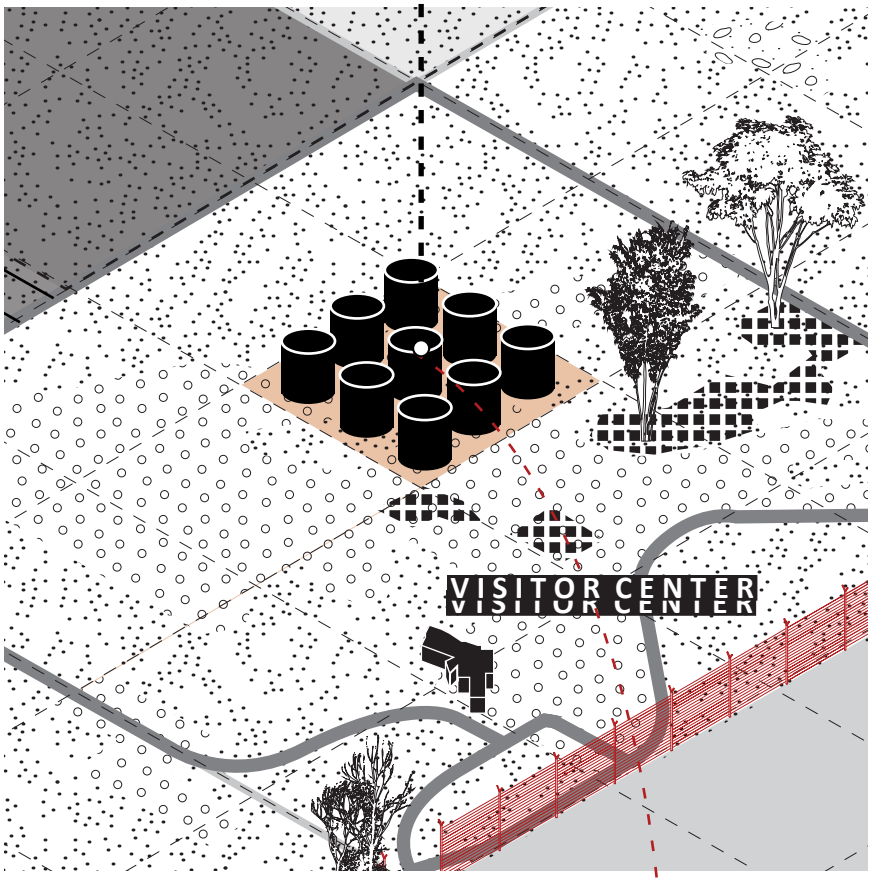
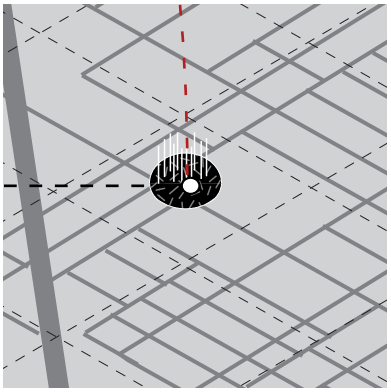


figure 2.86

2.1 SUBURB

Visitors can take home their compost mounds [TYP: SOIL] and place in their backyard, acting as an extension of the site.



Black-tailed Prairie Dog /*Mustela nigripes*/

3.1

INTERVENTION [TYP: SOIL]

After 6-12 months, compost/soil mounds are created and spread out around the site. These mounds create a hilly-terrain in areas frequented by black-tailed prairie dogs to provide extra terrain and look-out points for the colony in blocks designated by the park.

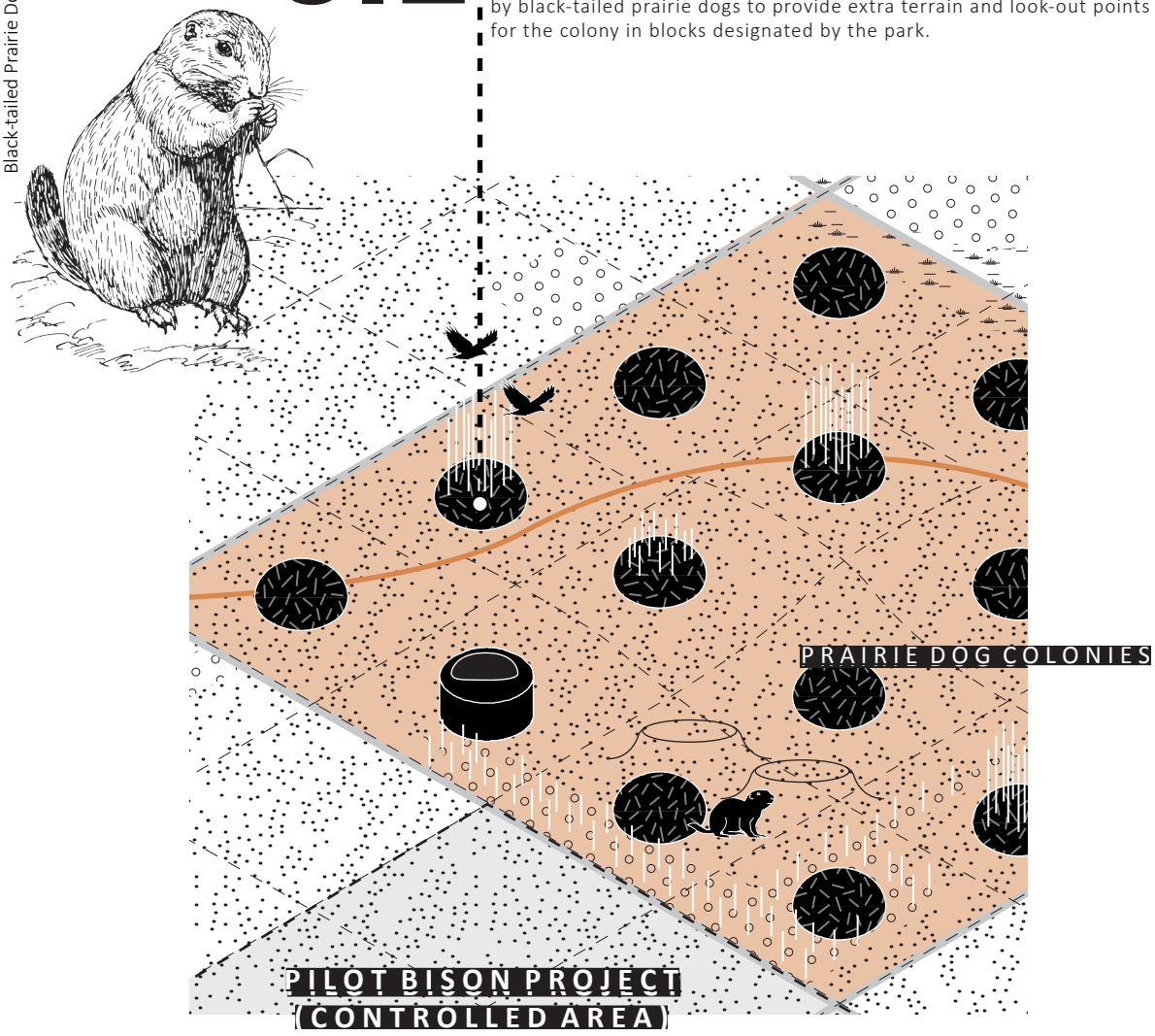


figure 2.87

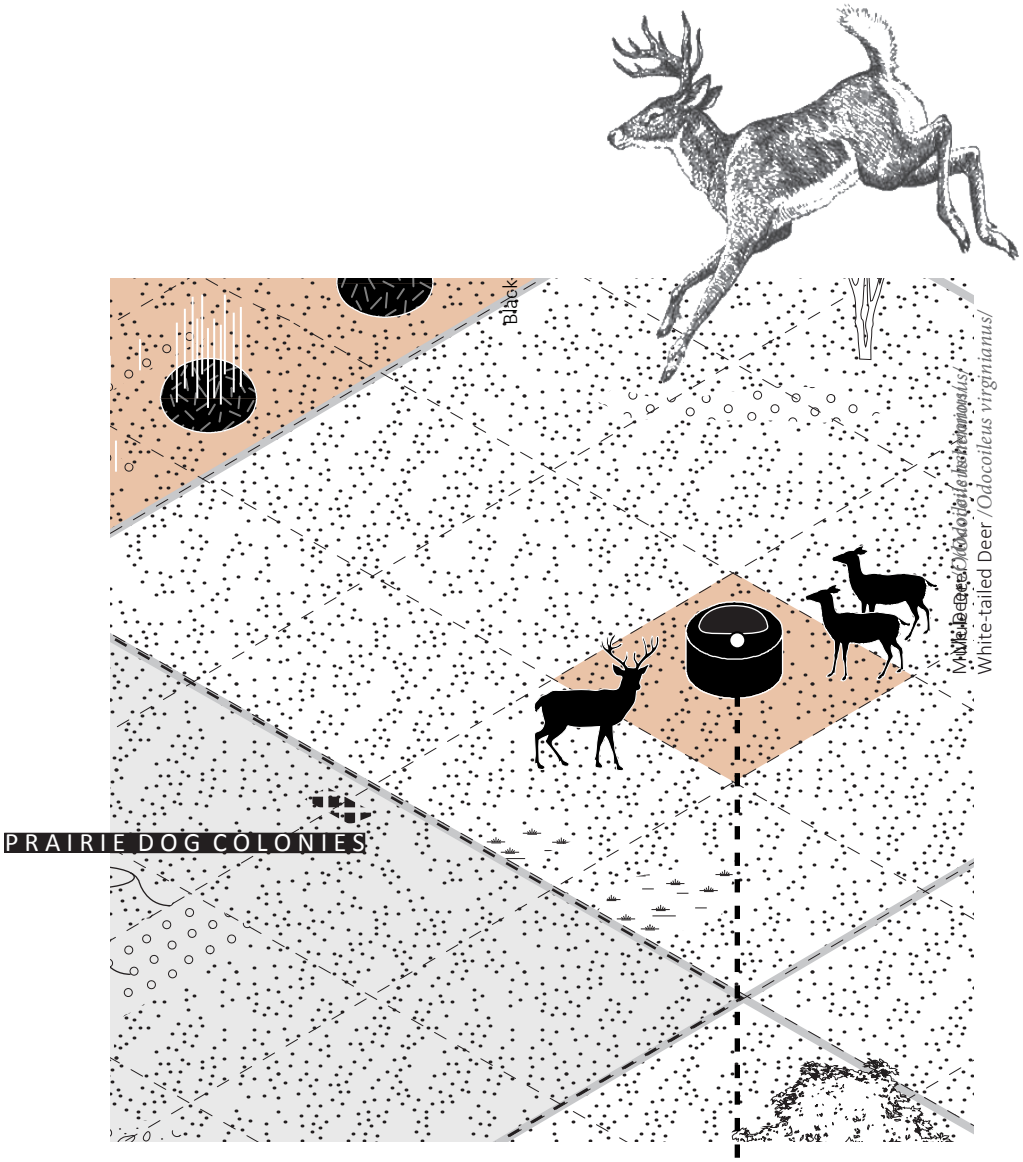


figure 2.88

3.2

INTERVENTION
[TYP: SALT]

After casting in a workshop, visitors distribute the bird blinds/lookout posts in areas near ecological intensities. This typology works well in conjunction with the other typologies: [TYP:SOIL] [TYP: SALT].

3.3

INTERVENTION [TYP: SOIL]

After 6-12 months, compost/soil mounds are created and spread out around the site. These mounds create a hilly-terrain in areas frequented by black-tailed prairie dogs to provide extra terrain and look-out points for the colony in blocks designated by the park.

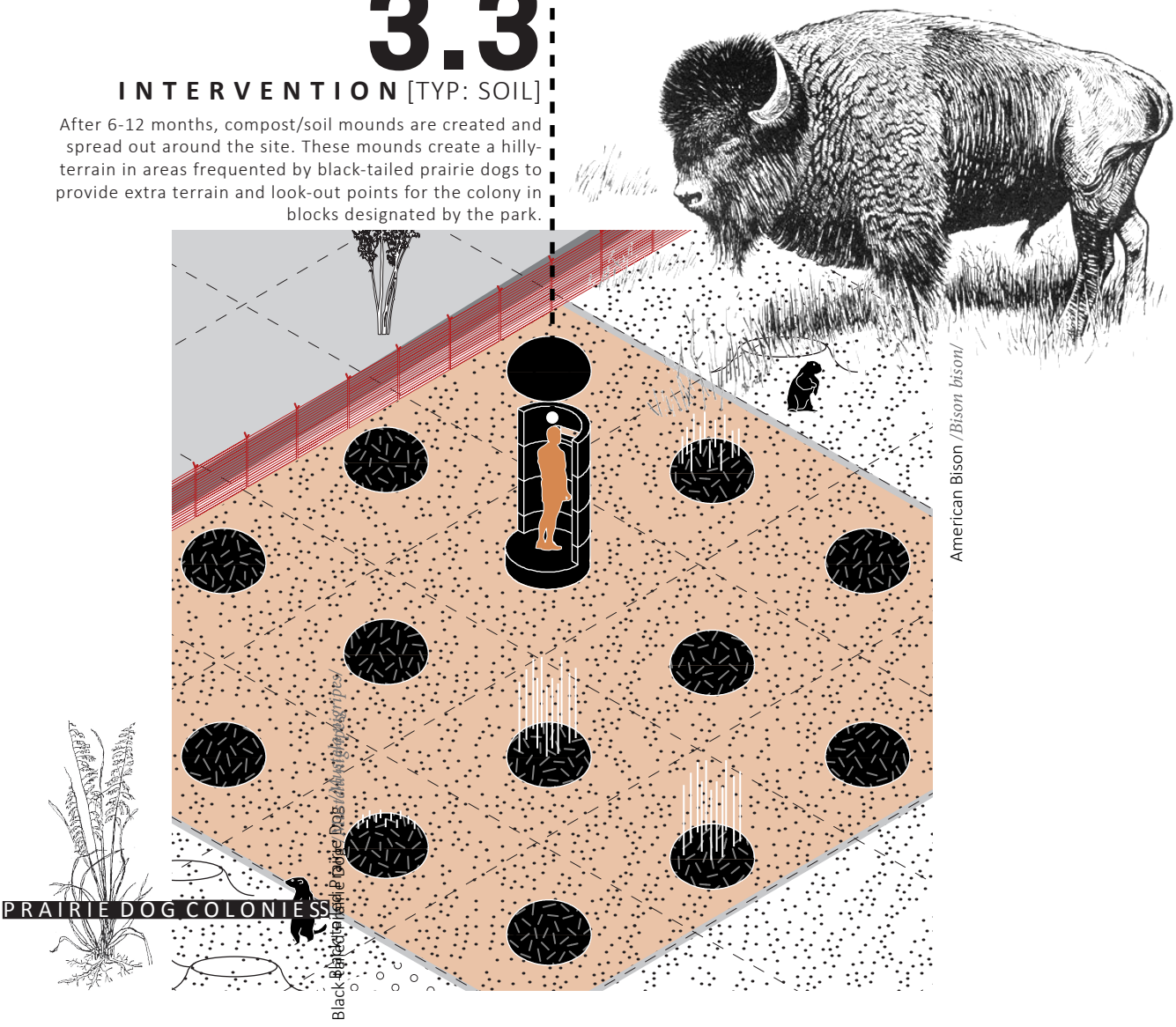


figure 2.89

4

BURN

When weather permits, the refuge performs a prescribed burn on a zoned section of the site. Residents in surrounding cities are invited to come watch.

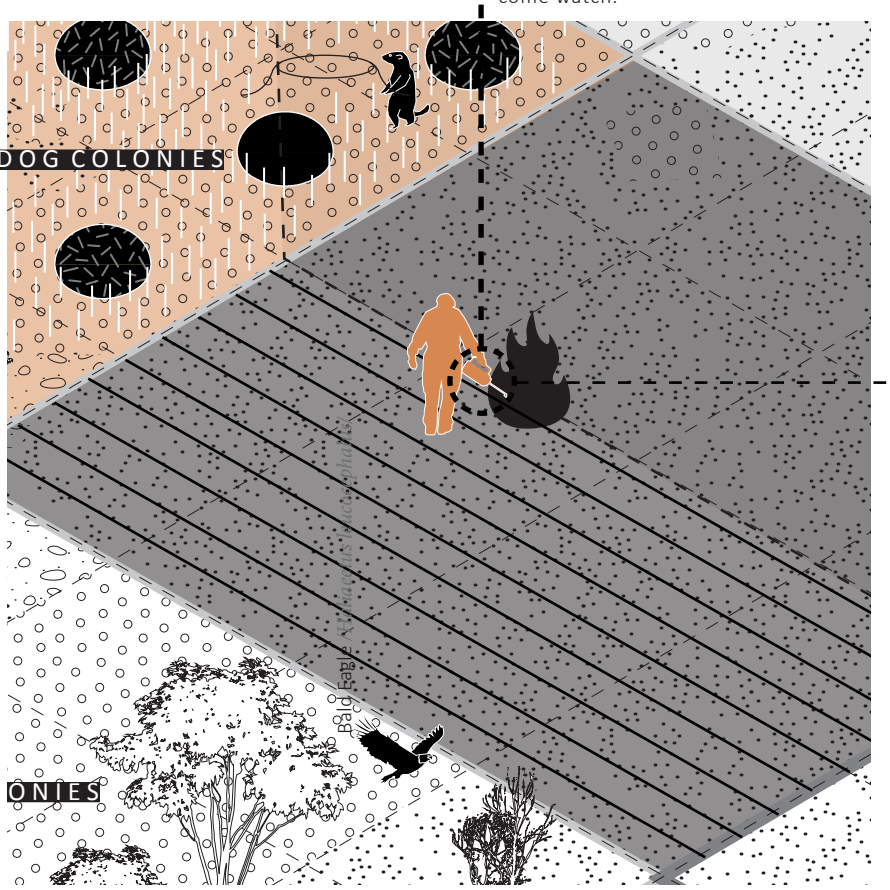
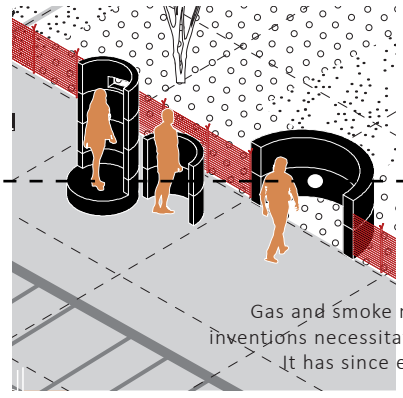


figure 2.90

4.1

TOURIST

When a prescribed burn is conducted, an invite is issued to the surrounding counties to come watch the event.



3M 6000-series

Gas and smoke masks were military inventions necessitated by World War I. It has since entered civilian use.

ECOSYSTEM-AFTER

The added interventions create new nodes in the cyborganic ecosystem and integrate within existing relationships. Seen in orange, the aggregated monuments create new concentrations of ecological activity that advocate for further colonization.

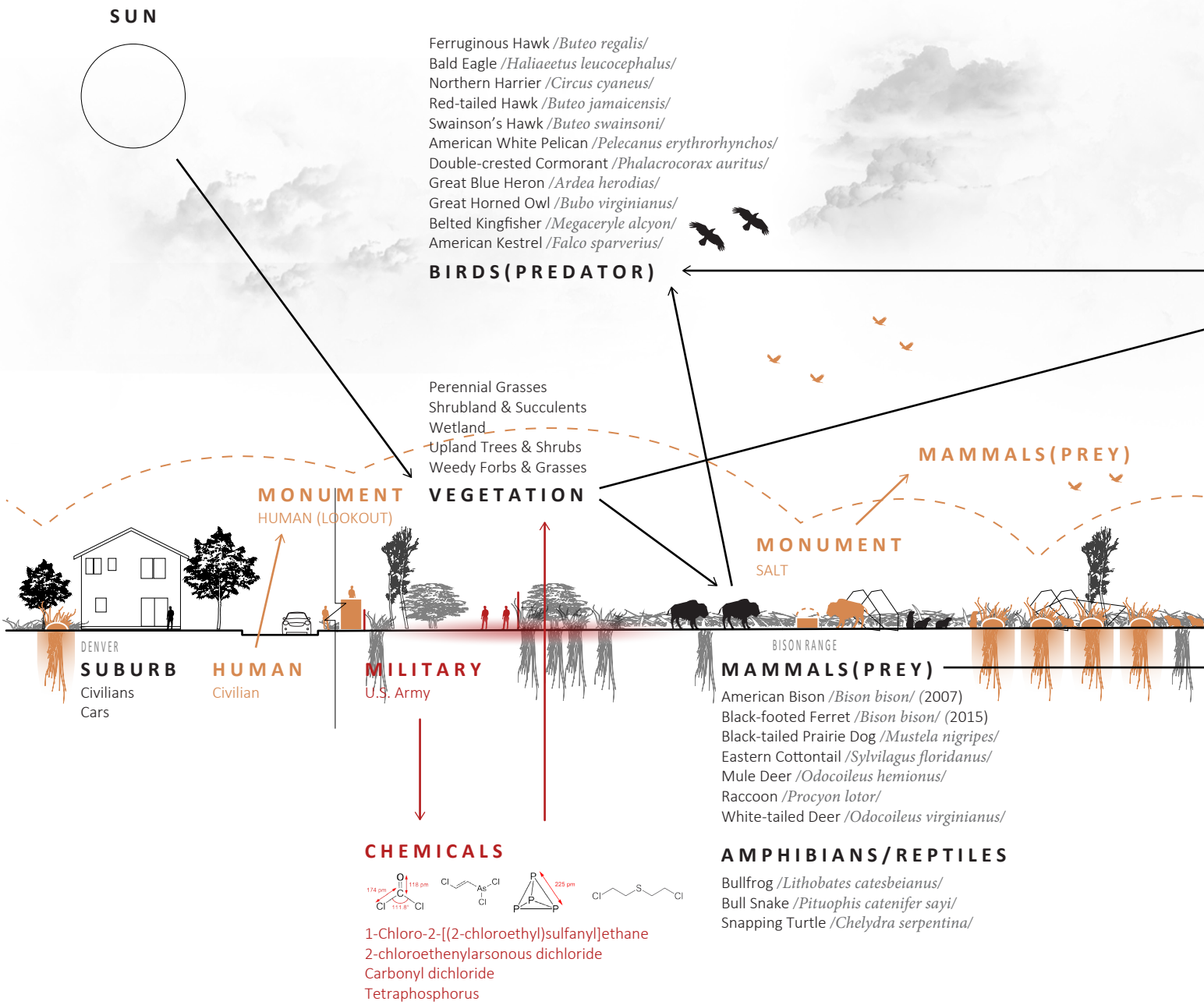
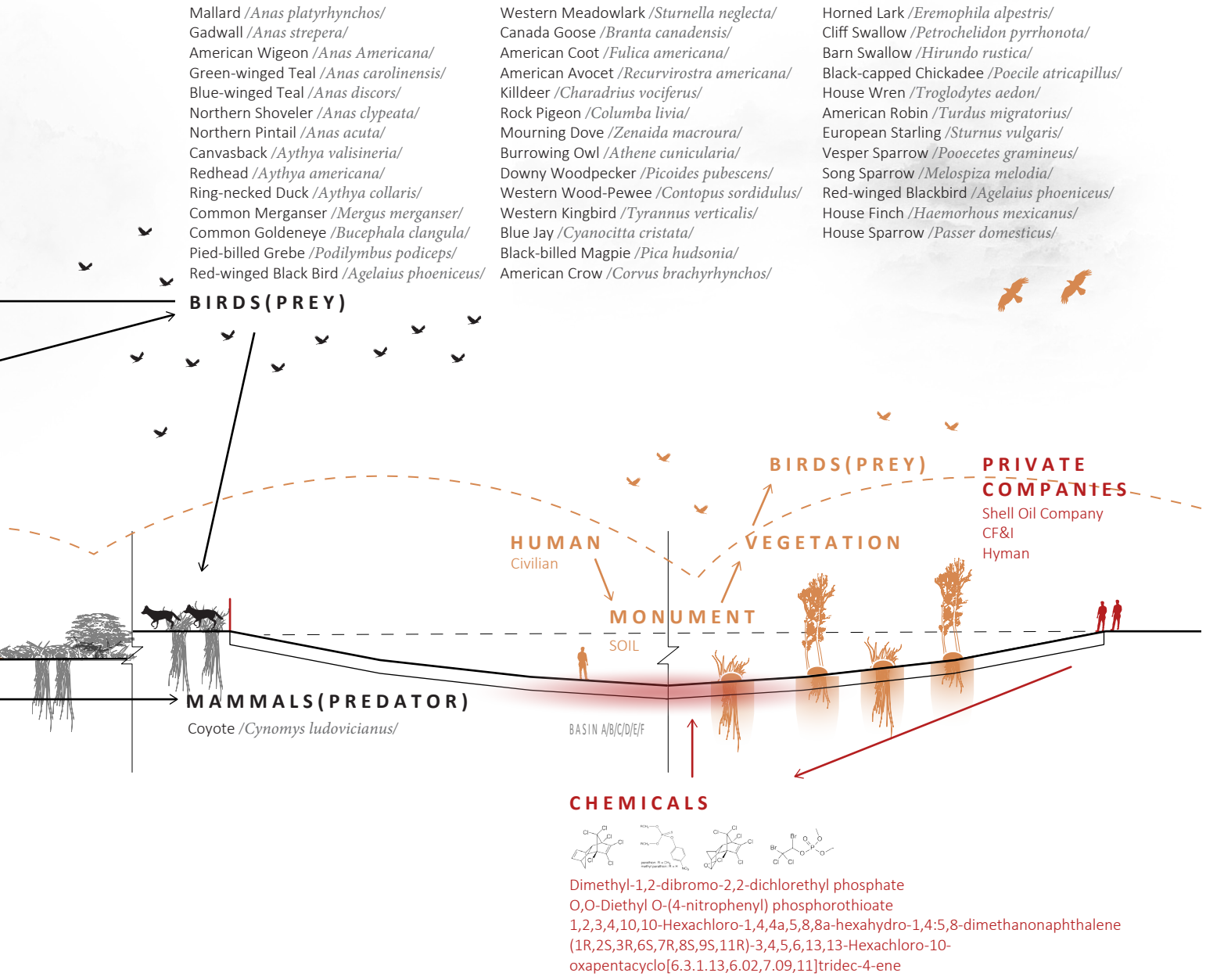


figure 2.91 Ecological Section (after).



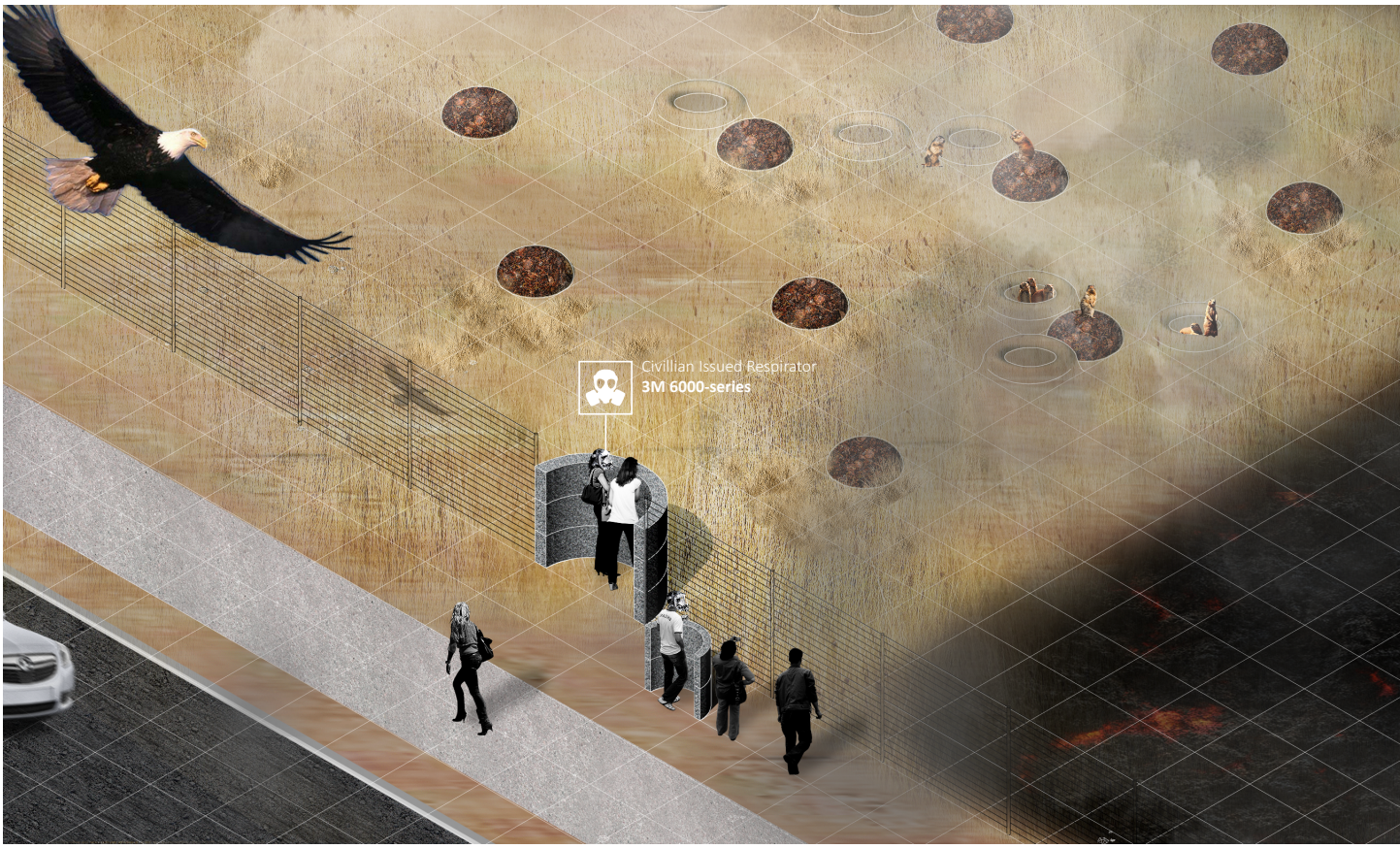
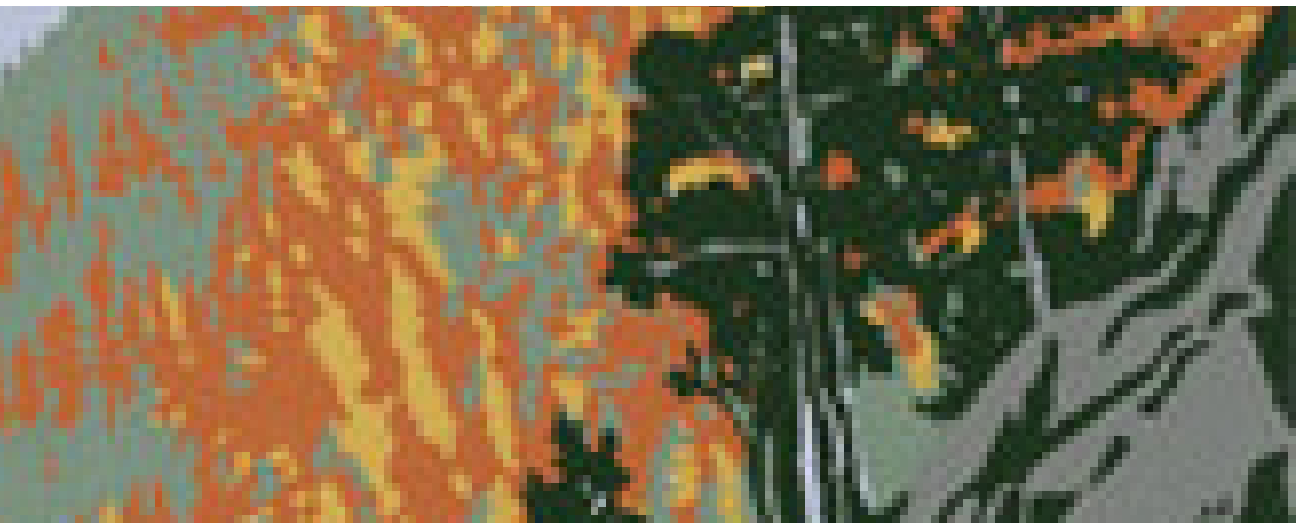


figure 2.92 Render.


Prescribed Burn Tools
Drip Torch

CONCLUSION



CONCLUSION

Since we human beings are accustomed to dragging our existences wearily from one goal to another, we are convinced that animals live in the same way. That is a fundamental mistake that has led research to this point down the wrong path.[78]

Jakob von Uexkull
A Foray into the Worlds of Animals and Humans

It is undeniable that we have entered a new era in our Earth's history. Anthropogenic issues such as climate change and the rising sea levels are prominent threats to our very existence as humans. But there is also a much smaller voice in this that has been overlooked. That is the voice of the animal. Scientists understand and have documented the threat that these issues have on the other 8.7 million species on our planet, but does the average layperson? The animals' position in our society as the "other" makes it easy to rationalize their experience. Especially because signs of progress, progress in the form of agricultural development, resource extraction, and everything else that supports our way of life happen out of sight to the masses. As the old adage says, out of sight, out of mind.

This is also a time where political normalcy is being shaken and unprecedented decisions are being made about American lands in the name of said progress. But the presence of these cyborg landscapes offer an opportunity for a more complex understanding of nature aside from the romantic and the capitalistic; that encompass both human and non-human species, that understand parks and other territories as part of a continuum of natural and highly man-made environments. Therefore we cannot ignore what potential the cyborg landscapes hold: a second chance for Nature. And so, we must acknowledge their current state and understand that "pure nature" no longer exists and, as Timothy Luke argues, to look past that façade:

> *Whatever Nature once was cannot be regained, because it existed as a set of forces, settings, or conditions when the human, or, more pertinently, the humachinic, influences upon planetary ecologies were very low impact. … Take for example, a stunning image of the Great Smokie Mountains in a contemporary 'nature photograph' [figure 3.94]. The blue sky framing such Sierra Club ideographs of Nature on a sunny day has holes in its ozone, the clouds carry acidic stack residues, the rock cliffs are dissolving*

figure 3.93 (Previous) Vintage poster for the Great Smoky Mountains National Park.

78 Uexkull, *A Foray Into the Worlds of Animals and Humans*, 53.

figure 3.94 Dave Allen Photography, ***Great Smoky Mountains at sunrise***.

away in acid rains, the forest is disappearing in timber clear-cuts, and the soils are contaminated with heavy-metal poisons. It looks 'natural', but it is being denaturalized by vast industrial metabolisms even as environmental pressure groups cling to such photographic myths as utopian images of a place and a moment outside of our cyborganic-humachinic history.[79]

The Rocky Mountain Arsenal Wildlife Refuge is already following a remediation and development plan that began in 1996, acknowledged in the previous chapter. Their mission

is to enhance and sustain fish and wildlife and their habitat and to provide the public with meaningful opportunities to experience nature near an urban area. In addition, the Refuge will provide urban dwellers with the opportunity to see a variety of wildlife close to home.[80]

The vision it has set out is one that exemplifies this myth of a pure "nature": it reinforces the problematic assumption that a designed, clean nature is ideal; that the cyborg can be fixed. This is evident in their promotional images that show an idyllic relationship with nature – sun shining, birds chirping, with little to no acknowledgement of previous contamination. But we must look beyond that.

A new approach is needed towards these cyborg landscapes. Their very nature, Haraway argues, "is that [cyborgs] are the illegitimate offspring of militarism and patriarchal capitalism. … But illegitimate offspring are often exceedingly unfaithful to their origins. Their fathers, after all, are inessential."[81] Ergo this new approach must carve a new position for them in our landscape imagination separate (but not ignoring) their past. If we understand the fate of the Rocky Mountain Arsenal as an unusual outcome in the life cycle of these cyborg landscapes, their futures are uncertain. But even action in preserving these sites remains problematic, as stated earlier. The United States military does not often handle clean-up efforts, often defaulting to the EPA due to lack of allocated funds.[82] Therefore, the thesis does not rely on their interest. Instead, the choice to rely on human engagement via "ecotourism/ voluntourism" comes as both a fiscally pragmatic decision as well as symbolic. To re-quote Gregory Bateson: "if an organism … sets to work with a focus on its own survival[,] … its 'progress' ends up with a destroyed environment. If the organism ends up destroying its environment, it has in fact destroyed itself."[83]

The proposed alternate life for these damaged cyborg landscapes as a 21st century posthumanist national park system may seem an odd coupling between tourism *(figure 3.95)* and the military *(figure 3.96)*. "Contemporary tourism evolved from heroic travel of the past[.] ... Since the First World War, the lure of travel has been built directly into the seductive language of military recruitment."[84] In fact, the history of these new proposed parks may become the very catalyst that drives their success because "[w]ar is also a tourist destination. ... [T]hese sites appeal to another touristic desire - a desire for the extreme".[85] The allure of these landscapes are embedded within their own messy and disfigured past and may find their way into contemporary discourse by their newfound ecological importance.

79 Luke, "At the end of Nature: cyborgs, 'humachines', and environments in postmodernity," 1377.
80 U.S. Fish and Wildlife Service, *Rocky Mountain Arsenal National Wildlife Refuge Comprehensive Management Plan*, (Commerce City, 1996), 45.
81 Wegman Jr. and Bailey, "The Challenge of Cleaning up Military Wastes When U.S. Bases are Closed," 868.
82 Haraway, "A Cyborg Manifesto," 293.
83 Bateson, "Form, Substance, and Difference," 457.
84 Diller + Scofidio, "Introduction," 24.
85 Ibid, 25.

figure 3.95 Department of the Interior, National Park Service, ***Grand Canyon National Park, a free government service***, 1938.

figure 3.96 James Henry Daugherty, ***Give the World the Once over in the United States Navy***, 1919.

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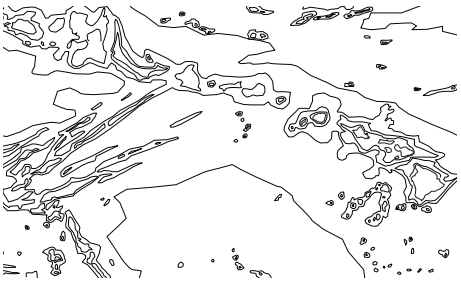
APPENDIX-A
JOHNSTON ATOLL LEGENDS

figure 3.97 Context Plan.

LANDFORMS

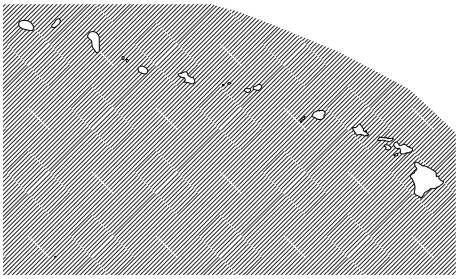


> BATHYMETRY

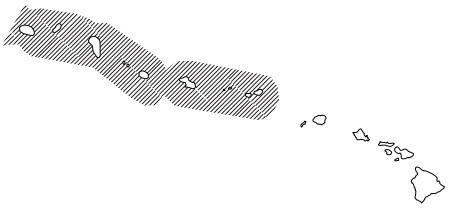
> LANDFORM

ANIMAL ACTIVITY

> BIODIVERSITY HOTSPOT



> BIODIVERSITY HOTSPOT (OUTER LIMIT)

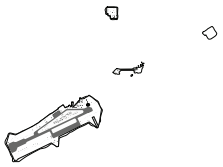


> NORTHWESTERN HAWAIIAN ISLANDS CORAL REEF ECOSYSTEM RESERVE AREA

figure 3.98 Site Plan.

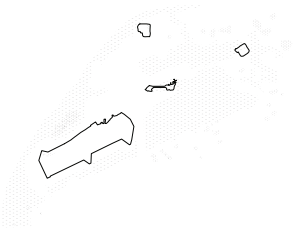
LANDFORMS

> BATHYMETRY

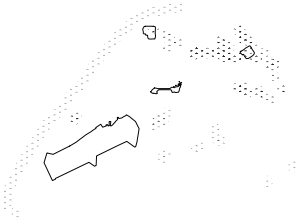


> LANDFORM

VEGETATION

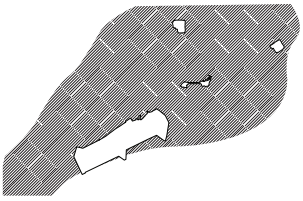


> SUBMERGED CORAL REEF



> CORAL REEF

ANIMAL ACTIVITY

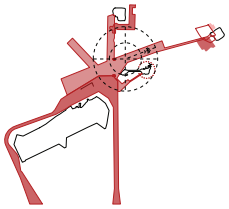


> MARINE LIFE / FISH

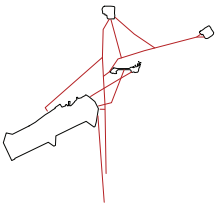
> SEA TURTLE

> BIRD

MILITARY ACTIVITY



> CORAL DREDGING



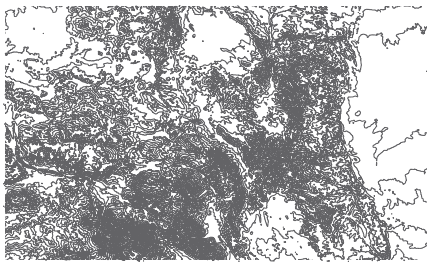
> SUBMARINE CABLE

> GROUND POLLUTION

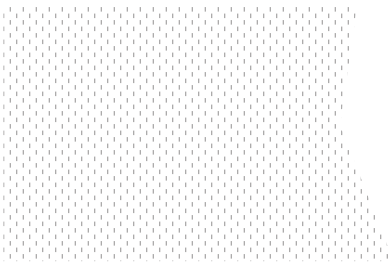
APPENDIX-B
ROCKY MOUNTAIN ARSENAL LEGENDS

figure 3.99 Context Plan.

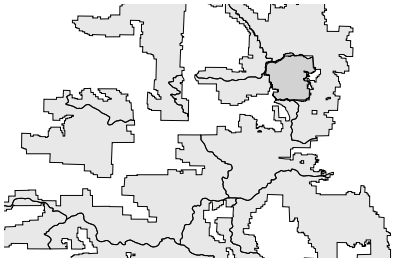
LANDFORMS



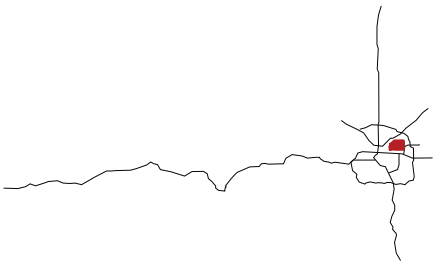
> TOPOGRAPHY



> FORESTED MOUNTAIN AREA



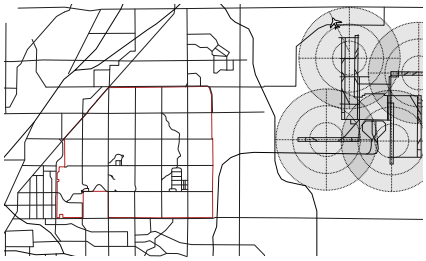
> NATIONAL PARK/NATIONAL FOREST



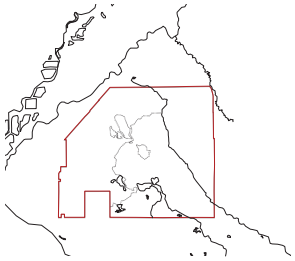
> ROAD/HWY

figure 3.100 Site Plan.

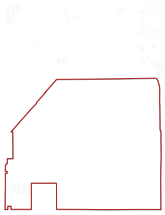
CONTEXT



> ROADS/HWY (PLANE NOISE)

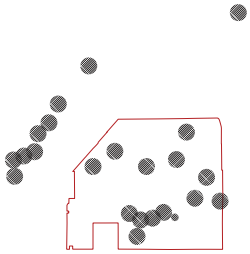


> WATER FEATURES

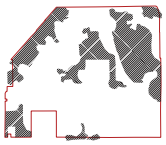


> PARKS

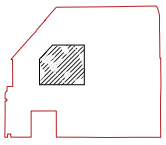
ANIMAL ACTIVITY



> BIRD

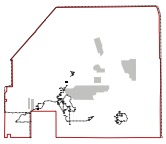


> PRAIRIE DOG/GROUND ANIMAL

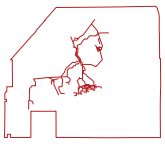


> BISON RANGE

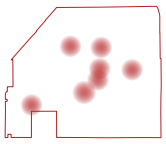
MILITARY ACTIVITY



> EXISTING/DEMOLISHED BUILDINGS



> UNDERGROUND PIPE SYSTEM



> GROUND POLLUTION