DIVERSE ECONOMIES AND SOCIAL INFRASTRUCTURES OF THE CITY

Research Group

The Labour of Ecology

How can diverse economies perspective of ecological labour support the struggles around and restoration of the ecosystems? A study of Hounslow Heath Park.

Radhika Chagane

UCA Canterbury
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Contents

Abstract

This paper focuses on various ways labour within ecology can be portrayed using the study of Hounslow Heath. Along with the perspective of diverse economies that explores important elements within society that are oppressed and mistreated. The thesis is structured in two main components. The first explores different theories that relate to labour and value, with the analysis on how these hypothetical ideas did not consider labours surrounding ecology. This investigation will then continue to apply these concepts to the current scenarios and relationships within the ecosystem. Leading to the origins of the notion of superiority on ecological labours, through religion and science, and how their varied ideologies lead to the evolution of exploitation through technology. The second half will focus on Hounslow heath and the application of the investigated theories and research within the space. Other methodologies used are random sampling, statistical analysis, photography, and observation drawings, to encapsulate various forms of data illustrating human interactions, ecological labours, and diverse organisms that play the role of labourers. The objective of this thesis is to embody the inequality the biotic and abiotic community face through human actions, as well as present the importance of ecological labours for survival and stability.

Figure 1: *Hounslow Heath (2020)*

Introduction

Living in a world surrounded by the subtleties of "diverse economies" that continue to exist through invisibility and neglect. We take for granted, the small infra ordinary ecological spaces and their labours. Hounslow Heath, A large multipurpose green area is a prime example of this. During the pandemic, this space has become the heart of Hounslow. Growing up near Hounslow Heath I was always captivated by its beauty. However, as it became popular within the society, its reputation deteriorated. Human actions left the misconception that space, is a matter of concern. The large landscape is secluded leaving people to mistreat and increase crime rates. This overpowers nature's function of nurturing and bringing stability into the community.

The labours of humans is considered a work-pay job, that has helped the progression of the planet. However, it has also contributed to the destruction of wildlife and the ecosystem, by manipulation of the resources, using the labour from ecology. This raises questions about our survival. How is this dying, adamant planet still functioning and maintaining its living environment? Where does this labour come from that ensures the health of all these cohabiting communities?

To bring these issues to light throughout this thesis, I will focus on the relationships between the apparent and hidden types of ecological labours, and their beneficial application to humans. Along with an analysis of value and labour from controversial theorists and authors. How its application to the modern world introduces us to the current ecological issues as well as the negative origination of our views on environmental labour. I intend to apply these theories to Hounslow Heath and explore the ecological labours through visual investigation and statical analysis. To present the labours that are unappreciated and dismissed as mundane, while supporting the perspective of the struggling environment.

Figure 2: *Diverse Economies Iceberg (2013)*

Chapter One: Evaluating Theories of Value and Labour in Relation to Ecology

To understand the concept of ecological labours and its significance. I will be exploring various theories on labour and value along with how they intersect with the economy and ecology. When acknowledging labour, we knowingly or unknowingly appreciate it as a human task; disregarding the struggles of other labours that we see as ordinary. This ideology can be a failure towards the insight of all other perspectives alive, active, and working on this planet. Those that do not have a voice, operate in an unusual yet remarkable way to constantly remind us of their presence. One of the most undervalued labour within a diverse economy is the labour of ecology.

The vision of "the economy as singularly capitalist", (Gibson-Graham et al 2017:10) with the involvement of only specific activities, shows domination and ignorance towards "other possible worlds already all around us" (Gibson-Graham et al 2017:10). This is because it is known as a minuscule segment or as Gibson and Graham describes it, only the "tip of this diverse economy iceberg" (Gibson-Graham et al 2017:10). They explain how there are a variety of buried economies that are compact in an iceberg with the top of the activities being valued just because they are visible (See Fig. 2). They also expand on how the activities below the waterline do not exist momentarily. But are fabricated with the collaboration of a range of practices working collectively, making it just as significant. By understanding the concept of a diverse economy, we can "involve a wide range of people, processes, sites, and relationships" (Gibson-Graham et al 2017:10) that are usually masked with mainstream economics. Bringing "diverse economic practices into visibility" (Gibson-Graham et al 2017:30), we give them opportunities to show that they are an asset. This directs humans to become caring agents for restoration through the establishment, that the neglected labour of anything functioning, can enhance the concern of inequality within society (Fitz and Krasny, 2019:16).

This theory of diverse economy, can be closely connected to a reframing of the idea of labour within ecology? How the fostered and nurtured processes of the natural environment, is exploited and then abandoned. Like many that suffer inequality in the economy, "ecological labour is feminized, racialized, and naturalized" (DiNovelli-Lang and Hébert, 2018), causing their labour to be devalued. Justifying how "diverse economies, different forms of labour and ecology are interconnected" (Fitz and Krasny, 2019:14). By using resources and forcefully take advantage of the labour from our ecosystem, we leave a pathway of problems. Staying oblivious to the fact that what we call a smart modern way of productivity is what ecology would perceive as a struggle for survival.

Marx controversial theory on labour and value show the struggles between the workers and capitalist. With an in depth "analysis of capitalism to explain the uneven development that was increasingly evident" (Gibson and Dombroski, 2020:5). This theory focuses on the relationship between time and labour and its correlation with value or price leading to this concept of "socially necessary labour" time (Marx, 2008:12). Marx's theory suggests that just because the same labour takes longer does not mean its price should increase. However, the theory focuses on a "perfect" capitalist world using human labour; not considering multiple potential obstacles.

Marx then explains how the production of profit would fall within capitalism leaving the capitalist to exploit workers, extracting "surplus value" (Taylor, 1996). He uses the term "labour-power" (Marx, 2008:17) to describe what is sold to the capitalist by the workers, focusing mainly on human labour having the capacity for transformation. This labour-power is assessed in two ways "The first is measured by the clock, the other by the scales" (Marx, 2008:17) and "the exchange-value of labour-power" (Marx, 2008:37) from the capitalist to the worker is known as wage. This concept looks at quantitative methods in an ideal setting. But the question remains how do we determine the value of that exact labour?

When looking at the theory of labour in various contexts, Marx had not "considered the full range of social relationships involved in the production of commodities" (Bollier, 2016:16). This is shown when we try to apply his theory to understand the value of labour within ecology and expresses his notion of reciprocating the value of labour through money. The amount of labour that is produced within ecology cannot be quantified, as there are so many factors and participants to consider. The ecosystem works as a group, with an estimated number of 15 million species (ScienceDaily, 2020), which collaborate to build a healthy environment. Identifying every single type of activity, and species that take part in them is nearly impossible. Many of these species and labours are not even discovered yet. And with the theory of evolution, the labours in the biological community are constantly changing to survive (See Fig. 3). Many of these variations are influenced naturally and from human impact. Therefore, it is impractical to survey every single space, species, and labour in the world to determine a numerical answer. "value is not fixed and static, but something that emerges naturally as living entities interact" (Bollier, 2016:16).

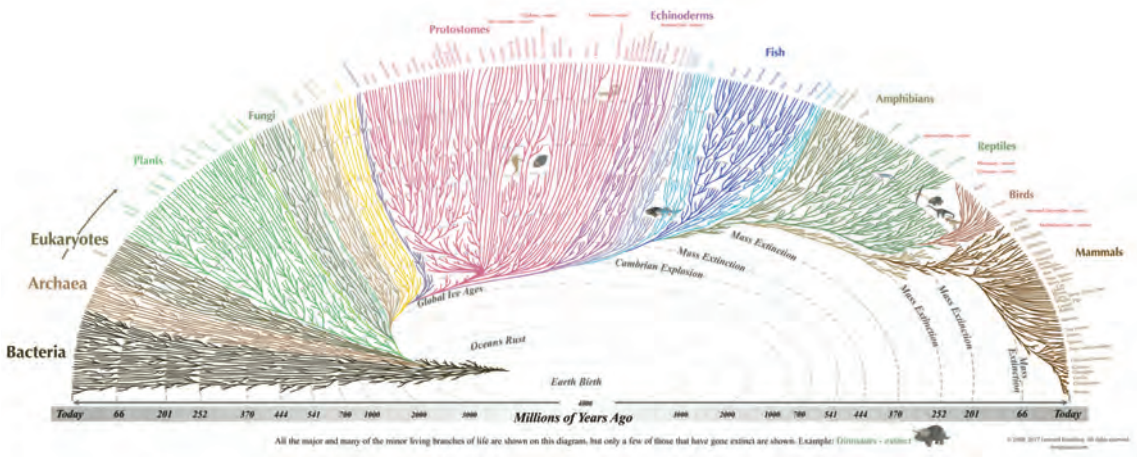

Figure 3: *The Tree of Life (2008)*

The author Nick Dyer-Witheford had disagreed with the idea that the "theory of value ascribes value to things" (Bollier, 2016:16), as "Value does not inhere in objects; it emerges through a process as living entities" (Bollier, 2016:16). However, he believes that there is an "implicit theory of emergence in Marx's thinking about value" (Bollier, 2016:16). Since the labour "of nonhumans – the Earth, other creatures, plants – can be regarded as a source of value, and not definitionally excluded" (Bollier, 2016:16). This is proved when the theory of "surplus value" (Bollier, 2016:30) is seen in action, through the relationship between humans and the ecosystem. Here the capitalist or humans are the exploiters while the workers are the range of actors within the ecosystem. Despite there being additional users of the environment; these communities have established "mutual interrelationships between and among species" (Gibson, Rose et al 2015:11), forming a 'give and take' alliance. Our idea of rewarding labour is through wage (money), but it is physically not possible to reward nature using currency, therefore this rule of trade is not accomplished. When one is brought up with the concept of taking and "self-interest" (Plumwood, 1994:183), a set "of boundary problems" (Plumwood, 1994:178) are "encountered by forms of deep ecology" (Plumwood, 1994:178). As the population increased and this concept became the norm; ignorance progressed to arrogance, forgetting "local responsibilities of care" (Plumwood, 1994:182). Rising "another variant on the superiority" (Plumwood, 1994:182) connecting to diverse communities and placing ecology with the 'inferiors' such as "women, servants, the colonised, animals" (Plumwood, 1994:178) that face inequality. In these cases, the workers or inferiors would fight back to get justice. An example of this would be the current situation, where the ecosystem has exceeded the 'surplus value' causing climate change. Like Marx explains, with the greed of profit comes a stage where the labourer gets exhausted and cannot reproduce. This causes alterations and dilemmas to a complex, essential system that is in control of every living thing.

There are many ways humans can fix these issues. Val Plumwood, a philosopher points out that we must start by understanding the concerns and changing the way we think. She describes this act of thinking that the theory of ecology being independent of us as 'backgrounding' (Plumwood, 1994:54). Superiority on nature showed the "denial of dependence on biospheric processes" (Plumwood, 1994:21), resulted in a deteriorating world. Plumwood outlines specific principles that we need to accept to build the belief on "connectivity" (Gibson, Rose et al 2015:4). "The first is to resituate the human in ecological terms, and the second is to resituate the non-human in ethical terms" (Gibson, Rose et al 2015:3). This means we must acknowledge that we are not 'outside' of ecology and cannot be considered as individuals because "We are the environment" (Bollier, 2016:28). The second is to understand that nature has "meaning, values and ethics" (Gibson, Rose et al 2015:4). This can help restore the respect towards ecology and help value their labour, perceiving the "economy as ecology" (Gibson, Rose et al 2015:8).

When analysing these theories, the idea of value and neglect of non-visible labour was a big issue. Applying the notions towards Hounslow Heath using diverse perspectives on labour, can help with the evaluation of multiple relationships and boundaries set between ecology and its actors. This widens our understanding of factors that aid or exploit nature, whilst assessing our actions and views on human labour concerning enviromental labour.

Chapter Two: Changing the way, we think about Ecology and Labour

Our perception of ecological labour has developed through the evolution of technology, science, and the growing knowledge in industrialised capitalism. But the first exploration of this was through religious traditions and conceptions of nature, that expanded to alternative views. Exploring these foundations led to the question of who has ownership of the labour produced by the environment and why?

Theoretically, the origin of our current understanding and value of ecology could have sprouted from our old principles through religion. When researching the point of view of many different religions, they all had a reoccurring belief that nature and animals need care and respect, placing them above human needs. However, this belief is then contradicted with the statement that humans have a higher status than animals and plants; 'justifying' why they have a right on the ecosystem (Szűcs et al, 2012). Christianity believes that "human beings have stewardship over God's creation" (BBC Bitesize, 2021). Where this means we have responsibility and should care for other organisms, many have interpreted this as we own them, therefore can treat them however we like. The idea of authority is further established with the Quran that states "humans dominion over other creatures" (Qur'an 35:39) (BBC Bitesize, 2021). This supports the idea of duty and obligation, but by building fear, that if "they abuse this power" (BBC Bitesize, 2021) then they "will be questioned by Allah on the Day of Judgement" (BBC Bitesize, 2021). The 1579 drawing of Great Chain of Being from Didacus Valades, Rhetorica Christiana (See Fig. 4), shows a visual representation of a hierarchy set amongst humans. Animals, plants, and the non-living are at the bottom and of less importance because they are further away from god. This reflects on the existing treatment of the ecosystems. How their labour is constantly all around us yet is unacknowledged because of the unconscious hierarchy of the pyramid of significance.

Where one would think that the development of science would be a diversion from religion and the unfair treatment of ecology. Merchant explores how Francis Bacon's quotes of encouragement to "The new man of science" (Merchant, quoting Bacon, 2005: 45) and experiments, labels nature as a 'slave' (Merchant, 2005: 45). Declaring that their sole purpose is to "enlarge knowledge by observation and experiment" (Merchant, 2005: 47). By thinking of nature "not as an organism but as a machine—dead, inert, and insensitive to human action" (Merchant, 2005: 45), we can freely manipulate the ecosystem for our needs, ignoring morality or ethics for science.

The advancement of science through technology is clear evidence of the unsympathetic control of nature's labour. Most of our demands are met through technology. Where we want our technological systems to be useful and durable, the capitalist markets want "short-term profits" (Bollier, 2016:47). Therefore the "overextraction from nature" (Bollier, 2016:47) takes place. By understanding the repercussions of our current non-renewable methods, we are trying to "avoid waste and localize production" (Bollier, 2016:47). This is through slowly transitioning to green and renewable techniques.

Figure 4: *The Great Chain of Being (1579)*

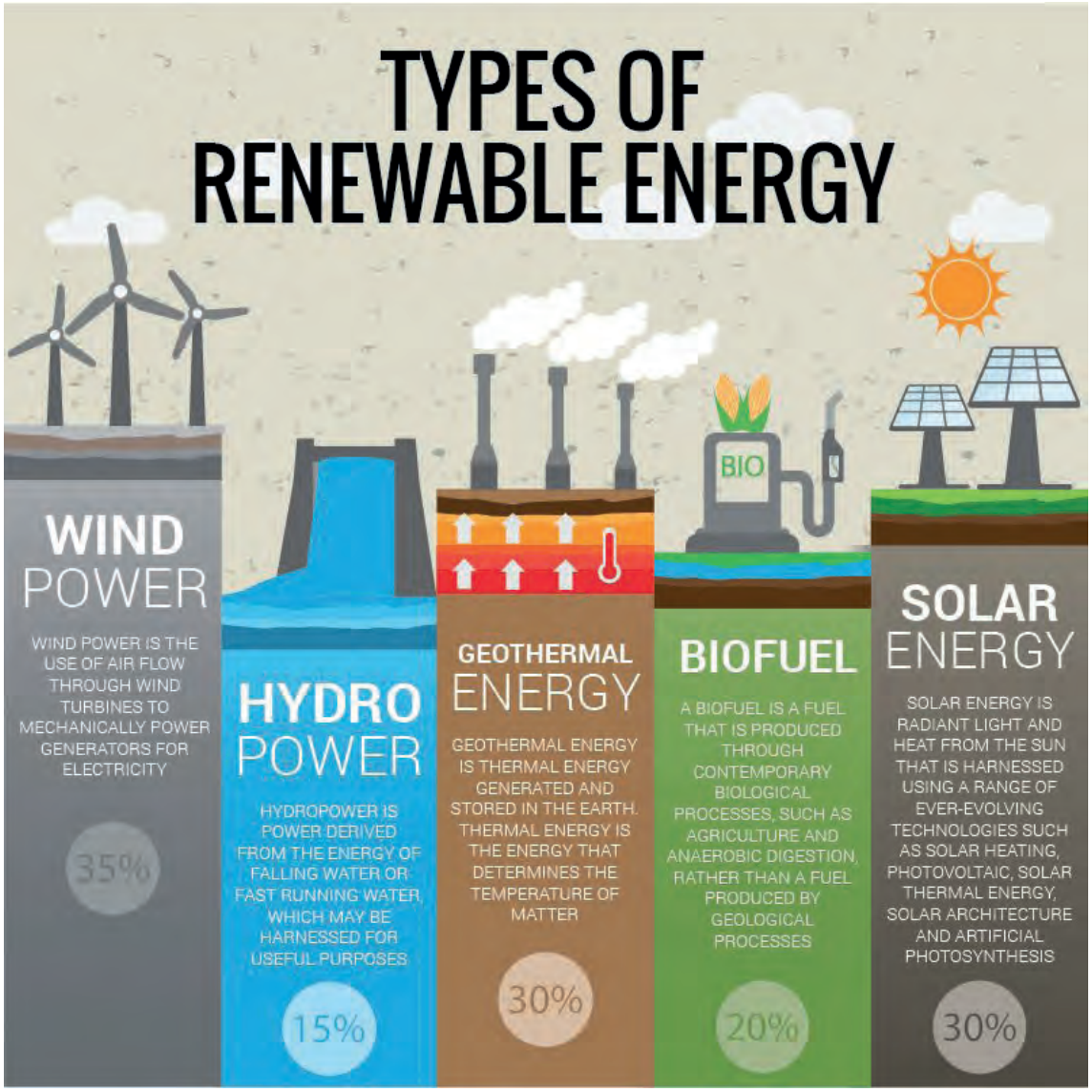

Figure 5: *Renewable Energy (n.d.)*

However, one can argue that the processes we see as efficient and sustainable are proof that the "man's relation to the non-human world is immoral", (Plumwood, 1994:183) as we overlook all the "nonhuman labour that goes into producing the commodity" (Bollier, 2016:56). An example of this is renewable energy sources. Wind energy, hydro energy, and tidal energy all use kinetic movements from water and wind (See Fig. 5). They all use forms of movements from nature to push turbines, that are "used to drive generators which then feed electricity into the National Grid" (EDF, 2019). These movements occur naturally and, in the processes, help other organisms for the normal function of the ecosystem. The wind helps with the dispersion of seeds on land, whereas the tides do this with aquatic plants and help with the reproductive activities of fish. They both also "help remove pollutants and circulate nutrients" (Barr, K., 2019), providing a stable and healthy environment. Despite us calling our approaches eco-friendly, we are still manipulating nature's ways. "The application and improvement of new machines, by a more advantageous exploitation of the forces of nature on a larger scale" (Marx, 1847:20), not only refuses to give environmental labour any recognition or appreciation. But praise humans for innovative inventions that are taken from ecological activities.

We can justify our actions by saying like many organisms we used the natural resources available. Nonetheless, by physically abusing animals for our causes and stealing the outcome of their labour, we represent the dark immoral side of humans. For centuries animals such as donkeys, mules, and horses have been used for traveling, and other household chores, helping with "saving time and transport costs" (Brooke, 2020). These reasons are why they are also useful in commercial services and "cart services within industries such as agriculture, tourism, transport, garbage management, construction and the transport of goods" (Brooke, 2020). The labour they provide is not for money or value but because they are terrorised, abused, and threatened into working. These animals are oppressed and mistreated giving their life no meaning but to serve those who have the 'power'.

Evaluating this debate on rights in the environment through religion and technology shows the self-centred nature of humans, like Val Plumwood unfolds. The idea of humans owning environmental labours shows the negative impact on the ecosystem. It is vital to understand that we are part of the ecological community and the outcomes must be shared. To reach equilibrium through a reasonable give and take alliance.

Chapter Three: Different Relationships with Ecological Labours

An ecosystem consists of "biotic (living) and abiotic (non-living) factors of an ecological community" (Easton, 1997: 3) that operate together. The community depends on each other for many reasons: survival, reproduction, balance, care, and more. This links back to Gibson-Graham's ideologies of an interconnected community. Where some present visible labour, whilst others help in the background practicing unwitnessed activities. These labours and characters are just as essential, as both the visible and invisible, rely on each other to exist.

This cooperation between the ecosystem, deducting human interactions, have a relationship of providing and receiving. All these economies are independent of one another. The "human economy is one kind of economy, but the bee economy is yet another, then there are the economy mitochondria, the economy of fungus" (Frichot et al 2018: 221), this classification helps understand relationships and how they support lives.

In "Our planet: High Seas", David Attenborough talks about the exchange of labour between the sea and its creatures (Our Planet: High seas, 2020). The "increase in water temperatures, mass bleaching of coral reefs" (Fitz and Krasny, 2019: p.50) and species extinction from climate change, is mainly from human labour (See Fig. 6). Activities such as overfishing, hunting, and relentless consumption of industrial productions that cause pollution are some of the major global issues (Fitz and Krasny, 2019, p.50). During these hardships, the ecosystem must learn how to "adapt to these novel relationships and encounters" (Fitz and Krasny, 2019: 45) to be responsive and creative for survival.

Attenborough gave an insight into how this recovery takes place and the unique ways the sea, underwater creatures, and aquatic plants communicate through labour, to support one another (Our Planet: High seas, 2020). Humpback whales, a mammal who was close to extinction, is relied upon many in 'the deep blue' for survival. Their labour as a collective and individually, not only provides habitats for other creatures, but are essential for a fully functioning ocean, and as a result, are vital for the wellbeing of our planet (Our Planet: High seas, 2020). To survive, these mammals must hunt together, using a tactical method, demonstrating how intelligently the labour is divided between them. The whales would gather on feeding grounds, directed by the leader, who would dive in first and "blows a curtain of bubbles to concentrate the fish" (Our Planet: costal sea, 2020) and krill, followed by a melodic call that would instruct the rest to synchronise an attack. This labour of the leader making the first move, allows his team to eat first and factors in the caring agents. They are not the only ones that take advantage of this. Barnacles, which are small organisms that have formed a leech-like relationship, make the whale its habitat (Oceana Canada,2020). Their host also provides a ride for them to dive deeper as well as protection from predators. Whales carry the job of "recycling nutrients that enrich surface water" (Our Planet: High seas, 2020), that in turn fuel phytoplankton who are the prey of the barnacles and krill. The labour that the whales carry shows a self-sustaining cycle that proves these diverse communities within ecology benefit from each other, not forming an 'iceberg' where some of the labour is invisible. This form of 'payment' is an ongoing process; valuing each member and their role that contributed to the activity. This is one of the few processes that help life to sustain a planet that provides us all with a habitat (See Fig. 7).

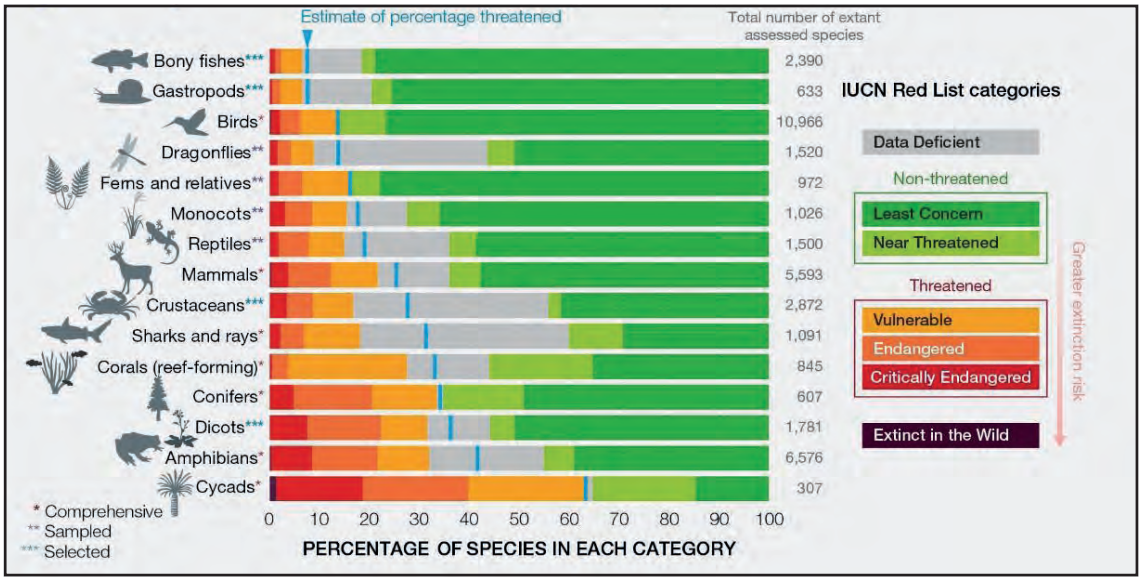

Figure 6: *Current Global Extinction Eisk in Different Species Group (2019)*

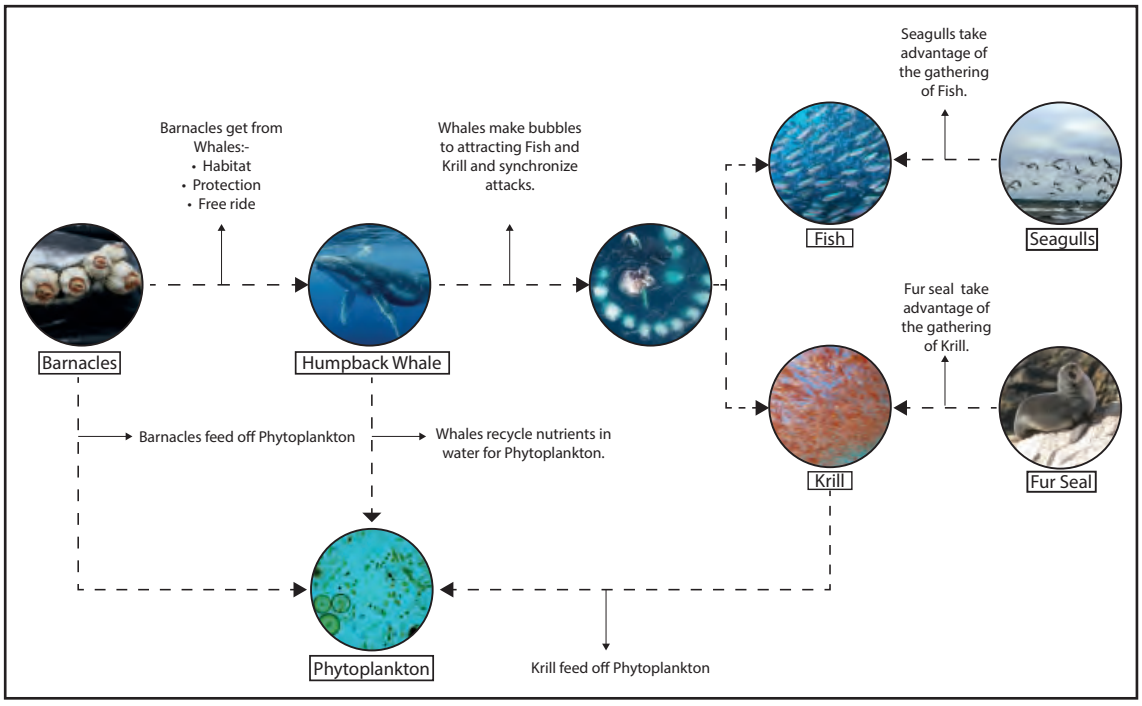

Figure 7: *Humpback whale Labour Cycle (2020)*

These organisms within ecology have a relationship where their labour is appreciated and reciprocated. Where as, in a capitalist culture, that has become globally dominant, the human relationship with ecological labour has somewhat become destructive. The belief system of superiority within a community has always led to one group making decisions and conquering those repressed (Coote, 2012:790). This hierarchy of humans being at the top, gave birth to the idea that they can take advantage of the rest. Those that survive through the natural ways of living must silently endure the fruits of their labour being robbed.

The transition from hunting to farming made the process of animal husbandry a norm. This control has put us on top of the food chain but has also altered a lot for other species on earth. Pulling them away from their habitat and lifestyles as well as interfering with evolution. Like humans, all organisms work together and co-exist, they have multiple roles and relationships. An "army of workers" (Marx, 1847:19) whose "labour is subdivided" (Marx, 1847:19) and produces an outcome that is shared equally, is the economy of bees. They play an important role in our survival as pollinators. The bee colony has "an independent "system"— with its own internal laws and imperatives" (Gibson, Rose et al 2015:10) that they follow to exist. But with human demands needing to be met the labour that is produced by bees to make their own food is stolen for our food. Leaving bees to starve and eventually die. Triggering pollination to decrease, which can reduce the number of green plants and oxygen we receive (See Fig. 8). Our selfish actions of manipulation because of the evolutionary advantage we have has ultimately come back around. The current global crisis of climate change that the ecosystem and those residing in it face can be the next mass extinction. We have used up too much and are running out of resources. With species slowly being extinct we have distorted the ecosystem, where the natural process cannot take place and with an unfamiliar environment that has been polluted too much, our chance of survival is low.

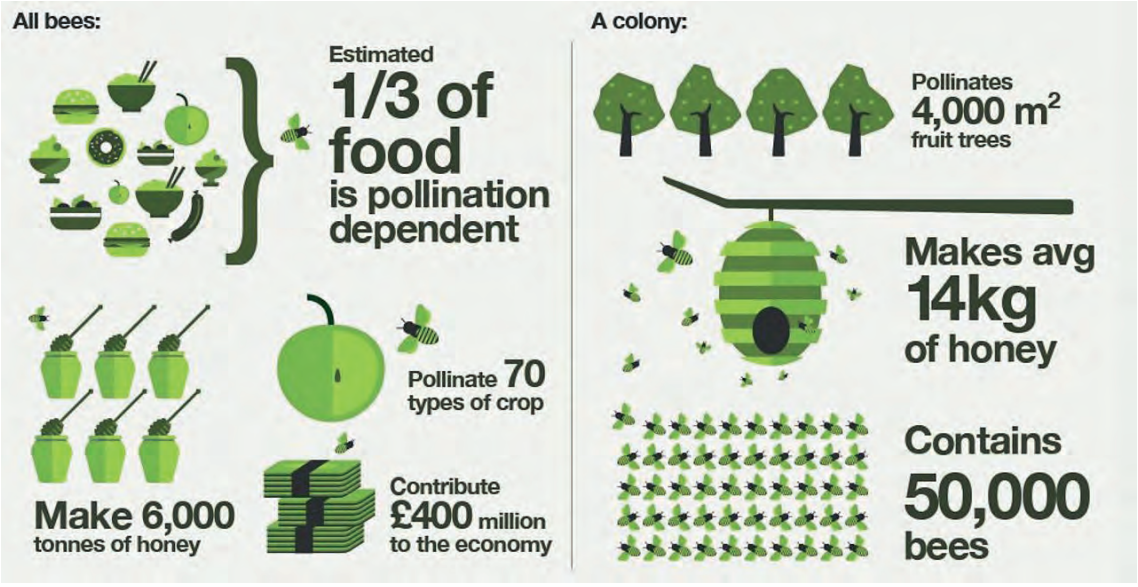

Figure 8: *What All Honey Bees and a Colony of Honey Bees, Do For Us? (n.d.)*

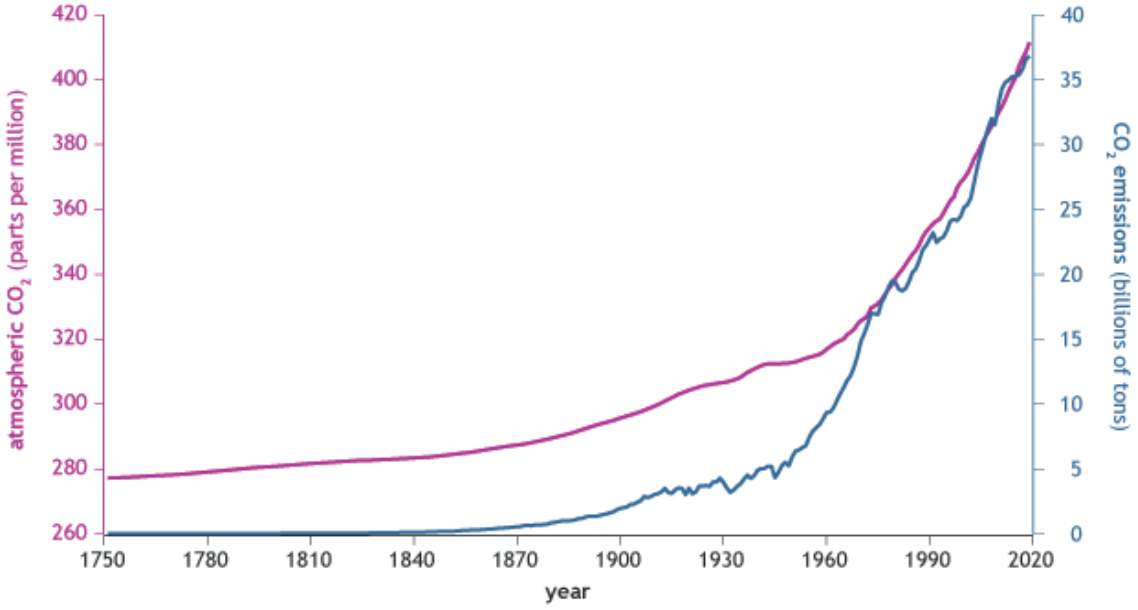

Figure 9: *CO2 in the Atmosphere and Annual Emission (2020)*

These biotic communities depend on each other. But statistics show how the labour of one side can be more difficult to carry compared to the other, through measurement of emission. Throughout the years, the emission of carbon dioxide has risen rapidly (See Fig. 9) there are many reasons but some of the highest carbon dioxide producing activities include: Consuming electricity, Transportation, building, and deforestation (Urton, 2020). By decreasing the biotic community in charge of reducing CO2 emissions, we are making it more difficult for the ecosystem to stay stable. Pressurising the rest of the atmosphere for unhealthy absorption and causing the CO2 that the plants intake to be of high concentration. This can then lead to plants being "less efficient in sequestering atmospheric carbon" (Urton, 2020). The plant's labour in stabilisation becomes more difficult by the increase in the population of living organisms that count on it.

The focus on multiple relationships with ecology shows a positive balance that is accomplished, where the labour is valued and reciprocated. These invisible labours weigh a lot on the balance of the modern system. The interconnection between labours makes us rethink about improving current human relationship with nature. To reach an equilibrium that regenerates the declining environment.

Chapter Four: Introduction to Hounslow Heath

Figure 10: Hounslow Heath Nature (2020)

Hounslow Heath park, a large hidden green space where nature blooms amongst the busy city life is located in the London Borough of Hounslow, it was first formed around 1,000 years ago (Ramblers, 2020:13). In 1545 it was known to have extended over many towns and "estimated to cover 4,293 acres" (Blaney, 2019). Hounslow Heath was naturally used to pasture but has also been "used as a hunting ground for Norman kings and barons as the site supported wildlife such as wild boar" (Ramblers, 2020:13).

However, after Henry VIII was appointed king in the 16th century, more than "1700 hectares were common land and people were permitted to rear geese, ducks, cattle and sheep, and gorse and peat could be gathered for fuel" (Ramblers, 2020:13). The space in the 1800s site was obtained by the government for military training. Which then became the main site for aerial defences during the First world war and an extraction space of gravel in the Second World War for landfill (Ramblers, 2020:13).

Figure 11: *Memorial Stone at the Entrance of Hounslow Heath (2020)*

Hounslow Heath Park officially opened in memory of Hounslow Airfield that was 'dedicated to all units and personnel based' (See Fig. 11) from 1910-1920. In 1991 the surviving sections of the wild were announced as a Local Nature Reserve that held "82 hectares of mixed grassland, heathland, meadows, wetland, scrub, and woodland" (Ramblers, 2020:13) (See Fig. 12). Hounslow Heath "is a rare heathland habitat for London" (Gray, 2015:1) and controlled by the council. Presently, the park includes a range of habitats and species with multiple, formal, and informal entrance points around the perimeter. The main pedestrian access point is "from Staines Road and Frampton Road" (Blaney, 2019) this entrance includes a car park, a visitor and information centre, and nature trails. The area is covered in greenery and is divided into parts that characterise the unique regions. The crowded tress in Firing Wall Pond, Paradise Wood, and Scrubland explodes with diversity through like ponds, lakes, rivers, and trees (See Fig. 12). These features differ from the rich leaves and flat land with grass patches such as the meadow, Wetlands, and heathland (See Fig. 12).

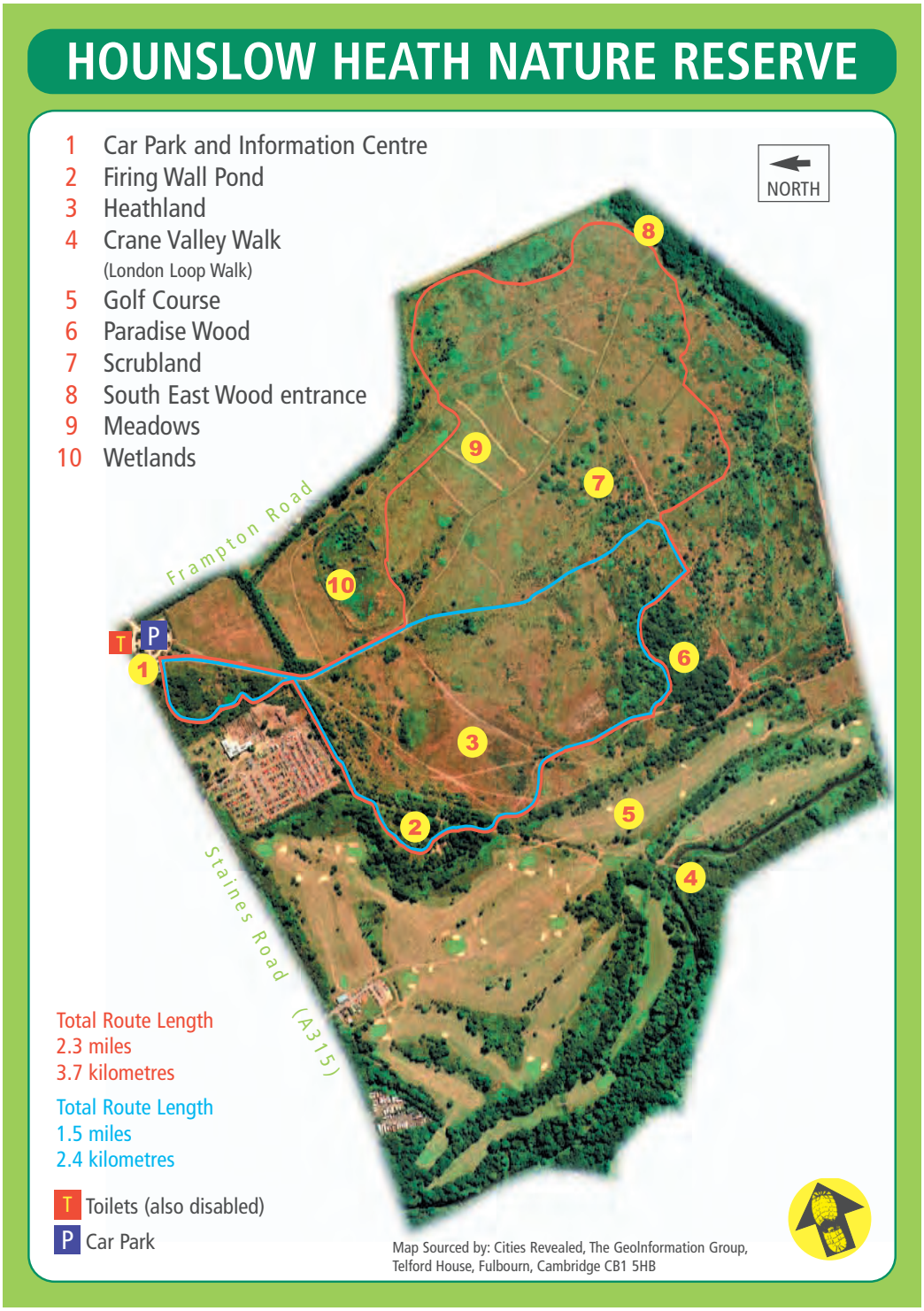

Figure 12: *Hounslow Heath Nature Reserve (2020)*

They possess traits where each area can be differentiated from each other, the trails are designed to be beautiful and educational. These trails are leading routes to other parks that spread all over London. The Historic walk (See Fig.13) gives an insight into the hidden past of Hounslow's heath while the Wild walk (See Fig. 14) offers in-depth information about animals and insects, one can observe during the walk, for an interactive experience. An aspect that differs from all these spaces is the man-made golf course that takes up Metropolitan Open Land. This land unlike the rest of the park is segregated for the public district and is comprised of mounds (See Fig. 20). These spaces are of "high environmental value" (Gray, 2015:6) and as a collective provides an important "wildlife and environmental corridors in London" (Gray, 2015:1).

Hounslow heath was chosen as it is an important public green space that is local to me. During the pandemic, it has played a huge role in the mental and physical heath of the community in Hounslow. But its labour and value have only just been recognised and even then, people still question the parks worth. By applying the research of ecological labours and analysis of theories to my case study I want to outline its struggles and significance.

Figure 13: *Wild Walk (n.d.)*

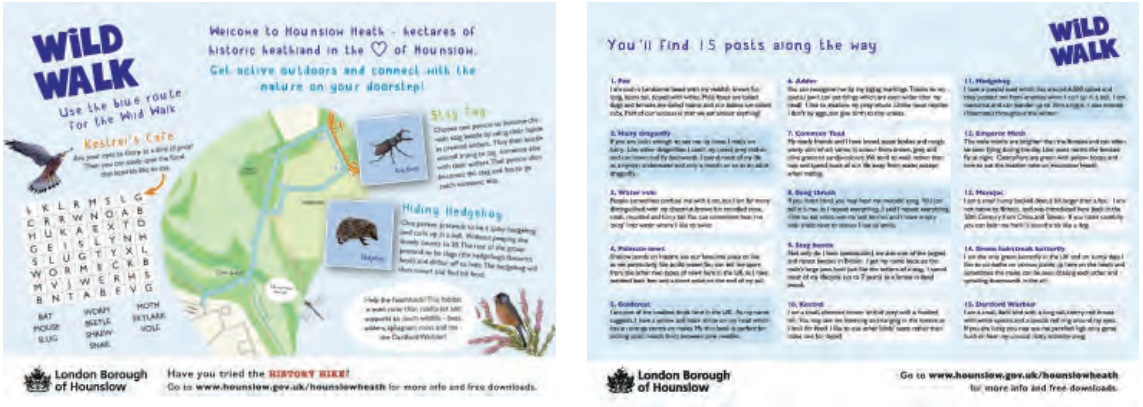

Figure 14: *History Hike (n.d.)*

Figure 15: *Panoramas of Green Spaces within Hounslow Heath (2020)*

Chapter Five: Site Analysis

Hounslow Heath is surrounded by numerous structures that all have a purpose for humans. The constant development of Hounslow meant that there are persistent industrial activities taking place to accommodate the growing population. Through the analysis of the surrounding area and focused study of my site, I will be showing the effects on the park along with various partnerships formed that project inequality.

Exploring the surrounding it was clear that Hounslow Heath was not the only green space present as narrow green routes and rivers entwined all over. But what struck out the most was one of the largest airport in the UK, Heathrow airport and one the largest stadiums in Europe, Twickenham stadium. Both spaces are close to the park and renowned for bringing visitors into the area (See Fig.16). But with that a large amount of transportation such as cars, buses, and trains are used and are obliged to interact with the park due to interconnected routes. Where financially these features help the community, their role in the production of pollution is substantial.

Hounslow Heath's greenery plays a role in providing clean air and getting rid of air pollutants. The production of carbon-dioxide from the surrounding helping plants to grow and in return provide oxygen for humans. Here we can say the give and take' alliance of labour is formed. However, comparing the number of plants in a 0.82 km^2 space (Ramblers, 2020) and production of pollution within a 12.14 km^2 airport shows how a balance is never going to be achieved with the unfair distribution (Baxter, 2011:78).

Adding on the other contributors from the surrounding, the park itself cannot be relied on for the reduction of air and noise pollution. We can also argue that the park is not the sole stabiliser as there are other surrounding green spaces involved. However, even then the proportions of greenery compared to total pollution from all these characteristics, is still not enough for environmental steadiness.

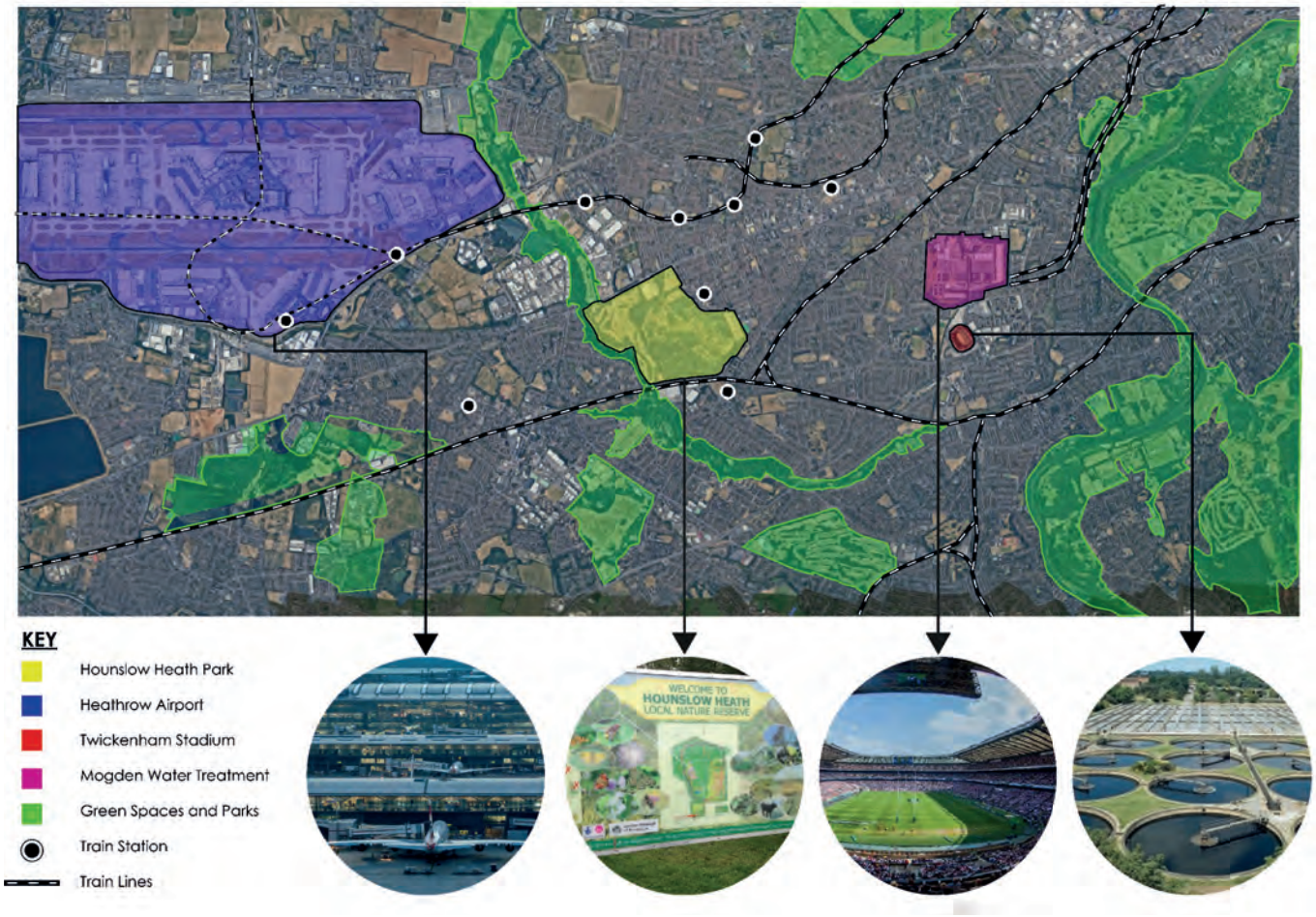

Figure 16: *Diagram of Site Analysis around Hounslow Heath (2020)*

Figure 17: *6 Walks observed within Hounslow Heath (2020)*

Deconstructing Hounslow Heath through walks, photography, drawings, and experiments I was able to observe elements within the space that informed me on ways the biotic and abiotic components operate to keep the space labours running. I also got to witness the ways human interaction can be a hindrance or support to the park.

To make sure I was able to see most of Hounslow Heath I followed 6 different walking trails showing the mesmerising beauty of nature (See Fig. 17). Trying to capture the labour was difficult as many of the labourers worked at different times and in hidden spaces. The threats that these workers faced were from human actions. The area is spoiled through piles of rubbish and vandalism (See Fig. 18a,b and c) that is seen everywhere making the space run down and neglected (Cumber, 2015). Throughout the walks, I encountered lots of areas that where logs and branchers were burnt. One of the most popular and intriguing sights were the burnt cars and motorbikes scattered all over the park (Cumber, 2015) (See Fig. 19). Hounslow Heath is "vulnerable to fires" (Worden, 2018) with 114 incidents in Hounslow Heath recorded in 2015 (Worden, 2018). These fires usually take place through barbecues, cigarettes, and glass bottles, traces left by people (Miller, 2018).

Figure 18: *Observed Vandalism and Rubbish in Hounslow Heath (2020)*

Figure 19a: *Burnt Cars in Housnlow Heath (2018)*

Figure 19b: *Burnt Cars in Housnlow Heath (2019)*

Figure 19c: *Remains of Burnt Logs in Hounslow Heath (2020)*

Figure 20: *Site Analysis of Hounslow Heath (2020)*

Deforestation is a big concern, with trees being cut down for human uses leave animals without habitats and maintenance issues for the ecological labourers (See Fig. 21). A cleared-out zone within the park is used as a car boot sale, where many find a shortcut entry by ruining wildlife (See Fig. 20). To accommodate these spaces car parks are built adding to the pollution, vandalism and loud activities that take place within a quiet area designed for wildlife. The destruction of the space shows how Hounslow heath and its living organisms are struggling and worn out with the labour they do increase and its positive outcomes decreasing. However, there are some that project stewardship towards the environment by organising clean up sessions (See Fig. 22) and communities such Aldermaston Recycling and Ron Smith Recycling that helps tidy, protect, and restore Hounslow heath (See Fig. 20).

Figure 21: *Chopped trees within Hounslow Heath (2020)*

Figure 22: *Save Hounslow Heath (2015)*

Figure 23: *Hydropower Turbine within Hounslow Heath (2020)*

During the walk, I encountered a small hydropower turbine that was hidden in the park (See Fig. 23 and 24). These turbines usually have the role to produce electricity using kinetic movements but when researching who they provided for there was no information. Hounslow Heath has an unspoken part in masking unwanted odours from Hounslow especially, Mogden sewage treatment works, 3 miles away (See Fig. 20). This is one of the "largest such plants in south-east England, treating wastewater from" (Willey, 2005) 1.9 million people and is part of the Thames water sewage plant (Willey, 2005) . Once the sewage is treated the purified effluent is piped and "discharged into the Thames around high tide" (Willey, 2005), the idea of this is so the toxic substances do not go straight into the water and is partially cleaned. The water from the Thames flows down towards other rivers and streams, even Hounslow Heath Park. Where we so-called take responsibility by cleaning the waste before dumping it in the water, it still is a way of polluting the water. The rivers do not carry the responsibility to store human wate. The labour of storage is another way of polluting and toxifying the rivers that carry important roles for many organisms.

Figure 24: Hidden Space within Hounslow Heath (2020)

Figure 25: *Abandoned Building owned by Thames Water in Hounslow Heath (2020)*

This also interferes with labour of many creatures that live underwater or drink the contaminated water. During the walk, there were areas that were blocked off to the public, one of these sections held an abandoned building with a chipped off Thames water sign (See Fig. 25), suggesting that there may be some correlation with the sewage Plant. This links back to the research on technology, how Hounslow Heaths nature is a part of this unequal society where ongoing ecological labour is not recognised but also harmed through human activities.

Val Plumwood's theory of 'backgrounding' and our notion of 'superiority' (Plumwood, 1994:182) exemplifies the current situation in Hounslow Heath. This site analysis reveals the forceful adaptation of an environmental space that then salves away for our requirements, creating an ambiguous future with suffering. Being one with nature, we are required to fill in human responsibility to protect our environment. However, the greed of advancement lures human actions against this.

Chapter Six: Biodiversity Experiment

Figure 26: *Random Sampling of Hounslow Heath during Biodiversity Experiment (2020)*

The "built environment becomes predominantly viewed as quantity, not quality or relation", therefore any labour "outside of this framework becomes invisible" (UDALL et al 2014: 66). But how can there be a method or a scale that "quantifies efforts" (Coote, 2012: 794) of the hidden?

The work produced by ecology consists of a broad range of routine activities. The more species within these communities the better the interactions and the function of the ecosystem. Analysing Marx's theory on quantifying labour, I understood that trying to get an accurate value of ecological labours would be nearly impossible.

However, I wanted to find a way where an estimated number of labours within Hounslow Heath can be calculated. We can establish that the ecosystem is more stable when biodiversity is high. By measuring the biodiversity using Simpson's Diversity Index (SDI) (Glen, 2020). That considers species richness, the "number of species present in a habitat" (Astarbiology, 2020), and the species evenness, which is the "number of individuals of each species" (Astarbiology, 2020). We can determine the diversity within an allocated space. With this information, we can identify a variety of species and detect the labours they do and how these labours correlate to the restoration in different parts of Hounslow Heath.

Species	Number of organism in speice (n)	n(n-1)
A	176	30800
B	966	932190
C	143	20306
D	44	1892
E	26	650
F	36	1260
G	11	110
H	400	159600
I	43	1806
J	12	132
K	11	110
L	9	72
M	41	1640
N	8	56
O	27	702
P	28	756
Total	1981	1152082

$$\text{Simpson's diversity index} = 1 - \frac{\Sigma n(n-1)}{N(N-1)}$$

$$\text{Simpson's diversity index} = 1 - \frac{1152082}{1981(1981-1)}$$

$$\text{Simpson's diversity index} = 1 - 1981(1981-1)$$

$$\text{Simpson's diversity index} = 1 - 0.293720139$$

$$\text{Simpson's diversity index} = 0.7062798607$$

Figure 27: *Table showing Data of Random Sampling Experiment in Hounslow Heath and Simpson's Diversity Index Calculation (2020)*

My investigation included random sampling; using a 20 by 20 quadrat that is thrown in random locations throughout the walks. I then observed and recorded the number of species present within the quadrant (See Fig. 26). The data I had gathered was then used to calculate the SDI, which was 0.706. If the score is closer to 1 than 0, it indicates that there is a high diversity within Hounslow Heath (See Fig. 27). This also implies that the range of ecological labours that take is great to ensure permanency of the environment.

Where this conclusion is backed with evidence through photographs, research, and statistical analysis. The experiment was conducted once without a time frame, and with it being random sampling most of these species involved were plants as a lot of the areas with animals and insects were hidden. Identifying these plants was also challenging due to the similarity in their appearance. The irregularity of this can conclude the experiment was not precise. However, it does not determine that the results were incorrect. As it explains the survival of the park through the existence of the distinct creatures and their labour, despite the damaging obstructions.

Chapter Seven: Labours within Hounslow Heath

Deducing that the space is full of diverse plants through the biodiversity experiment. I further evaluated the labours that the plants did to maintain Hounslow Heath and the community that resides around it. Marx theory on surplus value and its negative outcome, illustrates Hounslow Heaths deterioration and mistreatment over time. The devalued title of preserving is slowly reaching a limit where routined labours are becoming difficult to execute.

The labour that takes place in Hounslow Heath is subtle yet impactful. Each element plays a role to not only support each other but to maintain human survival and wellbeing. The park is known for its rich diversity of species as well as its resources that accommodate the species needs. The park is full of "over 500 different species" (Dabbagh, 2020) from creatures such as fox, rabbits, adders, Hedgehog, Muntjac, toads Water vole, and birds to vibrant insects (Wild Walk, n.d:2). They are hidden in the green spaces, enriched with herbs, flowers, and other plants that provide habitats and food (Force, 2014:3). Another essential element for the existence of many of the wildlife in Hounslow Heath is water, which appears in the form of ponds, lakes, streams, and rivers. These organisms and features knowingly and unknowingly carry daily jobs that continue a systematic life cycle that is required to keep order within the park.

Many natural processes take place and are involved in the exchange of products or by-products to aid the chemical reactions to help the functioning of another organism. To understand how these processes and cycles take place in Hounslow Heath. I focused on specific labour that benefits humans the most. The labour revolves around the survival of plants in Hounslow Heath. We benefit from nature, but directly from plants.

However, the activities that take place in the background to keep then plants alive and maintained are not emphasised. Animals within Hounslow Heath range and so do the way they behave, travel, hunt, protect, etc. During these processes, the smallest of their chores such as moving around and looking for food helps with the transportation of seeds and minerals, required for plants to feed on and pollinate (Bouchard, 2016). When the animals feed off the plants, they also provide natural fertilisers through excretion and decomposition for growth. There are insects and animals that travel from land to water and some that appear in day light whilst others appear at night. The rivers are a key component for the survival of plants as it carries several direct and indirect labours through distinct methods. They are a habitat for many aquatic plants, insects, and fishes. Their job is to provide water to plants directly or through the medium of hydrating organisms that provide labour to the plants. In return, these plants and trees not only provide food and habitat but also provide amenities like a shelter from rough weather, protection from predators and water through various and unusual channels (See Fig. 30).

Figure 28: *Plants in Hounslow Heath (2020)*

Figure 29: *Different Spaces in Hounslow Heath (2020)*

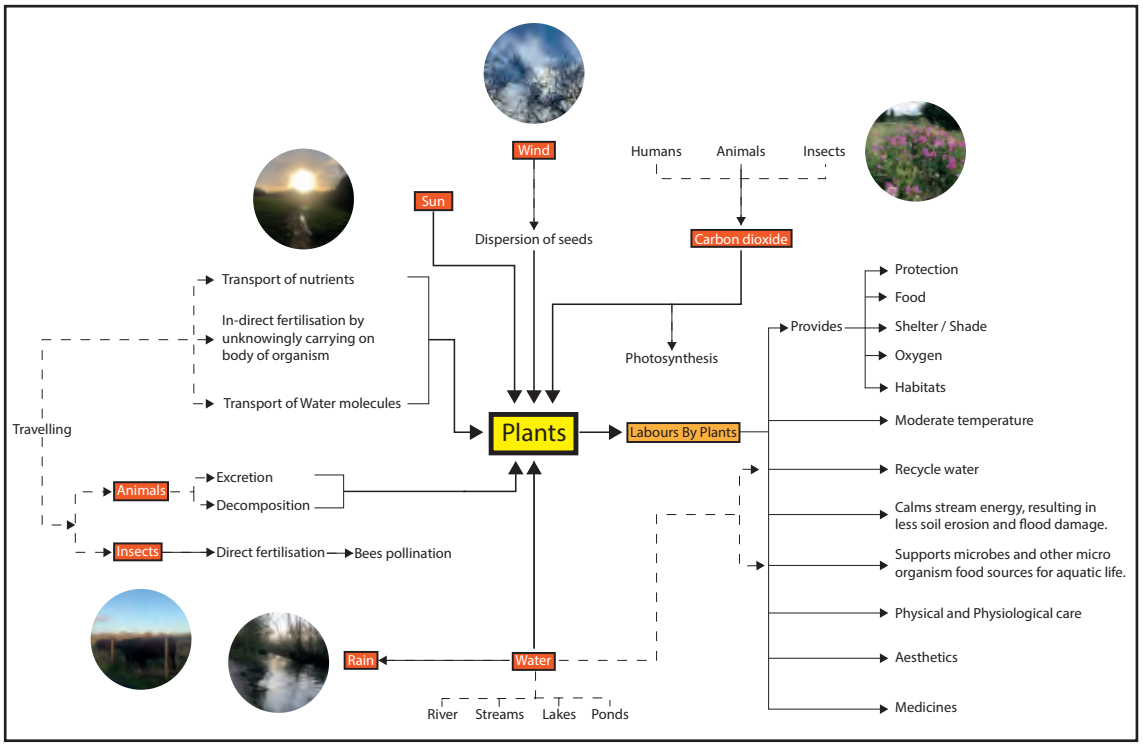

Figure 30: *Labours of Plants within Hounslow Heath (2020)*

These visible and invisible co-operations between various living organisms, water, and other abiotic communities play a role in keeping plants alive; an essential element for our survival through the stabilisation of our mental and physical health (Keniger et al,2013). This was evident when documenting the types on human interaction that took place in Hounslow Heath park. How positive connection with greenery enhanced the healthy communication within Hounslow community, especially during the pandemic. (See Fig. 31a and 31b) The major labours provided by plants is the production of oxygen and the removal of carbon dioxide. The process of respiration is an unconscious action to many organisms and vital activity for survival. The chemical reaction that takes place for breathing, involves an output of carbon dioxide, that we also produce through industrial activities. This output is then used by plants through photosynthesis to make food (glucose). During this, the favour is returned by the production of oxygen, which is used by us when respiring (Brown, n.d.). The trade-in product is the outcome of their labour and of great importance to many. But as the process is mundane, we forget to acknowledge its existence. Gibson and Graham's theory of diverse economies helps to visually represent responsibilities. When illustrating an iceberg that describes the labours that took place in Hounslow Heath to accommodate plants, other organism, and humans, we can see "how different kinds of activities are valued or devalued" (Gibson and Dombroski, 2020:9). The activities beneath the waterline represent a "host of heterogeneous practices" (Gibson and Dombroski, 2020:9), activities that we disregard or are hidden (See Fig. 32).

This picture "thus provokes ethical reflection" (Gibson and Dombroski, 2020:9) and evokes a discussion where we can expose the unappreciated economies and ensure that status given to labours, do not devalue their importance as each element participates in a task.

Figure 31a: *Observational Drawings of Human Interactions within Hounslow Heath (2020)*

Figure 31b: *Observational Drawings of Human Interactions within Hounslow Heath (2020)*

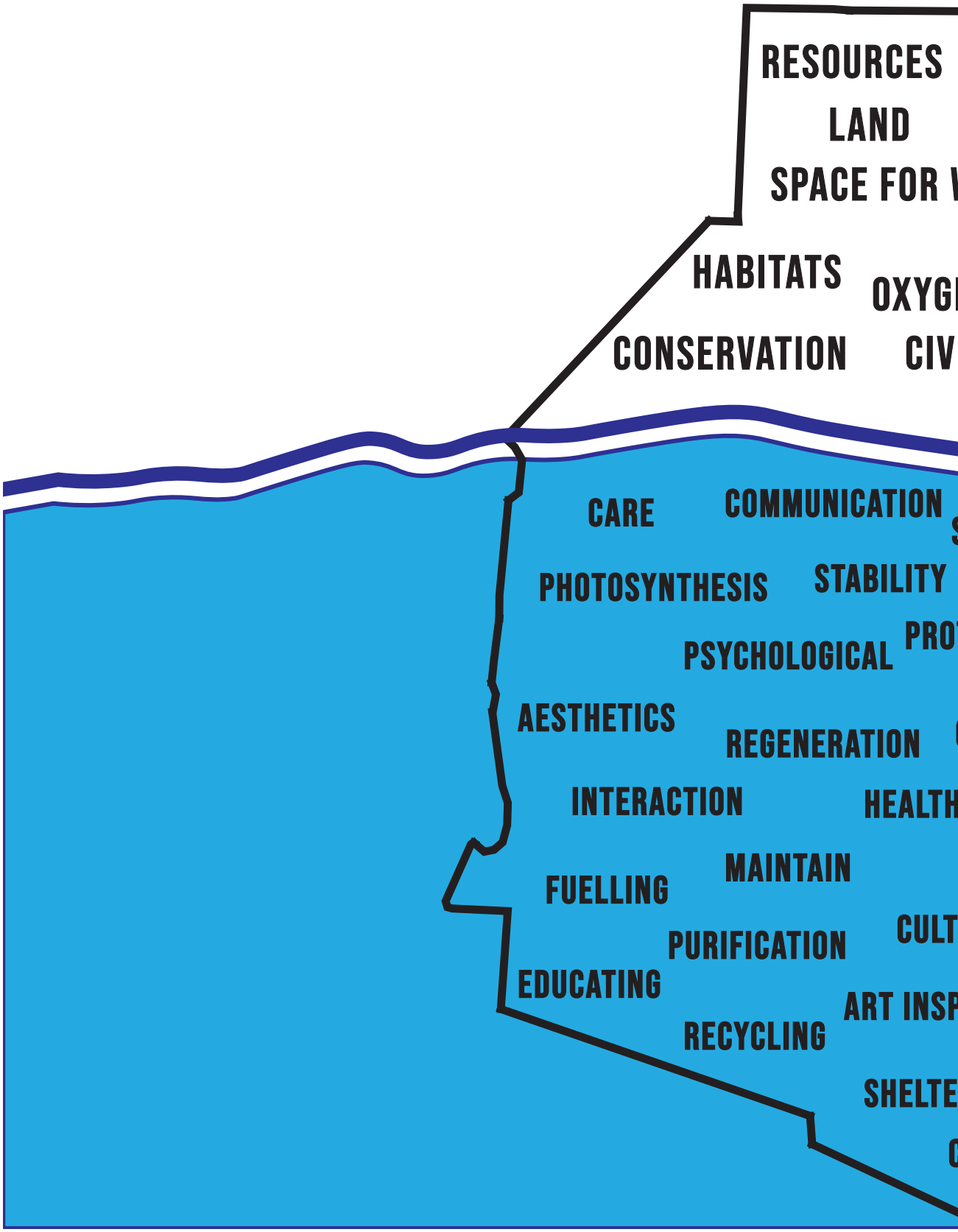

Figure 32: *Iceberg showing Labours within Hounslow Heath (2020)*

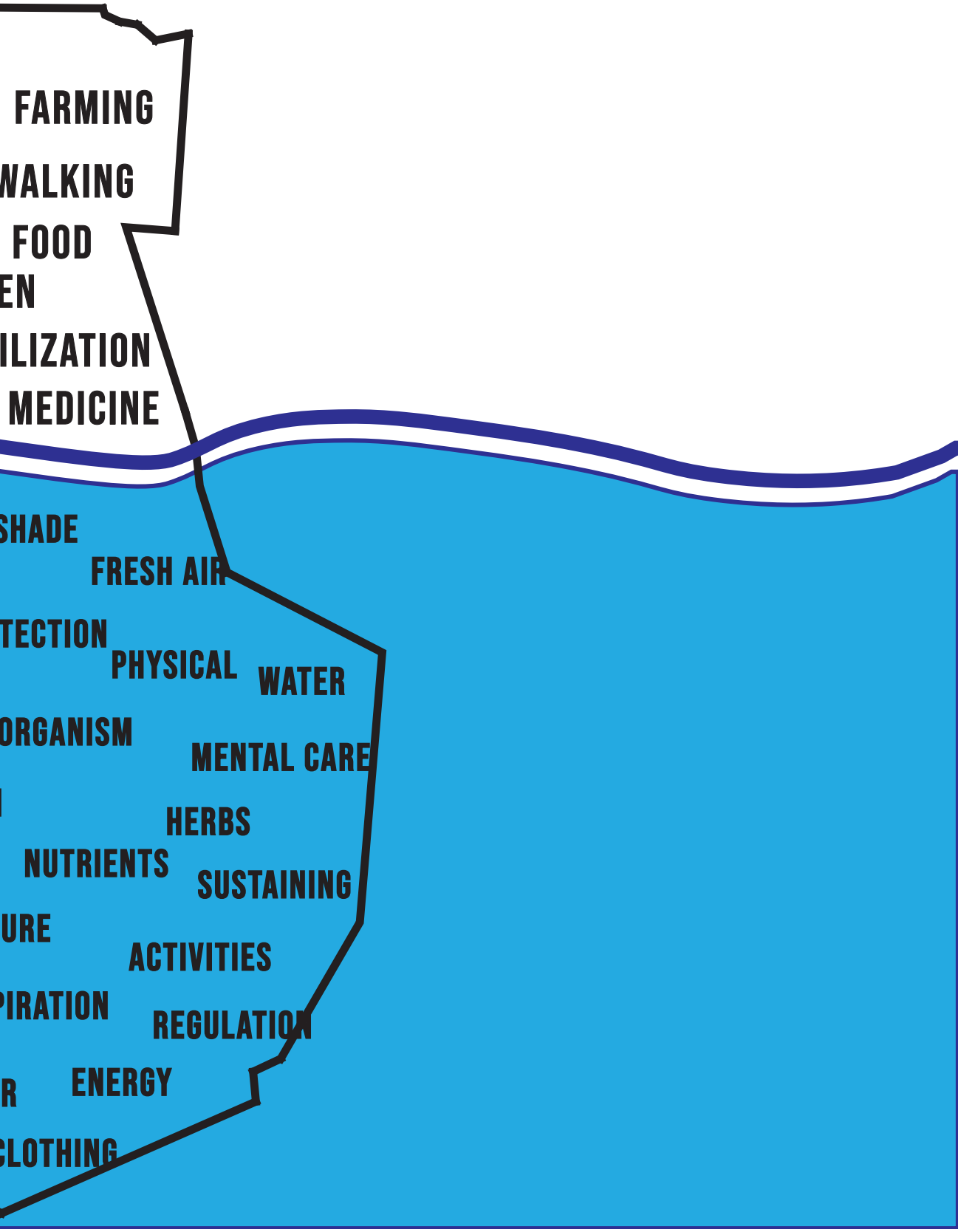
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Figure 33: *South East View of Hounslow Heath (2020)*

Conclusion

The labours within ecology fall under the category of "Unpaid and Underpaid labour" (Fitz and Krasny, 2019:34). Understanding the "tension between preservation and exploitation" (Frichot et al 2018: 202), has helped unfold the struggles and restoration system within Hounslow Heath. An enticing evolution of species has always coexisted here through hidden activities. Disassembling the ecological labours by using the perspective of diverse economies, unveils the overlooked unique characteristics and difficult labour.

The reviews on various theories of labour and value with the ideologies on the origins of views. Showed by labelling ecological labours 'normal', we devalue their role through the lack of appreciation. Relating these findings to Hounslow Heath and reflecting on other organism relationship with environmental toil. Displayed evidence that human interaction caused the ecosystem to decline due to manipulation of resources.
Through observation, research, and experimentation, it was fair to conclude that Hounslow Heath diversity is what is keeping physical, psychological, and social stability in Hounslow. Where some demonstrate stewardships towards the ecosystem, the constant display of patronizing superiority defeats their purpose. This mistreatment is realised when humanity is placed in a position, where its only companion would be nature. The current global pandemic of COVID -19 is a strong example of this. Where ecology in Hounslow Heath and civilisation come together in various ways to cope. By understanding plumwood solution of changing our perception on humans being separate from nature and superior, we can rebuild Hounslow heath.

Labourers of ecology are playing their role by sustaining and stabilising. With the insight of our privileges and the outcomes of our actions we should begin to re-establish through conserving what is left and restoring what has been damaged. "Eventually we'll realize that if we destroy the ecosystem, we destroy ourselves" (Salk, 1982), as we are a part of ecology. "Ecology is not somebody's work; it's everybody's work" (Vasudev, 2021).

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Figure 13: London Borough of Hounslow, n.d. Wild Walk. [image] Available at: <https://www.hounslow.gov.uk/downloads/file/1216/hounslow_heath_wild_walk_-_quest_sheet> [Accessed 10 January 2021].

Figure 14: London Borough of Hounslow, n.d. History Hike. [image] Available at: <https://www.hounslow.gov.uk/downloads/file/1215/hounslow_heath_history_hike_quest_sheet> [Accessed 10 January 2021].

Figure 15: Chagane, R., 2020. Panoramas of Green Spaces within Hounslow Heath. [Primary Photograph].

Figure 16: Chagane, R., 2020. Diagram of Site Analysis around Hounslow Heath. [Diagram].

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Figure 18: Chagane, R., 2020. Observed Vandalism and Rubbish in Hounslow Heath. [Primary Photograph].

Figure 19 a: Eardley, p., 2018. Burnt Cars in Hounslow Heath. [image] Available at: <https://www.google.co.uk/maps/place/Hounslow+Heath/@51.462704,-0.3874075,3a,75y,90t/data=!3m8!1e2!3m6!1sAF1QipOexkPtb5bYsHEePiAdYg6Mndy0DLN9eydtW4lD!2e10!3e12!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipOexkPtb5bYsHEePiAdYg6Mndy0DLN9eydtW4lD%3Dw203-h152-k-no!7i3968!8i2976!4m10!1m2!2m1!1shounslow+heath+burnt+cars!3m6!1s0x4876732fbf176103:0xa1056d9eb00c7f8c!8m2!3d51.462704!4d-0.3874075!14m1!1BCgIgAQ?hl=en-GB> [Accessed 24 January 2021].

Figure 19 b: Nuggets, S., 2019. Burnt Cars in Housnlow Heath. [image] Available at: <https://www.google.co.uk/maps/place/Hounslow+Heath/@51.462704,-0.3874075,3a,75y,90t/data=!3m8!1e2!3m6!1sAF1QipMAgPmLZxNmHdd7h5smqQxmrkDhauUhPlBW3hd2!2e10!3e12!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipMAgPmLZxNmHdd7h5smqQxmrkDhauUhPlBW3hd2%3Dw203-h152-k-no!7i4160!8i3120!4m10!1m2!2m1!1shounslow+heath+burnt+cars!3m6!1s0x4876732fbf176103:0xa1056d9eb00c7f8c!8m2!3d51.462704!4d-0.3874075!14m1!1BCgIgAQ?hl=en-GB> [Accessed 28 January 2021].

Figure 19 c: Chagane, R., 2020. Remains of Burnt Logs in Hounslow Heath. [Primary Photograph].

Figure 20: Chagane, R., 2020. Site Analysis of Hounslow Heath. [Diagram].

Figure 21: Chagane, R., 2020. Chopped trees within Hounslow Heath. [Primary Photograph].

Figure 22: Save Hounslow Heath, 2015. Save Hounslow Heath. [image] Available at: <https://www.facebook.com/media/set/?vanity=Save.Hounslow.Heath.2015&set=a.486257421556809> [Accessed 20 January 2021].

Figure 23: Chagane, R., 2020. Hydropower Turbine within Hounslow Heath. [Primary Photograph].

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Figure 26: Chagane, R., 2020. Random Sampling of Hounslow Heath during Biodiversity Experiment. [Primary Photograph].

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