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Combating the Climate Crisis: Deconstructing Western Anthropocentricity and the Value of Indigenous Teachings

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**Combating the Climate Crisis
Deconstructing Western Anthropocentricity and the Value of Indigenous Teachings**

by

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requirements for the degree of

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Abstract

This thesis will analyze prevailing Western perceptions of the natural environment and the historical construction of these beliefs, in an attempt to discern the root problems contributing to the present-day climate crisis. The dominant historical narratives of the West (such as Greco-Roman, and Christian) will be examined so as to demonstrate the trajectory of Western thought in regard to perceptions of the natural environment. Prominent theories on combating climate change in the modern era, put forth by scholars with expertise in relevant fields, will be examined and discussed, with a specific focus on the established dichotomy between man and nature, characteristic of Western (and Christian) culture. Methods for the deconstruction of detrimental ideologies will be posited in the effort to dismantle such problematic anthropocentricity. The author suggests that this cultural paradigm shift must occur through the acceptance of new stories, and then emphasizes the ways in which Indigenous narratives serve as a far better conceptual model of environmental interactions, ethics, and land management. To provide evidence to this claim, Western cultural artifacts such as language, education, and economy will be contrasted with Indigenous ones to demonstrate the potential improvements associated with heeding Indigenous communities. The benefits and potential barriers to Indigenous co-collaboration will be outlined in order to preemptively identify potential solutions. Finally, methods for incorporating Traditional Ecological Knowledge (TEK), and tangible instances of effective co-collaboration with Indigenous groups will be discussed using relevant case studies as evidence.

Key Words: Traditional Ecological Knowledge, Anthropocentricity, Anthropocene, Western History, Climate Degradation, Reciprocity

Contents

Introduction	4
Historical Stories: Narratives Regarding Humanity's Place in Nature	14
Greek Polytheism	14
Roman Polytheism	18
The Totality of Impacts from Ancient Greece and Rome	21
The Rise of Christianity	22
Christian Cosmology	23
Peripheral Western Narratives	27
Indigenous Cosmologies	29
Further Subjugation	36
Worldviews Expressed: Examining Cosmograms	41
Language	41
Economy and Consumption	44
Education and Environmental Management	49
Shifting the Paradigm	58
The Need for TEK	59
Barriers to Collaboration	62
Tangible Instances of Co-Collaboration: Relevant Case Studies	64
Case Study 1 - Slave River Delta	65
Case Study 2 - Saskatchewan River Delta	67
Case Study 3 - Unama'ki/Cape Breton Island	70
Next Steps	76
Conclusion	79
References	81

Introduction

In 2002, Nobel Prize-Winning chemist, Paul Crutzen, suggested that planet Earth had departed the Holocene, and entered into a new geological epoch – the Anthropocene – an era characterized by the global environmental effects of increasing human population, economic development, environmental degradation, and exploitation (Zalasiewicz et al., 2008). Since Crutzen first posited the term, a discourse has subsequently emerged, debating its meaning and suggesting alternative titles to denote the epoch. One of the prominent scholars contributing to this discussion is the ecofeminist and historian, Donna Haraway. In her 2016 work, “Anthropologists are talking about the Anthropocene”, Haraway remarks that the formal transition from the Holocene to the Anthropocene occurred when we arrived at the point of inflection of environmental consequences that altered circumstances for all life on Earth. More than climate change alone, she states, the Anthropocene is characterized by the “extraordinary burdens of toxic chemistry, mining, nuclear pollution, depletion of lakes and rivers under and above ground, ecosystem simplification, vast genocides of people and other critters ... in systemically linked patterns that threaten major system collapse after major system collapse after major system collapse” (Haraway et al., 2016, p. 100). She argues that the Anthropocene is a period marked by severe discontinuities – what comes after will be nothing like what came before – and it is undeniable that, regardless of whatever term varying scholars might use to define it, planet Earth has emerged into a new age characterized by degradation. The body of evidence displaying the consequences of our exploitation has continued to stack ever higher; sea levels rise, glaciers melt, permafrost thaws, weather patterns shift, temperatures climb, and yet we continue to operate according to outmoded paradigms based on the understanding of resources as infinite and inexhaustible.

Scholars within the discourse community continue to debate what term most accurately embodies the dilemma we find ourselves in, with phrases like “Anthropocene”, “Plantationocene”, “Capitalocene”, and so on, being put forward, each emphasizing a different defining or exacerbating element of the crisis (Haraway, 2015). Amidst such controversy, some might question, “Why should it matter what term we use to define this era? Is not the far more urgent concern the identification of a solution?” At this late stage, such an inquiry would not be unfounded, however, as many scholars would reason, narratives hold power. Stories, they collectively concede, have adaptive consequences. Doctrines, and even terms, play a crucial role in how we come to understand problems, and thus how we approach the pursuit of solutions (Kimmerer, 2013; Merchant, 2003).

Academics such as John Tresch, Bruno Latour, and Donna Haraway, present their preferred terms for defining this epoch, positing associated solutions, and exploring the implications of differing Western narratives. Haraway advocates for the disposal of the term “Anthropocene”, in the belief that while it may properly describe the dilemma, it is ill-disposed for defining an appropriate solution. The title “Anthropocene”, she argues, perpetuates the very anthropocentricity that it criticizes, and we would be far better off finding a term (and ushering in an age) that acknowledges the “symchthonic forces and powers of which people are a part” (*sym*, as derived from Greek “together”, and *chthonic* derived from the Greek “of, or relating to Earth”), a term that encourages intense commitment, and collaborative work with all other living beings (Haraway et al., 2016). Thus, Haraway alternatively proposes, “Chthulucene – past, present, and to come” (Haraway et al., 2016, p.101). The most urgent, and perhaps most difficult pursuit of the Chthulucene, she states, is both making and recognizing kin; if we ever are to reestablish refuge for all beings, we require a recomposition of thought that recognizes all beings

as relations in the deepest sense, for after all, as Haraway says, “all critters share a common ‘flesh’, laterally, semiotically, and genealogically” (Haraway et al., 2016, p. 103). Accordingly, she proposes the official slogan of the Chthulucene as, “Make Kin Not Babies!” (Haraway et al., 2016, p. 101).

The discussion of the utility of the term “Anthropocene” is furthered by Bruno Latour in his 2018 work, “We Don't Seem to Live on the Same Planet – A Fictional Planetarium”, where he discusses political orientations toward the Earth and emphasizes how the geopolitics of today are dominated by wars over definitions of the stage itself. However, as opposed to Haraway, Latour takes the novel approach of rationalizing these various stage definitions by defining past influences, and future potential trajectories as conceptual and representative “planets”, taking his readers on a tour of a fictional planetarium of his own invention. Following a historical sequence of Western narratives, (narratives regarding humanity's relationship with nature), Latour begins by defining the earlier political orientations towards the Earth, as “Planet Modernity”, and “Planet Globalization” respectively. “Planet Modernity” which could also be termed, “Planet Galileo, or Descartes” is that celestial body that Latour states is characterized by sentiments of modernity, discovery, and a continued notion of “otherness” (Latour, 2018, p. 279). Such modernism appeared as a small interval and thus the transition from “Planet Modernity” to “Globalization” was rapid. “Planet Globalization” is “the sphere imagined by the recent attempts at modernizing Earth” that planet which “implies that everyone on Earth could develop according to the American way of life, and forever, without any limit” (Latour, 2018, p. 276). According to Latour, “Planet Globalization” is simultaneously that which the whole world is supposed to have progressed to, while also existing as a skewed utopian domain where both time

and space have been colonized to the point with which it has been rendered uninhabitable, and its inhabitants paralyzed in the face of imminent threat (Latour, 2018, p. 277).

According to Latour, these two historical narratives, (characterized in part by rational inquiry without feeling, and exploitation) have led us to the crisis of “Planet Anthropocene” where we currently reside, or that sphere that has increased its gravitational pull for the last forty years. As Latour explains, “Planet Anthropocene” is just “Planet Globalization”, but where the Earth is reacting to human enterprise – no longer existing as solely a frame or a stage but as a powerful actor with agency. As we continually exceed her carrying capacity, the Anthropocene is characterized by Gaia as a rational agent, a legitimate player, (unlike her passive role in planet Globalization) and the people are taking notice. If we as a society would allow such agency to flourish, we would usher in “Planet Terrestrial”, which he describes as the same planetary body as the “Planet Anthropocene”, but one where the politicization of nature may finally take over. “Planet Terrestrial” places emphasis on human and nonhuman entanglements without the boundaries of the past. “Planet Terrestrial” demands that freedom is not reserved for human lifeforms; enter Gaia.

He then emphasizes how Western culture has reached a turning point, where we find ourselves debating several potential directions (or Planets). Alongside “Planet Terrestrial” exist two other competing political orientations, including the darker bodies of “Planet Security” and “Planet Exit”. These dark planets, each with a strong gravitational pull capable of engulfing all others, share the common traits of fear and denial. The first of these two harmful narratives is “Planet Exit”, characterized by the transcendence of technology. “Planet Exit” is the primary hope for those like Elon Musk. As Latour says, planet Exit “needs no Earth except as a provisional platform before new adventures begin. On to Mars!” (Latour, 2018, p. 278). Such a

narrative discards the universe of the modernist dream (that narrative that is still being entertained by those on planet Globalization), and instead, *accelerates* the break away from Earthly conditions. One of the primary issues associated with this dark theoretical “Planet” is that it is comprised of a gated community of elites, intending to abandon civilization as we know it, leaving behind billions who lack the financial means for undertaking such a journey. As Latour says, Planet Exit is Noah's Ark for the rich and elite.

The second of these two dark planets is also the one Latour believes to possess the most considerable gravitational pull of all, “Planet Security”. “Planet Security” answers the question of “where do the millions of people go?”, by replying, “wherever they would like, so long as they remain behind walls, and thereby retain at least one element of the former civilizing project—protection and identity” (Latour, 2018, p. 278). The attraction to “Planet Security” is apparently overwhelming, as evidenced by the masses in support of the former United States president so invested in the security narrative that he felt he must build a wall to keep others out, as Latour says, “almost everybody, it seems, dreams of fleeing inside a neo-national, neo-local bounded space, even though it might mean abandoning any pretense of maintaining the civilizing project of the recent past” (Latour, 2018, p. 277). He states that, for both of these dark planets, “climate denial is consubstantial to their projects”, and resultantly we may confidently state that fear is likely the guiding principle in both cases (Latour, 2018, p. 279).

At the conclusion of his tour, Latour discusses “Planet Vindication” or in a historical context, the first political orientation whose gravity pulls upon “Planet Terrestrial”. He emphasizes how “Planet Vindication” contains historical narratives of pre-modernity, of more traditional cultural nature ethics, so why then does he explore this narrative last? According to Latour, “Planet Vindication” is that celestial body that can only be viewed when considering all

the planets together in a spatial configuration, and thus needs to be considered contextually after the other narratives have been introduced, furthermore whenever it is treated first, it is deemed “primitive”. In his discussion of this label, he states, “whenever people talk about modernization, they immediately create, by way of contrast, a primeval site, that of archaic attachment to the soil, to the ground, which is then either ridiculed as that from which the whole civilizing project has been extricating itself, or—what is worse—celebrated as a mythical, archaic, primordial, autochthonous Ur-Earth free from all the tragic sins of civilized humans” (Latour, 2018, p. 281). However, with the extraordinary rebirth of anthropology that has occurred in more recent years, Latour argues that for the first time we do not have to define things in comparison with modernity, and thus may be able to collectively discard such false notions of traditional narratives as rudimentary or primitive. The “Planet Vindication” narrative emphasizes the appeal of these more traditional narratives of Earthly reciprocity, and its significance lies in its influence on “Planet Terrestrial”, or that narrative that Latour hopes we opt for among our many options. If we entered into the narrative of “Planet Terrestrial”, as informed by “Vindication” we would be accepting the validity of traditional narratives (such as the nature ethic ubiquitous in Indigenous cultures) and turning back to those stories and political orientations that are bound in that attachment to the soil, to the Earth, that some might falsely deem “primitive”. Latour remarks, “it is about time we move from modernity to contemporaneity, that is, to the present, and seek vindication” (Latour, 2018, p. 281).

The value of Latour’s work in relation to this examination lies in his emphasis on the importance of stories, and his argument that progress must entail the cultural shift to a new narrative (or “Planet” in Latour’s terms), characterized by interconnection, and the politicization of nature, where we refuse to nurse denial, or flee in fear but rather to increase our connection

with all beings and the Earth itself. Furthermore, Latour eloquently makes the crucial point that humanity has arrived at a junction, where we experience the lure of multiple potential societal narratives, many of which will do little to solve the problems at hand but may bring more comfort through willful ignorance. In a time where we feel the gravitational pull of so many radically different stories, we must ask ourselves, which of these narratives places emphasis on truth, self-awareness, and progressive understandings?

In his 2020 paper, “Around the Pluriverse in Eight Objects: Cosmograms for the Critical Zone”, John Tresch discusses such concepts through the lens of cosmological arrangements, from the view of the Critical Zone. He examines varying cultural perceptions of humanity's place in the universe and relationship with their natural environment. Tresch conducts this analysis by examining cultural artifacts, or what he deems “cosmograms”, defined as “representations of the universe, objects that convey what the cosmos contains, its interrelations and hierarchies, its history and direction and humans place within it” (Tresch, 2020, p. 58). He reads these cosmograms as if they were written stories, believing they provide insight into the ways that different cultures and eras think about their relationship with the rest of the universe. As Tresch says, “beyond the question of their content and aesthetics, we can ask why these cosmograms were made, by whom, and in response to what historical pressure? What theory of representation do they imply? And above all, what do they *do* — how do they propose, institute, challenge, satirize, critique, prop up, or quietly reinforce an order of the universe?” (Tresch, 2020, p. 58). He asks how we might represent our cosmos not from above and outside, but from below and from within. This in and of itself, is the challenge of the critical zone, of Gaia 2.0, as Tresch says. He calls for the need to re-terrestrialize, asking the question, “how do we acknowledge that we live in a pluriverse without descending into pure chaos or endless cosmo-clash?”, “how do we

grant each of them a genuine reality, a livable coherence?” (Tresch, 2020, p. 68). Most importantly, Tresch asks, “how do we reposition ourselves in relation to, and within, a cosmos where over two hundred years of entrenched policy are steadily eroding the self-regulating cycles of air, soils, rock, water, and organisms?” (Tresch, 2020, p. 58).

While Tresch focuses primarily on material objects in his examination of cosmograms (like a seismograph, a painting, or a map) this analysis will analyze cultural artifacts through Tresch’s theoretical framework, focusing on more intangible cultural cosmograms such as economy, language, and science specific to the West, in the belief that these intangible expressions still transmit the same representative insights.

In the wake of examining such scholarship, we must collectively ask, Will we allow ourselves to be sucked into the gravitational pull of those dark planets like Latour’s *Exit or Security*, effectively allowing our fears to paralyze us? Or, perhaps, will we opt for Planet Terrestrial? Or Haraway’s *Chthulucene* of species assemblages, characterized by recognition of kin? Or might we make attempts to re-terrestrialize as Tresch suggests? As these scholars recommend (along with the author of this analysis) before we decide to lock ourselves behind walls, stubborn and armed, or flee with our tails between our legs for another planet where we will inevitably repeat the same cycles of exploitation and ignorance, we ought to make another effort – an informed effort – at being connected, rational beings, distinguished by empathy rather than greed, ignorance, or fear. We must then ask ourselves how we might actualize such a paradigm shift? Who might we look to as an example?

The dominant commonality consistently echoed throughout the recommendations of Tresch, Latour, and Haraway (*Planet Terrestrial*, *Chthulucene*, and re-terrestrialization) entails the necessity for a fundamental shift in our understanding of kin and community to embody more

than humanity alone. However, as scholars like Robin Kimmerer, Carolyn Merchant, Gregory Cajete, Howard Harrod, Dave Aftandilian, and many more would cite, a narrative of interconnectedness and of reciprocity with the Earth, has existed under our very noses for the entirety of Western history (a point emphasized by Latour's "Planet Vindication"). Indigenous cosmologies and understandings of the world reflect and perpetuate a nature ethic that the West has summarily dismissed since the dawn of relations between Christian Western entities and Indigenous tribal ones. The ethics of interconnectedness, of reciprocity with the land, of re-terrestrialization, of kinship, have long been practiced in Indigenous societies of the West. We need not search for new narratives to inform us; we simply must allow ourselves to listen to those that have existed in Indigenous cultures since time immemorial.

This analysis, therefore, intends to contribute to the discourse surrounding the power of narratives, the deconstruction of anthropocentricity, and the acceptance of alternative paradigms, characterized by themes of interconnection and reciprocity, such as Indigenous cosmologies and ways of knowing. The Western societal notion of humanity as distinct from nature, fostered by ancient stories, religion, and cosmologies, no longer serves us. This collective misinterpretation has bred unrestrained exploitation, domination, and general indifference with dire consequences. Deconstructing such deeply embedded understandings (present in so many aspects of culture and society, as exemplified by Western cosmograms) requires the acceptance of new stories that reshape our orientation to the world. As proposed by the more progressive scholars in the discourse community, we may look to Indigenous teachings, cosmologies, and Traditional Ecological Knowledge (TEK) as a far superior conceptual model for understanding the environment and the alternative not taken.

In what follows, we will examine some of the dominant stories of the West, including Greco-Roman and Christian, and how they reveal deeply embedded Western doctrines of separation from nature. The peripheral narrative (peripheral in the eyes of the dominant Western powers) of Western Indigenous communities will be examined to exemplify the alternative environmental ethic present in Indigenous cosmologies versus traditional Western ones. Then we will further exemplify this contrast by examining some tenets of culture, through the lens of John Tresch's "cosmograms" to display how these vastly differing cosmologies are expressed in society. We will then discuss how we might deconstruct the social construction of the perceived divide between humanity and nature, by heeding Indigenous narratives and collaborating with Indigenous groups to restructure policy and environmental land management in the West.

Historical Stories: Narratives Regarding Humanity's Place in Nature

In our attempts to determine how we have arrived at this juncture in Western history – an epoch characterized by collective misinterpretations, climate degradation, and ecological collapse – we must first investigate both the dominant and peripheral narratives of the West that have informed our collective perceptions of the natural environment. Beginning with the ancient West, the following segment of the analysis will examine Greco-Roman cosmologies, perceptions, and relations with the natural environment through the lens of prominent environmental historian, Donald Hughes, specific to his 2014 work, *Environmental Problems of the Greeks and Romans*. Ancient interpretations of the natural world, and the expressions of these understandings in the societies and cultures of antiquity, will be examined and discussed in order to provide historical context to our analysis. This discussion will then follow the thread of history into the emergence of Christianity as the dominant ideology, relying heavily on the work and theories of prominent scholars including the ecofeminist, historian, and philosopher, Carolyn Merchant, and her 2003 work *Reinventing Eden the fate of nature in western culture*, as well as American historian, Lynn White Jr., and his 1967 work, “The Historical Roots of our Ecologic Crisis”. Other works featured in this analysis (but somewhat less prominently) include the theological historian, Alan Kreider’s 2016 book, *The Patient Ferment of the Early Church: The Improbable Rise of Christianity in the Roman Empire*, and the historian, Kenneth Latourette’s 1975 work, *A History of Christianity*.

Greek Polytheism

Greco-Roman civilization marked a lengthy period of varied attitudes, where creativity flourished through the tolerance of new ideas and understandings. Some of these ideologies

supported a balanced human relationship with the natural environment, and others contested it – there existed no consensus among the Greeks on this matter. However, the dominant theology of the age, polytheism, had a positive influence on cultural perspectives of the environment.

Traditional Greek polytheism regarded the natural world as sacred, teeming with the gods of nature who possessed some human qualities. This notion of interconnectedness between the gods, Earth, and humanity bred an expectation that the natural world should be treated with care and awe, a belief widely practiced (Hughes, 2014). As Donald Hughes states “even the gods associated most closely with aspects of human life had deep connections with nature; the religious tradition did not distinguish sharply between human beings and the rest of nature” (Hughes, 2014, p. 44).

Greek polytheism assumed the presence of multiple gods and goddesses, regarding them as personifications of natural forces. All the major gods were associated with nature and many of the minor ones were believed to be divinized natural features such as winds, rivers, or trees. Virtually all features of the landscape had an associated deity – nymphs called naiads for springs, limniads for lakes, oreads for mountains, napaeae for valleys, and leimoniads for meadows. For the ancients, the entirety of the natural environment was endowed with living beings, resisting ill-considered actions of humanity, protecting natural places, and maintaining their order. Earth herself was considered the oldest of the gods – mother of deities, humanity, and every living thing. The worship of Mother Earth, or Gaia, (gê), was immensely ancient, traceable back to the Stone Age. The Greeks believed her creative womb bore all in existence, that they were born from her, nourished by her, and returned to her at death (Hughes, 2014). Hughes quotes one ancient Greek text, which portrays a conversation between Socrates, and Critobulus. Socrates, the prominent Greek philosopher, remarks to the Greek politician, historian, and scholar,

Critobulus “who treat her well receive blessings, who treat her ill suffer privation, for she gives with even-handed measure. Earth forgives, but only to a certain point, when the balance tips and it is too late: famine, disease, disaster, and death ensue” (Hughes, 2014, p. 45). This exchange, occurring between two influential scholars of Ancient Greece, displays the relevance and reach of these concepts – extending into the upper echelons of Greek society.

Beyond temples dedicated to deities of the environment, this delight and reverence for natural beauty were reflected in the poetry, literature, architecture, art, and prose of the time. The subjects of paintings included landscapes, animals in motion, and the flashing sea, rocky islands, and waving forests of the Mediterranean. Although the nonceramic paintings of the Greeks are almost entirely lost, it can be deduced from Etruscan and Roman adaptations that the majority included portrayals of nature. The lyric and dramatic poets sang praises of the land and the sea and a school of pastoral writers in Hellenistic Alexandria (of whom Theocritus is best known), even developed and adopted a romantic style of describing the environment, placing emphasis on the delights of the countryside (Hughes, 2014; Payne, 2014). Displaying remarkable environmental awareness, ancient and sacred architecture was always erected with attention, and adaption to the natural context of the site, Hughes writes “the sacredness of the place existed before it was dedicated or a temple constructed there, and anything built or done there had to recognize the power present in Earth and sky” (Hughes, 2014, p. 49). Every sanctuary had an orientation or location dictated by its natural setting, especially those that could be perceived as bodily forms, including masculine promontories, and feminine breasts. Architecture of this type reflected the perceived connection between the human form, the natural environment, and the sacred gods (Hughes 2014).

These attitudes were reflected in collective understandings of morality as well. Justice was viewed, not solely as equity amongst humanity, but as the maintenance of proper relationships between people, the natural environment, and the gods, as balance between these entities was believed to maintain the balance of the whole universe. As a result of this perspective, transgressions against nature and its deities were believed to have serious implications. Pollution, for example, was an egregious violation, thought to result in divine punishment to the offender for the disrespectful act of deliberately sully nature. Traditional texts detail a lengthy list of taboos associated with pollution of various kinds. The Latin words *polluere*, and *pollutus* carry both moral and ceremonial significance along with the meaning of sully with filth. Instances of deliberate pollution even aroused public wrath; the most famous example being when emperor Nero bathed ostentatiously at the intake of the Aqua Marcia, one of Rome's Aqueducts. The early Greek poet Hesiod even cautioned his audience against urinating or defecating in springs or rivers, a prohibition that occurred as part of a long list of magical injunctions. Such rules exemplify the notions of morality and justice held amongst the ancient Greeks, as encompassing more than humanity alone (Hughes, 2014).

The careful balance they strived for was maintained through both rewards and punishments. The gods responded with gifts when people acted in ways they found pleasing and cared for the environment justly and wisely. These gifts were reciprocated, as many ancients believed sacrifice was a gift to the gods in expectations of benefits, or in thanksgiving. This reciprocity ethic is represented in the Latin phrase *do ut des*, or "I give [to you] so that you will give [to me]" (Hughes, 2014, p. 52).

Beyond their admiration for the environment, they regarded it as a proper object for rational investigation and made attempts to understand it. Beginning first with the natural

philosophers, the Greeks wondered about the basic building blocks of the universe, and who, why, and when they were assembled. Although ancient thinkers did not refer to these investigations as ecology, they posed questions that would today qualify as ecological inquiry. The Greek Pre-Socratic philosopher, Empedocles, conceived of the universe as endlessly recycling, even discussing notions of natural selection, believing that all creatures arose from a mixture of elements, and noticing that only those whose structure fit their purpose survived, while those with an odd assortment of parts would more frequently perish. Empedocles pondered why different plant and animal species preferred different environments, puzzling over the roles of moisture, soil, and climate in plant growth and attempting to divine a concept of harmony between organisms and the environment they inhabited. Another pre-Socratic Greek philosopher, Anaximander, wondered how humans, who appeared to him weaker than any other species and spend childhood in a defenseless state, could have survived in the earliest times. The Greek historian Herodotus extensively considered the relationships between predators and prey. Such an intimate cultural connection with the natural environment fostered rational curiosity that was encouraged by Greek culture (Hughes, 2014). For these reasons, Hughes considered the Greeks, as “forerunners of the science of ecology, even if their ideas reached fruition only in modern times” (Hughes, 2014, p. 59).

Roman Polytheism

Roman occupation of Greece, and Roman interpretations of religion and nature (based more in practicality than reverence), altered the dominant cultural milieu, allowing for the eventual erosion of Greek polytheism in favor of Roman, and later Christian, narratives. Greece was conquered by the Roman Empire towards the end of the Hellenistic period, and the following years showed a shift in the dominant ideology (Hughes, 2014; Merchant, 2003).

Although the Romans still maintained a reverence for wild places, even personifying mountains like Father Apennine as gods in their own right, Roman polytheism followed a slightly different course. While Roman polytheism still shared many sources with Greek religion, and in later times exhibited openness to Greek myths, as well as religious practices, their mythology had a strong agricultural leaning, based more in practicality and less in reverence but still containing strong elements of both. While they were fascinated with Greek ecological inquiry, they added little to it, besides the small contributions of Roman agricultural writers, who made a few useful comments on cultivation but could hardly be considered students of ecology (Hughes, 2014). Attitudes under Roman rule began to weaken the older Greek polytheism, taking on a more pragmatic feel. This transition impacted attitudes towards the natural environment as well – a shift reflected in the poetry of the late Hellenistic period (Payne, 2014). The German philosopher, and poet, Friedrich Schiller, in his paper 1795-6 *On Naïve and Sentimental Poetry*, examines poetic theory, specific to the different varieties of poetic relationships with the natural world. Dividing poetry into two forms, he classifies naive poetry as those works which depict direct descriptions of the natural world, and sentimental poetry as those depicting more sentimental and self-reflective attitudes (Payne, 2014). In his examination of Greek poetry, written towards the end of the Hellenistic period, (or the period in which Greece was conquered), Schiller claims there exists a fundamental change in the way the natural world was depicted, displaying a new perception of externality in respect to “nature”, stating “the early Greeks did not experience their difference, such that they can be said to have been part of Nature in the way in which we understand rivers, rocks, trees, or animals (‘the natural world’) to be parts of a totality that, because it does not include ourselves, we can long to be part of too” (Payne, 2014, p. 2). Payne finds that Schiller argues that since the early Greeks had not lost what was natural in

their humanity (or the understanding of humanity as a part of nature) they did not depict any distinctions between themselves and the natural world in earlier forms of poetry (Payne, 2014). More specifically, Schiller argues that the early Greeks did not depict the environment with any clear sentiment, believing that they did not conceive of their difference enough to feel a moral obligation to strive for such a connection, because, for the Greeks, such a connection was an implicit truth. He states that the early Greek poet, “seems, in his love for the object, to make no distinction between what it is of itself, and what it is through art and human will. Nature seems of more interest to his intellect and thirst for knowledge than to his moral feeling. He does not cling to nature with the fervor, sensitivity, and sweet melancholy that we moderns do. Indeed, by personifying and deifying it in its individual appearances, and by presenting its effects as actions of beings endowed with freedom, the Greek overcomes the serene necessity in it” (Payne, 2014; Schiller, 1795-6, p. 194). In simpler terms, “the poet either *is* nature, or he will *seek* it” (Schiller, 1795-6, p. 200). Late Hellenistic successors display what Schiller deems “naive and sentimental” forms of poetry, emphasizing a perception of separation between themselves and the environment (Payne, 2014; Schiller, 1795-6). It is important to note that Schiller’s work is both complex and theoretical, thus the interpretations posited in this essay may display the limitations of the author’s understanding of the disciplines in question.

From the philosophical standpoint, many of the Roman emperors were stoics, and in a position to apply their philosophy in ways to affect widespread areas of the Mediterranean basin and beyond. Stoic attitudes were largely focused on humanity, and primarily assumed a natural order of beings with plants at the bottom, animals second, and man on top. These attitudes, evidenced in the academia and arts of the time period, continued to erode the old Greek polytheism, and with it, the associated attitudes surrounding nature (Hughes, 2014).

The Totality of Impacts from Ancient Greece and Rome

There is no simple answer regarding the degree to which ideas held by the Greeks and Romans affected their practical treatment of the environment. Some protection was undoubtedly afforded through the dominant polytheism and associated regard, but it is characteristic of humanity to evade religious teachings in the face of self-interest. Major changes to the landscape were frequently avoided as they were believed to challenge the authority of the gods and incite their vengeance, and general animism made them think twice before harming the flora and fauna of the landscape. The ecologists of the time even pointed out and recognized environmental problems and occasionally offered solutions. The ancient religion and some forms of philosophy could have likely provided constructive environmental attitudes but would have been rendered useless without specific knowledge of the effects of human actions, and the inner workings of the environment to inform conservation. Overall, the environmental orientation of the ancient religion was rooted in preserving the natural order but not all Greeks and Romans subscribed to this understanding (Hughes, 2014).

The transition from polytheism to the monotheism of the Roman empire marked the disintegration of the Greco-Roman gods that embodied and guarded nature, its features, and inhabitants. In later classical times, religious agnosticism and doubt trickled downward, with the spread of Christianity weakening the older nature religion. The decline of polytheism, as well as the rise of attitudes of hierarchical superiority allowed for Christian understandings to dominate Rome over a period of hundreds of years (Hughes, 2014).

The Rise of Christianity

The following examination of the rise of Christianity in the Roman Empire will focus on the research and theories put forth by Kreider, Latourette, and Merchant, with less emphasis on the work of Hughes. The late Republic of Rome brought a change in attitude towards the Roman state religion (Hughes, 2014). While they continued to build temples to the old gods, the educated and wealthy classes had already begun to doubt their very existence (Kreider, 2016). While the ruling elite did not surrender the state religion – primarily because it was so intertwined with the politics of Rome — many of the elite turned privately to astrology as primary guidance, while maintaining the facade of public worship of the old gods. These seeds of doubt amongst the educated and wealthy classes likely paved the way for Christianity to become the official religion of the Roman empire in 380 CE (Latourette, 1975). Meanwhile, (around 36 CE), in cities brimming with the poorest of peoples, Paul the Apostle, a converted Christian, spread the gospel to those in desperate need of hope. While Jesus had spread his teachings only to the Jewish peoples, Paul believed that Christianity should be distributed to the whole of the Roman Empire, and by the end of his life, Paul had traveled some 10,000 miles for over 30 years, spreading the gospel of Jesus Christ and converting the hopeless and destitute. Through a combination of these factors, Christianity spread like wildfire through the Roman Empire, and by the eve of emperor Constantine’s accession in the fourth century, an estimated five to six million people (between 8-12% of the imperial population) already practiced Christianity (Kreider, 2016; Latourette, 1975). In 313 CE, the religion was granted legal status in the Roman empire with the issuance of the Edict of Milan by Emperor Constantine. Later in 325 CE, Constantine summoned the council of Nicaea – an assemblage of Christian leaders gathering to define the formal and orthodox beliefs of Christianity. This council meeting resulted in the

Nicene Creed, a document laying out the agreed-upon beliefs of the growing theology. Despite these measures, Christianity did not formally dominate the empire until 380 CE when Emperor Theodosius issued the Edict of Thessalonica, which declared Christianity (more specifically Nicene Christianity) the official religion of the Roman state. Subsequently, most other Christian sects were deemed heretical, losing their legal status and members had their properties confiscated by authorities (Kreider, 2016; Latourette, 1975; Radford, 1995).

Christian Cosmology

Carolyn Merchant's examination of Christian cosmology, present in her 2003 book, *Reinventing Eden: The Fate of Nature in Western Culture*, provides significant insight into Christian cosmological understandings relating specifically to the natural environment. The dominant cosmology in Christianity, the story of Adam and Eve in the Garden of Eden, tells of a precipitous fall from a pristine past. The Christian Bible offers two origin stories preceding the fall. In Genesis 1, God created the land, the sea, the grass, herbs and fruit, the stars, sun and moon, and the birds, whales, cattle, and beast, after which he made man in his own image ... male and female. He instructs the couple to, "be fruitful and multiply, replenish the Earth, and subdue it", they are given "dominion over the fish of the sea, the fowl of the air, and over every living thing that moveth on the face of the Earth" (Genesis 1:26-31; Kreider, 2016; Latourette, 1975; Merchant, 2003).

The alternative Garden of Eden creation story, derived from Genesis 2 and 3, tells a slightly altered story of creation, temptation, and expulsion. In Genesis 2, God creates "man" from dust, then the Garden of Eden, the four rivers flowing from it, and the trees for food. He places man in the garden to dress and keep it, creates the birds, and beasts from the dust, bringing them to Adam to name, and only then does he create "woman" from Adam's rib.

Genesis 3 begins with Eve's temptation by the serpent, the consumption of the fruit from the tree of knowledge of good and evil, and the loss of innocence through the expulsion from the Garden of Adam and Eve. Eve becomes "the mother of all living", and Adam is condemned to eat bread "in the sweat of thy face", and sent forth from the Garden, to till the ground from whence he was taken. Because of Eve's mistake, the first couple is cast from the light of an ordered paradise into the dark disorderly wasteland of Earth, doomed to labor for eternity (Kreider, 2016; Latourette, 1975; Merchant, 2003). Eve is the central actress, and the story's plot is declensionist and tragic. Merchant discusses the fall from the garden, stating "the end result is a poorer state of both nature and human nature. The valence of woman is bad; the end valence of nature is bad, Men become the agents of transformation" (Merchant, 2003, p. 12).

Although faith in the old gods and the associated environmental ethics had begun to dwindle many years prior, the formal shift to Christianity legitimized newer attitudes of hierarchy and separation. Christian doctrine established the dualism of man and nature, insisting that it is God's will that man must exploit the environment for his proper ends; a belief posited by nearly all of the scholars present in this analysis (Merchant, 2003). This understanding starkly contrasted with the principles of Greek polytheism, where every tree, spring, and hill had a guardian spirit, accessible to men and responsible for protecting wild and sacred places (Hughes, 2014; Kreider, 2016). In antiquity, before one dammed a brook, or chopped down a tree, the ancients believed it paramount to placate the resident spirit, showing respect to mother, Gaia, and her fellow gods (Hughes, 2014). In stark contrast, the Christian worldview regarded a tree or a brook as no more than a physical fact, placed on God's green Earth for use by men as they saw fit (Hughes, 2014; White, 1967). Genesis 9 declares that God says to Noah and his sons, "the fear and dread of you will fall upon all the beasts of the Earth and all the birds of the air, upon

every creature that moves along the ground, and upon all the fish of the sea; they are given into your hands. Everything that lives and moves will be food for you” (Genesis 9:2). Humanity, once an equal member of the universal assemblage of man, deities, and the environment, had now assumed disproportionate significance in the established hierarchy of beings. Even as early as the 2nd century, Tertullian, one of the first Christian authors, and Saint Irenaeus of Lyons, a Greek Bishop, insisted that when God shaped Adam, he was foreshadowing the image of the incarnate Christ or the second Adam (White, 1967). In this way, as Lynn White puts it in his essay “The Historical Roots of Our Ecological Crisis”, “man shares, in great measure, God’s transcendence of nature” (White, 1967, p. 197).

Furthermore, the depiction of man as cast from an ordered haven (Eden) into a desolate wasteland (Earth), fostered false conceptualizations of the possibilities of order and perfection in landscapes. Compared to that perfect paradise, Eden, Earth was a disordered, frightening, unruly, and insufficient desert, and man became immediately responsible for attempting to tame and shape it into the original garden. According to Merchant, this aspect of the story of the Garden of Eden has continued to dominantly shape Western culture since its immersion into the mainstream narrative, in the creation and perpetuation of what she deems, “The Recovery Narrative”, or the theory that humanity has continually tried to reclaim the lost Eden by reinventing the Earth as a garden. As Merchant emphasizes this narrative is, “perhaps the most important mythology humanity has developed to make sense of their relationship with the natural world” (Merchant, 2003, p. 2). The methods for achieving this recovery have changed with both the passage of time and the directions provided by biblical texts; in the book of Genesis 1, recovery was to be achieved through domination, and in Genesis 2 human labor was believed to be the route to redemption for men and women, while cultivation and domestication would redeem the Earthly

wilderness. Enlightenment brought the tools of science, technology, and capitalism as transformative agents, and modernity utilizes biotechnology and industrialization in these continued attempts at recovery (Merchant, 2003).

As emphasized by numerous scholars, cosmologies and theologies shape our orientation to the world. Origin stories both reflect and influence our cultural understandings and inform our actions. As displayed in the accounts of the Greeks and Romans, the manner in which theology or cosmology presents an entity determines the treatment and perception of that entity. In the context of the Greeks and to some degree the Romans, their polytheism established a natural order that recognized humanity as a member of a natural community of beings, capable of contributing to balance and a reciprocal connection, and their treatment of the environment largely reflected that belief (Hughes, 2014). In the context of Christianity, doctrine designated nature as a commodity materialized for the sole purpose of serving humanity (Merchant, 2003; White, 1967). As a result, the relationship was reduced to one of consumption, and our actions have largely reflected this worldview ever since. These ancient theologies inform the present – as White states “we continue today to live, as we have lived for about 1700 years, very largely in a context of Christian axioms” (White, 1967, p. 197). In Hughes’ discussion of the impact of Christianity on Roman treatment of the environment, he states “the first book of the Bible said that God had given man “dominion” over the Earth, and many Christians took that command as permission to do what they wished to the environment, rather than as a call to responsibility” (Hughes, 2014, p. 231). He goes on to claim “here can be seen an important root of the modern ecological crisis. To use nature as a slave by right of conquest, without considering her ability to meet the demands placed upon her, was shortsighted practicality” (Hughes, 2014, p. 231).

The dominance of Christianity, which marked the decline of the nature ethic present in Greek (and to some extent Roman) culture, shifted the cultural cosmology from a polytheistic understanding of the universe to the Adam and Eve narrative. This transformation established the natural environment as solely in existence for human use and abolished notions of universal interconnectedness or equality amongst man and other living beings (particularly characteristic of Greek understandings). Gaia was cast from the Western record and replaced with the age of man, the age of capitalism, effectively separating us from our natural environment. The dominance of the Christian narrative has prevailed ever since, its doctrines woven into the fabric of Western society, and thus we find Christian tenets of belief ingrained in our modern perceptions of the natural world despite whatever religious views we may hold today.

Peripheral Western Narratives

We have now examined the dominant Greco-Roman, and Christian understandings of the world – those narratives that form the bedrock of Western culture – but what of the peripheral narratives of the West? In examining the totality of Western history, we must also investigate the alternative groups functioning outside of Christian and Roman doctrines of practicality and separation from the natural environment. The Christian worldview, which validated capitalist ideologies of exploitation of nature, subjugated and disregarded any narratives that went against this status quo. Thus the doctrines of Christianity and capitalism, in tandem, overshadowed those cultures with a strong nature ethic like the Greeks (who viewed nature as more than a means for exploitation), and Indigenous communities who likewise regarded the natural world as sacred and sentient; for in a Christian and capitalist society, such beliefs were fundamentally antithetical to Western notions of ownership of land, and land as an asset for profit. While we have discussed the nature ethic present in Greek society, we have yet to examine Indigenous cultural beliefs.

Scattered across Western landscapes lived innumerable Indigenous societies, operating under vastly differing doctrines than those dominating the West. Indigenous narratives, informed by diametrically opposite cosmologies, fostered an interconnectedness with the natural environment that bears similarities to the ancient Greeks. To glean a better understanding of Indigenous cultural beliefs and modes of operationalization, we must examine Indigenous cosmologies and spirituality as we have done with Greco-Roman and Christian beliefs.

The examination of Indigenous cosmologies and the cultural expressions of these beliefs will filter primarily through the lens of the Indigenous botanist and ecologist, Robin Kimmerer, in her 2013 work, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Other scholarship that will feature prominently in this investigation include sociologist, and theologian, Howard Harrod's 2011 work, *The Animals Came Dancing: native American sacred ecology and kinship*, the anthropologist Dave Aftandilian's 2011 work, "Toward a Native American Theology of Animals: Creek and Cherokee perspectives", and Virginia Anderson's 2004 book, *Creatures of Empire: How Domestic Animals Transformed Early America*. It is important to note that while Indigenous and Aboriginal communities existed all throughout the world, this examination will focus largely on narratives from Indigenous communities in Canada and North America in accordance with the geographic focus of the reference materials. As a narrative operating on the periphery of Western history and culture, subjugated by Christian doctrines of dominance and attempts to "civilize" those which they deemed "wild", and "savage" it is crucial to emphasize the validity of the Indigenous narrative, which offers such an alternative understanding of humanity's place in the natural world.

Indigenous Cosmologies

As with Greco-Roman cosmology and theology, one cannot speak of consensus regarding Indigenous origin stories, and spirituality (Aftandilian, 2011; Hughes, 2014). However, while accounts vary from Indigenous Nation to Nation, common threads exist throughout. One primary theme is the prominent role of animals as sentient and capable beings, instrumental in the establishment of the natural world, and often possessing sacred spiritual power. Another is the theme of a reciprocal dynamic existing between Mother Earth, animals, and humanity, as well as an emphasis on the importance of maintaining a balance between all three connected entities. Lastly, Indigenous cosmologies present no dichotomy between humanity and animals – humans are just one of the many species comprising the diversity of life on Earth (Aftandilian, 2011; Kimmerer, 2013).

As an exemplary tale of some of these prominent themes, we can look to the Iroquois, or Haudenosaunee origin story of Skywoman Falling. The Haudenosaunee are an Iroquoian-speaking confederacy of First Nations peoples in northeast North America (or Turtle Island), made up of six Indigenous Nations, the Mohawk, Oneida Onondaga, Cayuga, Seneca, and Tuscarora (Kimmerer, 2013). The following retelling was adapted from the description provided by Robin Kimmerer, in her book, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. The story begins with a column of light streaming from a hole in the Skyworld, a falling woman clutching a bundle tightly in her hand. She sees only dark water below her, but in the emptiness, she begins to distinguish the glint of many eyes gazing up at the shaft of light. To the eyes below, she was, at first, only a small indistinguishable object, a mere dust mote in the beam. But as it grew, they could see it was a woman, with arms outstretched and long black hair flowing behind her. The geese nodded at one another, rising

together from the water and she soon felt the beat of their wings as they flew beneath her to break her fall. Far from the only home she had ever known, the warm embrace of the geese allowed her to catch her breath, and the soft feathers carried her gently downward. The geese could not hold her above water for much longer, so they assembled a council to decide what was to be done next. Resting on their wings, she watched them gather, loons, otters, beavers, swans, fish, and a great turtle. The turtle offered her his back to rest upon, and gratefully she stepped from the wings of the geese and onto his shell. The others knew she needed land for her home and discussed how they might help her. The deep divers amongst the group had heard of mud at the bottom of the flooded world, and so together they agreed to endeavor to search. The loon dove first, but the distance was too far for him and after a long time he resurfaced with nothing to show for his efforts. One by one the animals offered their help, but the depth, the darkness, and the pressure were too great for even the strongest of the swimmers. Soon, only the little muskrat was left – the weakest diver of the group – yet he volunteered while the others looked upon him doubtfully. He was gone for a very long time and the others waited and waited for him to return, fearing the worst for their relative and their friend. Before too long, a stream of bubbles rose with the small limp body of the muskrat. He had given his life to aid a vulnerable woman. But soon the others noticed that his paw was tightly clenched, and when they opened it, he held a small handful of mud. Turtle said, “here, put it on my back and I will hold it”, and so Skywoman spread the mud with her hands across the shell of Turtle. She was moved by the extraordinary kindness of the animals, and she sang and danced in thanksgiving to them. The land grew as she danced her thanks, from the small bit of mud on Turtle’s back into the whole of the Earth. Not by Skywoman alone, but from the alchemy of all the gifts of the animals and her deep gratitude. Together they formed Turtle Island.

Like any good guest, Skywoman had not come empty-handed – when she had toppled from the hole in the Skyworld she had reached out to grab onto the Tree of Life, and in her grasp were branches – fruits, seeds, and plants of all kinds. She scattered these onto the new ground, carefully tending to each until the brown world became awash with green. The sunlight streaming through the hole from Skyworld, and Skywoman’s care, allowed these seeds to flourish. Wild grasses, flowers, trees, and medicines spread. Now that the animals had plenty to eat, many came to live with her on Turtle Island (Kimmerer, 2013, p. 3). While this account varies from tribe to tribe within the Iroquois Confederacy, the primary themes remain the same. For example, the Cherokee cosmology tells a similar story about an Earth Diver animal; in their case, a water beetle, or a turtle, bringing back Earth from the mud at the bottom of a flooded world. The animals use this mud to form the lands, the lands were then shaped into the many mountains and valleys of Cherokee country by the beating of a Great Buzzard's wings (Aftandilian, 2011). As Kimmerer says, “children hearing the Skywoman story from birth know in their bones the responsibility that flows between humans and the Earth” (Kimmerer, 2013, p. 5). Although Kimmerer is a member of the Potawatomi Nation, an Algonquian-speaking Eastern Woodlands tribe, she considers the Iroquois or Haudenosaunee origin story of Skywoman Falling to be the cosmology that informed her worldview growing up. This speaks to the crossover of origin stories and shared values amongst tribal nations.

In the story of Skywoman Falling, the plants, the animals, and humanity all had something meaningful to contribute to the cycle of reciprocity. The interconnectedness present in her story, and Indigenous cosmologies in general, allow for collective belief in a nonhierarchical assemblage of equal beings – an element we see largely absent from Christian theology (Aftandilian, 2011; Anderson, 2004; Kimmerer, 2013). Although Indigenous cultures recognized

the differences between people and other animals, they could not regard them as lesser beings, as they were not defined from the moment of creation as subordinate to humans. As Aftandilian emphasizes, when Creek and Cherokee Nations sought to understand humanity's place in the world, they did so not from a position of superiority, but from the point of view that understood humanity as just one member of numerous species, all united and connected through the cycles of nature (Aftandilian, 2011). He goes on to suggest that while Creek and Cherokee cultures conceived of the similarities and differences between humans and other animals, they did not perceive any real separation between the two, beyond basic distinctions that might be applied when discerning one animal species from another. As a result, all creatures – human and non-human – were capable of possessing spiritual power as they were not defined solely as vessels for human utility. Perceptions of plant life followed a similar track as well. For example, in Indigenous understanding, *Wiinggaashk*, or sweetgrass, was the very first plant to grow on Turtle Island, and so its fragrance holds the memory of Skywoman's hand. Thus, it is honored as one of the four sacred plants of many Indigenous communities (Kimmerer, 2013). Indigenous elders say that ceremonies are the way to “remember to remember”; sweetgrass is a powerful ceremonial plant cherished by many Indigenous Nations, used to make beautiful baskets, as medicine, and considered a relative, possessing both material and spiritual value (Kimmerer, 2013, p. 5). As Kimmerer says, “there is such tenderness in braiding the hair of someone you love. Kindness and something more flow between the braider and the braided, the two connected by the cord of the plait. *Wiinggaashk* waves in strands, long and shining like a woman’s freshly washed hair. And so, we say it is the flowing hair of Mother Earth. When we braid sweetgrass, we are braiding the hair of Mother Earth, showing her our loving attention, our care for her beauty and well-being, in gratitude for all she has given us (Kimmerer, 2013, p. 5). These

perceptions and stories indicate that Indigenous communities did not conceive of their difference from the natural world, and this lack of separation bred meaningful connection with the environment.

Virginia Anderson discusses these topics in her book, *Creatures of Empire: How Domestic Animals Transformed Early America*, examining the place of animals in Native American societies in New England and the Chesapeake region. Anderson argues that Indigenous communities regarded the world as infused with spiritual power, able to assume a multitude of forms. Known to the Algonquian peoples as *manit* or *manitou* (synonymous with the Iroquois *orenda*), this spiritual power could manifest itself in the appearance, behavior, or rarity of particular kinds of animals, humans, and even objects. Possession of *manitou* was not considered permanent but depended primarily on the favor of the guardian spirits who controlled its distribution. According to Anderson, the Narragansett people (an Algonquian American Indian tribe from Rhode Island) identified bears, black foxes, rabbits, and deer as particularly spiritually powerful, with the manifestation of *manitou* in these animals likely linked to their success in eluding hunters. Northern Indigenous tribes, subsisting primarily through hunting, were particularly prone to perceive *manitou* or spiritual power in the prey animals they hunted. However, even though *manitou* was most often detected in animals that provided food, and the raw materials for clothing and shelter, perceptions of *manitou* were not wholly defined by the utility of a species, even if the two factors were likely related. Indigenous tribes that obtained much of their sustenance through horticulture still shared the belief that animals could possess *manitou*, despite a lack of reliance on animal species as a primary food source. There were even mythological creatures believed to be permanently imbued with *manitou* including a sacred thunderbird occupying the sky world, and a giant horned underwater serpent. Additionally, not

all hunted species possessed spiritual power, according to Anderson, Indigenous peoples rarely detected *manitou* in game birds or fish, even though they formed an important element of their diet (Anderson, 2004).

This spiritual association afforded nonhuman creatures access to significant protection, and a special status in many Indigenous societies. The potential for possession of *manitou* could make animals formidable adversaries and thus many Indigenous communities believed that angering the guardian spirit of an individual in possession of *manitou* could lead to retaliation such as ensuring that offending hunters were unlucky in all future hunting endeavors. Hunting, in particular, involved numerous rituals to cultivate the goodwill of animal spirits controlling access to prey. These careful actions sought to maintain the perceived balance existing between humans and other creatures, as Indigenous connections with animals were based in terms of mutual support rather than human dominance (Aftandilian, 2011; Kimmerer, 2013). In her discussion of these rituals, Anderson states “in this, as in so many other aspects of Indian culture, the principle of reciprocity structured both thought and conduct” (Anderson, 2004, p. 32).

Known as natural laws, these rituals and tenets included showing respect to animals, restraint in hunting them, and as Anderson cited, the cultivation of reciprocity – or the principle of giving back in return for the gifts provided by other species (Aftandilian, 2011; Anderson, 2004). Aftandillian discusses the views of the contemporary Creek medicine man, Bear Heart, who explains that his people believed that they should show the same respect for animals, and the rest of nature, as they do for their elder human relatives. As contemporary Cherokee storyteller, Edna Chekele Lee explains, when you hunt a deer, you should kill only one and never waste any of the meat, for doing so would show disrespect for the gift of life that the deer has given to the hunter. The practice of thanking those that gave their lives to the hunters, as well as

apologizing for the need to kill so that their people might live, was a common practice amongst many Indigenous Nations. Perhaps more importantly, consideration was shown by restraint in hunting – Creek medicine man David Lewis, Jr. explained that his people would not kill unless absolutely necessary. He expresses that this practice was a base form of reciprocity, stating, “we take care of them, and they take care of us” (Aftandilian, 2011, p. 200). This ethic is directly represented in the Iroquois story of Skywoman; the animals create land for her to walk, and she in turn dances and sings her thanks, planting gardens for their nourishment (Aftandilian, 2011; Kimmerer, 2011). As both Aftandilian, and Kimmerer emphasize, of all the natural laws, reciprocity is the most important, yet also the one most difficult to succinctly summarize. Contemporary Creek author Jean Chaudhuri explains it as a form of conservation of energy, “in Creek thought, energy is the basis of the universe, and so when a hunter takes energy out of the world by killing an animal for food, she or he must also return energy to the world, giving something back” (Aftandilian, 2011, p. 201).

World renewal ceremonies, performed on behalf of all living beings, were another form of maintaining a reciprocal relationship with the natural world. Tribes of the Plains held Sun Dances, whereas Creeks, Cherokees, and other tribes of the Southeast held Green Corn Ceremonies (Aftandilian, 2011; Harrod, 2000). The Creek perspective specifically believes that humans have sacred trust responsibilities to take care of the rest of nature; thus, when members of Creek culture pray, they pray for all of their relations, seen and unseen, known and unknown including their plant and animal relatives (Aftandilian, 2011).

The consequences associated with disregarding these natural laws range from a lack of success in future hunting endeavors – as described by Anderson – to a loss of spiritual power to even illness or death of the transgressor or a member of their family. Considering the dependence

of Indigenous tribes on animals for both food and spirituality, these implications were taken incredibly seriously (Aftandilian, 2011; Anderson, 2004).

Just like Greco-Roman culture, Indigenous understandings of the natural world were depicted in their art and garb. An English colonist, William Wood, declared that the faces of Massachusetts Native Americans bore certain portraits of animals including bears, deer, moose, wolves, eagles, and more. He stated they were not produced by, “a superficial painting but [by] a certain incision, or else a raising of their skin by a small sharp instrument under which they convey a certain kind of black unchangeable ink which makes the desired form apparent and permanent” (Anderson, 2004, p. 23). Many of the animals depicted were commonly identified with *manitou* and shamanistic spirits, which may explain why those who wore animal emblems wished them to be permanent. Garb and imagery reflected these views as well – animal motifs could be observed on material objects such as tobacco pipes, mortars and pestles, amulets, and even rocks (Anderson, 2004). In her discussion of the garb of Algonquian-speaking Indigenous peoples, Anderson states that they “did not just cloak themselves in fur and inscribe their bodies with figures of various creatures, but also utilized animal materials and images in numerous other ways. Powhatan shamans, for instance, donned ceremonial garb that included a mantle fashioned from feathers and weasel skins and a ‘crown’ made from a dozen or 16 or more snake skins stuffed with moss to give them a more lifelike appearance” (Anderson, 2004, p. 28).

Further Subjugation

While Indigenous narratives already existed on the periphery of thought for the dominant Western powers, these communities and stories were further subjugated when cultural contact occurred between groups. Indigenous erasure occurred ubiquitously in the West, however, in keeping with the geographic focus of the reference materials, this analysis will focus specifically

on the marginalization that occurred (and continues to occur) in North America. The following discussion of these atrocities in Western history will continue to rely heavily on Anderson's and Merchant's research and theoretical understanding of the clash between Native American Indigenous groups and English colonists.

Considering the stark contrast between Indigenous and Christian cosmologies it is no surprise that the convergence of the two cultures marked the beginning of a long and disturbing epoch in American history. In her study of encounters between Indigenous societies, and colonist groups in America, Anderson observed the consequences that arose from the convergence of such vastly differing narratives; one characterized by doctrines of dominance, the other by tenets of reciprocity. The Puritan fathers arrived in a bountiful world, endowed with spirituality, bringing with them their own origin story of Adam and Eve and the associated principles of order. This strange land, free from the Christian doctrines of hierarchy and structure, made the New World an uncomfortable home for the colonists, and they coped with this discomfort by fiercely pursuing the intent to take full possession of America and its fauna, "civilize" those beings they deemed "savage", and impose order. A central tenet of this order was the possession of livestock, as the assertion of dominance over animals was a doctrine that was considered to be both natural and divinely sanctioned. Christian orthodoxy affirmed the colonist's practical experience of dominion over animals that, in the case of livestock, was further reinforced by the animal's legal status as property. This discussion is one of the central points that Anderson argues in her book – more specifically, that the possession of cattle, swine, and other livestock brought over from England by the colonists, acted as physical evidence of the cultural polarity between local Indigenous groups and colonists. To Indigenous communities, the concept of animals as property was both foreign and highly incongruent with their cultural perception of other species

(Aftandilian, 2011; Anderson, 2004; Kimmerer, 2013). English settlers, believing in their own superiority, used this ethic and the associated lack of animal ownership as a metric with which to gauge Native American (perceived) societal deficiencies and therefore prescribe a remedy.

Thomas Jefferson himself discussed the utility of animal husbandry as a primary mechanism for “civilizing” Native Americans. He regarded the raising of cattle as the first essential step in this plan, for he believed it would help Indigenous communities “acquire knowledge of the value of property” (Anderson, 2004, p. 245). Introducing Native Americans to “civilized” ways became a principal goal and colonists asserted that societies who learned to keep livestock would “grow in prosperity, advance along the path toward civility, and eventually convert to the Christian faith that considered human dominion over animals to be divinely ordained” (Anderson, 2004, p. 9). In her discussion of colonists’ attempts to impose civility, Anderson states, “underlying all of these plans was the firm conviction that animals could be made into private property. Though few such designs ever came to fruition, colonists never abandoned their desire to serve as models of the proper relationship between people and animals” (Anderson, 2004, p. 71). According to Merchant, in the eyes of the colonists, the primary method to civilize Indigenous communities was by imbuing them with the Protestant work ethic needed to achieve salvation and properly cultivate the land (Merchant, 2003). As Merchant says, “they would be raised to a more “civilized” state as farmers and commercial traders as they manufactured and sold surplus products and participated in the market economy. They would thus be educated and fully assimilated into the capitalist framework, realizing their potential ‘human nature’ as competitors and becoming full American citizens” (Merchant, 2003, p. 148).

These programs largely failed; Native American communities for the most part maintained a communal rather than individualist ethos, as they were accustomed to sharing

rather than accumulating. Although they were forcibly drawn into a system of trading for commodities, they refused to readily adopt a get-ahead attitude or promote rapid exploitation of natural resources in exchange for profits. Despite rigorous attempts to assimilate them into the Christian narrative, Indigenous communities rejected characterizations of their lands as wilderness or desert, simply calling them home (Anderson, 2004; Merchant, 2003). Chief Luther Standing Bear stated, “we did not think of the great open plains, the beautiful rolling hills, and winding streams with tangled growth, as ‘wild’. Only to the white man was nature a wilderness and only to him was the land ‘infested’ with ‘wild’ animals and ‘savage’ people. To us it was tame. Earth was bountiful...” (Merchant, 2003, p. 150).

When the imposition of Christian order failed to change the fundamental beliefs held by Indigenous groups, the colonists turned to simply displacing them. As Merchant says, white settlers believed that there was no reason to relinquish “a rich, fertile, and beautiful country to a few thousand savages, who can make no use of it but to chase the lessening herds of buffalo and deer.” (Merchant, 2003, p. 149). Thus the U.S. government carried on numerous wars against the plains Native Americans and then, adopted what Merchant calls “a paternalistic stance” and began to regard them as children for whom whites must provide and care, she states, “the treaties in the 1850s and 1860s removed them to reservations, allotted farming plots jointly to several families, and provided funds for education, cattle, farm equipment, and mills and blacksmith shops to bring them out of a state of wandering into one of settled agriculture” (Merchant, 2003, p. 149). Merchant even cites Andrew Jackson in his recommendation that Indigenous communities be relocated to territory especially set up for their habitation – in this way, he stated, they would “share in the blessings of civilization and be saved from that degradation and destruction to which they were rapidly hastening...” (Merchant, 2003, p. 149).

As game diminished, diseases took their toll, and metal trade goods were introduced, Indigenous communities found it increasingly difficult to avoid colonist narratives of life and maintain the old ways. Eventually, many Indigenous communities did turn to livestock husbandry as a way to compensate for the changes induced by American settlement, but like earlier generations, they did so in ways that rejected the agenda intending to erase native culture. As Anderson discusses, this partial accommodation still did not serve them – even the Cherokees, whose engagement in animal husbandry exceeded those of many other groups, suffered forced displacement and the loss of their lands (Anderson, 2004; Merchant, 2003).

Disenfranchised, displaced, and disrespected, the history of Indigenous communities in the West is one of racism, bigotry, and mistreatment. In her discussion of the convergence of Christian and Indigenous cultures, Kimmerer says, “and then they met — the offspring of Skywoman and the children of Eve – and the land around us bears the scars of that meeting, the echoes of our stories” (Kimmerer, 2013, p. 7). She goes on to state, “look at the legacy of poor Eve’s exile from Eden: the land shows the bruises of an abusive relationship. It’s not just land that is broken, but more importantly, our relationship to land. As Gary Nabhan has written, ‘we can’t meaningfully proceed with healing, with restoration, without re-story-ation.’ In other words, our relationship with land cannot heal until we hear its stories. But who will tell them?” (Kimmerer, 2013, p. 9). Listening and learning from Indigenous community members is the first step in healing both our relationship with the land and our relationship with members of a severely marginalized community with wisdom to share.

Worldviews Expressed: Examining Cosmograms

We have examined the historical expressions of these narratives and now must consider the modern ones. The history of the West has been marked by the continual domination and erasure of other cultures in favor of Christian narratives, but what might our modern society look like had we not let these doctrines define us? How might Western culture today be different if we had been propelled by the peripheral Indigenous understandings of our place in the world as opposed to the dominant Christian ones? To construct this image, we can examine what John Tresch has coined, “cosmograms”, or the tangible expressions of humanity’s understanding of their place in the universal order. Cosmograms such as language, economy, education, and environmental science convey notions of history, direction, and collective perceptions of place and hierarchy. The analysis of such significant cultural artifacts provides insight into these frameworks of understanding and allows us to imagine what form life in the West might have assumed, had Indigenous cosmograms been the dominant ones influencing Western culture.

Language

A central element of any culture or society is language. As a fundamental building block of civilization, language is a constantly changing medium of expression, responsible for social interaction, and communication, with a significant influence on worldview. The structure of language embodies a myriad of meanings, many of which are linguistically and culturally specific, reflecting, embodying, and perpetuating particular cultural, historical, and social experiences. These distinctions can be clearly observed in the existence of words present in one language, but missing in another, known as lacuna, or lexical gaps. Linguistic relativity, or the Sapir-Whorf hypothesis, is the principle suggesting that the structure of a particular language

directly affects the worldview, and cognition of the speaker, and therefore influences perceptions relative to the spoken language (Lucy, 2015). A parallel hypothesis with strong evidence in its favor is the theory that language, or more specifically, the knowledge of multiple languages, has significant effects on physical brain function. A study measuring the brain function of monolingual versus bilingual individuals found that learning new languages physically alters the brain networks that enable cognition, facilitate learning, and support language performance skills (Penn State University, 2016). If language is capable of altering physical brain function, it should come as no surprise that it has a significant influence on worldview and cultural meaning as well. In our imagination of an Indigenous West, we can use linguistic relativity to exemplify the disparities between traditional Western beliefs and Indigenous ones through the medium of language. We can pose the question, “How might the structure of our language be different if Indigenous frameworks had composed our lexicon rather than Christian ones?”

This concept of linguistic relativity related to cultural understandings is discussed by Kimmerer, specific to her native language of Potawatomi. In her comparison of language structure, she examines how in Potawatomi, 70% of the vocabulary is composed of verbs compared to 30% in the English language. Furthermore, instead of defining nouns by gender, Potawatomi defines them in terms of animate, and inanimate so that there are entirely different ways to speak of the living versus the nonliving world. In Potawatomi, “a bay” is defined as a verb, or “to *be* a bay” because the living water is choosing to shelter itself between two shores rather than choosing to occupy a stream or an ocean or a waterfall. Kimmerer provides a helpful example, “imagine seeing your grandmother standing at the stove in her apron and then saying of her, “look, it is making soup. It has gray hair.” We might snicker at such a mistake, but we also recoil from it. In English, we never refer to a member of our family, or indeed to any person, as

‘it’. That would be a profound act of disrespect” (Kimmerer, 2013, p. 55). Referring to someone as an “it” robs that individual of selfhood and kinship and reduces them to an object rather than a subject. Kimmerer continues to say, “in Potawatomi and most other Indigenous languages, we use the same words to address the living world as we use for our family. Because they are our family (Kimmerer, 2013, p. 55).” This is why she refers to Potawatomi as the “grammar of animacy” (Kimmerer, 2013). When a tree is a *who* rather than an *it*, you think twice before you cut it (or him/her) down.

This discussion is furthered by Anderson who demonstrates the prevalence of these discrepancies by displaying the lexical gap between the colonist’s English (as her 2004 work examines colonization in North America specifically), and Indigenous languages. Upon interaction with local Indigenous groups, the colonists discovered there was no Indigenous equivalent for the word “animal”. The closest approximation was a word seeming to reflect the English meaning of “beast”, but which upon further examination, turned out only to signify four-footed mammals rather than any nonhuman creature. While Europeans placed all nonhuman beings into the generic categorization of “animals”, Indigenous groups may only have conceived of them as distinct species, a perception directly reflected in their vocabularies (Anderson, 2004). As Anderson says, “if this linguistic peculiarity represented a genuine conceptual difference, it suggests that Indians did not conceive of the natural world in terms of a strict human-animal dichotomy but rather as a place characterized by a diversity of living beings” (Anderson, 2004 p. 19).

These linguistic discrepancies represent the contrast between worldviews. One presents the world as animate, equal, and imbued with life; the other is largely reductionist, establishing a strict dichotomy between humanity and other species. In William Cronon’s 1996 work, “The

Trouble with Wilderness: Or Getting Back to the Wrong Nature”, he discusses the moral of understanding some wild places as animate and beautiful (like an old-growth forest), and some as merely inanimate fixtures of human life (like a tree in the backyard of an urban home). He states that we cannot, and should not, take credit for either, but we are responsible for both and that our primary challenge is to cease the use of bipolar moral scales as our conceptual map for understanding and valuing the world; the human and the nonhuman, the unnatural and the natural, the fallen and the unfallen (Cronon, 1996, p. 24). These binaries serve no one. The structure of Indigenous languages (such as Potawatomi) is exemplary of the existence of a far superior conceptual map for linguistic understanding.

Economy and Consumption

The discussion of Western economy as a cosmogram will rely heavily on those most qualified to posit economic theories and analyses. The following segment will reference the works of political theorist and economist, Timothy Mitchell, specific to his 2020 article, “Uber Eats: How Capital Consumes the Future”, the sociologist, Paul Jobin’s 2020 paper, “Extractivism in the Critical Zone”, Wendell Berry’s 2002 work, “The Agrarian Standard”, Rosemary Ruther’s 1995 paper, “Ecofeminism: Symbolic and Social Connections of the Oppression of Women and the Domination of Nature”, as well as Cronon, Kimmerer, and Merchant.

Economies (like language) reflect and perpetuate ingrained cultural understandings, deepening power structures of inequality, and perpetuating harmful exploitative practices. As Mitchell quotes, “the language of finance blinds us”. This statement is particularly relevant to the West, a culture primarily driven by economic pursuit (Jobin 2020; Mitchell, 2020, p. 84). Embedded so deeply into the bedrock of our society, it is difficult to conceptualize any other mode of being outside of capitalism, a point emphasized in another one of Mitchell’s quotes

where he asks his readers, “how could we survive under a different temporality, in which the future was not defined by the principle of economic expansion?” (Mitchell, 2020, p. 84).

Capitalism, in the eyes of Mitchell, is a dominating cosmology in the West, and the associated worldview defines nature as a site solely intended for exploitation; a means of extraction for the purpose of economic expansion, and in pursuit of profit. Such a worldview presents land as a commodity, which is why Western capitalist narratives surrounding nature are rooted in the concept of “property”, meaning that any who “own” a plot of land are free to exploit it freely for personal gain. This perception in and of itself excludes Indigenous communities, who perceive land, not through the lens of property ownership or exploitation, but from the point of view where the inhabitant and the land have a relationship of stewardship.

In such a culture (dominated by an economic system that reflects our ingrained understanding of the natural environment as a commodity to be exploited) the pursuit of monetary gain trumps any potential consequences of such exploitation (Jobin, 2020). Furthermore, the consequences of such pursuits are often most felt by vulnerable and marginalized groups who do not possess the social or economic capital to oppose such harm – like Indigenous communities (Jobin, 2020). In our examination of economies as cosmograms, we may look to Indigenous communities (the same communities that we continually harm through exploitative practices) for the model of a viable economic alternative to Western capitalism.

In a discussion of the contrasts between Indigenous economic systems and Western ones, Kimmerer emphasizes her belief that the United States economy (in particular) is just one more example of the Adam and Eve ideology expressed. She discusses her experience growing up in a gift economy, or a trade economy, the method employed by many Indigenous groups. Kimmerer impresses upon us the crucial distinction between a gift economy and a market economy. The

nature of an object is changed by the way it is received, whether as a gift or a commodity. Gifts establish a particular relationship dynamic. They create the obligation to receive with gratitude and to reciprocate. A gift establishes a bond between two people or entities. By contrast, in the case of a commodity, the obligation of reciprocity is lost the minute the cash is handed off to the grocery store clerk. It is this relationship between the producer and the consumer that will change the nature of the interaction. The essence and importance of a gift economy is that it establishes an ongoing responsibility. Kimmerer describes it as such, “in Western thinking, private land is understood to be a “bundle of rights,” whereas in a gift economy property has a “bundle of responsibilities” attached.” (Kimmerer, 2013, p. 28). The ‘private property, no trespassing signs’ so common to Western societies do not exist in a gift economy where all of the land is seen as a blessing. The culture of gratitude that comes from a gift economy enforces that you take only what you need, and what is given and no more. She uses the example of your grandmother bringing you homemade cookies on a china plate. You take what is presented with many thanks, but would you break into her pantry and steal more cookies along with the rest of the china plates? This would be a breach of trust, a dishonor to the loving relationship, and the caring gift you have been given (Kimmerer, 2013, p. 185). It would also disincline your grandmother to ever make you any more cookies. For something to be sacred, it cannot be sold for a price. We extend these courtesies to the ones we love, but we fail to extend the same love to the Earth. Kimmerer and her culture call these morals of consumption “the honorable harvest”. While the term is not specifically defined, its meaning is culturally known. The honorable harvest instructs that you do not take more than half, you take only what is given to you, only what you need. You use the gifts respectfully, never waste, harvest ethically with as little harm as possible, ask permission before taking and abide by the answer, and reciprocate the care and love with an

offering of your own so that giver and receiver can sustain each other (Kimmerer, 2013, p. 183). In an economy based in greed, scarcity, and consumption, the honorable harvest becomes a laughable and disposable nicety when it should be a necessity. Cronon discusses the very moral of respecting when non-use is necessary when he states that learning to honor the wild “means striving for critical self-consciousness in all of our actions. It means that deep reflection and respect must accompany each act of use, and means too that we must always consider the possibility of “non-use” (Cronon, 1996, p. 20). It is a choice we make, a matter of perception, “if all the world is a commodity, how poor we grow. When all the world is a gift in motion, how wealthy we become” (Kimmerer, 2013, p. 31). Seeing all the world as a gift full of riches eliminates the scrambling overconsumption, which we as a society believe necessary to sustain ourselves. When we ignore these tenets, we over-consume in greed. We disrespect and exploit the giver of the gift. Cautionary stories detailing the harms of overconsumption are ubiquitous in Native cultures, yet there are scarce few in Western ones. Maybe this explains why Western society is so enthralled with the destructive force of overconsumption. When does taking turn to theft? Kimmerer characterizes theft in a statement where she writes, “something is broken when the food comes on a Styrofoam tray wrapped in slippery plastic, a carcass of a being whose only chance at life was a cramped cage. That is not a gift of life; it is a theft” (Kimmerer, 2013, p. 31).

The development of mechanization and industrialization made this theft all the more palatable by allowing us to step back even further from the crime. In Wendell Berry’s 2002 work, “The Agrarian Standard” he discusses the harm of a market economy obsessed with production, consumption, and excess. He discusses how the way of industrialism is inherently the way of the machine, “to the industry mind, a machine is not merely an instrument for doing work, or amusing ourselves, or making war; it is an explanation of the world and of life. Because

industrialism cannot understand living things, except as machines, and can grant them no value that is not utilitarian, it conceives of farming and forestry as forms of mining; it cannot use the land without abusing it” (Berry, 2002, p. 354). He emphasizes the fact that industrialism disregards distinctions of one place to another, applying its destructive methods indiscriminately without considering what each landscape needs. This method of brute force has led to large-scale problems like soil loss, genetic impoverishment, and groundwater pollution; problems that can only be solved by locally adapted agricultural methods. He states, “industrialism begins with technological invention. But agrarianism begins with givens: land, plants, animals, weather, hunger, and the birthright knowledge of agriculture” (Berry, 2002, p. 355). Berry’s words echo the same morals Kimmerer deems so important; treat the land with the same care you would show to a family member and apply your knowledge of the individual in your treatment of them. We are by nature, creatures of consumption, but is there no way to consume ethically and mindfully? Kimmerer states “if we are fully awake, a moral question arises as we extinguish the other lives around us on behalf of our own. Whether we are digging wild leeks or going to the mall, how do we consume in a way that does justice to the lives that we take? (p. 177). By following the rules of the honorable harvest, one comes to regard every object from its origin of life.

As Rosemary Reuther discusses in her 1995 paper “Ecofeminism: Symbolic and Social Connections of the Oppression of Women and the Domination of Nature”, Western economies have been built on a foundation of injustices from the start - dependent on the takeover of land and its mineral, agricultural and metallic wealth and appropriated through the exploitation of labor. The slow destruction of our one green planet, on which all life depends, seems an impossibly high price to pay in the name of economic gain.

On one end of the economic spectrum, we see how Indigenous cosmologies inform an economic system that perpetuates the themes of reciprocity present in Indigenous cultural spirituality and origin stories; a gift (or trade) economy where land is seen not as property, but as a continual relationship to be maintained. On the other side of this spectrum we see how Western economies, informed by the Adam and Eve ideology of dominion over land, and forced labor in the Earth, have informed a capitalist economy that views land as a commodity for man's use as he sees fit; exploitation, extraction, and scarcity. As emphasized by Mitchell, this mode of operationalization is so deeply ingrained into Western culture (akin to our cosmological understandings) that it is nearly impossible to imagine a viable alternative, however in consideration of the impacts of this worldview of domination and exploitation, we must make a shift towards the superior alternative.

Education and Environmental Management

Education and academia act as the more functional processes of informing our understanding of the world. Just like cultural origin stories, the narratives taught in schools and universities, and the principles and theories shared in academic groups, deeply impact, and inform the worldview of all parties involved. Similarly, just like origin stories, the narratives we pass down to our children or our students perpetuate and reflect deeply held cultural understandings. Indigenous education – more specifically Indigenous scientific knowledge (more commonly known as Traditional Ecological Knowledge or TEK) has long been disregarded by Western academia, despite the considerable knowledge, and experience Indigenous scholars have to contribute to the field of Western academia, science, and environmental management. In consideration of the Christian roots of Western science, it can come as no shock that the paradigms of scientific inquiry differ so greatly between Indigenous and Western societies. What

might an education system look like had we emphasized integrative and collaborative education amongst disciplines and across cultures rather than methods for domination? How might we view the world if taught from a young age about the importance of TEK, and Indigenous principles of reciprocity?

Indigenous scholars such as Kimmerer, and Gregory Cajete have remarked on the stark contrast between Western education and academic understanding compared to their Native American cultural counterparts. In the introduction to Cajete's 2000 work, *Native Science: Natural Laws of Independence*, he remarks on how Indigenous languages have no verbal equivalent for terms such as "science", "philosophy", "psychology", or any other foundational Western disciplinary title (another example of a lexical gap). Not having or needing these terms does not signify that Indigenous communities do not find these topics important, rather, Indigenous perceptions of knowledge are not categorized into the categorical and disparate classifications of the Western education system. Cajete states, "while there were tribal specialists with particular knowledge of technologies and rituals, each member of the tribe in his or her own capacity was a scientist, an artist, a storyteller, and a participant in the great web of life" (Cajete, 2000, p. 2). This emphasis on an interdisciplinary understanding of all of the fields of study as interconnected is a theme far less underscored in traditional Western academia.

In his dialogue, Cajete narrows in on the field of scientific inquiry – a field relevant to this discussion as science typically relates to understanding the inner workings of the natural world. Native science, he believes, is a metaphor for a wide range of tribal processes of thinking, acting, and perceiving. To gain an understanding is to experience the natural world because Native science is born of a lived and communicated participation. The foundations of Native science incorporate the roles of perception, imagination, sensation, emotion, and spirit as well as

the standard Western logic and rational empiricism. Indigenous scientific knowledge is drawn from collective heritage, a map of reality drawn from the phenomenon of generations of lived experience (Cajete, 2000). This is in stark contrast to Western science, where Western scholars argue that to qualify as scientific inquiry, the field must be entirely objective, culturally neutral, rational, and unbiased. This determination has led many Western scientists, academics, and their organizations to dismiss Indigenous science due to its interdisciplinary nature. Of course, the counterargument to this claim (as anthropologists would emphasize) is that no matter how objective a discipline and its scholars claim to be, nothing can exist outside of the cultural realm. As Kimmerer puts it, Western science has cornered the market on truth. This leaves little room for Indigenous ways of knowing in scientific discourse. Kimmerer describes attending university for the first time, attempting to become a botanist, and struggling to make the required transition from her cultural way of thinking to Western scientific ones. She writes, “the questions scientists raised were not ‘Who are you?’ but ‘What is it?’ No one asked plants, ‘What can you tell us?’ The primary question was ‘How does it work?’ The botany I was taught was reductionist, mechanistic, and strictly objective. Plants were reduced to objects; they were not subjects” (Kimmerer, 2013, p. 42).

When examining the topic from a historical perspective, mechanistic science fits the narrative of Western Christian understandings. In the Western tradition, science is originally derived, not from questions about interacting reciprocally with the environment or understanding our place in the universe, but as a means for discerning how we might practically exert control over nature (Merchant, 2003). The discussion of science as informed by Christianity is one strongly emphasized by Merchant in her discussions of the Recovery Narrative. The emergence of science in the Enlightenment period, she theorizes, was simply a mechanism for transforming

the Earth into a manageable entity and exercising further dominion over nature. She discusses the philosopher Francis Bacon (1561-1626), Lord Chancellor to King James I, considered to be one of the fathers of modern science, whom she says sought to formulate the scientific methods of modernity as a secular program for recovering paradise (Merchant, 2003). According to Merchant, he advocated a “forceful entry into nature’s womb through the Song of Science” (as opposed to the Song of Solomon), interrogating nature through experimentation. She states that the emergence of science as a formal discipline acted as a direct means to act out the Recovery Narrative, stating, “since the Fall, nature had become chaotic and plants and animals wild and uncontrollable. But scientists could restore order to the garden by inventing docile, domesticated plants and animals, such as those in the original Garden of Eden” (Merchant, 2003, p. 65).

Mechanistic science, in the eyes of Merchant, was the means of deciphering the book of nature and held the key to answering questions of how humanity might beat it into submission, “recovering the lost Eden became Western culture’s major project during the Scientific Revolution of the seventeenth century. Reason and experiment were the keys to reinventing Eden on Earth. During this century-long transformation, the Fall and Salvation narrative of the Middle Ages was secularized. Rather than an escape from the Earth to a heavenly Eden, the new narrative remade the planet in the image of the lost Eden. Explorations of the New World, expanding capitalism, and the rise of science and technology stimulated new visions for the mind and new possibilities for the land” (Merchant, 2003, p. 57). However far Western science may have come since the Enlightenment period, if the foundations of the discipline are fundamentally rooted in concepts of domination and manipulation, the practices that are produced from that discipline will be inherently imbued with those values. According to Merchant, modern science relies on a constructed reality that allows for the possibility of control, and the assumption of

nature as potentially ordered – both concepts that are integral to the modern scientific worldview (Merchant, 2003). Where one culture wishes to utilize science as a means of communication with the natural world, the other employs it as a manual for exerting control.

A further disparity between Indigenous and Western science relates to the perception of what qualifies an individual to practice science. Indigenous ecologists who lack formal Western training are invalidated in academia. For science degrees, students are typically required to fulfill a certain amount of ‘fieldwork’ based on the thought that gaining an understanding of the land requires time spent, close and personal, with our surroundings. Why then is this invalidated when it is not done to fulfill a degree or certificate? Kimmerer speaks of a Navajo woman without a day of university training, able to name all of the plants in her valley. She detailed when they bloomed, where they lived, whom they liked to live near, their relationships, which animals ate them, the medicine they offered, and the animals that lined their nests with its fibers (Kimmerer, 2013, p. 44). Despite this extensive knowledge, this Navajo woman would certainly not be regarded as a botanist in Western academic circles regardless of the fact that she would undoubtedly possess unique and significant experiential knowledge to contribute to the field of Western botany.

Regarding Indigenous scholars as illegitimate, simply for employing alternative methods of education and ways of knowing, is a substantial oversight. Creating an intersection between Western science and Indigenous traditional knowledge creates a wider scope of understanding and allows us to see the world more fully. By merging cultural knowledge (in a mindful and respectful way), and empowering the voices of Indigenous scholars, we may determine how to better care for the Earth and meet its needs as it meets ours. When we ask a tree or a leek if it is ready to be harvested, a combination of these perceptions can better help us determine which

signs mean yes and which mean no. Kimmerer calls this understanding “heart-driven science”, a principle she teaches her students as a university professor of botany, ecology, ethnobotany, Indigenous environmental issues, and the application of TEK to conservation. Her unique curriculum inspired one of her graduate students, Laurie, who expressed to Kimmerer a strong desire to take on a thesis project that would mean more to her than data alone – she wished to practice ‘heart-driven science’. Kimmerer suggested she study the success of sweetgrass populations in relation to harvesting; more traditionally known as braiding sweetgrass. The ancient practice of braiding sweetgrass (known as *wiingaashk*, or “the sweet-smelling hair of Mother Earth” in Potawatomi) has both spiritual and material value in Indigenous cultures as sweetgrass is believed to be the very first plant to grow on Earth. Through generations of interaction with sweetgrass, Indigenous communities have well-tested and validated theories regarding harvest practices that stimulate growth rather than damage populations. When Laurie presented her thesis proposal to a faculty committee; the dean's dismissal was swift, “anyone knows that harvesting a plant will damage the population. You’re wasting your time. And I’m afraid I don’t find this whole traditional knowledge thing very convincing.” (Kimmerer, 2013, p. 159). The committee told Laurie that there was no basis of theory to back these claims as if generations of people and understanding do not add up to a well-tested theory. Two years of work yielded a result to disprove the faculty committee. Picking sweetgrass actually stimulated its growth. The plants that had grown the best were not the control populations left untouched, but the harvested ones. The Western understanding sets human beings as separate from nature. Scholars are taught that the best way to protect an endangered species or habitat is to leave it alone and keep humanity away. The sweetgrass of Laurie’s experiment displayed that human interaction had become a vital part of the system. Kimmerer writes, “Laurie’s findings might

have been surprising to academic ecologists but were consistent with the theory voiced by our ancestors. “If we use a plant respectfully it will stay with us and flourish. If we ignore it, it will go away” (Kimmerer, 2013, p. 163).

Like Laurie’s review board, even the best-intentioned environmentalists can be as harmful as the ones tearing fossil fuels from unwilling land. Michael Pollan refers to individuals who view human intervention negatively as ‘environmental purists’ in his 1991 book, *Second Nature*. The 10th chapter of the novel, ‘Idea of Garden’ discusses the devastation of the old-growth Cathedral Pines Forest and the moral dilemma of whether or not to intervene in its restoration. While maybe at one time the forest was untouched by man, the ecosystem is now a product of years of interactions with society. Pollan states that to deem any management as ‘unnatural’ is to disregard the actual history of the forest; the lines have already been blurred. He emphasizes the pitfalls of considering ecosystems, ‘wildernesses’, in the traditional sense of the word, meaning “a pristine place untouched by white men”. In doing so, we disregard how these ecosystems may benefit from a relationship of mutualism. The ‘Nature Ethic’ held by environmentalists often leads to ecosystem deterioration, as was the case with Yellowstone Park management after the 1988 fires, and unharvested sweetgrass. He states, “at this point in history, creating a landscape that bears no marks of human intervention will require a certain amount of human intervention” (Pollan, 1991, p.186), and even then, emulating a ‘pristine’ habitat is impossible in this day and age. Christian doctrine ordained humanity as above nature, divinely made in the image of God, romanticized, and separate. The consequences of this narrative have been catastrophic. Now environmentalists try in vain to repent through the villainization of humanity as capable of contributing nothing to the natural world but destruction. But both ends of the spectrum of perception fail to miss the crucial point – these understandings are still

manifestations of humanity as distinct from the natural world. Neither divinely made nor inherently evil, we are part of the assemblage of beings like every other species on Earth. Rather than continuing with the absolutist narrative that we must either leave nature entirely untouched or exploit all of its resources, we must find the balance of mutualism (Pollan, 1991).

We circle back yet again to this concept of reciprocity, of interacting with the land in a respectful manner and accepting its gifts while bestowing our own. To understand how this idea became so central in Indigenous culture, examine the lessons taught to Indigenous children. Many Native communities, despite various cultural differences, are rooted in a culture of gratitude. Instead of the Pledge of Allegiance, the children of Onondaga Nation speak the “Thanksgiving Address” otherwise known as “The Words That Come Before All Else” (Kimmerer, 2013). As Kimmerer says “this ancient order of protocol sets gratitude as the highest priority. The gratitude is directed straight to the ones who share their gifts with the world” (Kimmerer, 2013, p. 107). The Thanksgiving address is not only an expression of gratitude but a scientific inventory of the natural world. Each element of the ecosystem is named, along with its function, and subsequently thanked. It teaches children that gratitude is the first priority and shows them that everything needed to sustain life is already here and that we must be thankful for this gift of abundance. It is no wonder these tenets are not central in Western society’s market economies, as Kimmerer says “in a consumer society, contentment is a radical proposition. Recognizing abundance rather than scarcity undermines an economy that thrives by creating unmet desires. Gratitude cultivates an ethic of fullness, but the economy needs emptiness” (Kimmerer, 2013, p. 111). Gratitude does not send you out to shop for fulfillment. The thanksgiving address shows respect and allegiance to all nonhuman relatives, with not one political entity mentioned. How might we view the world if every morning of our education had

begun with this recitation of thanks? Would we struggle with such feelings of scarcity if gratitude was a central tenet taught in schools? How would the world change if everyone decided to disregard political boundaries and nationalism in favor of Earth and its gifts? We might become a democracy of species relying on interdependence. Kimmerer says of cultures of reciprocity, “each person, human or no, is bound to every other in a reciprocal relationship. Just as all beings have a duty to me, I have a duty to them. If an animal gives its life to feed me, I am in turn bound to support its life... An integral part of a human’s education is to know those duties and how to perform them (p. 115). As our world deteriorates through our lack of respect, when will we decide to turn to the thanksgiving address to spur our restorative action? As Cajete puts it, we have lost the depth of our ancient participation with nature, and we must regain it in some substantial form in modern life and modern education (Cajete, 2000). We must, once again, become rooted in a life centered and lived around experiences of the natural world (Cajete, 2000, p. 5).

Shifting the Paradigm

Through examination of Indigenous cosmograms in contrast with traditional Western ones, we observe the significance of Indigenous cosmologies in informing a worldview that emphasizes a reciprocal and integrative dynamic with the natural world. The traditional Western worldview of exploitation and domination has not served us; we have jeopardized the future of every organism on the planet through our actions informed by this narrative. As our climate degrades and collapses, we must find new stories to inform us. Luckily, this awareness has been dawning amongst the more progressive ecologists and environmentalists for several years now. As a result, we see examples of the incorporation of TEK into environmental management and more importantly, land management policies. While this incorporation is still minimal at best, (particularly in the case of co-decision making in policy) the future shows promise. The intent of the following portion of the investigation is to further display the necessity for TEK incorporation (or the problems associated with Western land management), discuss potential barriers, demonstrate the tangible instances of co-collaboration in Western environmental science, and management projects and programs (through the examination of relevant case studies), and examine the methodologies that have proven most effective in this incorporation.

This inquiry will rely on the work of scholars and researchers who have substantial experience with the co-collaboration of TEK and Western Science, as well as expertise in the policy aspects of these endeavors. The work of Flores and Russell will be used to exemplify the necessity of TEK (including some of the flaws of Western land management), impediments to implementation, and the current status of co-collaboration efforts in the West. The discussion will then segue into the tangible instances of TEK incorporation, relying on the case study examinations put forth by Reid et al., in their 2020 paper, “Two-Eyed Seeing: An Indigenous

framework to Transform Fisheries Research and Management” to exemplify the methods with which this co-collaboration can be achieved successfully.

The Need for TEK

The following segment will demonstrate the necessity for TEK in conservation and land management, relying on the work of scholars that emphasize this recognition in their discourse. Among these scholars, we include the work of Flores and Russell, who exemplify an acute awareness of the value of TEK for ecological management in their discussion of the benefits of co-collaboration. In their 2020 paper, “Integrating Tribes and Culture into Public Land Management” they examine traditional land management practices employed by Indigenous tribes throughout the American West (such as prescribed burning), emphasize the consequences of TEK exclusion from policy decision making, and highlight the significant opportunities for multifaceted and collaborative management (appropriate for handling periods of environmental, economic, and institutional transitions). They discuss the impact of tribal senses of place on Indigenous land management practices, as well as the long-established cultural and spiritual connections to the natural environment that precede Western economic measures of well-being. Recognizing cultural models of knowledge formation, they state, provides insight into the tacit understandings people have about the world around them, as well as how they perceive, remember, and describe natural features, and utilize and manage natural resources. Recognizing place identity can provide significant insight that may allow for the deconstruction of harmful notions and the recognition of those that may benefit us more. Indigenous knowledge and senses of place, built through generational interaction with land, permeates situational perceptiveness about a place by producing an intuitive understanding, key for recognizing certain types of environmental phenomena which might be indistinguishable to those with less familiarity or

experience. As Flores and Russel discuss, place-based knowledge of this type has been “described as sacred and holistic, engendering reciprocity between humans and the nonhuman world to the point where human beings are inseparable from our surroundings” (Flores & Russell, 2020, p. 179). Indigenous traditions (specific to American Western tribes), informed by generations of interaction with land, serve to inform land management practices that effectively maintained sustainable ecological balance between people and land for thousands of years (Flores & Russell, 2020).

As evidenced by the discussion of the pitfalls of Western science and environmental management (exemplified through our analysis of cosmograms), co-collaboration with Indigenous groups, and the incorporation of TEK into the decision-making process for land management agencies (as well as restoration of traditional practices) is sure to breed ecological benefits while preserving crucial aspects of cultural heritage (Flores & Russel, 2020). The diverse characteristics and identities associated with TEK present a multitude of opportunities for multifaceted and flexible collaborative decision-making, appropriate for managing the periods of environmental, institutional, and economic transition occurring in the West.

Despite this recognition amongst the more progressive academics and scholars, these notions have largely failed to translate to the policy level. Policy decision-making in the West continues to proceed from a rational, top-down approach; one which has continually marginalized Indigenous communities through the dismissal of their cultural traditions as irrational, while simultaneously imposing external values, policies, and actions on both Indigenous communities and their landscapes. This approach arises from the Western traditions of European philosophy, more specifically the false assumption that humans are capable of removing themselves from and controlling the natural environment. The prevalence of this

attitude is evidenced by policies intending to protect biodiversity, which simply prohibit humans from participating in both consumptive and non-consumptive activities throughout state-established protected areas. According to Flores and Russel well-intentioned laws, (like the National Environmental Policy Act of 1970), become “inadvertent records of exclusion because of their exclusive reliance on scientific materialism to evaluate environmental impacts” (Flores & Russel, 2020, p. 180). We once again observe the harm of misconceptions associated with Western traditions – nonuse can be just as harmful as consumptive use. This is just one more attitude that displays the degree to which Western paradigms require the help of Indigenous insight, but the way in which we receive this help must be handled with extreme care. A primary element of this care, necessary to inclusion, entails recognizing aspects of ecosystem valuation not typically considered, such as social, sacred, and cultural factors that have been historically overlooked in Western land management decision making but are crucial to many Indigenous groups. Rather than framing land management policies around the potentially consumptive properties of nature (as is characteristic of the West), environmental legislation must place an emphasis on a conservation ethic based in Indigenous teachings and backed by detailed knowledge of regional conditions.

Another vital aspect of Indigenous environmental understanding is the prominent emphasis on process over outcome, actualized by the pursuit of a sense of responsibility to the generations ahead – generations of all beings (Reid et al., 2020). This philosophy has been largely absent from Western science and management, as management tactics tend to center around economic pursuits, and therefore employ quick fixes so as not to disrupt the influx of capital (Flores & Russell, 2020). However, this ethic (seen in Indigenous relations with the land) is crucial to sustainable management as it imbues and perpetuates a continual sense of

commitment to the environment and all of its inhabitants, rather than viewing management through finite and singular acts (Reid et al., 2020).

Despite the lack of effective policy translation, scholars within the discourse believe that government awareness of the importance of Indigenous co-collaboration is slowly but surely improving. Flores & Russel cite two coinciding trends that have ushered in this increased awareness of and receptiveness to Native American stewardship of public lands (forests in particular) – the first of the two is the growing trend within reservations across the United States towards self-determination, leading to forests and other resources managed not by the Bureau of Indian Affairs, but by the tribes themselves, in accordance with their specific values and objectives. The second is the increasing recognition amongst management and academic communities that management of all lands can seriously benefit from seeking out Indigenous perspectives (TEK more specifically) (Flores & Russel, 2020).

Lastly, despite the vast history of exclusion and marginalization, a recent survey of forest resource managers and decision-makers from Indigenous tribes indicated tribal managers have an interest in collaborating with managers from government agencies (Flores & Russell, 2020). This willingness to collaborate by tribal groups is a further reason that initiatives must be taken by Western government entities to form meaningful partnerships and reparations with Indigenous communities.

Barriers to Collaboration

In the pursuit of co-collaboration, we must first discuss the potential barriers to inclusion so as to preemptively define proper solutions. As Reid et al., emphasize in their paper 2020 paper, “Two-Eyed Seeing: An Indigenous framework to Transform Fisheries Research and Management”, research paradigms and worldviews, are defined and distinguished according to

the ontologies, epistemologies, axiology's, and methodologies of the researchers and their institutions – a reality that quickly becomes a predicament in the case of Western research paradigms (Reid et al., 2020). Thus, it can come as no surprise that Western land management policies and research efforts, informed by problematic narratives of anthropocentricity, trump all alternatives. Furthermore, even in the event that we can transcend Western self-assurance, co-collaboration with Indigenous groups will mean finding ways to reconcile vastly differing research methodologies and understandings of land. Reconciling the crux of the difference that exists between government land management perspectives and tribal ones will require Western governments to make a fundamental shift in their perceptions of value overall. While tribal entities appear to value land according to cultural uses (as many Indigenous groups regard the right to maintain a cultural connection to land as just as important as any other land right) government entities historically and consistently opt for the economic benefits. According to Flores and Russel, this notion is enforced by interviews with representatives from government agencies who emphasized the economic benefits of land in contrast to tribal leaders, who were largely dismissive of the economic aspect. This disparity is further exacerbated when considering the problems that arise from managing cultural aspects of an ecosystem through the lens of socio-economic policies – the incongruence is often too drastic to reconcile. As a result, land management agencies like the National Park Service, the U.S. Department of Interior, the U.S. Department of Agriculture, and the Forest Service are wrestling with questions and concerns regarding how exactly to incorporate Indigenous perspectives into land management decisions. A potential solution to such a barrier includes Legislation like the 1992 amendments to the National Historic Preservation Act which encourages these partnerships by authorizing tribes' greater sovereignty over ancestral lands. However there exists another obstacle embedded into the

aforementioned solution; often these pieces of legislation do little more than pay lip service to the concepts when members of government make no tangible efforts at real co-collaboration (Flores & Russel, 2020). All in all, co-collaboration requires enduring commitments to knowledge sharing that extend far beyond the usual boundaries of professional training and ensure that the threads of marginalization will not be woven into partnership efforts. The next logical question regards how exactly we might achieve this goal?

The work of Reid et al. is particularly beneficial in this pursuit; as they offer specific methods for co-collaboration; a subject surrounded by limited scholarship but one that is incredibly crucial, particularly as exemplified by Flores and Russel in their discussion of government entities displaying ignorance around how to approach inclusion. As Reid et al. discuss, a primary framework that must back co-collaboration is that which they call, “Two-Eyed seeing”, or “learning to see from one eye with the strengths of Indigenous knowledge and ways of knowing, and from the other eye with the strengths of mainstream knowledge and ways of knowing and to use both these eyes together, for the benefit of all” (Reid et al., 2020, p. 245). Plural coexistence, they believe, holds numerous possibilities for growth including the improvement of our understanding of complex systems through the insights of multiple knowledge sources contributing to a larger picture, conformance to legal norms and practical requirements breeding increased accountability, and through the necessity to answer to undeniable moral queries about proper practices and human rights and equality dilemmas (Reid et al., 2020).

Tangible Instances of Co-Collaboration: Relevant Case Studies

In their analysis of tangible instances of TEK co-collaboration, Reid et al., emphasize the effectiveness of several specific tools, including the co-development of research questions, the

documentation, and mobilization of knowledge, and the co-production of insights and decisions (Reid et al., 2020). The authors demonstrate the effectiveness and application of these concepts through the medium of three case study examinations, including the individual works of Mantyka-Pringle et al., Abu et al., and Giles et al., each of which serves to exemplify a different benefit or aspect of TEK incorporation. The work of Reid et al., is highly significant to this examination as it displays concrete instances of cooperation between groups, indicates potential problems that may arise, and the benefits of such progress, all while offering specific recommendations for how to proceed.

Case Study 1 - Slave River Delta

The first case study reviewed by Reid et al., examines the work of Mantyka-Pringle et al.. In the Northwestern Territories of Canada, significant resource development has profoundly impacted the Slave River Delta, with notable implications to ecosystem health and societal well-being downstream. In response to increasing community concerns regarding the health of fish, a diversity of parties in the region came together to form the Slave River and Delta Partnership (pr SRDP) in 2010. The SRDP, composed of three First Nations, three Metis organizations, two towns, a college, a research institute, and various territorial and federal government agencies, established a primary goal of developing community monitoring activities throughout the region, for which they acquired the help of several academic partners (6 universities). Together, the SRDP co-developed three central questions, 1) is the water safe to drink? 2) are the fish and wildlife safe to eat and 3) is the ecosystem healthy? Over 100 participants joined together for a 2011 workshop to address these crucial questions and identify key indicators of aquatic ecosystem health along two complementary and crucial lines of inquiry: Western Science and Indigenous Knowledge. The Western science lens described water quality

and fish health in terms of “turbidity” (Nephelometric Turbidity Units), and “fish external anomalies” (lesions, tumors, cysts, and malformations). Indigenous knowledge correspondingly described these concepts in terms of the “physical appearance of the water” (changes in water visibility and movement over time), and “fish aesthetics” (changes in the frequency of lesions or deformities over time). Data to inform the Western science narrative was obtained through field observation and document reviews (between 2011-2015), while Indigenous data was gathered through interviews with key informants like tribe elders (in 2014). Two-eyed seeing was the primary principle informing how these two knowledge systems would coexist, (across 41 indicators), while Bayesian Belief Networks (BBN's) served as the central methodology for operationalizing Two-Eyed-Seeing (A Bayesian Belief Network is a graphical data structure representing joint probability distributions of a problem domain, used in various tasks such as diagnostics, reasoning, decision making under uncertainty, prediction, and anomaly detection. They are often used to estimate probabilities associated with causal or subsequent events, by determining conditionally dependent and conditionally independent relationships between random variables). Data analysis involved an equal number of elders, harvesters, fishers, government staff, and scientists. Through the compilation of interview transcripts, field data, and existing models (via participatory modeling) the SRDP was able to provide a power neutral approach to answering the co-developed set of questions and produce a co-authored plan. Authors of the Slave River Delta study add to a growing agenda that BBNs are capable of providing an effective means to widen the evidence base of management projects and allow for the incorporation of both quantitative and qualitative information which leads to a more holistic understanding.

We have established the necessity for Indigenous co-collaboration in land management and policy decision-making, but a primary barrier to such action is the “how” of the problem. By offering specific employable methods for TEK co-collaboration, such as the co-development of research questions, the unification of two types of knowledge systems to assess ecosystem health (e.g., Western fish external anomalies versus Indigenous fish aesthetics), and the examination of these variables through the use of BBN's to statistically compile this data, the work of Mantyka-Pringle et al., as emphasized by Reid et al., is a significant contribution to the discourse surrounding specific tactics for bringing this collaboration to fruition.

Case Study 2 - Saskatchewan River Delta

The second examined case study centers around the work of Abu et al., concerning the Saskatchewan River Delta (the largest freshwater delta in North America, at 10,000 km²). In a similar fashion to the Slave River Delta study previously examined by Reid et al., and Mantyka-Pringle et al., the Saskatchewan River has been significantly impacted by upstream anthropogenic activity, with consequences to system hydrology, fish, and wildlife populations. Community concerns surrounding these issues provoked the 2012 formation of a collaborative community and academic partnership. The partnership, centering around the theme of consilience (or the congruence between differing ideologies), held the primary goal of finding ways for Indigenous communities and academic researchers to collaborate as equals. Academic partners of the group from the University of Saskatchewan identified three main questions: 1) how can we learn about long-term social and ecological change from diverse knowledge holders, 2) how can we provide for the coexistence of plural forms of knowledge while engaging in respectful critique, 3) How can we document the relative contribution each knowledge system provides and explain how each helps to fill in the gaps of the others? Members of the partnership

drafted a literature review to outline varying approaches for bridging multiple systems of knowledge in order to answer such complex inquiries and found Two-Eyed Seeing as the most effective enabler for addressing their central questions. In an attempt to answer the first two of these central inquiries, researchers used the Two-Eyed-Seeing framework to bring together Indigenous knowledge, archival records, and information collected through traditional Western scientific methods and instruments in a cohesive manner to gauge ecosystem change in the delta. Indigenous knowledge was drawn from key informant interviews with elders and harvesters (fishers, hunters, and trappers) in 2014, which included significant accounts of key historical events and perceived changes within the system. Archival records were gathered from the Provincial Archives of Saskatchewan, with a specific focus on key historical events and past system changes as well as information on resource-related policies (permits, quotas, and regulations), and government correspondence (letters and petitions). Traditional Western scientific inquiry data was gathered through the use of scientific instruments such as water gauges or through field records like fish-landing data. All three bases of evidence included both qualitative and quantitative information, brought together to address their third guiding question using the means of examining knowledge congruence, where knowledge systems were indexed as either consistent (in agreement with each other), inconsistent (in disagreement with each other), or lacking for comparison (the evidence type is incompatible for the indexing process).

Taking these multiple evidence-based approaches guided by the Two-Eyed seeing framework enabled the team to document (“document” in this case as referring to the transcription of information into a written form) one evidence base (Indigenous knowledge), and mobilize two others (instrumental observation, and archival records) to create a holistic approach for examining the status of a complex ecological and social system. Employing such an

interdisciplinary method allowed researchers far more insight into the system and its intricacies as well as an understanding of the cohesion of the congruence of so many approaches. Contrary to what Western scientists might assume, researchers found a high degree of convergence across knowledge systems with similar results reflected throughout each discipline in the examination of ecosystem changes since the development of upstream dams. Adverse changes to hydrology displayed an 83% congruence rate across disciplines, fish, and wildlife changes at 94% congruence, and vegetation alterations at 100% congruence. One example of an incongruent indicator included Indigenous knowledge which signaled poor water quality, (whereas instrumental quality declared it safe), as well as an indicator displaying high abundance of Northern Pike, whereas instrumental observations found Northern Pike populations to be near zero in the region. In the case of the Northern Pike, this incongruence may be explained by a decline in commercial interest in the Pike, and therefore far less fish landing data for the species. This disparity is significant as it displays the gaps in Western science, which can often be inadvertently driven by commercial interests, and economic pursuits. For six out of the nine employed vegetation indicators, (pertaining largely to the knowledge of berries and other flowering plants), Indigenous knowledge provided the sole source of available information. This instance is another indicator of the importance of the Two-Eyed Seeing approach, necessary for filling in the gaps of knowledge, ethical inclusion, and an interdisciplinary approach. Despite these incongruencies, the overall high degree of agreement between knowledge systems further proves the possibility of finding ways to cohesively combine understandings in a meaningful way in future research endeavors.

As emphasized by Reid et al., the work of Abu et al., is beneficial in the discussion of TEK collaboration because it provides a model for specific steps to be taken by those attempting

to spur collaboration. Furthermore, it exemplifies, some specific ways in which Indigenous knowledge fills in important gaps in understanding, absent from Western knowledge (e.g., incongruent indicators which display that one knowledge system displayed a better understanding of a topic than the others), and discusses specific tactics for creating a holistic approach to ecosystem management (e.g., combining three different types of knowledge, Indigenous knowledge, instrumental observation, and archival records). The work of Abu et al. provides further reason to be confident about understanding ecological phenomena through more than a strictly traditional lens.

Case Study 3 - Unama'ki/Cape Breton Island

The third examined case study investigates the work of Giles et al., moving beyond examples of uniting disparate knowledge bases and instead, to bringing together disparate experiences, in order to gain insights about fishery decision-making based on contrasting experiences. Giles et al., examine the experiences of Mi'kma'ki – the traditional and contemporary territory of the Mi'kmaq people, located in Canada's eastern Maritime province on the East Coast. Unama'ki, or Cape Breton Island, where this particular research takes place within Mi'kma'ki territory, is home to the largest Indigenous community in Atlantic Canada, and the largest Mi'kmaq community on the continent. The Eskasoni Mi'kmaq First Nation (a band government of the Mi'kmaq Nation, with a population of ~ 4,000 individuals), located along the Bras d'Or Lakes and surrounded by the Atlantic Ocean, relies heavily on the surrounding sea for fishing activities, food, social, ceremonial, and commercial purposes, with a community-owned and operated fishing company that employs >150 fishers and contributes to nearly 10% of Eskasoni's annual revenues. Eskasoni is also home to the Unama'ki Institute of Natural Resources (UINR), responsible for representing Eskasoni and the four other Mi'kmaq

communities on the island and formed in response to rising community concerns regarding natural resources and their sustainability (fisheries in particular). One of the institute's central goals is to strengthen research and natural resource management, while fiercely maintaining Mi'kmaq knowledge and worldviews. Accordingly, they often partner with external governments, organizations and universities on key environmental issues and concerns. One such partnership involved researchers from UINR, Dalhousie University, commercial fishers, and representatives from the Eskasoni First Nation. As a group, they examined Indigenous inclusion in policy-level fisheries decision-making in Canada, using Eskasoni's American eel fishery as a model system. The American eel, a species that has been vital to the Mi'kmaq for thousands of years, has come under great threat in recent decades due to the combined effects of habitat fragmentation and destruction via hydroelectric development, commercial fishery operations and other threats. Dramatic species decline (65% fewer maturing eels in the Great Lakes and upper St. Lawrence River area between 1996-2010) resulted in the listing of the species as threatened in 2012 to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and even prompted its consideration for listing under Canada's 2003 *Species at Risk Act* (SARA). Despite SARA's statement that "the traditional knowledge of the aboriginal peoples of Canada should be considered in the assessment of which species may be at risk and in developing and implementing recovery measures" little has been done to involve the Mi'kmaq in the conservation of the American eel, despite the species' tribal significance (Reid et al., 2020, p. 252). As Reid et al., emphasize, there are inherent challenges that arise from attempting to "integrate" Indigenous knowledge and values into government-level policy. This is made all the more significant considering that Food Social and Ceremonial (FSC) fisheries are constitutionally protected in Canada, and the listing of a culturally significant species such as the

eel could have profound impacts on community subsistence, well-being and constitutional and treaty rights. Still, Giles et al., find little to no evidence of Mi'kmaq inclusion in the COSEWIC and SARA processes. In an attempt to understand the intricacies of this exclusion, Giles et al., interviewed both Eskasoni eel fishers (about the fishery and linked knowledges) and federal government representatives involved in COSEWIC and SARA assessments (about the processes and its “use” of knowledge). Through these consultations, Giles et al. found that despite the existence of an Aboriginal Traditional Knowledge Sub-Committee (ATK SC) within COSEWIC, as well as other various measures within SARA (e.g., the National Aboriginal Council on Species at Risk, NACOSAR), and Aboriginal Funding for Species at Risk (AFSAR) (committees not even discussed by interviewees), the full understanding of the Mi'kmaq knowledge system was not at all reflected in the current knowledge system. This discovery exemplifies the way in which government entities pay only lip service to tribal groups, despite the fact that often, these groups are the most affected by environmental crises, and despite the fact that they often possess generations of critically important knowledge regarding the management of their ancestral lands and the species inhabiting them. The discord between these two groups (Western governmental land management entities, and tribal groups) is further underpinned by the fact that for the Mi'kmaq, eel fisheries were found to be associated with values of kinship, relationality, generosity, and *Netukulimk* (“*Netukulimk*” defined as, achieving adequate standards of community nutrition and well-being without jeopardizing the integrity, diversity, or productivity of the environment for the future”— for seven generations to come (McMillan & Prosper, 2016; Reid et al., 2020)) whereas the Canadian bureaucratic take was found to be ruled by the Western scientific worldview that prioritizes process, compartmentalization, and economic benefits. Reconciling such vastly differing approaches to management presents a considerable challenge,

which in turn means it is no surprise that government entities consider co-collaboration to be a sticky wicket. From the perspective of government respondents, the barriers are simply logistical (noting that there exists no formal process for “integration”, as well as concerns around data ownership), as well as conceptual (noting there exists no space in the process for cultural or spiritual components, and that the two systems are operating on completely different time scales – immediate, versus seven generations). Of course, these perspectives predictably fail to consider that sustainability intended only to apply in the moment is akin to buying a disposable product, built to break down and be replaced; while the immediate solution may be the more comforting one it is also the one that will require far more work in the grander scheme of things. Further barriers cited by government respondents included communication-based concerns (using different languages and interpretations), and the unresolved historical traumas and issues of mistrust between the Mi’kmaq and the Canadian government. Again, these concerns exemplify a preference for the more comforting and immediate solutions, that ultimately perpetuates harm in the long term. Avoiding interactions with Indigenous groups due to guilt and discomfort around historical atrocities committed against them is how we further perpetuate and exacerbate the rift between groups. Nevertheless, the authors report considerable opportunity for bringing Mi’kmaq knowledge systems to bear on the COSEWIC and SARA processes – highlighting specific mechanisms in their workflow (e.g. ATK SC, NACOSAR, AFSAR), as well as flagging areas that could be significantly enhanced through inclusion of community advisory boards, and scenario building activities, and identifying the numerous benefits of operating via the Two-Eyed Seeing approach (i.e. promoting cross-cultural and enriched understandings, fostering mutual respect and upholding constitutional and treaty rights). Giles et al., offer specific recommendations for improving Mi’kmaq inclusion in the conservation of the American eel,

including particularly beneficial Indigenous eeling practices which could be employed by Western parties (e.g., being highly selective during summer eeling), and corresponding management recommendations (e.g. minimum FSC level ensured; size limits for summer eeling, respectively) that the Mi'kmaq wish to be reflected in the forthcoming update to the American eel Integrated Fisheries Management Plan (IFMP) for the Maritimes region of Canada.

In summation, Giles et al. performed a critical examination of the involvement of Indigenous peoples and knowledge in policy decision-making and envisioned a path for meaningful and equitable co-governance based on a Two-Eye-Seeing approach. Parallel arguments and scenarios have been examined by other authors, built around the Tao Row Wampum mode (A 17th-century treaty belt to record an agreement between the Haudenosaunee Confederacy and Dutch settlers, centering around the principle of distinct cultures meant to interact with and assist each other while remaining separate (McGregor, 2004; Reid et al., 2020), the Two Ways philosophy (A metaphorical concept of how to mix knowledges equitably and achieve meaningful two-way collaborations, similar to a “dialectical” relationship in which two opposed patterns of ideas complement, interact and relate to one another, but never lose their distinctiveness as separate and opposed parts of one whole (Muller, 2012; Reid et al., 2020)), and the Double-Canoe Framework (A conceptual framework formalized in 2018 for unifying knowledges and ways of knowing, described as “two canoes... lashed together... each canoe represents the worldview and values of the people who are coming together to achieve a common purpose... each group is inherently different, and the knowledge, values and actions of each, are not made to fit into the other” (Maxwell et al., 2019; Reid et al., 2020).

The work of Giles et al., (as exemplified by Reid et al. in their use of the study) related to Unama'ki, and the American eel is highly valuable to this reflection as the authors investigated

the ways in which Indigenous exclusion was occurring, engaged in a discussion with members of Canadian government regarding these issues, and put forth a set of specific recommendations to improve Mi'kmaq input into the current Western-dominant approach to American eel fisheries and their management.

Each of the three case studies examined by Reid et al. provides insight into a knowledge gap in Western science, a barrier to collaboration, and specific methodologies for spurring collaborative action with Indigenous groups. Some examples of the co-benefits achieved through the inclusion of Indigenous knowledge systems in fisheries research and management, across these case studies, (and as summarized by Reid et al.) include technological shifts that improved fisheries selectivity and sustainability, enhancement of early warning systems for sea state forecasting, reverse declines in the abundance and size of exploited species, yields otherwise inaccessible ecological insights such as missing beeline information and critical improvement and collective adherence to fisheries' policies. Each of these case studies exemplifies both specific methods for collaboration but additionally displays how numerous scholars are examining these questions and attempting to spur TEK inclusion into western environmental management. If we are ever to fulfill our legal, practical, and moral obligations, and reap co-benefits across groups, there must be a fundamental revamp of how we come to know and manage all environmentally related entities in favor of a new narrative that allows room for multiple ways of knowing. The nature ethic expressed in TEK, and indigenous management, in general, is vital to the future of environmental reparations. Thus, finding effective and respectful ways to collaborate with those who possess this knowledge – wisdom informed by generations of interaction with land and cosmologies that emphasize reciprocity – is crucial.

Next Steps

As exemplified by the works of Flores and Russel, Reid et al., Abu et al., and Giles et al., (amongst numerous other authors) effective collaboration is both possible and necessary, with the right tactics and attitudes (such as the Two-Eyed-Seeing approach). As exemplified by Reid et al., the Two-Eyed Seeing approach has had visible traction in the co-development of crucial environmental questions, the documentation, and mobilization of knowledge, and the co-production of insights in research and management endeavors. However, as Reid et al., and Giles et al., emphasize, without Indigenous voices reflected in policy making, (which ultimately determines management, study, perceptions, and utilization), the effectiveness and significance of the mutual understanding generated through Two-Eyed Seeing is called into question. This lack of involvement in government additionally raises the question of whether Indigenous knowledge systems are only being valued in these cases because they are supported by, or in congruence with Western science, but continued colonialism and xenophobia within governing bodies are preventing their full and equitable inclusion into policy decisions. As Reid et al., states, “rarely are the past and present impacts of colonialism on these knowledge systems and their power recognized, let alone rectified, which is both practically and politically dangerous” (Reid et al., 2020, p. 253). In order for tangible progress to be made, Indigenous voices must matter in policy-making processes, and Two-Eyed Seeing holds promise for providing structure with which to guide this endeavor (i.e., true decision co-production).

As of today, the U.S. Department of the Interior, Bureau of Land Management (BLM) cites the essential reasons for government-to-government relations with sovereign nations as, “to identify the cultural values, religious beliefs, traditional practices and legal rights of Native American people, which could be affected by BLM actions on public lands” (Department of the

Interior, n.d.). The BLM states that tribal consultation regarding public-land activities has 4 essential elements including, 1) the identification of appropriate tribal governing bodies and individuals from whom to seek input, 2) communication with appropriate tribal officials, and inquiries about land use proposals or other pending BLM actions that might affect traditional tribal activities, 3) examining practices or beliefs relating to particular locations on public lands while treating tribal information as a necessary factor in defining the range of acceptable public land management options, and 4) creating and maintaining a permanent record to show how tribal information was obtained and used in the BLM's decision-making process (Department of the Interior, n.d.). The BLM 1789 Tribal Relations Manual and Handbook is cited to "represent years of outreach and coordination between the BLM and American Indian tribes and has been developed to complement the direction of the Administration and the Department" (Department of the Interior, n.d.). According to BLM, this handbook, developed according to tribal feedback, attempts to assist BLM's line managers and staff who carry out consultation and cooperation across a spectrum of resources and issues of concern to tribes. However, the handbook reads somewhat as a "rules of etiquette" pamphlet rather than a roadmap for collaborative decision-making. While these measures taken by the U.S. government are promising, they are futile without government agents who are not committed to the deconstruction of harmful Western notions. This study has demonstrated the power and influence of ideologies and understandings. If we approach co-collaboration from a sole place of fear and forced obligation, the progress we make will be essentially meaningless. Only when we vow to overcome our discomfort, to accept the atrocities we have committed and commit to making genuine reparations, to discard arrogance and xenophobia and accept the incredible value and validity of

other narratives, will we be able to welcome in Indigenous voices – a feat that should have been accomplished so very long ago.

Western science is informed by a Christian cosmology that presents a false dichotomy between humanity and nature. As a result, the discipline overlooks crucial elements of ecosystem management and environmental relations – gaps inevitably present when we view ourselves as separate from the environment (e.g., failing to acknowledge the spiritual, and cultural value of land, failing to recognize the importance of a reciprocal relationship with the environment, failing to understand humanity as part of the environmental system rather than a distinct entity with disproportionate value or power). Correspondingly the technicalities of Western science can contribute elements not present in Indigenous TEK. Each cultural understanding has something valuable to contribute to the other, a problem that can be helped with collaboration. However, Western dominance, xenophobia, and entitlement have presented considerable barriers to achieving such a feat and fostering this relationship. Recognizing the inherent biases of Western science, the value of TEK, and providing specific methods for where and how to begin collaboration can alleviate some of these impediments, and advance valuable efforts.

Conclusion

Scholars within this discourse community have raised questions regarding how we frame our relationship with the natural environment, through ancient narratives, cosmologies, political orientations, economic pursuits, theologies, and more; many of these queries raised in the attempt to define effective solutions in our current era of climate degradation, or the “Anthropocene”. The Christian cosmologies, Roman doctrines, and capitalist worldviews that have dominated Western culture for centuries have led us to the climate emergency that we now face, validating our anthropocentricity, and thus our continued exploitation of the natural environment. When all the world is a vessel for human utility, we see no harm in the taking. No longer a looming or distant dilemma on the horizon, the climate crisis is an urgent predicament, impossible to ignore as it continues to impact our collective realities. To face such a quandary requires a paradigm shift, a cultural course correction. In our search for solutions, let us discard the term “Anthropocene”, Western paradigms of dominance over nature, and all those associated harmful actions justified by such stories. Scholars within the discourse have been searching for an alternative; an alternative of entanglement, of kinship, of reciprocity, and interconnection. They discuss theoretical worldviews characterized by these traits as if the very narrative that they’re proposing does not already exist, and furthermore as if we do not have tangible evidence for the ways in which a narrative of entanglement with the natural environment expresses. This thesis has attempted to contribute to such scholarship, by offering Indigenous narratives as the alternative that we have been searching for; a deep well of historical wisdom which we have overlooked and disregarded. Collaboration with those that already possess such wisdom, those who represent the direction we need to be headed in, can guide us into the future of reciprocity that we require.

In changing the cultural narrative to one of mutualism, giving, and receiving, and in listening to those voices we have stifled for centuries, we may be able to change our trajectory as a species. Cronon states that truly honoring the wild, “means practicing remembrance and gratitude, for thanksgiving is the simplest and most basic of ways for us to recollect the nature, the culture, and the history that have come together to make the world as we know it” (Cronon, 1996, p. 25). The benefits of these relationships of mutualism are innumerable; our symbiosis leads to fruitful interactions and meaningful relationships with our surroundings, to feelings of wealth and gratitude, to heartfelt connection, and a better understanding of our world. We must accept what is given rather than taking what is not by force. Rather than mine for coal, we can utilize the power of wind, sun, water, all resources readily given. As the harvester is to the sweetgrass, as the gardener is to the corn, beans, and squash, as the ash tree is to the basket maker, Kimmerer and other Indigenous scholars show us that we must uphold our end of the bargain to care and lovingly tend to these beings and they will uphold theirs to support us as they always have; then we will live in reciprocity.

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