ALGAL ALTERITY :

A Study of Florida's Algae-Crisis-Culture

BY

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Abstract

This research critically engages with the ecology of media discourse surrounding Florida's "harmful algae crisis" . It uses a content analysis of online news media articles to address how the presence and unique processes of aquatic algae organisms are entangled with people and cultural practices. Specifically, this work grapples with the dynamic relationship between algae organisms and the cultural production of meaning through visual imagery/stimuli. It examines both visual and textual representations of algae in mass media communications covering the harmful algae crisis or "red tide crisis" of 2017 and 2018: an extreme period of aquatic algae proliferation and hazardous biotoxins which catalysed a state of emergency due to continual and severe inundation of Florida's waterways.

Ultimately, this work showcases how the communication and representation of algal phenomena was predominantly contextualized within antagonistic frames of risk, hazard, and ecological crisis or mass marine mortality. A critical visual analysis of article titles and hyperlink images was used to identify potential patterns of media framing and recurring use of specific visual forms, subject matter, and emotional stimuli throughout the "harmful algae crisis", with most visual forms and subject matter signifying elements of non-human suffering (both denotatively and connotatively). These inferences point to a growing need for improved understanding of the roles which emotional appeals and spectacle-based narrative assume in online news media communications of harmful-algae phenomena and socio-ecological dynamics or environmental crises in the broader sense.

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“The discourse of vulnerability, no less and no more than that of tropicality or development, belongs to a knowledge system formed from within a dominant Western liberal consciousness and so inevitably reflects the values and principles of that culture.” - Greg Bankoff, Cultures of Disaster: Society and Natural Hazards in the Philippines (2002 , p. 29)

“Over the last few decades, the trajectory of modernity has reinforced the mind-body dualism to the point of producing the illusion, so powerfully propagated in cyberspace, that human beings have freed themselves from their material circumstances to the point where they have become floating personalities ‘decoupled from a body’.” - Amitav Ghosh, The Great Derangement: Climate Change and the Unthinkable (2016, p. 161)

“The prison of one’s character is painstakingly built to deny one thing and one thing alone: one’s creatureliness. The creatureliness is the terror...the anxiety that results from the human paradox that man is an animal who is conscious of his animal limitation”. - Ernest Becker, The Denial of Death (1973, p. 87)

Introduction

We live in an era largely defined by the emergence of distinctively new and problematic hazards. In this age of indeterminacy, humans face a great paradigmatic shift toward addressing modernity's endemic production of catastrophic risks. Ulrich Beck's seminal reflection on the modern condition[1] expanded this idea by proposing that we are firmly entrenched in a "Risk Society" wherein global decisions, phenomena, and processes are pervasively intertwined with local consequences that affect daily experiences of life on Earth. The far-reaching effects of risk perception, he argues, are exacerbated by accelerated, informational capitalism and near constant access to advanced means of digital social communication or news media. We can't seem to escape our own mortal entanglement with the biophysical realm -- the vulnerable "environment" or externalized "Earth", Nature itself -- especially when our eyes ceaselessly flicker across digital communication pathways nearly each hour of the day, fixating between images of new "wicked" problems and crises.

As the deluge of information continues to inundate social imaginaries, it is of increasing importance to investigate how nature-culture crises or concerns are communicated and represented throughout media pathways so as to foster public engagement beyond just temporary, terrified awareness of looming threats, hazards and change. Such is the underlying goal of this thesis. Supporting this mission, Beck argues that human perceptions of risks -- and indeed the formulation of the Risk Society itself -- is largely informed by mainstream media:

> *" ... radioactivity.... toxins and pollutants in the air, the water and foodstuffs, together with the accompanying short- and long-term effects on plants, animals and people. They induce systematic and often irreversible harm, generally remain invisible,*

[1] From *Risk Society: Towards A New Modernity* (Ulrich Beck 1992)

> *are based on causal interpretations, and thus initially only exist in terms of the (scientific or anti-scientific) knowledge about them. They can thus be changed, magnified, dramatized or minimized within knowledge, and to that extent they are particularly open to social definition and construction. Hence the mass media and the scientific and legal professions in charge of defining risks become key social and political positions.* (Beck, 1992b, 22–3)

At this point in time, it is common knowledge that the world's biodiversity continues to rapidly decline. Sea levels have risen at an alarming rate[2] (Warrick 1990). Humanity's carbon footprint continues to expand (despite a near-total halt on air travel throughout 2020 due to the Covid-19 pandemic). Experts and scientists continuously warn of surpassing Earth's critical "tipping points". Yet, while some eyes may be opening with intense disillusion at these dire predictions, others would appear to be sealed with indifference... or sheer desensitization to the prospective terror of the future. Many of the World's powerful leaders continue to promote collective cognitive dissonance. Adding to the abstract chaos of the climate crisis, humanity's global population is projected to reach 9.3 billion by 2050 (Anderson 2012), and coastal inhabitants are expected to account for nearly 40% of that growing population. With people already inhabiting and altering coastal regions more than ever before, not least among the deluge of emerging global concerns is the urgent need to understand the hazards and risks which coastal communities now face. It is also critical to facilitate long-term, engaged awareness among coastal inhabitants about the ways in which the entangled relationships between marine ecosystems and their community's lives are rapidly changing.

[2] This IPCC report concludes that "at the year 2030, global-mean sea level is 8 - 29 cm higher than today, with the "most favorable" estimate of 18 cm resulting from "thermal expansion of the oceans and the increased melting of mountain glaciers/small ice caps". It also notes that "even with substantial decreases in the emissions of the major greenhouse gases, future increases in temperature and sea level are unavoidable" (Warrick 1990: 266, 278).

The issue of increasing proliferation of algal organisms in aquatic environments and the resulting concentration of hazardous biotoxins in those environments -- also known as "harmful algae blooms" or "HABs"-- is one example of a rapidly changing socio-ecological dynamic which is already adversely affecting public health and weakening economies all over the World. A recent UNESCO report, for example, concludes that both global and local fisheries and aquaculture practice are being adversely impacted as a result of HAB-induced marine mortality (Kudela et al. 2015, 8). The report cites an estimation of the US National Oceanic and Atmospheric Administration (NOAA) which concludes that "more than 50% of all *unusual mortality events* (UMEs) in marine environments are due to algal biotoxins", also noting that the economic impact or costs related to the mitigation and monitoring of HABs and their effects are going to increase as the demand for marine resources also increases. Exacerbating these troublesome conditions, many changes in freshwater and marine environments are anticipated to occur with the acceleration of global climate change (Doney 2012, 11–37., Hallegraeff 2010) . As a result, scientists are confident that the frequency and intensity of algae blooms will likely increase in certain regions as the World's oceans become more acidic, nutrient-rich, and polluted (Anderson 2012, Gobler 2020, Hallegraeff 2010, Wells et al 2020).

With these dire predictions and factors in mind, it is reasonable to assume that most Americans have come across the terms "algae bloom", "harmful algae bloom" or "toxic algae" used in mainstream news media at some point in recent years. But how exactly do we contemplate our own perceptions of -- or relationships with -- algal organisms? What guides our predominant perception of complex aquatic beings? In other words, when, and through what forms do we become aware of our community's relationship with algal beings and their aquatic habitats? Algae are commonly perceived as tiny, aquatic organisms which float about aimlessly

in oceans, rivers and lakes-- as the term is commonly used to refer to a broad group of plant-like organisms. Even most young students learn how algae function within global ecosystem cycles to filter pollutants, generate nutrients, and produce approximately 50% of the planet's oxygen. Yet, despite this underlying knowledge, are we more acutely aware of algal exuberance in terms of its life-giving or life-threatening qualities? Consider, for example, how the contextualizing of microscopic algal organisms in terms of "threat" or "hazard to life" may at first seem dramatic-- in the same way that news headlines like "*Florida Algae Blooms Send People to Hospital, Kill Marine Wildlife*"[3] or "*Biblical' blood bloom bleeds the waters 'tomato soup' red in Cocoa Beach*"[4] seem urgent, alarmist or dramatizing. In truth, the positioning of algae in such contexts has arguably become a normative communication model of media discourse for communities living near aquatic environs.

For those inhabiting warm regions like Florida, where enormous 'blooms' of algal organisms occur annually, it is likely that perceptions of aquatic algal beings and their processes are often centered around predominantly antagonistic associations. Through the excavation of such representations and conceptualizations of algal organisms within mainstream accounts of Florida's "algae crisis", this work seeks to draw attention to the presence and development of a unique relationship between algal species and people. This relationship is largely informed by the intersection of short public-media accounts on "ecological calamity" with the root concepts of Nature embedded in Florida's social imaginary[5]. A collection of samples presented in the Findings and Discussion sections supports this claim clearly by showcasing how media

[3] Article 18

[4] Article 10

[5] The "social imaginary" is a term coined by the Canadian philosopher Charles Taylor to denote *"the way ordinary people ''imagine'' their social surroundings… expressed/carried in images, stories, and legends"* (Taylor 2004, 23). In Florida, the "social imaginary" is arguably juxtaposed to the "ecological realm" with deep roots in Westernized concepts of Nature(d) otherness, influenced by rapid colonization of the region by migrant European populations beginning in the eighteenth century.

representations direct public attention to mass marine mortality, thus formulating a deluge of negative perceptive links and cultural associations with certain aspects of non-human otherness. More specifically, negative associations are culturally constructed between algal exuberance and ecological calamity.

These questions and concerns are not only central to the focus of this work, but ultimately point to a growing need for adopting a reflexive approach to normalized conceptual models of nature and non-human alterites. To expand the scope of these core questions, this work examines how seemingly objective accounts of ecological calamity, toxicity or degradation may unintentionally perpetuate age-old hierarchical dichotomies between nature and culture at a time when the exact opposite may be required for cultivating pro-environmental behavior. The discussion section will elaborate upon these foundational dualisms, offering insight as to how algal organisms and HABs have been caught up in the net of invented dichotomies.

Algae *'blooms' !*?

Each year, a fatal combination of human-induced environmental stressors and natural hydrological processes combine to transform the Florida coasts into virulent abattoirs for heaps of rotting marine life. This seemingly spontaneous transformation from "paradise" to virtual "purgatory" to 'blooms' of marine and freshwater *phytoplankton*[6] is often directly attributed to "*harmful algal blooms*" or "HABs" [7]. After a half-century of investigating these seemingly spontaneous algal bloom events, scientists now understand that they are generally produced

[6] Throughout the following data set, findings and discussion sections, the term *phytoplankton* -- derived from the Greek words phyto (plant) and plankton (made to wander or drift) (Webster 2002)-- is used here interchangeably with the terms "algae" or "algal organisms" to account for a diverse group of microscopic organisms that live in watery environments and use sunlight and nutrients to grow. The term algae is also used here in encompassing reference to dinoflagellates as well as larger multicellular cyanobacteria.

[7] "HABs" actually account for only one aspect of the full life cycle and relational qualities of phytoplanktonic organisms.

when natural marine and estuarine nutrient cycles combine with anthropogenic (*human-induced*) environmental stressors like coastal development, industrial agriculture runoff (of fertilizers), or ocean acidification resulting from Climate Change (Davidson 2014, Fleming 2005). While most algal species contribute to marine and freshwater ecosystems by producing food or shelter for larger organisms, some species can produce dangerous and toxic environmental conditions which lead to HABs.

Decades of research and news-media coverage of algal phenomena in Florida have designated HABs as not only a threat to ecosystems and wildlife, but also a threat to economic stability and human health (Fleming 2005, Hoagland 2014, Kirkpatrick 2014). Within the State of Florida, there are several specific types of microorganisms known to contribute to the production and intensity of HABs. Most visible (and thus infamously "harmful" or "threatening") are the species *Microcystis aeruginosa* and *Karenia brevis.* What Floridians commonly refer to as *"blue-green algae blooms",* for example*,* are actually thick, greenish proliferation of the cyanobacterium *Microcystis aeruginosa* atop freshwater ponds and lakes. The adverse health impacts of *Microcystis aeruginosa* are considered to be minor and limited to exposure to the bloom's surface material or surrounding water. This is because toxins produced during "blue-green-blooms" are often restricted to the site of occurrence, whereas other algal or cyanobacterial species are known to produce dangerous toxins which travel via *aerosolization* (when toxins are released from the water's surface by heavy wind and wave turbulence).

The largest and most frequent type of HAB in Florida -- commonly referred to as "Red Tides" -- are produced by a microorganism (*dinoflagellate*) known as *Karenia brevis*. It is this dinoflagellate and the powerful effects of its toxins-- or *brevetoxins* -- which have made Florida's HAB events almost globally notorious for their health risks. Data suggests that even

minimal exposure to these specific toxins may “lead to acute, subacute, and possibly more chronic illness” in humans (Fleming et al. 2012, 8). The Centers for Disease Control and Prevention (CDC) defines brevetoxins as “a group of similar neurotoxic compounds which are tasteless and odorless”, and notes that severe illness can be caused in both humans and wildlife through the exposure to toxins during peak algal growth. It also specifies that while exposure to potent brevetoxin compounds often occurs through “oral ingestion of contaminated shellfish”--which catalyses abdominal pain, vomiting, and diarrhea as well as neurological reactions such as vertigo -- toxicity and subsequent illness also results from inhalation or dermal exposure. In cases of inhalational exposure, reactions in both humans as well as aquatic wildlife include severe respiratory symptoms such as cough, dyspnea and bronchospasm (Fleming et al. 2005).

Though often accompanied by foul aromas of rotting seaweed, algae and other marine creatures, brevetoxins themselves are tasteless and odorless neurotoxic compounds. Over the last few decades, cases in which severe respiratory and neurological reactions have occurred after human exposure to algal brevetoxins have been increasingly reported (Hoagland 2014, Fleming 2005, Clarke 2018). Scientists believe that this may be due to the potential for the red tide algal brevetoxins of Karenia brevis to become “air-borne” or aerosolized and therefore travel to areas surrounding HAB sites (Fleming et al. 2005). These findings highlight the mobility of algal functions and thus point to another characteristic of their entanglement with human beings and bodies which extends far beyond aquatic environs.

Based on this information alone, HABs may intimidate those seeking to safely inhabit a coastal region. But rather than merely perpetuate doomsday narratives about algae and other ecological phenomenon, this work aims to reflect on the way that diverse and vital organisms like algae become focal points of human attention, fear and even anger when characterised as

antagonistic or toxic entities to “the human” or “the cultural”. This work is heavily concerned with how people have come to know algae to be hazardous to human well-being, but seeks to also address broader aspects of Nature’s interface with the social imaginary. More specifically, it serves as a preliminary assessment or mapping of the tension between entertainment and information in the context of algal discourse. By questioning whether HAB discourse is dominated by fear-inducing media representations of complex socio-ecological phenomena, it seeks to illuminate broader cultural tendencies (such as *romanticising*, *moralizing*, or “*spectacle-izing*”) which may be problematically rooted in age-old nature-culture dualisms.

At its core, this thesis draws attention to the relationship between people and algal organisms through a lens which illuminates an unsustainable lack of collective long-term socio-ecological entanglement. It does so by addressing some foundational concepts about nature (as opposed to culture) which inform contemporary society. For example, according to Bruno Latour, one of the founding principles of Western modernity has been the assumption that moderns believe they “inhabit a distinctly cultural universe, which directly opposes nature and animals”(Latour 1993). Thus, as humans have become increasingly dependent upon the perceived “stability” of the environment -- a cultural construct rooted in notions of Nature’s “purity” or “productivity” in anthropocentric terms -- environmental change (in the form of melting ice, ozone depletion or even algae blooms) can deeply unsettle socio-psychological distance from non-human realms. Research suggests that humans tend to adopt more ambivalent attitudes towards the natural world prior to environmental catastrophes (Fritsch & Hoppe 2019). In other words, the point at which a person perceives the occurrence or possibility of catastrophe is also the point at which deeper fears for the individual loss of order and control are first triggered (Fritsch & Hoppe 2019, Sanniti 2017). As such, it is arguable that shifts in ecological

dynamics can both reinforce nature-culture divides by magnifying our own sense of vulnerability. Adding to this, social theories pertaining to the (in)effectiveness of media-narrative rooted in environmental *"spectacle-izing"* and TMT, also support this perspective. The psychological Theory of Terror Management (TMT), for example, suggests that social cognition and behavior is largely motivated by a practice of denying or distracting from the realization that we humans are mortal beings (Fritsch & Hoppe 2019). These theories, among others to be addressed further, point to the possibility that dramatic or detrimental shifts in ecological conditions or ensuing environmental catastrophe can effectively "rupture" the divides between nature and culture. This work emerged from an observation of that *rupturing* capacity, to discover that social perspectives on algae may be significantly defined by a kind of prevailing "algae-crisis-culture"-- a term coined here to encapsulate the fluctuating socio-ecological dynamics between people and algae which have induced a cycle of fear, uncertainty, and relative indifference about our changing environment.

The Past, Present, Future of 'Harmful' Algae

To better understand the significance of this "algae crisis culture" , it is useful to understand how people in Florida first perceived their relationship to hazardous algal phenomena in the context of mortality or "vulnerability". It is said that the first literary reference to "harmful algae blooms" or "Red Tide" in Florida can be traced back to the sixteenth century, when a Spanish explorer vaguely described oral stories of the regions Indigenous populations warning of "agua rosa peligrosa" or "toxic red water" and the mass death of birds and fish associated with it (H.A. Magaña et al. 2003). Unfortunately, this ambiguous account makes up much of what historians know of the relationship between algal organisms and Indigenous Peoples (such as the

Calusa and Tequesta) who inhabited the peninsula for thousands of years prior to its early invasions by the Spanish Empire. This is due to the fact that the active monitoring of harmful algal blooms and large scale algal events like "Red Tide" by local governments was only initiated in 1947. Prior to that, practices of documenting algae's presence in local environments took place sporadically in community newspaper accounts, letters of "untrained" scientists and notes from captain's ship logs. Despite the subjective nature of these miscellaneous and ambiguous records, patterns of increased algal proliferation or "significant" bloom events are recognizable and do manage to provide contemporary scientists with some useful data for distinguishing natural from anthropogenic cassal factors and effects.

One of the first significant reviews of synthesized reports on Red Tide occurrences was conducted by Feinstein et. al in 1955. The review identified a collection of reports which observed a concentrated algae-bloom-event which occurred in Florida from from 1844 to January of 1848. Notes detailed that toxic conditions, "a poisoning" and "an excessive fatality" occurred in waters off the Southwestern coast of Florida persisted from appx. 1878 to 1881 (Feinstein et al. 1955, 6). This particular finding is useful in understanding when aquatic environmental conditions may have first been anthropogenically altered to the point of sustaining intense algal proliferation for "unusual" periods of time. For instance, a dramatic shift took place in the relationship between Florida's inhabitants (now non-indigenous settlers of primarily European, South American, Central American, and African origins), ecosystems, and economic practices in the decades prior to this intense HAB outbreak. Until 1840, Florida's agricultural production remained virtually paralyzed. Following the end of the "Indian Wars" (ie. the final decimation of Florida's diverse Indigenous populations-- including the Tequesta, Calusa, Seminole Tribes, among many others), the region experienced an influx of White settlers (with

human slaves) seeking to tame the "rugged wetland wilderness" for profit. The majority of these settlers took up sugar agriculture (Cresap 1982, 163), as well as tobacco, cotton and corn production. This intense period of human-settlement turned the region into one of the biggest producers of sugar in the United States-- a fact which is still true to this day. As a consequence of this dramatic, anthropogenically-induced transformation, the localised-draining of critical wetland areas which once fed the Everglades watershed (Cresap 1982, 164) combined with the introduction of chemical fertilizers into the soil and the redirection of estuarine water/nutrient-flow, the region's ecological stability has been adversely affected.

Fig. 1 shows how Florida's hydrological landscape has been significantly altered to prevent Lake Okeechobee from flooding Southward into the Everglades. The region's natural hydrology was originally a powerful -- though delicately balanced -- process by which vital nutrients were once filtered and distributed evenly throughout the region. The introduction of pumping stations and levees for agricultural production immediately hindered the natural flow of water, thus directly promoting the high concentrations of nutrients which sustain algae blooms and render them "harmful". Between 2017 and 2018, two algae outbreaks occurred simultaneously in Florida. The prolonged, large-scale blooms killed fish and other marine life while producing noxious gases that threatened people living near coasts and inland waterways. The southwest coast experienced one of the longest-lasting red tide outbreaks in the state's history, and had to close more than 100 miles of beaches to prevent human exposure to algal toxins. At the same time, polluted freshwater and polluted, nutrient-rich local runoff water was being discharged from Lake Okeechobee, as well as the St. Lucie and Caloosahatchee watersheds (shown below). The southward convergence and concentration of these pollutants through the State's watershed then catalysed major blooms of blue-green algae in estuaries along

both coastlines. A State of Emergency was Declared by Florida's former governor on July 9th, 2018. This is what is referred to as Florida's 2017-2018 Algae Bloom Crisis.

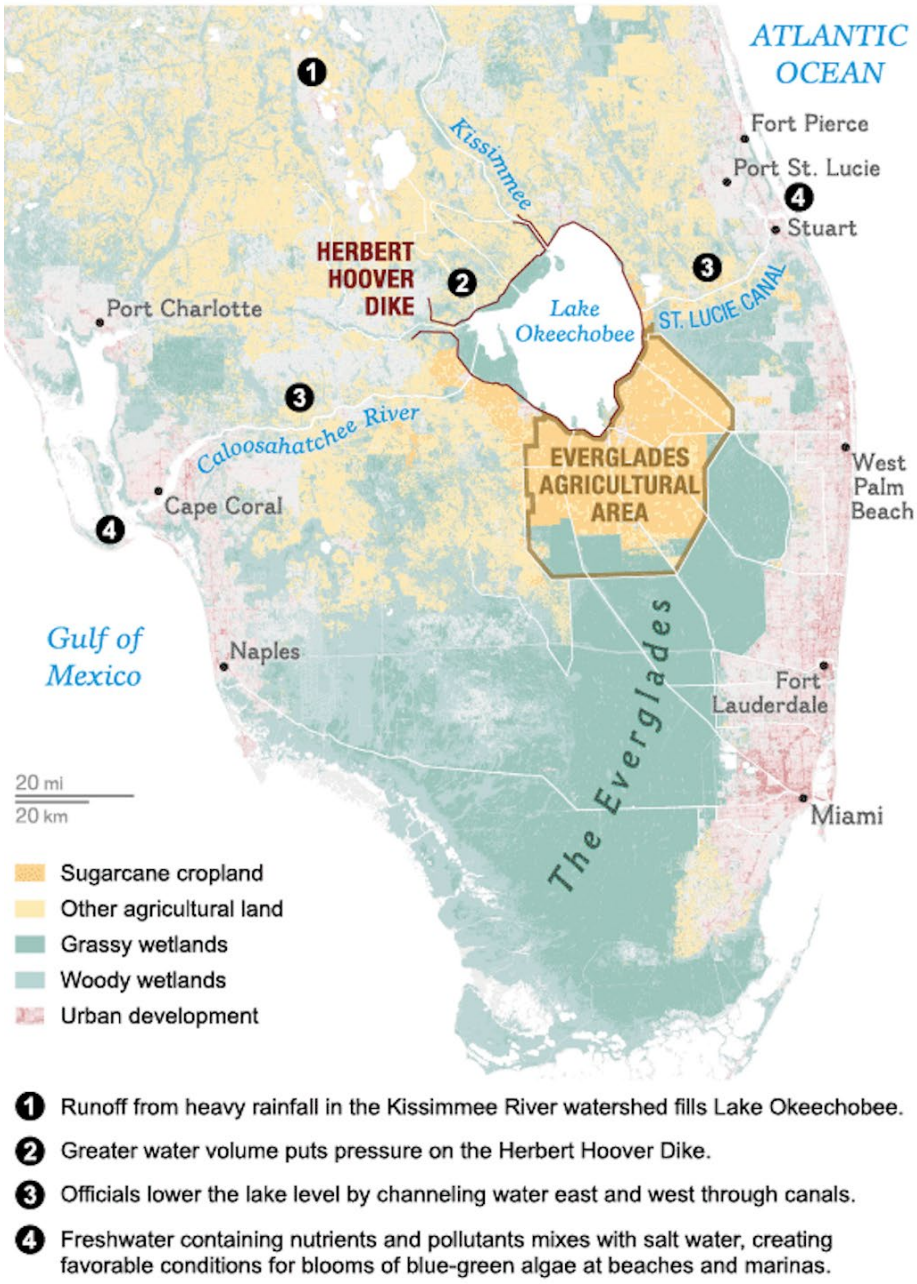


Fig 1. - "Florida's Leaky Arrangement" (Riley D. Champine. Sources: USGS, USDA, U.S Army Corps of Engineers, South Florida Water Management District)

News Media and the Environment

In the twenty-first century, much of our perceptions of the world are made using bits and fragments of information gathered from quick online media communications. News media serves many critical roles in modern society, with the most significant role being the perceived objective communication of factual information to mass audiences. To the extent that the media invents and sustains conditions of relevance or importance, it can be used to instruct public attention towards and away from certain topics (McCombs 2003). Ultimately, the media wields a pivotal role in communicating environmental issues in terms of cultivating public perspectives, particularly in matters which concern ecological health, human health and economic risk. This capacity for influence through communication brings greater concerns for the processes by which environmental meanings are constructed and negotiated across the assemblage of science, media, culture, environment and politics (Goodman 2016). As such, it is critical to consistently question how individuals may more effectively engage with the complex assemblages of information, ideologies and perceptions that make up their understandings of the environments with which they are intertwined. The same influential capacity of valuing or devaluing environmental issues through media communications are also true for news coverage of algal phenomena. It is for this reason that **this work explores the visual and textual representations of various forms of harmful algae blooms.**

Through a practice of representational mapping of Florida's 2017-2018 "Harmful Algae Crisis" and ensuing narratives of algal organisms embedded in its social imaginary, several dominant conditions within HAB discourse are to be uncovered. Firstly, this research addresses the more obvious anthropocentric modes embedded in the dualistic view of "the human/cultural"

as victim to "the natural", or as in this case, "the algal". To the extent that algae are predominantly characterised as "toxic" or "hazardous", it showcases how algal microorganisms and HABs are viewed as a threat to human health and economic stability (ie. culture). Secondly, in assessing HAB representations, it also addresses how "the natural" is frequently viewed as a victim of "the cultural" in the sense that human activity has the *power* to *interrupt* and *manipulate* natural environmental cycles by producing toxic environmental conditions. When HABs are perceived as the direct result of human development through exploitation of the environment, for example, they are transformed into cultural productions. Finally, this work exposes how HABs are predominantly viewed as hazardous "aliens" which exist external to Florida's culturally constructed "natural" ecosystems based on cultural perceptions of "ecological purity" and the concept of "contamination" or "the unnatural". Following this sequence of analysis and discussion, this work explores some possible paths towards magnifying *critical entanglements* or *re-enchanting* the relationship between Florida's complex aquatic ecologies and its people.

Theoretical perspectives on the relational dynamics between media and society ultimately maintain that: a) "the media are the main messengers *about* society" (McQuail 2003b, 82) as a result, "the priorities of the media strongly influence the priorities of the public" (McCombs 2003, b and c) that environmental 'problems' are "socially constructed through public claims-making" (Hansen 2013). Supporting this claim, Boykoff 2009 suggests that "media representations—from news to entertainment—provide critical links between formal environmental science and politics and the realities of how people experience and interact with their environments" (Boykoff 431).

Based on these arguments alone, the necessity for investigating media communications of ecological concerns becomes clear, as doing so uncovers not only how such perceptions and interpretations characterize what is "true" or "real", but also how those characterizations serve to crystallize public opinion (Lippman 1922). This analysis of media representations of algal organisms may then serve as one small study of human capacities for conceptualizing and relating to other-than-human-life, and the intricacies of the world through mass communication networks.

Media Images and Environmental Spectacle

Visual expressions of meaning through images through mainstream media are ubiquitous in the modern world. As showcased through the study of *semiotics*-- the study of activities and processes (or *semiosis*) that use signs in the production of meaning-- founded in the early twentieth century by Ferdinand de Saussure and Charles Sandres Peirce, humans may only know culture through processes of *signification*… the representation of meaning. As such, signs are not only fundamental to the human perception of reality itself and thus to the sustenance of culture.

To the extent that visual imagery and communication establishes our place in the surrounding world or at the very least informs how humans 'make sense' of the world, it is important to acknowledge how cultural constructions influence and shape what and how we see. What we often consume as "factual" through the media is a construction disseminated through many forms of representation, for example, and as such it is only through the dissection of signs and signification that we may begin to uncover how the construction of certain realities inform the construction of cultural patterns.

The influential role of imagery is particularly potent in media communications of environmental issues, in that they are often embedded or "framed" with positive or negative emotional appeal devices which inspire shock, anger, surprise or laughter. Furthermore, in the context of environmental degradation, images draw on the synthesis of the viewer's emotional attachment to ignite collective activism or reformation of individual action. In *Green Media and Popular Culture: An Introduction*, John Parham argues that visual representation, otherwise addressed as "image events" or "staged acts of protest designed for media dissemination" (De Luca 2003, 315) are effective rhetorical weapons in that they can exclude anti-ecological framing or editorial control: *"... visual media has an ability to operate beyond 'the association of rhetoric with a notion of discourse as limited to words or reasoned argument'"* (De Luca 2003, Parham 2016, 109).

Media Framing

Based on the aforementioned conditions, this thesis will predominantly focus on the *framing* of HAB-narratives through visual representation so as to uncover how the construction of certain "environmental realities" informs the construction of cultural patterns of perception and/or action. *Media framing* occurs when certain events are presented within a specific thread of meaning. Framing theory suggests that frames serve to organize and structure meaning through a process of abstraction, often drawing from common societal ideologies to develop a particular message. They define a problem, diagnose its causes, make moral judgments, and suggest remedies. This is significant in the context of communicating complex scientific information in that the *"frame"* in which a topic is presented to an audience has significant

influence on how information is processed. This, in turn, directly impacts the perspectives or choices made in relation to that information or issue.

In addition to framing, audiences are "convinced" of the truth-telling nature of news media accounts because frames are semiotic in that they are closely tied to symbols in words or pictures, metaphors, catch-phrases and anecdotes for their capacity to carry narrative meaning. Therefore, an analysis of visual or symbolic representations is vital to understanding an article's narrative beyond its core *reasoning devices*-- hence our focus on framing in media accounts of algal phenomena.

Cultural Mediations of Nature

As mentioned, visual mass-media narratives are arguably the most significant channel of information and as such have become one of the greatest influencers and/or developers of nature-culture perspectives. Adding to the scope of influence with regards to local and global environmental issues, literature suggests that visual representations of the environment in television news coverage predominantly emphasize romantic views of nature in that the environment is more frequently depicted as "spectacle, landscape or "under threat" (Hansen 2013, 156, Cottle 2000, 41). Such representations "tend to be decontextualized and aestheticized in ways that enhance their flexible and versatile use across different genres of communication" (Hansen 2013). It is reasonable to argue, therefore, that in order to confront our wicked problems -- the social and ecological crises or catastrophes which plague this Risk Society (Beck 2003) -- we must first critically engage with the normative nature-culture dynamics which guided us to our so-called "tipping points". By engaging with how algae organisms and their processes are

communicated, represented, and conceptualised within dominant nature-culture ideologies or conceptual frameworks, this work takes a small step in doing so. The following sections touch upon cultural inventions of nature or "environmental spectacle" and the theories on the spectacle-izing of "nature" as a byproduct of environmental imaging, as such concepts are critical to this analysis of HAB representations.

To begin with, as Guy Debord explains in *La société du spectacle* (*The Society of the Spectacle* 1967), the true role of images exists in their "distraction and pacification of the masses". Debord argues that *the image* can also be interpreted as a kind of *fragmentation*-- a process by which reality, time and geographic distance collapse. This fragmentation occurs in part because images become "commodities alienated from the relationships that produced them" (Igoe 2010). As will be discussed in our analysis, one physical example of fragmentation with regard to HAB media representations can be found in the way the communication of algal phenomena is most often tied to visual depiction of marine mortality. Images of deceased fish-bodies or the carcasses of marine mammals presented in the context of HAB discourse, for instance, are immediately accepted to be in association with the presence of algae organisms… even if no algal organisms are present in the image itself. Spectators become more and more alienated from lived reality as images demand passive acceptance, and communicative tendencies such as romanticising, moralizing, and "spectacle-izing" (Debord 1967) add to this effect. It is for this reason that this work is concerned with the presence and influence of spectacle-izing narratives in HAB discourse.

Inventing Algal Alterity

Generally speaking, dualisms serve to rationalize regimes across genders, races, classes and species. Aiming to dismantle foundational dualisms which invent and sustain such regimes in the quest for a new practice of environmental ethics, the self-proclaimed ecofeminist, Val Plumwood (Gaard 2011., Plumwood 1993, 2002) worked through the dilemmas of anthropocentric thought. She did so primarily with her critical exploration of the ecofeminist project, maintaining that the same dualistic attitudes which positioned the female as external and inferior to "the male" was of the same branch of thought which positioned "nature" (and everything associated with it) as inferior to "the human".

According to Plumwood, anthropocentrism is the core framework of Western thought which encourages (if not demands) the externalization of the natural, the physical, the biological, or the animal as hyper-separated "other". Furthermore, she established that the political purpose of dominant anthropocentric binaries were rooted in the naturalization of patriarchal structures which elevate male/masculine entities as dominant over non-male/non-masculine entities (ie. androcentrism). Supporting this perspective, Carolyn Merchant's work in *The Death of Nature: Women, Ecology and the Scientific Revolution* (1980) addresses how "scientific" modern ways of thinking enabled the exploitation of nature and even philosophically approved extractive practices of capitalistic expansion or "progress". Merchant not only identified how the mechanistic philosophies of the emerging industrial era served to frame nature and "the natural" as a static and passive "resource" to be exploited by man, but also effectively traced how the subjugation of "the natural" directly informed the subjugation of women.

Such approaches allow for a deeper understanding of how humans and human bodies have been continually isolated from a sense of belonging to "the organic" or "the natural"-- or

more specifically to this work, how human bodies have been isolated from algal bodies and aquatic environs. With that said, such approaches also draw attention to the alienation of algal organisms from their own environment. One example which will be addressed further in our analysis, accompanies the fact that HABs are often framed in human contexts or concerns … but they do not only affect human health, or alter "distinctly human" habitats. In fact, fish, turtles, manatees, dolphins, and whales (to name a few species) are even more susceptible to the toxins produced during harmful algal blooms than humans (Wells et al. 2020). Their survival and the safety of their habitats are at greater risk because they exist in closer proximity to (and dependency upon) environments in which algae thrive. With that said, algae do not exist in opposition to turtles, fish or marine cetaceans, as algal organisms contribute to the very ecological cycles and conditions which allow other species to exist. Yet, when the deceased and bloated bodies of fish or manatees, for instance, are found washed ashore during an algal bloom event, news accounts of their casualties tend to invoke a directly antagonistic link to algal organisms. This observation will also be expanded in the discussion section of this work, but will be elaborated upon briefly.

Consider Kellert 1984's assertion that "the most common perceptions of animals in contemporary American society are informed by humanistic, moralistic, utilitarian, and negativistic attitudes" (Kellert 182), with all of these human factors rooted in "a bedrock of affection and concern" for animals and wildlife. Kellert reduces these affectional factors into a list of attitudinal dimensions toward wildlife and the environment (Barney et al. 2005, fig. 1), which are described as follows:

> Aesthetic - *Interest in the artistic and symbolic characteristics of animals*
> Dominionistic - *Interest in the mastery and control of animals*

Ecologistic - *Concern for the environment as a system and for interrelationships of wildlife species and the environment*
Humanistic - *Interest and strong affection for animals,*
Moralistic - *Concern for the right and wrong treatment of animals, with strong opposition to exploitation or cruelty toward animals*
Naturalistic - *Interest in direct experience with animals and exploration of nature*
Negativistic - *Orientation toward an active avoidance of animals out of dislike or fear*
Neutralistic - *Orientation toward a passive avoidance of animals out of indifference*
Scientific - *Interest in the physical attributes and biological functioning of animals*
Utilitarian - *Concern for the practical and material value of animals; their body parts or habits, or both*

With these findings, Kellert points to significant conflicts in perception of, and subsequently, relation to other-than-human forms of life. Ultimately, there is no single unifying perspective or "attitudinal dimension" which humans wield towards nature or non-human-beings. Instead, there are many dimensions of perception which may act in significant contrast to one another. The prevalence of moralistic attitudes among Americans, for example, is directly opposed by utilitarian perspectives which emphasize the value of nature in terms of extractable resources or usefulness. This also applies to the strong inclination for direct experience with nature or animals held among Americans, which exists alongside an equally strong avoidance of animals and the natural world. As mentioned, these findings are significant in this work, in that they showcase the inherent potential for finding conflicting messaging or framing in mainstream news media or visual representation of the environment.

Based on these theoretical foundations, this work explores how attitudes regarding nature/culture binaries may be clearly exhibited in the predominantly anthropocentric cultural representations of algal phenomenon (to be discussed in the following sections). Such attitudes

and representations may operate to legitimize the externalization of aquatic environments and "distinctly other-than-human" forms from "distinctly human" forms. Through this analysis, particular themes of representing and communicating conditions of non-human otherness may be uncovered. More specifically, we may unearth how these frames or commutative lenses (which promote ideas of contamination, toxicity, or hazard) may operate to further elevate the human above so-called "risky", "inferior", "malfunctioning", "barren" or "hazardous" forms of Nature.

METHODOLOGY

Cultural *productions* made in response to an issue (ie. the contents which make up *discourse*) are generally considered to be qualitative in that they are non-numerical data which speak to the emotive qualities and/or feelings of human beings. Additionally, the interaction and interpretation of cultural symbols with simple descriptive statistics, allows for the uncovering of relationships between seemingly disparate or unrelated variables in discourse. As a study of nature-culture dynamics which observes the complex relationship between ecological conditions and the cultural productions developed in response to those conditions, a mixed methods approach was critical to accommodating both the quantitative and qualitative aspects of HAB phenomenon/discourse.

Generally speaking, Content Analysis (CA) methodologies transform qualitative data into quantitative data intended for use in larger analyses. Therefore, this research uses CA to assess visual materials in online news media articles primarily for its hybrid inferential nature of identifying forms, values and attitudes within symbolic or communicative data (Stone et al.,

1955, 5). This research design uses Visual Content Analysis (VCA) inductively-- that is, for the expansion of existing eco-critical theory -- in collaboration with Critical Discourse Analysis (CDA) (Krippendorf 2004, Lin 2014) to assess the relational characteristics between environmental issues and communication in the production of an ensuing "crisis-culture" centered around algal phenomena.

Research Questions

Concerned with analysing the semiotic power of visual media communications to better understand Florida's HAB discourse, this work specifically asks:

a) How are algal organisms and algae-related phenomena such as Florida's harmful algal blooms (HABs) visualized or represented in online news media? Are there dominant themes, patterns, and/or narratives of visual imagery found in media coverage of the 2018 harmful algal bloom crisis in Florida?
b) If so, do these themes sustain problematic nature/culture dichotomies?

Conducting Visual Content Analysis

If words, images and artifacts in and of themselves have no inherent meaning, and meaning can only be understood in relation to the context in which the item is produced, consumed or analysed, then description is only the first part of the process. As a theory of meaning and symbolic phenomenon, CA cannot be performed or justified without delineating a

context qualitatively in the same manner that all methods of analysis require description (of an issue or subject) before interpretation. Thus, the first stage of this analysis uses two primary types of issue-description or "coding" of data:

a) *manifest coding*, which addresses and describes the most obvious empirical components of an item being studied (ie. the surface descriptions which are easily identified, described and counted)

b) *latent coding*, a process of identifying deeper meaning behind the items being counted. This process of "coding" is the initial step in the shift from description to interpretation in a content analysis.

Once manifest and latent codes are established, a deeper interpretation of the data set is conducted using CDA to identify potential symbolic meanings of collected materials in cultural contexts. As mentioned in the previous section, framing and framing devices are key indicators of underlying meanings, intents, and effects of media communication. The particular aspects of an issue that are chosen to be addressed (or "framed") in public media communications as well as the emphasis with which those aspects are discussed significantly influence how people view that issue (McCombs 2003, 7). It is for this reason that this study is concerned with identifying how harmful algal bloom events are curated in online media representations. The deconstruction of frames, therefore, is important to identifying ideological structures embedded in discourse surrounding HABs. By conducting frame-analyses, we may better understand socio-ecological dynamics and overall significance of environmental issues in cultural contexts.

This disassembling of media materials "up-close" framing analysis using CDA is based on the following assumptions: a) there is no such thing as neutral language when it comes to media (ie. framing) and the packaging of any symbols or images is therefore designed for a

particular message; b) framing aligns messages with pre-existing understandings (Entman 1993). By first examining pre-existing representations, it then uses realist approach to visual materials for preliminary observational analysis followed by the identification of problematic patterns in representation: ie. anthropocentric or hierarchically dualistic, and/or spectacle-izing tendencies.

Identifying frames

Media frames largely influence public audiences in that they “define problems, diagnose causes, make moral judgements, and suggest possible remedies' (Entmen 1993). Based on the idea that “there is no such thing as neutral language when it comes to framing” (Entmen 1993), framing analysis tends to disassemble texts for individual/up-close analysis and uncovers two predominant threads of possible media bias. It looks first at how “frames" align messages with pre-existing understandings, and then analyses how the packaging of the text(s)/image(s) is designed for a particular message (Entmen 1993).

The image is perhaps the most basic type of media construction or frame in the sense that photography-- particularly journalistic photography-- is a process of direct selection, omission, and invention or transfer of meaning. A representational image, therefore, can be broken down and analysed as a system of signs and series of decisions which more directly indicate how meaningful emotional appeal is achieved. In this case, dissecting the visual in terms of cultural meaning first requires an understanding of two main concerns: a) the context of visualization (ie. online news media) and b) significance of the visual in Western culture and the significance of the visual in representations of “the ecological” or “environmental” (ie. environmental degradation, crises, hazards, injustice, etc). Analyses of framing devices in visual materials

include considerations of the following: *assumptions, tone or agenda, implicit bias, rhetoric, implications, underlying patterns, recurring metaphors, audience, emotional tone, etc.*

The first step in the analysis of collected visual materials was to define framing devices likely to be found in the text accompanying each sample. The frames and framing devices of 82 textual samples (article titles) were analysed using several categories within the broader "umbrella frame" of ecological risk and hazard-messaging. The following categories or "frame dimensions" as defined by the Policy Frames Codebook (Boydstun et al. 2013, 5), were determined to be relevant to this analysis of HAB discourse:

1. Economic frames: *"The costs, benefits, or monetary/financial implications of the issue (to an individual, family, community or to the economy as a whole)."*
2. Morality frames: *"Any perspective—or policy objective or action (including proposed action)— that is compelled by religious doctrine or interpretation, duty, honor, righteousness or any other sense of ethics or social responsibility."*
3. Health and safety frames: *"Healthcare access and effectiveness, illness, disease, sanitation, obesity, mental health effects, prevention of or perpetuation of gun violence, infrastructure and building safety."*
4. Quality of life frames: *"The effects of an issue on individuals' wealth, mobility, access to resources, happiness, social structures, ease of day-to-day routines, quality of community life, etc."*
5. Cultural identity/impact frames: "*The social norms, trends, values and customs constituting cul- ture(s), as they relate to a specific policy issue"*

Each of these dimensions are analysed in terms of social and ecological context, as HABs are socio-ecological phenomena often characterized in the media as a strictly "environmental issue". An analysis of economic frames in HAB-related media, for example, would primarily focus on the communication of costs, benefits, and financial implications of the *ecological condition*-- ex. harmful algae blooms-- on individuals, communities, or Florida's overall economy. However, it might also focus on the framing of HABs as a threat to ecological resources and economic stability (thus overlapping with other frame dimensions). An analysis of morality framing in HAB-related media, for instance, would engage with morality in an ecological context, highlighting existing predominant conceptions and pre-existing notions of ethical dynamics between "culture" and "Nature" (ex. environmental stewardship, sense of responsibility, eco-guilt, capitalistic resource extraction etc.).

This research also uses a comparative temporal analysis to showcase the correlation between the 2017-2018 HAB crisis timeline-of-events and possible trends in media coverage of those events. Second, quantitative-observational and qualitative thematic analyses of harmful-algae-related visual materials produced online during the same time period are assessed to characterise the relational dynamics between: a) framing patterns and ideological themes found in media representations of algal phenomena informed by that scientific information; and b) the influential potential of those patterns and ideological trends.

Data Sampling

A total of 81 news articles were selected for this analysis, with between 3 and 5 articles addressing Florida's 2018 algae-crisis collected from the following news-media platforms. These platforms were deemed to be representative of media-communications on HAB phenomena in Florida based on their overall ranking of circulation figures (rankings provided by Alliance for Audited Media (AAM)).

- National newspapers, broadcast channels, and weather/climate resources: CNN (5), FOX (5), ABC (4), CBS (5), NBC (2), The New York Times (5), The Guardian (3), The Weather Channel (4), and USA Today (3)
- Regional newspapers: Tampa Bay Times (5), Florida Today (3), South Florida Sun Sentinel (4), The Orlando Sentinel (3), The Miami Herald (5), The Palm Beach Post (5), The Florida Times-Union Jacksonville (5), Sarasota-Herald Tribune (5), Naples Daily News (4), Daytona Beach News-Journal (4), TC Palm Beach (2)

The following terms were used to select relevant articles directly from the search results of aforementioned news-media platforms. While there are many ways to address hazardous algal phenomena, this analysis limited search terms to: "*Toxic Algae", "Red Tide", and "Algae Crisis".* Stratified sampling was then used to select materials within the search results to ensure that the data set was specifically representative of Florida's 2018 algal crisis. The timeline of Florida's 2018 algal cycle was used to stratify materials for selection using data from the National Oceanic and Atmospheric Administration's (NOAA) Harmful Algal Bloom Bulletin

and the Florida Fish and Wildlife Conservation Commission's (FWC) 'red tide status' website. Based on this timeline, materials for analysis were selected within a specific date range (April 2018 - Feb 2019) in correspondence with the beginning and ending of the 2018 algal cycle.

Quantitative Visual Analysis

Following the stratified sampling of articles, the first image (or video-frame) shown in the article was used to develop a quantitative data set using the units of analysis depicted below. When approaching new visual materials for analysis, Rose 2001 concludes that the primary methodology should be a descriptive analytical method which does not prescribe interrupting the underlying meaning of the image itself. Whereas c*ompositional interpretation* is usually used to objectively identify characteristics of an image (ex. the "*focus, angle, point of view, spatial organization, color, light and expressive content"* of an image (Rose 2001), this analysis identified characteristics deemed to be more specific to HAB phenomenon. Units of analysis were developed and subject matter of primary article images were identified based on scientific understandings about HAB impacts. The data set includes the following units:

1. Article Title
2. Date Published
3. Emotional Tone of Title
    a. *Negative Emotional Appeal (N)*
    b. *Positive Emotional Appeal (P)*
4. Signifiers - (*what is being used to convey meaning/a message in primary imagery?)*
5. Signified - (*what theme/message do the signifiers convey in primary imagery?)*
    a. *HAB induced marine mortality*
    b. Landscape altered/impacted by HAB phenomenon, Risk of exposure to HAB phenomenon
    c. Risk of exposure to HAB phenomenon

    d. *Social impact of HAB phenomenon*

6. Thematic Frame
    a. *Economy (E)*
    b. *Moral Appeal (M.A.)*
    c. *Health/Safety (H/S)*
    d. *Quality of Life (QOL)*
7. Presence of Death or Suffering in Imagery
    a. *Death (D)*
    b. *Suffering (S)*
    c. *Neither (-)*
8. Presence of Marine Beings in Imagery
    a. *Yes/No*
    b. *If Yes, how are they depicted?*
        i. *deceased*
        ii. *at-risk (of exposure to HAB toxins)*
        iii. *neither deceased nor at-risk*
9. Presence of Human Beings in Imagery
    a. *Yes/No*
        i. *deceased*
        ii. *at-risk (of exposure to HAB toxins)*
        iii. *neither deceased nor at-risk*
10. Setting of Imagery - (what is the spatial context/landscape?)
    a. *beachscape, waterscape, underwater sea-scape, private home, research facility, or political setting*

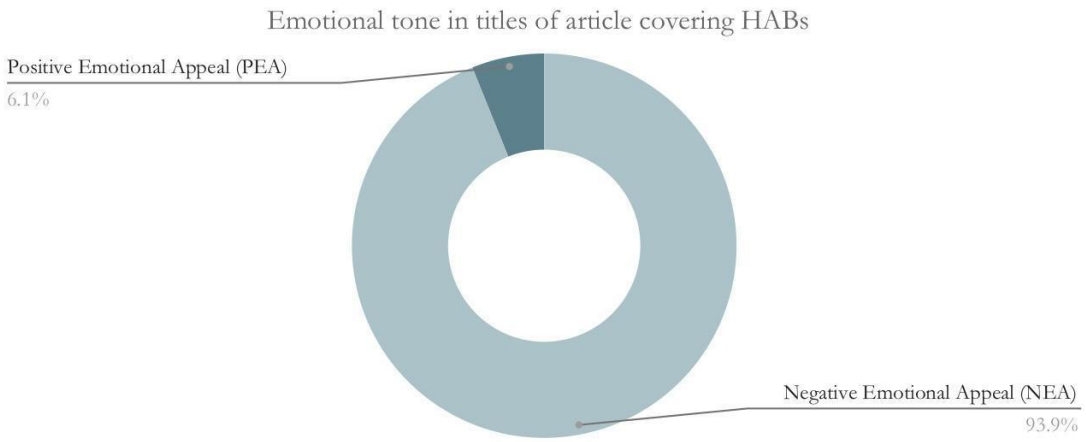
FINDINGS

This section describes the analysis of data in congruence with variables previously specified in the methodology section. Through a quantitative content analysis of article titles and their primary images (or inline-linked images) circulated throughout media-coverage of HAB phenomenon during Florida's 2017-2018 "Harmful Algae Crisis", this analysis shows the following:

On Emotional Appeal of Article Titles

Of articles sampled, the majority of titles were found to use predominantly negative emotional tones to communicate the occurrence or impact of algae-related phenomenon. A total of 75 articles employed *Negative Emotional Appeal ("NEA" or "N")* while only 5 used *Positive Emotional Appeal ("PEA" or "P").* Of the 93.75% of article-titles identified as NEA within the data set, the terms "toxic" and "Red Tide" were present in nearly 80% of them. Titles often referred to the presence or occurrence of HAB events, but did not always specify evidence of a documented HAB. Positive emotional appeal (PEA) was identified in less than 7% of article titles, with PEA title subjects predominantly associated with research, political figures and policy-making, or social engagement with/responses to HAB events.

Fig 2.



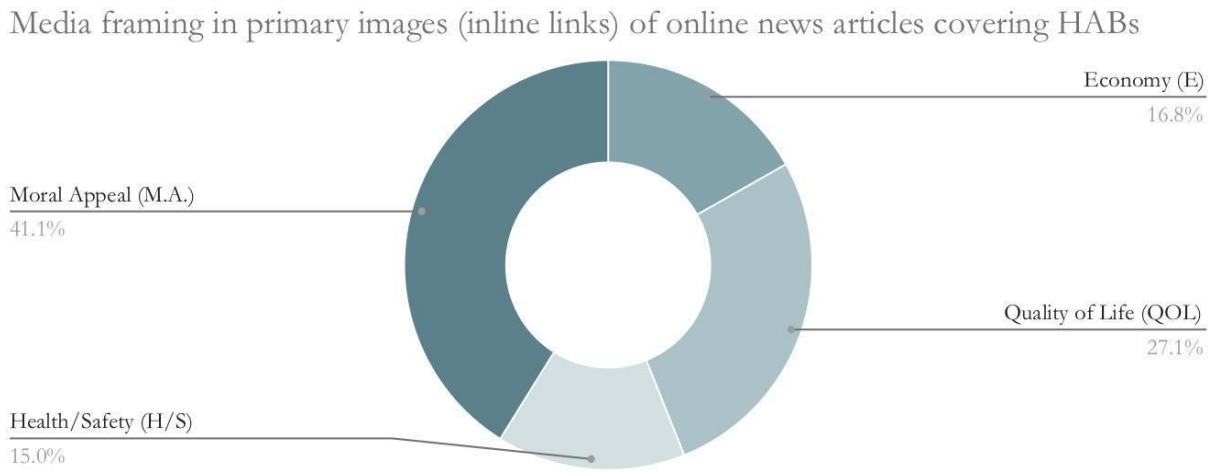
On Framing of Primary Images

Online news articles are more easily selected by audiences based on titles and/or images shown in search results, and as such the transfer of information about an issue is largely determined by visual factors/characteristics. While text may be overlooked, the v*isuality* of an article is interpreted more quickly in that viewers engage with a title or image for a few seconds-- thereby 'skimming' literary information about complex issues like HABs while retaining only a small component of broader socio-ecological dynamics. It is largely for this reason that the underlying meaning of a news article's *visuality* becomes significant in communicating multifaceted crises, especially those regarding complex nature-culture dynamics.

While primary and secondary aspects of an image (a.k.a, "thumbnail images" or "hyperlink images") within HAB discourse may employ both negative or positive appeal, this analysis highlights the primary focus of an image as the main identifier of negative or positive emotional appeal. The primary visual characteristics of sampled articles within the data set

showed a trend towards moral framing in HAB-related images (refer to *Fig. 3* below), wherein the image subjects were most heavily associated with objects or scenes which inspired a sense of ethical concern, responsibility, or cultural stewardship over "the natural".

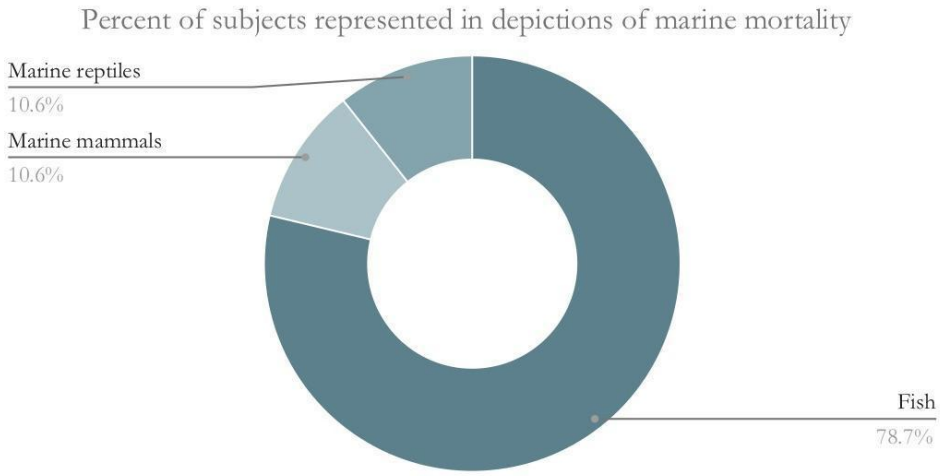
Fig 3.



On Emotional Appeal and Ecological Mortality

Within the set of article titles determined to be categorized under NEA, 62% were accompanied by a primary image of ecological mortality, with 48% of these depicting some form of marine mortality. Deceased fish (of various species) were most frequently represented. Fig. 4 (below) showcases how frequently specific forms of subject matter were utilized in visual representations of marine mortality associated with NEA article titles. The numerical distributions are as follows: deceased fish - 37 ; deceased marine mammals (manatees, dolphins, whales) - 5 ; deceased marine reptiles (turtles) - 5.

Fig. 4



On Temporal Relationships between HABs and Media Coverage

As mentioned in the methods section, a comparative temporal analysis was used to showcase the correlation between the 2017-2018 HAB crisis timeline-of-events and possible trends in media coverage of those events. Of articles within the data set, 55% were found to have been published in late July and August of 2018. This percentage showcases a direct relationship between increased algal proliferation -- with the highest concentration of algal blooms peaking in late August of 2018-- and increased media reporting on those events. Of the articles published during the peak bloom period in late August, 98% were identified as using titles associated with negative-emotional-appeal (NEA). The majority of primary article images during this time were found to predominantly portray marine mortality, with deceased fish corpses making up the majority of depicted subject-matter. The following section breaks down the distribution of subject-matter depictions.

Subject Matter Identified In Primary Imagery

1. Signifiers:
    i. *Depictions of marine beings (suffering, deceased, or decaying) in beachscapes, waterscapes or underwater sea-scapes.*
    ii. *Discolored water/ algae proliferation in aquatic ecosystems*
    iii. *Recreational boaters, locals beach-goers in HAB "risk-zones"*
    iv. *Political figures, community response, researchers/research efforts*
2. Signified:
    a. *Presence of Death or Suffering*
        i. Death (D) = 47
        ii. Suffering (S) = 4
        iii. Neither (-) = 29
    b. *Presence of Wildlife/Marine Beings*
        i. Yes/No = Y (49), N (31)
        ii. If Yes, how are they depicted?
            1. *deceased = 46*
            2. *at-risk (of exposure to HAB toxins) = 6*
    c. *Presence of Human Beings*
        i. Yes/No = Y (26), N (56)
            1. *deceased = 0*
            2. *at-risk (of exposure to HAB toxins) = 3*
    d. *Presence of HAB induced marine mortality*
        i. Total = 47
            1. of fish = 39
            2. of charismatic megafauna = 14
                a. *mammal and/or marine mammals = dolphin (2), manatee (3), whale shark (1), dog (1)*
                b. *marine reptiles = turtle (5)*
                c. *coastal birds = 2*

e. *Depictions of "Landscape adversely impacted by HAB phenomenon"*
    i. Total = 26
f. *Depictions of "Risk of exposure to HAB phenomenon"*
    i. Total = 10
        1. *of humans - 3*
        2. *of charismatic megafauna - 6*
        3. *of fish - 0*
g. *Depictions of "Cultural impact of HAB phenomenon"*
    i. Total = 16

Of articles assessed, no primary images within the data set were found to portray HAB-induced death of human beings, with images of human-suffering as a result of HAB phenomena/exposure comprising less than 4%. On the other hand, portrayals of death and suffering of non-human beings were used most in 58.75% of images, with another 5% showcasing some form of suffering of non-human suffering after apparent exposure to HABs. Visible impacts of HABs upon landscapes made up the second largest theme/message signified in HAB online news media-coverage, with 32% of primary imagery depicting some form of alteration to publicly accessible ecosystems, beaches, or canals.

Based on this assessment, it is arguable that media representations of algae communicate harmful algal phenomena to audiences through several overarching themes or narrative *"frames"*. Additionally, representations of algal phenomena in Florida's HAB discourse may align with and ultimately sustain dominant nature-culture ideologies by showcasing algae through predominantly negative emotional appeals rooted in *environmental spectacle.* These narrative appeals were found to portray algal organisms as a threat, risk, or hazard to several groups of victimized entities including:

i) the environment or “the natural”

ii) the human and/or to human bodies

iii) economic and/or cultural norms/practices

DISCUSSION

The cliches of visual representation of ecosystems and environmental issues are well known, yet they continue to dominate and inform much of our interpretations of the world with which we are intricately entangled. The many cliches or *‘ecology of images’* which we are exposed to on a daily basis are powerful -- as the sociologist Andrew Ross argues – in that they comprise a “system of ethics and politics" which affect our perception of the world and of ourselves: *“... on the one hand we see belching smokestacks, seabirds mired in petrochemical sludge, fish floating belly-up, traffic jams in Los Angeles and Mexico City, and clear-cut forests; on the other hand, the redeeming repertoire of pastoral imagery, pristine, green, and unspoiled by human habitation, crowned by the ultimate global spectacle, the fragile, vulnerable ball of spaceship earth” (Ross 1994, 171)*.

As mentioned previously, it is arguable that much of the global disasters or unfolding “environmental catastrophes” which people (predominantly Western populations of the Global North) “witness” in this era are largely experienced through smartphone screens. Ulrich Beck draws attention to this notion by identifying the peculiarities of contemporary risks which are, as he suggests, often “literally and/or geographically invisible” (Beck 1992.a). He further argues

that this problem of *"issue-invisibility"* is somewhat remedied by the visualization and symbolization of risks (and their consequences) through the media (Beck, 1992.a.119–20):

"The cultural blindness of daily life in the civilization of threat can ultimately not be removed; but culture 'sees' in symbols. The images in the news of skeletal trees or of dying seals have opened people's eyes. Making the threats publicly visible and arousing attention in detail, in one's own living space — these are cultural eyes through which the 'blind citoyens' can perhaps win back the autonomy of their own judgement."

Unfortunately, overexposure to distant, abstract, crisis-riddled sensory stimuli has in many ways contributed to a collective sense of numbness or decreased tendency to engage in environmentally responsible behavior. In recent decades, scholars have proposed concepts to account for the effects of our increased exposure to new crises -- Degradation Desensitization (DD) which "characterizes the loss of sensitivity to a previously aversive degradation stimulus". While each of us may not "directly" experience the realities of ecological devastation or crisis in a sensorial manner, we may be seemingly terrorized by our own encounter of their abstracted visualizations in images such as those described above. And though one may shudder at the sight of environmental plight, there is some truth to the idea that humans have become somewhat accustomed to seeing images of a dying planet.

Throughout this research process (and perhaps even prior to it), images of algae organisms have remained exceptionally stimulating in a spectacularly "terrifying" sense. Images of "toxic" algae blooms tend to specifically accentuate those "unusual" characteristics of nature which (to be discussed further) cater to the increasing need for striking visuality in contemporary environmental imagery. They easily become sensorial spaces from which some of the root

complexities or hidden dynamics between the temporal "toxic alterity" of nature(d) otherness and "the self" or "human" (as the isolated, "pure" or "permanent" life-form) can be excavated.

Fig. 5 - "A boat sails through a deepening algae bloom across the Caloosahatchee River on June 27, 2018, in Labelle, Florida." (Article Title: "As the world warms, harmful algal blooms are on the rise" by Tom Metcalfe. Oct.17, 2019. Photographer: Pedro Portal/Miami Herald)

Take this salient image above, for example. Notice how your eyes may fixate from one lifeless form to another, clinging to any clues and scanning for indications of what caused this scattering of colorless bodies encased in striking green slime. Consider how your mind searches for meaning and conjures relational proximities or distances not only between the "dead things" or "living things" being represented, but also between the potential source of threat and the vulnerable ecosystem. What visual *forms*, *signs* or "*codes*" stand out to you, and how do they relate to one another?

The thick toxic goop, as we may then imagine it, has completely engulfed what is assumed to have once been a thriving and exuberant body of pristine water. From our interpretation through this restricted lense, toxic algae has permeated and contaminated a once "pure" ecological space. We find a cultural object positioned near the center-right area of the scene's middle ground-- a gleaming white boat cutting through the water and trailing a disturbance of the green striated matter at its surface. The boat appears to be the only dynamic, "clean", or even visibly living entity in a sea of static contamination. What does this say about its conception of "the natural world"? The following discussions will elaborate on the various roles of anthropocentric perspective in perpetuating what have been found to be predominantly negative media representations of algal organisms and processes.

Rupturing the Toxins of Normativity

Cultural inventions of "normalcy" within prevailing, Westernized nature-culture perspectives are often tied to notions of what is "natural". Concepts of Nature and "naturalness" -- also including conceptualizations of the "organic" (as opposed to the "inorganic") -- are often associated with conceptions of "purity", from the Latin *purus* meaning "clean, clear, unmixed, chaste" (Webster 2002). This is in part because of *"The Recovery n*arrative" or fixation with the *"recovery of Eden"*, as Carolyn Merchant argues: ie. the mainstream narrative of Western culture and therefore perhaps the "most important mythology humans have developed to make sense of their relationship to the earth" (Merchant 2003, 2). This *recovery narrative* is key to the concept of Western European civilization in that at its core, civilized society depends on the

Biblically- rooted myth that humans must reject "barbarism" and "savagery" to regain worthiness in the eyes of a higher "God" (Merchant 2003, 56):

> *"The inhospitable arid desert of the Old Testament contrasted sharply with the bountiful, fruitful Garden of Eden and with the promised land of milk and honey. The expulsion from the Garden into the wilderness equated the latter with the evil introduced when Eve submitted to the temptation of the serpent. The desert represented a land to be subdued and irrigated, a land whose fertility was tied to the scarcity of rainfall. Indeed, humanity had a mandate to "make the desert blossom as the rose (Isaiah 35:1)."*

Over two millennia, this mission has taken form in the transforming or laboring of "wilderness into garden, "female" nature into civilized society, and indigenous folkways into modern culture", for example (Merchant 2003, 2). Tools of science, technology, and capitalism have even been instrumentalized for wielding control, power, dominance and mastery over Nature to "recover" Nature by subduing it. The process of Westernization brought *mechanization*, wherein "the railroad, the steam engine, the factory, and the mine began to demolish forests, blemish landscapes, and muddy the air and water" (Merchant 2003, 3). Ironically, this enabled nineteenth century colonizers to invent a new kind of "pure landscape" by cutting through watersheds to build suburbs in wetland areas like Florida, for example. Now, people are riddled with surprise when our built structures sink into the marsh, the sinkhole, or the sea…. And we are somehow shocked by the unruly sight or haunting smell of Nature's uncontrollable exuberance in what we long believed was our own backyard.

To the extent that the presence and proliferation of algal organisms is depicted as "not normal" or impure, hazardous, toxic, contaminating, etc., the organisms themselves are thus perceived to be rupturing the culturally conceived "norms" of nature. In the image below (Fig.6),

algal exuberance is once again addressed in association with marine mortality-- an occurrence which our analysis has shown to make up the majority of visual representations within existing HAB discourse. In this sense, algal beings are not only depicted as a disruptor of ecological agency (a "villain" against vulnerable Nature(d) others -- in this case, a dolphin), but are also communicated in opposition to a cultural sense of perceived normalcy.

Fig. 6 (Article Title: "Agencies overwhelmed as scores of dead dolphins wash up on Southwest Florida shores in 2018" by Amy Bennett Williams, Naples News. Photographer: Colleen Gill)

It seems they occupy a realm which is somehow external to the ecological, the natural world, but also exists as a contaminating entity within it. Karen Barad highlights this irony well within the context of popular perceptions regarding humanity's "acts against nature", but the sentiment is arguably befitting of aquatic algal organisms so called "acts against nature" as well:

"On one hand, it is clear that humans are understood to be the actors, the enactors of these "acts against nature." The sense of exteriority is absolute: the crime is against Nature herself, against all that is natural. Nature is the victim, the victimized, the wronged. At the same time, humans who commit"acts against nature" are said to be acting like animals. In other words, the "perpetrator" is seen as damaging nature from the out-side, yet at the same time is reviled for becoming part of Nature. Bestiality is surely both a spoken and an unspoken infraction here, but the real crime is the breach of the Nature/culture divide, which has not simply been ruptured but has itself been wronged" (Barad 2011, 121).

Adding to this, the denial of "naturalness" or harmless agency of everyday algal beings -- except when in their "terrorizing" form -- is enabled by their relative "invisibility" to us, or rather, by our own human inability to perceive their presence in aquatic environments until they appear in dense scummy masses of red or blue-green foam. In other words, algae are a kind of *"phantom species"* as Barad might say… only becoming "real" or "visible" to humans through negative frames: ie. when we determine they are a threat to human forms or place more "valuable" aspects of nature at risk (such as beaches and "pristine" wilderness areas). Ultimately, this results in a persistent "devaluation" of algal organisms. This devaluation is particularly poignant with regards to our perception of their impact on other marine animals, as such normative hierarchical perspectives of non-human otherness tend to be largely rooted in *anthropocentrism*. As Jacques Derrida maintains in the seminal work *The Animal That Therefore I Am*, there is danger in pitying the animal (or the ecological), for assuming stewardship over an animal which we determine to be "helpless" is itself an othering act. By doing so, "nature" serves Western rationality as a stage upon which human beings distinguish and elevate themselves above the multitude of other living creatures. Derrida ultimately attests that to assume another

being's position is to inferiorize that other entity by devaluing its agency or power. The process of inferiorization, however, also enables a formulation of hierarchies within the human conception of nature or the ecological. This section will further elaborate on the role of human-centric hierarchies in HAB discourse.

In addition to the mechanisation of human curiosity and concern through spectacle-ization of the environment, the media wields incredible influence over our attitudes towards or emotional attachments to certain "charismatic megafauna" or "flagship species". This is because humans tend to prioritize affection or interest for certain species based on their appeal to distinctly "cultural" or "human" qualities and affinities. Thus, the term "charismatic megafauna" or "flagship species" refer to those large, fluffy, or cute members of the animal kingdom which are perceived to more easily "capture the imagination of the public and induce people to support conservation action and/or to donate funds" (Barney et al. 2005. 41, Mazzoldi et al. 2019, 2). Bottlenose dolphins such as the one depicted in the above image, along with other marine mammals have been found to "elicit positive, aesthetic, and humanistic views" (Barney et al. 2005, 43) due to their emotional affect and appeal to local relationships with coastal communities. Floridians who live along the state's coastlines, for example, often witness the exuberance of marine megafauna on a daily basis and thus have increased opportunities to develop potentially close attachments to their presence in nearby aquatic environs. Colleen Gills, a resident of Naples, Fl. and the photographer of the above image, attested to this sentiment in an interview with Naples Daily News, following the discovery of several deceased dolphins on a beach near her home: "*Monday hit me hard because I am a kayaker and dolphins are my company out in the water. I got really upset, really enraged. I had every emotion go through me at once. I am tired of seeing our paradise dying. This is not normal*" (Article 6. Dec. 27, 2018).

As mentioned in the introduction section of this thesis, Kellert 1996's findings regarding human attitudinal dimensions toward wildlife and the environment primarily conclude that: a) and b), interest in local animals (or environmental concerns) is greater than either national or international animals (or environmental concerns). Based on the comparison between those findings and the observations made in this analysis, we may make several important assumptions. First, we may assume that titles such as *"A red tide ravaging Florida may have killed a whale shark for the first known time" (The Florida Times-Union, Aug. 2018)*, lead audiences to believe that algal organisms exist in opposition to the well-being of other, more visible, organisms.

Secondly, similar titles such as *"Blue-green algae, red tide soil beaches, threaten Florida tourism" (Article 12, Jul. 10, 2018)* or *"Sarasota prepping for the next wave of toxic red tide destruction" (Article 60. Sept. 20, 2018), s*howcase how news articles may inform/sustain our perspective on the antagonism between algae and our sense of "the local" (and notions of "purity" which accompany it). Not only do both article-titles address narratives concerned with quality-life or economic stability through negative emotional appeal, the primary images associated with these articles (depicted below in Fig.7) were found to use visual signifiers including deceased fish-bodies or discolored water to signify that the local landscape itself had been altered by the presence of HABs.

(Fig. 7) "Zayden Drake Taylor, 6, fishes at W.P. Franklin Lock and Dam park in Labelle where a growing algae bloom could be seen along the canal on June 27" (Article Title: "Blue-green algae, red tide soil beaches, threaten Florida tourism" by Jennifer Kay, Associated Press, Orlando Sentinel. Photographer: Pedro Portal)

In accentuating the clear distinction between natural "objects" and "cultural actors", this image (Fig. 8) becomes more than objective documents [8] of "environmental change" or "ecological calamity". Like so many other "documentations" of environmental crises, images of HABs identify external risks, dangers and issues using mainstream media-trained fixations with otherness. This otherness or alterity is then rooted in the context of violence, victimhood and blame. When algal blooms are determined to be "hazardous" in that they are rendered "threatening" to human communities, for example, one of the foundations of such anthropocentric thinking is the awareness of a departure from "the cultural norm". But who's "cultural norm"? Referring to Figures 6. and 7., consider how the close relationship between the

[8] Concerns for objective documentation of the environment is often a status imposed, in part, by the credibility-driven practice of photojournalism (Rose 2001).

"objects of mortality" -- ie. deceased fish and algal material-- and the noxious space surrounding them cultivates a tense dynamic of "ecological disturbance" wherein an intricate network of complex organisms is reduced to a traditionally hierarchical dualism: *pure/contaminated, natural/unnatural, or good/evil*. In this scenario, we may then find ourselves asking: *What is responsible for this disturbance?* Or *"Who is responsible?"*.

Such questions are easily inspired by appeals to fear in visual representation of "hazardous" algal events. *Fear appeal* is a common example of persuasive methods intended "to arouse fear in order to promote precautionary motivation and self-protective action" (O'Neill & Cole 2009, 360). According to Witte 1992, fear appeal is achieved in several stages of communication which instrumentalizes the following:

The existence of a threat (external)...

- *The severity of that threat to the individual.*
- *The individual's susceptibility to the threat.*

The emotion of fear itself...

- *Recognition of the threat or risk.*
- *Resulting unease or distress.*

This work finds that fear appeals are frequently used throughout HAB discourse, with 63% of images assessed depicting fear-based appeals to some form of ecological mortality and/or suffering. With that said, warnings and fear-appeals may keep people off beaches during times when toxins foul the air, but they may not be as effective in catalysing long-term bio remediative action to protect both people and vulnerable ecosystems. This is because fear-appeals have been found to be ineffective in sustaining long-term commitment to environmental awareness and pro-environmental attitudes or behavior. For example, there is little clarity on

whether fear appeal or the use of fear-inducing/ alarmist narratives are effective for engaging audiences in issues such as climate change (O'Neill & Cole 2009). One of the most obvious reasons behind its inefficacy is the risk that individuals may become desensitized to fear appeals as a byproduct of the need for increasing intensity of threatening information in communication (O'Neill & Cole 2009). Not only is there a risk of public desensitization-- causing what Gifford 2011 identifies as a chronic "environmental numbness"-- but the overuse of fear-appeals may lead to the diminishment of public trust of information (O'Neill & Cole 2009, 363). As with other environmental issues, it is possible that the use of fear appeals with regards to harmful algae is unsustainable due to the distant and impersonal nature of fear-inducing communication tendencies in HAB discourse. From this it is reasonable to argue that the effects of fear-inducing media-sensationalism -- or more specifically, the spectacle-ization of nature(d) otherness with regards to HABs and algal organisms -- can potentially undermine one's ability to engage intelligently with increasing signals of environmental deterioration.

Ultimately, current modes of media discourse on HABs and algae may actually be inducing a pattern of reactions among audiences which contribute to the sense of "stuckness" or helplessness which exists at the core of Florida's "algae crisis culture". Furthermore, it is arguable that the patterns of HAB media discourse and visual representation-- which coincide with temporal and ecological shifts, as addressed in our findings section-- may unknowingly fit within a specific sequence of communication modes. Future investigations are needed to confirm this theory.

Media Spectacle

Within just a few days of a bloom-event, news media coverage warns people that "hazardous blooms" are occuring, they seem to pay attention. It would seem that at the mere mention of "algae" (regardless of potential for health hazard), Floridians and tourists alike can be found eyeing the shoreline and running from those same environs which have long defined and romanticised the region's landscape so distinctly as that of a "paradise" or "refuge". People lament the scene of those once "pristine" beaches which are now inundated with dead fish and toxins. We gasp at the obvious impact of agricultural pollution, and maybe even secretly throw out a few bottles of our chemical lawn fertilizers. Yet, at the end of the algal cycle -- and despite references to "marine massacres" in headlines like "*A toxic algae bloom in Florida is slaughtering marine life by the masses"* [9] -- social concern for the health of aquatic ecosystems dissipates as algal microorganisms recede quietly beneath the water's surface. Once again, this algae-crisis-culture seems to trap Floridians in their own kind of cyclical, place-based cognitive dissonance that appears and disappears with momentous instances of ecological calamity. Without the visual presence of colorful slimy masses engulfing Florida's beloved waterways and suffocating charismatic marine life, it is questionable whether anyone would even know about this aspect of Florida's ecosystems and its algal exuberance. This section will argue that a potential cause of this cognitive dissonance and desensitization is the product of spectacle-ization.

[9] Article 4

Guy Debord's concept of "the spectacle" explores the conditions of alienation which transpire between spectators and lived reality through "spectacle-izing" or "spectacle-zation" (Debord 1967). Debord suggests that images demand passive acceptance, and communicative tendencies such as romanticising, moralizing, and spectacle-izing add to the effect of alienation. From this, one may infer that increased exposure to "spectacle" or "calamity" might lead to increased desensitization. Desensitization resulting from "over-spectacle-ization" with regards to environmental communication is problematic in that visual representations in news media accounts are assumed to objectively inform or influence our daily understandings of the environment and actions towards. Instead, they often catalyze indifference and inaction because of over-exposure to spontaneous instances of violence and calamity. Hansen 2013 argues that desensitization is partially the result of decontextualization through the use of "global, symbolic and iconic imagery". As opposed to representations which are more geographically or culturally recognizable, decontextualization can sustain a kind of "visual disconnect" from the underlying factors of the environmental issues being represented. To temporarily overcome this disconnect, images must have increased "impact" or "memorability". In other words, they must be *spectacular*. Communicating notions of contamination or hazard-- like those which are deeply embedded in HAB discourse -- often require that a sense of alarm or risk is magnified to more effectively solidify a sense of individual connection to the issue(s) being addressed.

Though it would seem to be common knowledge that news media communication is essentially the capturing and abstraction of fragments of reality for cultural invention of meaning, what is perhaps less considered is the possibility that expansion of the nature/culture divide is enacted throughout this process of fragmentation with regard to communicating environmental realities. Studies of *spectacular environmentalisms* point to how iconographic

symbols of popular and paradoxically attractive conceptions such as “the world is dying” are embedded in the ethics of environmental communication (Goodman 2016). In other words, media-representations of socio-environmental dynamics may actually exacerbate the practice of abstracting the concept of ecological degradation being addressed. Consider the visual imaging or capturing of deceased fish bodies in a non-contextualised setting (ie. a fish body is entrapped in rotting seaweed or buried in sand somewhere) compared to filming a random human body in the midst of death or suffering. The documentation of suffering or deceased “animal” others-- which, as we have discussed, can in many ways trigger comparable emotional responses to the documentation of human suffering or death -- becomes an act that further fragments that being’s life and or/death into isolated bits for abstracted reproduction. Thus, the cultural production and consumption of abstracted visual symbols of ecological calamity can be seen as an act of exploitation through decontextualization. In other words, media-representations which spectacle-size and externalize the ecological calamity or health-risks of HAB phenomena under the premise of concern for degraded environs or ecosystem-services enact a kind of *degradation through fragmentation*.

Representations of ecological *degradation* or, as in this case-- what we perceive to be objective reporting on algal cycles or “harmful” algae blooms-- rely heavily on the audience's momentary fixation on a cataclysmic threat to life to be impactful. The same level of spontaneous emotional impact is difficult to sustain over time, and leads to the desensitization of audiences. This makes it even more difficult to inspire a meaningful relationship between people and external complex socio-ecological dynamics without the use of fear. With this crisis fixation or media “spectacle-ization” in mind, it becomes clear how HABs may be more frequently presented to public audiences as spontaneous moments of “ecological evil” in ways that neglect

recognition of the beneficial, continual, and diverse roles that algal organisms maintain in annual ecological cycles and our daily lives. In the following sections, we will discuss some of the underlying structures and sociological patterns which arguably contribute to the production and endurance of Florida's *algae-crisis-culture*.

Algal Creatureliness and Terror

In recent years, mass-media representations of algal-organisms have primarily depicted them as the culprit of a kind of noxious "marine plague" in their increased association with "toxic" or "hazardous" algae blooms. Consider this article titled "*Biblical' blood bloom bleeds the waters 'tomato soup' red in Cocoa Beach"* [10], for instance. In so far as such media-characterizations isolate algal proliferation as a threat to human life or nature, they largely overlook what roles algae blooms play in the lives of other marine species and ecosystems. Viewers and readers of media reports on algal phenomenon are often inundated with familiar stories about the rotting piles of seaweed keeping people off beaches, the "bubbling" blue-green slime polluting whole neighborhoods with its poisonous gases, or the "red-tide" "responsible" for killing tons of manatees. Thus, it is arguable that algal-organisms are commonly painted with a deeply anthropocentric brush in ways which easily position "algae bodies" or "algae creatures" as entities which are antagonistically *alien* to conceptions of "the human" or "the cultural". This article from Sept. 2018 titled *"Smelly 'green gunk' mucks up million-dollar views"* [11] showcases how that antagonism is magnified in the context of economy, wealth, and perceptions of prosperity. Not only does the frame of this particular article illuminate the ubiquitous reduction

[10] Article 10
[11] Article 61

of complex algal organisms and processes into undesirable forms of non-human otherness, it also exhibits how the reduction of other forms of life is used to elevate certain forms of distinctly human life.

As previously addressed, “spectacle-izing” points to the demand for images to “have impact” or “be memorable”. Because of the effectiveness of symbols and significance through imagery, impactful meaning can be conveyed quickly. Peeples 2013 discusses how the meaning of toxicity is easily constructed through visual narrative. On the public communication of complex issues like environmental contamination, she concludes that the ease, immediacy, and emotional resonance of the images can overpower the written text” (Peeples 2013, 204). Concerning visual representations of toxicity or “toxic images", she elaborates that visuals are especially adept at representing and reifying national ideologies “while hiding the decision-making involved in the production of the image” (Peeples 2013, 205). Due to the amorphous and invisible nature of toxins themselves, their imaging requires that they be visually contextualized within a larger, more emotionally-striking narrative. This is true for invisible toxins, as Peeples 2013 suggests, but also for more visible forms of toxicity such as those associated with harmful algal phenomena. Furthermore, images which attempt to capture toxicity may provide human victims of exposure to algal processes an opportunity “for involvement in the social construction of a toxin” as Peeples 2013 suggests (206). For example, fixations on algae-related crises (and the resulting mischaracterization of algal organisms more broadly) occur in part because toxins are “not so easily contained” and are more easily communicated when contextualized or *culturally constructed* against something.

This research has found that algal organisms and HABs are frequently positioned against a victim, a human community or cultural space. In the same way that the antagonistic

dynamics of toxicity are better communicated when "situated within a particular site", they are also easily conveyed when positioned against the quality of human life. While there is no singularly agreed upon definition for the "quality of life" itself, but the World Health Organisation (WHO) defines Quality of Life (QOL) as "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. These concerns for "quality of life" are inherently anthropocentric because the multidimensional factors which determine those "qualities" (and elements which devalue those qualities) are culturally constructed concepts. It is for this reason that we assessed the frequency with which representation of algal organisms and their proliferation are contextualized within moral, economic, or human health concerns. The communication of HABs in the context of "moral concerns", for example, position algal proliferation and "toxicity" at the center of adverse dynamics between people and their relationship with aquatic environments where HABs are present.

Beyond pure emotional impact, HAB-related images often force audiences to consider the perceived material cost of an algae colony's rapid growth--the decay of life around it, and a deeper sense of loss which accompanies that condition. This may be especially true for the visual representations which make up our externalized perceptions of "awful" or "wicked" algae. In a sense, algae microorganisms are ascribed villainous roles similar to those shared by mythological sea monsters and other aquatic "creatures" lurking in the ocean's dark depths or just beneath the swamp's surface. Consider the image below, for example:

Fig. 8 - "Fish are seen washed ashore the Sanibel causeway in Florida after dying in a red tide on August 1" (Article Title: "A toxic algae bloom in Florida is slaughtering marine life by the masses" by Jessica Campisi and Saeed Ahmed, CNN. Photographer: Joe Readley)

Images like the one above invent algal organisms as aggressors or antagonists by visually depicting them as contaminants of living organisms and landscapes. It achieves this by invoking our sympathy with notions of suffering marine beings. Perhaps we imagine how these fish bodies struggled beneath thriving algae bodies before being washed ashore, and perhaps our sympathy with these other-than-human forms helps to characterize them as helpless victims. Thus, a simpler interpretation emerges from this re-envisioning, entrenching "the scene" in a condition of dualistic antagonism between "the sufferers" and a threatening element of their environment.

Though algae are not in fact alien antagonizers of vulnerable environments, they do challenge and antagonize cultural norms. Upon blooming into human sight, aerosolizing into human lungs, and permeating human minds through media pathways, these microorganisms effectively claim space in both the strictly ecological and cultural realms of our imagination. **In a**

sense, as algae "terrorizes" beachgoers or "massacres marine life", the deep-rooted dualistic perceptual boundaries between *nature* and *culture*, *human* and *animal* are temporarily exposed and erased.

Discomfort induced by exposure to visual experiences of life, death, and loss often found in media imagery of environmental crises, may inform viewer's methods for coping with those emotions. So how do we cope with depictions of ecological vulnerability in other beings, and does their vulnerability or mortality remind us of our own? Terror Management Theory (TMT) assumes that human social cognition and behavior is largely motivated by our awareness of death, or more specifically, by awareness that they are mortal beings. Based on this assumption, we might concur that harmful algal bloom coverage in the media acts as a salient reminder of corporeal vulnerability. Algae "crises" thus become less about the biological mortality of fish exhibited in a mass marine die-offs, and more about the inconvenient reminder of one's own biological mortality. It is arguable then that "algal crises" are at heart about a sense of helplessness and vulnerability that humans feel in relation to the biophysical realm.

Alternatively, while HABs magnify our proximity to the environment -- and by extent, expose our vulnerability to its fluctuations by denying nature/culture hierarchies-- it also magnifies our imagined *need* for distance from the environments with which we live. As Stacy Alaimo reminds us, there was great discontent experienced by Darwin's contemporaries in response to his tracing of human origins and the unveiling of mammalian evolution (Alaimo 2012, 479). Their discontent manifested from the fear of evident similarities between human-organisms and other-than-human organisms, for such similarities would disrupt the predominant western nature-culture hierarchies upon which modern "civilizations" were believed to have been sturdily constructed.

It is reasonable to argue that the sense of need for distanced distinction from non-human life forms would be magnified in relation to tiny aquatic algal organisms. Perhaps humans communicate algae in spectacular and terrifying ways because we subconsciously want to be distinct from the algal environment to perpetuate imagined superiority to the natural world. By doing so, the cultural need for a sense of impermeability or relative immortality also persists. But how much of the cultural productions or representations of HAB are driven by human fear of death/mortality? **With depictions of mortality (ie. HAB induced marine mortality) making up the majority of signifiers used to convey meaning-- and with the imagery of death, suffering and decay accounting for 58.75% of primary imagery analysed-- it becomes clear how algal organisms are inextricably linked to ideas of death and marine mortality through cultural representation.** Consequently, we also begin to see how the entanglement between life and death of all complex aquatic ecosystems is lost in translation.

Based on this, it is probable that algal organisms are essentially sublated from their intricate entanglement with other life-forms as well as their own habitat through current media modes of representing HAB phenomena. One example of this is how they are described at peak proliferation, wherein they are depicted as being visitors or even invaders of the environments from which they are born. Even if only for a brief media moment, these portrayals build up and solidify an image of algal organisms as alien to natural ecologies. Thus, it is through media abstractions that we re-invent algal organisms as unnatural entities and continue to imagine them not as worldly beings, but instead as a simplified and singularly unnatural "thing" from somewhere else. The following sections will elaborate how the imposing of "thingness" upon non-human organisms and processes reveals several modes of cultural practices and imaginings

that persist throughout the collection, production, or circulation of information on "environmental topics".

Science and Media Narratives

When the relevance or significance of scientific data is ubiquitously tied to romantic imagery of decaying matter or other signifiers of a "degraded state of Nature", the relevance of that data may also be inextricably bound to sensationalized emotional narratives. When environmental concerns are framed within emotion-driven narratives, individual interest and emotional investment in those issues become increasingly conditional. This is particularly true when those issues or crises are abstracted due to factors which may be temporally or spatially distant from the individual. In reference to Walter Lippman-- an early founder of the study of signs and symbols known as *semiotics* or *semiology*-- a person's limitations in receiving factual information "combine with the obscurity and complexity of the facts themselves to thwart clearness and justice of perception, to substitute misleading fictions for workable ideas" (Lippman 1922, 49). Such limitations alter the "accuracy" of what he denotes as "the pictures in our heads". This section will discuss how the "pictures in our heads" regarding our cultural conceptions of algae and their toxins are heavily informed by polarizing negative emotional responses, and why this may be problematic.

As mainstream news media struggles to keep up with the challenges of the face-paced, tech-driven "time-warp" that is the twenty-first century, human brains are being increasingly exposed to an unprecedented volume of data and random snippets of information. A recent report from the American Press Institute shows that roughly 7 in 10 Americans consume some form of

mainstream news at least daily, the content of which is increasingly negative and polarizing (Vanderweel et al. 2020, 1). As VanderWeele et al. 2020 confirms, this is due to the fact that news media networks have a greater incentive to provide negative reporting because the human mind is "more likely to be attracted to, carefully watch, and become fixated upon something that is negative than something that is positive."

(Fig. 9) "Dead fish are washed up along the shoreline at Bayfront Park in Sarasota on Aug. 21 as a result of a persistent red tide algal bloom in the Gulf of Mexico." (Article Title: "Sarasota prepping for next wave of toxic red tide destruction" by Nicole Rodriguez, Herald Tribune. Photographer: Mike Lang/Herald Tribune Archive)

The image above (Fig. 9), showing a mass of deceased marine life strewn along a shoreline, accompanies an article titled *"A toxic algae bloom in Florida is slaughtering marine life by the masses" (4)*. The article[12] was published after the passing of Florida's Executive

[12] The article was published by CNN (and written by Jessica Campisi and Saeed Ahmed) on Aug. 6th 2018.

Order 18-191 which aimed to direct government funds/resources to mitigating the algal . It touches upon several key aspects of what was then considered an "algae *crisis*" including the intensity and duration of the bloom, the state-wide emergency order, as well as uncertainties regarding forecasting future algae-outbreaks or mitigating the influence of anthropogenic causal factors.

As such, it could be argued that the online news article accompanying the above image intended to enhance public knowledge of HAB occurrences and promote pro-environmental attitudes or awareness-- as public ignorance on environmental issues often becomes a direct barrier to effective action (Gifford 2014). However, based on contemporary understandings of the manner with which mainstream news outlets instrumentalize our innate "negativity bias" (VanderWeele et al. 2020), it is more likely that the goal behind the article's use of such polarizing imagery and negative rhetoric was to primarily generate views among online audiences rather than educate them.

Unfortunately, the instrumentalization of public attraction to negativity, attention to environmental calamity, and increasing curiosity about wildlife may pose long-term risks to the efficacy of communicating environmental concerns. This is in part because the capacity for an individual's sustained investment may offer "irrational commitments to an argument or frame-narrative based on emotional connections" (Parham 2016, 109). There is greater risk still that the communication of scientific information through spectacle leaves audiences with more uncertainty and distance from the issue than before. For example, scientists investigating HAB phenomena are uncertain whether the increase in reported cases correlates directly with an increase in human exposure/impact, or whether the number of reported cases has increased as the result of better monitoring methods of the algal phenomenon (Hoagland 2014, Fleming 2005).

As a result, the uncertainty regarding the occurrence or detection, prevention, mitigation and broader socio-political significance of harmful algal blooms has grown to sustain social and political inaction. Due to the limited available research on the complicated catalysts, risks, and impacts of HABs on human health, there has been a prolonged hesitation to transform methods for monitoring and effectively mitigating harmful algal blooms.

Despite this lack of scientific consensus on the exact cultural factors or anthropogenic stressors which exacerbate algae blooms, however, news media representations of algal phenomena tend to polarize the public's perception of algal proliferation. HABs are communicated as being either completely hazardous to human health, or completely "natural" and therefore benign, for example. Consider this title from July of 2018-- the peak of Florida's algae crisis-- *"Florida Algae Blooms Send People to Hospital, Kill Marine Wildlife"*compared with an article published several weeks later titled*"Is red tide hazardous to human health? Not especially"*[13].

Issues with communicating complex information on fast-paced online news platforms are also well characterized by the relationship between social uncertainty and research on the aerosolization of brevetoxins -- that is, biotoxins converted into a fine spray by turbulent sea conditions (Fleming 2005). These aerosolized brevetoxins are usually the hazardous risk-factors which keep humans away from beaches and waterways during algal blooms. Monitoring aerosolization is complicated, and calls for interpreting the role of complex sea-surface conditions such as wind speed/direction on cellular integrity of phytoplankton, as well as the effects of those hydrodynamics on the availability of light for phytoplankton production (Davidson 2014, Fleming 2005). However, few of these "background factors" and dynamics are

[13] (Articles 18 and 34)

specifically outlined or described in news media coverage of HABs. Instead, articles with titles such as "Red Tide, Take Warning"[14] can immediately induce a sense of risk and vulnerability while foregoing mentions of scientific fact. Ultimately, it is plausible that algal organisms are encountered by public audiences primarily through heavily mediated manners. As such, their entanglement with both media and big science allows them to become -- as Stacy Alaimo puts it -- "simultaneously hyper-localised as an almost personal threat"universalized in globalized distant imaginary" (Alaimo 2012).

Algae, Risk, Uncertainty

Adding to the plethora of struggles within HAB research in Florida, spectacle-ized media accounts of harmful algal phenomena tend to abstract scientific uncertainty in a manner which induces a sense of inevitable risk or hazard that is directly associated with the region's aquatic environments. This section will address how including objective scientific fact, debate and uncertainties in popular HAB media discourse may be unintentionally contributing to an increased sense of inevitable risk and vulnerability amongst viewers-- thus sustaining Florida's algae-crisis-culture.

Aided by local and mainstream news media platforms, several scientific, political and social debates have emerged around Florida's "algae crisis". As mentioned, these debates are largely anthropocentric in that they are predominantly concerned with the extent to which HABs are induced by human activity, and also how they inhibit social activity or human health. To begin with, there are some agreements about the fundamental mechanism of HABS. We know that increased phytoplankton biomass and primary production as a result of direct or indirect

[14] (Article 56)

stressors from economic resources like tourism, coastal development, and aquaculture, and increased nutrient enrichment from agricultural and residential fertilizer runoff promote algal activity (Kirkpatrick 2014), but scholars have operated under the premise that it is too difficult to establish the specific level of anthropogenic influence on the occurrence and duration of HABs or FRT (Davidson 2014, Fleming 2005, Hoagland 2014). In other words, scientists cannot determine the exact level of human influence on algal blooms due to the fact that monitoring methods for HABs vary between locations, as such methods are heavily based on site-specific marine agricultural activity (Davidson 2014).

Additionally, these articles titled *"Florida's Blue-Green Algae Bloom 10 Times Too Toxic to Touch, Testing Shows"* and *"Toxic Algae in Florida Causing Illnesses?"*[15], showcase how objective data can be easily mixed with potentially alarmist rhetorical devices. This illuminates the tension between communicating available scientific data or information and cultivating a sense of public urgency. On one hand, there is a need to inform public audiences of new factual information and scientific understanding (within which uncertainty plays a critical role). On the other hand, there is an urgent need to stir public awareness of a potentially hazardous issue in the interest of public safety.

Tensions between objectivity and a collective growing sense of reflexive urgency can be found in the relationship between localised HAB events and more abstract phenomena like global climate change. Scientists are still investigating how current changes in coastal ecological systems may be induced by localized activities, but now there is growing uncertainty surrounding how global changes in climate factors such as ocean acidification, temperature, rainfall, or nutrient availability might shape current and future HABs (Wells et al. 2020).

[15] (Articles 23 and 70) -- collected from the popular weather-forecasting site, "Weather.com".

Oceanographers expect that the aquatic nutrient composition of coastal zones will be directly altered by global climate change, and that these fluctuations will have wide-ranging consequences for phytoplankton production and therefore HABs.

Fig. 10 - "An aerial photo shows blue-green algae enveloping an area along the St. Lucie River in 2018. The governor declared a state of emergency in two of the affected counties. (Article Title: "Blue-green algae may be back on Lake Okeechobee" by Richard Tribou, Orlando Sentinel. June. 7, 2019. Photographer: Greg Lovett/AP)

Let us address these suspected climate-induced consequences in the context of the above image (Fig. 10), which focuses viewers on the sense of their own vulnerability (signified by depictions of man-made environments) to encroaching HAB toxins. Regarding the impacts of climate change on the functions of algal proliferation in marine and freshwater ecosystems, Wells et al. 2020 notes several rational predictions. Firstly, any increase in nutrient flux is

expected to deplete localized ocean oxygen levels, thereby potentially promoting the proliferation of certain algal species which are better adapted for surviving in lower-than-normal oxygen conditions. Secondly, fluctuations in nutrient availability, temperature or salinity, for example, may "drive competitive interactions or advantages" of different algal species "in ways that enhance or diminish HABs" (Wells et al. 2020, 7). This means that climate change's contributions to changes in nutrient availability in local environments may or may not exacerbate HABs, and if it does, then the impacts could be worse than those currently experienced.

Such knowledge proves neither comforting, nor helpful, to public audiences, particularly when the wellbeing of local environments are contextualized against abstracted and seemingly distant global phenomena. In fact, as Gifford 2011 showcases, such contextualization may even contribute to sustaining social inaction. Titles such as "*Red tide is always bad. Global warming is making it worse"*[16], for example, positions the human against the environment by nihilistically magnifying those aspects of aquatic environments which are "problematic" or "threatening". This is an issue when juxtaposed against articles that reaffirm a sense of confusion or inevitability regarding the mitigation of current and future HAB outbreaks, such as: *"Much remains unknown in battle against red tide"* or "Red tide may be 'natural,' but scientists believe coastal pollution is making it worse"[17]. A similar issue occurs in the case of communicating climate change for example, as Gifford 2011 claims that individuals tend to struggle with comprehending predicted risks or loss associated with environmental change which pose no immediate difficulty or threat (Gifford 2011, 292). He calls this psychological barrier *"ancient brain"*, noting that our instinctual "concerns with immediate dangers and exploitable resources of the present moment" (Gifford 2011, 291). This also aligns with Carolyn Merchant's assertion

[16] (Article 50)
[17] (Articles 37 and 53)

that early *mechanismic* mentalities (as opposed to *organismic* mentalities) function on the premise that "knowledge of the world could be certain and consistent, and that the laws of nature were imposed on creation by God'" (Merchant 2003, 102). Thus, these conditions of HAB representation ultimately showcase how a mechanistic approach to interpreting human relationships with nature can devalue unceratiny (and perhaps even negate curiosity) about the environment.

Algal Agency

The question remains: can we re-enchant and re-entangle our relationships with other-than-human beings while representations of those beings continue to distance them from "the human"? Is it possible to bewitch and attract a deep attachment between people and tiny algal beings whose corporeality is depicted as being so distinct -- and in many ways, grotesquely distinct -- from their own? Practices of othering and devaluing through alterity continue to plague relationships beyond the dynamics between human beings and other-than-human beings or the so-called "natural world". Broad cultural conditions of alterity have led to the creation of many bifurcations and assumedly "natural" distinctions between humans and animals, homosexuals and heterosexuals, the female/feminine and the male/masculine, etc. (Merchant 2003).

In some ways, these anthropocentric convictions, concepts, and processes of valuing (by devaluing) the other-than-human animal have begun to shift, however. Observing how alterity inevitably demands the devaluing and eventual erasure of others' life-forms, for instance, Jacques Derrida urged us to change our binary modes of thinking by recognizing "the immense

multiplicity of other living things" (Derrida 2008). In *Electric Animal: Toward a Rhetoric of Wildlife*, Akira Mizuta Lippit similarly suggested that understanding the so-called "phantom animal" -- that is, the "ineradicable... animal which continues to haunt the recesses of the modern human being, appearing only to reestablish human identity in moments of crisis" (Lippit 2008, 54) -- may lead us humans to a crucial space of reflection that goes against the near-mantric disavowal of agency beyond our own. Such reflection calls for a mode of looking *into* and engaging *with* -- rather than *at* -- animals and other life-forms which is directly opposed to traditional Western thought organized around a core of dichotomous oppositions, such as *mind/matter, mind/body, culture/nature,* and *human/animal* (Plumwood 1993, 41-68).

This work has identified patterns of representation centered around similar core dichotomous positions which pose great difficulty to the practices of re-enchanting the algal. In light of the theoretical assumptions about existing Western nature/culture dynamics, it would appear that an acknowledgement of the critical and age-old symbiosis between algal proliferation and Florida's environments (aquatic, marine, and terrestrial alike) would be akin to admitting the critical entanglement and vulnerability (or *transcorporeality,* a concept addressed in the following section) of humans and the environment. Such an acknowledgement of algae in a contemporary context would effectively demand a deep reexamining of nature/culture relationships with those environments which had long been externalised from "the human". By extension, a drastic adjustment to current practices of the State's economic expansion and coastal development would be brought into focus in a different perspective. Humans -- in this particular case, the people of Florida -- would effectively be reframing the predetermined conditions of cultural or ecological landscapes by reconnecting with those formerly *otheri-zed* natural environments through algae. Instead of hiding from beaches inundated with rotting fish corpses

and noxious gooey matter, we could be rekindling those intimate *nature/culture, human/animal*, *mind/body,* entanglements by reintegrating “the algal” with “the cultural” or “human”.

‘The Bloom’ as Transcorporeal Space

To the extent that this work serves as a study of the reactive cultural phenomenon which both produce and are produced by algal phenomenon, it has assessed the role of online cultural (re)productions of nature as sites of intersections between and across what Stacy Alaimo calls “bodily natures". These *bodily natures* can be imagined as the complex conceptions of the materiality of the more-than-human world against human bodies or *corporeality*-- meaning “relating to a person’s body matter” (Oxford English Dictionary). By re-imagining human corporeality as a kind of *transient* corporeality, or *transcorporeality* (Alaimo 2010) -- that is, a corporeality that re-emphasizes one’s own impermanence and intimate permeability as opposed to the traditional fixation upon bodily permanence and isolation/indivualism -- one can begin to reimagine those historically binary, linear, or extractive nature-culture dynamics in new non-binary, non-linear, and non-extractive ethical contexts.

This is a particularly interesting perspective in relation to our conceptualization of algae and the vulnerability of bodies (both human and animal) to their toxins (depicted in Figure 11. below). By emphasising the Latin word *trans*, for example, meaning "across, (to go) beyond, through, on the other side of", Alaimo uses *transcorporeality* to highlight a critical expansion of the corporeal concept in which inevitable interchange between and of the human and more-than-human worlds. Algal organisms magnify these transient conditions well.

Fig. 11 - "A sign on Longboat Key beach warns visitors of Red Tide. The bloom started to our south." (Article Title: "Blue-green algae may be back on Lake Okeechobee" by Dr. Mona V. Mangat. Sep. 13, 2018. Photographer: Bronte Wittpen)

Adding to this image, the article warns: *"With our changing climate it seems Red Tide blooms are becoming an annual occurrence. Until we find ways to reduce their occurrence, people with pre-existing upper and lower respiratory conditions like allergic rhinitis, asthma and COPD should be cautious."* Even this seemingly harmless public health warning seems to convey a sense that algal proliferation -- and toxins produced during their life cycles -- are a temporary (or unnatural) occurrence in our communities and environment. By focusing public attention explicitly towards individual risk it effectively ignores the critical interconnectedness between algae beings, our communities, and bodies.

The call for a critical infusion of movement into the popular static conception of "the corporeal body" as a distinct and isolated material structure addresses the urgent need for a global embodiment of interconnectedness: ie. the acknowledgement of "the unpredictable or "unwanted actions of (/between) human bodies, nonhuman creatures, ecological systems, chemical agents, and other actors" (Alaimo 2010, 3). As Alaimo puts it, *"concern and wonder*

converge where the context for ethics becomes not merely social, but material-- the emergent, ultimately unmappable landscapes of interacting biological, climatic, economic, and political forces" (Alaimo 2010, 2). Thus, the practice of trans-corporeality may be useful in rejecting the mutual exclusivity between "the human " and "non-human" worlds-- or "the human" and "hazardous algae"-- in that it must be continually practiced as a critical awareness of perpetual entanglement.

Local communities who are directly impacted by this toxicity need to understand their individual proximities/ roles in these so-called "algae crises' " by dwelling collectively and philosophically in the existing conditions of socio-ecological relationships and dynamics (Todd 2017). Should people eventually come to recognize how algal beings are a critical part of our bodily experience -- by tracing the "material interchanges across human bodies, animal bodies, and the wider material world" through *trans-corporeality*, as Alaimo 2010 proposes -- then the inclination to disentangle or alienate the cultural, economic, political, or scientific from "the natural" may be replaced with an inclination to engage more curiously with infinite forms of other-than-human existence.

Conclusions

There is good reason for alarm concerning the increased production of harmful algal toxins and the risks they pose to both ecological health and human health, and there is good reason for despair over the loss of marine beings or ecosystems, but there is also good reason for questioning where our critical attentions are drawn, and why. In other words, it is important to question whether concerns which equate the exuberance of HABs with crimes against nature

itself (as contemporary HAB media discourse suggests), stems from the notion that more comfortable pretenses of ecological stability are being exposed and uprooted. For instance, this work has found that Florida's ensuing discourse on HABs -- its algae-crisis-culture -- maintains a hyperfocus on beaches being "*littered with dead sea turtles*"[18] or decreasing hotel occupancies[19] while naturalizing traditionally Western concepts of economic progress and expansion. It portrays algal organisms in direct opposition to cultural progress such as coastal development, tourism, mass agricultural production. Ironically, algal organisms have in fact been an instrumental component in the million-year-long process of creating those exact "unique" and "pristine" environments[20] and tropical landscapes which Florida's economies currently rely on so heavily. Furthermore, this work has found little to no recognition (in mass media representation) of the value and importance of such beings to human life … for the overall relevance of algal organisms and processes exists only faintly in the periphery of Florida's social imaginary (perhaps even less so the Global social imaginary).

Such thinking is both problematic and unsustainable in that regardless of anthropocentric disregard, algal organisms and the occurrence of HABs will persist. In truth, it is partly because of human disregard that they will continue to bloom and flourish with increasing intensity, as forecasted by experts globally. It is largely due to our dismissal of their intrinsic value and our mutual capacity for impacts that humans will continue to view algal exuberance as a "disruption", therefore continuing to be "antagonized" by it.

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[18] Article 19

[19] Article 42

[20] "The Wilderness ethic" or "Recovery Narrative" emerged in response to the perceived (and real) decline of nature during the middle ages, after dramatic increases of market economies, food production, and populations throughout 15th-16th century Europe. During this era of expansion, *"wild places were synonymous with uncultivated, uninhabited forests, wastes, and deserts"*. By the late 17th century, the foundations of contemporary environmental conservation and wilderness appreciation (among other concepts of sustainability) were born. (Merchant 2003, 65)

Moreover, algal beings have a capacity for actively and subversively challenging normative Western conceptions of "the environment" or *"eco-systems"* as a pure, utopic, "natural", and otherwise exclusively *productive* entity. Their complex exuberance throughout aquatic environs in close proximity to humans is enough to erase imagined boundaries and rupture cultural status-quos. So perhaps it is for the best that we simply cannot ignore their presence. Perhaps it is from our inability to escape the thick-slime of modernity's hazards that a new environmental ethic will emerge -- one based not on victimizing or dominating conditions between Nature and Culture, but instead on kinship, partnership, inter-connected and cooperative practices of *becoming with*. To achieve this, it may be more sustainable and therefore effective for these relational 'entanglements' to be cultivated independently of crises related to algal toxins and aquatic environmental health.

In conclusion, this work has also examined how harmful algal events and their impacts -- much like climate change or sea level rise -- are distorted and externalized through mediation in ways that characterize them as abstract or distant from the individual's lived experience. It has showcased how externalizations are achieved through overt-sensationalization and normalization, which ultimately serves to further alienate the "human" from the "ecological". These spectacle-ized externalizations are problematic in that they portray therefore rendering mitigation efforts futile or unnecessary. Thus, further research is needed to address the qualities of sustainability (or *un*sustainability, as has been proposed with this work) of communication within current and prospective HAB discourse. Finally, while this mapping of patterns and eco-narratives throughout visual representations of algae may have better characterised some of the origins, intents and overall influences of HAB discourse, it is merely one small step in a long process of critical engagement in communications research. We must seek new modes of

communicating worldly phenomena in ways that adapt, rupture, and critically magnify nature-culture divides so as to ultimately sustain the enmeshment of all earthly organisms.

Bibliography

Alaimo, Stacy. 2010. Bodily Natures: Science, Environment, and the Material Self. Bloomington: Indiana University Press.

Alaimo, S. 2012 "States of Suspension: Trans-Corporeality at Sea." Interdisciplinary Studies in Literature and Environment, vol. 19, no. 3, 2012, pp. 476–493., doi:10.1093/isle/iss068.

Backer, Lorraine C. 2009. "Impacts of Florida Red Tides on Coastal Communities." Harmful Algae 8 (4): 618–22. doi:10.1016/j.hal.2008.11.008.

Bankoff, Greg. 2015. Cultures of Disaster: Society and Natural Hazard in the Philippines. Routledge.

Barad, Karen. 2011. "Nature's Queer Performativity." Qui Parle, vol. 19, no. 2. Duke University Press. doi:10.5250/quiparle.19.2.0121.

Bauer, M. (Ed.), 2006. Harmful Algal Research and Response: A Human Dimensions Strategy. National Office for Marine Biotoxins and Harmful Algal Blooms, Woods Hole Oceanographic Institution, Woods Hole, MA, p. 54.

Beck, U. 1992 (a). 'From Industrial Society to Risk Society: Questions of Survival,Social Structure and Ecological Enlightenment', Theory, Culture and Society9: 97–123.

Beck, U. 1992 (b). Risk Society - Towards a New Modernity. London: Sage.

Bonaiuto, M., Alves, S., Dominicis, S. D., & Petruccelli, I. 2016. "Place attachment and natural hazard risk: Research review and agenda". Journal of Environmental Psychology, vol 48, 33-53. https://doi:10.1016/j.jenvp.2016.07.007

Boydstun, Amber E., Justin H. Gross, Philip Resnik , and Noah A. Smith. 2016. "Identifying Media Frames and Frame Dynamics Within and Across Policy Issues ," September, 1–13.

Boykoff, Maxwell T. 2009. "We Speak for the Trees: Media Reporting on the Environment." *Annual Review of Environment and Resources* 34 (1): 431–57. doi:10.1146/annurev.environ.051308.084254.

Doney, S.C., M. Ruckelshaus, J.E. Duffy, J.P. Barry, F. Chan, C.A. English, H.M. Galindo, J.M. Grebmeier, A.B. Hollowed, N. Knowlton, J. Polovina, N.N. Rabalais, W.J. Sydeman, and L.D. Talley. 2012. "Climate change impacts on marine ecosystems." Annual Review of Marine Science 4: 11–37.

Clarke, D., Murphy, C., & Lorenzoni, I. 2018. “Place Attachment, Disruption and Transformative Adaptation”. Journal of Environmental Psychology, vol 55, 81-89. https://doi:10.1016/j.jenvp.2017.12.006

Cottle, S. 2000. “TV news, lay voices and the visualisation of environmental risks.” Environmental risks and the media

Cresap, Ida Keeling. 1982. The History of Florida Agriculture: the Early Era. University of Florida. http://ufdc.ufl.edu/UF00002256/00001

Cronon, William. 2003. “The Trouble with Wilderness; or, Getting Back to the Wrong Nature.” In American Environmental History, edited by Louis S. Warren, 213–235. Blackwell Publishing.

Dallmeyer, Dorinda., Daigle, Doug. 2003, “Chpt. 13: How American Ecologists Think About Coastal Zone Environments.” In Values At Sea: Ethics for the Marine Environment, 239–259. Georgia: University of Georgia Press.

Davidson, K., Gowen, R. J., Harrison, P. J., Fleming, L. E., Hoagland, P., & Moschonas, G. 2014. “Anthropogenic Nutrients and Harmful Algae In Coastal Waters”. Journal of Environmental Management, vol 146, 206-216. doi:10.1016/j.jenvman.2014.07.002

Di Chiro, Giovanna. 2010.“Polluted Politics: Confronting Toxic Discourse, Sex Panic, and Eco-Normativity .” Queer Ecologies: Sex, Nature, Politics, Desire, Indiana University Press Bloomington. pp. 199–230.

Derrida, Jacques, and Marie-Louise Mallet. 2008. The Animal That Therefore I Am. Fordham University Press.

Feinstein A, Ceurvels AR, Hutton RF, Snoek E. 1955. Red tide outbreaks off the Florida west coast. Univ. of Miami; Fla.

Fleming, L. E., Backer, Lorraine. C., & Baden, D. G. 2005. “Overview of Aerosolized Florida Red Tide Toxins: Exposures and Effects”. Environmental Health Perspectives, Vol 113(5), 618-620. https://doi:10.1289/ehp.7501

Fleming, Lora E., Barbara Kirkpatrick, Lorraine C. Backer, Cathy J. Walsh, Kate Nierenberg, John Clark, Andrew Reich, et al. 2011. “Review of Florida Red Tide and Human Health Effects.” *Harmful Algae* 10 (2): 224–33. doi:10.1016/j.hal.2010.08.006.

Gaard, Greta. 2011. “Ecofeminism Revisited: Rejecting Essentialism and Re-Placing Species in a Material Feminist Environmentalism.” Feminist Formations, vol. 23, no. 2., pp. 26–53., doi:10.1353/ff.2011.0017.

Gibson-Graham, J. K., Jenny Cameron, and Stephen Healy. 2013. Take Back The Economy: An Ethical Guide For Transforming Our Communities. Minneapolis: University of Minnesota Press.

Ghosh, Amitav. 2017. The Great Derangement: Climate Change and the Unthinkable. The University of Chicago Press.

Grunwald, Michael. 2008. The Swamp: The Everglades, Florida, and the Politics of Paradise. Bridgewater, NJ: Distributed by Paw Prints/Baker & Taylor.

Goldenberg, Jamie L. 2005. “The Body Stripped Down.” Current Directions in Psychological Science 14 (4): 224–28. doi:10.1111/j.0963-7214.2005.00369.x.

Goodman, Michael K., Jo Littler, Dan Brockington, and Maxwell Boykoff. 2016. “Spectacular Environmentalisms: Media, Knowledge and the Framing of Ecological Politics.” Environmental Communication 10 (6): 677–88. doi:10.1080/17524032.2016.1219489.

Hansen, Anders, and David Machin. 2013. “Researching Visual Environmental Communication.” Environmental Communication 7 (2): 151–68. doi:10.1080/17524032.2013.785441.

Hallegraeff, G.M. 2010. "Ocean climate change, phytoplankton community responses, and harmful algal blooms: a formidable predictive challenge." Journal of Phycology 46: 220–235.

Happer, Catherine, and Greg Philo. 2013. “The Role of the Media in the Construction of Public Belief and Social Change.” Journal of Social and Political Psychology 1 (1): 321–36. doi:10.5964/jspp.v1i1.96.

Haraway, Donna. 2008. “When Species Meet.” Minneapolis: University of Minnesota Press.

Hoagland, P., Jin, D., Beet, A., Kirkpatrick, B., Reich, A., Ullmann, S., . . . Kirkpatrick, G. 2014. “The Human Health Effects of Florida Red Tide (FRT) Blooms: An Expanded Analysis.” Environment International, vol 68, 144-153. https://doi:10.1016/j.envint.2014.03.016

Igoe, Jim. 2010. “The Spectacle of Nature in the Global Economy of Appearances: Anthropological Engagements with the Spectacular Mediations of Transnational Conservation.” Critique of Anthropology 30 (4): 375–97. doi:10.1177/0308275x10372468.

Kirkpatrick, B., Kohler, K., Byrne, M., Fleming, L. E., Scheller, K., Reich, A., . . . Hoagland, P. 2014. “Human responses to Florida red tides: Policy awareness and adherence to local fertilizer ordinances”. Science of The Total Environment, vol 493, 898-909. https://doi:10.1016/j.scitotenv.2014.06.083

Koppel, Kira Nicole. 2016. “Contemporary Environmental Imagery: An Analysis.” University of South Carolina Scholar Commons: Senior Theses, 1–56. doi:https://scholarcommons.sc.edu/senior_theses/103.

Krippendorf, Klaus. 2004 “Content Analysis : an Introduction to Its Methodology.” 2nd ed., Sage Publications, Inc.

Kudela, R. M. et al. 2015. “Harmful Algal Blooms: A Scientific Summary for Policy Makers.” IOC/UNESCO, Paris (IOC/INF-1320).

Larkin, Sherry L., and Charles M. Adams. 2007. “Harmful Algal Blooms and Coastal Business: Economic Consequences in Florida.” Society & Natural Resources 20 (9): 849–59. doi:10.1080/08941920601171683.

Latour, Bruno. 1993. “We Have Never Been Modern.” Translated by Catherine Porter, Harvester Wheatsheaf.

Lin, Angel. 2014. “Critical Discourse Analysis in Applied Linguistics: A Methodological Review.” Annual Review of Applied Linguistics 34: 213–32. doi:10.1017/s0267190514000087.

Lippit, Akira Mizuta. Electric Animal: toward a Rhetoric of Wildlife. University of Minnesota Press, 2008.

Magaña, Hugo A., et al. “A Historical Assessment of Karenia Brevis in the Western Gulf of Mexico.” Harmful Algae, vol. 2, no. 3, 2003, pp. 163–171., doi:10.1016/s1568-9883(03)00026-x.

Mccombs, Maxwell. 2011. “The Agenda-Setting Role of Mass Communication.” Contemporary Public Opinion, 11–21. doi:10.4324/9781351226745-2.

McQuail, Denis. Mcquail's Media and Mass Communication Theory. 6th ed., SAGE PUBLICATIONS, 2010.

Meijers, Marijn H. C., Paola Remmelswaal, and Anke Wonneberger. 2018. “Using Visual Impact Metaphors to Stimulate Environmentally Friendly Behavior: The Roles of Response Efficacy and Evaluative Persuasion Knowledge.” Environmental Communication 13 (8): 995–1008. doi:10.1080/17524032.2018.1544160.

Merchant, Carolyn. 2003. Reinventing Eden: The Fate of Nature in Western Culture. Routledge.

Mythen, Gabe. 2004 “Ulrich Beck: A Critical Introduction to the Risk Society.” Pluto Press.

Nierenberg, Kate, Margaret M. Byrne, Lora E. Fleming, Wendy Stephan, Andrew Reich, Lorraine C. Backer, Elvira Tanga, Dana R. Dalpra, and Barbara Kirkpatrick. 2010. “Florida Red Tide Perception: Residents versus Tourists.” Harmful Algae 9 (6): 600–606. doi:10.1016/j.hal.2010.04.010.

Ogden, Laura. 2011. Swamplife : People, Gators, and Mangroves Entangled in the Everglades. Minneapolis: Univ Of Minnesota Press.

O'neill, Saffron, and Sophie Nicholson-Cole. 2009. “‘Fear Won't Do It.’” Science Communication 30 (3): 355–79. doi:10.1177/1075547008329201.

Ostrom, E. 1990. “Governing the Commons.” Cambridge: Cambridge University Press

Peeples, Jennifer. 2013. “Imaging Toxins.” Environmental Communication 7 (2): 191–210. doi:10.1080/17524032.2013.775172.

Plumwood, Val. 1993. “Feminism and the Mastery of Nature.”, Routledge.

Plumwood, Val. 2002. “Environmental Culture: the Ecological Crisis of Reason.” Routledge.

Rose, Gillian. 2001. Visual Methodologies: An Introduction to the Interpretation of Visual Materials. SAGE Publications.

Ross, Andrew. 1994. “The Chicago Gangster Theory of Life: Nature's Debt to Society.” Verso.

Sanniti, Sophia. 2017. “Applications of Terror Management in the Ecological Crisis: A Literature Review on the Topics of Human-Nature Relations & Economic Behaviour.” Edited by Peter Victor. Dissertation, Toronto, Ontario, Canada: York University . York University .

Singh, Neera M. 2018. “Introduction: Affective Ecologies and Conservation.” Conservation and Society, vol. 16, no. 1: p. 1., https://doi:10.4103/cs.cs_18_33.

Stewart, Kathleen. 2007. “Ordinary Affects.” Durham: Duke University Press.

Todd, Zoe. 2017. “Fish, Kin and Hope: Tending to Water Violations in Amiskwaciwâskahikan and Treaty Six Territory.” Afterall: A Journal of Art, Context and Enquiry 43: 102–7. doi:10.1086/692559.

“Understanding Florida's Red Tide.” 2019. Florida Sea Grant. January 9. https://www.flseagrant.org/news/2018/12/understanding-floridas-red-tide/.

VanderWeele TJ, Brooks AC. “A Public Health Approach to Negative News Media: The 3-to-1 Solution.” American Journal of Health Promotion. May 2020. doi:10.1177/0890117120914227

Warrick, R.A., J. Oerlemans, 1990: Sea Level Rise. In: Climate Change, The IPCC Scientific Assessment. J.T. Houghton, G.J. Jenkins, J.J. Ephraums (eds.), pp 260-281

Webster. Universal Dictionary and Thesaurus. Geddes & Grosset, 2002.

Wirth, Werner, and Holger Schramm. 2005. “Media and Emotions .” Communication Research Trends 24 (3).

“What Is a Harmful Algal Bloom?”, National Oceanic and Atmospheric Administration (NOAA), US Department of Commerce, 27 Apr. 2016, www.noaa.gov/what-is-harmful-algal-blooms

Young, Kylie, "The Death of Nature and the Rebirth of Gaia: Organicism, the Mechanical Philosophy, and Feminized Nature" (2017).
Writing Excellence Award Winners. 66.
http://soundideas.pugetsound.edu/writing_awards/66

Zimmerman, Michael et al. “Excerpt from The Death of Nature by Carolyn Merchant,” Environmental Philosophy: From Animal Rights to Radical Ecology. Prentice-Hall, 1993

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Fig. 11: Image - "A sign on Longboat Key beach warns visitors of Red Tide. The bloom started to our south." (Article Title: "Blue-green algae may be back on Lake Okeechobee" by Dr. Mona V. Mangat. Sep. 13, 2018. Photographer: Bronte Wittpen)

Samples in Data Set

1. *'It's kind of horrific': Toxic algae bloom threatens Florida coasts (again)* https://www.tampabay.com/florida-politics/buzz/2018/06/30/its-kind-of-horrific-toxic-algae-bloom-threatens-florida-coasts-again/
2. *'The Worst I've Ever Seen It': Lean Stone Crab Season Follows Red Tide in Florida* https://www.nytimes.com/2018/12/16/us/stone-crabs-florida-algae-red-tide.html?searchResultPosition=5
3. *A red tide ravaging Florida may have killed a whale shark for the first known time* https://www.jacksonville.com/news/20180804/red-tide-ravaging-florida-may-have-killed-whale-shark-for-first-known-time
4. *A toxic algae bloom in Florida is slaughtering marine life by the masses* https://www.cnn.com/2018/08/02/us/sea-turtles-florida-red-tide-wxc-trnd/index.html
5. *A Toxic Tide Is Killing Florida Wildlife* https://www.nytimes.com/2018/07/30/climate/florida-red-tide-algae.html
6. *Agencies overwhelmed as scores of dead dolphins wash up on Southwest Florida shores in 2018* https://www.naplesnews.com/story/news/environment/2018/12/27/scores-dead-dolphins-washed-up-southwest-florida-shores-2018/2426660002/
7. *Algae Bloom in Florida Prompts Fears About Harm to Health and Economy* https://www.nytimes.com/2018/07/09/us/algae-blooms-florida-nyt.html
8. *Algae blooms aren't only affecting Florida: Is climate change to blame?* https://www.palmbeachpost.com/opinion/20181214/point-of-view-algae-blooms-arent-only-affecting-florida-is-climate-change-to-blame

9. *Are the toxic algae blooms along Florida's coasts making people sick?* https://www.usatoday.com/story/news/nation-now/2018/08/07/toxic-algae-red-tide-florida-public-health-sick/922230002/
10. *Biblical' blood bloom bleeds the waters 'tomato soup' red in Cocoa Beach* https://www.floridatoday.com/story/news/2018/04/25/red-bloom-hits-waters-near-minuteman-causeway-cocoa-beach/549727002/
11. *Blue-green algae may be back on Lake Okeechobee* https://www.orlandosentinel.com/news/environment/os-ne-florida-blue-green-algae-update-20190607-ozfnem2pw5eptcu52grme4q4ji-story.html
12. *Blue-green algae, red tide soil beaches, threaten Florida tourism* https://www.orlandosentinel.com/business/os-florida-algae-bloom-20180710-story.html?int=lat_digitaladshouse_bx-modal_acquisition-subscriber_ngux_display-ad-interstitial_bx-bonus-story_____
13. *Clay may combat Florida's Red Tide, but opposition ended experiments here 15 years ago* https://www.tampabay.com/news/environment/Clay-may-combat-Florida-s-Red-Tide-but-opposition-ended-experiments-here-15-years-ago_171966607/
14. *Congress OKs harmful algal bloom bill to fund research, monitoring, mitigation* https://www.tcpalm.com/story/news/local/indian-river-lagoon/politics/2018/12/20/federal-algae-bloom-response-bill-passes-u-s-house-senate/2375286002/
15. *Devastating Red Tide Killing Sea Life in Southwest Florida* https://www.nbcmiami.com/news/local/devastating-red-tide-killing-sea-life-in-southwest-florida/173542/
16. *Devastating toxic algae bloom plagues Florida's Gulf Coast* https://www.news-journalonline.com/news/20180813/devastating-toxic-algae-bloom-plagues-floridas-gulf-coast
17. *Fla. algae crisis: what do you do when water is your home?* https://www.heraldtribune.com/news/20180721/fla-algae-crisis-what-do-you-do-when-water-is-your-home
18. *Florida Algae Blooms Send People to Hospital, Kill Marine Wildlife* https://weather.com/science/environment/news/2018-07-31-florida-algae-blooms-red-tide-health-wildlife
19. *Florida beaches littered with dead sea turtles; scientists blame red tide* https://www.foxnews.com/science/florida-beaches-littered-with-dead-sea-turtles-scientists-blame-red-tide
20. *Florida dolphin deaths linked to toxic algae on Gulf Coast* https://www.palmbeachpost.com/news/20181229/florida-dolphin-deaths-linked-to-toxic-algae-on-gulf-coast
21. *Florida red tide hurts stone crab industry* https://www.foxnews.com/science/florida-red-tide-hits-crab-consumers-around-america

22. *Florida's algae crisis: How is it affecting tourism and other businesses?* https://www.naplesnews.com/story/news/local/2018/07/14/floridas-algae-crisis-how-affecting-businesses/783906002/
23. *Florida's Blue-Green Algae Bloom 10 Times Too Toxic to Touch, Testing Shows* https://weather.com/science/environment/news/2018-08-10-florida-algae-bloom-st-lucie-microcystin
24. *Florida's red tide has produced 2,000 tons of dead marine life and cost businesses more than $8 million* https://www.cnn.com/2018/08/22/us/red-tide-fishkill-costs-trnd/index.html
25. *Florida's red tide: Scientists seek solution to toxic algae crisis* https://www.foxnews.com/science/floridas-red-tide-scientists-seek-solution-to-toxic-algae-crisis
26. *Florida's summertime slime fueled by climate change as well as pollution* https://www.tampabay.com/news/environment/Florida-s-summertime-slime-fueled-by-climate-change-as-well-as-pollution_169758168/
27. *Florida's toxic algae problem and your health: 'Red tide' and 'green slime'* https://www.cnn.com/2018/08/16/health/toxic-algae-bloom-health/index.html
28. *Four months later, red tide is still in our waters. Experts can't say when it will end* https://www.miamiherald.com/news/local/environment/article222709655.html
29. *Gov. Rick Scott declares emergency in 7 S. Florida counties over algae outbreaks* https://www.news-journalonline.com/news/20180709/gov-rick-scott-declares-emergency-in-7-s-florida-counties-over-algae-outbreaks
30. *Hands Along The Water' event takes aim at toxic green slime killing our fish* https://www.sun-sentinel.com/local/broward/fl-sb-hands-along-the-water-20180812-story.html
31. *Harmful discharges from Lake Okeechobee to be reduced* https://www.sun-sentinel.com/news/florida/fl-reg-lake-okeechobee-water-governor-20180621-story.html
32. *High concentrations of red tide algae continue to kill fish in Collier, Lee* https://www.naplesnews.com/story/news/environment/2018/04/27/high-concentrations-red-tide-algae-continue-kill-fish-collier-lee/558519002/
33. *In the first eight months of the year, the number of manatee deaths in Florida has surpassed the total for all of 2017* https://www.cnn.com/2018/08/20/us/manatee-death-florida-red-tide-trnd/index.html
34. *Is red tide hazardous to human health? Not especially* https://www.jacksonville.com/news/20180807/is-red-tide-hazardous-to-human-health-not-especially
35. *Manatees in peril as toxic red tide tests Florida's resources for rescued animals* https://www.theguardian.com/us-news/2018/nov/19/severity-of-toxic-red-tide-tests-floridas-resources-for-rescued-manatees

36. *Millions of pounds of dead fish have washed up on Florida beaches. This is what happens to them next* https://www.usatoday.com/story/news/nation-now/2018/08/19/florida-algae-crisis-millions-fish-dead-what-happens-next/1036559002/
37. *Much remains unknown in battle against red tide* https://www.jacksonville.com/news/20180813/much-remains-unknown-in-battle-against-red-tide
38. *Not again: Dreaded fish kill begins in Brevard* https://www.floridatoday.com/story/news/2018/04/10/fish-kill-cocoa-beach/502823002/
39. *Predicting red tide is possible, Florida scientists say* https://www.heraldtribune.com/news/20180823/predicting-red-tide-is-possible-florida-scientists-say
40. *Red and blue: The toxic algae that are a key issue in Florida's midterm elections* https://www.cbsnews.com/news/red-and-blue-the-toxic-algae-that-are-a-key-issue-in-florida-elections/
41. *Red Tide bloom now touching all three of Florida's coasts* https://www.tampabay.com/news/environment/Red-Tide-bloom-now-touching-all-three-of-Florida-s-coasts_172285646/
42. *Red tide caused worst Sarasota hotel occupancy dip since 9/11* https://www.palmbeachpost.com/news/20190128/red-tide-caused-worst-sarasota-hotel-occupancy-dip-since-911
43. *Red tide closes Florida beaches, could impact millions in tourism dollars* https://www.cbsnews.com/news/red-tide-closing-florida-beaches-could-impact-tourism-dollars/
44. *Red tide could linger on Florida's Atlantic, Gulf coasts* https://www.news-journalonline.com/news/20181005/red-tide-could-linger-on-floridas-atlantic-gulf-coasts/2
45. *Red tide counts back to normal, background levels for first time in 16 months in Southwest Florida* https://www.news-press.com/story/tech/science/environment/2019/02/18/red-tide-algal-bloom-algae-outbreak-fwc-fish-wildlife-report-mote-fish-kill-manatee-lee-collier/2882808002/
46. *Red tide creeps up to Melbourne Beach, Indialantic* https://www.floridatoday.com/story/news/2018/10/16/red-tide-melbourne-beach/1657047002/
47. *Red tide crisis: The science behind the toxic algae bloom on Florida's Gulf Coast* https://www.foxnews.com/science/red-tide-crisis-the-science-behind-the-toxic-algae-bloom-on-floridas-gulf-coast
48. *Red tide happens around the globe. No one has found a 'magic bullet' to kill it* https://www.miamiherald.com/latest-news/article222990095.html

49. *Red tide has sparked a state of emergency in Florida. What is red tide?* https://www.usatoday.com/story/news/2018/08/15/red-tide-state-emergency-florida-explained/997165002/
50. *Red tide is always bad. Global warming is making it worse, researcher says* https://www.miamiherald.com/news/state/florida/article225072815.html
51. *Red tide is spreading in Florida. Hurricane Michael didn't stop it.* https://www.cnn.com/2018/10/18/us/red-tide-florida-hurricane-michael-trnd/index.html
52. *Red tide likely spreads in Florida, causing breathing problems for beachgoers* https://www.cbsnews.com/news/red-tide-likely-spreads-in-florida-causing-breathing-problems-for-beachgoers/
53. *Red tide may be 'natural,' but scientists believe coastal pollution is making it worse* https://www.miamiherald.com/news/local/environment/article216894990.html
54. *Red Tide outbreak can be particularly bad for people with asthma or allergies* https://www.tampabay.com/news/health/Red-Tide-outbreak-can-be-particularly-bad-for-people-with-asthma-or-allergies_171692970/
55. *Red tide threat to Central Florida beaches leaves officials guessing* https://www.orlandosentinel.com/news/os-ne-red-tide-brevard-status-20181031-story.html
56. *Red Tide, Take Warning* https://www.nytimes.com/2018/09/29/opinion/sunday/red-tide-florida-tourism.html?searchResultPosition=14
57. *Red tide: 'It sucks,' says marine life rescuer* https://www.heraldtribune.com/news/20180807/red-tide-it-sucks-says-marine-life-rescuer
58. *Red tide: Living in the middle of the 'dead sea'* https://www.heraldtribune.com/news/20180829/red-tide-living-in-middle-of-dead-sea
59. *Researchers may be on brink of solving deadly red tides* https://www.cbsnews.com/news/red-tides-florida-researchers-may-have-come-up-with-a-solution-2018-08-16/
60. *Sarasota prepping for next wave of toxic red tide destruction* https://www.heraldtribune.com/news/20180920/sarasota-prepping-for-next-wave-of-toxic-red-tide-destruction
61. *Smelly 'green gunk' mucks up million-dollar views* https://www.sun-sentinel.com/local/broward/fort-lauderdale/fl-ne-green-slime-lauderdale-20180920-story.html
62. *State of emergency declared in Florida amid toxic red tide outbreak on Gulf coast* https://abcnews.go.com/US/state-emergency-declared-florida-amid-toxic-red-tide/story?id=57164849

63. *The Deadly Toll of the Red Tide* https://www.nytimes.com/2018/08/31/us/algae-toxic-florida-dead-animals-red-tide.html?module=inline
64. *The truth about red tide* https://www.palmbeachpost.com/sponsored/20181025/truth-about-red-tide
65. *This is why 'Toxic 2018' was a game-changer for water in Florida* https://www.tcpalm.com/story/opinion/columnists/eve-samples/2018/12/21/toxic-2018-worst-record-florida-water-algae-red-tide/2282017002/
66. *Tourists, businesses feeling Florida's Red Tide pinch* https://www.jacksonville.com/news/20180813/tourists-businesses-feeling-floridas-red-tide-pinch
67. *Toxic 'red tide' algae bloom is killing Florida wildlife and menacing tourism* https://www.theguardian.com/us-news/2018/aug/13/florida-gulf-coast-red-tide-toxic-algae-bloom-killing-florida-wildlife
68. *Toxic 'red tide' blamed for rise of manatee deaths in Florida* https://www.theguardian.com/us-news/2018/aug/20/manatee-deaths-toxic-red-tide-algae-bloom-florida
69. *Toxic algae bloom killing marine life, making people sick along Florida's Gulf Coast* https://www.foxnews.com/science/toxic-algae-bloom-killing-marine-life-making-people-sick-along-floridas-gulf-coast
70. *Toxic Algae in Florida Causing Illnesses?* https://weather.com/science/environment/video/toxic-algae-in-florida-causing-illnesses
71. *Toxic algae killed east coast dog after contact with St. Lucie River, owner says necropsy reveals* https://www.naplesnews.com/story/news/environment/2018/09/17/report-shows-dog-killed-toxic-blue-green-algae-st-lucie-river/1339559002/
72. *Toxic red tide blooms are creeping up Florida's west coast, killing marine life and irritating humans* https://abcnews.go.com/US/toxic-red-tide-blooms-creeping-floridas-west-coast/story?id=56965754
73. *Video: Red tide turns Casey Key waters from gorgeous to gross* https://www.jacksonville.com/news/20180808/video-red-tide-turns-casey-key-waters-from-gorgeous-to-gross
74. *What is Lake Okeechobee worth?* https://www.palmbeachpost.com/opinion/20190129/point-of-view-what-is-lake-okeechobee-worth
75. *What is red tide and what's next? | Q&A* https://www.sun-sentinel.com/local/palm-beach/fl-ne-red-tide-qa-20181001-story.html
76. *When is this going to stop?': Florida activist highlights devastating impact of algae blooms on wildlife* https://abcnews.go.com/Politics/stop-florida-activist-highlights-devastating-impact-algae-blooms/story?id=59680510

77. *Why won't red tide go away? After Hurricane Michael, toxic algae has again spread* https://www.miamiherald.com/news/local/environment/article221148120.html
78. *Wildlife Officials Rescue Manatee Exposed to Red Tide* https://www.nbcmiami.com/news/local/manatee-rescue-red-tide-florida-fish-wildlife-conservation-commission/173586/
79. *Worst "red tide" toxic algae bloom in years killing turtles, manatees in Florida* https://www.cbsnews.com/news/worst-red-tide-toxic-algae-bloom-in-years-killing-turtles-manatees-in-florida/
80. *Worst Red Tide In More Than a Decade Leaves Droves of Animals Dead on Southwest Florida Beaches* https://weather.com/science/environment/news/2018-07-28-florida-fort-myers-red-tide-dead-animals-turtles