Mangroves: Stuck Between a Rock and a Hard Place

As time progresses, humans seem to become increasingly at odds with the environment; so much so that an "us versus them" mentality has been adopted by some people. However, case studies involving mangroves, Little Penguins, and albatrosses reveal that this mentality is faulty. The livelihood of mankind is intertwined with the livelihood of many other species: if they go extinct, humans will not be far behind. In referencing the Dodo bird, *Flight Ways* author Thom Van Dooren writes "its fate [was] strangely bound up with a dawning historical awareness that human activity might not just kill individual plants and animals, sometimes in their thousands, but also bring to an end whole ways of life" (Van Dooren 2014: 4). Human populations, especially those along coastlines, are only just starting to face the repercussions of anthropogenic destruction and extinction.

Mangrove forests are extremely important coastal ecosystems. Their plants have large, complex root systems that slow down water, enabling sediment deposits, and "bind and build soils" ("The Importance of Mangroves"). Both of these functions help to stabilize coastlines and prevent erosion. These forests also foster biodiversity by providing important shelters and breeding areas for many organisms. Moreover, mangrove roots help to remove carbon from the atmosphere and trap it in the soil, contributing to the large amount of blue carbon that has been sequestered in the ocean. They "filter nitrates, phosphates and other pollutants from the water, improving water quality" ("The Importance of Mangroves"). Thus, mangroves play a large role in combating the large increase in carbon emissions that has occurred over the last century. However, since the presence of carbon emissions cannot be seen with the naked eye, it is easy to ignore the extent to which mangrove forests provide oxygen and trap carbon. Beyond the invisibility of some of the mangroves' ecosystem services, Van Dooren also brings up the topic

of human exceptionalism, or whether or not humans are "fundamentally set apart" from all other species. In the context of these two perceptions, it is easy for climate change to be "regarded as something that happens 'over there' or out in 'nature'" (Van Dooren 2014: 5). Yet, humans are inextricably bound to all other species — the loss of all mangroves would have detrimental effects to the world's coastlines and air quality. It "*implicates* us" (Van Dooren 2014: 4).

In India, vultures have a unique symbiotic relationship with the people. Van Dooren explains that "significant cultural and religious dimensions of Hinduism and life in India account for at least part of this differential treatment — for example, the birds' association with the mythical Hindu vulture king, Jatayu" (Baral et al. 2007:151, as cited in Van Dooren 2014: 51). Vultures likely lived on the land first and then, when people began to migrate to the area, their "cultural and religious practices emerged and took shape" based on their surroundings (Van Dooren 2014: 52). Similarly in India, mangrove trees are "worshiped as sacred groves" alongside gods and goddesses (Mitra 2019). Many different plant and animal species are valued by various cultures and religions. Therefore, those who rely on them will be disproportionately affected by their loss in comparison to the rest of mankind.

Unfortunately, the destruction of many species occurs despite their ecosystem services and cultural values, as Thom Van Dooren points out. Both Little Penguins and mangroves are facing "intensified patterns of 'coastal squeeze'" (Oldland et al. 2009: 5, as cited in Van Dooren 2014: 84), which occurs when humans move closer and closer to the shoreline, all the while sea level continues to rise. In an attempt to combat "coastal squeeze," locals have reported that Little Penguins will climb up and down flights of stairs to reach an area where they can burrow (Van Dooren 2014: 65). Mangroves, on the other hand, are able to adapt to sea-level rise by moving closer to shore overtime: "If the topography allows the mangrove forest to migrate landward,

with no anthropogenic barriers, then mangroves may delay submergence by 'back-stepping' into adjacent habitats" (Lovelock et al. 2015). However, they are beginning to drown as coastal developments prevent them from moving up towards shore. Although mangroves are resilient, humans are preventing their last resort adaptations. Van Dooren observes a similar situation amongst albatrosses in which humans not only threaten their ability to persist directly, but also indirectly. DDT is a chemical that results in the thinning of the eggshell, "which can ultimately lead to the loss of eggs that are accidentally crushed by incubating parents" (Van Dooren 2014: 31). The albatrosses must reproduce in order to survive, but humans are limiting that basic capability.

It is all too common to encounter scenarios of ecosystems and their species being neither protected nor prioritized. As Van Dooren follows the life journey of Little Penguins, he takes note of how "the unwillingness or inability of the local community to genuinely hold open a space for penguins highlights a disturbing and all-too-frequent dimension of life along the coast" (Van Dooren 2014: 76). Instead, many coastlines are cluttered with waterfront homes and seawalls. This is because humans operate from their own self-interest, which is often driven by money and ownership. Although a rocky shoreline provides safe burrows for Little Penguins, humans perceive it "as wasteful and irrelevant. The only meaningful use [of the shoreline] is human use: an extended backyard or an 'infinity pool' hanging out over the harbor" (Van Dooren 2014: 77). Humans continue to try to separate themselves from the environment by perceiving the use of land for natural purposes as "wasteful" and for personal enjoyment as "meaningful."

As previously stated, human self-interest is often linked to money. Therefore, in order for ecosystems to undergo conservation and restoration, a large monetary donation is required. Recent studies have tried to monetize the ecosystem services that mangroves provide. It is

challenging, though, to assign a dollar amount to something as abstract as carbon sequestration, biodiversity, and coastal protection. One study in Belize found that if 64,000 hectares of healthy mangroves are protected, then 41.1 million metric tons of carbon stock would be protected. This would "safeguard 800,000 pounds of spiny lobster catch worth $6 million BZD annually" (Arkema et al. 2023). Converting ecosystem protection into a monetary value may serve as an important motivator for conservation and restoration efforts.

Although adding more money into the problem that is climate change will likely be the most promising method of creating action, it still enables humans to allow themselves to feel removed from nature when, in reality, they are not. In the beginning of *Flight Ways*, Van Dooren wrote: "The continued use and abuse of substances that we know will gradually accumulate to kill others flies under the radar to such an extent that we often cannot even identify it as a form of violence at all" (Van Dooren 2014: 33-34). Through this, he emphasizes that extinction is real, it is a genuine threat to the existence of mankind. It is not as abrupt and obvious as what is generally considered to be "violence," such as war and crime, but its impacts will be more devastating than any form of violence ever experienced. If mangroves go extinct, the effect on the environment would be widespread — from a large decrease in fish populations to coastal destruction. There would also likely be negative impacts on public health due to dramatic changes in the carbon cycle and increases in pollution (Dasgupta 2018).

Despite the ecosystem services and cultural importance of mangroves, more than appreciation is required to conserve the species. Currently, there are multiple ecosystems at risk of collapsing due to climate change. Humans must acknowledge that all living things are "at stake in each other" — time is running out to prevent the extinction of not only other species, but humans, as well (Van Dooren 2014: 140). Although many activists and authors have advocated

that, because all life is intertwined, people must start making environmentally-conscious choices, economical and political efforts are also required for real change to occur.

Works Cited

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