DISAPPEARING PLACES: IMPACTS OF RISING SEAS & CLIMATE CHANGE ON SMALL ISLAND STATES

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ABSTRACT

This thesis examines the reactions of small island states to the effects of climate change. Rising sea levels threaten to render many low-lying coastal environments uninhabitable and may even submerge entire states. Those states will have their population, society, and sovereignty jeopardized. The strategies by which states respond to the existential threat posed by rising seas fall into two overarching courses of action: adaptation and abandonment. This thesis profiles the responses of two states, the Maldives and Kiribati, to the threats posed by climate change. The Maldives uses primarily adaptation strategies and Kiribati uses primarily abandonment strategies. Small island states are some of the first places to be fundamentally changed by climate change, but certainly will not be the last. Understanding the reactions of those places, as well as the looming crises of sovereignty and human rights created by the submergence of states, is critical for the international community.
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Chapter 1

Introduction

...the waters prevailed, and were greatly increased on the Earth...and all the high hills, that were under the whole heaven, were covered.

- Genesis 7:18-19 (King James Version)
The Blue Marble

In 1972, the last manned lunar mission, Apollo 17, rocketed into space. This mission was considered one of the greatest triumphs of human technology. The astronauts took a photo of Earth called *The Blue Marble* (Figure 1.1), which quickly gained the fascination of the world.\(^1\) In capturing the whole of Earth in a single photo, however, they turned a moment of human triumph into one of humility. From this perspective, the sobering reality that humankind has just one home – a swirling blue marble – is revealed.

![The Blue Marble](image)

*Figure 1.1 - The Blue Marble, taken by the crew of Apollo 17 in 1972. Image is in the public domain.*

Had the Apollo missions been launched a thousand years prior, the image they captured would look almost exactly the same. Photos of Earth taken a thousand years from now, however, may look dramatically different. In 2013, *National Geographic* created a series of images showing what the future blue marble may look like if all the glaciers and ice caps of Earth melted, causing a sea level rise of more than 65 meters.\(^2\) The images – including North America (Figure 1.2), Europe (Figure 1.3), Asia (Figure 1.4), and Antarctica (Figure 1.5) – are striking.

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Figure 1.2 - North America if all the world’s ice melted. Florida is completely submerged, as is much of the Eastern Seaboard. San Francisco Bay consumes the Great Valley. The lower Mississippi River becomes a great bay that dives into the American heartland. Image from National Geographic, cropped for presentation in this document.

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Earth’s ice sheets and glaciers may never completely melt. Thus, its seas may never rise 65 meters. Florida may be at least partially spared, Bangladesh may exist for thousands of years to come, and the Aral Sea may complete its evaporation. These images depict an extreme scenario, but not an implausible one. If climate change continues unabated – with mankind contributing to both its severity and acceleration – it is possible that thousands of years from now the seas will have risen high enough to make these maps come true.

That process has already begun: *The Blue Marble* is a “before” shot, the *National Geographic* images are an “after” shot, and the world is already moving from the former to the latter. Atolls and coral islands will be among the first places rendered uninhabitable by rising sea levels. While innately connected to the detrimental effects of climate change, rising sea levels, severe storms, and a few other related processes are what comprise the existential threat to states entirely made up of coral islands and atolls. These places – the Maldives, Kiribati, Nauru, Tuvalu, and the Marshall Islands – are invisible on these maps, because they are small, but the reality of places threatened by sea level rise cannot be ignored. Within decades, not centuries, the first places on Earth will be rendered uninhabitable by climate change and sea level rise.

**Understanding Climate Change**

Climate is the long-term weather patterns of a particular geographic area. Its components – temperature, precipitation, wind, humidity, severe weather events – and other natural features – topography, biomass, etc. – comprise the environment of an area. When climates change, so does the environment. Humans have dealt with changing climates for the entirety of their existence, but two distinct features make modern climate change exceptional: a) it is occurring faster than ever before, and b) it is significantly accelerated and driven by humans. If climates change too quickly or drastically for humans to adapt, many places around the world may become
uninhabitable. Thus, to study climate change is nothing less than to concern oneself with the survival of humankind.

Climate change is perhaps the most defining phenomenon of the present era, but human understanding of it has been several decades in the making. The phrase “climate change” was used only incidentally until the end of the 20th century. Beginning in the 1970s, its popularity skyrocketed through the 1980s and 1990s. In the 20 years between 1985 and 2005, usage of the term “climate change” in English written language increased by roughly 2600%. Public awareness of climate change is therefore relatively young, though scientists have been formulating their understanding of the issue for over a hundred years.

In 1896, Swedish scientist Svante Arrhenius, building on the work of others like Fourier (1824) and Tyndall (1856), concluded that adding CO₂ to the atmosphere by burning fossil fuels could increase the average temperature of Earth. Between 1920-1941, Milutin Milankovitch published his theory describing a ‘wobbling’ of Earth – a change in the tilt of its axis over time as it orbits the sun in a varying elliptical shape. Over thousands of years, changes in the orbit create a natural cycle of warming and cooling. By the end of the twentieth century, the human contributions to that cycle became clearer.

In 1977, a consensus was emerging in the scientific community that, despite evidence of short-term cooling caused by aerosols, the long-term trend of the climate was toward global warming. The Intergovernmental Panel on Climate Change (IPCC) was created in 1988 to study

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climate change and offer recommendations to governments. Its reports (1990, 1995, 2001, 2007, 2013) have found evidence that climate change exists, generally in the form of warming, and it is human-accelerated.\(^7\)

Toward the end of the twentieth century, climate change and politics become linked, as skeptics and believers divided along partisan lines. To this day, conservative coalitions in the United States and elsewhere refuse to admit human responsibility for climate change or even that it is happening, despite overwhelming evidence in support of both.\(^8\) In 2006, the documentary and book “An Inconvenient Truth,” by former United States Vice President Al Gore brought knowledge about anthropogenic climate change further into the mainstream.\(^9\)

The top ten carbon emitters in the world today generate nearly 78% of global carbon emissions. China and the United States – the two largest emitters – make up nearly 45% of global emissions.\(^10\) Unless the world’s largest carbon emitters take definitive action to reduce their emissions, climate change will continue.

As consensus grew around the issue and the effects of climate change slowly became visible, many governments reacted. The Kyoto Protocol, which sets targets to reduce greenhouse emissions, was signed in 1997 and went into effect in 2005. The U.S. Senate rejected the treaty, taking one of the world’s leading producers of carbon out of the agreement and making it far less effective. The 2015 Paris Agreement\(^11\) is perhaps the most significant international climate agreement.

\(^7\) “The Discovery of Global Warming: Timeline,” *American Institute of Physics.*
\(^8\) This stems from a belief that actions to address climate change are economically detrimental. In the United States, conservative coalitions include people with connection to fossil fuel energy sources who resist movement toward sustainable energy sources like wind and the sun.
\(^11\) The Paris Agreement comes out of the twenty-first Conference of the Parties (COP 21) to the United Nations Framework on Climate Change. COPs held around the world have produced agreements with varying effectiveness every few years since 1995.
change agreement since Kyoto.\textsuperscript{12} It includes commitments by wealthy states to provide $100 billion per year to fund climate resilience in vulnerable places, goals to keep global temperatures to 1.5°C above pre-industrial levels, and pledges by 187 states to reduce carbon emissions with a goal of carbon neutrality by 2050.\textsuperscript{13}

Climate change will ultimately affect all corners of the planet – indeed, its different effects can be measured across the globe already. Droughts, severe weather events, and other consequences of climate change threaten the habitability of various regions around the world. Sea level rise will be one of the most prolific, impactful, and earliest of climate change’s effects.

Chapter 2 will examine the physical geographic processes involved when climate change impacts small island states. The chapter identifies the vulnerabilities of atolls and coral islands and the threats created by climate change, with a focus on rising sea levels.

With a foundation of the physical realities of climate change in small islands, Chapter 3 identifies the states which are existentially threatened by climate change and rising sea levels. This chapter considers the dilemma of states which lose their physical territory and divides their potential reactions into two strategies: adaptation and abandonment.

Chapter 4 presents the Maldives as a state which is primarily utilizing adaptation strategies to respond to sea level rise. This chapter then examines the role of the Maldives and other microstates in international advocacy for climate change action. Chapter 5, in contrast to the Maldives in Chapter 4, presents Kiribati as a state which is utilizing mostly abandonment strategies in its response to climate change. The chapter also looks at a looming result of abandonment: a diaspora of people fleeing the negative effects of climate change.

\textsuperscript{12} “The Discovery of Global Warming: Timeline,” \textit{American Institute of Physics}.

Earth is full of paradoxes: it is fragile, yet resilient; infinitely complex, yet begging to be understood; the source of life and livelihood, yet the greatest source of danger to humankind. Climate change, its ramifications, and the human reactions to those effects will define the human experience in the present era. Thus, climate change must be considered and, indeed, prioritized in policy making, research, socio-cultural actions, business transactions, and even the more regular aspects of daily life. For certain small island states, failing to consider the impacts of climate change in any of these areas could be a fatal omission. Rising sea levels pose the most pressing existential threat to certain people and places of Earth. That threat, those places, and the response of threatened states are the subject of this thesis.
Chapter 2

The Rising Seas

...no challenge poses a greater threat to future generations than climate change.

- Barack Obama, President of the United States of America
  State of the Union Address, 2015

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Island Geographies and Vulnerabilities

Climate change will affect every polity, every place, and every person on Earth. More severe storms, droughts, rising temperatures, earlier frosts, and dozens of other changes are well-documented to be taking place around the world. The interconnectedness of world climate means that no place eludes the effects of a generally warming Earth. Still, there are places which are more severely or more immediately vulnerable than others.

Vulnerability of an island is dependent on its geomorphological structure; therefore, vulnerability of an island state is dependent on the what types of islands comprise it. For example, Pacific islands can be classified into four types: plate-boundary islands, raised limestone islands, intra-plate islands, and atolls.² For the most part, it is states comprised mostly or entirely of atolls that are the most existentially threatened. These islands (diagrammed in Figure 2.1) are the lowest-lying, generally just a few meters high at maximum, and have small surface areas.

Atolls are formed by volcanoes, which rise from the sea floor. When the volcano becomes dormant, corals build up along the edges of the volcano underwater. As the volcano mount erodes, it sinks back into the ocean, leaving a ring of coral which surrounds a shallow lagoon.³ Sand and sediment produced from the reefs builds up, forming coral islands. Plants take root and small layers of soil can form, though the latter is minimal and rare.

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³ Ibid., 16.
The freshwater lens of a coral island (the maroon area in Figure 2.2) is extremely thin and fragile. It relies entirely on rainwater as atolls have no surface water systems. The freshwater lens can easily be exhausted, contaminated with saltwater, or polluted.⁴

Additionally, the soil requires freshwater for agriculture and vegetation. The soil, too, can be contaminated with saltwater or washed away by a storm or exceptionally high waves and

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tides. This happens with “king tides” – exceptionally high tides with strong currents, caused by the alignment of the sun, moon, and Earth. In 2006, Tuvalu, which has a maximum elevation of 4.88 meters, recorded a king tide 3.41 meters above the sea level.\(^5\) When the small amount of arable land on these islands is salinized, even the most subsistence-level lifestyle becomes impossible to maintain. Thus, these places become highly reliant on external trade and aid.

The coral island rings of atolls are typically very thin,\(^6\) leaving them prone to significant effects from coastal erosion. About 50% of atoll islands have experienced ocean shoreline erosion, according to one study. However, this erosion did not typically reduce the size of the islands – rather, the rings migrated together, into the lagoon.\(^7\) Another study predicted that a 0.5-meter rise in sea level could move islands in Kiribati, Fiji, and the Maldives 3-15 meters inward.\(^8\)

If tropical cyclones become more frequent and intense with climate change, the resiliency displayed thus far by atolls may not continue. Tropical cyclones can bring high winds, high precipitation, high waves, and storm surges to atolls.\(^9\) These processes can be extremely erosive to the physical geography, in addition to substantially impacting the human-built landscapes of island states. The worsening of cyclones is linked to sea level rise, since both are at least partially caused by increasing surface sea temperatures.\(^10\) By 2100, the intensity of tropical cyclones could increase 2-11%, though frequency of the storms is expected to decrease.\(^11\) The storm surges which accompany these storms become more potent as sea levels rise.\(^12\)

\(^5\) Yamamoto and Esteban, *Atoll Island States and International Law*, 52.
\(^7\) Yamamoto and Esteban, *Atoll Island States and International Law*, 70.
\(^8\) This assumes the supply of sediment remains constant. Ibid., 69.
\(^9\) Ibid., 55-56.
\(^10\) Ibid., 59.
\(^12\) Yamamoto and Esteban, *Atoll Island States and International Law*, 61.
These forces can combine to destabilize atoll geography. The natural resilience of the islands would be tested. It is possible, then, that an exceptionally powerful cyclone or even a climate-change-unrelated tsunami could be the “tipping point” which pushes a fragile island over the brink of uninhabitability – or destroys it entirely. These factors might cause a sudden fatality to small island states. The long-term fragility and threats to island states are rooted in the slow rise of sea levels.

Sea Level Rise: Past, Present, & Future

The Intergovernmental Panel on Climate Change (IPCC), one of the most thorough and authoritative sources on the history, extent, and future of sea level changes, provides a sobering assessment of the future challenges faced by islands and coastal areas. The IPCC is an international body created by the World Meteorological Organization and United Nations Environment Programme to regularly assess the science related to climate change and to provide policymakers summaries and recommendations. It is composed of hundreds of scientists who synthesize information from hundreds of published reports and experts. As a result, analysis comes in a variety of date ranges and different authors may produce slightly different results. The IPCC’s summary indicates that global mean sea levels have fluctuated naturally throughout time, rising and falling with cyclical climatic change. Since the industrial era, sea levels have been rising and human action has accelerated that trend, which will continue into the foreseeable future.13

Records indicate that global mean sea levels from prior warm periods were between 5-10 meters higher than they are at present. During these periods, the global mean temperature was 2°C above pre-industrial temperatures. Since the 1700s, we have been able to measure sea levels with tidal gauges. Readings from gauges around the world, which have become increasingly accurate over the past 300 years, have allowed us to instrumentally observe sea level rise in the modern era.\textsuperscript{14}

There was an increase of about 0.19 (0.17-0.21) meters between 1901-2010,\textsuperscript{15} with a rate of sea level rise of 1.7 (1.5-1.9) millimeters per year. Beginning in 1992, satellite measurements became available, providing near global coverage. Between 1993-2012, global mean sea level rose at a rate of approximately 3.2 (2.8-3.6) millimeters per year.\textsuperscript{16} There is a high level of confidence that the rate of sea level rise has increased from the nineteenth to twentieth centuries, which has likely continued through the twentieth century and into the twenty-first.\textsuperscript{17}

The amount of water on Earth is finite and stable. As it travels through the water cycle, it changes form and it changes place, but the amount of water in Earth’s ecosystem does not change. Rising seas are therefore the result of the introduction of more water into the ocean. There are three primary contributing factors to sea level rise: thermal-induced expansion of the ocean, melting of ice sheets and glaciers, and reduced terrestrial land storage. While the latter two alter total ocean mass, thermal expansion contributes to sea level rise by increasing ocean volume.

\textsuperscript{14} IPCC 2013 Fifth Assessment Report WGI, 1145.
\textsuperscript{15} Ibid., 1150.
\textsuperscript{16} There is a high level of confidence that this is a real change and not due to the change in instrumentation or sampling errors. See IPCC 2013 Fifth Assessment Report WGI, 288; From 1920-1950, there was a comparably high rate of increase, 1150.
\textsuperscript{17} Ibid., 1139.
Thermal expansion is the largest of the three contributors globally. This occurs when energy from the sun heats the ocean. The effect varies with depth; from 1971-2010, the contribution of thermal expansion to sea level rise for a depth range of 0-700 meters was 0.6 (0.4-0.8) millimeters per year. Including lower depths increases this to 0.8 (0.5-1.1) millimeters per year.\textsuperscript{18} More recently, from 1993-2010, the total contribution of thermal expansion to sea level rise was 1.1 (0.8-1.4) millimeters per year.\textsuperscript{19}

Melting land ice is also a significant contributor to sea level rise and is expected to remain such.\textsuperscript{20} The cryosphere is made of many parts, but the two main contributors to sea level rise are ice sheets and glaciers. Ice sheets are continentally-sized glaciers; if a glacier is a river of ice, an ice sheet is a sea. Earth’s existing ice sheets, the Greenland, West Antarctic, and East Antarctic, are the largest collections of stored freshwater on the planet.\textsuperscript{21}

Starting in the nineteenth century, global glacier volume began a net decline, though this was not human-caused; rather, it is associated with the end of the Little Ice Age in the latter half of the nineteenth century. It was not until the latter decades of the twentieth century that the rate of melting land ice contribution began to accelerate through anthropogenic causes.\textsuperscript{22} Glaciers worldwide\textsuperscript{23} have lost mass at a rate with a sea level equivalent\textsuperscript{24} of 0.54 (0.47-0.61) millimeters per year from 1901-1990 and 0.76 (0.39-1.13) millimeters per year from 1993-2009.\textsuperscript{25} Ice sheets in Antarctica and Greenland have lost a total of 11.7 (8.4-15.1) millimeters sea level equivalent

\textsuperscript{18} 0.1 mm/year from in the depth range 700m-2000m, 0.1 mm/year in the depth range <2000m. See IPCC 2013 Fifth Assessment Report WGI, 288.
\textsuperscript{19} Ibid., 1150.
\textsuperscript{20} Ibid., 1153.
\textsuperscript{21} Ibid., 1177.
\textsuperscript{22} Ibid., 1151.
\textsuperscript{23} Excluding glaciers along the peripheries of ice sheets, which are difficult to measure independently.
\textsuperscript{24} Sea level equivalent does not necessarily equate to sea level rise. It is the total of sea level rise if all of the lost ice mass were to be added to the ocean. The difference lies in potential near-term dynamic responses such as marine-terminating glaciers and interception of terrestrial runoff.
\textsuperscript{25} IPCC 2013 Fifth Assessment Report WGI, 344.
between 1992-2011. Figures 2.3 and 2.4 show the respective sea level contributions of Greenland and Antarctica; the figures also illustrate how the rate of loss has accelerated over time.

**Figure 2.3 - Cumulative ice mass loss and sea level equivalent for Greenland, 1992-2012.** Figure 4.15 in the IPCC 2013 Fifth Assessment Report WGI.

**Figure 2.4 - Cumulative ice mass loss and sea level equivalent for Antarctica, 1992-2012.** Figure 4.16 in the IPCC 2013 Fifth Assessment Report WGI.

Terrestrial water storage is the water stored in snow packs, rivers, lakes, streams, aquifers, wetlands, and manmade structures. Naturally occurring climate-related changes in terrestrial water storage have had no long-term trends, only decadal fluctuations. For example, El Niño and La Niña increase the amount of precipitation over land or increase the amount of precipitation over the ocean, respectively, in multiyear to decadal cycles. Anthropogenic

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26 *IPCC 2013 Fifth Assessment Report WGI*, 353.

27 Ibid., 1155.
action, however, has had an impact: the construction of nearly 30,000 reservoirs during the twentieth century led to a -0.55 millimeter per year decrease in sea level from 1950-2000, as surface water was prevented from flowing into the sea. This has been counterbalanced by groundwater depletion. In sum, direct human intervention in terrestrial water storage contributed the following net rates of sea level rise: a decrease of -0.11 (-0.16- -0.06) millimeters per year 1901-1990, an increase of 0.12 (0.03-0.22) millimeters per year 1971-2010, and an increase of 0.38 (0.26-0.49) millimeters per year 1993-2010.\(^{28}\)

When combined, thermal expansion, glacier and ice sheet melting, and changes to terrestrial water storage account for the observed rate of global mean sea level rise.\(^{29}\) Figure 2.5 shows the recorded rates of each contributing factor from 1900-2010. The annual contribution to sea level rise has been positive for each factor in the last two decades.

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\(^{28}\) IPCC 2013 Fifth Assessment Report WGI, 1156.

\(^{29}\) Ibid., 1159.
Figure 2.5 - Historic measured contributions of thermal expansion (a), glacial melting (b), melting of ice sheets and water storage capacity on land (c) to sea level rise, 1900-2010. The rates are compared in chart (d). Figure 13.4 in the IPCC 2013 Fifth Assessment Report WGI.
While it is important to recognize that the rate of sea level change is accelerating and that the seas have risen over the past century, anthropogenic climate change is only in its earliest stages. Its multi-century effects are just beginning. It is an increasingly climate-changed future for which states must prepare.

That future is, of course, dependent on a multitude of compounding climate processes combined with human responses and actions. To account for these and allow the scientific community to make consistent predictions, multiple models, scenarios, and pathways have been developed. The IPCC publishes many of its predictions of sea level rise and related processes based on four representative concentration pathways (RCPs). These models are named for the level of radiative forcing\textsuperscript{30} which they assume in the year 2100: +2.6, +4.5, +6.0, and +8.5 watts per square meter. Each model assumes that carbon emissions peak at different decades in the twenty-first century; no one scenario has been evaluated to be more or less likely than another. The predictions can be interpreted to represent a world in which carbon emissions peak between 2010-2020 (RCP2.6), 2040 (RCP4.5), 2080 (RCP6.0), or continue to rise through the twenty-first century (RCP8.5).\textsuperscript{31} Figure 2.6 shows how CO\textsubscript{2} emissions, atmospheric CO\textsubscript{2} levels, surface air temperature, and ocean thermal expansion change under each of these scenarios.

\textsuperscript{30} These values are defined in the *IPCC 2013 Fifth Assessment Report WGI* (Annex III: Glossary, page 1460) as the difference (in watts per square meter) between the years 1750-2100 in radiative forcing. Radiative forcing is the change in the net amount of energy in the atmosphere per unit area due to – in this case – factors external to the natural climate (i.e. human-introduced emissions and concentrations.)

\textsuperscript{31} Ibid., 1038-1047.
Figure 2.6 - Long-term predictions of CO2 emissions, atmospheric CO2 rates, surface air temperature change, and ocean thermal expansion levels for each representative concentration pathway 2000-3000. Figure 12.44 in the IPCC 2013 Fifth Assessment Report WGI.
Concrete predictions of the contributions of each of the three major contributors to rising sea levels, given here in turn, comprise the total predictions of sea level rise. Thermal expansion contributes to global mean sea level rise at a rate proportional to the increase in ocean heat content, which in turn rises linearly with global mean surface air temperature. Models predict thermal expansion contributes approximately 0.2-0.63 meters of sea level rise per degree Celsius of global mean temperature increase. It is predicted that the ocean temperatures and thermal expansion will continue even after greenhouse gas concentrations stop rising. By 2100, thermal expansion could account for between 0.4-0.7 meters of sea level rise. By 2200, this could be 0.5-1 meters (RCP8.5). By 2500, this contribution could exceed 2 meters above pre-industrial levels.

Together, glaciers and ice sheets cover 10% of global land surface area, containing a sea level equivalent of 66.07 meters. The East Antarctic ice sheet is the largest portion of this, with the potential to contribute 58.3 meters of sea level rise if it were to disappear entirely. Predicted glacial contribution to sea level rise by 2100 varies: 0.07-0.17 meters (RCP2.6), 0.07-0.2 meters (RCP4.5 & RCP6.0), to 0.12-0.26 meters (RCP8.5).

Predictions for the contribution of ice sheets vary significantly. Greenland’s ice sheets are estimated to add 20-85 millimeters (RCP8.5) or 14-63 millimeters (RCP2.6, RCP4.5, RCP6.0) by 2100. For the Antarctic ice sheets, the IPCC predicts a likely sea level rise contribution

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32 IPCC 2013 Fifth Assessment Report WGI, 1161.
33 Ibid., 1163.
34 Ibid., 1162.
35 See Figure 2.5.
36 See Figure 2.4.
37 IPCC 2013 Fifth Assessment Report WGI, 1163.
38 Ibid., 321.
40 Ibid.
of -20-185 millimeters by 2100.\footnote{IPCC 2013 Fifth Assessment Report WGI, 1174.} If a large-scale collapse of the Antarctic ice sheets were to occur, this number could be substantially larger. One 2016 study considers the feedback processes which might lead to this collapse.\footnote{Specifically, Pollard and DeConto take into account hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs, which were not considered in the IPCC projections.} In this model, RCP 2.6 has relatively negligible sea level contribution in the future. RCP4.5 and RCP 8.5, however, predict a collapse of the West Antarctic ice sheet, which could contribute between 0.32 meters by 2100, 5 meters by 2500 (RCP4.5) and 0.77 meters by 2100, 12.3 meters by 2500 (RCP8.5).\footnote{Robert M. DeConto and David Pollard, “Contribution of Antarctica to past and future sea-level rise,” Nature 531 (2016): 591-597, accessed October 28, 2016, doi: 10.1038/nature17145. http://www.nature.com/nature/journal/v531/n7596/full/nature17145.html.}

Net future contribution to sea level rise from anthropogenic intervention in terrestrial water storage ranges from -10-90 millimeters by 2081-2100, compared to 1986-2005 levels.\footnote{IPCC 2013 Fifth Assessment Report WGI, 1178.} This range is wide because it is dependent on how groundwater extraction rates continue and to what extent humans continue to expand or decrease the capacity of reservoirs which intercept surface water headed to the ocean.

The total predicted net rise in sea level by 2100\footnote{Relative to 1986-2005 levels.} is substantial across all four RCPs: 0.44 meters (RCP2.6), 0.53 (RCP4.5), 0.55 (RCP6.0), and 0.74 (RCP8.5).\footnote{IPCC 2013 Fifth Assessment Report WGI, 1180.} As mentioned before, the collapse of the Antarctic ice sheet could cause global mean sea level to rise significantly above these levels. Predicting the future is a distinct challenge and to rely on any of the specific numbers in these projections would be a mistake. Rather, they should be considered as the most probable values in a range in which the scientific community is most confident. Figures 2.7 and 2.8 show the projected cumulative sea level rise and rates of change for the RCPs by 2100.
Figure 2.7 - Projected 21st century sum sea level rise and contributions from thermal expansion, land ice, ice sheets, and terrestrial water storage with the four RCP models. Figure 13.11.a in the IPCC 2013 Fifth Assessment Report WGI.

Figure 2.8 - Projected 21st century rates of sea level rise and contributions from thermal expansion, land ice, ice sheets, and terrestrial water storage with the four RCP models. Figure 13.11.b in the IPCC 2013 Fifth Assessment Report WGI.
Making long-term, multi-centennial predictions about sea level change is more difficult than even predicting the next eight decades. Predictions are divided into three categories, each with an assumed concentration of greenhouse gases: high (>700 ppm CO$_2$ equivalent), medium (500-700 ppm CO$_2$ equivalent), and low (<500 ppm CO$_2$ equivalent). These scenarios predict sea level rises as high as 1.02 meters (low), 2.32 meters (medium), or 6.63 meters (high) at the year 2500.\textsuperscript{48} If the Antarctic ice sheet experiences large-scale collapse, these numbers could be as much as doubled.\textsuperscript{49}

At any given coastal point around the world, the sea level will not necessarily rise with the global mean. Regional differences in sea levels are present for a variety of reasons, including atmospheric pressure, increased freshwater flows, changing precipitation patterns, salinity, wind patterns, ocean currents, and changes in land or sea floor elevation.\textsuperscript{50} As glaciers and ice sheets melt in Antarctica and Greenland and the weight of the ice decreases, the land is expected to rise. Thus, the seas around the Antarctic Peninsula and Greenland could actually see a net decrease in sea level over the near term. Over more than 95% of the world’s ocean area, however, regional sea level will rise. For as much as 9% of the ocean, the difference between the mean global and regional sea levels could exceed 25%.\textsuperscript{51} Figure 2.9 shows how seas will rise regionally by the end of the twenty-first century.

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{48} IPCC 2013 Fifth Assessment Report WGI, 1191.
\item \textsuperscript{49} DeConto and Pollard, “Contribution of Antarctica.”
\item \textsuperscript{50} IPCC 2013 Fifth Assessment Report WGI, 1191-1194.
\item \textsuperscript{51} For 30% of ocean area, the difference will exceed 10%. Ibid., 1195.
\end{itemize}
\end{footnotesize}
The ocean is not a static thing. Even within the time span of each day it can rise and fall meters with the tides. As severe ocean-born storms become larger and more frequent, the frequency of flooding events will rise as well. For much of the Pacific coastal areas, this frequency could increase by a multitude of 1000, as the islands are submerged daily.52

Death of the Reefs

Atolls and reef islands are dynamic structures, even alive in some ways. They are composed largely of calcium carbonate (CaCO₃), which is a byproduct, essentially the skeletons and shells, of corals and organisms such as foraminifers. These are living creatures, which rely on a specific environment to grow and, in turn, build the atolls and coral islands. The death of the

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52 IPCC 2013 Fifth Assessment Report WGI, 1201.
animal would mean the disintegration of the island. This is a key point in understanding the vulnerability of small island states, because it is likely that sea level rise by itself would not inundate islands to the point of uninhabitability. Rather, the reefs would, as they have in the past, grow to keep pace with the sea levels.

Reefs are the natural barriers which protect atolls from waves, storms, and erosion. They are the producers of the material which makes up the habitable island. Additionally, they are the heart of the ecosystem of an atoll or coral island – and often the heart of its economy as well. Without reefs, the islands would erode and be destroyed by the sea, though as fishing grounds and an economic resource the islands would be barren before that.

Many factors can affect the health of a reef and reef systems worldwide; climate change is affecting ocean temperature and acidity most. High ocean temperatures, like those predicted by the IPCC, lead to coral bleaching, which is the expulsion of symbiotic algae from the coral polyps. Mass-bleaching events could therefore increase with the impending rises in ocean temperature. The most recent of these events (2015-2016), destroyed as much as 67% of coral in the northern part of the Great Barrier Reef, prompting an internet obituary to bring attention to the issue. Fears remain that another event could occur before the coral has a chance to fully recover.

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54 Yamamoto and Esteban, Atoll Island States and International Law, 43.


Coral as a species may be able to migrate and survive, but the islands it has built will not. Some predictions are dire: coral reefs could nearly disappear in a generation due to mass bleaching and ocean acidification. The economic damage from lost tourism and coral-based agriculture may be impossible for small island states to endure. The physical loss of the reefs would leave the economy, people, culture, and sovereignty of small island states exceptionally and perhaps fatally exposed to the rising seas. Identifying those places and understanding their options to respond to this crisis is imperative.

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57 Yamamoto and Esteban, *Atoll Island States and International Law*, 42.
58 Ocean acidification is the uptake of CO2 by the ocean, which decreases the ability of coral to form calcium carbonate. It could increase by 150% by 2050. Yamamoto and Esteban, *Atoll Island States and International Law*, 45-46.
Chapter 3

The Submerged State: A Crisis for Sovereignty

A shore to which many dreamers had sailed, a severe, classic light. Was Atlantis torn from sunlight and air by an earthquake, or was it the target of a meteor? You may ponder its fate, yet anchor your belief in neither thesis. If truth be known, it sank under the weight of its own perfection. The arched lid closes; the mollusk deserts its perfect shell.

- Atlantis, by Gary Catalano (1982)¹

The Disappearing Places

In his dialogues “Critias” and “Timaeus,” Plato introduced one of the only examples in either Western history or pseudohistory of a state physically disappearing, swallowed up by the ocean: the island civilization of Atlantis. Flush with riches, Atlantis built a mighty empire on virtuous ideals, but eventually turned to avarice, fell out of favor with the gods, and was submerged beneath the Atlantic by a massive earthquake. The message of the allegory is that Atlantis’s hubris caused its destruction. That fable from 360 BCE has a parallel today, as the more industrialized states of the world, in pursuit of development and profit, perpetuate economic systems and policies which have created changes in global climate. These changes threaten to submerge whole states. The complete elimination of a state’s population or territory confronts the world political system with the mortality of sovereignty, a consequence which in the modern era is challenging in both conception and practice.

For the vast majority of the world’s states, Atlantis’s fate will never become reality. Climate change will continue to affect the entire world in different ways, through droughts, monsoons, early frosts, et cetera, but oceanic inundation is necessarily reserved to coastal areas – Mongolians will not notice its effects. Florida, the Netherlands, Bangladesh, Brazil, West Africa, and similar places will be challenged by the rising seas, but it is unlikely that any of those places would be completely flooded within the foreseeable future.

Small island states, however, are vulnerable to complete submergence due to sea level rise, particularly those with extremely low elevations. Since sea level rise will be at most about

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4 The overarching message was also that its foe, Athens, was the ideal form of government and society.
one meter by 2100, it is states primarily composed of atolls which are existentially threatened. These are the places where coral is dying, preventing the islands from outpacing the seas through growth and killing the sea life which the people rely on for agriculture and tourism. These are the places where there is not a critical mass of land area above, nor freshwater lenses that can withstand, the raised sea and its tidal fluctuations. Unlike large islands and coastal states, these are places where there is no higher ground and no inland to move to, where there is no escape from the sea.

Yamamoto and Esteban identify the Maldives, Kiribati, Tuvalu, Nauru, and the Marshall Islands as the places which could become uninhabitable because the entire state exists on small coral islands. For all other island states, there is at least one island with habitable high ground to which the population can move if necessary. The five states Yamamoto and Esteban name are existentially threatened by climate change-induced rising sea levels.

As much as 80% of the Maldives land area is under 1 meter in elevation, with no point reaching higher than 3 meters. It is possible the entire archipelago could be uninhabitable by 2100. The other islands are similar: Kiribati’s average elevation is below 2 meters, Tuvalu’s is 1.83 meters (maximum elevation is 4.88 meters), and the Marshall Islands’ average elevation is

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5 See Chapter 2: The Rising Seas.
6 Nauru is a raised coral atoll, one of the Pacific’s phosphate rock islands. Though not the typical ring shape of atolls, the only habitable land is low-lying and coastal. The interior is a high plateau, relegated to a pockmarked wasteland of coral pillars by phosphate mining. Kiribati possesses one island, Banaba, with a similar geography. Their average and maximum elevations are skewed by this geographic reality.
2.13 meters. The maximum elevation of the Marshall Islands is only 10 meters and Tuvalu’s is 5 meters.

These five states are not the only atoll archipelagos which will be flooded by the seas. Tokelau, parts of Palau, islands in Indonesia and Papua New Guinea, even most of the Federated States of Micronesia will face the same problems and so should perhaps make use of the same lessons. However, each of these places is part of a larger state which has at least one high-elevation island to which people can move and the state can remain attached to a physical land mass. Populations will be dislocated, economies ruined, and nations will be separated from their traditional homelands, but in none of those places will the sovereign state disappear entirely.

It is impossible to predict an exact time at which these places will completely cease to be habitable. Rates of sea level rise can only be estimated, not predicted exactly. Some states may undertake strategies to mitigate the impact of sea level rise, such as building sea walls or land reclamation. Most will be rendered uninhabitable long before they are completely submerged. Salinized freshwater lenses and soil, coupled with dying reefs, will leave the islands agriculturally infertile. What already rank as some of the world’s poorest states could become even worse as reef-dependent economies suffer. King tides and severe storms will threaten daily life and the integrity of buildings and infrastructures. If nothing changes, life on the shallow atolls will become untenable.

Possibly within the twenty-first century – and almost certainly within the next five hundred years – Kiribati, the Maldives, Tuvalu, the Marshall Islands, and Nauru are at risk of

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becoming submerged states. When that happens, their sovereignty will be placed in jeopardy, and the continued existence of these places as states, with a rights and roles in international politics, must be addressed by their governments, people, and the international community.

**Sovereignty Complicated**

Sovereignty is the legal right of a polity to absolutely rule itself. Its form in the world political system has evolved throughout the years. In the modern global political system, the primary actors endowed with absolute sovereignty are states. If sovereignty is the right of the state to absolute rule, then it is necessary to consider the subject of the state – what it is ruling. Almost always, this comes down to two subjects, population and resources, both of which exist in a defined geographic area. Determining which states are sovereign – that is, which states are legally states and actors subject to international law – has always been a contentious and imperfect process. Climate change will make it more complicated.

There are two competing theories to define states: the constitutive and declarative. Each is supposedly an exhaustive method for determining which polities are sovereign states, but both are necessary to accurately describe the world political system.

The constitutive theory is the older and more traditional method of state recognition. Essentially, this theory says that if another sovereign state politically recognizes a polity as a sovereign state, then the latter also becomes a sovereign state.\(^\text{12}\) This is perhaps manifested most clearly today in the United Nations, which includes almost all the world’s states in its membership. The General Assembly can vote to add members\(^\text{13}\) or recognize non-member


\(^{13}\) After approval by the United Nations Security Council, which has five members who can veto the resolution: China, the United States, the United Kingdom, France, and Russia.
“observer states.”\textsuperscript{14} In this body, all states receive one vote, because they are peers, not subject to one another based on size, population, wealth, or any other standard. However, to describe the General Assembly as an exhaustive list of polities exercising sovereignty in the world,\textsuperscript{15} or even as the authoritative source of statehood, would be inaccurate. Likewise, using another measure of constitutive sovereignty, states which have diplomatic relations with each other – establishing embassies, consulates, and sending ambassadors between states is a long-standing standard of recognition – creates an incomplete analysis of statehood in world politics.

The declarative theory is a much different way to determine statehood. Instead of relying on mutual recognition of \textit{de jure} states without regard to \textit{de facto} rule of a place, the declarative theory says a state is sovereign when it meets a set of criteria that is not subject to political considerations or even moral determinations. In stark contrast to the constitutive theory, “the political existence of the state is independent of recognition by the other states.”\textsuperscript{16} The foremost criteria set for the declarative theory was outlined most notably in the 1933 Convention on Rights and Duties of States (Montevideo Treaty)\textsuperscript{17} as follows: a) a permanent population, b) a defined territory, c) government, and d) capacity to enter into relations with other states.\textsuperscript{18}

The reality of statehood in the world political system exists somewhere between the two theories. The constitutive method usually succeeds in describing \textit{de jure} states, those which are

\textsuperscript{14} Such as Palestine and the Holy See.
\textsuperscript{15} Niue and the Cook Islands, for example, are independent states in free association with a larger state (New Zealand) which represent them in the General Assembly, but not in other United Nations and international organizations.
\textsuperscript{16} “Convention on Rights and Duties of States (inter-American); December 26, 1933,” \textit{The Avalon Project: Documents in Law, History, and Diplomacy}, Yale Law School, accessed January 8, 2017. \url{http://avalon.law.yale.edu/20th_century/intam03.asp}.
\textsuperscript{17} Ibid.
\textsuperscript{18} In Article XI, the treaty breaks from its strictly objective analysis of the state of sovereignty to declare that \textit{de facto} states which have achieved that status through force or coercion shall not be recognized. In an ideal world, perhaps, no state would be born from violence, however that does not reflect the reality of world politics. While the abhorrence of violence is a nearly universally held principle, it is nonetheless a morally-based determination. It is inconsistent with the otherwise objective analysis of \textit{de facto} states that the treaty seeks. Ibid.
party to intergovernmental organizations such as the World Health Organization, the United Nations, the World Bank, or the International Criminal Court. The declarative method, however, is most accurate at describing *de facto* states, states that exist in practice regardless of legitimacy or illegitimacy as perceived by the international community. For the most part, the results of these two theories overlap. However, in places like Taiwan, Somaliland, or Transnistria, there is a disconnect between the *de jure* and the *de facto*. These are polities which would meet the declarative theory of sovereignty – they are self-governing over defined territories, provide defense and social services to their citizens, and have the capacity to engage in diplomatic relations with other states. These are instances where the declarative, *de facto* state exists but is not formally recognized *de jure*. When there is a disconnect between the two theories, this is the most common way it happens. The problem small island states will face is the inverse and much rarer – *de jure* states will cease to present as *de facto* states (in the traditional sense).

Internationally-recognized sovereign states, members of the United Nations, will cease to meet the Montevideo Treaty’s criteria for statehood as a direct result of the rising seas.

The declarative method’s criteria are intimately tied to population and territory, with an understanding that the two coincide. If the physical territory of places like the Maldives and Tuvalu disappears, the “defined territory” criterion becomes questionable. If the I-Kiribati people evacuate their ancestral home, Kiribati and its islands could be without a “permanent population”. Examples of situations where a state no longer exists practically but is an internationally-recognized sovereign entity and participates in world politics are hard to come

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19 I.e. A state’s citizens must be comprised primarily of its residents. E-citizenship, passports for sale, etc. are features of the modern world, but do not generally contribute to legitimate state recognition and were almost certainly not considered by the Montevideo Conference in 1933.
by. The rarity of this situation highlights how unprecedented the challenges of climate change will be.

The closest example to a sovereign state losing its land, but continuing to function as a sovereign entity is the Sovereign Military Order of Malta \(^{20}\) (S.M.O.M.). S.M.O.M. ruled the island of Malta \(^{21}\) until 1798, when Napoleonic forces conquered the island. Over the next decade, the Order’s existence was limited, but it resurged after the Napoleonic Wars and lobbied unsuccessfully to be granted new territory of its own. \(^{22}\) Today, S.M.O.M. is still landless, \(^{23}\) but is regarded as a sovereign body under international law. It maintains bilateral relations with 106 states, and has established headquarters and embassies throughout the world, some of which have extraterritorial status. \(^{24}\) It publishes stamps and passports and has an observer status at the United Nations. \(^{25}\) Though classifying S.M.O.M. as a peer to states like France or Italy is a bit of a stretch, it is one of the clearest historical examples of how a microstate which loses its territory must transform its priorities and responsibilities.

Sovereignty is the absolute right to rule, but with a landless state, the question must be posed: to rule what? For a state to persist beyond the life of its physical territory, it will need to transform into something other than a traditional state; it will become a sovereign organization that pursues a different role in the world than those of the typical state (such as defense of its citizens, legislation, and provision of public goods and social services). In the case of S.M.O.M.,

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\(^{20}\) Officially the Sovereign Military Hospitaller Order of St. John of Jerusalem of Rhodes and of Malta.

\(^{21}\) S.M.O.M.’s sovereignty was first granted in 1113 by Pope Paschal II. The Order began in the Middle East, then controlled Rhodes. Over the centuries, their independence waned; eventually they entered a feudal arrangement under Charles V, King of Two Sicilies, though Charles V demanded only an annual payment of one Maltese falcon.


\(^{23}\) S.M.O.M. has embassies throughout the world and a headquarters in Rome, which have extraterritorial status.


that meant evolving into what can best be described as a humanitarian aid organization. They use their sovereignty as a tool to forward their humanitarian missions, but no longer need to pass laws or provide protection to a population, more traditional roles of a state. The Vatican City State offers a similar example. The sovereignty of the Holy See puts the Catholic church in a symbolic sense and its assets in a practical sense under the control of no outside authority – maintaining this independence has become the primary role of its existence as a sovereign body. Most small island states have little in terms of non-fixed assets, so it is mostly the citizenry who would remain a part of the state’s jurisdiction.

Small island states can draw from historical examples like the Sovereign Military Order of Malta or the Holy See, but neither are perfect precedents for what will happen to small island states. S.M.O.M.’s population was not forced from their ancestral lands – the Maltese stayed in place, eventually becoming citizens of the Republic of Malta. The Holy See has sovereignty over the Vatican City State, a small, but nonetheless physically present territory. Furthermore, the territory of small island states is not restricted to land – it includes sea territory, defined by the Law of the Sea. The threat to the former is the more obvious part of the discussion of continued sovereignty of small island states, but understanding how maritime jurisdictions are established – and could be destroyed – is vital as well.

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26 For the most of the nineteenth and twentieth centuries, Malta was ruled by the British Empire. It gained its independence in 1964, left the British Commonwealth ten years later, then joined the European Union in 2004.
International law grants all coastal states – including small island states – the right to rule not just their populace and a terrestrial area, but also significant sea holdings, as shown in Figure 3.1. The United Nations Convention on the Law of the Sea (UNCLOS) is the foremost legal source of this maritime sovereignty. Under these waters are sea life and subsoil resources which could have significant value and often make up the bulk of the economy of small island states. As sea levels rise, small island states will face at least terrestrial loss, possibly complete disappearance of landholdings, and – with either – potential maritime territorial loss.

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27 Figure 3.1 was cropped and the key was moved to show just Southeast Asia and Oceania. Rafi Segal and Yonatan Cohen, “Territorial map of the world,” OpenDemocracy.net, October 7, 2013, accessed January 31, 2017. https://www.opendemocracy.net/rafi-segal-yonatan-cohen/territorial-map-of-world.
Since UNCLOS took effect in 1994, all coastal states have been endowed with a concentric series of legal zones in the waters adjacent and interior to them, as shown in Figure 3.2. These zones emanate from a baseline, which is at the low water mark of the state’s shoreline. Waters inland of the baseline are internal waters; for all intents and purposes these are legally the same as land territory. The first zone outside of the baseline is that of territorial waters, where states have full sovereignty over the airspace, waters, sea bed, and subsoil. This extends up to 12 nautical miles from the baseline in the sea. Adjacent to this zone is the contiguous zone, no more than 24 nautical miles from the baseline, where states have the right at the surface to enforce customs, immigration, and sanitary laws. Next is the exclusive economic zone (EEZ), which extends 200 nautical miles beyond the baseline. In the 188-nautical mile stretch between the end of the territorial waters and the end of the EEZ, states are entitled to the living and nonliving resources in the water, seabed, and subsoil. Rights to the seabed and subsoil can be extended if there is a geological continental shelf formation present.

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30 Such as rivers, streams, lakes, and bays.


34 In the EEZ, a state also has the right to regulate marine research, preserve the environment, and build artificial islands. Ibid., 127.

35 Regardless of geology, all coastal states receive those rights up the extend of the EEZ. Ibid., 127-128.
All other parts of the oceans are called the high seas. All states are entitled to navigate above, upon, or below these waters, which are viewed as international territory. States are given a lot of freedom with their actions in the high seas. They may construct artificial islands and other structures, fish, and conduct research, though each of these actions must be conducted with regard for other states.\(^37\)

Many small island states and threatened atoll polities are composed of archipelagos, which are given special status under UNCLOS. These places are granted the special rights of drawing archipelagic baselines, “straight baselines joining the outermost points of the outermost islands and drying reefs of the archipelago.”\(^38\) However, archipelagoes cannot exceed a

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\(^{36}\) “Figure 1: Offshore extent of the maritime zones recognized under international laws,” National Oceanic and Atmospheric Administration, accessed January 26, 2017. [https://www.nauticalcharts.noaa.gov/nsd/coastpilot/files/cp1/images/6f9a86d4-296a-4083-9d22-04f51f1b277f.jpg](https://www.nauticalcharts.noaa.gov/nsd/coastpilot/files/cp1/images/6f9a86d4-296a-4083-9d22-04f51f1b277f.jpg).

\(^{37}\) Di Leva and Morita, “Maritime Rights of Coastal States and Climate Change.”

\(^{38}\) Ibid.
maximum land-to-water ration of 1:9 to maintain their special status. This ratio could be reduced if rising seas begin to submerge islands, turning the archipelago into just a few scattered islands and causing it to lose archipelago status under UNCLOS. This could cause the state to lose its claims over vast swaths of sea territory as the baseline is adjusted.\footnote{Rayfuse, “Sea Level Rise and Maritime Zones,” in \textit{Threatened Island Nations}, 174.}

The UNCLOS zones are not fixed – they move if the baselines move.\footnote{It should be noted that baselines are published by the individual states. It is therefore conceivable that they could prevent their movement by refusing to publish new baseline measurements. This creates potential for border disputes as states lay claims far beyond their stipulated jurisdictions.} Rising seas should therefore cause a recession in the EEZs and territorial seas of coastal and island states as the low water mark is raised and moves inland, whereas the continental shelf zone, if pinned to a geographic feature, would not recede. However, all zones would ostensibly disappear if the land (and with it the baselines and basepoints) were permanently submerged.\footnote{Rayfuse, “Sea Level Rise and Maritime Zones,” in \textit{Threatened Island Nations}, 173.} Additionally, these zones of sovereignty are denied to “rocks which cannot sustain human habitation or economic life of their own.”\footnote{United Nations Convention on the Law of the Sea, December 10, 1982, Article 121(3). \url{http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf}.} Small islands could meet that classification if they became uninhabitable.

The UNCLOS is complex and does not address specifically the submergence of small island states. Rather, the legal consequences of the total inundation of a state is informed conjecture. What is clear is that sea level rise physically and legally threatens their terrestrial and maritime holdings of small island states and therefore their status as states. The complexities of sovereignty over both land and sea, in both the past and the present, assert themselves into the decision-making processes forced upon small island states. They may look to the past, in cases like S.M.O.M. and the Vatican, but they will not find the perfect road map in any historical example. The submerged state faces an unprecedented situation, so it has a series of unprecedented routes for its future.
The Fate of the State

Threatened states must by necessity react to rising sea levels. They will do so through two courses of action: to stay or to leave. Small island states must make the fundamental decision between the adaptation or abandonment of their landscapes. Within each course of action are several strategies – and states will likely pursue more than just one. Each strategy has its merits and disadvantages; the best options for each state are dependent on specific geographic context and will affect the sovereignty of the state in different ways.

Adaptation options require the physical alteration or creation of land or other habitable structures to create or maintain a physical territory for the state. This is done through four main strategies: a) reinforcement of the perimeter, b) fill islands, c) fixed artificial structures, and d) floating islands. By doing so, the state and its population can stay in place – though that place necessarily looks different. Adaptation is a preferable scenario for a state, because it potentially allows for the populace to retain their ancestral homelands, mitigates emigration, and avoids the challenges that accompany abandonment.

The first hurdle in executing any of the four adaptation strategies is cost. For example, a temporary sea wall for a single Marshall Island atoll could cost twice the annual GDP of the country. This is an impossible burden for many small island states, which rank among the world’s poorest. Only places with extremely high value or population density would be worth protecting in such an expensive manner. The populations of most small island states are spread over dozens, even hundreds of atolls and islands, some of which are easier to protect than others.

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43 Yamamoto and Esteban, Atoll Island States and International Law, 152.
44 E.g. Venice, Japanese and Chinese islands with strategic value, and Malé.
Tuvalu’s main island of Funafuti is an example of this challenge in protecting the smaller islands in atoll states:

The land form of Funafuti is so narrow and attenuated that in order to protect its 2.5 square kilometers, 54 kilometers of sea defences would have to be constructed. Moreover, so narrow is the land form for much of its length that sea defences on one side would be protecting the back of sea defences on the other with nothing in between.\(^{45}\)

If defenses must be concentrated, populations must also and decisions will need to be made about which places are protected and which are sacrificed. Even then, after the resource costs are weighed against the benefits, states will need to consider the likelihood of success. If successful, the island remains habitable and the state may function and exist legally as always. However, bringing these strategies to fruition is not as simple as their conception and, as Hurricane Katrina exhibited in New Orleans, failure can mean dire consequences.

One of the simplest and, at present, common options for a threatened island is to reinforce its perimeter with barriers against the sea, as exhibited by Figure 3.3. Sea walls, dykes, and levees are long-proven strategies for holding back the seas. Major population centers such as the Netherlands and New Orleans rely on dykes and levees to prevent the flooding of valuable inhabited land. Venice, a city which is notoriously susceptible to flooding during king tides, has nearly completed an extensive system of gates which is designed to protect its lagoon from up to a 3-meter tide.\(^{46}\) By minimizing or eliminating movement of the coastline from inundation and erosion, small island states can limit the recession of their baselines and, in turn, their maritime holdings. For all of these reasons, perimeter reinforcement is an obvious short-term strategy for small island states, but its long-term viability is more challenging.


To prevent water from seeping under the walls – through the porous coral and sand – would require extremely expensive pumping systems.\(^{47}\) Doing so would interrupt the natural sediment formation and movement on which coral islands depend for their formation and continued existence.\(^{48}\) Even if the waters could be held back, the land would likely be rendered barren by salinization.\(^{49}\) Thus, the long-term sustainability of such systems is doubtful.

The next option for states is to create fill islands (Figure 3.4). These are islands created, raised, or expanded by fill material, often sand dredged up from nearby shallows or waste from the local population. Often referred to as land reclamation or artificial islands, fill islands are legal to build within an EEZ, but will not extend the baseline or expand the maritime jurisdictions of the state.\(^{50}\) The process is relatively common and is being used by China in the
South China Sea to reinforce island claims and extend the military’s reach, as well as by the United Arab Emirates to create beautiful and creatively-shaped developments off the coast of Dubai.

Fill islands are not cheap to build, in part because they also require many of the aforementioned coastal defenses to limit erosion. Additionally, fertile topsoil (rare enough already on atolls) would need to be removed and placed above the fill material if the island intends to maintain any agriculture. Unless raised, any existing structures would be buried at the lowest levels. Populated islands, which are most valuable and likely to be protected in such a way, are therefore more difficult to raise than unpopulated ones. Taken together, these complications create a significant and expensive feat of engineering.

Fill islands, like reinforced islands, are attractive because they maintain the existence of naturally-formed land, thus preserving the baselines and maritime jurisdictions. The land may be under dredged material or behind high walls, but it exists nonetheless. The two remaining

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51 These actions are widely condemned by the international community and have been ruled illegal. The South China Sea’s Paracel Islands and Spratly Islands are contested by China, the Philippines, Vietnam, Malaysia, and Brunei.

52 Yamamoto and Esteban, *Atoll Island States and International Law*, 159-160.
adaptation strategies preserve the geographic position of the state, but include the submergence of the natural land.

Fixed artificial structures could be constructed in the shallow waters of a once-island to house nationals of the state. Yamamoto and Esteban pose this as taking two forms: a “lighthouse” structure (Figure 3.5),\textsuperscript{53} serving mostly as a marker for sovereignty, or a stilt village of houses on pylons. The latter would be similar to traditional settlements like Venice or the Motuans of Papua New Guinea.\textsuperscript{54} Both instances are hardly novel, but neither has ever been relied on for modern national sovereignty.

![Lighthouse type structure ("Lighthouse Marker")](image)

*Figure 3.5 - Yamamoto and Esteban’s “lighthouse” structure, an example of using a fixed artificial structure to preserve a living space or sovereignty marker for a submerged state. Figure 5.8 in Atoll Islands and International Law by Yamamoto and Esteban.*

In fact, perhaps the best example of this strategy playing out is the Principality of Sealand (Figure 3.6), a micronation\textsuperscript{55} located just off the southeastern English coast. Its founder, Roy Bates, took over an abandoned World War II sea fort for use as a pirate radio station, then asserted the platform’s independence through a controversial interpretation of international

\textsuperscript{53} Yamamoto and Esteban, *Atoll Island States and International Law*, 155.

\textsuperscript{54} Ibid., 157.

\textsuperscript{55} Micronations are different than microstates. Microstates are extremely small states (usually under 500,000 people or less than 1,000 km\textsuperscript{2}), which are recognized by the international community as legitimate sovereign actors. Micronations are similarly sized, but receive no or questionable recognition legally. They are often personal projects, political statements, or tourist and business gimmicks and are generally considered to be more oddity than serious world actor. Still, they are a small, but significant, piece of discussions of sovereignty, statehood, and nationality.
Practically speaking, Sealand has ruled itself independently for the past 50 years. However, it has failed to gain formal recognition from another sovereign state and is generally considered to be more of an oddity than anything else.

How Sealand’s mixed success in its quest for statehood translates to the case of a small island state transferring its people and operations to a fixed structure is unclear. It remains uncertain if, through this strategy, a state can maintain legal jurisdiction over local waters. However, fixed artificial structures have many challenges in both construction and sustainability.

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56 Sealand’s original claim to sovereignty rests on the idea that, because its structure predated UNCLOS, which does not grant “island” status to artificial structures, and it sits in international waters, the land was *terra nullius*. After Roy Bates, Sealand’s founder, fired warning shots at British naval vessels, he went before a British court, which ruled it did not have jurisdiction over the platform. Bates claims this is *de facto* recognition by the United Kingdom. Sealand also negotiated with a German diplomat for the release of a German citizen who had briefly occupied the platform and taken Sealand’s residents captive, an event which Sealand claims was *de facto* recognition of the principality. Neither the United Kingdom nor Germany have officially recognized Sealand’s independence.


59 See the analysis of this method’s legality and effectiveness under UNCLOS by Yamamoto and Esteban. *Atoll Island States and International Law*, 155-159.
The final strategy to adapt the small island states to the rising seas is to construct *floating islands*, diagrammed in Figure 3.7. This strategy has the obvious benefit of being impervious to changes in sea levels: an island floating on top of the waves would rise and fall with them. However, the construction of these structures is extremely expensive, probably prohibitively so for most small island states. Engineering a floating island large enough to contain a state’s population is an additional challenge. Even if these issues could be overcome, the legal result is questionable. These islands would be unlikely to qualify as islands under UNCLOS – more likely they would be classified as ships.\(^6\)\(^0\) Despite the hurdles, this strategy has been actively considered by small island states, as well as by imaginative futurists.\(^6\)\(^1\)

For states for which these adaptation scenarios are not feasible, the alternative strategy is abandonment of the islands. Abandonment strategies do not represent avoidance of the crises of small island states. Rather, it is the state’s admirable acceptance of a harsh reality: that its land, way of life, and perhaps even state itself cannot be saved. Since the threats are tied to geography,

\(^{60}\) It is more likely that Yamamoto and Esteban, *Atoll Island States and International Law*, 157.
so too must the solution be. For abandonment strategies, the solution is fundamentally to move
the state and its people away from the threat. This can be done through a) cession of habitable
land to the small island state, b) merger with another state, or c) establishing an *ex situ* state.

*Cession of land* is the most straightforward route by which small island states could leave
their islands and still maintain sovereignty. The arguably definitional tie between sovereignty
and land is preserved – the land in question is simply elsewhere. In this scenario, a small island
state would purchase or be given land\(^6\) by another state for the purposes of moving the state to
new territory.

While instances of land cession are prevalent throughout history, including for
environmental issues,\(^6\) that history of displacing populations from their islands has been tied to
the more brutal aspects of colonialism.\(^6\) Finding a state willing to cede land in the modern era is
also more difficult, because citizens of most states today expect consultation before territory
would be traded away.\(^6\) As Rayfuse notes,

\[\text{it is difficult to envisage any state now agreeing, no matter what the price, to cede a portion of its}
\text{territory to another state unless that territory is uninhabited, uninhabitable, not subject to any}
m\text{property, personal, cultural, or other claims, and devoid of all resources and any value whatsoever}
to the ceding state. The political, social, and economic ramifications of ceding valued and/or inhabited}
territory may simply exceed the capacities – and courage – of existing governments.}\(^6\)

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\(^6\) This scenario could also be technically pursued through conquest, though that is a virtually impossible scenario. Kiribati, Nauru, Tuvalu, and the Marshall Islands all have no military, relying on larger powers for protection. The Maldivian military is one of the smallest in the world. Seizing new territory forcefully is not a remotely practical option for small island states.

\(^6\) In the 1870s, Canada gave thousands of Icelandic settlers dual citizenship, resources, and land in what is now Manitoba. The colony of New Iceland allowed the settlers to escape dire ecological and economic conditions in Iceland, before eventually joining the province of Manitoba. Yamamoto and Esteban, *Atoll Island States and International Law*, 188.

\(^6\) See Yamamoto and Esteban’s analysis of the Banaban and Chagossian displacements. Ibid., 192-197.

\(^6\) Ibid., 196.

Even if such an agreement could be found and the logistical difficulties of moving a whole country surmounted, the social, cultural, and economic consequences are unknown.⁶７ A nation that has been island-bound for centuries could now find itself residing in a state without islands, outside the tropics, or even one that is landlocked. The effects on daily life and culture would be significant and possibly painful, if not destructive, to national identities. Nonetheless, this option would preserve the sovereignty of the state, even possibly retaining claims to its old maritime jurisdictions.⁶⁸

The next abandonment strategy, which would perhaps be more palatable to other states, is to *merge* the small island state with a larger state. Together, they could form a new state, the threatened state could be completely subsumed by the recipient state, or they could form some type of federation. Although the costs of absorbing a small island states population are significant, recipient states may find this strategy attractive, because they would gain at least partial control over the large EEZs and continental shelf zones of the absorbed state. What degree of control the absorbed state retained over its nation, former citizens, and former resources would vary, depending on the terms of the agreement, but absolute sovereignty is relinquished in this scenario.⁶⁹

The final abandonment strategy for submerged states is to create a de-territorialized, or *ex situ,*⁷⁰ state. In this scenario, a state continues to operate with sovereignty over its citizens and resources, recognized by other states, and subject to the same international laws and conditions as other sovereign states, despite its lack of terrestrial holdings.

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⁶⁷ The creation of the State of Israel in the twentieth century exhibits how creating a nation-state for a diaspora can create conflict with local populations and have long-term geopolitical consequences. It is also a great example of how a nation, even one spread across dozens of countries, can become attached to a state created for it and, in some way, potentially preserved through it.


⁷⁰ *Ex situ* is Latin and translates to “off site.”
The *ex situ* state challenges the Montevideo Convention’s\(^{71}\) Westphalian belief that states require territory to be sovereign. It is conceivable, however, that maritime holdings could satisfy that condition. Rayfuse describes a few ways by which threatened states or even all states might freeze their baselines in accordance with UNCLOS to preserve them against coastal erosion or island disappearance.\(^{72}\) Atolls are actually advantaged here by their geography: waters within the lagoon of the atoll have the status of internal waters. Because they would still lie “landward” of the baseline, they would retain that status and be legally equivalent to land.\(^{73}\) Freezing the baselines has the added benefit of allowing resources that might be spent building basepoints and sovereignty markers to be directed elsewhere.\(^{74}\) Maintaining maritime jurisdictions also preserves the access of *ex situ* states to valuable resources which could be used to benefit their diasporas and economies. While control over only sea territories may be logistically possible for *ex situ* states, it is far from guaranteed that other states and the international political community as a whole will permit this status. Therefore, it is not sound strategy for small island states to rest the fate of their sovereignty in such an interpretation of the Law of the Sea without more international deliberation and reassurances.

As an alternative, Burkett argues that the concept of a state should not be inherently tied to land. She points particularly to S.M.O.M. and the Holy See as examples of sovereign entities which either at present or at some point in history did not have territory.\(^{75}\) Additionally, other institutions and entities are beginning to acquire increasing rights and responsibilities in international politics. The European Union and International Committee of the Red Cross are

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\(^{71}\) No threatened atoll state is a signatory of the Montevideo Convention.

\(^{72}\) Rayfuse, “International Law and Disappearing States,” 5.

\(^{73}\) Ibid., 6.

\(^{74}\) Ibid., 6.

notable examples of this: neither are sovereign states, but both are considered sovereign subjects of international law and have standing invitations to observe the United Nations General Assembly.\textsuperscript{76} The Westphalian state may be the primary actor in world politics, but as the \textit{ex situ} state, European Union, and Red Cross exhibit, it need not be the only such actor.

An \textit{ex situ} state would sacrifice some of the traditional obligations of the state, as S.M.O.M. and the Holy See have. For a state to continue to exercise its legislative authority over its jurisdiction – now relegated to just a population, possibly scattered around the globe – it would require the permission of the citizen’s host state to enforce those laws. It is unlikely, then, that the landless state would either pursue or be granted that role. Similarly, military defense would be virtually impossible and impractical, as would the distribution of most social goods and services. What role, then, would the \textit{ex situ} state play?

\textit{Ex situ} states could exist to maintain a sense of extraterritorial nationhood amongst the diaspora. They may use social networks and the increased connectivity of the modern world to preserve cultures and traditions across the diaspora in a way that was previous impossible.\textsuperscript{77} Economically, they may rely on resources from any still-recognized maritime jurisdictions. With or without those holdings, the \textit{ex situ} state could very well take a lesson from other microstates and micronations and use sovereignty as a commodity for sale. The \textit{ex situ} state would be well positioned to allow financial institutions and companies to charter under its government in order to receive certain legal benefits. In addition to being tax havens, de-territorialized states could lend their flag to ships for a price. Indeed, many of the world’s smallest states are considered “flags of convenience” by the International Transport Worker’s Federation.\textsuperscript{78}

\textsuperscript{76} Yamamoto and Esteban, \textit{Atoll Island States and International Law}, 203.
These and other schemes can bring financial gains to an *ex situ* state, but should be enacted cautiously because they may not be well-received by other states, on which *ex situ* states will rely in many ways. For example, one of the largest, though not prohibitive challenges, for an *ex situ* state is that the government, people, and their resources must live and operate within another state’s territory, technically requiring its consent. International systems would need to be created and reinforced to protect de-territorialized states and their diasporas without eroding either their sovereignty or that of host states. Burkett postulates a trusteeship system for de-territorialized states based on United Nations post-colonial trusteeships.79

Like the world’s understanding of the nature of a state, international laws, institutions, and norms must adapt to a climatically-changed world. The analyses put forward of how states might maintain sovereignty or maritime holdings will likely change dramatically as the world is presented with these new challenges and seeks specific solutions to address them. So long as the affected parties are present and considered, these changes can be beneficial for threatened states, offering clarity and a path forward in world with a new climate, geography, and politics.

At least five states – the Maldives, Kiribati, Tuvalu, the Marshall Islands, and Nauru – cannot wait for the world as a whole to answer the complicated questions of sovereignty and what to do with a submerged state. They must and are taking action today through varying combinations of adaptation and abandonment strategies. This is the imperative of threatened states: to protect their sovereignty, nations, citizens, and cultures against the rising tides.

79 Burkett then applies this framework to the Republic of the Marshall Islands, hypothesizing how it may become a state *ex situ*. “The Nation Ex-Situ,” in *Threatened Island Nations*, 108-119.
Addressing Their Imperative: Two States as Case Studies

Much of the discussion in Chapter 3 is theoretical and hypothetical, but the crisis of sovereignty and how to react to rising sea levels demands practical answers in threatened places. Similarly, the physical processes and changes to Earth’s environment outlined in Chapter 2 seem far-flung to anyone who does not live near a shallow coastal plain. This is a feature of climate change: as a phenomenon, it exists worldwide, discussed by scientists and debated by policymakers, but its ramifications are felt in specific localities.

Chapters 4 and 5 take these global issues and discussions and apply them to a smaller scale, where the theoretical and hypothetical are more clearly reality. Each case study showcases a state taking a different route in response to rising seas: the Maldives as a state adapting its geography to rising seas and Kiribati as a state preparing to abandon its islands.

Each atoll state is home to a people, culture, and unique history. This is presented at the beginning of each case study, in order to establish the place that may disappear in coming decades. Next, their vulnerabilities to climate change are discussed, followed by each state’s response strategies.

In exploring the cases of the Maldives and Kiribati, other consequences of climate change are uncovered. Chapter 4 elaborates on the role of microstates and small island states in creating international agency to address climate change, an effort in which the Maldives has been a leader. Chapter 5 discusses the looming “climate refugee” crisis, as people are displaced by the effects of climate change and forced to relocate, often without the protection of the United Nations or assurances of being accepted in a new state.

The case studies in Chapters 4 and 5 ground the discussions of Chapters 2 and 3 in real places. Climate change is not an abstract issue; it has real consequences that affect real people.
Chapter 4

Adapting the Maldives: The Floating City State

Historical evidence suggests that people were living here for thousands of years in equilibrium with the sea, but things are changing... The ability to sustain human life here is very fragile.

- Mohamed Nasheed, Fourth President of the Maldives

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The Maldives: People & Place

From a plane or satellite, the Maldives looks more like two dozen pearl necklaces strewn atop the ocean than a country. ² Thousands of islands fill its atolls – indeed, part of the title of the country’s sultans was “King of 13 provinces and 12,000 islands” – a number that probably is intended to represent an incomprehensibly large amount, rather than 12,000 exactly.³ Today, the archipelagic state (shown in Figure 4.1) is home to around 400,000 Maldivians, spread across about 200 populated islands, none of which exceed more than a couple of meters above sea level.⁴ The nature of the geography of their home place this people and their state at the forefront of climate change, their sovereignty and way of life threatened by the rising seas.

Evidence of the Maldives’ first settlers dates to approximately 500 BCE. These peoples likely came from the Tamil regions of India and Sri Lanka, bringing with them a shared script and language,⁵ which have since developed into the language Dhivehi; this and English are the Maldives’ predominant languages today.

Soon after people came to the Maldives, so too did Buddhism. Monuments and structures on islands across the archipelago – some uninhabited today – date back to 450 BCE.⁶ In the twelfth century, the Maldives began its conversion to Islam, which has remained the religion of Maldivians. The oldest Friday mosque in the capital city, Malé, was constructed in 1658 to replace an original 12th Century mosque. The building is constructed of coral stone, historically a major construction material for the Maldives. There are few other available materials in the

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Figure 4.1 - Map of the Maldives. Image is in public domain, cropped for presentation in this document.
region, which necessitates pulling up coral boulders, carving them into blocks, drying them and building with them.\(^7\) Two coral mosques in Malé alone have been proposed as World Heritage Sites because of the unique nature of this building material.\(^8\)

Malé means “King’s Island” and, in addition to being the seat of the sultan, it was a chief port for all the other islands, a central distribution center. The city’s port, just a few blocks from the sultan’s palace, is where goods from across the archipelago were collected, stored, and then shipped abroad. Using the capital island in this way offered a couple of advantages. First, it is economically practical; there are far too many islands, which are far too small, for foreign states to trade with each individually. Centralized distribution helped the sultan maintain control over the extended island chain as well as a monopoly over its primary exports, which have ranged from cowrie shells\(^9\) to dried fish.\(^10\) During the British colonial era in the nineteenth and twentieth centuries, the island chain was prized for its coconut, copra, coir, and luxury goods such as shells, tortoiseshell, and ambergris.\(^11\) For all of its history, the Maldives economy has been tied to its home and greatest resource: the seas and reefs upon which the civilization was built.

Proximity to the water is important in Malé and the sea is a focal point of Maldivian life. Though most cities would consider their surrounding waters to be the natural line at which the city stops, it is perhaps more appropriate to recognize that the channels, lagoons, and ocean surrounding Malé are in fact vital parts of the city itself. Like Venice, Italy or Suzhou, China, Malé’s citizens frequently use the waterways to commute throughout the city and between

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\(^8\) Ibid.


\(^11\) Ibid., 14, 40, 94, 102.
islands. François Pyrard, a Frenchman shipwrecked in the Maldives at the turn of the seventeenth century, recognized how Maldivians used the ocean as an extension of their settlements when he wrote, “So it would be impossible to tell the number of barques and boats upon all the islands, for the poorest will have a boat of his own, and a rich man will have many. … in truth, they are half fish, so accustomed are they to the sea, in which they pass their days…”

T.W. Hockly, a British national living in Colombo, Ceylon, visited Malé in the late 1920s and observed that, between the time when Pyrard was marooned in Malé and his own visit, no change had been made in “the general condition of the people.” Hockly’s descriptions of Malé, written at the precipice of modernization, give a window into what life for Maldivians was like during the colonial period. He depicts a society almost untouched by time, isolated as it always was. The British controlled the islands, but they did so from a distance, by controlling Ceylon, which was suzerain over the Maldives. For a European to visit was rare. Even foreign soldiers were not as present as they were during the period of Portuguese rule and, as early as the 18th Century, the island’s fortifications were crumbling. When Hockly noticed this in his visit, his guide replied, “…what real need have we of forts here now? Our fort is the British Navy,” though even the navy rarely appeared on the Maldives’ shores.

Isolation – imposed upon the islands by the sea – was perhaps the defining feature of Maldivian society through its history. Today, almost two million tourists travel to the Maldives annually seeking this isolation for themselves, ironically connecting the country to the outside

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13 Hockly, *The Two Thousand Isles*, 5.
14 Ibid., 34-46.
16 Hockly’s guide was Ahmad Didi, who was Private Secretary to the Sultan, as well as Collector of Customs and Postmaster General.
17 Hockly, *The Two Thousand Isles*, 34-36.
world at the same time. Arrivals were predicted to increase over 10% annually through 2017. It is the warm weather and exceptional privacy and isolation of Maldivian resorts, all located on islands separate from the native settlements, that are prized by the wealthy from across Asia, Europe, and the Middle East. Each resort island is far from the signs of civilization, but if that were not enough, resorts usually feature boardwalks that eject out into the sea, lined with private cabanas. These resorts create personal paradises at what must seem like the edge of the world.

The clear waters, bright coral reefs, and white sandy beaches of the Maldives' many atolls have made tourism a pillar of the modern Maldivian economy. In 2013, the roughly $400 million USD in tourist revenue accounted for nearly 28% of the Maldives GDP and made up 37.7% of government revenue. There are over 110 resorts, 19 hotels, 135 guest houses, and 163 floating safari vessels throughout the islands, with dozens of new construction projects underway.

The post-colonial paradise that has attracted this sizeable tourist economy has been marked by a much darker political scene. From 1978-2008 Maumoon Abdul Gayoom ruled the Maldives with an iron fist. Political imprisonment, beatings, and torture were commonplace, government corruption extensive. After a period of civil unrest, the 2008 elections were allowed to be competitive – the first such occurrence in the republic’s history. Gayoom lost in the second round of voting; his opponent, Mohamed Nasheed, became the first truly democratically elected President of the Maldives. In 2012, democratic progress was set back when, after controversially arresting the Chief Judge of the Supreme Court, Nasheed was forced to resign and subsequently imprisoned in what many consider a coup d’état that reinstated the old political guard.

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19 *Tourism Yearbook 2014.*  
20 Ibid.  
21 Ibid.  
22 *The Island President* (2011).
As it was when Hockly or Pyrard visited, the cultural, political, and economic center of the modern Maldives is Malé (Figure 4.2) and its neighboring islands in its eponymous atoll. Malé’s population today is over 150,000,\textsuperscript{23} crammed onto a roughly 5.8-square-kilometer island;\textsuperscript{24} this represents nearly half the population of the entire state, making Malé an excellent example of a primate city and turning the Maldives into something of a city state. The island is so densely populated that it is said the streets would not have enough room for everyone if they came down from their high-rise apartments.\textsuperscript{25}

Figure 4.2 - The Maldivian capital city of Malé on its eponymous island. The international airport is on Hulhulé, the island to the northeast (background). On the north side of the island (photo left), the port is visible, east of which the golden dome of the Islamic Center rises up next to Sultan’s Park. The south side of the island (photo right) is reclaimed from the sea. Breakwaters and sea walls can be seen circling the island. Image cropped for presentation in this document.\textsuperscript{26}


While no two cities on Earth are quite alike, the Maldivian capital is exceptionally curious and incomparable. Its urban core takes up nearly the entirety of the island, giving it the appearance of a city floating on the water. A forest of skyscrapers rise straight out of the waves as urban metropolis and tropical paradise combine. These are the dual societies of the modern Maldives: the oceangoing islanders with a burgeoning capital city and the tourists flooding in to hide away in the nooks of the Maldivian archipelago.

Climate Change in the Maldives

The Maldivian civilization lies in the crosshairs of climate change. Roughly 45% of tourist resorts are experiencing beach erosion. More than 67% of inhabited islands experienced erosion in 2013 alone. According to the Ministry of Environment and Energy’s 2016 state of the environment report, over 80% of islands are facing erosion problems, sea levels have risen 2.9-3.7 millimeters annually, and sea surface temperature is increasing 0.11-0.15 degrees Celsius per decade. Malé city lies just a couple of meters above sea level and predictions for its submergence (Figure 4.3) are dire; the other islands face just as bleak futures.

Additionally, the Maldives is increasingly susceptible to severe weather events which bring storm surges. A 2004 Indian Ocean tsunami exposed the mortality of such shallow islands when faced with abrupt, if temporary, floods. The ocean rose up and rushed through the streets, its only interruption the skyscrapers of Malé which poked through the waves. The event destroyed an estimated 50% of Maldives GDP that year and forced whole islands to be abandoned.

29 The Island President (2011).
In addition to physical insecurities, access to resources like drinking water is impaired. Rainwater accounts for just 2% of Malé’s drinking water (29% desalinated water, 68% bottled water), but makes up 87% of the drinking water on the other atolls (7% desalinated water, 5% bottled water). Precipitation rates are changing as the dry season grows longer, increasing
potential for drought. Only 43% of the population has access to the desalination network, but many freshwater lenses are already brackish and will be further salinized as sea levels rise.\textsuperscript{30}

In 2016, the islands recorded the largest mass bleaching event for coral systems since 1998. Approximately 75\% of the reefs in the Maldives were bleached.\textsuperscript{31} The Maldives is clearly experiencing the painful, though expected, effects of a changing climate on atoll islands, including rising sea levels, coastal erosion, changing weather patterns, soil and freshwater salinization, and ailing coral reefs. It is these events and others which led Mohamed Nasheed to observe, “it is not something in the future, it is something that we are facing right now.”\textsuperscript{32}

**Building a Floating City: The Adaptation Strategies of the Maldives**

The tourist resorts, the bustling urban city of Malé, the Islamic and Buddhist temples and relics – these are what is at risk as sea levels rise. A culture and state which was given life by the sea is finding that the waves can bring destruction, too. To stave off and prevent the demise of their civilization, the Maldives has pursued policy which makes it a prime example of a state whose overarching strategy to deal with sea level rise is adaptation.

By publishing frank reports on climate change and the state of the environment of Maldives, the government is taking the first step toward addressing their situation: recognizing it. The overwhelming data on the topic should make recognizing the threats of climate change a straightforward task, but many countries around the world are more skeptical about the scientific consensus and therefore less inclined to pursue necessary policies to address climate change. The Maldives, as with other small island states, does not have that luxury. They instead seek action:

\textsuperscript{31} Ibid., 87.
\textsuperscript{32} *The Island President* (2011).
as Nasheed said, “If we can’t stop global warming, it’s adaptation – how do we adapt to the new reality?”

At Malé island, the answer was to build sea walls and breaks of tetrapod barriers around the entire island; however, this cost millions of dollars. One seawall, at Dhuvasfaru, cost $4,000 USD per meter of coastline. Though the Maldives has a GDP higher than most other small island developing states, it is simply not economical to build such structures around all 200 inhabited islands. Furthermore, tetrapod sea walls are temporary barriers that are designed only to limit erosion; when the seas continue to rise, the barriers will not stop waves from flooding over the islands’ land areas.

Therefore, more substantial strategies are necessary, but their expense requires the concentration of population in order to economically justify their construction. The Maldivian government has long known that providing the goods and services of a modern society, let alone one so afflicted by climate change, for a population spread across all 200 inhabited islands is not sustainable. Through the 1980s and 1990s, the government began advocating for population consolidation. In 2001, then-President Gayoom launched the “National Population Consolidation Strategy and Programme,” which prioritized which islands (as 2 growth centers and 85 focus islands) would receive the bulk of governments services and created incentives for those on the other islands to move to these. Eventually, this morphed into a plan called the “Safe Island Strategy,” which called for the migration of citizens to 10-15 “safe islands” which would have

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33 The Island President (2011).
34 Tetrapods are four-pronged concrete pieces, which are stacked upon one another to create a permeable concrete barrier upon which the waves will break first before moving on to the coast.
36 Lilian Yamamoto and Miguel Esteban, Atoll Island States and International Law: Climate Change Displacement and Sovereignty, (Heidelberg: Springer, 2014), 152.
more services and be more resilient to climate change. Through much of the Gayoom administration, as Kothari points out, the justification for population consolidation was economic, not environmental.\(^\text{37}\)

When he took office, Mohamed Nasheed re-packaged this relatively unpopular idea as “Resilient Islands” which emphasized improving social services and connectivity of select island over providing direct incentives to migrate. While increasing awareness about the effects of climate change on health and livelihood make the people of low-population islands more amenable to moving, mistrust of government intent plagues the issue. Though population consolidation receives mixed opinion, Maldivians are beginning to see it as inevitable.\(^\text{38}\)

The government clearly sees the concentration and consolidation of the populace as a key part of sustainable development for the Maldives. The Maldives’ 2015 climate change framework includes this strategic point: “integrate population policy and population and development consolidation strategies in order to address climate change and sustainable use of resources and equitable services.”\(^\text{39}\) Goals from this framework include building climate resilient infrastructure, incorporating climate change scenarios into civic planning, and adjusting the national building code to consider climate change resilience.\(^\text{40}\)

So far, that framework has not translated into government initiative for the construction of artificial structures like Sealand or Yamamoto and Esteban’s lighthouse structures, but such options might fall in line with that strategy. That said, some fantastical designs have been drawn


\(^{38}\) Ibid.

\(^{39}\) Maldives Climate Change Policy Framework, 32.

\(^{40}\) Ibid., 24-32.
up by those outside the Maldives for what a future Maldivian society on artificial structures might look like and how to best preserve Maldivian culture in that untraditional circumstance.41

Instead, the Maldives has much more actively pursued the creation of fill islands or, more accurately, the artificial expansion of its islands using fill to create spaces safe from the seas. The environmental impact of this and other terraforming efforts, such as harbor construction, channel blasting, and breakwaters, has been significant. Over 1,300 hectares of what was once reef, lagoon, marsh, or mangrove forest has been “reclaimed” – filled in with sand to create livable terrestrial space – on approximately 98 inhabited islands.42 Of the Maldives’ reclaimed spaces, 430 hectares alone come from the Hulhumalé project.

Hulhulé is the island northeast of Malé, Hulhumalé its northern extension. This project – reclaiming the atoll and building upon it a futuristic planned city – began in 1997 as a way to alleviate overcrowding in Malé city.43 Current Maldivian president Abdulla Yameen called upon young people to relocate to this city,44 populating it and removing population from the far-flung small islands that are economically difficult to protect from climate change. Hulhumalé is being constructed at least 2 meters above sea level to keep it above rising seas through this century.45

As Figure 4.4 shows, Hulhumalé is in many ways a different landscape than Malé. By nature of its modernity, it lacks historical buildings and architecture. Its construction will be in a planned grid, with long avenues neatly organizing districts devoted to light industry, information

technology, government, culture, residential spaces, and commerce. Gone is the forest of skyscrapers that defines the Malé skyline; residents of the new expanded Malé metropolitan area live in rows of orderly, planned, spaced-apart complexes. Mosques are made into centerpieces in Hulhumalé, rather than being crammed onto every corner between apartments that rise far above the minarets. The new piece of the Malé urban area will be beautiful and orderly, but far from natural.\textsuperscript{46} Paradoxically, its design is much more in tune with the natural world. The green spaces that are hard to come by in Malé cover Hulhumalé. Waterways run through the streets, reminding citizens and visitors of the fascinatingly close relationship between the ocean and the city.\textsuperscript{47}

![Figure 4.4 - Hulhumalé from above, 2015. The north side of the island (photo left) has been reclaimed, but not yet developed. The southern part of the island (photo right) houses the international airport, which contains a seaplane terminal. This island is connected to Malé, which is less than three-quarters of a mile to the southwest (photo bottom right) by ferry. Image from Maldives Housing Development Corporation Hulhumalé site.](image)

A joint development project between the Maldives and its largest source of tourists, the China-Maldives Friendship Bridge will link Malé city to its airport transit node on Hulhulé. This bridge will span a total of 1.7 kilometers, allowing automobiles and pedestrians to move between the two islands.\textsuperscript{48}

\textsuperscript{46} “Hulhumalé,” \textit{Housing Development Corporation}.
\textsuperscript{47} Ibid.
Reclaiming an atoll to build a city larger than even Malé is an ambitious reaction to climate change, but even Hulhumalé may not be the most ambitious Maldivian undertaking. The government of the Maldives has commissioned a series of floating artificial islands, a move that brings the science fiction future to the present and is perhaps only imaginable from the shores of a city naturally surrounded by the ocean. The 5 Lagoons Project – developed by the Dutch Docklands, a company that specializes in artificial fill islands – will create 80 million square feet into five complexes that float above the water, attached to the seafloor by cables.

![Image of The Ocean Flower, 185 private residences priced at over $1 million USD each. Image from Dutch Docklands Maldives site.](http://www.dutchdocklands.com/Development/Maldives)

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The Ocean Flower (Figure 4.5), 185 waterfront villas constructed in the “traditional Maldivian style,” will fill one of the atolls 20 minutes by boat from Malé. Each has a pool, terraces, and is connected by a long walkway. Three levels of housing, the top two of which include underwater rooms to view ocean life, range in starting prices from $1.4-3.8 million USD. For those who seek even more luxury and have the money to afford it, ten unique Amarillah floating private islands will be constructed in a lagoon 25 minutes from Malé by boat. These include private jetties, private beaches, and lush green lawns (Figure 4.6).

For the new residents of these islands, The Royal Indian Ocean Club (Figure 4.7) will be a floating golf course and underwater clubhouse. Links will be connected by underwater tunnels. Nearby, shops, townhouses, and restaurants will float in a Venetian-style village. The Greenstar hotel and conference center (Figure 4.8) is to be constructed in the middle of another atoll, with a floating island restaurant beside it. It is shaped like a star, includes beaches, pools, and extensive open green space, rising several stories above the ocean. According to Dutch Docklands, it will become the “[number] 1 location for conventions about climate change, water management, and sustainability.”51

51 “Maldives.” Dutch Docklands.
Figure 4.7 - A) The Royal Indian Ocean Golf Club. B) The underwater tunnels which will connect the links of the Royal Indian Ocean Club. Both images from Dutch Docklands Maldives site, cropped combined, and labeled for presentation in this document.

Figure 4.8 - The Greenstar, a floating convention center and hotel. Image from Dutch Docklands Maldives site.

Some of these buildings may be accessible via private submarines, which can be docked under the houses in the underwater rooms.\textsuperscript{52} The lines between the terrestrial, ocean surface, and submarine worlds is so blurred by this technology and landscape, that those who live upon these constructs will surely question whether the very land underneath them is real; it both is and is not. Perhaps this type of creation is the natural addition to Malé, a city and people that have for so long lived with the ocean an integral part of their cityscape.

\textsuperscript{52} "Maldives." \textit{Dutch Docklands}.
It is worth noting that the 5 Lagoons project does not, for the most part, preserve a space for the Maldivian people. Rather, it maintains the tourists’ spaces: grand mansions, a hotel, golf courses. This is not necessarily inappropriate or unfair. After all, tourism is a major part of the Maldivian economy – a state cannot be preserved if its economy cannot be preserved. It is the money from wealthy tourists that allows the Maldives to pursue the expensive adaptation strategies that other states cannot afford. Still, as such projects move forward, the Maldives will need to balance the preservation of tourist and native interests in an equitable way.

The floating islands of the 5 Lagoons project, the land reclamation of Hulhumalé, and the breakwaters surrounding Malé are tangible actions the Maldives is taking to adapt the state to rising sea levels. With those plans in mind, the Maldives has also explored some abandonment strategies. Just after his election in 2008, Mohamed Nasheed announced plans for a “sovereign wealth fund,” seeded by profits from the tourist industry and purposed toward buying land in foreign countries – potential future homelands for dislocated Maldivians.53

International Cooperation Toward Climate Action

The Maldives is both seeking its own solutions and looking to the greater world for help. Small island states face the seemingly insurmountable obstacle of size in world politics – their small sizes simply do not afford them the military or economic clout necessary to force issues like, for example, climate change policy reforms. Rather than face the world political system alone, small island states have banded together to tackle climate change as a bloc to lobby for their issues in organizations like the United Nations.

53 The Maldives has announced plans to buy land in Australia, after also considering India and Sri Lanka. Kothari, “Political discourse of climate change and migration: resettlement practices in the Maldives.”
The premier example of this is the Alliance of Small Island States (AOSIS), which has almost 40 members, ranging from the Maldives to Cuba. The Maldives chairs AOSIS, a “coalition of small island…countries that share similar development challenges and concerns about the environment, especially their vulnerability to the adverse effects of global climate change.”\textsuperscript{54} The group “functions primarily as an ad hoc lobby and negotiating voice for small island developing states…within the United Nations system.”\textsuperscript{55}

The Maldives has taken a forward role amongst microstates and other states threatened by climate change. The state became an exceptionally strong and prominent advocate for global climate action during the presidency of Mohamed Nasheed. The 2011 documentary film, \textit{The Island President}, chronicles Nasheed’s efforts to raise awareness of his country’s plight. At the AOSIS summit in New York, just three months before the 2009 United Nations Climate Change Conference in Copenhagen, Denmark (COP 15). Nasheed can be seen persistently badgering world leaders (even as they attempt to dismiss him), prodding them to take more concrete action to address climate change. His personal appeals appear at least partially successful: the Maldives was able to insert key language into AOSIS’s pre-COP 15 declaration.

Following his efforts at AOSIS, Nasheed spoke at the United Nations, forcefully imploring the larger carbon emitters of the world to do more. He was verging on berating the developed world when he said to the United Nations General Assembly, “we continue to shout [our words] even though deep down we know you’re not really listening.”\textsuperscript{56} The Maldives made waves but had mixed success three months later at COP 15. A legally-binding agreement to reduce carbon emissions would not come until the 2015 summit in Paris (COP 21).

\textsuperscript{54} “About AOSIS,” \textit{Alliance of Small Island States}, accessed May 4, 2016. \url{http://aosis.org/about/}.

\textsuperscript{55} Ibid.

\textsuperscript{56} \textit{The Island President} (2011).
While slowly pushing through the inertia of United Nations institutions, the Maldives also challenged the international community through individual state stunts and action. In 2009, Nasheed held a cabinet meeting underwater; he and his ministers wore scuba gear to sit aside coral at desks and sign an agreement calling on all countries to cut carbon emissions. The unorthodox meeting of government officials, pictured in Figure 4.9, drew international attention to the Maldives.57

![Maldivian President Mohamed Nasheed signing a document during an underwater cabinet meeting. Photo by Mohammed Seeneen of AP, from NBC News site.](image)

To pursue energy sustainability and set an example for larger carbon-producing states, the Maldives has adopted an ambitious plan to convert its national energy production to renewable sources, with a goal of going carbon-neutral by 2020, which would make it the one of the first countries to achieve such a designation.58 For a developing state, this is a lofty goal:

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reaching 80% renewable energy production is likely, but closing the gap with the last 10-20% will be expensive and likely take longer than the five years incorporated into the plan. This is in part because Maldivian rely on boats for transportation, which mostly are diesel-powered and would need to be individually refitted to use alternate fuels.

Wind is not an effective source of power for the Maldives – islands can go months with relatively little wind. Instead, solar power is the alternative energy of choice. Solar photovoltaics will be used mostly to power small islands and resorts. Because the islands are hard to connect with power lines, local production is ideal. The Maldives lies at middle latitudes, so solar energy is abundant and can easily be gathered on-location across the atolls. Gasfinolhu Island led the tourism islands by becoming the world’s first 100% solar-powered resort in late 2014.

By creating a comprehensive plan to move toward carbon neutrality, the Maldives has issued a challenge to the rest of the world’s states. It is leading by example and arguing that the onus to address climate change lies with all states – large, small, developed, and developing. In the past, this demonstration has been met with disagreement from some developing states. India, for example, has expressed the belief that they have a right to the same high-carbon development the West took advantage of in the nineteenth and twentieth centuries. To those who agree, it is the responsibility of the developed world to move first toward carbon neutrality. With that

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59 Lean, “Clean power: Maldives leads the way with a carbon dream.”
mindset, Norway, Samoa, Costa Rica, and Ethiopia had joined the pledge by 2011; others have followed in recent years.\(^6\)

For small island states to survive, they must pursue cooperative international efforts to address climate change. The Maldives has taken initiative in this sphere. Likewise, the state is implementing many of the adaptation strategies available to vulnerable states. By looking to the wider world and acting decisively on its own, this long-isolated city state may be able to alter its geography in a way that ensures the survival of its sovereignty, populace, and culture.

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\(^6\) *The Island President* (2011).
Chapter 5

Abandoning Kiribati: The Climate Diaspora

It was one of those burning days of the doldrums, when the sea is glassy but not still. The solemn swells that came pulsing up out of the south were unruffled by any breath of wind, but the huge heave of them told of storms far away ... we heard the boom of the breakers from miles off shore as they crashed upon the reef ... It seemed unbelievable that the sweep of that thunderous attack could fail to engulf the tiny hump of land so forlornly crouched between the vastitudes of sky and sea.

- Sir Arthur Grimble, Resident Commissioner of the Gilbert & Ellis Islands
  Upon his arrival to the Gilbert Islands, 1914

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Kiribati: People and Place

Just after the clock struck twelve on January 1, 2000, Kiribati’s former president Teberuro Tito passed a torch from an elderly man to a young boy, metaphorically handing off time to the country’s younger generation. This celebration of the new year was held on Millennium Island, which until 1997 had been called Caroline Island. Caroline Island became the easternmost place that was still west of the International Date Line (IDL) in 1995 when Kiribati unilaterally moved the line. Until that point, the IDL had bisected the state of Kiribati, which made it one day in the west of the country but another in the east. Moving the line brought the whole state into one time zone and had the added benefit of making Kiribati the first state to ring in the new year, new century, and new millennium.²

An air of ominousness hung over these celebrations. The people of Kiribati knew that the time passed to the younger generation of I-Kiribati³ was more precious than ever before and with it came much responsibility. As the seas rise, Kiribati’s shores are among the most vulnerable to becoming submerged. When the time comes to welcome the next century, let alone a new millennium, there will be no Millennium Island, perhaps not even a Republic of Kiribati. The generation that took the torch in 2000 will pass it to their posterity in a different land, as the home of their ancestors slips beneath the seas.

The modern state of Kiribati consists of three island chains: the Gilbert Islands, the Phoenix Islands, and the Line Islands (Figure 5.1). More than 90% of the population resides in

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³ In this chapter, the term “I-Kiribati” will refer to the people of the modern state of Kiribati. The term “Gilbertese” will refer to the people of the Gilbert Islands during and before the British colonial era.
the Gilbert Islands. South Tarawa, the capital, houses about half of the republic’s population of 110,000. All three island chains contain a mixture of coral atolls and low-lying coral islands, which are at most a few meters above sea level. The geological outlier of Kiribati’s islands is Banaba, which is culturally but not physically a part of the Gilberts. Banaba lies about 400 kilometers west of the rest of the Gilberts and reaches an elevation of 81 meters. The height of this island, however, will not be the Kiribati’s saving grace when sea levels rise: the plateau was converted to barren wasteland in the twentieth century by British phosphate mining operations.

The Gilbert Islands (named for Thomas Gilbert, the first Briton to map the region in 1788) are part of the Pacific region of Micronesia, whereas the Phoenix and Line Islands are part of Polynesia. Archaeological evidence places the first settlement of the Gilbert Islands by the Micronesian people around 2000 years ago. Evidence suggests that both the Phoenix and Line Islands had Polynesian settlement in the distant past, but these chains were uninhabited at the time of European arrival in the eighteenth and nineteenth centuries. According to the oral histories of the Gilbertese and archaeological evidence, the Micronesians on the islands were invaded by groups from Melanesia and Polynesia. The Gilbertese generally accept that the present populace of the Gilbert Islands is originally from Polynesian Samoa, having displaced or integrated with the Micronesians who resided there.

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9 Ibid., 232-235.
Until European transcription using the Latin alphabet, the Gilbertese language was not written and the people’s histories were maintained only orally. Their stories morphed into myths and legends, so not much is known about the pre-colonial events of the Gilberts.

When Europeans arrived in what was then called Tungaru (Kiribati is a Gilbertese corruption of the word “Gilberts”), the Gilbertese welcomed them. Their legends told of a faraway land called Matang, where their fair-skinned ancestral heroes lived (probably a reference to invasion by a Melanesian or Polynesian people). They called the British, who took control of the islands in 1892, I-Matang – “Inhabitants of Matang” – and were deferential to them. When they began administering the islands as part of the Western Pacific High Commission, the British interrupted the islands’ common and bloody land and factional feuds.12

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10 Grimble, A Pattern of Islands, 40.
11 Ibid., 58.
12 Feuds could be sparked by perceived insults, as well as competition between clans for land. These feuds could perpetuate between clans for generations. Gerd Koch, The Material Culture of Kiribati, English trans. Guy Slatter (Institute of Pacific Studies of the University of the Pacific, Suva: 1986), 245.
Initially, the Gilbert Islands offered little economically. By the late 1890s, however, the British discovered that the plateau of Banaba (which they called Ocean Island) was home to the purest phosphate deposits yet discovered. By 1921, the British Phosphate Commission was exporting 300,000 tons of phosphate to New Zealand and Australia annually. The phosphate was used to fertilize the pastures of those two larger dominions.

The British administered the island chain from Banaba and their presence on the other islands was minimal. Traditional Gilbertese society was not drastically altered at first, though British laws, customs, and the Christian religion changed the islands over time. Initially, the southern Gilberts were politically democratic and chiefs were elected for wartime. The north’s political structures were aristocratic, some democratic and others feudal. Chiefs and clans often fought wars, after which the winner would gain more land and force the loser into servitude.

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The community came together for government, dance, or other social interactions in the *maneaba*, huge thatched assembly halls, an example of which is shown in Figure 5.2. Society was clan-based and revolved around large families. Men often took more than one wife, the first usually when she was around fifteen years old and he was twenty.

When the British took control, they forced monogamy into law, though not in practice. Hundreds of women thus saw their legal status change from wife to adulteress and their children become bastards, which led to a rash of suicides. Missionaries converted the islands from their pagan traditions to Christianity. Protestantism quickly became popular in the southern Gilberts, but it disrupted the traditional way of life. Women were forced to cover themselves, traditional dance ceased, pagan shrines were destroyed, government officials had to be deacons of the church, and the courts were controlled by the church. Ironically, it was in the north, where many women still went topless like the men, that the “un-Christian” behaviors that so disturbed the conservative British officials and missionaries were less prevalent.

The Gilbertese relied on native plants like breadfruit, pandanus, and coconut for food. They completed their diet with seafood, including fish, shark, and octopus. The sea was a source of life for the Gilbertese and they were accomplished sailors, swimmers, and fishermen. Sir Arthur Grimble, a British colonial officer and later Resident Commissioner for the Gilbert and Ellice Islands Colony, recounted a time when a Tarawese man, upon sighting a lone tiger shark, slipped off their boat with just a knife, using himself as bait. As it charged, he dodged to the side.

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18 Grimble, *Return to the Islands*, 87.
19 Ibid., 97.
at the last moment and stabbed the shark’s belly, gutting it with its own momentum.\textsuperscript{23} On another occasion, Grimble was induced to serve as the bait for an octopus hunt, an island pastime.\textsuperscript{24}

The Gilbert Islands are prone to drought. Banaba, for example, has no freshwater lens – for the islands that do, the water is extremely brackish. The residents of the islands collect rainwater, but the supply is unreliable during the dry season.\textsuperscript{25} To this day, water scarcity plagues Kiribati and its citizens. Rising seas are expected to exacerbate the problem by salinizing the freshwater lenses of islands. To make the matter worse, overcrowding on Tarawa has led to sewage contamination in the groundwater supply.\textsuperscript{26}

During World War II, much of what is now Kiribati was occupied by the Japanese Empire. Tarawa Atoll was captured by American forces after a bloody battle, but Japanese forces held Banaba until the end of the war, when it and the rest of the Gilberts were returned to British control. Most of the population of Banaba had been evacuated, but the British did not allow their return, instead resettling them in Fiji. This allowed phosphate mining to completely overtake the island through 1979, when the phosphate was nearly exhausted and the island converted to wasteland. Thus, Banaba went from being the most populated Gilbertese Island before World War II to only having a population of about 300 today, not enough to even warrant regular boat service, an airstrip, or internet.\textsuperscript{27}

The Gilbert Islands gained their independence in 1979, after the British stopped mining Banaba. The Phoenix Islands and Line Islands were included in the new Republic of Kiribati. Without the phosphate industry, Kiribati’s economy has not seen very high growth rates. It relies

\textsuperscript{23} Grimble, \textit{A Pattern of Islands}, 109-111.
\textsuperscript{24} Ibid., 120.
\textsuperscript{25} Rainbird, \textit{The Archaeology of Micronesia}, 233.
\textsuperscript{26} Thomas, “Kiribati: ‘Some Aspects of Human Ecology,’ Forty Years Later,” 3.
on foreign aid and remittances from I-Kiribati seafarers for much of its gross domestic product, but remains one of the world’s poorest states.\textsuperscript{28}

Perhaps because of the country’s isolation, the I-Kiribati have been able to maintain much of their traditional culture. The maneaba is still the focus of village social life. Traditional skills, practices, and values have been passed down through generations. As Whincup noted in 2005, “there are no dramatic changes in buildings, dress or forms of social behavior…and there has been limited integration with those of other nationalities.”\textsuperscript{29} Traditional dances (like that shown in Figure 5.3) are now accepted by the Catholic Church (the largest sect in Kiribati) and even integrated into Sunday mass. Dance is a pillar of I-Kiribati culture. Whincup interviewed one islander who summed up its importance: “this is our culture and identity, we are known as I-Kiribati from the way we dance… That is why I love my traditional dance very very much. I love it because it is my identity.”\textsuperscript{30}

![Figure 5.3 - Te bino, a traditional I-Kiribati seated dance. Photo by Tony Whincup (1999).](http://blog.tepapa.govt.nz/2015/05/02/tony-whincup-photographer-1944-2015/)

**Climate Change in Kiribati**

\textsuperscript{30} Ibid.
The I-Kiribati have largely been able to preserve their culture and way of life into the modern era. Now, however, the islands face a challenge that threatens to end both: climate change and rising sea levels. The coral islands and atolls which have been home for the I-Kiribati for millennia will be rendered uninhabitable by the end of the twenty-first century.

Most I-Kiribati live subsistence lifestyles, growing, harvesting, and fishing for the food and resources they need. Strong family networks dominate I-Kiribati culture; much of the economy relies on remittances from family abroad and extended families often live together in the same household. The standard of living is still extremely low, even compared to other developing countries.32 Because they live subsistence lifestyles, the I-Kiribati are heavily reliant on their islands for short and long-term survival. Climate change, especially rising seas, will make these places less dependable.

The islands of Kiribati have long been drought-prone. In times without rain, islanders would turn to brackish well water pulled from the thin aquifer below them. They would also drink from coconuts and keep reserves of water in cisterns. Today, most of the wells in South Tarawa are contaminated with bacteria like E. Coli, so water must be boiled before it can be consumed or used to cook. The towns of South Tarawa pump in water from other parts of the atoll, but only about 56% of the water pumped makes it past leaks and illegal pipes to customers and these sources are also at high risk of salinization and pollution.33 Without the ability to diversify water sources, I-Kiribati will be less resilient to circumstances that significantly

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damage the water supply, like extended dry seasons, king tides and tsunamis, and higher sea levels, all of which are predicted for the region.\(^{34}\)

In 2015, an El Niño event exacerbated the bleaching of Kiribati’s coral reefs. Only about 1-5% of the reefs are expected to recover from this event. The reefs are the root of life in Kiribati. They are the foundations of the islands, breakers of the waves, and the home of the sea life which the people have relied on for thousands of years for sustenance. If the reefs die, so too will all of these things. The Phoenix Islands have seen relatively cooler sea temperatures than the rest of Kiribati’s island chains, which suggests that damage to reef systems there could be less severe or delayed, though damage is still expected.\(^{35}\)

Already, the coast is increasingly inundated by higher waves and a higher sustained sea level. South Tarawa could experience 25-54% inundation by 2050 without significant implementation of adaptation scenarios. Other parts of Kiribati could fare even worse.\(^{36}\) La Niña events have caused more frequent king tides, which wash away the infrastructure and land of the atolls. In 2015, a king tide swept over South Tarawa, flooding the hospital and destroying local crops.\(^{37}\) Predictions for when, if ever, complete submergence may occur in Kiribati vary, but rising seas will likely render atolls uninhabitable long beforehand by salinizing the soil and water sources.\(^{38}\)

\(^{34}\) Kuruppu, “Adapting water resources to climate change in Kiribati,” 802.


Abandoning the Islands

To build resilience to the effects of climate change and prolong its effects, Kiribati is employing some adaptation measures. Sea walls, wave breaks, causeways, and dredging have been employed to mitigate erosion and inundation. These efforts, many of which are local and poorly planned, have likely accelerated coastal erosion, especially in South Tarawa.39 “Softer” methods like planting mangrove forests on the coastline have been more effective.40

To increase the effectiveness and deliberateness of these efforts, Kiribati has developed and followed the Kiribati Adaptation Program in partnership with the World Bank and other groups. This is a comprehensive plan to mitigate erosion and inundation, improve water management, integrate climate resilience into development, and improve awareness and governance practices. It is currently in its third state, “expansion,” which is expected to end in 2018. The total cost of this program will be over $21 million.41 This is a high price tag for a state with a gross domestic product of $160 million,42 but the costs of climate change impacts on Kiribati without any adaptation efforts are estimated at as much as one-third of GDP.43

Adaptation scenarios are extremely expensive. One proposed floating islands project for Kiribati, Green Float (shown in Figure 5.4), would move the entire state to massive “lilypad” structures. Each lilypad consists of a residential city-tower in the center, surrounded by a wide

circle of agricultural space. Green Float is one of several fantastical futuristic civilization proposals from bold engineering firms and has been considered by the former president of Kiribati Anote Tong. However, the cost of such a structure could be as much as 3,000 times the GDP of Kiribati. Without significant outside financing, Kiribati is unable to afford Green Float or any similar adaptation projects. Even if this project was realized, the I-Kiribati people would find themselves in a landscape very different from the one they have known for thousands of years. Whether “Kiribati” as a place is really being preserved is called into question.

![Figure 5.4 - A concept drawing of the Green Float floating islands project considered for Kiribati's future. Image from Shimizu Corporation Green Float site.](image)

Adaptation strategies like sea walls and wave breaks may delay the effects of rising sea levels in Kiribati, but when mismanaged they have been found to worsen erosion. Even with such barriers, Kiribati’s shallow islands and atolls are not resilient enough to withstand the inevitably rising seas. More long-term solutions like floating islands or fill islands are prohibitively expensive for the poor island state. Without plausible long-term adaptation

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strategies, Kiribati must turn to abandonment strategies. As Tong put it, “If we build up these lands, it’s going to cost billions of dollars...We might as well be buying land for millions of dollars elsewhere.” The reality of Kiribati’s future is that it will take place in different lands than the Gilbert, Phoenix, and Line Islands.

Recognizing this, the Kiribati government has purchased 6,000 acres of land on Vanua Levu, Fiji’s second-largest island, for a price of $8 million. This land is designated for agriculture and as a potential future home for I-Kiribati who leave the Kiribati. However, this territory cannot hold the entire state’s population, so the government has expressed interest in making similar purchases in other states, like Australia and New Zealand.

There is precedent for I-Kiribati taking refuge from environmental hazards in Fiji. Fiji’s Rabi Island is where the Banabans were resettled in order to clear Banaba for expanded phosphate mining. Even though they live abroad, the Banaban I-Kiribati living on Rabi Island are represented with a seat in Kiribati’s parliament. Many of the Rabi Banabans are also citizens of Fiji. Memories of injustice and an inability to reconcile place with identity define the Banaban community on Rabi Island.

The story of the Banabans could become the stories of many more I-Kiribati. The government accepts that relocation will be necessary in the coming decades, but the negative

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46 Weiss, “Kiribati's Dilemma: Before We Drown We May Die of Thirst.”
48 Weiss, “Kiribati’s Dilemma: Before We Drown We May Die of Thirst.”
sociological and strange political ramifications of forced resettlement of the Banabans are as present as ever. With this in mind, Kiribati has developed a “last resort” – though probably inevitable – resettlement strategy, with two main components: preparing the I-Kiribati to leave and preparing places for them to go.  

Kiribati is preparing its populace to leave the islands by giving them training they need to find employment after emigrating. The Kiribati-Australia Technical and Vocational Education and Training Sector Strengthening Program (TVET) epitomizes this. The goals of the program are threefold: 1) increase the employability of I-Kiribati domestically, 2) increase the productivity and effectiveness of workers in Kiribati’s economy, and 3) increase the employability of I-Kiribati in the states to which they emigrate. Among the key job sectors identified for training were caregivers for children and the elderly, construction workers, and tradesmen of various types. The Kiribati Technical Institute graduates about 150 people per year trained in these and other vocations. The institute teaches to internationally-recognized standards qualifying its graduates to meet the demand for jobs at home and abroad.

Similar programs exist outside of Kiribati, like the Kiribati Australia Nursing Initiative, located at Griffith University in Brisbane, Australia, which is training I-Kiribati to be nurses either in Australia or Kiribati, if they choose to return. I-Kiribati participating in this program, especially those that choose to remain in Australia, are the vanguard of I-Kiribati relocation. They will form, much as the Banabans have in Fiji, communities for I-Kiribati people to settle in the future, where they will be more easily welcomed economically and culturally.

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Together, these pillars of Kiribati’s resettlement strategy combine to create “migration with dignity.” Most I-Kiribati do not want to leave their ancestral island home, but climate change may leave them no choice. Because of the “migration with dignity” principle, Kiribati’s relocation efforts are designed to make its citizens mutually valuable to Kiribati and their future host state. Kiribati hopes to prevent its citizens from eventually becoming refugees who are fleeing the islands in a state of poverty and emergency.\textsuperscript{55} Instead, the goal is to make I-Kiribati an asset to their future communities, desired and accepted by their new homes.

As I-Kiribati leave their islands, the government of Kiribati must consider the needs of its diaspora. If the islands of Kiribati become submerged, the Kiribati state will need to transform itself accordingly. The question must be posed as sea level rise and displacement accelerate: what form will the future state of Kiribati take?

The situation of the Banabans in Fiji offers some insight. They maintain three key institutions of autonomy which tie them to the state of Kiribati: 1) rights to the land of Banaba, 2) a council of Banabans on Rabi Island to govern these rights, and 3) a voting representative in the parliament of Kiribati. If this becomes the standard for the governance of other I-Kiribati diasporas, it could be a precursor to a merger or federation with another state or the form of a state \textit{ex situ}.

Similar to the Banaban arrangement, Burkett proposes that threatened states could begin by establishing an interim authority to focus specifically on the transition to an \textit{ex situ} state and exercise the following functions: 1) determining how to modify political and economic institutions to fit an \textit{ex situ} state, 2) legislate or recommend legislation regarding continued citizenship and management of resources, 3) resolving property disputes, and 4) determining and

\textsuperscript{55} “Relocation,” \textit{Office of Te Beretitenti | Climate Change}. 
representing the best interests of the diaspora. It is possible that the existing government may assume these responsibilities during the transition, but the government of Kiribati (as with all state governments) was not designed to administer a rapidly dispersing population or shrinking territory. The government, perhaps redesigned by the interim authority, would absorb the interim authority after the state had made a final transition to being *ex situ*.

Many Banabans are citizens of Fiji, though they maintain the right to representation in Kiribati. There is little precedent for this situation, where citizens of one country have legal rights and representation in the government of another country. Nonetheless, this could become a tenet of *ex situ* states. An *ex situ* state could have a population of dual citizens, who were subject to both its laws *and* the laws of the host state, much in the same way that today’s travelers are subject to the laws of states they visit.

For a state to exist *ex situ*, both host states and the diaspora will need to live with mutual respect, coordination, and agreement. The experience of the Banabans in Fiji has given Kiribati a trial run for such an experience. Fiji seems a good candidate for a future host state, if Kiribati and Fiji do not opt for a merger or federation. In 2014, the former Fijian president Ratu Epeli Nailatikau spoke to the future relationship between the two states:

> These people now live in Fiji but have their own seat in the parliament of Kiribati and if necessary, we will do it again…Fiji will not turn its back on our neighbors in their hour of need…and if all else fails, you will not be refugees…The spirit of the people of Kiribati will not be extinguished. It will live on somewhere else because a nation isn’t only a physical place. A nation – and the sense of belonging that comes with it – exists in the hearts and the minds of its citizens wherever they may be.

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57 Ibid., 112.
Climate Refugees

Through agreements with other states, international recognition, and careful, proactive planning, mergers, federations, or *ex situ* states exist as options for submerged states. Even the outright cession of land by another state is possible, though significantly less likely. While Kiribati has taken proactive steps toward one of these abandonment scenarios and states like Fiji have pledged their support, Kiribati will likely be unable to prevent some of the worst ramifications of rising seas and climate change. One of the most prominent and foreboding of these is the creation of climate refugees. The prospect of a diaspora fleeing their home against their will – a failure of Kiribati’s “migration with dignity” principle – looms over threatened small island states, as well as any states where populations will be dislocated due to changing environments.

According to the United Nations, a refugee is a person “unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion.” This definition was established by the 1951 United Nations Convention Relating to the Status of Refugees (Refugee Convention). Notably absent is any consideration of people forced to leave their homes because environmental change has made them uninhabitable. One of the preeminent challenges of twenty-first century international law will be establishing a legal framework which recognizes people displaced by environmental change as refugees.60

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Refugees are distinct from migrants, people who have left their home for a variety of reasons but face no impediment to returning. The distinction is important, because what a displaced person is considered – migrant or refugee – alters how they must be received by a host state, according to international law.

Refugees, unlike migrants, are entitled to certain rights. Refugees must be allowed the same rights to practice their religion as citizens, be allowed to transfer their property out of the state if they find asylum, have free access to the courts, pursue employment including liberal professions, and be afforded the same welfare conditions as either citizens or other legal aliens.

Refugees must be allowed free movement within the territory of a host state. They cannot be punished for illegal entry into the state if they are fleeing a place where their lives were at risk. Additionally, states cannot expel refugees except in instances of a national security or public order threat; they must at least be allowed to seek refuge in another place. Refoulement, returning refugees to a country where they will be at risk of persecution, is likewise illegal.

To qualify as a refugee – and for the rights guaranteed to refugees – a person must meet the requirements outlined by the 1951 U.N. Refugee Convention. These include crossing international boundaries, being “persecuted” or expecting persecution, and that the motive for persecution is listed in the Convention. The emigrants of atoll island states will cross international borders, but classifying climate change as a “persecutor” is difficult, because it is

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62 Ibid.

63 Ibid.

64 There are three types of displacement: local, internal, and international. Local displacement is on a very small scale, where residents are able to move to nearby habitable land. In the case of atoll states, there is no higher ground upon which to relocate (or in the case of Banaba and Nauru, this land is uninhabitable). Internal displacement is slightly larger scale, but the movement is still domestic. For small island states, this would be relocating to a slightly higher-elevation or otherwise more resilient island (like Malé or Hulhumalé in the Maldives). This is only temporary form of dislocation for the people of states whose entire land area will ultimately be submerged or otherwise rendered uninhabitable. Thus, atoll island states can expect to be internationally dislocated, leaving their state for another. Yamamoto and Esteban, Atoll Island States and International Law, 227.
not one of the listed methods of persecution from which refugees are protected and because it is an abstract subject.\textsuperscript{65}

For a person fleeing their home state because of climate change, overcoming these obstacles and being recognized as a refugee under the U.N. Refugee Convention is impossible at present. For now, these people are likely to be legally “environmentally-displaced persons.” Unlike refugees, environmentally-displaced persons are not guaranteed asylum or non-refoulement, and the United Nations High Commission for Refugees has no responsibility to protect them. For now, that status is acceptable to the inhabitants of some threatened states, who consider designation as refugees undignified or even shameful.\textsuperscript{66} In the future, however, those forced from their homes by climate change-induced environmental change will need protections, so some have advocated for expanding the 1951 Refugee Convention’s scope to include “climate refugees.”

The Refugee Convention was developed with two international political eras in mind: the World Wars, which had caused many to seek asylum outside their home state, and the Cold War, where autocratic states like the Soviet Union were persecuting their own citizens and residents. The world is in a new era, one where climate change is as impactful as any political hegemon. However, expanding the Refugee Convention to include environmentally-displaced persons may prove to be politically unfeasible, as many states will not want to expand the number of people they are required to grant asylum. Instead, it may be expedient for states to establish bilateral agreements that can address international refugee movement with geographic and situational specificity.\textsuperscript{67}

\textsuperscript{65} Yamamoto and Esteban, \textit{Atoll Island States and International Law}, 231.
\textsuperscript{66} Ibid., 224-226.
\textsuperscript{67} Ibid., 239.
Whatever the solution, states need to take action now, because displacement has begun and is only expected to grow worse. Worldwide, the number of people expected to be displaced by climate change ranges from 150 million to 1 billion. In the Asia-Pacific region, the expectation is for 75 million displaced persons by 2050 and 150 million by 2100.\textsuperscript{68} If the total populations of Nauru, Tuvalu, Kiribati, the Maldives, and the Marshall Islands became climate refugees, this would be over 533,000 refugees (a number which does not include non-sovereign atoll and coral island polities). While these places represent a fraction of the total estimated population of future climate change-displaced persons, they will be some of the first and most desperate cases.

Already, some residents of small island states are feeling the effects of climate change and the stresses it places on their home countries. Sigeo Alesana, left Tuvalu with his family in 2007, moving to New Zealand. They cited coastal erosion and inundation-induced difficulty to grow crops as reasons for the abandonment of their island home. When Sigeo failed to qualify for a work visa in New Zealand, the Alesana family applied first for refugee status, then protected persons status, and then finally for residency on “exceptional humanitarian grounds”, winning their appeal only on the last classification.\textsuperscript{69}

Climate change was not the singular reason for which the New Zealand Immigration and Protection Tribunal finally granted residency, but it was mentioned as contributing to the “exceptional humanitarian grounds.” The court even referred to Alesana children as “vulnerable to natural disasters and the adverse impact of climate change.”\textsuperscript{70}

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\textsuperscript{68} Yamamoto and Esteban, \textit{Atoll Island States and International Law}, 229.
\textsuperscript{70} Ibid.
\end{flushright}
In 2007, the family of Ioane Teitiota, came to New Zealand from Kiribati. Teitiota was from the increasingly-crowded Tarawa, where he more than once had to rebuild his home after it was destroyed by the tides. Teitiota said that he was discouraged from returning to his home country when he realized that the erosion and flood damage Kiribati was suffering was related to the broader climate change phenomenon. When his visa expired in 2010, Teitiota found a lawyer who argued that Teitiota faced persecution by human-induced climate change and that persecution qualifies the family as refugees.71

In this case, the Immigration and Protection Tribunal ruled that the 1951 Convention did not apply to those fleeing climate change. The court recognized that climate change can cause one to become a refugee, if its effects lead to conflict or political persecution, but that in this case where the overall phenomena of climate change was the topic of discussion, Teitiota did not face personal and specific persecution substantial to meeting the definition of a refugee.72 The family was subsequently deported back to Tarawa, Kiribati.73

One of the more prevalent difficulties of granting refugee status is determining motive for relocation.74 Though emigrants like Alesana and Teitiota may attribute it to climate change, this is difficult to prove, especially if refugee considerations must be made not on an individual basis, but for towns, cities, even entire states.75 The point at which voluntary migration become forced displacement is hard to determine. For places like Kiribati and Tuvalu, the effects of rising seas are felt by the residents of the islands, but the islands are not technically completely


74 Yamamoto and Esteban, *Atoll Island States and International Law*, 222.

75 Ibid., 240.
uninhabitable yet. However, the people of these places cannot wait for the moment of uninhabitability to arrive before they leave. If that moment comes rapidly – in the form of a tsunami or typhoon – it will be too late. Even if it comes slowly, leaving at the last possible moment is impractical and unnecessarily reactionary.

In both the Alesana and Teitiota cases, the court determined that the law did not extend the right of refugee status to persons who are displaced by the physical effects of climate change. These rulings are usually met more with frustration than disagreement. Antonio Guterres, former United Nations High Commission for Refugees, lamented about the failure of existing legal frameworks to include environmentally-displaced persons, saying: “these persons are not truly migrants, in the sense that they did not move voluntarily…as forcibly displaced [and] not covered by any regime – by the refugee protection regime in particular – they find themselves in a legal void.”

The people of small island states will be forced to leave their homes in the near future; indeed, some are already doing so. Governments like Kiribati are managing this as best as possible, but the inevitability of forced and unplanned displacement bears down on these societies. Members of the diaspora will need the rights of refugees, so the international community will need to surmount the barriers to granting those rights. The 1951 U.N. Refugee Convention may be too limited in its goals and scope to be an effective tool to achieve this, so alternative methods such as bilateral treaties should be considered.

If states do not act quickly to determine the future of citizenship for climate diasporas, the risk of huge populations becoming stateless persons will grow. While the populations of small island states are indeed small, they are a window to what will become a larger and global

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76 Guterres became the Secretary General of the United Nations in 2017, succeeding Ban Ki-moon.
77 Weiss, “The Making of a Climate Refugee.”
problem. The climate diasporas of atoll and coral island states like Kiribati are the predecessors of many more peoples who will be forced to leave their homes because of storms, floods, drought, changes in agricultural suitability, and other effects of climate change. Solving their legal status, filling the “legal void,” is an opportunity to solve the problems of millions more in the future.
Chapter 6

Conclusion

*The climate is a common good, belonging to all and meant for all. At the global level, it is a complex system linked to many of the essential conditions for human life...Humanity is called to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at least the human causes which produce or aggravate it.*

- Pope Francis I, sovereign of Vatican City
  In his encyclical, *Laudato si’*\(^{1}\)

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Preserving Place

Rising sea levels and other effects of climate change constitute an existential threat to a number of small island states in the world – namely Tuvalu, Kiribati, the Maldives, Nauru, and the Marshall Islands. For these and many other places, there is a very real prospect of their entire society being submerged, perhaps even by the end of the century.

If a state loses its land territory, its sovereignty is called into question. There are a number of possible strategies for these places to transform or preserve their states and societies, which fall into two courses of action: adaptation and abandonment. These strategies require complex decision-making processes regarding the future of whole nations and cultures. They reveal opportunities for collective international climate action, as well as a looming human rights crisis for displaced persons.

The Maldives, at great expense, has engaged adaption strategies like artificial barriers, fill islands, and floating islands. Kiribati, much poorer by comparison and without a vibrant tourist economy to protect, has been forced to prepare for the eventual abandonment of its land; the structure of the state post-abandonment has yet to be developed. Both of these places – and the many more at risk of feeling climate change’s adverse effects – are home to communities, vibrant nations, with long histories and cultures. The preservation of these cultures and communities is challenging, regardless of whether the strategies undertaken are in the vein of adaptation or that of abandonment.

The Maldivian 5 Lagoons project, for example, literally builds a space where its tourist economy can be perpetuated. However, this is a strikingly artificial space, a construction of what companies believe the ideal tourist landscape is in the Maldives. These are not spaces for the preservation of Maldivian culture or the spaces in which the Maldivian people live. Even the fill
island project of Hulhumalé, which is largely designed to be inhabited by a concentrated and relocated Maldivian population, bears little resemblance to the organically-developed city of Malé or the small towns scattered across the rest of the archipelago.

When the people of Kiribati leave the islands which have been home to their nation for hundreds of years, the diaspora could be scattered across several, even dozens of other states. One of the chief roles of an *ex situ* state would be to preserve the culture and sense of nation for an increasingly disconnected and displaced people. This task, however, is formidable; emigrants will certainly integrate with the cultural and societal fabrics of their new homes, especially as generations are born who never set foot in Kiribati. Of course, as the Jews have proved through history, nations need not inhabit a place to be attached to it. Unlike the Jews, the posterity of a submerged state will never be able to return or make pilgrimages to their homeland.

It will be possible for states to preserve national identity and culture. For populations forced to abandon their home states, concentration is key. Living together in communities can preserve cultures amongst a diaspora. If the landscape of the host state is similar to that of the home state, way of life is more easily preserved. For example, I-Kiribati will find it easier to preserve their historically maritime culture if they relocate in Fiji than if they relocate in Kansas.

For adapting states, there should be a concerted effort to create a space that is reminiscent or reflective of the state’s current landscape. Mayank Thamalla designed an artificial structure with cultural preservation in mind. The structures are converted oil rigs, but Thamalla has designed them to reflect the city of Malé. His design (Figure 6.1) seeks to preserve the Maldivian sense of place even as the Maldives itself is submerged.²

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http://www.archdaily.com/634314/a-country-of-converted-oil-rigs-is-this-how-to-save-the-maldives/.
Efforts to preserve a state will be difficult; efforts to preserve a nation even more so. In a place like the Maldives, for example, cultural considerations may be sacrificed for the sake of investing in a preserved tourist landscape. While that may seem unfortunate or even unfair, it is the tourist industry that allows the Maldives to afford its adaptation strategies in the first place. States will need to balance economic, cultural, and societal factors as they react to climate change. The decision-making processes of threatened small island states should be considerate, democratic, and transparent – but the reality of climate change is that these places are undergoing an unavoidably painful and rapid transformation.
States should consider the merit of preserving the state. The I-Kiribati, for example, may find themselves scattered across the globe. Since many states in the modern world are at least ostensibly constructed to be home a specific nation – i.e. as a nation-state\(^3\) – it begs the question: if the nation is separated from the state, does the state still have purpose and value? In other words: what is the purpose of preserving the Republic of Kiribati if the I-Kiribati live in distant lands, unable to maintain a unified nation. Perhaps people do not need a state; even the Olympics, a notoriously nationalistic and simultaneously globalist festival, had a team composed entirely of refugees in Rio de Janeiro. Submerged states will be forced to answer these questions.

It is possible that the people of a submerged state could see their needs met by a non-state entity. Microstates like the S.M.O.M. and the Vatican, massive international corporations like Walmart and Apple, and international organizations like the United Nations and the African Union exemplify how non-state actors are increasingly important and powerful in the twenty-first century. Even the prospect of online, internet-based states has been raised;\(^4\) attempts have had limited success.

Submerged states will be forced to consider new forms of both polities and landscapes as they make decisions about their post-sea level rise futures. At the end of these difficult decision-making processes, the places they inhabit may be very different – whole nations may be dramatically altered as a result. The actions of small island states will impact the people and politics of many other parts of the world.

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\(^3\) A nation-state is a state that is comprised of and for a specific nation. Sometimes nations are created to coincide with states (e.g. Italy). Other times, states are created for nations (e.g. Germany). Very few states are homogenous enough to truly be called nation-states, but many have a significant majority nation from which the state attempts to derive its legitimacy and identity.

Our Common Home

While it is small island states who are first faced with uninhabitability by way of sea level rise and inundation, they are not the last. Other non-sovereign low-lying islands, as well as low-lying areas like the Netherlands, Louisiana, and Bangladesh will be similarly endangered by climate change. In turn, changes in one environment will cause changes in another. Earth is composed of a complicated and intertwined series of environments and climates.

It is that interconnected nature which has created the problem of rising seas in the first place. The problem exists primarily for poor small island states, but it did not originate with them. Wealthy industrialized states are the source of anthropogenic climate change – the Maldives, Kiribati, and the like are just the unfortunate victims. This reality raises complex ethical questions. What responsibilities do carbon emitters and developed states have to assist small island states? Should they pay for adaptation measures or cede land for abandonment scenarios? Should they offer residency or even citizenship to the diasporas of submerged states? As Yamamoto and Esteban put it, small island states have “a moral claim for assistance against industrialized countries which are the major emitters of greenhouse gas.”

To their credit, many industrialized states are recognizing their culpability to some degree. Through the 2015 Paris Agreement, states have offered to assist vulnerable places with significant funding to improve the resilience of inhabited places and pledges to reduce carbon emissions. Making good on these promises, as well as reacting responsibly to the approaching

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climate refugee crisis and other consequences of rising sea levels is seen by many as a moral imperative of the industrialized world.

The efforts of industrialized states and developing states to create global agreements to reduce climate change are tactics of a third strategy to respond to climate change: in addition to adaptation and abandonment, there is amelioration. Amelioration is the mitigation and ultimate reversal of climate change. Unlike adaptation and abandonment, this is a global strategy that requires cooperative international action. Just as small island states did not create the problem of anthropogenic climate change, they cannot alone solve it.

Unfortunately, efforts to reduce carbon emissions have met with opposition from various industries, climate deniers, and policymakers. At the same time, there are millions of businesses, governments, and international institutions that support immediate action. A debate about the best way to proceed in protecting the world from humanity itself is underway. Even fantastical ideas about terraforming Earth (intentionally, as opposed to the unintentional human-induced warming of the past century) have been proposed. Unfortunately, it seems unlikely that the solutions that emerge from this debate will be able to save small island states. Reversing climate change will be a long and difficult task.

Rising seas pose an existential threat to the states, nations, and people of Kiribati, the Maldives, Nauru, Tuvalu, and the Marshall Islands. These are the canaries in the coal mine – they warn of a problem which will appear then in Florida, the Netherlands, Bangladesh, and other places around the world. There is much to be gleaned from the scientific studies already conducted by the IPCC and other groups, as well as much to learn about the practical responses of states through the actions of the Maldives, Kiribati, and others. There may be answers to

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questions of what the other international actors should do in works like Pope Francis’s second encyclical, *Laudato si’,* or enshrined in international laws.

Still, there are areas of further research which would benefit those seeking to understand and ameliorate the plight of small island states, as well as combat climate change. Scientists and policy makers need an even better understanding of the physical geography: the impacts of warming and acidic seas upon coral reefs, the impacts of bleaching on the structure of coral islands and atolls, and the potential for ice caps and glaciers to melt and contribute to sea level rise. The international political system will need to debate the role of the state as the primary actor in world politics, determine the viability of *ex situ* states and states without physical land, and clarify international laws ranging from refugee protections to maritime jurisdictions. The viability and sustainability of different response strategies – adaptation versus abandonment and their specific strategies – will need to be evaluated. Solutions will require states, nations, policymakers, and people to answer difficult ethical questions, which are too numerous and complicated to be answered by one person or within the scope of a single thesis.

Indeed, these tasks are endeavors for the entire world. It is the whole of Earth which is feeling the effects of anthropogenic climate change. It will take the world to solve a global problem – that starts in the remote, isolated paradises of the Maldives, Kiribati, and other small island states. As one Tuvalu diplomat said, “calling on the world collectively is the only way to save us.”8 Former Maldivian president Mohamed Nasheed echoed the sentiment saying: “if the Maldives cannot be saved today, I don't think there is much chance for the rest of the world.”9

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Reader: Dr. Deryck Holdsworth

Grants & Scholarships
Paterno Fellows Scholarship  Fall 2013-Spring 2017
Matthew J. Wilson Honors Scholarship  Fall 2016
Thomas R. & Joan G. Dye Scholarship  Fall 2016
College of the Liberal Arts Supplementary Funding  Summer 2016
Kim Anderson Memorial Scholarship  Spring 2016
G. D. Richardson & Kathy LaSauce Scholarship  Spring 2016

Awards
Geography Department Marshal  Spring 2017
Magna Cum Laude  Spring 2017
President’s Freshman Award  Spring 2014
Dean’s List  Fall 2013-Spring 2017

WORK EXPERIENCE

- Evaluated and restructured global philanthropy program’s web presence
- Compiled a report on how global grantmaking can be done through donor advised funds
- Prepared materials, staffed events for global philanthropy program, edited a CEO speech
- Prepared social media, debriefed executive team on SDGs and philanthropy report launch
- Wrote blog posts, “17 Days, 17 Goals” blog series for the COF website
- Created plan to move web resources behind member paywall, wrote developer RFP and transition materials

Centre PACT Advisor, Centre Foundation, State College PA  (2015-2017)
- Approached Centre Foundation to create a grantmaking youth advisory committee
- Advised on structure, curriculum, and process
- Guided students through grantmaking and fundraising process
Lion Ambassador, Penn State Alumni Association (2015-2017)
- Alumni association ambassador to students, community, and alumni
- Give tours of Penn State to alumni, guests of the University, and prospective students
- Learned communication skills marketing Penn State to students, community, and alumni

President, Penn State University Choir (2015-2017)
- Secretary (2014-2015)
  - Elected by peers and worked with faculty director to lead choir of 50+ people
  - Managed an executive board to organize choir events and promote choir success

YouthGiving.org Advisory Committee Member, Foundation Center (2015-2016)
- Advised the Foundation Center during development of new site through monthly calls
- Alpha and beta tested YouthGiving.org to provide feedback
- Communicated launch through social media and blog post

Vice President for Communications, Penn State Intl. Affairs & Debate Association (2016)
- Elected to executive board, planned semiannual model United Nations conferences
- Implemented new logo branding strategy, organized club communications

- Committee Staffer (2014-2017)
  - Selected to serve on the planning committee for PUNC, an annual four-day collegiate model United Nations conference hosted by Penn State
  - Organized conference schedule, reserved hotel and conference rooms
  - Parliamentary debate chair, crisis simulation staffer, and designate cartographer

Team Leader, Berks Co. Community Foundation Youth Advisory Committee (2012-2013)
- Member (2009-2013)
  - Led delegation to Russian National Foundations Youth Conference in Ivanovo, Russia
  - Distributed over $80,000 in grants to Berks County nonprofits
  - Taught annual workshop on fundraising ask meetings
  - Coordinated and led team of 5 through grantmaking and development process
  - Presented to Community Foundation board of directors

PROFESSIONAL & HONOR SOCIETY MEMBERSHIPS

- Phi Beta Kappa Honor Society
- Gamma Theta Upsilon Honor Society
- Phi Kappa Phi Honor Society
- National Honor Society
- National Society of Collegiate Scholars
- North American Vexillological Association
- Toastmaster’s Youth Leadership Program