

EVAPORATING SECURITY:  
AN ANALYSIS OF WATER AND SECURITY IN THE ERA OF CLIMATE CHANGE

by

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## Abstract

For decades there has been a national and international conversation about climate change and its effect on our planet. In the 2014 Quadrennial Review, the U.S. Department of Defense acknowledged that climate change is a security threat and will exacerbate stressors such as political instability and poverty. In the next decades the effects of climate change will change not only the geographical landscape but the overall geopolitical and security landscape. *Evaporating Security* will look at the implications climate change and other stressors have on water security around the world and potential impacts on certain regions. Based on a literature review, government publications, and public data, *Evaporating Security* will look at the aspects that climate change, security, and the role water plays. First, an overview and explanation of the interconnectedness between climate change, water, and security will be provided to display the magnitude of the challenges faced. Subsequently, there will be an analysis of two areas in the world where water shortages could have great implications towards security. The first case study will look at China and how possible changes in its water resources could cause political instability. Then the Middle East will be looked through the Tigris-Euphrates Rivers and how water shortages could change the political and security landscape in the region. The last section will review current solutions in water security and challenges the United States faces in solving the water security challenge.

## Introduction

On a beautiful day in Northern Virginia, the Potomac River flows strongly at Great Falls National Park. The sound of the flowing Potomac invites for a tranquil environment to settle in. There are many invisible forces that make the river flow, allowing it to create change and allow new water to flow by constantly. Just like the consistency of the flowing Potomac, humans have always needed water to thrive and survive. The Tigris and Euphrates Rivers of the Fertile Crescent in the modern-day Middle-East is one of the earliest examples, dating over ten millennia ago, showing our necessity for water. As a result, early civilizations were able to sustain themselves and flourish. As water quenched our physical demands, it also quenched our intellectual demands and influenced our philosophies and the ways we think. The Greek poet Homer believed that all gods originated from the Ocean<sup>1</sup>. The ancient Chinese philosophy of Taoism tells us that water is “honest...gentle...[and] cannot be faulted”<sup>2</sup> (Tang). While water may be seen philosophically as gentle and infallible, many people around the world do not have enough water. According to the World Bank, “About 1.6 Billion people-almost a quarter of humanity-live in countries with physical water

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<sup>1</sup> De Santo RM et al. “The Nature of water: Greek thought from Homer to Acusilaos,” *Journal of Nephrology* 22, no. 14 (2009): 92-97, URL: <http://libproxy.txstate.edu/login?url=http://search.ebscohost.com/libproxy.txstate.edu/login.aspx?direct=true&db=mdc&AN=20013739&site=eds-live&scope=site>.

<sup>2</sup> Raymond Tang, “Be humble—and other lessons from the philosophy of water,” accessed March 22, 2018, [https://www.ted.com/talks/raymond\\_tang\\_be\\_humble\\_and\\_other\\_lessons\\_from\\_the\\_philosophy\\_of\\_water/transcript](https://www.ted.com/talks/raymond_tang_be_humble_and_other_lessons_from_the_philosophy_of_water/transcript).

scarcity, and in just two decades this number may double”<sup>3</sup>. The vital role that water plays in our daily lives is currently in jeopardy due to multiple reasons, one being most notably, climate change and if we do not do anything to change our actions we could be facing devastating consequences.

Today, we live in a pivotal moment in humanity. We face a challenge where the consequences are a global cataclysm. Climate change is altering the world we live in; from rising sea levels to rising temperatures, the global landscape and where we can live is rapidly changing. Recent weather events such as the 2017 hurricane season where hurricanes Harvey, Irma, and Maria bashed the United States (U.S.) and Puerto Rico may be a precursor to a pattern we could see for decades to come. In November 2017, over 15,000 scientists from 184 countries published a communique warning of the environmental consequences we face.<sup>4</sup> The consequences of climate change include changes such as higher temperatures and more severe weather events, but it can also pose a threat to U.S. National Security.

While climate change will affect all aspects of life, national security will face a significant burden. A news report by Vox highlighted the risks posed by climate change to national security. Citing a report from the National Academy of Sciences, Vox says “a

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<sup>3</sup> World Bank, *High and Dry: Climate Change, Water, and the Economy* (Washington, DC: World Bank, 2016), 1.

<sup>4</sup> Sarah Kaplan, “Thousands of scientists issue bleak ‘second notice’ to humanity” last modified November 13, 2017 [https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/13/thousands-of-scientists-issue-bleak-second-notice-to-humanity/?utm\\_term=.ac8ab0f7974e](https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/13/thousands-of-scientists-issue-bleak-second-notice-to-humanity/?utm_term=.ac8ab0f7974e).

three-foot rise in sea levels will threaten the operation of more than 128 military sites”<sup>5</sup>.

In addition to rising sea levels, rising temperatures will cause political instability around the world by creating failed states and therefore stretch U.S. military power more.

Water security will be a sector that will be exacerbated.

Water security is an essential aspect to research because it affects everything around us. Without water we would not be able to live, our agriculture would become non-existent, our livestock would go away, and life on this Earth would cease to exist.

According to the Center for American Progress, “Perhaps the most pressing area of concern at the nexus of climate change and national security is that of water security.”<sup>6</sup>

Due to climate change, water is becoming scarcer in areas of the world because it is drying up and being polluted. These observations show that there is an important issue at hand and it needs to be solved. Additionally, this will continue to multiply threats across the world. Since there would be a lack of usable water there will be issues when it comes to crops and issues when it comes to being able to sustain consumption levels for people and livestock. These problems could then start to affect governments and the way they govern their people. Despite the mounting evidence that climate change will affect our world in future decades, the U.S. government response has not maintained pace with the rapidly evolving threat climate change presents.

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<sup>5</sup> Alex Ward, “Experts to Trump: climate change threatens the US military,” last modified June 5, 2017, <https://www.vox.com/2017/6/5/15729426/paris-agreement-climate-change-military>.

<sup>6</sup> Carolyn Kenney, “Climate Change, Water Security, and U.S. National Security” last modified March 22, 2017, <https://www.americanprogress.org/issues/security/reports/2017/03/22/428918/climate-change-water-security-u-s-national-security/>.

In recent years, the United States government has started to see that climate change is affecting national security, but there are still some skeptics. In 2014, the Department of Defense looked into the issue of climate change in their Quadrennial Defense Review where they stated that climate change would act as a threat multiplier<sup>7</sup>. Essentially, this says the Department of Defense acknowledges the risks that climate change poses and sees that if we fail to take action then we run the risk of causing more issues around the globe. Additionally, there are attempts in Congress to fix the issue. One instance is HR. 2908 which establishes a committee that considers the effects of climate change when developing national security policy. Lastly, there is a push to conduct a study on the impacts of climate change and military operations to be added to the National Defense Authorization Act (NDAA). *The Hill*, states the report will look for “the vulnerability to military installations and combatant commander requirements resulting from climate change over the next 20 years.”<sup>8</sup> The bill also includes language that acknowledges the threat that climate change poses. While HR. 2908 and the NDAA are laudable efforts; there has been resistance by lawmakers. In July 2017, Republican lawmakers defeated efforts to add a climate study to the NDAA. Additionally, at the time of writing, HR 2908 has not moved out of committee since it was initially introduced in June 2017.<sup>9</sup>

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<sup>7</sup> U.S. Department of Defense, *2014 Quadrennial Defense Review* (Washington, DC: GPO, 2014), 8.

<sup>8</sup> Devin Henry, “Final defense policy bill mandates Pentagon climate change study” last modified November 9, 2017, <https://thehill.com/policy/energy-environment/359689-final-defense-policy-bill-mandates-pentagon-climate-change-study>.

<sup>9</sup> “H.R. 2908- Climate Change National Security Strategy Act of 2017,” Congress.gov, accessed March 29, 2018, <https://www.congress.gov/bill/115th-congress/house-bill/2908>.

This thesis will investigate the effects that climate change has on security with a concentration on water security. While many publications in academic literature explore water security in broad terms of security, this thesis wishes to further the literature by exploring possible political and economic impacts water security has on security. The first section will be an analysis and summary of the water-security-climate change nexus and explore how water and climate change are inextricably linked with one another. Additionally, this section will analyze the 2017 National Security Strategy and how it disregards and exacerbates climate change and its consequences. The second section will have an examination of two different case studies. The case studies will focus on two areas: China and The Middle East. The first part of the case studies will look into what is currently happening and provide analysis. The second step would look into how the region is being affected. For the China case study, this thesis will investigate the impact and influence that major sources of water in China could have on internal stability and Chinese influence. The Middle East case study will investigate the influence the Tigris-Euphrates river has on regional security with a close examination of Turkey. I chose these regions because they have been identified as being regions that are going through water shortages and could potentially have large impacts on security. Lastly, possible solutions will be explored, such as desalination and the concept of virtual water. The sources will derive from scholarship, government publications, and publicly available data.

## The Nexus of National Security, Climate Change, and Water Security

The concept of national security has been around for millennia. Throughout that time the concept and perspective of national security have been ever changing and as certain challenges arise so do the ways leaders meet these challenges. In many cases throughout history, leaders have used different criteria to define national security. A successful national security policy is one that protects and promotes the values and interests of a sovereign nation-state while also acknowledging threats that transcend national borders and working with other nations or international organizations to solve those threats. Throughout history, national security was mainly to protect a nation's borders and interest against other nations. At the end of the Cold War in the early '90s and with the onset of rapid globalization, threats are not limited to a nation's border but can affect multiple nations simultaneously<sup>10</sup>.

In the United States, this view has started to change with the onset of the new Trump Administration. With the release of their National Security Strategy in December 2017, the Trump Administration has moved away from the more liberal approach to national security to a strategy that embraces a stance of "principled Realism."<sup>11</sup> The

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<sup>10</sup> Michael Renner, *National Security: The Economic and Environmental Dimensions* (Washington, DC: Worldwatch Institute, 1989), 6.

<sup>11</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 1.



administration identified four pillars that its national security strategy would stand on, they are:

1. Protect the American People, The Homeland, and the American Way of Life,
2. Promote American Prosperity,
3. Preserve Peace through Strength, and
4. Advance American Influence<sup>12</sup>.

These four pillars are guided by the concept of principled realism and “by outcomes, not ideology.”<sup>13</sup> In this strategy there is a return to the great power balance that is a cornerstone of the realist theory. Both China and Russia are mentioned multiple times in addition to the rogue nations of North Korea and Iran as competitors to the United States. Furthering the stance of principled realism, the strategy also places priority on members of international organizations to pay their fair share or else the United States will forcibly exert more influence upon the organization<sup>14</sup>. This observation shows that the U.S. does not view international organizations as a valuable platform to promote peace and understanding but instead views them as a way other nations take advantage

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<sup>12</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 4.

<sup>13</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 1.

<sup>14</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 40.

of the U. S.’ benevolence. Additionally, the strategy mentions contemporary threats such as jihadi organizations and cyber threats<sup>15</sup>.

The NSS 2017 does not acknowledge the danger that transboundary threats pose, particularly climate change. In the second pillar of the 2017 NSS—Promote American Prosperity—the Trump administration identifies embracing energy dominance as an important aspect of this pillar and national security. As stated in the report, “Given future global energy demand, much of the developing world will require fossil fuels, as well as other forms of energy, to power their economies and lift their people out of poverty.”<sup>16</sup> This stance is a blatant disregard of the impacts that climate change would have on national security. In 1989, near the end of the cold war, when many posited that major power confrontation would come to an end, Michael Renner published *Worldwatch Paper '89, National Security: The Economic and Environmental Dimensions* where he investigated the impacts that our environment has on national security<sup>17</sup>. Since then, many scholars and government publications have continued to write about environmental security, the impacts that our environment has on national security<sup>18</sup>. Many of them have concluded the environment has a big impact on national security.

The link between the environment and security is compounded by the variable of climate change. According to the International Panel on Climate Change (IPCC) in

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<sup>15</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 3.

<sup>16</sup> United States of America, *National Security Strategy of the United States of America* (Washington, DC: GPO, 2017), 22.

<sup>17</sup> Michael Renner, *National Security: The Economic and Environmental Dimensions* (Washington, DC: Worldwatch Institute, 1989), 63.

<sup>18</sup> Simon Dalby, *Security and Environmental Change* (Malden: Polity, 2009), 9.

their Fifth Assessment Report, they found that the increase of global mean surface temperature was *very likely* attributed to the release of greenhouse gases<sup>19</sup>. Based on this information, the Trump administration promoting the use of fossil fuels would continue to further the rise of temperatures around the globe. While the NSS does mention using alternative forms of energy, which could mitigate some aspects of climate change, these forms of energy are not as vigorously promoted as fossil fuels. As mentioned in the 2014 Quadrennial Defense Review, it is seen that climate change will exacerbate certain stresses that can pose a threat to national security, one of them being water security.

A 2018 study on the global trends of freshwater availability found that one of the causes of freshwater shortages is climate change and human actions. The study is based on data from the Gravity Recovery and Climate Experiment (GRACE) satellite. The report concluded that climate change and human actions are having an impact on ice sheets and freshwater availability around the globe<sup>20</sup>. These findings corroborate with other reports such as the Food and Agriculture Organization of the United Nations' 2011 report on the nexus of climate change, water, and agriculture and the 2012 Intelligence Community Assessment Report on Water Security.

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<sup>19</sup> Nathaniel L. Bindoff and Peter A. Stott. "Detection and Attribution of Climate Change: From Global to Regional" in *The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, (Cambridge and New York: Cambridge University Press, 2013) 869.

<sup>20</sup> M. Rodell et al. "Emerging trends in global freshwater availability," *Nature* 557, no. 7707 (2018):650-672, DOI: 10.1038/s41586-018-0123-1.

As can be shown, security, the environment, and climate change are all inextricably linked. Additionally, since water is a vital part of our environment and it is proven that climate change has a great influence on water. Water therefore also can affect national security. According to the Pacific Institute's water conflict database, water has been a source of conflict or used as a weapon for thousands of years with one of the first conflicts being in the year 2500 BCE in western Asia, Lagash-Umma border dispute<sup>21</sup>. Since then, many have speculated that "water wars", a catchy, quirky term to describe the possibility of water shortages as a source of conflict.

## Case Studies

These case studies are relevant because they show possible outcomes that could arise because of water shortages around the world. In review, the last section talked about the intersection of climate change, water, and security. While various reasons cause water shortages, climate change plays a role in decreasing water levels. Impacts such as rising temperatures due to heightened CO2 levels contribute to a change in the water cycle and melting of glaciers. In turn, these decreasing water supplies can cause a chain reaction of unintended consequences. Steve Lonergan described this chain reaction when talking about water security:

*Problems of water security and water pollution affect human and ecosystem health, and hinder economic and agriculture development.*

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<sup>21</sup> "Water Conflict—World's Water," The Pacific Institute, accessed September 28, 2018, <http://www.worldwater.org/water-conflict/>.

*Local and regional problems, in turn, may affect the rest of the world by threatening food supplies and global economic development.* <sup>22</sup>.

All of the aspects Lonergan describe above are fundamental to security, and therefore water has a direct impact on security. As research has shown, the environment has a large impact on security. The 2017 NSS signifies a shift from that thinking though. The inclusion of the 2017 NSS in this thesis is two-fold. First, it is to benchmark the current policy at the time of writing and show how the Trump Administration is shifting away from decades of evidence that the environment affects our security. The second reason is to show how the retreating of the U.S. from fighting climate change can have major impacts around the globe. As a large polluter, a retreat of the United States' commitment to combating climate change will have a significant impact on our environment. In addition to not acting to fight climate change, the language displayed is concerning. That could then give other nations the idea that fighting climate change is not as important. As will be discussed in this next section, the consequences of climate change will have impacts upon water resources in the regions being studied. All this connects to the case studies because the environmental systems are interlinked. If one country, such as the United States were to distance themselves from fighting climate change, the consequences would be felt further beyond borders. Additionally, the promoted use of fossil fuels as stated in the 2017 NSS will have profound consequences around the world. By relinquishing a commitment to fight climate change, the United

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<sup>22</sup> Steve C. Lonergan, "Water and Conflict: Rhetoric and Reality," In *Environmental Conflict*, ed. Paul F. Diehl and Nils Petter Gleditsch (Boulder: Westview Press, 2000), 109-124. PDF.

States also abdicates its leadership standing around the world when it comes to this issue. By being absent from the fight against climate change, the United States could then set itself up to face more considerable consequences than just “climate change” or “water shortages.”

In 2014, the CNA—a nonprofit research organization—Military Advisory Board, stated that failure to think about climate change’s impact on U.S. National Power and security would be an example of a failure of imagination<sup>23</sup>. These two case studies will look at the current situation and make a prediction about the future. Whether or not these predictions come to fruition is to be decided by our actions of today and the response of tomorrow. I see that it is important though to present the facts and patterns so that it can help add to the discussion of this critical topic that affects all of humanity. It is with this mindset that we begin the case studies.

## China

### Introduction

In the mid-1960’s Chinese Communist Party Chairman Mao Zedong pulled off a great political stunt; he swam in the Yangtze River. During this time, Chairman Mao was facing pressure from his political opponents and rumors were circulating that he was in ill health and would no longer be able to lead<sup>24</sup>. The swim ended up being a political

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<sup>23</sup> CNA Military Advisory Board, *National Security and the Accelerating Risks of Climate Change* (Alexandria, VA: CNA Corporation, 2014), 2.

<sup>24</sup> Philip Ball, *The Water Kingdom: A Secret History of China* (Chicago: University of Chicago Press, 2017), 40-41.

success. Not only was Mao able to prove that he was still in good health, but he also showed that he—embodying the Chinese Communist Party—could take on a force as strong as the Yangtze<sup>25</sup>.

This allusion speaks not only to convey the political mind of Chairman Mao but also to the larger problems that are facing China today with water security. Currently, China is facing a problem with its water resources and it could cause problems within the nation and in turn the world. While for many years, the Chinese Communist Party has enjoyed much success with its economic policies that have allowed for it to grow, the issues that it faces with water could lead to challenges down the road. Particularly, its political stability is what's at stake. By taking advantage of a weak legal system, a history of geopolitical standing being linked to state legitimacy, compounded by the growing power of President Ji Jinping, China's water issues poses a real threat within the nation and around the globe.

#### Current Situation

China is facing challenges when it comes to its water resources. This part of the case study we will look into two different studies that look into water resources in China.

The GRACE satellite report determined that a variety of causes are contributing to water shortages in China. These causes include glacial melting, groundwater depletion, surface water diversion, and irrigation. Overall, the regions in China studied

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<sup>25</sup> Philip Ball, *The Water Kingdom: A Secret History of China* (Chicago: University of Chicago Press, 2017), 40-41.

in the report were found to have decreasing trends in their freshwater supplies.<sup>26</sup> One such instance was the North China Plain—a vast agriculture region—which had a decreasing trend of  $-11.3 \text{ Gt yr}^{-1}$ <sup>27</sup>. This is an important fact to recognize because any changes in water would have a direct impact on agriculture that is in China.

Additionally, another study looked at the impacts of climate change on the water resources of the Yellow River. The authors of this study looked at different greenhouse gas emission scenarios presented by the IPCC and how they affect the Yellow River. The results showed that under all three scenarios, water resources of the Yellow River would reduce.<sup>28</sup>

### Projections

Based on the information presented, it is possible that, if water security is left unchecked, there will be increased internal tensions within China and problems for the Chinese Communist Party. While it appears unlikely the Chinese Communist Party will be overthrown in the near future, I believe there will be greater pressures, stresses, and tensions facing the CCP. By exploiting weak legal institutions, challenging China's geopolitical prestige, and the consolidation of power by President Xi Jinping, water shortages will cause decreased legitimacy in the Chinese Communist Party and cause social and economic instability. While many impacts will affect China, this in turn will

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<sup>26</sup> M. Rodell et al. "Emerging trends in global freshwater availability," *Nature* 557, no. 7707 (2018):650-672, DOI: 10.1038/s41586-018-0123-1.

<sup>27</sup> M. Rodell et al. "Emerging trends in global freshwater availability," *Nature* 557, no. 7707 (2018):650-672, DOI: 10.1038/s41586-018-0123-1.

<sup>28</sup> Yongnan Zhu et al. "Impacts of climate changes on water resources in Yellow River Basin, China," *Procedia Engineering* 154, (2016): 687-695, DOI: 10.1016/j.proeng.2016.07.570.



have huge implications for the world and the United States due to the large size of China's economy.

As described in the 'current situation' section of this case study, China's water resources are facing major stresses due to climate change. This has a direct result in the nation's ability to provide for the people in the lifestyle they are moving towards while dealing with both internal and external pressures.

Water will have a great impact on China because shortages will influence its geopolitical position. By utilizing geopolitical theory, Jieli Li claims the Chinese Communist Party's survival and internal legitimacy derived from a favorable geopolitical position and low geopolitical strain.<sup>29</sup> As he stated in his writing "internal tension can be aggravated or relieved by the changing geopolitical position of the state"<sup>30</sup>. This is important to understand because there are important changes going on within China that affect the amount of strain they experience and their position within the world.

Currently, water issues are a source of concern for citizens of China. According to the Asia Society, "in 2006, the country saw 51,000 pollution related protests, many of which involved water pollution."<sup>31</sup> While the main reason these people protested was because of polluted water, it still serves as an important observation this is because it shows that water-related issues are an important subject that the people of China care

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<sup>29</sup> Jieli Li. "Geopolitics of the Chinese Communist Party in the Twentieth Century," *Sociological Perspectives* 36, no. 4 (1993): 315-333, URL: <https://www.jstor.org/stable/1389391>.

<sup>30</sup> Jieli Li. "Geopolitics of the Chinese Communist Party in the Twentieth Century," *Sociological Perspectives* 36, no. 4 (1993): 315-333, URL: <https://www.jstor.org/stable/1389391>.

<sup>31</sup> The Leadership Group on Water Security in Asia, *Asia's Next Challenge: Securing the Region's Water Future* (New York: The Asia Society, 2009), 28.

about. It was even stated in the World Economic Forum that “water will likely be a key domestic and environmental (and political) issue for China to focus on over the next decade or so as it seeks to rebalance the environmental impacts of its economic growth.<sup>32</sup>” These tensions lay a foundation for larger implications because these protests show that there is a demand for citizens to have enough water. It is then ultimately up to the Chinese government as to whether they want to listen to their concerns. As environmental issues are starting to become a major aspect of policy in China though, the consolidation of power by President Xi Jinping can pose a problem for China.

In 2017 the Chinese Communist party threw out term limits which allowed Xi Jinping to become the most powerful party chairman China has ever seen since Mao Zedong. It was during the Chinese Communist Congress Plenum that President Xi introduce Xi Jinping thought, engraining his name into the Chinese Communist Party Constitution<sup>33</sup>. By engraining his name, President Xi is making his motive clear that he wants to be a strong leader for China. This has also set a standard that he is in charge and no-one is above him or his stance. This is a problem though. In the past when China faced unfavorable geopolitical circumstances there were factions that developed within the party<sup>34</sup>. By consolidating power President Xi is taking the reins of the Chinese

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<sup>32</sup> World Economic Forum Water Initiative, *Water Security: The Water-Food-Energy-Climate Nexus* (Washington, DC: Island Press, 2011), 92. PDF.

<sup>33</sup> Huang, Cary, “‘President for Life’ Xi Risks Repeat of China’s Mao-Era Mistakes” last modified March 11, 2018, <https://www.scmp.com/week-asia/opinion/article/2136255/president-life-xi-risks-repeat-chinas-mao-era-mistakes>.

<sup>34</sup> Jieli Li. “Geopolitics of the Chinese Communist Party in the Twentieth Century,” *Sociological Perspectives* 36, no. 4 (1993): 315-333, URL: <https://www.jstor.org/stable/1389391>

Communist Party by himself. This would be a problem though, if water issues continue to grow, this could stigmatize fellow party members who have differing viewpoints in how to handle the water issue protesters. Additionally, tensions would continue to arise since he is also starting to crack down on more dissident and would close the limited outlets people have to express their concerns in China<sup>35</sup> (cite Fisher).

In addition to closing down outlets for dissident, weak legal institutions pose a problem because without them there would be no legitimate way to solve issues that may arise. In the 1980s and 1990s, China took great steps to improve and expand their legal institutions<sup>36</sup>. Despite making these changes, the CCP is side-stepping legal institutions when it comes to resolving issues and this is because the CCP bases its legitimacy on outcomes as opposed to adherence of legal processes<sup>37</sup>. This is an issue because basing legitimacy on outcomes and not adherence to legal processes shows that there is a mistrust in legal institutions that they cannot handle issues that are presented before them. Water will play an issue in this because water issues will continue to be the source of tensions and protests in China. Additionally, health and economic related issues would increase for courts because of the interconnectedness water has in those areas. Since the courts are basically an extension of the CCP and when people see that these legal institutions cannot handle issues, that could raise

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<sup>35</sup> Max Fisher, "How China Stays Stable Despite 500 Protests Every Day," last modified January 5, 2012, <https://www.theatlantic.com/international/archive/2012/01/how-china-stays-stable-despite-500-protests-every-day/250940/>.

<sup>36</sup> Benjamin L. Liebman. "Legal Reform: China's Law-Stability Paradox," *Daedalus, the Journal of the American Academy of Arts and Sciences* 143, no. 2 (2014): 96-109. DOI: 10.1162/DAED\_a\_00275.

<sup>37</sup> Benjamin L. Liebman. "Legal Reform: China's Law-Stability Paradox," *Daedalus, the Journal of the American Academy of Arts and Sciences* 143, no. 2 (2014): 96-109. DOI: 10.1162/DAED\_a\_00275.

doubt among citizens. Without legal institutions, there would be no consistent manner in which water-related issues will be dealt with, even if they're dealt with at all. As Liebman describes, "courts lack authority to accept many sensitive cases and refuse to accept such cases even they have such authority."<sup>38</sup> This would in turn place any court-related issues in the purview of other organizations. This in turn allows for more opportunity for corruption and mishandling of cases. As mentioned earlier, the actions of Xi Jinping will have great influence and this area is no exception. By cracking down on protesters, Xi Jinping can single-handedly suppress any protests and focus on the immediate issue of social stability and allow for him to ignore the deeper issues that lie with water.

Ultimately, a combination of all these events will leave Chinese with no outlets to express concern and will affect the economy. An unresponsive Communist Party would cause issues because Chinese citizens see the Communist Party as a parental figure whose job it is to take care of its citizens<sup>39</sup>. If the Chinese see that the Party does not take care of them then that could further tensions. This would be because the Chinese would demand for their concerns to be addressed. According to Jin et al., China has a huge impact on the world economy and they see that its stable government is an

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<sup>38</sup> Benjamin L. Liebman. "Legal Reform: China's Law-Stability Paradox," *Daedalus, the Journal of the American Academy of Arts and Sciences* 143, no. 2 (2014): 96-109. DOI: 10.1162/DAED\_a\_00275.

<sup>39</sup> Michael Schoenhals. "Political Movements, Change and Stability: The Chinese Communist Party in Power," *The China Quarterly*, no. 159 (1999): 595-605. URL: <https://www.jstor.org/stable/655754>.

influential factor in its economic growth<sup>40</sup>. Therefore, if anything was to happen to the government then it would have implications for the entire globe.

## The Middle East

### Introductions

This case study will look at the Tigris-Euphrates river region. In particular, the impacts of the Southeastern Anatolia Project on the region and potential impacts on important partnerships.

### Current Situation

The Tigris-Euphrates rivers are a pair of rivers that originate in Turkey and flow through Iraq and Syria. When it comes to this region, there are wide-spread water shortages.

The GRACE satellite report found that the Northern Middle East (which includes Turkey) has a trend of losing 32.1 Gt yr<sup>-1</sup> of water and attributes that mainly to drought and overuse of groundwater<sup>41</sup>. Additionally a second study found that Turkey was experiencing water shortages due to climate change because of changing temperatures influencing the hydrological cycle<sup>42</sup>. This shows that there is a huge change occurring for the water resources in Turkey and in turn a challenge towards security because water is vital for many societal functions. By recognizing these trends, it allows us to continue to

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<sup>40</sup> Xingye Jin, David Daokui Li, and Shuyu Wu. "How will China shape the world economy," *China Economic Review* 40, (2016): 272-280. DOI: 10.1016/j.chieco.2016.07.006.

<sup>41</sup> M. Rodell et al. "Emerging trends in global freshwater availability," *Nature* 557, no. 7707 (2018):650-672, DOI: 10.1038/s41586-018-0123-1.

<sup>42</sup> Abdullah Gokhan Yilmaz and Monzur Alam Imtaez. "Climate Change and water resources in Turkey: A review," *International Journal of Water* 8, no. 3 (2014): 299-313, DOI: 10.1504/IJW.2014.064222.

look more into the implications that water shortages will have on the region because we see that there is a declining trend.

As mentioned in the previous section about the nexus of climate change, water, and security, it has been shown that temperatures around the globe have been increasing due to human activities that contribute greenhouse gases and exacerbate climate change. By having an increase in temperature, the rates of evaporation increase and therefore result in less water. Additionally, since changes are happening in the hydrological cycle, aspects such as climate, which is supposed to be a consistent pattern, will change and result in larger changes for the environmental landscape around the area.

A large influence that is playing a role in the Tigris Euphrates region is the Southeastern Anatolia Project (GAP). This is an ambitious project for Turkey that consists of 22 dams and an extensive irrigation system.<sup>43</sup> The goal of GAP is to increase the water resources and energy produced for Turkey<sup>44</sup>. By constructing dams and implementing this project, Turkey is withholding water from its downstream neighbors and is compounding the water stress that is already happening due to climate change.

### Projections

Based on the research conducted I agree with previous literature that there will be no wars in the Tigris-Euphrates region that will be directly caused by water. Instead, I

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<sup>43</sup> Frederick Lorenz and Edward J. Erickson, *Strategic Water: Iraq and Security Planning in the Euphrates-Tigris Basin* (Quantico: Marine Corps University Press, 2013), 96.

<sup>44</sup> Mark Dohrman and Robert Hatem. "The impact of Hydro-politics on the relations of Turkey, Iraq, and Syria," *The Middle East Journal* 68, no. 4 (2014): 567-583, URL: <https://muse.jhu.edu/article/556629>.

believe the Southeastern Anatolia Project will promote Turkish nationalism that is already present and growing within the country. This will prevent Turkey from joining the European Union and I believe that Turkey will continue to build its relationship with Russia and move away from U.S. backed coalitions such as NATO. This change of partnership will be the result of the continued consolidation of power by President Erdogan.

In review of the current situation section, Turkey is experiencing water shortages because of increasing temperatures which in turn affects precipitation and climate in regard to droughts. These observations support the country's official position that they are a water scarce country. According to Turkey's Ministry of Foreign Affairs website, they state that: "Contrary to the general perception, Turkey is neither a country rich in freshwater resources nor the richest country in the region in this respect<sup>45</sup>." This statement should be viewed with some skepticism though. According to Frederick Lorenz and Edward Erickson they say that "Turkey treats detailed water data as a state secret and knows that a release of (even accurate) data will rarely serve its own self-interests<sup>46</sup>." Withholding of data then provides a reason on why there could be a discrepancy when it comes to Turkey's actual situation when it comes to water and what's affecting it. Nonetheless, it has been shown that climate change is affecting water resources in Turkey.

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<sup>45</sup> Republic of Turkey Ministry of Foreign Affairs, "Turkey's Policy on Water Issues" last modified 2011, [http://www.mfa.gov.tr/turkey\\_s-policy-on-water-issues.en.mfa](http://www.mfa.gov.tr/turkey_s-policy-on-water-issues.en.mfa).

<sup>46</sup> Frederick Lorenz and Edward J. Erickson, *Strategic Water: Iraq and Security Planning in the Euphrates-Tigris Basin* (Quantico: Marine Corps University Press, 2013), 142.

In recent decades, Turkey has been working on the Southeastern Anatolia Project (GAP). Considering that the project involves the creation of dams and in result, decreasing the amount of water that flows through the rivers. This would raise concerns because the downstream nations would receive less water and could result in conflict. A 1986 cable from the U.S. Department of State expressed concern about GAP, stating, “Water-related issues (such as that faced by Syria, Iraq, and Turkey) could catalyze future international disputes among neighboring water-deficit countries...<sup>47</sup>.” This has yet to be the case. According to Dohrman and Hatem, while water has not resulted in major conflict, it has been a point of tensions<sup>48</sup>. At the time of this writing this source is around five years old. Thankfully, in the time since the sources publishing, no war has been fought over water in the region. From the perspective of 2018, it is likely that this trend of no war over water will continue because of current events going on in the region including the Syrian Civil War and Iraq’s current aspirations for a more stable government. These events have been the leading issues of the region and as a result, political will may be limited when it comes to action over water shortages at this level.

If war will not be started because of water, then what would happen? I see that instead of a war occurring, GAP will play a fundamental role in Turkey’s rising nationalism, which will ultimately result in it being denied admittance into the European Union, and continue building its ties with Russia.

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<sup>47</sup> U.S. Department of State. “Geographic Notes No. 4” (online Scanned Document, Washington, DC, 1986), 12.

<sup>48</sup> Mark Dohrman and Robert Hatem. “The impact of Hydro-politics on the relations of Turkey, Iraq, and Syria,” *The Middle East Journal* 68, no. 4 (2014): 567-583, URL: <https://muse.jhu.edu/article/556629>.



For many decades, Turkey has been a fundamental partner with the European Union. In October 2005, membership ascension negotiations were opened between Turkey and the European Union<sup>49</sup>. If admitted, Turkey would bring much to the European Union, especially since Great Britain recently left. In recent years though, the relationship between the European Union and Turkey has become strained. In their most recent annual report, the European Commission stated that “Turkey has been moving away from the European Union<sup>50</sup>.” Citing recent changes in government, rising authoritarianism and nationalism, the European Union is starting to see that Turkey may not be best suited for membership<sup>51</sup>. This matters because at the current moment Turkey is starting to distance itself from the European Union and therefore losing much of its incentive to change the current way that it is being governed. If it is to be admitted then it would hopefully move Turkey away from a more authoritarian government. Regardless of what happens, there is much that Turkey can offer to the European Union especially in the workforce that it would add to the European Union. According to the Turkish Government, they have the 3<sup>rd</sup> largest workforce in Europe at 31.6 million people<sup>52</sup>. That is an astonishing amount of people and if admitted, they would be eligible to work within the European Union. This in turn can also help other countries with smaller workforces develop their economy. While this is one of the many benefits

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<sup>49</sup> European Commission, *Turkey 2018 Report* (Strasbourg: European Commission, 2018), 3.

<sup>50</sup> European Commission, *Turkey 2018 Report* (Strasbourg: European Commission, 2018), 3.

<sup>51</sup> European Commission, *Turkey 2018 Report* (Strasbourg: European Commission, 2018), 4.

<sup>52</sup> Presidency of the Republic of Turkey Investment Office, “Demographics” last accessed November 5, 2018, <http://www.invest.gov.tr/en-US/investmentguide/investorguide/Pages/DemographyAndLaborForces.aspx>.

that Turkey could bring to the European Union, there is still much uncertainty about their future with the European Union.

While they may not seem interconnected on the surface, I believe that GAP will continue to contribute to the rise of nationalism in Turkey this is because of limited foreign financing and its popularity. One of the most important reasons that GAP will contribute to rising nationalism is the fact that GAP was mostly financed by Turkey with no assistance from international organizations<sup>53</sup>. This would increase nationalism because developing this project without assistance shows the world that Turkey has the means and resources to make this project a reality and chart their own destiny. This also shows unilateral action on Turkey's behalf when it comes to how they want to use their water as well. As was discussed earlier, climate change is affecting the water resources of Turkey, GAP will help mitigate the consequences of those water shortages since it would affect the amount of water Turkey has. Lastly, as stated in *Strategic Water*, "The GAP represents a source of great national pride."<sup>54</sup> It is understandable to see why it represents a great source of national pride, when considering that it helps Turkey with its water and its standing on the international stage. By having a stronger standing on the international stage, Turkish leaders can point to this project and show that Turkey does not have to rely on other nations in order to implement the project they see as vital to their national interests. It is also important to note that this project is still

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<sup>53</sup> Frederick Lorenz and Edward J. Erickson, *Strategic Water: Iraq and Security Planning in the Euphrates-Tigris Basin* (Quantico: Marine Corps University Press, 2013), 95.

<sup>54</sup> Frederick Lorenz and Edward J. Erickson, *Strategic Water: Iraq and Security Planning in the Euphrates-Tigris Basin* (Quantico: Marine Corps University Press, 2013), 95.

popular despite it currently not meeting its objectives<sup>55</sup>. This shows that the original objectives of this project are being overshadowed by other goals that have been set. Once its objectives are met, it'll continue to reinforce any concept of Turkey being a great nation and a strong sense of nationalism among its citizens.

I predict that the culmination of these events, where water shortages do have influence, will result in stronger ties between Russia and Turkey. If Turkey is denied admittance to the European Union, it would still need partners to advance economic and security objectives. Currently, Russia and Turkey have worked together on many fronts. Even when they appear to be at odds with one another at sometimes, when they have strong mutual interests, they will work together<sup>56</sup>. According to Mamedov and Lukyanov, "The sheer volume of bilateral economic cooperation and the historic ties between Russia and Turkey going back to the 1990's helped the two countries overcome the [2015 Russian fighter jet] crisis in their bilateral relations<sup>57</sup>". Additionally, according to a report by the Center for American Progress, they found that only 10% of Turkish citizens find the United States as favorable as opposed to a 28% favorability rate when it comes to Russia<sup>58</sup>. It can then be seen that Russia is starting to gain more popularity

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<sup>55</sup> Mark Dohrman and Robert Hatem. "The impact of Hydro-politics on the relations of Turkey, Iraq, and Syria," *The Middle East Journal* 68, no. 4 (2014): 567-583, URL: <https://muse.jhu.edu/article/556629>.

<sup>56</sup> Ruslan Mamedov and Grigory Lukyanov. "Russia and Turkey: Approaches to Regional Security in the Middle East," *Perceptions: Journal of International Affairs* 23, no. 2 (2018): 51-71, URL: <http://libproxy.txstate.edu/login?url=http://search.ebscohost.com/libproxy.txstate.edu/login.aspx?direct=true&db=poh&AN=132575188&site=eds-live&scope=site>.

<sup>57</sup> Ruslan Mamedov and Grigory Lukyanov. "Russia and Turkey: Approaches to Regional Security in the Middle East," *Perceptions: Journal of International Affairs* 23, no. 2 (2018): 51-71, URL: <http://libproxy.txstate.edu/login?url=http://search.ebscohost.com/libproxy.txstate.edu/login.aspx?direct=true&db=poh&AN=132575188&site=eds-live&scope=site>.

<sup>58</sup> John Halpin, Michael Werz, Alan Makovsky, and Max Hoffman, "Is Turkey Experiencing a New Nationalism" last modified February 11, 2018,

among the government and the people of Turkey. This is in direct opposition to the 2017 NSS because losing Turkey to Russian influence will decrease American influence in the region and make achieving security objectives more difficult. Additionally, depending on the outcome of the Syrian Civil War, Russia could possibly lose an ally in the region and that means all the more reason to continue to build relations with Turkey.

## Solutions

### Introduction

When it comes to solutions, there is no one solution that will solve all water security problems. Each situation is different and therefore needs a solution that is tailored to the conditions present. Currently, there are a wide array of solutions available that can solve the problems nations face when it comes to water shortages. Government reports and academic scholarship show that this problem can be solved by utilizing technology and changing policy but even then there are still challenges to implement these solutions. In this section, a short review of some current solutions will be provided to show various ways that the water security challenge has been handled. This is to show that there are efforts being made to address the issues at hand. The last part of this section will look into the role that the United States could play in the future of water security and the challenges that it faces currently.

### Diplomacy

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<https://www.americanprogress.org/issues/security/reports/2018/02/11/445620/turkey-experiencing-new-nationalism/>.

Diplomacy will be the first solution looked into. Essentially, diplomacy for water consists of nations working together to solve shared water problems. Currently, there are 261 transboundary waterways around the globe<sup>59</sup>. With this being said, there is the potential for conflict. Unfortunately, not much success has been accomplished in creating an effective international set of rules. The 1966 Helsinki Rules is an effort by the international community to set up rules on transboundary waterways but are ineffective since they do not have enforcement mechanisms<sup>60</sup>. Additionally, in 1997, the United Nations General Assembly adopted the United Nations Watercourse Convention. This convention lays out a framework for governing international watercourses<sup>61</sup>. At the time of writing 16 have signed onto this convention<sup>62</sup>. Given the low number of signatories, it is quite understandable because when it comes to water, nations have different interests in the waters that go through their boundaries and therefore they would not want to be subject to the rules in this convention.

## Desalination

The second solution that will be looked explored is desalination. This is the process of removing salt from seawater and makes water safe for consumption<sup>63</sup>. While it seems like a very viable solution there are some obstacles that desalination needs to

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<sup>59</sup> Steve C. Lonergan, "Water and Conflict: Rhetoric and Reality," In *Environmental Conflict*, ed. Paul F. Diehl and Nils Petter Gleditsch (Boulder: Westview Press, 2000), 109-124. PDF.

<sup>60</sup> Mark Dohrman and Robert Hatem. "The impact of Hydro-politics on the relations of Turkey, Iraq, and Syria," *The Middle East Journal* 68, no. 4 (2014): 567-583, URL: <https://muse.jhu.edu/article/556629>.

<sup>61</sup> "United Nations Watercourses Convention," The United Nations, accessed November 5, 2018, <http://www.unwatercoursesconvention.org/>.

<sup>62</sup> "Convention on the Law of the Non-Navigational Uses of International Watercourses," United Nations Treaty Collection, Accessed November 5, 2018, [https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg\\_no=XXVII-12&chapter=27&lang=en](https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-12&chapter=27&lang=en).

<sup>63</sup> World Economic Forum Water Initiative, *Water Security: The Water-Food-Energy-Climate Nexus* (Washington, DC: Island Press, 2011), 64. PDF.

overcome for it to be a strong solution for nations. One of the first challenges that desalination poses is that it's an energy intensive process. The World Economic Forum states that it takes about 3,600-4,500 kWh per million liters produced<sup>64</sup>. Since energy is a limited resource, depending on the level of resources, it may not be in the best interest of a nation to expend limited energy resources on water. The other challenges that are faced by desalination are mainly environmental impacts. According to the World Bank Group, desalination produces brine which is a stew of all the rejected material from the desalinating process and desalination plants leave a huge greenhouse gas emission<sup>65</sup>. Essentially, we're trying to solve one problem—water shortages—at the expense of another problem—greenhouse gas emissions/climate change—and will therefore continue to exacerbate the issues that we face today. Therefore, it is based on this research that it would be best not to construct desalination plants unless a nation has the energy resources and is in a position where it is viable and necessary.

### Virtual Water

This concept was created by Professor Tony Allan of the King's College in London. This concept states that all products have a water footprint and that water is embedded in product<sup>66</sup>. In his book *Virtual Water*, Allan estimates that it takes about 1,300 liters of water to produce a kilogram of wheat<sup>67</sup>. Therefore by trading wheat or any other product a nation can save water so they can use the water for different

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<sup>64</sup> World Economic Forum Water Initiative, *Water Security: The Water-Food-Energy-Climate Nexus* (Washington, DC: Island Press, 2011), 57. PDF.

<sup>65</sup> World Bank, *High and Dry: Climate Change, Water, and the Economy* (Washington, DC: World Bank, 2016), 36.

<sup>66</sup> Tony Allan, *Virtual Water* (London: I.B. Tauris, 2011), 9.

<sup>67</sup> Tony Allan, *Virtual Water* (London: I.B. Tauris, 2011), 347.

purposes or to grow another food product that would not have been grown had the trade not taken place. An example is as follows: Nation A (a water scarce country) imports wheat from Nation B (a water abundant country), nation A saves 1,300 liters of water per kg by importing wheat from nation B. It's very good in the fact that it helps promote trade and sends water—albeit virtual—to where it's needed. One point that the World Economic Forum pointed out in their 2011 report though was there needs to be a strong trading environment/regime in order for a virtual water trade to be successful<sup>68</sup>. At the current moment, with the rise of nationalism and isolationism around the globe the trading environment would have to overcome many obstacles in our day and age before a successful virtual water trade can reach its full potential.

#### [The Role of the United States in solving International Water Security](#)

At the conclusion of the ICA 2012 Report, it was said that the United States could play a vital role in solving the water security issue<sup>69</sup>. There are many things the U.S. could do as outlined in the report such as collaborating with other nations and sharing technologies and best practices. While the U.S. has the opportunity to address the water security issue, recent U.S. activities have made it hard to work with other nations.

The main issue is the credibility of the United States and its standing in the world. According to Freedom House in their 2018 *Freedom in the World* report state that America's eroding democratic standards are "damaging its international credibility

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<sup>68</sup> World Economic Forum Water Initiative, *Water Security: The Water-Food-Energy-Climate Nexus* (Washington, DC: Island Press, 2011), 74. PDF

<sup>69</sup> National Intelligence Council, *Global Water Security* (Washington, DC: GPO, 2012), 11.

as a champion of good governance...<sup>70</sup>". Therefore, it may be harder for the U.S. to work with other nations since there is now starting to be a seed of mistrust planted in the international community towards the U.S. This in turn may create a power vacuum that another nation could possibly fill.

## Conclusion

In conclusion, this thesis has looked into the nexus of climate change, water, and security. It showed that climate change has a huge impact on many aspects of our environment, most notably water. With a shortage of water, many fundamental aspects of society are negatively impacted such as the food sector. This in turn effects security both regionally and globally. This thesis has also shown that there is an inextricable connection between security, climate change, and water. This was accomplished by conducting a literature review of previous scholarship and analyzing the 2017 National Security Strategy released by the Trump Administration to serve as a benchmark of policy during the time of writing. After the first section was completed, case studies were then explored. The case studies looked into China and the Tigris-Euphrates River. The case studies went along the format of two sections, the first section looked at the current situation in the region in regard to climate change and water. The second section then looked at projections and showed possible political and security issues that could arise because of water scarcity. These case studies show that the Chinese

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<sup>70</sup> Freedom House, *Freedom in the World 2018* (Washington, DC: Freedom House, 2017), 4.



Communist Party could experience divisions and increased social instability and that Turkey will experience continued growth of nationalism, be denied admission to the European Union, and continue to cultivate closer ties with Russia. The last section reviews solutions currently implemented in combating water security. Solutions that were reviewed include diplomacy, desalination, and the concept of virtual water. These solutions have their merits, but they also have downsides that make them difficult to implement. The last part of this section then talked about the United States' role in addressing water security. While the United States is attempting to combat water security around the world, there are challenges it needs to overcome.

Closing warrants a return back to the Potomac River in Great Falls National Park in Northern Virginia. The amazing falls in the park are the result of years and years of erosion and constant flowing of the Potomac. Unfortunately, humanity has not been as constant with our habits towards the environment as the Potomac is with its flow. Years of pollution, emission of greenhouse gases, and over-reach of resources have placed humanity in a dire position. Our swift actions shocked the environment and now it is changing. If there is one lesson that water can teach us is that consistency can change and shape mountains, like those at Great Falls National Park. For humanity, that consistency starts with a commitment to change our current situation for ourselves and our future. In October 2018, the United Nations warned that we only 12 years until our world faces irreversible damage from climate change<sup>71</sup>. It is a daunting statement.

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<sup>71</sup> Jonathan Watts, "We have 12 years to limit climate change catastrophe, warns UN" last modified October 8, 2018, <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>.

Hopefully, if we start soon fighting climate change vigorously and consistently in our everyday actions, just like water, we can change and shape the mountain that we face.

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