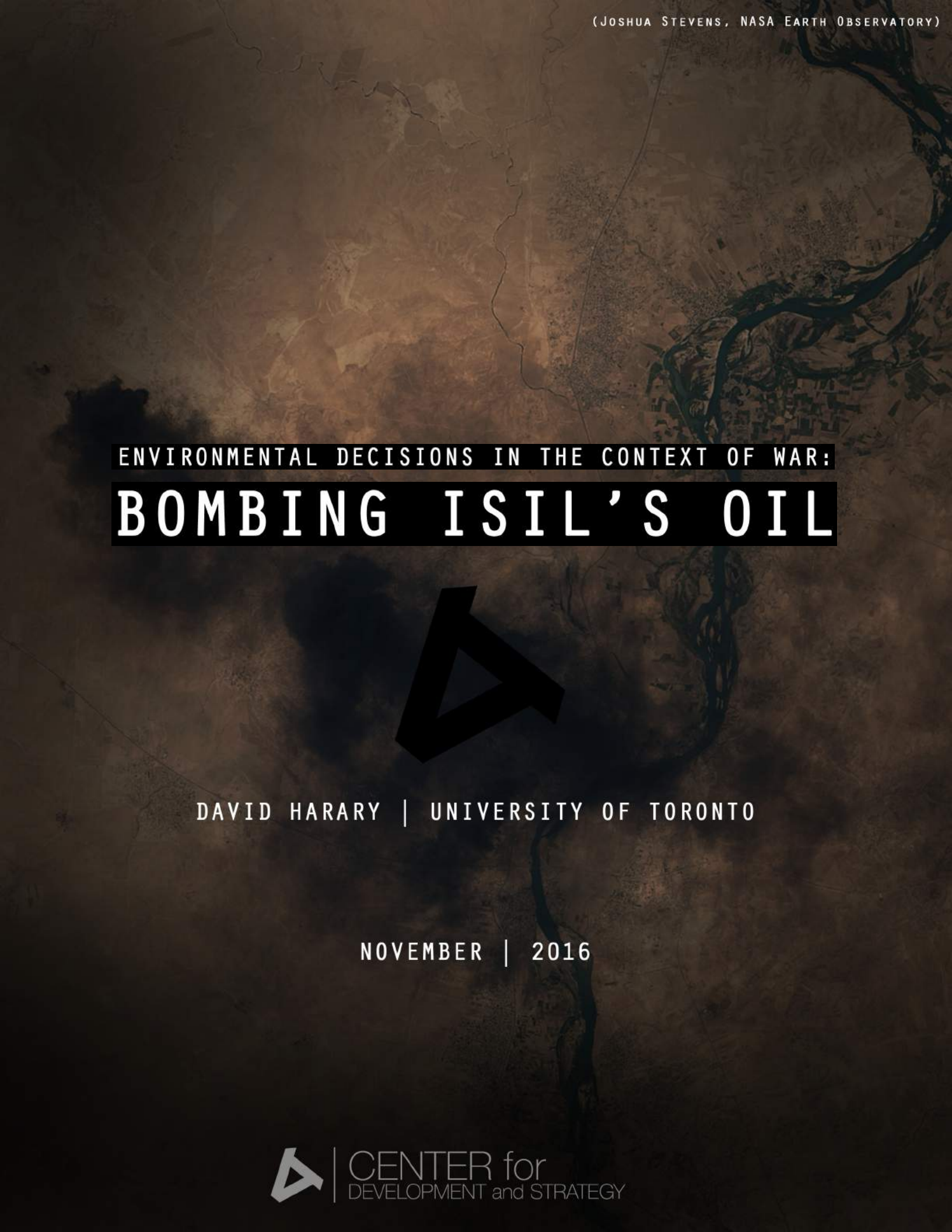

ENVIRONMENTAL DECISIONS IN THE CONTEXT OF WAR:

BOMBING ISIL'S OIL

DAVID HARARY | UNIVERSITY OF TORONTO

NOVEMBER | 2016

CENTER for DEVELOPMENT and STRATEGY

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1.0 Abstract

This paper evaluates the ethical dilemma coalition forces had to face when deciding to target and take out ISIL's primary source of revenue – oil. By gathering the impacts ISIL has had on the globe as well as the impacts aerial attacks could have on the MENA region; this paper was able to create a decision matrix that quantitatively weighs the options decision-makers had to limit further harm done on the region's society, environment, and economy. This paper serves as a baseline tool by which policymakers can quickly process the plusses and minuses of initiating attacks. Future research should investigate further into the values associated with ISIL's destruction.

Keywords: Oil, environment, economy, Islamic State

Published on November 16, 2016

2.0 Introduction

Since the United States withdrawal from Iraq in 2011, the Islamic State of Iraq and the Levant (ISIL) has grown substantially. The widely designated terrorist organization garnered significant notoriety in 2014 after having committed many war crimes, human rights abuses, and children's rights violations. To counter this, a number of international military coalitions have been formed. In December of 2014, leaders from 59 countries met at NATO headquarters in Brussels, Belgium to formulate a strategy that would defeat ISIL.[1] One of the core tenants of this strategy was to cut off the group's sources of financing and funding.

Mission Objectives

In coordination with its coalition partners, the U.S. intelligence community (IC) gathered key information on the oil and gas reserves ISIL was in control of. Control of these reserves has been a primary source of revenue for the terrorist organization. However, there have been reports that decision-makers had been reluctant to the targeting of these reserves, as it could pose significant environmental risks on communities. Additionally, bombing these targets could induce long-term damage to

[1] Joint Statement Issued by Partners at the Counter-ISIL Coalition Ministerial Meeting. United States Department of State, 3 December 2014. Retrieved 13 November 2016.

the Middle East and North African (MENA) region's economic prosperity following ISIL's prospective defeat. This paper will review the ethical dilemma U.S. intelligence officials were faced when deciding to target these oil fields. It will provide an overview of the hazards associated with bombing ISIL's oil and gas reserves with respect to the destruction ISIL has had on the world. An analysis will be conducted using a series of options that are weighted according to their associated risks, costs, and benefits. Based on this analysis, recommendations for IC decision-makers will be made.

3.0 ISIL's Damage

ISIL's rise and takeover of vast swaths of land across Iraq and Syria has affected the region's way of life, cultural heritage, economy, and more. In addition, ISIL's infiltration across the globe has induced numerous casualties from terrorist attacks as well as major political shifts in western nations. This section will provide a brief overview of the net impacts ISIL has had on the world.

Land Capture

After declaring itself as a global caliphate in June of 2014, ISIL quickly captured cities and territory in northern Iraq, Libya, Nigeria, and Syria. Additionally, numerous offshoot branches of the terrorist group were established in Algeria, Egypt, Afghanistan, Pakistan, Yemen, the North Caucasus, Gaza, Chad, Niger, Cameroon, and elsewhere. Through means of war, persecution, and terrorist attacks; ISIL's land grabs have led to thousands of deaths throughout the world.

Casualties of War and Terrorism

According to U.K.-based non-profit Airwars, in over 827 days, there have been over 16,242 strikes initiated by coalition forces against ISIS.[2] Airwars has estimated the minimum civilian death count as a result of these aerial attacks to be over 1,841 as of November 14, 2016.[5] Additionally, after military intervention against ISIL began, the group has suffered numerous casualties. As of August 2016, the U.S. military estimated 45,000 total ISIL fighters had been killed in Iraq and Syria and 300 in Afghanistan.[3,4] On the coalition side, there have been over 4,230 security fighters killed in battle.[5,6] Over 17,000 civilians in Iraq and Syria have been killed by ISIL.[8]

There have also been a number of terrorist incidents linked to ISIL throughout the world. As of September 1, 2016, there has been 143 attacks in 29 countries that have killed over 2,043 innocent civilians.[7]

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[2] "Airwars." Airwars. November 14, 2016. Accessed November 14, 2016. https://airwars.org/.
[3] "45,000 ISIS fighters killed in past two years: US general". AFP. 10 August 2016. Retrieved 14 November 2016.
[4] Miglani, Sanjeev. "U.S. Says 300 Islamic State Fighters Killed in Afghan Operation." Reuters, August 10, 2016. Accessed November 14, 2016. http://www.reuters.com/article/us-afghanistan-usa-islamic-state-idUSKCN10L14B.
[5] "Iraq 2015: A Catastrophic Normal." Iraq Body Count. January 1, 2016. Accessed November 14, 2016. https://www.iraqbodycount.org/analysis/numbers/2015/.
[6] "Egypt: ISIS Attack Kills 15 Security Personnel in North Sinai." The Indian Express, March 20, 2016. Accessed November 14, 2016. http://indianexpress.com/article/world/world-news/egypt-isis-attack-kills-15-security-personnel-in-north-sinai/.
[7] Lister, Tim, Ray Sanchez, Mark Bixler, Sean O'Key, Michael Michael Hogenmiller, and Mohammed Tawfeeq. "ISIS Goes Global: 143 Attacks in 29 Countries Have Killed 2,043." CNN, September 1, 2016. Accessed November 14, 2016. http://www.cnn.com/2015/12/17/world/mapping-isis-attacks-around-the-world/.

Displacement

In addition to both civilian and military causalities, ISIL has displaced far more civilians through both land takeovers and war. Most notably, the displacement of over 7.6 million Syrian civilians and 3.3 million Iraqi civilians has been largely attributed to ISIL.[8]

Cultural Damage

ISIL has also destroyed many ancient historical artifacts and buildings as a form of 'cultural cleansing'. These have included mosques, shrines, churches, ancient and medieval sites, and libraries. In Syria, six UNESCO World Heritage sites have been either been damaged or destroyed since the start of the civil war.[9]

Economic Damage

In a World Bank article published in October of 2016, the direct and indirect economic effects of the Syrian war and the emergence of ISIL were quantitatively evaluated on the countries in the greater Levant region. The study found that Iraq and Syria has borne the brunt of economic decline, with direct and indirect economic

[8] Crowcroft, Orlando. "Isis: Worst Refugee Crisis in a Generation as Millions Flee Islamic State in Iraq and Syria." International Business Times, June 17, 2015. Accessed November 14, 2016. http://www.ibtimes.co.uk/isis-worst-refugee-crisis-generation-millions-flee-islamic-state-iraq-syria-1506613.

[9] Thompson, Stephanie. "This Map Reveals the Full Extent of ISIS's Cultural Destruction." World Economic Forum. February 19, 2016. Accessed November 14, 2016. https://www.weforum.org/agenda/2016/02/this-map-reveals-the-full-extent-of-isis-s-cultural-destruction.

losses totaling 28 and 23 percent, respectively.[10] Additionally, Egypt was found to have suffered economic losses of 10 percent, while Jordan lost 9 percent in total economic output.[13]

Environmental Damage

ISIL has also waged war in the MENA region through environmental destruction. In October of 2016, NASA satellites captured imagery of white plumes escaping a large sulfur plant near Mosul, which was purposefully set on fire by ISIL.[11] Over 1,000 people were hospitalized and two people died as a result of breathing these sulfur fumes.[12] The group has also been responsible for setting oil wells on fire, which has filled the air with black carbon and toxic fumes.[13] Also in 2016, ISIL opened up oil pipelines in towns where Iraqi security forces have raided, causing floods of crude oil to spill out into streets and the Tigris river.[14] ISIL's version of environmental warfare is expected to have long-lasting consequences on Iraq's resources.

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[10] Ianchovichina, Elena, and Maros Ivanic. "Economic Effects of the Syrian War and the Spread of the Islamic State on the Levant." The World Economy (2016).
[11] NASA. Earth Observatory. *Sulfur Dioxide Spreads Over Iraq.* November 02, 2016. Accessed November 15, 2016. http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=88994&src=twitter-nh].
[12] "Sulphur Cloud from Torched Plant Kills Two Iraqis." *Al Jazeera*, October 22, 2016. Accessed November 15, 2016. http://www.aljazeera.com/news/2016/10/sulphur-cloud-torched-plant-kills-iraqis-161022152140398.html.
[13] NASA. Earth Observatory. *Oil Fires in Iraq.* September 02, 2016. Accessed November 15, 2016. http://earthobservatory.nasa.gov/IOTD/view.php?id=88666&src=twitter-iotd.
[14] Plumer, Brad, and Yochi Dreazen. "In Iraq, the Environment Itself Has Once Again Become a Weapon of War." Vox. November 1, 2016. Accessed November 15, 2016. http://www.vox.com/2016/11/1/13481682/isis-mosul-oil-fires-sulfur.

4.0 ISIL'S Oil Resources

One of ISIL's primary sources of revenue has been through its occupation, control, and exploitation of oil and gas reserves across Iraq and Syria. ISIL's rise to power; ability to recruit; and capacity to wage war was significantly affected by its control over these energy resources.[15]

Economics

While many estimates vary, it's likely ISIL was producing between 34,000-40,000 barrels per day and sold between $20-45 USD at the wellhead in October of 2015.[16] This is equivalent to generating revenues of over $1.5 million per day. It's estimated that ISIL controlled over 350 oil wells in Iraq at its peak.[17] In 2014, Iraqi

[15] Solomon, Erika, Guy Chazan, and Sam Jones. "Isis Inc: how oil fuels the jihadi terrorists." *Financial Times* 14 (2015).
[16] Erika Solomon; Guy Chazan; Sam Jones (14 October 2015). "ISIS Inc: how oil fuels the jihadi terrorists". Financial Times. Retrieved 13 November 2016.
[17] Levitt, Matthew. "Terrorist financing and the Islamic State." *Testimony to the House Committee on Financial Services* 13 (2014).

intelligence acquired information that revealed the organization was in possession of over $2 billion in total assets, making it the world's wealthiest jihadist group.[18]

It's clear oil and gas has played a central role in ISIL's power and existence. According to the U.K. government, 40% of ISIL's revenues were coming from oil and gas at its peak.[19] For coalition forces wishing to defeat ISIL, knocking out the resources that are critical towards ISIL's success has been an important strategic approach. Furthermore, the destruction ISIL has had on both the MENA region as well as the world gives coalition forces ample backing to decimate the terrorist group as soon as possible. However, there are a few considerations decision-makers have had to wrestle with to ensure the impacts in the region would be limited. Section 5.0 will provide an overview of the possible unintended consequences of aerial attacks on the oil and gas reserves ISIL is in control of.

[18] Moore, Jack (11 June 2014). "Mosul Seized: Jihadis Loot $429m from City's Central Bank to Make ISIS World's Richest Terror Force". *International Business Times*. UK. Retrieved 13 November 2016.
[19] Wintour, Patrick. "Oil Revenue Collapse Means Isis Reliant on Gulf Funds, Inquiry Hears." *The Guardian*, March 8, 2016. Accessed November 14, 2016. https://www.theguardian.com/world/2016/mar/08/oil-revenue-collapse-isis-reliant-gulf-funds-inquiry-hears.

5.0 Aerial Attack Impacts

Aerial attacks via drones and manned aircraft are often a preferred method of eliminating high-value targets by military leaders and decision-makers. However, while precision-guided munitions (PGMs) limit both collateral damage and risk to civilians, the consequences related to hitting oil and gas reserves may be more substantial. In particular, these effects involve both short-term risks to valuable resources, as well as long-term risks to the economic prosperity of the MENA region.

Environmental Impacts

In November of 2015, former deputy director of the Central Intelligence Agency (CIA), Michael Morell, stated on PBS's "Charlie Rose" the White House had been reluctant to bombing oil wells held by ISIL.[20] Morell claimed this was due to the possible long-term environmental and infrastructure damages bombings would induce. Instead, Morell inferred the targeting of oil trucks as a reasonable alternative.

[20] "Charlie Rose." Transcript. In *Charlie Rose*. Public Broadcasting Service. November 24, 2015.

"As ISIL continues to lose **territory**, it also continues to lose the **money** that is its lifeblood. As a result of our **strikes** against its oil infrastructure and supply lines, we believe that we've cut ISIL's **revenue** from oil by millions of dollars per month."

– President Obama June 14, 2016

If coalition forces were to strike the 350 oil wells held by ISIL, environmental damage in the region could become far worse than the contamination ISIL has already inflicted on the region. While attacks on industrial infrastructure, including oil wells, are illegal per the Geneva Conventions, there have been many instances where oil has been targeted in warfare.[21] In many of these events, pollution has made post-conflict recovery more difficult and instability persist longer.

Air, soil, and water contamination can also inflict significant health effects on local populations. Burning oil releases toxic chemicals into the air. These can include sulfur dioxide, nitrogen dioxide, carbon monoxide, polycyclic aromatic hydrocarbons, and lead. Long-term exposure to these substances may lead to kidney disorders, liver problems, respiratory disorders, and cancer.

Alarmingly, many of ISIL's oil fields are located nearby the Tigris river in Syria's eastern Deir Ezzor province.[22] Groundwater contamination can imperil agricultural production, as well as ground and surface water used for drinking and domestic purposes. Food and water insecurity could therefore be increased, which could perhaps induce further unrest and conflict in the region. However, it should also be

[21] Zwijnenburg, Wim, and Annica Walejj. "Fire and Oil: The Collateral Environmental Damage of Airstrikes on ISIS Oil Facilities." *New Security Beat* (blog), January 13, 2016. Accessed November 15, 2016. https://www.newsecuritybeat.org/2016/01/fire-oil-collateral-damage-airstrikes-isis-oil-facilities/.
[22] Solomon, Erika, Robin Kwong, and Steven Bernard. "Inside Isis Inc: The Journey of a Barrel of Oil." Financial Times. February 29, 2016. Accessed November 15, 2016. http://ig.ft.com/sites/2015/isis-oil/.

noted that before ISIL emerged in 2014, Syria and Iraq's environmental quality was already in poor condition.[23]

Indirect Impacts

In addition to the potential environmental and health impacts induced by aerial attacks, Iraq and Syria would be highly susceptible to long-term decreased economic output. For example, the petroleum industry accounted for 25.1% of Syria's total revenue in 2010.[24] Between 2010-2014, Syria lost over 97.5 percent of its registered volume of oil production.[25] Knocking out all oil fields held by ISIL would make it considerably difficult for both Syria and Iraq to rebuild following the group's prospected defeat.

Additionally, attacks that disable critical infrastructure can have further hazards on important resources. When electrical power facilities were demolished in the Gulf War of 1991, water purification and sewage treatment plants shut down, which induced outbreaks of gastroenteritis, cholera, and typhoid. This led to an estimated 100,000 civilian fatalities.[26] These kinds of unintended effects are often geographically variant and unforeseeable. For this reason, the precautionary approach the White

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[23] Zwijnenburg, Wim, and Kristine Te Pas. *Amidst the Debris: Environmental Impact of Conflict in Syria Could Be Disastrous*. Report. PAX For Peace. Colophon, 2015.
[24] IMF, Syria. "Staff Report for the 2009 Article IV Consultation." *Syrian Arab Republic* (2010).
[25] Syrian Economic Forum (2015). The Islamic State benefits from the regime's loss of 97.5% of Syria's oil production. Accessed at: http://www.syrianef.org/ En/?p=4179
[26] Fisk, Robert. *The great war for civilisation: The conquest of the Middle East*. Vintage, 2007.

House took may have been ethically correct. To determine whether this is the case, section 5.0 will analyze the choices policymakers had on ISIL's oil and gas reserves, to minimize the most amount of damage possible.

6.0 Analysis

In order to deduct the most viable option for the IC, its coalition partners, and White House policymakers, a decision matrix was constructed that accounts for the total amount of social, environmental, and economic value that would be destructed in the aftermath scenario of each choice.

Methodology

Variables were weighted according to their importance on a scale between 0-5. Next, the risked amount of damage inflicted upon each variable, according to each option, was scored between 0-10. These values were then multiplied across, resulting in a net score. The best option for decision-makers to choose from is the lowest net score.

The social values category is based on ISIL's forecasted ability to grab more land, kill more people, displace more civilians, and destroy more relics following each option's implementation. The environmental values category is based on both ISIL's ability to wage further environmental destruction as well as the risks of unintended environmental damage following each option's implementation. Lastly, the economic values category is based on both ISIL's further economic effect on the region as well as the risks of unintended economic damage following each option's implementation.

The first option, ‘don’t strike’, is the IC’s business-as-usual scenario. This would not involve any targeted strikes on ISIL’s oil and gas reserves. The second option, ‘strike’, would involve the active deployment of PGMs directly towards oil and gas fields. The third option, ‘alternative strike’, would involve the active deployment of PGMs and/or aerial gunfire towards petroleum transportation vehicles, as opposed to oil and gas fields directly.

	Risked Damage Inflicted			
Option:	Social	Environmental	Economic	**Total**
Weights:	*5*	*2*	*3*	***150***
Don't Strike	10	4	6	**76**
Strike	6	9	7	**69**
Alternative Strike	8	2	4	**56**

Table 1.

7.0 Recommendations

Based on this paper's analysis, the best option for military and intelligence decision-makers to choose, would be to target ISIL's petroleum transportation vehicles. This option would pose 26 percent less risk towards the social, environmental, and economic elements of society in Iraq and Syria than not deploying any PGMs at all. The 'alternative strike' option also poses 18 percent less risk than deploying PGMs directly on oil and gas fields. It's therefore recommended that intelligence, military, and White House decision-makers go ahead with the direct bombing of ISIL's transportation vehicles containing oil and/or gas.