# Heritage

### Property Rights---1AC

#### Advantage 1 is Property Rights

#### An agreement on lunar artifacts sets precedent for a preservation-based regime that addresses property and mining rights in space---starting with a non-confrontational issue like preservation is key

Jacqueline Feldscher 19, National Security Reporter, M.A. in Journalism from the Medill School of Journalism at Northwestern University, Interviewing Michelle Hanlon, Associate Director of the National Center for Air and Space Law at the University of Mississippi School of Law, 6-28-2019, How A Park On The Moon Could Lead To More Consensus On Space Exploration, Politico, https://www.politico.com/story/2019/06/28/moon-space-travel-tourism-1383824

Hanlon also says she believes advancing the discussion on preservation is a non-confrontational way to launch a broader conversation about property and mining rights in space. And she hopes getting nations to agree on heritage sites that are out of this world could pave the way for consensus on other critical space issues. “If we can agree that there are places on the moon that we need to protect, that’s one way of figuring out how we’re going to zone and create the concept of if, not property ownership, at least title or mining rights," she told POLITICO. This transcript has been edited for clarity. What Prompted You To Want To Save The Moon Sites? It started with a quote from the head of the European Space Agency. … He said, “I like to joke that we need to get back to the moon if only to take down those American flags.” It hit a nerve with me. He was totally joking, but it was like, wait a minute, can they do that? … Anybody can run over those boot prints with impunity. But it got bigger than that. … We’re not all going to sit around the table and sing Kumbaya tomorrow, but this is a baby step to getting all nations to agree. We haven’t agreed on anything enforceable in space since the ‘70s, but 193 countries on Earth have acceded to the [list of] World Heritage sites. … We all agree on preservation. If we can take that, and help it form basis of future agreements in space. So, you hope a consensus to protect the lunar landing sites would lead to other agreements? Absolutely. … The concept of preservation gets at the next big issue in space, which is property ownership and mining. How do we figure out who gets to mine what and what happens to the resources extracted? … If we can agree that there are places on the moon that we need to protect, that’s one way of figuring out how we’re going to zone and create the concept of if, not property ownership, at least title or mining rights. We think starting that conversation about property in space with preservation is sort of unifying.

#### Absent agreement on property and mining rights---conflict over resources is inevitable

John Myers 16, 2017 J.D. Candidate, University of San Diego School of Law, Extraterrestrial Property Rights: Utilizing the Resources of the Final Frontier, San Diego International Law Journal, Volume 18, Page 77–128, 2016, Accessed via Hein Online

The doctrine of discovery is a “top-down” approach to the acquisition of property: sovereignty and property are inherently intertwined. The topdown view of property traces its roots to the 1648 Peace of Westphalia; however, there is a strong tradition in Western scholarship and law that property law is grown and developed from the bottom up. For example, in Roman law, the Institutes of Justinian advanced the idea of ownership through occupancy. In addition, John Locke in England promoted the labor theory that allows ownership to be earned by the “sweat of your brow.” Most importantly, property today is largely viewed as a bundle of rights that include the rights to possess, use, exclude, and transfer. This bundle of rights is subject to reconfiguration depending on the form of property. Property rights in space are novel and therefore require a new configuration in the bundle of rights associated with that property. Moreover, the grant of property rights in space will prevent both the Tragedy of the Commons and the Tragedy of the Anticommons. In the first case, if property rights are not granted in space, it is foreseeable that conflicts will arise because multiple corporations could land on the same asteroid. Hypothetically, if a particularly resource-rich asteroid that would be easy to land on and mine is discovered, both an American corporation and a Chinese corporation could land on it and this would result in issues both in space and on Earth. In the second case, if property rights are not granted in space, it is as likely foreseeable that corporations will not invest in space and the resources of space will go underexploited. Currently there are analogous situations on Earth that the recognition of property rights in space will either avoid or emulate. In the case of African land grabs, there is virtually no government oversight and therefore resources are being overexploited. On the other hand, in the East and South China Seas, there are several governments claiming a number of islands and island groups leading to under-utilization of resources. Space offers an opportunity for a blank slate, provided the rights and obligations of nations are clear from the beginning. The deep seabed is perhaps the most closely analogous situation on Earth. Like outer space, the deep seabed is considered the “Common Heritage of Mankind.” The UNCLOS was intended to create an agreement to regulate the use and exploitation of the resources in the deep seabed. The United States, along with Japan, West Germany, and the United Kingdom, did not sign the convention, and instead created national legislation and other schemes to explore and exploit the deep seabed. The United States legislature enacted the DSHMRA that authorizes U.S. citizens to explore and exploit deep seabed resources. This Act further asserts that the United States is not exerting sovereignty over the deep seabed and recognizes the rights of other nations to engage in the same activities. Most importantly, the United States currently has bilateral and multilateral agreements with almost every nation capable of exploiting the deep seabed.

#### Preservation based approach to property that decouples commercial space mining from research is key to prevent conflict

Ramin Skibba 16, Formerly Assistant Project Scientist and Lecturer at the Center for Astrophysics and Space Sciences at the University of California, San Diego, Journalist, 4-19-2016, Mining in Space Could Lead to Conflicts on Earth, Nautilus, <http://nautil.us/blog/mining-in-space-could-lead-to-conflicts-on-earth>

For one thing, it appears to violate international law, according to Congressional testimony by Joanne Gabrynowicz, a space law expert at the University of Mississippi. Before NASA’s moon landing, the United States—along with other United Nations Security Council members and many other countries—signed the 1967 Outer Space Treaty. “Outer space, including the moon and other celestial bodies,” it states, “is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” The 1979 Moon Agreement went further, declaring outer space to be the “common heritage of mankind” and explicitly forbidding any state or organization from annexing (non-Earth) natural resources in the solar system. Major space-faring nations are not among the 16 countries party to the treaty, but they should arguably come to some equitable agreement, since international competition over natural resources in space may very well transform into conflict. Take platinum-group metals. Mining companies have found about 100,000 metric tons of the stuff in deposits worldwide, mostly in South Africa and Russia, amounting to $10 billion worth of production per year, according to the U.S. Geological Survey. These supplies should last several decades if demand for them doesn’t rise dramatically. (According to Bloomberg, supply for platinum-group metals is constrained while demand is increasing.) Palladium, for example, valued for its conductive properties and chemical stability, is used in hundreds of millions of electronic devices sold annually for electrodes and connector platings, but it’s relatively scarce on Earth. A single giant, platinum-rich asteroid could contain as much platinum-group metals as all reserves on Earth, the Google-backed Planetary Resources claims. That’s a massive bounty. As Planetary Resources and other U.S. and foreign companies scramble for control over these valuable space minerals, competing “land grabs” by armed satellites may come next. Platinum-group metals in space may serve the same role as oil has on Earth, threatening to extend geopolitical struggles into astropolitical ones. NASA’s increasing collaboration with space mining companies could distort and divert efforts previously focused on space exploration. Moreover, the technology that might enable this free-for-all—versatile “nanosatellites,” no larger than a loaf of bread—is relatively inexpensive. In December, while reporting for a story about these tiny satellites, also known as CubeSats, I came across some missions applicable to mining asteroids. In mid-2018, NASA will launch a satellite for a mission called Near-Earth Asteroid Scout, for example. It will deploy a solar sail, propel itself with sunlight, and journey to the asteroid belt, where it will scope out a particular asteroid and analyze its properties. Last June, NASA also awarded grants to Planetary Resources to advance the designs of spectral imagers and propulsion systems for CubeSats, and other missions will develop the satellites’ abilities to communicate and network with each other. NASA also awarded Deep Space Industries contracts to assess commercial approaches for NASA’s asteroid goals, which may involve hosting DSI’s asteroid-prospecting equipment on its missions. Like all forms of mining, it will be dangerous. If space-mining activities break up asteroids, the resulting debris could be hazardous for satellites, other spacecraft, and astronauts nearby. On the other hand, in a best-case scenario, space mining could be environmentally safe, capture only necessary minerals and water, and, in the more distant future even lead to the construction of a far-flung space station led by NASA and other space agencies, orbiting 200 million miles from Earth and serving as both a mining depot and a pit-stop for passing spacecraft. But it’s not clear that a pact between the commercial space mining industry and NASA would align with the public’s interest. NASA’s increasing collaboration with space mining companies could distort and divert efforts previously focused on space exploration and basic research and discourage public interest and engagement in astronomy. Last October, for example, Seager advocated for space mining at a science writing conference I attended. She’s part of a motley group of advisors for Planetary Resources, including the movie director James Cameron, a lawyer for a prominent Washington D.C. firm, and Dante Lauretta, another astronomer whom I respect. Seager seems to believe that encouraging private space mining will lead to more investments and technological innovation that would enable more scientific research. In a 2012 interview with The Atlantic, for instance, she said, “The bottom line is that NASA is not working the best that it could for space science right now, and so in order for people like me to succeed with my own research goals, the commercial space industry needs to be able to succeed independently of government contracts.” But if the U.S. and U.S.-based companies lay claim to the richest and most easily accessible prospecting sites, not allowing other companies and nations to share in the wealth, economic and political relations could be damaged. That’s why this seems to be a dangerous path for space explorers. Once you’re on board with the commercial space industry, then you as a researcher must accept, if not support, everything that comes with it. Seager and a few other researchers may be willing to take this risk, but what about the rest of the space science community? Moreover, to succeed, these businesses will seek profitable missions, while science, exploration, and discovery—goals that stimulate public interest—will inevitably have lower priority. (Other commercial spaceflight companies, like Elon Musk’s SpaceX, do generate public interest, but they’re not directly involved in mining asteroids.) NASA may have its shortcomings, but at least its missions and research goals answer to the public. It’s not exactly a welcome thought to imagine more and more of our presence and activity in space being ceded, with NASA’s help, to private industry. What should happen instead? Commercial space mining and science would both be served well by decoupling from each other. We should treat outer space like we do Antarctica. That icy landscape is humankind’s common heritage, where we encourage scientific investigations and conservation and forbid territorial claims. If some organizations want to mine asteroids, then we should take the time to develop and establish an international framework to regulate it properly. Space-mining is an exciting opportunity to articulate our species’ role in our little galactic fragment. But it’s not just about sustainably managing limited or dwindling resources. It’s about our interactions with the nature beyond our humble world. We should explore the solar system as its steward without repeating our economically rapacious past.

#### Property rights regime key to investor certainty for mining

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D PROBLEMS SURROUNDING ASTEROID MINING

While the significant benefits described above show the impending need and the rewards of asteroids mining, many problems must be addressed before asteroid mining becomes a certain fixture of the future. The main issues confronting asteroid mining are the needs for a massive upfront investment and the economic and political implications of mining asteroids in the future.

The most obvious roadblock to asteroid mining is the high required upfront investment needed to participate. While Part I spoke to some of the plans that the NASA is supporting and the goals the agency has set, it omits an impor- tant point: the funding for NASA has decreased drastically over the last twenty years. Currently, it operates using the lowest percentage of the federal budget since 1960.70 Just when we are on the cusp of cracking open the final frontier, the government is bowing out. According to a Collaborative Modeling for Paramet- ric Assessment of Space Systems (COMPASS) team at NASA's Glenn Research Center in Cleveland, the estimate for a successful asteroid capture endeavor is in the ballpark of $2.6 billion,71 while the government's grant to NASA for its cap- ture project is only around $100 million.72 Private companies will have to take the lead and absorb the large costs associated with asteroid mining and space exploration. The costs only continue to Increase beyond the creation of asteroid capture technology—from the harnessing technology, or the costs required for the transport and process of raw asteroidal material to Earth for use (on Earth or elsewhere). In this assessment, the administrative costs of running a company are not even taken into account. While the discussion of technology in Part I of this Note highlights a few successfully funded companies, the high costs op- erate as a roadblock for others. Even though the potential profits are massive, the initial risks of asteroid mining come close to swallowing the benefits. While both Planetary Resources and Deep Space Industries have been very tight-lipped about their costs, the list of big name investors and the ambitious plans insinuate investments in the hundreds of millions of dollars, at a minimum.

As it stands today, mining asteroids is too theoretical and not yet profitable enough to ask the private industry to continue to dump billions into the en- deavor. It will require more relative financial certainties, rather than mere mirages of wealth, to propel the industry.

The current legal framework that is in place, as is described in the next sec- tion, is not adequate to incentivize investors for such a risky endeavor. These businesses want to be sure that the technology, funding, and efforts they put toward the development of space will be rewarded, and so a properly crafted property law regime, unique to outer space, must be developed to ensure that 73 private space industry continues to invest in cosmic ventures and technologies.

The law needs to create a level of predictability and incentive structure that will actually make investors overlook the long path still ahead of them and see the end goal.

#### Asteroid mining solves rare earth mineral shortages, resource conflicts, and toxic waste

Kevin MacWhorter 16, J.D. Candidate, William & Mary Law School, "Sustainable Mining: Incentivizing Asteroid Mining in the Name of Environmentalism", William & Mary Environmental Law and Policy Review, Vol 40, Issue 2, Article 11, https://scholarship.law.wm.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1653&context=wmelpr

A. Rare Element Mining on Earth

In the next sixty years, scientists predict that certain elements crucial to modern industry such as platinum, zinc, copper, phosphorous, lead, gold, and indium could be exhausted on Earth. 12 Many of these have no synthetic alternative, unlike chemical elements such as oil or diamonds.13 Liquid-crystal display (LCD) televisions, cellphones, and laptops are among the various consumer technologies that use precious metals.14Further, green technologies including wind turbines, solar panels, and catalytic converters require these rare elements. 15 As demand rises for both types of technologies, and as reserves of rare metals fall, prices skyrocket.16 Demand for nonrenewable resources creates conflict, and consumerism in rich countries results in harsh labor treatment for poorer countries.17

In general, the mining industry is extremely destructive to Earth’s environment.18 In fact, depending on the method employed, mining can destroy entire ecosystems by polluting water sources and contributing to deforestation.19 It is by its nature an unsustainable practice, because it involves the extraction of a finite and non-renewable resource.20 Moreover, by extracting tiny amounts of metals from relatively large quantities of ore, the mining industry contributes the largest portion of solid wastes in the world.21 The Environmental Protection Agency (EPA) describes the industry as the source of more toxic and hazardous waste than any other industrial sector [in the United States], costing billions of dollars to address the public health and environmental threats to communities. 22 Poor regulations and oxymoronic corporate definitions of sustainability, however, make it unclear as to just how much waste the industry actually produces.23

Platinum provides an excellent case study of the issue, because it is an extremely rare and expensive metal—an ore expected to exist in vast quantities in asteroids.24 Further, production of platinum has increased sharply in the past sixty years in order to keep up with growing demand for use in new technologies.25 In fact, despite their high costs, platinum group metals are so useful that [one] of [four] industrial goods on Earth require them in production. 26 Scholars do not expect demand to slow any time soon.27 Among other technologies, industries use platinum in products such as catalytic converters, jewelry production, various catalysts for chemical processing, and hydrogen fuel cells.28 While there is no consensus on how far the Earth’s reserves of platinum will take humanity, many scientists agree that platinum ore reserves will deplete in a relatively short amount of time.29

With the rate of mining at an all-time high,30 it is increasingly clear that historical patterns of mineral resources and development cannot simply be assumed to continue unaltered into the future. 31 The platinum mining industry, however, has a strong incentive to increase its rate of extraction as profits grow with the rate of demand. Without any alternative, this destructive practice will continue into the future.32

So-called platinum-group metal (PGM) ores are mined through underground or open cut techniques.33 Due to these practices, all but a very small fraction of the mined platinum ore is disposed of as solid waste.34 The environmental consequences of platinum production are thus quite significant, but like the mining industry in general, the amount of waste is typically under-reported.35

While this is due to high production levels at the moment, those levels will only increase given the estimated future demand of platinum.36 In spite of the negative consequences, mining continues unabated because it is economically important to many areas.37 The future environmental costs provide a major challenge in creating a sustainable system. Relegating at least some mining companies to near-Earth asteroids would reduce the negative effects of future mining levels on Earth. The economic benefits of mining need not be sacrificed for the sake of the environment.38

#### Mineral shortages prevent the transition to clean energy needed to solve warming

Nafeez Ahmed 18, DPhil in international relations from the School of Global Studies at Sussex University, an investigative journalist and international security scholar, Dec 12 2018, "We Don't Mine Enough Rare Earth Metals to Replace Fossil Fuels With Renewable Energy", Vice, https://www.vice.com/en\_us/article/a3mavb/we-dont-mine-enough-rare-earth-metals-to-replace-fossil-fuels-with-renewable-energy

A new scientific study supported by the Dutch Ministry of Infrastructure warns that the renewable energy industry could be about to face a fundamental obstacle: shortages in the supply of rare metals.

To meet greenhouse gas emission reduction targets under the Paris Agreement, renewable energy production has to scale up fast. This means that global production of several rare earth minerals used in solar panels and wind turbines—especially neodymium, terbium, indium, dysprosium, and praseodymium—must grow twelvefold by 2050.

But according to the new study by Dutch energy systems company Metabolic, the “current global supply of several critical metals is insufficient to transition to a renewable energy system.”

The study focuses on demand for rare metals in the Netherlands and extrapolates this to develop a picture of how global trends are likely to develop.

“If the rest of the world would develop renewable electricity capacity at a comparable pace with the Netherlands, a considerable shortage would arise,” the study finds. This doesn’t include other applications of rare earth metals in other electronics industries (rare earth metals are widely used in smartphones, for example). “When other applications (such as electric vehicles) are also taken into consideration, the required amount of certain metals would further increase.”

Demand for rare metals is pitched to rise exponentially across the world, and not just due to renewables. Demand is most evident in “consumer electronics, military applications, and other technical equipment in industrial applications. The growth of the global middle class from 1 billion to 3 billion people will only further accelerate this growth.”

But the study did not account for those other industries. This means the actual problem could be far more intractable. In 2017, a study in Nature found that a range of minerals essential for smartphones, laptops, electric cars and even copper wiring could face supply shortages in coming decades.

#### Warming causes extinction

Peter Kareiva 18, Ph.D. in ecology and applied mathematics from Cornell University, director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA, et al., September 2018, “Existential risk due to ecosystem collapse: Nature strikes back,” Futures, Vol. 102, p. 39-50

In summary, six of the nine proposed planetary boundaries (phosphorous, nitrogen, biodiversity, land use, atmospheric aerosol loading, and chemical pollution) are unlikely to be associated with existential risks. They all correspond to a degraded environment, but in our assessment do not represent existential risks. However, the three remaining boundaries (climate change, global freshwater cycle, and ocean acidification) do pose existential risks. This is because of intrinsic positive feedback loops, substantial lag times between system change and experiencing the consequences of that change, and the fact these different boundaries interact with one another in ways that yield surprises. In addition, climate, freshwater, and ocean acidification are all directly connected to the provision of food and water, and shortages of food and water can create conflict and social unrest.

Climate change has a long history of disrupting civilizations and sometimes precipitating the collapse of cultures or mass emigrations (McMichael, 2017). For example, the 12th century drought in the North American Southwest is held responsible for the collapse of the Anasazi pueblo culture. More recently, the infamous potato famine of 1846–1849 and the large migration of Irish to the U.S. can be traced to a combination of factors, one of which was climate. Specifically, 1846 was an unusually warm and moist year in Ireland, providing the climatic conditions favorable to the fungus that caused the potato blight. As is so often the case, poor government had a role as well—as the British government forbade the import of grains from outside Britain (imports that could have helped to redress the ravaged potato yields).

Climate change intersects with freshwater resources because it is expected to exacerbate drought and water scarcity, as well as flooding. Climate change can even impair water quality because it is associated with heavy rains that overwhelm sewage treatment facilities, or because it results in higher concentrations of pollutants in groundwater as a result of enhanced evaporation and reduced groundwater recharge. Ample clean water is not a luxury—it is essential for human survival. Consequently, cities, regions and nations that lack clean freshwater are vulnerable to social disruption and disease.

Finally, ocean acidification is linked to climate change because it is driven by CO2 emissions just as global warming is. With close to 20% of the world’s protein coming from oceans (FAO, 2016), the potential for severe impacts due to acidification is obvious. Less obvious, but perhaps more insidious, is the interaction between climate change and the loss of oyster and coral reefs due to acidification. Acidification is known to interfere with oyster reef building and coral reefs. Climate change also increases storm frequency and severity. Coral reefs and oyster reefs provide protection from storm surge because they reduce wave energy (Spalding et al., 2014). If these reefs are lost due to acidification at the same time as storms become more severe and sea level rises, coastal communities will be exposed to unprecedented storm surge—and may be ravaged by recurrent storms.

A key feature of the risk associated with climate change is that mean annual temperature and mean annual rainfall are not the variables of interest. Rather it is extreme episodic events that place nations and entire regions of the world at risk. These extreme events are by definition “rare” (once every hundred years), and changes in their likelihood are challenging to detect because of their rarity, but are exactly the manifestations of climate change that we must get better at anticipating (Diffenbaugh et al., 2017). Society will have a hard time responding to shorter intervals between rare extreme events because in the lifespan of an individual human, a person might experience as few as two or three extreme events. How likely is it that you would notice a change in the interval between events that are separated by decades, especially given that the interval is not regular but varies stochastically? A concrete example of this dilemma can be found in the past and expected future changes in storm-related flooding of New York City. The highly disruptive flooding of New York City associated with Hurricane Sandy represented a flood height that occurred once every 500 years in the 18th century, and that occurs now once every 25 years, but is expected to occur once every 5 years by 2050 (Garner et al., 2017). This change in frequency of extreme floods has profound implications for the measures New York City should take to protect its infrastructure and its population, yet because of the stochastic nature of such events, this shift in flood frequency is an elevated risk that will go unnoticed by most people.

4. The combination of positive feedback loops and societal inertia is fertile ground for global environmental catastrophes

Humans are remarkably ingenious, and have adapted to crises throughout their history. Our doom has been repeatedly predicted, only to be averted by innovation (Ridley, 2011). However, the many stories of human ingenuity successfully addressing existential risks such as global famine or extreme air pollution represent environmental challenges that are largely linear, have immediate consequences, and operate without positive feedbacks. For example, the fact that food is in short supply does not increase the rate at which humans consume food—thereby increasing the shortage. Similarly, massive air pollution episodes such as the London fog of 1952 that killed 12,000 people did not make future air pollution events more likely. In fact it was just the opposite—the London fog sent such a clear message that Britain quickly enacted pollution control measures (Stradling, 2016). Food shortages, air pollution, water pollution, etc. send immediate signals to society of harm, which then trigger a negative feedback of society seeking to reduce the harm.

In contrast, today’s great environmental crisis of climate change may cause some harm but there are generally long time delays between rising CO2 concentrations and damage to humans. The consequence of these delays are an absence of urgency; thus although 70% of Americans believe global warming is happening, only 40% think it will harm them (http://climatecommunication.yale.edu/visualizations-data/ycom-us-2016/). Secondly, unlike past environmental challenges, the Earth’s climate system is rife with positive feedback loops. In particular, as CO2 increases and the climate warms, that very warming can cause more CO2 release which further increases global warming, and then more CO2, and so on. Table 2 summarizes the best documented positive feedback loops for the Earth’s climate system. These feedbacks can be neatly categorized into carbon cycle, biogeochemical, biogeophysical, cloud, ice-albedo, and water vapor feedbacks. As important as it is to understand these feedbacks individually, it is even more essential to study the interactive nature of these feedbacks. Modeling studies show that when interactions among feedback loops are included, uncertainty increases dramatically and there is a heightened potential for perturbations to be magnified (e.g., Cox, Betts, Jones, Spall, & Totterdell, 2000; Hajima, Tachiiri, Ito, & Kawamiya, 2014; Knutti & Rugenstein, 2015; Rosenfeld, Sherwood, Wood, & Donner, 2014). This produces a wide range of future scenarios.

Positive feedbacks in the carbon cycle involves the enhancement of future carbon contributions to the atmosphere due to some initial increase in atmospheric CO2. This happens because as CO2 accumulates, it reduces the efficiency in which oceans and terrestrial ecosystems sequester carbon, which in return feeds back to exacerbate climate change (Friedlingstein et al., 2001). Warming can also increase the rate at which organic matter decays and carbon is released into the atmosphere, thereby causing more warming (Melillo et al., 2017). Increases in food shortages and lack of water is also of major concern when biogeophysical feedback mechanisms perpetuate drought conditions. The underlying mechanism here is that losses in vegetation increases the surface albedo, which suppresses rainfall, and thus enhances future vegetation loss and more suppression of rainfall—thereby initiating or prolonging a drought (Chamey, Stone, & Quirk, 1975). To top it off, overgrazing depletes the soil, leading to augmented vegetation loss (Anderies, Janssen, & Walker, 2002).

Climate change often also increases the risk of forest fires, as a result of higher temperatures and persistent drought conditions. The expectation is that forest fires will become more frequent and severe with climate warming and drought (Scholze, Knorr, Arnell, & Prentice, 2006), a trend for which we have already seen evidence (Allen et al., 2010). Tragically, the increased severity and risk of Southern California wildfires recently predicted by climate scientists (Jin et al., 2015), was realized in December 2017, with the largest fire in the history of California (the “Thomas fire” that burned 282,000 acres, https://www.vox.com/2017/12/27/16822180/thomas-fire-california-largest-wildfire). This catastrophic fire embodies the sorts of positive feedbacks and interacting factors that could catch humanity off-guard and produce a true apocalyptic event. Record-breaking rains produced an extraordinary flush of new vegetation, that then dried out as record heat waves and dry conditions took hold, coupled with stronger than normal winds, and ignition. Of course the record-fire released CO2 into the atmosphere, thereby contributing to future warming.

Out of all types of feedbacks, water vapor and the ice-albedo feedbacks are the most clearly understood mechanisms. Losses in reflective snow and ice cover drive up surface temperatures, leading to even more melting of snow and ice cover—this is known as the ice-albedo feedback (Curry, Schramm, & Ebert, 1995). As snow and ice continue to melt at a more rapid pace, millions of people may be displaced by flooding risks as a consequence of sea level rise near coastal communities (Biermann & Boas, 2010; Myers, 2002; Nicholls et al., 2011). The water vapor feedback operates when warmer atmospheric conditions strengthen the saturation vapor pressure, which creates a warming effect given water vapor’s strong greenhouse gas properties (Manabe & Wetherald, 1967).

Global warming tends to increase cloud formation because warmer temperatures lead to more evaporation of water into the atmosphere, and warmer temperature also allows the atmosphere to hold more water. The key question is whether this increase in clouds associated with global warming will result in a positive feedback loop (more warming) or a negative feedback loop (less warming). For decades, scientists have sought to answer this question and understand the net role clouds play in future climate projections (Schneider et al., 2017). Clouds are complex because they both have a cooling (reflecting incoming solar radiation) and warming (absorbing incoming solar radiation) effect (Lashof, DeAngelo, Saleska, & Harte, 1997). The type of cloud, altitude, and optical properties combine to determine how these countervailing effects balance out. Although still under debate, it appears that in most circumstances the cloud feedback is likely positive (Boucher et al., 2013). For example, models and observations show that increasing greenhouse gas concentrations reduces the low-level cloud fraction in the Northeast Pacific at decadal time scales. This then has a positive feedback effect and enhances climate warming since less solar radiation is reflected by the atmosphere (Clement, Burgman, & Norris, 2009).

The key lesson from the long list of potentially positive feedbacks and their interactions is that runaway climate change, and runaway perturbations have to be taken as a serious possibility. Table 2 is just a snapshot of the type of feedbacks that have been identified (see Supplementary material for a more thorough explanation of positive feedback loops). However, this list is not exhaustive and the possibility of undiscovered positive feedbacks portends even greater existential risks. The many environmental crises humankind has previously averted (famine, ozone depletion, London fog, water pollution, etc.) were averted because of political will based on solid scientific understanding. We cannot count on complete scientific understanding when it comes to positive feedback loops and climate change.

#### Conflicts coming over water scarcity---extinction

Daniel Darling 19, senior international military markets analyst at Forecast International Incorporated, an aerospace and defense consulting firm located in Newtown, Connecticut, where he covers the Europe and Asia-Pacific markets, “The Coming Wars over Water,” The National Interest, 4/14/19, https://nationalinterest.org/blog/buzz/coming-wars-over-water-52147

But another looming issue confronting global leaders involves the earth’s most precious resource: water.

In many regions of the globe—from Northern Africa to the Middle East to Central and South Asia—efforts to manage internal freshwater supplies or conserve transboundary water agreements are under strain as scarcity rises in parallel with population growth, consumption and warming temperatures.

A World Bank study on the global water picture in 2016 noted that entire regions may see their gross domestic product decline by up to 6 percent by 2050 due to water-related losses in agriculture, health, income and property. The areas highlighted consist of many of the world’s largest population concentrations, regions with developing economies, intensive and unsustainable agricultural practices and high occurrences of drought.

Dam-building and its downstream effects across national borders—as in the case of Ethiopia’s Grand Ethiopian Renaissance Dam and China’s water diversion project from the Yarlung Tsangpo River in southern Tibet—threaten to escalate tensions or redefine national claims over disputed regions.

Such disputes could mushroom across the globe in the face of broader demographic and resource shifts.

According to the Pacific Institute’s water conflict chronology database, eighteen water-related incidents occurred in 2018 alone, ranging from violence erupting at protests over water management to outright fighting between competing communities over access to water and herding rights.

These incidents appear destined to become more a norm than an outlier as water resources are consumed faster than rainfall replenishment in some areas and limitations exacerbate longstanding tensions, be they ethnic, tribal or national-based. Delicate tradeoff systems between nations located upstream and downstream of major rivers threaten to be undone by disruptions, as in the case of Central Asian countries sharing parts of the Fergana Valley.

In addition, scarcity issues may create internal security pressures by leading to radicalization amongst vulnerable population sectors.

With water a vital and finite resource, the world’s industrialized nations are naturally protective of local supply and place a premium on water security in instances where water flows across shared borders. When mixed with political disputes or rivalries, resource pressures may act as a catalyst for armed conflict.

Wars over water resources are not without precedent. The Six-Day War of 1967, for instance, was in part an Israeli military response to a Syrian attempt to dam the Yarmuk River, a tributary of the Jordan River, a crucial water source for Israel.

Another potential flashpoint exists in one of the world’s most tense arenas: the border between India and Pakistan. There the potential repudiation of a water-sharing agreement brokered by the World Bank in 1960, the Indus Waters Treaty, would serve to further damage relations between Pakistan and India, potentially sending the two rivals spiraling into a conflict that might draw in other nations.

The treaty remains in place despite two wars conducted over that time between the neighboring rivals. This is a credit to the cornerstone of the agreement: the rational self-interest of both signatories. With water at a premium for both, any war over it would threaten the supply of each actor, thus ostensibly negating the pretense for armed conflict.

But with Pakistan facing declining water availability and blaming its situation on India's “water terrorism,” the potential for crisis increases.

India, which plans for a presumptive “collusive threat” on both its northeast and northwest borders from China and Pakistan, must tread carefully in order to avoid reciprocity from Beijing should the latter turn its back on water rationality. While India holds an upstream riparian advantage over Pakistan in regards to the Sutlej, Beas and Ravi Rivers, so too does China as it relates to major rivers flowing into India from Tibet.

Considering Pakistan’s water vulnerability—which involves exploding population growth, poor water utilization and infrastructure maintenance, and unsustainable usage patterns—any threat by India to abrogate the treaty or maximize its use of water from any of the rivers covered under the IWT would be seen by Islamabad as tantamount to an act of war.

Factor in Pakistan’s strategic alignment with China and any outbreak of conflict might draw Beijing into the scrum, thereby resulting in India confronting the two-front war its planners most fear. Under this scenario, in which three nuclear-armed nations conduct military operations at some level of intensity, the rest of the world would be left scrambling to mediate the crisis at zero hour.

#### Agreement spills over to prevent SCS and Arctic conflict

Jon Kelvey 14, Journalist, Interviewing and Asteroid Mining Could Become a Reality in Our Lifetimes. Is It Even Legal?, Slate Magazine, https://slate.com/technology/2014/10/asteroid-mining-and-space-law-who-gets-to-profit-from-outer-space-platinum.html

If U.S. policy toward space has the power to affect geopolitics on the ground, why not use that fact to our advantage? If the very discussion of asteroid mining has the power to influence, say, Russia’s behavior in the Arctic for the worse, couldn’t it also be used as influence for the better? And what about other countries with whom the United States has had communication breakdowns as of late? When a conversation turns dull or repetitious, change the topic to outer space. Gabrynowicz agreed after I posed the question to her in an email. “I do think there could be opportunities in speaking with other countries about asteroid mining,” she wrote. “In fact, since day one, space has always been about foreign policy. [President Kennedy] used Apollo to demonstrate the superiority of U.S. technology and to influence nonaligned nations; the Apollo-Soyuz Project of the ’70s was a demonstration of détente.” In the early 1990s, the Clinton administration used the International Space Station to keep the nuclear weapons of the former Soviet Union from falling into the wrong hands. In the chaos following the collapse of the USSR, the administration brought the Russians into the space station project because, Gabrynowicz said, “The people that were in charge of the nuclear materials and the rocketry were the rocket forces. Those were the same people that would have to make the decision on the space station,” and the strategy was to open a bona fide line of communication with the people in control of the bombs. It was a gamble, and none of the other ISS partners initially wanted the Russians involved, but it worked. Perhaps similar lines of communication could be opened with states that are nuclear hopefuls. Might a change in topic with Iran provide an opportunity to talk about their nuclear program, or at least give us more insight as to the peaceful or offense plans for their rockets? Or, to take an entirely different tack, maybe we could kick off a new, three-way space race between the United States, China, and Russia, one where we benefit from agreed upon codes of conduct as well as the driving force of competition. We might also direct focus away from the Arctic and the South China Sea and onto those near-Earth asteroids. The political opportunities that could come from discussions with other nations about asteroid mining might be of more immediate value than anything the space entrepreneurs can do. It could be years, decades even before the platinum really starts flowing, if it ever happens. Political alliances forged over a discussion of asteroid mining can yield benefits today—benefits that could well persist even if the dreams of the miners never come to fruition.

#### Artic incidents are inevitable and go nuclear---draws in Russia & NATO

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In early March, an estimated 7,500 American combat troops will travel to Norway to join thousands of soldiers from other NATO countries in a massive mock battle with imagined invading forces from Russia. In this futuristic simulated engagement—it goes by the name of Exercise Cold Response 2020—allied forces will “conduct multinational joint exercises with a high-intensity combat scenario in demanding winter conditions,” or so claims the Norwegian military anyway. At first glance, this may look like any other NATO training exercise, but think again. There’s nothing ordinary about Cold Response 2020. As a start, it’s being staged above the Arctic Circle, far from any previous traditional NATO battlefield, and it raises to a new level the possibility of a great-power conflict that might end in a nuclear exchange and mutual annihilation. Welcome, in other words, to World War III’s newest battlefield. For the soldiers participating in the exercise, the potentially thermonuclear dimensions of Cold Response 2020 may not be obvious. At its start, Marines from the United States and the United Kingdom will practice massive amphibious landings along Norway’s coastline, much as they do in similar exercises elsewhere in the world. Once ashore, however, the scenario becomes ever more distinctive. After collecting tanks and other heavy weaponry “prepositioned” in caves in Norway’s interior, the Marines will proceed toward the country’s far-northern Finnmark region to help Norwegian forces stave off Russian forces supposedly pouring across the border. From then on, the two sides will engage in—to use current Pentagon terminology—high-intensity combat operations under Arctic conditions (a type of warfare not seen on such a scale since World War II). And that’s just the beginning. Unbeknownst to most Americans, the Finnmark region of Norway and adjacent Russian territory have become one of the most likely battlegrounds for the first use of nuclear weapons in any future NATO-Russian conflict. Because Moscow has concentrated a significant part of its nuclear retaliatory capability on the Kola Peninsula, a remote stretch of land abutting northern Norway—any US-NATO success in actual combat with Russian forces near that territory would endanger a significant part of Russia’s nuclear arsenal and so might precipitate the early use of such munitions. Even a simulated victory—the predictable result of Cold Response 2020—will undoubtedly set Russia’s nuclear controllers on edge. To appreciate just how risky any NATO-Russian clash in Norway’s far north would be, consider the region’s geography and the strategic factors that have led Russia to concentrate so much military power there. And all of this, by the way, will be playing out in the context of another existential danger: climate change. The melting of the Arctic ice cap and the accelerated exploitation of Arctic resources are lending this area ever greater strategic significance. ENERGY EXTRACTION IN THE FAR NORTH Look at any map of Europe and you’ll note that Scandinavia widens as it heads southward into the most heavily populated parts of Denmark, Finland, Norway, and Sweden. As you head north, however, it narrows and becomes ever less populated. At its extreme northern reaches, only a thin band of Norway juts east to touch Russia’s Kola Peninsula. To the north, the Barents Sea, an offshoot of the Arctic Ocean, bounds them both. This remote region—approximately 800 miles from Oslo and 900 miles from Moscow—has, in recent years, become a vortex of economic and military activity. Once prized as a source of vital minerals, especially nickel, iron ore, and phosphates, this remote area is now the center of extensive oil and natural gas extraction. With temperatures rising in the Arctic twice as fast as anywhere else on the planet and sea ice retreating ever farther north every year, offshore fossil-fuel exploration has become increasingly viable. As a result, large reserves of oil and natural gas—the very fuels whose combustion is responsible for those rising temperatures—have been discovered beneath the Barents Sea and both countries are seeking to exploit those deposits. Norway has taken the lead, establishing at Hammerfest in Finnmark the world’s first plant above the Arctic Circle to export liquified natural gas. In a similar fashion, Russia has initiated efforts to exploit the mammoth Shtokman gas field in its sector of the Barents Sea, though it has yet to bring such plans to fruition. For Russia, even more significant oil and gas prospects lie further east in the Kara and Pechora Seas and on the Yamal Peninsula, a slender extension of Siberia. Its energy companies have, in fact, already begun producing oil at the Prirazlomnoye field in the Pechora Sea and the Novoportovskoye field on that peninsula (and natural gas there as well). Such fields hold great promise for Russia, which exhibits all the characteristics of a petro-state, but there’s one huge problem: The only practical way to get that output to market is via specially designed icebreaker-tankers sent through the Barents Sea past northern Norway. The exploitation of Arctic oil and gas resources and their transport to markets in Europe and Asia has become a major economic priority for Moscow as its hydrocarbon reserves below the Arctic Circle begin to dry up. Despite calls at home for greater economic diversity, President Vladimir Putin’s regime continues to insist on the centrality of hydrocarbon production to the country’s economic future. In that context, production in the Arctic has become an essential national objective, which, in turn, requires assured access to the Atlantic Ocean via the Barents Sea and Norway’s offshore waters. Think of that waterway as vital to Russia’s energy economy in the way the Strait of Hormuz, connecting the Persian Gulf to the Indian Ocean, is to the Saudis and other regional fossil-fuel producers. THE MILITARY DIMENSION No less than Russia’s giant energy firms, its navy must be able to enter the Atlantic via the Barents Sea and northern Norway. Aside from its Baltic and Black Sea ports, accessible to the Atlantic only via passageways easily obstructed by NATO, the sole Russian harbor with unfettered access to the Atlantic Ocean is at Murmansk on the Kola Peninsula. Not surprisingly then, that port is also the headquarters for Russia’s Northern Fleet—its most powerful—and the site of numerous air, infantry, missile, and radar bases along with naval shipyards and nuclear reactors. In other words, it’s among the most sensitive military regions in Russia today. Given all this, President Putin has substantially rebuilt that very fleet, which fell into disrepair after the collapse of the Soviet Union, equipping it with some of the country’s most advanced warships. In 2018, according to The Military Balance, a publication of the International Institute for Strategic Studies, it already possessed the largest number of modern cruisers and destroyers (10) of any Russian fleet, along with 22 attack submarines and numerous support vessels. Also in the Murmansk area are dozens of advanced MiG fighter planes and a wide assortment of anti-aircraft defense systems. Finally, as 2019 ended, Russian military officials indicated for the first time that they had deployed to the Arctic the Kinzhal air-launched ballistic missile, a weapon capable of hypersonic velocities (more than five times the speed of sound), again presumably to a base in the Murmansk region just 125 miles from Norway’s Finnmark, the site of the upcoming NATO exercise. More significant yet is the way Moscow has been strengthening its nuclear forces in the region. Like the United States, Russia maintains a “triad” of nuclear delivery systems, including intercontinental ballistic missiles (ICBMs), long-range “heavy” bombers, and submarine-launched ballistic missiles (SLBMs). Under the terms of the New Strategic Arms Reduction Treaty (New START), signed by the two countries in 2010, the Russians can deploy no more than 700 delivery systems capable of carrying no more than 1,550 warheads. (That pact will, however, expire in February 2021 unless the two sides agree to an extension, which appears increasingly unlikely in the age of Trump.) According to the Arms Control Association, the Russians are currently believed to be deploying the warheads they are allowed under New START on 66 heavy bombers, 286 ICBMs, and 12 submarines with 160 SLBMs. Eight of those nuclear-armed subs are, in fact, assigned to the Northern Fleet, which means about 110 missiles with as many as 500 warheads—the exact numbers remain shrouded in secrecy—are deployed in the Murmansk area. For Russian nuclear strategists, such nuclear-armed submarines are considered the most “survivable” of the country’s retaliatory systems. In the event of a nuclear exchange with the United States, the country’s heavy bombers and ICBMs could prove relatively vulnerable to pre-emptive strikes as their locations are known and can be targeted by American bombs and missiles with near-pinpoint accuracy. Those subs, however, can leave Murmansk and disappear into the wide Atlantic Ocean at the onset of any crisis and so presumably remain hidden from US spying eyes. To do so, however, requires that they pass through the Barents Sea, avoiding the NATO forces lurking nearby. For Moscow, in other words, the very possibility of deterring a US nuclear strike hinges on its ability to defend its naval stronghold in Murmansk, while maneuvering its submarines past Norway’s Finnmark region. No wonder, then, that this area has assumed enormous strategic importance for Russian military planners—and the upcoming Cold Response 2020 is sure to prove challenging to them. WASHINGTON’S ARCTIC BUILDUP During the Cold War era, Washington viewed the Arctic as a significant strategic arena and constructed a string of military bases across the region. Their main aim: to intercept Soviet bombers and missiles crossing the North Pole on their way to targets in North America. After the Soviet Union imploded in 1991, Washington abandoned many of those bases. Now, however, with the Pentagon once again identifying “great power competition” with Russia and China as the defining characteristic of the present strategic environment, many of those bases are being reoccupied and new ones established. Once again, the Arctic is being viewed as a potential site of conflict with Russia and, as a result, US forces are being readied for possible combat there. Secretary of State Mike Pompeo was the first official to explain this new strategic outlook at the Arctic Forum in Finland last May. In his address, a kind of “Pompeo Doctrine,” he indicated that the United States was shifting from benign neglect of the region to aggressive involvement and militarization. “We’re entering a new age of strategic engagement in the Arctic,” he insisted, “complete with new threats to the Arctic and its real estate, and to all of our interests in that region.” To better protect those interests against Russia’s military buildup there, “we are fortifying America’s security and diplomatic presence in the area…hosting military exercises, strengthening our force presence, rebuilding our icebreaker fleet, expanding Coast Guard funding, and creating a new senior military post for Arctic Affairs inside of our own military.” The Pentagon has been unwilling to provide many details, but a close reading of the military press suggests that this activity has been particularly focused on northern Norway and adjacent waters. To begin with, the Marine Corps has established a permanent presence in that country, the first time foreign forces have been stationed there since German troops occupied it during World War II. A detachment of about 330 Marines were initially deployed near the port of Trondheim in 2017, presumably to help guard nearby caves that contain hundreds of US tanks and combat vehicles. Two years later, a similarly sized group was then dispatched to the Troms region above the Arctic Circle and far closer to the Russian border. From the Russian perspective, even more threatening is the construction of a US radar station on the Norwegian island of Vardø about 40 miles from the Kola Peninsula. To be operated in conjunction with the Norwegian intelligence service, the focus of the facility will evidently be to snoop on those Russian missile-carrying submarines, assumedly in order to target them and take them out in the earliest stages of any conflict. That Moscow fears just such an outcome is evident from the mock attack it staged on the Vardø facility in 2018, sending 11 Su-24 supersonic bombers on a direct path toward the island. (They turned aside at the last moment.) It has also moved a surface-to-surface missile battery to a spot just 40 miles from Vardø. In addition, in August 2018, the US Navy decided to reactivate the previously decommissioned Second Fleet in the North Atlantic. “A new Second Fleet increases our strategic flexibility to respond—from the Eastern Seaboard to the Barents Sea,” said Chief of Naval Operations John Richardson at the time. As last year ended, that fleet was declared fully operational. DECIPHERING COLD RESPONSE 2020 Exercise Cold Response 2020 must be viewed in the context of all these developments. Few details about the thinking behind the upcoming war games have been made public, but it’s not hard to imagine what at least part of the scenario might be like: a US-Russian clash of some sort leading to Russian attacks aimed at seizing that radar station at Vardø and Norway’s defense headquarters at Bodø on the country’s northwestern coast. The invading troops will be slowed but not stopped by Norwegian forces (and those US Marines stationed in the area), while thousands of reinforcements from NATO bases elsewhere in Europe begin to pour in. Eventually, of course, the tide will turn and the Russians will be forced back. No matter what the official scenario is like, however, for Pentagon planners the situation will go far beyond this. Any Russian assault on critical Norwegian military facilities would presumably be preceded by intense air and missile bombardment and the forward deployment of major naval vessels. This, in turn, would prompt comparable moves by the United States and NATO, probably resulting in violent encounters and the loss of major assets on all sides. In the process, Russia’s key nuclear retaliatory forces would be at risk and quickly placed on high alert with senior officers operating in hair-trigger mode. Any misstep might then lead to what humanity has feared since August 1945: a nuclear apocalypse on Planet Earth. There is no way to know to what degree such considerations are incorporated into the classified versions of the Cold Response 2020 scenario, but it’s unlikely that they’re missing. Indeed, a 2016 version of the exercise involved the participation of three B-52 nuclear bombers from the US Strategic Air Command, indicating that the American military is keenly aware of the escalatory risks of any large-scale US-Russian encounter in the Arctic. In short, what might otherwise seem like a routine training exercise in a distant part of the world is actually part of an emerging US strategy to overpower Russia in a critical defensive zone, an approach that could easily result in nuclear war. The Russians are, of course, well aware of this and so will undoubtedly be watching Cold Response 2020 with genuine trepidation. Their fears are understandable—but we should all be concerned about a strategy that seemingly embodies such a high risk of future escalation. Ever since the Soviets acquired nuclear weapons of their own in 1949, strategists have wondered how and where an all-out nuclear war—World War III—would break out. At one time, that incendiary scenario was believed most likely to involve a clash over the divided city of Berlin or along the East-West border in Germany. After the Cold War, however, fears of such a deadly encounter evaporated and few gave much thought to such possibilities. Looking forward today, however, the prospect of a catastrophic World War III is again becoming all too imaginable and this time, it appears, an incident in the Arctic could prove the spark for Armageddon.

#### South China Sea disputes are inevitable and go nuclear

Peter Rudolf 20, Senior Fellow in The Americas Division at German Institute for International and Security Affairs, The Sino-American World Conflict, SWP Research Paper 3, February 2020, Berlin, https://www.swp-berlin.org/fileadmin/contents/products/research\_papers/2020RP03\_rdf\_Web.pdf

The Regional Dimension

The US-Chinese conflict is more pronounced in the Western Pacific, especially in the South China Sea, than on the continental periphery of China.95 In “mari­time Asia”, the relationship is antagonistic, im­bued with military threat perceptions.96 In the United States, it is widely expected that China intends to estab­lish an exclusive “maritime sphere of influ­ence” in the South China Sea.97 China is expanding its mili­tary options to counter US intervention capabilities on its periphery and to project its military power into the East Asian region and beyond. In conjunction with increased economic influence, this might enable China to “decouple” the United States from Asia, there­by gaining supremacy in the region.98 In the United States, it is feared that China could use its growing eco­nomic clout and asymmetric economic relations to influence the security orientation of other states in the region, thereby undermining the US alliance sys­tem. This concern tends to ignore the fact that the economies of the East Asian states (apart from North Korea) are globally integrated, thus limiting China’s ability to politically instrumentalize bilateral eco­nomic relations.99 In the Chinese discourse, the prevailing self-percep­tion seems to be that China does not intend to ex­clude non-regional actors from the region as is often assum­ed in the United States. Chinese behavior in the South China Sea, however, can be taken as an indication that China is moving towards a policy of exclusion. Beijing has resolutely asserted legally questionable, historically founded territorial claims and established military outposts on artificial islands.100 In the South China Sea, China’s claims to some islands, rocks, reefs and low-tide elevations clash with those of four other littoral states (Vietnam, Philippines, Malaysia and Brunei). In addition, China’s sovereignty claims with­in the “Nine-Dash Line” (an area that makes up most of the South China Sea) conflict with the Exclusive Economic Zones of these states and Indonesia. More­over, China’s (as well as some other countries’) inter­pretation of the Convention on the Law of the Sea is that states have the right to regulate and prohibit the military activities of other states in their Exclusive Economic Zones (which extend up to 200 nautical miles from the coast), an interpretation that the United States firmly rejects.101 China may not yet have a coherent strategy with regard to the South China Sea, at least not a “master plan” aimed at supremacy, as is often assumed by the Americans. The current policy can be interpreted as an “implicit strategy”, which, from China’s point of view, seeks to combine the defence of (however dubi­ous) rights with the preservation of stability in the region. Yet, there seems to be a debate between pro­ponents of competing approaches. Hardliners pro­claim the necessity for Chinese control in this region, while pragmatists do not want to enforce Chinese sovereignty claims at the expense of regional insta­bil­ity, and moderates see the need to garner support in the region.102 Clash of incompatible positions in the South China Sea. In the South China Sea, there is a clash of incom­patible positions under the law of the sea.103 Basically, it is a conflict between the US claim to freedom of the seas and the Chinese claim to a sphere of influence. The conflict is fed by the mutual perception that in a crisis the other side could block important maritime lines of communication in the South China Sea. If China were to block them, the economic costs would probably be bearable if shipping traffic to Australia, Japan or South Korea had to be diverted, for example via the Sunda or Lombok Passage. However, a large proportion of the goods shipped across the South China Sea come from China or go there. It is, there­fore, in China’s interest to ensure maritime transport remains unhindered in the region. The Chinese fear that the US military could block the Strait of Malacca in the event of a crisis, thus severely affecting China’s energy supply.104 The geopolitical conflict over the South China Sea also has a nuclear dimension to it.105 China seems to be fortifying the South China Sea as a protected bastion for ballistic missile submarines as part of a survivable second-strike capability. According to information from the United States, four ballistic missile submarines are already in service and more are in the planning stage.106 China still has no sea-based ballistic missiles in service that, operating in the South China Sea, could reach not only Alaska and Guam but also the continental United States. It ap­pears that they will be included in the next generation of strategic submarines.107 Due to the limited range of the sea-based nuclear missiles cur­rent­ly in service, in the event of a serious inter­national crisis, China may try to relocate ballistic missile submarines to the deeper and thus safer waters of the Pacific, through the bottlenecks of the “first island chain” (which extends from the Kuril Islands via the Japanese islands and Taiwan to Bor­neo). Securing the South China Sea against US anti-submarine warfare forces is already an enormous challenge – the expansion of the artificial islands must also be seen in this context. The protection of strategic submarines on their way to the western Pacific probably requires more surface ships than China currently has in service.108 While the East-West conflict was stabilized to a certain degree through the establishment of clear spheres of influence in Europe, the geostrategic situation in East Asia is a different, less stable one. There is no clear demarcation between spheres of influence and there are no respected buffer zones. China’s efforts to establish a kind of security zone with­in the first island chain amounts to a severe provocation of the United States as the leading sea power.109 In this region, a worsening crisis between the United States and China poses a considerable risk to military instability. As US military planners assume, China will pursue offensive pre-emptive options in a crisis. At least, there are significant incentives for pre-emptive action against US armed forces in the region, for example in the form of massive missile salvoes. US forces must therefore be able to withstand a surprise attack. How good Chinese offensive capabilities are remains somewhat uncertain. In order to shore up their deterrent, states – and this holds true for the United States as well – make some of their capabilities transparent, but try to keep others hidden, so that the opponent remains uncertain. This uncertainty is a factor driving the arms race. For example, if the United States wants to remain militarily “competitive” with China in respect of a regional conflict, it must expand its capabilities to destroy Chinese systems with long-range weapons, especially cruise missiles.110 Since the termination of the INF Treaty Washington has been free to deploy medium-range systems in Asia. It could base them on the island of Guam, which belongs to the United States, or – should its allies agree – in the north of Japan, the southern Philippines or in the northern part of Australia. With conventionally equipp­ed medium-range systems, the US military could destroy Chinese forces in the South China and East China Seas without sending naval units into these risk zones. This would also obviate the need to initially eliminate missile systems on the Chinese mainland that would endanger US surface ships. Such an attack could inadvertently neutralize Chinese nuclear forces or their command and control facilities since, according to available information, China’s con­ventional and nuclear forces seem to be entangl­ed. It cannot be ruled out that, in the event of a serious confrontation, China will be tempted to use nuclear weapons before they are put out of action.111

### Preservation---1AC

#### Advantage 2 is Heritage:

#### Failure to protect Apollo collapses heritage protections writ large and hinders broad application

Joseph Reynolds 15, M.S. in Historic Preservation from Clemson University, Legal Implications of Protecting Historic Sites in Space, Chapter 8, Archaeology and Heritage of the Human Movement into Space, Space and Society, Beth Laura O’Leary, P.J. Capelotti, Springer International Publishing Switzerland 2015

The protection of these lunar sites would become a watershed moment for preservation. The preservation of these extraterrestrial sites would mark the changing of a thought process that has enveloped the field of preservation since its inception. Preservation as a field needs to adapt to this or the profession will become irrelevant. The preservation of a site that was the launching point of the future could become a relatively uncomfortable task for a profession that is rooted primarily in domestic and commercial architecture and embraces technological and industrial sites timidly. Preserving this site would shift, dramatically, what we define as worthy of preservation and protection.

#### Lunar preservation precedent creates protections on Maritime and Antarctic

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Allowing space heritage sites off of Earth to be included in the WHL may require changes to the Convention and to its Operational Guidelines. First, a change to the Operational Guidelines would be necessary to address immovable heritage that is likely to become moveable. These types of resources are not currently covered by the Convention. Although many of the contributing elements on Earth are immovable and are likely to remain so, the sites on the Moon are composed of artifacts and objects that could be moved and returned to Earth, should someone so desire in the future.

Second, changes would be required to allow for States Parties—or the World Heritage Committee itself, through consensus—to nominate properties that are currently situated outside of their territories, or in areas that governed by international space treaties. Such a change would similarly address conflicts with significant historical sites within international waters or on Antarctica, for example. Such amendments would need to be compatible with existing international treaties, as well.

#### Coop is key---current regimes definitionally cannot solve preservation

Joseph Reynolds 15, M.S. in Historic Preservation from Clemson University, Legal Implications of Protecting Historic Sites in Space, Chapter 8, Archaeology and Heritage of the Human Movement into Space, Space and Society, Beth Laura O’Leary, P.J. Capelotti, Springer International Publishing Switzerland 2015

The international conventions and treaties created to govern human usage of the heavens were created for various reasons. They were drafted to stop developed nations from treating celestial bodies the same way 16th century European explorers treated the New World by claiming land for their crowns through various cultural ceremonies. These documents were written to stop the US and the USSR from placing nuclear weapons on the Moon. They were fashioned to help astronauts should they ever find themselves in danger in outer space. The laws were shaped to place liability upon a state that did something the wrong way and ended up damaging another states property. The laws were drafted to keep track of everything humans sent up into space, and to take care of the immediate needs of space faring states at the time of their drafting. One thing the laws were not created to do is preserve locations of human cultural significance on celestial bodies.

That fact that these treaties did not take preservation into account should not be surprising for several reasons. First, the OST was ratified 2 years before a human presence was made on the lunar surface. The laws at that point were theoretical, and human beings have a tendency to be more reactive than proactive by only preserving sites of historical importance once they become threatened. Because no human had ever been on the moon before, how could it be threatened?

More importantly, because no one had been there, how could anyone protect it? Human occupation of the moon took place intermittently during a brief three-year window from 1969 to 1972, and only twelve humans have ever set foot upon the lunar surface. That means the only significant place on our planet that fewer people have been to than the moon is the bottom of the Mariana Trench, the lowest point on the planet.

Arguing that these laws do not allow for the preservation of archeological sites on the lunar surface is complex. Just because that idea was not directly factored into the drafting of this legislation does not mean that it is impossible. These conventions and treaties consistently ask for international cooperation in matters pertaining to human usage of the heavens, and that is exactly what is necessary for the Apollo Landing Sites to be protected by the World Heritage Convention.

The lag time of historic preservation considerations in space exploration follows similar concerns on Earth. Human beings have been using the oceans for trade, travel, and warfare for thousands of years. There are an unimaginable number of shipwrecks and culturally significant objects lying on the ocean floor, and it was only in 2001 that UNESCO created the Convention on the Protection of Underwater Cultural Heritage to safeguard those objects (UNESCO 2001). Antarctic exploration reached its peak during the turn of the 20th century, when Roald Amundsen reached the South Pole in 1911. The Antarctic Heritage Trust was created in 1987; 76 years after the first humans reached the South Pole.

Historic preservation takes both time and perspective, but more importantly, a proactive stance. Enough time has passed to preserve the Apollo Lunar Landing Sites for their significance to be appreciated, but human beings need far more perspective on the situation to truly appreciate how important Neil Armstrong’s footsteps are to the history of our human species

#### Heritage preservation is key to sustainable development

Montira Unakul 19, Ph.D. Candidate, Chulalongkorn University, Expanding Boundaries of Practice in (World) Heritage Management: from Conservation to Sustainable Development, NAJUA: Architecture, Design and Built Environment, Volume 34, Issue 2, https://so04.tci-thaijo.org/index.php/NAJUA-Arch/article/view/225911

This enduring focus on sustaining the heritage place itself versus the contributions of heritage towards larger goals of sustainable development have led to a bifurcation in the debate about heritage and sustainable development (Logan & Larsen, 2018). On the one hand, ensuring the sustainability of heritage places has led to more reflexive considerations of how heritage practices need to be rethought, such as the recognition of the role of local stewards as custodians of their heritage sites. On the other hand, “heritage principles and practice could and should contribute to wider social, cultural and environmental sustainability” (ibid). Beyond this binary framework, Logan and Larsen offer a more fine-grained differentiation illustrates the linkages between heritage conservation and sustainable development: (i) “sustainable heritage” which reflects “an inward looking perspective concerned with whether…heritage itself is being sustained for new generations”, (ii) “heritage vs. sustainable development” which sees one “as a threat to the other”, (iii) “sustainable development for heritage” which is “about adapting development paths to the needs and requirements of heritage conservation” and (iv) “heritage for sustainable development” which sees the potential of heritage to contribute to “solving wider sustainability challenges”. Within the development profession, the latter framing has gained currency, with heritage increasingly being viewed as integral to sustainable development (Hosagrahar, Soule, Girard, & Potts, 2016). Soini and Birkeland (2014) propose that culture can be included in three ways in the sustainable development discourse. First, as a fourth pillar of sustainable development, on par with the three existing pillars of social, economic and environmental. Secondly, with culture acting as a driver for development, thus acting in a transversal manner across the three existing pillars. Thirdly, as being fundamental for development, thus creating a new paradigm for sustainable development thinking itself. This seemingly new-found ubiquity of sustainable development can actually be traced back to the landmark World Conference on Cultural Policies held in Mexico City in 1982 which already tabled the links between culture and development. Despite high-level conferences in the following World Decade for Cultural Development from 1988-1997, culture was explicitly absent from the Millennium Development Goals adopted in 2000. Unlike its predecessor, the 2030 Agenda for Sustainable Development adopted in 2015 explicitly refers to culture and heritage. “It is the first international agenda to acknowledge the power of culture for creating decent work and economic growth, reducing inequalities, protecting the environment, promoting gender equality and building peaceful and inclusive societies” (UNESCO, 2018). Within the 17 Sustainable Development Goals and their 169 targets, cultural heritage is considered to contribute to the SDG 4 (quality education), SDG 5 (gender equality), SDG 6 (clean water), SDG 8 (decent work and economic growth), SDG 11 (sustainable cities and communities), SDG 13 (climate action), SDG 14 (life below water), SDG 15 (life on land), SDG 16 (peace, justice and strong institutions) and SDG 17 (partnerships). Target 11.4 specifically calls for safeguarding cultural and natural heritage. Culture and heritage are being mainstreamed into other sectors and even enshrined in seminal official texts like UN Habitat’s New Urban Agenda which call for “including culture as a priority component of urban plans and strategies” (Art. 124). The sustainable turn in heritage is reflected in recent conceptualizations of heritage, such as Historic Urban Landscapes. By providing this new holistic framework for dealing with the multiple components within an urban setting that encompasses buildings, other urban features, the environment, and underlying geography, the Historic Urban Landscape concept offers a model for reconciling “not only the urban multi-layered function, but also development agendas” (Reed et al 2016, Van Oers & Pereira Roders 2014). Driven by the United Nations-wide mission towards sustainable development, in 2015, the World Heritage Committee adopted the “Policy Document for the integration of a sustainable development perspective into the processes of the World Heritage Convention”. The policy reflects the earlier Budapest Declaration on World Heritage that was adopted in 2002 by the World Heritage Committee calling for appropriate and equitable balance between conservation, sustainability and development. The policy responds to: “the need to achieve appropriate balance and integration between the protection of the Outstanding Universal Value of World Heritage properties and the pursuit of sustainable development objectives and called upon States Parties to ensure that sustainable development principles are mainstreamed into their national processes related to World Heritage, in full respect of the Outstanding Universal Value of World Heritage properties” Reflecting the different dimensions threatening harmonious co-existence and sustainability in its broadest sense, the policy is framed by four dimensions: environmental sustainability, inclusive social development, inclusive economic development and fostering peace and security. With the threat of planetary collapse, environmental sustainability responds to “ensuring a stable climate, stopping ocean acidification, preventing land degradation and unsustainable water use, sustainably managing natural resources and protecting the natural resources base, including biodiversity” (UN Task Team on the post-2015 UN Development Agenda, 2012). The need for greater social inclusion reflects critiques of World Heritage regimes as failing to consider communities, indigenous peoples and other key stakeholders. As World Heritage sites have seen the gap between have and have-nots grow larger, inclusive economic development has become more pressing, raising questions “whether, in economic terms, [a given World Heritage space] promotes locally driven businesses, livelihoods and economies” (Logan & Larsen, 2018). Finally, as war, civil conflict and violence are on the uptick, the need for peace and security becomes more fundamental, and also more elusive. Thompson and Wijesuriya (2018) flags this broader perspective for World Heritage that is finally infusing into both heritage and development discourse and, to a certain extent, practice, as the third stage in the evolution of heritage conceptualization since the 1960s. From originally being confined in its own disciplinary silo with a bunker mentality in trying to defend monuments and silos, the future of heritage is now seen as being inextricably linked with larger realms of sustainability. As articulated by the Kyoto Vision drafted on the occasion of the 40th anniversary of the World Heritage Convention in 2012: “only through strengthened relationships between people and heritage, based on respect for cultural and biological diversity as a whole, integrating and intangible aspects and geared toward sustainable development will the ‘future we want’ become attainable.”

#### Lack of preservation of heritage causes illicit financing of insurgent groups---causes failed states---it’s extends the duration of conflicts

Pierre Losson 16, Ph.D. Candidate in the Political Science Department, The Graduate Center, City University of New York, New York, NY, USA, Does the International Trafficking of Cultural Heritage Really Fuel Military Conflicts, Studies in Conflict & Terrorism, Received 02 Jun 2016, Volume 40, Issue 6, Pages 484-495, https://doi.org/10.1080/1057610X.2016.1221255

Cultural Heritage as a Nonrenewable Resource

Among all forms of cultural heritage, Elia36 argues that archeological sites, in particular, are nonrenewable resources because their “stock” is finite. As mentioned in the introduction, once looted, an artifact loses its scientific value, but it retains an aesthetic and commercial value, for which there exists a worldwide demand. Therefore, the question of whether heritage can form part of the opportunity structure that contributes to the long-term financial sustainability of armed non-state actors—and thus should be treated as other “natural resources”—must at least be raised. Considering that the nexus between heritage looting and internal conflicts is that the former is marketable, competing arguments may be raised in determining the extent of this relationship. The first hypothesis presented by Ross37 proposes that the looting of natural resources by the weaker party in the conflict would contribute to lengthening the war by providing additional resources (conversely, if looting is practiced by the stronger side, it may shorten the conflict by giving it a decisive advantage). Even though internal conflicts have decisively been linked to the presence of lootable primary resources in at least some regions of a country, these resources thus being available to rebel groups,38 it has also been argued that primary resources do not necessarily favor rebel groups. For Fearon, “primary commodity exports provide governments39 with a relatively easy source of tax revenue, which may counterbalance or offset increased extortion possibilities for rebels.” 40 In this regard, heritage objects present a particularity: states do encourage their extraction or exploitation, instead of their onsite conservation, for the reasons mentioned in the introduction (tourism, science, etc.). However, in these cases, the economic benefits are only indirect for governments (through an increase in tourism visits, for example). It is only through the looting and illegal sale on international black markets that heritage objects can acquire a direct commercial value, an activity that governments are unlikely to carry out, at least officially. This characteristic classifies heritage in the category of other commodities (such as drugs and exotic timber) whose sale is restricted under the terms of international agreements and conventions to which armed non-state actors are unlikely to abide41; consequently, cultural heritage objects and antiquities are most likely to provide additional funding to the “weaker” party to the conflict only thus contributing to an increase in conflict duration. Evidence may also confirm Ross’s second hypothesis (according to the “incentive” hypothesis, if the conflict offers financial incentives to combatants through the exploitation of natural resources, its duration may increase; conversely, if peace provides such opportunities, then this exploitation may accelerate the peace process). In Cambodia, for instance, looting is often done by the military, and greatly increased in the ten-year period of civil war that succeeded the reign of the Khmer Rouge:42 in this case, the activity benefited individuals, not the state, and the trafficking (and the profits it promises) may have represented an incentive not to abide by peace agreements. Finally, Ross’s “separatism” hypothesis proposes that resource wealth tends to increase the duration of separatist civil wars by decreasing the likelihood that the government will adhere to a peace accord that gives the region rich in natural resources its fiscal autonomy. While Ross argues that the method he employs in his 2004 article does not allow him to test that hypothesis, a few comments can be made about the importance of heritage in separatist regions. Heritage can be considered a special kind of resource because it bears a particular significance for the local population. As noted above, heritage (at least in the way it is conceived of among Western nations and in academic circles) embodies a special connection between a population and its history through the existence of physical remains of an often sublimated past. These vestiges of the past are geographically located and, as acknowledged by Buhaug, Gates, and Lujala “territory may possess certain nontangible qualities, for example, symbolic values tied to group identity and cohesion, which may play a critical role in recruitment and allegiance to an army.” 43 Heritage may form part of the identity and separatist discourses of armed non-state actors seeking to establish their legitimacy. According to this argument, local populations should be reluctant to sell their own heritage and would oppose rebel groups that seek to dispossess them from that heritage to fund their war effort. However, the importance of cultural artifacts, and the normative value locals attach to them, shall not be overstated: when Cameron describes how conservation projects have sought to “instill in local people a pride in their past,” she implicitly admits that the value attributed to material heritage is not universal, and varies among cultures and countries.44 An object that has lost its emotional value for locals may now have an aesthetic and economic value on the international market. French45 demonstrates, in the case of Cambodia, how different “regimes of value” can co-exist simultaneously. On the other hand, the heritage of a separatist region may form part of the government’s centralizing, nationalist discourse: abandoning a region with a highly symbolic cultural value may undermine the state’s legitimacy over the rest of its territory by showing its incapacity— or lack of will—to defend the nation as currently embodied by the state. Overall, Ross’s hypotheses offer a theoretical framework for a preliminary explication of the causal relationship between, on the one hand, the existence of an international black market for looted and illegally exported heritage objects and, on the other hand, the duration of military conflicts. There is growing evidence and documentation not only that conflicts create an opportunity for looting and trafficking, but also that looting contributes to increasing the duration of the war rather than shorten it. As noted in the introduction, there exist many examples of pieces of cultural heritage being looted, illegally exported from their country of origin, and bought by Western collectors, a process largely facilitated by the existence of civil conflicts. Evidence suggests that wars do not create the problem of looting, only aggravate it: wars generate dire economic conditions for local populations, which seek any possible means to improve their situation. This does not imply, however, that rebel and armed non-state actors are controlling the looting of heritage objects to fund their war effort. Finding Evidence on Illegal Activities Evidence on the issue of looting in war zones is, by definition, scarce. As with any other illegal activity, only educated guesses can be made about its actual economic significance because data are very difficult to gather.46 Archeological looting and the plunder of museum collections have been reported as funding the Khmer Rouge and rival military groups in Cambodia,47 rival militia in Afghanistan,48 the Taliban in Afghanistan, and ISIS (as well as other rebel groups) in Iraq and Syria,49 all of which have also sought to finance their fight, in part, through the looting and trafficking of drugs, oil, and other primary resources. Numerous international media outlets have reported on cases of heritage destruction in Iraq and Syria since 2012, but only to a lesser extent on looting. Most of the available evidence on the link between insurgency and terrorism funding, on the one hand, and the illicit trade in antiquities and cultural heritage, on the other, can be found in general newspapers and magazines (such as Time, The New Yorker, Newsweek, and Le Monde, in the articles cited above), as well as in a few pieces of so-called gonzo journalism, which have tried to establish a clear link between looters and, in particular, ISIS.50 The articles suggest that looting is practiced by individuals for their own benefit or on behalf of armed groups (and even officials within the Syrian government), cases that would seem to support Ross’s “looting” and “incentive” hypotheses. However, these publications provide little evidence of the extent to which the sale of cultural heritage fund the belligerents’ war effort. Estimates of the actual figures that a group such as ISIS can derive from this traffic are the object of much debate.51 One way to assess the credibility of the hypothesis that the looting and sale of cultural heritage funds armed non-state groups would be to obtain an estimate of the total volume of the cultural heritage trafficking worldwide. However, there is little consensus over the actual size of the market for stolen art in the world. Estimates range from 10 to 20 million USD paid to looters in Iraq every year, according to the Archeological Institute of America cited by Shelley,52 to “hundreds of millions of dollars” obtained by ISIS through the sales of antiquities.53 Lacking first-hand data, many academic articles that mention this issue54 use estimates found in newspapers and magazines, which themselves refer to figures provided by institutions and nongovernmental organizations (NGOs) such as the Federal Bureau of Investigation (FBI), UNESCO, the European Association of Archeologists, or Iraq Heritage. Overall, estimates of the proceedings from the illicit art market worldwide range from 300 million USD to 6 billion USD per year.55 Within this range, the documentary Blood Antiques56 cites a total of 5 billion USD. However, scholars who argue that these evaluations are not statistically validated challenge their plausibility.57 Also, raw numbers that try to grasp the scale of this international illicit market may be misleading to answer the question of whether this market significantly funds rebel and armed non-state actors, for at least two reasons. First, the prices paid by collectors in market countries are much inflated compared to those paid to the looters. As much as 98 percent of the final sales price may go to middlemen, effectively providing a meager income to local looters.58 In this case, it is difficult to argue that the sums paid at the source represent a substantial source of income for rebel or armed non-state actors on the ground. Overall, as Fearon admits, “we still know little about the sources of rebel groups’ incomes.” 59 Besides, while sums reaching several million dollars may seem impressive, they mean little if we do not know how much rebel and armed non-state actors need to fund their military activities, and how much they derive from other sources, particularly the sale of other, potentially more lucrative, primary resources. In this regard, a difference may appear between rebel groups fighting civil wars and other armed non-state actors. What may not be enough to fund a militarized conflict (which, in Fearon’s definition, involves fight over the long term) may be more appealing for terrorist groups, who are leading complex but less encompassing operations, requiring less financial capacity.60 Thompson speaks of a “bureaucracy of looting” implemented by ISIS, whose fighters would not do the looting themselves but issue licenses and collect taxes on the product of the excavations and even, according to her information, adapt the level of taxes to the anticipated final sales price.61 However, other scholars such as Donna Yates consider looting to be just one more activity supervised, but not organized, by ISIS, which taxes it just as it does many other illicit activities.62 In her opinion, the sale of looted objects is not profitable enough to merit the direct organization of such activities. Most importantly, in answering the question of whether the sale of heritage objects funds armed non-state actors, scholars should be careful not to select on the dependent variable: while there are documented cases of such groups controlling the process of looting and illicit sale of cultural and heritage objects, there also exist cases of countries where there seems to be no particular relationship between the presence of extensive archeological resources and a surge of illicit trafficking during an armed conflict. For example, neither Shining Path in Peru nor the Fuerzas Armadas Revolucionarias de Colombia (Revolutionary Armed Forces of Colombia—FARC) in Colombia seem to have taken advantage of this particular funding resource,63 even though the trafficking of antiquities from Peru had started several decades before, prompting the country to promote an early draft of what would become the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property.64 Similarly, in the case of Al Qaeda and Jemaah Islamiya in Southeast Asia, Abuza65 does not mention the looting and trafficking of antiquities as a source of funding for these organizations, even though the region abounds in archeological treasures. In the case of the Kurdish Workers Party (PKK), which fights in the same archeologically rich regions of Mesopotamia as ISIS, Roth and Sever66 do not mention the trafficking of antiquities as a source of funding. The documented cases of armed non-state actors—in particular, ISIS—funding their war effort through the sale of cultural heritage objects do not allow, at this stage, generalizable conclusion to be reached. However, they point to a growing trend: as the size of the (legal and illicit) international market of antiquities grows, the looting and trafficking of antiquities may just be becoming more profitable for rebel and terrorist groups, a possible explanation for why it is difficult to trace this phenomenon historically, but also a source of concern that scholars of civil conflicts may be observing it more frequently in the future. Conclusion This article has examined, in light of Ross’s hypotheses developed in his 2004 article, the growing, but still inconclusive, evidence pointing at heritage objects being a factor that contributes to increasing the duration of an internal conflict. Exact figures of the importance of the trade in art and heritage objects in funding such groups are impossible to obtain, as in the case with any other illicit market. As a growing body of evidence provided by journalists, expert observers of the sector, and official agencies that fight transnational crime confirms this connection, political scientists may join scholars of other disciplines (in particular, archeologists, art historians, and museum curators) in demanding stricter regulations of the international art markets. Indeed, if this trade proves to be a growing threat to international security, states may show greater willingness to enforce existing international conventions on the topic, and/or strengthen current regulations. Clearly, security is currently an obstacle to further research, sustained by on-the-ground investigation, interviews, and document analysis, about the specific cases of terrorist groups in Iraq and Syria. However, the study of more ancient cases, such as that of Cambodia,67 can provide hindsight about the nexus among looting, insurgent and other armed non-state groups, and transnational criminal networks.68 More research is necessary, however, to evaluate the exact extent to which the looting of art and cultural heritage objects represents a decisive source of funding for armed non-state actors. Additional evidence confirming the importance of art and heritage trafficking in the funding of such groups would add one more layer of complexity to Collier and others’ 69 “natural resource trap”: countries with rich and largely unexploited archeological and cultural heritage may be more at risk than others to experience a prolonged civil conflict. Even though decisive evidence is still lacking, confirmation of this phenomenon would mean that the looting and trafficking of cultural heritage poses a security threat for the countries at war, potentially increasing the duration of internal conflicts. This traffic would also represent a security threat beyond the borders of the warzone. For example, terrorism is largely internationalized, and many armed non-state actors have developed the capacity to strike targets well beyond their natural borders. Additionally, the mafias that control the illegal market of antiquities and cultural artifacts operate worldwide, often linking this traffic to that of other restricted goods (drugs, weapons, wild animals), constituting a threat to the security, governance, and sovereignty of states not directly related to the country where the conflict is taking place.

### Lunar Research---1AC

#### Advantage 3 is Lunar Research

#### Establishing protection zones for old moon poop is key---even landing within one hundred meters could ruin the artifacts

Brian Resnick 19, Science Journalist at Vox, 3-22-2019, Apollo Astronauts Left Their Poop On The Moon. We Gotta Go Back For That Shit., Vox, <https://www.vox.com/science-and-health/2019/3/22/18236125/apollo-moon-poop-mars-science>

But the bigger human footprint on the moon is, arguably, the 96 bags of human waste left behind by the six Apollo missions that landed there. Yes, our brave astronauts took dumps on their way to the moon, perhaps even on the moon, and they left behind their diapers in baggies, on humanity’s doorstep to the greater cosmos. The bags have lingered there, and no one knows what has become of them. Now scientists want to go back, and answer a question that has profound implications for our future explorations of Mars: Is anything alive in them? Human feces can be disgusting, but they’re also teeming with life. Around 50 percent of their mass is made up of bacteria, representing some of the 1,000-plus species of microbes that live in your gut. In a piece of poop lives a whole wondrous ecosystem. Planet Earth has hosted this life and so much more for upward of 3.9 billion years. The moon, as far as we know, has been sterile and lifeless that whole time. With the Apollo 11 moon landing, we took microbial life on Earth to the most extreme environment it has ever been in. Which means the human feces — along with bags of urine, food waste, vomit, and other waste in the bags, which also might contain microbial life — on the moon represents a natural, though unintended, experiment. The question the experiment will answer: How resilient is life in the face of the brutal environment of the moon? And for that matter, if microbes can survive on the moon, can they survive interstellar travel, making them capable of seeding life across the universe, including on places like Mars? After Neil Armstrong descended from the Eagle lander, becoming the first human to set foot on the moon, the very first picture he took on the surface shows, yes, the moon’s cratered surface, but also a white jettisoned trash bag (or jett bag). I can’t confirm there are feces in this particular bag (Buzz Aldrin declined to comment for this story), but there’s definitely one like it on the moon that contained or still contains human waste, according to the NASA History Office. Apollo 16 astronaut Charlie Duke spent 71 hours on the moon in 1972. On a recent phone call, he confirmed that the crew left human waste behind. “We did,” he says. “We left urine that was collected in a tank ... and I believe we had a couple of bowel movements — but I’m not sure — those were in a trash bag. We had a couple of bags of trash we kicked out on the lunar surface.” (You might be thinking, “Wait he was on the moon for nearly three days and he’s unsure if he pooped there?” As he told me, “Three days is not bad to have without a bowel movement.” Fair enough?) Even so, he says, they threw out the garbage thinking everything would be sanitized by the solar radiation. “I’d be really really surprised if anything survived,” he says. Plus, taking it back with them wasn’t really an option. “The moon missions were engineered very carefully, and weight was a very big issue,” says Andrew Schuerger, a University of Florida space life scientist who recently co-authored a paper on the viability of microbes surviving on the moon. “So it made sense if you’re picking up moon rocks, you’d also want to discard things that were not necessary to increase your margin of safety.” During the flight to the moon, the astronauts relied on “a plastic bag which was taped to the buttocks to capture feces,” according to NASA. It was a disgusting, cumbersome process. On the moon itself, the astronauts used a “maximum absorbency garment” for “fecal containment.” But forget the technical phrasing. It’s a diaper. With the 50th anniversary of the Apollo 11 moon landing on July 20, there’s renewed interest in returning humans to the moon in the near future. The Trump administration has a goal of getting back there by 2028 at the earliest. And there’s budgetary momentum for NASA to work on a “lunar gateway,” a habitable space station that will orbit the moon, allowing for longer-term lunar missions and prep for an eventual human mission to Mars. As we prepare for those journeys and beyond, the poop is one more reason we have to go back. The case that the poop bacteria are dead The question scientists are asking of whether anything is alive in those jett bags, while seemingly silly, may lead to important insights about the extreme conditions life can endure. But it will also speak to our human potential to contaminate celestial bodies — or even seed life on them — when we go exploring. That’s reason enough to go back to the moon and collect some samples. Those jett bags “are the most protected of anything that would have high levels of fungi, [bacteria], and viruses from Earth,” Schuerger says. (Fungi are another form of microbial life that could possibly have survived.) For astrobiologists, that means those bags are the most interesting objects on the moon. That said, the chances that anything survived in any of those jett bags are slim, Schuerger says. He and his colleagues recently completed an analysis modeling the likelihood that any microbes from Earth are still alive on any of the surfaces of the spacecraft that were left behind on the moon. The jett bags might be better protected (more on that in a bit), but the same harsh conditions apply. In all the ways Earth is so hospitable to life, the moon is not. It does not have a protective magnetic field to deflect the most powerful and damaging cosmic radiation. It does not have an ozone layer to absorb the sun’s ultraviolet rays. The vacuum of the moon is inhospitable to life. And without an atmosphere, the moon is subjected to wild temperature swings over day and night: It can be minus 173 degrees Celsius (minus 279.4 degrees Fahrenheit) at night, and 100°C (212°F, or the boiling point of water on our surface) during the day. There’s a good chance that a combination of radiation and extreme temperature has killed the microbes in the jett bags. Schuerger says there’s a “low probability” that anything survived in them. “But it’s the highest probability of anything that landed on the moon.” The case that the poop bacteria are alive The surface conditions are harsh, but don’t lose hope: “Microbes don’t need to have a lot of protection,” Margaret Race, a biologist at the SETI Institute, says. After all, bacterial life has been found on Earth just about everywhere we look: at the very bottom of the ocean, near scorching thermal vents, 2 miles beneath one of Greenland’s glaciers. On the Apollo 16 mission, the astronauts performed an experiment where they kept a sample of nine species of microbes on the outside of the spacecraft, exposing them to the harshest conditions in space. Many of them survived (though a few days in space is not the same as 50 years in space). “We do not have a definition of life that says, ‘It can never go beyond this temperature, beyond this salinity, beyond that acidic level,’” Race says. “Every time we look places, we find life.” A lot would have to go right for the microbes to still be alive — or at least revivable. Bacteria can’t replicate (i.e., grow) without moisture. The human waste would have to have been packaged really well, for one, so their environment could remain moist. “In the [moist] environment of a closed diaper, presumably you should be able to have replication,” says Mark Lupisella, a NASA scientist who is doing some preliminary work on a potential mission to retrieve the jett bags and study them. The jett bags would have to still be intact, which is not a given considering the wild temperature swings on the moon; they could be ripped open by the mechanical forces involved with heating and cooling. “Also, we don’t know what the internal temperature of the bag is going to reach when it’s exposed to the sun,” Schuerger says. If it tops 100°C, he says, bacteria would likely only survive a few days, or weeks, on the moon. Lupisella says even if all the life in the jett bags is dead, the bags are still worth studying. Scientists could possibly figure out how long the microbes lived on the moon and whether they evolved or adapted to the environment at all. “It’s a stretch, but it is possible we could discern whether or not these life forms might have mutated early on,” he says. He’s saying there’s a tiny chance that natural selection might have kicked in inside those jett bags, leading to the microorganisms evolving to survive. If there were just a few microorganisms in the poop with the ability to survive the moon, they could have grown and spread. Again, this is the most extreme place we’ve ever left life — possibly the most extreme place life has ever been. We need to see how resilient (or not) it is in that environment. There’s also the possibility that some microbes might be revivable. That is, after decades of dormancy on the moon, some of these microbes might be able to be coaxed back to life under the right conditions. Bacterial spores (dormant bacteria that form a protective outer coating) in the Arctic have been revived after thousands of years frozen in ice. It would be fascinating if spores in fecal matter could be revived after decades on the moon. Those lessons would be interesting for microbiology — assessing the extreme limits for microbial life — but they’d be invaluable for a trip to Mars. The moon poop matters for future missions to Mars If microbes can survive for a given period on the moon, they’re even more likely to survive on Mars, which has a thin atmosphere, a more hospitable environment, and evidence of flowing water. One of scientists’ top questions about Mars is, “Is there, or has there ever been, life here?” The prevailing wisdom is that if life exists there, it probably looks a lot like bacteria, or some other type of very simple single-celled organism. But if we make it to Mars and then accidentally contaminate the planet with our literal shit, it might be harder to answer this question. How would we know if the life we find on Mars is truly Martian, or something that’s come from Earth? And if our microbes from Earth take a liking to Mars and spread, there may be no way to undo that. The UN Outer Space Treaty — signed in 1967, two years before the Apollo 11 landing — stipulates that member states “shall avoid harmful contamination of space and celestial bodies.” That may be difficult if we get to Mars because wherever we go, our fecal matter goes too. Thinking about poop on the moon helps us think about a possible origin of life on Earth As new missions to the moon are planned, we need to think carefully about the need to preserve the artifacts left at the Apollo landing sites. NPR’s Nell Greenfieldboyce recently reported that just landing within 100 meters of an Apollo site could potentially damage it. Protecting the history of human exploration on the moon also means protecting the garbage — its historic value is immense, but so is its scientific value. We need to preserve these sites so scientists can return to them and take samples.

#### Protection’s key to research on biocides that prevent interplanetary contamination

Brian Vanhooker 19, Journalist, 4-2-2019, Why NASA Is So Eager to Study Moon Poop, MEL Magazine, <https://melmagazine.com/en-us/story/why-nasa-is-so-eager-to-study-moon-poop>

With that poop, there are a number of possible outcomes. The most likely of these, again, is that it’s dead, due to the extremely harsh conditions on the moon and the biocide included in those bags. Although Lupisella admits that he’s not sure if every mission made use of the biocide, he believes that they probably did. If some didn’t, it would be interesting to compare those that did use it versus those that didn’t, as this could help inform whether or not the biocide they use is effective enough to prevent against forward contamination in future missions.

Even if it were dead, though, it doesn’t mean that we wouldn’t be able to still contaminate Mars. Again, Mars is less harsh than the moon, as it at least has an atmosphere, may already have life, and isn’t subject to some of the extreme temperature throws that the moon is.

It’s also possible that the gut bacteria is hibernating and that it can be revived by us. While the image coming to mind may be unfreezing the bacteria like Captain America or Fry from Futurama, Lupisella explains that instead, some bacteria can go dormant when its resources disappear, only to be revived later when you create more favorable conditions by adjusting temperature and reintroducing other resources like food and water.

Revived bacteria would be cool, but no doubt the most exciting outcome would be if life survived or even thrived on the moon. While Lupisella explains that it’s extremely unlikely, it would be interesting to discern if there were any kind of mutations or adaptations that took place, which brings us to the other main thing that can be learned from moon poop: the resiliency of life.

#### Extinction from interplanetary contamination

John Spacey 16, 9-29-2016, What is Interplanetary Contamination?, Simplicable, <https://simplicable.com/new/interplanetary-contamination>

Interplanetary contamination is the risk that a space mission will result in the transfer of life between Earth and an extraterrestrial body. Forward Contamination Forward contamination is the transfer of life from Earth to another planet that can theoretically support life such as Mars. Life is extremely resilient. It is thought that certain types of microbes might potentially survive a space journey and the surface of Mars. If forward contamination were to occur, it could have a variety of impacts that might be impossible to reverse once they were set in motion. For example, if life exists on Mars it may be wiped out by a microbe from Earth. In theory, such contamination could evolve and eventually become an alien civilization. Scientists are also concerned that contamination from Earth could be mistaken for native alien life resulting in an erroneous scientific view of our solar system. Probes and unmanned spacecraft that visit a planet that could theoretically support life such as Mars can be sterilized to prevent forward contamination. Manned missions are more of a challenge because a typical human contains around 39 trillion microbes. Back Contamination Back contamination is the potential for alien life to contaminate Earth on its return. Missions may not want to sterilize returning samples if they have a goal of discovering alien life. Special quarantine facilities and procedures could be built to handle samples that may contain life such as soil samples from Mars. Back contamination is theoretically an existential risk as an alien microbe could cause environmental issues or a pandemic.

#### Preserving the artifacts is key---it’s key to identify approaches to long-lasting tech in space----national approaches fail to preserve the artifacts

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Now, with what’s been called the New Space Race and plans to return to the Moon, the Apollo 11 and other lunar sites are under threat. We need to protect this heritage for future generations. The archaeological site of Tranquillity Base consists of the hardware left behind, as well as the marks made in the lunar surface by the astronauts and instruments. The hardware component includes the landing module, the famous flag (no longer standing), experiment packages, cameras, antennas, commemorative objects, space boots and many other discarded objects – more than 106 in total. Around these objects are the first human footprints on the Moon as well as the tracks the astronauts made walking around, and the places where they dug out samples of rock and dust to take back to Earth for scientific analysis. The artefacts, traces and the landscape constitute an archaeological site. The relationships between them can be used by archaeologists to study human behaviour in this environment so different to Earth, with one-sixth terrestrial gravity and no atmosphere. Assessing the heritage value Not only this, but the site has heritage value for people on Earth. To assess this, we can look at a number of categories of cultural significance. Those in the Burra Charter are widely used across the world for heritage assessment. Historic: There is no doubt that, as the first place where humans set foot on another celestial body, this is a very important place in global history. It also represents the ideologies of the Cold War (1947-1992) between the US and the USSR. Scientific: What can we learn from the site? More particularly, what questions would we no longer be able to answer if Tranquillity Base was damaged or destroyed? This is not just about archaeological research into human behaviour on the Moon. Apollo 11 has been exposed to the harsh lunar environment for 50 years. The surfaces of the hardware are accidental experiments in themselves: they carry the record of 50 years of micrometeorite and cosmic ray bombardment. Finding out how well the materials have survived can also provide information about how to design future missions. Aesthetic: This type of cultural significance is about how we experience a place. While we can’t assess it in person, there are films and photographs that give us a feeling for the place. This includes the light, shadows and colours of the lunar surface from the perspective of the human senses. The aesthetic qualities have inspired many artists and musicians, including astronaut Alan Bean who devoted his post-Apollo 12 life to painting the Moon. Social: This is about the value that contemporary communities place on the site. For the 600 million-plus people who watched the television broadcast of the landing, it was a life-changing moment representing the ingenuity of human technology and visions of a space-age future. But the mission did not mean the same for everyone. Some African Americans protested against Apollo 11, seeing it as a waste of resources when there was such great economic and social disparity between white and black communities in the US. For them, it was a sign of human failure rather than a triumph. The larger the community that has an interest in a heritage place, the higher its level of social significance. It could be argued that Apollo 11 has outstanding universal significance, like places on the World Heritage List (unfortunately the World Heritage Convention cannot be applied to space). What are the threats? In the past few years we have seen an increase in proposed missions to return to the Moon. Some have stated their intention to revisit the Apollo sites, by human crew or robot – and this could lead to the removal of material, for souvenirs or science. But the sites are both fragile and unprotected. The two primary risks to their survival are uncontrolled looting, and damage from abrasive and sticky lunar dust. Removing material from the sites damages the integrity of the artefacts and the relationships between them. A casual visit could erase the original footprints and astronaut traverses. The corrosive dust disturbed by surface activities could wear away the materials. Dust was a problem for all the crewed lunar missions. Apollo 16 commander John Young said: “Dust is the number one concern in returning to the Moon.” The dust can be stirred up by plumes from landing or ascending vehicles, driving vehicles, walking on the surface, or, in the next phase of lunar settlement, by construction and industrial activities, such as mining. Attempts at protection The Outer Space Treaty of 1967 forbids making territorial claims in space. Applying any national heritage legislation to a place on the Moon could be interpreted as a territorial claim. The US states of California and New Mexico have placed the Apollo 11 artefacts left on the Moon on a heritage list. They can do this because, under the treaty, the US legally owns the artefacts. But this does not protect the site itself.

### Plan---1AC

#### The United States federal government should establish a lunar space traffic management regime with the Russian Federation and the People’s Republic of China for the protection of lunar artifacts.