**Neg---Case Defense**

**Case**

**Modeling---Prolif D**

**Allies don’t believe in credibility theory.**

**Henry ’20** — Iain; Lecturer in the Strategic and Defence Studies Centre at the Australian National University. April 13, 2020; “What Allies Want: Reconsidering Loyalty, Reliability, and Alliance Interdependence”; *International Security*, Volume 44, Issue 4; Accessed Online via University of Michigan Libraries; //CYang

Leaders believe that if their state abandons one ally during a crisis, then their state's **other allies** will expect **similar disloyalty** in the future. Thus, a **single instance** of disloyalty can damage, or even destroy, alliances with other states. Because of this belief in interdependence — that developments in one alliance will also affect other alliances — the desire to demonstrate loyalty has exercised a tremendous influence on U.S. policy. But is indiscriminate loyalty what allies want? The First Taiwan Strait Crisis (1954–55) case study suggests that allies do not desire U.S. loyalty in **all situations**. Instead, they want the [US] United States to be a reliable ally, posing no risk of abandonment or entrapment. In the First Taiwan Strait Crisis, several allies worried that U.S. loyalty to the Republic of China increased the risk of **unwanted conflict**, and as the crisis persisted, these allies sought to restrain the United States and thus reduce the likelihood of war. Although U.S. leaders were reluctant to coerce the Republic of China into backing down during this territorial dispute with the People's Republic of China, other U.S. allies **actively encouraged** such disloyalty. These findings have significance for theories of alliance politics and international reputation, as well as contemporary alliance management.

Introduction

Do states judge their ally's behavior toward its other allies? If yes, how? Historically, decisionmakers have instinctively adopted deterrence theory's logic that a state's character is judged through displays of innate loyalty: if a state is disloyal to one ally, then this will create a reputation for disloyalty, which will cause other allies to doubt the state's reliability. Thus, disloyalty can have calamitous consequences: the aggrieved ally will punish the betrayal; other allies will suffer crises of faith; and adversaries will conclude that the state's alliances are cheap talk. The logic is that discrete alliance commitments are interdependent—that what happens in one alliance affects the expectations of other allies—and that this interdependence is underpinned by demonstrations of loyalty. President Lyndon Johnson said that if the United States were “driven from the field in Viet-nam, then no nation can ever again have the same confidence in American promise or in American protection.”1

These convictions regularly animate contemporary debates: Nancy Bernkopf Tucker and Bonnie Glaser argue that if the United States were to abandon Taiwan in a conflict with China, this could deal “a fatal blow to the U.S.-Japan alliance” and might lead to South Korea “renouncing its security alliance with Washington and aligning with Beijing.”2 Aaron Friedberg writes that expecting a U.S. “back down … [and] a Chinese victory over Taiwan … to leave America's Asian alliances unscathed, is to indulge in wishful thinking of the most dangerous kind.”3 Others suggest cross-regional effects, claiming that by “retreating from the Middle East and abandoning Ukraine to Russian aggression,” President Barack Obama left “America's Asian allies … bewildered and alienated.”4 If alliance interdependence exists, and is governed by innate loyalty, then fighting for reputation is crucial, because any single alliance rift could quickly tear asunder other alliance relationships.

Some scholars, described as “reputation skeptics,” dispute this common wisdom. Skeptics argue that because “reputation is in the **eye of the beholder**,” the United States should **never** regard demonstrating loyalty as sufficient grounds for military action.5 Jonathan Mercer argues that when allies observe the **U**nited **S**tates demonstrating loyalty, they will attribute this **desired behavior** to **situational causes** and thus will not conclude that it will be loyal in **future crises**. In contrast, he concludes that when the **U**nited **S**tates is disloyal, this undesired behavior will be attributed to **national character**, but will not always cause allies to expect **similar behavior** in the future.6 Reputation skeptics believe that “leaders are **tragically mistaken** when they commit to the use of force in the expectation of long-term benefits beyond any gains in the immediate dispute.”7

**The nuclear umbrella is unsustainable and fails to prevent proliferation or solve deterrence.**

**Walt ’21** — Stephen; columnist at Foreign Policy and the Robert and Renée Belfer professor of international relations at Harvard University. March 23, 2021; "It’s Time to Fold America’s Nuclear Umbrella"; *Foreign Policy*; <https://foreignpolicy.com/2021/03/23/its-time-to-fold-americas-nuclear-umbrella/>; //CYang

Why is this statement so intriguing? Because it shows the authors of this report recognize that Europe as a whole might be **more secure** if it could rely on a **locally based deterrent** instead of continuing to shelter under the U.S. nuclear umbrella. And if that is true for the nations of Europe, then it might well be true for others. Although the report’s authors are opposed to new states joining the nuclear club (Britain and France are already members), their statement clearly implies that deterrence would be strengthened if states facing **serious external threats** had a nuclear guarantee that didn’t depend on **Uncle Sam**.

This is hardly a new issue. Since fairly early in the nuclear age, the United States has used nuclear weapons to “extend deterrence” and shield some of its allies. It sought to convince potential adversaries that the United States might use its formidable nuclear arsenal if these allies were attacked, even if the United States was not. Of course, there was always some chance that a war involving one of the United States’ allies might escalate to the nuclear level, either by accident, through inadvertence, or via deliberate decision, no matter what U.S. leaders said in advance. Even so, Washington went to considerable lengths to make its nuclear umbrella credible, partly to discourage enemies from attacking but also to convince its allies not to get nuclear weapons themselves.

Accordingly, U.S. leaders made lots of public statements linking the U.S. arsenal to its core alliance commitments, and NATO drew up various plans and doctrinal pronouncements designed to reinforce perceptions of a reliable U.S. guarantee. The United States also deployed thousands of warheads on some of its allies’ territory, along with dual-key arrangements that gave those allies some say in how, when, or if these fearsome weapons got used. Lastly, and very importantly, the United States kept trying to achieve a meaningful degree of nuclear superiority to make a possible first use of nuclear weapons to defend allies more credible. Instead of acquiring a “minimum deterrent” (i.e., retaliatory forces that could survive any possible attack and then inflict unacceptable damage on an aggressor), U.S. war plans and weapons decisions always focused on trying to come out on top in the awful event of an actual nuclear war.

Why did the United States do this? In good part because convincing people you might use nuclear weapons to defend an ally isn’t easy. One might imagine a U.S. president using nuclear weapons to retaliate against a direct attack on U.S. territory or to deter the extremely unlikely prospect of a conventional invasion that threatened U.S. independence. This is the one thing nuclear weapons are good for: deterring existential threats to their possessors’ independence or autonomy. This form of deterrence (sometimes termed “basic” or “Type I”) works because the deterring side will almost certainly care more about preserving its own independence than a potential attacker is likely to care about trying to take it away. Because the balance of resolve favors the defender, even much weaker nuclear powers can deter enemies from attacking them directly. If you don’t find this argument persuasive, remember the U.S. attacked non-nuclear Iraq in 2003 and non-nuclear Libya in 2011, but it leaves nuclear-armed North Korea alone.

By contrast, deterring a conventional or a nuclear attack on an ally by threatening to go nuclear — and convincing your allies that you really mean it — is **more challenging**. It is one thing to threaten to use nuclear weapons to keep one’s own country from being subjugated but quite another to do so to save an ally from defeat or domination. Or, as people used to wonder back in the Cold War, would a U.S. president really risk Washington or Chicago to save Paris or Berlin? Long after they had left office, a few former U.S. officials suggested the answer was almost **certainly** “**no**.” Extended deterrence could still work because potential attackers can’t be sure about any of this, but it still isn’t as **credible** as deterring attacks on one’s own territory.

The solution to this conundrum — if one can call it that — is to achieve **overwhelming** “**nuclear superiority**.” If you could wipe out an adversary’s entire nuclear force in a first strike, you wouldn’t have to fear its retaliation, and using nuclear weapons to defend an ally would be much more credible. Even if a splendid first strike were not possible, perhaps you could convince a potential attacker that it will end up even worse off than you are at the end of a nuclear war to convince it not to put so much as a toe on the first rung of the escalation ladder.

Thus, the perceived need to extend deterrence is one of the reasons why the United States has long sought nuclear superiority. It’s not the only reason: A genuine first strike capability could limit damage in the event of an actual war. A few commentators have also tried to argue — not very convincingly — that superiority would enable the stronger side to coerce weaker states in crises. Chasing the holy grail of a first-strike advantage was also popular with defense contractors and parts of the armed services because it requires spending billions of dollars annually on more and more accurate weapons, more efficient and destructive warheads, improved surveillance and anti-submarine warfare capabilities, and lots of other shiny objects.

Interestingly, a number of sophisticated scholars have recently claimed that technological advances have put the United States on the brink of a true **first-strike capability**. Perhaps in theory, but **certainly not** as a usable option. To see why, ask yourself what you would do if you were president and facing a serious crisis with a nuclear-armed adversary. You’ve put the armed services on alert, and there is some danger that force might be used and fighting could escalate. Suppose your military advisors and intelligence experts tell you if you order a first strike now, you can almost certainly destroy the enemy’s entire nuclear arsenal, leaving the United States unscathed and in an ideal position to resolve the dispute on favorable terms.

Being a sensible person, you’d undoubtedly ask them: “Can you guarantee that? Are you absolutely, 100 percent sure the enemy will have zero usable weapons left, and therefore, we won’t even get our hair mussed?”

“We are highly confident of success,” you are told. “But there is a slim chance that a few enemy weapons would survive and reach U.S. soil. No more than one to three.”

Even if you weren’t troubled by the moral issues involved in ordering an attack that would kill **untold numbers** of people (and you ought to be), would you do it? Of course you wouldn’t, because you wouldn’t want to risk losing New York, Los Angeles, Chicago, Boston, or any other major U.S. city, which is what might happen if that first strike you authorized turned out to be just a tiny bit less effective than your advisors predicted. To issue a launch order, you’d have to believe the proposed attack would work perfectly the very first time it was executed (simulations and exercises aren’t the same), almost all of the missiles and bombs that have been sitting in silos or storage facilities for years would work as designed, and the other side wouldn’t have dispersed its own forces or hidden some extra weapons in places you had failed to detect. Based on everything the United States’ knows about complex military operations and the limits of intelligence, you’d be a **fool** to **roll the dice** in this way.

One more thing: As first-strike capabilities improve, adversaries may respond by keeping forces on **higher alert** or adopting “**l**aunch-**o**n-**w**arning” procedures that increase the risk of **accidental** or **inadvertent** war. No matter what U.S. forces are capable of in theory, in short, it’s hard to see how any president would be willing to use nukes first even if the probability of “success” was extremely high. This reality casts further doubt on the whole idea of extended deterrence, insofar as it is based on the threat to deliberately escalate to the nuclear level if a key ally is in danger of being conquered.

Extending a protective umbrella over allies in Europe and Asia may have made good sense during the Cold War, both to protect them and to discourage proliferation. But the **nuclear weapons environment** has changed: The number of nuclear-armed states has crept upward, and several countries (India, Pakistan, and the United Kingdom) are increasing the size of their own arsenals (though they remain far lower than U.S. or Russian levels). Moreover, the **U**nited **S**tates is not as **tightly coupled** to some of its traditional allies as it was during the Cold War, and serious rifts may continue to grow despite the Biden administration’s efforts to restore **alliance solidarity** and reassert U.S. leadership.

Which raises the obvious question: Does it still make sense to shield allies under the U.S. nuclear umbrella? Using the threat of nuclear use to protect other countries is not cost- or risk-free, and it may even be **more dangerous** than letting some other states acquire **arsenals of their own** and encouraging them to rely on “Type I” deterrence provided by their own national capabilities.

This view has been advanced before — most notably by Kenneth Waltz in a controversial Adelphi Paper 40 years ago. Waltz was not advocating giving other states the bomb or arguing that the rapid spread of nuclear weapons would be desirable; his central point was that trying to prevent the slow spread of these weapons was not without costs of its own and that in some cases, as he put it, “more may be better.” The question is: Is that becoming the case today?

To be sure, folding the nuclear umbrella might well have some negative effects. It might make states long accustomed to U.S. protection question its commitment (though there’s no logical reason for them to do so if it is still in the United States’ interest to aid their defense in other ways). It could also reduce U.S. influence or leverage if certain allies were no longer as dependent on U.S. protection, though folding the umbrella would not eliminate their reliance on other elements of U.S. power. Removing the U.S. nuclear guarantee might encourage a few states to pursue nuclear arms of their own, but it is not obvious that acquisition by Japan or Germany would be a terrible outcome from a purely U.S. perspective.

Moreover, even the possibility that these states might take over responsibility for deterring attacks on their own territory could have a sobering effect on a rising China and a recalcitrant Russia. In particular, it would remind Beijing and Moscow that their own behavior will affect the strategic calculations that their neighbors make in the near future, including decisions about nuclear arms. If China doesn’t want to face more nuclear weapons states in its immediate region, for instance, then its leaders should start asking themselves what they can do to make those neighbors feel less need for additional protection. The obvious answer: Stop harassing them in various ways, drop the sharp-elbowed approach to diplomacy, stick to agreements previously reached, and do more to resolve existing disputes on a fair-minded basis.

Whatever Washington ultimately chooses to do with its nuclear umbrella, the more important task is to **move beyond** the tendency to see nuclear weapons as **potent signs** of status, indispensable tools of statecraft, or **powerful sources** of leverage. Nuclear weapons are extremely useful for deterring direct and all-out attacks on one’s own homeland but not much else. For that purpose, a great power doesn’t need an enormous arsenal or some hypothetical capability to “fight and win” a nuclear exchange. All it needs is a stockpile that can survive an enemy attack and be able to respond in kind. Properly concealed or protected, they don’t need to be poised and ready to strike at a moment’s notice. **Fetishizing the bomb** and using it to try to protect others isn’t just expensive; it may also be dangerous.

**Ukraine shoots non-prolif.**

Michael E. **O'Hanlon** and Bruce Riedel **22**, O'Hanlon, senior fellow and director of research in Foreign Policy at the Brookings Institution; Riedel, senior fellow and director of the Brookings Intelligence Project; 3-29-2022, "The Russia-Ukraine war may be bad news for nuclear nonproliferation," https://www.brookings.edu/blog/order-from-chaos/2022/03/29/the-russia-ukraine-war-may-be-bad-news-for-nuclear-nonproliferation/, jy

Alas, though some arms control advocates would like to argue that the only purpose of nuclear weapons is to deter a nuclear attack on one’s territory, recent world events confirm that nuclear weapons can have another plausible purpose for some countries. For smaller or weaker states, owning nuclear weapons helps ensure that a large country will **not be able to attack** them and overthrow their government. Or, at least, the converse is true — **NOT** having nukes clearly leaves one **vulnerable**.

Just ask Saddam **Hussein**, who did not have nuclear weapons, about the 2003 Iraq war. Or Moammar **Gadhafi**, who also did not have nuclear weapons, about the 2011 NATO air campaign launched against Libya after he threatened to exterminate domestic opponents. Of course, we cannot really ask them — because not only are their regimes gone, they are **dead**, as a direct consequence of wars that they could not deter with conventional arms alone.

Watching all this, Kim Jong Un had already made the calculation, long before the Ukraine war, that he would cherish the North Korean nuclear weapons that his grandfather and father had bequeathed him. Our efforts to persuade him to denuclearize have **failed** under U.S. President Joe Biden’s four immediate predecessors, and the Biden team itself appears to be putting little effort into the quest itself, perhaps out of recognition that the task is just too hard if attempted in absolutist terms.

North Korea is not alone. Twenty four years ago we tried to persuade **Pakistan** not to test nuclear weapons after India had done so. Deputy Secretary of State Strobe Talbott led a team to Islamabad to make the case. Then Pakistani Prime Minister Nawaz Sharif reluctantly said he had no choice, and, buoyed by Saudi money and his Chinese ally, Pakistan tested.

Now we watch a Ukrainian regime vilified as “Nazi” in nature by Russian propaganda fighting for its territory, as well as its existence as a country — and indeed the personal survival of its leadership. Can there be any doubt that Putin would prefer the dismemberment and annexation of Ukraine — Putin has repeatedly called into doubt the very concept of Ukraine as a sovereign state — and the capture or killing of its president, Volodymyr Zelenskyy, given the way Putin has demonized him? When aggressors have extremist, existential goals like these, nuclear theorists rightly argue that nuclear weapons alas CAN be relevant, for threatening unacceptable retaliation to any such attack and thereby deterring it.

At the end of the Cold War, Ukraine had the world’s third largest nuclear arsenal. The fact that, in 1994, Ukraine returned to Russia almost 2,000 nuclear weapons that it had inherited from the breakup of the Soviet Union — receiving in reply a guarantee, in the form of the Budapest Memorandum (also signed by the U.K. and U.S.) that Ukraine would not be attacked — adds insult to the injury. Presumably Kyiv would like to take that decision back, given Russia’s subsequent behavior.

Some countries will draw two lessons, neither in the interest of the United States, from this history. If you have nuclear weapons, **keep them**. If you don’t have them yet, **get them**, especially if you lack a strong defender like the United States as your ally, and if you have **beef** with a big country that could plausibly lead to war.

Thinking through similar hypothetical scenarios 60 years ago, President John F. Kennedy predicted that there would be at least 25 nuclear weapons powers in the course of the 20th century. Luckily, he was wrong, and today we still have only nine. But the reasons for Kennedy’s fears persist; in fact, recent events have exacerbated and magnified them.

There is no simple solution to this problem, and we certainly do not propose that the United States enter the Ukraine war and fight a nuclear superpower today to reduce the risks of nuclear nonproliferation tomorrow. That would be oxymoronic in the extreme.

However, there are other more practical implications of this analysis. One is clearly that the Biden team and U.S. government, more broadly, should be working as hard as possible, not only to help Ukraine defend itself, but to seek a diplomatic solution to the conflict that preserves intact most or all of Ukraine’s territory as well as its government. Otherwise, beyond the further damage done to Ukraine and its people, the resulting precedent will be terrible for the cause of nuclear nonproliferation. Second, we need to be more careful about promising alliance expansion when we don’t really mean it. NATO proposed, back in 2008, that Ukraine would someday be invited to join the alliance — but with no timetable and no interim security guarantee. That had the net effect of painting a bullseye on Kyiv’s back that Russia has now targeted. Third, where we do have allies and alliances, we need to be resolute and consistent in conveying our seriousness about defending them. Biden is doing this latter job well, but his predecessor did not.

If we fail in these efforts, Kennedy’s prediction about the spread of nuclear weapons may wind up just being **premature**, not **wrong**. That would be a very dangerous and regrettable outcome for the future of international security.

**No prolif spread nor escalation.**

**Mueller 17** – John Mueller, Political Science Professor at Ohio State University. [Nuclear Weapons: Proliferation and Terrorism, CATO Handbook for Policymakers, 8th Edition, <https://object.cato.org/sites/cato.org/files/serials/files/cato-handbook-policymakers/2017/2/cato-handbook-for-policymakers-8th-edition-76_0.pdf>]

However, nuclear proliferation is **unlikely to accelerate** or prove to be **a major danger**. Terrorists are likely to continue to find that obtaining and using nuclear weapons is exceedingly difficult. And aggressive counterproliferation policies can generate costs far higher than those likely to be inflicted by the proliferation problem they seek to address. Those policies need careful reconsideration.

Nuclear Proliferation

Except for their effects on agonies, obsessions, rhetoric, posturing, and spending, the consequences of nuclear proliferation have been largely **benign**: those who have acquired the weapons have “**used**” them **simply to stoke their egos** or to **deter real or imagined threats**. For the most part, **nuclear powers** have found the weapons to be **a notable waste of time**, **money**, **effort**, and **scientific talent**. They have **quietly kept** the weapons **in storage** and haven’t **even found much benefit** in rattling them from **time to time**. If the recent efforts to keep Iran from obtaining nuclear weapons have been successful, those efforts have done Iran a favor.

There has never been a militarily compelling reason to use nuclear weapons, particularly because it has not been possible to identify suitable targets—or targets that couldn’t be attacked as effectively by conventional munitions. Conceivably, conditions exist under which nuclear weapons could serve a deterrent function, but there is little reason to suspect that they have been necessary to deter war thus far, even during the Cold War. The main Cold War contestants have never believed that a repetition of World War II, whether embellished by nuclear weapons or not, is remotely in their interests.

Moreover, the weapons have not proved to be crucial status symbols. How much more status would Japan have if it possessed nuclear weapons? Would anybody pay a great deal more attention to Britain or France if their arsenals held 5,000 nuclear weapons, or much less if they had none? Did China need nuclear weapons to impress the world with its economic growth or its Olympics?

Those considerations help explain **why alarmists** have been **wrong for decades** about **the pace** of **nuclear proliferation**. Most famously, in the 1960s, President John Kennedy anticipated that in another decade “fifteen or twenty or twenty-five nations may have these weapons.” Yet, of the **dozens of technologically capable countries** that have considered obtaining **nuclear arsenals**, **very few** have done so. Insofar as most leaders of most countries (even rogue ones) have considered acquiring the weapons, they have come to appreciate several drawbacks of doing so: nuclear weapons are dangerous, costly, and likely to rile the neighbors. Moreover, as the University of Southern California’s Jacques Hymans has demonstrated, the weapons have also been exceedingly difficult for administratively dysfunctional countries to obtain—it took decades for North Korea and Pakistan to do so. In consequence, **alarmist predictions** about **proliferation chains**, **cascades**, **dominoes**, **waves**, **avalanches**, **epidemics**, and **points of no return** have proved **faulty**.

Although proliferation has so far had **little consequence**, that is not because the only countries to get nuclear weapons have had rational leaders. **Large, important countries** that acquired the bomb were run at the time by unchallenged—perhaps certifiably **deranged**—**monsters**. Consider Joseph Stalin, who, in 1949, was planning to change the climate of the Soviet Union by planting a lot of trees, and Mao Zedong, who, in 1964, had just carried out a bizarre social experiment that resulted in an artificial famine in which tens of millions of Chinese perished.

Some also fear that a country might use its nuclear weapons to “dominate” its area. That argument was used with dramatic urgency before 2003 when Saddam Hussein supposedly posed great danger, and it has been frequently applied to Iran. Exactly how that domination is to be carried out is never made clear. The notion, apparently, is this: should an atomic rogue state rattle the occasional rocket, other countries in the area, suitably intimidated, would bow to its demands. Far more likely, threatened states would make common cause with each other and with other concerned countries (including nuclear ones) against the threatening neighbor. That is how countries coalesced into an alliance of convenience to oppose Iraq’s region-threatening invasion of Kuwait in 1990.

Yet **another concern** has been that the weapons will **go off**, by **accident** or **miscalculation**, devastating the planet in the process: the weapons exist in the thousands, sooner or later one or more of them will inevitably go off. But those prognostications **have now failed to deliver** for 70 years. **That time period** suggests **something more than luck** is **operating**. Moreover, the notion that if **one nuclear weapon** goes off in one place, the world will necessarily be plunged into **thermonuclear cataclysm** should remain in **the domain** of **Hollywood scriptwriters**.

**The non-prolif regime is unsustainable---BUT, reigning it back solves nuclear escalation.**

Stephen M. **Walt 21**, 3-23-21, "It’s Time to Fold America’s Nuclear Umbrella," https://foreignpolicy.com/2021/03/23/its-time-to-fold-americas-nuclear-umbrella/, jy

“Europe needs to build up the nuclear dimension of its defense efforts, including by retaining and modernizing capabilities for existing NATO nuclear missions and by France and Britain working together to extend their nuclear deterrents to their European allies.”

Why is this statement so intriguing? Because it shows the authors of this report recognize that Europe as a whole might be **more secure** if it could rely on a **locally based deterrent** instead of continuing to shelter under the U.S. nuclear umbrella. And if that is true for the nations of **Europe**, then it might well be true for **others**. Although the report’s authors are opposed to new states joining the nuclear club (Britain and France are already members), their statement clearly implies that deterrence would be **strengthened** if states facing **serious external threats** had a **nuclear guarantee** that didn’t depend on Uncle Sam.

This is hardly a new issue. Since fairly early in the nuclear age, the United States has used nuclear weapons to “extend deterrence” and shield some of its allies. It sought to convince potential adversaries that the United States might use its formidable nuclear arsenal if these allies were attacked, even if the United States was not. Of course, there was always some chance that a war involving one of the United States’ allies might **escalate** to the nuclear level, either by accident, through **inadvertence**, or via **deliberate decision**, no matter what U.S. leaders said in advance. Even so, Washington went to considerable lengths to make its nuclear umbrella credible, partly to discourage enemies from attacking but also to convince its allies not to get nuclear weapons themselves.

Accordingly, U.S. leaders made lots of public statements linking the U.S. arsenal to its core alliance commitments, and NATO drew up various plans and doctrinal pronouncements designed to reinforce perceptions of a reliable U.S. guarantee. The United States also deployed thousands of warheads on some of its allies’ territory, along with dual-key arrangements that gave those allies some say in how, when, or if these fearsome weapons got used. Lastly, and very importantly, the United States kept trying to achieve a meaningful degree of nuclear superiority to make a possible first use of nuclear weapons to defend allies more credible. Instead of acquiring a “minimum deterrent” (i.e., retaliatory forces that could survive any possible attack and then inflict unacceptable damage on an aggressor), U.S. war plans and weapons decisions always focused on trying to come out on top in the awful event of an actual nuclear war.

Why did the United States do this? In good part because convincing people you might use nuclear weapons to defend an ally **isn’t easy**. One might imagine a U.S. president using nuclear weapons to retaliate against a direct attack on U.S. territory or to deter the extremely unlikely prospect of a conventional invasion that threatened U.S. independence. This is the one thing nuclear weapons are good for: deterring existential threats to their possessors’ independence or autonomy. This form of deterrence (sometimes termed “basic” or “Type I”) works because the deterring side will almost certainly care more about preserving its own independence than a potential attacker is likely to care about trying to take it away. Because the balance of resolve favors the defender, even much weaker nuclear powers can deter enemies from attacking them directly. If you don’t find this argument persuasive, remember the U.S. attacked non-nuclear Iraq in 2003 and non-nuclear Libya in 2011, but it leaves nuclear-armed North Korea alone.

By contrast, deterring a conventional or a nuclear attack on an ally by threatening to go nuclear—and convincing your allies that you really mean it—is more challenging. It is one thing to **threaten to use nuclear weapons** to keep one’s own country from being subjugated but quite another to do so to **save an ally** from defeat or domination. Or, as people used to wonder back in the Cold War, would a U.S. president really risk Washington or Chicago to save Paris or Berlin? Long after they had left office, a few former U.S. officials suggested the answer was almost certainly “**no**.” Extended deterrence could still work because potential attackers can’t be sure about any of this, but it still **isn’t as credible** as deterring attacks on one’s own territory.

The solution to this conundrum—if one can call it that—is to achieve overwhelming “nuclear superiority.” If you could wipe out an adversary’s entire nuclear force in a first strike, you wouldn’t have to fear its retaliation, and using nuclear weapons to defend an ally would be much more credible. Even if a splendid first strike were not possible, perhaps you could convince a potential attacker that it will end up even worse off than you are at the end of a nuclear war to convince it not to put so much as a toe on the first rung of the escalation ladder.

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“We are highly confident of success,” you are told. “But there is a slim chance that a few enemy weapons would survive and reach U.S. soil. No more than one to three.”

Even if you weren’t troubled by the **moral issues** involved in ordering an attack that would kill **untold numbers of people** (and you ought to be), would you do it? Of course you **wouldn’t**, because you wouldn’t want to risk losing New York, Los Angeles, Chicago, Boston, or any other major U.S. city, which is what might happen if that first strike you authorized turned out to be just a **tiny bit less effective than your advisors predicted**. To issue a launch order, you’d have to believe the proposed attack would work perfectly the **very first time it was executed** (**simulations** and **exercises** aren’t the same), almost all of the missiles and bombs that have been sitting in silos or storage facilities for years **would work as designed**, and the other side wouldn’t have **dispersed its own forces** or hidden some extra weapons in places you had failed to detect. Based on everything the United States’ knows about complex military operations and the limits of intelligence, you’d be a **fool to roll the dice in this way**.

One more thing: As first-strike capabilities improve, adversaries may respond by keeping forces on **higher alert** or adopting **“launch-on-warning” procedures** that increase the risk of **accidental** or **inadvertent war**. No matter what U.S. forces are capable of in theory, in short, it’s hard to see how any president **would be willing to use nukes first** even if the probability of “success” was extremely high. This reality casts further doubt on the whole idea of extended deterrence, insofar as it is based on the threat to **deliberately escalate to the nuclear level** if a key ally is in danger of being conquered.

Extending a protective umbrella over allies in Europe and Asia may have made good sense during the Cold War, both to protect them and to discourage proliferation. But the nuclear weapons environment has **changed**: The number of nuclear-armed states has crept **upward**, and several countries (India, Pakistan, and the United Kingdom) are increasing the size of their **own arsenals** (though they remain far lower than U.S. or Russian levels). Moreover, the United States is not as tightly coupled to some of its traditional allies as it was during the Cold War, and serious rifts may **continue to grow** despite the Biden administration’s efforts to restore alliance solidarity and reassert U.S. leadership.

Which raises the obvious question: Does it still make sense to shield allies under the U.S. nuclear umbrella? Using the threat of nuclear use to protect other countries is **not cost- or risk-free**, and it may **even be more dangerous** than letting some other states **acquire arsenals of their own** and encouraging them to rely on “Type I” deterrence provided by their own national capabilities.

This view has been advanced before—most notably by Kenneth Waltz in a controversial Adelphi Paper 40 years ago. Waltz was not advocating giving other states the bomb or arguing that the rapid spread of nuclear weapons would be desirable; his central point was that trying to prevent the slow spread of these weapons was not without costs of its own and that in some cases, as he put it, “**more** may be **better**.” The question is: Is that becoming the case today?

To be sure, folding the nuclear umbrella might well have some negative effects. It might make states long accustomed to U.S. protection question its commitment (though there’s no logical reason for them to do so if it is still in the United States’ interest to aid their defense in other ways). It could also reduce U.S. influence or leverage if certain allies were no longer as dependent on U.S. protection, though folding the umbrella would not eliminate their reliance on other elements of U.S. power. Removing the U.S. nuclear guarantee might encourage a few states to pursue nuclear arms of their own, but it is not obvious that acquisition by **Japan** or **Germany** would be a terrible outcome from a purely U.S. perspective.

Moreover, even the possibility that these states might take over responsibility for deterring attacks on their own territory could have a **sobering effect** on a **rising China** and a **recalcitrant Russia**. In particular, it would remind Beijing and Moscow that their own behavior will affect the **strategic calculations** that their neighbors make in the near future, including decisions about **nuclear arms**. If China doesn’t want to face **more nuclear weapons states** in its immediate region, for instance, then its leaders should **start asking themselves what they can do** to make those neighbors feel less need for additional protection. The obvious answer: **Stop harassing them** in various ways, drop the sharp-elbowed approach to diplomacy, stick to agreements previously reached, and do more to resolve existing disputes on a fair-minded basis.

Whatever Washington ultimately chooses to do with its nuclear umbrella, the more important task is to move beyond the tendency to see nuclear weapons as potent signs of status, indispensable tools of statecraft, or powerful sources of leverage. Nuclear weapons are extremely useful for deterring direct and all-out attacks on one’s own homeland but not much else. For that purpose, a great power doesn’t need an **enormous arsenal** or some hypothetical capability to “fight and win” a nuclear exchange. All it needs is a stockpile that can **survive an enemy attack** and be able to respond in kind. Properly concealed or protected, they don’t need to be poised and ready to strike at a moment’s notice. Fetishizing the bomb and using it to try to protect others isn’t just expensive; it may also be **dangerous**.

**Modeling---Insects D**

**No Biodiversity impact.**

**Berger 17**---Kevin Berger is a features editor at Nautilus, interviewing Chris Thomas, a professor of conversation biology at the University of York in England, October 26th ("Is the Modern Mass Extinction Overrated?", Nautilus, Available online at https://nautil.us/issue/53/monsters/is-the-modern-mass-extinction-overrated, Accessed 4-20-2021)

After decades of researching the impact that humans are having on animal and plant species around the world, Chris Thomas has a simple message: Cheer up. Yes, we’ve wiped out woolly mammoths and ground sloths, and are finishing off black rhinos and Siberian tigers, but the doom is not all gloom. **Myriad species**, thanks in large part to humans who inadvertently transport them around the world, have **blossomed in new regions,** mated with like species and formed new hybrids that have themselves gone forth and prospered. We’re talking mammals, birds, trees, insects, microbes—all your flora and fauna. “Virtually all countries and islands in the world have **experienced substantial increases** in the **numbers of species** that can be found in and on them,” writes Thomas in his new book, Inheritors of the Earth: How Nature Is Thriving in an Age of Extinction.

Thomas is a professor of conservation biology at the University of York in England. He is not easily pigeonholed. He has been a go-to scientist for the media and lawmakers on how climate change is scorching the life out of animals and plants. At the same time he can turn around and write, “Wild geese, swans, storks, herons and cranes are returning as well, and the great whales, the largest animals ever to have lived on Earth, are once more plying their way across our seaways in numbers after centuries of unsustainable butchery.” Glass half empty, meet Chris Thomas.

Inheritors of the Earth collects years of Thomas’ field research, illuminating plant and animal species—notably one of his specialties, butterflies—flourishing all over the Earth. Thomas also puts big ideas on display. Humans are just another animal on the planet, he wants us to know. Our actions are not outside the engine of evolution, even though we have the most horsepower. Environmentalists need to stop fencing off nature from humans, he argues, understand the mechanics of evolution better, including our role in it, and quit being such nattering nabobs of negativity. Once they do all those things, real conservation has a chance. The Sixth Great Extinction, he tells us, is premature.

There may be a bit too much of Dr. Pangloss in Inheritors of the Earth, and despite its ample footnotes, I would have liked to have learned more about how Thomas quantifies some of his general assertions about increases in species. I did ask Thomas to cite the research he has drawn from to support his views, and he responded with the names of five scientists who have influenced him. You can read his answer in a footnote at the end of the interview.1 (I didn’t include it because it seemed kind of wonky.) In any event, Thomas was a pleasure to talk to. What is it about a wry Englishman that so enchants an American interviewer? Thomas and I had a jolly conversation, even if it got contentious at times, as I reminded him of the environmental wreckage that hung like a dark cloud over his thesis.

You write, “It is entirely possible that the long-term consequence of the evolution of Homo sapiens will be to increase the number of species on the Earth’s land surface.” That sure goes against the grain of what we have been hearing for generations.

Yes, it does.

What first caused you to you come to that conclusion?

I knew there was a new hybrid plant living in my hometown of York, England, and nowhere else in the world, and I had also heard about a new kind of fly evolving on introduced apple trees in North America. I started to reflect on the fact that so many of our crop plants started out as hybrids between different species. So I privately asked myself: How many new species might come into existence because of humans? All I needed was a pencil and the back of an envelope for my first calculation. I was gobsmacked, and eventually pleased with my preliminary answer. I reckoned that we might, very roughly, **double the number of species** on Earth over the **next million years**. Brought up on stories of extinction and environmental doom, it took me several years to believe my own answer.

Give us a convincing example of how humans boost the number of species.

The Italian sparrow is a really good example of a rapid evolution of a new species. It began when the house sparrow colonized out of Asia, following the development of agriculture. In the Mediterranean Basin, it met the Spanish sparrow. At some point, probably about 6,000 years ago, the house sparrow and the Spanish sparrow hybridized, and their offspring became sufficiently genetically distinct. Although they can interbreed with both of their parents, they basically don’t. So a new species **came into existence** by **hybridization**. I really like this example because the Italian sparrow has probably already survived for several thousand years. **It’s not** one of these **species** that come into existence and **suddenly disappear**.

Most of the new hybrids exist because we humans have either deliberately or accidentally brought the parents—which used to live in different parts of the world—into contact with one another. This is an extraordinary feature of the modern world. There has been no time in the history of life when species have been mixed up within and between continents at the rate that’s going on at the moment. The consequence of this human-caused transport is that hybrids must be coming into existence faster than ever before.

Is there a mammal that fits your scenario? Mammals have not fared well with humans.

You are quite right. The heavyweight, large body-sized mammals are where we have most systematically exterminated other species over the last 60,000 years. There’s no doubt about that whatsoever. But hybridization is taking place in mammals too, when they’ve been introduced to new locations. In Britain, the native red deer has been mating with the sika deer. There’s some hybridization among the wapiti, or elk, and red deer. Presumably, these new populations will start to diverge with a new mixture of genes that they didn’t have previously.

In 1997, the biologist E.O. Wilson wrote, “Extinction is now proceeding thousands of times faster than the production of new species.” Is that just wrong?

At the time he wrote that, nobody had made **any estimate** whatsoever of the current **speciation rate**. It was based on **a presumption** that the **present-day speciation rate** is the same that it appears to have been in the **long-term historical past**. For animals, particularly vertebrates, it’s pretty clear that over the last few thousand years, the extinction rate has indeed been a lot higher than the speciation rate. However, it’s **not so obvious for plants**. If you take the mainland North America north of Mexican border, for which there’s good data, and mainland Europe, we know of more hybrid plant species in both of these regions that have come into existence over the last 300 years than we know of plant species that have become completely extinct.

I’m not disputing that what Wilson and others are talking about is real. What I’m saying is that, simultaneously, **large numbers of biological gains** are also going on, and that they are at least as worthy of scientific study as the losses. As environmental managers and conservationists, we should start incorporating these gains into our thinking of how we manage the planet, rather than taking a stance of simply trying to fight the losses.

How do we benefit by taking those gains into account?

It depends on what sort of gain you are talking about. A number of scientists have suggested the benefits of ecosystems to humans may increase with the number of species in an ecosystem. Most ecologists accept that various plants can **stabilize the soil, purify water, or fix carbon** from the atmosphere, and so on. If so, then why should these services not also be provided by so-called non-native species? There’s no clear evidence that the old ones are better than new arrivals at doing these ecological jobs. The fact that new species are becoming established in our new, disturbed environmental conditions, suggests that **non-native species** could **actually be better at these jobs**. If you were to say, “My standpoint is that ecosystems are degraded by the loss of the **former diversity**,” then you might think that the ecosystem service has declined. But that argument doesn’t follow once you take into account the balance in gains.

**Status quo solves.**

**Marris 21**---Emma Marris is a freelance writer based in Klamath Falls, Oregon. Her book Wild Souls: Freedom and Flourishing in the Nonhuman World, February 1st ("Inevitable Planetary Doom Has Been Exaggerated", Atlantic, Available online at https://www.theatlantic.com/science/archive/2021/02/other-side-catastrophe/617865/, Accessed 4-25-2021)

But environmentalists are so good at **emphasizing worst-case scenarios** that when we look to the future, apocalypse often feels inevitable. After all, aren’t we in the “sixth mass extinction”? Haven’t populations of wild animals already crashed by 60 percent? Don’t we have just “10 years left” to avert climate meltdown? Do we really dare to hope?

Yes, we do dare to hope. Looking at these problems from a distance, they seem like impenetrable, mountainous barriers to a good future, but in every case, there is a path through.

“Saving the planet” can mean many things in practice, but one goal pretty much everyone shares is stopping extinctions. Elizabeth Kolbert’s 2014 Pulitzer Prize–winning book, The Sixth Extinction: An Unnatural History, reported on scientists sounding the alarm about high extinction rates, and in the years that followed, the idea that we are in the midst of one of the planet’s greatest mass-extinction events has come to feel like a bedrock truth to many greenies. This framing can make extinction feel like a force too huge and powerful to avert.

That’s just not true. As of today, according to the International Union for Conservation of Nature’s Red List, the conservation status of 128,918 species has been assessed. Of those, 902 have gone extinct since the year 1500. This is absolutely too many. One is too many. But to cause an **extinction event** on the scale of those seen millions of years ago, in which more than 75 percent of species disappeared, **we would have to lose all our threatened species within a century** and then keep losing species at that same super-high rate for between 240 and **540 more years**. In other words, the concept assumes that we won’t save anything, ever, and that hundreds of years into the future, we will still be **as inept at protecting biodiversity** as we are now.

You might have also heard that we’ve lost something like 60 percent of wild animals since the 1970s? Surely this suggests that a lot more extinctions are imminent? In 2018, The Atlantic’s Ed Yong helpfully explained that this study actually looked at the average decline of a given population (not species) of wild animal. So **severe declines in small populations** disproportionately increase the **average decline**.

More recently, a new analysis of the data showed that, indeed, the 60 percent average decline was driven by very severe crashes in a very small number of vertebrate populations. For example, one small population of Australian waterfall frogs declined 99.5 percent over two years. This decline became one data point, which was averaged with 14,000 others, many from stable or increasing populations.

Really, **less than 3 percent** of vertebrate populations are crashing. Remove the most strongly declining populations, and the average would actually be growing slightly. This means that declines are not the rule everywhere. It means that the specific populations in crisis can be identified and helped. And we have the knowledge to save them, if we can marshal the will and resources.

This targeted approach works for environmental policy too. The Trump administration pushed for more than 100 rollbacks of pollution standards, land protections, and other green policies, with the glee of a team of comic-book villains. Jill Tauber, the vice president of litigation for climate and energy at Earthjustice, told me that her organization has more than 100 lawsuits pending against the Trump administration and that so far, once cases pass any procedural hurdles, her side is winning more than 80 percent of them. Tackled one-by-one, many of his policies can be undone and their damage limited.

Addressing climate change is obviously a cornerstone of environmental protection. Some change has already happened and more is locked in, but as the cost of key technologies such as solar panels and batteries has fallen, the price tag to move the country to **net-zero emissions** by 2050—as President Joe Biden has pledged—has also dropped. The U.S. could spend about what it **already spends** on energy—a mere 4 to 6 percent of gross domestic product—and **still reach this goal**, according to a new report out of Princeton University.

**Tipping points are wrong and we don’t need biodiversity to survive**

**Brook 15**---Barry Brook is a PhD in Population Viability Analysis and Conservation Biology at Macquarie University, Australian Laureate Professor and Chair of Environmental Sustainability at the University of Tasmania, former Director of Climate Science at the Environment Institute, January 2015 (“The Limits of Planetary Boundaries 2.0,” 16 January 2015, Available online at https://bravenewclimate.com/2015/01/16/the-limits-of-planetary-boundaries-2-0/)

Steffen et al (2015) revise the “planetary boundaries framework” initially proposed in 2009 as the “safe limits” for human alteration of Earth processes(Rockstrom et al 2009). Limiting human harm to environments is a major challenge and we applaud all efforts to increase the public utility of global-change science. Yet the planetary boundaries (PB) framework---in its original form and as revised by Steffen et al---**obscures** rather than clarifies the environmental and sustainability challenges faced by humanity this century.

Steffen et al concede that “not all Earth system processes included in the PB have **singular thresholds** at the global/continental/ocean basin level.” Such processes include **biosphere integrity** (see Brook et al 2013), **biogeochemical flows**, **freshwater use**, and **land-system change**. “Nevertheless,” they continue, “it is important that boundaries be established for these processes.” Why? Where a global threshold is unknown or lacking, there is **no scientifically robust way** of specifying such a boundary---determining a limit along a continuum of environmental change becomes a matter of **guesswork or speculation** (see e.g. Bass 2009;Nordhaus et al 2012). For instance, the land-system boundary for temperate forest is set at 50% of forest cover remaining. There is **no robust justification** for why this boundary should not be 40%, or 70%, or some other level.

While the stated objective of the PB framework is to “guide human societies” away from a state of the Earth system that is “less hospitable to the development of human societies”, it **offers little scientific evidence** to support the connection between the global state of specific Earth system processes and human well-being. Instead, the Holocene environment (the most recent 10,000 years) is **assumed to be ideal**. **Yet** most species evolved before the Holocene and the contemporary ecosystems that sustain humanity are **agroecosystems**, **urban ecosystems** and other **human-altered ecosystems** that in themselves represent some of the most important global and local environmental changes that characterize the Anthropocene. Contrary to the authors’ claim that the Holocene is the “only state of the planet that we know for certain can support contemporary human societies,” the **human-altered ecosystems** of the Anthropocene represent the only state of the planet that we know for certain can support contemporary civilization.

Human alteration of environments produces multiple effects, some advantageous to societies, such as enhanced food production, and some detrimental, like environmental pollution with toxic chemicals, excess nutrients and carbon emissions from fossil fuels, and the loss of wildlife and their habitats. The key to better environmental outcomes is not in ending human alteration of environments but in anticipating and mitigating their negative consequences. These decisions and trade-offs should be guided by robust evidence, with global-change science investigating the connections and tradeoffs between the state of the environment and human well-being in the context of the local setting, rather than by framing and reframing environmental challenges in terms of untestable assumptions about the virtues of past environments.

Even without specifying exact global boundaries, global metrics can be **highly misleading for policy**. For example, with nitrogen, where the majority of human emissions come from synthetic fertilizers, the real-world challenge is to apply just the right amount of nitrogen to optimize crop yields while minimizing nitrogen losses that harm aquatic ecosystems. Reducing fertilizer application in Africa might seem beneficial globally, yet the result in this region would be even poorer crop yields without any notable reduction in nitrogen pollution; Africa’s fertilizer use is already suboptimal for crop yields. What can look like a good or a bad thing globally can **prove exactly the opposite** when viewed regionally and locally. What use is a global indicator for a local issue? As in real estate, location is everything.

**No human extinction**

* Permian-Triassic extinction proves resiliency
* No data on tipping points
* Ecosystems never outright collapse
* 600 models prove no ecosystem collapse

**Hance 18** [Jeremy Hance, wildlife blogger for the Guardian and a journalist with Mongabay focusing on forests, indigenous people, climate change and more. He is also the author of Life is Good: Conservation in an Age of Mass Extinction. Could biodiversity destruction lead to a global tipping point? Jan 16, 2018. https://www.theguardian.com/environment/radical-conservation/2018/jan/16/biodiversity-extinction-tipping-point-planetary-boundary]

Just over 250 million years ago, the planet suffered what may be described as its greatest holocaust: ninety-six percent of marine genera (plural of genus) and seventy percent of land vertebrate vanished for good. Even insects suffered a mass extinction---the only time before or since. Entire classes of animals---like trilobites---went out like a match in the wind.

But what’s arguably most fascinating about this event---known as the Permian-Triassic extinction or more poetically, the Great Dying---is the fact that anything survived at all. Life, it seems, **is so ridiculously adaptable** that not only did thousands of species make it through whatever killed off nearly everything (no one knows for certain though theories abound) but, somehow, after millions of years life even recovered and went on to write new tales.

Even as the Permian-Triassic extinction event shows the fragility of life, it also proves its **resilience** in the long-term. The lessons of such mass extinctions---five to date and arguably a sixth happening as I write---inform science today. Given that extinction levels are currently 1,000 (some even say 10,000) times the background rate, researchers have long worried about our current destruction of biodiversity---and what that may mean for our future Earth and ourselves.

In 2009, a group of researchers identified nine global boundaries for the planet that if passed could theoretically push the Earth into an uninhabitable state for our species. These global boundaries include climate change, freshwater use, ocean acidification and, yes, biodiversity loss (among others). The group has since updated the terminology surrounding biodiversity, now calling it “biosphere integrity,” but that hasn’t spared it from critique.

A paper last year in Trends in Ecology & Evolution scathingly attacked the idea of any global biodiversity boundary.

“It makes **no sense** that there exists a tipping point of biodiversity loss beyond which the Earth will collapse,” said co-author and ecologist, José Montoya, with Paul Sabatier Univeristy in France. “There is **no rationale** for this.”

Montoya wrote the paper along with Ian Donohue, an ecologist at Trinity College in Ireland and Stuart Pimm, one of the world’s leading experts on extinctions, with Duke University in the US.

Montoya, Donohue and Pimm argue that there isn’t evidence of a point at which loss of species leads to ecosystem collapse, **globally** or even **locally**. If the planet didn’t collapse after the Permian-Triassic extinction event, **it won’t collapse now**---though our descendants may well curse us for the damage we’ve done.

Instead, according to the researchers, every loss of species counts. But the damage is gradual and incremental, not a sudden plunge. Ecosystems, according to them, slowly degrade but **never fail outright.**

“Of more than 600 experiments of biodiversity effects on various functions, **none showed a collapse**,” Montoya said. “In general, the loss of species has a detrimental effect on ecosystem functions...We progressively lose pollination services, water quality, plant biomass, and many other important functions as we lose species. But we never observe a critical level of biodiversity over which functions collapse.”

**Redundancy, adaptation, and studies.**

**Kareiva et al ‘12** (Chief Scientist and Vice President, The Nature Conservancy (Peter, Michelle Marvier --professor and department chair of Environment Studies and Sciences at Santa Clara University, Robert Lalasz -- director of science communications for The Nature Conservancy, Winter, “Conservation in the Anthropocene,” http://thebreakthrough.org/index.php/journal/past-issues/issue-2/conservation-in-the-anthropocene/)

2. As conservation became a global enterprise in the 1970s and 1980s, the movement's justification for saving nature shifted from spiritual and aesthetic values to focus on biodiversity. Nature was described as primeval, fragile, and at risk of collapse from too much human use and abuse. And indeed, there are consequences when humans convert landscapes for mining, logging, intensive agriculture, and urban development and when key species or ecosystems are lost.¶ But ecologists and conservationists have **grossly overstated** the fragility of nature, frequently arguing that once an ecosystem is altered, it is gone forever. Some ecologists suggest that if a single species is lost, a whole ecosystem will be in danger of collapse, and that if too much biodiversity is lost, spaceship Earth will start to come apart. Everything, from the expansion of agriculture to rainforest destruction to changing waterways, has been painted as a threat to the delicate inner-workings of our planetary ecosystem.¶ The fragility trope dates back, at least, to Rachel Carson, who wrote plaintively in Silent Spring of the delicate web of life and warned that perturbing the intricate balance of nature could have disastrous consequences.22 Al Gore made a similar argument in his 1992 book, Earth in the Balance.23 And the 2005 Millennium Ecosystem Assessment warned darkly that, while the expansion of agriculture and other forms of development have been overwhelmingly positive for the world's poor, ecosystem degradation was simultaneously putting systems in jeopardy of collapse.24¶ The trouble for conservation is that the data simply do not support the idea of a fragile nature at risk of collapse. Ecologists now know that the disappearance of one species does not necessarily lead to the extinction of any others, much less all others in the same ecosystem. In many circumstances, the demise of formerly abundant species can be **inconsequential** to ecosystem function. The American chestnut, once a dominant tree in eastern North America, has been extinguished by a foreign disease, yet the forest ecosystem is surprisingly unaffected. The passenger pigeon, once so abundant that its flocks darkened the sky, went extinct, along with countless other species from the Steller's sea cow to the dodo, with **no catastrophic or even measurable effects**.¶ development. A 2010 report concluded that rainforests that have grown back over abandoned agricultural land had 40 to 70 percent of the species of the original forests.27 Even Indonesian orangutans, which were widely thought to be able to survive only in pristine forests, have been found in surprising numbers in oil palm plantations and degraded lands.28¶ Nature is so **resilient** that it can **recover rapidly** from even the **most powerful** human disturbances. Around the Chernobyl nuclear facility, which melted down in 1986, wildlife is thriving, despite the high levels of radiation. These stories of **resilience are not isolated** examples -- a **thorough review of** the scientific literature identified **240 studies** of ecosystems following **major disturbances** such as deforestation, mining, oil spills, and other types of pollution. The abundance of plant and animal species as well as other measures of ecosystem function recovered, at least partially, in 173 **(72 percent) of** these **studies**.25¶ While global forest cover is continuing to decline, it is rising in the Northern Hemisphere, where "nature" is returning to former agricultural lands.26 Something similar is likely to occur in the Southern Hemisphere, after poor countries achieve a similar level of economic 29 In the Bikini Atoll, the site of multiple nuclear bomb tests, including the 1954 hydrogen bomb test that boiled the water in the area, the number of coral species has actually increased relative to before the explosions.30 More recently, the massive 2010 oil spill in the Gulf of Mexico was degraded and consumed by bacteria at a remarkably fast rate.31¶ Today, coyotes roam downtown Chicago, and peregrine falcons astonish San Franciscans as they sweep down skyscraper canyons to pick off pigeons for their next meal. As we destroy habitats, we create new ones: in the southwestern United States a rare and federally listed salamander species seems specialized to live in cattle tanks -- to date, it has been found in no other habitat.32 Books have been written about the collapse of cod in the Georges Bank, yet recent trawl data show the biomass of cod has recovered to precollapse levels.33 It's doubtful that books will be written about this cod recovery since it does not play well to an audience somehow addicted to stories of collapse and environmental apocalypse.¶ Even that classic symbol of fragility -- the polar bear, seemingly stranded on a melting ice block -- may have a good chance of surviving global warming if the changing environment continues to increase the populations and northern ranges of harbor seals and harp seals. Polar bears evolved from brown bears 200,000 years ago during a cooling period in Earth's history, developing a highly specialized carnivorous diet focused on seals. Thus, the fate of polar bears depends on two opposing trends -- the decline of sea ice and the potential increase of energy-rich prey. The history of life on Earth is of species evolving to take advantage of new environments only to be at risk when the environment changes again.¶ The wilderness ideal presupposes that there are parts of the world untouched by humankind, but today it is impossible to find a place on Earth that is unmarked by human activity. The truth is humans have been impacting their natural environment for centuries. The wilderness so beloved by conservationists -- places "untrammeled by man"34 -- never existed, at least not in the last thousand years, and arguably even longer.

**Greater species discovery rates.**

**Costello 19**---Mark Costello is a professor in marine ecology at Nord University, July 26th, 2019 (“Unhelpful inflation of threatened species”, *Science*, Vol. 365, Issue 6451, pp. 332-333, Available online at https://science.sciencemag.org/content/365/6451/332.2)

**Unhelpful inflation** of threatened species

The recent assessment of the state of the world’s biodiversity by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) claimed that 1 million species are threatened with extinction and that extinction rates are tens to hundreds of times higher than those in the past 10 million years based on the fossil record (1, 2). Neither estimate is helpful to conservation, and both may be counterproductive.

The claim that **1 million** threatened species are under threat was based on an **outdated high estimate** of how many species may exist. Old estimates of species diversity need to be reduced to recognize that continued **high rates** of **species discovery** are being maintained by increasing effort, that the number of apparent species includes **many synonyms**, and that at least two-thirds of all species are named (3–6). Comparisons between the present situation and the (patchy and biased) fossil record are **flawed** because they differ in causes of extinctions, species groups measured, and **time scales** (3, 7).

Perhaps 1.8 million living species have been named if we consider that at least one-fifth of presently accepted species names may be synonyms (3–5, 8). Of the named species, the International Union for Conservation of Nature (IUCN) has only assessed about 100,000 (5%) for extinction risk (9). Of these, about 27,000 species are listed as threatened with extinction (in addition to 872 species that are already extinct) (9). This, likely an underestimate, is a global crisis that needs to be addressed. Helpfully, we know which species are threatened.

The IPBES report’s compromised comparisons with the fossil record and emphasis on a highly speculative 1 million (instead of the ~27,000 known threatened species at risk), do not contribute to conservation action. Instead, they can be detrimental to conservation because they fuel **distracting debates** and contribute to “**compassion fade**,” a phenomenon in which people **feel overwhelmed** and **less likely** to act as a result (10). Conservation requires the wider society to stay engaged and continue to work toward solutions. Rather than focus on **exaggerated numbers**, we should emphasize successes and steps forward. For example, partly because of conservation, **extinction** **rates** have **not been as high** as some have feared (11, 12).

To help conservation action, we should assess the threats to all known species. The freely available online databases now listing over 2 million species provide a foundation for this, including an expert network (8).

**Global actors mean they can’t solve biodiversity — prefer the only comparative analysis.**

**Carrington ’20** — Damian, environment editor, citing the Swiss Re Index; (October 12, 2020; “Fifth of countries at risk of ecosystem collapse, analysis finds”; *The Guardian*; <https://www.theguardian.com/environment/2020/oct/12/fifth-of-nations-at-risk-of-ecosystem-collapse-analysis-finds>; //LFS—SR)

**One-fifth of the world’s countries are at risk of their ecosystems collapsing** because of the destruction of wildlife and their habitats, according to an analysis by the insurance firm Swiss Re.

Natural “services” such as food, clean water and air, and flood protection have already been damaged by human activity.

More than half of global GDP---$42tn (£32tn)---depends on high-functioning biodiversity, according to [the report](https://www.swissre.com/media/news-releases/nr-20200923-biodiversity-and-ecosystems-services.html), but the risk of tipping points is growing.

Countries including **Australia**, **Israel** and **South Africa** rank near the top of Swiss Re’s index of risk to biodiversity and ecosystem services, with **India**, **Spain** and **Belgium** also highlighted. Countries with fragile ecosystems and large farming sectors, such as **Pakistan** and **Nigeria**, are also flagged up.

Countries including Brazil and Indonesia had large areas of intact ecosystems but had a strong economic dependence on natural resources, which showed the importance of protecting their wild places, Swiss Re said.

“A staggering fifth of countries globally are at risk of their ecosystems collapsing due to a decline in biodiversity and related beneficial services,” said Swiss Re, one of the world’s biggest reinsurers and a linchpin of the global insurance industry.

“If the ecosystem service decline goes on [in countries at risk], you would see then scarcities unfolding even more strongly, up to tipping points,” said Oliver Schelske, lead author of the research.

Jeffrey Bohn, Swiss Re’s chief research officer, said: “This is the first index to our knowledge that pulls together indicators of biodiversity and ecosystems to **cross-compare around the world**, and then specifically link back to the economies of those locations.”

The index was designed to help insurers assess ecosystem risks when setting premiums for businesses but Bohn said it could have a wider use as it “allows businesses and governments to factor biodiversity and ecosystems into their economic decision-making”.

The UN revealed in September that the **world’s governments failed to meet a single target** to stem biodiversity losses in the **last decade**, while leading scientists warned in 2019 that [humans were in jeopardy](https://www.theguardian.com/environment/2019/may/06/human-society-under-urgent-threat-loss-earth-natural-life-un-report) from the accelerating decline of the Earth’s natural life-support systems. More than [60 national leaders recently pledged](https://www.theguardian.com/environment/2020/sep/28/world-leaders-pledge-to-halt-earth-destruction-un-summit) to end the destruction.

The Swiss Re index is built on 10 key ecosystem services identified by the world’s scientists and uses scientific data to map the state of these services at a resolution of one square kilometre across the world’s land. The services include provision of clean water and air, food, timber, pollination, fertile soil, erosion control, and coastal protection, as well as a measure of habitat intactness.

Those countries with more than 30% of their area found to have fragile ecosystems were deemed to be at risk of those ecosystems collapsing. Just **one in seven countries had intact ecosystems covering** more than **30%** of their country area.

Among the G20 leading economies, South Africa and Australia were seen as being most at risk, with China 7th, the US 9th and the UK 16th.

**Alt-causes to aquatic bio-d loss.**

**Bassem 20** (Samah, Associate Professor @ National Research Center’s Department of Water Pollution, Egypt, “Water pollution and aquatic biodiversity,” Biodiversity International Journal, volume 4, issue 1, 1/16/20, page 16, DOI: 10.15406/bij.2020.04.00159, ccm, \*passage modified for grammatic integrity; (an ‘)’ has been added after “seen as decreasing” because the lack of a ‘)’ is a typo; - added [such]---added 3 commas to account for the addition of [while], the excerpt that follows is the modified version inserted into the text, unmodified excludes the commas and [while], “industrial and domestic sources, [while] other pollution sources are growing, such as chemical pollution, which act as important threats to water bodies” changes denoted by brackets)

Global aquatic biodiversity suffers from **major threats** that can be grouped in the following categories: i) **Climate change** ii) **Water pollution**; iii) **Overexploitation;** iv) **invasion** by **exotic species**; v) **habitat degradation** and vi) **flow modification**.36–39 Climate change is known as the alterations in atmospheric, biogeochemical and hydrological cycles. The fluctuations such as: delicate variations in average daily temperatures, the period of rainy seasons, carbon cycle, night-time temperature, and also solar radiation that may affect biological organisms. In the twentieth century the temperatures has elevated by about 0.6 degrees Celsius than past centuries. Research on the tree rings and ice cores, established scientific data needed to demonstrate such trend of increasing temperatures. As a result of temperature change, some oceanic coral reef ecosystems declined. The **coastal regions** may be quickly **submerged** due to the **rapid increase** of **sea levels**, which estimated to increase 0.1 to 0.2 metres by the last century. This is considered **catastrophic** to some species and also **diverse communitie**s in the **ecotone**. The past climatic changes lead to ecosystems with various species composition, due to species’ different capabilities to adapt to the climate changes.

Water bodies’ **contamination** by **different pollutants** (**physical**, **biological**, **chemical** and **radioactive**) resulted from many sources (**mining activities**, **industrial effluents**, **domestic sewage** and **agricultural runoff**) is considered a **major threat** to water biodiversity.40–42 Pollution causes many **diseases** and even deaths all over the world but mostly in Asia and Africa. Visual water pollution may be caused by some physical pollutants such as; temperature change.43 Different pathogenic pollutants were exuded by untreated sewage and nuclear power plants produce radioactive matter pollution.44,45 There are two types of water pollutants either point sources or non-point sources, both of them resulted from agriculture drains and sewage.46–49 It has been realized that pollution problems are pandemic and even some industrialized nations have proceeded in decreasing water pollution from different sources such as industrial and domestic sources, [while] other pollution sources are growing, such as chemical pollution, which act as **important threats** to **water bodies**.50,51

**Overexploitation** (especially, **overfishing**) is affecting greatly marine vertebrates (large vertebrates and predators [such] as **sharks** and **tuna** that were seen **decreasing**).52 **Overfishing** of **target species** at law levels may also basically affect ecosystems particularly when **constituting** a **high ratio** of **biomass** or related to food webs.53 For example, sand eel and cod stocks have subjected to overexploitation in UK waters,54 by the effect being increased by synergism of sand eel overfishing and also range shift of copepod Calanus finmarchicus, which is considered a major food for sand eel.55

It was found that **widespread invasion** and willful **submission** of exotic species raises the **chemical** and **physical impacts** of humans over freshwater ecosystem, firstly because exotic species mostly invade ecosystems that were already **degraded** or modified by human activities.56,57 Many examples were recognized representing **dramatic impacts** of **exotics** upon the **indigenous species** (the crayfish plague in Europe, salmonids in Southern Hemisphere streams and lakes, Nile perch, Lates niloticus, in Lake Victoria),35 such impacts are projected to **grow fast**.58 Also some indirect impacts are pronounced such as effect of terrestrial plants (Tamarix spp. (Tamaricaceae), that change water regime of riparian soils and also alter stream flows in North America and Australia.59

Habitat degradation refers to an arrangement of reactive factors that may include **direct impacts** on **aquatic environment** or indirect which occur from drainage basin changes. As an example, **forest removal** is usually with **alterations** in **surface runoff** and also raised **river sediment** loads which may lead to **habitat changes** such as **erosion** of **shoreline**, **strangling** of **coastal habitats**, **blocking river bottoms** or even **aggradations** of **floodplain**.9

Flow modifications occur **ubiquitously** in running water bodies.60 They differ in type and severity but resort to be **highly aggressive** especially in regions with extremely variable flow zones. This refers to humans in such areas have the highest need for water storage and food protection. That found dams retain about 10 000km3 of water, equal to five times all world’s water volume,61 explains the global extent of human change of river flow. Recently some of the world’s longest rivers suffer from **dryness** as a result of the large scale water abstraction.62 Impacts also of **flow modifications** on river biota such as fish are likely to be **severe** and need to be considered in future research.63,6

**Modeling---SDGs D**

**SDGs solve nothing---trade-offs & liberal actors are *failing***

**Deighton 19**---Ben; managing editor. (“SDGs ‘failing to create transformational change’” SciDev.Net. September 24, 2019. <https://www.scidev.net/global/news/sdgs-failing-to-create-transformational-change/>) //LFS—SR

The Sustainable Development Goals (SDGs) are often **failing** to produce the profound changes needed to achieve their ambitious objectives **due to a lack of coordination** across the 17 separate goals, the American Association for the Advancement of Science (AAAS) annual meeting heard.

“The reality is that if they are just seen as **aspirational** goals what happens is---what is actually happening now--- is that governments are just labelling what they are doing anyhow as being in the obligation of the SGDs,” Peter Gluckman from the University of Auckland, New Zealand, told a panel discussion during the event, held in Washington, DC from 14-17 February.

The [SDGs](https://www.scidev.net/global/governance/sdgs/) were adopted by the United Nations in September 2015, and call for [governments](https://www.scidev.net/global/governance/) to achieve goals such as ending poverty, eradicating hunger and ensuring everyone has access to clean, affordable [energy](https://www.scidev.net/global/environment/energy/) by 2030.

However, global hunger has **risen for the third year in a row**, according to the latest UN’s [world food security report](http://www.fao.org/state-of-food-security-nutrition/en/), while fewer than five per cent of countries are on track to meet childhood obesity and tuberculosis targets, according to [a study](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)32336-X/fulltext) published in The Lancet in 2017.

**Global**[**carbon emissions**](https://www.scidev.net/global/environment/pollution/) were also set to **rise by two per cent** in 2018 to **hit an all-time high**, according to [a report](https://www.uea.ac.uk/about/-/strong-growth-in-global-co2-emissions-expected-for-2018) by the UK’s University of East Anglia and the Global Carbon Project. The trend is driven by rises in the use of coal, oil and gas.

“Don’t get me wrong, those [the SDGs] are critically important and we are fully committed---but let’s be honest about lots of words and lots of talk, but perhaps little action,” Daan du Toit, deputy director-general for international cooperation at the South African Department of Science and Technology, said during a panel discussion.

Nakao Ishii, chief executive of the DC-based funding organisation Global Environment Facility, said that in her native Japan, people would wear SDG badges at policy meetings, but that did not always mean they understood the changes that are required to implement the objectives.

“It’s almost an order if you go to those meetings you have to wear the SDG badge, but the question is to what extent they really do understand the need of transformation, which is not the incremental approach anymore,” she said.

Trade-offs

One of the problems, according to the panel, is that **there is often a trade-off between** different **SDGs**, meaning that one goal is achieved to the detriment of other goals.

One example is that of the Aral Sea on the border between Kazakhstan and Uzbekistan, formerly the fourth largest inland lake in the world. The rivers that feed the lake have been diverted to irrigate desert farmland, causing it to shrink by over 90 per cent since the 1960s.

“The irrigation of the farmland helped to achieve one SDG goal, number two, that aims to enhance food security,” said Hongbo Yang, from the US-based Smithsonian Conservation Biology Institute.

“But that progress is achieved as **a sacrifice of** another goal which is SDG number 14, which **aims to protect aquatic wildlife.”**

**Modeling---Inflation AC**

**Inflation’s hitting them hard.**

Melissa **Eddy 7-1**-2022. correspondent based in Berlin who covers German politics, social issues and culture for The New York Times. "Eurozone inflation rises to 8.6 percent, the highest ever, driven by energy prices.". New York Times. https://www.nytimes.com/2022/07/01/business/eurozone-inflation-june.html. Pen-DL

The situation in each eurozone member varies. Although inflation in Germany and the Netherlands dipped slightly in June, Spain set a record, hitting double digits for the first time since 1985. For the three **Baltic States** in northeast Europe — Latvia, Lithuania and Estonia — prices that high have **been a reality** for months.

Despite their differences, all of these countries are in some way feeling the effects of the jump in the **price of energy**, which rose to 41.9 percent over the year through June, three times the rate in the same period a year earlier, and **prices for food**, which were up to 8.9 percent over the past year, also a significant acceleration.

Economists are predicting that higher prices could lead workers to demand higher wages, which could solidify rapid inflation and put more pressure on interest rates to rise. But the aftereffects of the coronavirus pandemic, combined with the unpredictability of the war, have made forecasts difficult.

Mateusz Urban, an economist at Oxford Economics, wrote in a report that June could be the peak of eurozone inflation, but that the pace of price rises “will slow only gradually throughout 2022.” But as Kerstin Bernoth and Marcel Fratzscher of the German Institute for Economic Research note, “There is **enormous** uncertainty how the economic situation and the inflation in the eurozone will develop in the coming months.”

The Baltics

Estonia recorded an annual inflation rate of **22 percent**, the **highest** in the eurozone, followed by its neighbors on the Baltic Sea, Latvia (**19 percent**) and Lithuania (**20.5 percent**). The three countries lack any **domestic** energy sources, and their efforts to replace Russian energy have **left them exposed** to the **exorbitant prices** on the spot markets.

**Modeling---Industrial Ag D**

**High industrial yields are sustainable---precision ag and new innovation solve the drawbacks to industrial ag**

**Lusk 16** – PhD, professor of agricultural economics at Oklahoma State University (Jayson, “Why Industrial Farms Are Good for the Environment,” *NYT*, Factiva)

There is much to like about small, local farms and their influence on what we eat. But if we are to sustainably deal with problems presented by population growth and climate change, we need to look to the farmers who grow a majority of the country’s food and fiber. Large farmers---who are responsible for 80 percent of the food sales in the United States, though they make up fewer than 8 percent of all farms, according to 2012 data from the Department of Agriculture---are among the most progressive, technologically savvy growers on the planet. Their technology has helped make them far gentler on the environment than at **any time in history**. **And a new wave of innovation makes them more sustainable still**. A vast majority of the farms are family-owned. Very few, about 3 percent, are run by nonfamily corporations. Large farm owners (about 159,000) number fewer than the residents of a medium-size city like Springfield, Mo. Their wares, from milk, lettuce and beef to soy, are unlikely to be highlighted on the menus of farm-to-table restaurants, but they fill the shelves at your local grocery store. There are legitimate fears about soil erosion, manure lagoons, animal welfare and nitrogen runoff at large farms---but it’s not just environmental groups that worry. Farmers are also concerned about fertilizer use and soil runoff. Continue reading the main story That’s one reason they’re turning to **high-tech solutions** like precision agriculture. Using location-specific information about soil nutrients, moisture and productivity of the previous year, new tools, known as “variable rate applicators,” can put fertilizer only on those areas of the field that need it (which may reduce nitrogen runoff into waterways). GPS signals drive many of today’s tractors, and new planters are allowing farmers to distribute seed varieties to diverse spots of a field to produce more food from each unit of land. They also modulate the amount and type of seed on each part of a field---in some places, leaving none at all. Many food shoppers have difficulty comprehending the scale and complexity facing modern farmers, especially those who compete in a global marketplace. For example, the median lettuce field is managed by a farmer who has 1,373 football fields of that plant to oversee. For tomatoes, the figure is 620 football fields; for wheat, 688 football fields; for corn, 453 football fields. How are farmers able to manage growing crops on this daunting scale? Decades ago, they dreamed about tools to make their jobs easier, more efficient and better for the land: soil sensors to measure water content, drones, satellite images, alternative management techniques like low- and no-till farming, efficient irrigation and mechanical harvesters. Today, that technology is a regular part of operations at large farms. Farmers watch the evolution of crop prices and track thunderstorms on their smartphones. They use livestock waste to create electricity using anaerobic digesters, which convert manure to methane. Drones monitor crop yields, insect infestations and the location and health of cattle. Innovators are moving high-value crops indoors to better control water use and pests. Before “factory farming” became a pejorative, agricultural scholars of the mid-20th century were calling for farmers to do just that---become more factorylike and businesslike. From that time, farm sizes have risen significantly. It is precisely this large size that is often criticized today in the belief that large farms put profit ahead of soil and animal health. But increased size has advantages, especially better opportunities to invest in new technologies and to benefit from economies of scale. Buying a $400,000 combine that gives farmers detailed information on the variations in crop yield in different parts of the field would never pay on just five acres of land; at 5,000 acres, it is a different story. These technologies reduce the use of water and fertilizer and harm to the environment. Modern seed varieties, some of which were brought about by biotechnology, have allowed farmers to convert to low- and no-till cropping systems, and can encourage the adoption of nitrogen-fixing cover crops such as clover or alfalfa to promote soil health. Herbicide-resistant crops let farmers control weeds without plowing, and the same technology allows growers to kill off cover crops if they interfere with the planting of cash crops. The herbicide-resistant crops have some downsides: They can lead to farmers’ using more herbicide (though the type of herbicide is important, and the new crops have often led to the use of safer, less toxic ones). But in most cases, it’s a trade-off worth making, because they enable no-till farming methods, which help prevent soil erosion. These practices are one reason soil erosion has declined more than 40 percent since the 1980s. Improvements in agricultural technologies and production practices have significantly lowered the use of energy and water, and gr eenhouse-gas emissions of food production per unit of output over time. United States crop production now is twice what it was in 1970. That would not be a good change if more land, water, pesticides and labor were being used. But that is not what happened: Agriculture is using nearly half the labor and 16 percent less land than it did in 1970. Instead, farmers increased production through innovation. Wheat breeders, for example, using traditional techniques assisted by the latest genetic tools and information, have created varieties that resist disease without numerous applications of insecticides and fungicides. Nearly all corn and soybean farmers practice crop rotation, giving soil a chance to recover. Research is moving beyond simple measures of nitrogen and phosphorus content to look at the microbes in the soil. New industrywide initiatives are focused on quantifying and measuring soil health. The goal is to provide measurements of factors affecting the long-term value of the soil and to identify which practices---organic, conventional or otherwise---will ensure that farmers can responsibly produce **plenty of food for our grandchildren**.

**Megacities are sustainable – stresses aren’t coming soon.**

Dr. Toby **Ord 20**, Senior Research Fellow in Philosophy at Oxford University, DPhil in Philosophy from the University of Oxford, The Precipice: Existential Risk and the Future of Humanity, Hachette Books, Kindle Edition, p. 113-115

Climate change is not the only form of environmental damage we are inflicting upon the Earth. Might we face other environmental existential risks through **overpopulation**, running out of critical resources or biodiversity loss?

When environmentalism rose to prominence in the 1960s and 1970s, one major concern was overpopulation. It was widely feared that humanity’s rapidly growing population would far outstrip the Earth’s capacity to feed people, precipitating **a**n environmental and humanitarian catastrophe. The most prominent advocate of this view, Paul **Ehrlich**, painted an apocalyptic vision of the near future: “Most of the people who are going to die in the greatest cataclysm in the history of man have already been born.”93 This catastrophe would come soon and pose a direct existential risk. Ehrlich predicted: “Sometime in the next 15 years, the end will come—and by ‘the end’ I mean an utter breakdown of the capacity of the planet to support humanity.”94

These confident predictions of doom were **thoroughly mistaken**. Instead of rising to unprecedented heights, the prevalence of famine **dramatically declined**. **Less than a quarter** as many people died of famine in the 19**70s** as in the 19**60s**, and the rate has **since halved again**.95 Instead of dwindling to a point of crisis, the amount of food per person has **steadily risen** over the last fifty years. We now have 24 percent more food per person than when Ehrlich’s book, The Population Bomb, was published in 1968.

Much of the credit for this is owed to the **Green Revolution**, in which developing countries rose to the challenge of feeding their people. They did so by modernizing their farming, with improved fertilizers, irrigation, automation and grain varieties.96 Perhaps the greatest single contribution was from Norman Borlaug, who received the Nobel Prize for his work breeding the new, high-yield varieties of wheat, and who may be responsible for saving more lives than anyone else in history.97

But the improvements in **ag**riculture are just part of the story. The **entire picture** of overpopulation has **changed**. Population growth is almost always presented as an **exponential** process—increasing by a fixed percentage each year—but in fact that is **rare**ly the case. From about 1800 to 1960 the world population was growing much faster than an exponential. The annual growth rate was itself growing from 0.4 percent all the way to an unprecedented rate of 2.2 percent in 1962. These trends rightly warranted significant concern about the human and environmental consequences of this rapid population increase.

But suddenly, the situation **changed**. The population growth rate started to **rapidly decline**. So far it has halved, and it continues to **fall**. Population is now increasing in a roughly **linear** manner, with a fixed number of people being added each year instead of a fixed proportion. This change has been driven not by the feared increase in death rates, but by a dramatic change in **fertility**, as **more and more countries** **have undergone** the **demographic transition** to a **small family size**. In 1950, the average number of children born to each woman was 5.05. It is now just 2.47—**not so far above the replacement rate** of 2.1 children per woman.98

While we can’t know what will happen in the future, the **current trends** point to a **rapid stabilization** of the population. The current **linear** increase is likely to be an **inflection point** in the history of human population: the point where the curve finally starts to **level off**. We may **never again** see the **rapid population growth** of the mid-twentieth century. In the last eighty years, population grew threefold. In the next eighty years (to 2100) it is expected to go up just 50 percent, to about 11 billion. For every person alive now, we’ll have to make room for an extra half a person. This will be a challenge, but a much easier one than last century.

**Hybrid War---Deterrence D**

**Deterrence theory is wrong.**

**Walt ’22** — Stephen; columnist at Foreign Policy and the Robert and Renée Belfer professor of international relations at Harvard University. June 2, 2022; "Will Teaching Aggressors a Lesson Deter Future Wars?"; *Foreign Policy*; https://foreignpolicy.com/2022/06/02/will-teaching-aggressors-a-lesson-deter-future-wars/; //CYang

Arguments of this sort have been a staple of **hard-line** (and especially **neoconservative**) discourse for decades. Like the domino theory, which refuses to die no matter how often it is disproved, such claims transform the outcome of a single conflict into a struggle for the fate of the **entire planet**. The choice we are said to face is stark. Down one path: a revitalized liberal order led by a unified alliance of powerful, peace-loving democracies, and a future where war is rare and prosperity reigns. Down the other path: a world of rising autocracy, eroding human rights, and more war. According to this view, Ukraine must win big, or all is lost.

Framing the issue in this way stacks the deck in favor of **always doing more** and rejecting any sort of compromise, but is the choice as stark as hard-liners make out? Does defeating an aggressor really teach others to **behave better**? It would be a more benign world if this were the case, but a quick glance at the past century or so suggests **otherwise**.

Start with World War I. Although all the major European powers played a role in the outbreak of war, Germany was the driving force during the July Crisis of 1914. Overly fearful of rising Russian power, German leaders used the assassination of Archduke Franz Ferdinand of Austria and the confrontation between Austria-Hungary and Serbia as the occasion for a preventive war for hegemony in Europe. The result was four horrific years of war, a total German defeat at the hands of the Allies, the end of the Hohenzollern monarchy and its Austro-Hungarian and Ottoman allies, and the imposition of a highly punitive peace treaty.

The **stark reality** of Germany’s **W**orld **W**ar **I** defeat didn’t teach Adolf Hitler not to make his own bid for **European hegemony** 20 years later; indeed, the myth that Germany had been stabbed in the back and the **harsh peace** imposed at Versailles helped fuel the rise of **Nazism** and set the stage for another round of war. Nor did the carnage of the First World War teach **Imperial Japan** that trying to carve out its own empire in Asia was a **bad idea**.

The chief aggressors were also soundly punished in World War II. Japan was firebombed repeatedly, and two of its cities were destroyed by atomic bombs; Germany was occupied and subsequently divided into two separate states; and Hitler and Italian leader Benito Mussolini both ended up dead. A clearer demonstration that “aggression does not pay” would be hard to imagine, and a good case can be made that both Germany and Japan learned that lesson well. But this lesson didn’t stop Kim Il Sung from attacking South Korea in 1950 (with Joseph **Stalin’s full support**) or convince various leaders elsewhere in Asia or the Middle East that going to war was **always unwise**.

Similarly, one might have thought the French and American experiences in Vietnam would offer a vivid and **enduring reminder** of the dangers of **hubris** and the limits of military power, not to mention the futility of trying to nation-build in a deeply divided society without a competent local partner. Yet the George W. Bush administration paid no heed to this lesson when it invaded Afghanistan in 2001 and Iraq in 2003.

Mind you, it’s not just great powers that get taught harsh lessons after launching an aggressive war. Back in 1982, Argentina’s military junta decided that the British Falkland Islands (which they call the Malvinas) were theirs and decided to take the territory by force. Britain sank the flagship of the Argentine navy and successfully retook the islands, and popular protests in Argentina eventually swept the generals from power.

Iraq’s Saddam Hussein eventually suffered a similar fate. His decision to attack revolutionary Iran in 1980 led to nearly eight years of war in which hundreds of thousands of Iraqis lost their lives and Iraq’s economy cratered. Two years later, he decided to solve the economic problems the first war had created by seizing neighboring Kuwait, only to be ignominiously expelled by a U.S.-led coalition and placed under highly intrusive United Nations sanctions. Aggression didn’t pay in either case, but Saddam’s failures didn’t stop some other countries — including some prominent democracies — from starting new wars themselves.

If **painful defeats** really sent **clear warnings** to others, the Soviet and American experiences in Afghanistan and the U.S. experience in Iraq after 2003 would have taught Putin and his associates that invading Ukraine was likely to trigger a **powerful nationalist reaction** and encourage outside powers to do what they could to thwart his aims. Surely he knew that the United States had helped defeat the Soviet occupation of Afghanistan by supplying the mujahideen, just as Syria and Iran had each helped the Iraqi insurgents defeat the U.S. effort in Iraq. The lesson of these two conflicts seems **all too obvious**, but Putin seems to have convinced himself it **didn’t apply** to Ukraine.

Not every aggressive war ends in defeat, of course, but there seems to be no shortage of cases where aggressors were badly beaten and more than a few where the people who started the war paid a large personal price for their folly. Yet the lesson that “aggression does not pay” is typically **ignored** or **forgotten**. Why?

One reason is that the lessons of any given war aren’t always clear-cut, and reasonable people can draw different conclusions from a defeat. Was going to war a bad idea from the start, or was defeat due to poor implementation or just bad luck? The lessons from a failed war will also be discarded if policymakers believe that this time is **different**, and that new knowledge, new technology, a clever new strategy, or a **uniquely favorable** set of political circumstances will bring success this time around. One should never underestimate what elites can talk themselves into if they really want to go to war.

Leaders may be intimately familiar with their own national histories, but they know and care less about what happened to other nations in similar circumstances.

A second problem — one highlighted in the work of the late scholar Robert Jervis — is that humans tend to place more weight on their own experiences than on the experiences of others. Leaders in one country may be intimately familiar with their own national history (though they have probably absorbed a self-serving version of it), but they will know and care less about what happened to other nations in similar circumstances.

And it’s easy to dismiss another country’s failure by claiming their cause was not as just, their resolve not as great, and their military not as competent as one’s own. Moreover, because decisions for war typically reflect a complex weighing of threats, opportunities, expected costs, and alternatives, what happened to another country in a wholly different conflict may not loom large in their calculations.

Furthermore, leaders who start wars are often aware that there are **risks involved**, and they sometimes recognize that the odds of victory are slim. Even so, they will “**roll the iron dice**” if they believe the alternative is even worse. To take an obvious example, Japan’s leaders in 1941 understood that the United States was vastly stronger and that attacking Pearl Harbor was a huge gamble that would probably fail. Nonetheless, they believed the alternative was bowing to U.S. pressure and giving up their quest for great-power status and Asian dominance — an outcome they regarded as infinitely worse.

The bottom line is that U.S. policymakers should not base their actions today on the belief that victory in Ukraine (or Yemen or Ethiopia or Libya) is going to tilt the **arc of history** decisively in the directions they favor. Nor will the outcome of today’s conflicts have much effect on how future leaders think about their own prospects when they are **deciding whether** to launch a war.

**Impact defense**

**1NC---AT: Black Sea**

**NATO’s black sea presence is hollow --- doesn’t fool Russia, assure allies, or constrain behavior --- but Turkey won’t rock the boat and there’s no scenario for tensions emerging**

**Istomin 20** [Igor Istomin, “Stepping Up NATO's Presence in the Black Sea Region: Causes and Consequences,” Jan 21, 2020, https://valdaiclub.com/a/highlights/stepping-up-nato-s-presence-in-the-black-sea/]

Returning to the general situation in the Black Sea region, it is worth emphasising once again that **NATO’s build-up of military activity is largely symbolic and** in essence **does not change the balance of power**. In military and political terms, the key change in the strategic situation in the region came in 2014: the entry of Crimea into the Russian Federation, among other things, provided an additional impetus for modernisation and the build-up of Russian forces on the peninsula. The geographical location of Crimea itself provides Moscow with a fairly comfortable position in terms of ensuring the military aspects of national security in the Black Sea. In this regard, there is no real reason to reassess Romania’s attempts to stimulate some kind of NATO activity on the southern flank.

An important circumstance, which also corresponds to Russian interests in the Black Sea, is the increased independence of Ankara’s position. Despite the fact that the latter remains a member of NATO, it has distanced itself from the Western allies, especially after the attempted military coup in 2016. Despite the fact that the partnership between Russia and Turkey is saddled with a number of serious contradictions, **for Ankara it is not advantageous to aggravate relations with Moscow in a situation where it sees in the Euro-Atlantic partners as almost the main threat** to its political regime.

In the current conditions, **it is difficult to count on the resumption of the plans for the development of Black Sea cooperation** that were born in the 2000s, but the risks of the bloc confrontation spreading in this region should not be overestimated.

**No impact --- Black Sea tensions only risk escalating if Ukraine tries to coerce the US into opposing Russia --- strategic restraint prevents escalation**

**Carpenter 18** [Ted Carpenter, CATO, “Ukraine Doesn’t Deserve America’s Blind Support,” Nov 28, 2018]

In reality, the Kerch Strait incident involves a complex mixture of factors. They include the tense Russian‐​Ukrainian bilateral relationship, Kiev’s broader foreign policy objectives, and Ukraine’s volatile domestic politics.

Ukrainian President Petro Poroshenko had to know that a decision to send three naval vessels through the Kerch Strait would be disruptive. The strait, which connects the Black Sea and the Sea of Azov, separates Russia’s Taman Peninsula from the Crimea Peninsula. Despite Moscow’s annexation of the latter in 2014, Kiev still considers Crimea to be Ukrainian territory, a position that the United States and its allies back emphatically. Moreover, passage through the strait is the only oceanic link between Ukraine’s Black Sea ports and those on the Azov. Kiev, not surprisingly, views the strait as international waters. Russia, however, regards the waterway as its own territorial waters and viewed the attempted transit by the three Ukrainian ships as a violation.

Whatever the legal merits of the competing positions regarding sovereignty over Crimea and the status of the Kerch Strait, the reality is that Russia controls that peninsula and is unlikely to ever restore it to Ukraine, despite Western demands. Poroshenko had to know that his attempt to send warships through a narrow passage between what the Kremlin insists are two portions of Russian territory was certain to cause an incident. **Why did Kiev risk** (if not avidly seek) **such a confrontation**? And why now? There are several likely motives.

Kiev wants to **increase pressure on NATO**, and especially the United States, to take a **harder stance against Moscow**. Despite their official position that the Kremlin must disgorge Crimea and end support for pro‐​Russian separatists in eastern Ukraine, Western policy looks increasingly stale and ineffectual. Some European officials even muse that it may be time to reconsider (weaken) the economic sanctions that the West imposed on Russia. President Trump has stated that Russia should be re‐​admitted to the G-7 group of leading economic powers.

Such talk is potentially quite threatening to Ukraine’s interests. Creating an incident that reminds Kiev’s Western supporters (and the rest of the world) of Moscow’s aggressive tendencies makes any prospect of even a limited rapprochement between Russia and either NATO or the European Union less likely.

Ukrainian leaders are especially determined to nurture greater bilateral strategic cooperation with the United States. The notion that the Trump administration has pursued a “soft” policy toward Russia, much less one that amounts to appeasement, has always been overstated. Trump’s initiatives are actually more hardline than those Barack Obama’s administration embraced. That is especially true regarding Washington’s relationship with Kiev. Whereas Obama consistently refused to provide weapons to Ukraine, the Trump administration has approved two major arms sales, one of which included sophisticated anti‐​tank missiles. U.S. troops have participated in joint military exercises with Ukrainian forces, and Secretary of Defense James Mattis concedes that the United States is training Ukrainian units at a base in western Ukraine.

Poroshenko and his associates want to encourage and intensify those trends. They hope that creating a new incident underscoring aggressive Russian conduct will lead the Trump administration to boost arms sales and other forms of bilateral military cooperation. Even if Trump proved reluctant to adopt that course, domestic and international pressure might leave him little choice. Indeed, Western news media outlets excoriated Trump for not immediately condemning Russia as an outright aggressor in the Kerch Strait incident.

Poroshenko thus has ample foreign policy reasons for taking the actions he did in the Kerch Strait. He also has significant political and ideological incentives. His government did not announce the official date for Ukraine’s 2019 presidential election until two days following the naval clash; it is now set for March 31. To say that the timing of the announcement was suspicious is an understatement.

No candidate in the extremely crowded field is likely to exceed the 50 percent mark needed to avoid a runoff, but recent surveys have indicated that Poroshenko is in surprisingly poor political shape. Most polls showed him receiving between 8 and 15 percent of the first‐​round vote. The leading candidate is former prime minister Yulia Tymoshenko, with Poroshenko running in third. Corruption scandals continue to bedevil his administration, making his re‐​election (or even his ability to make the runoff) far from certain.

In addition to creating a “rally around the flag” effect, thereby boosting Poroshenko’s status, Russian seizure of the Ukrainian vessels gave the president a justification to impose outright martial law in 10 regions of eastern Ukraine—areas likely to be especially hostile to his political prospects. It could also serve as a basis for tightening Ukraine’s already worrisome restrictions on freedom of expression.

That track record should trouble Kiev’s backers in the West. To wage war against eastern separatists, Kiev early on not only instituted military conscription, it arrested critics of that action. Authorities jailed television journalist and blogger Ruslan Kotsaba and charged him with treason for making a video denouncing the conscription law. Kotsaba become Amnesty International’s first “prisoner of conscience” in Ukraine since the 2014 so‐​called Maidan revolution.

The vagueness of the applicable laws (and the absence of any meaningful independent review or right of appeal) has been especially alarming. Indeed, it seems that anyone who disputes the government’s account of the Maidan revolution (especially those who dare to mention the role of ultranationalist, neo‐​fascist elements) or the conflict in eastern Ukraine is likely to be silenced.

Bogdan Ovcharuk, a spokesperson for Amnesty International’s Kiev office, expressed the concerns of many proponents of freedom of expression when he told the BBC: “This is a very slippery slope indeed. It’s one thing to restrict access to texts advocating violence, but in general banning books because their authors have views deemed unacceptable to politicians in Kiev…is deeply dangerous.” The consequences of such a campaign, he warned, were certain to damage the fabric of liberty.

Yet **the Kiev government’s restrictive policies continue unabated**. In September 2015, Ukrainian authorities issued an order banning 34 journalists and seven bloggers from even entering the country. The Committee to Protect Journalists reported that the newly publicized list was merely part of a larger blacklist that contained the names of 388 individuals and more than a hundred organizations that were barred from entry on the grounds of “national security” and allegedly posing a threat to Ukraine’s “territorial integrity.”

Human Rights Watch criticized the Kiev government in September 2017 for imposing yet more restrictions on journalists, especially foreign correspondents. The Poroshenko government even pushed through legislation barring criticism of Ukraine’s past, including the role that ultra‐​nationalist guerilla leader (and Nazi collaborator) Stepan Bandera and his followers played in World War II. Censorship provisions and other media restrictions may become even more widespread and arbitrary with Poroshenko’s new declaration of martial law.

**Ukraine’s Western admirers typically ignore such evidence of authoritarian conduct**, since it does not fit with their portrayal of the country as an enlightened member of the democratic community. The reality is that **Ukraine epitomizes** what CNN analyst Fareed Zakaria has aptly described as an “**illiberal democracy**.” The Poroshenko regime certainly does not warrant unquestioned Western backing**. Kiev is not above engaging in provocations to serve either its political leadership’s domestic agenda or its foreign policy objectives**. **The United States does not have vital strategic or moral interests at stake in the overall Ukraine‐​Russia quarrel, much less the latest parochial spat in the Kerch Strait**. A cautious, restrained posture is appropriate.

**1NC – NC3 System**

**NC3 system is adaptable – attackers can’t just break all of it.**

**Larsen 19** ["NUCLEAR COMMAND, CONTROL, AND COMMUNICATIONS: US COUNTRY PROFILE", NAPSNet Special Reports, August 22, 2019, <https://nautilus.org/napsnet/napsnet-special-reports/nuclear-command-control-and-communications-us-country-profile/>] Eric

Diagram

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**1NC – AT: Black Sea – Defense**

**Past disputes thump AND Russia won’t risk it.**

**Brennan 21** [David Brennan is currently Newsweek's Diplomatic Correspondent covering world politics and current affairs from London. Prior to joining Newsweek in early 2018, he reported on British politics and global current affairs as a staff writer at International Business Times, 7-2-2021, Russia won't risk "suicidal" NATO war in Black Sea, says Ukraine foreign minister, Newsweek, https://www.newsweek.com/exclusive-russia-wont-risk-suicidal-nato-war-black-sea-ukraine-foreign-minister-dmytro-kuleba-1606269] Eric

Ukraine's foreign minister has urged [NATO](https://www.newsweek.com/topic/nato) not to allow Russia to extend its influence in the Black Sea, amid tensions that Kremlin critics say are a symptom of Moscow's plan to establish de facto control of the wider region.

[Dmytro Kuleba](https://www.newsweek.com/ukraines-foreign-minister-fires-back-vladimir-putins-claim-country-us-pawn-1605645) told Newsweek that discussions about the Black Sea were central to Kyiv's expanding cooperation with NATO, a bloc Ukraine has been pushing to join since its 2014 revolution ousted a pro-Russian government.

**Recent weeks** have **seen tense confrontations** between NATO warships and Russian forces in the Black Sea. First, Russian jets reportedly **fired warning shots** close to British destroyer [HMS Defender](https://www.newsweek.com/vladimir-putin-claims-us-aircraft-followed-british-warship-see-how-russia-would-react-1605555) sailing close to Crimea—the peninsula annexed by Russia from Ukraine in 2014. British defense officials, however, denied that HMS Defender came under fire.

This week, Dutch frigate HNLMS Evertsen was **shadowed by Russian jets** in the Black Sea, also while sailing close to the peninsula. Dutch officials complained that the jets conducted "mock attacks" on the vessel.

Despite the confrontations, Kuleba told Newsweek in a statement that Kyiv does not expect a sudden outbreak of serious violence in the Black Sea.

"I do believe Russia is ready to escalate some local tensions in the Black Sea region, but I do not see them being suicidal," Kuleba said. "They may pinch and provoke here and there. **But Russia will not risk a full-scale confrontation with NATO, clearly realizing they have no chances to succeed in it**."

**1NC – AT: Grid Collapse -- Defense**

**Texas grid collapse thumps – killed 30 people**

**No grid impact**

**Koerth 18** – Maggie Koerth, formerly known as Maggie Koerth-Baker, is an American science journalist. She is a senior science editor at FiveThirtyEight and was previously a science editor at Boing Boing and a monthly columnist for The New York Times Magazine, August 13th ("Hacking The Electric Grid Is Damned Hard", FiveThirtyEight, Available online at https://fivethirtyeight.com/features/hacking-the-electric-grid-is-damned-hard/, Accessed 10-17-2020)

But, surprisingly, some electrical system experts are thinking about it in a different way. Cyberattacks on the grid are a real risk, they told me. But **the worst-case scenarios we’re imagining** **aren’t that likely**. Nor is this a **short-term crisis**, with risks that can be permanently solved. Bringing down the grid is a lot harder than just flicking a switch, but the danger is real — and it may **never go away**. Representatives from two nonprofit organizations — both of which play large roles in how the electric grid is regulated and maintained — said it is easier to imagine disaster scenarios than create one. “There’ve been some very sensational books out there about the **grid going dark** because someone’s got their **finger ready** over a mouse and everything is going to turn off at the same time,” said Bill Lawrence, vice president and chief security officer at the North American Electric Reliability Corporation, the regulatory authority that sets and enforces technological standards for utility companies across the continent. “The **grid does not work that way**.” Our electric infrastructure is chock-full of both **redundancies** and **regional variations** — two things that impede widespread sabotage. That’s not to say that the grid isn’t under attack. Lawrence acknowledged that there is interest in “trying to hurt us from a distance.” But he emphasized **there have not** yet **been any successful attacks** — meaning hackers haven’t caused any blackouts. Chart, bar chart

Description automatically generated They’ve been poking at our critical infrastructure for a long while. Incident reports published by the Industrial Control Systems Cyber Emergency Response Team — a division of Homeland Security that does training and responds to cyberattacks on critical infrastructure — suggest that electricity, oil and natural gas infrastructure have been routinely targeted for years.1 There are dozens of these attacks reported to ICS-CERTS annually. However, it would be difficult for these attacks to lead to **wide-scale blackouts**, according to Lawrence and Candace Suh-Lee, who leads a cybersecurity research team at the Electric Power Research Institute, a nonprofit research and development lab. And that’s true **even if hackers** do eventually **succeed** in taking control of **some electric systems.** It helps that the North American electric grid is both diverse in its engineering and redundant in its design. For instance, the Ukrainian attacks are often cited as evidence that hundreds of thousands of Americans could suddenly find themselves in the dark because of hackers. But Lawrence considers the Ukrainian grid a lot easier to infiltrate than the North American one. That’s because Ukraine’s infrastructure is more homogeneous, the result of electrification happening under the standardizing eye of the former Soviet Union, he told me. The **North American grid**, in contrast, began as a **patchwork of unconnected electric islands,** each designed and built by companies that weren’t coordinating with one another. Even today, he said, the enforceable standards set by NERC don’t tell you exactly what to buy or how to build. “So taking down one utility and going right next door and doing the same thing to that neighboring utility would be an extremely difficult challenge,” he said. Meanwhile, the electric grid already contains a lot of redundancies that are built in to prevent blackouts caused by common problems like broken tree limbs or heat waves — and those redundancies would also help to prevent a successful cyberattack from affecting a large number of people. Suh-Lee pointed to an August 2003 blackout that turned the lights off on 50 million people on the east coast of the U.S. and Canada. “When we analyzed it, there was about 17 different things lined up that went wrong. Then it happened,” she said. Hackers wouldn’t necessarily have control over all the things that would have to go wrong to create a blackout like that. In contrast, Suh-Lee said, scenarios that sound like they should lead to major blackouts … haven’t. Take the 2013 Metcalf incident, where snipers physically attacked 17 electric transformers in Silicon Valley. Surrounding neighborhoods temporarily lost power, but despite huge energy demand in the region, “the big users weren’t even aware Metcalf had happened,” she said. Difficult isn’t the same as impossible, Suh-Lee told me. Depending on where an attack happened and how people responded, you could get the stuff of our nightmares. Lawrence repeatedly invoked the phrase “knock on wood” as he talked about the possibility of infiltrations of electric infrastructure turning into real-world blackouts. That’s why there’s a lot of effort going into research, monitoring and preparation for cyberattacks. Lawrence’s team, for instance, is gearing up for an event that’s held every other year and is sort of like war games for the electric grid. And the Department of Energy is planning a similar event, focused on figuring out what it takes to reboot after a hacker-caused blackout. But that preparation doesn’t mean we’ll eventually solve this problem, either, Suh-Lee said. If the chances of a cinematic disaster are low, the chances of a theatrical hero on a white horse riding in to save the day are even lower. Making **the grid stronger** and more resilient also means **making it more digital** — the work that’s being done **to improve the infrastructure** has also created new opportunities for **hackers to break in**. And the risk of attack is here to stay. Security improvements are “never going to completely eliminate the risk,” she said. “The risk is out there and people will find a new way to attack.” We’ll be living with cyber threats to the grid for the rest of our lives.

**AT: Geoengineering Impact---2AC**

**ENMOD prevents the use of cloud seeding as a weapon.**

Alan **Witt 16**. J.D. & Sustainability Law Student Research Fellow, Sandra Day O'Connor College of Law at Arizona State University. "Seeding Clouds of Uncertainty." Jurimetrics: Vol. 57, No. 1, pp. 105-144. 2016. <https://www.jstor.org/stable/26322705> //EM edited for errors\*

1. International Weather Modification Law

While **i**nternational weather modification **law**, is limited it does provide, in part, for **national rights to cloud water**,69 and prohibits the **militarization** of weather modification technology that could be used to cause **floods or drought**.70 Another significant **i**nternational **law** directly addressing weather modification is its **prohibition against militarization**.71

From 1967 to 1972, the U.S. military used weather modification as a **tactical weapon** for its war effort in **Vietnam**.72 During the war, North Vietnamese infiltrators used the Ho Chi Minh Trail as a supply route.73 In an attempt to deny access to the route, the U.S. military initiated Operation Popeye hoping to ex tend the monsoon season and make the trail impassable by seeding clouds over the trail with over two-thousand flights.74 Officials have since described the operation as unpredictable and ultimately irrelevant.75 Despite doubts about the **effectiveness** of Operation Popeye, this and other military efforts eventually **led** to the **I**nternational **C**onvention on the **P**rohibition of **M**ilitary or **A**ny **O**ther **H**ostile **U**se of **E**nvironmental **M**odification **T**echniques of 1977 (ENMOD).76 The **U**nited **S**tates is a signatory to **ENMOD** which entered into force in 1978.77 The treaty prohibited the "**hostile use** of environmental modification techniques having **widespread**, long-lasting, or **severe effects**."78 Environmental modification techniques include, among other things, "**deliberate manipulation** of... [the] **atmosphere**."79 In other words, the treaty effectively **banned the use of cloud seeding** as a weapon for war **between nations.**

**Indian and Chinese conflicts make war inevitable.**

James **Griffiths 20**. an author and foreign correspondent. He has reported from across Asia, including Hong Kong, China, Sri Lanka, Malaysia and South Korea. “China to expand weather modification program to cover area larger than India.” CNN. 12-3-2020. https://www.cnn.com/2020/12/03/asia/china-weather-modification-cloud-seeding-intl-hnk/index.html //EM

Hong Kong China this week revealed plans to **drastically expand** an experimental weather modification program to cover an area of over 5.5 million square kilometers (2.1 million square miles) -- more than 1.5 times the **total size of India**.

According to a statement from the State Council, China will have a "developed weather **modification system**" by 2025, thanks to breakthroughs in fundamental **research** and key **technologies**, as well as improvements in "comprehensive prevention against safety risks."

In the next five years, the total area covered by **artificial rain** or snowfall will reach 5.5 million sq km, while over 580,000 sq km (224,000 sq miles) will be covered by **hail suppression** technologies. The statement added that the program will help with disaster relief, agricultural production, emergency responses to forest and grassland fires, and dealing with unusually high temperatures or droughts.

China has long sought to **control the weather** to protect farming areas and to ensure clear skies for key events -- it **seeded clouds** ahead of the 2008 Beijing Olympics to reduce smog and avoid rain ahead of the competition. Key political meetings held in the Chinese capital are notorious for enjoying beautiful clear skies, thanks both to weather modification and the shutting down of nearby factories.

As a concept, cloud seeding has been **around for decades**. It works by injecting small amounts of silver iodide into clouds with a lot of moisture, which then condenses around the new particles, becoming heavier and eventually falling as precipitation.

A study funded by the US National Science Foundation, published earlier this year, found that "cloud **seeding can boost snowfall** across a wide area if the atmospheric conditions are favorable." The study was one of the first to **ascertain definitively** that cloud seeding worked, as previously it had been difficult to distinguish precipitation created as a result of the practice from normal snowfall.

That uncertainty had not stopped China investing heavily in the technology: between 2012 and 2017, the country spent over $1.34 billion on various weather modification programs. Last year, according to state news agency Xinhua, weather modification helped reduce 70% of hail damage in China's western region of Xinjiang, a key agricultural area.

And while other countries have also invested in cloud seeding, including the US, China's enthusiasm for the technology has created some alarm, particularly in neighboring India, where agriculture is heavily dependent on the monsoon, which has already been disrupted and become less predictable as a result of climate change.

India and China **recently faced off** along their shared -- and **hotly disputed** -- border in the Himalayas, with the two sides **engaging in their bloodiest clash** in decades earlier this year. For years, some in India have speculated that weather modification could potentially **give China the edge** in a future conflict, given the importance of conditions to any **troop movements** in the inhospitable mountain region.

Though the primary focus of Beijing's weather modification appears to be domestic, experts have warned there is the potential for impact beyond the country's borders.

**AT: Geoengineering Impact---Inevitable**

**China makes it inevitable.**

Adriana **Vélez-León 17**. a 2017 J.D. Candidate at The George Washington University Law School. She received her B.A. in Journalism from the University of Puerto Rico. "Rain on Demand: Regulating Weather Modification Throughout the United States." Geo. Wash. J. Energy & Envtl. L. vol 8, no. 2: pp. 148-162. //EM edited for errors.

According to the **W**orld **M**eteorological **O**rganization, weather modification programs, primarily involving cloud seeding activities aimed at **enhancing precipitation** or mitigating hail fall, exist in more than approximately **fifty-two countries**.129 One of these countries includes China, which has the most “**extensive weather modification** program in the world, with more than 35,000 people **working** in cloud seeding programs across the country.”130 The Chinese government has enacted regulations **promoting** weather modification **cooperation** between provinces and regions.131 Also, the government **funds a greatly expanded** weather modification research and operations program at $100 million per year, in addition to training over 1,500 new weather modification scientists.132 China’s cloud seeding weapons include approximately 6,781 artillery guns and 4,110 rocket launchers.133 In 2004, the Chinese government reported it **eased drought** by employing “[a]ircraft, rockets, artillery shells, meteorological balloons and mountain-top-based devices . . . to scatter **silver iodide** particles into **gathering clouds** to induce precipitation in the form of rain or snow over the city.”134

**Their tech is already creating tensions.**

Adam **Minter 20**. a Bloomberg Opinion columnist. “Has China Mastered Weather Modification? Should We Worry?.” Bloomberg. 12-17-2020. https://www.bloomberg.com/opinion/articles/2020-12-17/has-china-mastered-weather-modification-should-we-worry //EM

Last month, 16 “artificial rain **enhancement rockets**” were launched off the back of a pickup truck 300 miles south of Beijing. The operation, ordered up by the Juye County Meteorological Bureau in response to a local drought, was reportedly a success. Over the next 24 hours, the county received more than **two inches of rain** that, according to local officials, **alleviated** the drought, lowered the risk of forest fires and improved air quality.

It sounds like something out of a cartoon. But for decades, China has been home to one of the **world's most advanced** weather-modification programs. Generally, its **goals** have been **modest**: more rain in arid places, less field-destroying hail and sunny days for big national events. But that modesty is starting to give way. Earlier this month, China announced plans to expand its rainmaking capabilities to cover nearly 60% of the country by 2025. Details are sketchy, but fears are **rising** about the **potential military** uses of these capabilities, and their effects on an already changing climate. For China, and the world, these concerns need to be addressed soon.

Humans have dreamed of controlling the weather for millennia. But it wasn’t until 1946 that scientists at General Electric Co. discovered that dry ice can create precipitation when it interacts with clouds under certain conditions. By 1953, roughly 10% of the land area of the U.S. had been targeted for cloud seeding. Twelve years later, the government was spending millions of dollars on weather-modification research each year, and 15 other companies had started cloud-seeding operations in 23 states.

It wasn’t just about rainfall, however. During the Vietnam War, the U.S. military weaponized cloud seeding to inhibit enemy troop movements and reduce the effectiveness of anti-aircraft attacks, among other things. These uses so alarmed policy makers that they began seeking an international agreement to end “environmental warfare.” In 1978, the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification went into force.

Although China **ratified the treaty** in 2005, its interest in controlling the weather and the environment **didn’t wane**. Meteorological calamities such as hail and flooding account for more than 70% of the country's annual disaster-related damage. Because of that ongoing toll, the government has staked its legitimacy in part on how well it responds to such incidents. In recent decades, as the country has grown wealthier, Earth-altering projects such as the Three Gorges Dam have become a favored solution.

Weather modification, by comparison, is relatively inexpensive. In the 1980s, the government began making substantial investments in cloud physics and related fields. Advances in everything from satellites to rocketry boosted the effort, even though definitive scientific proof for the effectiveness of cloud seeding emerged only in 2018 (and in Idaho, not China). Nonetheless, the government claimed a great success in 2008, when Beijing launched 1,110 allegedly rain-suppressing rockets to ensure that the Olympic opening ceremonies were dry (they were, although scientists have questioned whether the rockets had much to do with it). By 2015, there were rainmaking and hail-suppression programs in 30 Chinese provinces, employing some 35,000 people.

Success has bred greater ambitions. In 2017, China’s top economic policy-making body showered $175 million on a weather-modification system designed to bring more precipitation to a region that makes up about 10% of the country’s territory (among the items purchased: 897 rocket launchers). A year later, Chinese aerospace and defense companies were reportedly building thousands of fuel-burning chambers intended to produce vast amounts of precipitation along the Alaska-sized Tibetan plateau. This month’s announcement was a predictable progression — albeit one that has generated significant skepticism among scientists.

But as the U.S. learned decades ago, even **modest success** at weather modification is **sufficient** to **worry rivals** and neighbors. And other **Asian countries** are increasingly concerned that China’s program could **negatively affect the monsoons** and regular rains that have fed their people for millennia. Although the science behind such schemes is still debatable, this isn’t an idle worry. In a region where **tensions are already rising** over access to water, weather modification will at **best appear** like diplomatic **pressure**; at worst, it looks like a weapon.

**The threat of warming causes fear-driven geoengineering.**

Stewart M. **Patrick 21**, James H. Binger senior fellow at the Council on Foreign Relations, "Geoengineering Is Coming, Whether It’s Governed or Not," World Politics Review, 03/22/2021, https://www.worldpoliticsreview.com/articles/29510/geoengineering-is-coming-whether-it-s-governed-or-not.

Humanity’s collective failure to **reduce** greenhouse gas emissions is driving the world **inexorably toward geoengineering**, or the intentional, large-scale human manipulation of Earth’s climate system. Facing runaway global warming, individual nations will **surely** develop and deploy new technologies to reduce atmospheric **carbon dioxide** and the planet’s exposure to solar radiation.

Playing with the environment and the atmosphere, however, is **playing with fire**. Without **adequate** rules, geoengineering will create **massive, unintended consequences**, deepen **geopolitical rivalries** and hasten the world’s **division** into climate winners and losers. To avoid these fates, the world must create a **robust multilateral regime** to govern the research, development and deployment of these new technologies.

Geoengineering comes in two main forms: mitigation, in the form of large-scale carbon dioxide removal, or CDR, and remediation, known as solar radiation modification, or SRM. CDR involves the sequestering of atmospheric carbon dioxide through measures ranging from massive afforestation to direct air capture—capturing carbon dioxide from the air—to ocean seeding—adding iron to the oceans in order to stimulate phytoplankton growth and therefore absorb more carbon. SRM encompasses a variety of techniques to make the Earth more reflective—the so-called albedo effect—by injecting aerosols into the stratosphere, brightening marine clouds and oceans, and creating more reflective terrestrial surfaces. Unlike CDR, SRM has no impact on greenhouse gas concentrations; it merely reduces the heat they would otherwise trap, as long as those technologies remain in place.

**AT: 5G Impact**

**‘5G race’ is nonsense**

Nilay **Patel 19**, J.D. from the University of Wisconsin Law School, Editor-in-Chief of The Verge, Former Acting Managing Editor for Vox, AB in Political Science from the University of Chicago, “Wait, Why The Hell Is The ‘Race To 5G’ Even A Race?”, The Verge, 5/23/2019, https://www.theverge.com/2019/5/23/18637213/5g-race-us-leadership-china-fcc-lte

I have a dumb question that no one seems capable of answering directly: ***Why is 5G a race?***

Everyone — the wireless industry, Democrats, Republicans, the major media, you name it — frames the building of next-generation 5G networks as a “race” in which the **U**nited **S**tates needs to demonstrate “leadership.”

Here is The Washington Post declaring America has the lead in the race to 5G. Here’s CNN asking “Who’s winning the race to 5G?” Here’s AT&T CEO Randall Stephenson declaring that China isn’t beating the US to 5G “yet,” as some sort of ominous warning. Here’s T-Mobile CEO John Legere telling the House Subcommittee on Communications and Technology that merging with Sprint will let his company “win the race to 5G.” Here is an entire microsite from industry lobbying group CTIA titled “The Race to 5G.”

Let us never forget AT&T being so desperate to lead this “race” that it rolled out fake 5Ge logos on its phones.

But the **stakes** of this supposed race are **wholly unclear**. What happens if we win, besides telecom execs **get**ting **slightly richer**? More importantly, what are the drawbacks to coming in second, or even third? Where is the list of specific negative outcomes of China building a 5G network a **month**, a year, or even **five years** before the **U**nited **S**tates? I’ve **never seen it**, and I keep asking about it.

NO ONE CAN SAY WHAT BAD THINGS WILL HAPPEN IF WE DON’T WIN THE RACE TO 5G

For example, here’s FCC Commissioner Geoffrey Starks on The Vergecast this week, when I asked why 5G is a race.

“I think it is important for us to continue to lead the race ... we obviously led to 4G and I think we get to set some of the standards that are ultimately going to be implemented worldwide, which is why there is a little bit of a race.”

Starks went on to say that China wants to be a global leader in supplying 5G equipment and that’s why Huawei has been so aggressively building and pricing its gear. But Huawei depends on American chip technology to make its products, and the US government has just put Huawei on a blacklist anyway. So... the race is so we can **set some wireless standards**? I suspect Apple, Google, Qualcomm, Verizon, and AT&T can **fend for themselves** when it comes to that process.

The other main argument for winning the “race” to 5G is that having the world’s best and fastest networks will create new economic opportunities for businesses of all kinds — we’ll enable self-driving cars and telemedicine and all the other stuff you hear about during interminable 5G slideshows at trade conferences. At a hearing before the Senate Committee on Commerce, Science, and Transportation earlier this year, Mississippi Sen. Roger Wicker confidently declared that “failing to win the race to 5G would not only materially delay the benefits of 5G for the American people, it would forever reduce the economic and societal gains that come from leading the world in technology.”

WE WON THE RACE TO LTE AND OUR LTE NETWORKS ARE AMONG THE SLOWEST AND MOST EXPENSIVE IN THE WORLD

Maybe. It is indeed true that better networks lead to better opportunities, and that widespread high-speed broadband is something everyone wants. But **I** sincerely doubt that all of these companies will pick up and move to China or Europe if the **U**nited **S**tates builds 5G networks slightly slower. After all, we already have some of the **slow**est and most expensive networks in the world, and Apple and Facebook have not yet relocated to South Korea.

The more I hear about the race, the more **I don’t buy it**. I think the “race” framing is there to make some big decisions seem urgent and important — to make it appear as though some serious trade-offs are worth it in order to “win.” And those trade-offs are indeed serious: 5G networks will require a serious rethinking of how we use wireless spectrum. There are incredible privacy implications around putting millions of IoT devices in a “smart city” on 5G. Investment dollars will naturally flow toward building 5G networks in cities instead of expanding our networks to rural areas, exacerbating the digital divide.

THE “RACE” IS TO THERE TO MAKE SERIOUS TRADE-OFFS SEEM WORTH IT SO WE CAN “WIN”

And once the “race” to build out 5G in big cities is “won,” the pressure to expand access to other places in the country will vanish, making that divide even worse. It is worth carefully considering all of these things before giving in to haste.

Oh, and it appears that some of the required 5G spectrum might interfere with important weather sensors, a concern raised by NASA, the Navy, and the NOAA in hearings before Congress last week. How did the wireless industry respond to these concerns? By writing a blog post accusing meteorologists from across three government agencies of “risking our 5G leadership.” The implication, of course, is that worrying about detecting major weather events could make us lose the race.

This race is **imaginary bullshit**. It’s being foisted on us by huge telecom companies that know internet access is fundamentally a commodity and want something new to sell at high prices instead of competing to improve service and lower prices on the networks they have. After all, the **U**nited **S**tates “won” the “race” for LTE, but it bears repeating: our LTE networks are among the **slow**est in the world, and our prices among the highest. **What did winning that race accomplish** for the millions of people across the country that still can’t get a reliable LTE signal?

**It can’t be ‘weaponized’**

John **Tanner 19**, Editor of Disruptive Asia, Former Editor-In-Chief and Global Technology Editor at Telecom Asia, Two Degrees in Telecommunications, “US Memo Claims China Could Use 5G To Kill People, Maybe”, Disruptive Asia, 1/8/2019, https://disruptive.asia/memo-china-5g-kill-people/

ITEM: A former Trump administration official is circulating a memo **claim**ing China could weaponize 5G if its market dominance isn’t checked.

How does one weaponize 5G, you may ask? According to the memo author – retired Air Force Brigadier General Robert Spalding, who used to sit on the National Security Council – you do it by selling your 5G gear cheap enough to ensure it’s installed in every 5G network in the world, then make use of secret back doors to wreak international havoc, reports Bloomberg:

Spalding in his memo paints a future headed toward domination by China. Eventually, alternatives to its network technology won’t exist, because other suppliers won’t be able to compete with government-subsidized offerings from Huawei and fellow Chinese gear maker ZTE Corp., Spalding said.

Once China controls the market for internet-connected devices, it will be able “to weaponize cities,” Spalding said in the memo: “Think of self-driving cars that suddenly mow down unsuspecting pedestrians. Think of drones that fly into the intakes of airliners.”

Well. Yes. **Think**.

If you’re wondering, Spalding is the same person who put together a memo and presentation last year that proposed a similar idea on the grounds that Chinese dominance of 5G was tantamount to China attempting to reinvent the global internet as a platform designed to enable Chinese cyber espionage and cyber attacks on US networks.

**Which is silly, because that’s not really how 5G or the internet work**.

I haven’t read the new memo (which hasn’t been made public), but based on the Bloomberg report, Spalding’s concept of weaponized 5G sounds both **silly and paranoid**.

That’s not to say that China doesn’t engage in cyber espionage and hacking against US targets. Of course it does – it has done for years, just as the US has been doing likewise to China and … well, just about everyone, really.

And sure, it’s technically possible that China could secretly leverage Huawei or ZTE network gear to control every 5G network on earth, hoover up personal data and turn cars and drones into robo-assassins. (It’s also technically possible that once Alexa, Siri, Bixby, Cortana and Google Assistant become smart enough, they’ll become sentient, team up to form an AI hive mind called Skynet and kill us all.)

But Spalding’s scenario **doesn’t hold up** if you **look closely**. For a start, it seems to depend on the premise that (1) Huawei and ZTE will literally become the **only commercially viable alternatives** for buying 5G solutions (which is **highly unlikely**), and (2) there will be **no possible way** for regulators, law enforcement agencies or telcos to **vet** 5G gear for possible spyware capabilities before installing it (also **highly unlikely**).

The other main assumption here seems to be that autonomous cars, drones and the rest of the **I**nternet **o**f **T**hings will either be manufactured by Huawei (or run Huawei software), or have crap security, zero encryption and no failsafes whatsoever. The latter may be possible given the state of IoT security today, but in that case Chinese hackers **wouldn’t need Chinese gear** in everyone’s networks to pull off such an attack. They certainly haven’t needed it up to now.

Again, I don’t have a copy of the full memo, and it might contain details that make this sound more plausible than the ones included in the Bloomberg report. But I’m reasonably sure that **of all the things China plans to do with 5G, turning self-driving cars into murderbots is not one of them**.

**No Chinese dominance**

**SCMP 19,** South China Morning Post, citing a variety of experts, “China Experts: US Still Out Front In Tech Race Despite Pentagon Claim”, 11/3/2019, https://www.abacusnews.com/tech/china-experts-us-still-out-front-tech-race-despite-pentagon-claim/article/3036161

Chinese **experts** have **reject**ed the claim by a senior Pentagon official that the US is lagging behind China in some key dual-use technologies.

Michael Brown, director of the US Department of Defence’s innovation unit, said at a seminar earlier this week that China was either competitive or catching up in the areas of hypersonics, artificial intelligence, quantum sciences, **5G** mobile networks, genetic engineering, and space.

With the exception of hypersonics, these technologies had not only military applications but were also critical for long-term economic prosperity, making them important to the future of US-China competition, he said.

“I believe that national security and economic security are inextricably linked,” Brown told the think tank Centre for Strategic and International Studies in Washington.

China prepares to send its own astronauts to the moon 50 years after Apollo 11

But Chinese experts said China’s progress had been **exaggerated** and many of its achievements were **only partial successes** so far.

Hong Kong-based military commentator Song Zhongping said the US had been “**unarguably** more **successful** and **experienced**, **far ahead** of anyone” in space technology. “Look at Project Apollo and the Space Shuttle programme – decades later no other country has ever matched those achievements,” he said.

Despite breakthroughs in certain fields like **5G**, there was more **generally a clear gap** between **China**’s digital information and electronics technologies and the **world’s technological leaders**, according to Beijing-based naval expert Li Jie.

In the field of hypersonics, China may have achieved milestones in glider vehicles, but in another important technology – ramjet engines – there was no evidence of any major breakthroughs, and the US was still far more experienced in the field, said Zhao Tong, senior fellow at the Carnegie-Tsinghua Centre for Global Policy.

China exhibited hypersonic missiles and drones at last month’s National Day parade, and has just launched a commercial 5G – fifth generation mobile network – service on Friday, which is the biggest in the world.

Huawei, China’s telecommunication giant has won contracts to construct the 5G infrastructures for many countries, despite the US campaign to ban Huawei equipment over security concerns.

Brown said China was “already ahead of the US in quantum sciences” – citing the Chinese launch in 2016 of Micius, the world’s first quantum communications satellite. China had also made more launches into space than the US in 2018 as it speeded up its space programme, he said.

Brown added the US had used Chinese equipment for genome sequencing, which meant China had more data on the genetic sequencing of the US population than the US itself, he said, and the US was also playing “a catch up game” with China in AI-based facial recognition.

5G is available now in China for just US$18

For the past 50 to **80 years**, the US had **led the way** and **set the standards** in **almost all** important **tech**nologies and industries, he said. In doing so, the US had been able to build and shape a **global ecosystem** and **enjoy its advantages** since the end of World War II.

But, Brown warned, for China to set the pace for these technologies would be “game-changing”.

“Imagine what the world would look like if China was setting standards,” he said. “Over time, that means we have fewer levers to shape what the US wants to do, both from a global technology standpoint and also what are the values that are highlighted around the world as ones to be looked up to.”

Ni Lexiong, a Shanghai-based military commentator, said Brown had his **own agenda** in making his comments.

“The US military wants **more budget**, more new equipment, more new R&D projects. And the theory of a China threat is, of course, a **handy excuse**,” Ni said.

**AT: 5G Impact---US Winning**

**Their ‘lead’ is hype, manufactured with fake patents and propaganda**

Elsa B. **Kania 19**, Adjunct Senior Fellow with the Technology and National Security Program at the Center for a New American Security, and Lindsey R. Sheppard, Associate Fellow with the International Security Program at the Center for Strategic and International Studies, “Why Huawei Isn’t So Scary”, Foreign Policy, 10/12/2019, https://foreignpolicy.com/2019/10/12/huawei-china-5g-race-technology/

5G may have become a buzzword, but the notion that countries must rush to be first to deploy it is **mistaken** and **reckless**—and increases the odds of security breaches. There’s no doubt that 5G is important, promising the high speeds and unparalleled connectivity that are required to unleash the full potential of the “internet of things”—the ever-growing network of web-connected devices—and artificial intelligence. 5G could prove critical to economic competitiveness, but not only will a race to install the system end up backfiring, there is also reason to think twice about the claims of **China**’s Huawei that it alone can shape our **tech**nological future.

Huawei’s marketing—and Chinese government propaganda—has built the impression that it’s either Huawei or no way to 5G. The telecommunications firm declares itself the unparalleled leader in 5G as it attempts to secure commercial partnerships around the world, now boasting more than 50 contracts across some 30 countries. In Europe, Huawei has even launched a campaign urging residents to “Vote for 5G,” as if its 5G technologies were the only way for Europe to achieve a smarter future.

Huawei’s claims to be No. 1 in 5G can be misleading. Huawei is a leader and a powerhouse, but it is not the only top player. And it isn’t clear that the company is winning—at least, not yet. Although Huawei’s technological capabilities shouldn’t be underestimated, there are reasons to look skeptically at its supposed superiority in 5G.

Huawei’s quest for dominance in the global telecommunications industry has involved tactics and practices that are antithetical to fair, healthy competition. That Huawei has amassed a market share estimated at nearly 30 percent of the global telecom equipment industry reflects its capacity to underbid and undercut competitors, not to mention multiple alleged incidents of bribery and corruption. The Chinese firm’s determination to provide cheap services and equipment to capture market share often puts intense pressure on competitors. But it’s not always a fair fight: Huawei’s rise has been enabled by the billions of dollars in support, subsidies, and various benefits it has received from the Chinese government. For instance, Huawei has lines of credit from state-owned banks that reportedly amount to $100 billion.

Huawei has also been helped by a business culture in which theft is often encouraged—even outright incentivized. At best, some of its activities, such as the aggressive recruitment of talent from rivals, may be considered standard practice within the industry. At worst, however, Huawei’s business practices violate legal boundaries. There have been numerous accusations of intellectual property theft, as well as ongoing reports of attempts to expropriate sensitive technologies, from the early copying of Cisco source code to military technology. And what these dubious practices reveal is that Huawei is in fact not as cutting-edge as its publicity claims.

The idea that Huawei has an insurmountable lead in the 5G race also represents a **failure** of observers to distinguish its **carefully crafted image** from any **real technological edge**. To be sure, Huawei has long pursued 5G. Since 2007, it has invested massively in next-generation telecommunications, spending more than $60 billion on research and development over the course of a decade. And the company now plans to increase its 5G investments as part of an annual R&D budget that may exceed $15 billion.

Huawei truly does provide mature and cost-effective equipment. It is one of the few players offering an end-to-end 5G solution, with particular strengths in radio access networking. However, it’s **unclear** how well the company’s systems **integrate** with existing **4G** infrastructure from other vendors. The security of Huawei’s products has been assessed to be **subpar**, and the **long-term performance** of its 5G networks also remains **questionable**. Countries that choose this low-cost option for fear of losing out in the 5G race risk creating an unstable and insecure foundation for their future societies and economies.

Although Huawei may **assert** that it has already taken **a**n unbeatable lead in 5G infrastructure, judging who’s truly ahead in the field means looking at **multiple criteria**. Such indicators can include commercial contracts, deployed performance, integration with network infrastructure, and real technological innovation. For example, Huawei has claimed that it has more 5G patents than all U.S. companies combined, but **quantity does not necessarily correlate with quality**—especially in **China**, where patents are often of **dubious value**.

Huawei CEO Ren Zhengfei has declared that his company’s dream is to “stand on top of the world.” But the global supply chain remains highly interdependent—a point of leverage that Washington is seeking to exploit by potentially limiting Huawei’s access to U.S. technologies. Moreover, Huawei’s competitors have their own core strengths among the fundamental technologies that will shape 5G. And although Huawei’s promise of relative vertical integration may offer efficiencies, the **diversity** of competitive suppliers continues to drive both competition and innovation. A number of companies based in the **U**nited **S**tates, **E**uropean **U**nion, South Korea, Taiwan, and Japan are also industry leaders and major providers throughout the supply chain. A healthy ecosystem for telecommunications would be based on market diversity and fair competition and would emphasize the importance of regulatory bodies, standards, and industry alliances to ensure security and interoperability.

**Even if they get there first, the U.S. has enough breadth and scope to win the race**

Stella **Soon 19**. Tech Reporter. “Here’s How The Us Can Beat China In The Race For Dominance In Next Generation Networks.” CNBC. 11/26/2019. <https://www.cnbc.com/2019/11/26/5g-race-how-the-us-can-beat-china-in-the-competition-for-dominance.html>

“There will be a **tendency** to cast these developments as **a**nother sign that the **U**nited **S**tates is **losing the race** for the next generation of communication technologies,” Adam **Segal**, director of the digital and cyberspace policy program at **CFR**, wrote in a separate note earlier this month.

“**But** the **U**nited **S**tates still **has strengths to play**,” Segal said. “U.S. companies can **dominate** the **app**lication**s** and services that run over 5G.”

Just because China switched on its networks first does not mean that the competition is over.

That’s where the United States’ innovative capacity could give it an advantage, said Paul Triolo, geo-technology practice head at Eurasia Group. U.S. technology companies have already been working on autonomous vehicles, augmented reality, and virtual reality, which he explained could be the first few killer applications of 5G.

“Even as China rolls out 5G a **little faster**, the U.S. will **eventually roll out 5G in enough breadth and scope** that U.S. will be able to **innovate on top of it**,” said Triolo.

**It’ll play out over a decade**

Elsa B. **Kania 19**, Adjunct Senior Fellow with the Technology and National Security Program at the Center for a New American Security, PhD Student in Harvard University's Department of Government, Former research Assistant at the Belfer Center for Science and International Affairs and the Weatherhead Center for International Affairs and Boren Scholar, “The United States Must Compete to Innovate in 5G”, The National Interest, 7/28/2019, https://nationalinterest.org/print/feature/united-states-must-compete-innovate-5g-69122

5G is **not merely a race** to be won, **nor** should the objective of the **U**nited **S**tates be simply to deploy it **“as soon as possible.”** Instead, the deployment and realization of the full potential 5G will play out over **at least a decade to come**. 5G is not simply faster 4G, but rather creates a new paradigm for connectivity with very high speed, low latency and high throughput. Based on these characteristics, 5G will be integral to realizing the potential of the Internet of Things and promising applications of artificial intelligence, from remote surgeries to autonomous driving in smart cities. In this regard, 5G will become tantamount to critical infrastructure, because its disruption or exploitation could prove deeply damaging, even deadly. Consequently, security will be imperative, and talk of ‘racing’ for 5G risks undermining this critical foundation.

**AT: 5G Impact---Defense**

**There are no backdoors and simple countermeasures solve**

Dr. Jeffrey D. **Sachs 19**, Professor of Sustainable Development and Professor of Health Policy and Management at Columbia University, Director of Columbia’s Center for Sustainable Development and the UN Sustainable Development Solutions Network, “America’s War on Chinese Technology”, Project Syndicate, 11/7/2019, https://www.project-syndicate.org/commentary/cheney-doctrine-us-war-on-chinese-technology-by-jeffrey-d-sachs-2019-11

That is what US leaders are doing again: creating a **panic** over Chinese **tech**nology companies by raising, and **exaggerating, tiny risks**. The most pertinent case (but not the only one) is the US government attack on the wireless broadband company Huawei. The US is closing its markets to the company and trying hard to shut down its business around the world. As with Iraq, the US could end up creating a geopolitical disaster for no reason.

I have followed Huawei’s technological advances and work in developing countries, as I believe that 5G and other digital technologies offer a huge boost to ending poverty and other SDGs. I have similarly interacted with other telecoms companies and encouraged the industry to step up actions for the SDGs. When I wrote a short foreword (without compensation) for a Huawei report on the topic, and was criticized by foes of China, I asked top industry and government officials for evidence of wayward activities by Huawei. I heard repeatedly that Huawei behaves no differently than trusted industry leaders.

The US government nonetheless argues that Huawei’s 5G equipment could undermine global security. A **“backdoor”** in Huawei’s software or hardware, US officials claim, could enable the Chinese government to engage in surveillance around the world. After all, US officials note, China’s laws require Chinese companies to cooperate with the government for purposes of national security.

Now, the facts are these. Huawei’s 5G equipment is low cost and high quality, currently ahead of many competitors, and already rolling out. Its high performance results from years of substantial spending on research and development, scale economies, and learning by doing in the Chinese digital marketplace. Given the technology’s importance for their sustainable development, low-income economies around the world would be foolhardy to reject an early 5G rollout.

Yet, despite providing **no evidence** of backdoors, the US is telling the world to stay away from Huawei. The US claims are generic. As a US Federal Communications Commissioner put it, “The country that owns 5G will own innovations and set the standards for the rest of the world and that country is currently not likely to be the United States.” Other countries, most notably the **U**nited **K**ingdom, have found **no backdoors** in Huawei’s hardware and software. **Even if** backdoors were discovered later, they could almost surely be **closed** at that point.

The debate over Huawei rages in Germany, where the US government threatens to curtail intelligence cooperation unless the authorities exclude Huawei’s 5G technology. Perhaps as a result of the US pressure, Germany’s spy chief recently made a claim tantamount to the Cheney Doctrine: “Infrastructure is not a suitable area for a group that cannot be trusted fully.” He offered no evidence of specific misdeeds. Chancellor Angela Merkel, by contrast, is fighting behind the scenes to leave the market open for Huawei.

Ironically, though predictably, the US complaints partly reflect America’s own surveillance activities at home and abroad. Chinese equipment might make secret surveillance by the US government more difficult. But unwarranted surveillance by any government should be ended. Independent United Nations **monitoring** to curtail such activities should **be**come part of the global telecoms system. In short, we should choose **diplomacy** and **institutional safeguards**, not a technology war.

The threat of US demands to blockade Huawei concerns more than the early rollout of the 5G network. The risks to the rules-based trading system are profound. Now that the US is no longer the world’s undisputed technology leader, US President Donald Trump and his advisers don’t want to compete according to a rules-based system. Their goal is to contain China’s technological rise. Their simultaneous attempt to neutralize the World Trade Organization by disabling its dispute settlement system shows the same disdain for global rules.

If the Trump administration “succeeds” in dividing the world into separate technology camps, the risks of future conflicts will multiply. The US championed open trade after World War II not only to boost global efficiency and expand markets for American technology, but also to reverse the collapse of international trade in the 1930s. That collapse stemmed in part from protectionist tariffs imposed by the US under the 1930 Smoot-Hawley Act, which amplified the Great Depression, in turn contributing to the rise of Hitler and, ultimately, the outbreak of World War II.

In international affairs, no less than in other domains, stoking **fears** and acting on them, rather than on the **evidence**, is the **path to ruin**. Let’s stick to rationality, evidence, and rules as the safest course of action. And let us create independent monitors to curtail the threat of any country using global networks for surveillance of or cyberwarfare on others. That way, the world can get on with the urgent task of harnessing breakthrough digital technologies for the global good.

**It only makes a small difference in speed and efficiency---not a game-changer**

Mike **Price 19**, President and Principle Consultant at Netconex, MS in Computer Science from Northeastern University, BS in Computer Science from Millersville University of Pennsylvania, “How 5G is Being Overhyped”, Netconex, 5/17/2019, https://www.netconex.com/blog/how-5g-is-being-overhyped

More and more is being said about the impending shift from fourth-generation wireless to **fifth-gen**eration, and how impactful this shift will be. The only problem is, a lot of what is being said is **conflated hyperbole** - **exaggerated** and **overhyped**.

How 5G is Being Overhyped

Behind all of the **marketing materials**, 5G is really just some emerging **tech**nologies that will **improve** wireless networks. Latencies will be lower, and the networks will be faster and more efficient… **somewhat**. The **real difference** between 4G LTE and 5G will be **much smaller** than the difference between black and white and color TV, as Sprint’s CEO Marcelo Claure compared the two.

Furthermore, many advancements that have been claimed to only be possible through 5G (like smart cars and cities) are actually possible **without 5G** connectivity. Eric Xu, the current chairman of Huawei, stated that consumers would see **no real difference** between 5G and the current LTE standard.

Pairing that with the fact that the United States pays some of the highest rates for mobile connectivity - despite ranking 62nd in 4G speeds - thanks to the monopolistic hold that cellular companies hold over the market, we should also expect 5G to be incredibly expensive.

How Carriers Are Leveraging 5G to Their Advantage

Cellular carriers Sprint and T-Mobile have proposed a merger, supporting their position by stating that they need to combine their resources to bring 5G connectivity to the entire nation, or as they put it, to win the race to 5G. Government regulators are uneasy about this merger, as it would reduce the number of major carriers in the United States from four to three.

It is also telling that both companies have claimed to be capable of deploying 5G independently for years.

Tom Wheeler, former FCC Chairman, had a few choice words to share about T-Mobile and Sprint’s defense of their proposed merger - a merge that was already blocked in 2014.

“The ‘China is winning on 5G’ argument of Sprint and T-Mobile is creative, and probably the only rationale they could concoct after the government twice before rejected their proposal to reduce national wireless competition from four providers to three,” Wheeler said in a blog post, conflating any efforts thus far to win on 5G to harming consumers by reducing competition.

Again, the United States ranks 62nd in 4G speeds, largely due to this limited competition and despite paying some of the highest fees for these services. So, while 5G will be **beneficial** when it eventually does become publicly available, don’t expect it to be a complete **game-changer**.