Space Aff

I affirm the resolution resolved: The appropriation of outer space for private entities is unjust.

Before I read my case, I would like to offer the following definitions:

Outerspace: the physical universe beyond the earth's atmosphere.- oxford languages
Private entity: any person or private group - Cornell
Unjust: not based on or behaving according to what is morally right and fair- Merriam Webster
Appropriation: the act of taking or using in an unfair/illegal way- merriam webster .

The single standard is utilitarianism.

1. **Util is a prerequisite to any other framework: Threats to bodily security and life prevent the ability for moral actors to effectively use other frameworks since they are in a constant state of crisis that destroy the ideal conditions which other theories assume.**

Cummiskey 90 (Dr. David Cummiskey. Bates College. "Kantian Consequentialism."Ethics. Vol. 100. No. 3 (Apr., 1990), pp. 586-615 Published by: The University of Chicago Press. Stable URL: https://www.jstor.org/stable/2381810)

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract "social entity." It is not a question of some persons having to bear the cost for some elusive "overall social good." Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Robert Nozick, for example, argues that "to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has." But why is this not equally true of all those whom we do not save through our failure to act? By emphasizing solely the one who must bear the cost if we act, we fail to sufficiently respect and take account of the many other separate persons, each with only one life, who will bear the cost of our inaction. In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? A morally good agent recognizes that the basis of all particular duties is the principle that "rational nature exists as an end in itself". Rational nature as such is the supreme objective end of all conduct. If one truly believes that all rational beings have an equal value, then the rational solution to such a dilemma involves maximally promoting the lives and liberties of as many rational beings as possible. In order to avoid this conclusion, the non-consequentialist Kantian needs to justify agent-centered constraints. As we saw in chapter 1, however, even most Kantian deontologists recognize that agent-centered constraints require a non- value-based rationale. But we have seen that Kant's normative theory is based on an unconditionally valuable end. How can a concern for the value of rational beings lead to a refusal to sacrifice rational beings even when this would prevent other more extensive losses of rational beings? If the moral law is based on the value of rational beings and their ends, then what is the rationale for prohibiting a moral agent from maximally promoting these two tiers of value? If I sacrifice some for the sake of others, I do not use them arbitrarily, and I do not deny the unconditional value of rational beings. Persons may have "dignity, that is, an unconditional and incomparable worth" that transcends any market value, but persons also have a fundamental equality that dictates that some must sometimes give way for the sake of others. The concept of the end-in-itself does not support the view that we may never force another to bear some cost in order to benefit others.

3. Existential impacts outweigh. A one percent risk of extinction takes priority over anything else

Bostrom 2- is a Swedish philosopher at the University of Oxford known for his work on existential risk, the anthropic principle, human enhancement ethics, superintelligence risks, the reversal test, and consequentialism. (Nick, "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards; Published in the Journal of Evolution and Technology, Vol. 9, No. 1. 2002. http://www.nickbostrom.com/existential/risks.html) ZachDiesel

In combination, these indirect arguments add important constraints to those we can glean from the direct consideration of various technological risks, although there is not room here to elaborate on the details. But the balance of evidence is such that it would appear unreasonable not to assign a substantial probability to the hypothesis that an existential disaster will do us in. **My subjective opinion is that setting this probability lower than 25% would be misguided, and the best estimate may be considerably higher.** **But even if the probability were much smaller (say, ~1%) the subject matter would still merit very serious attention** **because of how much is at stake.** In general, the greatest existential risks on the time−scale of a couple of centuries or less appear to be those that derive from the activities of advanced technological civilizations. We see this by looking at the various existential risks we have listed. In each of the four categories, the top risks are engendered by our activities. The only significant existential risks for which this isn't true are "simulation gets shut down" (although on some versions of this hypothesis the shutdown would be prompted by our activities [27]); the catch−all hypotheses (which include both types of scenarios); asteroid or comet impact (which is a very low probability risk); and getting killed by an extraterrestrial civilization (which would be highly unlikely in the near future).[19] **It may not be surprising that existential risks created by modern civilization get the lion's share of the probability. After all, we are now doing some things that have never been done on Earth before, and we are developing capacities to do many more such things. If non−anthropogenic factors have failed to annihilate the human species for hundreds of thousands of years, it could seem unlikely that such factors will strike us down in the next century or two. By contrast, we have no reason whatever not to think that the products of advanced civilization will be our bane**. **We shouldn't be too quick to dismiss the existential risks that aren't human−generated as insignificant, however.** It's true that our species has survived for a long time in spite of whatever such risks are present. But there may be an observation selection effect in play here. The question to ask is, on the theory that natural disasters sterilize Earth−like planets with a high frequency, what should we expect to observe? Clearly not that we are living on a sterilized planet. But maybe that we should be more primitive humans than we are? In **order to answer this question, we need a solution to the problem of the reference class in observer selection theory [76]. Yet that is a part of the methodology that doesn't yet exist. So at the moment we can state that the most serious existential risks are generated by advanced human civilization, but we base this assertion on direct considerations. Whether there is additional support for it based on indirect considerations is an open** question. We should not blame civilization or technology for imposing big existential risks. Because of the way we have defined existential risks, a failure to develop technological civilization would imply that we had fallen victims of an existential disaster (namely a crunch, "technological arrest"). Without technology, our chances of avoiding existential risks would therefore be nil. With technology, we have some chance, although the greatest risks now turn out to be those generated by technology itself. Implications for policy and ethics **Existential risks have a cluster of features that make it useful to identify them as a special category: the extreme magnitude of the harm that would come from an existential disaster; the futility of the trial−and−error approach; the lack of evolved biological and cultural coping methods; the fact that existential risk dilution is a global public good;** **the shared stakeholdership of all future generations; the international nature of many of the required countermeasures; the necessarily highly speculative and multidisciplinary nature of the topic; the subtle and diverse methodological problems involved in assessing the probability of existential risks; and the comparative neglect of the whole area.** From our survey of the most important existential risks and their key attributes, we can extract tentative recommendations for ethics and policy:

The contention is environmental destruction.

A. Private entities worsen the environment and increase emissions

Travel emissions; A single rocket launch has significant carbon emission

Gammon 21, Katherine Gammon, "How the Billionaire space race could be one giant leap for pollution," July 19, 2021

https://www.theguardian.com/science/2021/jul/19/billionaires-space-tourism-environment-emissions

The carbon emissions from rockets are small compared with the aircraft industry, she says. But they are increasing at nearly 5.6% a year, and Marais has been running a simulation for a decade, to figure out at what point will they compete with traditional sources we are familiar with. For one rocket launch 200-300 tonnes of carbon dioxide are split between 4 or so passengers, according to Marais. But emissions from rockets are emitted right into the upper atmosphere, which means they stay there for a long time: two to three years. Even water injected into the upper atmosphere – where it can form clouds – can have warming impacts, says Marais. "Even something as seemingly innocuous as water can have an impact." Closer to the ground, all fuels emit huge amounts of heat, which can add ozone to the troposphere, where it acts like a greenhouse gas and retains heat. In addition to carbon dioxide, fuels like kerosene and methane also produce soot. And in the upper atmosphere, the ozone layer can be destroyed by the combination of elements from burning fuels.

Space tourism and increased number of flights has an unreasonable negative ecological footprint

(Heilweil 21), Rebecca Heilweil, "How bad is private space tourism for the environment," July 25, 2021

https://www.vox.com/recode/22589197/space-travel-tourism-bezos-branson-rockets-blue-origin-virgin-galactic-spacex

The emissions of a flight to space can be worse than those of a typical **airplane flight because just a few people hop aboard one of these flights, so the emissions per passenger are much higher. That pollution could become much worse if space tourism becomes more popular. Virgin Galactic alone eventually aims to launch** 400 of these flights **annually.** A study from 2010 found that **the soot released by 1,000 space tourism flights could warm Antarctica by nearly 1 degree Celsius.** "**There are some risks that are unknown**," Paul Peeters, a tourism sustainability professor at the Breda University of Applied Sciences, told Recode. "**We should do much more work to assess those risks and make sure that they do not occur** or to alleviate them somehow — **before you start this space tourism business." Overall**, he thinks **the environmental costs are reason enough not to take such a trip.**

B. Climate Change

Increased Carbon Emissions only increases Climate Change

EPA No Date [Environmental Protection Agency "Causes of Climate Change" No date accessed 23-12-2021

https://www.epa.gov/climatechange-science/causes-climate-change] Wrench

Since the Industrial Revolution, **human activities have released large amounts of carbon dioxide and other greenhouse gases into the atmosphere, which has changed the earth's climate.** Natural processes, such as changes in the sun's energy and volcanic eruptions, also affect the earth's climate. However, they do not explain the warming that we have observed over the last century. Scientists have pieced together a record of the earth's climate by analyzing a number of indirect measures of climate, such as ice cores, tree rings, glacier lengths, pollen remains, and ocean sediments, and by studying changes in the earth's orbit around the sun.2 This record shows that the climate varies naturally over a wide range of time scales, but this variability does not explain the observed warming since the 1950s. Rather, it is extremely likely (> 95%) that human activities have been the dominant cause of that warming.3 **Human activities have contributed**

substantially to climate change through: Greenhouse Gas Emissions, Reflectivity or Absorption of the Sun's Energy. Concentrations of the key greenhouse gases have all increased since the Industrial Revolution due to human activities. Carbon dioxide, methane, and nitrous oxide concentrations are now more abundant in the earth's atmosphere than any time in the last 800,000 years.4 **These greenhouse gas emissions have increased the greenhouse effect and caused the earth's surface temperature to rise.** Burning fossil fuels changes the climate more than any other human activity. Carbon dioxide: **Human activities currently release over 30 billion tons of carbon dioxide into the atmosphere every year.s Atmospheric carbon dioxide concentrations have increased by more than 40 percent since pre-industrial times, from approximately 280 parts per million (ppm) in the 18th century6 to 414 ppm in 2020.**

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Climate Change is an impact filter for all other scenarios –wars, food shortages, migration flows and security threats are exponentially worse on a hotter planet

Swain 15 - Department of Peace and Conflict Research, Uppsala University, Uppsala, Sweden (Ashok, "Climate Change: Threat to National Security", p1-3, Encyclopedia of Public Administration and Public Policy, Third Edition) ZachDiesel

In the last two decades, many research works have pointed that **environmental stress is one main catalyst that creates societal insecurity** that may result in armed conflict.[1–6] Not only scarcity of renewable resources, but also resources scarcity-induced population migration might become a source of violent conflicts as well.[7,8] However, in recent years, the relationship between climate change and armed conflict has received more attention. It is often assumed that climate change will intensify environmental stress and might even create new conflicts.[9–14] The loss of living space and source of livelihood attributable to climate change could force the affected people to migrate. Arguably, the mass movement of populations due to climate change may create security concerns for a nation-state. Climate change has become a global environmental problem caused by the buildup of greenhouse gases, particularly carbon dioxide and methane, in the Earth's atmosphere. The world is warming up faster than any time in the previous 10,000 years. The predicted marked sea level rise caused by this climatic change may deprive millions of people of their living space and source of livelihood in the near future. The Intergovernmental Panel on Climate Change (IPCC) has predicted that sea levels could rise an average rate of 6 cm per decade over the next century.[15] A rise of this magnitude will no doubt threaten the densely populated low-lying countries and coastal zones of Asia and Africa and many island states in the Pacific and Indian Ocean. Not only developing countries, rich countries like the Netherlands and the south-eastern part of the United States will also be affected by the sea level rise. Among other predicted impacts are increases in tropical cyclones. Increased number of cyclones would also enhance the risk of coastal flooding. Climate change can also potentially alter the typical rainfall pattern, which may lead to increased flooding, drought, and soil erosion in tropical and arid regions of the world. The issue of climate change is high on the world's policy agenda at present. The controversy over the science of global warming and the procedures adopted by the IPCC in collecting data fail to undermine decades of climate research confirming the overall global climate change. Doubts and denial give way to debates about the likely impact of climate change, particularly on developing countries.[16] Agricultural production may become highly vulnerable to climate change, given the other multiple stresses that affect food systems in the South. Response to climate change can also affect particular societies' cultural norms and social practices related to food production. Moreover, some countries and societies are better at formulating adaptation strategies for all aspects of land use practices to safeguard them against the negative consequences of climate change. To address the adverse effects of climate change, the effectiveness and coping abilities of existing institutions matter as well. Within this context, there is general recognition that the poor in the developing countries will be the hardest hit by the impacts of climate change, as they tend to depend more on the natural environment for their livelihoods and have limited coping mechanisms and adaptive capacity.[9] **Climate change** can also potentially **increase the number of poor people** by reducing the existing resource base, thereby pulling more people into poverty. It has also been argued that climate change will **compound the propensity for violent conflict,** particularly in states with weak governance, poor institutions, and low social capital. CLIMATE CHANGE AND INSECURITY Climate change has changed the discourse in international politics, bringing the conservative military security paradigm into the forefront of the debate. The interstate dimension clearly dominates this discourse. A major focus of the ongoing discussion is about the anticipated ice-free Arctic and, thus, the competition to exploit arctic oilfields. The other most discussed emerging challenge lies in the future of existing water-sharing agreements because the run-off in many of the river basins will vary more frequently and severely, because of changing climate dynamics. Challenges are expected with extreme glacier melting while, in other regions, droughts and meteorological disasters are the major threats. The geopolitical dimensions and military security consequences of **climate change pose a severe challenge to interstate relations** However, it is the adverse impact on human security of a large number of nations is most worrying. A critical component of human security is **food security,** which **is going to be seriously affected through** the multiple impacts of **climate change.** The agriculture sector is very sensitive to changes in climate. Climate change will consequently lead to more frequent extreme weather events particularly in arid and tropical regions, such as droughts and floods, eventually affecting agricultural productivity and likely leading to food shortages and societal insecurity.[17] **Sea level rise** has posed a serious threat to the survival of some of the smaller island states. But it also **threatens** the sources of livelihood for **millions** of people that live in low-lying river deltas **in poor developing countries** Rich and developed states might be able to mitigate the impact of rising sea levels to some extent, for instance, London with the Thames Barrier. Others rich countries have long experience with seawater intrusion, e.g., Netherlands, which shields parts of its inland through the Oosterscheldekering (Eastern Scheldt Storm Surge Barrier). But, the situation is quite precarious for poor developing countries. CLIMATE CHANGE AND CONFLICTS **Conflicts will increase owing to the impact of climate change**, though not through a direct singular causal mechanism. The debate, which evolved prominently during the 1990s, frequently refers to **population migration as one of the key linking points between climate change and armed conflict**. The anticipated increase in the number of climate change migrants will cause stress on receiving communities, which might themselves suffer under resource stress, and, thus, eventually lead to new security problems through increased competition.[5,7] Some preliminary research finds quantifiable connections between climate change and organized communal violence.[18] Raleigh and Kniveton[19] confirm the trend of high rainfall leading to increased risk of localized communal conflict. However, the findings indicate that **combination of socioeconomic and political factors with climate change factors lead to conflict** The discussion regarding the causal relationship between climate change and conflicts has yet to produce consensus.[16] On the basis of the existing literature, it can be safely argued that climate change may not generate conflicts in itself, but that **climate change can** and in some instances already does, **act as a "threat**

multiplier." CLIMATE CHANGE AND WATER CONFLICTS As **climate change can** potentially **change** water supply and **demand patterns,** sharing of scarce water resources of shared rivers systems in the arid and semiarid regions will become the most likely security challenges in the near future. Climate science has been able to provide a basic understanding of how the hydrological cycle will change at the global level, but the predictions of water demand and supplies at the regional and basin level is still far from reaching some sort of consensus. It is a fact that the projected impacts of global climate change over fresh water may be huge and marked, but they will not take shape on the same scale in each and every geographical region. Even within an international river basin, the effects will vary depending on the location. This further enhances the uncertainties and anxieties over the water availability in the shared river systems. Unfortunately, as Eckstein rightly points out, "both domestic and international water laws and policies are inadequate to meet the challenges posed by this global phenomenon or to adapt to the additional consequences that appear to be inevitable."[20] Existing water-sharing arrangements between the riparian countries of international rivers in most cases provide some mechanisms to adjust to the run-off variability while agreeing on allocation of fixed quota of water. Usually, the regular water-sharing agreements tend to be based upon the assumption that any resulting shortages will be for a short duration only and that they can address the issue with temporary reallocation methods.[21] However, climate change not only can bring long-term increases or decreases to the average run-off of the river system, it can also influence the variability of those flows that require flexibility to be the part of the water-sharing framework to cope with emerging situations.[22] As global climate change brings long-term changes to the volume and pattern of run-off in shared river systems, it becomes crucial to examine the suitability of existing agreements to address this challenge. Climate-related changes might require comprehensive adjustments in the ongoing water management structure of international rivers.[23] There is no doubt that climate change poses extreme challenges to water resource management in international river basins in the South.[24] Maarten De Wit and Jacek Stankiewicz[25] demonstrate the marked potential effects of relatively small changes in rainfall due to climate change over the perennial drainage of the river. Moreover, climate change might cause extreme weather events, water shortages, changing sea levels, or melting glaciers that can generate serious threats to critical river water management infrastructure. While the importance of adjustment of flow variability in water sharing is crucial, many of the existing provisions within agreements are not adequate enough to meet the scenarios that global climate change models project. They lack enforcement and are generally dependent upon "ideal" riparian behavior in case of eventuality. However, this approach may overcome run-off deficits in the short term, but climate change poses the risk of long-term flow reduction that would severely test existing provisions. CLIMATE "REFUGEES" AND CONFLICTS The predicted marked sea level rise caused by this climatic change may take away the living space and source of livelihood of millions of people in the near future. The IPCC has predicted that sea levels could rise an average rate of 6 cm per decade over the next century. A rise of this magnitude will no doubt threaten densely populated low-lying countries and coastal zones and many small island countries. Among the other impacts, there could be an increase in tropical cyclones. Increased cyclones would also enhance the risk of coastal flooding. Climate change can also potentially alter the usual rainfall pattern, which may lead to increased flooding, drought, and soil erosion in tropical and arid regions of the world. The problem of climate change-induced population migration ranks as one of the foremost crises of our times. To date, however, these people have been viewed as a peripheral concern. But, their sheer size has now brought them into the fore as one of the most important issues on the global political agenda. **Large-scale transborder migration has several dimensions for inducing conflict between the receiver and sender states** In some cases, giving permission to the migrants to enter into its own territory may strain the relationship between the receiving state and the sender country. The tension may arise from the exposure of the sender's inability to handle the migration crisis by itself, or the sender may suspect or allege that the receiving country is encouraging the migration. The other possibility is that the migrants, after being settled in the host country, may indulge themselves in antigovernment activities against their native government, which they may perceive as the perpetrator of their plight. The new location, physical proximity, and protection from the former regime's retribution can provide a good opportunity for them to take revenge. In some cases, the **migrants may be encouraged or be manipulated by the host state in their effort to take revenge because of existing political differences** between the host and the sender states. This will of course result in creating negative implications for regional security.[7] CONCLUSION Although **climate change** may not be the sole cause of conflict or large-scale population migration, it **is** considered **a threat multiplier** [13,26] Social, economic, and political factors will also affect the vulnerability or resilience of communities. In most of the developing countries, the ability to cope with climate change decreases, and the likelihood of conflict increases, as a result of factors that include poverty, low levels of education/literacy, lack of skills, weak institutions, limited infrastructure, lack of technology and information, limited access to health care, poor access to resources, overexploitation of resources, etc. **Climate change is likely to exacerbate many of these problems**

C. Extinction

Warming is an existential threat of high probability – feedback loops begin at increases as low as 2 degrees – only emissions reductions solve

(Spratt and Dunlop 19) Research Director for Breakthrough National Centre for Climate Restoration, Melbourne and international oil, gas and coal industry executive, chairman of the Australian Coal Association, chief executive of the Australian Institute of Company Directors, and chair of the Australian Greenhouse Office Experts Group on Emissions Trading May 2019 David and Ian, "Existential climate-related security risk: A scenario approach," Breakthrough - National Centre for Climate Restoration, https://docs.wixstatic.com/ugd/148cb0_b2c0c79dc4344b279bcf2365336ff23b.pdf ZachDiesel

An existential risk to civilisation is one posing permanent large negative consequences to humanity which may never be undone, either annihilating intelligent life or permanently and drastically curtailing its potential With the commitments by nations to the 2015 Paris Agreement, the current path of warming is 3°C or more by 2100. But this figure does not include "**long-term" carbon-cycle feedbacks**, which are materially relevant now and in the near future due to the unprecedented rate at which human activity is perturbing the climate system. Taking these into account, the Paris path **would lead to around 5°C of warming by 2100** Scientists warn that warming of **4°C is incompatible with an organised global community, is devastating to the majority of ecosystems, and has a high probability of not being stable** The World Bank says **it may be "beyond adaptation**". But an existential threat may also exist for many peoples and regions at a significantly lower level of warming. In 2017, **3°C of warming was categorised as "catastrophic" with a warning that, on a path of unchecked emissions, low-probability, high-impact warming could be catastrophic by 2050.** The Emeritus Director of the Potsdam Institute, Prof. Hans Joachim Schellnhuber, warns that "climate change is now reaching the end-game, where very soon humanity must choose between taking unprecedented action, or accepting that it has been left too late and bear the consequences." He says that **if we continue down the present path "there is a very big risk that we will just end our civilisation.** The human species will survive

somehow but we will destroy almost everything we have built up over the last two thousand years." Unfortunately, **conventional risk and probability analysis becomes useless in these circumstances because it excludes the full implications of outlier events and possibilities lurking at the fringes** Prudent risk-management means a tough, objective look at the real risks to which we are exposed, especially at those "fat-tail" **events which may have consequences that are damaging beyond quantification, and** threaten **the survival of human civilisation** Global warming **projections display a** "fat-tailed" distribution with a **greater likelihood of warming that is well in excess of the average amount of warming predicted by climate models**, and are of a higher probability than would be expected under typical statistical assumptions. More importantly, the risk lies disproportionately in the "fat-tail" outcomes, as illustrated in Figure 1. This is a particular concern with **potential climate tipping-points** — **passing critical thresholds which result in step changes in the climate system that will be irreversible** on human timescales — **such as the polar ice sheets** (and hence sea levels), **permafrost and other carbon stores,** where the impacts of global warming are non-linear and difficult to model with current scientific knowledge. Recently, attention has been given to a "hothouse Earth" scenario, in which **system feedbacks and their mutual interaction could drive the Earth System climate to a point of no return whereby further warming would become self-sustaining. This "hothouse Earth" planetary threshold could exist at a temperature rise as low as 2°C, possibly even lower**

Extinction leads to a perpetual domino effect destroying ecosystems

Noseworthy 14 – forester and conservation biologist working in the Atlantic Region for the Nature Conservancy of Canada (Josh, "The Jenga theory of biodiversity: The tipping point of ecosystems and the diversity of species" http://www.natureconservancy.ca/en/blog/the-jenga-theory-of.html)–

With only 20 seconds left of a roughly seven-minute interview, I ended up using a metaphor of Jenga — that surprisingly simple game that gives you just enough anxiety to make it fun. I described how **each species can be seen as a block in the tower.** If you take a block out (representing species extinction) it might not make the tower fall, but it does make it weaker. **Every block removed increases the chances** of the tower **collapsing** by taking away the support of the blocks that remain, and also by shifting the balance of the tower as a whole. After a while **it doesn't take much to knock the whole thing down**. The final blow might be the removal of that all-important block, or it might be caused by outside forces — a wobbly table, a heavy breather, or maybe just a fault in one of the blocks that went unnoticed. The **resilience** Of the Jenga tower **becomes increasingly compromised,** and everyone sitting around the table knows that someone will eventually be responsible for a disorderly pile of blocks (amidst squeals of delighted laughter by those that aren't responsible, of course). Sea otter, Vancouver Aquarium (Photo by Wikimedia Commons, Stan Shebs) Sleeping sea otter at the Vancouver Aquarium (Photo by Wikimedia Commons, Stan Shebs) Probably the most well known "block" relevant to the topic of biodiversity is the sea otter. The "tower" that the Sea otter supported was the kelp forest ecosystem of pacific North America. After being driven close to extinction by early European explorers, the lack of sea otters allowed sea urchins, their favourite food, to explode in numbers, which in turn caused the disappearance of the kelp forests. Sea urchins munched these kelp beds into oblivion since the otters weren't around to control the urchin population, which then resulted in the disappearance of all the other marine life that depended on the kelp beds as habitat, from shrimp to whales. We know this because fortunately, remnant populations of sea otters were discovered before it was too late, and the impacts of their reintroduction to their natural habitat were recorded. After putting the otters back, the rich kelp forest ecosystem with all its diversity of creatures began to return (albeit slowly), including those that are commercially important for people (we're just another block, after all). On the island of Mauritius in the Indian Ocean, previously home to the infamous dodo bird, there was once a species of 600-pound tortoise. The story goes that when Dutch sailors first arrived on the island in 1638 there were so many tortoises that they could walk exclusively on the turtles' backs without touching the ground (a bit of a stretch most likely, but you get the idea). Then they ate them all — every last one. The extinction did not seem to have any obvious impacts on the surrounding ecosystem, until in the 1970s researchers began to notice that the native tree species (which can live for centuries) were not reproducing and were becoming threatened by extinction. If the trees were lost, so would be the insect pollinators, the birds that fed on their foliage, the bats that roosted in their branches and the orchids that grew in their canopies. After some frantic research, it turned out those trees needed their fruit to pass through the gut of a tortoise in order to germinate. No tortoise, no trees. In a desperate and controversial attempt to reverse the decline, a similar species of tortoise was relocated from a nearby island with some promising results. Although there are still no guarantees of success due to the unknowns surrounding the ecology of both the tortoise and the tree species, it goes to show how the removal of a seemingly unnecessary block could have huge repercussions down the road. Whether the impacts of **extinction** happen right away or centuries later, they **will undoubtedly happen. No species stands alone**, and **the loss of one will always have** some form of **impact** on others, often **in a chain reaction.** We've only scratched the surface of discovering the interconnectedness within ecosystems; in many cases we know nothing at all. What we do know however, is that at the end of the day **resilient ecosystems** — those that are best suited to remain stable and continuously provide us with goods and services — are the ones that **maintain** their **full diversity**.