

Indo-Pacific Military Basing

Accounting for Climate-Change Effects

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Abstract

The 2021 Executive Order (EO) 14008 states that the United States and world face not only climate change but also an intense climate crisis that must be acted on now. This EO puts climate change and its effects at the center of US foreign policy and national security, especially in the Indo-Pacific region that is the focus of this article. Therefore, the Department of Defense (DOD) and Indo-Pacific Command (INDOPACOM) must incorporate climate-change effects with associated risks into their strategic, operational, and tactical planning to sustain, maintain, and further develop basing options within the current Agile Combat Employment operational scheme to support integrated deterrence and strategic competition. The DOD already had guidance and resources addressing climate-change effects to improve its preparedness and resiliency of the environment, infrastructure, equipment, materials, operations, services, and programs throughout the Indo-Pacific. However, with the new EO, the DOD developed a climate risk analysis (DCRA) as part of a US government-wide approach. This article not only examines the importance of planning for climate-change effects per the DCRA but includes an assessment of other environmental challenges that have been faced by US leadership in this region of the world, such as sea-level rise and existing severe climate conditions in and around the vast Indian and Pacific Oceans. The area's regional historical dilemmas will also be reviewed because they may impact the stability of regional power relations, especially in this era of strategic competition. As the United States incorporates climate-change effects in pursuit of Indo-Pacific basing options, I also propose collaboration with worldwide allies, partners, and potential partners in our global strategic efforts to keep a free and open Indo-Pacific region. The global and regional nature of the climate change issue could be leveraged to find opportunities for cooperation with China.

As the United States, especially the Department of Defense (DOD) and Indo-Pacific Command (INDOPACOM), looks at military basing in a peer competition or strategic competition with People's Republic of China (PRC), the DOD must identify and analyze many facets in sustaining existing bases and selecting new basing opportunities to support US national defense, our Indo-Pacific partners, and the international waters of the Indian and Pacific Oceans. The DOD especially needs to analyze the details of climate change in the Indo-Pacific region that are transforming the geostrategic, operational, and tactical circumstances with significant implications to US national security and

defense. The climate changes with associated environmental effects and risks include variations in average weather conditions that persist over multiple decades or longer that encompass increases and decreases in temperatures. They also include changing precipitation patterns and changing risk of certain types of extreme weather such as frequent, intense, and unpredictable conditions including typhoons and tsunamis, along with sea-level rise and atmospheric corrosivity, to mention a few. These climate-change effects and associated risks create security challenges and impact defense strategies, plans, capabilities, missions, material, equipment, vehicles, weapon systems, and even personnel. In concert and conjunction with climate-change effects, the US strategic, national, and regional security issues across the Indo-Pacific region are also compounded by growing health, water and food scarcity, population, and urbanization issues. This region is the most dynamic in the world and its future affects people globally, so it is critical for the United States with allies and partners to observe, analyze, and provide solutions for climate-change effects throughout the Indo-Pacific area.

Within these circumstances, the Indo-Pacific people, geography, and nations with the massive Indian and Pacific Oceans surrounding them already experience a very harsh and harmful climate. Besides the climate change and associated risk issues, the environment is characterized by high temperatures, humidity, extreme levels of ultraviolet rays, wet saline atmosphere, and lots of rain causing a tremendous deterioration to the natural environment, equipment, ships, vehicles, facilities, infrastructure, and even the people. The average annual rainfall amounts change over the vast Indo Pacific region, but the Pacific Ocean area has more than 80 inches and the Indian Ocean area has more than 100 inches. I recommend the DOD adapt its current and future basing in this region to incorporate associated operations that address the impact and effects of climate change in a balanced way that ensures the execution of effective and efficient military objectives and plans. I also recommend that the DOD's mission-planning process include: identification and assessment of climate-change effects on missions, incorporation of climate-change effects into plans and procedures, and anticipation and management of these climate change risks to build in resiliency, especially for built-up base infrastructure and support systems. We must look at all these environmental issues/threats (climate change, sea-level rise, and atmospheric corrosion) in our base development and their impact to global and national security, while ensuring the United States and DOD take better care of the Indo-Pacific environment. Besides the military instrument of power, the United States also needs to utilize additional diplomatic and economic instruments of power more appropriately to help heal and secure strong relations with all our Indo-Pacific partner nations as the DOD establishes new Agile Combat Employment (ACE)-equipped bases

throughout the region. Today as the United States pivots toward the China threat in the Indo-Pacific region, the United States and its allies and regional partners must account for how climate change risks relate to military basing choices.

Recent DOD Policies and Programs Addressing Climate Change

Even as recently as spring 2021, Secretary of Defense Lloyd J. Austin III specifically called climate change an existential threat. In other words, his evidence-based explanation of the imminent threat posed to the DOD by climate change effectively turned the issue into a fact of actionable importance for the DOD.¹ Some people still do not accept the fact that climate change occurs. However, I contend that the DOD must keep a balanced perspective on addressing climate-change challenges, by which I mean incorporating the issue into basic foreign military mission prerogatives, such as acting as ambassadors for democracy, providing humanitarian relief from natural disasters, and enforcing international laws. Also, important to keep in mind are other particular challenges in the Indo-Pacific identified by Austin, including those associated with the threats from “rising sea levels and more frequent and intense storms that put individuals, families and whole communities at risk—while pushing the limits of our collective capacity to respond.”²

During a congressional hearing in July 2021, the DOD, Department of State, US Agency of International Development, and allies specifically addressed the effects of climate change that exacerbate existing challenges and even create new ones in the Indo-Pacific region. Additional climate information discussed during the hearing included increased frequency and intensity of extreme weather events and rising sea levels that endanger critical national security sites such as the Ronald Reagan Ballistic Missile Defense Test Site and Space Fence facilities on Kwajalein Atoll in the Republic of the Marshall Islands.³ Also, climate-change effects of extreme weather may contribute to migration, insecurity, and instability of Indo-Pacific communities and areas. It also makes this region’s communities and areas susceptible to recruitment and radicalization by insurgent-type groups.

As the United States and its allies and partners continue to collaborate in preparation for a combined response capability, hopefully, all parties will agree that climate change exists and we must address its challenges accordingly, but not at the expense of our prime objective to keep the Indo-Pacific a free and open environment in which all countries prosper side by side as independent states and in which the international rules-based order is respected. This includes free, fair, and reciprocal trade, open investment environments, good governance, and freedom of the seas. We also need to ensure completion of appropriate cost-risk

analyses to assist with making right decisions and resource utilization to address climate change without any negative impact to our overall Indo-Pacific mission.

As the US government continues to make multiple steps to address climate change in the Indo-Pacific region, I recommend that leaders do not view climate change as catastrophic or as a profound, impossible crisis. The DOD must take a level-headed, balanced, and sensible perspective by incorporating climate-change challenges into all planning, management, and execution of Indo-Pacific engagement, especially where our allied countries are involved. I recommend that the DOD accomplish additional research and testing of new technologies, materials, and equipment at forward Indo-Pacific basing to assist with selection of additional basing options and the support equipment needed for greater strategic stability in the region.

Per requirements specified in Executive Order (EO) 14008, *Tackling the Climate Crisis at Home and Abroad*, the October 2021 DOD Climate Risk Analysis (DCRA) takes an important step toward integrating climate considerations and risks into DOD planning, resourcing, operations, and missions. EO 14008 puts the climate crisis at the center of US foreign policy and national security with a government-wide approach to address it. Again, it is a valid and important aspect to include climate-change effects into the DOD's national security strategy, but it is critical that we take a solid view with justification on the part of the United States. These climate change risks can cause key security implications and strained international efforts with allies and partners as well as policies and responsibilities. The DCRA looks at key documents, hazards, risks, relevant strategies, planning, processes, interagency scientific and intelligence products, wargames, analyses, and studies for exercises with their related funding implications to US national security and defense issues, especially in the Indo-Pacific theater.

The DOD also recently developed a climate assessment tool that is web-based collection of scientific data accessible by all DOD personnel.⁴ It supports research, analysis, and decision making by evaluating historically extreme weather events and foreseeable climate effects. These effects include future changes in sea levels, flooding, drought, heat, land degradation, energy demand, and wildfires. This tool should help the United States and its allies and partners to better understand existing and future installations' vulnerabilities to climate-change effects and risks. This tool is new and currently helps identify locations that could benefit from additional climate-change effects research on assets and personnel exposure, sensitivity, and adaptive capability. I recommend the DOD further develop this tool and share it with Indo-Pacific allies and partners to apply resources to improve climate adaptation and resiliency throughout the region.

The United States and its allies and partners have a joint, global vision for peace and prosperity in a free and open Indo-Pacific that includes free and fair trade, shared access to global markets, good governance, a rules-based international order, human rights, and civil liberties. The United States needs to support this global vision through the best means possible, especially amid climate-change effects and their associated risks for both current and future Indo-Pacific basing options.

Current and Future Basing Perspective

Since World War II, the United States has relied heavily on a network of global military bases and forces that include both large and small overseas installations. Dave Vine refers to such installations as *Little Americas or lily pads*,⁵ which provide forward, collective defense against belligerent nations, especially in the Indo-Pacific region. Following the end of WWII and the Korean War, the US Air Force (USAF) significantly reduced its global footprint from a peak of about 93 air bases during WWII to about 40 permanent bases today. From a strategic perspective, these overall base reductions have concentrated high-value US forces and weapon systems. Concentrating resources in one discrete location in this way will unfortunately make them easier targets during any future PRC actions. High-investment areas that would be especially impacted include the USAF main operating bases (MOB) in the Indo-Pacific such as Kadena, Yokota, and Misawa air bases (AB) in Japan; Osan and Kunsan ABs in South Korea; and Anderson Air Force Base (AFB) in Guam.

Per Air Force Doctrine Note 1-21, the USAF is reexamining future force structure and posture to develop Indo-Pacific basing that complicates the PRC's targeting process, creates political and operational dilemmas for the PRC, and creates flexibility for US and partner forces. The doctrine states, "The USAF has introduced Agile Combat Employment (ACE): a proactive and reactive operational scheme of maneuver executed within threat timelines to increase survivability while generating combat power across the competition continuum."⁶ This new operational scheme basically returns to the USAF's historic, truly expeditionary roots and leads to streamlining ways of organization and force presentation. ACE conducts military operations on short notice in response to crises, with forces tailored to achieve finite and clearly stated purposes. However, it also involves organizational changes, decentralization of authorities, mission command control, logistical approach redesigns, applications of emerging technologies, and even changes to the meaning of an Airman. Collectively, this resurrected method of warfighting differs vastly from the previous 30 years where the United States was fighting counterinsurgency operations in the Middle East. Under this new operational war-fighting method, ACE, especially in the Indo-Pacific region, cli-

mate change—with all its associated effects and risks—will have a profound impact on this lily pad-type or island basing with associated infrastructure.

Under the ACE doctrine, both the proactive and reactive maneuvers require a force that is lean, agile, and multi-capable. As doctrine states, “(Multi-Capable Airmen) are enabled by cross-utilization training (CUT) and can operate independently in an expeditionary environment to accomplish mission objectives within acceptable levels of risk.”⁷ In both proactive and reactive movements, personnel and assets need the ability, flexibility, and adaptability to move quickly among MOBs, forwarding operating sites (FOS), cooperative security locations (CSL), and contingency locations (CL) even in a contested conflict with the PRC. Even if CSLs and CLs are the main choice of basing with only prepositioned assets, climate change and severe environmental effects could seriously impact mission readiness and national security.

During the selection of all these varied bases throughout the Indo-Pacific, the DOD needs to respond to defense and security risks associated with all climate-change and environmental severity issues. This can be tough, especially with risks associated to climate change that are so difficult to predict, particularly in geographical areas or land near the Indian and Pacific waters. I recommend the DOD further develop and utilize the new climate assessment tool, along with the installation of as many sensors as possible at existing bases and potential future ACE basing locations to provide readiness status of prepositioned materials, equipment, and vehicles. This climate tool and such sensor installations at existing and future ACE basing locations will provide the ability to monitor climate change with some predictability in hopes to mitigate its devastating effects. I also recommend locating inland basing options that are further away from severe coastal environments and their related climate-change effects, such as India’s geographical interior. While India has its own climate-change challenges, they are arguably less severe than those faced in small tropical island environments. The continental situated-ness of many inland sites in India is common to most land in the United States. This will not only help limit or mitigate coastal severe environments and climate-change effects but also give the United States an additional geostrategic asset to help contain any future Chinese aggression. This would also be a sound and valuable choice for the Indian economy and stability in the region, while simultaneously strengthening the counter to Chinese regional influence.

Existing Severe Environment

As the DOD looks at the overall support functions from a standpoint of prepositioned assets and infrastructure requirements for these new ACE bases, it must also address environmental severity classification/atmospheric corrosivity. This is

especially critical in the INDOPACOM theater, where the severe environmental conditions of high temperatures, high humidity, large amounts of rainfall, and saltwater spray increase the atmospheric corrosion causing deterioration to the built environment. Adverse environmental conditions deteriorate weapons systems, equipment, facilities, and infrastructure thus impacting sustainment, potential safety, mission readiness, and environmental issues. I identify four primary factors important for mitigating atmospheric corrosivity to military assets in the Indo-Pacific region. These corrosion control methods include:

- Extensive and thorough wash and clean cycles for all structures to protect surfaces from deterioration;
- Appropriate material selection that provides more corrosion-resistant materials;
- Protective coatings that protect the structures' boundary between the material and corrosive environment; and
- Humidity control systems, which reduce the humidity and overall corrosivity to assets.

These methods help mitigate and limit corrosion activity to the structure and provide life extension at the best overall life-cycle cost for all prepositioned material, equipment, infrastructure, and all associated support systems in the Indo-Pacific region. It is highly recommended to include these corrosion-control methods for existing and future assets throughout the region even with a higher initial cost because they will extend the structures' overall life and therefore, provide a lower life-cycle cost. It would be wise for expeditionary forces to refer to this checklist on how to extend the life of built environments in tropical, corrosive island climates. The list above may help conserve resources by enabling more efficient decisions in the planning phase of any new installation or cooperative use agreement with a foreign power.

Sea-Level Rise Impacts

Another climate-change risk that directly relates to basing decisions is sea-level rise. Per a scientific report, *Many Atolls May be Uninhabitable within Decades Due to Climate Change*, sea-level rise is due to climate change. The highest rates of sea-level rise occur in the tropical Pacific Ocean, where there are many of the world's low-lying atolls, existing USAF bases, and potential future ACE base locations. The DOD needs to look carefully at this climate risk with sea-level rise, because any new ACE infrastructure needs to be located out of areas most impacted by sea-level rise. The sea level-affected zone includes places where water invades coastal areas and causes erosion. This threatens areas where people live

and has negative effects on farmland. Higher sea levels also cause heavier rains and stronger winds, which can unleash severe storms and other significant atmospheric phenomena. Sea-level rise also submerges low-lying islands and atolls, leading to the abandonment of coastal communities.

To further support my conclusion, the US Geological and Marine Science Center performed testing and observations of the overall impact of sea-level rise at several Pacific Ocean Island locations. These locations included Laysan Island and the Midway Atoll's of Sand, Spit, and Eastern Islands under five sea-level rise scenarios. Their scientific testing, modeling, and observations included the following array of data, tests, and models: oceanographic and meteorologic effects, based on wind and wave data from 1981 to 2004; numerical modeling, which involved modeling the propagation and breaking of waves; bathymetric and topographic data, made up of landform data from above and below sea level; and inundation and flooding modeling that examined wave heights and wavelengths for wave run-up.⁸ Per the article, "Sea level rise is particularly critical for low-lying carbonate reef-lined atoll islands; these islands have limited land and water available for human habitation, water and food sources and ecosystems are vulnerable to inundation from sea level rise."⁹ Therefore, this study not only shows sea-level rise occurring but also points to its potential future occurrence and impact on the Indo-Pacific region's atolls and islands. In so doing, I hope to have provided the DOD with a brief primer on some climate change risks to help in the future deliberations of basing options that support ACE and other operational schemes.

As one alternative, the United States and partners can raise atolls' heights to create land for industrial development and aggressive expansion for ACE basing support; however, this may cause severe destruction of coral reefs. The PRC already created more than 3,000 acres of these artificial islands in the South China Sea for industrial and military purposes. The creation of these islands also caused a dramatic environmental change that damaged about 2,000 acres of living coral reefs. Therefore, if the United States and/or Indo-Pacific partners elect to create additional islands from existing atolls as FOSs, CSLs, and/or CLs, we need to ensure the safety of the natural environment.

Climate change will have other drastic effects on atolls and islands where future bases may be located. The domino effect of global warming starts with ice melting, then sea-level rise, increased wave depth, wave-breaking reduction at reef crest, wave-energy dissipation reduction, and larger waves especially during storms. This results in the deterioration of the shoreline and poses a threat to islands where current or future bases may be located.¹⁰ Flooding of low-elevation islands causes problems with freshwater sources, local vegetation, and animal life and may even cause population displacement. In the context of these and other ongoing effects

of climate change, the creation of artificial islands would only further compound the overall negative effects on the living coral reefs and Indo-Pacific. It is therefore not an option I recommend.

Most Indo-Pacific Island people live along the coastline and largely subsist on foods they harvest from the natural environment. It is therefore critical for the US government to not only take sea-level rise into account when selecting basing options but also to aid the region's populace to help alleviate as much of climate change's impact as possible. The *Singapore Journal of Tropical Geography* article, "The End of the Pacific?: Effects of Sea Level Rise on Pacific Island Livelihoods," discusses sea-level rise and its impact on coastal lifestyle, land productivity, and people's livelihoods. The article states, "Over the past 200 years, sea level has been rising along most Pacific Island coasts causing loss of productive land through direct inundations (flooding), shoreline erosion and groundwater salinization."¹¹ Sea-level rise affects the local indigenous peoples and their livelihoods due to radical changes in geography spawning fundamental changes in settlement patterns, communications, infrastructure, subsistence systems, societies, and economic development. How will this sea-level change impact US relations with indigenous peoples? How will it impact existing and future US military basing, infrastructure, and location in the Indo-Pacific? Again, the United States, specifically INDOPACOM, needs to take climate-change risks and the environmental threat into account in all future plans, processes, decisions, and operations.

Multi-Government Agencies Approach

The Biden administration combats climate change by reducing pollution, increasing resiliency, protecting the public, conserving natural resources, delivering justice to offenders, and encouraging jobs with economic growth through innovation, preparation, and distribution of clean-energy technologies and infrastructure. The administration established a new National Climate Task Force (NCTF) under EO 14008, chaired by the National Climate Advisor with members from 21 executive branch agencies such as the Treasury, Defense, Interior, Transportation, Energy, Environmental Protection Agency, and others. The NCTF will combat climate crisis within the extent permitted by law by prioritizing actions in their policy making and budget processes. These include contracting, procurement, and engagement with other countries such as those in the Indo-Pacific region. The approach needs to be coordinated from planning to implementation, especially in working with our Indo-Pacific partners toward ACE basing opportunities and options.

The presidential EO 14008 says, "The scientific community has made clear that the scale and speed of necessary action is greater than previously believed.

There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding to the climate crisis will require both significant short-term global reductions in greenhouse gas emissions and net-zero global emissions by mid-century or before.”¹² Although the phrase, “there is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory,” may seem a little extreme, it is important for the DOD to account for and mitigate against risks associated with climate change and severe environmental conditions as we develop US relations with partners to identify additional basing options. I hope that the suggestions I have made herein, which are based on my 40 years of experience with resource management in this area of responsibility, will help spur into action preventive measures that draw on existing strengths and resources as opposed to calling for greater investment. For example, the corrosion control checklist outline in this article may be helpful in regional project design and management documents that are the purview of INDOPACOM and Pacific Air Forces (PACAF), among others. In addition to the field-specific suggestions I have made in this article, I would suggest policy development and refinement on the issue of Indo-Pacific basing possibilities. These should include correct assessments of military capabilities, threats, and the existing relationships our allies and partners maintain with other nations.

Climate-change effects combined with other stressors likely will contribute to political, economic, and social instability in Indo-Pacific region. The Indo-Pacific region is an enormous area and refers mainly to the maritime space stretching from the Indian Ocean across the littorals or coastal regions of East Asia to the western Pacific Ocean. Per INDOPACOM, this massive area encompasses about half the earth’s surface with about 36 nations spanning from the west coast of the United States to the west coast of India. This region is home to more than 50 percent of the world’s population, 3,000 different languages, two of the three largest economies, and 10 of the 14 smallest ones. These cultural, social, economic, and geopolitical diversities make it exceedingly hard for the United States to initiate development of ACE basing and address climate change and the effect of severe climates on national infrastructure with the various populations of the Indo-Pacific. The United States and like-minded nations and territories ought to work toward providing stability in this unstable region, which will require both figurative and literal interpretations of what it means to produce stability. In a more literal sense, as this article has shown, providing stability will mean shoring up existing (and planned) improvements to land and the built environment to fend off intensifying environmental headwinds. As the United States continues to develop and improve relationships

with Indo-Pacific partners to secure additional ACE basing options (FOS, CSL, and CL), the DOD must incorporate all climate-change and severe environment survivability calculations into future planning.

Regional History Dilemmas

Besides dealing with ACE basing options, atmospheric corrosivity, and climate-change risks, the DOD also has a storied history of improperly handling and storing military munitions, materials, supplies, and equipment, as well as the use of vehicles, ships, aircraft, and all associated materials along with past ammunition testing, use, and disbandment. One example of the history of US mismanagement of environmental issues in the Pacific region comes from David Vine's book, *Base Nation: How U.S. Military Bases Abroad Harm America and the World*. Vine writes, "Leaks in storage tanks and pipelines are also a regular danger. At Diego Garcia, to mention just one example, four separate incidents between 1984 and 1998 spilled more than 1.3 million gallons of jet fuel, polluting soil and groundwater."¹³ A broader history of environmental damage such as this extends across this region and has had a negative effect on our current and future basing options in the Indo-Pacific. I would be remiss if I did not include a more thorough accounting of the environmental mistakes the US DOD has made abroad. To name a few, they include: huge amounts of energy usage, noise pollution, nuclear testing, the introduction of outside wildlife, and the storage of large quantities of toxic chemicals and other hazardous waste in the region.

Among the above examples, one is worth briefly considering in more depth. The US military tested nuclear weapons in the Marshall Islands in the 1950s, which left lasting damage to the islands and the people who have protested the contamination ever since. What may be less widely known is that inspectors detected radioactive materials in the area of Guam where naval vessel post-test cleaning took place. Further still, nuclear waste from post-test cleaning was found as far away as Hunters Point Naval Shipyard in San Francisco, California. This expansive range of radiation exposure impacted various populations and regions well outside of the Marshall Islands. It points to the much broader and more complex net effects of this problem.

In various ways, the US government has taken steps to address this case of nuclear fallout. Moreover, the current policy direction incorporates thoughtful responses to dilemmas posed by environmental problems inherited from earlier generations. Hopefully, the lighter and shared footprint that underscores the ACE basing concept should help eliminate some questionable past practices, such as high energy usage and unchecked noise pollution. The extent to which the US government

maintains complete control over how we respond is limited, and past practices have caused many international relations problems through to the present day.

Moreover, as an outgrowth of this history, there are credibility issues with our presence in the area still today. A recent news article from Okinawa illustrates one widely discussed example: “A fire suppression system in an aircraft hangar discharged a massive volume of toxic firefighting foam from Marine Corps Air Station Futenma in Okinawa on April 10, 2020.”¹⁴ This carcinogenic foam was accidentally released into a local river and seen floating in the air until it settled in a residential neighborhood. Protests about the damage caused by this foam are ongoing. Although, within the last year the Marine Corps has further tested the water in and around Okinawa and replaced the old fire suppression foam with a more environmentally friendly material, the local and federal Japanese officials issued a protest letter demanding three items from the United States: (1) an apology from US military for its environmental crimes, (2) prompt on-site investigations, and (3) that all treatment and costs should be borne by the US military. Controversial environmental management challenges such as this one could only be further complicated by climate-change effects and associated risks that might impact ACE basing concepts, procedures, and processes. Ultimately, it seems likely that the more unresolved environmental challenges leaders are facing, the less attention they will be able devote to planning for and managing of climate change and corrosion.

To improve our environmental standards domestically and abroad, the United States enacted the National Environmental Policy Act on 1 January 1970. Thus began the “environmental decade,” marked with enforcement laws. However, as already mentioned, the United States needs to work on its record of taking care of the Indo-Pacific environment and people. According to Vine, “It was 2011, and the Navy was holding a public meeting on Saipan, the largest of the Northern Mariana Islands, some 130 miles north of Guam. The meeting was part of an environmental impact statement process for proposed military training and testing. . . . Many locals were especially concerned about the bombing of Farallon de Medinilla, . . . home to numerous species of migratory birds.”¹⁵ Thus, these examples show that even with the 1970 environmental laws, the DOD still needs to become a better steward and representative in this region. This is all the truer today as the United States is working with Indo-Pacific countries to maintain existing bases and develop additional ones.

Importance of Partnerships

Climate-change effects and other posturing issues must be incorporated into the regional overall plans and objectives through planning processes that involve

our Indo-Pacific partners. As the DOD seeks to maintain existing installations and initiate new basing opportunities under ACE, we must collaborate with allies and partners to find a better balance between realistic military activities, preserving the natural environment, and addressing the climate change requirements. What does the United States need to do as we collaborate with our partners to find this balance? Where are the best locations and how does ACE basing manifest in this theater where climate change and environmental severity have immense impact on everything? Can the United States establish ACE basing with specific Indo-Pacific partners to help them with some of the climate-change or environmental issues they encounter? Should the DOD and INDOPACOM develop and/or utilize more naval forces and weapon systems instead of the USAF to fulfill any future Indo-Pacific mission? Whether in peace or war, the United States must do what is right to preserve the natural environment while maintaining its superior power as a global hegemon to help keep international order in the Indo-Pacific region and deter any conflict with the PRC.

Conclusion

In conclusion, the Indo-Pacific people, geography, and nations with the massive Indian and Pacific Oceans surrounding them already experience a very harsh and harmful climate. Besides the climate-change effects and associated risk issues, the environment already experiences high temperatures, high humidity, extreme levels of ultraviolet rays, wet saline atmosphere, and significant rainfall. These cause a tremendous deterioration to the natural environment, equipment, ships, vehicles, facilities, infrastructure, and people. The DOD must be able to adapt current and future basing and operations to adequately address the impact of climate-change effects to maintain an effective and efficient military in the Indo-Pacific. Mission planning must include identification and assessment of climate-change effects on missions, incorporation of climate-change effects into plans and procedures, and anticipation and management of these climate change risks to build resiliency, especially for base infrastructure and support systems. We can better utilize scientific testing, tools, and data with historical weather to better predict climate change, and thus help build better flexibility, adaptability, and resiliency into our current and future basing options. How can the United States and Indo-Pacific partners best address these issues with respect to their impact on existing and future basing? We must look at all these environmental issues/threats (climate change, sea-level rise, atmospheric corrosion, etc.) in base development, their impact to global and national security, and ensure that the United States and DOD take better care of the Indo-Pacific environment. Besides the military instrument of power, the United States also needs to continue utilizing additional diplomatic and economic instru-

ments of power more appropriately to help heal and secure strong relations with all our Indo-Pacific partner nations as the DOD establishes new ACE bases throughout the region. Today as the United States pivots toward China and the threat in the Indo-Pacific, the United States and its allies and partners must evaluate the climate-change effects and risks as related to military basing choices. We also must take full advantage of this global issue, climate change, for possible cooperative opportunities with the PRC. 🌐

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Notes

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