

**Written Testimony – March 2, 2021, for the  
US House of Representatives Committee on Natural Resources  
Virtual Legislative Hearing on Discussion Draft H.R. \_\_\_\_, “Insular Area Climate Change Act.”  
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*Chair Grijalva, Ranking Member Westerman, and distinguished members of the Committee, it is an honor to submit this written testimony in support of the Insular Area Climate Change Act.*

My name is Zena Grecni, and I am the Sustained Climate Assessment Specialist with the Pacific RISA team based at the East-West Center in Honolulu. The Pacific RISA is one of eleven Regional Integrated Sciences and Assessments (RISA) teams funded and supported by the NOAA Climate Program Office to build the nation's capacity to prepare for and adapt to climate variability and change. I have worked in the Pacific Islands region for more than a decade, supporting Pacific Island governments and communities by conducting research and synthesizing climate information.

As the Sustained Climate Assessment Specialist for Hawai'i and the US-Affiliated Pacific Islands (USAPI), I coordinate a regional climate assessment effort, the Pacific Islands Regional Climate Assessment (PIRCA), comprised of local governments, NGOs, and academic organizations, and supported by Federal entities. To increase representation of the USAPI (American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the Freely Associated States under the Compact of Free Association) in regional and national assessments, the PIRCA is conducting climate assessments for each of the USAPI countries and territories. The PIRCA reports summarize up-to-date climate trends and projections for Pacific Islands, and detail specific ways that climate change is affecting critical sectors. Each report was co-authored with local experts and involved collaboration with 30 to 50 technical contributors across a range of essential sectors. I served as an author on three of these assessments released in the past year, including as lead author on assessments for Guam and the Commonwealth of the Northern Mariana Islands (CNMI). I was also an author of our [region's chapter in the Fourth US National Climate Assessment, Volume 2](#), released by the US Global Change Research Program in 2018.

Climate change has arrived in the Pacific Islands. I have spoken with public officials struggling to help their communities to recover from the strongest storm ever to strike US soil. I have witnessed coral reefs dying record-high temperatures. Governments and leaders are taking the impacts seriously and are committing resources, time, and creativity to keep people safe, while fostering adaptation and practical planning for future climate-related risks. Yet climate change remains the greatest challenge to the region.

I am therefore pleased and excited by the introduction of the Insular Area Climate Change Act, which will support the considerable efforts of Pacific Island governments and communities. Without increased support, adaptation will not approach the scale needed to meet the multiple crises that climate change will bring to Pacific islands, the beloved home to nearly half a million

people. By necessity, Pacific Island governments have recently focused on addressing extreme weather events and the COVID pandemic more than on actions to respond to future climate risks and emerging threats. Despite setbacks, Pacific Island peoples have nonetheless shown time and again that adaptation and resilience are at their core and that they are willing and ready to partner with US Federal entities and the international community on durable, scalable solutions to the climate crisis.

### ***The need for unique climate programs for Insular Areas in the Pacific***

The Pacific Islands region contains an area larger than the continental United States, including 50% of the US Exclusive Economic Zone and key strategic sites for the US Military. The US Pacific Island Insular Areas—also known as the USAPI—are culturally, socially, and economically diverse.

Communities in the USAPI are already experiencing unique impacts from climate change, which are well-documented. The Fourth US National Climate Assessment describes the key climate-related challenges that the Pacific Islands already face and what lies ahead:

- Dependable and safe water supplies are at risk from rising temperatures, changing rainfall patterns, sea level rise, and increased risk of extreme drought and flooding. Some islands already experience saltwater contamination of fresh water supplies or periodic extreme droughts (Keener et al. 2018, Key Message 1). Because of the remoteness of islands, responses to water scarcity have involved delivery of water and deployment of emergency reverse osmosis units by the US Navy at a high cost (Keener et al. 2018; Keener et al. 2012).
- Sea level rise is now beginning to threaten critical infrastructure. Even on islands with higher land elevations, most infrastructure and communities are typically confined to a narrow band of land within a few feet of sea level. The USAPI will experience higher sea level rise than the global average (Sweet et al. 2017). Sea level rise projected during this century will threaten the food and freshwater supplies of Pacific island populations and jeopardize their continued sustainability (Keener et al. 2018, Key Message 3).
- Coral reefs and ocean resources are inseparable from well-being in the Pacific because they underpin livelihoods, culture, and economies. Widespread coral reef bleaching and mortality now occur more frequently than before. By mid-century, the conditions for severe coral bleaching are projected to occur annually if current warming trends continue (see Figure 1). This could result in the loss of reef structures, leading to the loss of coastal protection and fish habitat that reefs provide (Keener et al. 2018, Key Message 4).
- Climate change impacts are expected to amplify existing risks, such as the spread of disease and the prevalence of poor health outcomes. In some locations, compounding impacts may result in severe disruptions to livelihoods that increase the risk of human conflict or compel the need for migration (Keener et al. 2018, Key Message 6).

- All of these changes imperil the health and well-being of Indigenous communities of the Pacific (Keener et al. 2018, Key Message 5).

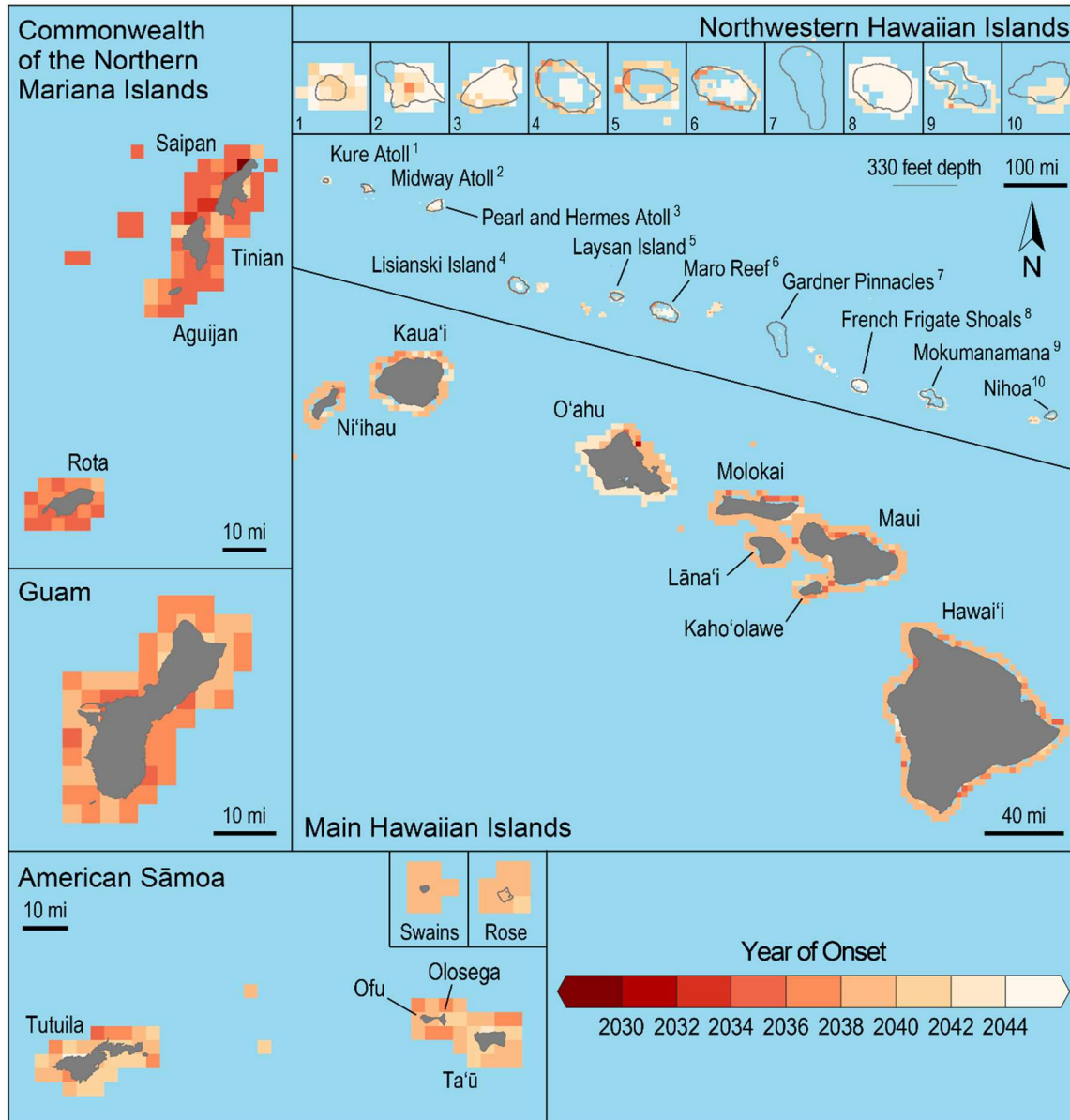


Figure 1. The figure shows the years when severe coral bleaching is projected to occur annually in the Hawai'i and the US-Affiliated Pacific Islands region under a higher emissions scenario (RCP8.5). Darker colors indicate earlier projected onset of coral bleaching. Under projected warming of approximately 0.5°F per decade, all nearshore coral reefs in the region are expected to experience annual bleaching before 2050. Source: Keener et al. 2018; NOAA.

The PIRCA assessment delves deeper into some of the impacts, further examining the situation in specific USAPI locations. For instance, the increasing power of hurricanes, also called tropical cyclones and typhoons in our region, puts island populations and infrastructure in a uniquely vulnerable state. In 2018, seven tropical cyclones, typhoons, and super typhoons damaged

infrastructure, claimed lives, and destroyed ecosystems across the Pacific Islands in quick succession, causing billions of dollars in direct damages. A major disaster was declared when Super Typhoon Yutu struck the Northern Mariana Islands in October 2018. Torrential rain and sustained winds of 130-180 miles per hour killed two citizens, injured at least 133 others, and damaged or destroyed significant portions of the islands' buildings and critical infrastructure (FEMA 2020). Applications for individual assistance from FEMA amounted to \$40.5 million and public assistance provided was \$131 million (FEMA 2020).

The inaccessibility of Pacific Islands means that recovery from such events is especially challenging. Super Typhoon Yutu caused widespread power outages, severed water lines, produced a sizable homeless population, and entailed extensive debris removal. Hazardous waste removed from damaged and destroyed households filled 193 shipping containers (FEMA 2020). School was disrupted for all students and many moved to temporary classrooms supplied by FEMA, some used for a year or more after the typhoon. There is scientific consensus that tropical cyclone intensity—the strength of hurricanes and typhoons— is likely to increase in a warming world (Kossin et al. 2017; IPCC 2013; Knutson et al. 2015; Kossin et al. 2020). Already, cyclone intensity has increased globally over the past four decades (Kossin et al. 2020). An increase in maximum typhoon intensities in the Pacific will amplify the potential for severe damage. The Insular Area Climate Change Act, particularly directly sections 404, 502-503 and 601-602, would reduce the potential for harm and increase the ability of communities to recover from major storms.

Increasingly dangerous storms are not the only extreme climate events that require adaptations and weather-proofed infrastructure. Wildfire, drought, hotter temperatures, and more extreme rainfall events present issues for the reliable provision of critical services. As we witnessed millions of Texas residents under a boil water advisory in the past weeks, I thought of the residents of American Samoa for whom unsafe water is a long-term reality. Boil water advisories have been in effect on the most populated island of Tutuila for more than a decade (Wallsgrrove and Grecni 2016). Climate change and increasingly intense storms promise to further hinder provision of clean water for drinking and household use.

Even small increases in average temperatures can increase extremes. Hot weather is known to increase hospitalizations and deaths among people with pre-existing cardiovascular, kidney, and respiratory disorders (Sarofim et al. 2016). Non-communicable diseases are already leading causes of death in the USAPI territories, where medical services cannot match those available in most of the Contiguous US. NOAA weather stations have documented an increase in hot days across the Pacific Islands, and 2019 was the hottest year on record in Oceania (Grecni et al. 2021; NOAA NCEI 2021).

Governments and leaders cannot afford to simply watch these impacts unfold. They are engaging in adaptation in many forms. Resilience-building is evident in policies, plans, management actions, and international engagement by Pacific leaders. American Samoa's Governor created the American Samoa Climate Change Task Force; similarly, the Governor of

Guam through Executive Order 2019-19 established Guam's Climate Change and Resiliency Commission, with the objective to develop an integrated strategy to build resilience against adverse climate impacts; the CNMI adopted Safe, Smart Growth Guidance; the Republic of Palau established a National Office of Climate Change and adopted the Palau Climate Change Policy, with an action plan and timeline for updates. The result of these actions, and others, is that US Insular Areas in the Pacific now have durable institutions in place that can identify high priority needs, develop proposals for funding, and coordinate cross-sectoral projects.

Nevertheless, adjusting to the impacts of climate change presents logistical challenges and entails higher costs for the USAPI than for locations in the Contiguous US. Materials must be shipped in at great cost, and experienced contractors must be engaged from overseas. Recruiting contractors is particularly complicated now that COVID has necessitated travel restrictions. Because the USAPI have constrained human and technological capacity, the Insular Area Climate Change Act rightly puts emphasis on programmatic coordination and technical assistance. Local training and capacity building are essential for maintaining any new infrastructure or programs.

The National Climate Assessment underscored the importance of early adaptation in avoiding accelerating costs. The savings in the long-term from adaptation are expected to be several times the up-front costs and can generate co-benefits (Lempert et al. 2018). Sea level rise, for example, is projected to accelerate strongly after mid-century, so adaptation strategies implemented sooner can better prepare communities and infrastructure, avoiding more severe impacts.

### ***Coral reefs are critical lifelines***

The PIRCA has highlighted just how integral healthy coral reefs are to the ongoing sustainability of Pacific Island populations, economies, and cultures. Reefs and connected nearshore ecosystems inject hundreds of millions of dollars into Pacific Island economies every year. The total economic value of the CNMI's coral reefs and connected seagrasses were estimated at \$115 million USD, including all goods and services that reefs provide, the value to tourism, and the cultural and social value (Eastern Research Group 2019). In Guam, reef-related tourism alone was estimated at \$323 million USD per year (Spalding et al. 2017). Coral reefs currently offer \$17 million USD annually in protection for buildings and economic activity from coastal flooding in Guam and \$15 million USD annually on Saipan (Storlazzi et al. 2019).

Given the enormous value coral reefs represent, it is troubling that multiple, consecutive coral bleaching events in recent years led to mass reef mortality in some locations. Bleaching events in 2017 caused 90% mortality of some branching coral species in the Saipan Lagoon, well-documented by local scientists and management agencies (CNMI Coral Reef Initiative 2019; Maynard et al. 2019). In the CNMI and Guam, the conditions for significant bleaching are expected to occur on an annual basis starting between 2030 and 2040 (van Hooidonk et al. 2016). Research has identified places have the greatest potential for reef resilience and thus

represent wise investments in conservation (Schumacher et al. 2018; Maynard et al. 2019; Gouezo et al. 2017; Miles et al. 2020).

Despite the urgent need to protect and restore reefs, funding levels remain low. According to a coral management specialist in the Northern Mariana Islands, it is like trying to run an emergency room stocked only with boxes of Band-Aids. Funding for targeted coral reef conservation in the CNMI has averaged less than \$1 million USD annually in recent years. A significant portion of this funding has been allocated to outreach, reducing stresses on corals, and studying coral health. These activities create a good foundation for coral restoration by reducing non-climate threats and providing data to inform managers, yet coral restoration has barely begun in the USAPI. Scientists and managers identify the need for greatly increasing coral restoration to reach a meaningful scale. Saipan Lagoon alone has more than 1,500 acres of coral reef habitat, almost all of which could benefit from increased restoration and management effort. This entails hiring qualified people to implement, manage, and maintain projects. To realize the benefits from investments in coral reef restoration, programs must build local capacity to ensure that the application of new expertise, technology, or tools are sustained.

Examples of projects that are ready to be implemented or scaled up include: (1) both in-situ and ex-situ coral propagation; (2) expanding existing in-water coral nursery networks; (3) developing a portfolio of coral conservation and restoration options that could function as a “mitigation bank” to offset any unavoidable impacts from US Military operations in Guam and the CNMI; and, (4) enhancing post-disaster response and recovery with measures that restore corals in areas providing substantial protection for infrastructure from extreme storms. Great progress was made in the Caribbean after Hurricane Maria, where Puerto Rico and the US Virgin Islands were able to include coral reef work under FEMA recovery support functions. Similar programs for post-disaster recovery could be made available to the USAPI.

Sections 103 (Coral Reefs Prize Competitions), 301 (Climate Change Insular Research Grant Program), and 302 (Coastal Management Technical Assistance and Report) of the Insular Area Climate Change Act can enable research and, most importantly, give a boost to innovative coral reef conservation programs, ultimately making reefs more resilient and bolstering the lifeline services they provide.

### ***Active climate monitoring is needed for improved modeling and forward-looking management***

Basing management decisions on past experience alone is like trying to drive by looking in the rearview mirror. It risks missing upcoming curves and going dangerously off the road. For decision-makers today, climate change is a big curve in the road.

The Pacific RISA and the PIRCA have documented the need for increased climate monitoring in the Pacific Islands for more than a decade. Quality climate data is needed to produce more reliable forecasts and future projections that enable managers to construct reasonable future

scenarios. Throughout the USAPI, stations collecting climate data (air temperature, rainfall, wind speeds, etc.) have changed location, and station records are not continuous. Tracking climate trends requires consistent data records of 30 years at the same location, yet only a few locations in the USAPI have data records of sufficient quality.

Federally produced fine-resolution projections are currently available to the Contiguous US States but do not extend to the USAPI. Developing localized predictive modeling for infrastructure planning, agriculture, and a range of other applications would require more data collection stations and, ideally, fine-scale, gridded data. This bill would be a big step toward making the types of data currently available to the Contiguous US also available to the USAPI.

The existing climate data are also difficult to access online in formats suitable for non-specialists. A central data portal for the USAPI could increase data access and use. The US Climate Explorer serves this purpose for all US states but is not available currently for the USAPI.

Sections 303 (National Weather Service Technical Assistance and Grants) and 304 (Ocean and Coastal Mapping Integration) of the Insular Area Climate Change Act would expand the ability of existing NOAA programs to fill data gaps. Although the Act does not specifically provide for it, there is a great need for better understanding of surface water and groundwater systems. The PIRCA technical contributors identified the need for information about the impacts of climate change to island-specific water budgets (Grecni et al. 2021), such as a study done by the USGS looking at water resources under climate change in Guam (Gingerich et al. 2019). Insight into water supplies can help water managers enhance water sustainability and identify solutions, such as conservation measures or storage and recharge mechanisms.

### ***Regarding renewable energy programs for US Insular Areas in the Pacific***

Other potential blind spots in the curve brought on by climate change are the shifts in global energy supply and prices. The Pacific Islands are highly dependent on imported fossil fuels, leaving them vulnerable to global oil price fluctuations that directly impact the cost of electricity. American Samoa relies on fossil fuel (primarily diesel) for 97% of its electricity generation; nearly 100% of CNMI's electricity is generated using heavy fuel oil; in Guam, 96% of electricity is generated using fossil fuels, with only 4% coming from solar (NREL 2020a; NREL 2015; NREL 2020b).

Electricity prices for residential customers in the USAPI are above the US average. American Samoa's electricity rate for residential customers is \$0.33 USD per kilowatt-hour (kWh); CNMI's residential rates are \$0.21 to \$0.35 USD/kWh; Guam's residential rate is \$0.20 USD/kWh; and the Freely Associated States have rates ranging from \$0.27 to \$0.43 USD/kWh (NREL 2020a; NREL 2020c; NREL 2020b). All are well above the \$0.13 USD/kWh average US residential rate, while per capita GDP is well below that of any US state.

***USAPI clean energy initiatives provide a solid foundation, but updates are needed***

Title IV of the Act, particularly sections 403 (Energy Efficient Product Rebate Program), 404 (Renewable Energy Grant Program), and 406 (State Energy Program Non-Federal Cost-Share Waiver), and Title V, section 504 (Insular Area Renewable Energy Grant Program), would support the renewable energy targets set by USAPI governments and protect island communities. Pacific Island governments have demonstrated they are ready to implement renewable energy and energy efficiency projects but need support to do so.

The USAPI countries and territories have experience with successful small-scale renewable energy projects, particularly small-scale solar photovoltaic (PV) projects, demonstrating the economic and social benefits of such projects and the strong potential for increasing renewable energy generation. Furthermore, major electric utilities in American Samoa, Guam, and CNMI have net-metering in place. Issues remain with ensuring maintenance of new infrastructure and the capital investment needed to dramatically scale up renewable energy.

The US Department of the Interior (DOI) Office of Insular Affairs (OIA) funded the National Renewable Energy Laboratory to conduct initial technical energy assessments for American Samoa, the CNMI, and Guam. With the technical assessments and a Territory energy summit as a springboard, the Pacific Island Territories each established through executive orders nonregulatory advisory groups: the American Samoa Renewable Energy Committee, the CNMI Energy Task Force, and the Guam Energy Task Force.

In 2010, the CNMI Energy Task Force developed the *Commonwealth of the Northern Mariana Islands Strategic Energy Plan* with a focus on energy efficiency and renewable energy. In partnership with the US DOI OIA and the US Department of Energy's National Renewable Energy Laboratory, in 2013 the CNMI Energy Task Force created an Energy Action Plan that outlines near-term strategies for increasing energy efficiency and renewable energy technologies, and decreasing reliance on electricity generation from fossil fuels (NREL 2015).

With the potential for growth in energy demand due to the anticipated military build-up and the need for increased economic self-reliance, Guam has invested in energy conservation and efficiency, renewable energy, efficient transportation, green building design, and smart grid technologies. The *Guam Energy Action Plan* created by the Guam Energy Task Force identified strategies achievable in a short timeframe.

Guam and the CNMI have sufficient wind and solar resources to make a significant shift toward renewable energy. However, potential impacts on threatened bird species and typhoon-level winds may complicate the siting of wind turbines.

The American Samoa Renewable Energy Committee's activities have included expanding solar energy installation, exploring the option of geothermal energy, and developing a waste to energy plant. In 2017, the island of Ta'u converted their energy production from 100% diesel to an entirely solar-powered microgrid. With a population ranging from 200-600 people, the \$8 million project was funded by the DOI and the American Samoa Power Authority and installed by Tesla, demonstrating that energy sustainability is possible on small Pacific Islands.



Updates are now needed to the Energy Action Plans to account for more recent technological advances, the landscape of private- and public-sector partners, and new understanding of best practices. All of the Energy Action Plans call for pursuing finance mechanisms, such as grants and public-private partnerships, for renewable power generation, energy efficiency, and energy conservation projects. The new programs detailed in the Insular Area Climate Change Act, Titles IV and V, would make great progress toward providing the US Territories and Freely Associated States reliable sources of renewable energy while increasing resilience to extreme weather and global energy price shocks.

***Additional specific considerations for the Insular Area Climate Change Act***

- The Insular Area Climate Change Act establishes the Insular Area Climate Change Interagency Task Force (section 101) to evaluate and identify ways to provide greater access to the Territories and Freely Associated States to climate change-related Federal programs. Including the heads of state of the Territories and Freely Associated States (the Governors and Presidents) as members or advisors to this Task Force would ensure that the leaders responsible for the management of critical infrastructure and natural resources are at the table and can help to ensure success of Federal programs. Pacific RISA has demonstrated that working directly with governments fosters ownership of assessments, and results in lasting relationships and two-way communication that ensures use of Federal science products and resources in climate adaptation. The inclusion of heads of state would follow on a successful Federal model of the US Coral Reef Task Force, which includes freely elected leaders from the US Insular Areas. In Guam, the US Coral Reef Task Force has worked effectively across levels of government to coordinate and support coral reef management.
- The programs and funding for US Insular Areas within the Office of Insular Affairs and NOAA's Office for Coastal Management would provide technical assistance for climate change planning, mitigation, and adaptation. Some flexibility in the language of the bill to support the implementation of the projects that include nature-based solutions, would increase the Act's effectiveness. I also suggest that involvement of the NOAA Climate Program Office, including the NOAA RISA teams, could be valuable, as they have existing programs providing information and assistance to support climate risk management and adaptation in the USAPI.
- Pacific Island economies are struggling to recover from the collapse of tourism, an economic mainstay, due to COVID-19. The waivers of Non-Federal matching requirements for the grants listed in this legislation will remove a barrier to resourcing projects that directly address climate change and improve economic resilience.
- Pacific RISA stands ready to support new programs for the US Insular Areas in the Pacific with actionable research that brings together natural resource managers, decision-makers, and scientists to better evaluate climate risks and prioritize needed adaptations with the most up-to-date science.

**Thank you.**

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