

2018 U.S. PACIFIC ISLANDS COMPREHENSIVE  
ECONOMIC DEVELOPMENT STRATEGY  
(Guam, American Samoa, the Commonwealth of the  
Northern Mariana Islands, and State of Hawaii)

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## Executive Summary

The U.S. Pacific Islands Region comprises the territories of Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI), as well as the State of Hawaii—the westernmost, and remotest, members of the U.S. political family. The region has a population of just over 1.7 million, with the majority (1.43 million) concentrated in Hawaii<sup>1</sup>. According to the latest available figures<sup>2</sup>, Guam has a population of 165,178; American Samoa, 60,200; and the CNMI, 53,890.

The most distinguishing feature of the region is its isolation from the continental United States. Hawaii is about 2,500 miles southwest of Los Angeles, California; Guam and the CNMI, about 6,000 miles west; American Samoa about 4,700 miles south. Dispersed as it is across the Pacific Ocean, the region faces unique challenges, particularly related to transportation and infrastructure.

On the other hand, location has fueled economic growth. Proximity to major Asian markets, such as Japan, Korea, and China, contributed in large measure to the thriving tourism industries of Guam, the CNMI, and Hawaii. American Samoa has a much smaller potential for tourism, but possesses something unique: one of the deepest natural harbors in the South Pacific, which hosts two industrial canneries. Commercial fishing fleets from Asia and the United States offload their catch at Pago Pago, the territory's capital, in the process creating jobs and driving economic growth.

Location has also made the U.S. Pacific Islands Region a strategic component of U.S. national security in the Asia-Pacific Region. Positioned halfway between the continental United States and Asia, three of the four jurisdictions are important to current U.S. military strategy. U.S. Department of Defense dollars have driven economic growth throughout the region. This is expected to continue, as Guam prepares to absorb the relocation of 5,000 Marines and approximately 1,300 dependents from Okinawa by 2024, or as soon as the construction of facilities and training centers is complete.

Other features that distinguish the U.S. Pacific Islands Region are smaller population sizes and the political status of its territories. This last point is noteworthy; while affiliation with the United States carries some benefits, the application of federal laws and regulations also impact air and maritime travel. The lack of available labor has adversely impacted workforce development needs and economies in Guam and the CNMI, for example.

Tourism, the presence of the U.S. military, and construction will continue to be mainstays of development throughout the region, and new opportunities are emerging in the aquaculture, renewable energy, and broadband industries. This report outlines the ways in which the region

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<sup>1</sup> The population estimate for Hawaii was published by the U.S. Census Bureau on July 1, 2017.

<sup>2</sup> The 2018 population for Guam was projected by the Guam Economic Development Authority in 2015. In July 2016, the American Samoa Department of Commerce Statistics Division estimated the population figure for American Samoa. The population figure for the CNMI comes from the Household, Income, and Expenditures Survey conducted by the CNMI Department of Commerce in 2016.

can leverage its strengths and competitive advantages to seize opportunities, weather challenges, and achieve sustained economic growth.

Separated by ocean from the rest of the world, the U.S. Pacific Islands Region is extremely vulnerable to external disturbances both economic and environmental. Because its jurisdictions rely heavily on imports and tourism, they are greatly affected by fluctuations in national and foreign markets. Woven through this report are goals, strategies, and actions that can mitigate the effects of a natural disaster and support long-term recovery efforts should one occur. The document lays out a plan for increasing the resiliency of the region by improving infrastructure maintenance, disaster preparedness, renewable energy production, invasive species management, and climate change adaptation efforts.

Resilience is rooted in community and collaboration. Among the region's many strengths is the strong sense of community that has long existed in the Pacific Islands. This core value shapes other values, among them an emphasis on economic opportunity for all, an abiding respect for relationships, and a belief in shared environmental responsibility.

### **What is the CEDS?**

The Pacific Basin Development Council, established in 1980 by the governors of Guam, American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), and the State of Hawaii, is a regional non-profit organization that focuses on economic and social development issues in the Pacific Islands. Among the Council's responsibilities is the preparation of an annual regional Comprehensive Economic Development Strategy (CEDS), or a strategy-driven plan for managed growth.

The following report draws from CEDS reports, past and present, produced in each of the regional jurisdictions. Every five years, each island jurisdiction is responsible for convening a committee that invites stakeholder feedback and uses it to inform its own CEDS. The process involves contributions from individuals, government, private industry, educational institutions, and non-profit organizations. For further information on the CEDS of Guam, American, Samoa, the CNMI, and Hawaii, visit <https://pacificbasindevelopment.org/comprehensive-economic-development-strategies/>.

At the time of writing, Hawaii completed an updated 2016-2020 CEDS, and the CNMI completed a 2016-2021 CEDS; Guam and American Samoa are updating their CEDS plans, a process expected to be complete by the end of 2018. We also relied on other data and statistics available from federal Bureau of Economic Analysis, recent laws and statutes, and reports produced by local governments.

The following document is a snapshot of current economic, demographic, and social trends currently impacting the U.S. Pacific Islands Region. It is also a blueprint for how the public sector, in coordination with the private sector, non-governmental organizations, academic institutions, and the general public can collaborate to drive sustained economic growth. This CEDS assumes that an area's economic strategy should be defined by its strengths and comparative advantages, while also adapting to or addressing its weaknesses and challenges.

In addition to providing a cooperative framework for economic development coordination and planning, this report provides:

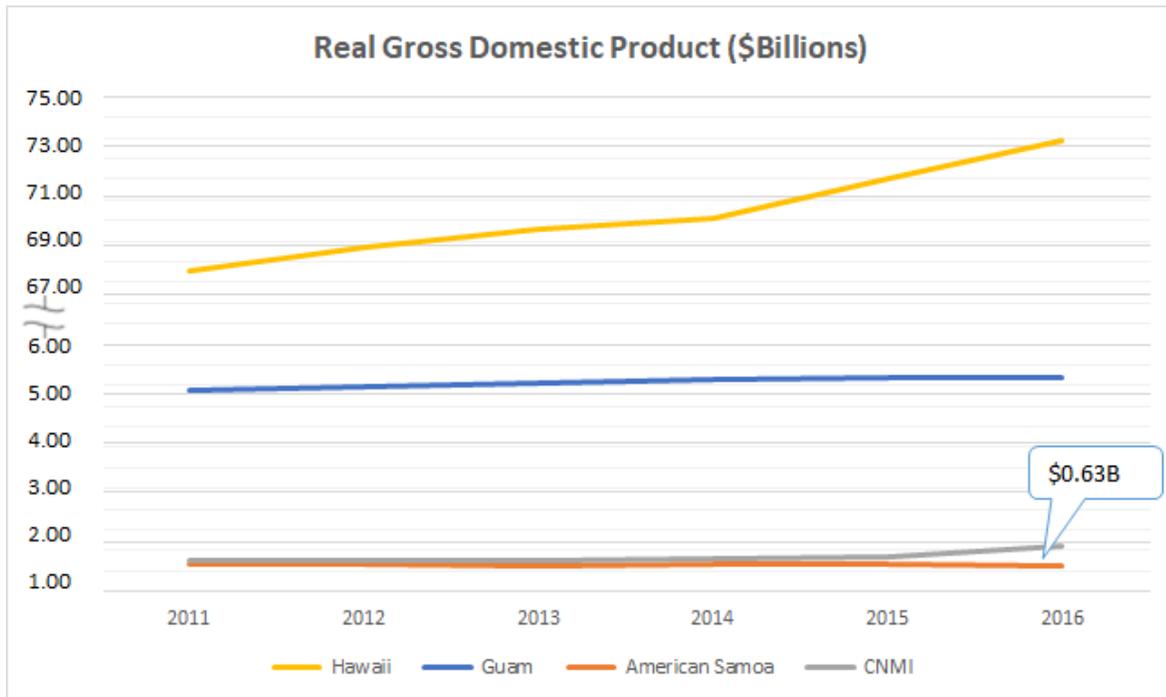
- Summary Background - A background and history of the economic circumstances in the region, as well as a discussion of its geography, population, labor force, and natural resources;
- Regional Trends - The identification of economic trends that impact the region;
- SWOT Analysis - An analysis of regional and internal strengths and weaknesses, as well as of the opportunities and threats arising from engagement with the rest of the world;
- Strategic Direction - A section setting forth specific goals and objectives aligned with promoting growth and a plan of action for implementing these goals;
- Evaluation Framework - A set of performance measures for evaluating whether, and to what extent, goals are met; and
- Economic Resilience - A discussion of the ways in which the region can avoid, withstand, and recover from externally imposed catastrophic events.

## Summary Background

This section offers a snapshot of the economic trends currently impacting the U.S. Pacific Islands Region. It begins with a profile of each island jurisdiction, which provides context for what then follows—a general overview of the strongest forces at work in the region, either driving or hindering economic development.

With the exception of American Samoa, GDP is growing in regional jurisdictions, as illustrated in the graph below. According to the latest figures published by the federal Bureau of Economic Analysis (BEA) at the U.S. Department of Commerce, Guam's total GDP, which depends largely on tourism and defense, increased by 0.4% in 2016. This followed an increase of 0.5% the previous year. In 2016, GDP for Guam measured \$5.2 billion. The CNMI's economy, which revolves around gaming and tourism, grew by more than 28% in 2016. GDP for the CNMI hit \$1.1 billion in 2016. The figures for Hawaii were updated more recently; in 2017, the state's current-dollar GDP was \$88.1 billion, representing an increase of 1.7% from the previous year.

The following section explains how and why regional economies are growing. It also explains why American Samoa's GDP declined by 2.5% in 2016 on account of a drop in government spending and a slowing of activity at the tuna canneries. GDP for American Samoa fell from \$649 million in 2015 to \$632 million in 2016.



Source: U.S. Bureau of Economic Analysis. Figures in chained 2009 dollars.

### Guam

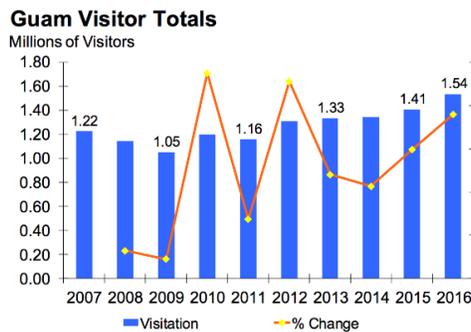
Guam, the largest and southernmost island of the Marianas archipelago, is the westernmost possession of the United States and has been since after the Spanish-American War in 1898. The

island, which measures 30 miles in length and between five and nine in width, has a total land area of 209 square miles. In 2015, Guam’s Economic Development Authority estimated that the territory’s population would be 165,178 in 2018, reflecting a slight increase over the five years prior.

Guam has a tropical climate and a mean annual temperature of 81 degrees. Drought-like conditions can occur during the dry season; however, the island’s subterranean water lens is capable of supplying more water than residents and tourists need. Guam’s environment boasts generally excellent air and water quality, except near sewage treatment plants. Still, the pressure of development weighs on its fragile environment. Erosion and solid waste management are among the territory’s foremost issues. While Guam does not possess substantial and exportable natural resources, the island has one of the largest protected harbors in the Pacific. It also has the most advanced telecommunications infrastructure in the Western Pacific region, and more terminating cable connections than anywhere else in the world. The island’s strategic positioning has made it a key military site; Guam’s CEDS for 2011 notes that Navy and Air Force bases cover 27% of the territory’s landmass.

Between 1940 and 1950, the island’s population doubled due to the construction of a naval base; the lifting of security clearance requirements in 1962 contributed further to population growth. Since becoming a territory, the island’s population has grown from 18,000 to more than 160,000 through a mixture of in-migration and one of the highest birth rates in the U.S. (20.6 births per 1,000 women in 2016). During World War II, Guam was extensively damaged; since then, it has registered cyclical growth, largely driven by tourism and military spending.

According to an annual report published by the Guam Visitor’s Bureau, approximately 1.56 million tourists visited Guam in FY 2017; this exceeded the previous year, which registered an 8.4% increase from FY 2015. However, North Korea missile threats in early 2018 had a detrimental impact on Guam in the Japan market, a major source of tourism. Given the improved relations between the United States and North Korea, which culminated in a June 12, 2018 summit between U.S. President Donald Trump and North Korea’s Leader Kim Jong-un, Japanese visitor arrivals are expected to measuredly rebound. Most recently, Japan Airlines announced it will extend the period for its second daily flight from Narita to Guam through March 30, 2019. United Airlines also announced it will be restoring four weekly flights between Nagoya and Guam from December 2, 2018 to the end of March 2019.



Source: Guam Visitors Bureau

The latest figures from the federal Bureau of Economic Analysis show that the largest contributor to a gradual increase in GDP is the accommodation and amusement sector, reflecting growth in spending by tourists, particularly from Korea. The growth was tempered by a decline in government spending, indicating the completion of some major construction projects.

In December 2017, President Trump signed into law the National Defense Authorization Act for FY 2018, which authorized \$354.6 million for military construction projects on Guam. This preempts a major shift in the island's economic profile and the level of pressure on its infrastructure. In 2001, government and civic leaders jointly submitted a white paper calling for a greater military presence on Guam; in 2013, the governments of Japan and the U.S. agreed to begin relocating Marines and their dependents from Okinawa to Guam in 2024. As of 2016, there were 12,807 military personnel and dependents living on Guam, comprising 7.9% of the population. The island is now preparing for the impending shift of 5,000 Marines and 1,300 family members; between 2016 and 2017, Department of Defense construction contracts increased by 310%, according to the Guam Economic Development Authority.

Just as the Guam economy grows, a strict federal immigration policy is leaving a gap in the territory's local labor force. Some residents, who are U.S. citizens, seek better pay and the perks of being unionized in the continental United States. For 30 years, foreign workers have been filling the jobs they leave behind, particularly highly skilled workers and construction workers. Since December 2015, the United States Citizenship and Immigration Service (USCIS) has been denying H-2B visa applications, according to an August 2017 report published by the H-2B Task Force at the Office of the Governor of Guam. For 30 years prior to 2015, these petitions were approved at a rate of about 95%. This is having a detrimental impact despite the ongoing efforts Guam has made in workforce development, most notably through its Center for Micronesian Empowerment.

With Guam's political and business leaders continuing to call for federal relief on this issue, in June 2018, the first arrivals of H2-B workers arrived on Guam since 2015. Other relief for H2-B worker for military projects is imminent from the U.S. Congress. A provision in the House version of the FY 2019 National Defense Authorization Act (NDAA) extends Guam's exemption from the H2-B visa caps for up to 4,000 workers annually until 2029. On June 28, 2018, Congresswoman Madeleine Bordallo of Guam was appointed to the NDAA conference committee on the NDAA. Guam Governor Eddie Calvo would like such H2-B visa relief to be extended to the civilian or non-DOD sector on Guam as well.

### American Samoa

American Samoa is an unincorporated territory of the United States and the only U.S. possession in the southern hemisphere. Located in Polynesia, the territory is made up of five islands and two atolls with a total area of approximately 76 square miles. Tutuila, the territory's largest island, is the center of government and business and home to 90% of the total population, which was estimated to be 60,200 in 2016. The territory has a tropical marine climate, moderated by southeast trade winds. While there is little seasonal variation in temperature, tropical cyclones are common from December through March.

During World War II, the U.S. government built roads, airstrips, docks, and medical facilities to accommodate troops on American Samoa. Locals enlisted in large measure. When, in 1945, the military exited as suddenly as it had arrived, much of the territory's limited workforce left for Hawaii on Navy vessels.

To revive the post-war economy, the Rockefeller Foundation financed a cannery at Pago Pago, which is home to one of the best natural deepwater harbors in the South Pacific. Relying almost exclusively on the fish processing and packaging industry as well as federal financial aid, the territory economy expanded steadily. Perhaps because of the growth, there was never a serious effort to diversify its economic base.

A period of sustained development was tempered in 2007 by the imposition of the federal minimum wage, which would ultimately double the wages paid in an economy of mostly minimum wage earners. Economic growth slowed. People left. Then, in 2009, two significant events occurred: one of two major canneries closed and a major tsunami struck, prompting considerable federal expenditures and the creation of temporary jobs.

Work to improve broadband capacity and rebuild a power plant generated an uptick in government spending in 2015, but in 2016 these projects reached completion. A slowing of growth coincided with the shuttering of Samoa Tuna Processors, leading to declines in investment, tax revenues, and overall economic activity. According to a quarterly performance report for FY 2018, published by the American Samoa Department of Commerce, GDP decreased by an estimated 10.4% in 2017. Between 2017 and 2018, the government recorded a 15.7% decrease in applications for business licenses, a notably sharper decline than the five years prior. The federal Bureau of Economic Analysis published estimates in 2017 showing a 2.5% decrease in GDP in 2016.

Cyclone Gita struck in February 2018, causing more than \$7 million worth of damage to the infrastructure of American Samoa. Government spending increased in the storm's aftermath; an influx of aid workers from FEMA, the Red Cross, and other organizations purchased accommodation, food, and supplies.

There is large and untapped potential for the development of tourism in American Samoa. In the second quarter of FY 2018, according to the American Samoa Department of Commerce, 4,379 people visited American Samoa, and 2,087 of them were there to see relatives. Planners have suggested tourism, as well as agriculture, telecommunications, information technology, and light manufacturing as options for economic diversification.

### Commonwealth of the Northern Mariana Islands (CNMI)

The CNMI is the youngest member of the United States political family and has been part of the Commonwealth since 1978. Located just north of Guam, the territory is part of the Marianas archipelago consisting of 14 islands with a total land area of 183.5 square miles. The most populated are Saipan, Rota, and Tinian. The territory is at the border of the Mariana Trench, which is the deepest known place on earth. The CNMI has thick forest, a healthy source of groundwater, and two active volcanoes that lend it "significant geothermal energy potential,"

according to the U.S. Energy Information Administration. Its climate is tropical with little variation, though typhoons can occur in the rainy season from July to November.

In 2016, according to the CNMI Household Income and Expenditures Survey Report, the population was 53,890. The same year, the number of visitors was 530,670—more than 10 times the residential population.

The territory's economy has long been rooted in tourism, driven largely by Asian markets. Relatively short flights and reasonable airfares have attracted many travelers from Japan, Korea, and China to the CNMI. The U.S. Department of Homeland Security also allows Chinese nationals, on a case-by-case basis, to enter the territory without a visa. Over the last five years, the CNMI has experienced a 48% increase in arrivals; the number of visitors, primarily from Korea and China, grew by more than 10% in 2016, according to the federal Bureau of Economic Analysis. Proximity to Asian markets has offered advantages beyond tourism. In the 1980s, the CNMI developed a thriving textile manufacturing industry; at its height, the industry generated an annual \$2 billion. The population skyrocketed with the influx of foreign workers. When the World Trade Organization decided in 2005 to lift quotas on non-member nations, the CNMI lost the competitive advantage it had enjoyed as a provider of textiles to the U.S. market. Revenues dropped from a peak of \$80 million in direct revenues to \$13 million in 2008. The industry effectively collapsed in 2009. This led to a decline in business gross revenues of 32.3% from the previous year, according to the CNMI Department of Commerce, and ultimately to outmigration and economic decline.

The government began searching for other sources of revenue, eventually passing legislation to make Saipan, the CNMI's capital, a hub for gambling casinos. The emergence of the gaming industry has created jobs and other spin-off effects, including the construction of hotels and proliferation of retail outlets. The CNMI economy experienced explosive growth in 2016, driven by tourism and gambling, according to a report by the federal Bureau of Economic Analysis. That year, the territory's gross domestic product increased by 28.6% to \$1.24 billion—a marked improvement over 2015, which recorded an increase of 3.8%. Projections into the future are rosy, though the growth has not lifted everyone.

Economic growth also coincides with a labor shortage that is not forecasted to ease within the next five years. U.S. Public Law 110-229, a mandate intended to phase out foreign workers by 2019, was significant given that at the time of the 2010 Census, foreign workers comprised 43% of the CNMI population. Many skilled, educated workers leave the CNMI, where 55.7% of people live in poverty, according to the CNMI Household Income and Expenditures Survey published in 2016. H.R. 5956, the Northern Mariana Islands U.S. Workforce Act of 2018, which passed the U.S. House of Representatives and U.S. Senate by June 28, 2018, is expected to be signed into law by President Donald Trump in July. The bill extends the CNMI CW-1 transition worker program to December 31, 2029. The new law seeks to increase the percentage of U.S. workers in the CNMI, while continuing to provide a seamless transition from its current need for foreign workers under its CW-1 program.

## Hawaii

The State of Hawaii is the world's most isolated population center, located at the northernmost point of Polynesia. According to the U.S. Census Bureau, as of July 2017 the population was 1.43 million. Hawaii's CEDS report reflects the economic situations of its four counties: Kauai, Maui, Hawaii, and Oahu. In 2017, the state's current-dollar GDP was \$88.1 billion. Hawaii's climate is tropical and humid, cooled by trade winds. Since much of its natural area has been filled in for agriculture or urban development, wetlands now make up less than 3% of the landmass. Development has put pressure on Hawaii's environment and infrastructure, though innovation is ripe: the state government is on track to meeting its goal of 100% clean energy by 2045.

Tourism generates much of the state's economic activity. As compared to Guam and the CNMI, where the majority of visitors are from Asian markets, about two-thirds of the travelers who visit Hawaii come from the continental United States. In 2017, 63% of total visitors by air were from the U.S. mainland. Tourism does not appear to be tapering. According to the Hawaii Tourism Authority's annual visitor research report for 2016, the industry achieved new records in arrivals that year, marking the fifth consecutive year of record growth in both categories. A total of 8,934,277 visitors came by air or by cruise ships, up 2.9% from the previous record of 8,679,564 visitors in 2015. Spending by visitors increased 5.3%, reaching a new high of \$15.91 billion. Despite destructive volcanic activity on the island of Hawaii in May 2018, the number of visitors increased by 8% compared to the same month in 2017. According to state figures, total tourism expenditures across the state increased to \$1.4 billion from \$1.3 billion the previous year, representing an increase of 11%. State planners anticipate continued high levels of tourism, albeit with marginal gains. Construction tied to the tourism industry is also expected to remain a strong contributor to the local economy.

The state's strategic location in the Asia-Pacific region has made it an ideal base for the U.S. military, which remains a significant economic driver. More than 146,000 military members and their dependents across the state represent the Army, Navy, Air Force, Marines, Coast Guard, and National Guard, according to the Hawaii Defense Economy project developed through the Hawaii Department of Labor and Industrial Relations with support from the U.S. Department of Defense. A DOD Office of Economic Adjustment Study showed that for FY 2015, defense spending in Hawaii reached \$7.8 billion and the economic impact of national security exceeded \$14.7 billion. Beyond tourism and military, the following are key industries, according to the state's CEDS: healthcare, research and technology, agriculture and food production, energy, manufacturing, and the creative arts.

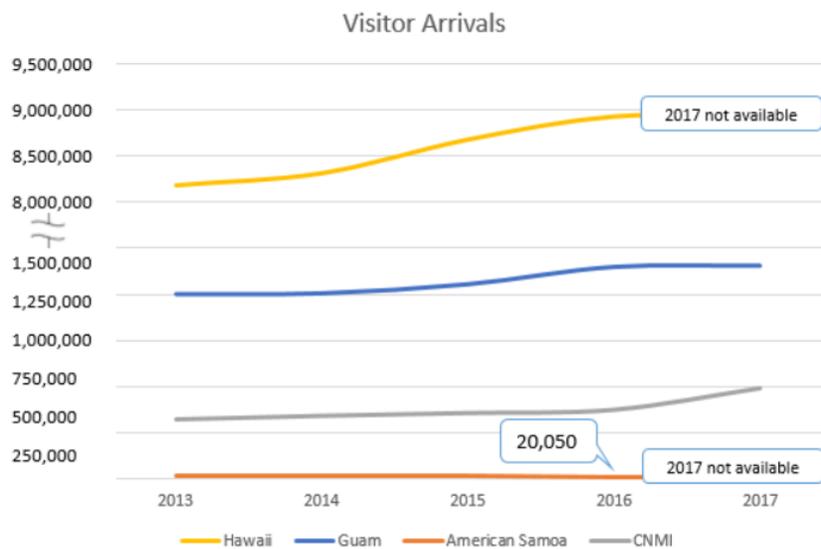
## **Regional Trends**

### **Sustainable Tourism**

Today more tourists are seeking environmentally responsible travel experiences; the region's natural beauty and traditional focus on conservation prepare it to grow a thriving ecotourism industry. Surveys also show that today's tourists are seeking more authentic experiences, searching to understand how people in other parts of the world live. With thriving indigenous

cultures of Chamorros, Samoans, Carolinians, and Native Hawaiians in the U.S. Pacific Islands Region, cultural tourism is an industry that can also be embraced and enhanced moving into the future.

The region can expect an increase in both eco- and cultural tourism to meet the demands of a changing tourism clientele and to respond to the call for communities in the region to address environmental impacts related to tourism and have greater respect for indigenous cultures. However, due to their limited landmasses, island environments are disproportionately vulnerable to the degradation of land and natural resources. It is important that tourism, which is a major driving force for the regional economy, is promoted and developed in a sustainable fashion. This will require sound planning by tourism and state officials to ensure that island infrastructure and land and natural resources are taken into account while determining the maximum number of tourists as measurable objectives. As per the below graph, visitor arrivals have increased since 2013 in every jurisdiction except American Samoa. Arrivals for Guam increased during that period from 1.3 million to more than 1.5 million. The number of arrivals to the CNMI increased from about 433,900 to more than 653,000. In 2013, 8.2 million people visited Hawaii; in 2016, the number increased to 8.9 million, and in 2017, the number broke nine million. The American Samoa Department of Commerce reports that tourism numbers have decreased from about 26,000 to about 20,000.



Sources: Guam Visitors Bureau, American Samoa Department of Commerce, Marianas Visitors Authority, and Hawaii Tourism Authority

## National Security

Because of their U.S. affiliation and strategic locations, both Guam and Hawaii will continue to be important to U.S. national security interests in the Asia-Pacific Region. According to the federal Bureau of Economic Analysis, defense spending exceeded \$2 billion for Guam in 2015; a

report produced for FY 2015 by the Office of Economic Adjustment with the U.S. Department of Defense pegs defense spending in Hawaii at \$7.8 billion.

The upcoming relocation of 5,000 Marines from Okinawa to Guam heralds a spike in construction contracts and economic activity for Guam and the region, including the contributions to small businesses. The spinoff effects will stretch across jurisdictions. In the CNMI, however, due to the adamant opposition by political and business leaders, and the community, it remains to be seen whether the Department of Defense will be successful in its proposed military initiatives for the Commonwealth. The U.S. Navy seeks to conduct live-fire training on Tinian, and bombing exercises on the remote northern island of Pagan. While the U.S. Navy expects to release its Revised Environmental Impact Statement on the CNMI Joint Military Training (CJMT) later in 2018, the federal district court in the CNMI will consider oral arguments on August 9, 2018, regarding the DOD's June 1, 2018, motion for a summary judgment on a lawsuit filed by Earthjustice on behalf of groups opposed to military training in July 2016. The lawsuit asks the federal court to throw out the 2010 and 2015 records of decision for the Guam military buildup. In October 2017, CNMI District Court Chief Judge Ramona Manglona dismissed most of the arguments by the plaintiffs. The case will now focus on the single issue of whether or not the Navy failed to evaluate, in a single Environmental Impact Statement, the impacts of stationing U.S. Marines on Guam and the full range of training in the CNMI required by those Marines.

### **Labor and Workforce Development**

Labor and workforce development issues will continue to be priorities for the economies of Guam and the CNMI, which are reliant on foreign workers as part of their H2-B and CW-1 visa programs, respectively, established by the U.S. Congress. Currently, pending legislation in the U.S. Congress provides relief to Guam on the H2-B visa program for DOD-related jobs and relief to the CNMI for the CW-1 program through December 31, 2019. However, while progress has been made in this area, there are other labor and workforce issues to consider which necessitate more permanent, sustainable solutions. These are referenced in the 902 Consultations Report presented to Congress in 2017. The report, developed after extensive site visits and consultations authorized by Section 902 of the Covenant to Establish the CNMI in Political Union with the United States of America, provides recommendations that representatives from both the U.S. and the CNMI agree could help the CNMI transition to a U.S. workforce. Among them are the need for a permanent immigration status for long-term guest workers; consideration of immigration policies that address regional labor shortages in the CNMI and Guam; and the extension of eligibility to the CNMI for federal workforce development programs.

Hawaii's high cost of living is one of the main reasons that people are deciding to move to the U.S. mainland to live. In June 2018, the median sale price for single-family homes is \$782,388 and for condominiums, \$420,000. Hawaii is not as far away from the continental United States as Guam and the CNMI, and there is an ample supply of workers for its main industries of tourism and defense. The sectors that are adversely being impacted include nurses and doctors in the health sector and teachers in the public schools system.

Hawaii's teacher shortage crisis is spurring action by education and political leaders. In addition to absorbing the cost of living, teachers have one of the lowest salaries in the nation (\$46,790 income for a licensed teacher). The state's 3.5% teacher vacancy rate at the start of the 2017-18 school year was among the highest of the 15 largest school districts in the U.S., according to Chalkbeat, an education-focused news site. According to the Hawaii State Teacher's Association (HSTA), the number of teacher resignations jumped 61% between the 2010-11 and 2017-18 school years, from 529 to 852. Teacher vacancies also rose 51% from 2011-12 to 2017-18 from 377 to 571, according to HSTA.

One way that Hawaii is attempting to address the teacher shortage is through increased collaboration between the Hawaii Department of Education at the University of Hawaii at Manoa College of Education. They have partnered to establish the "Grow our Own" initiative in an attempt to help substitute teachers in the school system get the necessary educational and certification training needed to become full-time teachers. After completion of the program, participants must commit to three years of teaching in Hawaii's public middle and high schools in high-need subject areas like math, science, English, Hawaiian language, or world languages. The program, championed by State Senator Michelle Kidani, Chair of the Education Committee, started with an initial \$600,000 in state appropriations in 2017, and received \$400,000 in 2018.

### **Broadband**

Broadband capacity is increasing within the region, though the cost of connectivity in the territories remains among the highest in the nation. In 2011, global nonprofit One Economy and think-tank New America Foundation conducted a survey of the Pacific territories, adding their findings to a National Broadband Map and confirming the region had the most expensive internet access in the United States.

Since then, improvements have been made, though slow, expensive internet continues to prevent residents of remote islands in the region from fully utilizing tools such as e-commerce, e-learning, telemedicine, and from communicating with the rest of the world. Guam is unique because in addition to satellite connectivity, it sits on cables that connect the United States and Asia, running to places like Hawaii, California, Japan, China, and Southeast Asia. Unlike in the other Pacific territories, the price of broadband in Guam is competitive.

In 2015, a storm-related break in an undersea cable crippled communication within and outside of the CNMI, impacting emergency response, financial systems, and travel. Although the event was resolved in a matter of days, the impact on the community prompted private sector investments to begin the installation of a second fiber optic cable to service the CNMI. In 2017, a \$25 million Atisa cable was laid from Guam to the CNMI, which in 2012 had a broadband cost five times higher than Guam's.

In American Samoa, the cost of internet has stalled attempts to establish a call center, a potentially productive enterprise given the population is literate and English speaking (like other jurisdictions in the U.S. Pacific Islands) and the territory is seven time zones away from the East Coast of the United States. An undersea cable was laid in 2009, linking American Samoa to Hawaii and increasing bandwidth in the territory from 20 megabits per second to 1 gigabit per second. The cost, borne by Bluesky and the government of American Samoa, was passed on to a

small number of consumers. As of 2017, the territory still had the nation's most expensive broadband.

In June 2018, private companies from New Zealand and the United States laid a \$500 million, 9,320-mile cable connecting Australia, New Zealand, American Samoa, Hawaii, and Oregon, with branches to facilitate future connections to New Caledonia, Fiji, and Tonga. At the time of this writing, analysts envision the cable, called Hawaiki, will reduce the cost of broadband in the region and boost economic development. The official launch date is July 19, 2018.



Source: [Hawaikicable.co.nz](http://Hawaikicable.co.nz)

Hawaii ranks high for both connectivity and speed. A Broadband Deployment Report released in 2018 by the Hawaii Department of Commerce and Consumer Affairs notes 95.3% of the state's population, in both urban and rural areas, had access to fixed broadband at the end of 2016, and 99.8% had access to Mobile LTE. Between December 2016 and December 2017, the state's mean download speed increased from 81 to 102 Megabits per second (Mbps) and its median from 53 to 65 Mbps.

In 2017, the 9,000-mile SEA-US fiber cable was laid in response to exponential growth in demand for broadband, connecting Indonesia, the Philippines, Guam, Hawaii, and California. As well as boosting growth, increasing the region's broadband capacity will also enhance its resilience. All jurisdictions in the U.S. Pacific Islands Region have Statewide Interoperability Coordinators—people who work with emergency response teams across all levels of government to implement a strategy for interoperability, or for increasing the capacity of hardware and software from multiple manufacturers to seamlessly communicate.

Because improved technology allows long-haul submarine consortium cables to forego any landing and bypass Hawaii, the state's government created the Hawaii Broadband Initiative to reposition Hawaii as a welcoming home for all new trans-Pacific submarine fiber optic cable projects. To achieve this, Hawaii plans to build a secure, open access, carrier neutral, multi-tenant cable landing station and provide terrestrial backhaul connectivity options to connect data centers and major content repositories to the trans-Pacific cables. This broadband infrastructure will serve as a regional and international interexchange and cross-connect platform for broadband communications in the Pacific Basin. With an open access, carrier neutral, multi-

tenant cable landing station in Hawaii, the state intends to make submarine cable landings quicker and less costly than the current option of building private cable landing stations.

In addition, with a robust, resilient broadband network, major economic drivers including the Department of Defense, tourism sector, and the application of the future—machine learning, augmented intelligence, smart energy grid, autonomous vehicles, virtual and augmented reality, big data, cloud computing, etc.—will usher in new industries in Hawaii.

### **Aquaculture**

Due to pressure from commercial fleets, nearly all of the world's fish stocks are fully fished or overfished. The U.S. National Oceanic and Atmospheric Administration (NOAA) has identified aquaculture as an important solution to the problem. There are efforts underway in the region to develop aquaculture, both in marine and freshwater ecosystems, as a means of achieving economic growth while practicing responsible environmental management.

The State of Hawaii has made aquaculture a funding priority. In 2014, Hawaii's aquaculture industry experienced record high sales, generating \$78.2 million and marking a 40% increase from sales for 2012. Products produced at NELHA (The Natural Energy Laboratory of Hawaii Authority), which brings ashore high-quality supplies of warm surface and cold deep seawater 24 hours a day, ranked first. NELHA has supported businesses like Big Island Abalone Corporation, which won exporter of the year in 2003 and grew into one of the world's largest abalone aquafarms.

Traditionally, indigenous people in the Pacific Islands prioritized conservation and sustainability. Today, community-based organizations are making efforts to reclaim this heritage by developing aquaculture projects that advance both sustainability and economic growth. In Hawaii, supporters and practitioners of *loko i'a*—traditional Hawaiian fishponds—formed Hui Malama Loko I'a to empower each other and advocate for the restoration of fishponds throughout the state. In 1990, a statewide assessment found 488 *loko i'a* sites although many were either beyond repair, unrecognizable, or in degraded condition.

One example of restoration success is Paepae O He'eia, a nonprofit organization on the island of O'ahu dedicated to restoring an ancient Hawaiian fishpond and educating people about the process. Developing this method of fish cultivation expands the potential of aquaculture to include saltwater farming; recognizing this, in 2015 Governor David Ige signed into law Act 230, which waives certain requirements for and advances fishpond restoration projects. Kohala Institute on the island of Hawaii is another example of a nonprofit that educates people about sustainable agriculture and clean energy, as well as owning a hatchery, grow operation, and processing facility. Through Kohala Mountain Fish Company, the farm creates jobs and a positive economic impact.

Indigenous and community groups in Guam, American Samoa, and the CNMI have similar values, and there is potential to leverage these into growth in industries such as eco- and cultural tourism and aquaculture. The Guam Aquaculture Development and Training Center at the University of Guam is in the process of renovating its hatchery through a public-private partnership estimated to cost \$2 million. With support from the Secretariat of the Pacific

Community, the CNMI government drafted an Aquaculture Development Plan for 2011-2015 to nurture the growth of its industry. In February 2017, the Northern Marianas College opened an aquaculture development center to teach fish cultivation.

There is potential to grow offshore aquaculture using submersible cages and giant clam and pearl farming in all of the region's jurisdictions. Together with the Western Pacific Fisheries Management Council, NOAA Fisheries designed a plan for permitting offshore aquaculture in the waters of the U.S. Pacific Islands Region; in 2017, the formal process of assessing the environmental impacts began.

## **SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis**

This section considers the U.S. Pacific Islands Region in relation to the rest of the world. The region possesses natural strengths that enhance its likelihood to thrive economically but, like any other region, it also has weaknesses that require attention and management. As is the case anywhere, engagement with a global economy carries both risk and reward.

Following is an analysis of the region's SWOT—strengths, weaknesses, opportunities, and threats. This section addresses how the region and each of its jurisdictions can leverage strengths, transform weaknesses, use opportunities, and mitigate threats to achieve sustained and sustainable economic development.

### **Regional Strengths**

**People.** For reasons both geographic and cultural, island communities are tightly knit. Though the tide of global markets has eroded tradition to a large degree, there remains in the region a deeply rooted respect for family and neighbor among indigenous communities, as well as among diverse immigrant populations. Island people have always observed the law of reciprocity, understanding that mutual sharing creates mutual benefit. On some islands within the region, people still live subsistence lifestyles and barter resources. In these economies, social capital is critical. In other, more developed places, the sense of mutuality still persists in some places. People activate, whether to host functions or support social initiatives. This spirit of collaboration is an important tool in the process of building economic and environmental resilience.

**Location.** Global positioning is a key strength for the jurisdictions of the U.S. Pacific Islands Region. In most of them, U.S. Department of Defense dollars have energized spending. Except for American Samoa, which relies more heavily on tuna canneries than on tourism, proximity to major Asian markets also drives economic activity. The region's marketability continues to bear fruit. In Guam, the CNMI, and Hawaii, the number of visitors is expected to keep rising. American Samoa's industry, though small, has potential for development.

**U.S. Affiliation.** Affiliation with the United States brings political and economic stability, not only through federal assistance and funding but also through the protection of the U.S. military. It also guarantees U.S. and foreign investors a certain level of legal protection over business dealings—an advantage given the instability of some countries in the region, including other independent Pacific Island nations.

**National Security.** As previously stated, both Guam and Hawaii will continue to be important to U.S. national security interests in the Asia-Pacific Region because of their U.S. affiliation and strategic locations.

**Traditional Knowledge/Conservation.** Prudent resource management has been a mainstay of indigenous island cultures. In the U.S. Pacific Islands Region, these include Chamorros, Samoans, Carolinians, and Native Hawaiians. For thousands of years, these peoples lived in harmony with their environments; they observed seasonal harvests and periodic bans on fishing, collecting seafood, and planting in certain areas to maintain the health of the ecosystems that fed

them. They were intentional and conscious about their resource use. Coupled with a deeply rooted respect for family, this heritage lends itself to widespread support of environmentally sustainable initiatives. Traditional knowledge can be a useful tool for both natural resource management issues and strategies for sustainable tourism.

### **Regional Weaknesses**

***Island Economies.*** Smaller jurisdictions have smaller labor pools and lesser potential for economies of scale. They also have smaller budgets. Regional economies are largely dependent on tourism and national security; growth in these two unpredictable areas has tempered, among planners, the drive to diversify. Further, reliance on imports results in higher prices on commodities and materials.

***Transportation.*** One of the region’s strengths—its location—can also be a weakness. Distance from the continental United States means better access to Asian markets, but it also makes domestic transportation a challenge due to air cabotage laws, which require travel between two U.S. destinations to be on U.S. carriers, and the Jones Act, which is a federal maritime law requiring ships that conduct commerce between two U.S. ports to be U.S. flagged, U.S. manned, and U.S. made. The high cost of importing materials hampers business and timely infrastructure maintenance.

***Labor and Workforce Development.*** Many islands lack available workers and also experience “brain drain,” or the outmigration of educated labor. Residents from the U.S. Pacific Islands Region are able to seek better pay and the benefits of unionization on the continental United States; the resulting loss of local labor affects all industries, most notably in the construction and health sectors. In response, businesses tend to recruit employees from Asia; federal immigration policy can have considerable impact on workforce supply in the region, particularly for Guam and the CNMI.

***Natural Disasters.*** One of the most significant implications of the region’s location, isolation, and remoteness is extreme vulnerability to disastrous weather events such as typhoons and hurricanes. This is exacerbated by climate change. As sea levels rise and oceans acidify and king tides become more frequent, it is critical for the region to focus on improving infrastructure, information networks, emergency preparedness, and local production of food and energy. Presently, jurisdictions in the region import up to seven times more than they export. In growing local production sources there is opportunity.

***Climate Change.*** The impacts of rising temperatures and sea levels will be disproportionately strong in the U.S. Pacific Islands Region. Coastal flooding, king tides, saltwater intrusion into freshwater tables, and erosion are likelier to affect development and food security in the Pacific Islands, including on atolls and low-lying islands, than anywhere else in the world. It is important that the region develops and implements multi-sector climate change adaptation strategies, given what is at stake for residents’ overall quality of life, economies, and environments.

## **Regional Opportunities**

***Sustainable Tourism.*** Concern about the impact of tourism on the environment and infrastructure, the embrace of indigenous cultures, and the influence of traditional knowledge on conservation make the region a fertile place for new sustainable tourism strategies.

***Renewable Energy.*** As the world becomes more aware of the relationship between fossil fuels and climate change, demand for renewable energy continues to grow. The region, with its tropical climates, possesses ample solar, wind, and geothermal resources. All jurisdictions in the region have strategic plans for energy and are committed to reducing reliance on fossil fuels.

***Aquaculture.*** Demand for aquaculture grows as fish stocks diminish under pressure from commercial fleets and recreational overfishing of nearshore waters. There are commercial efforts underway in the region to develop aquaculture, both in marine and freshwater ecosystems, as a means of achieving economic growth and in the process practicing responsible environmental management. Traditionally, indigenous people in the Pacific Islands prioritized conservation and sustainability. Today, community-based organizations are making efforts to reclaim this heritage by doing aquaculture projects that advance both sustainability and measured economic development.

***National Security.*** As previously stated, both Guam and Hawaii will continue to be important to U.S. national security interests in the Asia-Pacific Region because of their U.S. affiliation and strategic locations. In the long term, however, it would behoove DOD to address local communities' socioeconomic issues in order to understand their concerns about the impact on the environment, housing, and indigenous communities.

***Conservation Research.*** Given the willingness of the U.S. Pacific Islands Region to support ambitious conservation outcomes, the region can be a model for conservation research for the world. Federal, state, territorial, and non-profit based organizations' initiatives and research should continue to help the region protect lands and natural resources, while also drawing conservation researchers to the region to learn about coral reef protection, climate change adaptation, invasive species management, and watershed protection efforts.

## **Regional Threats**

***Labor and Workforce Development.*** As stated before, failure to address federal immigration restrictions on the H2-B and CW-1 visa issues in Guam and the CNMI, respectively, would have detrimental impacts on their overall economies. While current federal legislation seeks to address the issues through 2029, there needs to be a more coordinated and permanent federal approach.

***Unsustainable Tourism.*** Unsustainable tourism can have a negative impact on the environment and infrastructure of the U.S. Pacific Islands Region. This is why it is important that economic development planning prioritizes sustainability and managed growth.

**National Security.** As previously stated, both Guam and Hawaii will continue to be important to U.S. national security interests in the Asia-Pacific Region. In the long term, however, it would behoove DOD to address local communities' socioeconomic issues to understand their concerns about impacts on the environment, housing, and indigenous communities.

**Federal Laws and Regulations.** Federal transportation laws on air cabotage and maritime transportation will continue to be one of the greatest challenges to the economic development of Guam, the CNMI, and American Samoa, given their remoteness and distance from the continental United States. Moreover, federal immigration laws regarding H2-B and CW-1 visas for Guam and the CNMI, respectively, will continue to be challenges. The federal government will need to evaluate long-term solutions for these jurisdictions to ensure the availability of workers. Territorial leaders need to also increase capacity within their own local workforce through educational and training opportunities.

### **Guam SWOT Overview**

The 2011 CEDS for Guam illustrates the relationship between an economy's strengths and its weaknesses, portraying how distinguishing attributes carry both positive and negative implications.

The jurisdiction's smallness manifests as a lack of economies of scale, limited human and productive resources, and a lack of economic diversification. Guam's size, isolation, lack of labor union presence, and lack of unemployment benefits makes it a challenging place to find reliable and experienced labor. The upsides of smallness are opportunities for the development of niche markets and small businesses; more than 90% of Guam's business establishments are classified as "small businesses," according to the U.S. Small Business Administration's definition. Smallness also implies a more tightly knit community, which encourages innovation, collaboration, and the emergence of new industries.

The island's political status lends it advantages and disadvantages also. As a territory of the United States, its local leaders have limited policy tools; bound by U.S. law, they are unable to directly compete with low-wage Asian countries and ineligible for development assistance from international entities. They are also at the whim of immigration policy decisions made in Washington, D.C. At the same time, this affiliation gives investors confidence in Guam as a site for doing business.

As a multicultural society, Guam offers a rich diversity of perspectives. This lends itself to economic resilience, which requires flexibility, adaptation, and collaboration. On the other hand, multiculturalism can be complicated when consensus needs to be quickly reached.

While Guam's marine resources are abundant, the island cannot compete with the productive fisheries a few hundred miles to the south.

### **American Samoa SWOT Overview**

Among American Samoa's strengths, according to its 2012 CEDS, is a productive fishing industry, marked not only by proximity to thriving fishing grounds but also by the availability of

an experienced workforce. The success of the fishing and processing industry has led to the construction of extensive physical infrastructure and of laborers experienced in modern manufacturing.

Due to its robust culture and stunning natural beauty, the territory is a prime destination for tourism and ecotourism. These industries have yet to be developed, but new opportunities exist in ecotourism as well as in associated industries linked to fisheries, such as charter tours.

The territory's political status means federal grant support, tax exemptions, stability, duty-free access to the U.S., and a relatively high standard of living. However, trends in global trade are reducing tariffs and non-tariff barriers to such an extent that American Samoa's duty-free access to the U.S. and exemptions from federal maritime laws are not as exceptional as they once were. These align with the continued liberalization of trade, which ships jobs overseas.

People educated overseas tend not to return, and importing labor is an expensive and timely process. Local governments generally offer better pay and benefits than private corporations; there has been ample discussion about whether privatizing certain services will favorably impact productivity levels.

Strategists anticipate a downward spiral in employment because minimum wage continues to rise. When the federal minimum wage went into effect in 2007, the consequences were deeply felt. In the continental United States, three percent of the population earns minimum wage. In American Samoa, people live subsistence lifestyles and the majority of the workforce in the cash economy earns minimum wage. Various agencies, including the U.S. Department of Labor, have studied the deleterious effects of this shift.

Other threats to development are a lack of labor force training, aging infrastructure, and a lack of available land. This last point is bound up with lending patterns; because only indigenous people can own land and financial institutions cannot, interest rates are high.

The greatest threat to the economic development of American Samoa is the impending exhaustion of post-disaster federal spending. Funding earmarked in 2009 for relief after a fatal earthquake and tsunami will soon run out.

As American Samoa's CEDS reports, the future is not in trying to recapture old low productivity/low wage jobs but rather in building an economy capable of supporting higher productivity industries. Advances in technology make higher paying jobs more accessible to limited markets like American Samoa's.

### **The CNMI SWOT Overview**

The CNMI CEDS for 2016-2021 identifies access to Asian marketplace as a primary driver of economic growth. The emergent gaming industry continues to attract Chinese tourists, who have become the linchpin for economic activity generated at the casinos.

The writers of the CEDS view governance structure as a strength. Not only does the territory

enjoy the protection of U.S. financial and legal systems, which promotes trust among foreign investors, but its community leaders still exercise influence within the community and act as mediators between policymakers and the people. The CEDS acknowledges that foreigners might consider this a weakness, but that the structure works. The territory's affiliation with the United States allows it to avail itself of various programs, such as the New Market Tax Credit program, that are attractive to foreign investors. Additional local tax incentive programs are in place to encourage investment.

Another key strength is the impending construction of a second fiber-optic cable, which creates competition in the telecommunications space and strengthens the territory's resilience by increasing its connectivity and diversifying its economic base.

The CNMI CEDS identifies a lack of exportable natural resources as a key weakness. The territory possesses ample marine resources but lacks the infrastructure to harvest and export them in ways that would produce a meaningful economic contribution. There are also no land-based resources in high demand for export markets.

The CNMI has a unique history of labor, involving foreign workers on temporary visas. As the government attempts to shift this situation, the dearth of experienced, available domestic laborers threatens economic growth.

As is the case for any remote island, infrastructure is a weakness; the cost of transportation hinders regular maintenance and the volume of visitors adds pressure. Another threat is that land ownership is limited to indigenous peoples. This is a cultural and environmental strength but an economic challenge, as financial institutions are unable to own property. Lending rates are high and there are limited windows of opportunity in which to foreclose and unload real estate held as collateral. Efforts are underway to expand land ownership in the CNMI.

The gaming industry represents new opportunities for the CNMI. Economic activity generated at the casinos has flow-on effects, including a boom in construction and cottage industries. There are plans to diversify into other, more capital-intensive industries also.

The authors of the CEDS identify as a primary threat the lack of an extension to provisions in U.S. Public Law 110-229, which zeroes out the CW-1 worker program at the end of 2019. H.R. 5956, the Northern Mariana Islands U.S. Workforce Act of 2018, which extends the program through the end of 2019, has passed the U.S. Congress and is expected to be signed into law by President Trump in July.

In terms of opportunities, the CNMI has an existing aquaculture industry with large potential for development. In 2005, the CNMI was farming tilapia, milkfish, catfish, and marine shrimp; the industry was generating \$7 million annually. There is talk about venturing into offshore aquaculture using submersible cages and giant clam and pearl farming. The planned relocation of Marines from Okinawa to Guam is another opportunity because it will likely increase tourism to the CNMI, though the social and environmental impacts can also be perceived as threats.

## **Hawaii**

The Hawaii 2016-2020 CEDS report identifies innovation as a strength. When resources are limited, people become resourceful; innovation is a skill often borne of isolation.

The destination's brand is another strength. Popularized by the media and carefully managed by the tourism industry, the state is a heavily impacted vacation spot. The number of jobs in the hospitality and tourism industry is growing at a pace 11.59% faster than the national average. Earnings in the industry are also higher than average. Other strengths include a sense of community, access to renewable energy resources, and multiculturalism.

The report also lists weaknesses, beginning with a high cost of living due to steep real estate prices and the cost of imported products. There are others besides, including a lack of trust between people and their government, aging infrastructure, and geographic isolation.

According to the CEDS, opportunities abound in Hawaii. The report focuses first on the state's potential as a test bed for projects in the renewable energy industry. Hawaii has access to sources of clean energy and progressive policies; its publicized goal is to run on 100% clean energy by 2045. The second opportunity is in astronomy, aerospace, and aviation. In 1986, NASA financed the Mauna Kea Science Reserve and the first telescope built atop Mauna Kea, a mountain on the island of Hawaii. Since then, the state has been widely recognized for its contributions to astronomy. It has also long been in the running as a potential site for the establishment of an aerospace industry. In 2015, the state legislature approved seed funding to establish an international flight training center and advanced aviation degree program at the University of Hawaii at Hilo.

Other opportunities for economic growth include broadband expansion and the diversification of the tourism industry. The authors of the Hawaii CEDS identify strong leadership in the public and private sectors as a contributor to growth.

The CEDS also addresses the growing sense of polarization within the community, calling it a threat to development. As tourism and money continue to transform the state's economic landscape, the gap between rich and poor grows. Climate change, sea level rise, and ocean acidification—all branches of the same tree—are other noteworthy threats to development.

## **Strategic Direction/Action Plan**

Each jurisdiction in the region has created an itemized strategic plan designed to advance its economic development. Whether, and to what extent, these goals are met will be determined by the evaluation measures presented in the section following this one.

### **Vision Statement**

These strategic plans intend to make the region more competitive in a global economy, while also prioritizing an equitable distribution of wealth, economic resilience, and prudent environmental management.

Growth in the region has not been proportional, as evidenced by such indicators as participation in food stamp programs and rates of homelessness. This CEDS seeks to raise the standard of living while simultaneously valuing diversity, health, education, cultural traditions, environmental stewardship, and collaboration.

### **Action Plans and Implementation**

This section identifies projects, programs, and activities identified by each jurisdiction as necessary for advancing its specific development goals.

#### **Guam**

The 2011 CEDS for Guam is based on the concept of the territory becoming the first Pacific Tiger.

The strategy is based on the following six economic goals:

1. Openness of economy to global markets for goods and foreign investment;
2. Investment in human capital;
3. Availability of a young, productive, and creative labor force;
4. Public sector reforms and fiscal discipline;
5. Effective policymaking and social partnerships; and
6. Hard work and sacrifice.

It was first proposed in July 2009 and received a favorable response from policymakers, local media, and the island community. The Pacific Tiger strategy aligns with “Blueprint 2020,” a strategy for Guam that focuses on developing the following areas:

1. Trade in Goods and Services
2. Education
3. Training
4. Wages
5. Local Labor
6. Government Operations
7. Fiscal Management

8. Infrastructure
9. Veteran Affairs
10. Social Issues
11. Environment and Natural Resources
12. Military Buildup

High-priority projects aligned with these goals and sectors include the construction of a new wharf; the revitalization of Guam Fisherman's Cooperative Association Marina Authority; the development of a new marina; renovation of the Guam Fisherman's Cooperative Association Building Complex; establishment of a longline fleet; the creation of a small revolving fund for low-interest loans to assist small-boat fishermen with repairs; the development a vessel able to perform multiple missions, including surveys, research, and rescue; creation of a domestic fishery; revitalization of the city of Hagåtña; support for education tourism and marketing of educational exchange programs through partnerships with Asian universities; creation of a technical assistance center to assist government agencies with data collection; development of the agricultural industry through expansion of current resources and the introduction of new technology; development of the telecommunications industry and establishment of a training center to fulfill the needs of IT and telecommunications industries; creation of a regional software support center for U.S.-based software companies; and marketing of Guam as a destination for the research, development, and manufacturing of green technologies.

### American Samoa

The American Samoa Economic Development Implementation Plan for FY 2014-2017, prepared by the Territorial Economic Development Implementation Plan Task Force, identifies the following objectives as necessary for advancing economic development. While the plan has expired, many of its actionable items are still being pursued or implemented.

- Improve air service to Pago Pago International Airport
  - Assess the feasibility of a public/private partnership to operate an airline
  - Study the experiences of other destinations
  - Continue to advocate for modifications to current federal cabotage restrictions imposed on the territories
  - Update infrastructure in support of air cargo services
- Continue implementation of Pago Pago harbor development plan
  - Identify funding sources to implement Port Master plan improvements via a phased long-term strategy
  - Identify funding to procure new multi-purpose vessel
- Consider regional trade
  - Develop strategy for federal highway maintenance and improvements
  - Coordinate roads, access ways, and utilities efforts
- Assess need for sea wall and wharf maintenance and construction in Tutuila, Aunu'u, and Manu'a to protect interisland commerce and transportation
- Seek out innovative methods for reducing energy costs for the territory
- Protect groundwater from pollution

- Minimize leaks and continue with septic tank installation project
  - Replace drinking water wells
- Extend life of solid waste landfill
  - Continue negotiations to build a waste-to-energy plant
- Improve telecommunications (e.g., e-commerce, informational technology-based enterprises, internet-based industries, educational and workforce development initiatives, medical research and diagnosis, etc.)
  - Complete O3B satellite networks
  - Assess feasibility of replacing fiber-optic cable
  - Develop an alternative cable in addition to O3B to provide redundancy for current platforms
  - Conduct a survey to assess viability of third cable and negotiate terms for cost sharing
  - Establish call and data center facilities
  - Train IT specialists
  - Develop incentives and tax breaks for service providers
  - Improve efficiency, convenience, and cost of services by establishing e-government
  - Improve teleconferencing for businesses, education, and health
- Pursue viable long-term banking and financial services solutions
- Encourage small business incubator programs to support job creation and business expansion
- Pursue permanent exemption from federal minimum wage laws with the intent of determining an appropriate minimum living wage for the territory
- Explore the economic benefits of American Samoa becoming a port of entry into U.S.
- Enact tax reform to encourage investment
- Prioritize environmental resource management in all development projects
- Modernize approach to agricultural production
  - Provide technical assistance to local farmers
  - Encourage diversification
  - Improve access to farming and heavy equipment
  - Research locally available animal feed substitutes such as breadfruit, coconut, cassava, and fishmeal
  - Support the ongoing effort to produce *ulu* (breadfruit) flour from the region with the goal of exporting to the U.S. market
  - Support efforts to revitalize cacao plantations
- Support tourism development and growth
  - Continue with offshore marketing to improve traveler/tourist awareness of American Samoa
  - Increase visitor accommodation capacity through redevelopment of the Rainmaker Hotel
  - Aggressively seek to increase number of cruise ships calling into port
  - Maintain Keep American Samoa Beautiful campaign
  - Develop and maintain local tourism infrastructure (parks, visitor sites, public restrooms, etc.)

- Modify immigration regulations to better align with the U.S. Visa Waiver Program
- Support current and create new annual international events (e.g. rugby sevens, game fishing tournaments, outrigger canoe regattas, international jazz festival, half marathon, etc.)
- Pursue improvements to facilities and infrastructure required for recreational boating and yachts
- Explore other innovative tourism strategies such as developing a wedding market, medical tourism, etc.
- Support continued growth of fisheries industry
  - Modernize the shipyard so as to improve services for fishing fleet
  - Pursue innovative options to decrease fuel costs
  - Develop workforce capacity in the maritime industry by supporting work-based learning initiatives with an emphasis on skilled trades
  - Assess and minimize potential adverse impacts of tuna treaty agreements
  - Develop local fisheries opportunities and education

The government of American Samoa is also in the process of renewing its Comprehensive Economic Development Strategy (2018–2022) and expects the work to be completed by year’s end.

### The CNMI

The CNMI 2016-2021 CEDS lists projects suggested during public hearings, meetings with public agencies, and via an online portal. Each includes a description, total cost, and justification for the expense.

The projects include the establishment of a career and technical educational school site; new classrooms at elementary schools; classroom construction at Northern Marianas College; the construction of a new mayor’s office; redevelopment of the harbor to accommodate larger vessels; the purchase of new engines for power generation; replacement of water lines; construction of a dialysis center on Rota; modernization of emergency room facilities, hospital departments, and pharmacies; construction of a transitional living facility; road pavement and repair; upgrades to solid waste facilities; construction of an open-air market facility and a fisheries facility including a dock, three longliners, and a processing plant; construction of a nursery and water lab; the purchase of an air quality monitoring machine; construction of new loading bridges at the port; a fuel farm; a dredging project; upgrades to the airport; a system for rerouting storm runoff; an aquaculture facility; a vocational training institute; a film studio; a sewage treatment plant; and cultural restoration projects.

Projects were entered into a database and a pivot table was used to organize and rank them. The following were identified as the territory’s highest priorities:

1. Construction of an island-wide sewer system and sewage treatment plant on Tinian, where currently septic systems leach untreated waste;

2. Development of a fisheries facility, which includes the purchase of three longliners and construction of a dock, processing facility, ice plant, supply room, and fueling station;
3. An overhaul and renovation of Saipan International Airport;
4. Purchase of new engines for power generation;
5. The transfer of utility lines underground in a core tourism area as a means of beautifying the space and strengthening resilience to extreme weather events;
6. Redevelopment of the Tinian port to include repair of the breakwater and dredging to accommodate larger vessels;
7. Replacement of water lines to address leaks throughout the distribution system;
8. Modernization and expansion of hospital departments;
9. Installation of passenger loading bridges at the port; and
10. Modernization and expansion of emergency room facility and staff lounge.

## Hawaii

The Hawaii 2016-2020 CEDS categorizes objectives and action plans according to prioritized industry clusters. Below are those clusters, as well as specific objectives and actions intended to advance their development.

### Hospitality and Tourism

- Objective: Improve local infrastructure to accommodate and balance the needs of visitors and residents
  - Monitor local infrastructure
  - Assist other counties in building capacity to service international flights
  - Provide eco and green tourism opportunities aligned with community input
- Objective: Perpetuate local expertise and cultural harmony
  - Capitalize on Hawaii's strengths to enrich the experience and lives of guests and residents
  - Recognize and edify the rich resource of practitioners aligned with multi-cultural values, arts, and practices by creating a Living Legends program to stimulate local enterprises
  - Compile and showcase Living Legends
- Objective: Educate residents and guests about the law and spirit of aloha
  - Reach out to residents and guests through tourism and social media channels
  - Display the Law of Aloha on all flights/cruise ships into Hawaii
  - Link on all visitor websites
- Objective: Redefine and diversify Hawaii as a destination of choice
  - Support the Hawaii Tourism Authority in its initiatives to transform the meetings and conventions market by producing a marketing video that features advantages and significant value
  - Identify new tourism markets
  - Support the effort to attract more national and international conferences

### National Security

- Objective: Redefine and diversify Hawaii as a destination of choice
  - Expand research opportunities with federal national security partners and agencies

- Increase local procurement of federal contracts, goods and services
- Strengthen local business capacity to secure federal contracts
- Build awareness of opportunities and the process of doing business with military
- Objective: Expand workforce pipeline
  - Align educational pathways with national security needs in Hawaii
  - Support and develop training programs for local residents
- Objective: Foster healthy relations between military and local communities
  - Improve community engagement and education about military
  - Broaden collaboration
  - Organize community awareness and education on the value of the military and affiliated branches
  - Develop plan for building relationships between community and military

#### Healthcare

- Objective: Invest in telemedicine to improve access to and complement existing healthcare services; support business development
  - Increase access to a broader array of quality services
  - Identify the location and type of telemedicine services that would be most significant to a community
  - Expand telemedicine hubs
- Objective: Attract and maintain an adequate number and array of physicians and health and wellness practitioners
  - Conduct a survey on the challenges of attracting and maintaining physicians and health practitioners in Hawaii
  - Create incentives to attract and retain physicians and health and wellness practitioners
  - Promote healthcare as a viable career pathway
  - Promote the benefits of practicing in Hawaii
  - Expand healthcare academies in public schools
- Objective: Promote technological innovation and entrepreneurship in healthcare and wellness
  - Collaborate with academic, public, and private sectors to identify needs and opportunities for innovation
  - Convene and establish a Statewide Steering Committee to coalesce data and align opportunities
  - Create a healthcare accelerator
  - Organize healthcare start-up events
  - Work with the University of Hawaii Innovation Initiative and the Aloha + Challenge
- Objective: Promote enterprises that inspire a lifestyle of wellness
  - Increase understanding of the value of wellness among residents
  - Brand Hawaii as a wellness destination
  - Publicize wellness services

#### Research, Innovation, and Technology

- Objective: Provide a supportive environment for research and innovation and the transfer

of technology to spur economic growth

- Enlist the support of policymakers, educational administrators, and others to provide the facilities, resources, and incentives that nurture and enable research, innovation, and technology
- Create hands-on career pathways for students, which may include workforce opportunities in line with the Aloha + Challenge Green Workforce and Education goals
- Objective: Adopt meaningful community engagement with research and innovation
  - Work with the Hawaii Business Roundtable to leverage support from the public and private sectors to link investors, entrepreneurs, and companies with resources to develop innovations and technologies into viable businesses
  - Convene community forums in every county to determine how research and innovation will provide benefit to the community
  - Utilize a variety of communication channels to inform the community about the value of research and innovation and the people who conduct the work
  - Publicize the research at Hawaii's institutions
- Objective: Expand Science, Technology, Education, and Math (STEM) pathways
  - Work with educational institutions of all levels to expand STEM curricular and opportunities for students to engage in STEM
  - Work with children and youth groups (e.g., 4-H, Boys and Girls Clubs, Girl Scouts) to offer STEM activities in their programs
- Objective: Encourage businesses to provide mentors to schools and informal student programs on entrepreneurship
  - Provide awards and recognition to outstanding mentors and student entrepreneurs
- Objective: Ensure adequate bandwidth throughout the state
  - Lay broadband cable
- Objective: Provide business support services
  - Develop services that respond to needs at all stages of business growth
  - Support services that cover mentoring, publicity (marketing), and capital
  - Continue to develop an investor pool and local projects to be invested in
- Objective: Develop and grow the technology industry to help businesses flourish
  - Develop and manage a network of incubation services and facilities for technology companies
  - Assist technology companies in raising start-up capital
  - Provide business development services for businesses in the technology sector

#### Agriculture and Food Production

- Objective: Expand market reach of local producers to institutions and the military
  - Align existing and new policies and procedures
  - Assist farmers and retailers to achieve food safety certification
- Objective: Increase access to agricultural lands with affordable, long-term leases and necessary infrastructure
  - Increase the number of agriculture parks
  - Maintain and repair state agriculture irrigation systems
- Objective: Grow the next generation of farmers and entrepreneurs in agriculture, aquaculture, and mariculture

- Expand outreach and technical and business assistance
- Create incubator/accelerator sites and programs for emerging farmers and entrepreneurs
- Create and strengthen agriculture, aquaculture, and mariculture entrepreneurial pathways in schools and in organizations serving youth
- Support food trucks, farmers markets, agri-tourism, aqua-tourism, and other forms of entrepreneurship
- Create greater awareness of the agriculture, aquaculture, and mariculture career fields
- Develop partnerships between industry and academia to recruit and prepare students for careers in agriculture, aquaculture, and mariculture
- Objective: Develop meaningful forums for listening and sharing with the community on agriculture, aquaculture, and mariculture entrepreneurship
  - Regularly inform the community about the changing landscape of agriculture, aquaculture, and mariculture
  - Promote understanding of the science and economics of agriculture, aquaculture, and mariculture
  - Convene a millennial conference on the future of agriculture, aquaculture, and mariculture
- Objective: Support pest prevention, control, and management
  - Increase number of agriculture inspectors
  - Increase funding for these initiatives
  - Conduct research on most effective technology and practices
- Objective: Invest in and subsidize infrastructure to revitalize agriculture, aquaculture, and mariculture
  - Use technology to enable more affordable practices
  - Increase number of and access to processing, handling, and production facilities
  - Increase number of and access to livestock slaughtering, processing, and finishing facilities
  - Explore programs for sharing resources among farmers
  - Encourage efficient distribution systems to move food to market
- Objective: Increase demand for, supply of, and access to locally grown foods
  - Expand and improve branding and labeling programs to identify local foods
  - Support consumer education programs

## Energy

- Objective: Utilize a full portfolio of renewable energy resources
  - Align policies and processes
  - Accelerate the adoption of storage
  - Support research and development in new technologies
- Objective: Expand energy efficiency and sustainable practices
  - Invest in more forms of public transportation
  - Create incentives for energy efficient behavior and practices at home and in workplaces
  - Optimize the use of waste for energy production
- Objective: Improve awareness and understanding about energy resources and practices

among homeowners, businesses, and government

- Increase investment in ongoing community-based energy education
- Employ multiple partners in delivering outreach and education
- Objective: Update the electrical grid infrastructure
  - Establish partnerships and capital to build, maintain, and enhance infrastructure

#### Manufacturing

- Objective: Increase the number of, and foster stronger partnerships between, Small Business Innovation Research (SBIR) companies and federal labs with the intention of bringing more resources and knowledge to technology and manufacturing companies in Hawaii
  - Support programs that cover the entrepreneurial aspects of manufacturing
  - Support and create initiatives such as the Hawaii on the Hill Initiative to provide national exposure to manufacturers of Hawaii products
- Objective: Focus on revenue growth by expanding into new markets locally, nationally, and internationally to be more globally competitive
  - Continue to work with the Chamber of Commerce of Hawaii on increasing the voice of the manufacturing industry in Hawaii
  - Evaluate and assess barriers to markets outside of Hawaii and develop strategies to support innovative solutions and actions to address the barriers (i.e. Jones Act, land use policies, and tax reform affecting manufacturers)
  - Provide support for manufacturers with a focus on prototyping and 3-d printing
- Objective: Reduce costs and increase workforce competency for Hawaii's manufacturing industry
  - Work with the appropriate organizations as well as private education providers on training Hawaii's manufacturing workforce by leveraging both federal and state training programs
  - Develop a system of engagement between the education, research, development, training, and manufacturing stakeholders to solve problems

#### Creative Industries

- Objective: Invest in innovative and emerging technologies to allow Hawaii's creative products to better compete in the global market
  - Establish creative lab accelerators
  - Establish a creative media fund to support Hawaii-based content development across multiple disciplines and platforms
  - Leverage tourism marketing resources to advance broadcast, web, and mobile channels showcasing Hawaii's creative clusters
  - Support the creative sector to position Hawaii as a cultural creative hub
- Objective: Continue building public-private partnerships in digital media and film
  - Build on, reinforce, and expand on the telling of Hawaii's history to inspire creative business development solutions based on multicultural integration
  - Establish policies to support creative media infrastructure development
  - Strengthen collaborations with film, music, tech, and new media industries
- Objective: Continue the development and fostering of new ideas, content, and local talent
  - Work with local programs that foster the growth of Hawaii's middle school and

high school digital media and recording programs

- Objective: Develop and grow the creative industry sector in Hawaii by increasing access to business mentors, increasing export/distribution, building workforce expertise, and providing facilities
  - Continue to provide mentoring and access to market specific decision-makers, investors, and distribution outlets
  - Continue workforce development programs to prepare students for creative industry jobs
  - Continue to provide accelerator programs for creative industry start-up projects
  - Continue to support maintenance and development of facilities

## **Evaluation Framework**

The evaluation framework is designed to measure the impact of actionable items identified in the previous section of this report. This framework assesses the extent to which objectives have been met. The performance metrics are critical to tracking the success of the various recommended actions and to gauging the return on their investment.

Measures identified in CEDS for regional jurisdictions include:

1. Gross domestic product;
2. Jobs created or retained;
3. Investment;
4. Unemployment rate;
5. Per capita income;
6. Revenues from major export industries;
7. High school graduation rates;
8. College graduation rates;
9. Diversification/number of industries; and
10. Consumer spending.

## Economic Resilience

Building resilience to external shocks, such as natural disasters, the exit of a significant employer, or the impacts of climate change, is a critical component of any economic development strategy. The process involves anticipating risk, evaluating how the risk can impact key assets, and creating a mitigation plan.

Because of its isolation, exposure to natural disasters, and dependence on foreign markets and powers, the U.S. Pacific Islands Region is particularly vulnerable to external disturbances. Due to transportation challenges, there is little probability of redundancy, particularly of economic infrastructure. Therefore, it is critical to develop strategies that ensure a quick and collaborative recovery from external shocks.

Examples of past shocks include:

- *Federal legislation or administration action.* The denial of H2-B visas for Guam, the cap on the CW-1 program for the CNMI, and the imposition of the federal minimum wage in the CNMI and American Samoa make a considerable economic impact.
- *Fluctuations in global tourism.* Economies that depend heavily on tourism are greatly affected by acts of terrorism, such as the toppling of the World Trade Centers in 2001 and North Korea's threats to Guam and Hawaii in early 2018, as well as other unanticipated threats to national and global security that cause a reduction in travel.
- *Closure of a Pago Pago cannery.* Tuna processing is the basis of American Samoa's economy; the closure of a major cannery in 2009 was a significant blow.
- *Extreme weather events.* Natural disasters have broad and far-reaching economic implications. In 2018, Cyclone Gita caused \$7 million worth of damage to American Samoa's infrastructure. Natural disasters that occur outside the region, within source markets for its tourism industry, can also have economic consequence.

Resilience is characterized by an economy's capacity to weather events like these and many others. There are two separate but equally important methods for establishing resilience. The first involves steady-state initiatives—long-term efforts, such as diversifying an economic base, building a workforce that can move between jobs, and promoting preparedness among businesses. The second method focuses on responsive initiatives, or developing the capacity of relevant agencies to respond—for example, by defining and delegating responsibilities, establishing a process for regular communication, and synchronizing recovery plans.

Presently, efforts to build resilience in the region are focused on five primary areas: infrastructure maintenance and improvement, disaster preparedness, renewable energy, invasive species management, and climate change. Among the region's advantages in this endeavor are cultural resilience to globalization and indigenous traditional knowledge that values the environment as a self-sustaining unit of interconnected and interdependent parts.

## Infrastructure Maintenance and Improvement

Infrastructure is an important challenge for remote islands; a failure to maintain and upgrade infrastructure makes the region more vulnerable to the impacts of a natural or manmade disturbance or disaster. As Guam prepares to accommodate more military personnel and their dependents and as tourism grows in Guam, the CNMI, and Hawaii, infrastructure improvements are of increasingly critical importance.

In Guam, the impending relocation of Marines prompted renovations to the international airport, funded by Federal Aviation Administration grants, which were completed in 2015. In November 2017, Guam Congresswoman Madeleine Bordallo announced that the U.S. Department of Defense Office of Economic Adjustment awarded the government of Guam grants totaling nearly \$130 million for civilian infrastructure projects related to the realignment. The Guam Waterworks Authority received nearly \$118 for upgrades to the Northern District Wastewater Treatment Plant and the Office of the Governor was awarded \$12 million for the design and construction of a cultural repository. In December 2017, President Trump signed into law the National Defense Authorization Act for FY 2018, which authorized \$354.6 million for military construction projects on Guam. A \$63 million underground pipeline to support Andersen Air Force Base was paid for by the Defense Logistics Agency Energy and finished in February 2018.

American Samoa's Economic Development Implementation Plan for 2014-2017 sets out a strategic vision for developing failing infrastructure in American Samoa. In FY 2016, the Department of the Interior provided \$9.5 million for the overhaul of tug boats servicing Pago Pago Harbor, improvements to Ofu Wharf, the repair of drainage problems at the port's container yard where runoff was greatly affecting operations, new school buses, new classrooms, and hospital renovations, among other infrastructure projects.

The CNMI also has aging facilities and equipment that threaten its economic upswing. Outdated seaport facilities are a stumbling block for cost-effective inter-island shipping, and impact costs and completion schedules for development projects. The 2016-2021 CEDS for the CNMI ranks and prioritizes infrastructure projects to accommodate the territory's growing economy.

Hawaii's infrastructure is deteriorating to a degree that impedes its ability to compete in the global economy. Though 98% of Hawaii's regulated dams have an Emergency Action Plan, there are also 123 high-hazard dams. Driving on roads in need of repair costs each driver \$708 per year, and 5.7% of bridges are structurally deficient. State schools have an estimated capital expenditure gap of \$88 million. Hawaii has three sites on the National Priorities List for hazardous waste management. Delaying upgrades compounds both cost and risk.

One of the most important federal grants programs addressing infrastructure for the U.S. territories is the Capital Improvement Project (CIP) grants program at the U.S. Department of the Interior's Office of Insular Affairs. For FY 2018, the Office of Insular Affairs provided infrastructural funding of \$6.9 million to Guam, \$10.6 million to American Samoa, and \$5.6 million to the CNMI. Annually, the current program is capped at \$27.72 million. An increase to \$100-\$200 million should be explored to adjust for inflationary costs incurred since the current program in 1978 and account for current infrastructure needs.

## Disaster Preparedness

The U.S. Pacific Islands Region is geographically prone to natural disasters, including coastal erosion, droughts, earthquakes, floods, hazardous materials, high surf, landslides, lightning strikes, soil hazards, tropical cyclones, tsunamis, volcanoes, and wildfires. These have dramatic impacts on small islands with heavily concentrated economies and disproportionate effects on vulnerable populations, of which there are many in the region. Both natural and manmade disasters have far-reaching consequences for remote jurisdictions that depend largely on tourism for economic development.

Compounding this vulnerability is the heavy regional reliance on imported goods and fuel. There are no large warehousing systems for storing supplies in case of emergency. Parts for repairing infrastructure are not readily available in the region and transportation can take time. Geographic isolation necessitates early identification, coordination, deployment, and tracking of resources to ensure on-time arrival of necessary items.

Disaster preparedness involves creating databases of resources and assets, establishing systems for tracking and reporting weather, setting up a communication chain, disseminating evacuation plans, identifying recovery partners, and engaging the community in all of these efforts. Among the most important steady-state strategies for disaster planning is the prioritization of local food, fuel, and energy production. If these basic needs are being met by internal sources, external forces become less consequential. Disaster preparedness also involves having a plan for infrastructure restoration, housing recovery, and the quick reestablishment of social services in the wake of an extreme event.

The Pacific Islands have experience recovering from disasters, both recently—examples include Cyclone Gita and the eruption of Kilauea on the island of Hawaii, both in the first half of 2018—and throughout history. By learning from past mistakes and integrating best practices into current plans, communities can strengthen their resilience to the whims of nature, which have always dictated life in the region. All four jurisdictions have FEMA-approved hazard mitigation plans, which make them eligible for disaster-related funding after a disaster declaration. However, all jurisdictions have yet to complete enhanced mitigation plans, which would make them eligible for increased federal funding after a disaster declaration. As of April 1, 2018, only 12 states have received FEMA approval of their enhanced state mitigation plans. In order to receive approval for an enhanced plan, each state or territory must demonstrate it has completed a comprehensive mitigation plan and is capable of managing increased funding to achieve its mitigation goals.

In January 2018, the governments of Guam, American Samoa, and the CNMI opted into the nationwide public-safety broadband network, a system made available through a public-private partnership between AT&T and the First Responder Network Authority, an independent authority within the U.S. Department of Commerce, at no cost to the territories. The network ensures the public safety community has access to a highly secure wireless broadband, facilitating the sharing of information and enhancing the region's resilience.

In February 2018, the government of Guam produced a Catastrophic Typhoon Plan, which simulates a Category 5 typhoon and outlines an appropriate response. The report considers a

multi-agency approach that includes centers and staff based overseas, such as the Regional Response Coordination Center in Oakland, California and the National Response Coordination Center based in Washington, D.C., as well as field-level operational facilities and staff from the FEMA Incident Management Assistance Team, Joint Field Office, Unified Coordination Group, and Unified Coordination Staff.

The objectives of the Catastrophic Typhoon Plan are as follows:

1. Promote effective land use planning and regulation, as well as public awareness, in order to reduce damage from natural hazards;
2. Improve infrastructure development standards with special attention to mitigating the increasing flood hazard;
3. Develop and implement projects aimed at reducing the risk of damage and destruction of existing assets and infrastructure from the full range of natural disasters threatening the territory;
4. Improve building codes and standards, as well as training programs, in order to reduce damage from strong winds, earthquakes, and tsunamis;
5. Develop public information and education programs in order to reduce disaster damage from strong winds, earthquakes, and tsunamis; and
6. Fund related planning projects to strengthen mitigation standards, research, education, and outreach efforts.

The Guam Department of Homeland Security's Office for Civil Defense updates its emergency response plan annually. The 2014 Guam Hazard Mitigation Plan, valid for a period of five years, is a comprehensive assessment of the territory's particular vulnerabilities and summary of its historical hazard record, which includes both natural disaster and disease, as well as a cross-sectoral and collaborative strategy for disaster mitigation. The territory also takes preemptive measures to increase its resilience; its building code warrants mention. In light of the island's location—in a seismically active zone and on a typhoon belt—the government of Guam has adopted and policed a building code far stricter than most U.S. cities, which mandates structural designs that minimize the destructive effects of both earthquakes and typhoons. While the adoption of a stringent building code has reduced the loss of life and property from natural disasters, it has also significantly increased construction costs.

Another example of disaster preparedness planning is the work being done by the American Samoa Coastal Management Program (ASCMP). Key efforts include Geographical Information Systems (GIS) mapping, which allows for sharing information among responders. The GIS unit of ASCMP has, in the wake of Cyclone Gita in February 2018, been collecting data, updating a web portal, and creating a centralized geodatabase for all government agencies. By assessing whether structures were conforming to permit laws, the team achieved the relocation of poorly located businesses and six billboards. The wetlands management team of ASCMP has been conducting outreach in schools, highlighting the importance of protecting wetlands and their surrounding environments through cleanups, planting workshops, and education about conservation. ASCMP was, at the time of the second quarter performance report for FY 2018, creating tsunami evacuation maps in collaboration with the American Samoa Department of Homeland Security and the National Oceanic and Atmospheric Administration.

The CNMI Office of Homeland Security & Emergency Management published its mitigation plan in August 2014. The document seeks to reduce vulnerability to hazards, improve public awareness around land use and planning by mapping hazard-prone zones, improve the insurance industry's risk management, and promote community-based prevention and preparedness activities. The plan considers climate change and the likelihood of increased typhoon intensity, noting that the estimated potential loss to structures from typhoon intensity is approximately \$97 million, plus an additional \$230 million in damage to their contents. About 16,000 people, according to these estimates, would potentially be at risk of injury or death. The mitigation strategies laid out in the 2014 plan are intended to save lives and minimize injuries, reduce damage to property and the environment, and ease the financial burden of a disaster.

In 2017, the Governor of the CNMI and a regional FEMA representative signed off on the CNMI Catastrophic Typhoon Plan, which simulates a Category 4 typhoon based on Typhoon Soudelor, which struck the CNMI in 2015, and then maps out an appropriate response. The plan acknowledges that the greatest challenges to disaster response in the Pacific region are time and distance, and that the timely transportation of resources and labor is crucial. The planning process undertaken to create both of these documents for the CNMI involved assessing the territory's particular vulnerabilities and prioritizing inter-agency coordination as a means of increasing resilience to disaster.

The extent to which the State of Hawaii has coordinated its response plans, according to the National Disaster Economic Recovery Strategy, can be instructive for the rest of the region. Through the National Disaster Preparedness Training Center, a member of the National Domestic Preparedness Consortium, the Department of Homeland Security/FEMA National Preparedness Directorate delivers training and education.

The state also coordinates with other organizations involved in making communities more resilient. In partnership with the Waikiki Business Improvement District Association, the Center completed a recovery plan for Waikiki, a tourism hub on the island of Oahu. It also has plans to continue pursuing uniformity among response plans, in order to increase the state's ability to weather all shocks, including diseases, infrastructure failures, terrorism, and malicious cyber-activity.

In May 2016, Honolulu was selected to join the Rockefeller Foundation's 100 Resilient Cities network, based on its track record as a hotbed of innovation and its commitment to building resilience. The network enables cities around the world to access resources that help them to weather social, economic, and environmental challenges. Hawaii faces many of these, given its aging infrastructure, vulnerability to natural disaster and sea level rise, and large population of homeless people which prompted the governor to declare a state of emergency in 2015. Joining the international 100 Resilient Cities network cements Hawaii's role as a leader in the global movement to build resilience.

The Hawaii CEDS identifies small businesses as the foremost gap in resilience. Findings show that businesses with 25 employees or less are considerably less prepared for disasters. To encourage small businesses to spend time and resources on emergency preparedness, the CEDS

suggests that the government offer financial incentives such as state tax rebates. Other recommendations include:

- Support funding for programs that offer low-interest disaster loans and technical assistance to small businesses in recovery;
- Explore government funding and assistance at the county and state levels that can support recovery efforts;
- Expand insurance coverage for small businesses;
- Increase participation of small businesses in Community Emergency Response Training (CERT);
- Disseminate information pertaining to CERT;
- Increase resiliency of utilities and infrastructure including electricity, communication, roads, water, and sewer, which impact small businesses; and
- Provide centralized and user-friendly information.

Hawaii also has an Emergency Operations Plan, produced in May 2017, which outlines the state's vulnerabilities and lists the responsibilities of federal, state, and county governments, as well as non-government organizations and the private sector, in the event of a disaster. Following Hurricane Maria, which devastated the U.S. territory of Puerto Rico in 2017, leaders in Hawaii collaborated with staff at the National Disaster Preparedness Center to learn valuable lessons for application at home. There were additional meetings after Hurricane Harvey, which struck in August 2017, between leaders at Honolulu's Office of Climate Change, Sustainability & Resiliency and Houston-based disaster preparedness experts about the value of having a long-term recovery plan in order to fully leverage FEMA disaster funds.

In April of 2018, the island of Kauai in the State of Hawaii received nearly 50 inches of rain in 24 hours—the most rainfall ever recorded in the U.S. This disaster prompted officials to issue more calls to action on climate change and the reduction of carbon pollution.

### Renewable Energy

Importing petroleum products is not only costly; it can also be an unreliable method of sourcing energy in the event of an emergency. Increasing the region's capacity to produce its own electricity is an important means of increasing its overall resilience to external shocks, whether a spike in the price of fuel or an extreme weather event that prevents tankers from reaching island jurisdictions. By limiting use of petroleum products, regional jurisdictions can also register a contribution, albeit small, toward global efforts to mitigate climate change. Renewable energy also brings economic opportunity to islands that possess a seemingly limitless supply of sun and wind.

In Guam, an increasing number of residents are installing solar photovoltaic panels; as of 2016, nine megawatts of distributed solar power was connected to the grid, according to the U.S. Energy Information Administration. The U.S. Navy agreed in mid-2017 to lease sites expressly for the installation of 40 megawatts of additional solar power.

In American Samoa, where the price of energy was 2.3 times the national average in mid-2017, the government has ambitious targets for renewable energy. The American Samoa Renewable Energy Committee adopted a goal of getting half of the territory's energy from renewable sources by 2025 and 100% by 2040. Though not legally binding, efforts are being made in alignment with this objective. In 2016, the entire island of Ta'u converted to 100% solar electricity generation.

In the CNMI, where most people get their electricity from imported petroleum products, generators and infrastructure are aging. As of September 2017, the islands had only small-scale wind and solar facilities. This makes the present an opportune time to shift toward renewable energy. There are active volcanoes in the CNMI, lending it potential to produce geothermal energy.

In the United States and the world, Hawaii is leading the charge for clean energy. In 2015, according to the U.S. Energy Information Administration, the state was importing 91% of the energy it consumed, though it had the fourth-lowest per capita consumption rate because of its mild and tropical climate. The same year, it became the first state in the nation to enact a mandatory Renewable Portfolio Standards requirement to generate 100% of electricity sales from renewable sources by 2045. According to the Energy Resources Coordinator's Report on the Status and Progress of Clean Energy Initiatives and the Energy Security Special Fund, as of December 2017 targets were being exceeded.

In 2016, Hawaii generated more solar power per capita than any other state. As of October 2017, it was one of seven states with utility-scale generation from geothermal energy; it was also leading the nation for the sixth consecutive year in the per capita value of energy savings performance contracts awarded by state and local governments. Since 1996, the contracts awarded through the Hawaii State Energy Office total more than \$507.1 million, according to a report prepared in December 2017 by the Department of Business, Economic Development & Tourism. Over the lifetime of the contracts, the state is expected to have saved an estimated \$1.2 billion on electricity.

Increasing the region's capacity to produce its own energy is a key component of building its resilience to external shocks, as well as ensuring that both the environment and economy will thrive into the future.

### Invasive Species Management

The introduction of non-native species can threaten the availability of water and food, impair human health, cause economic damage, and undermine security. Invasive species can have immediate and serious consequences for small, vulnerable islands that rely heavily on their natural resources. Furthermore, the cultural identity of indigenous Pacific people is closely tied to the ecological integrity of the environment. As a result, the impacts of invasive species are widely felt. Increasing the region's resilience to these impacts involves careful and evolved environmental management, which in turn prepares regional governments and communities to deal with other threats, such as climate change or economic downturn.

In 2014, governments from around the region collaborated with the U.S. Department of Defense to produce a lengthy and comprehensive plan now known as the RBP, or the Regional Biosecurity Plan for Micronesia and Hawaii. The RBP was, in part, a response to concerns about the environmental impact of relocating thousands of military personnel from Okinawa to Guam. American Samoa, given its distance from Hawaii and Micronesia, was not included in the RBP. The plan acknowledges Guam as the main transport hub for the rest of Micronesia and Hawaii as a major hub for much of the Pacific Region, including Micronesia. Entry of any pest or disease into either hub could result in rapid movement throughout the entire region. The RBP also acknowledges the interplay between invasive species and other trending issues in the region, including climate change, public health, green development, conservation, food security, and economic growth.

The good news is that because there are relatively few entry points in the region, monitoring the transfer of vessels and goods is more feasible than elsewhere in the world. In developing functional biosecurity mechanisms, the region can serve as an international model. The RBP assesses the risks of introducing invasive species to three areas: terrestrial ecosystems, freshwater ecosystems, and marine ecosystems. To mitigate these, it offers biosecurity recommendations such as securing funding, enhancing coordination among and across agencies, focusing on prevention, developing early detection and rapid response mechanisms, monitoring and tracking species, eradicating where feasible, promoting education and outreach, supporting research, designing and implementing policy, and restoring damaged habitats.

In 2016, the U.S. Territories Invasive Species Coordinating Committee—a body of representatives from territorial governments, including American Samoa—signed a Memorandum of Understanding committing its signatories to the prevention, eradication, and control of invasive species as well as the protection and restoration of natural and cultural resources from their detrimental effects.

The same year, the Governor of the CNMI established the CNMI Invasive Species Council comprised of representatives from the departments of Lands and Natural Resources, Finance, Commerce, the Bureau of Environmental and Coastal Quality, Northern Marianas College, Commonwealth Ports Authority, Marianas Visitors Authority, and Commonwealth Healthcare Corp., among others. The Council released an Invasive Species Strategy and Action Plan in June 2017, which describes the nature and extent of the invasive species in the CNMI and proposes specific actions to minimize both the threat of new invasive species and the negative impacts of existing invasive species. The document acknowledges that public health, tourism, food security, and self-sufficiency are all under threat and much damage has already been done, most of it irreversible. It outlines the way forward, including such steps as regional coordination, improved data collection, forest restoration, and manage the environmental impact of the U.S. military presence in the CNMI.

The CNMI Department of Lands and Natural Resources published an Action Plan for *Oryctes rhinoceros* 2018-2023, which explains standard operating procedures for eliminating the coconut rhinoceros beetle, recently discovered on the island of Rota, and provides a framework for addressing other invasive species.

In 2017, the American Samoa Invasive Species Task Force (ASSIST) produced a strategy and action plan to guide the management of invasive species in the territory. The plan aims to increase awareness of the critical threat invasive species pose, encourage collaboration in minimizing the threat, and improve decision-making by sharing data and information.

The report identifies the following goals:

1. Enhance the capacity of the government and partners to take urgent action by reviewing the legal framework, developing new legislation, encouraging collaboration across and among agencies, harmonizing plans with other regional bodies, and promoting education and outreach.
2. Enhance the capacity of the committee, government, and community to make informed, science-based decisions about managing invasive species. This will involve monitoring the list of concerning species, conducting assessments of priorities (using both science and traditional knowledge), and sharing data through both tangible and digital databases.
3. Prioritize prevention and develop early detection protocols to deal with invasive species. This will involve conducting a risk assessment; implementing a wide range of biosecurity measures at points of entry, along priority pathways, and in already impacted areas; and establishing a monitoring and reporting network.

In Hawaii, because red fire ants were estimated to cost the state an annual \$211 million and brown tree snakes an estimated \$2.14 billion, collaboration between federal, state, and county agencies led to the publication of a comprehensive biosecurity plan in December 2016. The Hawaii Interagency Biosecurity Plan 2017-2027 encourages better coordination among industries and agencies, renewed focus on human health impacts, enhanced control of established pests, increased staff and inspections for inter-island travel, import substitution programs to support local food production, and outreach activities. It also acknowledges the importance of reaching and maintaining agreements with other jurisdictions, maintaining inspection facilities, and providing the Department of Agriculture with the authority and staff to inspect non-agricultural items.

### Climate Change

There is international, regional, and scientific consensus that climate change is a priority-level concern for the global community, but for oceanic nations the matter is especially pressing. Rapid warming of the atmosphere and oceans is causing sea level rise that threatens development and food security; this is particularly true for low-lying nations with narrow economies. Recent studies estimate that up to 3.2 feet of global sea level rise could occur as early as 2060 and that it is plausible for the sea to rise more than six feet by the end of the century, according to a Sea Level Rise Vulnerability and Adaptation Report prepared by the Hawaii Climate Change Mitigation and Adaptation Commission. This kind of change will make the already vulnerable region more prone to coastal flooding, erosion, and erratic weather patterns that affect food security. Rising sea temperatures also herald increasingly intense storm events. The region is taking this concern seriously and adapting laws, processes, and practices as a means of increasing its resilience to climate change.

The Pacific Islands Climate Change Cooperative (PICCC), a conservation alliance comprised of local, state, federal, indigenous, and non-governmental member organizations from the U.S. -

affiliated Pacific Islands, produced a climate change adaptation report in 2017 to guide planning and decision-making in the region.

The report recommends the following as pillars of any planning strategy:

1. A focus on zoning and land-use planning so as to minimize future impacts of coastal flooding and erosion;
2. Scenario planning for forest and watershed management, given prevailing concerns about how climate change will impact precipitation patterns and stream discharges and therefore affect municipal water supply and agriculture;
3. Prioritization of managing coral reef and marine systems, as these are the most vulnerable of ecosystem classes to the near-term effects of climate change;
4. Widespread outreach and education;
5. An emphasis on renewable energy and energy efficiency, in order to mitigate as well as adapt to climate change; and
6. Commitment to food security, which involves assessing the vulnerability of current crops and fish stocks, as well as identifying potential crop alternatives and fishery conservation measures. Food security is a central tenet of adaptation efforts; this is particularly true in the region, where many people continue to live subsistence lifestyles. Many indigenous people possess inherited knowledge about the environment and a sense of collective responsibility for its stewardship and management.

According to the PICCC report, at climate change adaptation workshops in CNMI, Guam, and American Samoa, the following near-term actions were identified as priorities for regional jurisdictions:

1. Create full-time climate coordinator positions;
2. Integrate climate change into job descriptions within government agencies;
3. Build GIS capacity to better assess vulnerabilities;
4. Sustain natural infrastructure like coastal mangroves, wetlands, and natural drainage systems since manmade infrastructure can put undue pressure on natural resources;
5. Design environmentally sound buildings and infrastructure;
6. Climatize existing programs, plans, and projects by building capacity within and across local agencies; and
7. Incorporate climate change language amendments into existing statutes and administrative rules.

The American Samoa Department of Commerce produced a Territorial Climate Change Adaptation Framework in August 2012, which acknowledges the territory's particular vulnerabilities, among them limited size, limited landmass, high population density, continued population growth, isolation and high transportation costs, limited natural resources, stressed ecosystems, and limited available funding. Already the territory is facing the loss of coastal lands due to increased erosion caused by sea level rise, the degradation of coral reef systems due to changes in water temperatures and acidity levels, an increased dependence on off-island food sources due to a projected decrease in local food production as a result of changes in rainfall patterns, severe storm systems, higher rates of pest infestation, and decreases in near-shore fish

stocks. All of this impacts not only the environment but also public health and the economic potential of vulnerable industries, including tourism, agriculture, recreation, commercial fishing, and exports of natural resources.

To address these realities, the report identifies four main priorities:

1. Coral reef and mangrove ecosystem management, which involves raising awareness about climate change among youth, improving solid waste management, and encouraging environmental stewardship.
2. Consideration of human settlement and infrastructure, which involves updating energy systems, conducting assessment audits on existing buildings and enforcing revised building codes, and implementing a coastal hazard assessment.
3. Prioritization of human health, in and through developing response plans for natural disasters, increasing the participation of youth in policy planning, and integrating climate change education into school curricula.
4. Management of agriculture, forestry, and water resources, which involves promoting agro-forestry, improving education and outreach, and teaching farmers to use more sustainable practices.

The government of American Samoa is prioritizing environmental management as a means not only to adapt to climate change but also to propel economic growth. For example, the American Samoa Coastal Management Program (ASCMP) sponsors the Fautasi Coastal Challenge Village Ecotourism project, which assesses the potential of developing an ecotourism industry by encouraging coastal stewardship.

Hawaii has also prioritized climate change adaptation. A University of Hawaii study took into account factors such as topography, underwater landscape, erosion, and wave energy, then concluded that, as sea levels rise and storms intensify, one-third of the state's shorelines are moderately to highly vulnerable to coastal flooding. The findings were published in July 2018.

In 2017, the Hawaii Climate Change Mitigation and Adaptation Commission produced the Sea Level Rise Vulnerability and Adaptation Report to assesses the state's vulnerability to sea level rise. The report also makes some pertinent recommendations for reducing the jurisdiction's sensitivity to coastal flooding and increasing its capacity to adapt accordingly. Over the next 30 to 70 years, coastal flooding is projected to impact approximately 6,500 structures and 19,800 people in certain areas, particularly on Oahu, the state's urban center. This kind of damage would render more than 25,800 acres of land unusable; the estimated value of these impacts exceeds \$19 billion, according to the 2017 report.

The report makes the following recommendations to guide planning:

1. Support sustainable land use and community development;
2. Prioritize smart urban redevelopment outside the Sea Level Rise Exposure Area (SLR-XA) and limit exposure within it;
3. Incentivize improved flood risk management;

4. Enable legacy beaches to persist with sea level rise by setting aside funding for land acquisition and beach restoration, which may include realigning roads and other structures or nourishing sands;
5. Preserve Native Hawaiian culture and communities with sea level rise by developing protocols to manage cultural assets and creating a mitigation strategy in consultation with Native Hawaiian communities;
6. Protect nearshore water quality by reviewing existing laws, regulations, and best management practices, as well as crafting and implementing new laws, regulations, and best management practices;
7. Develop innovative and sustainable financing and incentives to support adaptation to sea level rise;
8. Support research, assessment, and monitoring; and
9. Promote collaboration and accountability, given adaptation will require difficult decisions and the input of many agencies and sectors.

The Honolulu Office of Climate Change, Sustainability & Resiliency has earmarked funding for meeting the requirements of the Paris climate agreement, performing an energy assessment to reduce demand, and making available more data related to sea level rise projections. A report commissioned by nonprofit organization Elemental Excelsior found that fast tracking the state's renewable energy goals could result in savings of \$7 billion.

## **Going Forward**

It is vital that all the jurisdictions in the U.S. Pacific Islands Region find commonalities such as those identified in this report, and work collaboratively to build strengths, overcome weaknesses, and increase levels of resiliency. The Pacific Basin Development Council will, over the next 12 months, be working on developing and enhancing mechanisms to facilitate the kind of collaboration necessary for achieving managed economic growth in the region.

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