

February 2016

Economic Impacts Attributable to FY 2015 Federal Grants and Payments to Seven Insular Areas

Final Report

Prepared for

**Office of Insular Affairs
U.S. Department of the Interior**
1849 C Street, NW
Washington, DC 20240

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RTI Project Number 0215158



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EXECUTIVE SUMMARY

The Office of Insular Affairs (OIA) carries out the Department of the Interior's responsibilities for U.S.-affiliated insular areas. These areas are the territories of American Samoa, Guam, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands as well as the Freely Associated States (FAS)¹ of the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau.

The total budget of the OIA for fiscal year (FY) 2015 was \$614 million, of which \$580 million was direct grants and payments to the insular areas. This assistance played an important role in the economies of each of these areas by providing financial and technical assistance to promote economic growth, education, and public health and the development of more efficient and effective government.

Generally, a lack of sophisticated economic data series for these insular areas deprived territorial and federal leaders of the type of thorough economic analysis that would help them make more informed policy decisions. For the FY 2015 analysis, input-output data from the Bureau of Economic Analysis (BEA) are newly available for U.S. territories. For FAS, RTI International used the economic base analysis approach employed in previous years' studies.

The following economic aggregates were estimated for each insular area:

- Employment: the number of individuals gainfully employed, which typically consists of full-time and part-time employees but excludes subsistence agriculture and fishing
- Employee compensation: payments made to all employees during the year, including salaries, wages, and other forms of compensation
- Gross domestic product (GDP): a measure of each area's economic output—typically defined as the value of all final goods and services made within the borders of the insular area in a particular year

Table ES-1 summarizes the results of this analysis.

¹ FAS are independent nation states that maintain a close relationship with the United States through the Compact of Free Association, which makes them eligible to receive funds and assistance from U.S. federal agencies.

Table ES-1. Economic Impact Summary of OIA Grants and Payments (FY 2015)

	Total OIA Payments (\$'000, 2015\$)	Total OIA Employment Impact	National Employment Supported by OIA Payments (%)	Total OIA Employee Compensation Impact (\$'000, 2015\$)	National Employee Compensation Supported by OIA Payments (%)	Total OIA GDP Impact (\$'000, 2015\$)	National GDP Supported by OIA Payments (%)
American Samoa	35,231	1,137	8%	29,429	15%	44,781	6%
Guam	103,980	3,421	5%	100,059	7%	128,596	2%
Northern Mariana Islands	15,996	809	3%	15,643	3%	24,061	3%
U.S. Virgin Islands	224,689	6,052	16%	239,187	18%	344,845	9%
Micronesia	108,656	8,621	58%	45,368	74%	260,554	81%
Marshall Islands	76,873	4,704	44%	47,231	44%	104,828	54%
Palau	14,645	908	9%	10,487	11%	38,725	15%
Total	580,071	25,642	15%	487,279	13%	945,313	8%

Note: Total impacts are the sum of estimated direct, indirect, and induced impacts associated with OIA grants and payments. Approximately \$33.9 million of a total \$614 million was spent outside the seven insular areas that were the primary focus of this study.

Source: RTI estimates.

ES.1 FY 2015 OIA Payments to the Insular Areas

OIA's responsibilities are framed by the long-term security interests of the United States in the western Pacific and serious economic and fiscal problems affecting the U.S. territories and FAS. Although each insular areas situation is unique, they share common challenges, including limited land and resources; small populations; limited local technical expertise; narrow economic bases; and exposure to natural disasters, such as hurricanes and typhoons. OIA strives to empower the local communities, foster economic development, promote sound management, and improve quality of life while respecting and preserving local cultures.

U.S. per capita GDP was estimated to be approximately \$56,249 in 2015 (BEA, 2015). By contrast, per capita GDP for the insular areas averages to less than \$20,000, although there is great variability in income across areas (Table ES-2).

Table ES-2. Economic Characteristics by Insular Area

	Estimated Population (# in 2014)	Estimated Employment (#)	Estimated Employee Compensation (\$'000, 2015\$)	GDP (\$'000, 2015\$)	GDP per Capita (2015\$)
American Samoa	55,430	13,692	191,344	723,444	13,051
Guam	167,500	62,530	1,378,051	5,534,962	33,045
Northern Mariana Islands	54,540	24,838	567,766	693,936	12,723
U.S. Virgin Islands	104,200	38,454	1,349,235	3,858,368	37,028
Micronesia	104,000	14,818	61,491	321,734	3,094
Marshall Islands	52,900	10,624	107,642	194,241	3,672
Palau	21,100	10,086	98,169	250,916	11,892
United States	318,900,000				56,249

Sources: 2014 population estimates were obtained from the World Bank (2015b). Data on estimated 2015 GDP and GDP per capita for the four U.S. territories were collected from the Bureau of Economic Analysis (BEA) (2015) and are presented in 2015 terms. Data on estimated employment and employee compensation for the four U.S. territories are RTI estimates based on IMPLAN (2013). Data on estimated 2014 population, 2015 GDP, and GDP per capita for the three FAS were obtained from Pacific & Virgin Islands Training Initiatives (PITI-VITI) (2015a, 2015b, 2015c). 2015 GDP per capita for the United States was from the World Bank (2015a, 2015b). RTI constructed estimated employment and employee compensation statistics for the three FAS based on data obtained from PITI-VITI (2015a, 2015b, 2015c). The construction of this data for each insular area is explained in more detail in the full report.

For FY 2015, \$580 million of OIA's \$614 million budget was distributed directly to insular areas for technical assistance, grants, and payments to the insular areas, of which a large majority is considered mandatory, essential assistance to provide basic services or defined by law, while only a small percentage is considered discretionary (OIA, 2015b). OIA payments fund health care, education, government operations, roads, and other types of social and physical infrastructure. From a budgetary standpoint, payments can be separated into three primary categories (Table ES-3):

- *Fiscal payments*, which are the return of taxes collected by the U.S. federal government to Guam and the U.S. Virgin Islands, as required by law
- *Assistance to Territories*, which provides general technical assistance; finances education and health care operations; funds and maintains essential infrastructure; and supports environmental initiatives, including brown tree snake control and the Coral Reef Initiative
- *Compact of Free Association*, which distributes annual payments to FAS, per their treaties with the United States, and provides support to the U.S. western Pacific territories and Hawaii to offset the impact the Compact has on regional social infrastructure

Table ES-3. FY 2015 OIA Payments by Insular Area

	Assistance to Territories (\$'000; 2015\$)	Compact of Free Association— Current (\$'000; 2015\$)	Compact of Free Association— Permanent (\$'000; 2015\$)	Fiscal Payments (\$'000; 2015\$)	Total OIA Payments (\$'000; 2015\$)
American Samoa	35,209	—	22	—	35,231
Guam	10,605	—	14,907	78,468	103,980
Northern Mariana Islands	13,686	—	2,310	—	15,996
U.S. Virgin Islands	4,343	—	—	220,346	224,689
Micronesia	772	0	107,885	—	108,656
Marshall Islands	1,863	500	74,511	—	76,873
Palau	994	13,651	0	—	14,645
Other ^a	18,504	2,314	12,762	—	33,580
Total	85,976	16,465	212,396	298,814	613,651

^a This other category represents payments being spent outside the seven insular areas, such as Washington, DC; Hawaii; and others.

Source: RTI estimates based on detailed budget information provided by OIA (2015a, 2015b)

ES.2 Study Methodology

Total economic impacts are the sum of direct economic impact and indirect/induced economic impact resulting from recipient organizations' consumption of goods and services and household spending by organizations' employees. RTI reviewed employment, employee compensation, and activity trends for each insular area to estimate the direct impact of OIA payments.

In 2012, economic data for the U.S. Territories—American Samoa, Guam, Northern Mariana Islands, and the U.S. Virgin Islands—became available. This was an indirect result of OIA funding given to BEA to develop more robust economic data for the U.S. territories. Unlike the economic base analysis model, an input/output (I/O) modeling framework allows specific multipliers to be calculated for each industry. Although the economic base analysis performed can use more recent data, it often relies on an amalgamation of various sources. Using the input-output analysis to estimate the economic impacts of OIA payments produces more accurate results because data come from a single data source.

For FAS—Micronesia, Marshall Islands, and the Republic of Palau—indirect/induced impacts were estimated using economic base analysis (EBA). The reasoning underlying EBA is that an individual region's economic activity is derived from its "base" or "primary" sectors, which are defined as those sectors whose revenue is received primarily from outside the

region. Base sectors often include manufacturing, mining, agriculture, and fisheries that produce goods for export and activities that are funded by the U.S. federal government and aid organizations. EBA is best applied to small, relatively specialized regions whose economies rely to a larger extent on exports (Wang and vom Hofe, 2007). Consequently, this methodological approach is well suited to studying the economies of the FAS.

RTI also conducted a supplemental analysis of the economic impact of OIA spending on Washington, DC, and Hawaii.

ES.3 Economic Impact Results

RTI estimated the direct, indirect/induced, and total economic impacts of OIA payments on each insular area in terms of employment, employee compensation, and GDP. Estimates of local employment supported by OIA payments are presented in Table ES-4.

Table ES-4. Estimated Employment Impact of OIA Payments (FY 2015)

	Direct Employment Impact (#)	Indirect/Induced Employment Impact (#)	Total Employment Impact (#)	National Employment Supported by OIA Payments (%)
American Samoa	1,018	118	1,137	8%
Guam	3,284	137	3,421	5%
Northern Mariana Islands	681	128	809	3%
U.S. Virgin Islands	5,473	578	6,052	16%
Micronesia	2,765	5,856	8,621	58%
Marshall Islands	1,958	2,746	4,704	44%
Palau	318	581	899	9%

Source: RTI estimates for the four U.S. territories are based on IMPLAN (2013). Estimates for the three FAS were based on PITI-VITI (2015a, 2015b, 2015c).

In the cases of the Marshall Islands and Micronesia, a significant portion of national employment is directly and indirectly supported by OIA payments. Approximately 58% of total recorded employment in Micronesia was either directly or indirectly supported by OIA payments. These data do not include subsistence agriculture or fishing.

Estimates of the amount of employee compensation supported by OIA payments are presented in Table ES-5.

Table ES-5. Estimated Employee Compensation Impact of OIA Payments (FY 2015)

	Direct Employee Compensation Impact (\$'000, 2015\$)	Indirect/Induced Employee Compensation Impact (\$'000, 2015\$)	Total Employee Compensation Impact (\$'000, 2015\$)	National Employee Compensation Supported by OIA Payments (\$'000, 2015\$)
American Samoa	27,421	2,008	29,429	15%
Guam	97,201	2,857	100,059	7%
Northern Mariana Islands	13,781	1,862	15,643	3%
U.S. Virgin Islands	222,373	16,814	239,187	18%
Micronesia	12,813	32,555	45,368	74%
Marshall Islands	21,475	25,755	47,231	44%
Palau	3,945	6,417	10,363	11%

Source: RTI estimates for the four U.S. territories are based on IMPLAN (2013). Estimates for the three FAS were based on PITI-VITI (2015a, 2015b, 2015c).

In the cases of the Marshall Islands and Micronesia, a significant portion of national employee compensation is directly and indirectly supported by OIA payments. For example, approximately 74% of total estimated recorded employee compensation in the Federated States of Micronesia is either directly or indirectly supported by OIA payments.

Estimates of the amount of GDP supported by OIA payments are presented in Table ES-6. Based on RTI's analysis of the economics of each insular area, we determined that for every \$1.00 of GDP directly supported by OIA payments, approximately \$0.70 of GDP was supported elsewhere in the insular economy, on average. As a result, a significant portion of national employee compensation is directly and indirectly supported by OIA payments. For example, approximately 54% of total GDP in the Marshall Islands is either directly or indirectly supported by OIA payments.

Table ES-6. Estimated GDP Impact of OIA Payments (FY 2015)

	Direct GDP Impact (\$'000, 2015\$)	Indirect/Induced GDP Impact (\$'000, 2015\$)	Total GDP Impact (\$'000, 2015\$)	National GDP Supported by OIA Payments (%)
American Samoa	35,231	9,550	44,781	6%
Guam	103,980	24,616	128,596	2%
Northern Mariana Islands	15,996	8,065	24,061	3%
U.S. Virgin Islands	224,689	120,156	344,845	9%
Micronesia	85,109	175,445	260,554	81%
Marshall Islands	47,649	57,179	104,828	54%
Palau	9,874	27,775	37,649	15%

Source: RTI estimates for the four U.S. territories are based on IMPLAN (2013). Estimates for the three FAS were based on PITI-VITI (2015a, 2015b, 2015c).

In addition to the analysis of the seven insular areas, RTI also conducted a supplemental analysis of the economic impact of OIA operations in Washington, DC, and Hawaii. RTI estimated that approximately \$10.7 million of OIA's operating budget was spent in Washington, DC, and approximately \$19.0 million in Hawaii for OIA operations and to offset the impact Compact provisions have on Hawaii's social infrastructure. To estimate the economic impacts, RTI used IMPLAN modeling software to construct input-output models of each region. Using these models, RTI estimated that OIA's operations and payments would directly support 54 jobs in Washington, DC, receiving approximately \$8.9 million of employee compensation, and support a total output of \$10.73 million. In Hawaii, OIA spending in FY 2015 is estimated to support 157 employees, receiving \$11.96 million of employee compensation, and a total output of \$19.04 million.

1. INTRODUCTION

The Office of Insular Affairs (OIA) contracted with RTI International to estimate the economic impacts of federal payments and grants from fiscal year (FY) 2015 to U.S.-affiliated insular areas. These areas are the U.S. territories of American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and the U.S. Virgin Islands (USVI), and the freely associated states (FAS) of the Republic of the Marshall Islands (RMI), the Federated States of Micronesia (FSM), and the Republic of Palau.

Out of its budget of \$614 million, OIA distributed approximately \$580 million in technical assistance, grants, and payments directly to the insular areas during FY 2015. These payments play an important role in each area’s economy, supporting local jobs and providing employee compensation in regions. The economic characteristics of these areas are displayed in Table 1-1.

Table 1-1. Economic Characteristics by Insular Area

	Estimated Population (2014 #)	Estimated Employment (#)	Estimated Employee Compensation (\$'000, 2015\$)	GDP (\$'000, 2015)	GDP per Capita (2015\$)
American Samoa	55,430	13,692	191,344	723,444	13,051
Guam	167,500	62,530	1,378,051	5,534,962	33,045
Northern Mariana Islands	54,540	24,838	567,766	693,936	12,723
U.S. Virgin Islands	104,200	38,454	1,349,235	3,858,368	37,028
Micronesia	104,000	14,818	61,491	321,734	3,094
Marshall Islands	52,900	10,624	107,642	194,241	3,672
Palau	21,100	10,086	98,169	250,916	11,892
United States	318,900,000				56,249

Sources: 2014 population estimates were obtained from the World Bank (2015b). Data on estimated 2014 GDP and GDP per capita for the four U.S. territories were collected from the BEA (2015) and are presented in 2015 terms. Data on estimated employment and employee compensation for the four U.S. territories are RTI estimates based on IMPLAN (2013). Data on estimated 2014 population, 2015 GDP, and GDP per capita for the three FAS were obtained from Pacific & Virgin Islands Training Initiatives (PITI-VITI) (2015a, 2015b, 2015c). 2015 GDP per capita for the United States was from the World Bank (2015a, 2015b). RTI constructed estimated employment and employee compensation statistics for the three FAS based on data obtained from PITI-VITI (2015a, 2015b, 2015c).

Because the insular areas are not included in many U.S. statistical surveys of economic activity, critical data on local economic activity are often not captured. To some degree this changed through OIA funding of the Bureau of Economic Analysis (BEA) to develop better economic data for U.S. territories under the Statistical Improvement Project. BEA provides

benchmark I/O data for the United States. The benchmark accounts show how industries interact at the detailed level; specifically, they show how more than 500 industrial sectors provide input to, and use output from, each other to produce gross domestic product (GDP).¹ These data are now available for U.S. territories, and they were used for this report.

In this study, RTI estimated direct economic impacts and multipliers for estimating total economic impact, which includes indirect and induced impacts, for each of the seven insular area's economies. Analysis results were designed to be integrated into a larger report that estimates the economic benefits of lands and other resources managed by the Department of the Interior (DOI), thus enabling OIA to report on its economic impacts in the same manner as other Department offices and bureaus (DOI, 2013).

1.1 FY 2015 OIA Payments to Insular Areas

In FY 2015, OIA's total budget was \$614 million, of which \$580 million was spent directly in the insular areas to provide assistance, grants, and compacts to the insular areas during the fiscal year. In this report, all assistance, grants, and compacts are referred to collectively as "payments," the majority of which are considered mandatory (OIA, 2015b). OIA payments fund health care, education, government operations, roads, and other types of social and physical infrastructure. From a budgetary standpoint, payments can be separated into three primary categories:

- *Fiscal payments*, which are the return of taxes collected by the U.S. federal government to Guam and the USVI, as required by law
- *Assistance to Territories*, which provides general technical assistance; finances education and health care operations; funds and maintains essential infrastructure; and supports environmental initiatives, including Brown Tree Snake Control and the Coral Reef Initiative
- *Compact of Free Association*, which distributes annual payments to FAS, per their treaties with the United States, and provides support to the U.S. western Pacific territories and Hawaii to offset the impact the Compact has on regional social infrastructure

For the purposes of this analysis, RTI received detailed budget information from OIA, which was then used to estimate expenditures in each insular area related to OIA payments (Table 1-2). Although this determination was typically straightforward, in some cases determining where spending would be directed was not possible using readily available information.

¹ These accounts provide detailed information on the flows of the goods and services that make up the production processes of industries. See <http://www.bea.gov>.

Table 1-2. FY 2015 OIA Payments by Insular Area

	Assistance to Territories (\$'000, 2015\$)	Compact of Free Association— Current (\$'000, 2015\$)	Compact of Free Association— Permanent (\$'000, 2015\$)	Fiscal Payments (\$'000, 2015\$)	Total OIA Payments (\$'000, 2015\$)
American Samoa	35,209	—	22	—	35,231
Guam	10,605	—	14,907	78,468	103,980
Northern Mariana Islands	13,686	—	2,310	—	15,996
U.S. Virgin Islands	4,343	—	—	220,346	224,689
Micronesia	772	0	107,885	—	108,656
Marshall Islands	1,863	500	74,511	—	76,873
Palau	994	13,651	0	—	14,645
Other ^a	18,504	2,314	12,762	—	33,580
Total	85,976	16,465	212,396	298,814	613,651

^a This other category represents payments being spent outside the seven insular areas, such as Washington, DC; Hawaii; and others.

Sources: RTI estimates based on detailed budget information provided by OIA (2015a, 2015b).

1.2 Study Objectives

The objectives of this study were to

- estimate the direct economic impacts of OIA payments and indirect/induced multipliers and impacts relevant for OIA grant and payment categories for each insular area;
- review FY 2015 grants and payments and determine affected economic sectors for the American Samoa Operations Grant, Brown Tree Snake Control, Compact of Free Association (permanent and current), Coral Reef Initiative, covenant grants, maintenance assistance fund, return of federal taxes to U.S. Virgin Islands and Guam, and technical assistance;
- model the direct and indirect/induced economic impacts of FY 2015 grants and payments for each insular area and for each payment category; and
- prepare a final report that summarizes assumptions and provides tabular data on economic impacts.

1.3 Overview of Study Methodology

In 2012, input-output data for the U.S. Territories—American Samoa, Guam, Northern Mariana Islands, and the U.S. Virgin Islands—became available following the Statistical Improvement Project. In contrast to the economic base analysis approach used for all insular areas in previous reports, an I/O modeling framework allows more specific

multipliers to be calculated for each industry.² I/O models use multipliers to simulate how employment or income generated in one industry can generate additional jobs, income, and output in other industries and for the region's economy as a whole. This allows for greater precision relative to using the economic base multiplier for all sectors. We used the IMPLAN software tool.

Although the economic impacts of government spending for the U.S. territories are estimated using I/O models, no I/O data were available for the three Freely Associated States (FAS), Federated States of Micronesia, Marshall Islands, and the Republic of Palau. As such, RTI developed multipliers for the FAS using economic base analysis.³

The reasoning underlying EBA is that an individual region's economic activity is derived from its "base" or "primary" sectors, which are defined as those sectors whose revenue is received primarily from outside the region—base sectors typically include manufacturing firms, mines, and farms that produce goods for export and activities that are funded by the federal government (Klosterman, 1990). As a result, EBA is best applied to small, relatively specialized regions whose economies rely to a larger extent on exports (Wang and vom Hofe, 2007). Consequently, this methodological approach is well suited to studying the economies of the insular areas.

Estimating the economic impact of federal funds on economic aggregates like regional employment is typically accomplished using a simple mathematical representation of a region's economy, such as

$$\Delta Y = s * \Delta X \tag{1.1}$$

where

ΔY is the change in total employment,

ΔX is the change in base-sector employment (direct impact), and

s is total employment/base-sector employment (the base employment multiplier).

² The IMPLAN data for each U.S. Territory is based on data calculated by the BEA for the territories in 2009.

³ Other researchers have used I/O models for Hawaii to model economic impacts for U.S. insular territories; however, RTI does not recommend this approach because it assumes that the economic structure of the insular area is the same as that for Hawaii (see Pike [2007]). The model is also static and does not adjust for sectoral responses to materially significant shocks. Another alternative, but one that requires extensive data collection, would be the same as that employed in a 2008 analysis performed for the Department of Commerce and American Samoa (see ASDC [2008]). This latter method is resource intensive but may narrow the confidence interval surrounding economic multipliers.

This model represents how an increase in base-sector employment will generate a larger increase in the region's total employment because of the ripple effect as new base-sector employees spend money on locally produced goods and services. This ripple effect is quantified by the "s" term, called the "base employment multiplier," which is typically estimated by taking the ratio of total employment to base-sector employment.

Using this core approach as a starting point for modeling the economy of each FAS, RTI estimated economic impacts in a short time period using available economic data. First, RTI computed an estimate of direct impacts for each of the grant and payment categories. This entailed combining these data with existing information on employment and income associated with government spending and other economic activities. Direct impacts are usually computed using ratios of employment or income created per dollar of government funding that have been derived from historical data. Second, to estimate the combined indirect and induced impact, RTI calculated multipliers for employment, income, and GDP by examining the economic structure and activities of each FAS.

To obtain more accurate measures of the direct employment impact of OIA payments, one must obtain an understanding of who receives these payments and what they are being spent on. For example, OIA payments used to fund a construction project will have different employment impacts than OIA payments used to fund education. Therefore, the first question asked when creating a more refined analysis is how OIA payments should be classified or treated as direct impacts. For the purposes of this study, OIA payments can be classified in six different ways:

- Education: payments associated with training or education inside the relevant insular area.
- Construction: payments associated with building new or maintaining existing structures.
- Government: payments associated with general government operations or general technical assistance.
- Health care: payments associated with providing medical and other health care services.
- Private: this classification is used only for payments to the Prior Service Benefits program. Beneficiaries receive this money in appreciation for their service during World War II, and it generates an economic impact when recipients spend it on goods and services. Because data are not available on the spending behavior of these beneficiaries, precise output and employee compensation to employee ratios was difficult to obtain. Therefore, RTI typically used ratios that represented averages for the private nonagricultural sector and assumed 100% of beneficiary funds were spent locally.

- Wholesale: payments associated with purchasing goods or equipment from local wholesalers (companies involved in the resale, sale without transformation, of new and used goods to retailers; to industrial, commercial, institutional, or professional users; or to other wholesalers). This treatment assumes that the goods or equipment themselves were not manufactured in the insular area.

In addition to improving our classification of OIA payments, this study sought to refine economic impact estimates in a second way. Generally, only standard industries (agriculture, mining, manufacturing, and federal government) were assumed to be part of the economic base. However, many insular areas attract a number of tourists, which also contributes to the economic base. Similarly, government operations that are funded from external sources should also be included in measures of economic base employment and employee compensation.

1.4 Methodological Limitations

Although I/O and EBA have several advantages that make them the most reasonable methodological approaches, several limitations are associated with it that one must keep in mind when interpreting analysis results.

First, the quality of economic base multipliers relies heavily on the quality of the data being used. Most developing areas have a substantial informal sector composed of subsistence agriculture and fishing, domestic aids, street vendors, producers of clothing and handicrafts, and other workers whose occupation and income often go unreported.

Although accurate data on the size and makeup of the informal sector are difficult to gather, the informal sector in developing island areas was assumed to make up a significant percentage of official employment and income statistics. In a study of 110 countries, Schneider (2002) found that the informal sector made up 41% of official gross national income in developing countries and 38% in transition countries. Lal and Raj (2006) compiled data on the informal sector in developing island nations (data on the insular areas were not included) and found that self-employment as a percentage of total nonagricultural employment averaged 35% for the six islands for which these data were available. Data on the informal sector in the Pacific Island areas may be particularly difficult to obtain because, as a result of the rural nature of these areas, most informal workers operate from homes rather than working as street vendors, transportation providers, or other typically urban occupations (Duncan and Voigt-Graf, 2008).

Because of the size of the informal sector in the insular areas, much of the data used in this analysis likely underestimate employment, labor income, and GDP. Subsistence agriculture often makes up a substantial portion of unreported employment. A 1996 survey in Palau estimated the value of the primarily agricultural informal sector at \$5 million, or twice the size of the recorded agricultural sector in that year. Most of these goods, however, are

consumed by the household and traded informally and do not reach the market (FAO, 2006).

Second, with EBA, the division between base and nonbase sectors is often unclear. In this analysis, RTI used standard assumptions for identifying which sectors are considered base and nonbase. However, companies within these sectors are often engaged in satisfying both local and external demand. For example, local manufacturers may produce products that are exported and also consumed by local residents. This concern can often be minimized by using techniques for better estimating the portions of each sector that are truly base and nonbase (for example, surveys can be used to collect this information directly from local businesses); however, given the time and data constraints, these techniques were not feasible for this analysis.

Third, EBA in particular focuses exclusively on external demand. Therefore, supply constraints are assumed to not be binding, and nondemand factors that may contribute to regional growth are ignored (such as capital accumulation or productivity improvements). Because supply-side considerations are typically most important for long-term growth, EBA is best suited for short-term analyses.

1.5 Data Limitations

For the FY 2014 analysis, we were able to better estimate GDP base multipliers for each insular area and used newly available I/O data for U.S. territories. This higher level of analysis was possible because of new estimates of GDP released by the BEA in September 2014; this data was not updated in time for the FY 2015 report. Up-to-date employment, employee compensation, and GDP data were available for the FAS through new reports released in August 2015 by PITI-VITI. These reports helped better estimate aspects of the base economy.

When possible, we incorporated newer economic data into the FY 2015 EBA model in order to update the output-to-employee and employee compensation-to-employee ratios, as well as the base multipliers. These data are essential to determining the direct and indirect impacts of OIA payments, and we believed these inclusions would better describe the significance of funding given the changing economies of the insular areas. Incorporating these new data sets did, however, cause some of the data to come from differing years. For example, to achieve updated employee compensation-to-employee ratios for the U.S. territories, we used newly released data from the 2013 County Business Patterns (released by the U.S. Census in May 2015). However, these data sets lacked information about sales in each sector, and output-to-employee ratios could not be determined. RTI had to rely on the 2012 Economic Census for these ratios. During periods of decline and recovery, output-to-employee tends to increase (BEA, 2013); Bureau of Labor Statistics [BLS], 1986). The data from the Census also often exclude information about agricultural and public-sector

employment, which leads to even more agglomeration of sources and assumptions to complete the employment statistics.

For the FAS, economic data rely on studies that are funded by the OIA through the PITI-VITI educational program. Although we were able to update employment data and employment compensation-to-employee ratios for each of these areas, data on output were unavailable. Therefore, we had to assume that the output-to-employee for these three areas was comparable to that of American Samoa or in the case of Micronesia, the Commonwealth of Northern Marinas Islands (CNMI). These was chosen as the best U.S. Territory comparison because they were the most similar to the FAS in terms of GDP per capita and other economic measures. This assumption is also likely an overestimate of the FAS's true output-to-employee ratio because they have a higher GDP per capita. The use of American Samoa and CNMI data as a proxy will likely underestimate the impacts of OIA spending because more jobs will be supported by each dollar of OIA spending.

1.6 Report Organization

A separate report section detailing the payments, economic multipliers, and economic impacts was prepared for each insular area (Sections 2 through 8). In addition, a section for Washington, DC, and Hawaii was prepared (Section 9), because OIA locates significant operations in these regions. Section 10 summarizes economic impact data for all FY 2015 payments.

2. AMERICAN SAMOA

2.1 FY 2015 OIA Payments Summary

American Samoa faces a number of obstacles to economic development, including limited land and resources, a small population, limited local technical expertise, a narrow economic base, and vulnerability to natural disasters. The American Samoa economy is highly dependent on the tuna cannery industry, which accounts for the majority of its exports. In 2009, one of two major tuna canneries closed because of foreign competition, and this closure has caused economic decline and unemployment. Also in 2009, American Samoa was affected by an earthquake and tsunami. In 2013, American Samoa's GDP shrank 2.4%. That drop followed a 2.7% loss in 2012. By contrast, real GDP for the United States (excluding the territories) increased 2.2% in 2013 and 2.8% in 2012 (OIA, 2015a). The average GDP per capita for American Samoa in 2014 was \$13,051 (in 2015 U.S. dollars) compared with approximately \$56,249 in the United States (BEA, 2015).

OIA strives to foster economic development, promote sound management, and improve quality of life in American Samoa. OIA payments to American Samoa in FY 2015 totaled \$35 million and were primarily directed toward the government and construction sectors with additional support for education and health care (Table 2-1).

The largest block of OIA payments came in the form of Assistance to Territories funding, the largest proportion of which is operations grants that total \$22.8 million. These grants are used to fund basic Samoan government operations and to support the American Samoa High Court (the highest court in American Samoa excluding the U.S. Supreme Court) and the operation of the LBJ Hospital. The American Samoa Operations Grants made up approximately 15% of American Samoa's general fund and 13% of LBJ Hospital's revenue (OIA, 2015a).

Other Assistance to Territories funding, totaling \$12.5 million, was used to fund economic development programs, judicial training, and other initiatives such as the Compact Impact Discretionary, which provides funding to offset impacts to the educational systems from immigration of FAS citizens, as well as the PITI-VITI. PITI-VITI was established to assist island governments in developing superior leadership, financial stability, accountability, program effectiveness, and economic growth.

Table 2-1. American Samoa: OIA Payments (FY 2015)

Appropriation	Spending (\$'000; 2015\$)	Impact Treatment
Compact of Free Association		
Compact impact	22	Education
<i>Total, Compact of Free Association</i>	22	
Assistance to Territories		
American Samoa operations grant—Basic operations	12,639	Government
American Samoa operations grant—LBJ hospital operations	7,900	Health Care
American Samoa operations grant—High court	855	Government
<i>American Samoa operations grant—ASCC Operations</i>	1,358	Government
<i>Subtotal, American Samoa Operations Grants</i>	22,752	
General technical assistance—Direct Grants	1,144	Government
General technical assistance—USDA Grad School PITI-VITI	83	Education
General technical assistance—Close-Up Foundation	36	Education
General technical assistance—NEPA review	39	Government
<i>General technical assistance—Judicial Training</i>	40	Government
<i>Subtotal, General Technical Assistance</i>	1,343	
Empowering Insular Communities		
Wholesale Purchases	503	Wholesale
Installations	503	Construction
Capacity Building	503	Government
<i>Subtotal, Empowering Insular Communities</i>	1,508	
American Samoa construction	9,297	Construction
Coral Reef Initiative	116	Government
Office of Insular Affairs	191	Government
Compact Impact Discretionary	2	Education
<i>Subtotal, Other Assistance to Territories</i>	9,606	
<i>Total, Assistance to Territories</i>	35,209	
Total Spending Inside American Samoa	35,231	

Source: RTI estimates based on OIA (2015a, 2015b).

In addition to funding received from OIA's Assistance to Territories, American Samoa also received \$22,000 through the Compact of Free Association Compact Impact Grant, which offsets costs incurred by American Samoan health, educational, and social systems from immigration of FAS residents. American Samoa allocated its FY 2015 appropriated compact impact payments toward training materials and equipment for the education of college nursing students.

2.2 Economic Impacts of OIA Payments Using Input-Output Analysis

To determine the direct impacts of OIA payments in American Samoa, the payments from Table 2-1 were each applied to a corresponding IMPLAN sector code. Direct impacts were estimated using output and employee compensation-to-employee ratios within the IMPLAN modeling system. The direct employment, employee compensation, and output inputs are reported in Table 2-2.

We estimated that the \$35.2 million spent in American Samoa directly supported 1,020 jobs and \$20.7 million in employee compensation. These direct impacts were multiplied by Type II Social Accounting Matrix multipliers to estimate the total impact of OIA payments on the region's economy. The relevant multipliers that were estimated for this analysis are reported in Table 2-3. Note the OIA payments from 2015 are treated as the output inputs.

Using these multipliers, we compute the total economic impacts associated with OIA payments to American Samoa. The total economic impacts of this activity in American Samoa support 1,137 employees, \$29.4 million in employee compensation, and \$44.8 million in GDP. These results are displayed in Table 2-4.

Table 2-2. American Samoa: Direct Economic Impacts of OIA Payments Using I/O Analysis (FY 2015)

Industry	IMPLAN Code	FY2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
State and Local Government, non-Education	437	15,527	\$30,457	\$30,457	510	15,527
State and Local Government, Education	438	1,501	\$22,252	\$22,252	67	1,501
Hospitals	397	7,900	\$36,387	\$27,372	217	5,943
Wholesale trade business	319	503	\$1,033,000	\$15,815	0	8
Maintenance and construction	39	9,800	\$43,850	\$19,878	223	4,442
Total		35,231			1,018	27,421

Source: RTI estimates based on IMPLAN (2013).

Table 2-3. American Samoa: Selected IMPLAN Multipliers by Industry

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
State and local government, noneducation	437	1.12	1.07	1.32
State and local government, education	438	1.09	1.07	1.32
Hospitals	397	1.12	1.07	1.25
Wholesale trade business	319	1.90	1.89	1.07
Maintenance and repair construction of nonresidential structures	39	1.11	1.10	1.21

Source: RTI estimates based on IMPLAN (2013).

Table 2-4. American Samoa: Total Economic Impacts Using I/O Analysis (FY 2015)

Industry Description	IMPLAN Code	Total Employment Impact (# of workers)	Total Employee Compensation Impact (\$'000 2015\$)	Total Output Impact (\$'000 2015\$)
State and local government, noneducation	437	571	\$16,576	\$20,469
State and local government, education	438	73	\$1,603	\$1,979
Hospitals	397	242	\$6,368	\$9,903
Wholesale trade business	319	1	\$15	\$535
Maintenance and repair construction of nonresidential structures	39	249	\$4,868	\$11,895
Total		1,137	\$29,429	\$44,781

Source: RTI estimates based on IMPLAN (2013).

The significance of OIA's economic contributions can be better understood when viewed in relation to the American Samoa economy as a whole, which is summarized in Table 2-5. As this table illustrates, the 1,137 jobs directly and indirectly supported by OIA payments represent 8% of American Samoa's estimated total employment. Similarly, \$29.4 million of employee compensation associated with these employees accounts for approximately 15% of total employee compensation inside the region, and the \$44.8 million of GDP associated with these employees represents 6% of total GDP produced by the insular area.

Table 2-5. American Samoa: Estimated Impact Relative to National Economy (FY2015)

	Total Economic Impact for FY2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	1,137	13,692	8%
Employee compensation (\$'000; 2015\$)	29,429	191,344	15%
GDP (\$'000; 2015\$)	44,781	723,444	6%

Source: RTI estimates based on IMPLAN (2013).

3. GUAM

3.1 FY 2015 OIA Payments Summary

Although among the wealthier of the insular areas, Guam continues to face challenges in implementing effective government, health care, and education systems. Guam's economy is largely based on tourism from Asia and is, therefore, sensitive to regional consumer spending trends. Tourism sectors like accommodations and amusement have only recently begun to experience growth after years of decline. Guam is also experiencing growth due to proposed relocation of 5,000 U.S. Marines and roughly 1,300 dependents from the military base in Okinawa, Japan, to the insular area by 2021. Major construction and infrastructure improvements are underway in preparation for the move, which recently cleared the last regulatory hurdle (Olson, 2015).

In addition to the relocation of U.S. Marines, the US Navy's Joint Program Office issued an Environmental Impact Statement that estimated a far greater impact resulting from the military realignment. According to the study, the total military population on Guam would increase by 30,190, including 9,182 permanent military personnel, 9,950 dependents, 9,222 transient military personnel, and 1,836 civilian workers (Kan, 2013). Additionally, nearly 80,000 construction workers and contractors could be present at the height of relocation in 2014. Due to this study there was significant push back from the local population on Guam and the proposed number of military personnel was decreased to the number mentioned in the preceding paragraph. This will still likely lead to a significant increase in population during the relocation and construction periods.

The Department of Defense has been the largest contributor to GDP in recent years as the federal government has been supporting construction and infrastructure preparations on the island (BEA, 2012). From 2011 to 2012, real GDP of Guam grew by 0.5% (BEA, 2013). The average GDP per capita for Guam in 2014 was \$33,045 (2015\$), about 60% of the GDP per capita of the United States (\$56,249) (BEA, 2015).

OIA payments to Guam in FY 2015 totaled \$103.98 million and were primarily directed to the government sector with additional support for education and construction. A detailed breakdown of OIA payments is presented in Table 3-1. The largest block of OIA payments, totaling \$78.5 million, came in the form of fiscal payments associated with Section 30 Income Taxes. These are funds transferred by OIA from the U.S. Treasury to Guam and largely consist of federal income taxes paid by military personnel stationed on Guam, immigration fees, and miscellaneous duties (Limtiaco, 2008). OIA also provided nearly \$15 million through the Compact of Free Association, which Guam intends to use for a variety of equipment purchases and infrastructure.

Table 3-1. Guam: OIA Payments (FY 2015)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Fiscal Payments		
Guam Section 30 income taxes	78,468	Government
<i>Total, Fiscal Payments</i>	<i>78,468</i>	
Compact of Free Association		
DOE/DPW Schools Leaseback	7,100	Education
DOE/DPW Operations Offset	607	Government
DPHSS Operations Offset	4,200	Healthcare
GMHA Operations Offset	3,000	Healthcare
DOE/DPW Operations Offset	607	Government
Balance	-606	Government
<i>Total, Compact of Free Association</i>	<i>14,907</i>	
Empowering Insular Communities		
Wholesale Purchases	366	Wholesale
Installations	366	Construction
Capacity Building	366	Government
<i>Subtotal, Empowering Insular Communities</i>	<i>1,097</i>	
Assistance to Territories		
General technical assistance—USDA Grad School PITI-VITI		
General technical assistance—NEPA review	36	Government
General technical assistance—Close-Up Foundation	43	Education
General technical assistance—Judicial Training	37	Government
<i>Subtotal, General Technical Assistance</i>	<i>2,127</i>	
Brown Tree Snake Control		
Northern Mariana Covenant Grants—Guam construction	5,795	Construction
Maintenance assistance		
Coral Reef Initiative	95	Government
Compact Impact Discretionary	1,491	Education
<i>Subtotal, Other</i>	<i>7,381</i>	
<i>Total, Assistance to Territories</i>	<i>10,605</i>	
Total Spending Inside Guam	103,980	

Source: RTI estimates based on OIA (2015a, 2015b).

Guam received \$2.1 million through the Assistance to Territories—General Technical Assistance payments, which provided direct grants, judicial training, and funding for the PITI-VITI and the Close-Up Foundation. The Close Up Foundation is a civic education

program designed to teach democracy and citizenship and improve civic education in the insular areas. Other technical assistance programs, which made up about \$8.5 million of the assistance to Territories payments, include infrastructure maintenance assistance, funding for Guam Construction, and Brown Tree Snake Control. The Brown Tree Snake Control program is intended to fund research and implementation techniques to eradicate this invasive species. OIA distributed funds for the Compact Impact Discretionary, which provides funding to offset impacts to the educational systems from immigration of FAS citizens.

3.2 Economic Impacts of OIA Payments Using Input-Output Analysis

To determine the direct impacts of OIA payments in Guam, the payments from Table 3-1 were each applied to a corresponding IMPLAN sector code. Direct impacts were estimated using output and employee compensation-to-employee ratios from the IMPLAN modeling system. The direct employment, employee compensation, and output inputs are reported in Table 3-2.

Table 3-2. Guam: Direct Economic Impacts of OIA Payments Using I/O Analysis (FY 2015)

Industry	IMPLAN Code	FY2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
State and local government, non-education	437	79,609	\$30,451	\$30,451	2,614	79,609
State and local government, education	438	10,645	\$22,248	\$22,248	478	10,645
Wholesale trade business	319	366	\$369,066	\$25,705	1	25
Maintenance and construction	39	6,161	\$45,978	\$35,505	134	4,757
Health Care	396	7,200	\$128,233	\$38,559	56	2,165
Total		\$103,980			3,284	\$97,201

Source: RTI estimates based on IMPLAN (2013).

We estimated that the \$103.98 million spent in Guam directly supported 3,284 jobs and \$97.2 million in employee compensation. These direct impacts were multiplied by Type II Social Accounting Matrix multipliers to estimate the total impact of OIA payments on the state's economy. The relevant multipliers that were estimated for this analysis are reported in Table 3-3. Note the OIA payments from 2015 are treated as the output inputs.

Table 3-3. Guam: Selected IMPLAN Multipliers by Industry

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
State and local government, noneducation	437	1.04	1.03	1.25
State and local government, education	438	1.03	1.03	1.25
Wholesale trade business	319	1.27	1.29	1.09
Maintenance and repair construction of nonresidential structures	39	1.05	1.03	1.21
Health care	396	1.12	1.07	1.13

Source: RTI estimates based on IMPLAN (2013).

By multiplying the direct impacts of each sector with their corresponding Type II SAM Multiplier, we can compute the total economic impacts associated with OIA payments to Guam. The total economic impacts of this activity in Guam support 3,421 employees, \$100.1 million in employee compensation, and \$128.6 million in GDP. These results are displayed in Table 3-4.

Table 3-4. Guam: Total Economic Impacts Using I/O Analysis (FY 2015)

Industry Description	IMPLAN Code	Total Employment Impact (# of workers)	Total Employee Compensation Impact (\$'000, 2015)	Total Output Impact (\$'000, 2015)
State and local government, noneducation	437	2,722	\$81,844	\$99,324
State and local government, education	438	493	\$10,943	\$13,281
Wholesale trade business	319	1	\$33	\$397
Maintenance and repair construction of nonresidential structures	39	141	\$4,912	\$7,466
Health care	396	63	\$2,327	\$8,129
Total		3,421	\$147,637	\$128,596

Source: RTI estimates based on IMPLAN (2013).

The significance of OIA's economic contributions can be better understood when viewed in relation to the Guam economy as a whole, which is summarized in Table 3-5. As this table illustrates, the 3,421 jobs directly and indirectly supported by OIA payments represent 5% of Guam's total employment. Similarly, \$100.1 million of employee compensation associated with these employees accounts for approximately 7% of total employee compensation inside

the region, and the \$128.6 million of GDP associated with these employees represents 4% of total GDP produced by the region.

Table 3-5. Guam: Estimated Impact Relative to National Economy (FY 2015)

	Total Economic Impact for FY2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	3,421	62,530	5%
Employee compensation (\$'000; 2015\$)	100,059	1,378,051	7%
GDP (\$'000; 2015\$)	128,596	5,534,962	2%

Source: RTI estimates based on IMPLAN (2013).

4. COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS (CNMI)

4.1 FY 2015 OIA Payments Summary

In 2014, the GDP per capita for CNMI was approximately \$12,723 (2015\$), approximately 23% of the U.S. GDP per capita \$56,249 (BEA, 2015). Once home to a billion-dollar garment industry, garment factories closed in the face of foreign competition; as a result, real GDP declined steadily. As measured by the annual rate of change, the CNMI's economy had its best year in 2013 since the beginning of official GDP data in 2002. The Commonwealth's real GDP increased 4.4% in 2013 that followed a 2.1% gain in 2012. For the period beginning in 2002 and ending in 2012, the CNMI's real GDP had dropped 52.7%, accompanied by a population loss of 29.8% and a per capita real GDP decrease of 32.6% (OIA, 2015a).

OIA payments to CNMI in 2015 totaled \$16 million and were primarily directed to the construction and government sectors with additional support for education and the private sector (Table 4-1). Assistance to Territories payments, totaling about \$13.7 million, made up the majority of funding to CNMI. General technical assistance, which made up \$2.3 million of all Assistance to Territories, provided payments for direct grants, judicial training, and PITI-VITI. Also included in general technical assistance were the Close Up Foundation, the CNMI Ombudsman's Office, CNMI Immigration, Labor and Law Enforcement General, Compact Impact (discretionary) and the Prior Service Benefits Program, which issues benefits to CNMI citizens who worked for the U.S. Navy or the U.S. Trust Territory of the Pacific Islands from 1944 through 1968. The remainder of the Assistance to Territories funding went to other activities such as the Coral Reef Initiative, maintenance assistance, construction, and Brown Tree Snake Control.

OIA also provided \$2.3 million through the Compact of Free Association, which CNMI intends to use for a variety of government purposes, including funding for the Department of Public Health and Division of Youth Services.

Table 4-1. CNMI: OIA Payments (FY 2015)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Compact of Free Association		
Department of Public Health	1,111	Government
Division of Youth Services	46	Government
Department of Public Safety	734	Government
Department of Corrections	122	Government
Office of Public Defender	17	Government
Northern Mariana College	53	Education
Public school system	126	Education
Karidat	37	Education
Judiciary	64	Government
Balance	0	Government
<i>Total, Compact of Free Association</i>	<i>2,310</i>	
Assistance to Territories		
General technical assistance—Direct Grants	677	Government
General technical assistance—USDA Grad School PITI-VITI	68	Education
General technical assistance—Close-Up Foundation	790	Education
General technical assistance—Prior Service	702	Private
General technical assistance—NEPA review	40	Government
General technical assistance—Judicial Training	42	Government
<i>Subtotal, General Technical Assistance</i>	<i>2,319</i>	
Empowering Insular Communities		
Wholesale purchases	122	Wholesale
Installations	122	Construction
Capacity building	122	Government
<i>Subtotal, Empowering Insular Communities</i>	<i>366</i>	
Brown Tree Snake Control	971	Government
Coral Reef Initiative	149	Government
Maintenance assistance	0	Government
Northern Mariana Covenant Grants—CNMI construction	9,565	Construction
Office of Insular Affairs	75	Government
Compact Impact Discretionary	231	Education
<i>Subtotal Other</i>	<i>11,001</i>	
<i>Total, Assistance to Territories</i>	<i>13,686</i>	
Total Spending Inside CNMI	15,996	

Source: RTI estimates based on OIA (2015b).

4.2 Economic Impacts of OIA Payments Using Input-Output Analysis

To determine the direct impacts of OIA payments in CNMI, the payments from Table 4-1 were each applied to a corresponding IMPLAN sector code. Direct impacts were estimated using output and employee compensation-to-employee ratios from the IMPLAN model software. For the Prior Service Benefits we used the average ratios of the entire private sector. The direct employment, employee compensation, and output inputs are reported in Table 4-2.

Table 4-2. CNMI: Direct Economic Impacts of OIA Payments Using I/O Analysis (FY 2015)

Industry	IMPLAN Code	FY2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
State and local government, non-education	437	4,179	\$30,457	\$30,457	137	4,179
State and local government, education	438	1,306	\$21,893	\$21,893	60	1,306
Wholesale trade business	319	122	\$172,723	\$12,138	1	9
Maintenance and repair construction of nonresidential structures	39	9,687	\$20,467	\$17,186	473	8,134
Private sector	—	702	\$67,793	\$14,858	10	154
Total		15,996			681	13,781

Source: RTI estimates based on IMPLAN (2013).

We estimated that the \$16.0 million spent in CNMI directly supported 681 jobs and \$13.8 million in employee compensation. These direct impacts were multiplied by Type II Social Accounting Matrix multipliers to estimate the total impact of OIA payments on the region's economy. For the private sector, we used the average multiplier across all private sector industries. The relevant multipliers that were estimated for this analysis are reported in Table 4-3. Note the OIA payments from 2015 are treated as the output inputs.

By multiplying the direct impacts of each sector with their corresponding Type II SAM Multiplier, we can compute the total economic impacts associated with OIA payments to CNMI. The total economic impacts of this activity in CNMI support 809 employees, \$15.6 million in employee compensation, and \$24.1 million in GDP. These results are displayed in Table 4-4.

Table 4-3. CNMI: Selected IMPLAN Multipliers by Industry

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
State and local government, noneducation	437	1.25	1.13	1.54
State and local government, education	438	1.18	1.13	1.54
Wholesale trade business	319	1.60	1.81	1.22
Maintenance and repair construction of nonresidential structures	39	1.17	1.14	1.50
Private sector	—	1.31	1.31	1.37

Source: RTI estimates based on IMPLAN (2013).

Table 4-4. CNMI: Total Economic Impacts Using I/O Analysis (FY 2015)

Industry Description	IMPLAN Code	Total Employment Impact (# of workers)	Total Employee Compensation Impact (\$'000, 2015)	Total Output Impact (\$'000, 2015)
State and local government, noneducation	437	172	\$4,705	\$6,446
State and local government, education	438	71	\$1,470	\$2,014
Wholesale trade business	319	1	\$15	\$149
Maintenance and repair construction of nonresidential structures	39	552	\$9,252	\$14,492
Private sector	—	14	\$201	\$960
Total		809	\$15,643	\$24,061

Source: RTI estimates based on IMPLAN (2013).

The significance of OIA's economic contributions can be better understood when viewed in relation to the CNMI economy as a whole, which is summarized in Table 4-5. As this table illustrates, the 809 jobs directly and indirectly supported by OIA payments represent 3% of CNMI's total employment. Similarly, \$15.6 million of employee compensation associated with these employees accounts for approximately 3% of total employee compensation inside the region, and the \$24.1 million of GDP associated with these employees represents 3% of total GDP produced by the region.

Table 4-5. CNMI: Estimated Impact Relative to National Economy (FY2015)

	Total Economic Impact for FY2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	809	24,838	3%
Employee compensation (\$'000; 2015\$)	15,643	567,766	3%
GDP (\$'000; 2015\$)	24,061	693,936	3%

Source: RTI estimates based on IMPLAN (2013).

5. U.S. VIRGIN ISLANDS (USVI)

5.1 FY 2015 OIA Payments Summary

In 2014, the GDP per capita in USVI was about \$37,028 (2015\$) compared with \$56,249 in the United States (BEA, 2015). USVI's economy relies heavily on tourism and oil refining. The economy of USVI shrunk in both 2012 and 2013, by 3.4% and 8.5% respectively. The sharp decline is largely attributable to decreases in exported goods and territorial government spending (BEA, 2013). One of the world's largest oil refineries, the Hovensa refinery, shut down operations on St. Croix in 2012, which greatly affected USVI's net trade (BEA, 2013). The petroleum refining industry primarily reflects the drop in GDP from 2012 to 2013.

OIA payments to USVI in 2015 totaled \$224.7 million (Table 5-1). The largest block of OIA payments to USVI came in the form of Rum Excise Tax Payments totaling \$220.3 million. Under current U.S. law, excise taxes are collected on rum imported into the United States that is not of USVI or Puerto Rican origin. A fixed percentage of these excise taxes is distributed by the U.S. government to USVI. Although this funding is not designated for a particular purpose, USVI generally uses it to finance public infrastructure or provide support to the rum industry (Maguire and Teefy, 2010). The Assistance to Territories—General Technical Assistance payments totaled about \$1.1 million and provided for general technical assistance for direct grants, the Close Up Foundation, and the PITI-VITI, which are jointly managed by the USDA Graduate School.

Through other Assistance to Territories programs, which made up \$3.2 million in payments, OIA funds items such as USVI construction as part of the Northern Mariana Covenant Grant, and the Coral Reef Initiative, which pursues the sustainable maintenance and protection of coral reefs through education, outreach programs, and the establishment of protected areas.

Table 5-1. USVI: OIA Payments (FY 2015)

Appropriation	Spending (\$'000; 2015\$)	Impact Treatment
Fiscal Payment		
USVI rum excise tax payments	220,346	Government
<i>Total, Fiscal Payments</i>	<i>220,346</i>	
Assistance to Territories		
General technical assistance—Direct Grants	929	Government
General technical assistance—NEPA review	39	Government
General technical assistance—USDA Grad School PITI-VITI	44	Education
General technical assistance—Close-Up Foundation	48	Education
General technical assistance—Judicial Training	39	Government
<i>Subtotal, General Technical Assistance</i>	<i>1,099</i>	
Coral Reef Initiative	181	Government
Northern Mariana Covenant Grants—USVI construction	3,063	Construction
Office of Insular Affairs		Government
<i>Subtotal, Other</i>	<i>3,244</i>	
<i>Total, Assistance to Territories</i>	<i>4,343</i>	
Total Spending Inside Virgin Islands	224,689	

Source: RTI estimates based on OIA (2015b).

5.2 Economic Impacts of OIA Payments Using Input-Output Analysis

To determine the direct impacts of OIA payments in the USVI, the payments from Table 5-1 were each applied to a corresponding IMPLAN sector code. Direct impacts were estimated using output and employee compensation-to-employee ratios from the IMPLAN modeling system. The direct employment, employee compensation, and output inputs are reported in Table 5-2.

We estimated that the \$224.7 million spent in USVI directly supported 3,993 jobs and \$131.2 million in employee compensation. These direct impacts were multiplied by Type II Social Accounting Matrix multipliers to estimate the total impact of OIA payments on the region's economy. The relevant multipliers that were estimated for this analysis are reported in Table 5-3. Note the OIA payments from 2015 are treated as the output inputs.

Table 5-2. USVI: Direct Economic Impacts of OIA Payments Using I/O Analysis (FY 2015)

Industry	IMPLAN Code	FY2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation -to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
State and local government, noneducation	437	\$221,534	\$40,610	\$40,610	5,455	\$221,534
State and local government, education	438	\$92	\$29,191	\$29,191	3	\$92
Maintenance and repair construction of nonresidential structures	39	\$3,063	\$203,068	\$49,540	15	\$747
Total		\$224,689			5,473	\$222,373

Source: RTI estimates based on IMPLAN (2013).

Table 5-3. USVI: Selected IMPLAN Multipliers by Industry

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
State and local government, noneducation	437	1.11	1.08	1.54
State and local government, education	438	1.08	1.08	1.54
Maintenance and repair construction of nonresidential structures	39	1.27	1.17	1.33

Source: RTI estimates based on IMPLAN (2013).

By multiplying the direct impacts of each sector with their corresponding Type II SAM Multiplier, we can compute the total economic impacts associated with OIA payments to USVI. The total economic impacts of this activity in USVI support 6,052 employees, \$239.2 million in employee compensation, and \$344.8 million in GDP. These results are displayed in Table 5-4.

Table 5-4. USVI: Total Economic Impacts Using I/O Analysis (FY 2015)

Industry Description	IMPLAN Code	Total Employment Impact (# of workers)	Total Employee Compensation Impact (\$'000; 2015\$)	Total Output Impact (\$'000; 2015\$)
State and local government, non-education	437	6,029	238,212	340,629
State and local government, education	438	3	99	142
Maintenance and repair construction of nonresidential structures	39	19	875	4,073
Total		6,052	\$239,187	\$344,845

Source: RTI estimates based on IMPLAN (2013).

The significance of OIA's economic contributions can be better understood when viewed in relation to the USVI economy as a whole, which is summarized in Table 5-5. As this table illustrates, the 6,052 jobs directly and indirectly supported by OIA payments represent 16% of USVI's total employment. Similarly, \$239.2 million of employee compensation associated with these employees accounts for approximately 18% of total employee compensation inside the region, and the \$344.8 million of GDP associated with these employees represents 9% of total GDP produced by the insular area.

Table 5-5. USVI: Estimated Impact Relative to National Economy (FY 2015)

	Total Economic Impact for FY2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	6,052	38,454	16%
Employee compensation (\$'000; 2015\$)	239,187	1,349,235	18%
GDP (\$'000; 2015\$)	344,845	3,858,368	9%

Source: RTI estimates based on IMPLAN (2013).

6. FEDERATED STATES OF MICRONESIA (FSM)

6.1 FY 2015 OIA Payments Summary

FSM faces severe challenges in implementing effective government, education, and health care systems and relies heavily on OIA support. FSM's economy is based in large part on the fishing industry, which earns income through licensing fees charged to foreign tuna fishing vessels for fishing rights in FSM's exclusive economic zone. The FSM had an average GDP per capita of about \$3,094 (2015\$) in 2014. In 2013, total real GDP in the FSM declined 4% and declined in each of the four states for the first time since GDP was recorded in 1996. The drop in real GDP stemmed from losses in both domestic fisheries and construction. There were also significant capacity issues with implementation of the Compact infrastructure grants (OIA, 2015a).

OIA payments to FSM in 2015 totaled \$108.7 million. A detailed breakdown of these payments is presented in Table 6-1. The largest block of OIA payments to FSM, totaling \$107.9 million, came through the Compact of Free Association. The Compact provides essential funding for operating FSM's education, health care, and government systems and improves the insular area's infrastructure.

Payments associated with Assistance to Territories totaled \$0.8 million. General technical assistance provided direct grants, judicial training, the Close Up Foundation, the Prior Service Benefits Program, and the PITI-VITI. Other Assistance to Territories programs included items such as the Coral Reef Initiative.

Table 6-1. FSM: OIA Payments (FY 2015)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Compact of Free Association		
Education	24,396	Education
Judicial Training	175	Government
Health	20,112	Health Care
Capacity Building	2,381	Government
Private Sector	1,989	Government
Environment	1,521	Government
Enhanced Reporting & Accountability	1,200	Government
Infrastructure	—	Construction
Balance	56,112	Government
<i>Total, Compact of Free Association</i>	<i>107,885</i>	

(continued)

Table 6-1. FSM: OIA Payments (FY 2015) (continued)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Assistance to Territories		
General technical assistance—Direct Grants	223	Government
General technical assistance—USDA Grad School PITI-VITI	36	Education
General technical assistance—Close-Up Foundation	27	Education
General technical assistance—Prior Service	27	Private
General technical assistance—NEPA review	26	Government
General technical assistance—Judicial Training	26	Government
<i>Subtotal, General Technical Assistance</i>	<i>366</i>	
Office of Insular Affairs	179	Government
Coral Reef Initiative	227	Government
<i>Subtotal, Other</i>	<i>406</i>	
<i>Total, Assistance to Territories</i>	<i>772</i>	
Total Spending Inside FSM	108,656	

Source: OIA, 2015b.

6.2 Direct Economic Impacts

Direct economic impacts of OIA payments were assigned to five economic sectors—education, construction, government, health care, and an assortment of private industries through the spending of Prior Service Benefits recipients. To calculate the employment and employee compensation impacts associated with this spending, as described in the methodology, we used the following output and employee compensation-to-employee ratios:¹

- **Education:** Based on employment and gross wage data provided in Fiscal Year 2014 Economic Review for FSM (PITI-VITI, 2015a), the employee compensation-to-employee ratio for private-sector workers in the education sector was **\$5,013** in 2015 dollars. Because information was not available for output associated with the education industry, the output-to-employee ratio for Commonwealth of North Marianna Islands was used (\$38,649).CNMI was chosen to be the best point of comparison in this context because economic metrics, such as GDP per capita, were more similar to FSM than for any other area for which output-to-employee data were available. However, it should be noted that to the extent this proxy overestimates the true output-to-employee ratio for FSM the direct impacts of OIA spending will be underestimated because more jobs will be supported by each dollar of OIA spending.
- **Construction:** Based on employment and gross wage data provided in Fiscal Year 2014 Economic Review for FSM (PITI-VITI, 2015a), the employee compensation-to-

¹ All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2015).

employee ratio for private-sector workers in the construction sector was \$5,682 in 2015 dollars. Because information was not available for output associated with the construction industry, the output-to-employee ratio for CNMI was used (\$46,817).

- **Government:** According to the Fiscal Year 2014 Economic Review for FSM (PITI-VITI 2015a), the government of Micronesia received approximately \$224.5 million in revenue and employed approximately 6,283 individuals in 2014. Adjusting for inflation, this implies an output-to-employee ratio of **\$35,774**. Similarly, according to information presented in the same report, these workers received approximately \$21.5 million in employee compensation in 2014. This implies an employee compensation-to-employee ratio of **\$3,529**.
- **Health care:** Based on employment and gross wage data provided in Fiscal Year 2014 Economic Review for FSM (PITI-VITI, 2015a), the employee compensation-to-employee ratio for private-sector workers in the health care sector was **\$9,722** in 2015 dollars. Because information was not available for output associated with the health care industry, the output-to-employee ratio for CNMI was used (\$58,881).
- **Private:** Based on employment and gross wage data provided in Fiscal Year 2014 Economic Review for FSM (PITI-VITI, 2015a), the average wage for a private-sector worker was **\$4,761** in 2015 dollars. Because information was not available for output associated with the private sector, the output-to-employee ratio for CNMI was used (\$96,141).

Dividing the payments directed toward each sector by the output-to-employee ratio yields the direct employment impacts, while multiplying the direct employment impacts by the employee compensation-to-employee ratio yields the direct employee compensation impacts. Direct impacts are reported in Table 6-2.

Table 6-2. FSM: Estimated Direct Economic Impacts Using EBA (FY 2015)

Industry	FY 2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
Education	24,459	38,649	5,013	633	3,172
Construction	0	46,817	5,682	0	0
Government	64,059	35,774	3,529	1,791	6,319
Health care	20,112	58,881	9,722	342	3,321
Private	27	96,141	4,761	0	1
Total	108,656			2,765	12,813

Sources: RTI estimates based on PITI-VITI (2015a), Census (2015a), and OIA (2015b). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

6.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using 2014 employment and gross wage data from the Micronesia Fiscal Year 2014 Economic Review performed by researchers at PITI-VITI (Table 6-3).

The economic base of FSM is agriculture, fishing, manufacturing, and federal government activities. Industries supported by tourism can also be considered part of the economic base. Ideally, data would be available on the number of employees who are supported by tourism. However, because these data were unavailable, we assumed that the entire accommodation and food services industries are supported by tourism and are, therefore, part of the economic base.² This is likely a conservative approach because, to the extent that this approximation over represents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of FSM's territorial government is considered part of the economic base. Specifically, because over half of FSM's government revenue comes from external sources, approximately 58% of public administration was also included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2013). Based on these assumptions and the data in Table 6-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 4,753 employees out of a total of 14,818. Dividing total employment by base employment yields a multiplier of **3.12**, meaning that for every base employment position supported by OIA funding, an estimated 2.12 additional jobs are formed elsewhere in the economy.
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be \$17.4 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **3.54**, meaning that every dollar of employee compensation supported by the FY 2015 spending will create an additional \$2.54 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 6-2 by these multipliers yields a total employment impact of 8,621 employees and \$45.4 million of employee compensation.

6.4 GDP Base Multipliers

As part of its strategic goals, OIA has funded the PITI-VITI to estimate more detailed and accurate economic indicators for the FAS. In September 2015, PITI-VITI released updated FY 2014 economic reports for the Freely Associated States, which included estimates of GDP by industry. Using this data we were able to estimate GDP multipliers, making for a more detailed analysis of the GDP impacts of OIA payments.

² A similar approach for creating a proxy for measuring the role of tourism in insular area economies was used in GAO (2006).

Table 6-3. FSM: Employment and Employee Compensation by Industry (2014 estimates)

Industry	Employment (#)	Employee Compensation (\$'000, 2015\$)
Economic Base Industries		
Agriculture, hunting, and forestry	66	211
Mining and quarrying	0	0
Fishing	250	1,389
Extra-territorial organizations	63	0
Government (public administration) ^a	6,187	21,806
Manufacturing	113	451
Tourism—Hotels and restaurants	648	2,580
Noneconomic Base Industries		
Construction	877	4,976
Education	809	4,050
Electricity, gas, and water supply	350	1,210
Financial intermediation	247	0
Health and social work	125	1,214
Other services	549	2,365
Private households with employed persons	17	37
Real estate, renting, and business activities	395	2,490
Transport, storage, and communications	985	6,018
Wholesale and retail trade and repairs	3,137	12,694
Total	14,818	61,491

^a Because 58% of FSM's budget comes from external sources, it was assumed that only 58% of the employment and employee compensation associated with public administration was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Note: A significant portion of employment across all sectors was accounted for by public enterprises. However, employee compensation statistics were only provided for private-sector workers. Therefore, to estimate total employee compensation for all workers across industries, we assumed that the employee compensation-to-employee ratio was the same for public-sector workers and private-sector workers in each industry.

Source: RTI estimates based on PITI-VITI (2015a).

Direct GDP impacts are the sum of OIA payments to insular governments plus the impacts of OIA payments on private sectors. A GDP-to-employee ratio was used to determine the direct GDP impacts of OIA payments in the private sector. It is estimated that FSM's GDP was \$322 million in 2014 (PITI-VITI, 2015a). Dividing this by the total number of employees estimated to be working in FSM (14,818) implies a GDP-to-employee ratio of \$21,712. Multiplying this ratio by the direct employment impact in the private sector (975

employees) yields a direct private-sector GDP impact of \$21.2 million. This private-sector impact is then added to the \$64.1 million of OIA payments spent in the public sector to produce an estimate of approximately \$85.2 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent PITI-VITI data (Table 6-4) on GDP by industry to calculate a base multiplier using the same methodology as the employment and employee compensation base multipliers. It was assumed that the agriculture, hunting, and forestry; mining and quarrying; fishing; hotels and restaurants; and manufacturing sectors were economic base sectors, along with 58% of the territorial government. The remaining territorial government and other private sectors were included in the noneconomic base industries.

Table 6-4. FSM: GDP by Industry (2014)

Industry	GDP (in millions of 2015\$)
Economic Base Industries	
Agriculture, hunting, and forestry	48.0
Mining and quarrying	0.0
Fishing	31.9
Government (public administration) ^a	32.6
Manufacturing	1.1
Tourism—Hotels and restaurants	5.0
Noneconomic Base Industries	
Construction	9.4
Education	33.1
Electricity, gas, and water supply	7.9
Financial intermediation	24.7
Health and social work	15.3
Other services	318.5
Real estate, renting, and business activities	34.3
Transport, storage, and communications	17.2
Wholesale and retail trade and repairs	35.6
Total at Basic Prices	614.7
Taxes on products less subsidies	25.7
Total at Purchasers' Prices	640.4

^a Because 58% of FSM's budget comes from external sources, it was assumed that only 58% of the employment and employee compensation associated with public administration was part of the base sector. The remaining employees and employee compensation were assumed to be part of the non-base sector.

Sources: RTI estimates based on PITI-VITI (2015a).

Based on these assumptions and the data in Table 6-4, base GDP was calculated to be \$105.1 million. Dividing total GDP by base GDP yields a multiplier of **3.06**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 2.06 of additional GDP dollars are formed elsewhere in the economy. By multiplying the direct GDP impacts of OIA payments by the GDP base multiplier, we estimate the total impact on GDP is \$260.9 million.

6.5 EBA Economic Impact Estimate

In summary, the \$108.5 million spent by OIA inside FSM directly supports 2,765 jobs, \$12.8 million in employee compensation, and \$85.2 million in GDP. Accounting for secondary effects, we estimate that OIA spending supports a total of 8,621 jobs, \$45.4 million in employee compensation, and \$260.9 million in GDP. This information is summarized in Table 6-5.

Table 6-5. FSM: Total Estimated Economic Impact Using EBA (FY 2015)

	Direct Economic Impact	Indirect/Induced Economic Impact	Total Economic Impact
Employment (#)	2,765	5,856	8,621
Employee compensation (\$'000; 2015\$)	12,813	32,555	45,368
GDP (\$'000; 2015\$)	85,222	175,677	260,554

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015a, 2013), and Census (2015a). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

The significance of OIA's economic contributions can be better understood when viewed in relation to the FSM economy as a whole, which is summarized in Table 6-6. The 8,621 jobs directly and indirectly supported by OIA payments represent 58% of FSM's total employment in 2015. Similarly, \$45.4 million of employee compensation associated with these employees accounts for approximately 74% of total employee compensation inside the region, and the \$260.9 million of GDP associated with these employees represents 81% of the \$322 million of total GDP produced by the region.

Table 6-6. FSM: Estimated Impact Relative to National Economy Using EBA (FY2014)

	Total Economic Impact for FY 2015, OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	8,621	14,818	58%
Employee compensation (\$'000, 2015\$)	45,368	61,491	74%
GDP (\$'000, 2015\$)	260,554	321,734	81%

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015a, 2013), and Census (2015a). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

7. REPUBLIC OF THE MARSHALL ISLANDS (RMI)

7.1 FY 2015 OIA Payments Summary

RMI faces severe challenges in implementing effective government, education, and health care systems and relies heavily on OIA support. RMI has an average GDP per capita of only about \$3,672 (\$2015) in 2014. RMI's economy is based on fishing, subsistence farming, and production of copra, its largest export. The public sector is also a significant factor in RMI's economy. The real GDP grew 3.5% in 2013, following growth in 2012. The RMI's fiscal operations in 2013 also recorded a surplus, an improvement over a deficit in 2012. However, despite gains in revenues, expenditures grew with increases in payroll, continued state-owned enterprise (SOE) subsidies, and drought in the northern islands (OIA, 2015a).

OIA payments to RMI in 2015 totaled \$76.9 million. A detailed breakdown of these payments is presented in Table 7-1. The largest block of OIA payments, totaling \$74.3 million in spending inside RMI, came through the Compact of Free Association. The Compact provides essential funding for operating RMI's education, government, and health care systems; improving infrastructure; and protecting the environment. In 2012, the Compact and Ebye Special Needs contributed nearly 75% of the funding available for education in RMI and 37% of the budget for health care (OIA, 2014b). Assistance to Territories payments totaled \$1.9 million. General technical assistance provided direct grants, judicial training, the 4 Atoll Health Care Program (which provides health care services, including a full-time primary care physician for each atoll, for Enewetak, Bikini, Rongelap, and Utrik), the Close Up Foundation, the Prior Service Benefits Program, and PITI-VITI. Other Assistance to Territories programs included items such as Maintenance Assistance.

For the Enewetak assistance program, 35% of funding provides imported food for the citizens of this atoll and, thus, was not included in the analysis because this assistance is not being spent in the insular area. Therefore, the total amount of OIA payments spent within RMI is about \$76.7 million.

Table 7-1. RMI: OIA Payments (FY 2015)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Compact of Free Association		
Enewetak	500	65% government, 35% transfer
Judicial training U.S. territories	175	Government
Education	11,324	Education
Health	7,327	Health care
Infrastructure	0	Construction
Environment	325	Government
Ebeye Special Needs—Education	4,305	Education
Kwajalein Environmental impact	233	Government
RMI Trust Fund	14,535	Government
Kwajalein Landowner Payments	20,929	Private
Disaster Assistance Emergency Fund	233	Government
RMI Single Audit (FY12)	500	Government
Balance	14626	Government
<i>Total, Compact of Free Association</i>	<i>74,511</i>	
Assistance to Territories		
General technical assistance—Direct Grants	259	Government
General technical assistance—NEPA review	30	Government
General technical assistance—USDA Grad School PITI-VITI	46	Education
General technical assistance—Close-Up Foundation	33	Education
General technical assistance—Prior Service	32	Private
General technical assistance—4 Atoll Health Care Program	1,200	Health Care
General technical assistance—Judicial Training	30	Government
Subtotal, General Technical Assistance	1,630	
Coral Reef Initiative	122	Government
Office of Insular Affairs	111	Government
<i>Subtotal, Other</i>	<i>233</i>	
<i>Total, Assistance to Territories</i>	<i>1,863</i>	
Total Payments	76,873	
Spending Outside RMI	155	
Total Spending Inside RMI	76,718	

Source: RTI estimates based on OIA (2015b).

7.2 Economic Impacts of OIA Payments Using Economic Base Analysis

Direct economic impacts of OIA payments were assigned to five economic sectors—education, construction, government, health care, and an assortment of private industries through the spending of Prior Service Benefits recipients. To calculate the employment and employee compensation impacts associated with this spending, as described in the methodology, we used the following output and employee compensation-to-employee ratios:¹

- **Education:** Based on FY 2014 employment and wage cost data provided in the Fiscal Year 2014 Economic Review for RMI (released in September 2015), the employee compensation-to-employee ratio for private-sector workers in the education sector was **\$12,671** in 2014 (PITI-VITI, 2015b). Because information was not available for output associated with the education industry, the output-to-employee ratio for American Samoa was used (\$73,681). American Samoa was chosen to be the best point of comparison in this context because economic metrics, such as GDP per capita, were more similar to RMI than for any other area for which output-to-employee data were available. However, it should be noted that to the extent this proxy overestimates the true output-to-employee ratio for RMI the direct impacts of OIA spending will be underestimated because more jobs will be supported by each dollar of OIA spending.
- **Construction:** Based on employment and wage cost data provided in the Fiscal Year 2014 Economic Review for RMI, the employee compensation-to-employee ratio for private-sector workers in the construction sector was estimated to be **\$7,973** in 2014 (PITI-VITI, 2015b). Because information was not available for output associated with the construction industry, the output-to-employee ratio for American Samoa was used (\$75,048).
- **Government:** Based on data provided in the Fiscal Year 2014 Economic Review for RMI, the RMI government received approximately \$102.9 million in revenue and employed approximately 3,573 individuals in 2014 (PITI-VITI, 2015b). Adjusting for inflation, this implies an output-to-employee ratio of **\$29,309** in 2015 dollars. Similarly, 3,573 government workers received \$42.2 million in employee compensation in 2014. This implies an employee compensation-to-employee ratio of **\$11,820**.
- **Health care:** Based on employment and wage cost data provided in the Fiscal Year 2014 Economic Review for RMI, the employee compensation-to-employee ratio for private-sector workers in the health care sector was estimated to be **\$9,946** in 2015 dollars (PITI-VITI, 2015b). Because information was not available for output associated with the health care industry, the output-to-employee ratio for American Samoa was used (\$15,663). American Samoa was chosen to be the best point of comparison in this context because economic metrics, such as GDP per capita, were more similar to RMI than for any other area for which data were available.

¹ All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2015).

- **Private:** According to the Fiscal Year 2014 Economic Review for RMI, the average wage for a private worker in RMI was estimated to be **\$5,198** in 2014 (PITI-VITI, 2015b). Because information was not available for output associated with the private industry, the output-to-employee ratio for American Samoa was used (\$168,461). American Samoa was chosen to be the best point of comparison in this context because economic metrics, such as GDP per capita, were more similar to RMI than for any other area for which data were available.

Dividing the payments directed toward each sector by the output-to-employee ratio yields the direct employment impacts, while multiplying the direct employment impacts by the employee compensation-to-employee ratio yields the direct employee compensation impacts. Direct impacts are reported in Table 7-2.

Table 7-2. RMI: Estimated Direct Economic Impacts Using EBA (FY 2015)

Industry	FY 2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
Education	\$15,708	73,681	12,671	213	\$2,701
Construction	\$0	75,048	7,973	0	\$0
Government	\$31,522	29,309	11,820	1,076	\$12,712
Health care	\$8,527	15,663	9,946	544	\$5,415
Wholesale	\$0	1,122,801	5,272	0	\$0
Private	\$20,961	168,461	5,198	124	\$647
Total	\$76,718			1,958	\$21,475

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015b), and Census (2015b). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

Employment and Employee Compensation Base Multipliers. The employment and employee compensation multipliers were developed for 2014 using data from the RMI Fiscal Year 2014 Economic Review performed by researchers at PITI-VITI (Table 7-3).

Table 7-3. RMI: Employment and Employee Compensation by Industry (2014 estimates)

Industry	Employment (#)	Employee Compensation (\$'000, 2015\$)
Economic Base Industries		
Agriculture, hunting, and forestry	17	56
Fishing	1,007	4,116
Extra-territorial organizations	917	16,883
Government (public administration) ^a	3,573	42,909
Manufacturing	102	837
Tourism—Hotels and restaurants	249	1,478
Noneconomic Base Industries		
Community, social, and personal service activities	279	2,035
Construction	377	3,054
Education	522	6,720
Electricity, gas, and water supply	334	4,474
Financial intermediation	233	4,098
Health and social work	210	2,122
Private households with employed person	21	86
Real estate, renting, and business activities	249	2,040
Transport, storage, and communications	664	6,716
Wholesale and retail trade	1,870	10,017
Total	10,624	107,642

^a Because 60% of RMI's budget comes from external sources, we assumed that only 60% of the employment and employee compensation associated with public administration was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Note: A significant portion of employment across all sectors was accounted for by public enterprises. However, employee compensation statistics were provided only for private-sector workers. Therefore, to estimate total employee compensation for all workers across industries, we assumed that the employee compensation-to-employee ratio was the same for public-sector workers and private-sector workers in each industry.

Source: RTI estimates based on PITI-VITI (2015).

The economic base of RMI is agriculture, hunting, forestry, manufacturing, and federal government activities. Industries supported by tourism can also be considered part of the economic base. Ideally, data would be available on the number of employees supported by tourism. However, because these data were unavailable, we assumed that the entire accommodation and food services industries are supported by tourism and are, therefore, part of the economic base.² This is likely a conservative approach because, to the extent

² A similar approach for creating a proxy for measuring the role of tourism in insular area economies was used in GAO (2006).

that this approximation over represents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of RMI's territorial government is considered part of the economic base. Specifically, because approximately 60% of RMI's government revenue comes from external sources, 60% of public administration was also included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2013). Based on these assumptions and the data in Table 7-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 4,422 employees out of a total of 10,624. Dividing total employment by base employment yields a multiplier of **2.40**, meaning that for every base employment position supported by OIA funding, an estimated 1.40 additional jobs are formed elsewhere in the economy.
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be \$48.9 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **2.20**, meaning that every dollar of employee compensation supported by the FY 2015 spending will create an additional \$1.20 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 7-2 by these multipliers yields a total employment impact of 4,704 employees and \$47.2 million of employee compensation.

7.3 GDP Base Multipliers

Direct GDP impacts are the sum of OIA payments to insular governments plus the impacts of OIA payments on private sectors. A GDP-to-employee ratio was used to determine the direct GDP impacts of OIA payments in the private sector. It is estimated that RMI's GDP was \$190 million in 2014 (PITI-VITI, 2015b). Dividing this by the total number of employees estimated to be working in RMI (10,624) implies a GDP-to-employee ratio of \$18,283. Multiplying this ratio by the direct employment impact in the private sector (882 employees) yields a direct private-sector GDP impact of \$16.1 million. This private-sector impact is then added to the \$31.5 million of OIA payments spent in the public sector to produce an estimate of approximately \$47.6 million in direct GDP impacts.

Total GDP impacts are determined by multiplying the direct GDP impacts by a GDP base multiplier. Because of RMI's high percentage of OIA payments compared with GDP (a ratio of 0.38, the highest of the insular areas), small size of economy, and small base sector (in terms of GDP), using a GDP base multiplier from the PITI-VITI FY 2014 Economic Report would create a high base GDP multiplier and potentially overestimate the impacts of OIA payments on GDP. Therefore, we used the smaller value employment base multiplier of **2.20** as a proxy GDP base multiplier. Using this multiplier created a total GDP impact that was consistent with previous analyses and the other FAS.

By multiplying the direct GDP impacts of OIA payments by the proxy GDP base multiplier, we estimate the total impact on GDP is \$104.8 million.

7.4 EBA Economic Impact Estimate

In summary, the \$76.7 million spent by OIA inside RMI directly supports 1,958 jobs, \$21.5 million in employee compensation, and \$47.6 million in GDP. Accounting for secondary effects, we estimate that OIA spending supports a total of 4,704 jobs, \$47.2 million in employee compensation, and \$104.8 million in GDP. This information is summarized in Table 7-4.

Table 7-4. RMI: Total Estimated Economic Impact Using EBA (FY 2015)

	Direct Economic Impact	Indirect/Induced Economic Impact	Total Economic Impact
Employment (#)	1,958	2,746	4,704
Employee compensation (\$'000, 2015\$)	21,475	25,755	47,231
GDP (\$'000, 2015\$)	47,649	57,179	104,828

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015b, 2013), and Census (2015a). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

The significance of OIA's economic contributions can be better understood when viewed in relation to the RMI economy as a whole, which is summarized in Table 7-5. As this table illustrates, the 4,704 jobs directly and indirectly supported by OIA payments represent 44% of RMI's total employment in 2015. Similarly, \$47.2 million of employee compensation associated with these employees' accounts for approximately 44% of total employee compensation inside the region, and the \$104.8 million of GDP associated with these employees represents 54% of total GDP produced by the insular area.

Table 7-5. RMI: Estimated Impacts Relative to National Economy Using EBA (FY2015)

	Total Economic Impact for FY 2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	4,704	10,624	44%
Employee compensation (\$'000, 2015\$)	47,231	107,642	44%
GDP (\$'000, 2015\$)	104,828	194,241	54%

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015b, 2013), and Census (2015b). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

8. REPUBLIC OF PALAU

8.1 FY 2015 OIA Payments Summary

Like the other insular areas, Palau faces a number of obstacles to economic development, including limited land and resources, a small population, limited local technical expertise, a narrow economic base, and vulnerability to natural disasters. The average GDP per capita for Palau in 2014 was \$11,892 (2015\$) as compared with the GDP per capita of the United States, which was \$56,249 (BEA, 2015). Through their funding and support, OIA strives to foster economic development, promote sound management, and improve quality of life in Palau.

In September 2010, the governments of the United States and Palau signed a new 15-year compact agreement that offers \$250 million in assistance through 2024. The assistance will fund direct economic assistance and infrastructural projects, and the amount of funding will decline each year to promote Palau's self-sufficiency (OIA, 2015b). These payments, which are dispersed through OIA, were enacted in FY 2012. OIA payments made to Palau in 2015 totaled \$14.6 million and were primarily dedicated to the government sector with some additional support for education, construction, and the private sector. A detailed breakdown of OIA payments to Palau is presented in Table 8-1. The largest block of OIA payments to Palau, totaling \$13.7 million in spending inside the island, came through the Compact of Free Association. This includes funding for infrastructure improvements, economic assistance, and government fiscal support (OIA, 2015a). Under the new compact agreement, the OIA also funds a subsidy for the U.S. Postal Service to provide mail service to the insular area; because this payment is a direct transfer, this value was not included in the analysis of the direct impacts of OIA's assistance.

Assistance to Territories payments totaled \$0.9 million. General technical assistance provided direct grants, judicial training, the Close Up Foundation, the Prior Service Benefits Program, and the PITI-VITI. Therefore, the total amount of OIA payments spent within Palau is about \$14.1 million.

Table 8-1. Palau: Grant Spending by Appropriation (FY 2015)

Appropriation	Spending (\$'000, 2015\$)	Impact Treatment
Compact of Free Association		
Federal Services Assistance	504	Transfer
Program Grant Assistance	2,000	Government
Infrastructure projects	6,000	Construction
Economic assistance	5,147	Government
<i>Total, Compact of Free Association</i>	<i>13,651</i>	
Assistance to Territories		
General technical assistance—USDA Grad School PITI-VITI	78	Education
General technical assistance—Close Up Foundation	44	Education
General technical assistance—NEPA review	37	Government
General technical assistance—Prior Service	39	Private
General technical assistance—Direct Grant	648	Government
General technical assistance—Judicial Training	37	Government
<i>Subtotal, General Technical Assistance</i>	<i>884</i>	
Coral Reef Initiative	110	Government
<i>Total, Assistance to Territories</i>	<i>905</i>	
Total Payments	14,645	
Spending Outside RMI	504	
Total Spending Inside RMI	14,141	

Source: RTI estimates based on OIA (2015b).

8.2 Direct Economic Impacts of Payments

Direct economic impacts of OIA payments were assigned to four economic sectors—education, construction, government, and an assortment of private industries through the spending of Prior Service Benefits recipients. To calculate the employment and employee compensation impacts associated with this spending, as described in the methodology, we used the following output and employee compensation-to-employee ratios:¹

- **Education:** Based on data provided in the Fiscal Year 2015 Economic Review for Palau, the employee compensation-to-employee ratio in the education sector in 2015 was \$11,055 (PITI-VITI, 2015c). Because information was not available for output associated with the education sector, the output-per-employee ratio for American Samoa was used (\$73,681). American Samoa was chosen to be the best point of comparison in this context because economic metrics, such as GDP per capita, were more similar to Palau than for any other area for which data were available.

¹ All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2015).

However, it should be noted that to the extent this proxy overestimates the true output-to-employee ratio for Palau the direct impacts of OIA spending will be underestimated because more jobs would be supported by each dollar of OIA spending.

- **Construction:** According to the PITI-VITI (2015c) economic review, in 2014 801 workers were located in the construction sector who received \$5.6 million in employee compensation in 2014. This implies an average employee compensation-to-employee ratio of **\$6,996** in 2015 dollars. Because information was not available for output associated with the construction sector, the output-to-employee ratio for American Samoa was used (\$75,048).
- **Government:** Based on data reports by the Asian Development Bank, the government of Palau received \$101.7 million in revenue in 2014 and employed approximately 3,055 people that year (ADB, 2014; PITI-VITI, 2014c). This implies the ratio of government revenue to government employees was \$33,337 in 2015. Similarly, based on 2014 average wage estimates from the PITI-VITI (2015c) 2015 Economic Review, the employee compensation-to-employee ratio for government workers was estimated to be \$14,259 in 2015.
- **Private:** Based on quarterly employment and gross wage/salary reports from PITI-VITI, 7,880 workers were located in the private sector who received \$64.6 million in employee compensation in 2014. This implies an average employee compensation-to-employee ratio of **\$8,211** in 2015 dollars. Because information was not available for output associated with the private sector, the output-to-employee ratio for American Samoa was used (\$168,461).

Dividing the payments directed toward each sector by the output-to-employee ratio yields the direct employment impacts, while multiplying the direct employment impacts by the employee compensation-to-employee ratio yields the direct employee compensation impacts. Direct impacts are reported in Table 8-2.

Table 8-2. Palau: Estimated Direct Economic Impacts (FY 2015)

Industry	FY 2015 Payments (\$'000, 2015\$)	Output-to-Employee Ratio (\$/employee)	Employee Compensation-to-Employee Ratio (\$/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact (\$'000, 2015\$)
Education	\$123	73,681	11,055	2	\$18
Construction	\$6,000	75,048	6,996	80	\$559
Government	\$7,979	33,337	14,259	239	\$3,413
Private	\$39	168,461	8,211	0	\$2
Total	\$14,141			321	\$3,993

Sources: RTI estimates based on OIA (2015b), ADB (2014), Census (2015b), and PITI-VITI (2015c). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

8.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using data from the PITI-VITI 2014 Economic Review of Palau (Table 8-3).

Table 8-3. Palau: Estimated Employment and Employee Compensation by Industry (2015)

Industry	Employment (#)	Employee Compensation (\$'000, 2015\$)
Economic Base Industries		
Agriculture, hunting, and forestry	107	466
Fishing	95	514
Extra-territorial organizations	20	285
Government (public administration) ^a	3,055	43,566
Mining and quarrying	79	732
Manufacturing	175	1,200
Tourism—Hotels and restaurants	1,660	13,746
Noneconomic Base Industries		
Construction	801	5,600
Education	431	4,770
Financial intermediation	109	1,874
Health and social work	72	867
Other service activities	331	2,021
Private households with employed person	531	1,085
Real estate, renting, and business activities	193	1,334
Transport, storage, and communications	816	7,712
Wholesale and retail trade; repair of motorcycles; personal and household goods	1,611	12,397
Total	10,086	98,169

^a Note that because 47% of Palau's budget comes from external sources, it was assumed that only 47% of the employment and employee compensation associated with public administration was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Source: RTI estimates based on PITI-VITI (2013). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

The economic base of Palau is agriculture, hunting, forestry, manufacturing, and federal government activities. Industries supported by tourism can also be considered part of the economic base. Ideally, data would be available on measures of the number of employees who are supported by tourism. However, because these data were unavailable, we assumed that the entire accommodation and food services industries are supported by tourism and

are, therefore, part of the economic base.² This is likely a conservative approach because, to the extent that this approximation over represents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of Palau's territorial government is considered part of the economic base. Because approximately 47% of Palau's government revenue comes from external sources, 47% of public administration was included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2015c). Based on these assumptions and the data in Table 8-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 3,568 employees out of a total of 10,086. Dividing total employment by base employment yields a multiplier of **2.83**, meaning that for every base employment position supported by OIA spending, an estimated 1.83 additional jobs are formed elsewhere in the economy.
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be \$37.3 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **2.63**, meaning that every dollar of employee compensation supported by the FY 2014 spending will create an additional \$1.63 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 8-2 by these multipliers yields a total employment impact of 858 employees and \$9.8 million of employee compensation.

8.4 GDP Base Multipliers

As part of its strategic goals, OIA has funded the PITI-VITI to estimate more detailed and accurate economic indicators for the FAS. In June 2014, PITI-VITI released updated FY 2013 economic reports for the Freely Associated States. With this data, we were able to better estimate GDP multipliers, making for a more detailed analysis of the GDP impacts of OIA payments.

Direct GDP impacts are the sum of OIA payments to insular governments plus the impacts of OIA payments on private sectors. A GDP-to-employee ratio was used to determine the direct GDP impacts of OIA payments in the private sector. It is estimated that Palau's GDP was \$251 million in 2014 (PITI-VITI, 2015c). Dividing this by the total number of employees estimated to be working in Palau (10,086) implies a GDP-to-employee ratio of \$24,878. Multiplying this ratio by the direct employment impact in the private sector (87 employees) yields a direct private-sector GDP impact of \$2.2 million. This private-sector impact is then

² A similar approach for creating a proxy for measuring the role of tourism in insular area economies was used in GAO (2006).

added to the \$7.8 million of OIA payments spent in the public sector to produce an estimate of approximately \$10.0 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we estimated the breakdown of GDP by industry using the proportion of GDP by industry from the PITI-VITI (2013). We then used this estimate of GDP by industry (Table 8-4) to calculate a base multiplier using the same methodology as the employment and employee compensation base multipliers. It was assumed that the agriculture, mining, manufacturing, and trade sectors were economic base sectors, along with 47% of the territorial government. The remaining territorial government and other private sectors were included in the noneconomic base industries.

Table 8-4. Palau: GDP by Industry (2015)

Industry	GDP (in millions of 2015\$)
Economic base industries	
Agriculture	8.9
Mining	0.7
Manufacturing	2.5
Trade	35.1
Government (public administration) ^a	37.4
Noneconomic base industries	
Electricity, gas, and water	7.6
Construction	8.3
Transport and communications	21.7
Finance	6.6
Other services	89.2
Total at basic prices	218.1
Taxes on imports less imputed bank service charges	29.1
Total at purchasers' prices	247.1

^a Note that because 47% of Palau's budget comes from external sources, it was assumed that only 47% of the employment and employee compensation associated with public administration was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Source: RTI estimates based on PITI-VITI (2015c).

Based on these assumptions and the data in Table 8-4, base GDP was calculated to be \$64.8 million. Dividing total GDP by base GDP yields a multiplier of **3.87**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 2.87 of additional GDP dollars are formed elsewhere in the economy. By multiplying the direct GDP impacts of OIA payments by the GDP base multiplier, we estimate the total impact on GDP is \$38.7 million.

8.5 EBA Economic Impact Estimate

In summary, the \$14.6 million spent by OIA inside Palau directly supports 321 jobs, \$4.0 million in employee compensation, and \$10.0 million in GDP. Accounting for secondary effects, we estimate that OIA spending supports a total of 908 jobs, \$10.5 million in employee compensation, and \$38.7 million. A summary of the economic impacts associated with OIA payments is presented in Table 8-5.

Table 8-5. Palau: Total Estimated Economic Impact Using EBA (FY 2015)

	Direct Economic Impact	Indirect/Induced Economic Impact	Total Economic Impact
Employment (#)	321	587	908
Employee compensation (\$'000, 2015\$)	3,993	6,494	10,487
GDP (\$'000, 2015\$)	10,015	28,709	38,725

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015c), PITI-VITI (2013), Census (2015b), ADB (2013), and World Bank (2015a). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

The significance of OIA's economic contributions can be better understood when viewed in relation to the Palau economy as a whole, which is summarized in Table 8-6. Specifically, the 908 jobs directly and indirectly supported by OIA payments represent 9% of Palau's total employment. Similarly, \$10.5 million of employee compensation associated with these employees accounts for approximately 11% of total employee compensation inside the region, and the \$38.7 million of GDP associated with these employees represents 15% of total GDP produced by the insular area.

Table 8-6. Palau: Estimated Impacts Relative to National Economy Using EBA (FY 2015)

	Total Economic Impact for FY 2015 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	908	10,086	9%
Employee compensation (\$'000, 2015\$)	10,487	98,169	11%
GDP (\$'000, 2015\$)	38,725	250,916	15%

Sources: RTI estimates based on OIA (2015b), PITI-VITI (2015c), POPS (2008), Census (2015b), ADB (2013), and World Bank (2015a). All data were adjusted to 2015 dollars using the consumer price index (BLS, 2015).

9. DISTRICT OF COLUMBIA AND HAWAII

In addition to payments spent directly in the insular areas, the OIA operates and spends payments in the District of Columbia and Hawaii. The economic impact of OIA operations in the District of Columbia and Hawaii was calculated using IMPLAN I/O modeling software.¹ Similarly to modeling for the US territories, IMPLAN uses an I/O modeling framework that allows specific multipliers to be calculated for each industry.

9.1 Economic Impact Assessment of OIA Operations in District of Columbia

The FY 2015 budget for OIA operations and the Coral Reef Initiative in Washington, DC, was \$10.7 million, which falls within the IMPLAN industry code 535: Federal Government, Non-military. Similar to the analysis used for the insular areas, direct employment and employee compensation impacts can be measured using the output-to-employee and employee compensation-to-employee ratios for this sector.

Direct impacts were multiplied by IMPLAN-generated multipliers to estimate the total impact of OIA activity in Washington, DC. The relevant multipliers and total impacts that were estimated for this analysis are reported in Table 9-1. The total economic impacts of OIA operations on DC are

- 65 employees,
- \$9.6 million in employee compensation, and
- \$12.6 million in output.

9.2 Economic Impact Assessment of OIA Operations in Hawaii

The FY 2015 budget for OIA operations in Hawaii was \$19.0 million. The details of these payments and the IMPLAN codes to which they were assigned are reported in Table 9-2.

As in the previous analysis, direct impacts were estimated using output and employee compensation-to-employee ratios from the IMPLAN model. The direct employment, employee compensation, and output inputs are reported in Table 9-3.

¹ To estimate the total economic impact associated with this funding, we used 2013 I/O models of the Washington, DC, and Hawaii economies constructed using IMPLAN economic modeling software. IMPLAN categorizes businesses in these industries into a system of 536 industry codes. IMPLAN was selected because it is one of the most widely used I/O modeling software packages in economic development analysis. IMPLAN, like all I/O models, quantifies the economic impact using multipliers to represent indirect and induced impacts. Total impacts can be estimated by multiplying the direct impacts of the project by these multipliers.

Table 9-1. Economic Impact Assessment of OIA Operations in District of Columbia (FY 2015)

	Employment (# of employees)	Employee Compensation (\$'000, 2015)	Output (\$'000, 2015)
Direct Economic Impact			
OIA operations	54	\$8,899	\$10,730
Indirect and Induced Economic Impacts			
Multiplier	1.21	1.08	1.17
Total Economic Impact	65	\$9,611	\$12,550

Sources: RTI estimates based on OIA (2015b) and IMPLAN.

Table 9-2. 2015 OIA Operations in Hawaii and Corresponding IMPLAN Codes

Funding Description	Funding Amount (\$2015)	Industry Description	IMPLAN Code
Compact of Free Association			
Compact Impact	12,762	Hospitals	482
<i>Total, Compact of Free Association</i>	<i>12,762</i>		
Assistance to Territories			
General technical assistance—USDA Grad School PITI VITI	89	Education	472
General technical assistance—Pacific Basin Development Center	0	Government	531
General technical assistance—Direct Grant	831	Government	531
General technical assistance—Close-Up Foundation	47	Education	472
General technical assistance—NEPA review	38	Government	531
General technical assistance—Judicial Training	38	Government	531
<i>Subtotal, General Technical Assistance</i>	<i>1,044</i>		
Coral Reef Initiative		Federal government, nonmilitary	439
Brown Tree Snake Control	1,414	Federal government, nonmilitary	439
Maintenance assistance	1,081	Federal government, nonmilitary	439
Office of Insular Affairs	1,465	Federal government, nonmilitary	439
Compact Impact Discretionary	1,276	State and local government, education	438
<i>Subtotal Other</i>	<i>5,236</i>		
<i>Total, Assistance to Territories</i>	<i>6,280</i>		
Total Spending Inside Hawaii	19,042		

Sources: RTI estimates based on OIA (2015b) and IMPLAN.

Table 9-3. Direct Economic Impacts of OIA Operations in Hawaii (FY 2015)

Industry Description	IMPLAN Code	Employment (# of employees)	Employee Compensation (\$'000, 2015)	Output (\$'000, 2015)
Hospitals	482	82	\$6,823	\$12,762
Education	472	26	\$977	\$1,412
State Gov't—non-Education	531	49	\$4,162	\$4,868
Total		157	\$11,963	\$19,042

Sources: RTI estimates based on OIA (2015b) and IMPLAN.

As previously discussed, direct impacts were multiplied by Type II Social Accounting Matrix multipliers generated in IMPLAN to estimate the total impact of OIA payments on the state's economy. The relevant multipliers that were estimated for this analysis are reported in Table 9-4.

Table 9-4. Selected Multipliers by Industry, Hawaii

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
Hospitals	482	1.82	1.43	1.68
Education	472	1.28	1.30	1.68
State Gov't—non-Education	531	1.40	1.20	1.53

Source: IMPLAN.

Using these multipliers, we can compute the total economic impacts associated with OIA operations in Hawaii. The total economic impacts of this activity in Hawaii are

- 252 employees,
- \$16.0 million in employee compensation, and
- \$31.3 million in output.

These impacts are reported in Table 9-5.

Table 9-5. Total Economic Impacts of OIA Payments, Hawaii

Industry Description	IMPLAN Code	Employment (# of employees)	Employee Compensation (\$'000, 2015)	Output (\$'000, 2015)
Hospitals	482	149	\$9,766	\$21,498
Education	472	33	\$1,272	\$2,370
State gov't—non-Education	531	69	\$5,010	\$7,472
Total^a		252	\$16,048	\$31,340

^a Values may not add to total because of rounding.

Sources: RTI estimates based on OIA (2015b) and IMPLAN.

10. ANALYSIS SUMMARY

The purpose of this study was to measure the economic impact of OIA payments on insular areas as measured by economic aggregates such as employment, employee compensation, and GDP. This task was accomplished primarily through the use of simple economic base models that were constructed for each of the seven insular areas. The results of this analysis are presented in the following tables and in the Executive Summary.

Table 10-1. Estimated Employment Impact of OIA Payments (FY 2015)

	Direct Employment Impact (#)	Indirect/ Induced Employment Impact (#)	Total Employment Impact (#)	Percentage of National Employment Supported by OIA Payments (%)
American Samoa	1,018	118	1,137	8%
Guam	3,284	137	3,421	5%
Northern Mariana Islands	681	128	809	3%
U.S. Virgin Islands	5,473	578	6,052	16%
Micronesia	2,765	5,856	8,621	58%
Marshall Islands	1,958	2,746	4,704	44%
Palau	321	587	908	9%

Source: RTI estimates.

Table 10-2. Estimated Employee Compensation Impact of OIA Payments (FY 2015)

	Direct Employee Compensation Impact ('000, 2015\$)	Indirect/ Induced Employee Compensation Impact ('000, 2015\$)	Total Employee Compensation Impact ('000, 2015\$)	Percentage of National Employee Compensation Supported by OIA Payments (%)
American Samoa	27,421	2,008	29,429	15%
Guam	97,201	2,857	100,059	7%
Northern Mariana Islands	13,781	1,862	15,643	3%
U.S. Virgin Islands	222,373	16,814	239,187	18%
Micronesia	12,813	32,555	45,368	74%
Marshall Islands	21,475	25,755	47,231	44%
Palau	3,993	6,494	10,487	11%

Source: RTI estimates.

Table 10-3. Estimated GDP Impact of OIA Payments (FY 2015)

	Direct GDP Impact ('000, 2015\$)	Indirect/ Induced GDP Impact ('000, 2015\$)	Total GDP Impact ('000, 2015\$)	Percentage of National GDP Supported by OIA Payments (%)
American Samoa	35,231	9,550	44,781	6%
Guam	103,980	24,616	128,596	2%
Northern Mariana Islands	15,996	8,065	24,061	3%
U.S. Virgin Islands	224,689	120,156	344,845	9%
Micronesia	85,109	175,445	260,554	81%
Marshall Islands	47,649	57,179	104,828	54%
Palau	10,015	28,709	38,725	15%

Source: RTI estimates.

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APPENDIX A: ALLOCATION OF FY 2015 TECHNICAL ASSISTANCE AND OTHER PAYMENTS BY INSULAR AREA

OIA grants and federal payments for technical assistance and other initiatives are made or distributed as needed during each fiscal year. For FY2015 payments we relied on two sources to determine payments to the insular areas. First we used the 2014 Congressional Report as the most recent estimate of FY2015 funding, we then used the 2015 Budget Justification from the OIA to further breakdown spending categories in order to understand which economic sector to apply certain payments. Table A-1 presents a breakdown of general technical assistance by grant/program and by the insular area receiving the funds. In several cases, the exact amount of funding going to each insular area was indicated in the Congressional Report or Budget Justification. However, in several cases, information was not available for how the funds associated with particular grants/programs would be distributed by area, so we made assumptions. These cases included the following:

- Allocation for the Direct Grants to Insular Areas, part of general technical assistance funding, was not available at the time of this report. Therefore, RTI applied a solver analysis through excel to distribute the funds based on the sub-totals from the congressional report, and the grant totals in the budget justification document.
- USDA Graduate School PITI-VITI: A total of \$2.5 million was allocated to this program for FY 2015. Because the PITI-VITI serves all seven insular areas, this \$2.5 million was distributed across all seven areas and Hawaii (where the PITI-VITI offices are located) based the solver program used earlier.
- Close Up Foundation: A total of \$1.1 million was allocated to this program for FY 2014. This money is received directly by the Close Up Foundation, but no additional information for how these funds might be distributed across each insular areas was provided. Therefore, the \$1.1 million was divided across all seven insular areas.
- Prior Service Benefits Program: A total of \$800,000 was allocated to this program split between Guam, Federated States of Micronesia, Marshall Islands, and Palau
- Judicial training: A total of \$320,000 was allocated to this program for FY 2014. According to OIA (2014b), these payments fund judicial training for the insular areas in the Pacific. Therefore, the funding was allocated through the Pacific insular areas.
- In a few instances the OIA's Congressional Report or Budget Justification did not explain where certain payments had been allocated, but further information about these payments was found using OIA's website announcements. A statement made by the OIA's Assistant Secretary of the Interior to Congress also provided details on payment allocations for Palau (OIA, 2012a). We assumed this distribution was similar for FY2015. For several other categories of OIA funding, the actual allocation by insular area was unknown, but information about the total amount of funding for the funding category was listed.

Table A-1. Estimation of FY 2015 General Technical Assistance by Area

	Treatment	American Samoa	Guam	CNMI	U.S. Virgin Islands	Federated States of Micronesia	Republic of Marshall Islands	Republic of Palau	Hawaii	Other	Total
Direct Grants To Insular Areas	Government	\$1,144,478	\$676,607	\$—	\$929,066	\$223,354	\$258,885	\$647,746	\$831,486	\$2,807,378	\$7,519,000
USDA Grad School PITI VITI	Education	\$83,138	\$68,157	\$2,011,003	\$44,016	\$35,706	\$46,392	\$78,383	\$89,070	\$44,136	\$2,500,000
U.S. Bureau of Commerce, BEA (for GDP data)	Government	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$750,000	\$750,000
Closeup Foundation	Education	\$36,059	\$790,270	\$42,657	\$48,323	\$27,275	\$32,604	\$44,346	\$46,933	\$31,533	\$1,100,000
Junior Statesmen	Other	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—
Pacific Basin Development Center	Government	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—
Prior Service Benefits Program	Prior Service Benefits Program	\$—	\$701,869	\$—	\$—	\$27,244	\$31,631	\$39,256	\$—	\$—	\$800,000
Judicial Training	Education	\$39,914	\$41,998	\$36,881	\$39,038	\$26,320	\$30,390	\$37,355	\$38,489	\$29,615	\$320,000
NEPA review and compliance	Education	\$39,411	\$40,099	\$36,459	\$38,557	\$26,101	\$30,098	\$36,914	\$38,022	\$29,338	\$315,000
Atoll	Health care	\$0	\$0	\$0	\$0	\$0	\$1,200,000	\$0	\$0	\$0	\$1,200,000
Other	Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total		\$1,343,000	\$2,319,000	\$2,127,000	\$1,099,000	\$366,000	\$1,630,000	\$884,000	\$1,044,000	\$3,692,000	\$14,504,000