December 2012

Economic Impacts Attributable to FY 2012 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

Prepared by

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RTI Project Number 0211740.008

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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) 2012 was $571 million, of which $544 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. Because of a lack of sophisticated economic data series, such as input-output tables, for these insular areas, territorial and federal leaders are largely deprived of the type of thorough economic analysis that would help them make more informed policy decisions.

OIA contracted with RTI International to develop a methodology that, despite data limitations, approximates the economic impact of OIA grants and payments to the insular areas. To meet OIA's needs, RTI canvassed existing secondary data and provided OIA with a methodology for rapidly approximating the economic impact of OIA payments. This methodology was used to estimate the impact of payments on each of the following economic aggregates 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 nations that were at one time governed by the United States and continue to 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 2012)

	Total OIA Payments ($'000, 2011$)	Total OIA Employment Impact (#)	National Employment Supported by OIA Payments (%)	Total OIA Employee Compensation Impact ($'000, 2011$)	National Employee Compensation Supported by OIA Payments (%)	Total OIA GDP Impact ($'000, 2011$)	National GDP Supported by OIA Payments (%)
American Samoa	35,932	1,561	10%	25,229	10%	136,334	21%
Guam	82,462	4,598	7%	124,537	7%	185,036	4%
Northern Mariana Islands	16,582	1,150	5%	17,218	5%	42,468	6%
U.S. Virgin Islands	199,114	13,376	30%	455,458	29%	516,828	11%
Micronesia	108,405	7,638	48%	49,930	73%	183,793	59%
Marshall Islands	71,519	4,013	38%	42,171	42%	105,978	62%
Palau	30,220	2,391	20%	26,859	26%	56,766	32%
Total	**544,233**	**34,726**	**18%**	**741,402**	**18%**	**1,227,202**	**11%**

Note: Total impacts are the sum of estimated direct, indirect, and induced impacts associated with OIA grants and payments. Approximately $26.4 million of a total $571 million was spent outside the seven insular areas that were the primary focus of this study.

Source: RTI estimates.

ES.1 FY 2012 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 $48,442 in 2011 (World Bank, 2012a). 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 (#)	Estimated Employment (#)	Estimated Employee Compensation ($'000, 2011$)	GDP ($'000, 2011$)	GDP per Capita (2011$)
American Samoa	55,519	15,434	242,452	634,413	11,427
Guam	159,358	68,025	1,679,585	4,721,474	29,628
Northern Mariana Islands	53,883	21,399	317,984	756,137	14,033
U.S. Virgin Islands	106,405	45,095	1,544,992	4,639,981	43,607
Micronesia	102,843	15,924	68,314	310,288	2,994
Marshall Islands	52,921	10,482	101,566	170,748	3,212
Palau	20,472	11,678	102,759	179,900	8,729
United States	309,349,689				48,442

Note: 2010 population estimates were obtained from the 2010 U.S. Census (2011) and the World Bank (2012b). Data on estimated 2010 GDP and GDP per capita for the four U.S. territories were collected from the Bureau of Economic Analysis (BEA) (2012) and are presented in 2011 terms. Data on estimated 2010 population, 2011 GDP, and GDP per capita were obtained for the three FAS from Pacific & Virgin Islands Training Initiatives (PITI-VITI) (2012a, 2012b) for Micronesia and the Marshall Islands and from the World Bank (2012a, 2012b) for Palau. Finally, 2011 GDP per capita for the United States was from the World Bank (2012a, 2012b). RTI constructed estimated employment and employee compensation statistics from the most recent secondary sources available and represent various years. The construction of this data for each insular area is explained in more detail in the full report.

For FY 2012, OIA provided $544 million in 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, 2012e). 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 2012 OIA Payments by Insular Area

	Assistance to Territories ($'000, 2011$)	Compact of Free Association—Current ($'000, 2011$)	Compact of Free Association—Permanent ($'000, 2011$)	Fiscal Payments ($'000, 2011$)	Total OIA Payments ($'000, 2011$)
American Samoa	35,918	—	14	—	35,932
Guam	12,635	—	16,827	53,000	82,462
Northern Mariana Islands	14,652	—	1,930	—	16,582
U.S. Virgin Islands	4,114	—	—	195,000	199,114
Micronesia	1,844	1,577	104,984	—	108,405
Marshall Islands	2,604	2,076	66,839	—	71,519
Palau	1,014	—	29,206	—	30,220
Other[a]	15,121	—	11,229	—	26,350
Total	**87,901**	**3,653**	**231,029**	**248,000**	**570,583**

[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 (2012a, 2012b, 2012c, 2012d, 2012e).

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.

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, mines, 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 seven insular areas.

RTI's selection of EBA as an analytical strategy was motivated by the importance of offering OIA a methodology for estimating economic impacts that could be applied using data currently available and that could be updated as needed, either for future fiscal years' payments or as new economic data are made available for the insular areas.

In addition to its primary analysis of the seven insular areas, RTI also conducted a supplemental analysis of the economic impact of OIA spending on Washington, DC, and Hawaii. Because input-output statistical data were available for these two areas, RTI used IMPLAN, a static input-output model of economic activity, to quantify the impact OIA spending has on each economic region.

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. Based on RTI's analysis of the economic structure of each insular area, it was determined that for every 1 job directly supported by OIA payments, approximately 1.88 jobs were supported elsewhere in each insular economy, on average. Base employment multiplier estimates ranged from 1.90 in American Samoa to 3.87 in the Northern Mariana Islands.

Table ES-4. Estimated Employment Impact of OIA Payments (FY 2012)

	Direct Employment Impact (#)	Indirect/Induced Employment Impact (#)	Total Employment Impact (#)	National Employment Supported by OIA Payments (%)
American Samoa	823	738	1,561	10%
Guam	1,627	2,970	4,598	7%
Northern Mariana Islands	297	852	1,150	5%
U.S. Virgin Islands	3,894	9,482	13,376	30%
Micronesia	2,566	5,072	7,638	48%
Marshall Islands	1,795	2,217	4,013	38%
Palau	817	1,574	2,391	20%
Total	**11,820**	**22,906**	**34,726**	**18%**

Source: RTI estimates.

In the cases of the Marshall Islands and Micronesia, a significant portion of national employment is directly and indirectly supported by OIA payments. Approximately 48% 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. Based on RTI's analysis of the economic structure of each insular area, we determined that for every $1.00 of employee compensation directly supported by OIA payments, approximately $2.15 of employee compensation was supported elsewhere in the insular economy, on average. Base employee compensation multiplier estimates ranged from 1.92 in the American Samoa to 5.10 in the Northern Mariana Islands.

Table ES-5. Estimated Employee Compensation Impact of OIA Payments (FY 2012)

	Direct Employee Compensation Impact ('000, 2011$)	Indirect / Induced Employee Compensation Impact ('000, 2011$)	Total Employee Compensation Impact ('000, 2011$)	National Employee Compensation Supported by OIA Payments (%)
American Samoa	13,120	12,109	25,229	10%
Guam	40,374	84,163	124,537	7%
Northern Mariana Islands	3,377	13,842	17,218	5%
U.S. Virgin Islands	133,596	321,862	455,458	29%
Micronesia	13,455	36,475	49,930	73%
Marshall Islands	19,866	22,305	42,171	42%
Palau	9,862	16,997	26,859	26%
Total	**233,650**	**507,752**	**741,402**	**18%**

Source: RTI estimates.

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 73% 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 $1.88 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 62% 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 2012)

	Direct GDP Impact ('000, 2011$)	Indirect/Induced GDP Impact ('000, 2011$)	Total GDP Impact ('000, 2011$)	National GDP Supported by OIA Payments (%)
American Samoa	32,970	103,364	136,334	21%
Guam	81,853	103,182	185,036	4%
Northern Mariana Islands	12,572	29,896	42,468	6%
U.S. Virgin Islands	199,093	317,736	516,828	11%
Micronesia	63,841	119,951	183,793	59%
Marshall Islands	47,416	58,562	105,978	62%
Palau	21,012	35,753	56,766	32%
Total	**458,757**	**768,445**	**1,227,202**	**11%**

Source: RTI estimates.

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 $7.94 million of OIA's operating budget was spent in Washington, DC, and approximately $15.7 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 support 41 jobs in Washington, DC, receiving approximately $4.89 million of employee compensation, and support a total output of $9.48 million. In Hawaii, OIA spending in FY 2012 is estimated to support 209 employees, receiving $12.96 million of employee compensation, and a total output of $26.49 million.

1. INTRODUCTION

The Office of Insular Affairs (OIA) contracted with RTI International in November 2012 to estimate the economic impacts of federal payments and grants from fiscal year (FY) 2012 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.

OIA distributed approximately $544 million in technical assistance, grants, and payments to the insular areas during FY 2012. 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.

Because the insular areas are not included in most U.S. statistical surveys of economic activity, critical data on local economic activity are not captured. As a result, federal and insular officials do not have detailed economic data with which to inform their policy decisions, including input-output (I/O) and other data necessary for measuring the economic impact of federal grants and payments, with the same level of precision and accuracy available for U.S. states.[1]

In this study, RTI estimated direct economic impacts and multipliers for estimating total economic impact, which include 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, 2011).

[1] In contrast, the U.S. Bureau of Economic Analysis (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). 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 1-1. Economic Characteristics by Insular Area

	Estimated Population (# in 2010)	Estimated Employment (#)	Estimated Employee Compensation ($'000, 2011$)	GDP ($'000, 2011$)	GDP per Capita (2011$)
American Samoa	55,519	15,434	242,452	634,413	11,427
Guam	159,358	68,025	1,679,585	4,721,474	29,628
Northern Mariana Islands	53,883	21,399	317,984	756,137	14,033
U.S. Virgin Islands	106,405	45,095	1,544,992	4,639,981	43,607
Micronesia	102,843	15,924	68,314	310,288	2,994
Marshall Islands	52,921	10,482	101,566	170,748	3,212
Palau	20,472	11,678	102,759	179,900	8,729
United States	309,349,689				48,442

Note: 2010 population estimates were obtained from the 2010 U.S. Census (2011) and the World Bank (2012b). Data on estimated 2010 GDP and GDP per capita for the four U.S. territories were collected from the BEA (2012) and are presented in 2011 terms. Data on estimated 2010 population, 2011 GDP, and GDP per capita were obtained for the three FAS from Pacific & Virgin Islands Training Initiatives (PITI-VITI) (2012a, 2012b) for Micronesia and the Marshall Islands and from the World Bank (2012a, 2012b) for Palau. Finally, 2011 GDP per capita for the United States was from the World Bank (2012a, 2012b). RTI constructed estimated employment and employee compensation statistics from the most recent secondary sources available and represent various years. The construction of this data for each insular area is explained in more detail below.

1.1 FY 2012 OIA Payments to Insular Areas

In FY 2012, OIA's total budget was $571 million, of this$544 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 OIA's payments are considered mandatory; 83% of spending is classified as "permanent" (OIA, 2012a). 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 Treesnake 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. In these cases, RTI made assumptions based on information from previous fiscal years, which are detailed in Appendix A.

Table 1-2. FY 2012 OIA Payments by Insular Area

	Assistance to Territories ($'000, 2011$)	Compact of Free Association —Current ($'000, 2011$)	Compact of Free Association— Permanent ($'000, 2011$)	Fiscal Payments ($'000, 2011$)	Total OIA Payments ($'000, 2011$)
American Samoa	35,918	—	14	—	35,932
Guam	12,635	—	16,827	53,000	82,462
Northern Mariana Islands	14,652	—	1,930	—	16,582
U.S. Virgin Islands	4,114	—	—	195,000	199,114
Micronesia	1,844	1,577	104,984	—	108,405
Marshall Islands	2,604	2,076	66,839	—	71,519
Palau	1,014	—	29,206	—	30,220
Other[a]	15,121	—	11,229	—	26,350
Total	**87,901**	**3,653**	**231,029**	**248,000**	**570,583**

[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 (2012a, 2012b, 2012c, 2012d, 2012e).

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 2012 grants and payments and determine affected economic sectors for the American Samoa Operations Grant, Brown Treesnake 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, technical assistance, and water and wastewater projects;
- model the direct and indirect/induced economic impacts of FY 2012 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

Typically, the economic impacts of government spending on specific regions are estimated using I/O models. These 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. These methods also allow a breakout between indirect and induced effects that can be useful for policy analysis.

Because no publicly available I/O models existed for the economies of the seven insular areas, RTI developed multipliers for each of the seven insular areas using economic base analysis (EBA).[2] RTI's selection of EBA was motivated by the importance of offering OIA a methodology for estimating economic impacts that can be updated as needed, either for future fiscal years' payments or as new economic data are made available for the insular areas.

EBA is one of the simplest and most widely used techniques for regional economic analysis because it is supported by both the intuitive insights of urban planners and geographers and the formal theory of modern economics (Klosterman, 1990). 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 seven 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

$$\Delta Y = s * \Delta X \qquad (1.1)$$

[2] 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.

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).

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 insular area, RTI estimated economic impacts for each of the seven insular areas 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 for each of the seven insular areas. 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 insular area.

To better illustrate this approach, consider the following *hypothetical* example. Suppose that Guam received $50 million of grants and other payments from OIA in 2012. The Guam Office of Finance and Budget (GOFB, 2010) estimated the government of Guam would receive total funding of $540 million in FY 2011, and the Guam Bureau of Statistics and Plans (GBSP, 2012a) notes that Guam employed approximately 11,705 workers (GBSP, 2012a). Assuming the ratio of government revenue per employee remains constant ($540 million/11,705 = $46,152 per employee), we estimate that the $50 million of funding would have supported approximately 1,083 jobs on the island ($50 million/$46,152 = 1,083). These jobs would be considered the direct employment impact of OIA grants and payments.

To estimate how this direct employment impact would influence Guam's total employment, RTI calculated base multipliers using available data on employment by industry, such as those reported in Table 1-3. Base employment multipliers are calculated by taking the ratio of total employment to employment in base sectors. Base-sector employment is ideally measured through surveys or the use of location quotients. However, in instances where data are limited, it is acceptable to assume that the entire workforce in those sectors that

tend to derive much of their revenue from outside the region can be considered base-sector employment.

Table 1-3. Guam Employment by Industry (2011)

Industry	2011 Average Employment
Agriculture	300
Construction	6,073
Manufacturing	1,718
Transportation	4,373
Trade	13,580
Finance, insurance, and real estate	2,688
Accommodations	7,657
Other services	9,626
Government of Guam	11,705
Federal government—Military	6,275
Federal government—Nonmilitary	4,033
Total Employment, All industries	**68,025**

Note: Average nonmilitary employment was calculated by taking the average of Guam 2011 employment estimates for March, June, September, and December as reported in Table LF-5 of the 2010 *Statistical Yearbook Update*. These data include full-time and part-time employees who worked during or received pay for any part of the pay period that included the 12th day of the survey months. Proprietors, self-employed unpaid family workers, and domestic servants are excluded from these estimates. An estimate of active military personnel is included as reported in Table FP-1 of the 2010 *Statistical Yearbook Update*. However, one should note that military employment is likely to increase drastically in coming years because of the anticipated military scale-up on the island.

Source: GBSP, 2012a, 2012b.

In this example, we used the standard assumption that base employment can be estimated as the sum of employment in the agriculture, manufacturing, and federal government sectors (12,325 employees). As a result, the base employment multiplier is estimated to be 5.5 (68,025/12,325 = 5.5). This means that for every one new job supported in the base sector, 4.5 jobs are created elsewhere in the economy. Therefore, the payments support 1,083 jobs directly and support 4,894 additional jobs indirectly elsewhere in the economy as a result of the multiplier process (1,083 *4.5 = 4,894) for a total of 5,977 jobs in the region.

Although this hypothetical example is appropriate for illustrative purposes, this study improved on this simple analytical construction in several ways. First, in the example, economic impacts are estimated using only a single output-to-employee ratio. However, 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. In the example above, only the 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.

In the analysis described in this report, RTI incorporated both refinements into its economic impact assessment approach to provide OIA with the most accurate estimates possible, given existing data restrictions. RTI also used IMPLAN to model the economic impact of OIA activities in Washington, DC, and Hawaii, areas in which OIA has operations.

1.4 Methodological Limitations

Although EBA has several significant advantages that make it the most reasonable methodological approach for this study, 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, 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.

Lastly, EBA 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

When possible, RTI tried to incorporate newer economic data into the FY 2012 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 2010 County Business Patterns (released by the U.S. Census in June 2012). 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 2007 Economic Census for these ratios. This approach assumes that employment and compensation have changed over time in the territories, but output-to-employee has remained constant since 2007. Because most of the insular areas have experienced some economic decline since 2007, using output-to-employee ratios from 2007 may underestimate the impacts of OIA payments, because during periods of decline and recovery, output-to-employee tends to increase (BEA, 2012; 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 RTI was 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. American Samoa was chosen as the best U.S. Territory comparison because it was 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 American Samoa has a higher GDP per capita. The use of American Samoa data as a proxy will likely underestimate the impacts of OIA spending because more jobs will be supported by each dollar of OIA spending.

For the FY 2012 analysis, we were able to better estimate GDP base multipliers for each insular. This higher level of analysis was possible because of new estimates of GDP released

by the BEA in September 2012. Up-to-date employment, employee compensation, and GDP data were available for the FAS through new reports released in October 2012 by PITI-VITI. In addition, PITI-VITI's Performeter Reports[3] for each insular area, released in January 2012, provided updated information on percentage of government operations that are funded by external sources. These reports helped better estimate aspects of the base economy. Updated IMPLAN data from 2010 were also used to estimate the impacts of OIA spending in Washington, DC, and Hawaii.

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 presents summary economic impact data for all FY 2012 payments.

[3] A Performeter Report takes government financial statements and converts these measures into an easy to measure overall rating of government performance and financial health. The Performeter Report also provides trend data of government finance measure such as fund balances, net assets, and revenue dispersion (PITI-VITI 2012c).

2. AMERICAN SAMOA

2.1 FY 2012 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.[1] Also in 2009, American Samoa was affected by an earthquake and tsunami. Increased government spending and construction activities in response to the disaster helped American Samoa's real GDP grow by 1.4% percent from 2009 to 2010 (BEA, 2012). The average GDP per capita for American Samoa in 2010 was $11,427 (in 2011 U.S. dollars) compared with approximately $48,442 in the United States (BEA, 2012; World Bank, 2012a).

OIA strives to foster economic development, promote sound management, and improve quality of life in American Samoa. OIA payments to American Samoa in FY 2012 totaled $35.9 million and were primarily directed toward the government and construction sectors with additional support for education and health care (Table 2-1). According to the OIA's 2013 Congressional District Report, $32.8 million in payments were specifically directed to American Samoa in FY 2012 (OIA, 2012a). The remaining $3.1 million came from other OIA payments that are spent across the insular areas (see Appendix A).

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 nearly $23 million. These operation 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 18% of American Samoa's general fund and 22% of LBJ Hospital's revenue for FY 2011 (OIA, 2012e).

Other Assistance to Territories funding, totaling $13.2 million, was used to fund economic development programs, judicial training, and other initiatives such as the Coral Reef Initiative, which pursues the sustainable maintenance and protection of coral reefs through initiatives such as education and outreach programs and the establishment of protection areas, and the PITI-VITI. PITI-VITI was established to assist island governments in developing superior leadership, financial stability, accountability, program effectiveness, and economic growth.

[1] The real GDP from the manufacturing sector of American Samoa's economy decreased by 13% from 2009 to 2010.

Table 2-1. American Samoa: OIA Payments (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Compact of Free Association		
Compact impact	14	Education
Total, Compact of Free Association	*14*	
Assistance to Territories		
American Samoa operations grant—Basic operations	14,218	Government
American Samoa operations grant—LBJ Hospital operations	7,645	Health care
American Samoa operations grant—High court	854	Government
Subtotal, American Samoa Operations Grants	*22,717*	
General technical assistance—Direct grants	951	Government
General technical assistance—Judicial training	53	Government
General technical assistance—U.S. Department of Agriculture (USDA) Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—Compact Impact Discretionary	1,250	Education
Subtotal, General Technical Assistance	2,617	
Coral Reef Initiative	87	Government
Maintenance assistance	259	Government
Northern Mariana Covenant Grants—American Samoa construction	10,089	Construction
Office of Insular Affairs	149	Government
Subtotal, Other Assistance to Territories	10,584	
Total, Assistance to Territories	35,918	
Total Spending Inside American Samoa	**35,932**	

Source: RTI estimates based on OIA (2012e).

In addition to funding received from OIA's Assistance to Territories, American Samoa also received $14,000 through the Compact of Free Association Compact Impact Grant, which offsets costs incurred by American Samoan health, educational, and social systems from in-migration of FAS residents. American Samoa allocated its FY 2012 appropriated compact impact payments toward training materials and equipment for the education of college nursing students. In FY 2012, the OIA set aside an additional $5 million in discretionary compact impact payments to help alleviate costs incurred by the migration of citizens from the FAS on education systems. We assumed that American Samoa received a portion of this discretionary funding (see Appendix A).

2.2 Direct Economic Impacts of OIA Payments

Direct economic impacts of OIA payments were assigned to four economic sectors—education, construction, government, and health care. 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:[2]

- **Education:** Based on sales and employment data from the 2007 Economic Census for American Samoa, the average output-to-employee ratio in the education sector (North American Industry Classification System [NAICS] 61) was $44,907 per employee (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$48,718**. Based on payroll and employment data from the Census 2010 County Business Patterns for American Samoa, the average employee compensation-to-employee ratio in the education sector was $10,718 per employee. Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$11,057** (Census, 2012).
- **Construction:** Based on sales and employment data from the 2007 Economic Census for American Samoa, the average output-to-employee ratio in the construction sector (NAICS 23) was $52,431 per employee (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$56,881**. Based on payroll and employment data from the Census 2010 County Business Patterns for American Samoa, the average employee compensation-to-employee ratio in the construction sector was $14,890 per employee (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$15,360**.
- **Government:** According to American Samoa's Basic Financial Statements (American Samoa Treasury Department [ASTD], 2010), the government of American Samoa received approximately $225 million in revenue and employed 6,035 individuals in 2009. Adjusting for inflation, this implies an output-to-employee ratio of **$39,097**. Because data on government employee compensation were unavailable, the average employee compensation-to-employee ratio for nonagricultural private-sector workers ($14,959) from the 2010 County Business Patterns was used as a proxy (Census, 2012). Adjusting for inflation, this implies an employee compensation-to-employee ratio of **$15,431**.
- **Health care:** Based on sales and employment data from the 2007 Economic Census for American Samoa, the average output-to-employee ratio in the health care sector (NAICS 62) was $37,445 per employee (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$40,623**. Based on payroll and employment data from the Census 2010 County Business Patterns for American Samoa, the average employee compensation-to-employee ratio in the health care

[2] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

sector was $17,958 per employee (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$18,525**.

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

Table 2-2. American Samoa: Estimated Direct Economic Impacts (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	1,627	48,718	11,057	33	369
Construction	10,089	56,881	15,360	177	2,724
Government	16,572	39,097	15,431	424	6,541
Health care	7,645	40,623	18,525	188	3,486
Total	**35,932**			**823**	**13,120**

Sources: RTI estimates based on Census (2009, 2012), ASTD (2010), and OIA (2012e). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

2.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using the best available employment and employee compensation data for American Samoa (Table 2-3). Table 2-3 was developed from a combination of data sources. First, total employment for American Samoa as a whole was listed in the 2011 Government Accountability Office (GAO) report as 15,434 total employees for the year 2009. Employment in the tuna cannery industry for 2009 was estimated by applying the average change in employment in the sector from 2001 to 2008, which was obtained from American Samoa's Financial Statement (ASTD, 2010). Next, employment for the remaining industries was distributed assuming that the proportion of total employment associated with each remaining industry was the same as it was in 2002 (2002 employment data by industry were obtained from American Samoa Department of Commerce [ASDC] [2008]). After employment by industry was estimated, total employee compensation in each industry was estimated by applying employee compensation-to-employee ratios for each industry that were obtained from the 2010 County Business Patterns and 2007 Agricultural Census to the employment totals (Census, 2012; USDA, 2011). Because employee compensation data for government employees were not available from either of these sources, government employees were

assumed to earn the same employee compensation-to-employee as the average for the nonagricultural private sector.

Table 2-3. American Samoa: Employment and Employee Compensation by Industry (2009)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture, fishing, and mining	450	298
Government—American Samoa government[a]	3,627	55,961
Government—Federal government	137	2,112
Manufacturing—Fish processing	4,815	83,484
Manufacturing—Other	49	841
Tourism—Accommodation	38	441
Tourism—Food services and drinking places	495	5,727
Noneconomic Base Industries		
Construction	518	7,956
Educational and health care services	663	10,238
Financial activities	283	5,972
Information	255	5,742
Other services	304	4,691
Professional and business services	780	14,441
Retail trade	1,606	22,626
Transportation and warehousing	681	10,326
Utilities	430	6,629
Wholesale trade	305	4,967
Total	**15,434**	**242,452**

[a] Because 59% of American Samoa's budget comes from external sources, we assumed that only 59% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Sources: RTI estimates based on Census (2012), USDA (2011), GAO (2011), ASTD (2010), and ASDC (2008). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

The economic base of American Samoa is agriculture, fishing, mining, 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, therefore, are part of the economic base.[3] This is likely a conservative approach because, to the extent that this approximation overrepresents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of American Samoa's territorial government is considered part of the economic base. Because an average of approximately 59% of American Samoa's budget comes from external sources, this analysis assumes 59% of territorial government employment is considered base employment (PITI-VITI, 2012c).[4] Based on these assumptions and the data in Table 2-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 8,134 employees out of a total of 15,434. Dividing total employment by base employment yields a multiplier of **1.90**, meaning that for every base employment position supported by OIA funding, an estimated 0.90 additional jobs are formed elsewhere in the economy. This estimate matches the 2005 economic base multiplier that was estimated for American Samoa in the 2008 OIA study on the prospective economic impact of the decline of the Samoa cannery industry (ASDC, 2008).
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $126 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **1.92**, meaning that every dollar of employee compensation supported by the 2011 spending will create an additional $0.92 in employee compensation.

Multiplying the direct employment impact and employee compensation impacts in Table 2-2 by these multipliers yields a total employment impact of 1,561 employees and a total employee compensation impact of $25.2 million.

2.4 GDP Base Multipliers

In recent years, OIA has funded the U.S. Bureau of Economic Analysis (BEA) under the Statistical Improvement Program to estimate more detailed and accurate economic data for the U.S. territories. In September 2012, the BEA released updated economic reports for each U.S. territory, including American Samoa, which included for the first time an estimate of GDP by industry. With this new data, we were able to better estimate GDP multipliers, making for a more detailed analysis of the GDP impacts of OIA payments.

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

[4] In addition to payments from the OIA and the Department of the Interior, the government of American Samoa also receives support from various other federal government agencies, including the Department of Education, the Department of Agriculture, and the Department of Health and Human Services (GAO, 2006).

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 American Samoa's GDP was $615 million in 2010, or $634 million in 2011 dollars (BEA, 2012). Dividing this by the total number of employees estimated to be working in American Samoa (15,434) implies a GDP-to-employee ratio of $41,105. Multiplying this ratio by the direct employment impact in the private sector (399 employees) yields a direct private-sector GDP impact of $16.3 million. This private-sector impact is then added to the $16.6 million of OIA payments spent in the public sector to produce an estimate of approximately $33 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent BEA data (Table 2-4) 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 federal government and manufacturing sectors were economic base sectors, along with 59% of the territorial government. The remaining territorial government and nonmanufacturing sectors were included in the noneconomic base industries.

Table 2-4. American Samoa: GDP by Industry (2010)

Sector	GDP (in millions of 2011$)
Economic base industries	
Government—Federal	18
Government—Territorial[a]	158
Manufacturing	42
Noneconomic base industries	
Nonmanufacturing	417
Total	**634**

[a] Because 59% of American Samoa's budget comes from external sources, we assumed that only 59% of the GDP associated with the territorial government was part of the base sector. The remaining GDP was assumed to be part of the nonbase sector.

Source: RTI estimates based on BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

Based on these assumptions and the data in Table 2-4, base GDP was calculated to be $153 million. Dividing total GDP by base GDP yields a multiplier of **4.14**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 3.14 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 $136 million.

2.5 Summary Economic Impact Estimate for FY 2012

In summary, the $35.9 million of OIA payments directly support 823 jobs,$13.1 million in employee compensation, and $33 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 1,561 jobs, $25.3 million in employee compensation, and $136 million in GDP. A summary of economic impact measures is presented in Table 2-5.

Table 2-5. American Samoa: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	823	738	1,561
Employee compensation ($'000, 2011$)	13,120	12,109	25,229
GDP ($'000, 2011$)	32,970	103,364	136,334

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), PITI-VITI (2012c), GAO (2011), ASTD (2010), ASDC (2008), USDA (2011), and BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 2-6. As this table illustrates, the 1,561 jobs directly and indirectly supported by OIA payments represent 10% of American Samoa's estimated total employment. Similarly, $25.2 million of employee compensation associated with these employees accounts for approximately 10% of total employee compensation inside the region, and the $136 million of GDP associated with these employees represents 21% of total GDP produced by the insular area.

Table 2-6. American Samoa: Estimated Impact Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	1,561	15,434	10%
Employee compensation ($'000, 2011$)	25,229	242,452	10%
GDP ($'000, 2011$)	136,334	634,413	21%

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), PITI-VITI (2012c), GAO (2011), ASTD (2010), ASDC (2008), USDA (2011), and BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

3. GUAM

3.1 FY 2012 OIA Payments Summary

Although Guam is among the wealthiest of the insular areas, it 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 8,000 U.S. Marines from the military base in Okinawa, Japan, to the insular area. 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). The U.S. military buildup, which may increase Guam's population by an estimated 45%, creates uncertainty for Guam, which could see an increase in employment but also strains on its infrastructure (*Washington Post*, 2010). From 2009 to 2010, real GDP of Guam grew by 1.2% (BEA, 2012). The average GDP per capita for Guam in 2010 was $29,628 (2011$), about 60% of the GDP per capita of the United States ($48,442) (BEA, 2012; World Bank, 2012a).

OIA payments to Guam in FY 2012 totaled $82.5 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. According to the OIA's 2013 Congressional District Report, $75.9 million in payments was specifically directed to Guam in FY 2012 (OIA, 2012a). The remaining $6.6 million came from other OIA payments that were spent across the insular areas (see Appendix A).The largest block of OIA payments, totaling $53 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 $17 million through the Compact of Free Association, which Guam intends to use for a variety of equipment purchases and infrastructure.

Guam received $3.1 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. In FY 2012, a new category of Assistance to Territories payments was created—Empowering Insular Communities. In FY 2012, Guam received all $2.2 million of the payments under this category to help the insular area prepare its infrastructure for the military transition and apply sustainable energy strategies (OIA, 2012b). Other technical assistance programs, which made up about $7.3 million of the Assistance to Territories

payments, include infrastructure maintenance assistance, water and wastewater improvements, funding for Guam Construction, and Brown Treesnake Control. The Brown Treesnake Control program is intended to fund research and implementation techniques to eradicate this invasive species. OIA distributed funds for the Coral Reef Initiative, which supports the sustainable maintenance and protection of coral reefs through initiatives such as education and outreach programs and the establishment of protection areas. Guam also received $0.8 million for the Guam Waterworks Authority to improve the delivery of clean water and wastewater treatment to residents in the southern portion of the insular area (OIA, 2012c).

Table 3-1. Guam: OIA Payments by Appropriation (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Fiscal Payments		
Guam Section 30 income taxes	53,000	Government
Total, Fiscal Payments	53,000	
Compact of Free Association		
DPW schools leaseback	7,100	Education
GMHA vendor payables and financial study	4,142	Government
GFD ambulance and fire apparatus procurement	1,560	Wholesale
DOC improvements and equipment	1,525	Wholesale
DISID individualized budget program	200	Government
BSP centralized data center project	300	Government
RevTax Real Property Project	2,000	Government
Total, Compact of Free Association	16,827	
Assistance to Territories		
General technical assistance—Direct grants	1,465	Government
General technical assistance—Judicial training	53	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—Compact Impact Discretionary	1,250	Education
Subtotal, General Technical Assistance	3,131	
Empowering Insular Communities		
Fire ladder truck	600	Wholesale
Two Rescue Trucks	240	Wholesale
Rigid Hull Inflatable Rescue Boat & Equipment	280	Wholesale
Guam Department of Public Works—Wholesale	90	Wholesale

(continued)

Table 3-1. Guam: OIA Payments by Appropriation (FY 2012) (cont.)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Guam Department of Public Works—Construction	90	Construction
Guam Energy Office for Better Buildings with Energy Code	150	Government
General Services Agency—Wholesale	125	Wholesale
General Services Agency—Construction	125	Construction
Guam Power Authority—Wholesale	253	Wholesale
Guam Power Authority—Construction	253	Construction
Subtotal, Empowering Insular Communities	2,205	
Brown Tree Snake Control	285	Government
Maintenance assistance	55	Government
Coral Reef Initiative	83	Government
Northern Mariana Covenant Grants—Guam construction	6,086	Construction
Wastewater projects	790	Construction
Subtotal, Other	7,299	
Total, Assistance to Territories	12,635	
Total Spending Inside Guam	**82,462**	

Source: RTI estimates based on OIA (2012b, 2012c, 2012e).

3.2 Direct Economic Impacts of OIA Payments

Direct economic impacts of OIA payments were assigned to four economic sectors—education, construction, government, and wholesale. For Empowering Insular Communities payments that were for purchasing and installation, we assumed that 50% of those payments went to the wholesale sector and the remaining 50% went to the construction sector. 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 sales and employment data from the 2007 Economic Census for Guam, the average output-to-employee ratio in the education sector (NAICS 61) was $38,853 per employee (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of $42,151. Based on payroll and employment data from the Census 2010 County Business Patterns for Guam, the average employee compensation-to-employee ratio in the education sector was $20,708 per employee. Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of $21,361 (Census, 2012).

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

- **Construction:** Based on sales and employment data from the 2007 Economic Census for Guam, the average output-per-employee ratio in the construction sector (NAICS 23) was $96,302 per employee (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$104,475**. Based on payroll and employment data from the Census 2010 County Business Patterns for Guam, the average employee compensation-to-employee ratio in the construction sector was $22,983 per employee (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$23,709**.

- **Government:** According to Guam's Office of Finance and Budget, the revenue of the government of Guam was estimated to be $540 million (GOFB, 2010). The government of Guam employed approximately 11,705 individuals in 2011 accordingly to the GBSP's 2010 Statistical Yearbook Updates (GBSP, 2012a). This implies an output-per-employee ratio of **$46,152**. Because data on government employee compensation were unavailable, the average employee compensation-per-employee ratio for nonagricultural private-sector workers ($24,573) from the 2010 County Business Patterns was used as a proxy (Census, 2012). Adjusting for inflation, this implies an employee compensation-to-employee ratio of **$25,349**.

- **Wholesale:** Based on sales and employment data from the 2007 Economic Census, the average output-per-employee ratio in the wholesale sector (NAICS 42) was $334,104 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$362,459**. Based on payroll and employment data from the Census 2010 County Business Patterns for Guam, the average employee compensation-to-employee ratio in the wholesale sector was $29,016 per employee (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$29,932**.

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 3-2.

Table 3-2. Guam: Estimated Direct Economic Impacts (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	8,713	42,151	21,361	207	4,415
Construction	7,344	104,475	23,709	70	1,666
Government	61,733	46,152	25,349	1,338	33,906
Wholesale	4,673	362,459	29,932	13	386
Total	**82,462**			**1,627**	**40,374**

Sources: RTI estimates based on Census (2009, 2012), OIA (2012b, 2012c, 2012e), GOFB (2010), and GBSP (2012a). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

3.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using the best available employment and employee compensation data presented in Table 3-3. This table was developed from a combination of data sources. First, 2011 data on employment by industry and military employment were obtained from the 2010 Statistical Yearbook Updates. Next, employee compensation for each industry was estimated by applying the annual payroll to employee ratios found in the 2010 County Business Patterns and from the 2007 Agricultural Census (adjusted for inflation) to the employment totals (Census, 2012; USDA, 2009a). For the government and military sectors, the average employee compensation-to-employee ratio for nonagricultural private-sector workers was used as a proxy.

Table 3-3. Guam: Estimated Employment and Employee Compensation by Industry (2011)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture	300	485
Government—Government of Guam[a]	11,705	296,705
Government—Federal government (military)	6,275	159,062
Government—Federal government (nonmilitary)	4,033	102,218
Manufacturing	1,718	54,297
Tourism—Accommodation and food services	7,657	124,602
Noneconomic Base Industries		
Construction	6,073	143,972
Finance, insurance, and real estate	2,688	103,983
Other services	9,626	218,919
Trade	13,580	300,601
Transportation	4,373	174,741
Total	**68,025**	**1,679,585**

[a] Note that because 35% of Guam's budget comes from external sources, it was assumed that only 35% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Sources: RTI estimates based on GBSP (2012a, 2012b), Census (2012), and USDA (2009a). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

The economic base of Guam is agriculture, 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 that this approximation overrepresents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of Guam's territorial government is considered part of the economic base. Because 35% of Guam's government revenue comes from external sources, 35% of territorial government employment was included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c).[3] Based on these assumptions and the data in Table 3-3, the following multipliers were calculated:

- **Base employment multiplier:** Base employment was calculated to include 24,078 employees out of a total of 68,025. Dividing total employment by base employment yields a multiplier of **2.83**, meaning that for every base employment position supported by OIA funding, 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 $545 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **3.08**, meaning that every dollar of employee compensation supported by the 2011 spending will create an additional $2.08 in employee compensation elsewhere in the economy.

Multiplying the direct employment impact and employee compensation impacts in Table 3-2 by these multipliers yields a total employment impact of 4,598 employees and a total employee compensation impact of $125 million.

3.4 GDP Base Multipliers

In recent years, OIA has funded the BEA under the Statistical Improvement Program to estimate more detailed and accurate economic data for the U.S. territories. In September 2012, the BEA released updated economic reports for each U.S. territory, including Guam, which included for the first time an estimate of GDP by industry. With this new 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

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

[3] In addition to payments from the OIA and the Department of the Interior, the government of Guam also receives support from various other federal government agencies, including the Department of Education, Department of Health and Human Services, and Department of Homeland Security (GAO, 2006).

direct GDP impacts of OIA payments in the private sector. It is estimated that Guam's GDP was $4,577 million in 2010, or $4,721 million in 2011 dollars (BEA, 2012). Dividing this by the total number of employees estimated to be working in Guam (68,025) implies a GDP-to-employee ratio of $69,408. Multiplying this ratio by the direct employment impact in the private sector (290 employees) yields a direct private-sector GDP impact of $20 million. This private-sector impact is then added to the $62 million of OIA payments spent in the public sector to produce an estimate of approximately $82 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent BEA data (Table 3-4) 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 federal government and accommodation and amusement sectors were economic base sectors, along with 35% of the territorial government. The remaining territorial government, construction, distributive services, and other private sectors were included in the noneconomic base industries.

Table 3-4. Guam: GDP by Industry (2010)

Industry	GDP (in millions of 2011$)
Economic Base Industries	
Government—Federal	1,395
Government—Territorial[a]	827
Accommodation and amusement	404
Noneconomic Base Industries	
Construction	331
Distributive services	415
Other private	1,347
Total[b]	**4,721**

[a] Note that because 35% of Guam's budget comes from external sources, it was assumed that only 35% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

[b] Values may not add to total because of rounding.

Sources: RTI estimates based on BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

Based on these assumptions and the data in Table 3-4, base GDP was calculated to be $2,089 million. Dividing total GDP by base GDP yields a multiplier of **2.26**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 1.26 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 $185 million.

3.5 Summary Economic Impact Estimate for FY 2012

In summary, the $82.5 million of OIA payments directly supports 1,627 jobs , $40.4 million in employee compensation, and $82 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 4,598 jobs,$125 million in employee compensation, and $185 million in GDP. A summary of economic impact measures is presented in Table 3-5.

Table 3-5. Guam: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	1,627	2,970	4,598
Employee compensation ($'000, 2011$)	40,374	84,163	124,537
GDP ($'000, 2011$)	81,853	103,182	185,036

Sources: RTI estimates based on Census (2009, 2012), GBSP (2012a, 2012b), GOFB (2010), OIA (2012b, 2012c, 2012e), PITI-VITI (2012c), USDA (2009a), and BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 3-6. As this table illustrates, the 4,598 jobs directly and indirectly supported by OIA payments represent 7% of Guam's total employment. Similarly, $125 million of employee compensation associated with these employees accounts for approximately 7% of total employee compensation inside the region, and the $185 million of GDP associated with these employees represents 4% of total GDP produced by the region.

Table 3-6. Guam: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	4,598	68,025	7%
Employee compensation ($'000, 2011$)	124,537	1,679,585	7%
GDP ($'000, 2011$)	185,036	4,721,474	4%

Sources: RTI estimates based on Census (2009, 2012), GBSP (2012a, 2012b), GOFB (2010), OIA (2012b, 2012c, 2012e), PITI-VITI (2012c), USDA (2009a), and BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

4. COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS (CNMI)

4.1 FY 2012 OIA Payments Summary

In 2010, the average GDP per capita for CNMI was approximately $14,033 (2011$), close to 30% of the U.S. GDP per capita $48,442 (BEA, 2012; World Bank, 2012a). However, this insular area continues to face economic development and infrastructural challenges. Once home to a billion-dollar garment industry, CNMI lost all garment factories because of foreign competition; as a result, real GDP declined for six consecutive years from 2005 to 2009. However in 2010, real GDP increased by 2.4% due to an increase in territorial government spending, exports of goods and services, and tourism services (BEA, 2012).

OIA payments to CNMI in 2012 totaled $16.6 million and were primarily directed to the construction and government sectors with additional support for education and the private sector (Table 4-1). According to the OIA's 2013 Congressional District Report, $11.5 million in payments were specifically directed to CNMI in FY 2012 (OIA, 2012a). The remaining $5.1 million came from other OIA payments that were spent across the insular areas (see Appendix A).

Assistance to Territories payments, totaling about $14.7 million, made up the majority of funding to CNMI. General technical assistance, which made up $4.2 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 funding for immigration and law enforcement has increased over the years because CNMI must now adopt and implement the same immigration policies as the United States (OIA, 2012e). The remainder of the Assistance to Territories funding went to other activities such as the Coral Reef Initiative, maintenance assistance, and Brown Treesnake Control.

OIA also provided nearly $2 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.

4.2 Direct Economic Impacts of OIA Payments

Direct economic impacts of OIA payments were assigned to four economic sectors—education, construction, government, and the general private sector. To calculate the

Table 4-1. CNMI: OIA Payments (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Compact of Free Association		
Department of Public Health	537	Government
Division of Youth Services	45	Government
Department of Public Safety	1,157	Government
Department of Corrections	155	Government
Office of Public Defender	37	Government
Total, Compact of Free Association	1,930	
Assistance to Territories		
General technical assistance—Direct grants	1,106	Government
General technical assistance—Judicial training	53	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—CNMI Ombudsman's Office	250	Government
General technical assistance—CNMI immigration, labor and law enforcement	1,000	Government
General technical assistance—Prior Service Benefits Program	219	Private
General technical assistance—Compact Impact Discretionary	1,250	Education
Subtotal, General Technical Assistance	4,240	
Brown Tree Snake Control	306	Government
Coral Reef Initiative	83	Government
Maintenance assistance	146	Government
Northern Mariana Covenant Grants—CNMI construction	9,523	Construction
Office of Insular Affairs	354	Government
Subtotal Other	10,411	
Total, Assistance to Territories	14,652	
Total Spending Inside CNMI	**16,582**	

Source: RTI estimates based on OIA (2012e).

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]

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

- **Education**: Based on sales and employment data from the 2007 Economic Census for CNMI, the average output-to-employee ratio in the education sector (NAICS 61) was $26,228 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$28,454**. Based on payroll and employment data from the Census 2010 County Business Patterns for CNMI, the average employee compensation-to-employee ratio in the education sector was $15,204 per employee (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$15,684**.

- **Construction:** Based on sales and employment data from the 2007 Economic Census for CNMI, the average output-to-employee ratio in the construction sector (NAICS 23) was $59,466 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of $**64,513**. Based on payroll and employment data from the Census 2010 County Business Patterns for CNMI, the average employee compensation-to-employee ratio in the construction sector was $7,495 (Census, 2012). Adjusting this ratio for inflation gives an employee compensation-to-employee ratio of $**7,732**.

- **Government:** According to CNMI's Single Audit Financial Statements, the government of CNMI received approximately $260 million in revenue in 2010 or $268 million in 2011 dollars (CNMI Office of the Public Auditor, 2012). We calculated government employment to be 4,582 individuals based on reports from the CNMI Department of Commerce (2012a, 2012b). Assuming government employment was static between 2011 and 2010, this implies a government revenue-to-employee ratio of **$58,531** in 2011 dollars. Because data on government employee compensation were unavailable, the average employee compensation-to-employee ratio for nonagricultural private-sector workers ($14,057) from the Census 2010 County Business Patterns was used as a proxy (Census, 2012). Adjusting for inflation, this implies an employee compensation-to-employee ratio of **$14,500**.

- **Private:** Based on sales and payroll data from the 2007 Economic Census, the average output- to-employee in the nonagricultural private sector was $56,767 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of $**61,585**. Based on payroll and employment data from the Census 2010 County Business Patterns for CNMI, the average employee compensation-to-employee ratio in the nonagricultural private sector was $14,057 (Census, 2012). Adjusting this ratio for inflation gives an employee compensation-to-employee ratio of $**14,500**.

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 4-2.

Table 4-2. CNMI: Estimated Direct Economic Impacts (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	1,613	28,454	15,684	57	889
Construction	9,523	64,513	7,732	148	1,141
Government	5,228	58,531	14,500	89	1,295
Private	219	61,585	14,500	4	52
Total	**16,582**			**297**	**3,377**

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), CNMI Office of the Public Auditor (2012), and CNMI Department of Commerce (2012a, 2012b). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

4.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using the employment and employee compensation data presented in Table 4-3. CNMI Department of Commerce conducted a workforce study called the Prevailing Wage and Workforce Assessment Study (PWWAS) that sampled a large percentage of CNMI's workforce. The PWWAS study was released in two parts. The first portion of the PWWAS study listed total employment in CNMI to be 21,399 employees based on government tax data in 2011 (CNMI Department of Commerce, 2012b). The second PWWAS report sampled 14,450 employees in CNMI and listed this sample employment by industry (CNMI Department of Commerce, 2012a). To estimate total employment by sector, employment was distributed assuming that the proportion of total employment associated with each industry was the same as it was in the PWWAS sample. After estimating the employment by industry, we estimated total employee compensation in each industry by applying employee compensation-to-employee ratios for each industry that were obtained from the 2010 County Business Patterns (Census, 2012). To estimate the employee compensation for the agriculture, mining, forestry, fishing and hunting sector we took the average between the compensation-to-employee ratios from the Agricultural Census and the 2010 County Business Patterns and applied it to the number of employees (USDA, 2009b; Census, 2012). To estimate employee compensation information for the public administration industry, we used the average employee compensation-to-employee ratio for nonagricultural, private-sector industries.

The economic base of CNMI is agriculture, fishing, mining, and manufacturing. 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,

Table 4-3. CNMI: Estimated Employment and Employee Compensation by Industry (2011)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture, Mining, Forestry, Fishing and Hunting	67	1,073
Government	4,582	66,439
Manufacturing	576	5,385
Tourism—Accommodation and food services	2,937	29,291
Tourism—Arts, entertainment, and recreation	541	6,149
Noneconomic Base Industries		
Utilities	542	14,025
Construction	1,259	9,733
Wholesale trade	589	7,607
Retail trade	2,346	32,670
Transportation and warehousing	908	15,505
Information	391	11,092
Finance and insurance	215	5,991
Real estate and rental and leasing	772	9,667
Professional, scientific, and technical services	501	14,678
Management, administrative, support, and waste management and remediation services	1,511	31,278
Educational services	2,301	36,093
Health care and social assistance	338	8,160
Other services (except public administration)	1,026	13,148
Total	**21,399**	**317,984**

[a] Note that because 31% of CNMI's budget comes from external sources, it was assumed that only 31% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Sources: RTI estimates based on Census (2012) (USDA, 2009b), and CNMI Department of Commerce (2012a, 2012b). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

because these data were unavailable, we assumed that the entire accommodation and food services and arts, entertainment, and recreation industries are supported by tourism and are, therefore, part of the economic base.[2] This is likely a highly conservative approach because, to the extent that this approximation overrepresents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of CNMI's territorial government is considered part of the economic base. Specifically, because 31% of CNMI's government revenue comes from external sources, only 31% of territorial government (public administration) employment was included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c).[3] Based on these assumptions and the data in Table 4-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 5,531 employees out of a total of 21,399. Dividing total employment by base employment yields a multiplier of **3.87**, meaning that for every base employment position supported by OIA funding, an estimated 2.87 additional jobs are formed elsewhere in the economy.

- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $62.3 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **5.10**, meaning that every dollar of employee compensation supported by the FY 2012 spending will create an additional $4.10 in employee compensation elsewhere in the economy.

Multiplying the direct employment impact and employee compensation impacts in Table 4-2 by these multipliers yields a total employment impact of 1,150 employees and a total employee compensation impact of $17.2 million.

4.4 GDP Base Multipliers

In recent years, OIA has funded the BEA under the Statistical Improvement Program to estimate more detailed and accurate economic data for the U.S. Territories. In September 2012, the BEA released updated economic reports for each U.S. Territory, including CNMI, which included for the first time an estimate of GDP by industry. With this new data, we were able to better estimate GDP multipliers, making for a more detailed analysis of the GDP impacts of OIA payments.

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

[3] In addition to payments from the OIA and the Department of the Interior, the government of CNMI also receives support from various other federal government agencies, including the Department of Agriculture, Department of Health and Human Services, and Department of Homeland Security (GAO, 2006).

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 CNMI's GDP was $733 million in 2010, or $756 million in 2011 dollars (BEA, 2012). Dividing this by the total number of employees estimated to be working in CNMI (21,399) implies a GDP-to-employee ratio of $35,335. Multiplying this ratio by the direct employment impact in the private sector (208 employees) yields a direct private-sector GDP impact of $7.3 million. This private-sector impact is then added to the $5.2 million of OIA payments spent in the public sector to produce an estimate of approximately $12.5 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent BEA data (Table 4-4) 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 federal government, manufacturing, accommodation, and amusement sectors were economic base sectors, along with 31% of the territorial government. The remaining territorial government, distributive services, and other private sectors were included in the noneconomic base industries.

Table 4-4. CNMI: GDP by Industry (2010)

Industry	GDP (in millions of 2011$)
Economic Base Industries	
Government—Federal	15
Government—Territorial[a]	231
Manufacturing	25
Accommodation and amusement	112
Noneconomic Base Industries	
Distributive services	96
Other private	276
Total	**756**

[a] Note that because 31% of CNMI's budget comes from external sources, it was assumed that only 31% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Sources: RTI estimates based on BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

Based on these assumptions and the data in Table 4-4, base GDP was calculated to be $224 million. Dividing total GDP by base GDP yields a multiplier of **3.38**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 2.38 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 $42.5 million.

4.5 Summary Economic Impact Estimate for FY 2012

In summary, the $16.6 million of OIA payments directly support 297 jobs, $3.4 million in employee compensation, and $12.6 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 1,150 jobs, $17.2 million in employee compensation, and $42.5 million in GDP. A summary of economic impact measures is presented in Table 4-5.

Table 4-5. CNMI: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	297	852	1,150
Employee compensation ($'000, 2011$)	3,377	13,842	17,218
GDP ($'000, 2011$)	12,572	29,896	42,468

Sources: RTI estimates based on Census (2009, 2012), (USDA, 2009b), OIA (2012e), PITI-VITI (2012c), BEA (2012), CNMI Office of the Public Auditor (2012), and CNMI Department of Commerce (2012a, 2012b). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 4-6. As this table illustrates, the 1,150 jobs directly and indirectly supported by OIA payments represent 5% of CNMI's total employment in 2011. Similarly, $17.2 million of employee compensation associated with these employees accounts for approximately 5% of total employee compensation inside the region, and the $42.5 million of GDP associated with these employees represents 6% of total GDP produced by the region.

Table 4-6. CNMI: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	1,150	21,399	5%
Employee compensation ($'000, 2011$)	17,218	317,984	5%
GDP ($'000, 2011$)	42,468	756,137	6%

Sources: RTI estimates based on Census (2009, 2012), (USDA, 2009b), OIA (2012e), PITI-VITI (2012c), BEA (2012), CNMI Office of the Public Auditor (2012), and CNMI Department of Commerce (2012a, 2012b). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

5. U.S. VIRGIN ISLANDS (USVI)

5.1 FY 2012 OIA Payments Summary

USVI is the wealthiest of the insular areas, with an average GDP per capita nearly as high as that for the entire United States. In 2010, the GDP per capita in USVI was about $43,607 (2011$) compared with $48,442 in the United States (BEA, 2012; World Bank, 2012a). Among the major factors underlying USVI's economy are tourism and the oil refining industry. The economy of USVI contracted in 2008 and 2009, largely due to an increase in imported petroleum products and declines in tourism spending. However, the USVI did experience 2.4% of real GDP growth in 2010 as a result of increased government spending and private investment in construction (BEA, 2012).

OIA payments to USVI in 2012 totaled $199.1 million (Table 5-1). According to the OIA's 2013 Congressional District Report, $197 million in payments was specifically directed to USVI in FY 2012 (OIA, 2012a). The remaining $2 million came from other OIA payments that are spent across the insular areas (see Appendix A). The largest block of OIA payments to USVI came in the form of Rum Excise Tax Payments totaling $195 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 $2 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. USVI experienced a substantial increase in OIA payments from FY 2011 to FY 2012, mostly because of higher expected returns from the rum excise taxes.

Through other Assistance to Territories programs, which made up $2.1 million in payments, OIA funds items such as USVI construction as part of the Northern Mariana Covenant Grant and OIA administrative funding.

5.2 Direct Economic Impacts of OIA Payments

Direct economic impacts of OIA payments were assigned to three economic sectors—education, construction, and government. To calculate the employment and employee

Table 5-1. USVI: OIA Payments by Appropriation (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Fiscal Payment		
USVI rum excise tax payments	195,000	Government
Total, Fiscal Payments	195,000	
Assistance to Territories		
General technical assistance—Direct grants	1,607	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
Subtotal, General Technical Assistance	1,969	
Northern Mariana Covenant Grants—USVI construction	2,022	Construction
Office of Insular Affairs	123	Government
Subtotal, Other	2,145	
Total, Assistance to Territories	4,114	
Total Spending Inside Virgin Islands	**199,114**	

Source: RTI estimates based on OIA (2012e).

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 sales and employment data from the 2007 Economic Census for USVI, the average output-to-employee ratio in the education sector (NAICS 61) was $66,737 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-per-employee ratio of **$72,401**. Based on payroll and employment data from the Census 2010 County Business Patterns for USVI, the average employee compensation-to-employee ratio in the education sector was $25,349 per employee. Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$26,149** (Census, 2012).

- **Construction:** Based on sales and employment data from the 2007 Economic Census for USVI, the average output-to-employee ratio in the construction sector (NAICS 23) was $103,782 (Census, 2009). Adjusting this ratio to 2011 dollars gives an output-to-employee ratio of **$112,590**. Based on payroll and employment data from the Census 2010 County Business Patterns for USVI, the average employee compensation-to-employee ratio in the construction sector was $28,740 (Census, 2012). Adjusting this ratio to 2011 dollars gives an employee compensation-to-employee ratio of **$29,647**.

- **Government:** According to the U.S. Virgin Islands Annual Economic Indicators (U.S. Virgin Islands Bureau of Economic Research, 2012), the government revenue-to-

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

employee ratio in 2011 was **$50,817**. Because data on government employee compensation were unavailable, the average employee compensation-to-employee ratio for nonagricultural private-sector workers ($33,287) from the Census 2010 County Business Patterns was used as a proxy (Census, 2012). Adjusting for inflation gives an employee compensation-to-employee ratio of **$34,338**.

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 5-2.

Table 5-2. USVI: Estimated Direct Economic Impacts (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	363	72,401	26,149	5	131
Construction	2,022	112,590	29,647	18	532
Government	196,730	50,817	34,338	3,871	132,932
Total	**199,114**			**3,894**	**133,596**

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), and U.S. Virgin Islands Bureau of Economic Research (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

5.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using the employment and employee compensation data presented in Table 5-3. This table was developed from a combination of data sources. First, employment and employee compensation information for nonagricultural, private-sector industries was obtained from the Census 2010 County Business Patterns. Next, employment and employee compensation data for the agricultural industry were obtained from the 2007 Agricultural Census (USDA, 2009c). Lastly, employment associated with the federal and territorial governments was obtained for 2010 from the USVI Annual Economic Indicators (U.S. Virgin Islands Bureau of Economic Research, 2012). To estimate employee compensation information for these government workers, we used the average employee compensation-to-employee ratio for nonagricultural, private-sector industries.

Table 5-3. USVI: Estimated Employment and Employee Compensation by Industry (2010)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture	511	541
Government—Federal government	962	33,033
Government—Territorial government[a]	12,116	416,037
Mining, quarrying, and oil and gas extraction	10	850
Manufacturing	1,750	156,489
Tourism—Accommodation and food services	6,223	143,865
Tourism arts, entertainment, and recreation	766	18,553
Noneconomic Base Industries		
Administrative and support and waste management and remediation services	1,899	51,899
Construction	2,837	84,110
Educational services	898	23,482
Finance and insurance	1,221	59,403
Health care and social assistance	1,980	64,703
Information	750	67,041
Management of companies and enterprises	88	5,274
Other services (except public administration)	2,051	84,428
Professional, scientific, and technical services	1,152	57,217
Real estate and rental and leasing	944	34,830
Retail trade	6,465	148,291
Transportation and warehousing	1,585	51,715
Utilities	175	15,609
Wholesale trade	714	27,623
Total	**45,095**	**1,544,992**

[a] Note that because 24% of USVI's budget comes from external sources, we assumed that only 24% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

Sources: RTI estimates based on Census (2009, 2012), USDA (2009c), and U.S. Virgin Islands Bureau of Economic Research (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

The economic base of USVI is agriculture, fishing, mining, 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 supported by tourism. However, because these data were unavailable, we assumed that the entire accommodation and food services industries are supported by tourism and therefore part of the economic base.[2] This is likely a conservative approach because, to the extent that this approximation overrepresents the portion of the economy supported by tourism, employment and employee compensation multipliers will be reduced.

In addition to these industries, a portion of USVI's territorial government is considered part of the economic base. Because 24% of USVI's government revenue comes from external sources, only 24% of territorial government employment was also included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c).[3] Based on these assumptions and the data in Table 5-3, we calculated the following multipliers:

- **Base employment multiplier:** Base employment was calculated to include 13,129 employees out of a total of 45,095. Dividing total employment by base employment yields a multiplier of **3.43**, meaning that for every base employment position supported by OIA funding, an estimated 2.43 additional jobs are formed elsewhere in the economy.
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $453 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **3.41**, meaning that every dollar of employee compensation supported by the 2010 spending will create an additional $2.41 in employee compensation.

Multiplying the direct employment impact and employee compensation impacts in Table 5-2 by these multipliers yields a total employment impact of 13,376 employees and a total employee compensation impact of $455 million.

5.4 GDP Base Multipliers

In recent years, OIA has funded the BEA under the Statistical Improvement Program to estimate more detailed and accurate economic data for the U.S. Territories. In September 2012, the BEA released updated economic reports for each U.S. Territory, including USVI, which included for the first time an estimate of GDP by industry. With this new 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

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

[3] In addition to payments from OIA and the Department of the Interior, the government of USVI also receives support from various other federal government agencies, including the Department of Education and Department of Homeland Security (GAO, 2006).

direct GDP impacts of OIA payments in the private sector. It is estimated that USVI's GDP was $4,498 million in 2010, or $4,640 million in 2011 dollars (BEA, 2012). Dividing this by the total number of employees estimated to be working in USVI (45,095) implies a GDP-to-employee ratio of $102,893. Multiplying this ratio by the direct employment impact in the private sector (23 employees) yields a direct private-sector GDP impact of $2.4 million. This private-sector impact is then added to the $197 million of OIA payments spent in the public sector to produce an estimate of approximately $199 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent BEA data (Table 5-4) 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 federal government, good-producing industries, accommodation, and food services sectors were economic base sectors, along with 24% of the territorial government. The remaining territorial government, wholesale and retail trade, and other private sectors were included in the noneconomic base industries.

Table 5-4. USVI: GDP by Industry (2010)

Industry	GDP (in millions of 2011$)
Economic Base Industries	
Goods-producing industries	1,085
Government—Federal	154
Government—Territorial[a]	777
Accommodation and food services	362
Noneconomic Base Industries	
Wholesale and retail trade	412
Other services, except government	1,850
Total[b]	**4,640**

[a] Note that because 24% of USVI's budget comes from external sources, we assumed that only 24% of the employment and employee compensation associated with the territorial government was part of the base sector. The remaining employees and employee compensation were assumed to be part of the nonbase sector.

[b] Values may not add to total because of rounding.

Sources: RTI estimates based on BEA (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

Based on these assumptions and the data in Table 5-4, the base GDP was calculated to be $1,787 million. Dividing total GDP by base GDP yields a multiplier of **2.60**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 1.60 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 $517 million.

5.5 Summary Economic Impact Estimate for FY 2012

In summary, the $199.1 million spent by OIA directly supports 3,894 jobs, $134 million in employee compensation, and $199 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 13,376 jobs, $455 million in employee compensation, and $517 million in GDP. A summary of economic impact measures is presented in Table 5-5.

Table 5-5. USVI: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	3,894	9,482	13,376
Employee compensation ($'000, 2011$)	133,596	321,862	455,458
GDP ($'000, 2011$)	199,093	317,736	516,828

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), BEA (2012), USDA (2009c), and U.S. Virgin Islands Bureau of Economic Research (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 5-6. As this table illustrates, the 13,376 jobs directly and indirectly supported by OIA payments represent 30% of USVI's total employment in 2010. Similarly, $455 million of employee compensation associated with these employees accounts for approximately 29% of total employee compensation inside the region, and the $517 million of GDP associated with these employees represents 11% of total GDP produced by the insular area.

Table 5-6. USVI: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	13,376	45,095	30%
Employee compensation ($'000, 2011$)	455,458	1,544,992	29%
GDP ($'000, 2011$)	516,828	4,639,981	11%

Sources: RTI estimates based on Census (2009, 2012), OIA (2012e), BEA (2012), USDA (2009c), and U.S. Virgin Islands Bureau of Economic Research (2012). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

6. FEDERATED STATES OF MICRONESIA (FSM)

6.1 FY 2012 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 $2,994 in 2011. According to PITI-VITI (2012a), FSM's economy, after several years of loss in the early 2000s, expanded by an annual average of 1.8% between FY 2008 and FY 2011. This recent growth has been spurred by investments to improve infrastructure.

OIA payments to FSM in 2012 totaled $108.4 million. A detailed breakdown of these payments is presented in Table 6-1. According to OIA's 2013 Congressional District Report, $105 million in payments was specifically directed to FSM in FY 2012 (OIA, 2012a). The remaining $3.4 million came from other OIA payments that are spent across the insular areas (see Appendix A). The largest block of OIA payments to FSM, totaling $106.6 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 $1.8 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. OIA funds the U.S. Postal Service to provide mail service to the insular area, and because this payment is a direct transfer, this value was not included in the analysis of the direct impacts of OIA's assistance. Therefore, the total amount of OIA payments spent within FSM is about $107 million.

Table 6-1. FSM: OIA Payments by Appropriation (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Compact of Free Association		
Federal services assistance	1,407	Transfer
Judicial training U.S. territories	170	Government
Education	27,229	Education
Health	19,800	Health care
Capacity building	2,661	Government

(continued)

Table 6-1. FSM: OIA Payments by Appropriation (FY 2012) (cont.)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Private sector	2,580	Government
Environment	1,752	Government
Enhanced reporting and accountability	909	Government
Infrastructure	24,222	Construction
Other	25,831	Government
Total, Compact of Free Association	*106,561*	
Assistance to Territories		
General technical assistance—Direct grants	217	Government
General technical assistance—Judicial training	53	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—Prior Service Benefits Program	444	Private
Subtotal, General Technical Assistance	*1,076*	
Maintenance assistance	462	Government
Coral Reef Initiative	305	Government
Subtotal, Other	*767*	
Total, Assistance to Territories	*1,844*	
Total Payments	**108,405**	
Spending Outside FSM	**1,407**	
Total Spending Inside FSM	**106,998**	

Source: OIA, 2012e.

6.2 Direct Economic Impacts of OIA Payments

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 2011 Economic Review for FSM (PITI-VITI, 2012a), the employee compensation-to-employee ratio for private-sector workers in the education sector was $**4,824** in

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

2011. Because information was not available for output associated with the education industry, the output-to-employee ratio for American Samoa was used ($48,718). 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 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 2011 Economic Review for FSM (PITI-VITI, 2012a), the employee compensation-to-employee ratio for private-sector workers in the construction sector was $**6,029** in 2011. Because information was not available for output associated with the construction industry, the output-to-employee ratio for American Samoa was used ($56,881).

- **Government:** According to the Fiscal Year 2011 Economic Review for FSM (PITI-VITI 2012a), the government of Micronesia received approximately $204.5 million in revenue and employed approximately 6,335 individuals in 2011. Adjusting for inflation, this implies an output-to-employee ratio of **$32,276**. Similarly, according to information presented in the same report, these workers received approximately $21.2 million in employee compensation in 2011. This implies an employee compensation-to-employee ratio of **$3,341**.

- **Health care:** Based on employment and gross wage data provided in Fiscal Year 2011 Economic Review for FSM (PITI-VITI, 2012a), the employee compensation-to-employee ratio for private-sector workers in the health care sector was $**9,277** in 2011. Because information was not available for output associated with the health care industry, the output-to-employee ratio for American Samoa was used ($40,623).

- **Private:** Based on employment and gross wage data provided in Fiscal Year 2011 Economic Review for FSM (PITI-VITI, 2012a), the average wage for a private-sector worker was $**4,824** in 2011. Because information was not available for output associated with the private sector, the output-to-employee ratio for American Samoa was used ($123,291).

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.

6.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using 2011 employment and gross wage data from the Micronesia Fiscal Year 2011 Economic Review performed by researchers at PITI-VITI (Table 6-3).

Table 6-2. FSM: Estimated Direct Economic Impacts (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	27,592	48,718	4,824	566	2,732
Construction	24,222	56,881	6,029	426	2,567
Government	34,941	32,276	3,341	1,083	3,617
Health care	19,800	40,623	9,277	487	4,522
Private	444	123,291	4,824	4	17
Total	**106,998**			**2,566**	**13,455**

Sources: RTI estimates based on PITI-VITI (2012a), Census (2009), and OIA (2012e). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 overrepresents 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 65% of public administration was also included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c). 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 5,349 employees out of a total of 15,924. Dividing total employment by base employment yields a multiplier of **2.98**, meaning that for every base employment position supported by OIA funding, an estimated 1.98 additional jobs are formed elsewhere in the economy.

[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: Estimated Employment and Employee Compensation by Industry (2011)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture, hunting, and forestry	14	33
Mining and quarrying	7	4
Fishing	302	1,135
Extra-territorial organizations	50	239
Government (Public administration)[a]	6,335	21,166
Manufacturing	126	499
Tourism—Hotels and restaurants	733	2,741
Noneconomic Base Industries		
Construction	1,565	9,436
Education	887	4,276
Electricity, gas, and water supply	293	1,225
Financial intermediation	240	2,086
Health and social work	109	1,014
Other services	555	2,788
Private households with employed persons	18	47
Real estate, renting, and business activities	378	2,406
Transport, storage, and communications	1,032	5,772
Wholesale and retail trade and repairs	3,282	13,447
Total	**15,924**	**68,314**

[a] Because 65% of FSM's budget comes from external sources, it was assumed that only 65% 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 (2012a).

- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $18.4 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **3.71**, meaning that every dollar of employee compensation supported by the FY 2012 spending will create an additional $2.71 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 6-2 by these multipliers yields a total employment impact of 7,638 employees and $49.9 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 October 2012, PITI-VITI released updated FY 2011 economic reports for FSM and RMI, which included estimates of GDP by industry. With this new 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 FSM's GDP was $310.3 million in 2011 (PITI-VITI, 2012a). Dividing this by the total number of employees estimated to be working in FSM (15,924) implies a GDP-to-employee ratio of $19,485. Multiplying this ratio by the direct employment impact in the private sector (1,483 employees) yields a direct private-sector GDP impact of $28.9 million. This private-sector impact is then added to the $34.9 million of OIA payments spent in the public sector to produce an estimate of approximately $63.8 million in direct GDP impacts.

To determine the indirect and induced effects of OIA payments on GDP, we used the recent BEA 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 65% of the territorial government. The remaining territorial government and other private sectors were included in the noneconomic base industries.

Based on these assumptions and the data in Table 6-4, base GDP was calculated to be $107.8 million. Dividing total GDP by base GDP yields a multiplier of **2.88**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 1.88 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 $184 million.

Table 6-4. FSM: GDP by Industry (2011)

Industry	GDP (in millions of 2011$)
Economic Base Industries	
Agriculture, hunting, and forestry	43.6
Mining and quarrying	0.0
Fishing	36.6
Government (Public administration)[a]	32.3
Manufacturing	1.4
Tourism—Hotels and restaurants	5.2
Noneconomic Base Industries	
Construction	20.6
Education	32.3
Electricity, gas, and water supply	4.2
Financial intermediation	6.2
Health and social work	14.4
Other services	-0.2
Real estate, renting, and business activities	33.2
Transport, storage, and communications	17.4
Wholesale and retail trade and repairs	37.3
Total at Basic Prices	**284.3**
Taxes on products less subsidies	26.0
Total at Purchasers' Prices	**310.3**

[a] Because 65% of FSM's budget comes from external sources, it was assumed that only 65% 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.

Sources: RTI estimates based on PITI-VITI (2012a).

6.5 Summary Economic Impact Estimate for FY 2012

In summary, the $107 million spent by OIA inside FSM directly supports 2,556 jobs, $13.5 million in employee compensation, and $63.8 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 7,638 jobs, $49.9 million in employee compensation, and $184 million in GDP. This information is summarized in Table 6-5.

Table 6-5. FSM: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	2,566	5,072	7,638
Employee compensation ($'000; 2011$)	13,455	36,475	49,930
GDP ($'000; 2011$)	63,841	119,951	183,793

Sources: RTI estimates based on OIA (2012e), PITI-VITI (2012a, 2012c), and Census (2009)). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 7,638 jobs directly and indirectly supported by OIA payments represent 48% of FSM's total employment in 2011. Similarly, $49.9 million of employee compensation associated with these employees accounts for approximately 73% of total employee compensation inside the region, and the $184 million of GDP associated with these employees represents 59% of the $310 million of total GDP produced by the region.

Table 6-6. FSM: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 201, OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	7,638	15,924	48%
Employee compensation ($'000, 2011$)	49,930	68,314	73%
GDP ($'000, 2011$)	183,793	310,288	59%

Sources: RTI estimates based on OIA (2012e), PITI-VITI (2012a, 2012c), and Census (2009)). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

7. REPUBLIC OF THE MARSHALL ISLANDS (RMI)

7.1 FY 2012 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 $3,212 in 2011. 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. RMI's economy by FY 2010 had recovered from the global recession; however, in FY 2011 the economy only grew by 0.8% (PITI-VITI, 2012b).

OIA payments to RMI in 2012 totaled $71.5 million. A detailed breakdown of these payments is presented in Table 7-1. According to OIA's 2013 Congressional District Report, $67.3 million in payments was specifically directed to RMI in FY 2012 (OIA, 2012a). The remaining $4.2 million came from other OIA payments that are spent across the insular areas (see Appendix A). The largest block of OIA payments, totaling $68.9 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 2011, the Compact and Ebeye Special Needs contributed nearly 50% of the funding available for education in RMI and 40% of the budget for health care (OIA, 2012e). Assistance to Territories payments totaled $2.6 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 the Coral Reef Initiative.

Table 7-1. RMI: OIA Payments by Appropriation (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Compact of Free Association		
Federal services	1,407	Transfer
Enewetak	499	69% government, 31% transfer
Judicial training U.S. territories	170	Government
Education	11,839	Education
Health	6,835	Health care
Capacity building	300	Government
Infrastructure	9,958	Construction

(continued)

Table 7-1. RMI: OIA Payments by Appropriation (FY 2012) (cont.)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Enivironment—Wholesale	163	Wholesale
Enivironment—Construction	163	Construction
Ebeye Special Needs—Education	1,758	Education
Ebeye Special Needs—Health care	1,758	Health care
Kwajalein environmental impact	243	Government
Other	33,824	Government
Total, Compact of Free Association	*68,915*	
Assistance to Territories		
General technical assistance—4 Atoll Health Care Program	990	Health care
General technical assistance—Direct grants	556	Government
General technical assistance—Judicial training	53	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—Prior Service Benefits Program	146	Private
Subtotal, General Technical Assistance	*2,108*	
Coral Reef Initiative	50	Government
Maintenance assistance	349	Government
Office of Insular Affairs	97	Government
Subtotal, Other	*496*	
Total, Assistance to Territories	*2,604*	
Total Payments	**71,519**	
Spending Outside RMI	**1,562**	
Total Spending Inside RMI	**69,957**	

Source: RTI estimates based on OIA (2012e).

OIA provides funding to the U.S. Postal Service to provide mail service to the insular area, and because this payment is a direct transfer, this value was not included in the analysis of the direct impacts of OIA's assistance. Similarly, 31% of funding for the Enewetak assistance program 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 $70 million.

7.2 Direct Economic Impacts of OIA Payments

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. According to the OIA (2012e), the environmental spending portion of the Compact payments was allocated to support capital needs for the Majuro Atoll Waste Corporation. Therefore, we assumed 50% of these payments went to the wholesale sector and 50% to the construction sector. 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 2011 employment and wage cost data provided in the Fiscal Year 2011 Economic Review for RMI (released in October 2012), the employee compensation-to-employee ratio for private-sector workers in the education sector was **$13,026** in 2011 (PITI-VITI, 2012b). Because information was not available for output associated with the education industry, the output-to-employee ratio for American Samoa was used ($48,718). 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 2011 Economic Review for RMI, the employee compensation-to-employee ratio for private-sector workers in the construction sector was estimated to be **$7,263** in 2011 (PITI-VITI, 2012b). Because information was not available for output associated with the construction industry, the output-to-employee ratio for American Samoa was used ($56,881).
- **Government:** Based on data provided in the Fiscal Year 2011 Economic Review for RMI, the RMI government received approximately $109.2 million in revenue and employed approximately 3,424 individuals in 2010 (PITI-VITI, 2012b). Adjusting for inflation, this implies an output-to-employee ratio of **$32,907** in 2011 dollars. Similarly, 3,447 government workers received $40.3 million in employee compensation in 2011. This implies an employee compensation-to-employee ratio of **$11,705**.
- **Health care:** Based on employment and wage cost data provided in the Fiscal Year 2011 Economic Review for RMI, the employee compensation-to-employee ratio for private-sector workers in the health care sector was estimated to be **$8,622** in 2011 (PITI-VITI, 2012b). Because information was not available for output associated with the health care industry, the output-to-employee ratio for American Samoa was used

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

($40,623). 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.

- **Wholesale:** Based on employment and wage cost data provided in the Fiscal Year 2011 Economic Review for RMI, the employee compensation-to-employee ratio for private-sector workers in the wholesale sector was estimated to be **$5,362** in 2011 (PITI-VITI, 2012b). Because information was not available for output associated with the wholesale industry, the output-to-employee ratio for American Samoa was used ($1,014,306). 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.
- **Private:** According to the Fiscal Year 2011 Economic Review for RMI, the average wage for a private worker in RMI was estimated to be **$5,067** in 2011 (PITI-VITI, 2012b). Because information was not available for output associated with the private industry, the output-to-employee ratio for American Samoa was used ($123,291). 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 (FY 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	13,959	48,718	13,026	287	3,733
Construction	10,121	56,881	7,263	178	1,292
Government	35,986	32,907	11,705	1,094	12,800
Health care	9,583	40,623	8,622	236	2,034
Wholesale	163	1,014,306	5,362	0	1
Private	146	123,291	5,067	1	6
Total	**69,957**			**1,795**	**19,866**

Sources: RTI estimates based on OIA (2012e), PITI-VITI (2012b), and Census (2009). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

Employment and Employee Compensation Base Multipliers. The employment and employee compensation multipliers were developed for 2011 using data from the RMI Fiscal Year 2011 Economic Review performed by researchers at PITI-VITI (Table 7-3).

Table 7-3. RMI: Estimated Employment and Employee Compensation by Industry (2011)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture, hunting, and forestry	19	69
Fishing	1,147	3,493
Extra-territorial organizations	973	16,497
Government (Public administration)[a]	3,447	40,342
Manufacturing	98	573
Tourism—Hotels and restaurants	241	1,315
Noneconomic Base Industries		
Community, social, and personal service activities	171	1,133
Construction	515	3,737
Education	494	6,437
Electricity, gas, and water supply	313	4,435
Financial intermediation	222	3,779
Health and social work	235	2,028
Private households with employed person	14	54
Real estate, renting, and business activities	231	1,912
Transport, storage, and communications	650	6,575
Wholesale and retail trade	1,713	9,187
Total	**10,482**	**101,566**

[a] Because 64% of RMI's budget comes from external sources, we assumed that only 64% 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 (2012b).

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 that this approximation overrepresents 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 64% of RMI's government revenue comes from external sources, 64% of public administration was also included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c). 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 4,690 employees out of a total of 10,482. Dividing total employment by base employment yields a multiplier of **2.24**, meaning that for every base employment position supported by OIA funding, an estimated 1.24 additional jobs are formed elsewhere in the economy.
- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $47.8 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **2.12**, meaning that every dollar of employee compensation supported by the FY 2012 spending will create an additional $1.12 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 7-2 by these multipliers yields a total employment impact of 4,013 employees and $42.2 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 $171 million in 2011 (PITI-VITI, 2012b). Dividing this by the total number of employees estimated to be working in RMI (10,482) implies a GDP-to-employee ratio of $16,289. Multiplying this ratio by the direct employment impact in the private sector (702 employees) yields a direct private-sector GDP impact of $11.4 million. This private-sector impact is then added to the $36 million of OIA payments spent in the public sector to produce an estimate of approximately $47.4 million in direct GDP impacts.

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

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 0.41, 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 2011 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 **2.24** 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 $106 million.

7.4 Summary Economic Impact Estimate for FY 2012

In summary, the $70 million spent by OIA inside RMI directly supports 1,795 jobs, $19.9 million in employee compensation, and $47.4 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 4,013 jobs, $42.2 million in employee compensation, and $106 million in GDP. This information is summarized in Table 7-4.

Table 7-4. RMI: Total Estimated Economic Impact (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	1,795	2,217	4,013
Employee compensation ($'000, 2011$)	19,866	22,305	42,171
GDP ($'000, 2011$)	47,416	58,562	105,978

Sources: RTI estimates based on OIA (2012e), PITI-VITI (2012b, 2012c), and Census (2009). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 4,013 jobs directly and indirectly supported by OIA payments represent 38% of RMI's total employment in 2011. Similarly, $42.2 million of employee compensation associated with these employees accounts for approximately 42% of total employee compensation inside the region, and the $106 million of GDP associated with these employees represents 62% of total GDP produced by the insular area.

Table 7-5. RMI: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	4,013	10,482	38%
Employee compensation ($'000, 2011$)	42,171	101,566	42%
GDP ($'000, 2011$)	105,978	170,748	62%

Sources: RTI estimates based on OIA (2012e), PITI-VITI (2012b, 2012c), and Census (2009). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

8. REPUBLIC OF PALAU

8.1 FY 2012 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 2011 was $8,729 (2011$) as compared with the GDP per capita of the United States, which was $48,442 (World Bank, 2012a). 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, 2012e). These payments, which are dispersed through OIA, were enacted in FY 2012. OIA payments made to Palau in 2011 totaled $30.2 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. According to the OIA's 2013 Congressional District Report, $27.7 million in payments were specifically directed to Palau in FY 2012 (OIA, 2012a). The remaining $2.5 million came from other OIA payments that are spent across the insular areas (see Appendix A). The largest block of OIA payments to Palau, totaling $29.2 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, 2012d). 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 $1 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 $28.7 million.

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

Table 8-1. Palau: Grant Spending by Appropriation (FY 2012)

Appropriation	Spending ($'000, 2011$)	Impact Treatment
Compact of Free Association		
Infrastructure projects	8,000	Construction
Economic assistance	12,706	Government
Fiscal Consolidation Fund	5,000	Government
Infrastructure Maintenance Fund	2,000	Construction
Postal Service Subsidy	1,500	Transfer
Total, Compact of Free Association	*29,206*	
Assistance to Territories		
General technical assistance—Direct grants	406	Government
General technical assistance—Judicial training	53	Government
General technical assistance—USDA Grad School PITI-VITI	213	Education
General technical assistance—Close Up Foundation	150	Education
General technical assistance—Prior Service Benefits Program	192	Private
Subtotal, General Technical Assistance	*1,014*	
Total, Assistance to Territories	*1,014*	
Total Payments	**30,220**	
Spending Outside RMI	**1,500**	
Total Spending Inside RMI	**28,720**	

Source: RTI estimates based on OIA (2012d, 2012e).

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 2008 quarterly employment and gross wage reports from the Palau Office of Planning and Statistics (POPS), the average employee compensation-to-employee ratio in the education sector in 2008 was $9,559. Adjusting for inflation, this implies an employee compensation-to-employee ratio of **$9,986** in 2011 dollars. Because information was not available for output associated with the education sector, the output-per-employee ratio for American Samoa was used ($48,718). 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. 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.

[1] All adjustments for inflation were made using the U.S. Consumer Price Index for All Urban Consumers (BLS, 2012).

- **Construction:** Based on quarterly employment and gross wage/salary reports from POPS, 981 workers were located in the construction sector who received $5.6 million in employee compensation in 2008, or $5.8 million in 2011 dollars. This implies an average employee compensation-to-employee ratio of **$5,959** in 2011 dollars. Because information was not available for output associated with the construction sector, the output-to-employee ratio for American Samoa was used ($56,881).

- **Government**: Based on data reports by the Asian Development Bank, the government of Palau received $83.3 million in revenue in 2008 and employed approximately 3,029 people that year (ADB, 2012; POPS, 2008). This implies the ratio of government revenue to government employees was $27,505 in 2008, or **$28,736** in 2011 dollars. Similarly, based on 2008 quarterly employment and gross wage reports from POPS, the employee compensation-to-employee ratio for government workers was estimated to be $13,217 in 2008, or **$13,808** in 2011 dollars.

- **Private:** Based on quarterly employment and gross wage/salary reports from POPS, 8,637 workers were located in the private sector who received $58.2 million in employee compensation in 2008, or $60.8 million in 2011 dollars. This implies an average employee compensation-to-employee ratio of **$7,037** in 2011 dollars. Because information was not available for output associated with the private sector, the output-to-employee ratio for American Samoa was used ($123,291).

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 2012)

Industry	FY 2012 Payments ($'000, 2011$)	Output-to-Employee Ratio ($/employee)	Employee Compensation-to-Employee Ratio ($/employee)	Direct Employment Impact (#)	Direct Employee Compensation Impact ($'000, 2011$)
Education	363	48,718	9,986	7	74
Construction	10,000	56,881	5,959	176	1,048
Government	18,166	28,736	13,808	632	8,729
Private	192	123,291	7,037	2	11
Total	**28,720**			**817**	**9,862**

Sources: RTI estimates based on OIA (2012d, 2012e), Census (2009), and POPS (2008). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

8.3 Employment and Employee Compensation Base Multipliers

The employment and employee compensation multipliers were developed using POPS data. The latest year for which data were available was 2008; wages were totaled across all four quarters, and employment was averaged across all four quarters (Table 8-3).

Table 8-3. Palau: Estimated Employment and Employee Compensation by Industry (2008)

Industry	Employment (#)	Employee Compensation ($'000, 2011$)
Economic Base Industries		
Agriculture, hunting, and forestry	129	426
Fishing	149	650
Extra-territorial organizations	13	165
Government (Public administration)[a]	3,029	41,818
Mining and quarrying	17	150
Manufacturing	377	2,783
Tourism—Hotels and restaurants	1,655	10,764
Noneconomic Base Industries		
Construction	981	5,847
Education	560	5,587
Financial intermediation	145	2,474
Health and social work	101	635
Other service activities	277	1,348
Private households with employed person	847	1,531
Real estate, renting, and business activities	675	6,931
Transport, storage, and communications	894	8,902
Wholesale and retail trade; repair of motorcycles; personal and household goods	1,831	12,746
Total	**11,678**	**102,759**

[a] Note that because 55% of Palau's budget comes from external sources, it was assumed that only 55% 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 POPS, 2008. All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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,

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

to the extent that this approximation overrepresents 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 55% of Palau's government revenue comes from external sources, 55% of public administration was included in the base employment for the purpose of calculating base multipliers (PITI-VITI, 2012c). 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 3,991 employees out of a total of 11,678. Dividing total employment by base employment yields a multiplier of **2.93**, meaning that for every base employment position supported by OIA spending, an estimated 1.93 additional jobs are formed elsewhere in the economy.

- **Employee compensation multiplier:** Employee compensation associated with base employment was estimated to be $37.7 million. Dividing total employee compensation by base employee compensation yields a base multiplier of **2.72**, meaning that every dollar of employee compensation supported by the FY 2012 spending will create an additional $1.72 in employee compensation.

Multiplying the direct employment and employee compensation impacts in Table 8-2 by these multipliers yields a total employment impact of 2,391 employees and $26.9 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 October 2012, PITI-VITI released updated FY 2011 economic reports for FSM and RMI, while economic data for Palau is still forthcoming as of this report. However, based on data from the Asian Development Bank and the World Bank, we were still able to estimate GDP by industry. 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 $179.9 million in 2011 (World Bank, 2012a). Dividing this by the total number of employees estimated to be working in Palau (11,678) implies a GDP-to-employee ratio of $15,405. Multiplying this ratio by the direct employment impact in the private sector (185 employees) yields a direct private-sector GDP impact of $2.8 million. This private-sector impact is then added to the $18.2 million of OIA payments spent in the public sector to produce an estimate of approximately $21 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 Asian Development Bank (2012) and applied these proportions to a total estimate of GDP from the World Bank (2012a) for 2011. 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 55% 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 (2011)

Industry	GDP (in millions of 2011$)
Economic base industries	
Agriculture	9.5
Mining	0.2
Manufacturing	2.1
Trade	32.2
Government (Public administration)[a]	41.4
Noneconomic base industries	
Electricity, gas, and water	4.9
Construction	6.7
Transport and communications	15.5
Finance	7.1
Other services	51.0
Total at basic prices	**170.5**
Taxes on imports less imputed bank service charges	**9.4**
Total at purchasers' prices	**179.9**

[a] Note that because 55% of Palau's budget comes from external sources, it was assumed that only 55% 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 ADB (2012) and World Bank (2012a).

Based on these assumptions and the data in Table 8-4, base GDP was calculated to be $66.6 million. Dividing total GDP by base GDP yields a multiplier of **2.70**, meaning that for every dollar of base GDP supported by OIA funding, an estimated 1.70 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 $56.7 million.

8.5 Summary Economic Impact Estimate for FY 2012

In summary, the $28.7 million spent by OIA inside Palau directly supports 817 jobs, $9.9 million in employee compensation, and $21 million in GDP. Accounting for the multiplier process, we estimate that OIA spending supports a total of 2,391 jobs, $26.9 million in employee compensation, and $56.8 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 (FY 2012)

	Direct Economic Impact	Indirect / Induced Economic Impact	Total Economic Impact
Employment (#)	817	1,574	2,391
Employee compensation ($'000, 2011$)	9,862	16,997	26,859
GDP ($'000, 2011$)	21,012	35,753	56,766

Sources: RTI estimates based on OIA (2012d, 2012e), PITI-VITI (2012c), POPS (2008), Census (2009), ADB (2012), and World Bank (2012a). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

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 2,391 jobs directly and indirectly supported by OIA payments represent 20% of Palau's total employment. Similarly, $26.9 million of employee compensation associated with these employees accounts for approximately 26% of total employee compensation inside the region, and the $56.8 million of GDP associated with these employees represents 32% of total GDP produced by the insular area.

Table 8-6. Palau: Estimated Impacts Relative to National Economy (FY 2012)

	Total Economic Impact for FY 2012 OIA Payments	National Data	Impact as Percentage of Total Economy
Employment (#)	2,391	11,678	20%
Employee compensation ($'000, 2011$)	26,859	102,759	26%
GDP ($'000, 2011$)	56,766	179,900	32%

Sources: RTI estimates based on OIA (2012d, 2012e), PITI-VITI (2012c), POPS (2008), Census (2009), ADB (2012), and World Bank (2012a). All data were adjusted to 2011 dollars using the consumer price index (BLS, 2012).

9. WASHINGTON, DC, AND HAWAII

The economic impact of OIA operations in the District of Columbia and Hawaii was calculated using IMPLAN I/O modeling software.[1] Unlike modeling for the insular areas, IMPLAN uses an I/O modeling framework that allows specific multipliers to be calculated for each industry. The economic model was modified for each area so that spending associated with OIA's Washington, DC, and Hawaii operations would be consistent with data provided in the Budget Justification. Specifically, the Budget Justification indicates that $9.47 million of funding was allocated to OIA for continued operations and for continued employment of 41 full-time equivalents (FTEs) being paid $5.4 million in employee compensation and benefits. This implies that the funding-to-employee ratio was $230,854 and that the employee compensation-to-employee ratio was $132,073. These data were used to modify the assumptions underlying the IMPLAN model.

9.1 Economic Impact Assessment of OIA Operations in Washington, DC

The FY 2012 budget for OIA operations and the Coral Reef Initiative in Washington, DC, was $7.94 million, which falls within the IMPLAN industry code 439: 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

- 41 employees,
- $4.89 million in employee compensation, and
- $9.48 million in output.

[1] To estimate the total economic impact associated with this funding, we used 2010 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 440 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 Washington, DC (FY 2012)

Federal Government, Nonmilitary (439)	Employment (# of employees)	Employee Compensation ($2011 millions)	Output ($2011 millions)
Direct Economic Impact			
OIA operations	34	$4.54	$7.94
Indirect and Induced Economic Impacts			
Multiplier	1.19	1.08	1.19
Total Economic Impact	**41**	**$4.89**	**$9.48**

Sources: RTI estimates based on OIA (2012e) and IMPLAN.

9.2 Economic Impact Assessment of OIA Operations in Hawaii

The FY 2012 budget for OIA operations in Hawaii was $15.74 million. The details of these payments and the IMPLAN codes to which they were assigned are reported in Table 9-2.

Table 9-2. 2012 OIA Operations in Hawaii and Corresponding IMPLAN Codes

Funding Description	Funding Amount ($2011)	Industry Description	IMPLAN Code
Compact of Free Association			
Compact Impact	11,229	Hospitals	397
Total, Compact of Free Association	*11,229*		
Assistance to Territories			
General technical assistance—USDA Grad School PITI-VITI	213	State and local government, education	438
General technical assistance—Compact Impact Discretionary	1,250	State and local government, education	438
Subtotal, General Technical Assistance	*1,463*		
Brown Tree Snake Control	1,190	Federal government, nonmilitary	439
Maintenance assistance	966	Federal government, nonmilitary	439
Office of Insular Affairs	894	Federal government, nonmilitary	439
Subtotal Other	*3,051*		
Total, Assistance to Territories	*4,513*		
Total Spending Inside Hawaii	**15,742**		

Sources: RTI estimates based on OIA (2012e) and IMPLAN.

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.

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 9-3. Direct Economic Impacts of OIA Operations in Hawaii (FY 2012)

Industry Description	IMPLAN Code	Employment (# of employees)	Employee Compensation ($2011 millions)	Output ($2011 millions)
Federal Government, Nonmilitary	439	24	$2.77	$3.05
State and local government, education	438	24	$1.30	$1.46
Hospitals	397	78	$6.05	$11.23
Total		**126**	**$10.12**	**$15.74**

Sources: RTI estimates based on OIA (2012e) and IMPLAN.

Table 9-4. Selected Multipliers by Industry, Hawaii

Industry Description	IMPLAN Code	Total Employment Impact Multiplier	Total Employee Compensation Multiplier	Total Output Impact Multiplier
Federal government, nonmilitary	439	1.65	1.19	1.63
State and local government, education	438	1.29	1.19	1.61
Hospitals	397	1.78	1.34	1.71

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

- 209 employees,
- $12.96 million in employee compensation, and
- $26.49 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 ($2011 millions)	Output ($2011 millions)
Federal government, nonmilitary	439	39	$3.30	$4.97
State and local government, education	438	32	$1.54	$2.36
Hospitals	397	139	$8.12	$19.16
Total[a]		209	$12.96	$26.49

[a] Values may not add to total because of rounding.

Sources: RTI estimates based on OIA (2012e) 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 2012)

	Direct Employment Impact (#)	Indirect / Induced Employment Impact (#)	Total Employment Impact (#)	Percentage of National Employment Supported by OIA Payments (%)
American Samoa	823	738	1,561	10%
Guam	1,627	2,970	4,598	7%
Northern Mariana Islands	297	852	1,150	5%
U.S. Virgin Islands	3,894	9,482	13,376	30%
Micronesia	2,566	5,072	7,638	48%
Marshall Islands	1,795	2,217	4,013	38%
Palau	817	1,574	2,391	20%
Total	11,820	22,906	34,726	18%

Source: RTI estimates.

Table 10-2. Estimated Employee Compensation Impact of OIA Payments (FY 2012)

	Direct Employee Compensation Impact ('000, 2011$)	Indirect / Induced Employee Compensation Impact ('000, 2011$)	Total Employee Compensation Impact ('000, 2011$)	Percentage of National Employee Compensation Supported by OIA Payments (%)
American Samoa	13,120	12,109	25,229	10%
Guam	40,374	84,163	124,537	7%
Northern Mariana Islands	3,377	13,842	17,218	5%
U.S. Virgin Islands	133,596	321,862	455,458	29%
Micronesia	13,455	36,475	49,930	73%
Marshall Islands	19,866	22,305	42,171	42%
Palau	9,862	16,997	26,859	26%
Total	233,650	507,752	741,402	18%

Source: RTI estimates.

Table 10-3. Estimated GDP Impact of OIA Payments (FY 2012)

	Direct GDP Impact ('000, 2011$)	Indirect/Induced GDP Impact ('000, 2011$)	Total GDP Impact ('000, 2011$)	Percentage of National GDP Supported by OIA Payments (%)
American Samoa	32,970	103,364	136,334	21%
Guam	81,853	103,182	185,036	4%
Northern Mariana Islands	12,572	29,896	42,468	6%
U.S. Virgin Islands	199,093	317,736	516,828	11%
Micronesia	63,841	119,951	183,793	59%
Marshall Islands	47,416	58,562	105,978	62%
Palau	21,012	35,753	56,766	32%
Total	458,757	768,445	1,227,202	11%

Source: RTI estimates.

REFERENCES

American Samoa Department of Commerce (ASDC). 2008. *American Samoa's Economic Future and the Cannery Industry.* http://www.spc.int/prism/Country/AS/stats/canneries.pdf.

American Samoa Treasury Department (ASTD). 2010. *Territory of American Samoa—Basic Financial Statements (Year Ended September 30, 2009).* http://www.doi.gov/archive/oia/reports/PDF/ASG_FY2009FSSA.pdf.

Asian Development Bank (ADB). 2012. *Key Indicators for Asia and the Pacific 2012*. http://www.adb.org/sites/default/files/ki/2012/pdf/PAL.pdf.

CNMI Department of Commerce. 2012a. *2011 CNMI Prevailing Wage and Workforce Assessment Study (PWWAS): Reported Employees' Demographics and Small Employers' Employees Education and Skills Report. http://commerce.gov.mp/wp-content/uploads/2012/09/2011-PWWAS-Report-II-FINAL-Set_9.14.12.pdf.*

CNMI Department of Commerce. 2012b. *2011 CNMI Prevailing Wage and Workforce Assessment Study (PWWAS): Occupation, Hourly Wage, and Fringe Benefits Report.*

CNMI Office of the Public Auditor. 2012. *Report on the Audit of Financial Statements in Accordance with OMB Circular A-133: Year Ended September 20, 2010.* http://opacnmi.com/sites/default/files/reports/finaudit/FY10_CNMI_Single_Audit.pdf.

Department of Interior (DOI). 2011. *The Department of the Interior's Economic* Contributions. http://www.doi.gov/ppa/upload/DOI-Econ-Report-6-21-2011.pdf.

Duncan, R., and C. Voigt-Graf. 2008. "Labour Market Scenarios for the Asian Decent Work Decade in the Pacific Island Countries." ILO Asia-Pacific Working Paper Series. http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_098064.pdf.

Food and Agriculture Organization (FAO). 2006. "Support to the Regional Programme for Food Security in the Pacific Island Countries." http://www.faopacific.ws/Portals/167/progrmmes/trust%20funds/country_TF/GTFS-RAS-198-ITA%20PRODOC.pdf.

Government Accountability Office (GAO). 2006. *U.S. Insular Areas—Economic, Fiscal, and* Financial Accountability Challenges. http://www.gao.gov/new.items/d07119.pdf.

Government Accountability Office (GAO). 2011. *American Samoa and Commonwealth of the Northern Mariana Islands—Employment, Earnings, and Status of Key Industries Since Minimum Wage Increases Began.* http://www.gao.gov/new.items/d11956t.pdf

Guam Bureau of Statistics and Plans (GBSP). 2012a. *Guam 2010 Statistical Yearbook Updates: Labor Force and Employment Indicators*. http://www.bsp.guam.gov/Labor%20Force_2011.1.pdf

Guam Bureau of Statistics and Plans (GBSP). 2012b. *Guam 2010 Statistical Yearbook Updates: Military on Guam.* http://www.bsp.guam.gov/Federal%20Programs_2011.1.pdf.

Guam Office of Finance and Budget (GOFB). 2010. *FY 2011 Government of Guam Revenues Presentation.* http://www.senbenp.com/OFB/US%20Treasury%20Documents/SES%20FY11%20Revenue%20Presentation%20-%20August%2011,%202010.pdf.

Klosterman, R.E. 1990. *Community and Analysis Planning Techniques*. Savage, MD: Rowmand and Littlefield Publishers, Inc.

Lal, N. and S. Raj. May 11–12, 2006. "The Informal Economy in Small Island Developing States Case Study: Fiji Islands." Paper presented at The Ninth Meeting of the Expert Group on Informal Sector Statistics (Delhi Group), Delhi, India. http://www.mospi.nic.in/GDP%2005.doc.

Limtiaco, A. 2008. "Impact of Pledge of Section 30 Assets on Debt Ceiling." http://www.guamattorneygeneral.com/AG%20Opinions/2008/AG%2008-0891.pdf?id=42.

Maguire, S. and J. Teefy. 2010. "The Rum Excise Tax Cover-Over: Legislative History and Current Issues." Washington, DC: Congressional Research Service.

Office of Insular Affairs (OIA). 2012a. "2013 Congressional District Report." Provided by the Office of Insular Affairs to RTI International.

Office of Insular Affairs (OIA). 2012b. *OIA Announces $1.085 Million in "Empowering Insular Communities" Grants to Guam for Sustainable Energy Projects.* http://www.doi.gov/oia/press/2012/08302012.cfm.

Office of Insular Affairs (OIA). 2012c. *OIA Investing in Water Delivery for Southern Guam.* http://www.doi.gov/oia/press/2012/09062012.cfm.

Office of Insular Affairs (OIA). 2012d. *Statement of Anthony M. Babauta Regarding H.R. 6040, to Approve the Agreement Providing Terms for a Continuation of the Free Association between the United States and Palau.* http://www.doi.gov/oia/press/2012/09102012.cfm.

Office of Insular Affairs (OIA). 2012e. "The United States Department of the Interior Budget Justifications and Performance Information Fiscal Year 2013: Office of Insular Affairs." http://www.doi.gov/archive/oia/budget/FY2013_Budget_Justification.pdf.

Pacific Islands Training Initiative (PITI-VITI). 2012a. *Fiscal Year 2011 Economic Review: Statistical Appendices—Federated States of Micronesia.* http://www.pitiviti.org/files/other/FSM_EconStat_tabs_2011j.pdf.

Pacific Islands Training Initiative (PITI-VITI). 2012b. *Fiscal Year 2011 Economic Review: Statistical Appendices—Republic of the Marshall Islands.* http://www.pitiviti.org/files/other/RMI_EconStat_tabs_2011i.pdf.

Pacific Islands Training Initiative (PITI-VITI). 2012c. *Performeters for the Insular Areas*. http://www.pitiviti.org/initiatives/performeter.php.

Palau Office of Planning and Statistics (POPS). 2008. Palau Quarterly Economic Releases, Employment—1st-4th Quarter 2008. http://www.palaugov.net/stats/QTRLY_Econ/qrtly_rpts.htm.

Pike, C. 2007. Guam Tourism Economic Impact. http://www.doleta.gov/Programs/2006ReportsAndPlans/Economic_Analysis_Reports/GU-4.pdf.

Schneider, F. 2002. "Size and Measurement of the Informal Economy in 110 Countries around the World." http://www.amnet.co.il/attachments/informal_economy110.pdf.

U.S. Bureau of Economic Analysis (BEA). 2012. *Gross Domestic Product (GDP) for the U.S.* Territories. http://bea.gov/national/gdp_territory.htm.

U.S. Bureau of Labor Statistics. 2012. Consumer Price Index. Series ID CUUS0000SA0. http://www.bls.gov/cpi/.

U.S. Bureau of Labor Statistics. 1986. *U.S. Productivity Growth since 1982: The Post-Recession Experience.* http://www.bls.gov/opub/mlr/1986/12/art3full.pdf.

U.S. Census Bureau. 2009. *Economic Census of Island Areas*. http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

U.S. Census Bureau. 2011. *2010 U.S. Census*. http://2010.census.gov.

U.S. Census Bureau. 2012. County Business Patterns. http://www.census.gov/econ/cbp/.

U.S. Department of Agriculture (USDA). 2009a. Census of Agriculture—Guam Island Data (Table 4 and 7). http://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/guam.pdf.

U.S. Department of Agriculture (USDA). 2009b. Census of Agriculture—Northern Mariana Islands Commonwealth and Island Data (Table 4 and 7). http://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/cnmi.pdf.

U.S. Department of Agriculture (USDA). 2009c. Census of Agriculture—Virgin Islands of the United States, Territory and Island Data (Table 5 and Table 8). http://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/usvi.pdf.

U.S. Department of Agriculture (USDA). 2011. Census of Agriculture—American Samoa (Table 4). http://www.agcensus.usda.gov/Publications/2007/Full_Report/Outlying_Areas/AmericanSamoa.pdf.

U.S. Virgin Islands Bureau of Economic Research. 2012. *U.S. Virgin Islands Annual* Economic Indicators. http://www.usviber.org/pdfs/ECON11.pdf.

Wang, X., and R. vom Hofe. 2007. *Research Methods in Urban and Regional Planning*. Beijing, China: Tsinghua University Press.

The Washington Post. March 22, 2010. "On Guam, Planned Marine Base Raises Anger, Concerns." http://www.washingtonpost.com/wp-dyn/content/article/2010/03/21/AR2010032101025_3.html?sid=ST2010032102932.

World Bank. 2012a. *World Bank Data (Indicators—GDP)*. http://data.worldbank.org/indicator/NY.GDP.MKTP.CD.

World Bank. 2012b. *World Bank Data (Indicators—Population).* http://data.worldbank.org/indicator/SP.POP.TOTL.

APPENDIX A:
ALLOCATION OF FY 2012 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. 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 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 percentage distributions based on the FY 2011 budget (Table A-2).
- USDA Graduate School PITI-VITI: A total of $1.7 million was allocated to this program for FY 2012. Because the PITI-VITI serves all seven insular areas, this $1.7 million was distributed evenly across all seven areas and Hawaii (where the PITI-VITI offices are located).
- Close Up Foundation: A total of $1.05 million was allocated to this program for FY 2012. 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 $1.05 million was divided evenly across all seven insular areas.
- Prior Service Benefits Program: A total of $1 million was allocated to this program, which is distributed to 351 recipients in CNMI, 711 in FSM, 234 in RMI, and 307 in Palau. It was assumed that this $1 million was distributed to each of these insular areas in proportion to the number of recipients located in each.
- Judicial training: A total of $320,000 was allocated to this program for FY 2012. According to OIA (2012b), these payments fund judicial training for the insular areas in the Pacific. Therefore, the funding was allocated evenly through the Pacific insular areas.
- New for FY 2012 the OIA provided an additional $5 million in payments for reliving the impacts of migration from citizens of the Freely Associated States on infrastructure and social services. The OIA has allocated this discretionary spending to offset educational service or infrastructure costs. It was assumed that insular areas already receiving Compact Impact payments (American Samoa, CNMI, Guam, and Hawaii) would receive an even portion of these payments and that these payments would impact the education sector of their economies (Table A-1).
- In a few instances the OIA's Budget Justification did not explain where certain payments had been allocated, but further information about these payments was found using OIA's website announcements. The website updates provided a detail breakdown of the Empowering Insular Communities payments to Guam and demonstrated that Water and Wastewater funding was allocated to Guam (OIA 2012b

& OIA 2012c). A statement made by the OIA's Assistant Secretary of the Interior to Congress also provided further details on payment allocations for Palau (OIA, 2012d).

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. RTI was able to use the funding totals and percentage distribution from FY 2011's budget to estimate FY 2012 allocations by island for the brown tree snake program, maintenance assistance, coral reef initiative, and the OIA administrative payments (Table A-2).

Table A-1. Estimation of FY 2012 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	$951,020	$1,464,742	$1,105,652	$1,606,998	$216,909	$555,748	$406,229			$6,307,297
USDA Grad School PITI-VITI	Education	$212,500	$212,500	$212,500	$212,500	$212,500	$212,500	$212,500	$212,500		$1,700,000
U.S. Bureau of Commerce, BEA (for GDP data)	Internal transfer									$750,000	$750,000
Close Up Foundation	Education	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000			$1,050,000
Junior Statesmen	Spending Outside Insular areas									$356,500	$356,500
4 A Toll Health Care Program	Health care						$990,203				$990,203
Prior Service Benefits Program	Private			$218,964		$443,543	$145,976	$191,516			$1,000,000
Judicial training	Government	$53,333	$53,333	$53,333		$53,333	$53,333	$53,333			$320,000
CDC	Internal transfer									$50,000	$50,000
CNMI Ombudsman's Office	Government			$250,000							$250,000
CNMI Immigration, Labor and Law Enforcement	Government			$1,000,000							$1,000,000
Compact Impact Discretionary	Education	1,250,000	1,250,000	1,250,000					1,250,000		$5,000,000
Total		$2,616,853	$3,130,575	$4,240,450	$1,969,498	$1,076,285	$2,107,760	$1,013,578	$1,462,500	$1,156,500	$18,774,000

Table A-2. Estimation for FY 2012 Payments by Insular Area Using FY 2011 Actuals

Insular Area	FY 2011 Actual Payments ($'000, 2010$)	FY 2011 Distribution, by Insular Area (%)	Estimated FY 2012 Payments ($'000, 2011$)
Brown Treesnake Control			
American Samoa	—	—	—
Guam	285	9.52%	285
Northern Mariana Islands	306	10.22%	306
U.S. Virgin Islands	—	—	—
Federated States of Micronesia	—	—	—
Republic of the Marshall Islands	—	—	—
Republic of Palau	—	—	—
Hawaii	1,190	39.75%	1,190
Other	1,213	40.51%	1,213
Total	2,994		2,995
General Technical Assistance—Direct Grants to Insular Area			
American Samoa	1,566	15.08%	951
Guam	2,412	23.22%	1,465
Northern Mariana Islands	1,821	17.53%	1,106
U.S. Virgin Islands	2,646	25.48%	1,607
Federated States of Micronesia	357	3.44%	217
Republic of the Marshall Islands	915	8.81%	556
Republic of Palau	669	6.44%	406
Hawaii	—	—	—
Other	—	—	—
Total	10,386		6,307
Maintenance Assistance			
American Samoa	283	11.58%	259
Guam	60	2.46%	55
Northern Mariana Islands	159	6.51%	146
U.S. Virgin Islands	—	—	—
Federated States of Micronesia	505	20.67%	462
Republic of the Marshall Islands	381	15.60%	349
Republic of Palau	—	—	—
Hawaii	1,055	43.18%	966
Other	—	—	—
Total	2,443		2,237

(continued)

Table A-2. Estimation for FY 2012 Payments by Insular Area Using FY 2011 Actuals (continued)

Insular Area	FY 2011 Actual Payments ($'000, 2010$)	FY 2011 Distribution, by Insular Area (%)	Estimated FY 2012 Payments ($'000, 2011$)
Coral Reef Initiative			
American Samoa	87	8.72%	87
Guam	83	8.32%	83
Northern Mariana Islands	83	8.32%	83
U.S. Virgin Islands	—	—	—
Federated States of Micronesia	305	30.56%	305
Republic of the Marshall Islands	50	5.01%	50
Republic of Palau	—	—	—
Hawaii	—	—	—
Washington, DC	90	9.02%	90
Other	300	30.06%	300
Total	998		998
Office of Insular Affairs			
American Samoa	146	1.58%	149
Guam	—	—	—
Northern Mariana Islands	346	3.74%	354
U.S. Virgin Islands	120	1.30%	123
Federated States of Micronesia	—	—	—
Republic of the Marshall Islands	95	1.03%	97
Republic of Palau	—	—	—
Hawaii	875	9.45%	894
Washington, DC	7,680	82.92%	7,848
Other	—	—	—
Total	9,262		9,465

Source: RTI estimates based on OIA (2012e).