

Analysis of the
Economic Impact
of the
Naval Air Station
at
Patuxent River

and the
Naval Surface Warfare
Center
at
Indian Head

Developed by



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Executive Summary

Naval Air Station at Patuxent River in St. Mary's County and the Naval Surface Warfare Center at Indian Head in Charles County play important roles in the economy of Southern Maryland and the State. In order to determine the impact, the Maryland Department of Business and Economic Development (DBED), working with the Tri-county Council of Southern Maryland and the Calvert, Charles, and St. Mary's county economic development offices, retained the Jacob France Institute of the Merrick School of Business at the University of Baltimore (The France Institute) to analyze the economic impacts of the Naval Air Station at Patuxent River (Pax River) and Naval Surface Warfare Center at Indian Head (Indian Head) military facilities on the state of Maryland. Separate economic impact estimates were prepared for Maryland, the Southern Maryland region, and each of the three counties -- Calvert, Charles, and St. Mary's -- that comprise the region.

The France Institute used an economic model to estimate the economic impacts of each of the two bases. Four measures of the economic impact of the two bases were developed: Direct Effects¹, Indirect Effects², Induced Effects³, and Total Effects⁴.

Some of the key findings of this report are as follows:

- The two bases combined stimulate nearly \$3.4 billion in economic activity in the State of Maryland, (about 2% of the Gross State Product), and support 33,780 jobs in the State that generate \$1.4 billion in salaries and wages.
- The two bases stimulate more than \$1,181 million in employee compensations, or 37% of all wages and salaries paid to Southern Maryland residents
- Supporting more than 29,000 jobs in Southern Maryland, the two bases account for almost 1 of every 4 jobs in the region.
- The two bases also create high quality jobs in Southern Maryland. The average salary of a Southern Maryland resident employed at Indian Head is \$47,605, or \$15,407 above the Southern Maryland average earnings. For Pax River, the average salary for a Southern Maryland resident is \$54,747, or \$22,549 above the Southern Maryland average earnings.
- The increased economic activity supported by the two bases generates an estimated \$55 million in State of Maryland tax revenues. Pax River and Indian Head also contribute a total of \$14 million in local piggy back tax revenues
- Pax River and Indian Head employees pay an estimated total of \$11.2 million in local property taxes.

The table below summarizes the economic impact on Maryland's economy by the two military facilities.

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$1,505.4	\$1,018.5	\$844.7	\$3,368.6
Pax River	\$1,155.4	\$910.7	\$715.7	\$2,781.8
Indian Head	\$350.0	\$107.8	\$129.0	\$586.7

¹ Direct effects represent the change in economic activity in the sector in which the spending analyzed occurs -- in this case the operation of military facilities. Direct effects occur at the location of the facility being analyzed. In the case of Indian Head, all direct effects occur in Charles County, and for Pax River all direct impacts occur in St. Mary's County.

² Indirect effects represent the changes in inter-industry purchases, for example, the purchase of engineering services from a local supplier, in response to the change in demand from the directly affected industries

³ Induced effects represent the changes in spending from households as income and population increase due to changes in production.

⁴ Total effects, is the combined total of direct, indirect and induced effects.

Report

Acknowledgement

This analysis was done using the March 2002 Jacob France Institute's study "The Economic Impact of The Naval Air Station at Patuxent River And The Naval Surface Warfare Center at Indian Head On Maryland, Southern Maryland, Calvert County, Charles County, and St. Mary's County". That study was based on employment and procurement data provided by the Naval Air Station at Patuxent River and Naval Surface Warfare Center at Indian Head in November and December of 2001. We would like to thank the bases for providing the information needed to perform the study. Additional analysis was done using data from the Maryland Department of Assessment and Taxation, the Maryland Department of Labor, Licensing, and Regulation, the US Department of Commerce's Bureau of Economic Analysis, and US Census Bureau.

Introduction

The Naval Air Station at Patuxent River and the Naval Surface Warfare Center at Indian Head have play an important role in the economy of Southern Maryland and the State for decades. But the magnitude of that impact was not known. To answer the questions about the impact, the Maryland Department of Business and Economic Development (DBED), working with the Tri-county Council of Southern Maryland and the Calvert, Charles, and St. Mary's county economic development offices, retained the Jacob France Institute of the Merrick School of Business at the University of Baltimore (The France Institute) to analyze the economic impacts of the Naval Air Station at Patuxent River (Pax River) and Naval Surface Warfare Center at Indian Head (Indian Head) military facilities on the State of Maryland. Separate economic impact estimates were prepared for Maryland, the Southern Maryland region, and each of the three counties -- Calvert, Charles, and St. Mary's.

The France Institute used an economic model¹ to estimate the economic impacts of each of the two bases. This analysis includes measures of economic output (a figure similar to Gross State Product); and employment. Four measures of the economic impact of the two bases are included in this report:

1. Direct effects represent the change in economic activity in the sector in which the spending analyzed occurs -- in this case the operation of military facilities. Direct effects occur at the location of the facility being analyzed. In the case of Indian Head, all direct effects occur in Charles County, and for Pax River all direct impacts occur in St. Mary's County.
2. Indirect effects represent the changes in inter-industry purchases, for example, the purchase of engineering services from a local supplier, in response to the change in demand from the directly affected industries.
3. Induced effects represent the changes in spending from households as income and population increase due to changes in production.
4. Total effects, which are the combined total of direct, indirect and induced effects.

This Institute's analysis used data on the total budget, procurement, and payrolls provided by each of the two bases as the main inputs to the modeling effort. Indian Head and Pax River provided detailed information on total civilian and military payrolls by County of residence for their workers. This was used to estimate the induced effects², or the spending effects of the employee income supported by the bases in the County-of-residence for the employee. Indian Head provided procurement data by contractor, with the impacted industry identified as the primary Standard Industrial Classification (SIC) code of the supplier. Where it was not possible to identify the primary SIC of the supplier company, the purchase was treated as a wholesale purchase. Pax River provided procurement data by Federal Supply Code (FSC). France Institute personnel matched each FSC to the nearest applicable SIC code based on their own best judgment. Where it was not possible to identify a single SIC for the purchase or the industry was not present in the model, the purchase was treated as a wholesale purchase.

Additional analysis was done using information from other data sources, which included:

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- Maryland Department of Assessment and Taxation's 2001 County Tax Rate Report and 2000 Assessment Report.
 - Maryland Department of Labor, Licensing, and Regulation's Employment and Payroll Reports
 - US Department of Commerce's Bureau of Economic Analysis' Local Areas Personal Income and Employment Reports.
 - US Census Bureau's Home Ownership Report

The Economic Impact of Pax River and Indian Head on Maryland

The operations of the Indian Head and Pax River military installations have significant impacts on Maryland's economy. The two bases impact Maryland through the wages and salaries they pay their employees and through the purchases they make from Maryland companies. The economic impact of the bases is greater than the simple total of these payroll and purchases. Payroll expenditures are earned and spent by base employees on goods and services from other Maryland companies, who in turn pay their workers and make purchases from other businesses in successive rounds of revenue, income, and spending. Similarly, Maryland suppliers to the bases use contract revenues to pay their workers and suppliers creating additional economic impacts through other successive rounds of spending. However, these cycles of spending and revenues do not continue indefinitely. Because of leakages from out-of-state purchases, federal taxes, etc., each successive round of spending is less than the preceding round. The additional effects from these successive rounds of spending are called "multiplier effects" and can be estimated through the use of an economic model.

Indian Head and Pax River are major sources of economic activity in the State, especially in Southern Maryland, where they have been a major contributor to regional growth. Pax River has total local expenditures of \$1.155 billion comprised of \$505 million in Maryland payrolls and \$650 million in purchases from Maryland suppliers. Indian Head has a total base budget of \$350 million and spends \$114.9 million on Maryland payrolls and purchases \$75.6 million on goods and services from Maryland Suppliers.

As described above, Pax River and Indian Head impact the Maryland economy through the purchases they make from Maryland suppliers and through the wages and salaries they pay their employees. The economic impact of the purchases made by the bases and their associated multiplier effects are called the Indirect impact of the bases. The economic impact of the increase in State income and spending derived from the payrolls paid by the two bases their associated multiplier effects are the Induced impact of the bases.

As presented in Table 1, the two bases have a combined direct impact on the Maryland economy of \$1.5 billion tied to the economic activity occurring on the two bases -- \$1.155 billion associated with Pax River³, and \$350 million at Indian Head. Pax River's direct impact of \$1.155 billion is combined with \$911 million in indirect effects and \$716 million in induced effects for a total impact of nearly \$2.8 billion. Indian Head's direct impact of \$350 million is combined with \$108 million in indirect effects and \$129 million in induced effects for a total impact of \$587 million. Combined, the two bases contribute nearly \$3.4 billion to the Maryland economy, or nearly 2% of economic output in Maryland.

Table 1 - Economic and Employment Impact on Maryland

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$1,505.4	\$1,018.5	\$844.7	\$3,368.6
Pax River	\$1,155.4	\$910.7	\$715.7	\$2,781.8
Indian Head	\$350.0	\$107.8	\$129.0	\$586.7
Employment Impact (# of jobs)				
Total of the Two bases	12,861	10,655	10,264	33,780
Pax River	9,995	9,532	8,710	28,237
Indian Head	2,866	1,123	1,554	5,543

The two bases are the largest employers in Southern Maryland and together directly employ 12,861 persons. Pax River has direct employment of 9,995 military and civilian personnel. The indirect effects of Pax River create an additional 9,532 jobs and induced effects create 8,710 jobs with a total effect of 28,237 jobs. Indian Head has direct employment of 2,866 military and civilian personnel. The indirect effects of Indian Head create an additional 1,123 jobs and induced effects create 1,554 jobs with a total effect of 5,543 jobs. Pax River and Indian Head combined create or support 33,780 jobs in Maryland or 1.4% of the State's total jobs.

The Economic Impact of Pax River and Indian Head on Southern Maryland

As the largest employers in Southern Maryland, the Indian Head and Pax River military installations have a significant impact on the regional economy. The economic impacts associated with the two bases are concentrated in the Southern Maryland area. Ninety-six percent (96%) of Pax River's \$505 million Maryland payroll expenditures are paid to residents of the three Southern Maryland counties. Southern Maryland businesses account for 91% of \$650 million in purchases Pax River's made from Maryland suppliers. For Indian Head, 85% of the base's \$114.9 million in Maryland payroll expenditures are paid to Southern Maryland residents, and Southern Maryland businesses account for 86% of the base's \$75.6 million in purchases made from Maryland companies.

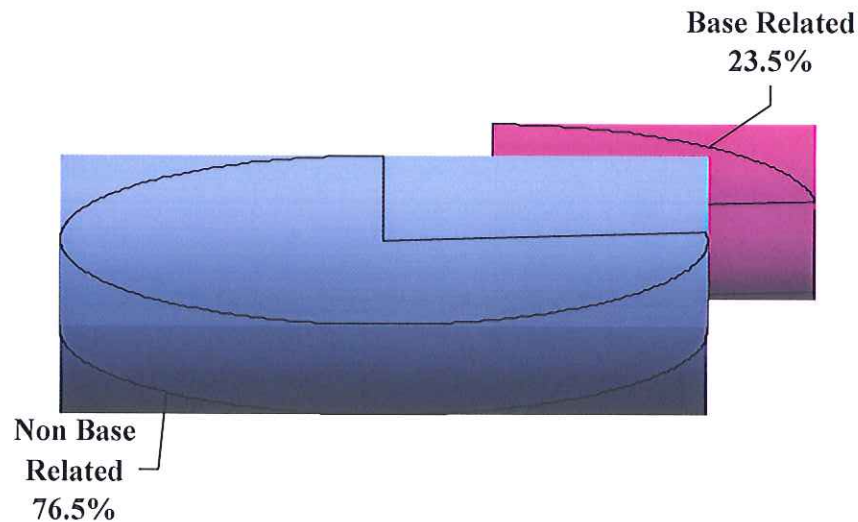
As presented in Table 2, the economic activity occurring on the two bases have a combined direct impact on the Southern Maryland economy of \$1.5 billion--\$1.155 billion associated with Pax River⁴, and \$350 million at Indian Head. When combined with \$777.4 million in indirect effects and \$398.5 million in induced effects, Pax River's total economic is more than \$2.3 billion. Indian Head's direct impact of \$350 million combines with \$69.2 million in indirect effects and \$64.1 million in induced effects for a total economic impact of \$483.3 million. Together, these two bases contribute more than \$2.8 billion to the Southern Maryland economy.

Table 2 - Economic Output and Employment Impact on Southern Maryland

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$1,505.4	\$846.6	\$426.6	\$2,814.6
Pax River	\$1,155.4	\$777.4	\$398.5	\$2,331.3
Indian Head	\$350.0	\$69.2	\$64.1	\$483.3
Employment Impact (# of jobs)				
Total of the Two bases	12,861	9,643	6,712	29,216
Pax River	9,995	8,907	5,793	24,695
Indian Head	2,866	736	919	4,521

The two largest employers in Southern Maryland directly employ 12,861 persons. Pax River directly employs of 9,995 military and civilian personnel. The indirect effects of Pax River create an additional 8,907 jobs, while induced effects create an additional 5,793. Pax River's total effect results in the generation of 24,695 jobs. Indian Head directly employs 2,866 military and civilian personnel. The indirect effects of Indian Head create an additional 736 jobs, and induced effects create 919 jobs. When combined, Indian Head's total effect creates 4,521 jobs. Pax River and Indian Head combined create or support 29,216 jobs in Southern Maryland, which as Chart 1 shows is almost one-fourth of the total Southern Maryland employment (See Appendix I for detailed distribution of jobs and salaries by place of residence).

Chart 1 – Base Related Employment as a % of Total Southern MD Employment



The two bases also create high quality jobs in Southern Maryland. Chart 2 compares the average earnings in Southern Maryland to the average wages paid to Southern Maryland residents by Pax River and Indian Head.

**Chart 2 - Average Salary of Southern Maryland Residents –
Pax River and Indian Head versus Area Average Wage**

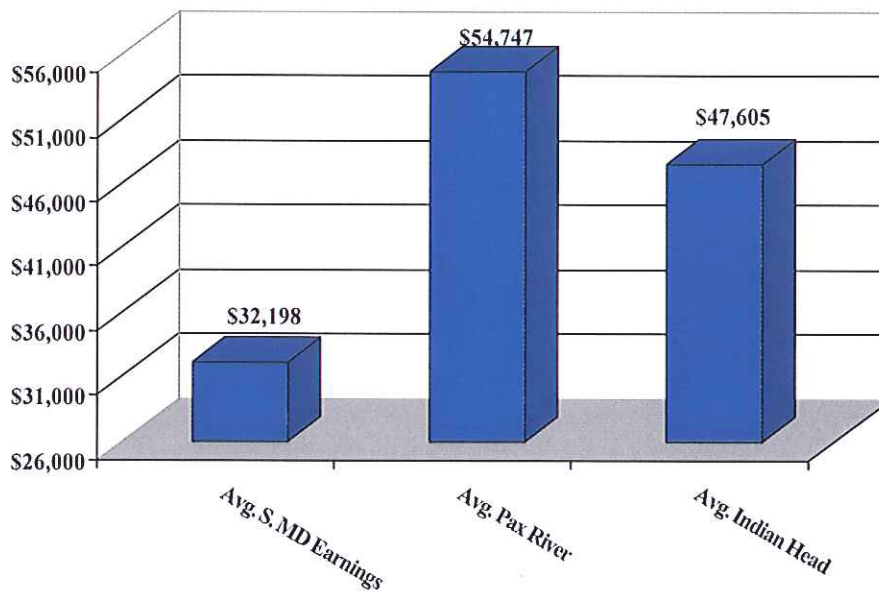


Table 3 provides details on employment, earnings, and salaries for each of the three counties, the region, and the State. The average salary ⁵ of a Southern Maryland resident employed at Indian Head is \$47,605, or \$15,407 above the Southern Maryland average earnings. For Pax River, the average salary for a Southern Maryland resident is \$54,747, or \$22,549 above the Southern Maryland's average earnings.

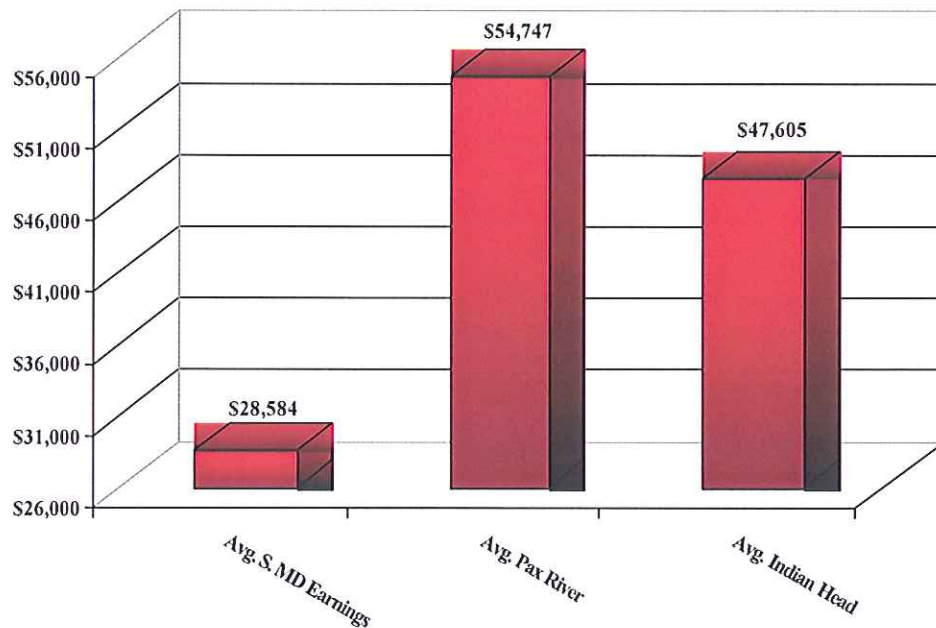
Table 3—Average Indian Head and Pax River Salary Compared to Area Average Wage

	Indian Head (IH)		Pax River (PR)		Area Avg. Earnings (1)	IH vs. Average	PR vs. Average
	Average Salary	Emp.	Average Salary	Emp.			
Calvert	\$49,402	80	\$59,262	1,158	\$30,212	\$19,190	\$29,050
Charles	\$47,382	1,838	\$60,829	511	\$28,340	\$19,042	\$32,489
St. Mary's	\$49,612	133	\$53,589	7,196	\$38,220	\$11,392	\$15,369
Southern MD	\$47,605	2,051	\$54,747	8,865	\$32,198	\$15,407	\$22,549
Maryland	\$48,174	2,385	\$54,909	9,200	\$36,400	\$11,774	\$18,509
Out of State		481		795			
Totals		2,866		9,995			

1. Source - Calendar Year 2001 DILLR employment and payroll information.

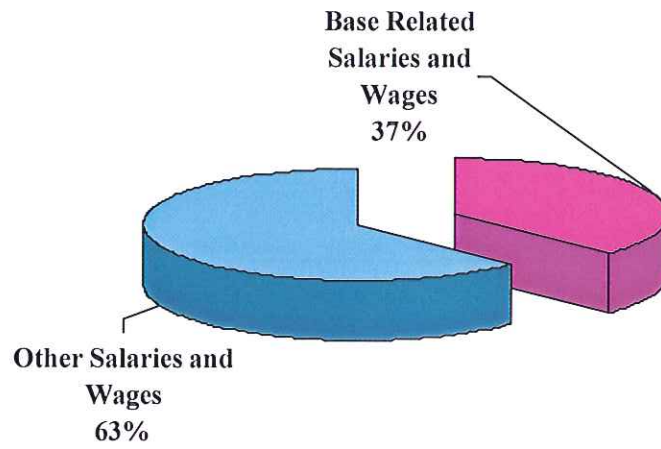
If federal employment is excluded from the area average earnings, the contrast between the salaries paid on the bases and the local earnings is even starker. Chart 3 shows that contrast.

**Chart 3 - Average Salary of Southern Maryland Residents –
Pax River and Indian Head versus Area Average Wage, Excluding Federal Employment**



The base's impact on earnings of Southern Maryland residents is even greater than its impact on employment. Chart 4 shows that the bases account for 37% of the total salaries and wages paid in Southern Maryland, \$1.076 billion out of a total of \$2.888 billion in salaries and wages.

**Chart 4 - Base Related Salaries and Wages Compared to Other Southern MD
Salaries and Wages**



The Economic Impact of Pax River and Indian Head on Calvert County

The Calvert County economy primarily benefits from the wages and salaries paid to County residents by Pax River. In Calvert County 1,158 residents work at Pax River, while Indian Head employs 80 more. County residents earned a total of \$72.6 million from the two bases -- \$68.6 million from Pax River and \$4.0 million from Indian Head.

Table 4 shows the *Induced Impacts* of the two bases as Calvert County residents spend the money they earn from Pax River and Indian Head on local goods and services. County economic impacts are lower than the sum of payrolls paid to County residents because a portion of this income is lost to federal taxes, out-of-County purchases, and other leakages. As presented in Table 4, Pax River and Indian Head contribute \$35.5 million in combined economic impacts to Calvert County and create 496 local jobs.

Table 4 - Economic Output and Employment Impact on Calvert County

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$0	\$0	\$35.5	\$35.5
Pax River	\$0	\$0	\$33.6	\$33.6
Indian Head	\$0	\$0	\$1.9	\$1.9
Employment Impact (# of jobs)				
Total of the Two bases	0	0	496	496
Pax River	0	0	469	469
Indian Head	0	0	27	27

The Economic Impact of Pax River and Indian Head on Charles County

With 2,866 employees, Indian Head is the largest employer in Charles County and the base alone accounts for 8% of total County employment. Indian Head impacts the County through the operation of the base, the purchases it makes from County suppliers, and through the salaries it pays County residents. Charles County residents account for 64% of Indian Head's total employment.

Charles County residents earn 76% of Indian Head's total Maryland payroll and County businesses receive 37%, or \$26.4 million, of Indian Head's total in-State purchases of \$75.6 million. The Charles County economy also benefits from the operations of the Pax River base, with 511 County residents employed on base earning \$31.1 million. County businesses also provided \$1.5 million in goods and services to Pax River.

As presented in Table 5, the two bases combined have a total impact on the Charles County economy of \$484.2 million. Indian Head operations provide \$350 million in direct effects, but the County receives no direct impact from Pax River. However, the two bases combine for with \$57.7 million in indirect effects, and \$76.5 million in induced effects. The overwhelming majority of these impacts, 96%, are attributable to Indian Head.

Table 5 - Economic Output and Employment Impact on Charles County

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$350.0	\$57.7	\$76.5	\$484.2
Pax River	\$0	\$2.2	\$18.1	\$20.3
Indian Head	\$350.0	\$55.5	\$58.4	\$463.9
Employment Impact (# of jobs)				
Total of the Two bases	2,866	589	1,104	4,559
Pax River	0	24	263	287
Indian Head	2,866	565	841	4,559

Indian Head employs 2,866 military and civilian personnel on the base and the base had a total payroll of \$138.2 million. Indian Head and Pax River purchases create an additional 589 jobs. Spending by employees of the two bases generated an additional 1,104 job, for a total impact on County employment of 4,559. These 4,559 jobs account for nearly 10% of total jobs in the County.

The Economic Impact of Pax River and Indian Head on St. Mary's County

With 9,995 employees, Pax River dominates the St. Mary's County economy and the civilian and military⁶ personnel employed on the base account for 30% of total County jobs. Pax River impacts the County through the operation of the base, the purchases made from County suppliers, and through the salaries it pays County residents. St. Mary's County residents account for 72% of Pax River's total employment.

St. Mary's County residents earn 76% of Pax River's total Maryland payroll and County businesses receive 91%, or \$593.3 million, of Pax River's total in-State purchases of \$650.2 million. The St. Mary's County economy also benefits from the operations of the Indian Head base, with 133 County residents employed on base earning \$6.6 million. St. Mary's County businesses also provided \$10.5 million in goods and services to Indian Head.

As presented in Table 6, the two bases have a total direct impact on the St. Mary's County economy of \$2.2 billion. Pax River operations provide \$1.155 billion in direct effects combined with \$758.3 million in indirect effects, through purchases from the two bases of goods and services from local suppliers, and \$294.7 million in induced effects, through the increase in County incomes attributable to the payrolls paid to County residents by Pax River and Indian head. The overwhelming majority of these impacts in the County, 99%, are attributable to Pax River.

Pax River employs 9,995 military and civilian personnel. Indian Head and Pax River purchases in St. Mary's County create an additional 8,331 jobs, spending by employees of the two bases creates an additional 4,224 jobs, for a total impact on County employment of 22,550 workers earning. These 22,550 jobs account for nearly one half of total employment in the County.

Table 6 - Economic Output and Employment Impact on St. Mary's County

Economic Impact (In Million of \$)	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Total of the Two bases	\$1,155.4	\$758.3	\$294.7	\$2,208.3
Pax River	\$1,155.4	\$744.6	\$289.7	\$2,189.6
Indian Head	\$0	\$13.7	\$5	\$18.7
Employment Impact (# of jobs)				
Total of the Two bases	9,995	8,331	4,224	22,550
Pax River	9,995	8,178	4,152	22,325
Indian Head	0	154	71	225

Fiscal Impact of Pax River and Indian Head

In addition to the economic output, employment, and employee compensation impacts discussed above, Pax River and Indian Head provide additional fiscal benefits to the State and three Southern Maryland counties. It was outside of the scope of this report to analyze the full tax impacts of the bases. Thus, this analysis looks at two sources of State government revenues, income and sales taxes, and one source of local revenues, local "piggy back" income taxes. Additionally, this analysis also did not look at the cost of the increased State and local government services required by the bases or their employees. The State and local income tax revenue estimates are based on effective State and local income tax rates. Sales tax revenues are based on prior France Institute research that found that consumers typically spend one-third of their income on goods and services subject to the Maryland State sales tax.

As Table 7 indicates, total State of Maryland sales and income tax revenues derived from the two bases is \$55.4 million -- \$33.0 million from income taxes and \$22.4 million in sales tax revenues. Pax River and Indian Head contribute a total of \$14 million in local income tax revenues -- \$11.8 million from Pax River and \$2.1 million from Indian Head. St. Mary's County derives the highest fiscal benefit, \$10.4 million, followed by Charles County, \$2.4 million, and Calvert County, \$1.2 million.

Table 7 – Summary of Estimated State and Local Tax Revenues

	Pax River	Indian Head	Total
Total State Income & Sales Taxes (In Million of \$)	\$47.1	\$8.3	\$55.4
State Income Taxes	\$28.1	\$4.9	\$33.0
Sales Taxes (1)	\$19.0	\$3.4	\$22.4
Southern MD Piggy Back Income Taxes ⁽²⁾	\$11.8	\$2.1	\$14.0
Calvert	\$1.1	\$1.1	\$1.2
Charles	\$1.1	\$1.8	\$2.4
St. Mary's	\$10.2	\$0.2	\$10.4

1. It is estimated that Maryland residents spend 33% of their income on goods subject to the sales tax.
2. The actual place of residence for the jobholders for off-base employment impacts is unknown. It was estimated that commuting patterns were balanced. It was outside of the scope of this project to estimate property or other local tax revenues.

The fiscal analysis presented above does not include property taxes, a major source of County revenues, because it was not possible to know whether base employees own houses, the value of their housing, or the place of residence or homeownership status of the indirect or induced effect jobholders. The Maryland Department of Business and Economic Development - using existing rates of homeownership and average property values for the three Southern Maryland counties, prepared an estimate of the property tax revenues associated with the employees of the two bases. Table 8 shows the analysis estimates that Pax River and Indian Head employees pay a total of \$11.2 million in property taxes -- \$6.8 million in St. Mary's County, \$2.8 million in Charles County, and \$1.5 million in Calvert County. These effects do not include the property taxes associated with the many jobs created through the indirect and induced effects of the bases. Furthermore, this analysis does not take into account the higher than average incomes, and therefore, likely higher than average housing costs, of the base employees. Thus, the actual County property tax receipts are likely to be much higher than these estimates.

Table 8 - Estimated Property Taxed from Employees of Indian Head and Pax River

	Average Property Tax	Direct Employees	Home Ownership Rate (¹)	Es timated Property Tax (²)
Calvert	\$1,459	1,238	85.2%	\$1,539,313
Charles	\$1,536	2,349	78.2%	\$2,821,710
St. Mary's	\$1,301	7,329	71.8%	\$6,843,620
Totals		10,916		\$11,204,643

1. 2000 Census data.

2. Only property tax from direct employment is included, total property tax would be higher

Appendix I

Employment and Salaries by Place of Residence

Pax River		
Residence	Employment	Salaries
Maryland	9,200	\$505,163,911
St. Mary's	7,196	\$385,626,777
Charles	511	\$31,083,542
Calvert	1,158	\$68,624,903
Other Maryland	335	\$19,828,690
Out-of-Maryland	795	\$45,168,678
Total	9,995	\$550,332,589

Indian Head		
Residence	Employment	Salaries
Maryland	2,385	\$114,896,078
St. Mary's	133	\$6,598,396
Charles	1,838	\$87,088,058
Calvert	80	\$3,952,171
Other Maryland	334	\$17,257,453
Out-of-Maryland	481	\$23,310,150
Total	2,866	\$138,206,228

Endnotes

1 The Jacob France Center used the IMPLAN input-output model. All impact figures are in year 2001 dollars.

2 Payroll data was adjusted to reflect disposable personal income prior to modeling.

3 See footnote #2 for a description of the direct impact of Pax River.

4 See footnote #2 for a description of the direct impact of Pax River.

5 For Military personnel salary does not include allowances, which can substantially increase the level of compensation.

6 The 6,900 contractors employed at Pax River are not counted as *Direct* employment on the base in order to avoid double counting when estimating the *Indirect* economic and employment impacts of the base, since these jobs are paid for by base procurement.