
APPENDIX L

**ECONOMIC IMPACT FORECAST SYSTEM (EIFS)
MODEL AND OUTPUT**

Appendix L: Economic Impact Forecast System Model and Output

Socioeconomic Impact Assessment

Socioeconomic impacts are linked through cause-and-effect relationships. Military payrolls and local procurement contribute to the economic base for the region of influence (ROI). In this regard, construction of military training ranges and supporting facilities necessary for transformation at the Schofield Barracks, Kahuku Training Area, and Dillingham Military Range in Honolulu County, and the Pōhakuloa Training Area in Hawai'i County, will have a multiplier effect on the local and regional economy. With the preferred alternative, direct jobs will be created, generating new income and increasing personal spending. This spending generally creates secondary jobs, increases business volume, and increases revenues for schools and other social services.

The Economic Impact Forecast System

The U.S. Army, with the assistance of many academic and professional economists and regional scientists, developed the Economic Impact Forecast System (EIFS) to address the economic impacts of NEPA-requiring actions and to measure their significance. As a result of its designed applicability, and in the interest of uniformity, EIFS should be used in NEPA assessments for RCI. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand, but still have firm, defensible bases in regional economic theory.

EIFS is implemented as an on-line system supported by the U.S. Army Environmental Policy Institute through the Computer Information Science Department of Clark Atlanta University, Georgia. The system is available to anyone with an approved user-id and password. University staff and the staff of the Army Environmental Policy Institute are available to assist with the use of EIFS.

The databases in EIFS are national in scope and cover the approximately 3,700 counties, parishes, and independent cities that are recognized as reporting units by federal agencies. EIFS allows the user to define an economic ROI by identifying the counties, parishes, or cities to be analyzed. Once the ROI is defined, the system aggregates the data, calculates multipliers and other variables used in the various models in EIFS, and prompts the user for forecast input data.

The EIFS Model

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Army-related changes in local expenditures or employment. In calculating the multipliers, EIFS uses the economic base model approach, which relies on the ratio of total economic activity to basic economic activity. Basic, in this context, is defined as the production or employment engaged to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating aggregate impacts and makes the economic base model ideal for the EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its base sector; for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a location quotient approach based on the concentration of industries within the region relative to the industrial concentrations for the nation.

The user inputs into the model the data elements which describe the Army action: the change in expenditures, or dollar volume of the construction project(s); change in civilian or military employment; average annual income of affected civilian or military employees; the percent of civilians expected to relocate due to the Army's action; and the percent of military living on-post. Once these are entered into the EIFS model, a projection of changes in the local economy is provided. These are projected changes in sales

volume, income, employment, and population. These four indicator variables are used to measure and evaluate socioeconomic impacts. Sales volume is the direct and indirect change in local business activity and sales (total retail and wholesale trade sales, total selected service receipts, and value-added by manufacturing). Employment is the total change in local employment due to the proposed action, including not only the direct and secondary changes in local employment, but also those personnel who are initially affected by the military action. Income is the total change in local wages and salaries due to the proposed action, which includes the sum of the direct and indirect wages and salaries, plus the income of the civilian and military personnel affected by the proposed action. Population is, of course, the increase or decrease in the local population as a result of the proposed action.

Because the counties in this study (Hawai'i County and Honolulu County) are two separate islands, two separate ROI's were defined and analyzed using EIFS. For Hawai'i County, the cost of construction of the new training ranges and supporting facilities was entered as the change in total expenditures. The total expenditure is the money that would be spent in the ROI study area, as well as outside the study area for goods that would need to be imported into the ROI (e.g., lumber). The expenditures associated with these projects were spread out over a 4-year period since the construction is currently scheduled to take place between 2004 and 2007. There would be no change in troop strength at any of the installations in Hawai'i County as a result of the proposed action.

For Honolulu County, just as for Hawai'i County, the cost of construction of the new training ranges and supporting facilities was entered as the change in total expenditures. The expenditures associated with these projects were spread out over a 5-year period since the construction is currently scheduled to take place between 2004 and 2008. Schofield Barracks in Honolulu County is expected to gain 480 troops. This increase in troop strength was entered as the change in military personnel. The average income of affected military personnel was calculated from the military basic pay scale, effective January 1, 2002.

The Significance of Socioeconomic Impacts

Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the user to evaluate the significance of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, income, employment, and population. These evaluations identify the positive and negative changes within which a project can affect the local economy without creating a significant impact. The greatest historical changes define the boundaries that provide a basis for comparing an action's impact on the historical fluctuation in a particular area. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of the following variables:

		<u>Increase</u>	<u>Decrease</u>
Sales Volume	X	100%	75%
Income	X	100%	67%
Employment	X	100%	67%
Population	X	100%	50%

These boundaries determine the amount of change that will affect an area. The percentage allowances are arbitrary, but sensible. The maximum positive historical fluctuation is allowed with expansion because economic growth is beneficial. While cases of damaging economic growth have been cited, and although the zero-growth concept is being accepted by many local planning groups, military base reductions and closures generally are more injurious to local economics than are expansion.

The major strengths of the RTV are its specificity to the region under analysis and its basis on actual historical data for the region. The EIFS impact model, in combination with the RTV, has proven successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring the intensity of impacts have been reviewed by economic experts and have been deemed theoretically sound.

The following are the EIFS inputs and output data for construction and the RTV values for the ROI. These data form the basis for the socioeconomic impact analysis presented in Section 4.13.

EIFS REPORT: HAWAI'I COUNTY**PROJECT NAME**

Hawai'i SBCT Hawai'i County

STUDY AREA

15001 Hawai'i, HI

FORECAST INPUT

Change In Local Expenditures	\$70,766,660
Change In Civilian Employment	0
Average Income of Affected Civilian	\$0
Percent Expected to Relocate	0
Change In Military Employment	0
Average Income of Affected Military	\$0
Percent of Military Living On-post	0

FORECAST OUTPUT

Employment Multiplier	2.54	
Income Multiplier	2.54	
Sales Volume – Direct	\$42,905,760	
Sales Volume – Induced	\$66,074,880	
Sales Volume – Total	\$108,980,600	7.38%
Income – Direct	\$6,989,448	
Income - Induced)	\$10,763,750	
Income - Total(place of work)	\$17,753,200	0.73%
Employment – Direct	364	
Employment – Induced	560	
Employment – Total	924	1.31%
Local Population	0	
Local Off-base Population	0	0%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	7.18	16.43	5.82	9.72
Negative RTV	-5.21	-10.91	-3.14	-4.57

RTV DETAILED**SALES VOLUME**

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	185647	549515	0	0	0
1970	220594	615457	65942	16620	2.7
1971	252094	675612	60155	10833	1.6
1972	281813	729896	54284	4962	0.68
1973	310283	753988	24092	-25230	-3.35
1974	348069	762271	8283	-41039	-5.38
1975	408890	821869	59598	10276	1.25
1976	458566	880447	58578	9256	1.05
1977	506281	901180	20733	-28589	-3.17
1978	567908	942727	41547	-7775	-0.82
1979	650721	969574	26847	-22475	-2.32
1980	752825	986201	16626	-32696	-3.32
1981	832443	990607	4407	-44915	-4.53
1982	868248	972438	-18169	-67491	-6.94
1983	954460	1040361	67924	18602	1.79
1984	1035799	1087589	47227	-2095	-0.19
1985	1112087	1123208	35619	-13703	-1.22
1986	1206327	1242517	119309	69987	5.63
1987	1306959	1306959	64442	15120	1.16
1988	1437378	1379883	72924	23602	1.71
1989	1639552	1491992	112110	62788	4.21
1990	1908654	1660529	168537	119215	7.18
1991	2062902	1712209	51680	2358	0.14
1992	2189113	1773182	60973	11651	0.66
1993	2290855	1809775	36594	-12728	-0.7
1994	2379061	1831877	22101	-27221	-1.49

INCOME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	224687	665074	0	0	0
1970	264917	739118	74045	27758	3.76
1971	295834	792835	53717	7430	0.94
1972	325697	843555	50720	4433	0.53
1973	359771	874244	30688	-15599	-1.78
1974	502996	1101561	227318	181031	16.43
1975	491104	987119	-114442	-160729	-16.28
1976	515059	988913	1794	-44493	-4.5
1977	564518	1004842	15929	-30358	-3.02
1978	630338	1046361	41519	-4768	-0.46
1979	725101	1080400	34039	-12248	-1.13
1980	914609	1198138	117737	71450	5.96
1981	910745	1083787	-114351	-160638	-14.82
1982	964313	1080031	-3756	-50043	-4.63
1983	1079310	1176448	96417	50130	4.26
1984	1118873	1174817	-1631	-47918	-4.08
1985	1181768	1193586	18769	-27518	-2.31
1986	1298903	1337870	144284	97997	7.32
1987	1384572	1384572	46702	415	0.03
1988	1527478	1466379	81807	35520	2.42
1989	1731074	1575277	108899	62612	3.97
1990	1994376	1735107	159830	113543	6.54
1991	2125966	1764552	29445	-16842	-0.95
1992	2233643	1809251	44699	-1588	-0.09
1993	2333581	1843529	34278	-12009	-0.65
1994	2426660	1868528	24999	-21288	-1.14

EMPLOYMENT

Year	Value	Change	Deviation	%Deviation
1969	29255	0	0	0
1970	30759	1504	-93	-0.3
1971	32222	1463	-134	-0.42
1972	33513	1291	-306	-0.91
1973	34536	1023	-574	-1.66
1974	35510	974	-623	-1.76
1975	37280	1770	173	0.46
1976	38030	750	-847	-2.23
1977	38971	941	-656	-1.68
1978	40307	1336	-261	-0.65
1979	43597	3290	1693	3.88
1980	46132	2535	938	2.03
1981	46372	240	-1357	-2.93
1982	46646	274	-1323	-2.84
1983	48009	1363	-234	-0.49
1984	48357	348	-1249	-2.58
1985	49659	1302	-295	-0.59
1986	50546	887	-710	-1.41
1987	53421	2875	1278	2.39
1988	57048	3627	2030	3.56
1989	62267	5219	3622	5.82
1990	67537	5270	3673	5.44
1991	72147	4610	3013	4.18
1992	70442	-1705	-3302	-4.69
1993	71101	659	-938	-1.32
1994	70788	-313	-1910	-2.7

POPULATION

Year	Value	Change	Deviation	%Deviation
1969	63104	0	0	0
1970	63549	445	-2368	-3.73
1971	73508	9959	7146	9.72
1972	69922	-3586	-6399	-9.15
1973	72856	2934	121	0.17
1974	73891	1035	-1778	-2.41
1975	77212	3321	508	0.66
1976	80481	3269	456	0.57
1977	82610	2129	-684	-0.83
1978	85661	3051	238	0.28
1979	89069	3408	595	0.67
1980	92897	3828	1015	1.09
1981	96122	3225	412	0.43
1982	98798	2676	-137	-0.14
1983	100764	1966	-847	-0.84
1984	103528	2764	-49	-0.05
1985	105900	2372	-441	-0.42
1986	108362	2462	-351	-0.32
1987	111735	3373	560	0.5
1988	113439	1704	-1109	-0.98
1989	116585	3146	333	0.29
1990	121451	4866	2053	1.69
1991	127338	5887	3074	2.41
1992	131231	3893	1080	0.82
1993	134132	2901	88	0.07
1994	136235	2103	-710	-0.52

***** End of Report *****

EIFS REPORT HONOLULU COUNTY**PROJECT NAME**

Hawai'i SBCT Honolulu County Total Region

STUDY AREA

15003 Honolulu, HI

FORECAST INPUT

Change In Local Expenditures	\$133,258,300
Change In Civilian Employment	0
Average Income of Affected Civilian	\$0
Percent Expected to Relocate	0
Change In Military Employment	810
Average Income of Affected Military	\$31,794
Percent of Military Living On-post	0

FORECAST OUTPUT

Employment Multiplier	2.7	
Income Multiplier	2.7	
Sales Volume – Direct	\$96,496,660	
Sales Volume – Induced	\$164,044,300	
Sales Volume – Total	\$260,541,000	1.87%
Income – Direct	\$39,197,690	
Income - Induced	\$26,286,210	
Income - Total(place of work)	\$65,483,900	0.29%
Employment – Direct	1,506	
Employment – Induced	1,183	
Employment – Total	2,690	0.47%
Local Population	2,017	
Local Off-base Population	2,017	0.23%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	5.33	5.37	3.28	3.25
Negative RTV	-3.17	-2.73	-2.02	-0.42

RTV DETAILED**SALES VOLUME**

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	2791375	8262470	0	0	0
1970	3192257	8906397	643927	300779	3.38
1971	3430733	9194365	287968	-55180	-0.6
1972	3782314	9796193	601828	258680	2.64
1973	4213643	10239153	442960	99812	0.97
1974	4635813	10152431	-86722	-429870	-4.23
1975	5081630	10214076	61646	281502	-2.76
1976	5532203	10621830	407753	64605	0.61
1977	5966744	10620804	-1025	-344173	-3.24
1978	6632447	11009862	389058	45910	0.42
1979	7512085	11193007	183145	-160003	-1.43
1980	8468880	11094232	-98774	-441922	-3.98
1981	9270254	11031603	-62630	-405778	-3.68
1982	9792031	10967075	-64528	-407676	-3.72
1983	10628959	11585566	618491	275343	2.38
1984	11463645	12036827	451261	108113	0.9
1985	12226186	12348448	311621	-31527	-0.26
1986	13015180	13405635	1057187	714039	5.33
1987	14010422	14010422	604787	261639	1.87
1988	15394929	14779132	768710	425562	2.88
1989	16873048	15354474	575343	232195	1.51
1990	18978679	16511451	1156977	813829	4.93
1991	19875185	16496403	-15048	-358196	-2.17
1992	21212282	17181948	685545	342397	1.99
1993	21769654	17198027	16079	-327069	-1.9
1994	22317293	17184315	-13712	-356860	-2.08

INCOME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	2823429	8357350	0	0	0
1970	3227259	9004052	646703	305572	3.39
1971	3464348	9284453	280400	-60731	-0.65
1972	3815552	9882279	597826	256695	2.6
1973	4244956	10315243	432964	91833	0.89
1974	4675693	10239768	-75475	-416606	-4.07
1975	5123358	10297950	58182	-282949	-2.75
1976	5573702	10701508	403558	62427	0.58
1977	6014845	10706424	4916	-336215	-3.14
1978	6673794	11078498	372074	30943	0.28
1979	7556023	11258474	179977	-161154	-1.43
1980	8535277	11181212	-77262	-418393	-3.74
1981	9318585	11089117	-92096	-433227	-3.91
1982	9844191	11025494	-63623	-404754	-3.67
1983	10702465	11665687	640193	299062	2.56
1984	11514431	12090152	424465	83334	0.69
1985	12282079	12404900	314748	-26383	-0.21
1986	13076407	13468699	1063799	722668	5.37
1987	14068466	14068466	599767	258636	1.84
1988	15469494	14850714	782248	441117	2.97
1989	16940601	15415947	565233	224102	1.45
1990	19053606	16576637	1160690	819559	4.94
1991	19937709	16548298	-28339	-369470	-2.23
1992	21261592	17221890	673591	332460	1.93
1993	21838982	17252796	30907	-310224	-1.8
1994	22372398	17226746	-26050	-367181	-2.13

EMPLOYMENT

Year	Value	Change	Deviation	%Deviation
1969	351504	0	0	0
1970	366968	15464	7123	1.94
1971	367495	527	-7814	-2.13
1972	381276	13781	5440	1.43
1973	398753	17477	9136	2.29
1974	407732	8979	638	0.16
1975	415976	8244	-97	-0.02
1976	417601	1625	-6716	-1.61
1977	418515	914	-7427	-1.77
1978	430716	12201	3860	0.9
1979	453950	23234	14893	3.28
1980	467861	13911	5570	1.19
1981	462301	-5560	-13901	-3.01
1982	458906	-3395	-11736	-2.56
1983	464579	5673	-2668	-0.57
1984	469054	4475	-3866	-0.82
1985	479598	10544	2203	0.46
1986	489660	10062	1721	0.35
1987	512579	22919	14578	2.84
1988	529650	17071	8730	1.65
1989	545845	16195	7854	1.44
1990	562139	16294	7953	1.41
1991	574907	12768	4427	0.77
1992	576393	1486	-6855	-1.19
1993	573314	-3079	-11420	-1.99
1994	568382	-4932	-13273	-2.34

POPULATION

Year	Value	Change	Deviation	%Deviation
1969	603438	0	0	0
1970	623756	20318	10133	1.62
1971	633043	9287	-898	-0.14
1972	664830	31787	21602	3.25
1973	683772	18942	8757	1.28
1974	698033	14261	4076	0.58
1975	707866	9833	-352	-0.05
1976	716911	9045	-1140	-0.16
1977	734962	18051	7866	1.07
1978	740505	5543	-4642	-0.63
1979	753428	12923	2738	0.36
1980	763820	10392	207	0.03
1981	767573	3753	-6432	-0.84
1982	776075	8502	-1683	-0.22
1983	789097	13022	2837	0.36
1984	797791	8694	-1491	-0.19
1985	804294	6503	-3682	-0.46
1986	810444	6150	-4035	-0.5
1987	818447	8003	-2182	-0.27
1988	824072	5625	-4560	-0.55
1989	831337	7265	-2920	-0.35
1990	837919	6582	-3603	-0.43
1991	846092	8173	-2012	-0.24
1992	856944	10852	667	0.08
1993	861238	4294	-5891	-0.68
1994	868236	6998	-3187	-0.37

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