Economic Impacts of the
Tampa Bay Water Monitoring Program

Prepared for:

TAMPA BAY WATER
Supplying Water To The Region

Prepared by:

Tampa Bay Regional Planning Council

Economic Analysis Program
Featuring REMI Policy Insight® and IMPLAN®

December 2000

The Tampa Bay Regional Planning Council has conducted an analysis of the combined impact of all of Tampa Bay Water's monitoring programs and an analysis of the hydrobiological portion of the environmental monitoring program. Tampa Bay Water conducts water quality monitoring, water level monitoring, private well mitigation and environmental monitoring. The environmental monitoring program is comprised of two components, well-field and hydrobiological monitoring. Only the program expenditures that would effect the Tampa Bay Water region were input into the model. These expenditures are listed in the summary table below. Combined, these programs directly contribute over $4 million to the region's economy annually.

All Monitoring Expenditures

Program	Annual
Water Quality Monitoring	$323,200
Water Level Monitoring	$210,240
Private Well Mitigation	$1,660,000
Environmental Monitoring	
Well Field Monitoring	$989,750
Hydrobiological Monitoring	$944,500
Total	**$4,127,690**

The Tampa Bay Regional Planning Council's Economic Analysis Program utilizes both Policy Insight® developed by Regional Economic Modeling, Inc and IMPLAN® developed by the Minnesota Implan Group to show the implications of economic development activity in the Tampa Bay region. Both models were developed using detailed industry output, employment, population, personal income, and other data specific to the region. Since Policy Insight® exhibits characteristics of input/output and dynamic equilibrium models, a baseline forecast can be established. Impacts are reported relative to the baseline forecast and are summarized in the table below.

Economic Impact Summary Table
All Monitoring Programs

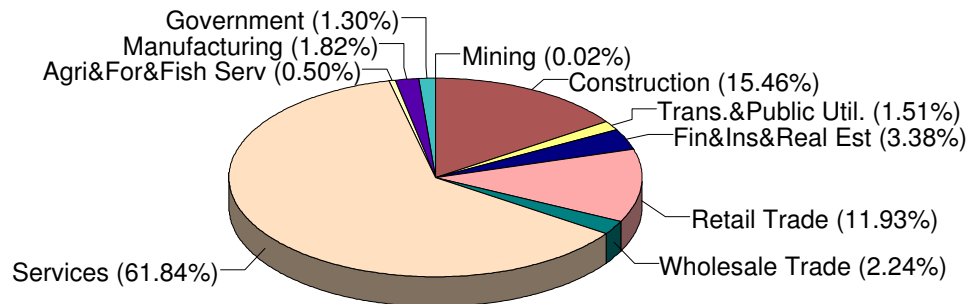| Tampa Bay Water Region	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Total
Employment	88	87	84	81	79	73	
GRP	$ 4,039,585	$ 4,096,510	$ 4,053,023	$ 4,005,489	$ 3,989,166	$ 4,158,820	$ 40,338,286
Personel Income	$ 3,319,000	$ 3,792,000	$ 4,074,000	$ 4,250,000	$ 4,425,000	$ 5,127,000	$ 44,069,000

*GRP and Personel Income are adjusted for inflation

The Monitoring program will create an average of 82 direct and indirect jobs. The creation of these new direct and indirect jobs will generate approximately $44 Million in personal income for the region's workers during the period 2001-2010. The program will contribute $40 Million to the Gross Regional Product. The Gross Regional Product is a concept analogous to the national concept of Gross Domestic Product. It represents compensation and profits. The following table and chart display a breakdown of the employment generated by the program.

Employment by Sector
All Programs

Sector	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10
Mining	0	0	0	0	0	0
Construction	14	13	13	12	12	10
Trans.&Public Util.	1	1	1	1	1	0
Fin&Ins&Real Est	3	3	3	2	2	2
Retail Trade	11	10	9	9	8	7
Wholesale Trade	2	2	2	1	1	1
Services	54	54	52	52	50	47
Agri&For&Fish Serv	0	0	0	0	0	0
Manufacturing	2	1	1	0	0	-1
Government	1	3	3	4	5	7
Total	88	87	84	81	79	73

Year 1

Government (1.30%)
Manufacturing (1.82%)
Agri&For&Fish Serv (0.50%)
Mining (0.02%)
Construction (15.46%)
Trans.&Public Util. (1.51%)
Fin&Ins&Real Est (3.38%)
Retail Trade (11.93%)
Wholesale Trade (2.24%)
Services (61.84%)

Hydrobiological Monitoring

An analysis of the hydrobiological monitoring portion of Tampa Bay Water's monitoring programs was also conducted. Tampa Bay Water will spend almost $1 Million annually on hydrobiological monitoring. The impacts of the hydrobiological monitoring dollars are summarized below.

Hydrobiological Expenditures

Hydrobiological Monitoring	$944,500

Hydrobiological Monitoring Program

Tampa Bay Water Region	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Total
Employment	24	23	23	22	22	21	
GRP	$ 1,087,360	$ 1,101,950	$ 1,088,113	$ 1,097,277	$ 1,091,525	$ 1,139,073	$ 11,025,945
Personel Income	$ 934,600	$ 1,076,000	$ 1,167,000	$ 1,213,000	$ 1,274,000	$ 1,488,000	$ 12,721,600

*GRP and Personel Income are adjusted for inflation

Economic Impact Summary Table

The hydrobiological monitoring program will generate approximately 23 direct and indirect jobs. The creation of these new jobs will generate an average of $1.1 Million in personal income annually for the regions workers. The program will contribute $11 Million to the Gross Regional Product from 2001-2010. The chart below represents the employment by sector attributed to the ecological monitoring program.

Year 1

Manufacturing (1.25%)
Mining (0.01%)
Construction (5.29%)
Trans&Pub Util (1.49%)
Fin&Ins&Real Est (3.49%)
Retail Trade (11.84%)
Wholesale Trade (1.97%)
Total Government (1.40%)
Agri&For&Fish Serv (0.37%)
Services (72.89%)
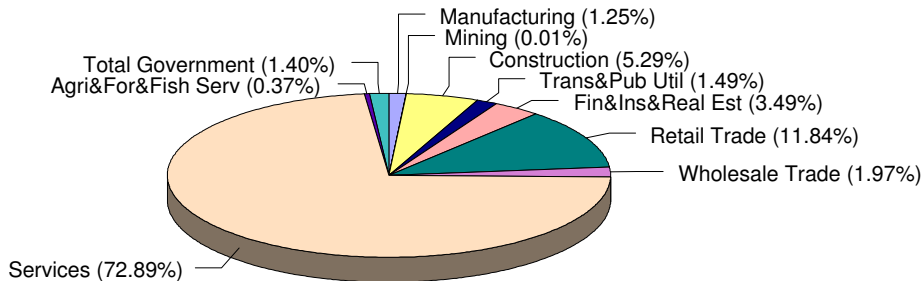
An Introduction to REMI
& REMI Policy Insight

What Is REMI Policy Insight?

Founded in 1980, Regional Economic Models, Inc. (REMI) constructs models that reveal the economic and demographic effects that policy initiatives or external events may cause on a local economy. REMI model users include national, regional, state and city governments, as well as universities, nonprofit organizations, public utilities and private consulting firms.

REMI Policy Insight, the newest version of REMI's software, combines years of economic experience with an easy-to-use software interface. A major feature of REMI is that it is a dynamic model which forecasts how changes in the economy and adjustments to those changes will occur on a year-by-year basis. The model is sensitive to a very wide range of policy and project alternatives and to interactions between the regional and national economies. By pointing and clicking, you can answer the toughest "What if…?" questions about federal, state, local or regional economies. REMI is dedicated to continuing economic research combined with quality customer service and support.

Model Introduction

REMI Policy Insight includes a REMI model that has been built especially for the geographic area(s) in your customized version of the model. The model-building system uses hundreds of programs developed over the past two decades to build customized models for each area using data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Department of Energy, the Census Bureau and other public sources.

The REMI model is a structural model, meaning that it clearly includes cause-and-effect relationships. The model shares two key underlying assumptions with mainstream economic theory: *households maximize utility* and *producers maximize profits*. Since these assumptions make sense to most people, the model can be understood by intelligent lay people as well as trained economists.

In the model, businesses produce goods to sell to other firms, consumers, investors, governments and purchasers outside the region. The output is produced using labor, capital, fuel and intermediate inputs. The demand for labor, capital and fuel per unit of output depends on their relative costs, since an increase in the price of any one of these inputs leads to substitution away from that input to other inputs. The supply of labor in the model depends on the number of people in the population and the proportion of those people who participate in the labor force. Economic migration affects the population size. More people will move into an area if the real after-tax wage rates or the likelihood of being employed increases in a region.

Supply and demand for labor in the model determine the wage rates. These wage rates, along with other prices and productivity, determine the cost of doing business for every industry in the model. An increase in the cost of doing business causes either an increase in price or a cut in profits, depending on the market for the product. In either case, an increase in cost would decrease the share of the local and U.S. market supplied by local firms. This market share combined with

the demand described above determines the amount of local output. Of course, the model has many other feedbacks. For example, changes in wages and employment impact income and consumption, while economic expansion changes investment and population growth impacts government spending.

Model Overview

Adjacent is a pictorial representation of the model. The Output block shows a factory that sells to all the sectors of final demand as well as to other industries. The Labor and Capital Demand block shows how labor and capital requirements depend both on output and their relative costs. Population and Labor Supply are shown as contributing to demand and to wage determination in the product and labor market. The feedback from this market shows that economic migrants respond to labor market conditions. Demand and supply interact in the Wage, Price and Profit block. Once prices and profits are established, they determine market shares, which along with components of demand, determine output.
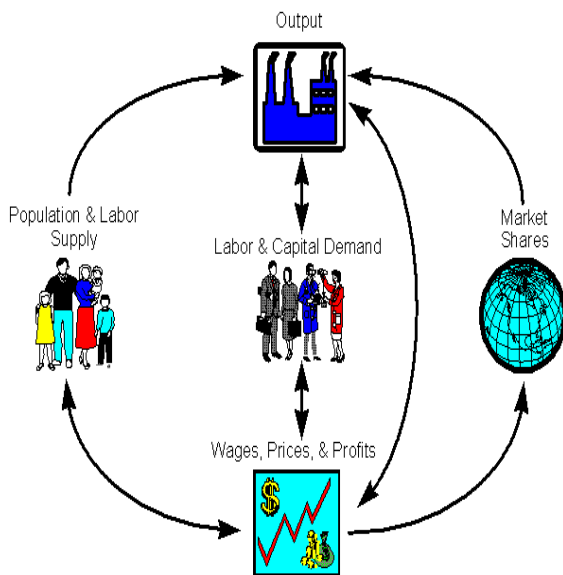
The REMI model brings together all of the above elements to determine the value of each of the variables in the model for each year in the baseline forecasts. The model includes all the inter-industry relationships that are in an input-output model in the Output block, but goes well beyond the input-output model by including the relationships in all of the other blocks shown in the figure.

In order to broaden the model in this way, it was necessary to estimate key relationships. This was accomplished by using extensive data sets covering all areas in the country. These large data sets and two decades of research effort have enabled REMI to simultaneously maintain a theoretically sound model structure and build a model based on all the relevant data available.

The model has strong dynamic properties, which means that it forecasts not only what will happen but when it will happen. This results in long-term predictions that have general equilibrium properties. This means that the long-term properties of general equilibrium models are preserved without sacrificing the accuracy of event timing predictions and without simply taking elasticity estimates from secondary sources.