

Economic Impacts of the Tampa Bay Water Master Water Plan

Prepared for



Prepared by



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Introduction

This is a macro-economic impact study on Tampa Bay Water's adopted Master Water Plan (MWP). It analyzes the economic impacts of the projects committed for construction as well as those being analyzed for construction (known as Stage A projects)¹.

The study addresses two scenarios:

- A. Construction & Operation of Facilities - The impact on the region's economy of the construction and operation of the Master Water Plan's facilities for the 2000 - 2010 period.
- B. "Water Supply Constraints" - The economic impacts if the Tampa Bay Water region incurs "water constraints" due to the lack of the Master Water Plan's facilities. What does the water produced by the Master Water Plan mean to the economy?

Introduction to the Economic Model

Tampa Bay Regional Planning Council's version of Policy Insight[®] was utilized to conduct the study. Policy Insight[®], created by Regional Economic Models, Inc. (REMI), is the nation's leading regional economic forecasting and policy analysis model. For this study, TBRPC constructed a regional model comprising the three Counties that comprise the Tampa Bay Water region. The model includes data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Department of Energy, the Bureau of Census, and other public sources. REMI Policy Insight[™] is a structural model, meaning that it clearly includes cause-and-effect relationships. The model is based on two key underlying assumptions from mainstream economic theory: households maximize utility and producers maximize profits. In the model, businesses produce goods to sell to other firms, consumers, investors, and governments as well as 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. 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 prices or a cut in profits, depending on the

¹ Stage A projects have not been approved by the Tampa Bay Water Board; therefore this analysis addresses a low range scenario and high range scenario.

market for the product. In either case, an increase in costs 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.

The model is utilized by adjusting variables based on expected economic activity. In this study, the expenditures by Tampa Bay Water on the Master Water Plan were input into the model. The low and high range of these expenditures are summarized below:

Summary of Inputs

Input	low	high
Construction	\$552,455,820	\$591,822,300
Feasibility	\$5,320,077	\$5,320,078
Other	\$143,771,059	\$143,771,060
O&M	\$281,602,032	\$342,606,752
Total	\$983,148,988	\$1,083,520,190

Detail on the Master Water Plan expenditures (model inputs) is provided at the end of the report on page 12. Additionally, the following information and issues were considered in conducting the study:

Information considered in this Analysis

- Cost of facilities construction;
- Cost of feasibility analysis for current and future projects;
- Cost of operation and maintenance of completed facilities;
- Cost of wetland mitigation (but not land purchases);
- Contingency costs (as estimated by system engineers);
- No land costs were included;
- Increased wholesale rates to member governments (unitary rate increase)

Summary and Conclusions

As a public works project (Scenario A), Tampa Bay Water’s Master Water Plan has a positive economic impact on the region. The project creates approximately 900 permanent jobs and generates between \$548 and \$569 Million in Gross Regional Product over 10 years. These benefits are not without costs. In outlying years, the increased water rates needed to pay for the Master Water Plan facilities begin to have negative impacts. This is mostly due to the reduction in consumer spending as a result of households spending more on water and less on goods and services.

The potential “Water Supply Constraint” (Scenario B) created by the lack of the new Master Water Plan Facilities could generate severe negative economic consequences. Potentially, the region could lose more than 11,000 jobs and more than \$5 billion in Gross Regional Product in the event of a water supply deficit.

Even though the positive economic impacts of the construction and operation of the Master Water Plan projects dwindle into slight negative impacts in the latter years of the current plan cycle, the large negative economic impacts of not constructing and operating the Master Water Plan projects far out weigh any latter year negative impacts created by the higher water prices needed to sustain the Master Water Plan.

Scenario Impacts Comparison

Tampa Bay Water region	Scenario A Const & Operate MWP <u>Low Range</u>	Scenario A Const & Operate MWP <u>High Range</u>	Scenario B “Constraint Scenario”
Employment (jobs)			
Peak Construction	4,188	4,206	n/a
Average during period	835	945	- 11,670
Personal Income (Millions \$)	\$809	\$720	- \$5,022
Gross Regional Product (Millions \$)	\$548	\$569	- \$5,752
Nominal \$ adjusted for inflation. Scenario A: Impact of the construction and operation of the MWP Facilities from 2000 - 2010. Scenario B: “Water Constraint Scenario” due to the MWP Facilities not being constructed - 2003 - 2010. All scenarios include an increase in the unitary water rate charged to members being passed along to consumers.			

Background

Geographic Area, Population, and Economic Output Summary for the Tampa Bay Water Region

Tampa Bay Water is a governmental agency funded through the sale of wholesale water to its member governments - Hillsborough County, Pasco County, Pinellas County, New Port Richey, St. Petersburg and Tampa. Many of the other water utilities within the three Counties purchase their water from one of the above members. The estimated 1998 population of the three-county region was 2,121,900. Tampa Bay Water serves 90% percent of the Region's population through its member governments. The balance of the population is at least indirectly affected by Tampa Bay Water through their place of business or through other economic relationships. In 1998, the estimated Gross Regional Product (GRP)² for the Tampa Bay Water region was \$55.58 Billion. Employment in the Region was 1,276,700 jobs. Total personal income was \$55.71 Billion. In most cases these measures represent 14 to 15 percent of the State of Florida total.

Economic Summary for Tampa Bay Water Region 1998

	TAMPA BAY WATER REGION	STATE OF FLORIDA	TAMPA BAY WATER % OF FLORIDA
Population	2,121,900	14,872,600	14.27%
Employment	1,276,400	8,226,200	15.51%
GRP (\$Billion)	\$55.58	\$360.81	15.40%
Pers Inc (\$Billion)	\$55.71	\$383.32	14.53%

Sources: Tampa Bay Regional Planning Council, University of Florida Bureau of Economic Research, and Regional Economic Models, Inc.

Overview of Master Water Plan

The Master Water Plan will provide for 91 million gallons per day (MGD) of potable water to the region by 2004. Additional sources and facilities must be identified and constructed by 2007 to provide another 20 MGD (known as Stage A projects). These additional sources can vary widely in costs. We have analyzed a Stage A low range and high range. The high range includes Seawater Desalination II. The study results listed on the following page represent the average between the Stage A low and high range.

Depending upon which alternative projects are selected, expenditures for the design, construction, and operation of the Master Water Plan between now and 2010 is currently

² Gross Regional Product as a value added concept is analogous to the national concept of Gross Domestic Product. It is equal to output excluding the intermediate inputs. It represents compensation and profits.

estimated to range between \$985 Million and \$1.1 Billion dollars. Construction costs during this time-frame are estimated to range between \$550 to \$590 Million. Operation and maintenance of the MWP projects during this time-frame is forecast to range from \$281 Million to \$343 Million. Feasibility analysis of Stage A alternatives will cost around \$5 Million and other expenses such as wetland mitigation, design expenses, and program contingencies are estimated at around \$161 Million.

Economic Impacts of the Construction and Operation of the Master Water Plan on the Tampa Bay Water Region

Economic Impacts

The expenditures summarized in the preceding section were input into the Tampa Bay Regional Planning Council’s version of Policy Insight®. Policy Insight®, created by Regional Economic Models, Inc. (REMI), is the nation’s leading economic impact analysis tool. A breakdown of the construction and operating expenses that were modeled is provided on page 11. The results of designing, constructing, operating, and maintaining the Master Water Plan in years 2000 to 2010 generate the following economic impacts:

Economic Impact Summary 2000 -2010 Tampa Bay Water Master Water Plan Construction and Operation

- ❑ \$548 to \$569 million in additional Gross Regional Product for the Tampa Bay Water region (net economic impact);
- ❑ \$630 to \$680 million in additional personal income for the region’s families.

Sources: Tampa Bay Water Master Water Plan , Tampa Bay Regional Planning Council, and Regional Economic Models, Inc. - Low and high range Stage A scenarios. Stage A projects have yet to be determined by Tampa Bay Water Board.

The tables on the following page provides more detail on the economic impacts of the Master Water Plan with and without Stage A projects. There is a low range and high range analysis for Stage A projects. An analysis of the Master Water Plan without Stage A projects was also performed under the “Water Supply Constraint Scenario.”

Economic Impacts of Construction and Operation of Master Water Plan

Master Water Plan with Stage A Low Range Projects

Tampa Bay Water Region	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment	622	4188	2650	2840	401	282	434	-171	-666	-710	-682	
Personal Income Millions	24.19	157.60	126.80	144.60	60.69	50.84	54.63	26.92	-0.40	-6.49	-8.73	630.7
GRP Millions	27.59	210.24	135.32	150.03	37.08	29.36	38.19	6.31	-25.94	-30.38	-29.52	548.3

West Central Florida	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment	648	4344	2745	2936	417	292	451	-168	-680	-722	-689	
Personal Income Millions	26.08	170.30	136.80	155.80	65.24	54.41	58.53	28.98	-0.43	-6.87	-9.06	679.8
GRP Millions	28.65	218.03	140.13	155.23	38.24	30.11	39.40	6.79	-26.60	-30.98	-29.84	569.2

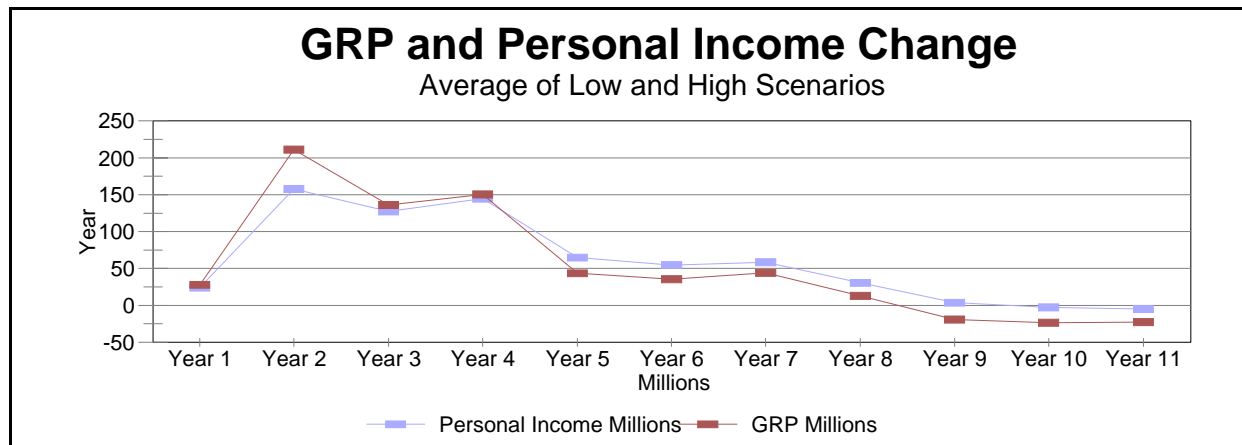
Master Water Plan with Stage A High Range Projects

Tampa Bay Water Region	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment	643	4206	2686	2851	675	530	665	-77	-566	-617	-599	
Personal Income Millions	24.23	157.90	127.90	144.90	68.58	58.85	62.77	33.96	7.87	1.70	-0.82	687.8
GRP Millions	28.31	211.11	137.09	150.68	50.20	41.64	49.92	19.33	-11.93	-16.37	-15.87	644.1

West Central Florida	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment	671	4363	2782	2948	696	544	686	-72	-577	-626	-603	
Personal Income Millions	26.12	170.60	138.00	156.20	72.85	62.07	66.28	35.94	7.92	1.40	-1.07	736.3
GRP Millions	29.43	218.90	142.03	155.88	51.72	42.69	51.41	20.08	-12.24	-16.64	-15.87	667.4

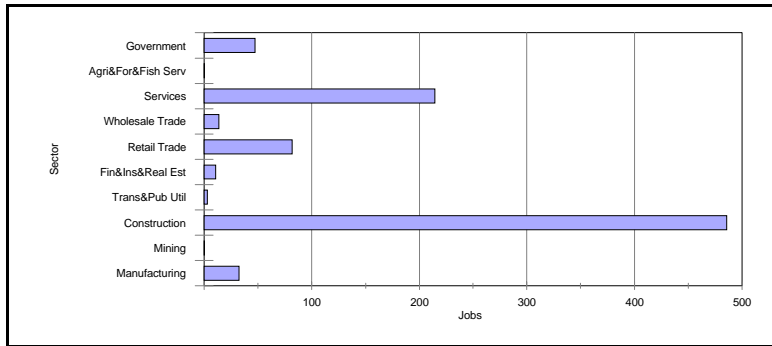
*Tampa Bay Water Region includes Hillsborough, Pinellas and Pasco

*West Central Florida includes Hillsborough, Pinellas, Pasco, Manatee, Sarasota, Polk and Hernandade



The Master Water Plan impacts the construction sector and services sector most. The engineering and professional services are included in the services sector. The following graph depicts the employment change by sector. The employment is average between the low and high scenarios as well as averaged for the Master Water Plan period.

Average Employment Change by Sector
Construction and Operation of Master Water Plan
(average during MWP period for low and high range scenarios)



Economic Impacts on the Region If the Master Water Plan Is Not Constructed “Water Supply Constraint Scenario”

Water supply constraints without the Master Water Plan Facilities

Beginning in 2003, there will be a shortfall of water supply if the new sources identified in Tampa Bay Water’s Master Water Plan are not on line. The new sources of water are necessary for Tampa Bay Water to fulfill its contractual obligations to its member governments (utilities) and to reduce negative environmental impacts associated with current withdrawal methods. Water use permit quantities for many of the existing water sources, primarily ground water withdrawal are being reduced during the next two to seven years. Due to the reduction of these permit quantities, without the new sources, Tampa Bay Water risks “production failure” or will be unable to deliver a sufficient quantity of water to its wholesale members. Tampa Bay Water projections forecast that without the new sources, a potential deficit of 16 MGD would exist in Year 2003 increasing to a Year 2007 deficit of 25 MGD. While political and economic reaction to water supply deficits would certainly take place, the selection, permitting, financing, and construction of alternatives can take as long as five to seven years.

If a “Water Supply Constraint” scenario were to materialize within the region, potential political and economic conditions could create an environment where our region becomes less attractive to future business prospects and residents. Possible consequences of this could be building moratoria due to limited water supply or the inability to attract or expand certain business activities.

Reduced Population and Economic Migration Growth

Due to economic conditions created by a “Water Supply Constraint” such as increased costs for goods, services, and housing, the incentive to migrate to the region would likely be diminished. Also, out-migration could be encouraged due to less desirable quality of life issues. These conditions would likely result in increased wages being demanded by the labor force. These wage increases would likely moderate the out-migration to some extent since higher wages tend to attract workers.

We have projected that the net migration to the Tampa Bay Water region is expected to average 15,700 persons annually through 2010³. For this study, it has been assumed that the net increase would be eliminated by a “Water Supply Constraint.” Natural population increases would still occur. We have input the 15,700 annual reduction in migrants into our economic model as well as an increase of 3% into the wage structure. A 3% increase is modeled to account for the increased wages that would likely occur because of increased housing/living costs and additional wages demanded by workers to stay in area and to attract workers.

Economic Impact Summary of “Water Constraint Scenario”

³ Based on U.S. Census Bureau projections 1995-2025, Internal Revenue Service return data from 1990-1999, REMI data and TBRPC analysis. The 15,700 breaks out by County as follows: Hillsborough - 5,200; Pasco - 6,800; and Pinellas - 3,700.

A portion of a region’s economic health is dependent upon sustainable population growth and growth of its economic base. In order to expand the economic base, job growth must occur. Employment and population growth must have an adequate water supply to be sustainable. Economic growth is normally accompanied by population growth due to economic in-migration for new jobs created. The population “lost” due to water supply deficits created by the “Water Supply Constraint” identified above were input into the Tampa Bay Regional Planning Council’s version of Policy Insight®. The results of economic out migrants (lost population) in years 2003 through 2010 due to water supply deficits would create the following impacts:

Economic Impact
No Master Water Plan Projects - “Water Supply Constraint”
Scenario

Years 2003 -2010

- \$5.7 billion in lost Gross Regional Product;
- Loss of 11,600 jobs within the Region;
- Reduction of Personal Income within the Region of \$5 Billion;
- 130,000 less persons within the Region than would have been expected with no water constraint issues.

The table on the following page provides a breakdown of the economic impact created by the “Water Supply Constraint” scenario.

An analysis of the Master Water Plan without Stage A projects was also performed. This analysis excludes expenditures associated with Stage A projects. This analysis includes a unitary rate increase but to a lesser extent since the Stage A projects will not need to be funded. The no Stage A option also includes a 15 percent constraint on net-migration. The results of this analysis are reported on page 11.

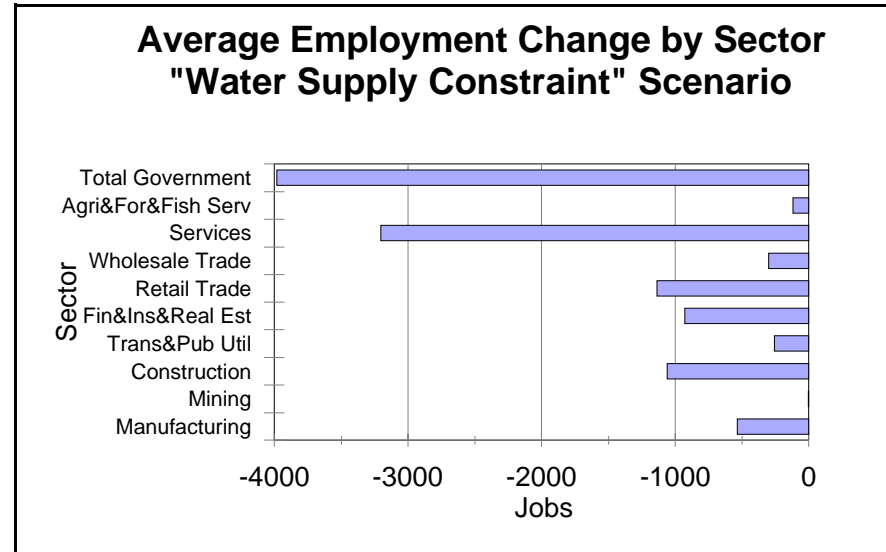
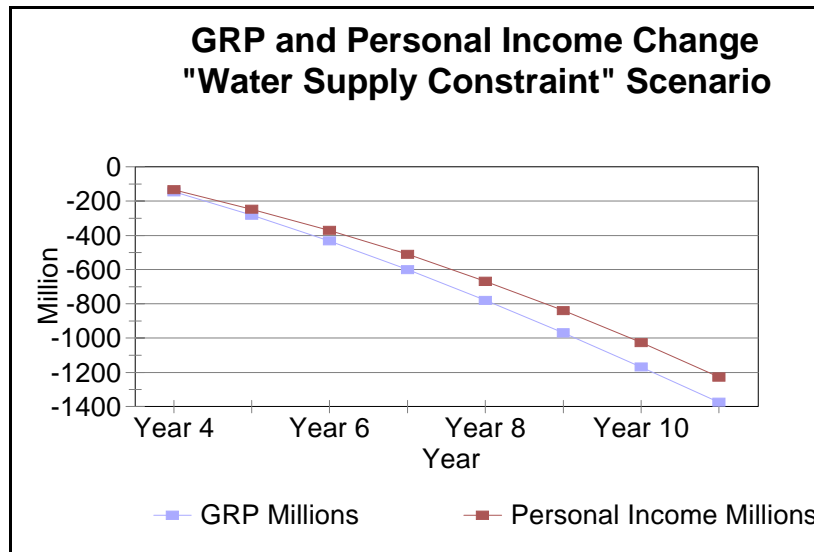
In summary, all scenarios that create a constrained water supply situation create negative economic consequences.

Economic Impacts of "Water Supply Constraint" Scenario Years 2003 -2010

Tampa Bay Water Region	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment (Thousands)	-2.38	-4.65	-7.17	-9.91	-12.73	-15.57	-18.44	-21.27	
GRP Millions	-145.23	-281.29	-432.86	-600.42	-779.79	-968.65	-1168.25	-1375.06	-5751.56
Personal Income Millions	-132.40	-246.50	-371.00	-510.60	-668.50	-839.20	-1027.00	-1227.00	-5022.20

West Central Florida	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Employment (Thousands)	-2.38	-4.65	-7.17	-10.00	-12.94	-15.83	-18.76	-21.64	
GRP Millions	-147.60	-285.36	-439.24	-609.86	-792.70	-985.58	-1189.67	-1401.16	-5851.16
Personal Income Millions	-133.70	-248.00	-373.50	-514.80	-675.50	-850.00	-1042.00	-1248.00	-5085.50

All Dollars Adjusted for Inflation



Feasibility, Construction, and Operation Expenditure Tables

Final Design and Construction	1998-2000	2001	2002	2003	2003-2010
	Fesability	Construction			O & M
Water Supply Projects	annually				annually
Sea Water Desalination	\$366,343	\$401,588	\$88,858	\$94,935,427	\$18,980,000
Surface Water Treatment	\$1,562,073	\$58,534,187	\$18,067,500	\$3,000,027	\$7,862,598
Ground Water Treatment	\$753,573	\$25,037,865	\$4,744,836	\$0	\$3,563,418
Repump Station	\$0	\$0	\$1,000,000	\$8,808,880	\$0
Alafia River Intake and Pump Station	\$876,851	\$3,123,306	\$6,438,589	\$1,172,605	\$168,036
Tampa Bypass Canal Intake and Pump	\$1,088,675	\$8,051,636	\$6,169,203	\$0	\$398,617
Regional Reservoir and Transmission Main	\$1,839,222	\$12,248,094	\$41,003,202	\$45,162,238	\$0
Brandon Urban Dispersed Wells	\$1,834,206	\$18,100,378	\$4,282,973	\$695,374	\$695,375
North Central Hill Intertie	\$943,762	\$38,013,199	\$3,640,191	\$0	\$146,600
South central Hill Intertie	\$2,779,579	\$14,125,645	\$22,017,012	\$2,185,663	\$167,000
Brandon/ South Central Interconnect	\$222,636	\$996,542	\$3,783,627	\$2,948,924	\$0
Loop 72	\$288,051	\$5,452,708	\$6,860,002	\$0	\$0
Cosme Transmission Main	\$33,333	\$9,450,000	\$3,950,000	\$0	\$0
Brandon Well #7 Emergency Tie-in	\$26,333	\$200,000	\$0	\$0	\$0
	\$12,614,638	\$193,735,148	\$122,045,993	\$158,909,138	\$31,981,644

Feasibility Analysis of Alternatives	1998	1999-2000	2001	2002	2004-2006	2007-2010
	Fesability				Construction	O & M
					annually	annually
Brackish Water Desal	\$0	\$165,868	\$298,596	\$0	\$5,623,333	\$1,770,000
Cypress Bridge II	\$0	\$0	\$623,000	\$267,000	\$3,836,666	\$1,336,000
Desal II	\$0	\$58,634	\$75,387	\$0	\$40,000,000	\$20,000,000
Cone Ranch and Dispersed Wells	\$0	\$833,333	\$500,000	\$2,478,258	\$17,417,841	\$1,642,820
Un-selected Phase A Projects	\$245,003	\$245,003	\$0	\$0	\$0	\$0
	\$245,003	\$1,496,983	\$1,496,983	\$2,745,258	\$66,877,840	\$24,748,820

Other	1998	1999	2000	2001	2002	2003
Wetland Mitigation	\$11,084,773	\$824,083	\$274,694	\$1,159,225	\$8,835,988	\$265,477
Design/ Construction/ Program Management	\$43,371,188	\$9,095,267	\$274,694	\$12,149,916	\$12,149,900	\$9,114,900
Program Contingency	\$19,647,396	\$4,911,849	\$274,694	\$4,911,849	\$4,911,849	\$4,911,849
Public Info	\$1,052,549	\$664,677	\$1,637,283	\$140,000	\$140,000	\$107,872
	2004	2005	2006	2007	2008-2010	
Wetland Mitigation	\$274,694	\$1,159,225	\$8,835,988	\$265,477	\$0	
Design/ Construction/ Program Management	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$0	
Program Contingency	\$4,911,849	\$4,911,849	\$4,911,849	\$4,911,849	\$0	
Public Info	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	

More on 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.

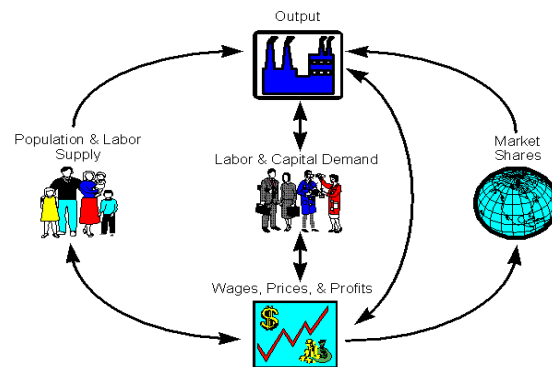
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Supply and demand for labor in the model determine the wage rates. These wage rates, along with other prices and productivity, determine the cost of doing business for every industry in the model. An increase in the cost of doing business causes either 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.

Tampa Bay Regional Planning Council (TBRPC)

TBRPC has licenced the Polciy Insight since January 1999. TBRPC staff has attended numerous training sessions and conferences on the use and application of the model. TBRPC has conducted over 30 studies using the model.