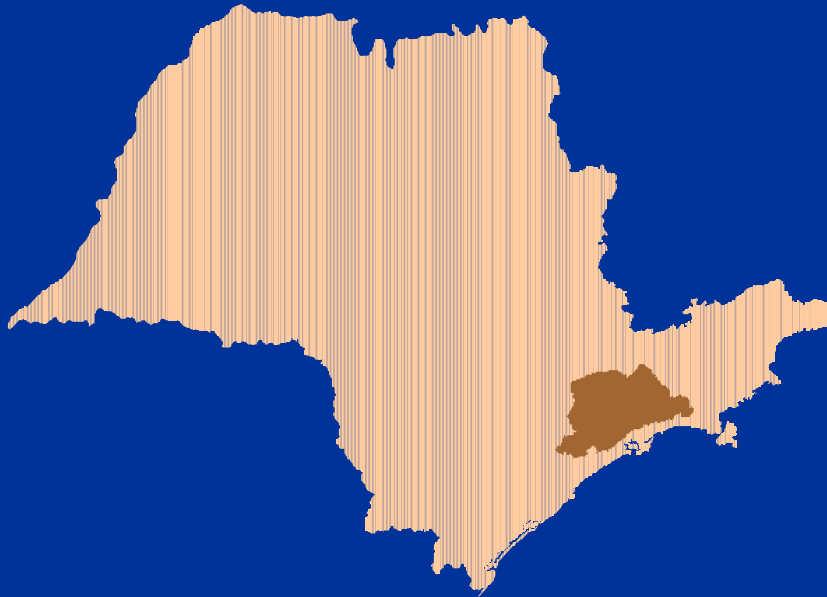




South America, Brazil and the State of São Paulo

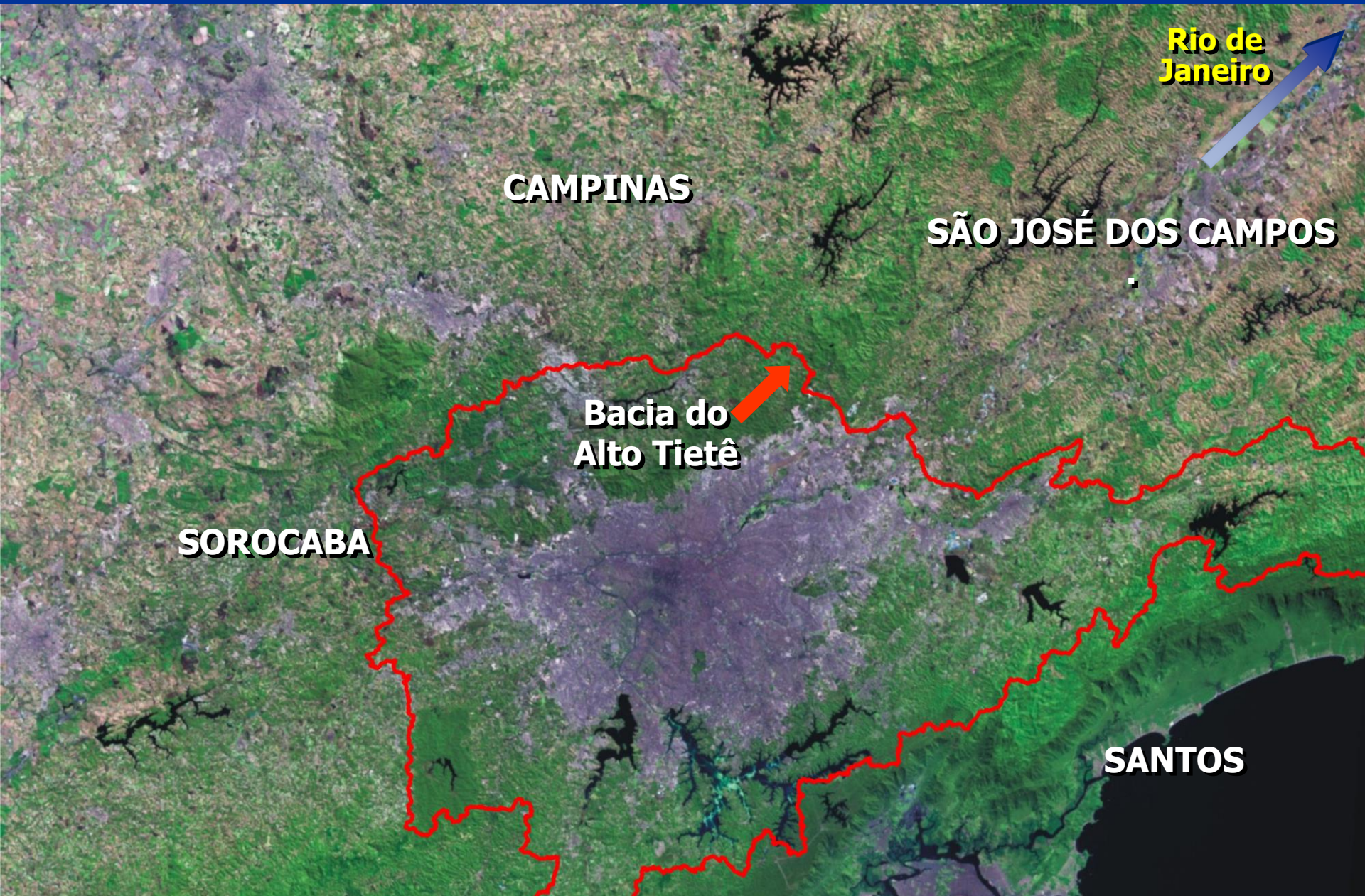


The State and the São Paulo Metropolitan Area



São Paulo
Metropolitan Area
21,2 million inhabitants
39 municipalities

São Paulo Macrometropolis



Water Sources São Paulo Metropolitan Region

Sao Paulo Metropolitan Region and City of Sao Paulo

Demographic Evolution Since 1900

Períod	City of São Paulo		São Paulo Metropolitan Region	
	Population (hab)	Annual Rate of Growth (%)	Population (hab)	Annual Rate of Growth (%)
1.900	239.820	-	302.787	-
1.920	579.033	4,5	702.248	4,3
1.940	1.326.261	4,2	1.568.045	4,1
1.950	2.198.096	5,2	2.662.786	5,4
1.960	3.781.446	5,6	4.854.414	6,2
1.970	5.885.475	4,5	8.078.287	5,2
1.980	8.475.380	3,7	12.549.856	4,5
1.991	9.512.545	1,2	15.089.744	1,9
2.000	10.398.576	0,9	17.807.926	1,7
2.010	11.253.503	0,8	21.154.933	1,1

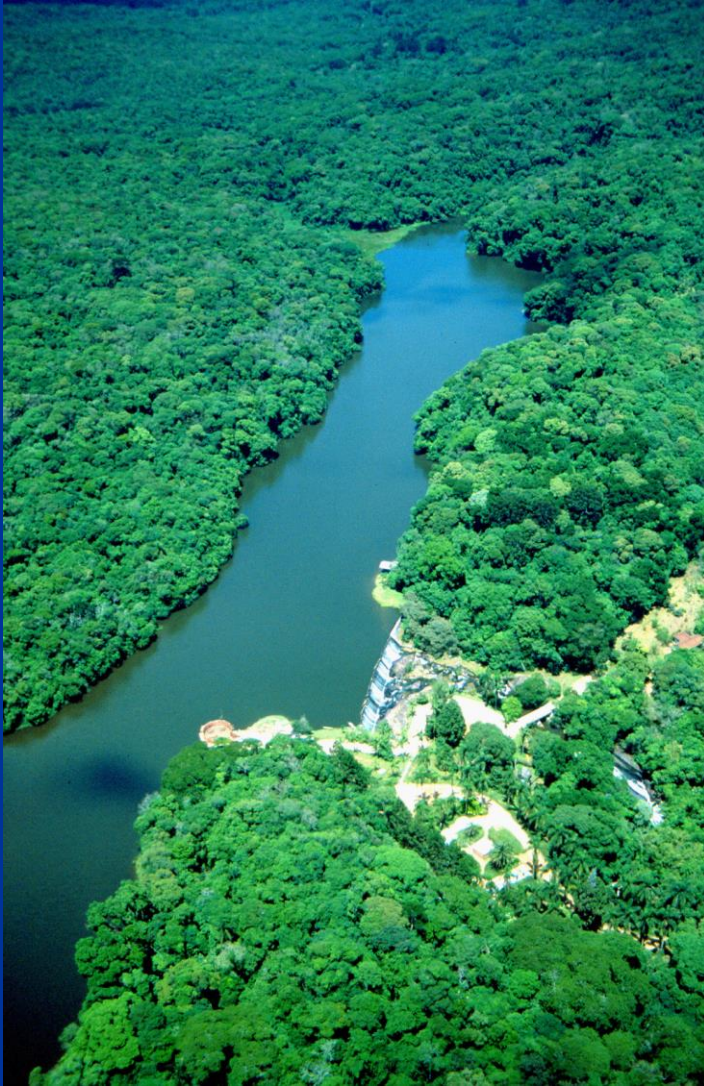
Cachoeira Reservoir – Cantareira System



Paiva Castro Reservoir – Cantareira System



Reservoirs of Alto Cotia System



Barragem da Graça



Pedro Beicht

Water Sources São Paulo Metropolitan Region

Guarapiranga e Billings Reservoirs



Compatible Uses in the Territory of Guarapiranga



The Wetland of Embu Guaçu Creek



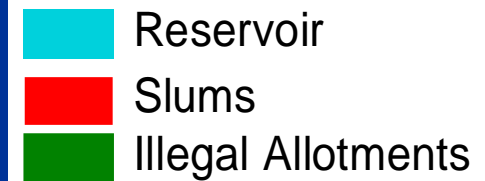
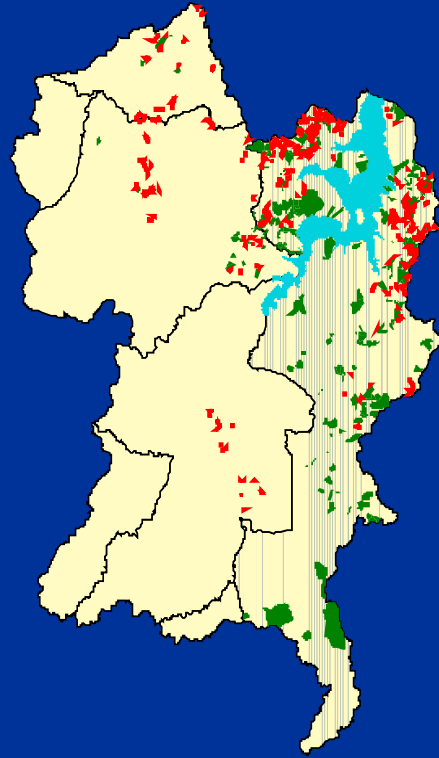
Guarapiranga Reservoir



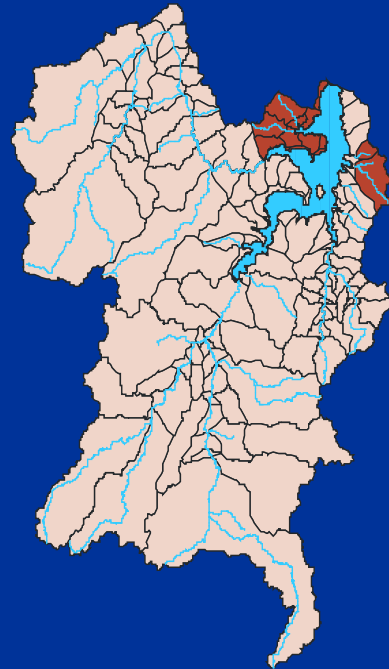
Billings Reservoir – Cantinho do Céu e Gaivota Settlements



Slums and Illegal Settlements



The Most Polluted Sub-basins



■ 50% of the phosphorus
inflow to the reservoir
3,5% of total area
7% of total flow.

Financial Details

Signing of Contract with the World Bank :	December/1992
Original Total Program Budget :	US\$ 262 million
Revised Budget :	US\$ 336 million
World Bank Financing :	US\$ 119 million

Executing Agency	World Bank		Local Fund		Total	
	Value	(%)	Value	(%)	Value	(%)
UGP	20.621	17	6.523	3	27.144	8
SABESP	42.465	36	51.885	23	94.350	28
CDHU	9.474	8	60.442	28	69.916	20
SMA	13.306	11	14.411	6	27.717	8
PMSP	33.133	28	83.754**	40	116.887**	36
Total (US\$ 1000)	119.000	100	217.015	100	336.015	100

NB : Revised figures (including Housing)

Investment Allocation

Water and Sewage Services	US\$ 94,3 million	<p>Expansion of the sewage collecting system; Increased number of domestic sewage connections Implantation of interceptors and main collectors; Construction of pumping stations Construction of sewage treatment plants.</p>
Refuse Collection	US\$ 5,7 million	<p>Expansion of refuse collection in the municipalities of Embu, Itapecerica da Serra and Embu-Guaçu Recovery and improvements to refuse-disposal areas in the municipalities of Embu and Itapecerica da Serra.</p>
Urban Rehabilitation	US\$ 187,1 million	<p>Installation of urban infrastructure in slums; Improvements to urban infrastructure Construction of housing units for removed families</p>
Environmental Protection	US\$ 27,7 million	<p>Installation of parks, basin resettlement, support for inspection procedures and environmental studies</p>
Basin Management	US\$ 21,3 million	<p>Installation of the Basin Management Committee; Studies on equipping basin management with the most effective instruments.</p>

Guarapiranga Project Water and Sewage Civil Works



Guarapiranga Project

Embu: dump before the intervention



Guarapiranga Project Embu: landfill during the intervention



Guarapiranga Project: dump in Itapecerica da Serra



Guarapiranga Project: Itapecerica da Serra – implementation of the landfill



Guarapiranga Project Reurbanization of a Slum - Jordanópolis



Guarapiranga Project Jardim Esmeralda Slum



Guarapiranga Project Jardim Iporanga Slum Before the Civil Works



Guarapiranga Project Jardim Iporanga Slum After the Civil Works



Housing Complexes



Pascoal Melantônio housing complex

Guarapiranga Ecological Park



Guarapiranga Projects Main Urban Interventions

Urbanized Slums	105
Families Benefited by the Urbanization of Slums	17.350
Housing Units	1.560
New Housing Units (within the slums)	836
Families Benefited by the Infrastructure in Low Income Settlements	38.200
New Parks	6 (459ha)

Designing an Intervention in Urban River Basins



In the Other Hand, What are the Problems to be Faced by the Management of Guarapiranga and Billings Basins?

- Population growth is fueled by job offers in the area outside, but adjacent to the basin
- Low and extremely low-income population groups concentrated on the reservoir's right and left banks. Urban expansion is almost exclusively limited to such groups. There are still large unpopulated areas subject to illegal settlements
- Legislation from 70th's produced ambiguous effects – controlled the “formal” economy, but not the “informal” one
- There is a poor public-service attendance (because the old legislation)
- There are high unemployment and underemployment, social deterioration and high crime rates (but falling)
- It is typically a regional problem, difficult to deal with anywhere, but specially because the Brazilian federalism.

Key Issues for Assessment and Sustainability (or some questions to be answered)

In areas with an occupation with certain characteristics

- high density, predominancy of low income families,

large presence of slums and precarious villages -, is it

possible to control and to upgrade the water quality?

Key Issues for Assessment and Sustainability

Is slum upgrading a feasible and justifiable housing-policy alternative?

Key Issues for Assessment and Sustainability

**Is a separate system an adequate
sewage solution?**

Key Issues for Assessment and Sustainability

What is necessary to change the pattern of land use in
the watershed ?

Key Issues for Assessment and Sustainability

Can such an ambitious program, focused on a relatively small area and whose results depend on much more far-reaching issues such as employment rates, earnings levels and housing policies, be successful?

Main Conclusions

Water Quality and Sewerage

- Emphasis on continued operational improvements to the sewage system and control over other sources of pollution loads
- Expand the use of complementary treatment for natural water bodies
- Adopt advanced treatment techniques for drinking water
- Expand knowledge of water quality in the São Paulo water-source rivers and reservoirs and improve monitoring procedures

Main Conclusions

- Improvement of urban standards and encouragement of adequate land use
- Continue with the slums upgrading and the recuperation of degraded areas; regularize title to the properties in the area and improve social follow-up
- Encourage alternative types of occupation compatible with protecting the water sources; strengthen inspection procedures

Main Conclusions

- Occupation of water-source territories in large, concentrated urban areas in the developing (or third) world is not a sectorial problem
- Slum upgrading is an adequate solution for situations like this
- Operating separate sewer systems in urban areas characterized by uncontrolled land occupation is a major problem

Main Conclusions

- **Water quality in tropical lakes and pollution-control and treatment techniques in water-supply reservoirs are an important field of study in the decades ahead**
- **Although it is possible to control such problems as those of the São Paulo water sources, this will always be a lengthy process involving gradual gains**
- **The methodology adopted in the Guarapiranga and Mananciais Projects can be useful for elaborating, controlling, carrying out and assessing programs for areas with serious problems of water pollution and availability in large, densely-populated urban regions**

Basic Aspects of the Changing Water Source Legislation

The Legislation to be substituted

- State legislation
- Land-use and occupation legislation
- Population density norms and restrictive control parameters

Category 1 Areas

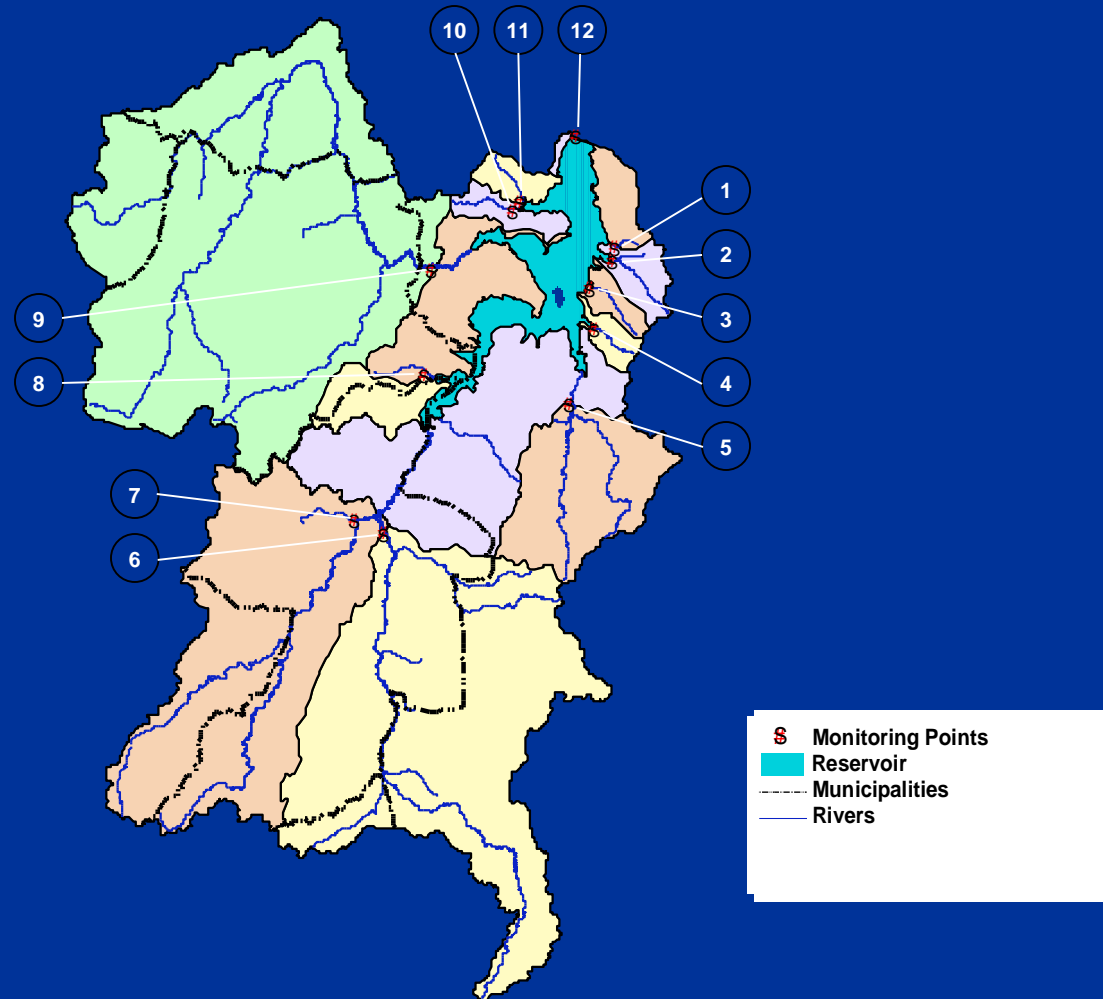
Category 2 Areas

- Type A: maximum density = 50 inhab./ha
- Type B: 34 inhab./ha
- Type C: average density similar to rural areas

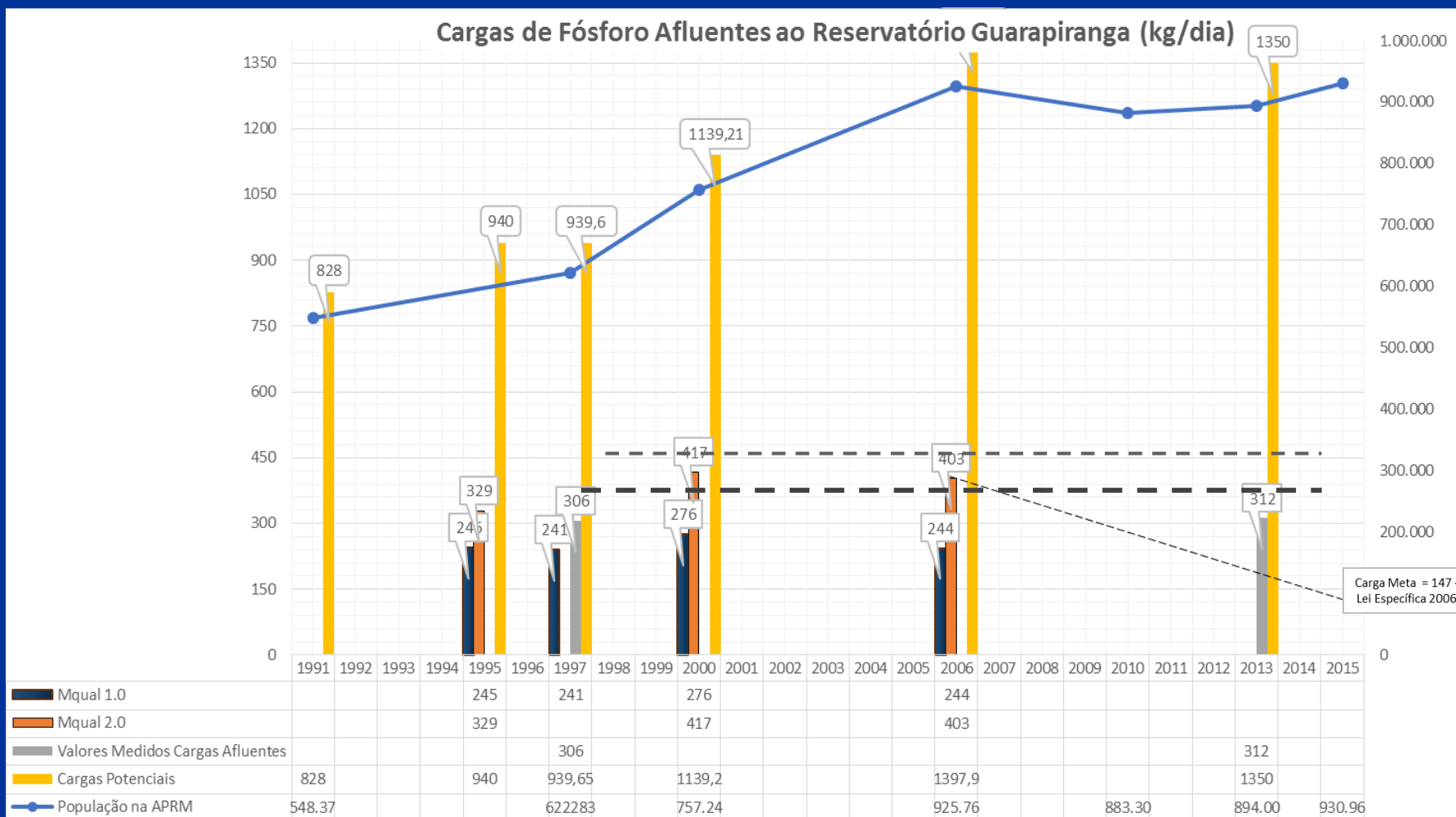
The New Legislation

- Water Quality Control
- Target for Affluent Loads (Phosphorous)
- Referential Loads for each Sub-Basin and Municipality
- Environmental and Development Plans
- Municipal Laws Detailing Land Use

Methodology – Land Use v. Water Quality Correlation Model



Water Sources São Paulo Metropolitan Region



Guarapiranga – Billings Project Budget (including fund of PAC)

Guarapiranga – Billings Project				
Agency	Federal Budget	State Budget	Municipality Budget	TOTAL
<i>São Paulo Municipality</i>	130,00	-	446,58	576,58
<i>SABESP ¹</i>	120,00	-	42,13	162,13
<i>State</i>	-	-	-	-
<i>Housing Company</i>		130,60	-	130,60
TOTAL	250,00	130,60	488,71	869,31
<i>Amount in R\$ milhões</i>				
<p>(¹) To applicate in the execution of water and sewerage systems of the 45 areas to be urbanized by São Paulo Municipality</p>				