

UK Latam Future Cities Joint Research Workshop

Sustainable use of water, land and energy adapt to Climate Change.

Challenges on scale and scope in metropolitan São Paulo

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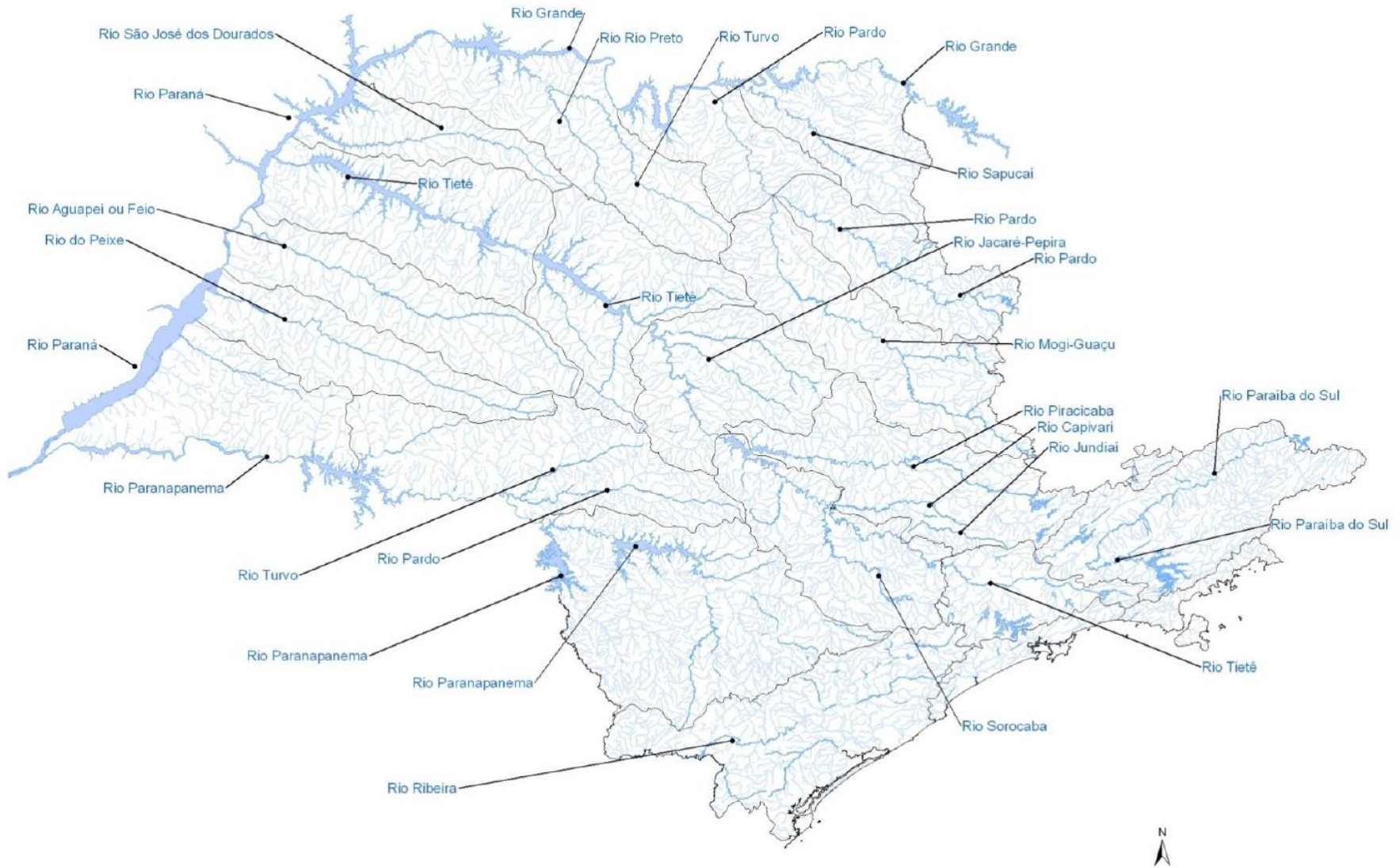
São Paulo State Government Strategic Advisory Board

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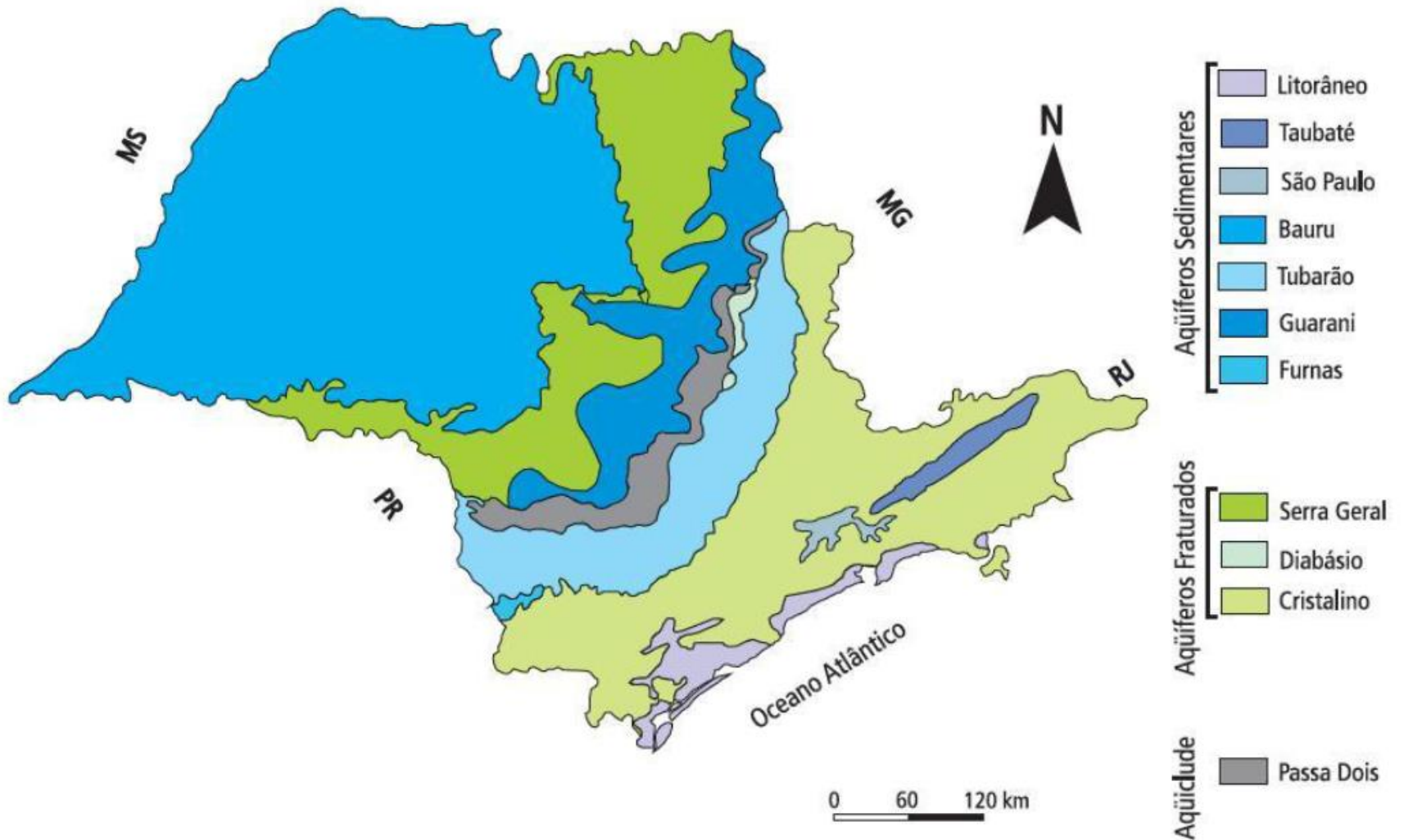
Presentation summary

- Basic hydrography and urban polarity in Eastern SP State
- Floods and droughts, a permanent concern.
- Urban environmental change: entangled effects of changing urban structures and hydrology.
- Adaptation of urban structures to specific needs on water security and flood control
- New prospects of cross-sector integration: de-pollution, water security, flood control and energy safety in multi-scope initiatives.

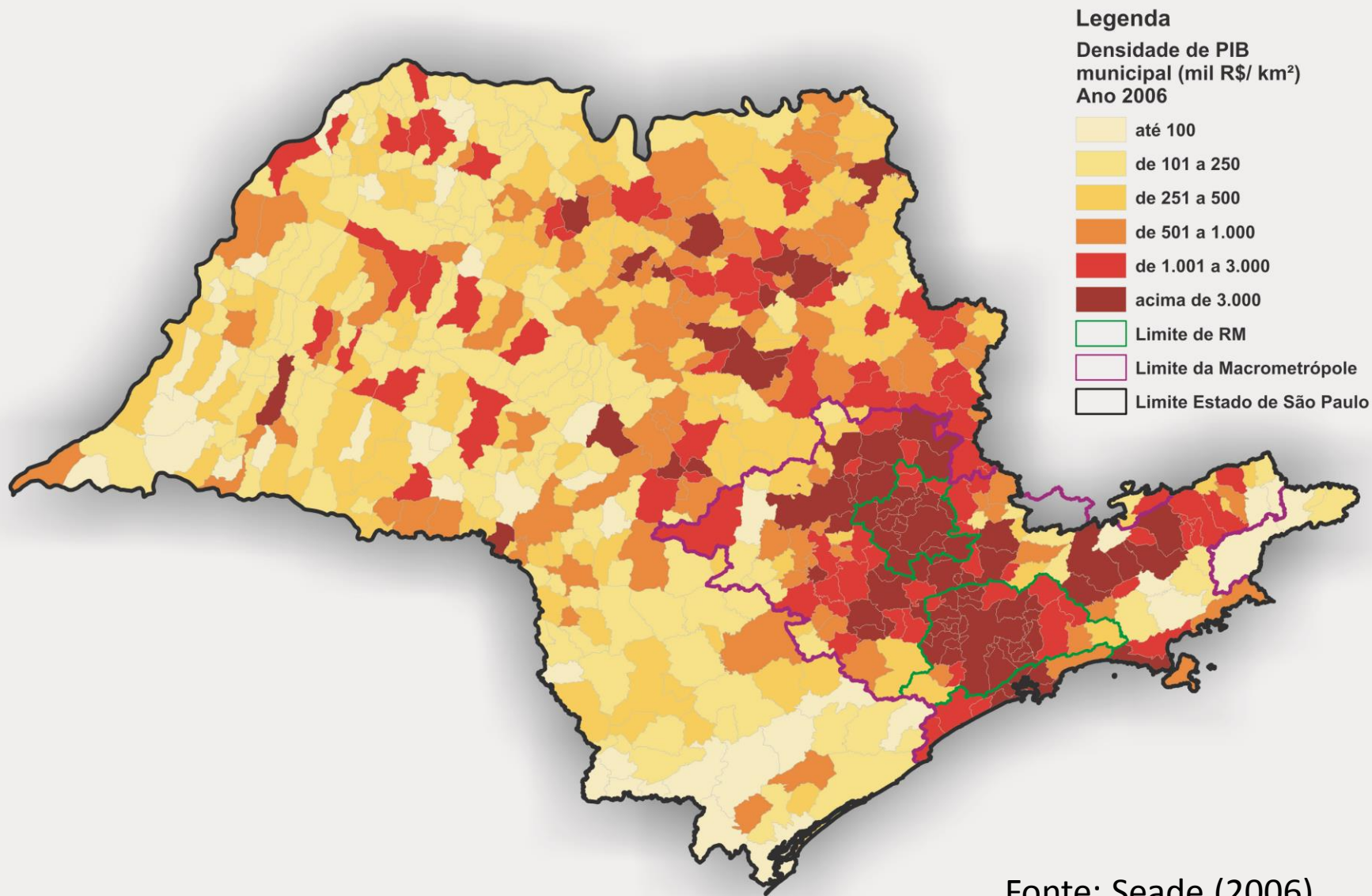
São Paulo State. Hydrographic network.



São Paulo State major aquifers.



São Paulo Macrometropolis: GNP concentration

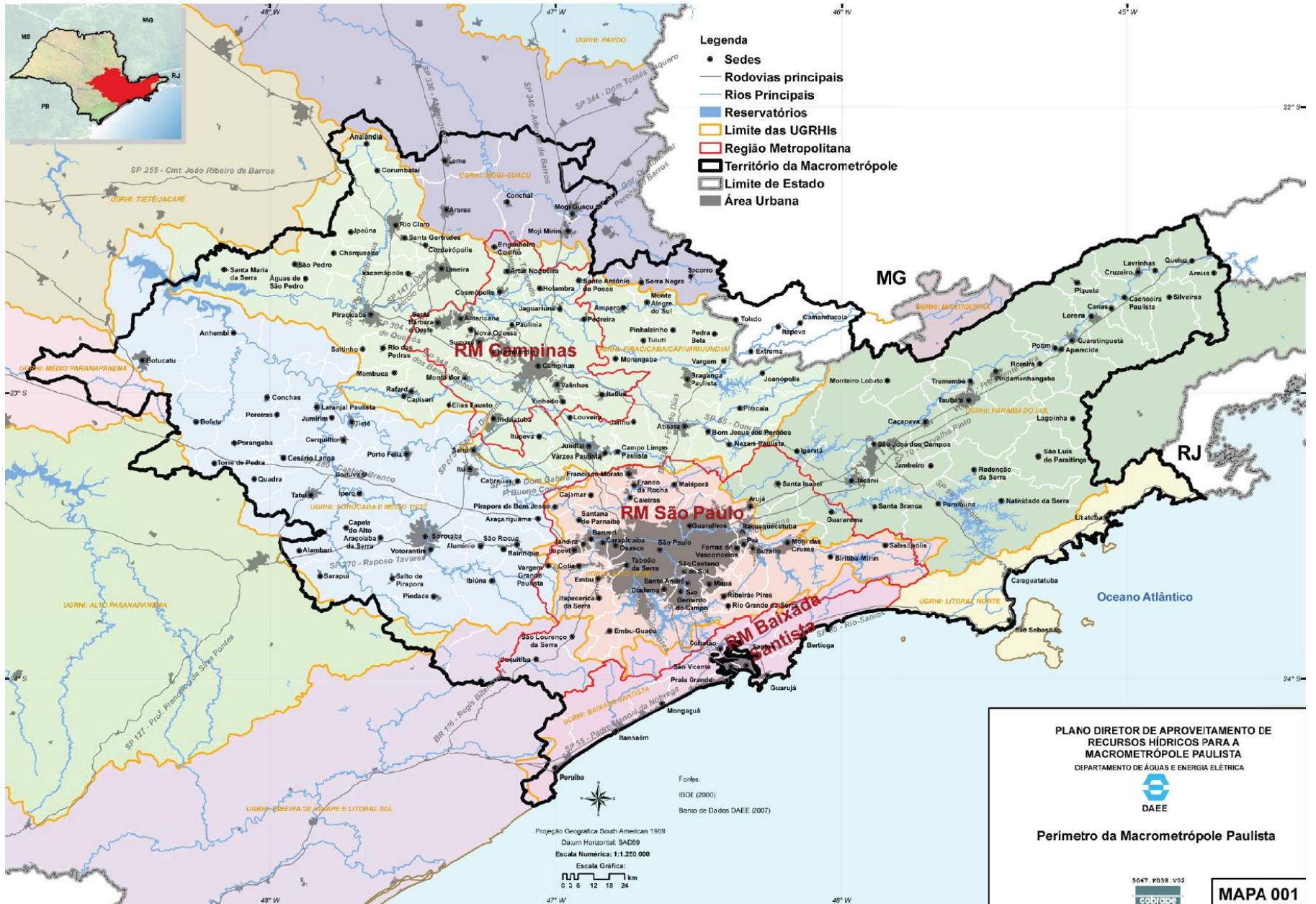


Water demand as a percentage of availability (Q7,10)



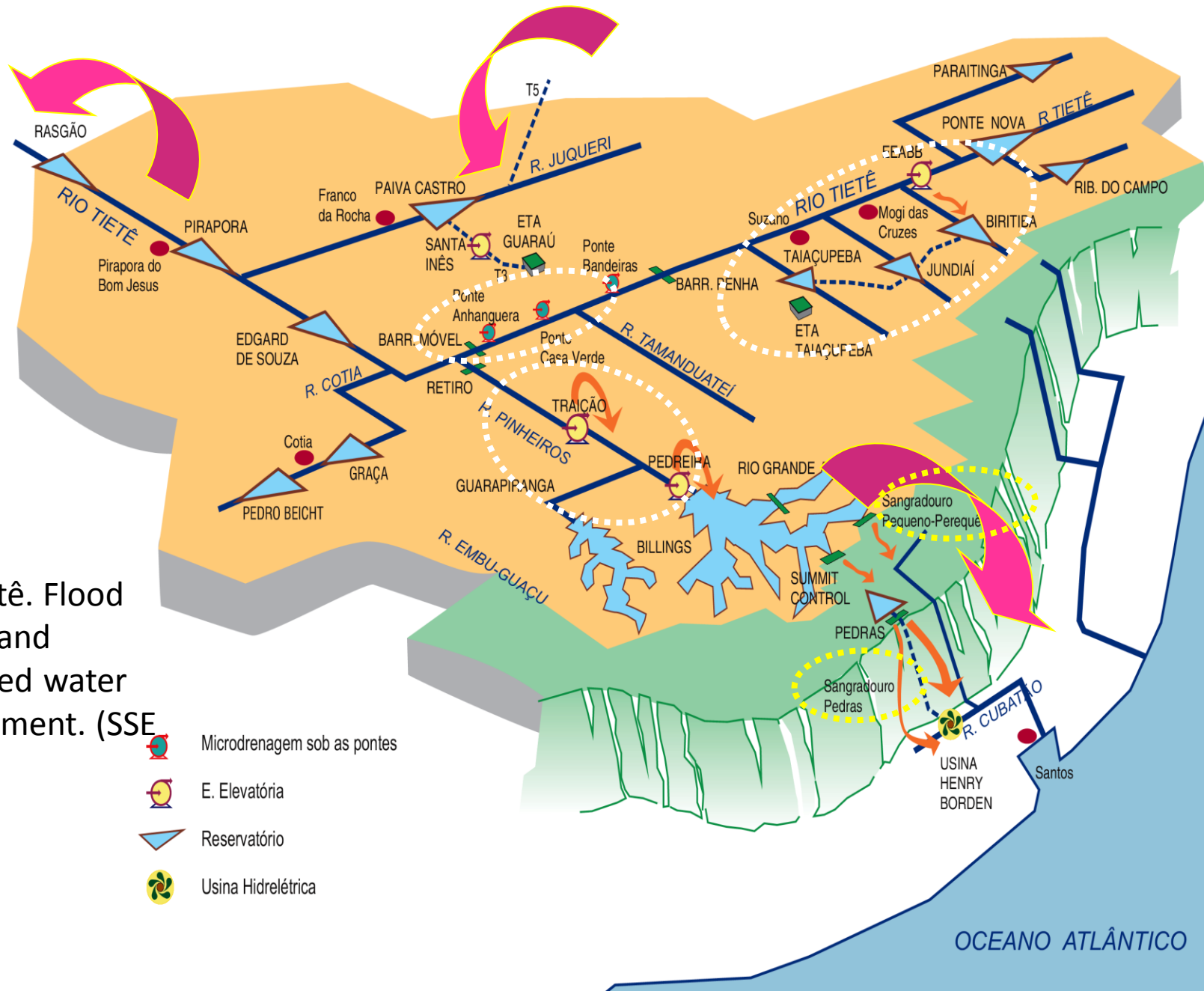
Source: Plano Estadual de Recursos Hídricos 2004.

The macro-metropolitan boundaries







Floods and droughts, a permanent concern

- Main changes: severe draughts and floods, heavy rains in dry season, continuity of rainy days
- The Eastern São Paulo State Metropolitan Network: economic development and water stress.
- Limitations of intra-metropolitan controls: urban degradation in a densely urbanized basin
- Conflicts on water use: urban supply, flood control, energetic security, strategic irrigation
- New complexities: expensive and distant supplies (and structural controls)



Alto Tietê. Flood control and integrated water management. (SSE 2010)

-  Microdrenagem sob as pontes
-  E. Elevatória
-  Reservatório
-  Usina Hidrelétrica

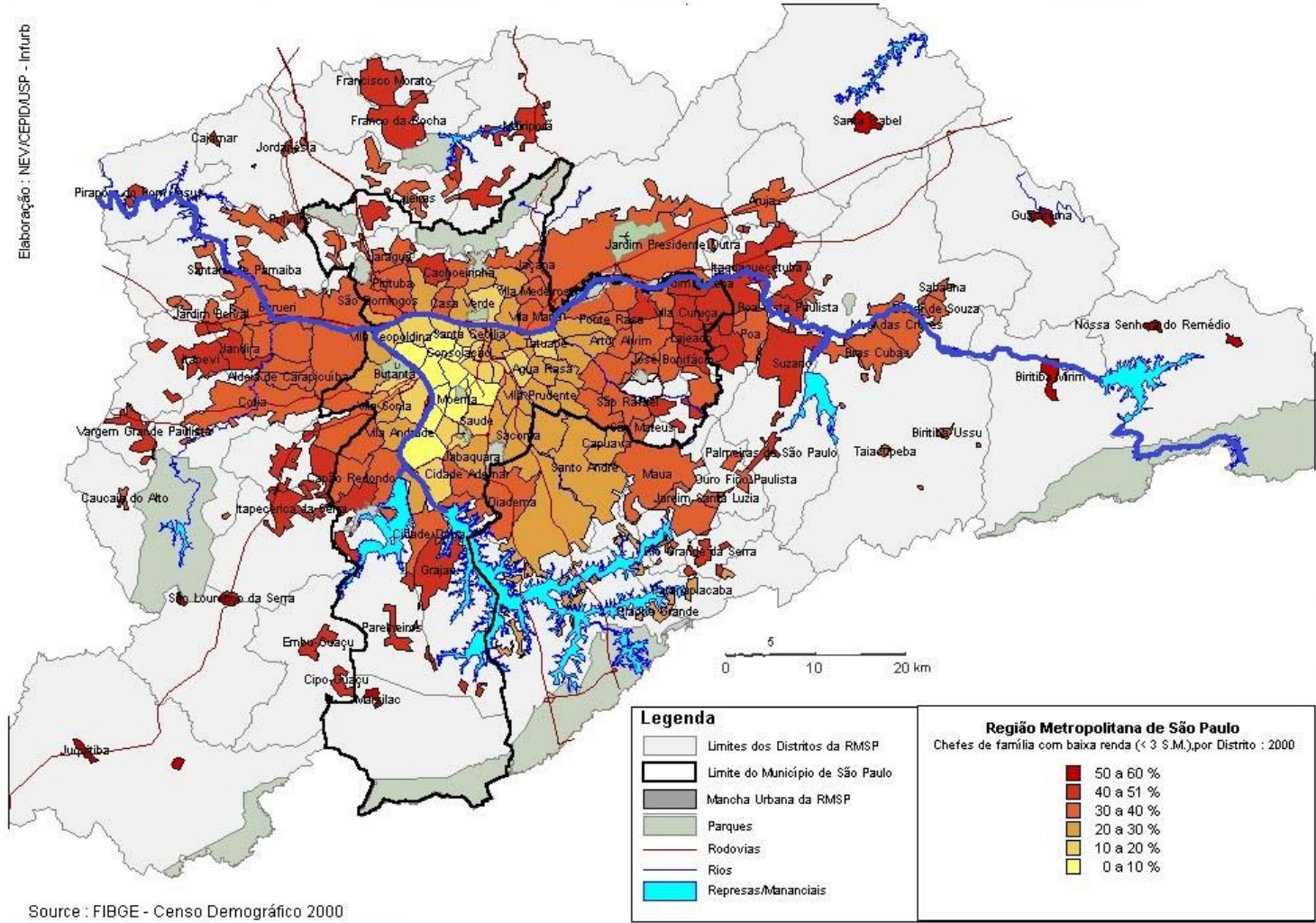
OCEANO ATLÂNTICO

Urban environmental change: entangled effects of changing urban structures and climate

- Changes in the urban / metropolitan structure
 - Initial urban centers developed in the best sites regarding flood and landslide safety
 - The wealthier occupy the safer and better connected central areas → the poorer settle either on the outskirts or on the environmentally fragile remains of central areas
 - New neighborhoods develop next to the older central areas, enlarging the boundaries of the expanded center → poorer households relocated to a more distant and vulnerable location
 - Perpetuation of an urban logic of socio-environmental vulnerability → growing external outcomes of degradation

Distribution of low-income households. 2000

Elaboração: NEV/CEPID/USP - Inturb



Source : FIBGE - Censo Demográfico 2000

Depollution, water security, flood control and energy safety in multi-scope initiatives

NEW PROSPECTS OF CROSS-SECTOR INTEGRATION

Facing droughts and floods: common approaches

(elements for a possible research agenda)

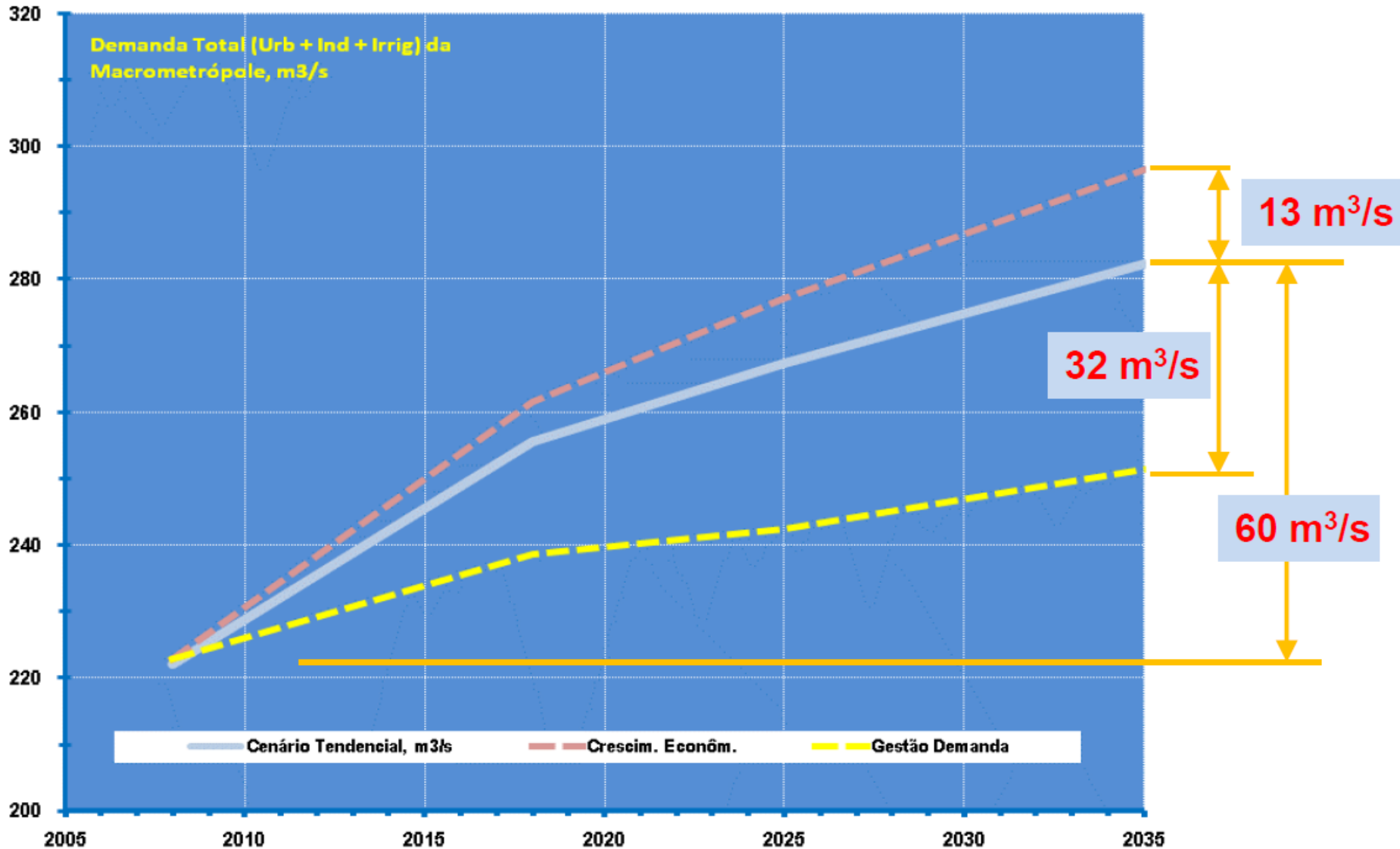
- Integrated reservoir management (multi-scope targets)
- Enhancing weather forecast , hydrological monitoring and alert systems
- Operational routines conditioned by weather, hydrological and quality monitoring
 - Flood control – restrictive stormwater discharges
 - Water supply – risk aversion curve according to depletion levels
 - Quality on water sources – target pollution loads
- Combining structural and non-structural measures
→ **quantify non-structural efficiency**
- Integrate quality and quantity management
- Point source pollution control – sewerage (a systemic approach)
- Non-point source pollution - stormwater pollution prevention

Specific actions on water security

- Reservoirs
 - Enhancing regularization and reliability (keeping nominal supply)
 - Enhancing combined uses of hydraulic infrastructure
- Reversions
 - Internal arrangements (inside the water management unit)
 - Between different water management units
- Demand management
 - Water loss control
 - Indoor water use reduction
 - Water reuse
 - Preservation and recovery of water sources

Water demand scenarios

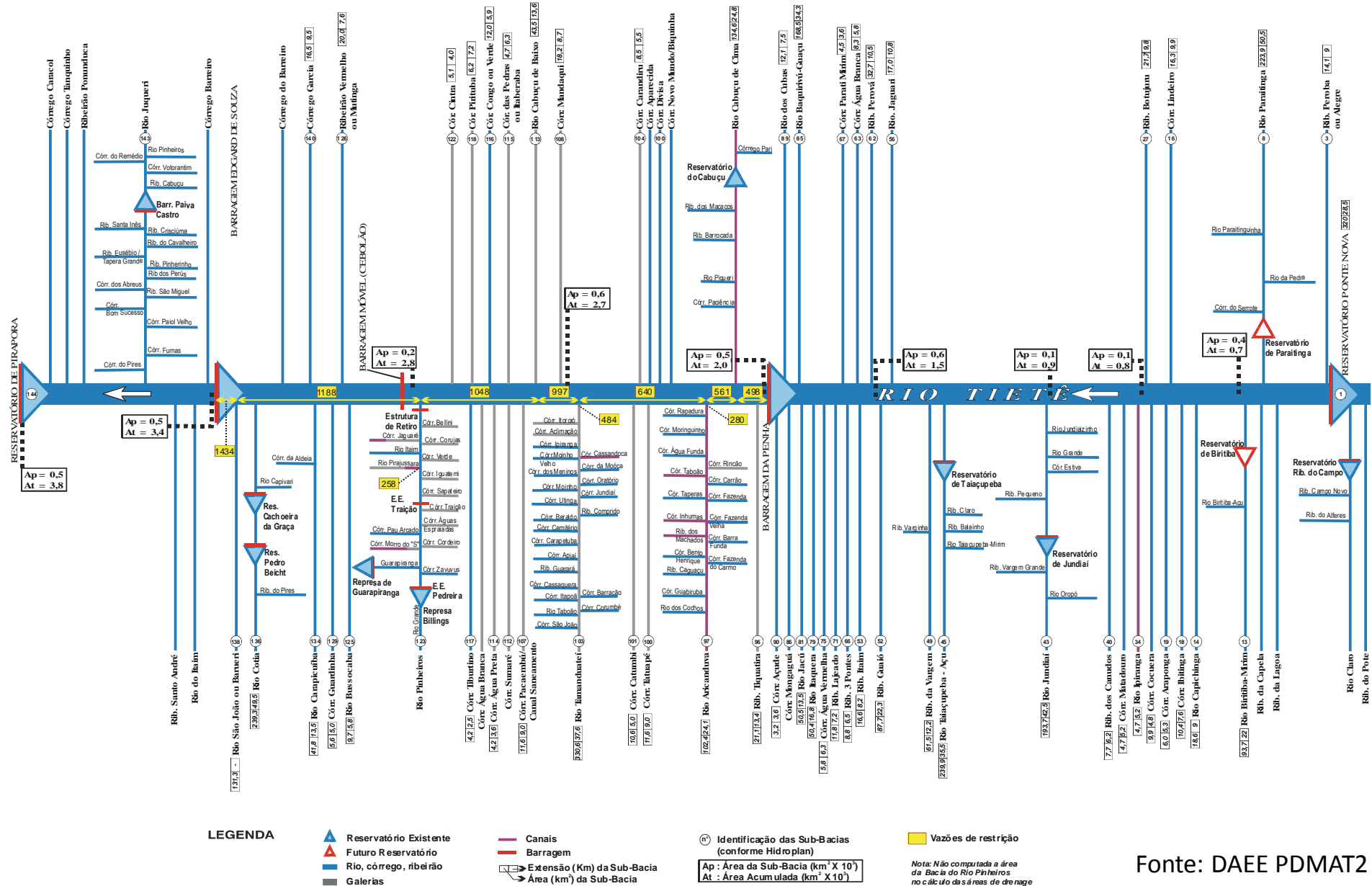
(tendential, economic growth and demand management)



Flood control and urban drainage – scales of integration

- Flood control
 - ***Regional scale (flood basins)***
 - Possible integration with major uses: urban supply, sanitation, irrigation, hydropower
 - Associates structural and non-structural measures
 - Associates detention capacity and discharge management
 - Strong interaction with water quality management
- Urban drainage
 - ***Local scale (flood compartments)***
 - Compensatory measures: integration with urban projects and local mobility, permeable floors, parks, gardens
 - Possible integration with building codes of practice
 - Local interactions with solid wastes, sewage and other processes of obstruction or contamination

Alto Tietê flood control scheme



Flood Control major challenge: financing

- Conventional mechanisms
 - Tax revenue (general budget)
 - Specific urban drainage rate
- Innovative prospects
 - Impermeabilization payment (urban developers)
 - Shared hydraulic infrastructure
 - Integrated management of natural disasters → joint risk assessment for multiple water uses
 - Economic recovery of the environmental valorization on urban developments
 - Insurance

The prospects of multiscope PPPs

(FSP 23/03/2012) <http://www1.folha.uol.com.br/mercado/1065897-sao-paulo-prepara-novo-modelo-de-parceria-publico-privada.shtml>

Como pode funcionar a PPP



☑ Solução de problema

💰 Geração de receita

☑ **Recurso hídrico**
Obras de drenagem urbana, controle de enchentes e despoluição são de interesse público com pouca chance de ser alvo de uma PPP

💰 **Exploração imobiliária**
A recuperação de mananciais pode viabilizar áreas para a exploração imobiliária

💰 **Geração de energia**
A produção de energia elétrica pode ser a compensação ao investimento em recuperação de rios

💰 **Transporte hidroviário**
A despoluição de rios pode viabilizar o transporte hidroviário de cargas, tanto de lixo quanto de materiais de construção

💰 **Lazer**
Projetos de lazer sobre corpos d'água saneados podem ser explorados por consórcios que participem da PPP