



**IUWM Financial + Economic Module**

**Simulation Game**

**Introduction Round 1**

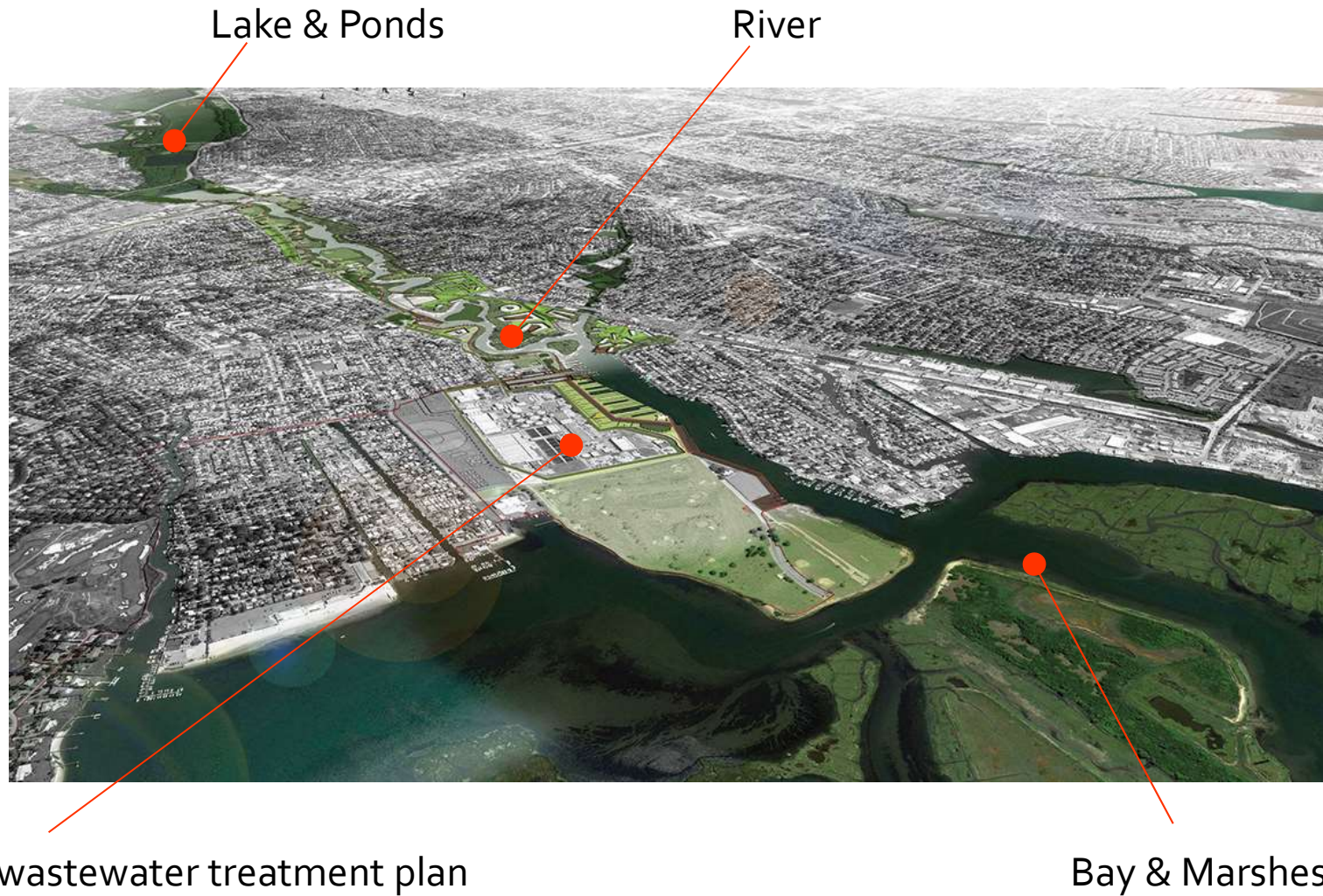
An aerial photograph of a city, likely Bay City, Michigan, showing a river winding through the urban landscape. The image is in grayscale and serves as a background for the text. The river flows from the upper left towards the lower right, with various industrial and residential areas visible along its banks. The text is overlaid in red on this background.

**Welcome!**

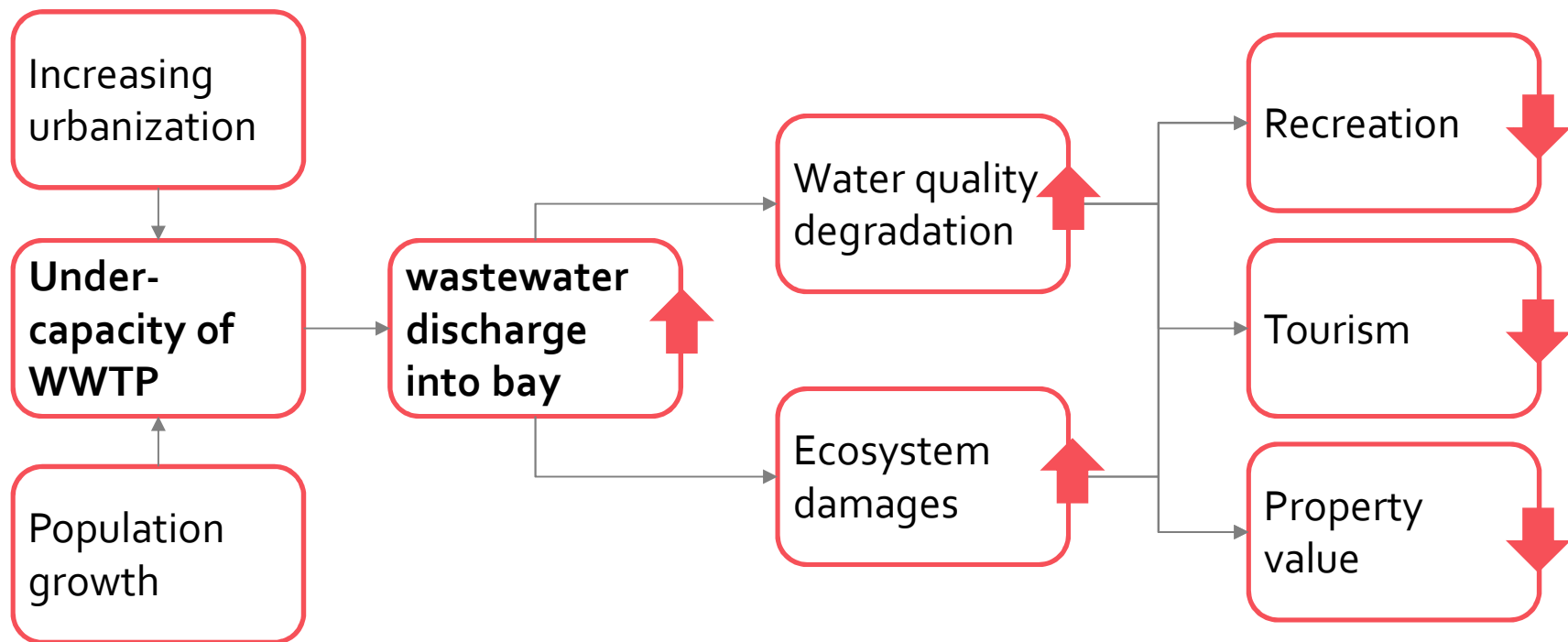
**...to the expert session of  
Bay City's  
Water Management Investment  
Program**



# Bay City – a growing city in the delta



# Bay City is facing problems with regard to urban development and wastewater



# Your task and your budget

- Your responsibility:  
the water management investment program
- Your budget (based on results of a revenue study):
  - Annual revenue stream of \$ 1 million over the coming 30 years (from levies/ taxes)
  - Available for investments in capacity expansion of the WWTP
- Your task:  
Determine the optimal solution for the wastewater problem

## Alternatives and choices

- The working group responsible for developing alternative technical investment programs came up with *three technically feasible alternatives*
- We now need an assessment of these alternatives from an **economic and financial perspective**



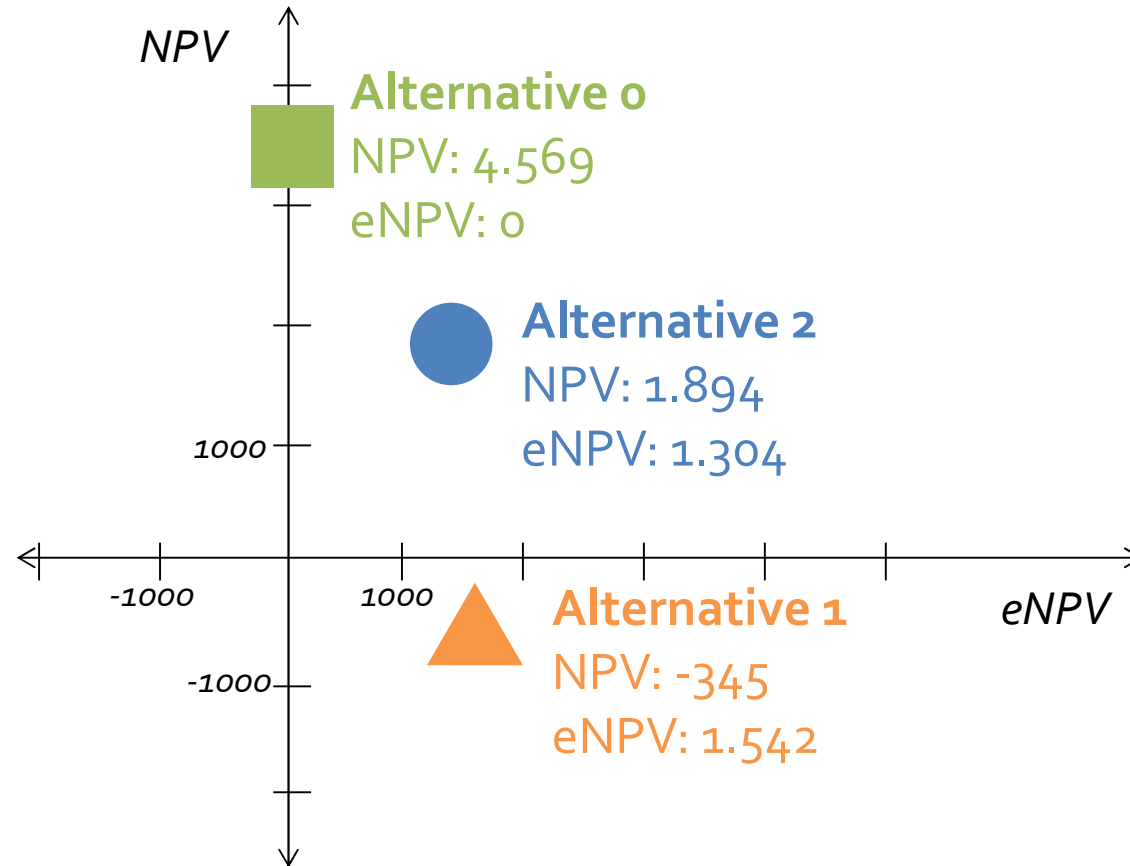
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**Simulation Game**

**Round 1 – Results**



# Results





## Lessons learned

- ✓ Financial feasibility is not just about investment costs, but also about life cycle costs, as well as revenues.
- ✓ The “without project” alternative is not just “doing nothing”, often some action is required in a situation with autonomous growth (population, economy)
- ✓ The economically optimal solution is not always the same as the financially optimal solution, but economic result can be a justification for government contribution, which then improves financial feasibility.

## In real life...

- ✓ ...there is uncertainty about pretty much all parameters in financial and economic feasibility analyses.
- ✓ ...several factors – especially benefits – cannot be quantified or monetized, but are still relevant in decision making.
- ✓ ...this typically leads to ranges of monetized outcomes and qualitative discussions of additional considerations.



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**Introduction Round 2**

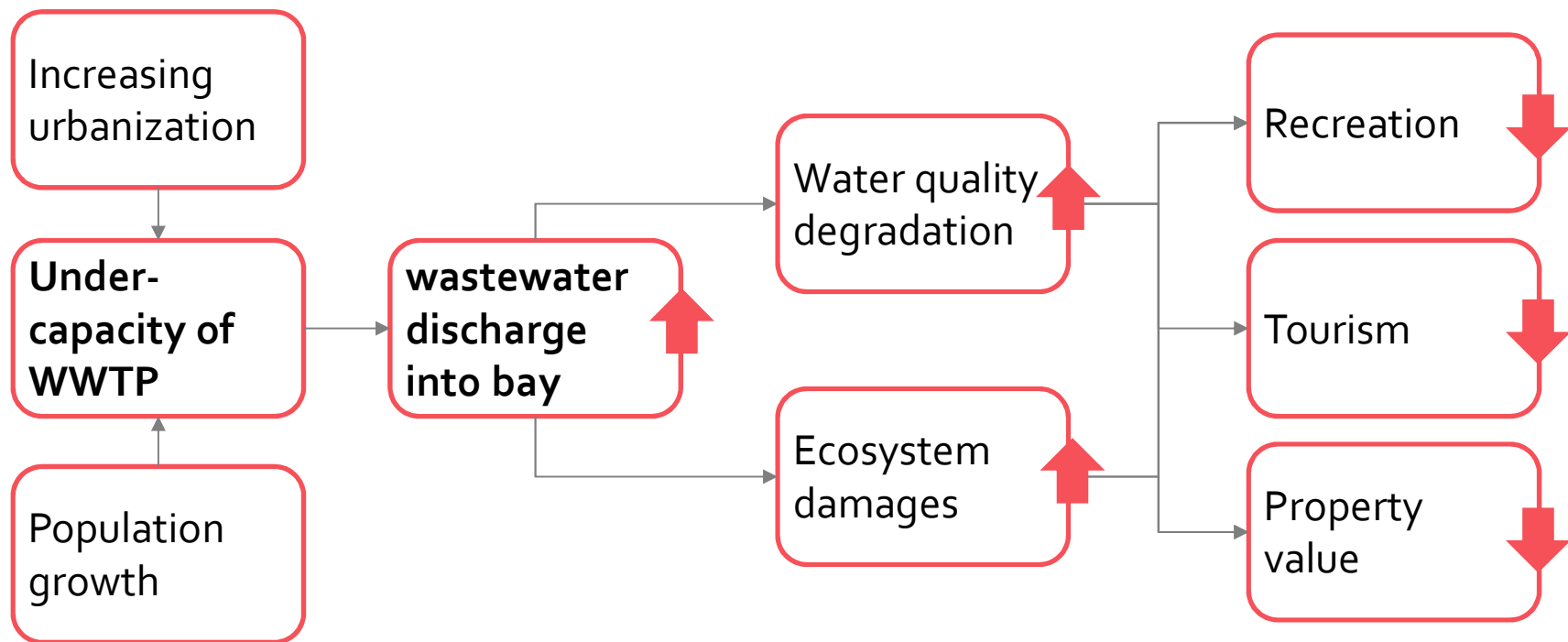
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**Welcome!**

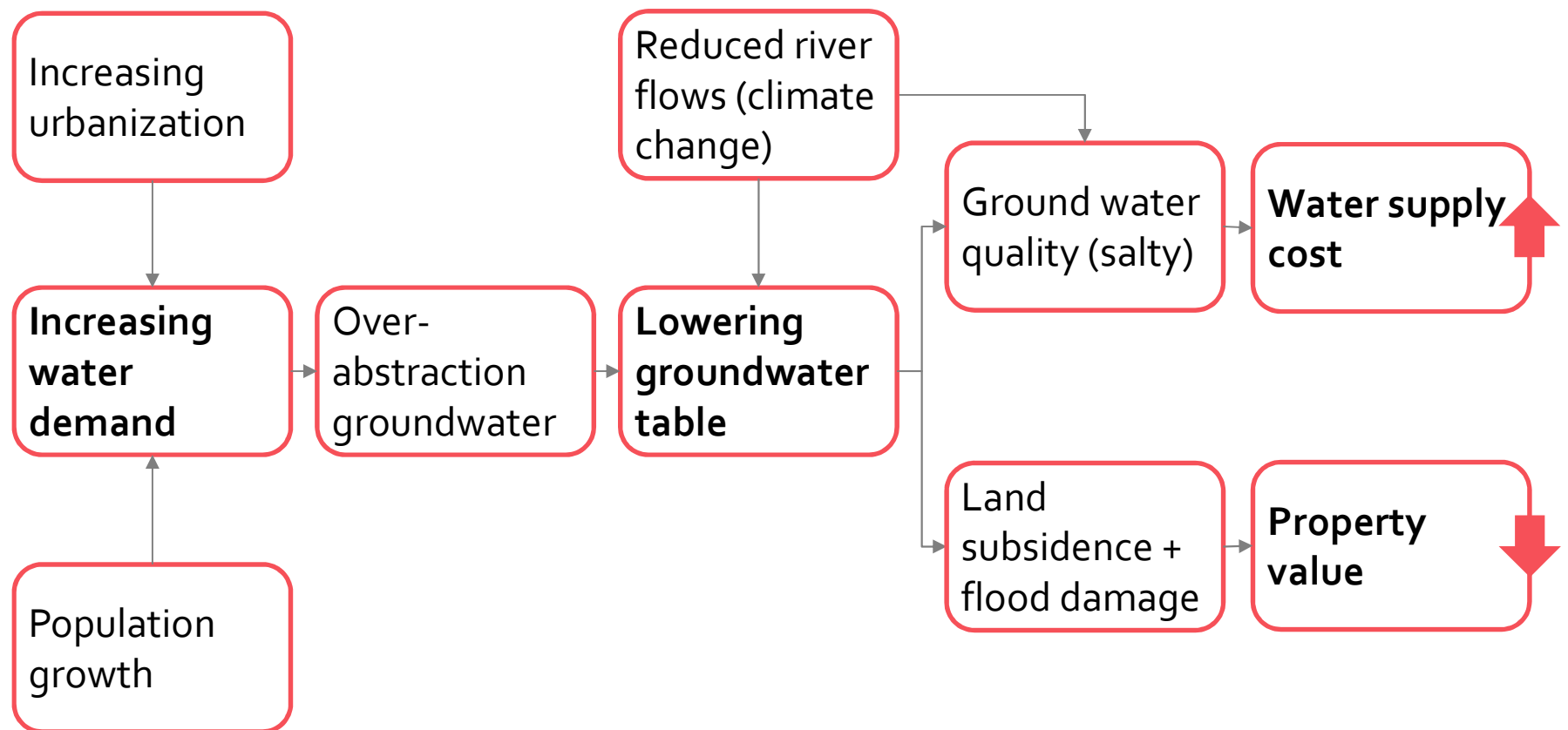
**...to the 2<sup>nd</sup> expert session of  
Bay City's  
Water Management Investment  
Program**

# Bay City is facing problems with regard to urban development and wastewater

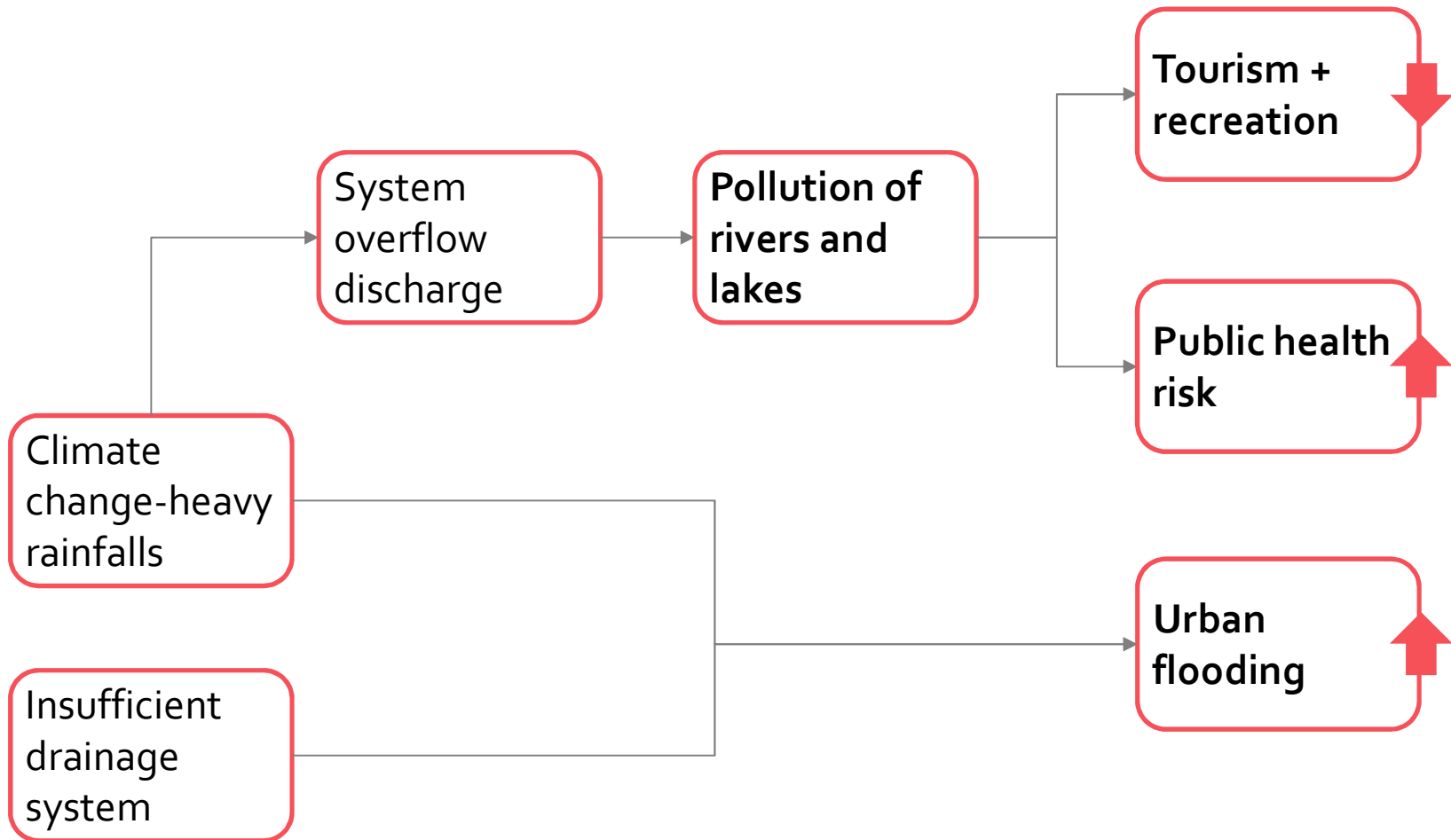




# Bay City is also facing problems with regard to **groundwater**



# Bay City is also facing problems with regard to **stormwater**



## Your task and your budget

- Your **task**, again:  
Determine the optimal solution for the wastewater problem but now also integrating stormwater and groundwater issues
- Your **budget**, again:  
Annual revenue stream of \$ 1 million over the coming 30 years (from levies/ taxes)
- **New approach**: pursue an **integrated approach** by:
  - Considering other urban water challenges
  - Seeking input from stakeholders!

# Stakeholders

Three main **stakeholders** were identified:

1. the Bay City water utility,
2. the regional blue-green infrastructure program, and
3. ABCD, a major developer in the region.

Potential advantages of stakeholder engagement:

- New alternatives / solutions
- Better solutions due to integrated approach
- Additional funding

Potential disadvantage of stakeholder engagement:

- More effort/ time required: transaction costs



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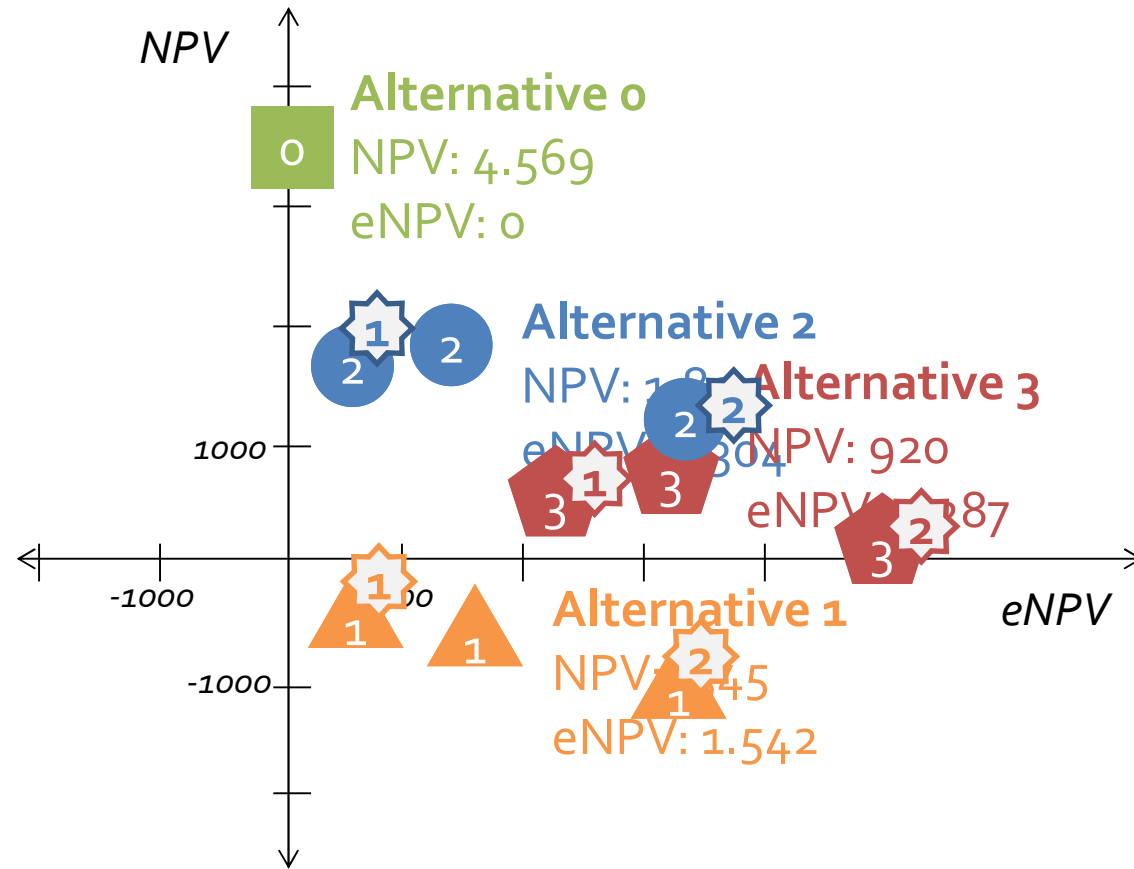
**Simulation Game**

**Round 2 – Results**





# Results



## Lessons learned

- ✓ Understanding the water system is crucial in understanding the true benefits and costs of urban water investments
  - ✓ Understanding the cause-effect relations of the problem
  - ✓ Understanding the effect of the intervention(s)
- ✓ Understanding and engaging stakeholders/beneficiaries can help in the identification of different funding sources
- ✓ Starting from one urban water challenge and widening the scope to others is an effective approach to IUWM

## In depth discussion

- ✓ Why would real life be even more complicated?
- ✓ What is your experience with 'transaction costs'?
- ✓ What could have been other integrated solutions?
- ✓ What demand management solutions, behavioral interventions and other non-hard-infrastructure measures contribute to overcoming water management challenges?
- ✓ What other stakeholder groups would be relevant?
- ✓ How can economic benefits be turned in financial revenues?