Evaluating Water-Related Ecosystem Services with NatCap Software RIOS and MESH

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General Context

- **The study takes place in Geneva (Switzerland)**:
  - 282 square kilometers (109 sq miles)
  - Surface: 33.4% urban setting and 39.5% agriculture
  - Six main watersheds (Figure 1) with the Rhône river crossing the canton form East to West

- **Based on "Environment 2030"**:
  - Political program to be implemented by Geneva between 2014 and 2030
  - Details objectives, actions and timeframes regarding the administration of the waters on the territory
  - Provides information with which to construct scenarios

- **Based on the "SPAGE"**:
  - Plan of the administration of the waters for each watershed
  - Coordinates different institutions and objectives for a global action plan
  - Reviewed every 6 years
  - Analyzes a range of factors: hydrological, biological, socio-economic, etc.
  - Enables to see where authorities place priorities regarding water related ES
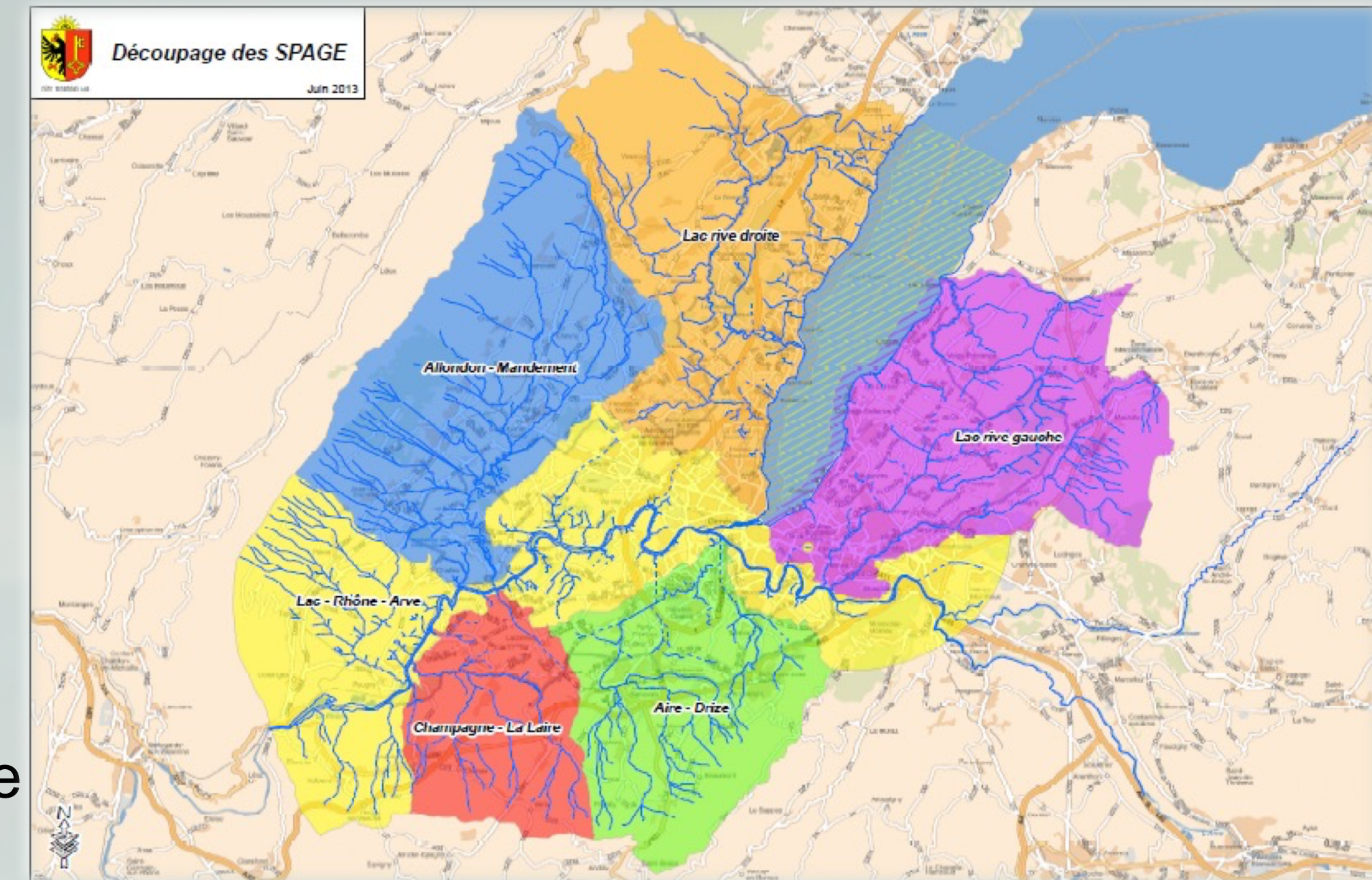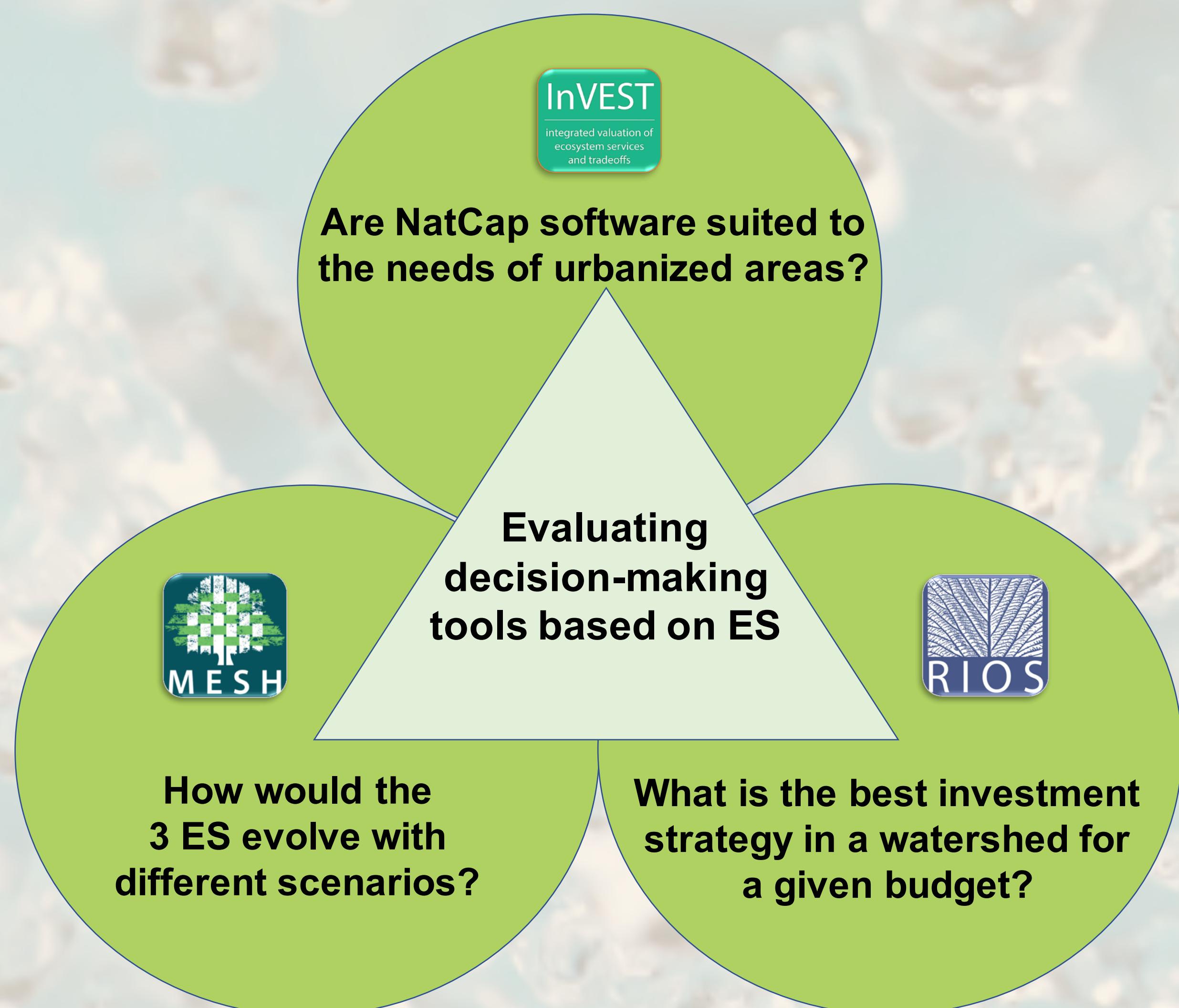 - Provides economical and physical parameters for NatCap software

Image 1: SPAGE Watershed distribution(Département de l'Intérieur et de la Mobilité, 2012)

Studied Ecosystem Services (ES):

- ➢ Water yield
- ➢ Nutrient retention (P, N)
- ➢ Sediment retention

Objectives and Research Questions

InVEST

Are NatCap software suited to the needs of urbanized areas?

Evaluating decision-making tools based on ES

MESH

How would the 3 ES evolve with different scenarios?

RIOS

What is the best investment strategy in a watershed for a given budget?

Methodology and Workflow

1. Prepare input data

Scenarios	InVEST inputs	Socio-economic data
Best and worst cases for:		
• Climate change (temperature)	• Watersheds	• Budget
• Land use	• Land use / land cover	• Activity costs
• Water use	• Biophysical tables	• Activity-transition table
• Fertilizer use	• Parameters	• Objective and transition weights table

2. Run the software and analyze the outputs

MESH — RIOS

ES forecasts for 2030, 2050, 2100

Investment portfolios for different budgets

3. Answer research questions and present conclusions to authorities

- **Synthesis maps**
- **Synergies and trade-offs**
- **Recommendations**

Expected Results and Perspectives

- Extrapolation of current trends would be in between the worst and best case scenarios.
- Representing the best and worst case scenarios through maps would help understand the importance of considering ES in decision-making.
- The benefits generated by improved quality of the watersheds would be greater than the implementation costs.
- NatCap software would be adapted to cities in developed countries such as Geneva
- NatCap software would be suited to respond to decision-maker's demand for simple and concise recommendations for environmental management.

References

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