



Global Water
Partnership
Mediterranean



Tools to support and improve Integrated Water Resources Management: STRATEAU and AQUATOOL

A Mediterranean Perspective

“APPLICATION AND DEMONSTRATION OF AQUATOOL”

Javier Paredes.

Water and Environmental Engineering Institute.

Water Resources Engineering Group.

Technical University of Valencia.

jpardea@hma.upv.es

<http://www.upv.es/aquatool>



Instituto de Ingeniería del
Agua y Medio Ambiente



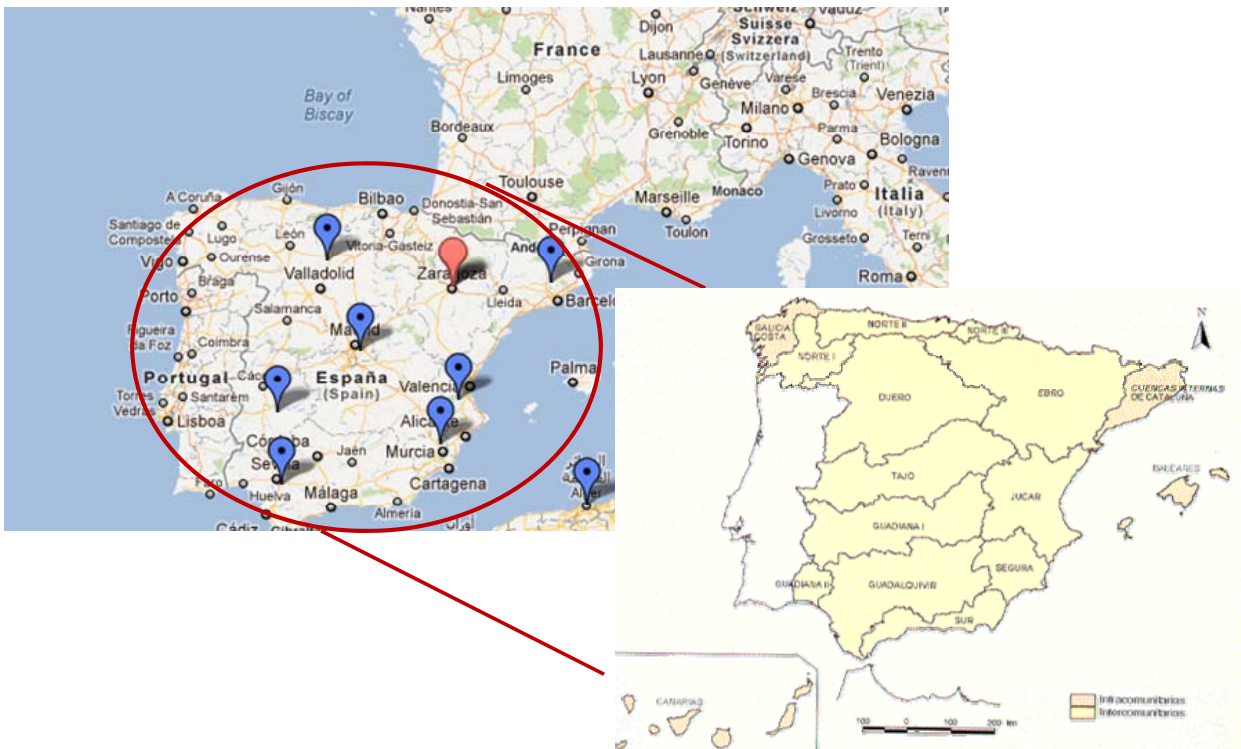
UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA

AQUATOOL IN...

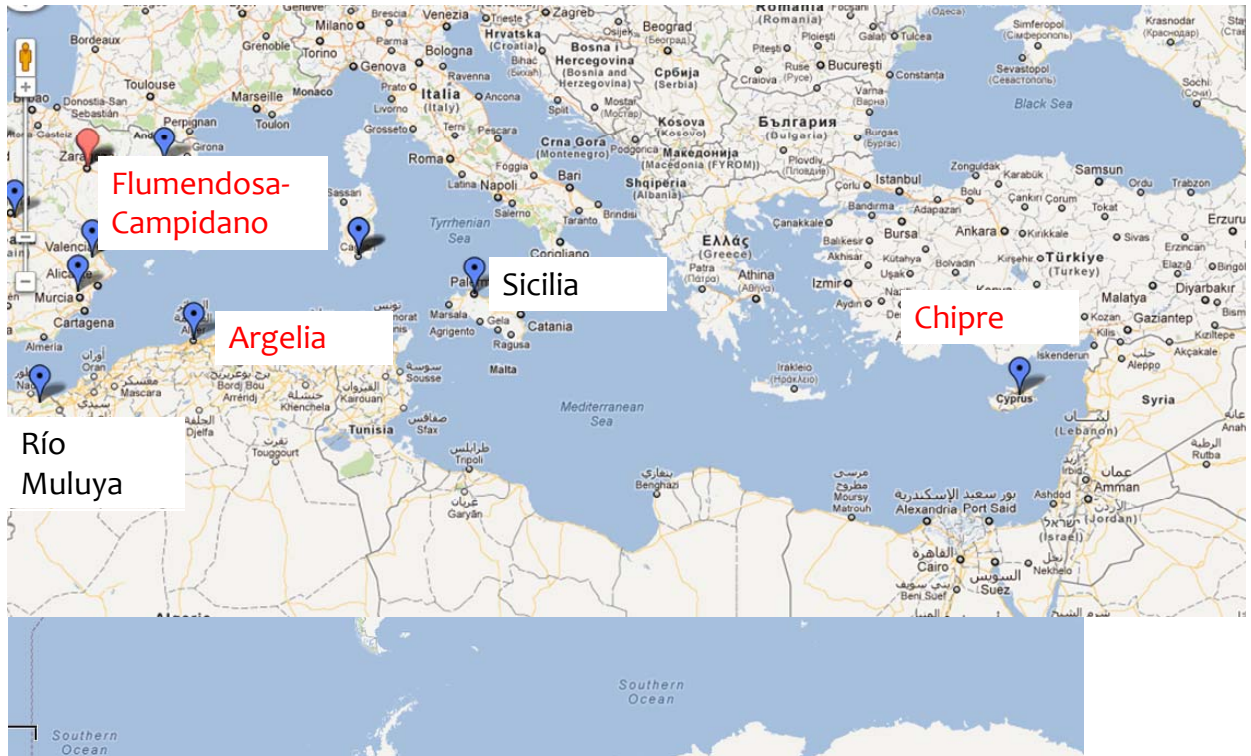
AQUATOOL in...



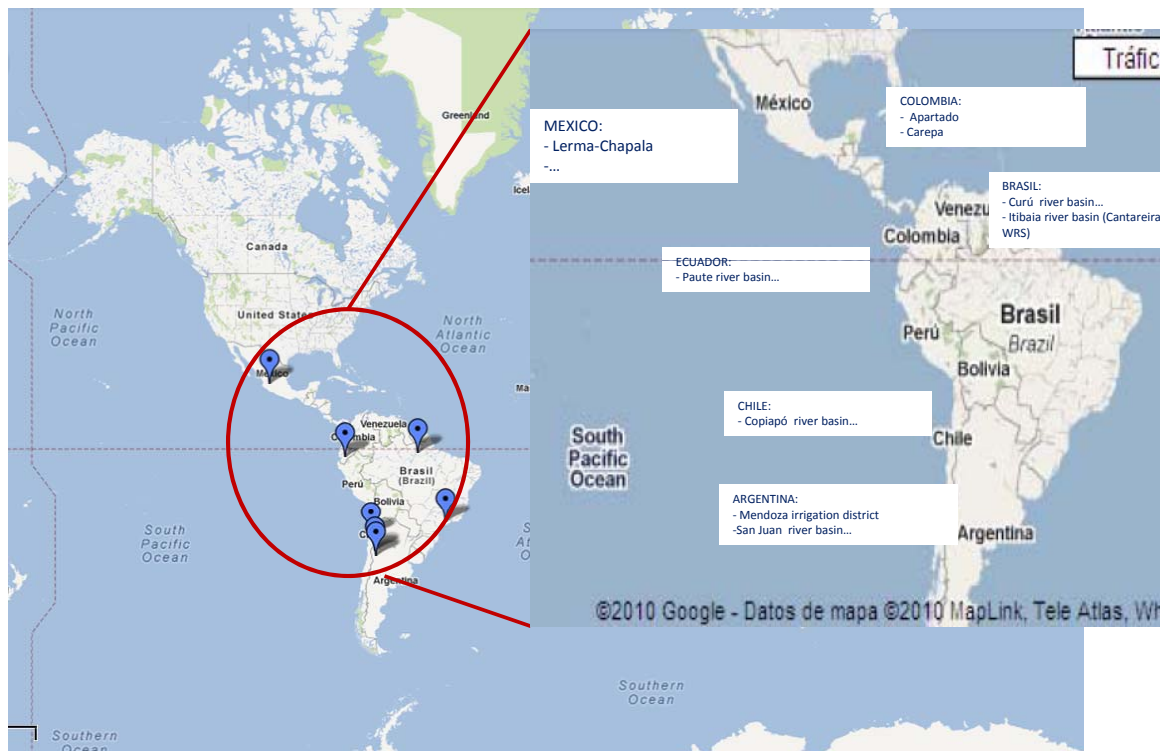
AQUATOOL in Spain



AQUATOOL in mediterranean countries



AQUATOOL in America



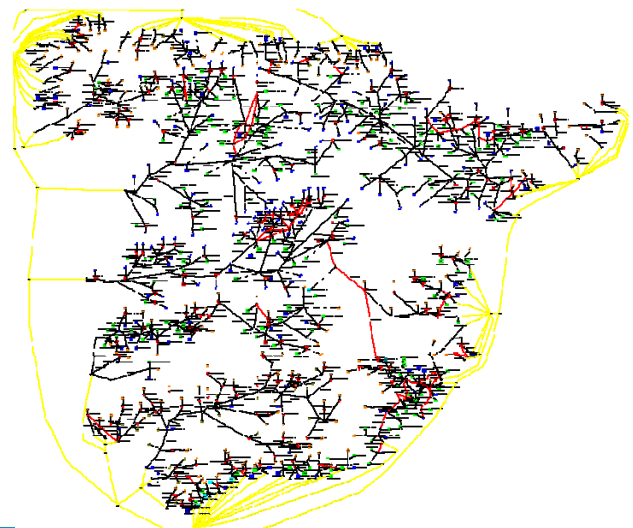
OPTIGES MODULE

WATER RESOURCES OPTIMISATION

Recent application of OPTIGES

“ESTUDIO SOBRE EL IMPACTO POTENCIAL DEL CAMBIO CLIMÁTICO EN LOS RECURSOS HÍDRICOS Y DEMANDAS DE AGUA DE RIEGO” – Centro de Estudios Hidrográficos (CEDEX). 2011

“Research on impact of climate Change over Water Resources and Irrigation Water Demands” – Hydrologic Research Center (CEDEX). 2011



Instituto de Ingeniería del
Agua y Medio Ambiente



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA



SIMGES AND SIMRISK MODULES

SIMULATION MODELS

Recent applications of SIMGES & SIMRISK

Water management models for Water Plans

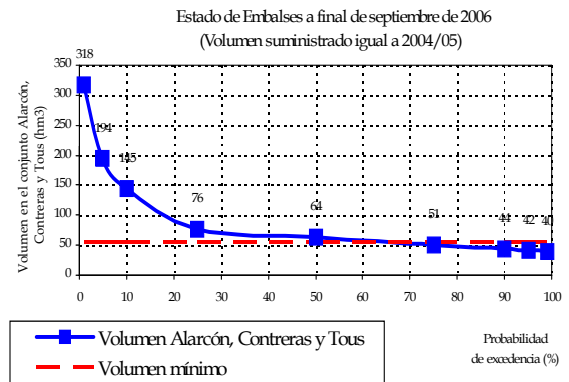
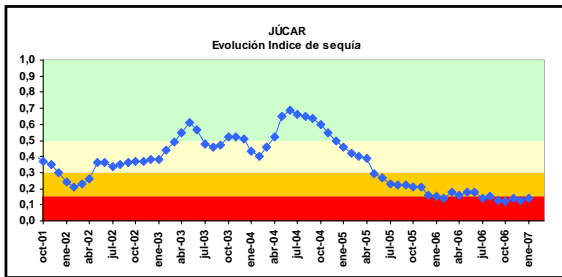
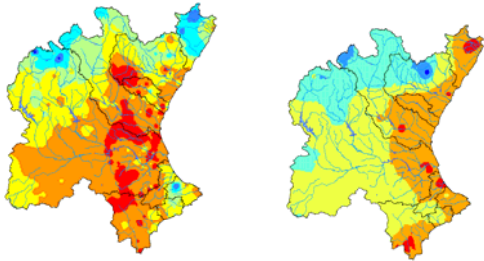
For the development of Water Plans under Water Framework Directive almost all the Spanish basins have used SIMGES to develop Water management models and:

- Assessing reliability of demands
- Water Budget of the basin
- Define the impact of e-flows
- Define possible future water users
- And more...



Recent application of SIMGES & SIMRISK

DROUGHT MANAGEMENT IN THE JÚCAR RIVER BASIN



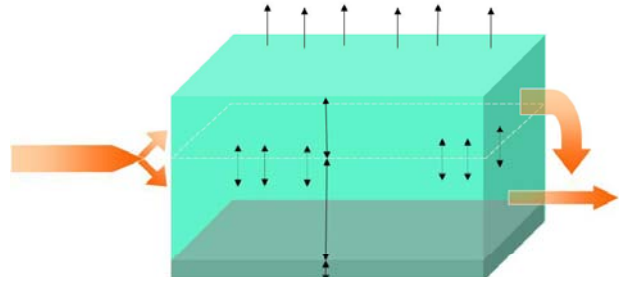
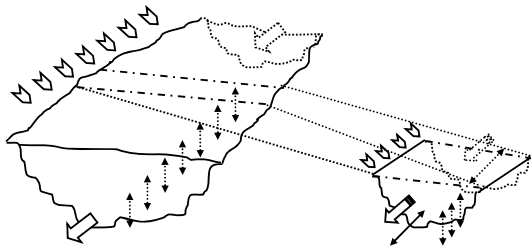
GESCAL MODULE

WATER QUALITY MODELING

GESCAL module

Water quality model coupled with a simulation model.

- Mechanistic model for rivers and reservoirs.
- Conventional constituents.
 - Temperature
 - Arbitrary constituents
 - DO + OM
 - Nitrogen cycle
 - Eutrophication problem.



$$0 = \frac{d}{dx} \left(E \frac{dC}{dx} \right) - \frac{d(uC)}{dx} + \frac{S_d + C_e q_e - C q_s + \sum W_i}{V}$$

$$V_1 \frac{dC_1}{dt} + C_1 \frac{dV_1}{dt} + C_{1/2} \frac{dV}{dt} = Q_{1e} C_e - Q_{1s} C_1 + E'_{12} (C_2 - C_1) + \sum W_i$$

$$V_2 \frac{dC_2}{dt} + C_2 \frac{dV_2}{dt} - C_{1/2} \frac{dV}{dt} = Q_{2e} C_e - Q_{2s} C_2 + E'_{12} (C_1 - C_2) + Sed + \sum W_{i2}$$

Application of GESCAL

MODELS DEVELOPMENT UNDER WATER PLANS:

- Júcar:
 - Water systems models.
 - Different eutrophication reservoir models.
- Segura:
 - Water systems models.
- Duero:
 - Water quality river models.
 - Water system models.
- Tajo:
 - 2-models covering all the basin.
 - Manzanares River (Madrid).
- Ebro:
 - 1 model of the whole basin.

INTERNATIONAL APPLICATION:

- Colombia: Aguas de Medellín.
- Brasil: Atibaia, Araguari rivers

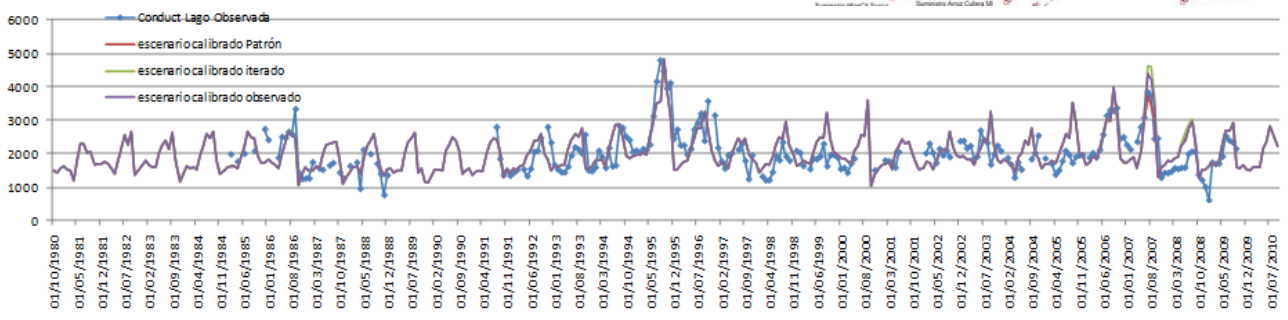
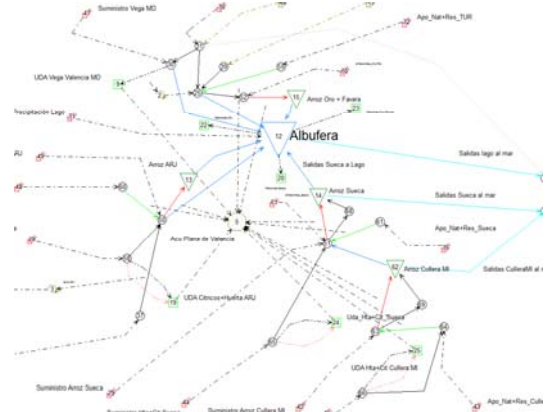


Recent application of GESCAL

ALBUFERA LAKE



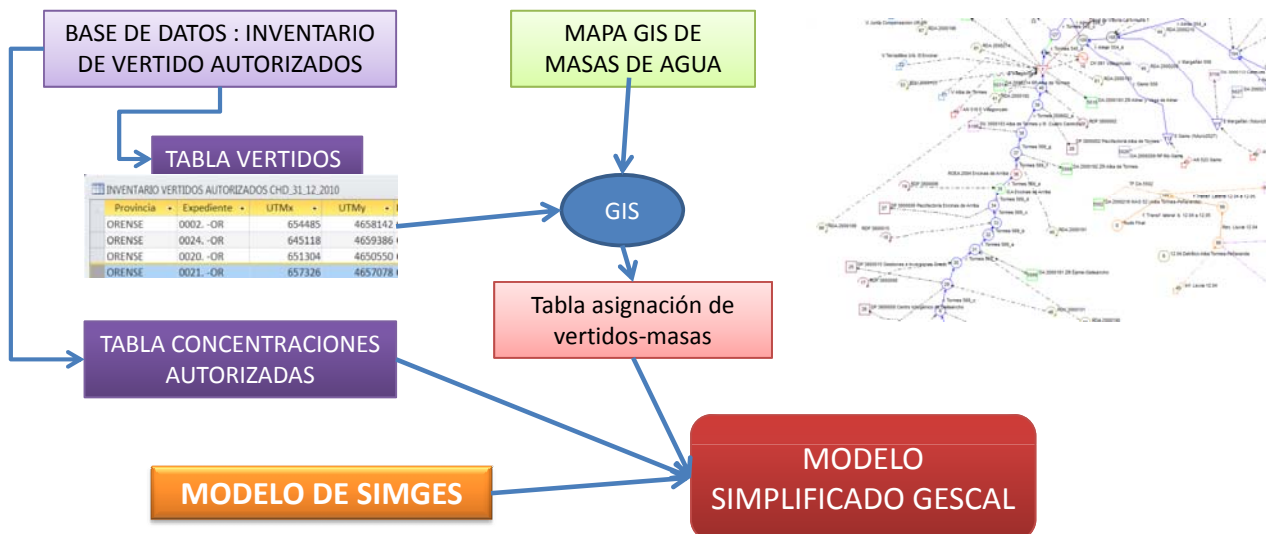
Análisis de los resultados de conductividad en la calibración, efecto del rebompeo en años de sequía, y gestión de las golos (2011)



Recent application of GESCAL

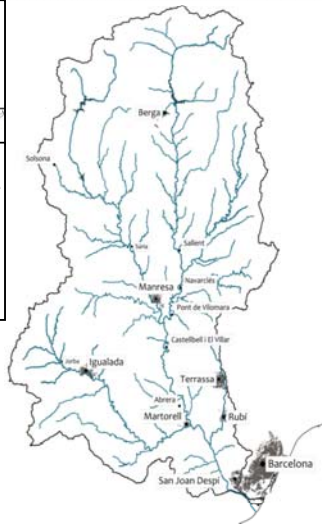
DUERO BASIN

Simplified Water Quality model for WFD quick responses

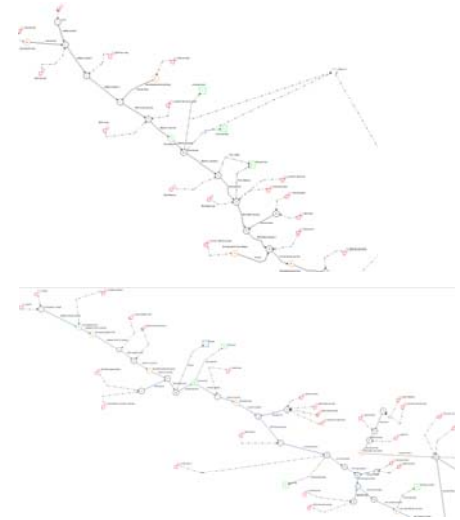


Nitratos, Fósforo, DBO5

Recent application of GESCAL



PLAN DE MEJORA DE LA CALIDAD DEL AGUA EN LA CUENCA DEL RÍO LLOBREGAT (ESPAÑA) BAJO CRITERIOS CUANTITATIVOS Y CUALITATIVOS



Assessing and predicting effects on water quantity and quality in Iberian rivers caused by global change (2009-2014). [SCARCE](#).
Consolider-Ingenio 2010 CSD2009-00065

CAUDECO MODULE

ENVIRONMENTAL FLOWS AND MANAGEMENT

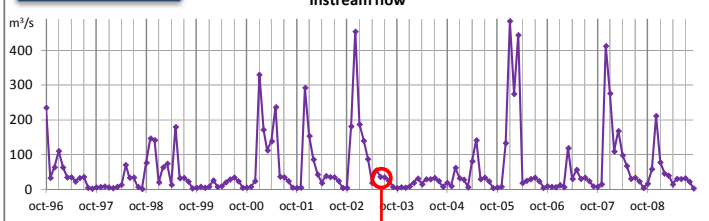
CAUDECO program

OBJECTIVE

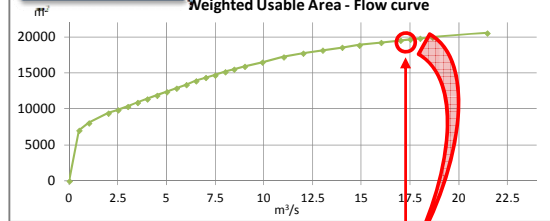
To obtain Habitat Time Series for different species and water bodies under a defined water management of a water resources system

CAUDECO inputs

SIMGES output



Habitat studies

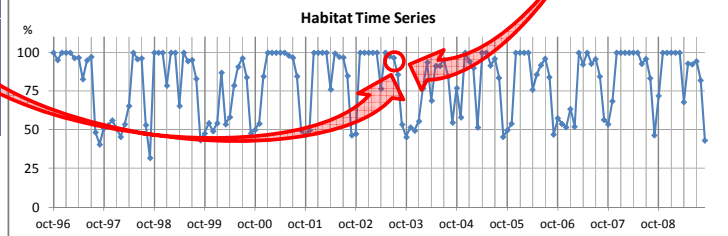


Habitat studies

Bio Periods

Species	Size	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
Luciobarbus b.	Large												
Luciobarbus b.	Small												
Squalius c.	Large												
Squalius c.	Medium												
Squalius c.	Small												

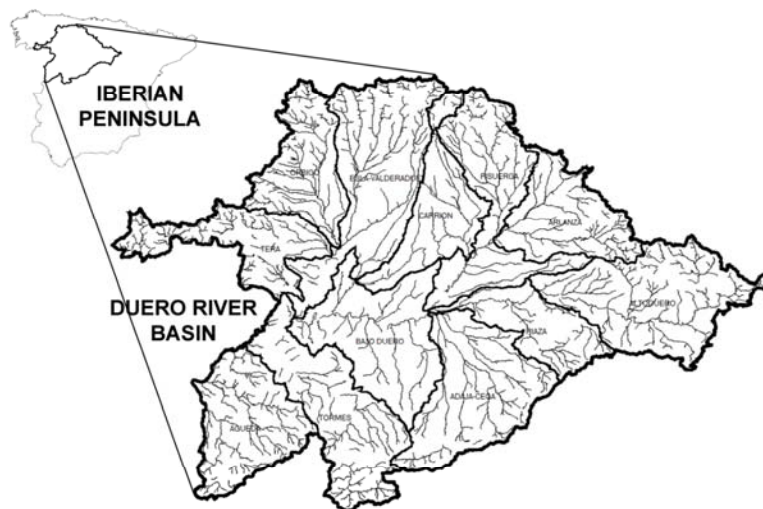
CAUDECO output



Other outputs {
 Habitat Duration Curves
 Cumulated Habitat Time Series
 Other habitat availability indicators

Recent application of CAUDECO

“IMPLEMENTING ENVIRONMENTAL FLOWS IN COMPLEX WATER RESOURCES SYSTEMS - CASE STUDY: THE DUERO RIVER BASIN, SPAIN.”

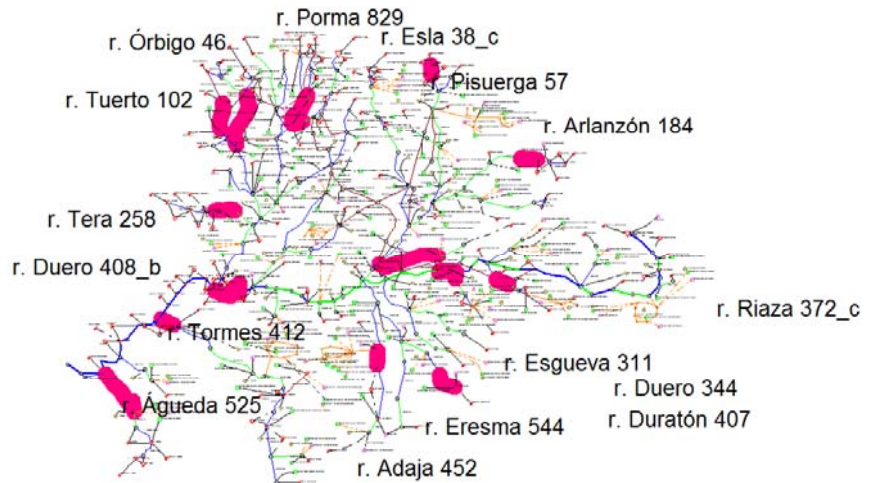


Recent application of CAUDECO

Objectives

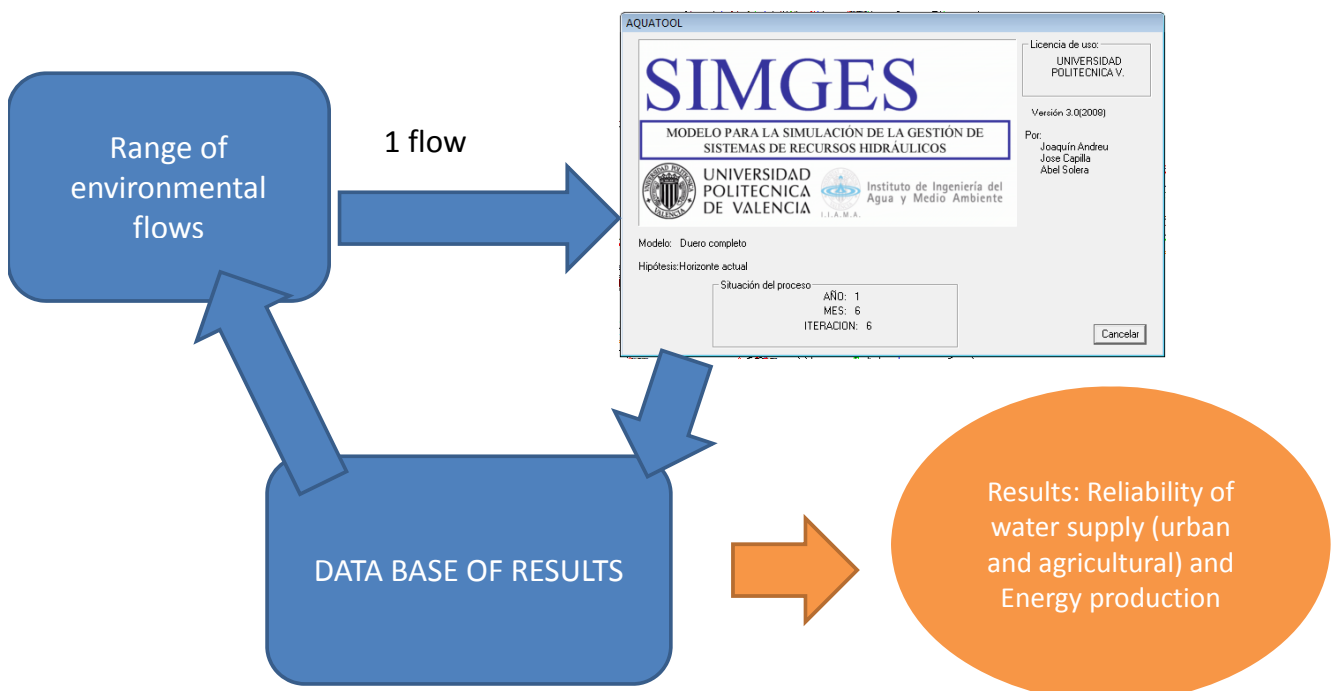
1. EFFECT. TO ASSES THE EFFCET OF 40 “NEW” ENVIRONMENTAL FLOWS IN THE DUERO RIVER BASIN OVER THE SUPPLY OF AGRICULTURAL DEMANDS, HYDROELECTRIC PRODUCTION AND HABITAT OF OTHER SPECIES.

2. OPTIMIZATION. TO DEFINE ENVIRONMENTAL FLOWS IN THE BASIN THAT REPRESENT THE MAXIMUM POTENTIAL HABITAT SITUATION MAINTAINING RELIABILITY OF WATER SUPPLY DEMANDS AND HYDROELECTRIC PRODUCTION



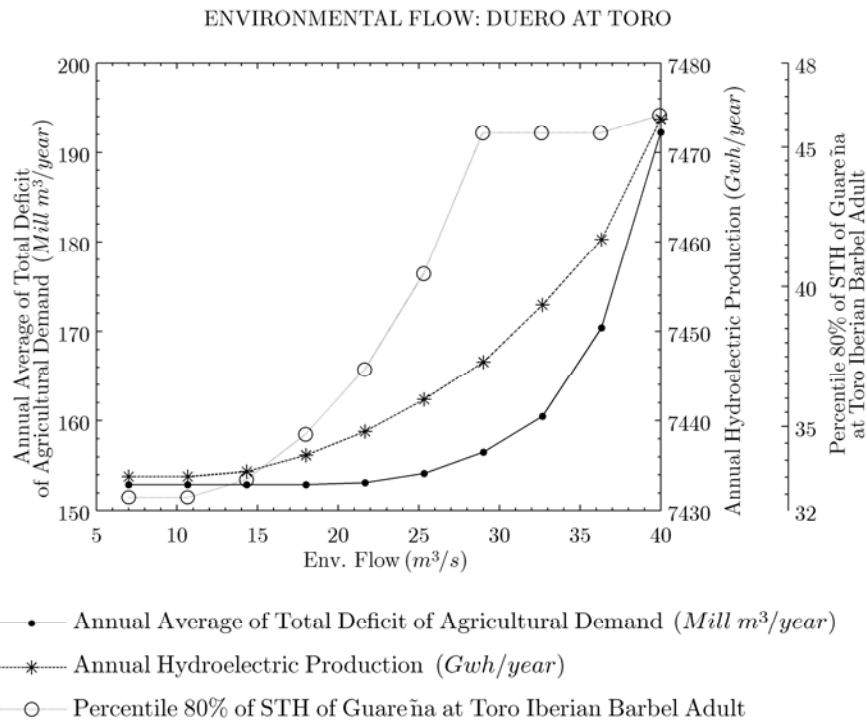
Recent application of CAUDECO

1. Estimation of effect of environmental flows



Recent application of CAUDECO

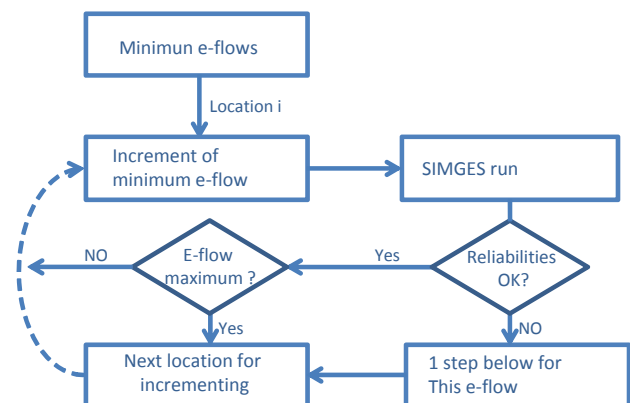
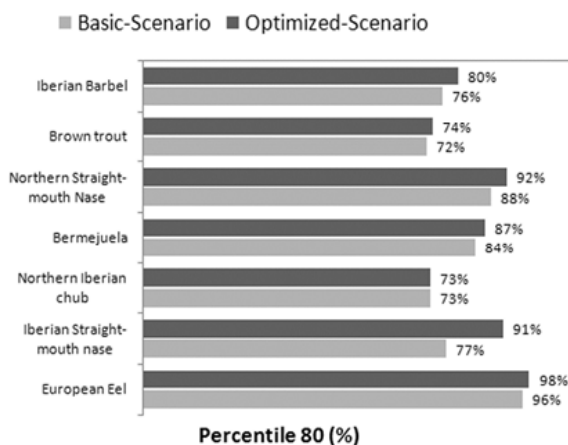
1. Estimation of effect of environmental flows



Recent application of CAUDECO

2. Optimisation of e-flows

- Defining an ORDER for increment of e-flows
- Legal Thershold for water supply of agricultural demandas

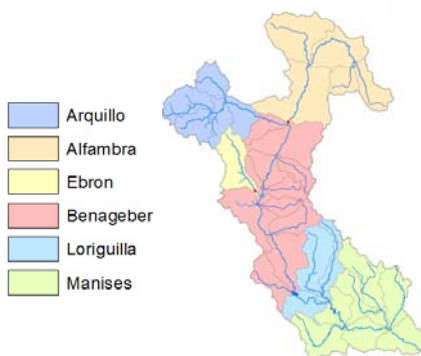


EVALHID MODULE

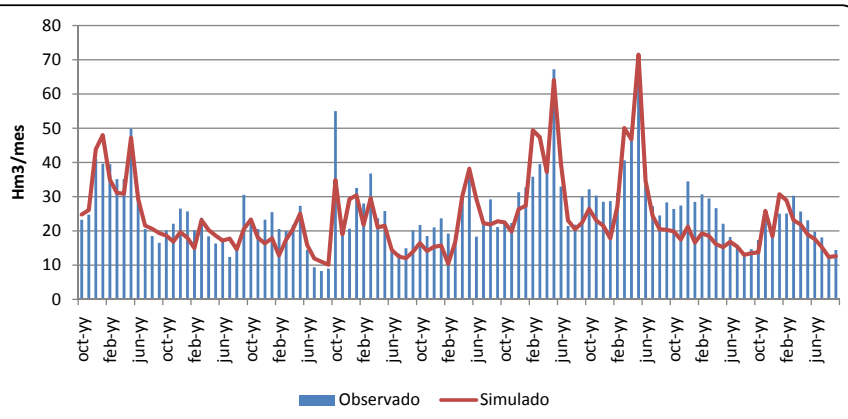
PRECIPITATION – RUNOFF MODULE

Recent application of EVALHID

“Evaluación de los recursos hídricos en la cuenca del río Turia mediante la aplicación de la herramientas EVALHID”



- Evaluation of water resources in the Turia River basin through semi-distributed models
- Use of EVALHID
- Establishing a methodology to define the data to be used and the characteristics of the calibration process



http://www.iiama.upv.es/aquatool

Bienvenido a la Intranet del Grupo de Ingeniería de Recursos Hídricos

Este portal tiene como objetivo el intercambio de conocimiento en materia de planificación y gestión de recursos hídricos.

Inicio

Desde este portal usted puede:

- Consultar y descargar contenidos públicos que se hayan publicado por miembros del GIRH o de sus colaboradores.
- Autenticarse como miembro del portal para gestionar sus propios contenidos.
- Consultar próximos eventos y agenda de reuniones.

Más información

Teléfono: +34 96 387 76 10

Fax: +34 96 387 76 18

Dirección postal: Camino de Vera S/N, 46022, Valencia, España



Global Water Partnership
Mediterranean



Tools to support and improve Integrated Water Resources Management: STRATEAU and AQUATOOL

A Mediterranean Perspective

“APPLICATION AND DEMONSTRATION OF AQUATOOL”

Javier Paredes.

Water and Environmental Engineering Institute.

Water Resources Engineering Group.

Technical University of Valencia.

jpardea@hma.upv.es

<http://www.upv.es/aquatool>

