MINISTERIO DE MEDIO AMBIENTE, Y MEDIO RURAL Y MARINO

CONFEDERACIÓN HIDROGRÁFICA DEL JÚCAR

Quality water objectives of the WFD in the Júcar Hydrological District: selection of measures through modelation

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Water Framework Directive

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ENVIRONMENTAL OBJECTIVES (art.4)

Achieve the good status of surface waters in 2015

Exceptions: establishment of less stringent objectives

- if due to natural conditions it is impossible to achieve the objectives
- if it is a highly modified water body
- if reaching the objectives results in disproportionate costs

STATUS OF SURFACE WATER BODIES (Annex V)

ecological + chemical status

Ecological status: very complex (CSI Guide)

- biological quality elements
- hydro-morphological conditions
- physical-chemical conditions

Simplification: the parameters of BOD5 and PT are "representatives"

Indicator	Limit for the good status
BOD_5	Lower than 6 mg/l
Total phosphorous	Lower than 0,4 mg/l

Measures programme

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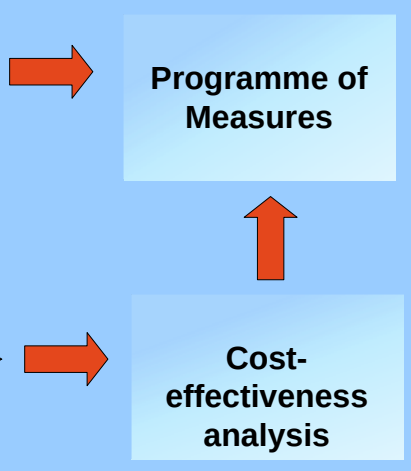
CLASSIFICATION OF MEASURES:

Basic Measures others directives:
WWTP (Directive 91/271):

Basic Measures Water Framework Directive:
WFD (Directive 2000/60/EC):

Supplementary Measures:
New WWTP in < 2.000 heq
Improve existent WWTP
Waste Water Reuse



Measures programme

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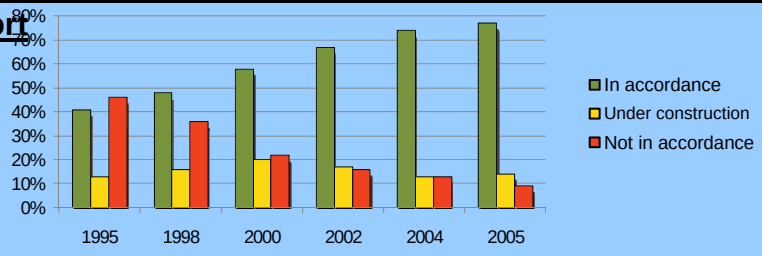
APPLICATION OF DIRECTIVE 91/271/CCE: an important effort



MEASURES OF THE NEW NATIONAL QUALITY PLAN (NQP):

• will contribute to achieve the quality objectives in surface waters marked by the WFD.
• collects measures of basic character (Directive 91/271/CEE), the improving existing installations and R+D activities.
• 2007-20015 period
• 19.007 Million euros at national scale
• 2.437 Million euros at JRD scale

GeoImpress model

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General characteristics of the GeoImpress model

- Developed with graphic script in GIS (Modelbuilder de ARCGIS 9.2)
- Intuitive modelation, the model looks like an “SQL outline”
- Admits integrated text. Allows to argument the model
- Automates and widens the calculation process started in art. 5
- Raster results in mesh 100 x 100 m throughout the whole drainage network

GeoImpress model

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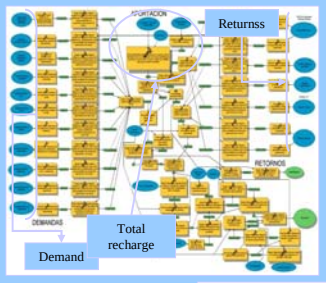
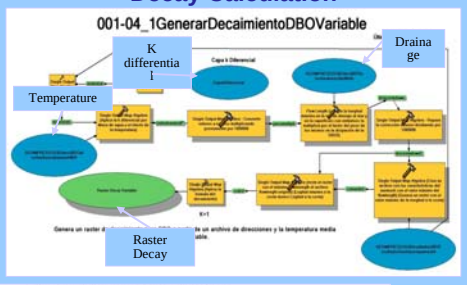
General scheme of modelation

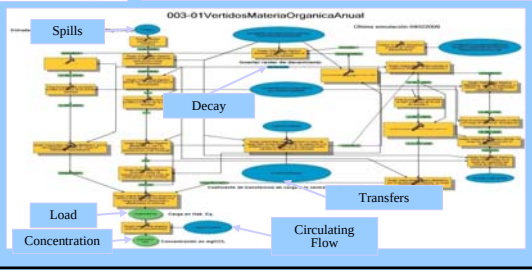
Circulation Flow Calculation



Decay Calculation



Calculation of BOD_5 concentration



GeoImpress model

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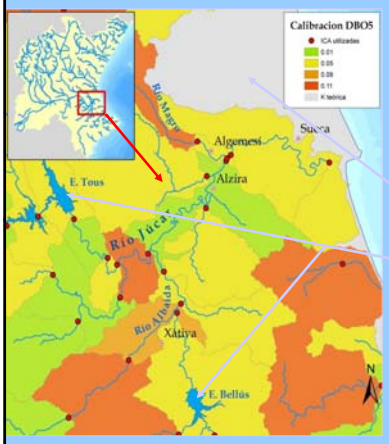
Calibration method



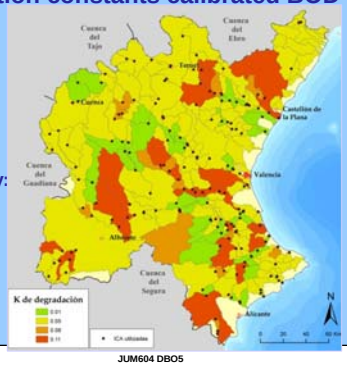
Degradation constants calibrated BOD

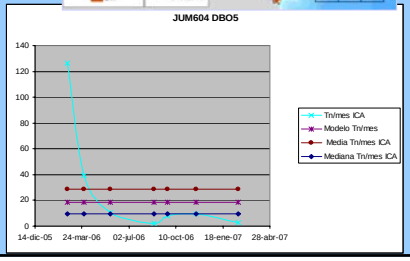
Used k typology:

-Theoretical

-Calibrated

-Reservoir





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SCENARIO SELECTION METHODOLOGY.

Trend scenario 0 2015 WITH basic measures of other Directives (91/271/CEE)

Rest of measures to reach good status and determination of exceptions

The water bodies that do NOT achieve the good status are disseminated in different sub river basins

SCENARIO A: TREATMENT IMPROVEMENT

- **If it does not comply due to BOD_5:** secondary treatment will be implemented in urbanities < 2.000 h-e affecting the water body.
- **If it does not comply due to P_T:** tertiary treatment will be adopted in urbanities > 2.000 h-e affecting the water body.

Scenario B: REUTILISATION OF 50%.

The adopted reuse volume will have to be adapted to the estimated demand of reused water on each case.

EXCEPTIONS: If adopting these measures there are water bodies not achieving Good Status, it will be necessary to suggest less rigorous objectives, due to the natural conditions of the bodies, mainly due to low circulating flow)

Scenario analysis

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SCENARIO EVOLUTION

Scenario evolution. BOD+P

SCENARIO 0
2015 measures 91/271/CEE

SCENARIO A
2015 quality improvement

SCENARIO B
2015 reuse: waste elimination

Combined status trend "spill improvement" vs. Trend "waste elimination"

	Basic measures	Waste improvement	Waste elimination
Achieve good status	249	267	286
Do not achieve GS	56	38	19
	305	305	305

Scenario analysis

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EXCEPTIONS:

Even adopting all the described measures, it is not possible to achieve the Good Status in all the water bodies, fundamentally due to spills located in sections of the river with scarce circulating flow.

Núm.	River reaches
1	Río Vinalopó
2	Río Guadalés
3	Río Girona
4	Río -magro (Requena)
5	Tramo Bajo Valdemembra
6	Rambla del Poyo
7	Bco. Carraixet
8	Río Belcaire
9	Afluentes Rambla de la viuda

Conclusions:

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•The application of Directive 91/271/CEE has allowed to solve the main problem regarding superficial water quality in Spain.

•WFD objectives require additional measures in order to achieve good status.

•Simplified models, as GeoImpress, are useful tools for analysis of additional measures or justifying exceptions.

•In Júcar River District the water bodies that do NOT achieve the good status are disseminated in different tributaries basins, so the measures will be defined in urbanities affecting the water body:

- omore advanced treatments that allow not only to eliminate organic contamination but also nutrients, specially phosphorous.
- oalso, reusing regenerated waste water (50%) is proposed with a double aim:
  - o reducing spills in reaches of rivers with low flow
  - o providing new water resources for agricultural uses.

•In some water bodies the circulating flow is so scarce that it is NOT possible to achieve the WFD objectives, making it necessary to adopt exceptions insome.

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Thank you for your attention