Instituto de Ingeniería del Agua y Medio Ambiente

UNIVERSIDAD POLITECNICA DE VALENCIA

Riparian vegetation modelling for the assessment of environmental flow regimes and climate change impacts within the WFD (RIPFLOW):

Project description

UNIVERSIDAD POLITECNICA DE VALENCIA

Technical University of Valencia

Hinc patriam sustinet
Instituto Superior de Agronomia
Universidade Técnica de Lisboa

Technical University of Lisbon

umweltbüro KLAGENFURT

Umweltbüro Klagenfurt

The Consortium & key personnel

- Technical University of Valencia (Spain)
  - Research Institute of Water Engineering and Environment: **Félix Francés** (coordinator)
  - Research Institute for Integrated Management of Coastal Zones: **Francisco Martínez-Capel**
- Tecnical University of Lisbon (Portugal)
  - Instituto Superior de Agronomia: **Teresa Ferreira**
  - Instituto Superior Técnico: **António Pinheiro**
- Umweltbüro Klagenfurt (Austria): **Gregory Egger**

Project objectives (1)

- Development of a dynamic riparian vegetation model
  - Development of the model itself
  - Implementation of the assessment of the ecological status in WFD sense
  - Creation of the software
  - Cost-effective methods for the data acquisition

Project objectives (2)

- Development of a dynamic riparian vegetation model

- Application to case studies
  - Calibrate and validate the model
  - Exploitation in national context: incorporate results in River Basin Plans
  - Exploitation in European context:
    - Identify scientific based guidelines for impact assessment
    - Identify good practices in water management for improvement ecological status

Contribution to ERA-NET IWRM Call

- Focused project
- Three research bids in the topic: “Hydrological and morphological pressures and impacts on ecological status”
  - Deliver techniques to understand and manage the impacts of altered hydrology
  - Development of tools/methodologies to asses the “ecological flow regime” of rivers
  - Deliver tools that support decision-making and policy development in extreme events

Work packages

- WP 1: Project coordination (1-24 months)
- WP 2: Generating scenarios (1-8 months)
- WP 3: Development of RIPFLOW model (4-14 months)
- WP 4: Field data acquisition and processing (8-14 m.)
- WP 5: Model application to case studies (15-24 m.)

Estimated person months per work package			
	Partner 1 (UPV)	Partner 2 (eb&p Umweltbüro)	Partner 3 (UTL)
WP 1	5	3	3
WP 2	10	5	7
WP 3	15	10	1
WP 4	12	1	8
WP 5	12	8	12
Total	54	27	31

WP 1: Project coordination (1-24)

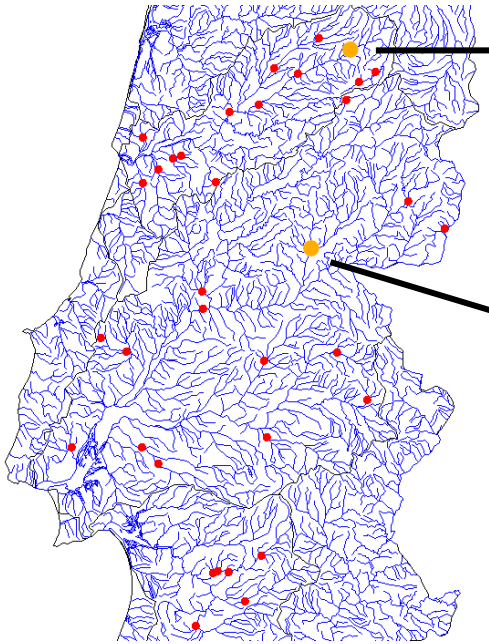
- T2.1- Management organization & decision making
  - Consensus among partners
- T2.2- The Board
  - 4 representants
- T2.3- The Coordinator: „business as usual“
- T2.4- The End-users
  - There must be an End-users panel with two-way exchange of ideas
- T2.5- Management events
  - 4 meetings. Last one open and with end-users
- T2.6- Management tools
  - Web page

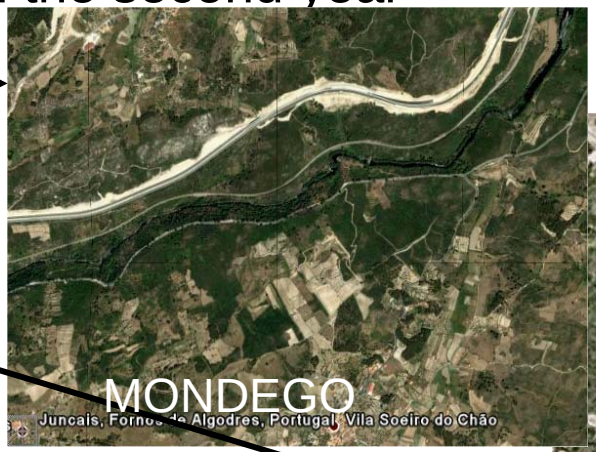
WP 2: Generating scenarios (1- 8)

- T2.1- Review and description of the most relevant impacts
- T2.2- Gathering climate information and climate change scenarios
- T2.3- Pre-selection of natural and altered study sites
- T2.4- Selection of natural sites for the biological data survey
- T2.5- Selection of case studies with altered flow regime
- T2.6- Hydrological flow regime characterization

Case studies: Portugal

- Identification of sites with gauging stations having long-term high-quality data series
- Selection of case-studies in rivers with similar drainage basins and valley forms, and with minor flow disturbance
- Disturbed sites selected in the second year



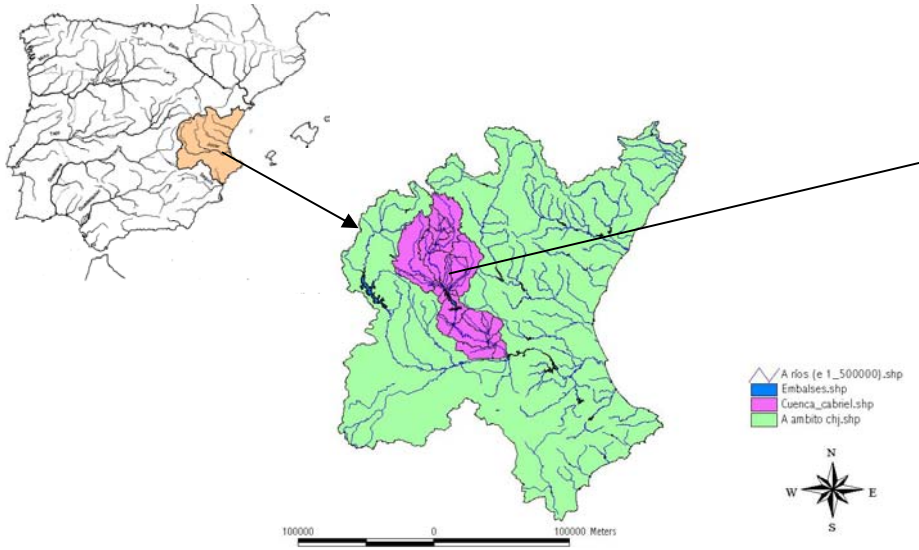


606 km2

982 km2

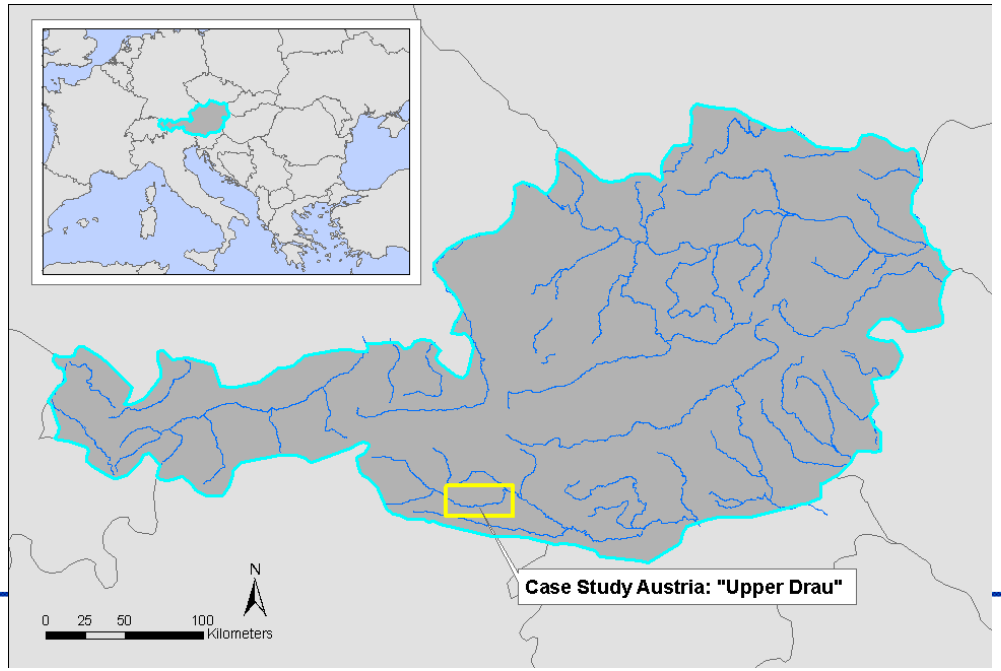
Case studies: Spain

- Cabriel River:
  - Natural site: upstream of a large dam (Contreras)
  - Altered downstream



Case study: Austria

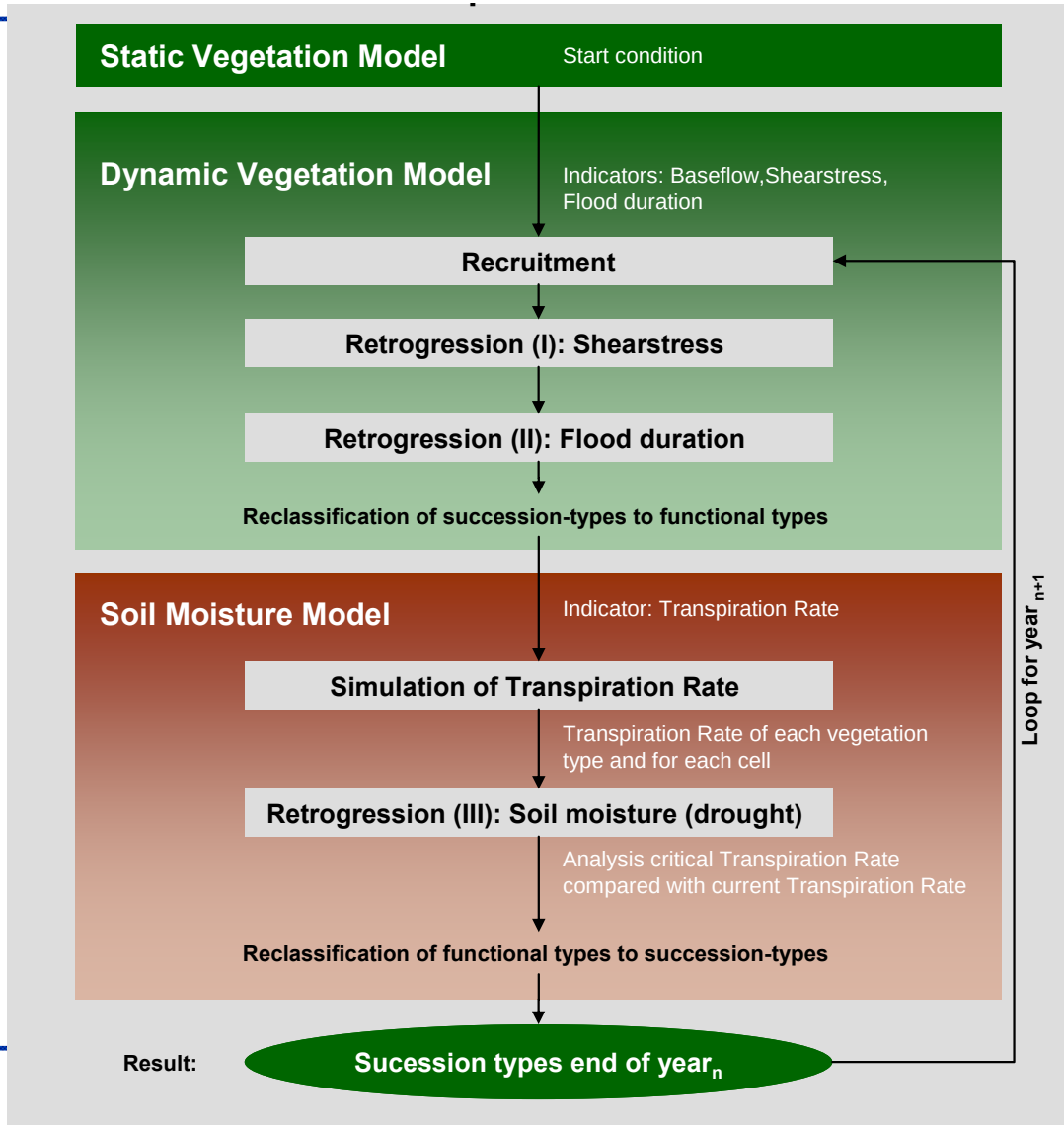
- Upper Drau: regulated river
  - 1.3 km restoration section near Klebach
  - Modelling riparian vegetation gravel banks and side channels



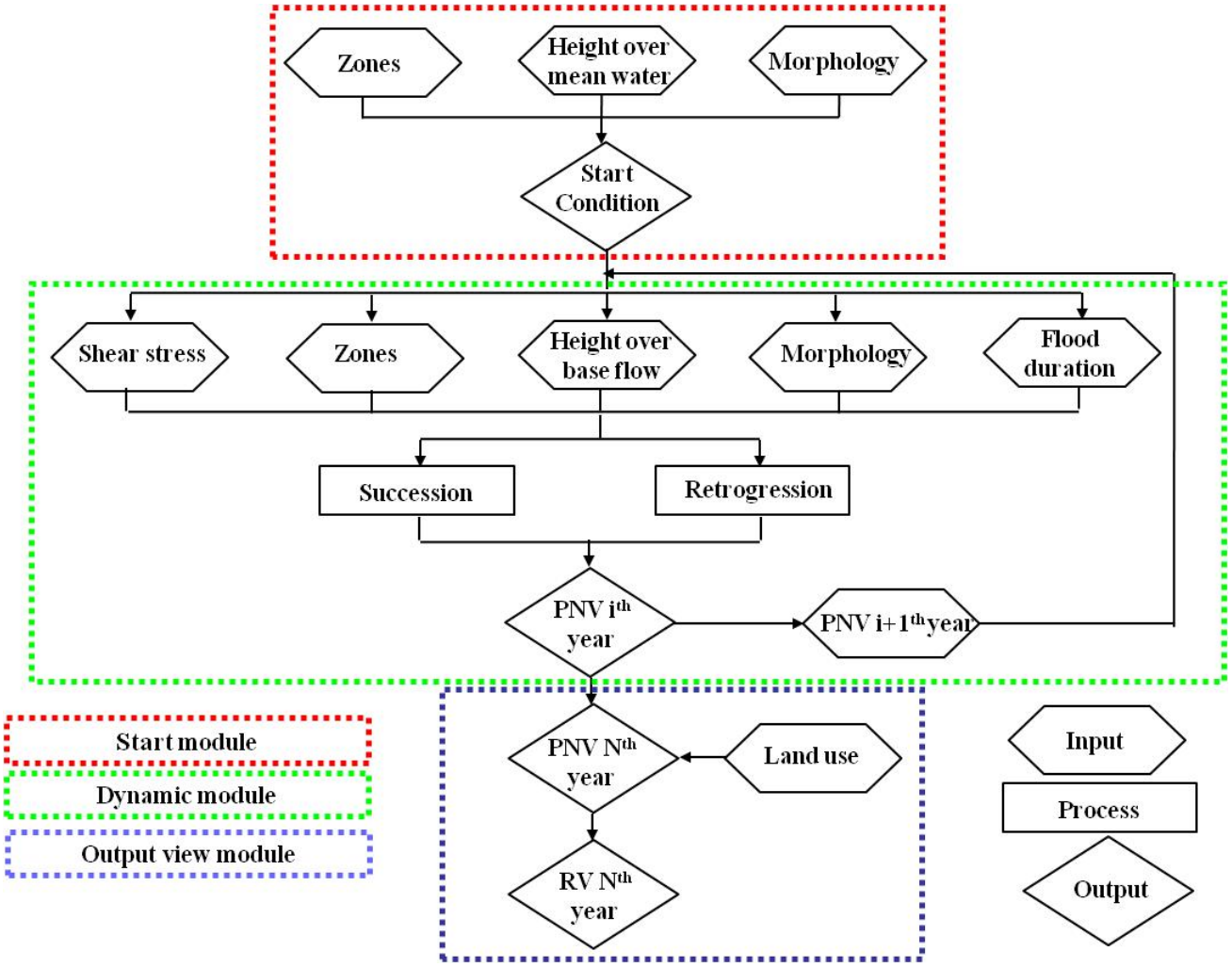
WP 3: Develop. of RIPFLOW model (4-14)

- T3.1- Definition of the main questions for water management
- T3.2- Definition of RIPFLOW information flow
- T3.3- Definition of the model conceptualization and structure
- T3.4- Programming of the model

Ripflow general structure



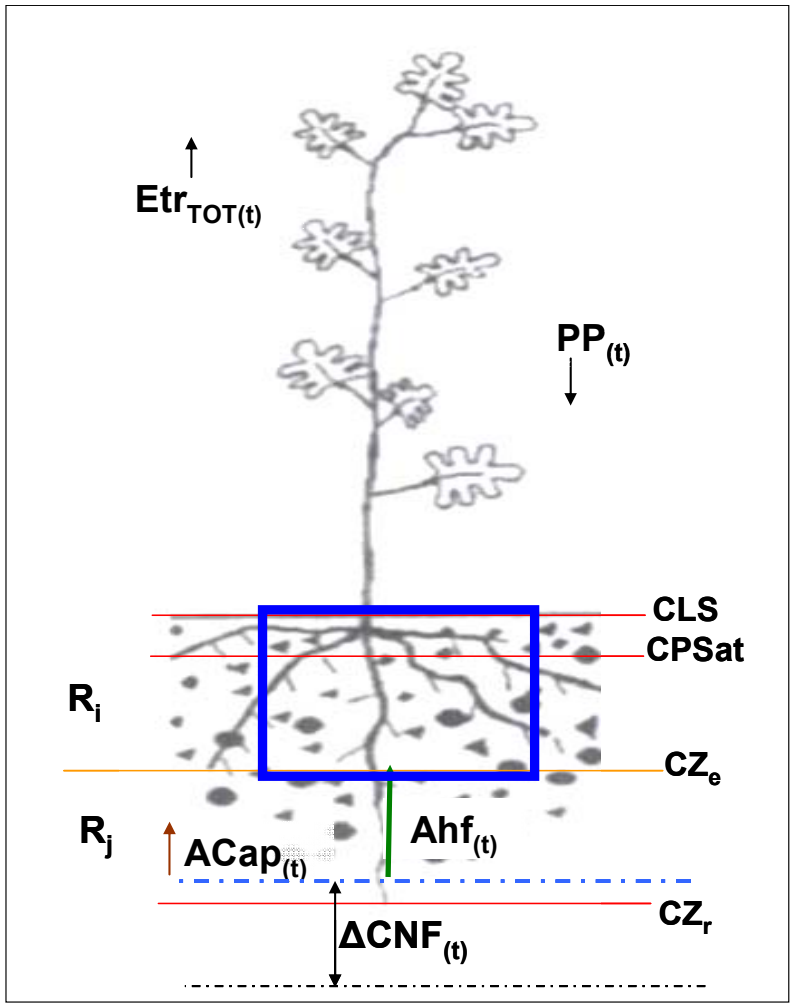
Dynamic vegetation submodel



Soil moisture submodel

- Elements:
  - Vegetation
  - Static tank
  - Saturated zone

- Inputs (time series):
  - Precipitation
  - PET
  - River daily discharges



WP 4: Field data acq. & processing (8-14)

- T4.1- Hydraulic and biological survey in natural river sites

  i) Hydrometry for hydraulic & habitat modelling (1D)

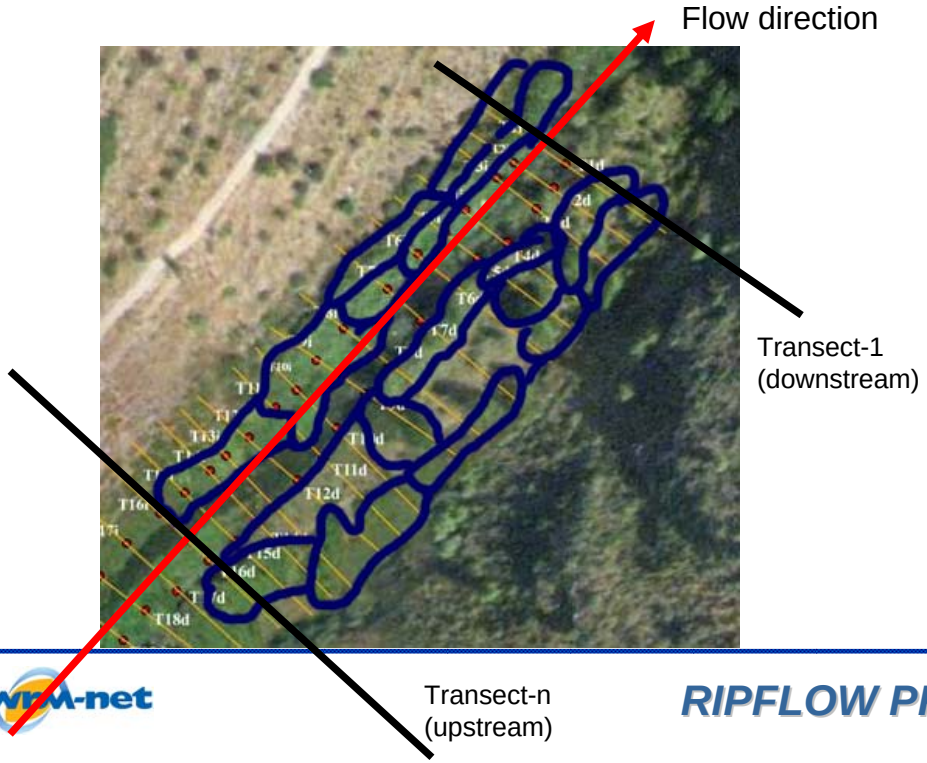
  ii) Characterizing habitat patches & vegetation

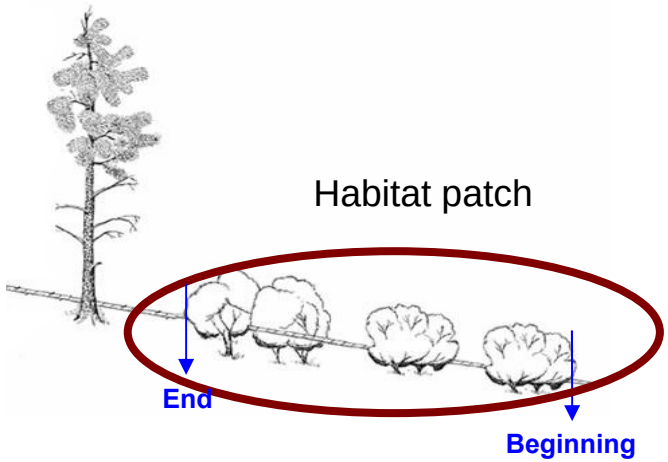
- T4.2- Biological data processing in natural rivers

- T4.3- Hydraulic and biological survey in altered river sites

Field data acquisition

- Topography survey
- Hydrometry for calibrating Hydraulic Model – 2D
- Vegetation survey by **habitat patches** within the study site (species and abundance, core samples to study age and growth) for vegetation submodel
- Soils Sampling → Texture and O.M. for soil moisture submodel





WP 5: Model appl. to case studies (15-24)

- T5.1- Calibration and validation of the model
- T5.2- Model simulations in the case studies
- T5.3- Proposal of general water management recommendations
  - Recommended rules for water management
  - Prediction of the riparian veg. structure in non-disturbed situations
  - Expected changes of the ecological status under different climate change scenarios
  - Recommended environmental flows
  - Recommended water management rules that could minimize or mitigate the future impact of the climate change on the ecological status
- T5.4 Feedbacks to the RIPFLOW model

Detailed Time Schedule

- Project duration: 2 years, starting November 3, 2008

Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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Transferring results to end-users

- Case studies results: Local end-users panel
- Methodologies:
  - RIPFLOW program (web)
  - Final Report (web)
  - Congress presentations
  - Scientific publications
- General recommendations:
  - Final Report (web)
  - Congress presentations