

## **CONSORTIUM COMPETENCE**

### **1. Universidad Politécnica de Valencia**

Two research institutes of this university will be involved in this project. The coordinator of this project belongs to the Hydraulic and Hydrology Research Group (GIHH), integrated in the Institute of Water Engineering and Environment. He also belongs to the Dep. of Hydraulic Engineering and Environment, with approximately 60 teaching personnel, 40 PhD students and 25 research assistants working in several research projects. This Department is currently the largest of its kind in Spain, and develops also a Ph. D. Program in Hydrology and Water Resources with the maximum qualification graded from the National Ministry of Education. The GIHH has more than 20 years of experience in research and consulting in Hydrology, Hydraulic and Water Resources Planning and Management. During that period, the large number of R+D+I projects executed by the GIHH members have been supported by city councils, the regional government of the Generalitat Valenciana, the Spanish Government, the European Union Framework Programs and several companies related with water. Concerning the EU, the GIHH has been involved in several research projects as FLOODAWARE, FRAMEWORK, EUROTAS and SPHERE all of them related with hydrology from different points of view. International relationships with Universities and Institutions all over the world, especially with the European Union, contribute to solve with innovative solutions the water problems, so important for our society.

Concerning the Institute of Research for Integrated Management of Coastal Zones, it has more than 10 years of experience in the study of aquatic ecosystems, from the perspectives of the aquatic fauna, riparian vegetation and environmental flow studies in different river basins, with permanent and non-permanent flow regimes. Also one professor is specialist in mathematics and applied statistics, whose contribution is important for data analysis and modelling. The group has participated in several R+D+I projects, which were funded by the regional and national government, as well as European institutions, for example the ECOSUD project. Most of these projects were related to the implementation of the Water Framework Directive and were done in cooperation with the water administration, Confederación Hidrográfica del Júcar. This basin (River Júcar) is a European pilot basin for the implementation for the Water Framework Directive, and it is the context for the Spanish case studies in this project. The technical support for the water administration includes pilot studies for environmental flow assessments, based on physical habitat simulation and habitat spatial analysis (1D and 2D models), and the evaluation of the ecological status of the water bodies based on indexes of riparian vegetation quality.

The key personnel to be directly involved in the present proposal will be:

**Prof. Félix Francés:** Full Professor at the UPV and former Vice-director of the Civil Engineering School. He graduated from this university in 1987 as Civil Engineer, has an MSc in Hydrology and Water Resources from the Colorado State Univ., and finished his PhD in 1991. From 1988 to 2007 he has participated or managed more than one hundred research projects and engineering studies in the fields of urban hydraulic modelling, stochastic hydrology, distributed hydrological and environmental modelling, flood forecasting systems, flood hazard and risk mapping, flood frequency analysis and applications of GIS in hydrology. These projects have been supported mainly by the city council of Valencia, the regional government, the Spanish national government, the European Union and private companies. He is the coordinator of another ERANET-CRUE project related to rivers hydrology, *Efficiency of non-structural flood mitigation measures: "room for the river" and "retaining water in the landscape"* (<http://www.iama.upv.es/roomfortheriver/home.html>). As a resulting of these activities, Prof. Francés has published during that period 19 research papers, 18 books and book chapters, and he has presented 72 national and international congress communications.

**Prof. Francisco Martínez Capel:** Professor at the UPV, he graduated from the Universidad Politécnica de Madrid as Forestry Engineer, in 1996, and finished his PhD in 2001. From 1996, he has participated or managed more than 25 research projects and engineering studies for the water and the environmental administrations, in the fields of river ecology, eco-hydraulics, environmental flow assessments and riparian vegetation modelling. Most of the work was done in close cooperation and communication with the regional water administration. In the European context, he participated in the project ECOSUD, *"Estuaries and coastal areas. Basis and tools for a more sustainable development"*. He is a member of the Eco-hydraulics section of the IAHR, has published 11 papers in scientific journals and congresses, and has presented 24 communications in national and international congresses.

**Prof. Olga Mayoral:** Professor at the UPV and also the Univ. de Valencia (UV), she graduated from the UV as Biologist in 1998 and is finishing her PhD on flora of the river Cabriel. In 1998 she won (with two colleagues) the Scientific Awards of the city of Castellón and published a study on environmental changes on coastal areas and the effects on its vegetation. She has published two more books and participated on chapters of other two. From 1998, she has managed more than 16 research studies, some of them on the fields of the quality of riparian vegetation supported mainly by different city councils, the regional environmental administrations of different regions in Spain, the Spanish national government, the European Union and private companies. She has recently received an honourable mention for the project of landscape adequacy and design of the "City of the Environment" in the city of Murcia, project developed together with the architects' office "bipolaire". She has published 32 papers in scientific journals and congresses, and has presented 16 national and international congress communications.

**Prof. Vicente Estruch:** Professor at the UPV, he graduated in Mathematics from the UV in 1985, and finished his PhD in the UPV in 1995. From 1992 to

2007 he has participated in eight research projects in the fields of Control Theory, Fuzzy Logic Applications and growth modelling. These projects have been supported mainly by the regional government, the Spanish national government, environmental official foundations and the UPV. He has published 10 research papers and has presented 17 national and international congress communications.

Some selected and recent publications closely related with this project are:

- Aguilella, A., J. Riera, M. A. Gómez-Serrano, O. Mayoral & E. Moreyra (2005). Evaluación del estado ecológico de los ríos de la cuenca hidrográfica del Júcar mediante el uso del índice QBR (Evaluation of the ecological status in the rivers of the Júcar River Basin using the QBR index). Ministerio de Medio Ambiente. Secretaría de estado de aguas y costas. Confederación hidrográfica del Júcar. Pp. 258.
- Baeza Sanz, D., F. Martínez Capel & D. García de Jalón Lastra (2003). Variabilidad temporal de caudales: aplicación a la gestión de ríos regulados (Time variability of flows: application to the management of regulated rivers). Ingeniería del Agua. Vol. 10, 4: 469-478.
- Bañares A., G. Blanca, J. Güemes, J. C. Moreno & S. Ortiz, eds (2003). Atlas y Libro Rojo de la Flora Vascular Amenazada de España (Atlas and Red Book of Threatened Vascular Flora of Spain). Dirección General de la Conservación de la Naturaleza. Madrid. Pp 1.072. ISBN 84-8014-521-8
- Bru, R., Coll, C., Estruch, V and Sánchez, E., Output Feedback of Forward/Backward Periodic Systems. Stability, IEEE Transactions on Automatic Control, 45, N 2, pp 319-323, 2000.
- Francés, F. & B. Botero. Flood Frequency Analysis for Extreme Events (2007). In: (Eds.) R. Ashley, S. Garvin, A. Vassilopoulos & C. Zevenbergen, Advances in Urban Flood Management. Taylor & Francis/Balkema. 123-138.
- Francés, F., I. Vélez & J. Vélez (2007). Split-parameter structure for the automatic calibration of distributed hydrological models. Journal of Hydrology, 332: 226-240.
- Gómez-Serrano, M. A. & O. Mayoral (2006). Distribución y ecología de *Rubus saxatilis* L. (Rosaceae) en el Sistema Ibérico (Distribution and ecology of *Rubus saxatilis* L. (Rosaceae) in the Iberian System). Flora Montiberica, 33: 32-36. ISSN 1138-5952.
- Martínez Capel, F., F. Hervella, M. Sainz de los Terreros & D. García de Jalón Lastra (2000). Assessing impacts of a hydropower plant: Ebro River, Spain. Hungarian Journal of Industrial Chemistry, 2: 1-6.
- Mayer P., Estruch, V., Blasco J., Jover M. (2008). Predicting growth of gilthead sea bream (*Sparus aurata* L.) farmed in marine cages under real conditions of production using temperature and time-depending models. Aquaculture Research, Accepted in February 2008.
- Medici, C., A. Butturini, S. Bernal, E. Vázquez, F. Sabater, J. I. Vélez and F. Francés. Modelling the non-linear hydrological response of a small Mediterranean forested catchment. Hydrological Processes. To be published in 2008.
- Montoya, JJ, F. Francés, J.J. Vélez & P. Julien (2006). Desarrollo de un modelo distribuido de producción, transporte y depositación de sedimentos. Aplicación en una cuenca experimental (Development of a distributed model of sediments production, transport and deposition. Application in an experimental catchment). XXII Congreso Latinoamericano de Hidráulica, Ciudad Guayana (Venezuela), publicado en CD 10 pp y en Actas 140-141.
- Quevedo, D.I. & F. Francés (2007). A conceptual dynamic vegetation-soil model for arid and semiarid zones. Hydrol. Earth Syst. Sci. Discuss., 4: 3469-3499. ISSN version Online: 1812-2116.

Ramis, J., Ferri, M., Redondo, J., Martínez, J., Estruch, V., Pastor, J. (2003). Applying Fuzzy Set Theory to the Evaluation of Sound Quality in Halls. WSEAS Transactions on Systems, 4: 1057 – 1061.

## 2. eb&p Umweltbüro GmbH

The Umweltbüro Klagenfurt consists of 20 members of staff at present. The strength of the team lies in the expertise of each individual and the ability to work in an interdisciplinary way enabling us to cover a broad spectrum of different tasks. They are therefore able to offer our clients extensive and highly specialised concepts, plans and problem solving. They work in the field of applied science on national and international level, especially in the field of floodplain vegetation and modelling. Within the field of the Water Framework Directive (WFD) the Umweltbüro works as a consultant of the administrative. Therefore the requirements of practice on tools for the implementation of the WFD are well known. The Umweltbüro has been working for many years on numerous projects on the ecological assessment of riparian ecosystems. Most of them contracted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Provincial Government of Carinthia but also by hydro power plant companies.

From 2003 to 2005 the Umweltbüro led a scientific project in which a DSS (Decision Support System) for assessing ecology on running water was developed ([www.riversmart.at](http://www.riversmart.at)). Management plans for river sites were not only elaborated for the aim of water management and flood protection but also for Natura 2000 sites (Upper Drau, Tyrolean Lech) with the goal of nature conservation. One important field of activity is the modelling of riparian vegetation. In this field Gregory Egger was staying as visiting professor at the University of Idaho (USA) for the year 2006 and in summer 2007 where he engrossed his mind in vegetation modelling.

Within the RIPFLOW project the Umweltbüro proposes to combine its experience about the practical uses of the water management and nature conservation with the scientific and technical experience in vegetation modelling.

The key personnel to be directly involved in the present proposal will be:

**Dr. Mag. Gregory Egger:** Managing director of eb&p Umweltbüro GmbH, project manager of various projects. Since 19 years Mr Egger focuses in environmental topics, especially on vegetation ecology and floodplain forests. He comprises research, planing and consulting.

Education: MSc in Botany, Phd in landscape ecology and landscape conservation, BOKU Wien; MSc in Technical environment protection, BOKU, Wien.

Expertise: 1990-1992 Research Assistant at the Institut for Meteorology and Physics, Univ. of Natural Resources and Applied Life Sciences, Wien; 1993-2003: University teaching assignment, Univ. of Natural Ressources and Applied Life Sciences, Wien; since 1992: establishment of a private office for environmental consulting and planing. He conducted various projects dealing

with ecology of waters, ecology of floodplains and modelling; 2006 – staying as visiting professor at the university of Idaho (USA): 2 university teaching assignments, project work, mentoring doctoral students); 2006: Submission of an postdoctoral thesis at the BOKU, Wien. 2007: course on “Introduction in SDSS”, part of the masterstudy Spatial Decision Support Systems on the Carinthia University of Applied Sciences (Villach).

**DI Karoline Angermann:** since 2003 working staff at the eb&p Umweltbüro GmbH. She focuses since 7 years on environmental topics, especially on the ecology of waters, evaluation of waters, creation of data bases, GIS and project management. She comprises research, planing and consulting.

Education: MSc and PhD (in prep.) in Landscape planning, BOKU, Wien. PhD thesis: Ecological evaluation of streaming waters – the decision support system (DSS) River Smart and its possibilities of implementation concerning the Water Framework Directive (2007)

Expertise: project coordination and project work an various projects in the topics Evaluation of running waters, Development of Decision Support Systems, Implementation of the Water Framework Directive, Development of methods for the river basin management plans, Development of management plans for protected areas, Ecological planning for water power stations.

**DI Karlhans Ogertschnig:** since July 2005 working staff at the eb&p Umweltbüro GmbH.

Education: MSc in Environmental Engineering, BOKU, Wien.

Expertise: 2004-2005 Kanzian Engineering & Consulting. In the he eb&p Umweltbüro GmbH he focuses on hydraulic engineering and modelling, torrent and avalanche control.

Some recent publications closely related with this project are:

- Angermann, K., G. Egger & N. Sereinig (2007). Pilot-Study: Development of measures within river basin management plans using the example of the Lavant in Carinthia/Austria. In: Österreichische Wasser- und Abfallwirtschaft (Wien), Heft 5-6: a18-a21.
- Angermann, K., G. Egger, H. Mader, M. Schneider, F. Kerle & S. Muhar (2005). Cost-effectiveness-Analysis of Heavily Modified River Sections Case study Drau (Austria). In: Harby et al. (ed.): Cost 626 European Aquatic Modelling Network. Proceedings from the final meeting in Silkeborg (Denmark), 7-13.
- Benjankar, R., G. Egger, Y. Xie & K. Jorde (2007). Reservoir Operations and Ecosystem Losses: Concept and Application of a Dynamic Floodplain Vegetation Model at the Kootenai River, USA. Proceedings of 6th International Symposium on Ecohydraulics. Christchurch, New Zealand.
- Egger, G., K. Angermann, K. Buchgraber & S. Aigner (2005). Alpine pasture assessing model – GIS-supported modelling of yield on alpine pastures. In: Strobl, J., T. Blaschke, & G. Griesebner: Angewandte Geoinformatik 2005. Beiträge zum 17. AGIT-Symposium Salzburg, 140-145.
- Egger, G., K. Angermann, H. Mader, I. Niederbichler, J. Dox, B. Häupler, C. Gabriel, F. Kerle, M. Schneider, S. Schmutz & S. Muhar (2005). RiverSmart - a decision support system for ecological assessment of impacts and measures on rivers. Hydro 2005, Villach, Austria 17-20 October 2005, Session paper (CD), The International Journal on Hydropower & Dams (Aqua-Media International), Session 13.08, 7 p.

- Egger, G., H. Mader, T. Kucher & D. Bogner (2005). Habitat modelling on running waters - using the example of the diverted river section of the power plant Laufnitzdorf/Mur (Styria, Austria). In: Österreichische Wasser- und Abfallwirtschaft (Wien), 57. Jg., Heft 5-6: 71-78.
- Muhar, S., G. Unfer, S. Schmutz, M. Jungirth, G. Egger & K. Angermann (2004). Assessing river restoration programmes: Habitat conditions, fish fauna and vegetation as indicators for the possibilities and constraints of river restoration. In: Garcia De Jalón, D. & Martínez, P. (Ed.): Proceedings of the Fifth International Symposium on Ecohydraulics Aquatic Habitats: Analysis and Restoration, 1: 300-305. Madrid.

### **3. Inst. Sup. Agronomia/Technical Univ. of Lisbon**

The Agronomy Institute (ISA) of the Technical University of Lisbon (UTL) was created in 1852 and has ministered graduation courses on Agronomical and Forest Engineering ever since. The Agronomy Institute is also devoted to research in various fields. ISA has a teaching staff of 154 Professors, 176 members of administrative and ancillary staff and ca. 3000 students. The Forest Research Centre (CEF, [www.isa.utl.pt/def/](http://www.isa.utl.pt/def/)) is considered since 1999 as the top research institution in Forest Sciences in Portugal, based on international expert-based evaluations promoted by the Ministry of Science and High Education. Current fields of research cover silviculture, forest inventory, growth and yield modelling, tree ecophysiology and genetics, riparian ecology, forest hydrology, game and wildlife management, freshwater and fisheries management, fire ecology, wood and cork science and technology. Research is carried out in collaboration with other Portuguese and Foreign Universities and Research Institutes as well as with the forest industry, the Portuguese Forestry Services and wood producers organizations.

The freshwater research group of CEF ([www.isa.utl.pt/def/waterlobby/](http://www.isa.utl.pt/def/waterlobby/)) presently includes 1 permanent faculty members, 5 post-graduation researchers and 2 field auxiliary elements. Research activities are made within the scope of PhD theses, of national and international research projects, and as part of a permanent collaboration with the Portuguese Forest Services and the Portuguese National Water Institute. ISA research staff is presently involved in 182 R&D projects. Of these, 36 are international EU-funded projects and ISA is leading 4 of these international teams. The ISA/UTL team has been involved in the assessment of climate change (project [SIAM-Climate Change in Portugal](http://www.siam.fc.ul.pt/siam.html), <http://www.siam.fc.ul.pt/siam.html>), contributing to predict the evolution of freshwater communities and ecosystems under future rainfall and temperature scenarios. In the last four years, the ISA/UTL team has been deeply involved in the implementation of the ecological assessment for the Water Framework Directive, and contracted by the National Water Institute to identify a network of reference sites having non-disturbed ecological conditions and to study pressure drivers for riparian and aquatic communities (contract n°2003/067/INAG). The team also participated in European projects related to the implementation of the WFD, namely [STAR](http://www.eu-star.at) (<http://www.eu-star.at>), [FAME](http://fame.boku.ac.at) (<http://fame.boku.ac.at>) and the ongoing [EFI+](http://efi-plus.boku.ac.at/summary.htm) (<http://efi-plus.boku.ac.at/summary.htm>). ISA/UTL team has also experience in riparian ecology, including distribution patterns and their changes over space and time, either in composition, structure

or tree growth (national research project FCT POCTI/AGR/46842/2002). The project [RIPIDURABLE](http://www.ripidurable.eu/) (<http://www.ripidurable.eu/>) - Interreg IIIC-SUD n° 3S01251 Gestion Durable de Ripisylves lead by the team, addressed riparian ecology and produced experimentation on riparian restoration in two case studies. Ecohydraulics has also been a field of work for ISA/UTL team, in what concerns habitat simulation studies for fish and minimal flow requirement assessment, including RHABSIM simulation (performed on an applied research contract in regulated river Lima for the National Conservancy Council), river 2D habitat simulation on a regulated river in Algarve region for the prediction of river restoration activities (contract n° 2004/057/INAG) and a minimal flow assessment for the protection of sea lamprey spawning, in late nineties, funded by the National Forest Service, identifying the wetted perimeter related to usable areas of lamprey nesting.

The key persons to be directly involved in the present proposal will be:

**Maria Teresa Ferreira.** Biologist, MSc in Limnology, PhD in Natural Resources Management in 1992, is an Associate Professor at the Forest Department. Her expertise and teaching skills address the ecology and management of freshwaters. Research activities are centered in riparian ecology and wetland vegetation (distribution patterns, environmental drivers and effects of human pressures) and the assessment of ecological quality (notably using riparian, macrophyte and fish communities). She has been involved in the Water Frame Work implementation in Portugal since 2002.

**António D. Fabião.** Forest Engineer, PhD in Natural Resources Management in 1987, is an Associate Professor at the Forest Department, and he works on forest ecology. In the last years, he has been conducting research on riparian vegetation, including breeding techniques, field survival and riparian restoration.

**Francisca Aguiar.** Agronomist, MSc in Plant Protection, PhD in Natural Resources Management in 2003, has presently a long-term research contract. She has been involved in riparian ecology since late nineties, including distribution, patchiness and compositional types, fragmentation of riparian corridors under the influence of human pressure present and past, the evaluation of ecological quality of the riparian component, and the invasiveness of riparian corridors by exotic species.

**António N. Pinheiro** (sub-contrat). Civil Engineer, PhD in Civil Engineering - Hydrology and Hydraulics in 1994, is an Associate Professor at the Technical University of Lisbon, Department of Civil Engineering. He has been cooperating with the ISA team for years in the field of eco-hydraulics, namely one-D and two-D models on river hydraulics, assessment of minimal flow requirement, and hydraulics of fishpasses.

Some selected and recent publications related with the project:

Aguiar, F.C. & M.T. Ferreira (2005). Human-disturbed landscapes: effects on composition and integrity of riparian woody vegetation in Tagus river basin, Portugal. *Environmental Conservation*, 32 (1): 30-41.

- Aguiar, F.C., M.T. Ferreira & A. Albuquerque (2006). Patterns of exotic and native plant species richness and cover along a semi-arid Iberian river and across its floodplain. *Plant Ecology*, 184: 189-202.
- Aguiar, F.C., M.T. Ferreira, A. Albuquerque & I. Moreira (2007). Alien and endemic flora on reference and non-reference sites from Mediterranean-type streams of Portugal. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 17: 335–347
- Berneiz, I., H. Daniel, J. Haurly & M.T. Ferreira (2004). Combined effects of environmental factors and regulation on macrophyte vegetation along three rivers in Western France. *River Research and Applications*, 20: 43-59
- Ferreira, M.T. & F.C. Aguiar (2006). Riparian and aquatic vegetation in Mediterranean-type streams (Western Iberia). *Limnetica*, 25 (1-2): 411-424.
- Ferreira, M.T., F.C. Aguiar & C. Nogueira (2005). Changes of riparian woods over space and time: influence of environment and land use. *Forest Ecology & Management*, 212: 145-159.
- Ferreira, M.T., P. Rodríguez-González, F. C. Aguiar & A. Albuquerque (2005). Assessing biotic integrity in Iberian rivers: development of a multimetric plant index. *Ecological Indicators*, 5: 137-149.
- O'Hara, M., A. Baattrup-Pedersen, R. Nijboer, K. Szoszkiewicz & M.T. Ferreira (2006). Macrophyte communities of European streams with altered physical habitat. *Hydrobiologia*, 566(1): 197-210.
- Oliveira, J., M.T. Ferreira & A.N. Pinheiro (2004). A simple method for assessing minimal flows in regulated rivers: a case of sea lamprey reproduction. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 14: 481-489.
- Rodríguez-González, P.M., M.T. Ferreira, A. Albuquerque, D. Espirito Santo & P. Ramil-Rego. In press. Spatial variation of wetland woods in the latitudinal transition to arid regions: a multiscale approach. *Journal of Biogeography*.
- Rodríguez-González, P., M.T. Ferreira & P. Ramil-Rego (2004). Northern Ibero-Atlantic wetland woods: vegetation types and within-stand structure. *Forest Ecology & Management*, 203: 261-272.