



Venice in Peril

THE BRITISH COMMITTEE FOR THE PRESERVATION OF VENICE



UNIVERSITY OF CAMBRIDGE
Committee for Interdisciplinary Environmental
Studies (CIES)



CORILA
Consortium for co-ordination of research concerning
the Venice Lagoon System

FLOODING AND ENVIRONMENTAL CHALLENGES FOR VENICE AND ITS LAGOON: CREATING AN INTERNATIONAL FORUM FOR DEBATE

**WORKSHOPS SUMMARY REPORT
(Cambridge, 9th-20th September 2002)**

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1.0 Introduction

1.1 Background to the project

Cambridge University Committee for Interdisciplinary Environmental Studies (CIES) and Churchill College Cambridge in collaboration with the Venice in Peril Fund (the British Committee for the preservation of Venice) are undertaking a three-year research project focussing on the flooding and environmental challenges for Venice and the Venice Lagoon. The project is carried out in association with the Venice based Consortium for co-ordination of research concerning the Venice Lagoon System (Corila).

The mission is to promote the objective study and review of information concerning key aspects of the flooding and environmental issues relevant to Venice, in an international dimension. The scope of the project is to:

- ? Support through discussions, workshops and an International Meeting, the exchange of information between researchers from around the world and from different disciplines, working on similar problems to facilitate a fruitful exchange of knowledge;
- ? Provide realistic analysis of the environmental issues for Venice;
- ? Promote widespread recognition of the flooding issues and related environmental problems of Venice.

The safeguarding of Venice has been an on-going issue since its beginnings and interventions to protect Venice in its unique setting, the Lagoon, have been undertaken for many centuries. Last century the world was awakened to the serious threat to the existence of Venice in the long-term by a large flood in 1966. Since then a large body of work has been accumulated in Venice - studying, explaining and raising solutions to the problem of flooding and wider measures to combat issues such as environmental degradation of the lagoon. Interventions and lagoon management policies have been set out in successive iterations of the special laws for safeguarding Venice (Special Law no. 171/73; 798/84; 139/92). The Italian Government has taken

major steps during the past year to proceed with a number of major interventions to regulate/control the hydrodynamics of lagoon/sea exchanges, in addition to on-going works for environmental restoration of the lagoon ecology and morphology. Hence this Venice in Peril initiative is especially timely. Furthermore, the depth of acquired knowledge on Venice, development and implementation of safeguarding measures and other key issues could also be relevant to other locations worldwide.

The project seeks to become an inter-disciplinary forum for discussion and involves organisations from Italy, Europe and worldwide, communicating the Venice situation internationally and showing that Venice experience can help other locations and, equally, experience from elsewhere can contribute to Venice. This initiative will also respond to the need to establish cross-disciplinary thinking to fully cover all the complexities of Venice's "problems" as well as the need for greater consensus on the baseline information characterising the Venice lagoon system. Taken together, these approaches will contribute to the development of a better understanding of sustainable environmental management solutions for this most unique city and its surroundings .

By supporting the work of existing bodies (mainly but not exclusively in Italy) which have been tackling issues relevant to safeguarding Venice, the project includes a review of the current understanding on Venice Lagoon using available scientific and technical data, and promoting direct communication between key scientists and engineers all with a view to providing further assessment of proposed solutions.

1.2 Action Plan

In broad terms the action plan contemplates the following:

1.2.1 *Information gathering process.* This includes highlighting relevant investigative reports, papers, key issues, proposed solutions and lists of experts. It also involves creating appropriate linkages to database cataloguing projects that are presently on-going in Venice.

1.2.2 *Technical workshop series - Cambridge, September 2002.* Each workshop focused on a particular discipline, albeit that within each session inter-

disciplinary links were addressed. The following five workshops were undertaken between 9th and 20th of September, 2002:

- i) Venice flooding; architectural and structural issues (Monday 9th September, 2002);
- ii) Engineering solutions to the flooding of Venice (Friday 13th September, 2002);
- iii) Physical and ecological processes in the Venice Lagoon (Thursday 12th September, 2002);
- iv) Mathematical modelling of hydrodynamics, water quality and morphology of the lagoon (Friday 20th September, 2002); and,
- v) Global environmental change, uncertainty and risk: Venice and the North Adriatic Sea (Wednesday 18th September, 2002).

The aims of the Workshops were to:

- o Start to build a community of researchers for September 2003 International Meeting;
- o Outline the key issues relating to the scientific understanding of phenomena governing Venice and proposed interventions and solutions to combat the flooding and environmental problems that should be addressed at the international meeting; and
- o Develop consensus on the state of knowledge regarding Venice and its lagoon system.

1.2.3 *International Meeting - Sunday 14th to Wednesday 17th September 2003.* The meeting will take place at Churchill College, Cambridge. Its primary aim is to facilitate an interdisciplinary debate of the issues facing Venice and develop

greater consensus and cohesion regarding our understanding of the Venice Lagoon system and safeguarding measures.

1.3 Website

A website has been set up, hosted by the Department of Geography, University of Cambridge (<http://ccru.geog.cam.ac.uk/events/venice2003/>) and will be linked to the Venice in Peril, Corila and other relevant websites.

2.0 Summary of key issues emerging from the Workshops

This Chapter presents a list of key issues taken from discussions at the Workshops held in Cambridge in September 2002. A draft summary of key issues for each workshop was sent to participants and their suggestions were incorporated in the write-ups that follow. These questions, in turn, will form the basis of the programme being developed for the International Meeting in September 2003.

The overall structure of the International Meeting includes an initial discussion of engineering interventions and immediate needs; a full programme of scientific sessions; and a concluding discussion forum. In the scientific sessions, we envisage a plenary address that covers the general field; the possibility of up to four 20-minute talks based around the issues raised below; and, a technical session for data elaboration issues, including communication issues. In addition, to give everyone an opportunity to present relevant work there will be poster sessions that will start with individuals having the opportunity to give a 3-minute introduction to their work.

2.1 Venice Workshop 1: Urban Flooding; Architectural and Structural Issues

Magdalene College, 8th/9th September 2002

2.1.1 *Key issues for the paper session at the International Meeting*

1. What are the key issues determining relative water level in the city? E.g. varying subsidence rates, tide propagation within the canal network.
2. What urban parameters should, or could, influence and determine barrier closure regime with respect to floods? (E.g. the water level at which damage begins for specific structure types e.g. buildings around Piazza S. Marco, maximum frequency possible for barrier closure in terms of flushing sewage, erosion effect of outgoing tide on a micro-scale (e.g. inside cracks on building facades) and possible regulation of flow velocities to abate these negative effects).
3. Are there any examples from other cities where indices have been developed to quantify and compare the degree of seriousness of different types of damage?
4. To what elevation might local protection measures go without compromising architectural integrity?
5. What measures are available to protect buildings from higher average water level as well as possible increase frequency of *acque alte*? (E.g. abatement and remediation of humidity and salt infiltration).
6. What are the conflicts in planning and undertaking the conservation of public v. private buildings and in reconciling residential v. commercial uses of buildings and prioritising access to them?
7. How does water flood into, and drain from, urban interiors and can this network of flow routes be mapped and managed and structural uplift problems be avoided?¹
8. What are the key canal maintenance issues, especially regarding sediment management taking factors such as sources of sediment, dynamics (currents, boat traffic and turbulence) and control (dredging, disposal of dredged materials, impacts on structural integrity of building).

2.1.2 *Technical and data questions for the technical session at the International Meeting*

1. How does the tide and tidally transported sediments move through the canal network in the city? What are the sources of canal sediments within the city?

¹ Including tidal flow, groundwater flow, rainfall runoff and discharges.

2. In what ways, and through what mechanisms, does boat traffic exacerbate environmental problems in the city's canals and how might these problems be mediated by boat traffic control?
3. What range of techniques are available to mitigate the lateral and vertical migration of water and salts through different building materials? What do we still need to learn about the processes involved?
4. Is ground modification a viable option and at what scale?
5. How can elevational and positional data on the fabric of the city be managed in an efficient, integrated and accessible manner?
6. What are the consequences of atmospheric photo-reactivity for building materials e.g. stone degradation?

2.2 Venice Workshop 2: Engineering Solutions to Storm Surge Flooding of Venice

Churchill College, 12th/13th September 2002

2.2.1 Key issues for the paper session at the International Meeting

1. What lessons can be learnt from existing barriers and large-scale flood control schemes around the world in relation to the barrier technology proposed for Venice?
2. What are the barriers to protect against? How often will they be closed? Can the barriers be used for purposes other than flood control (e.g. to improve lagoon flushing rates)?
3. How do the barriers fit in with other interventions as an integrated solution to the flooding and environmental management of Venice?

2.2.2 Technical and data questions for the technical session at the International Meeting

1. How can we assess the likely reliability of barrier operation and what are the possible modes of failure or malfunction (e.g. oscillation of individual tidal flaps/gates)?
2. How can a modern sewage system be established throughout the city? What are the constraints to the design and implementation of such a system?
3. How can contaminated dredged material from the Lagoon be disposed of safely in this region?
4. The implementation of large scale engineering projects giving relevant case-histories from other locations while also recognising the country specific nature of project management.
5. The feasibility of investigating and undertaking numerical modelling on the movement of the gates proposed.

2.3 Venice Workshop 3: Physical and Ecological Processes of the Venice Lagoon

Churchill College, 11th/12th September 2002

2.3.1 Key issues for the paper session at the International Meeting

Sediments

1. How can the ecological integrity of the lagoon be defined? To what extent can the systems be manipulated? How does the Venetian Lagoon compare with other Italian and European Lagoon systems?
2. What are the sediment linkages between adjacent drainage basins and the Lagoon? Can we reintroduce the river sediments into the Lagoon system? What is needed to build and implement an integrated catchment management plan?
3. What are the patterns of erosion, sedimentation and sediment transport in the Venice Lagoon. How many sub-systems are there? Is the system adjusted to normal or “extreme” events? How does boat traffic affect these processes?
4. What are the possible measures to mitigate the present general trend of progressive deepening of shoals, filling-up of channels and erosion of salt marshes?
5. What are the linkages between hydrodynamics, geomorphology and ecological function?

Water quality

6. What are the trends in water quality within the lagoon and how is water quality likely to change in the future? What are the sources and inputs? What source control measures are in place?
7. What is the seasonal eutrophication situation in Venice Lagoon? What methods and technologies exist to reduce nutrient inputs to the Lagoon (both nitrate inputs from the drainage basin and also ammonia nitrogen inputs from untreated wastewater of Venice)?
8. What contaminants are present in the Lagoon sediments? To what extent do these contaminants exchange with the overlying water column and how important is the lagoon flushing to the removal of contaminants? Will the contaminants degrade *in situ* or will they need to be contained or removed and treated?
9. What public health and hygiene issues are of concern, if any (e.g. biomagnification of contaminants in fish)?

2.3.2 *Technical and data questions for the technical session at the International Meeting*

1. How can remote sensing aid the identification of processes and problems in the Venice Lagoon?
2. How do we undertake habitat restoration and environmental restoration in Venice Lagoon (e.g. using dredged material to create salt marshes; technologies for environmental restoration)? What is the likely feedback between restoration and Lagoon functioning?
3. What data to collect? How to use the data? How good is the data? What does the data mean?
4. What measurements techniques need to be developed: what should be measured and how?
5. What would be the consequences of prolonged lagoon-entrance closures (e.g. by MOSE) on the sediment, pollution and structural deterioration processes?

2.4 Venice Workshop 4: Venice Lagoon: Modelling the Hydrodynamics, Morphology and Water Quality

Pembroke College, 19th/20th September 2002

2.4.1 Key issues for the paper session at the International Meeting

1. How can we improve water level forecasting capability?²
2. How can we build on and improve the hydrodynamic, morphological and water quality modelling of processes inside the lagoon?³
3. What are the dominant processes that need to be represented in ecological models? How few processes can be represented in a model that will still give a good representation of the system?
4. How much small-scale detail do we need in order to deal with larger scale effects? E.g. How do we represent the channel network? How do we deal with modelling long-term morphological change of the lagoon and linking physical processes to ecological processes?
5. How far should we rely on detailed, physically-based models of the hydrodynamics of the lagoon, and what potential exists for alternative forms of reduced-complexity models?
6. What are the key questions, and to what extent is the research effort focussed in terms of identifying appropriate model types to address particular questions; and to what extent might those different model types have different data requirements?
7. How should models of the lagoon be coupled with models of the contributing catchments, in order to best represent the effects of water, sediment, and solute inputs and their dynamics?

2.4.2 Technical and data questions for the technical session at the International Meeting

1. What datasets are available for model calibration and validation? Can existing data sets be more accessible in a usable form to the scientific and technical community working on Venice?
2. How do we communicate the modelling process (language issue)?
3. What new monitoring should be undertaken to add to existing data sets, which will include not only observations in single points of hydrographic data but also spatial information of relevant data on mud and sand properties, seasonal

3. The critical issue is the weather forecast (wind and pressure), quality, frequency and resolution.

4. I.e. calibration and validation of an integrated modelling complex: waves, currents, mud and sand transport and water quality.

processes under various hydrodynamic, water quality, salt and temperature conditions?

2.5 Venice Workshop 5: Global Environmental Change, Uncertainty, Risk and Sea Level Rise in the North Adriatic Sea

Jesus College, 17th/18th September 2002

2.5.1 Key issues for the paper session at the International Meeting

1. What components make up the “mean sea level” signal over the historical record and how might these be better identified and isolated?⁴
2. What has been the role of changing inlet configuration and other interventions (e.g. Canale dei Petroli) on water level characteristics?
3. Can we improve understanding of natural variability of *acqua alta* high tides?
4. What is the likely future trends in sea-level changes?
5. What is the likely future trends in the frequency and intensity of extreme events? What are the difficulties associated with their prediction? Can we look at a set of scenarios and historic data regarding surge frequency, duration, projected closures and come up with plausible scenarios (frequency and intensity) of the future of the extreme events and likely barrier closures required?
6. Would the projected gates (MOSE) be an adequate defence against flooding in the case of the near-future sea-level rise predicted by climatic models?

2.5.2 Technical and data questions for the technical session at the International Meeting

1. Can we reach a consensus on historical data: geology, meteorology and water levels, numbers and interpretation?
2. What guidelines can be given for monitoring mean sea level rise in future?
3. Can we get a better understanding of meteorological trends of past 40-50 years - pressure, wind direction, rainfall (intensity versus total)?

⁴ Including the significance of rainfall and river discharge for Venice water levels and Venice lagoon?

3.0 The Workshops – General points

3.1 General conclusions from the Workshop

Through the workshops we were able to:

- ? Identify key *flooding and environmental issues* for Venice that should be taken forward for further discussion at the International Meeting in September 2003;
- ? Identify *research requirements*. Here we distinguish between immediate applied research requirements (in part related to the execution of the barrier project and other safeguarding measures) from the longer term broader research needs for the Venice Lagoon system;
- ? Highlight *areas of information* where current understanding of the key components that make up the complex Venice system require further elaboration. This may in some cases require new data but in many cases the uncertainty could be addressed at (or in preparation for) the International Meeting by looking at existing data, perhaps in new ways. We have given a list of these areas under “data elaboration” in the attached document.
- ? Raise a number of questions about *communication and data availability*; and,
- ? Include some *interesting discussions* on the future of Venice.

3.2 Feed back from participants

In addition to the specific comments from participants which have been integrated in the key issues listed for the individual workshops (Chapter 2), other feedback included:

The idea that at the International Meeting time is allowed for preparation of a statement on the conclusions of the meeting, in terms of the state of knowledge on Venice. It would be prepared by a representative group of speakers/participants appointed to the task, and presented to Meeting participants for approval.

It was mentioned that presently there is nothing in the programme on future hazards/ social needs/ future industrial development. Therefore why not have a session(s) at which topics like the following are discussed/ problems aired and 'solutions' voiced?

- ? The relocation of Marghera industries (Marghera is in serious industrial decline anyway)
- ? Relocation of the oil terminals --- one serious spillage and its goodbye to everything we are trying to conserve.
- ? Oil and gas extraction in the Adriatic, offshore not far from Chioggia -- planned, underway and may well sabotage the Chioggia planned barrier system.
- ? Repopulating the City of Venice --- are we trying to preserve a museum or regenerate a decaying city - presumably the latter, so how can it be done?
- ? Revitalisation of the state of the lagoon -- this figured in the workshops but seems to have rather disappeared from the Conference?
- ? The general problem of recreating a viable social / environmental etc. climate for a sustainable Venice --- isn't this what it's all about?

The socio-economically oriented questions listed above, while extremely poignant to any reflection on the future of the city, are beyond the scope of this initiative which is focused on synthesising scientific and technical information. This supports the general aim to communicate more widely the state of scientific understanding of the problems facing Venice, alongside analogous situations from other locations around the world.

Suitable

scientific and technical information can then contribute, where appropriate, to the development of management solutions and policy decisions on wider issues.

4.0 Acknowledgements

The Project team would like to thank Venice in Peril, on behalf of CIES, Churchill College, University of Cambridge and Corila for the funding of this project and also the Cambridge-MIT Institute (CMI) for part funding these workshops. We would also like to thank Churchill College, Magdalene College, Jesus College and Pembroke College for hosting the meetings. Finally, we would like to thank the participants for their time and all the speakers for their presentations.

5.0 Appendices

Appendix 1 List of participants and affiliations

Appendix 2 Workshop Programmes

Appendix 3 Glossary of relevant organisations

Appendix 1: List of participants and affiliations

Venice Workshop 1: Magdalene College, 8th/9th September 2002

Urban flooding; Architectural and structural issues

1. Ing. Ivano Turlon - Technical Director, Insula SpA (Venice)
2. Arch. Ettore Vio - Proto della Basilica di San Marco (Venice)
3. Ing. Maria Teresa Brotto, Consorzio Venezia Nuova (Venice)
4. Ms Jane Da Mosto - Corila (Venice)
5. Mr Fabio Carrera – Director, WPI Venice Project Center and MIT (Boston, USA)
6. Prof. Roy Butterfield- Department of Engineering, University of Southampton
7. Dr Robin Spence- CURBE, University of Cambridge
8. Prof. Deborah Howard- Department of History of Art, University of Cambridge
9. Dr Tom Spencer- Department of Geography, University of Cambridge
10. Dr Caroline Fletcher- Department of Geography, University of Cambridge
11. Dr David Dernie- Department of Architecture, University of Cambridge
12. Dr Kenichi Soga- Department of Engineering, University of Cambridge
13. Dr Vicky Avery- Department of History of Art, University of Cambridge
14. Mr Tom Holbrook- Department of Architecture, University of Cambridge

Venice Workshop 2: Churchill College, 12th/13th September 2002

Engineering solutions to storm surge flooding of Venice

1. Ing. Alberto Scotti - Managing Director, Technital (Verona)
2. Ing. Giovanni Cecconi - Consorzio Venezia Nuova (Venice)
3. Ing. Pietrogrande – Chief Engineer, Autorità Portuale di Venezia (Venice)
4. Ing. Pierpaolo Campostrini - Director, Corila (Venice)
5. Ms Jane DaMosto - Corila (Venice)
6. Sir Alan Muir Wood- Independent Consultant
7. Prof. Peter Guthrie- Department of Engineering, University of Cambridge
8. Prof. William Allsop- HR Wallingford
9. Mr David Wilkes- Environment Agency
10. Prof. Roy Butterfield- Department of Engineering, University of Southampton
11. Mr Peter Hunter- JacobGibb
12. Mr Edoardo Faganello - JacobGibb
13. Prof. Jack Lewin- Independent Consultant
14. Dr Geoff Ballard- Independent Consultant
15. Dr Caroline Fletcher- Department of Geography, University of Cambridge

Venice Workshop 3: Churchill College, 11th/12th September 2002

Physical and ecological processes of the Venice Lagoon

1. Arch. Alberto Giulio Bernstein - Head of Environmental Engineering, Consorzio Venezia Nuova (Venice)
2. Prof. Gabriele Capodaglio - Environmental Sciences Dept., Università Ca' Foscari (Venice)
3. Prof. Giampaolo Di Silvio – Director, IMAGE, Università di Padova
4. Dr Miro Gacic - Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (CNR)
5. Dr Cristina Nasci – CNR-Istituto Biologia del Mare (Venice)
6. Ing. Alberto Scotti – Technital (Milan)
7. Ing. Pierpaolo Campostrini - Director, Corila (Venice)
8. Ms Jane Da Mosto - Corila (Venice)
9. Dr Stephen Malcolm- CEFAS
10. Dr Tom Spencer- Department of Geography, University of Cambridge
11. Dr Caroline Fletcher- Department of Geography, University of Cambridge
12. Mr Paul Elsner– Department of Geography, University of Cambridge

Venice Workshop 4: Pembroke College, 19th/20th September 2002

Venice Lagoon: Modelling the hydrodynamics, morphology and water quality

1. Dr Georg Umgieser – Oceanography division, CNR-ISDGM (Venice)
2. Prof. Roberto Pastres - Physical Chemistry Dept., Università Ca' Foscari (Venice)
3. Ing. Antonio Gozzi - Managing Director, Technital (Milan)

4. Prof. Andrea Defina – IMAGE, Università di Padova (Padua)
5. Prof Luigi D’Alpaos – IMAGE, Università di Padova (Padua)
6. Prof. Andrea Rinaldo - IMAGE, Università di Padova (Padua)
7. Ms Jane Da Mosto - Corila (Venice)
8. Dr Mørgens Flindt (University of Copenhagen)
9. Dr Ida Brøker (DHI)
10. Dr Dano Roelvink (WL DELFT)
11. Prof. Don Harleman (MIT)
12. Dr Jane Smallman- HR Wallingford
13. Dr Winifred Wood-Department of Mathematics, University of Reading
14. Dr Tom Spencer- Department of Geography, University of Cambridge
15. Prof. Keith Richards - Department of Geography, University of Cambridge
16. Dr Caroline Fletcher-Department of Geography, University of Cambridge
17. Ms Amala Mahadevan - Department of Applied Mathematics and Theoretical Physics, University of Cambridge

Venice Workshop 5: Jesus College, 17th/18th September 2002

Global environmental change, uncertainty, risk and sea level rise in the North Adriatic Sea

1. Dr Roberto Frassetto - CNR-ISDGM (Venice)
2. Prof. Alberto Tomasin - CNR-ISDGM (Venice)
3. Dr Dario Camuffo CNR-ISAC (Padua)
4. Jane Da Mosto - Corila (Venice)
5. Dr Cristina Zago - Corila (Venice)
6. Prof. Peter Stone (MIT)
7. Prof. John Day (University of Louisiana)
8. Dr Paolo Pirazzoli (CNRS, France)
9. Prof. Roy Butterfield- Department of Engineering, University of Southampton
10. Prof. Trevor Davies - University of East Anglia
11. Dr Tom Spencer- Department of Geography, University of Cambridge
12. Dr Harriet Allen - Department of Geography, University of Cambridge
13. Dr Caroline Fletcher- Department of Geography, University of Cambridge
14. Ing. Giovanni Cecconi - Consorzio Venezia Nuova (Venice)

Appendix 2: The Workshop Programmes

PROGRAMME FOR THE WORKSHOP 8th - 9th September 2002

Urban flooding; Architectural and structural issues

Sunday 8th September

6.15-7.15pm Welcome and Introduction to the Venice in Peril Project *Parlour*
(Dr Caroline Fletcher, Jane DaMosto and Dr Robin Spence)

7.30pm *Dinner in the Large Combination Room*

9.30-10.15pm "Venice: the amphibious city" Prof. Deborah Howard *Parlour*

Monday 9th September

8.0-9.0 *Breakfast* *Parlour*

Welcome/ Objectives of Workshop

9.0- 9.10 Dr Tom Spencer (VIP Project Steering Committee Chair) *Benson*
Hall

Chairman: Prof. Deborah Howard

Local Works

- 9.10- 11.15
1. Insula Study (Ing. Ivano Turlon)
 2. Piazza San Marco (Ing. Maria Teresa Brotto)
 3. San Marco Basilica (Arch. Ettore Vio)

11.15- 11.45 *Coffee*

Damage

11.45- 12.30 4. Damage to the buildings (Fabio Carrera)

12.30-1.30pm *Lunch* *Parlour*

Combating historic subsidence

Chairman: Dr Robin Spence

1.30-2.30pm 5. Overview of historic subsidence (Prof. Butterfield) *Benson*
Hall

6. Ground Modification Techniques (Dr Kenichi Soga)

2.30-3.30pm Closure and identification of key issues for International Meeting

4pm depart for Stansted (6.55pm flight)

PROGRAMME FOR THE WORKSHOP **12th –13th September**

2002

Engineering solutions to storm surge flooding of Venice

Thursday 12th September

6.15-7.15pm Welcome and Introduction to the Venice in Peril Project *Cockcroft*
(Dr Caroline Fletcher, Prof. Peter Guthrie, Jane Da Mosto
and Ing. Pierpaolo Campostrini)

7.30pm *Dinner in the Cockcroft Room*

9.30-10.15pm Mobile Barriers, Ing. Scotti, Technital S.p.A, Venice

Friday 13th September

8.0-9.0 *Breakfast* *Hall*

10.0- 9.10 **Welcome** - Prof. Peter Guthrie (Project Steering Committee) *Cockcroft*

Chairman: Sir Alan Muir Wood

9.10- 11.00 **Introduction to issues**

1. Geomorphological restoration (Ing. Cecconi)
2. Port of Venice (Ing. Pietrogrande)
3. The Thames Barrier (David Wilkes)
4. St Petersburg (Peter Hunter)

11.00-11.30 *Coffee*

11.46- 12.30 **Discussion of issues**

12.30-1.30pm *Lunch in the Cockcroft*

1.30-3.30pm **Identification of key issues for International Meeting** *Cockcroft*

4pm *depart for Stansted (6.55pm flight)*

PROGRAMME FOR THE WORKSHOP

11th –12th September

2002

Physical and ecological processes of the Venice Lagoon

Wednesday 11th September

6.15-7.15pm Welcome and Introduction to the Venice in Peril Project *Cockcroft*
(Dr Caroline Fletcher and Dr Tom Spencer (University of Cambridge),
Jane Da Mosto and Ing. Pierpaolo Campostrini (Corila))

7.30pm *Dinner in the Cockcroft Room*

9.30-10.15pm Overview, Arch. Bernstein (Consorzio Venezia Nuova) *Cockcroft*

Thursday 12th September

8.0-9.0 *Breakfast* *Hall*

9.00 Welcome and objectives of the Workshop *Cockcroft Room*

Chairman: Dr Tom Spencer (VIP Project Steering Committee Chairman)

Geomorphology and hydrodynamics *Cockcroft Room*

9.10- 10.45 1. Prof. Di Silvio
2. Dr Gacic

10.45-11.15 *Coffee*

Ecology and water quality *Cockcroft Room*

11.15- 12.30 3. Dr Nasci
4. Prof. Capodaglio

12.30-1.30pm *Lunch in the Cockcroft*

Discussion *Cockcroft Room*

Chairman: Dr Tom Spencer

1.30-2.30pm Functioning of the Lagoon

2.30-3.30pm Closure and identification of key issues for International Meeting

4pm *depart for Stansted (6.55pm flight)*

PROGRAMME FOR THE WORKSHOP **19th –20th September**

2002

Venice Lagoon: Modelling the hydrodynamics, morphology and water quality

Thursday 19th September

6.15-7.15pm Welcome and Introduction to the Venice in Peril Project *Nihon Room*

(Dr Caroline Fletcher and (University of Cambridge): Jane Da Mosto
(Corila))

7.30pm *Dinner in the inner Parlour Room*

9.30-10.15pm “Will Venice Survive” by Prof. Rinaldo (University of Padua)

Friday 20th September

8.15-9.0 *Breakfast* *Hall*

Dr Jane Smallman (Chairman) *Nihon*

Room

9.0 - 9.10 **Welcome and objectives of workshop** (Dr Tom Spencer)

9.10 -9.45 **Modelling water levels in Venice**

1. Dr Ida Brøker

9.45 –11.00 **Assessment of Engineering solutions using models**

2. Prof. Don Harleman

3. Dr Dano Roelvink

11.00-11.30 *Coffee*

11.30 -12.30pm **Hydrodynamic and geomorphology modelling of the system**

4. Dr Georg Umgiesser

5. Prof. Luigi D’Alpaos and Prof. Andrea Defina

12.30 -1.15pm *Buffet Lunch in the Nihon Room and Japanese Gardens*

1.15-2.30pm **Water quality and ecological modelling of the system** *Nihon Room*

6. Prof. Mørgens Flindt

7. Prof. Roberto Pastres

8. Ing. Antonio Gozzi (5 minutes)

2.30-3.30pm **Closure and identification of key issues for the International Meeting**

4pm depart for Stansted (6.55pm flight)

PROGRAMME FOR THE WORKSHOP **17th –18th September**

2002

Global environmental change, uncertainty, risk and sea level rise in the North Adriatic Sea

Tuesday 17th September

6.15-6.30pm Welcome and Introduction to the Venice in Peril Project *Alcock*
Room

(Dr Caroline Fletcher and Dr Harriet Allen (University of Cambridge):
Jane Da Mosto (Corila))

6.30-7.15pm Overview by Prof. Frassetto (CNR, Venice)

7.30pm *Dinner in the Prioress's Room*

Wednesday 18th September

8.0-9.0 *Breakfast*

Hall

Prof. Peter Stone (Chairman)

Alcock

Room

10.0 - 9.10 **Welcome and objectives of workshop** (Dr Tom Spencer)

9.10 -11.00 **Water levels and weather patterns**

2. Prof. Alberto Tomasin
3. Prof. Trevor Davies
4. Dr Dario Camuffo

11.00-11.30 *Coffee in the Cloisters*

11.30 -12.00 **Water levels and weather patterns (cont.)**

5. Dr Paolo Pirazzoli

12.00 -12.30 **The present and future status of wetlands in Venice Lagoon**

5. Prof. John Day

12.30 -1.30pm *Buffet Lunch in the Prioress's Room*

Dr Harriet Allen (Chairman)

Alcock

Room

1.30-2.30pm **Uncertainty**

6. Prof. Peter Stone

2.30-3.30pm **Closure and identification of key issues for the International Meeting**

4pm depart for Stansted (6.55pm flight)

Appendix 3 Glossary of relevant organisations

Italy

Organisation	Description
Autorità Portuale	<i>Port Authority</i>
Comune	Town Council
Consiglio Nazionale delle Ricerche – Istituto per lo Studio della Dinamica delle Grandi Masse – (CNR- ISDGM)	<i>National Research Council – Institute for the study of the dynamics of large masses (oceanography, hydrodynamics etc)</i>
Consiglio Nazionale delle Ricerche– Istituto Biologia del Mare – (CNR-IBM)	<i>National Research Council – Institute for Marine Biology</i>
Consorzio Venezia Nuova – (CVN)	<i>Private sector consortium of construction and engineering firms responsible for planning and execution of works for the Magistrato alle Acque (local branch of Public Works Ministry)</i>
Consorzio di Coordinamento delle attività di Ricerca inerenti il sistema Lagunare di Venezia (Corila)	Non-profit consortium for research on Venice Lagoon comprising Ca’Foscari University, IUAV, Padua University and CNR.
Insula S. p. A.	Public/private company engaged in urban maintenance (canal dredging and local defences, infrastructural services etc.)
IUAV	Istituto Universitario di Architettura di Venezia - <i>Venice Architecture University</i>
Soprintendenza per i beni architettonici ed il paesaggio	Supervisory Offices for Architectural and Landscape Treasures (local branch of Ministry of Culture)
Technital S.p.A.	Engineering consultancy (designer of mobile barriers)
Università di Padova-IMAGE	Dip. Ingegneria Idraulica, Marittima e Geotecnica - <i>Dept. of hydraulic, maritime and geotechnical engineering</i>
University of Venice Ca’ Foscari	University of Venice

Others

Organisation	Description
Cambridge Coastal Research Unit	Department of Geography, University of Cambridge
Department of History of Art	University of Cambridge
Department of Architecture	University of Cambridge
Martin Centre	University of Cambridge
Department of Biology	University of Cambridge
Department of Engineering	University of Cambridge
Cambridge Architectural Research Ltd	Architectural consultancy based in Cambridge
Environment Agency	UK government body. Thames Region responsible for the Thames Barrier.
Department of Civil and Environmental Engineering	University of Southampton
Tyndall Centre	University of East Anglia
HR Wallingford Ltd	UK engineering and hydrodynamics research consultancy specialising in the water environment
JacobGibb Ltd	Engineering consultancy
CEFAS, Centre for the Environment Fisheries and Aquaculture Science	England and Wales Government Scientific Advisory Agency for the marine environment. Also a research and consultancy centre
DHI	Hydraulics Laboratory, Denmark
Delft Hydraulics, Holland	Hydraulics Laboratory, Holland
Centre Nationale de Recherche Scientifique - CNRS	French National Research Council