

**Progress Report of the UK. Subgroup of
the GREATER project.
(1st Quarter, 1996)**

SUMMARY

This progress report contains the minutes of the first three meetings of the UK subgroup of the Monitoring/Modelling GREATER Project, which were held in the first quarter (January - March) of 1996.

An overview of the major aims of the three meetings is;

1. Discussion of requirements of the monitoring programme to meet the needs of the modelling community and identification of data needs, provision and current availability.
2. Assessment of which catchments may be suitable for inclusion in the monitoring programme. The selected catchments were to be validated in a field study (February 1996) to measure LAS concentrations in rivers. This is a preliminary screening.
3. Discussion of the results of the screening programme. Suitable catchments proposed for monitoring programme. Plan of action to report screening results via SIMCAT modelling to give a preliminary indication of suitability for GREATER.

Appended are the minutes of a meeting (28/29th February 1996) of interested parties in modelling aspects of GREATER held at Wallingford, UK.. The University of Gent, RIVM, ECETOC and IH were represented.

First Meeting of the U. K. Subgroup of the Great-er Project

Held at the NRA Offices, Olympia House, Leeds, on 11 January, 1996

Present:

Gerard Morris	NRA
Jim M ^o Evoy	NRA
Richard Freestone	NRA
Alan Gustard	Institute of Hydrology
Andy Young	Institute of Hydrology
Claire Round	Institute of Hydrology
Geert Boeije	Univ. of Gent
Martin Holt	AIS/CESIO (Shell)
Kay Fox	AIS/CESIO (Unilever)

Brief Summary

The meeting was extremely constructive, with the NRA providing the Great-er Project with access to their own data and models, and agreeing to ask Yorkshire Water for further data and to cooperate with us in the U. K. (Yorkshire Rivers) monitoring and model validation project. The next U. K. subgroup meeting will be on Feb. 9 at the NRA, with final selection of potential monitoring sites, to be checked by preliminary studies (grab samples), the major item on the agenda. Further details can be found in the attached action minutes.

Membership note: Subsequent to our meeting, Andy Young has suggested that Graham Leeks, a representative of the LOIS rivers datacentre, be invited to join the Great-er U. K. subcommittee, in order to inform us of data which the LOIS project has requested from Yorkshire Water, and to avoid duplication of effort for Yorkshire Water caused by LOIS and Great-er requesting the same data. This should also aid our data sharing with the LOIS project. If there are any objections to this proposal, please inform me as soon as possible, as it would be constructive to have him attend our next meeting. Thanks!

Kay Fox

**Minutes of the First Meeting of the U. K. Subgroup of the Great-er Project -
Held at the NRA Offices, Olympia House, Leeds, on 11 January, 1996**

Present:

Gerard Morris	National Rivers Authority (NRA)
Jim M ^e Evoy	National Rivers Authority (NRA)
Richard Freestone	National Rivers Authority (NRA)
Alan Gustard	Institute of Hydrology (I. H.)
Andy Young	Institute of Hydrology (I. H.)
Claire Round	Institute of Hydrology (I. H.)
Geert Boeije	Univ. of Gent
Martin Holt	AIS/CESIO (Shell)
Kay Fox	AIS/CESIO (Unilever)

Terms of Reference - The UK subgroup of the Great-er project has as its main objective to obtain hydrological, water quality, and LAS and Boron concentration data from Yorkshire Rivers, and to use these data to develop and validate the various component models (hydrological, water quality, river self-purification, concentration prediction) of the GIS Model Great-er. The membership consists of the Institute of Hydrology, the National Rivers Authority, Yorkshire Water (provisional), and AIS/CESIO/ECETOC. Any other participants in the Great-er project are welcome to participate in specific meetings, and will be circulated with the minutes of all meetings.

ACTION: NRA (Gerard Morris) to request Yorkshire Water to become involved.

The first task of this sub-group is the identification of suitable monitoring sites within the region, where LAS and Boron may be expected to be present at concentrations substantially above the detection limits. As a result of this meeting, the NRA have provided and are providing AIS/CESIO with BOD, total anionic surfactant, total nonionic surfactant, and Boron levels available at monitoring sites throughout the region.

ACTION: AIS/CESIO - Martin Holt leading - to analyze the data to see if suitable sites can be identified.

If insufficient monitoring sites can be identified from extant surfactant-specific data, other potential monitoring sites may be identified 1) downstream from trickling filter plants or 2) at sites where effluent dilution factors are low.

ACTIONS: 1) NRA (Gerard Morris) to contact Yorkshire Water to request a list of treatment plant types in the area, focusing on a list of trickling filter plants. Details required for trickling filter plants include the population served, and the flow through the plant, and dilution volumes. List to be forwarded to AIS/CESIO (Martin Holt).

Note to Action 1: A meeting of the AIS/CESIO members (Martin Holt, Jim Waters, and Kay Fox) was held on 17 January to discuss the data provided by the NRA at the 11 January meeting. We were able to focus on a few specific areas for possible monitoring work. We also realised that a different site may be required to verify the river die-away module than for verification of the combined GIS model, and have identified possible sites for this purpose. Martin Holt will contact Gerard Morris to request that further information (list of trickling

filter plants, list of sites with effluent dilution ratios of 3/1 or less, plant flow and population data for plants identified) be supplied for the identified sites as a matter of priority.

ACTION 2: NRA (Gerard Morris) will provide I.H. with effluent dilution factors for all STPs in the area.

ACTION: All. This data will be brought together at the next sub-group meeting (Feb. 9), when suitable sites for grab samples to be obtained to establish the presence of measurable LAS concentrations will be identified.

Hydrological data (abstractions, reservoirs) have also been requested by I.H. I. H. passed an outline of the required data types to the NRA for reference. The NRA have requested that I. H. expand on these data requirements, and have invited I. H. to pursue further the collation of required data on this list that is not currently held on the LOIS database.

ACTION: NRA/I.H. I. H. staff will spend a number of days at the NRA offices extracting the required data from NRA databases, with guidance from NRA staff.

I.H. requested formal permission to use the NRA data collected for the LOIS project for the Great-er project.

ACTION: NRA (Gerard Morris) to send a formal letter confirming approval of LOIS data use.

NRA and IH requested a minimum list of the water quality determinands required for the region.

ACTION: AIS/CESIO (Kay Fox) to provide. See attachment 1.

ACTION: IH will search the LOIS monitoring sites for information on the required water quality determinands.

Information on potential Boron sources is required, to establish what fraction of boron in rivers is attributable to its use in washing powders.

ACTION: AIS/CESIO (Kay Fox) to obtain available information and make it available to the group.

NRA and IH requested a definition of the number of monitoring sites, type of measurement required, specific timing objectives, and who will do the monitoring. Kay Fox (AIS/CESIO) responded that the answers to these questions are the responsibility of this subgroup, to determine in the most cost effective way to get the maximum amount of relevant data from our limited monitoring budget.

ACTION: AIS/CESIO will define a preliminary program (Attachment 2), but the final program depends on the results of monitoring pre-studies, to be initiated at the Feb. 9 meeting.

A potential site for validating the river die-away model has been identified in the meeting as the area downstream of the North Allerton trickling filter plant. The residence time of LAS

in the river is necessary for the river die-away model.

ACTION: NRA (Richard Freestone) will provide time of travel data for this and other rivers in the catchment.

The NRA provided the University of Gent and AIS/CESIO with substantial information and comprehensive manuals on water quality models (specifically CATNAP, but also a paper describing the models TOMCAT, SIMCAT, and Streams). The NRA also provided a comprehensive manual on the WRC methodology for modelling urban sewage (SIMPOL), which should save the project a substantial amount of modelling effort.

ACTION: Geert Boeije (Univ. of Gent) to read both manuals, and to decide how to use the methodologies described in the project.

ACTION: Geert Boeije (Univ. of Gent) to make the manuals available to other modellers, especially the University of Osnabrück group, if access requested.

The date of the next meeting was set as Friday 9 February, at 11am, at the NRA offices at Olympia house in Leeds. The meeting closed with thanks to the NRA for their kind hospitality, from all concerned.

Kay Fox

Attachment 1. Minimum list of water quality determinands requested from existing data sets.

NAME	LOIS Directory Page
BOD (all)	7
Boron (all)	8
(including Boron dissolved)	8
Detergents anionic synthetic (all)	14,15
Detergents nonionic synthetic(all)	15
Oxygen dissolved (all)	24
Particulate organic >4mm	24
Solids (all - incl suspended, settleable, 500C, non-settleable)	30

Other water quality parameters that would be useful:

NAME	LOIS Directory Page	
Carbon organic (any)	9	
Chemical Oxygen demand (any)	10	
Detergents cationic synthetic (all)	15	
Hardness (all)	17,18	*most useful
Nitrogen (all)	23	
Nitrate (all)	23	
Nitrite (all)	23	
pH (all)	26	
Phosphorous (all)	27	
Sulphide (all)	31	
Turbidity (all)	33	

Attachment 2. Preliminary Short -term Monitoring Program. Timetable and rationale.

(A date means do it before this date, while a date plus Mtg. means we'll make the decision at a meeting on that date. W1 March is the first week in March, etc.)

DEADLINE	OBJECTIVE	WHO?
9 Feb.	Data for preliminary site identification assembled	All
9 Feb. Mtg.	Identification of preliminary sites	All
9 Feb.	Executor of first grab sample site study identified	Martin Holt
9 Feb. Mtg.	Grab sample site study authorised	All / esp. M. Holt
9 Feb. Mtg.	Date set for grab sample study completion (before 14, 15 March meeting if practicable?)	All / esp. M. Holt
9 Feb. Mtg.	Date set for next subgroup meeting (NSM)-objective to consider grab sample report and select suitable pre-study sites.	All / esp. M. Holt
9 Feb. Mtg.	Geographical and flow data will be requested for selected grab sample sites.	
W1 March	This data will be scrutinised by modellers for site selection. Disadvantages of all sites will be listed, and indications of the importance of any disadvantages will be made.	IH, K. Fox, other modellers(?)
NSM Mtg.	Grab sample report and modellers site selection results will be combined to identify 3 prestudy sites* and about 3 reserve pre-study sites.	All
NSM Mtg.	Identification of contractor for pre-studies.	All / esp. M. Holt
NSM Mtg.	Authorisation of pre studies. Timetable set for prestudy completion.	All / esp. M. Holt
(Feb Mtg. or NSM Mtg.)	Reports to 14, 15 March general Meeting re our progress so far allocated.	All

*The object of the pre-study is to establish the suitability of a site for a full monitoring effort. In particular, 24hr composite samples will be compared with grab samples taken at a specific time of day, to see if the latter will give adequate results. The answer to this may be location dependent within the site, with influent to STP, effluent from STP, river above STP, and river sites below STP perhaps requiring different sampling techniques. Site history will also be investigated. We hope to identify at least 3, and probably only three, sites for fullscale monitoring from the pre study results. An ideal site distribution would be two sites of different hydrological and geological characteristics in different upper/middle areas of the catchment, and one site lower in the catchment containing flows from both of these.

Second Meeting of the U. K. Subgroup of the Great-er Project
Held at the NRA Offices, Olympia House, Leeds, on 9 February, 1996

Present:

Gerard Morris	NRA
Jim M ^c Evoy	NRA
Richard Freestone (in part)	NRA
Joanne Briddock	NRA
Andy Young	Institute of Hydrology
Claire Round	Institute of Hydrology
Harold Buckland	YWS PLC
Martin Holt	AIS/CESIO (Shell)
Kay Fox	AIS/CESIO (Unilever)

Brief Summary

This meeting succeeded in its major objective of identifying six sites in the Yorkshire region for grab sample analysis, to see if measurable LAS and boron concentrations are present. The grab sample study will be carried out in the next two weeks. Hydrological and other data required for the project are being assembled, necessary permissions are being obtained, and personnel (Joanne Briddock, NRA officer in charge of the River Went catchment, and Harold Buckland from Yorkshire Water) essential to the project are being recruited. On the political front, the NRA are able to contribute financially to the GREAT-ER project, with £30,000 of £50,000 being made available immediately. The meeting was extremely constructive, as always. The date for the next meeting has been set for 7 March. Action minutes are appended.

Kay Fox

ACTION MINUTES

Second Meeting of the U. K. Subgroup of the Great-er Project

Held at the NRA Offices, Olympia House, Leeds, on 9 February, 1996

Present:

Gerard Morris	NRA
Jim M ^c Evoy	NRA
Richard Freestone (in part)	NRA
Joanne Briddock	NRA
Andy Young	Institute of Hydrology
Claire Round	Institute of Hydrology
Harold Buckland	YWS PLC
Martin Holt	AIS/CESIO (Shell)
Kay Fox	AIS/CESIO (Unilever)

New members Harold Buckland of YWS PLC and Joanne Briddock, who is responsible for the river Went catchment for the NRA, were welcomed to the meeting. Kay Fox gave them a brief description of the aims of the Great-er project.

The subgroup then proceeded with its main task of identifying suitable monitoring sites within the region, where LAS and Boron may be expected to be present at concentrations substantially above their detection limits. Martin Holt presented the results of the AIS/CESIO analysis of water quality data supplied by the NRA, while Joanne Briddock supplied further information on the River Went catchment, and Harold Buckland and Gerard Morris provided additional local information. As a result, six potential monitoring sites were identified:

1. River Went catchment, to the confluence with the Don. A relatively uncomplicated, mainly rural area containing 8 sewage treatment plants, mainly trickling filter. The central part is a designated fishery. No LAS or MBAS data are presently available for this catchment, however.
2. River Don - around confluence with the Rother. A more complicated, industrialised area, containing a LOIS monitoring site. NRA have a fully calibrated steady state hydrological and water quality model for this catchment, which might help minimise the number of samples necessary for validation of Great-er modules.
3. River Aire - Conoley Bridge to Leeds Bridge, Thwait Weir, or Allerton Byewater. A statutory water quality river, for which a fully calibrated steady state hydrological and water quality model has also been developed by the NRA. A heavily industrialised area.
4. River Calder - area including Spen Beck and its confluence - up Sowerby Bridge - down to Dewsbury. This is downstream of the River Aire catchment, and incorporation of data from both regions would be useful for modelling purposes.
5. Area near Thirsk STP. This may be a good site for an "in stream" removal study - it is basically an example of a "worst case dilution" trickling filter plant, which might give a high enough initial LAS concentration to allow measurable LAS concentrations downstream. The North Allerton trickling filter plant for which we have evidence of high MBAS at present is

unsuitable, as it will be replaced by an activated sludge plant at about the time our monitoring studies will be carried out.

6. River Hull - an example of a river from the chalk side of the area. Should provide a necessary challenge for the hydrological modellers.

ACTIONS:

1. Martin Holt and Joanne Briddock will select sites for grab sampling within these areas in the week beginning 12 February.
2. They will then collect grab samples, sending the O. S. coordinates to the Institute of Hydrology.
3. Martin Holt will obtain LAS analyses for these grab samples.
4. Andy Young\Claire Round will obtain predicted flow information for the grab sample sites, from the O. S. information.
5. These results will be available for our next meeting.

ACTION: Harold Buckland will provide a list of treatment plant locations, plant types, population served, plant age and efficiency, dilution ratios (dry weather effluent flow to low river flow (Q95) data), or at least the dry weather effluent flow data if the river data are not available to him, for the six potential monitoring areas. Q95 estimates can be provided by the Institute of Hydrology from the Micro LowFlows program, if required. Any other relevant consent information will be welcomed. This data, hopefully from 1994-1995, should be provided for the next meeting. This type of data for the whole of the region will be useful for the program at a later stage.

Claire Round then gave us a list of the 11 LOIS sites in the region and reported on the information, requested in the minimum list of water quality determinands appended to the minutes of the last meeting, which is available from them. Only boron concentration data was readily identifiable, from the list of "most wanted" determinands. [However, subsequent to the meeting it became apparent that information on BOD and suspended solids are also available routinely from the LOIS sites. Claire will collate this information for us and report back.]

ACTION: Claire Round and Andy Young will investigate obtaining access to boron and other water quality determinands from the LOIS database.

Gerard Morris has formally authorised our use of NRA data collected for the LOIS project. Permission from any other collectors of data will need to be obtained.

Claire Round presented a useful draft report on the locations and types of reservoirs present in the Yorkshire region, with an introduction of great value to non-hydrologists. The report will be extended to include abstractions, and then to discharge consents. The report will be made available to the group on completion - Kay Fox will make the draft report available to interested parties upon request.

ACTION: Claire Round will proceed with the reports, aided by the NRA and by Yorkshire Water as necessary.

Kay Fox provided information on potential boron sources, and is in the process of obtaining

more complete boron and LAS usage data for the region.

ACTION: Kay Fox to obtain boron and LAS usage data for the region, and make this data available to the group.

ACTION: Richard Freestone agreed to provide time of travel data for any sites identified as suitable for monitoring.

ACTION: Geert Boeije\readers of these minutes. We assume Geert Boeije is making the models obtained at the last meeting available to anyone who requests them - if not, complain!

The group agreed that Andy Young should invite Graham Leeks, a representative of the LOIS rivers datacentre, to join us, to avoid duplicate requests for information to Yorkshire Water.

ACTION: Andy Young to invite Graham Leeks to attend our next meeting.

The NRA informed the meeting of their contacts in the Po valley, which may be useful in our monitoring effort there.

Andy Young and Gerard Morris agreed that Gerard Morris should give the talk on the catchment area for the 14 March GREAT-ER meeting.

ACTION: Kay Fox to arrange the necessary change in agenda, and Gerard Morris to prepare the talk.

Andy Young requested help and information from Harold Buckland regarding flow determinations in the selected rivers, including historical time series of discharge flows, where available, and information (obtained via meetings etc) about how water services operate in the region, about supply zones and which STPs serve which supply zones, about sewer networks, about conjunctive use of resources, and about population figures and equivalents.

ACTION: Harold Buckland and Andy Young to discuss the data needs and agree a protocol for obtaining them.

Jim McEvoy announced that he would be able to obtain a financial contribution to the GREAT-ER project from the NRA, which he has subsequently confirmed to be £50,000, of which £30,000 is payable immediately. Tom Feijtel has arranged for the NRA to be invoiced for this amount. The extra money is to be used as required to expedite the project.

The date of the next meeting has been set for 7 March, at the NRA offices in Leeds, starting earlier than 11 am if possible. A provisional agenda is attached - please send other items to Kay Fox in time for incorporation in the final Agenda. Also, any other members wishing to attend, please notify Kay Fox.

The meeting closed with thanks to the NRA for their hospitality, and to all participants for their constructive input.

Kay Fox

Attachment. Preliminary Short -term Program. Timetable and rationale.

(A date means do it before this date, while a date plus Mtg. means we'll make the decision at a meeting on that date. W1 March is the first week in March, etc.) This is a running list of what we need to do in the immediate future, and when we intend to do it.

DEADLINE	OBJECTIVE	WHO?
7 March Mtg.	Geographical and flow data will be provided for selected grab sample sites.	IH/Harold Buckland
7 March Mtg.	STP data will be provided for selected grab sample sites.	Harold Buckland
7 March Mtg.	Grab sample report and modellers site selection results will be combined to identify 3 prestudy sites* and about 3 reserve pre-study sites.	All
7 March Mtg.	Discussion of contractor for pre-studies, and of Timetable for prestudy completion. Involvement of AIS/CESIO monitoring group? Plans made.	All / esp. M. Holt
7 March Mtg.	Discussion of Reports to 14, 15 March general Great-er Meeting re our progress so far.	All
As soon as site suitability data available - start at 7 March Mtg.	This data will be scrutinised by modellers for site selection. Disadvantages of all sites will be listed, and indications of the importance of any disadvantages will be made.	IH, K. Fox, Richard Freestone, other modellers
Following Mtg.	Planning the pre-study in detail. Perhaps have joint meeting with all AIS/CESIO monitoring taskforce leading members actively involved in GREAT-ER?	M. Holt

*The object of the pre-study is to establish the suitability of a site for a full monitoring effort. In particular, 24hr composite samples will be compared with grab samples taken at a specific time of day, to see if the latter will give adequate results. The answer to this may be location dependent within the site, with influent to STP, effluent from STP, river above STP, and river sites below STP perhaps requiring different sampling techniques. Site history will also be investigated. We hope to identify at least 3, and probably only three, sites for fullscale monitoring from the pre study results. An ideal site distribution would be two sites of different hydrological and geological characteristics in different upper/middle areas of the catchment, and one site lower in the catchment containing flows from both of these. **Note - the provision of a fully calibrated catchment model at some sites may mean that less monitoring data is required for these sites, and may allow us to choose additional sites for monitoring.**

Minutes of the 3rd Meeting of the U. K. Subgroup of the GREAT-ER Project, Held 7 March, 1996 at the NRA Offices in Leeds

Minutes of the 3rd Meeting of the U. K. Subgroup of the GREAT-ER Project, held 7 March, 1996 at the NRA Offices in Leeds, are enclosed. Cheers!

Kay Fox

Summary: The results of the grab sample analysis showed that LAS was easily detectable at those sites where expert opinion expected it to be found. All four sites investigated were identified as suitable for monitoring studies. The results will be compared with catchment models using SIMCAT. Plant specific information, including effluent flow data, is being assembled. Gerard Morris's talk and the group contribution to the 14, 15 March meeting in Brussels were agreed. The next U. K. subgroup meeting will be on Thursday, 9 May, at the NRA offices in Leeds. The full minutes are appended.

Minutes of the 3rd Meeting of the U. K. Subgroup of the GREAT-ER Project, Held 7 March, 1996 at the NRA Offices in Leeds

Present: Gerard Morris	NRA
Joanne Briddock	NRA
Jim M ^c Evoy	NRA
Harold Buckland	Yorkshire Water PLC
Andy Young	Institute of Hydrology (IH)
Martin Holt	Shell
Kay Fox	Unilever

The meeting opened with apologies from Claire Round and Graham Leeks (IH), who asked Andy Young to convey to the group his offer to search additional (non-NRA) data available through the LOIS project for data which might be useful for chosen sampling sites in the GREAT-ER project, and to seek permission from owners of this data for its use in GREAT-ER. This offer was readily accepted.

Martin Holt and Joanne Briddock reported on the grab sampling program carried out on 14 Feb. Easily detectable LAS levels were found at 3 sites on the Don, at 5 sites on the Calder, and at 7 sites on the Aire. The last 2 river stretches are suitable for comparison with specific catchment modelling. This will be carried out before our next meeting.

ACTIONS: 1) Martin Holt will provide Andy Young with the specific sampling site grid references.

2) Andy Young will relate Feb 14 flows from nearby gauging stations to yearly flow profile with MicroLow Flows, including abstractions.

3) Gerard Morris and his group will run SIMCAT with this flow information to see how well the model predicts the measured data.

The Went catchment (6 sites) was also sampled for LAS. Three of the sites had easily detectable LAS concentrations, while the other three were only slightly above realistic detection levels. This catchment is also considered suitable for the program. Other sites have

not yet been sampled due to lack of time, but this work will be carried out if necessary. Harold Buckland looked at the Thirsk site as a possible river die-away modelling site, and considered it suitable. The LAS (total - dissolved plus particulate) levels found in the monitoring exercise were consistent with MBAS levels where available, and with BOD levels throughout. Gerard Morris suggested that weekly spots at selected sites could be fitted into the normal NRA sampling regime, which would greatly augment our data collecting ability.

Discussion of sewage treatment plants lead to the conclusion that we felt we knew much less about removal in trickling filter plants than in activated sludge plants.

ACTION: Harold Buckland will obtain BOD removal data for trickling filter plants, to give a realistic removal range.

Harold Buckland reported considerable progress towards obtaining the data requested at our last meeting. More plant efficiency data is expected, but the other requests are in hand. The definitive version of the requested data will be available before our next meeting. Harold agreed to add yearly average effluent flows and standard deviations from each plant to the list of requested information, and will consider other requests as they arise.

The LOIS data requested has now been made available to the group - further details in the minutes of the 28 Feb. meeting held at IH between IH, Gent, ECETOC, and RIVM, which have been circulated to all who receive these minutes.

Claire Round is proceeding with abstraction and discharge reports. Kay Fox is obtaining Boron and LAS usage data. Richard Freestone provided some relevant time of travel data, with references to further studies. Andy Young and Harold Buckland agreed to set up a mechanism for Harold to provide Andy with data at our next meeting.

Discussion of Gerard Morris's talk for the 14-15 March meeting followed, and major presentation points were agreed.

The date of the next meeting of the U. K. subgroup was set for Thursday 9 May, at the NRA offices in Leeds.

The meeting closed with thanks to all for their contributions, and to Gerard Morris and the NRA for their hospitality.

Minutes of Meeting of IH, U.Gent, RIVM and ECETOC, held 28-29 Feb at IH, Wallingford.

Present:

Geert Boeije	University of Gent	Andy Young	Institute of Hydrology
Peter Vanrolleghem	University of Gent	Claire Round	Institute of Hydrology
Ton de Nijs	RIVM	Isabella Tindall	Institute of Hydrology
Kay Fox	Unilever		

The meeting opened in the early afternoon with a "wish list" (Appended) of information which the University of Gent (UG) hoped the Institute of Hydrology (IH) would be able to provide. IH will be able to provide most of the information, and will reply in detail to UG when the written "wish list" is provided.

ACTION - UG to provide written request for information for quantity and quality data.

ACTION - IH to reply in detail.

Geert Boije informed the meeting that he had met with the University of Osnabruk the previous week, and that he would communicate minutes of this meeting as soon as possible. He also mentioned a recent meeting with the RIVM.

ACTION - All group meetings to be minuted and communicated to other members of the GREAT-ER project. Action on AIS/CESIO member if one is present, and on a nominated member otherwise - Geert in these cases?

Isabella Tindall then spent most of the afternoon demonstrating the LOIS (Land Ocean Interaction Study) data available at IH, and the database format of WIS - Water Information System - which holds it. WIS runs on a SUN workstation. The database is a cubic array, with time, features (i.e. river stretches, gauging stations, discharge consents...), and attributes (i.e. flow, BOD, pH, Boron concentration,) on the three axes. The ability to search upstream of a chosen point is built into WIS. Data can be exported in conventional format. Extensive LOIS data is available to us for the Yorkshire area, and training and remote access for the modellers in the GREAT-ER project are being investigated. IH are willing to grant internet access, but a specific SUN workstation operating system may be required. (The old Sunops 4.? Contact Peter Vanrolleghem for a progress report.) A 50 m grid digital terrain model to predict slopes, and give height corrections for potential evaporation, is included, as is 1991 population data on a parish basis, and more.

The next morning Andy Young demonstrated the detailed Yorkshire river network available in MicroLow Flows, and gave Geert Boije a copy of the relevant training manuals. Mean flows and low flows (Q95) are estimated by the program, which will incorporate artificial influences for Yorkshire. Catchment areas are also calculated. This program will also be available to the GREAT-ER project - copies of the licence will be faxed as addenda to these minutes. Basic terms - use it yourself, but don't sell it or give it away to anyone not in the GREAT-ER project. Andy Young told us abstraction information will be easier to obtain than discharge information. Independent efforts to obtain data on the operational management of potable supply and effluent disposal are being pursued by Harold Buckland (Yorkshire Water), who will also try to obtain the times series of effluent data for all treatment plants where it is measured within the Yorkshire Region.

MicroLow Flows will be made more robust for its use in GREAT-ER, and more user-friendly for the non-hydrologist. It delivers flow estimates for a 1km² catchment, but is better for catchments of 10 km² and above. The River network used in MicroLow Flows is subject to copyright by the Ordnance Survey (O. S.), so GREAT-ER will have to pay royalties for use of the data in the final product.

ACTION - Kay Fox. Look into royalty situation with O.S.

U.G. and RIVM expressed surprise at the detail of data available for this region. RIVM indicated that their "top down" approach would reach down to a region somewhat larger than Yorkshire. Kay Fox argued for the "bottom up" approach to model catchments with river stretches on the order of 20-30 km, where detailed NRA catchment-specific models are available to back up the box models to be used by U. Osnabruk. This would be coupled with the development of methods for establishing similarities between catchments, to build up to an area which can be considered a region for EU risk assessment purposes.

ACTION - IH will obtain catchment statistics, i.e. Q95/mean flow, to take to the U.K. GREAT-ER subgroup meeting on 7 March. This as a first attempt to define similar catchments.

Ton de Nijs then left to investigate the provision of FRIEND data for the RIVM parallel project. The discussion of appropriate scale continued in his absence.

All agreed that the determination of the scale for the initial modelling and monitoring study was very important, and agreed to request AIS/CESIO to consider the matter urgently. IH and U.G. felt this to be a decision which should be taken by the funding bodies alone, though Kay Fox felt that the expertise of the academic and institutional bodies was necessary input to the scale decision. IH requested that Industry, as the principal funding body, consider the target customer in deciding the scale required for the modelling. They suggested that the EU, the Individual National States, the Regulatory Bodies such as the NRA, and Industry might want different things from GREAT-ER, and that the modelling scale would determine the acceptability of the product to these different customers.

ACTION - Kay Fox to request AIS/CESIO modellers and monitoring experts to meet, to give guidance on a preliminary scale for modelling.

ACTION - a one page statement of the political aims of different interested parties/customers should be prepared, to focus attention on the relevant modelling scale for each identified consideration. Kay Fox should start this, with input from other industrial members.

IH requested that U. Osnabruk provide IH with a formal, written request for their data and information requirements.

ACTION - Kay Fox to request, by means of these minutes that U. Osnabruk provide IH with a formal, written request for their data and information requirements. (Done?)

The meeting closed with the knowledge that the complex pattern of data availability would necessitate a focused and coordinated modelling strategy for the project to be a success. Next U. K. meeting 7 March, next GREAT-ER meeting 14, 15 March.

Addenda - Wishlist from IH (For U. Gent)

Hydrology

1. - methodology to select 'main' rivers and lakes based on ERASM priorities.

Selection possibly based on:

- flows
- catchment properties (e.g. size)
- population in catchment
- ... ?
- list of main rivers / lakes in Yorkshire Ouse area

2. Digital river network of the main rivers in the Yorkshire Ouse area, including main lakes / reservoirs

(to be transported to ARC/INFO and ArcView)

3. Flow data (measured or predicted) along main rivers:

- resolution: depends on availability (proposed by IH = ca. every 2 km)
- flow data associated with digital river network
- distribution curves (best case) or mean and 95th percentile of:
 - flow
 - flow velocity (estimation, based on Q, river width, slope ... ??)
 - annual and seasonal

4. 'River properties' of main rivers in Yorkshire Ouse area:

- data associated with digital river network:
 - river width, depth, geometry...
 - sediment type
 - turbidity ?
 - slope

5. (??) Segmentation of rivers, associated with digital river network:

- based on:
 - river properties
 - flows
 - specific hydrological features

LOIS

- Water quality data
- Turbidity or suspended solids data in main rivers
- other data: based on required spatial resolution

- Waste Water Treatment Plants
 - location, river stretch in which is discharged
 - WWTP type and specifications, design capacity
 - number of inhabitant equivalents
 - influent and effluent data: flow, quality (actual or consent data)

- Combined Sewer Overflows (CSO)

- location, river stretch in which is discharged
- CSO type and specifications

Catchment Runoff Model

- scientific advice on rainfall transformation
- rainfall, land coverage, land use, potential and actual evapotranspiration, infiltration capacity, etc. datasets
- estimation of fraction which goes into sewers
- model implementation: proposed at RUG in co-operation with ERASMUS student from Milan