

**MIDDLESEX UNIVERSITY
FLOOD HAZARD RESEARCH CENTRE**

**FLOOD DEFENCE EMERGENCY RESPONSE:
NATIONAL LEVELS OF SERVICE**

PROJECT RECORD 289/2/T

STEERING COMMITTEE NOTES

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MIDDLESEX POLYTECHNIC

FLOOD HAZARD RESEARCH CENTRE

FLOOD DEFENCE EMERGENCY RESPONSE: NATIONAL LEVELS OF SERVICE

Notes on the Steering Group meeting held on Wednesday 6th January
at NRA Anglian Regional Offices, Peterborough.

Present

Peter Borrows	NRA Thames. (chairman)
Dennis Parker	MPFHRC.
Greg Twomey	MPFHRC.
Ken Taylor	RGC.
Steven Barr	Halcrow.
Richard Vivash	NRA Anglia.
Adrian Biggs	NRA Southern.
Paul Baily	NRA Severn Trent.
Lindsey Pickles	NRA.

1) Membership and role of the Steering Group.

The group were able to meet and confirm the membership of the NRA invitees. The role of the Steering Group was identified as essentially involving consultation with the research team to help provide targets and options, ie the Steering Group would act as a vehicle for progressing the project.

2) Contactors project team.

MPFHRC

D.Parker Project leader.
G.Twomey Day-to-day management.
B.Barret Expert Panel.

RGC

K.Taylor ROC Project leader.
P.Reaston Day-to-day management.
P.White Expert Panel.
T.Reid Expert Panel.

Halcrow

P.Von Lany Project direction and control.
S.Barr Day to day management.
E.Evans Expert Panel.
I.Townsend expert panel.

3) Discussion of the project brief and strategy.

a) Liason with regions.



The NRA regions represented in the Steering Group were accepted as a suitable cross-section and representatives from these regions would be the contactors.

b) Categorisation.

The problems involved in categorization were discussed and it was subsequently agreed that MPFHRC would produce a short paper including the items mentioned, and clarify the implications. The basic decision was that three categories should be used in the framework: Flooding Emergencies, Non Flooding Emergencies and Emergencies Not Related To Flooding.

c) Liaison with external agencies.

It was accepted that the research group will have to be selective in which agencies it decides to both contact and focus. Agencies involvement varies between regions and as such those primarily involved should be sought by contacting on a regional basis. However, a general view should also be sought from National bodies.

d) Links with other projects.

D.Parker has provided a list of related studies and Lindsey Pickles will also be able to provide a list of other projects. Other papers, articles etc that are relevant/ useful to the project should be directed to D.Parker.

e) Reporting arrangement.

The following arrangements were made with regards to completion of reports for the project:-

First milestone report at the end of April 1991.

First progress report in July 1991.

Second milestone report at the end of October 1991.

Second progress report at the end of December 1991.

Third milestone report at the end of February 1992.

Draft final report at the end of April 1992.

Final report at the end of June 1992.

Financial reports each quarter to be arranged between P.Borrows & D.Parker.

Copies of all correspondence should be sent to P.Borrows.

4) Future Steering Group meetings.

May 8th 1991 (Rivers House, London).

September 5th 1991 at RGC (Warwick).

January 22nd 1992 at Halcrow (Swindon).

Mid May 1992.

5) Other business.

Inquiry about the attitude of the NRA towards the utilisation of the project results by MPFHRC.

NATIONAL RIVERS AUTHORITY - RESEARCH AND DEVELOPMENT

FLOOD DEFENCE EMERGENCY RESPONSE - NATIONAL LEVELS OF SERVICE:
PROJECT C8.1 (90)

Note of a meeting held at Kingfisher House, Peterborough on 6 February 1991

Present: National Rivers Authority - A Biggs (Southern)
P Borrows (Thames)
D Pelleymounter (Yorkshire)
L Pickles (Thames)
R Vivash (Anglian)

Contract Consortium - D Parker and G Twomey (Middx Poly)
K Taylor (Robertson Gould)
S Barr (Halcrow)

Steering Group

1. The Steering Group for the NRA would include those present together with P Bailey (Severn Trent) and J Mosedale (Welsh) who were both unable to be present. Lindsay Pickles was Topic Leader for C8 in the Flood Defence commission.
2. The role of the Steering Group was agreed as setting objectives and deadlines and to facilitate the Contractor's work as far as possible.

Contract Consortium

3. Middx Poly - D Parker as Project Leader supported by G Twomey with specialist assistance from S Tunstall and B Barrett.
Halcrow - P Von Lany supported by S Barr and L Baird.
Robertson Gould - K Taylor supported by C Matthias with specialist assistance from Cremer and Warner.

Study sign and objective

4. The brief and the contractor's strategy document were discussed and a number of issues noted by the Contractor.

The study would need to take into account:

- (a) matters relating to - flooding emergencies
- flood defence emergencies (but not necessarily involving flooding)
- flood defence response to other emergencies
- (b) - fluvial flood (both main and non-main river)
- tidal flooding and sea flooding
- take into account the responsibilities of Internal Drainage Boards and local authorities

- (c) - the range of risks and circumstances associated with flood defence emergencies
 - the range of response actions to emergencies
 - the services actually provided to the community
 - (d) constraints or influences affecting emergency response
 - resources; man, machinery, money
 - implications of relevant statutes, other legal issues
 - geography; distance, ease of access
 - (e) inter-agency relationships, those who receive warnings directly and indirectly (this may vary from region to region).
5. Liaison with regions would be through Steering Group members or nominated officers from other regions. PFB to provide list for Contractor. PFB
 6. The Contractor will liaise directly with external agencies but copy correspondence to the Project Leader for information.
 7. Reporting to be accomplished generally through Steering Group meetings or formal reports. Financial reports to be compiled in direct consultation with Project Leader. Queries or urgent issues to be addressed to Project Leader or another member of the Steering Group.
 8. Steering Group members to advise the Contractor of any relevant research work, reports or correspondence in their region or coming to their attention. LP to provide Contractor with list of relevant research projects being undertaken by the NRA. LP

Project programme

9. The project programme proposed by the Contractor was accepted but it was noted that the reporting dates in the Contract did not conveniently match the programme. PFB to seek amendment of Schedule 1 of the Contract in accordance with the following: PFB

1. Milestone report (Phase 1)	30 April 91
2. Progress report (Phase 2A)	31 July 91
3. Milestone report (Phase 2A)	31 Oct 91
4. Progress report (Phase 2B)	31 Dec 91
5. Milestone report (Phase 2B)	28 Feb 92
6. Draft final report	30 April 92
7. Final report	31 June 92
10. Steering Group meetings were arranged for:
 - 8 May 91 at Eastbury House (NRA HQ)
 - 5 Sept 91 at Warwick (Robertson Gould)
 - 22 Jan 92 at Swindon (Halcrow)
 - March 92)
 - May 92) dates and venue to be arranged later.
11. The agenda for the next meeting to include for the rules on publication of research.

PROJECT RECORD: 289/2/T

FLOOD DEFENCE EMERGENCY RESPONSE: NATIONAL LEVELS OF SERVICE

Notes On The Steering Group Meeting Held At Eastbury House.
London, On 8th May 1991.

PRESENT

P. Borrows
D. Pelleymounter
A. Hunter-Blair
A. Biggs
D. Parker
G. Twomey
E. Evans
P. Von lany
K. Taylor
P. Reaston

The notes of the first Steering Group meeting were confirmed and it was decided that nothing else needed to be added.

The meeting reviewed the following documents that have been completed by the research team for the Phase 1 work:-

Review of Literature

The literature review looks at the general conceptual work on flood warnings that has been done to date. It was felt that further work was now needed to review the more pragmatic work that has been done (such as the survey done by the WRC on flood embankment standards) and to focus more attention on emergency response work as well as flood warnings.

Legal Framework

This document was of particular interest to the Steering Group as it is likely to have direct implications for future policy decisions. A number of scenarios were discussed ie the NRA having statutory powers for flood warning. The document has reached a stage whereby the NRA can now decide on the position it wants to aim for in the future but the following points need further expansion and clarification:-

The legal position on non-main rivers,
the legal position of local drainage boards and
the legal position in terms of tidal and sea flooding.

It was suggested that the legal events in the aftermath of the Towyn flooding should eventually be included in the report. It was also suggested that a survey of emergency events that has been carried out might be included (contact David Noble).

The legal document now needs to be shown at a meeting of the NRA solicitors who must then appoint someone to liaise with Brenda Barrett who compiled the document. Given the importance of the legal position to this project it was emphasised that the above should be undertaken as soon as possible.

Categorisation

The categorisation should be refined further (particularly in terms of predictable and unpredictable emergencies. It was emphasised that identifying emergency response (in the third category) to other emergencies should help to define a general framework for response which most events could be incorporated, but not necessarily defining set procedures for each type of emergency.

Levels of Service

It was emphasised that there should be a level of service which would be issued for public information and an internal measure of performance indicator based on how well a flood warning emergency response system has done. The problem was raised as to which should be defined first but it is expected that progress in the surveys and case studies will solve this.

Conceptualisation

The theory in the conceptualisation document was reviewed and it is intended that this will be backed up by information revealed in the case studies.

Some discussion was given to the criteria by which the two case studies should be selected.

It was suggested for example that one of the case studies should focus on fluvial flooding and the other, tidal flooding. The cases selected should have had recent experience of at least one event that involved response such as evacuation etc. The question was raised as to whether it was better to find a case study in an area where MPFHRC have previous knowledge ie Severn Trent or to focus in more unknown territory. Some specific cases were suggested ie, Trawbridge in Southern and Towyn in Wales but these were not definitely confirmed. The most likely case study area at this stage would appear to be an East coast sea defence case study. Andrew Hunter-Blair suggested that Ian Hart at Ipswich should be contacted with particular reference to Bush estate in Eccles (on the Winterton front N.Norfolk) which was flooded in November 1990.

Links With Other Projects

There are two more additional studies to be included in this document and minor confusion over the wording of a couple of the headings of existing projects needs to be resolved.

Technological Developments

This document has been completed but needs to be circulated to P. Borrows and the research team before it is revealed to the rest of the Steering Group members.

Questionnaire Regional Surveys

It has been forecast that 70% of the first round surveys and the case studies will be completed by the next Steering Group meeting. Two preliminary surveys have already been done in Severn Trent and Southern and some minor changes are likely to be made to the semi-structured questionnaire that was used. It was decided that the interviews would be enhanced by sending out the questionnaires prior to the actual interview with an

explanatory covering letter clarifying what the survey was for etc. It was also suggested that the interview schedule should be referred to as a checklist rather than a questionnaire.

Review of Schedule

The progress made in the project so far was perceived as very satisfactory and subsequently it was felt that there was no need to change the schedule at this stage.

Other matters

There is no need for future reports/documents like those that were submitted for this meeting to have bound covers.

The interim report that has been completed now needs to be circulated to all members of the Steering group.

Date and Venue Of Next Steering Group

5th September : Robertson Gould Consultants, Warwick 10.30am

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Enfield

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16.09.91

Peter Borrows
River Information and Control Manager
National Rivers Authority
Thames Region
Kings Meadow House
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Reading
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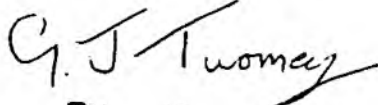
Dear Peter

Flood Defence Emergency Response: National Levels of Service

I have enclosed a copy of the notes on the Steering Committee meeting held on 5th September. Further to your enquiry about availability for a meeting on the legal paper, I can now confirm that D.Parker, B.Barrett and myself will be able to attend a meeting on the 5th November 1991. We are flexible on a venue but I suggest NRA HQ in London (Albert Square) is as good as anywhere.

Finally Peter, do you have news on the S.Muller report?

yours sincerely,



Greg Twomey
(Research Officer)

Notes on the Steering Committee Meeting held at RGC Warwick,
10.30am, September 5th 1991.

PRESENT

P. Borrows	NRA Thames
J. Mosedale	NRA Welsh
P. Bailey	NRA Severn Trent
T. Harris	Anglian
L. Pickles	NRA HQ
D. Pelleymounter	NRA Yorkshire
A. Biggs	NRA Southern
D. Parker	Middlesex Polytechnic
G. Twomey	Middlesex Polytechnic
P. Von Lany	Halcrow
P. Reaston	Robertson Gould Consultants

1 Notes of previous Steering Group meeting on 8th May 1991

P. Borrows is to find out if an internal draft report on procedures undertaken by S. Miller can be made available for research literature on this project and also to ensure that outputs from S. Miller's report do not compromise the FDER research project.

Internal NRA discussion of the legal document produced by B. Barrett is taking place but a meeting needs to be arranged between NRA legal representatives and B. Barrett and D. Parker.

2 Report of progress

D. Parker provided a report on progress and highlighted that nearly 50 per cent of the project has been undertaken. The Categorisation document has been updated. The project is on target with respect to deadlines. Two main issues which need further clarification concern the legal position and the choice of a second case study.

P. Borrows questioned whether the project was covering the side issues such as structural failure as indicated in the brief. D. Parker referred P. Borrows to the categorisation document and also reported that the consultants were concentrating on the main flood aspects of FDER but were aware that findings and reporting should bear in mind the other side issues such as structural failure;

3 Legal aspects

Feedback from the NRA on the initial draft legal report has prompted the need for a further revised report (including more focus on emergency response.) This is expected to have been completed during the Autumn. There was some discussion within the Steering Committee about the requirements of the legal paper. The comments made can be summarised as follows;

i) what does the law say should be done by the NRA at the moment?

ii) are the NRA covered for what they are doing?

iii) what are the implications of changing current practice, and how should changes be made?

However the research team stressed that there is a limit to what a research lawyer can produce in terms of meeting these requirements now being expressed within the NRA. Full definition of legal responsibilities or duties will only come from any existing legislation supplemented by new legislation and/or case law that may be pursued in the future.

In terms of extending the legal paper to cover more of the emergency response aspects it was felt important for Professor Barrett to meet with NRA lawyers. A meeting should be arranged between the two parties as soon as possible.

Discussion within the Steering Committee also raised a number of further points relating to this aspect. Such as:

- legal implications of formally defining a target standard level of service;
- different existing levels of service between and within regions;
- any implications for the NRA on non-main river,
- opinions on obligations from existing activities.

To provide input to the meeting between Professor Barret and NRA lawyers, NRA members of the Steering Committee were asked to list 6 or so of the main legal questions they believed needed to be considered and submit to P.Borrows within 3 weeks (by 27th September).

Discussion also included the possibility of training NRA staff in the legal implications of warning decisions and the introduction of disclaimers to warnings.

4 Progress on 1st round interviews

P.Reaston was able to give a report on the 1st round interviews. All interviews have been completed with the exception of five more which have been arranged with local authorities and Police. Full analysis of the 1st round interviews will be done in due course.

The information that has been collected from NRA personnel has included both the process and procedures leading up to and including issuing of flood warnings as well as details of emergency response actions undertaken, including both mitigation action before an event occurs or action in response to reported flood events. Interviews with some of the other agencies that may be involved have pursued similar questions of agency interactions and the activities undertaken by the agency in an emergency.

P.Bailey raised the question of the criteria which are used to

assess whether or not warnings are to be issued on a river. Already it has become clear that there are differences in the application of the colour coded warning system. For example Thames NRA distinguish between a Minor Red and a Major Red Warning.

An issue that was raised in the meeting was the identification of the real customers for NRA warnings. The implications are that there is a dual level of service, some are direct customers of the NRA service whilst some are customers of the overall emergency response service that includes actions of all agencies.

5 Progress on case studies

P.VL gave a verbal report on the progress that has been made on the 1st case study. A considerable amount of information has been collected for the analysis.

P.VL presented a methodology for measuring flood warning performance and enhancement based on an event sequence model. This approach centred on damage saving as the bottom line for flood warning performance assessment.

P.VL reported that whilst producing some useful results and points of interest, agreed by the Steering Committee, the technique was resource intensive as a lot of information had to be scanned. The approach had used significantly more resources than anticipated.

In the course of the research P.VL had encountered an alternative approach developed by Krysztofowicz and Davis and described it to the Steering Committee. It was agreed that the method provided an interesting conceptual tool to compare options and to illustrate that the performance depended on a range of interrelated actions and not just single actions.

There was some discussion of which of these techniques should be pursued in the second case study. A number of those present noted that it was important to ensure that parameters used in the assessment of the NRA should not be influenced by other agents.

It was decided that the event sequence model be pursued in a limited manner for the second case study to allow confirmation of the ideas raised by the first area even though using a different situation. The Krysztofowicz and Davis approach should however be retained as it may be of some interest, to be developed following the second case study.

The methodology described should be applied to the 1st case study but consideration needs to be given in allowing suitable time for analysis on another case study. Selection of the second case study was also discussed. The main criterion was that it should be in a coastal location. Subsequently Towyn was chosen as the best alternative for a second case study as there is already significant amount of information which can be utilised. Towyn particularly, would also enable further insight into the emergency response phase of the warning process and enable an assessment of costs. However, P.Borrows is to seek confirmation

that Towyn is politically acceptable. Gt Yarmouth was identified as a possible alternative to Towyn.

6 Development in flood warning technology

P.VL reported on Halcrow's assessment of technical developments in flood warnings. The assessment focuses on warning dissemination in terms of means used and the content of warnings. Examples from abroad have been incorporated. Most of the research in this area in the UK has been done by Middlesex Polytechnic Flood Hazard Research Centre. A. Biggs mentioned that research was being led by a Mr A. Roberts into dissemination in the Kent area.

Dissemination techniques vary within the NRA. The importance of dissemination and the significance of methods used should be highlighted particularly in the case studies and 2nd round interviews.

7 Further development of project

Work needs to aim at pulling together case study and interview material. The respective reports on these will be drafted for discussion at the research group meeting on the 3rd October with the aim of circulating a draft to the Steering Committee for comment in mid November. The next Steering Group meeting is scheduled for January 30th 92 but feedback will be required on the reports developed in the meantime. Research also needs to start on assessing costs and resources of the warning and emergency response service.

The second round surveys are due for completion at the end of February 92 to enable enough time to undertake the draft final report which should be produced by the end of April. The final report is scheduled for completion at the end of June.

8 Other business

The next Steering Group meeting was rearranged for January 30th at Halcrow, Swindon.

The following Steering Committee meeting was arranged for 18th March at York, NRA.

NOTES ON THE STEERING COMMITTEE MEETING HELD AT HALCROW CONSULTANTS, SWINDON, ON THE 30TH JANUARY, 1992.

PRESENT

P.Borrows	NRA
C.Birks	NRA
P.Bailey	NRA
D.Wilkes	NRA
E.Penning-Rowsell	Middlesex Poly
G.Twomey	Middlesex Poly
P.Costa	Middlesex Poly
E.Evans	Halcrow
P.Von Lany	Halcrow
S.Barr	Halcrow
K.Taylor	RGC
P.Reaston	RGC

Notes on the last Steering Committee meeting.

There were no outstanding comments or issues raised in connection with the notes of the last Steering Committee which were accepted as being in order.

Progress Report

G.T. and E.PR. briefly highlighted the major issues in the overall progress report documented by D.Parker.

The major points highlighted were that there has continued to be satisfactory progress in the project. A six week extension to the project has been officially accepted for a number of reasons including the need to carry out an extra consultation exercise with Flood Defence Managers and time to confirm the second case study and legal issues. E.PR. highlighted the fact that the second round survey and second case study is likely to be a particularly testing phase for the project research.

Legal Document and Summary Issues

E.PR. outlined the bottom line of the legal document which is that the NRA is implicitly more liable the further it gets involved in flood warning. The NRA are subsequently bound to ensure that a warning system is properly implemented.

Examples of problems concerning legal issues were cited by C.B. and D.W.. A major problem raised concerned flooding resulting from dam damage and the subsequent problem of who is held responsible ie, the dam owner or the NRA? There is a need for cooperation between the NRA and Water Companies to discuss the implications of such problems.

P.Borrows mentioned that there could be major legal implications for the NRA if they extend their functions. The project focuses on cases where a flood warning service exists but it was noted that there remain many areas which do not have any service at

all. If levels of service are to be nationally based then it is necessary to understand the cost and benefits of the do nothing option too and it's implications under tort negligence. However, it was felt that the section under the heading Failure to set up and maintain flood defence systems, page 21 of the legal document covered the legal explanation for the 'do nothing option'.

The issue of the colour coded warning scheme was raised in connection with the NRA's responsibility and hence liability, to disseminate warnings that are readily comprehended by other secondary and tertiary bodies. There was an underlying problem identified by C.B. with this scheme, the disparity between regions in the scheme's effective application. This led to confusion not only within the NRA but also between the Authority and the secondary emergency response bodies, in particular the Police.

D.W. noted that the Water Resources Act 1991 is not referred to in the current legal document and Middlesex Poly agreed to look into the possibility of incorporating this.

Final Report On The First Round Surveys.

P.R. of RGC indicated that as this document had previously been presented to the Steering Committee and that the contents remained the same there were no issues concerning the contents which needed further vocal embellishment.

P.B. identified two particular themes which appear throughout the paper;

- 1 Relationship between the NRA and secondary response/warning bodies,
- 2 Defining the areas that are at risk

E.PR pointed out that one of the possible standards of service, in light of these themes could be the standard of liaison between the Authority and the regional Police force - it was acknowledged that this was a difficult standard to measure, but the NRA was in an invidious position because of its statutory duty to protect life and material damage.

The NRA pointed out that County Councils' Planning Offices have recently been encouraged by a top down approach to get more involved in Emergency Response rather than just deal with their statutory duty of Civil Defence. However no budgetary provision has been assigned for this change/extension of their responsibility.

An idea suggested by E.PR to mitigate the potential liabilities that the NRA was open to, would be to pass on the onus of dissemination to secondary emergency response bodies. These would now also include County Councils. However, for this shifting of responsibilities to be successful the NRA would have to lobby not only the Home Office, to get the Police more involved than at present, but also the other two Ministries that

the NRA deal with - MAFF and the DoE.

First Case Study Report

The Case Study had been presented to the Steering Group at the previous meeting. D.Wilkes was able to give the Yorkshire NRA feedback notes on the document to Halcrow Consultants who had undertaken the study. The Committee particularly focused on section 5 of the report which details how performance of the warning system was assessed using event-sequence models (Figures 5.1(a) to 5.3(b).)

This methodology was commended by those at the meeting as a possible tool for establishing the position of the NRA in terms of performance in flood defence and emergency response although the NRA agreed that the terminology of Flood Warning Emergency Response (FWER) used by Halcrow should in fact be Flood Defence Emergency Response (FDER).

The methodology enables one to work back from standards set to see the implications on operational procedures. The methodology could be applied to different reaches although it is necessary to gather considerable site specific information to carry it out, and subsequently would require a large man hour input.

The trade off between warning lead time and the number of people warned was discussed and it was noted that this should be location specific.

The relationship of the NRA with other agencies was discussed. The case study example illustrated good communication between the Police and the NRA. The Essex system within the Anglian region was highlighted as one of the best information networks in operation between the NRA and the secondary response bodies. However, it was noted that in many other cases this relationship needs to be enhanced.

C.B. acknowledged that the Halcrow model could lead to a general framework if clear and accurate definitions could produce evidence to ascertain how individual performance parameters reacted. However, presently it showed several parameters that lay outside the responsibility of the NRA. To this effect D.W pointed out that the secondary response bodies, to which the above responsibilities allured to, needed precise and specific information from the NRA for their response to be effective and efficient. C.B. highlighted the problem of the high turnover of police personnel who deal with floods which causes problems through inexperience and ignorance.

The confusion over the application of the colour coding system was again highlighted as a point in question. Again the example of the Essex system was brought up.

P.B. agreed that there was a need for the NRA to issue a national directive clarifying the colour coding system and it's specific application in emergency warnings.

The lack of data in the form of mapping flood damage was

discussed and this was highlighted by P.Borrows who mentioned that on a recent request for mapped flood information by the British Insurance Agency, the NRA were only able to supply very high scale maps of only certain return periods.

Second Case Study Progress Report

A short summary sheet of progress to date was presented in the circulated document, by Halcrow. A formal request for further funding to enable Halcrow to comprehensively complete the Towyn case study has been made by the contract coordinator.

Report on responses to Performance Parameter Questionnaire

G.T. briefly outlined the findings of this exercise and highlighted that 14 performance parameters to be used in the second round surveys had been selected from an original 45. These are perceived as providing the best definition of the NRA performance at each stage of the Flood Defence Emergency Response system reflecting timeliness, accuracy and reliability.

C.B. outlined his view that the Standards of Service need to be established before performance can be measured. Performance measurements on their own mean nothing without a yardstick with which to measure them. The NRA therefore needs an action plan defining what it wants to achieve. The NRA need to know what the person on the ground needs to carry out his/her duties and the implications for achieving the required Standard of Service.

C.B. further added that these levels of service were associated to the outcome of a flood event ie. where the outcome is the level of damage limitation. This outcome is one half of the equation to calculate the value for money of the emergency response system. The denominator of the equation being the cost of the operation. The idea being to maximize the outcome while minimizing the cost, but this depends primarily on the nature of the event.

Standards of Service such as Flood Warnings need to be set primarily at the corporate level so that they can be filtered down the system, other Flood Response services can be set at a local level and aggregated upwards.

Once these standards of service have been determined the performance parameters that measure these levels of service will automatically 'fall out' of these definitions. However P.B. and C.B. are in agreement that these local level parameters need to be strictly defined and consistent at a national level. Furthermore P.B. pointed out that they should be reliable, accurate and of a 'timeliness' nature. The qualitative aspect of these parameters was deemed to be a problem, there are enough quantitative parameters that can be measured but there is a difficulty with qualitative measures.

The NRA philosophy on performance measures is as follows;

- 5 - 8 measures covering;
 - measures at a High level
 - measures at Regional level
 - measures at Local level

The nationally defined performance measures need to be aggregated upwards, as similar to the levels of service at the local stage, measuring each area of the flood defence emergency response system.

The NRA have been constrained by the Audit Commission to classify performance measures by three factors; Effectiveness, Efficiency and Economy.

Effectiveness - $\frac{\text{Outcome}}{\text{Output}}$

Efficiency - $\frac{\text{Output}}{\text{Input}}$

Economy - $\frac{\text{Resource or Input}}{\text{Cost}}$

Standard of Service as quoted above is related to the outcome in flooding but Standards of Service are defined by the extent to which the services of Flood warning, Hydrological monitoring, Inspection and Mitigation are provided. The factors which will influence the degree of service which should be targeted are numerous ie,

- * Landuse,
- * NRA resources,
- * Topography,
- * Soil type,
- * Climate,
- * River characteristics,
- * Maintenance standards,
- * Political,
- * Social,
- * Other bodies in Emergency Response.

Framework For Standards Of Service

Robertson Gould Consultants presented a short paper introducing ideas on how to categorize Standards of Service using a matrix to determine risk bands. (See Table 1 below) This paper was circulated to those present. It was argued by K.T. that this had the potential to provide a mechanism whereby some of the problems of litigation might be alleviated.

	Variation					Weight
Factors	5	4	3	2	1	
Land Use Band	A	B	C	D	E	10
Hydraulic/Run-off Characteristics	Rapid	-	Mod	-	slow	10
Travel Time from Nearest Depot (hrs)	>2.0	2.0	1.5	1.0	<0.5	5

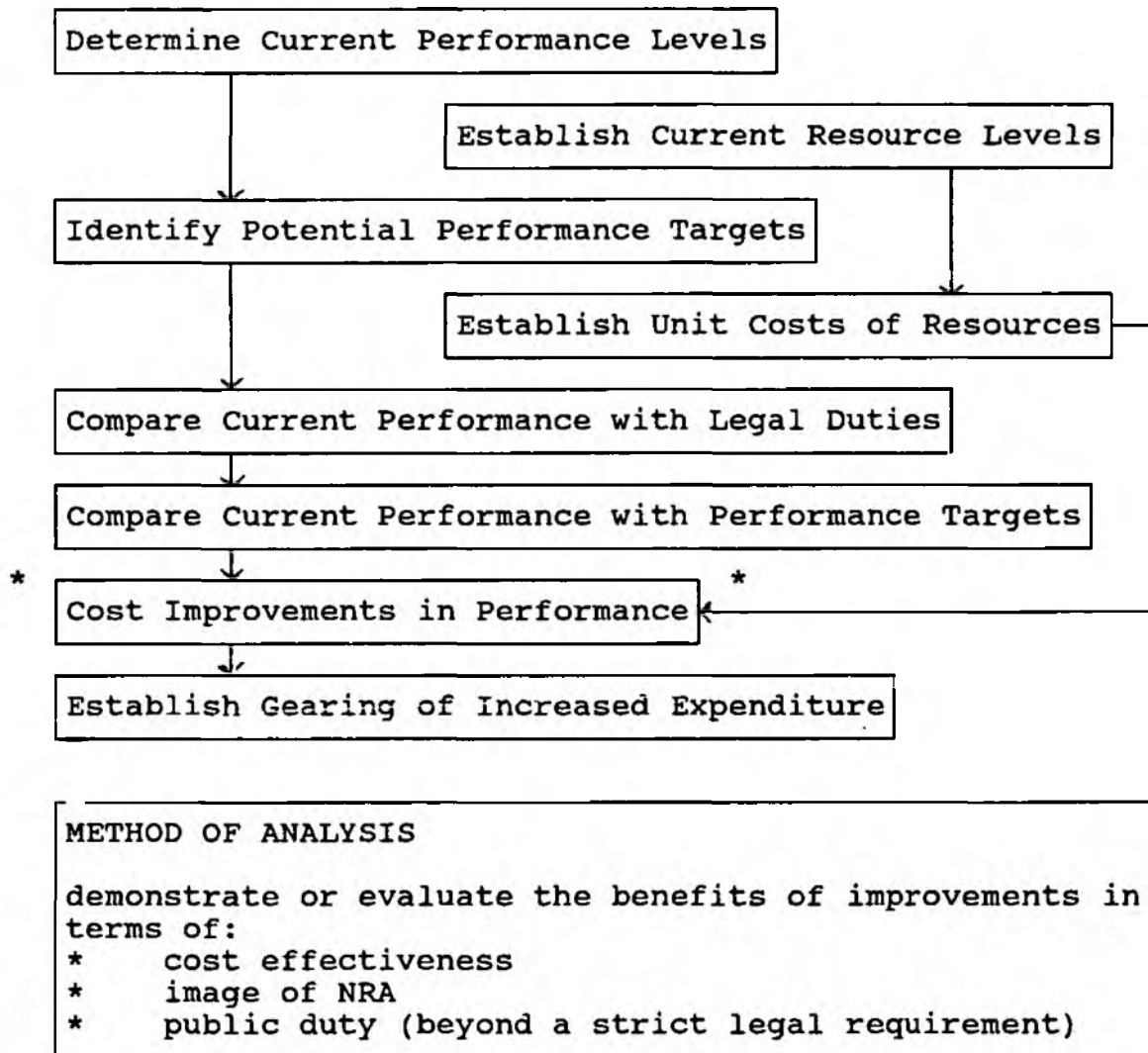
Table 1: Matrix for Determining Appropriate Service Level

P.VL. argued that there is a danger that the matrix only deals with static issues ie, it excludes factors such as frequency of flooding.

Strategy For The Second Round Survey

P.VL. and S.B. presented the proposed methodology phase 2B which was illustrated in the following chart;

OVERVIEW OF PHASE 2b METHODOLOGY



** Shows the level at which a detailed implementation stage would start because these deal with site specific locations.

C.B. suggested that a qualitative approach is needed for the second round surveys.

The team should be asking at what standard regions operate now and an estimating the targets that are needed.

Standards of Service need to be defined as the minimum standard of service which in some cases might be to do nothing. Each area should have its own appropriate Standards of Service.

However, problems can result through having different provisions of service as for example in Boroughbridge where the left bank is protected to 1:10 and the right is 1:100.

E.PR. suggested that the techniques used in the second round survey should be normative. Determining and cataloguing existing Standards of Service is an enormous task and therefore an overview/judgemental approach should be adopted.

Other Business

Two possible dates have been set aside for the next Steering Committee meeting; March 18th and April 13th. Middlesex Poly will confirm as soon as possible the date which will be selected.

MIDDLESEX UNIVERSITY

FLOOD HAZARD RESEARCH CENTRE

FLOOD DEFENCE EMERGENCY RESPONSE
NATIONAL LEVELS OF SERVICE

STEERING COMMITTEE
MINUTES OF MEETING, 30 APRIL.

May 1992

PROJECT RECORD: 289/2/T

6/5/92

P. Borrows
River Information & Control
National Rivers Authority
Kings Meadow House
Kings Meadow Road
Reading
RG1 8DQ

Dear Peter,

Flood Defence Emergency Response: National Levels of Service

I have enclosed the notes on the Steering Committee meeting held at the Foss Barrier, Yorkshire NRA on 30th April 1992.

Yours sincerely,

Greg Twomey
Research Officer

NOTES ON THE STEERING COMMITTEE MEETING HELD AT THE FOSSE
BARRIER, YORK NRA, ON 30th APRIL 1992.

P. Borrows	(Chairman)	NRA Thames
C. Birks		NRA HQ
R. Davidson		NRA HQ
D. Pelleymounter		NRA Yorkshire
P. Bailey		NRA Severn-Trent
R. Davey		NRA Anglian
S. Jayasinghe		NRA Thames
D. Parker		MUFHRC
K. Taylor		RGC
S. Barr		Halcrows
G. Twomey		MUFHRC
P. Costa		MUFHRC

Notes on the last Steering Committee Meeting.

P. Borrows verified that the six week extension has now been Officially endorsed by NRA HQ.

P. Burrows informed the meeting that discussions had been held concerning the implementation of the Colour Coding system on a national level that would cut out separate interpretation from regions.

The legal document is being refined by Professor B. Barrett of Middlesex University to include the Water Act 1991.

Progress Report

D. Parker introduced this report. It was noted that since the last meeting the research team has focused on six items of work as set out below.

- 1 Finalisation and implementation of the questionnaire survey under Phase 2b of the contract.
- 2 Analysis of incoming Phase 2b questionnaire returns.
- 3 Preparation of a draft paper on political influences and public attitudes/expectations relevant to flood defence emergency response.
- 4 Completion of the Towyn case study and preparation of a draft report thereof.
- 5 Further development of preferred methodology for assessing standards of service.
- 6 Preparation of a draft structure plan for the final report of the research project.

Items 3-6 above have all been either completed to draft stage or

are continuing (eg item 5).

It was noted that to date, six regions had returned information on the resource and performance questionnaires.

R. Davey said that the responses from Anglian region would be submitted soon.

R. Davidson questioned whether responses from the four remaining regions were necessary to complete the survey.

D. Parker responded that precisely because it was a survey these flood events were mere samples, and cutting the sample size would have a detrimental effect on the reliability of the inferences that could be taken from the data. Added to this reason was the fact that these four remaining regions made up fifty percent of the data pool.

C. Birks believed it to be imperative that all the regions should reply to avoid any problems that may arise from the implementation of the findings of the final report and its ownership.

P. Borrows said that he would contact North West region to check on their progress with the questionnaires.

D. Parker affirmed that despite the fact that there were still responses to the questionnaire which are outstanding, the project was still on course for the deadline although the timing is tight.

Political Influence And Public Attitudes Paper

G. Twomey outlined the contents of this draft paper but highlighted at the outset that it is currently insufficiently focused upon flood defence and emergency response. The document will make up a chapter in the final report and is intended to be a direct retort to specific objective (c) as defined in the terms of reference.

It was agreed that the implications for flood defence emergency response should be added to the existing information which as K. Taylor suggested has strong links with the legal document.

P. Borrows suggested that the document should reflect the changing political climate of emergency response and mention the implications of changing legislation concerning the other organisations involved in flood defence and emergency response.

C. Birks mentioned as an example of this, a Parliamentary Committee report on coastal management that is endorsing a complete change in the method of management. Thus emphasizing how the 'goal posts' are constantly changing due to a variety of pressures.

K.Taylor pointed out that in light of so many ongoing changes the report also needs to reflect the changing political ethos within emergency response. There is a need to cross reference with the Legal Document as all of these new laws and policies have yet to be tested in 'case law' ie. no precedents exist.

C.Birks reflected that the Citizens Charter is the basic example of this political 'wind of change' and should thus be substantially incorporated in the report.

R.Davidson expressed some reservation about this, because he believed the Charter to have such huge implications which are not covered within the remit of the report. However, by laying down certain parameters explicitly, the report would then be able to extract the relevant sections from the Charter.

P.Bailey pointed out that once the national scene was set the report needs to pull out the implications of these policies to see where they affect the FDER system.

R.Davey mentioned, concerning the involvement of other agencies, that there are indications that the Police Force might reduce its organisation to sixteen authorities, therefore having implications for the successful implementation of a FDER system. However, there is no official correspondence on this matter that is available at the moment.

R.Davidson moreover pointed out that he knew of at least three Police authorities that have expressed the wish to disassociate themselves with the warning dissemination of a FDER system.

C.Birks said that it was more than likely that a quarter of all Police authorities would wish to do the same.

Similarly changes to Local Authorities and other agencies should be considered as this would have equally significant implications.

D. Parker mentioned that he believed that the fire service are keen to expand their responsibilities in flood defence emergency response. R. Davidson said that his recent communications with the Fire Service College and the Fire Brigade in the North West Region of the NRA confirmed this view.

One potential reason for the interest now been shown by Fire Brigades was the concern the Home Office had expressed about the services' idle resources and the financial justification of it's expense.

R. Davey expressed concern that the fire brigade might impinge or duplicate the responsibilities which are currently undertaken by the NRA. He also stated that not all Fire Brigades could take on these responsibilities because of the nature of their employment eg. most the Lincolnshire Fire Service is a retained one ie. mostly part-timers.

However, it was acknowledged that the committee discussion could only speculate on the implications of such future changes.

Consequently, C. Birks suggested that the report should focus on the political influence as of now and whilst avoiding future speculation on changes, include an acknowledgement of the importance of other organisational structures.

D. Pelleymounter raised a point concerning the Citizens Charter. This is likely to encourage the NRA to show how money is spent. Subsequently it will be difficult for the NRA to show how the money spent is justified; for example, if £0.5 million is spent on forecasting/year and this produces a net benefit of £1 million for a 1:10 flood event is this justifiable expenditure ?

K.Taylor raised the point of public expectations being high than the deliverable service the NRA is capable to offer and hence would leave them open to litigation. A systems approach to FDER would mitigate this type of 'expected' responsibility. It is in this context justifiable expenditure should be debated.

The Committee also discussed the public perception of the NRA and responsibility for flood defence emergency response. There was some agreement that in many cases there is misconception over organisation responsibilities.

C. Birks drew attention to the paragraph on economy under section 2.2 where it should say not.....

Overall the report was highlighting all the right issues as far as the committee was concerned. All that seemed to be left to do was extract the implications for the Flood Defence Emergency Response system.

Second Case Study

S. Barr gave an outline of the completed second case study based on the event at Towyn, North Wales in 1990.

He emphasised two main reasons for why the flood defence emergency response system was poor;

- 1 No local warning service exists, warnings come from North West NRA instead.
- 2 No emergency plans existed.

K.Taylor pointed out that case studies are used not to criticize the agents involved but to develop better and more efficient management structures to improve the delivery of important services.

The issue of the benefits of action during the Towyn event was raised by C. Birks. A question was proposed as to what the consequences would have been if the NRA had done nothing at all to respond to the flood. If for example it was found that there would have been no benefits from providing a comprehensive service there would be no reason to do it. Although the economic

justification was apparent what would have been the political and social repercussions ? You need to be seen to be doing the 'right thing'. Consequently this raises questions as to the implications of Standards of Service.

K.Taylor/C.Birks agreed that the main reason for NRA involvement in the Towyn disaster was a political one.

R.Davidson hypothesized that the political reasoning was to do with accountability and liability. The latter is a major issue for the provision of FDER system.

It was agreed that the Towyn case study illustrated many of the issues discussed throughout the project and would be a very useful component of the final report.

Second Round Survey Report

P. Costa presented the results from the resources questionnaire data which had been received to date. The information was presented graphically and in table form depicting the resource cost distribution of different categories of resources and stages in the flood defence emergency response service.

The indication was that the highest costs were incurred during NRA operations. The resource category with the greatest expenditure seemed to be dependent on the information available. For example information on vehicle mileage was not available in most cases but where it was given ie. Wessex this accounted for most of the resource expenditure.

D.Pellymounter raised the point that had Yorkshire had double the resources they would have also employed them in the FDER system. So resource limitation in the system also has a bearing effect upon the final delivery of this service.

There was some discussion over how to distinguish between NRA operations and assistance with response. It was decided that the NRA need to clarify this themselves in the future.

The total resource cost for the Towyn event estimated from the second round survey data differs from that stated in the Towyn case study. This is due to the exclusion of clearing up costs in the questionnaire data but which were part of the case study total.

S. Barr introduced this report and highlighted the methodology which has been developed concerning performance measurement.

The Audit Commission has put forward a set of measures which can be used to define the performance of aspects of NRA activities

within the FDERS. Briefly these measures are:

- * Economy = $\frac{\text{Input}}{\text{Cost}}$
- * Efficiency = $\frac{\text{Output}}{\text{Input}}$
- * Effectiveness = $\frac{\text{Outcome}}{\text{Output}}$

In terms of data collected during Phase 2B, these ratios can be expressed as:

- (a) Economy = $\frac{\{\text{set of resources committed by the NRA}\}}{\text{total cost of NRA involvement}}$
- (b) Efficiency = $\frac{\{\text{set of standards of service}\} \{\text{achieved by NRA within the FDERS}\}}{\{\text{set of resources committed by the NRA}\}}$
- (c) Effectiveness = $\frac{\text{benefits achieved by actions of FDERS}}{\{\text{set of standards of service achieved}\} \{\text{by NRA within the FDERS}\}}$

A fourth ratio was introduced, representing value for money obtained by the NRA's involvement in the FDERS, expressed by:

- (d) Gearing = $\frac{\text{benefits achieved by actions of FDERS}}{\text{total cost of NRA involvement}}$

Gearing is defined here as the product of 'economy', efficiency' and 'effectiveness'.

The main focus of the discussion was on the gearing.
This is site specific

C. Birks said that he agreed with using this equation but that using the term gearing would not be acceptable to the Department of the Environment as National Rivers Authority standards of service are bound by the audit commission to refer to efficiency, effectiveness and economy.

C. Birks re-affirmed his claim that target standards need to be set before actual standards can be measured.

R. Davidson claimed that this was not an issue which should be debated within the project but instead should be resolved by the NRA outside the project.

D. Parker tabled a list of definitions of the terminology encompassing standards of service.

C. Birks stated that reference to 'subjective performance parameters' under the final heading 'performance parameters' should be dropped as the NRA is aiming to constantly be objective

in its assessment.

C. Birks will check the definitions with the NRA list of definitions.

It was agreed that it is appropriate to leave the title of the project as 'Levels' of service and not change it to 'Standards'. This is because levels refers to what the research team can recommend at the moment (and what will be defined in the final report) whereas standards will be defined by the NRA through policy decisions.

The Committee then discussed the development of a framework for categorising performance measurement.

The difficulty in this is to attach actual values to measures. The cascade system used in the Wharfe case study and presented at the last Steering Committee meeting was able to do this for a specific area, but applying this to every site nationwide is beyond the limits of this project.

However a system needs to be developed with an overall loose applicability. Influences on performance need to be included in a matrix which would enable the identification of standards in a particular area. The basic framework for this was presented at the last Steering Committee Meeting.

K.Taylor emphasized that a successful FDER system is dependent upon the performance of outside agencies such as the Police.

R.Davey questioned whether there is a real need to examine the performance of outside agencies as this does not seem to be within the remit of the project.

C.Birks pointed out that to establish a successful FDER system all the parts have to perform satisfactorily. Therefore performance parameters should measure performance of NRA operations and the FDER system as whole, so any problems can be identified and rectified.

It was decided that the parameters listed under Appendix E in the Interim Report on Surveys were suitable parameters which reflected either of the following; timeliness, accuracy and reliability. The following categorise would represent the flood defence emergency response system;

- Forecasting,
- Warning,
- NRA Operations,
- Response to unpredictable events.

The research should accomplish the framework but the actual placing of numbers in box's will have to be done by the NRA. However, where it is appropriate the research team should include the suggestion of what numbers should be for the NRA to develop.

It was agreed that the results should provide an indication of where the NRA are now, where they should go in the future and the options for how to get there.

Other Business

It was decided to hold another Steering Committee Meeting on the 1st July 92 at Robertson Gould Consultants, Warwick to discuss the draft final report.

The draft final report will be circulated to Steering Committee members on June 9th. Feedback from members needs to be returned by 23rd June. The final report should to be done by 31st July although the official deadline is 11th August.

MIDDLESEX UNIVERSITY
FLOOD HAZARD RESEARCH CENTRE

FLOOD DEFENCE EMERGENCY RESPONSE:
NATIONAL LEVELS OF SERVICE

NOTES ON THE STEERING COMMITTEE MEETING
HELD AT GOULD CONSULTANTS ON 1st JULY 1992

July 1992

Flood Hazard Research Centre
Middlesex University
Queensway
Enfield
Middlesex

PRESENT

P. Borrows	NRA Thames
C. Birks	NRA HQ
R. Davidson	NRA HQ
D. Pelleymounter	NRA Yorkshire
P. Bailey	NRA Severn-Trent
A. Biggs	NRA Southern
R. Davey	NRA Anglian
S. Jayasinghe	NRA Thames
D. Parker	Middlesex University
G. Twomey	Middlesex University
P. Costa	Middlesex University
K. Taylor	RGC
P. Von Lany	Halcrow

Notes On The Last Steering Committee Meeting

It was noted that no information on the resource and cost questionnaire had been received from North West and South West NRA regions at the time of the meeting. Information from Northumbrian had been received recently and will be incorporated into the final report.

There were no other issues discussed concerning the last Steering Committee meeting.

It was decided to turn attention at chapter ten first.

Comments on Chapter Ten of the Draft Report

D. Pelleymounter stated that there is no mechanism suggested as to how we should be looking at the implications (particularly on costs) for carrying out the strategy.

D. Parker mentioned that figure 9.1 tries to cover this aspect although it is only a draft model which needs further development.

It was noted that there were different opinions on the value of figure 9.1. L. Pickles expressed her approval of this in her written reply to the research team, but others (D. Pelleymounter, P. Borrows and S. Jayasinghe) stated that it was unclear in parts.

C. Birks stated that some quantification of benefits of different actions is required. Subsequently it was agreed that each region should provide a priority list of actions.

D. Pelleymounter stated that the monitoring of activities could place a further demand on costs which could then outweigh benefits.

S. Jayasinghe articulated the point which he had expressed in his

written comments of the draft final report concerning the possibility of developing some standard pro-forma, which can be used to collect nationally consistent data on emergency response.

C. Birks stated that although it must be conceded that the NRA does not currently collect sufficient data there is no purpose in attempting to collect 'all' data.

P. Von Lany explained that there are appraisal methodologies for cost effectiveness of projects which could be developed.

D. Parker stated that what has been said could be added to the final chapter.

S. Jayasinghe asked if any further work had been done on Figure 9.1.

P. Von Lany stated that if it was desirable, the diagram could be extended.

It was agreed that the decision route diagram should commence with the recognition of an existing system and the question of whether it is technically feasible.

The omission of table 9.1 from the draft report would have gone some way to answering the question of technical feasibility. This was circulated around the table for a brief preview and it was agreed that further work was required to develop the constraints of the decision route model.

A. Biggs suggested that in some cases it may be that although there is a legal requirement the best approach might still be to 'do nothing'.

C. Birks stated that the decision route model might not be applicable until all the regions have reached a minimum level of service.

D. Parker claimed that figure 9.1 could be improved in a number of ways. He agreed that the Terms of Reference should be in Chapter ten.

D. Pellemounter questioned the options for improvement which have been proposed in the draft final report. In particular he highlighted the issue of providing public information which (outside the NRA too) is a controversial issue.

K. Taylor claimed that the trials which North West NRA had carried out in this field had adverse results due to particular misunderstandings by the Press.

D. Parker stated that the current scientific evidence does not indicate that the public become unduly anxious or prone to stress when informed about flooding as was once suspected. Subsequently the current philosophy of the NRA which goes against this, is out of date.

C. Birks declared that the NRA, in effect, has no choice but to

release information. The NRA has declared itself to be an open organisation and legally has to provide information. The fundamental question which needs to be answered is whether the NRA should distribute the information voluntarily or only when asked to provide it?

D. Parker supported this by saying that the objective to protect people also signifies that the NRA should readily release information.

C. Birks identified that the NRA would currently have to admit to not having some of the data which is likely to be expected. A fundamental question is also how the NRA ensure that the information provided will be legally secure. The NRA also needs to look more closely at its relationship with the media.

D. Parker mentioned that the links which FDER agencies in the U.S.A have with the media are much more developed. He also indicated that the Meteorological office has ensured much better media relations following the hurricane that took place over Southern Britain in 1987. He emphasised that the issue would be developed in Chapter 10.

P. Bailey raised an issue over the collection of ongoing data. He stated that to do this effectively the background data (mapping etc) needs to be developed.

D. Parker stated that the R & D report on mapping and flood defence should be built into the conclusions of the final report.

D. Parker asked the Committee to voice their impressions of providing public information.

R. Davidson asserted that there was no question that the NRA need to consider how to undertake this recommendation after reviewing the report.

D. Pelleymounter stated that the standards of public information provided currently vary considerably.

P. Borrows mentioned that the recent report on Sea Defences has already provided information on the condition of defences. However it was conceded that this was only a superficial report.

D. Parker asserted that the risk of disseminating information requires the NRA to collate all hazard information currently used for evaluation. Legal experts should be involved in the evaluation which also needs to determine where there may be risks of negligent mis-statement and negligent non-statement.

C. Birks said that the Water Resources Act 1991 specifically empowers the NRA to collect flood hazard information and disseminate it.

P. Bailey claimed that there is a need to emphasise the section 10.4 (2) concerning non-main rivers and the implications of not providing a warning system at all.

C. Birks referred to figure 9.1 and suggested that a priority listing for non-main rivers should be included which can also relate to the rankings in chapter 10.

P. Von Lany mentioned that the priorities would be highly location specific and that recommendations for a methodology to look at them should be included (Event sequence modelling).

C. Birks read out some of the commentary notes of the NRA legal department on the legal document produced in the project. Concern was expressed over the section on pollution 3.3.1, 3.8. Under section 3.7.1 it was noted that the Water Act is not silent on breach of statutory duty. He said that a copy of the comments would be passed to D. Parker. He also said that the NRA would be adopting the report and recommendations.

P. Borrows circulated his draft proposal for the forward to the report. This will be updated.

C. Birks commented that there is a difficulty in implementing recommendations of R & D projects throughout the NRA. However, steps are being taken to improve this.

P. Borrows said that headings for each point would be useful in Section 10.4.

C. Birks was asked if the recommendations would be acceptable and he replied that recommendations as read alone can be misleading. To avoid this there is a need to ensure that the report is understood as a whole. Subsequently he suggested the need for an instructive summary.

Reporting Requirements

The Steering Committee discussed the arrangements for reporting the final report.

There was some discussion over the separate reports which were expected to be produced for the project. It was eventually discerned that the following are required;

- R & D Record (4 copies)
This is a volume of all the data utilised in the project.
- R & D Note (50 copies)
This is expected to be an accompaniment to the final report. It is a fifty page summary distilling the central findings of the report.
- R & D Digest (Number to be determined)
This is a summary document (newsletter) consisting of text on eight sides of A4 paper.
D. Parker and P. Von Lany agreed to meet at a later date to produce this document.

The number of final reports that need to be produced needs to be

confirmed by P. Borrows as soon as possible. The print services at Middlesex University must know the number by 15th July at the very latest if there is to be sufficient time to print the expected number of reports.

D. Parker confirmed that the intention is to send out the final report by the 31st July.

It was agreed that the current Executive Summary would be more appropriately called an Abstract. The Executive Summary should be included before the Abstract and should be extended to six or seven pages. The summary should inform the reader of the ground covered by the project and summaries in particular the points in Chapter 10. Headings and bullet points will be used to enhance the Executive summary.

Other Improvements

Apart from the presentation of tables in this chapter it was also decided to change the terminology used in section 9.3 'false warnings'. This should be altered to 'warnings not followed by a flood'.

It was agreed to alter Table 6.1. In the first paragraph on accuracy indicators the use of the term levels should be replaced by 'reaches'. The term 'flood level' should read 'flood level forecasts'. The use of 0.3m should be altered to the phrase 'an acceptable level of resolution'.

Consistent definitions are required in table 6.1 which relate to the terms in table 9.3. Table 9.3 needs to be backed up by definitions.

Any Other business

There was no particular other business which needed discussion. As the project draws to its conclusion and it was recognised that this would be the final Steering Committee meeting P. Borrows expressed his thanks to the members of the research team and the members of the Steering Committee. D. Parker also expressed his thanks to the Steering Committee and especially P. Borrows.

Greg Twomey
Middlesex University