

NRA Research and Development Programme - 1995/96

Schedule of On-going Projects and Proposed New Starts



March 1995



NRA

National Rivers Authority

Guardians of
the Water Environment

NRA R10 ANNUAL REVIEW



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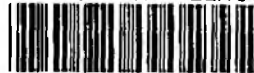
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ENVIRONMENT AGENCY



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First Published 1995

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This document has been produced to inform potential research contractors and potential collaborators of the NRA's R&D Programme for 1995/96.

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NRA R&D PROGRAMME 1995/96

Schedule of On-going Projects and Proposed New Starts

Introductory Notes

1. This document lists both on-going projects and proposed new starts in the approved NRA R&D Programme for the financial year 1995/96.
2. "On-going projects" are projects from the 1994/95 R&D Programme which are expected to be continuing on 31 March 1995. In some cases, a further phase of an on-going project is due to start during 1995/96. Such projects are identified in the 1995/96 Programme by their Start and End dates being shown only as the financial year, e.g. 95/96, and not as the month and year e.g. 11/94. Further phases of on-going projects will not necessarily be awarded to the Contractor which carried out the previous phase. Each on-going project has a distinct three digit project number e.g. 017, which is recorded below the proposal number. Shaded projects are due for completion by 31 March 1995.
3. "Proposed new starts" are new projects due to start during the NRA financial year 1995/96 i.e. from 1 April 1995 to 31 March 1996.
4. All Proposals are referenced, e.g. "A06(92)5". This provides the following information :

"A06" is the Topic number in Commission A;

"(92)" is the financial year 1991/92 in which the proposal was first listed as a "Proposed new start"; and

"5" is the proposal number for that Topic/Commission number for the financial year 1991/92.

Proposed new starts for 1995/96 can be either "(94)" or "(95)" series proposals. The former were originally listed as Proposed new starts for 1994/95.
5. Projects or proposals having an asterisk following the title are being undertaken or developed in collaboration with other research-commissioning organisations. As a result it is likely that the project will be procured by the collaborative organisation and not the NRA.
6. Potential contractors who wish to be considered for undertaking either further phases of on-going projects or proposed new starts should contact, in writing, the person below.
7. General enquiries on the NRA R&D Programme should be addressed to:-

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Abbreviations

AWRU	Aquatic Weeds Research Unit
BGS	British Geological Survey
BOD	Biochemical Oxygen Demand
BSRIA	Building Services Research and Information Association
CAP	Common Agricultural Policy
CIMA	Construction Industry Manufacture's Association
CMP	Catchment Management Plan
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
DoE	Department of the Environment
EC	European Commission
ELISAS	Enzyme Link Immuno-sorbent Assay
ENVAGE	Environmental Agency
EQS	Environmental Quality Standard
ESA	Environmentally Sensitive Area
EU	European Union
GC-AED	Gas Chromatography
GiA	Grant-in-Aid
GPP	Groundwater Protection Policy
GPS	Global Positioning System
GQA	General Quality Assessment
HMIP	Her Majesty's Inspectorate of Pollution
HPLC	High Performance Liquid Chromatography
IH	Institute of Hydrology
IPC	Integrated Pollution Control
JNCC	Joint Nature Conservation Committee
LIFE	Financial Instrument for the Environment
LOIS	Land Ocean Interaction Study
MAF	Minimum Acceptable Flow
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	IH acidification model
MS	Mass Spectroscopy
NERC	Natural Environment Research Council
QUASAR	Quality Simulation along Rivers
RHS	River Habitat Survey
RIVPACS	River Invertebrate Prediction and Classification System
SERC	Science and Engineering Research Council - now the Engineering and Physical Sciences Research Council (EPSRC)
SERCON	System for Evaluating Rivers for Conservation
STEP	Science and Technology for Environmental Protection
STW	Sewage Treatment Works
SWQO	Statutory Water Quality Objective
TBC	Toxicity Based Consent
UPM	Urban Pollution Management
WRA	Waste Regulation Authority

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
Business Area: Statutory Water Quality Objectives		
Topic Area A1 - Standards and Classification Schemes		
On-going projects A1		
A04(91)7 390	Joint Nutrient Study (JoNuS)* To understand the scale, trends and processes of nutrient cycling in major east coast estuaries and coastal waters	11/91 1/96
A04(92)2 457	Ionisation of ammonia in estuaries To develop theoretical models which allow the concentration of toxic ammonia in estuarine waters to be calculated from a knowledge of salinity, temperature, pH and total ammonia	2/93 9/94
A01(94)4	Lakes - Monitoring and classification - Phase 2 To develop an effective system of monitoring and classification of lakes and other standing bodies of water	95/96 96/97
A09(90)1 227	Metal speciation in rivers and estuaries To determine the chemical form of selected metals in rivers and estuaries	6/94 3/95
053	Development of Environmental Quality Standards To develop environmental quality standards (EQSs) for substances of concern to the NRA	8/94 7/95
A01(95)1	Phase 3 - Further EQSs	95/96 96/97
051	European pollution control philosophy To examine European pollution control strategies to assist in the development of related UK initiatives	6/94 3/96
A01(93)1 469	General Quality Assessment Scheme To develop and test a General Quality Assessment scheme for rivers, estuaries and coastal waters to provide an objective and comprehensive classification framework for river quality surveys	10/93 9/95
A08(94)5 540	Faecal coliforms in shellfish and surrounding waters* To assess the link between bacterial levels in shellfish flesh and surrounding waters to control pollution	8/94 5/95
A01(94)3 557	Assessment of metals in marine sediments* To assess the level of metals and particle sizes within marine sediments to support the development of GQA scheme	11/94 9/95
A01(94)1 560	Toxicity-based criteria for assessing receiving water quality To develop and assess toxicity-based criteria in order to assess the general quality of estuarine and coastal receiving waters. Phase 1 - Scoping study	12/94 3/95
A01(95)2	for marine waters, to include a review of biomarkers	95/96 96/97
Proposed new starts A1		
A01(94)2	National database on recreational freshwater quality To assemble all available data on recreational freshwater quality to assist in the setting of SWQO's	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A01(95)5	Sources and impacts of nutrients in estuaries* To conduct a feasibility study on the influence of nutrients on estuarine quality, in particular their importance to the special ecological nature of estuarine ecosystems	95/96 95/96
	Business Area: Monitoring Topic Area A2 - Strategy and Reporting	
	On-going projects A2	
015	Atmospheric inputs of pollutants into surface waters To determine the organic composition of atmospheric deposition in the UK and assess the contribution of airborne pollutants to the organic content of surface waters	10/88 6/94
A04(92)5 458	Estuarine water quality model* To develop, as part of the NERC LOIS study, a portable estuarine water quality model to enable classification of waters in relation to SWQOs	3/92 4/95
A02(93)2 479	Improved monitoring efficiency* To undertake practical catchment-based case studies to review existing monitoring activities and to develop and demonstrate new monitoring programmes and associated data analysis tools which provide an integrated approach and value for money. Phase 2 - Field trials of best practice	11/94 6/95
A02(95)2		95/96 97/98
A11(92)2 482	Early warning system for potential failure of river class To develop a system that would routinely inform the NRA as soon as possible of any river sampling point that was in danger of failing its class	7/93 8/94
	Proposed new starts A2	
A02(94)1	Further testing and development of QUASAR* To further develop the river quality model QUASAR to enable NRA staff to use it for specific end-user applications	94/95 95/96
	Business Area: Monitoring Topic Area A3 - Analytical Techniques	
	On-going projects A3	
A06(91)4 319	Moth-proofing agents and water quality management To develop analytical methods for and examine the fate of moth-proofing pesticides in the water environment and to assess the significance of the materials when discharged to aquatic systems	9/91 9/94
A03(95)1	Microbiological techniques - Phase 3 To produce and update a manual of standard microbiological techniques for the NRA with further techniques - which would include sampling analysis and quality control procedures	95/96 95/96
A09(92)8 460	Use of supercritical carbon dioxide for extraction of trace organics To develop an automated method for the selective extraction of Red List organics (except organotin and dioxin compounds) at levels useful for Red List monitoring work	3/93 3/95

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A03(93)1 527	Farmstat pesticides To develop analytical methods based on solid phase HPLC extraction and HPLC/MS to cover the increasing range of agrochemicals used in the environment	6/94 1/96
A03(94)3 533	New techniques for pesticides* To develop techniques for the determination of low concentrations of selected pesticides (atrazine and isoproturon) and their transformation products (TPs) in the subsurface aquatic environment	7/94 5/96
A09(92)3	Proposed new starts A3 ELISAS for the screening of herbicides and pesticides To establish a strategy for the introduction of immunoassays into the laboratories for the cost effective analysis of samples and for screening and semi-quantification of pesticides and herbicides	94/95 95/96
A03(94)2	Techniques to measure chromium by voltammetry To develop a method of analysis for chromium speciation in saline samples which achieves the sensitivity required by the client	94/95 95/96
A03(95)2	Analytical methodology for national EQSs for bromine and chlorine To develop a methodology suitable for field use to meet the levels of detection required by the proposed environmental quality standards for bromine and chlorine	95/96 96/97
A03(95)3	Development of analytical methods for pesticides To provide analytical methods, useful to the NRA, for pesticides yet to be prioritised	95/96 97/98
A03(95)4	Analytical methods for cationic poly-electrolytes at levels of environmental significance To review available methodology and assess whether further method development is required to meet the NRA's analytical needs	95/96 95/96
A03(95)5		95/96 96/97
Business Area: Monitoring		
Topic Area A4 - Instrumentation and Field Techniques		
On-going projects A4		
A05(91)2 348	Field detection of algal toxins To develop a field test kit for the detection to a specified level of Microcystin - LR in water	9/91 5/94
A10(91)7 442	Development of new techniques for the monitoring of ammonia in water, Phase 2 To develop and test in the laboratory and the field new and improved techniques for monitoring ammonia in water	1/93 9/94
A10(92)1 427	Assessment of field monitors for consent monitoring To assess accuracy, reliability, applicability and cost effectiveness of available equipment to enable the NRA to monitor alternative determinands to BOD and suspended solids Phase 2 - Evaluation of the best monitors	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A04(94)3 507	Evaluation of mini metal-sensors To evaluate bench-top metals analyzer and to develop methods to enable environmental concentration in seawater of major saline metals to be determined in situ on board a survey vessel	12/93 7/94
A04(94)3	Phase 2 - Production of prototype	94/95 95/96
A04(93)1 523	Moored marine water quality monitor To develop a prototype self-contained monitoring buoy in order to fulfil our statutory obligations to monitor both out to the three mile limit and to investigate the effect of polluting discharges	3/94 11/95
A04(94)4 532	Inland use of airborne remote sensing* To review the algorithms for interpreting data from airborne remote sensing to monitor the quality of inland waters	8/94 12/95
A04(94)6 570	Development of low cost nitrate and phosphate sensors* To develop sensitive and low cost, solid state sensors for the determination of nitrates and phosphates in water	10/94 4/95
A04(94)1	Proposed new starts A4 Biochemical oxygen demand predictor and hand held instrument To develop a method of indicating the level of BOD in a discharge of receiving water to enable NRA staff to make on the spot decisions for further sampling or action Phase 1 - feasibility study	94/95 95/96
A04(94)2	Oil in water - a review of existing monitors To review current equipment used to monitor the presence and levels of oil in freshwater to provide NRA staff with accurate assessment of their performance	94/95 95/96
A04(94)5	Instrumentation for self-monitoring To specify and/or develop the equipment for self-monitoring and auditing of compliance to provide information for NRA staff through a business study	94/95 95/96
A04(95)1	Sensors or methods for the determination of residual chlorine To develop a quick and simple method to determine low levels of residual chlorine in cooling water discharges in order for the NRA to better monitor discharge consents	95/96 96/97
A04(95)2	Sensors for ammonia detection To develop improved sensors for the determination of ammonia in water in order for the NRA to improve its monitoring of this determinand	95/96 96/97
A04(95)3	Sensors for nutrients To develop sensors in order to enable the NRA to make rapid on-site checks of nutrients (nitrates and inorganic phosphate)	95/96 96/97

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
Business Area: Monitoring		
Topic Area A5 - Biological Assessment		
On-going projects A5		
A13(90)1 243	Testing and further development of RIVPACS - Phase 2* To provide a more uniform, objective, user-friendly approach to the assessment of biological water quality for rivers within the UK	8/92 6/95
A05(95)3	Phase 3 - Development of RIVPACS methodologies	95/96 97/98
A13(90)3 242	Faunal richness of head water streams To assess the conservation value of head water stream macroinvertebrates and their contribution to catchment macroinvertebrate richness and determine agricultural impacts upon them and propose a conservation strategy	10/90 1/95
A08(91)3 354	Effects of low level contaminants on marine and estuarine benthic communities* To evaluate experimentally the effects of low levels of contaminants on marine and estuarine benthic communities	10/91 6/94
A12(92)3 420	Methods manual To establish standard operating procedures for ecotoxicological techniques and to produce and update a methods manual	9/92 8/95
A05(95)5	Method development To provide suitable selection tests for the ecotoxicological assessment of effluent and receiving water quality	95/96 97/98
A05(93)8 504	Biological assessment methods To quantify and, where possible control sources of variability in freshwater macroinvertebrate data for a range of river types and biological quality bands in order to increase the value of NRA data in water quality management	11/93 2/95
A05(94)4 550	Ecotoxicological Quality Assessment procedures* To develop quality assessment procedures for ecotoxicological methods and to provide accurate management information	10/94 3/97
Proposed new starts A5		
A05(94)1	Applications of artificial intelligence in river quality surveys To undertake analysis of data held on the National Biological Database and to further investigate the distribution of macroinvertebrates throughout England and Wales	94/95 95/96
A05(94)2	Biological techniques of still water quality assessment To assess present methods of biological assessment, develop a suite of methodologies and illustrate the range of biological quality definitions in still waters to develop a classification framework for biological quality	95/96 95/96
A05(95)5		96/97 97/98
A05(94)3	Alternative methods of biological classification of rivers To reassess work on macroinvertebrates and other biotic indicators in a European context to provide an alternative approach for classify quality of rivers	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A05(95)1	Terrestrial influences on aquatic systems* To evaluate the importance/influence of headwaters on the biology of the whole river and ensure that catchment management plans take account of the head waters characteristics and protect them in order to maintain biological quality	95/96 95/96
A05(95)4		95/96 97/98
A05(95)2	Assessment of trophic status of rivers using macrophytes To develop a national scheme of assessment of the trophic status of rivers through the interpretation of macrophyte presence and their extent in flowing waters	95/96 96/97
Business Area: Discharge Control and Charging		
Topic Area A6 - Consenting and Discharge Impact		
On-going projects A6		
A01(92)7 464	UPM Management manual* To produce a manual which will allow practitioners on both the regulator and sewerage undertaker sides of the industry to implement the Urban Pollution Management methodology to assess the impact of storm sewer overflows in rivers	2/93 9/94
A01(92)11 436	Removal of coloured effluents from dyehouses* To research novel and cost effective processes for removing colour from dyehouse waste in order to minimise adverse effects on the water environment	1/93 10/95
A01(92)9 430	National consent translation project* To establish a sound methodology for the neutral translation of consents for sewage treatment works' effluents into the format required by the EC Directive on Urban Waste Water Treatment	11/92 9/94
A06(94)8	Phase 2 - BOD/COD relationship	94/95 95/96
A06(94)9	Phase 3 - Integration of upper tier/intermittent standards	94/95 96/97
A06(95)7	Efficacy and effects of wastewater disinfection - Phase 4 To undertake desk, laboratory and field studies of the efficiency and environmental effects of candidate disinfection processes to support NRA policies on consenting disinfected discharges	95/96 96/97
A06(93)7 468	Cost benefit assessment* To develop an economic benefit methodology for evaluating environmental benefits resulting from changes in water quality stemming from improvements in effluent quality	3/94 3/95
A06(94)6 493	Toxicity based consents* To further develop toxicity criteria in regulatory control, to test the protocols and procedures necessary for the application of toxicity based consents	10/93 3/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A07(93)1 490	Identification of estrogenic substances in STW effluent* To identify and quantify the component(s) present in sewage effluents that are responsible for the vitellogenic response in fish	9/93 3/96
A06(94)5 534	Deposition and biological effects of organic carbon from sewage effluent* To produce a validated predictive model relating to emission and settlement of suspended solids to changes in the sediment-dwelling microfaunal communities	8/94 6/96
A06(95)5	Phase 2 - validation, statistical shell to model	95/96 95/96
A06(94)10 555	Implications of real time control on regulation of CSOs* To undertake a scoping study to review the issues and identify the options for funding and developing knowledge of real time control on the regulation of CSOs	12/94 3/95
A06(95)6	Phase 2 - development of protocol - pilot study	95/96 96/97
A06(94)2 556	UPM implementation project* To demonstrate the implementation of the Urban Pollution Management Manual and other procedures to assist NRA staff in implementing this methodology	11/94 3/95
A06(94)7 565	Septic tank leaflets* To produce a detailed specification (including costs) for the production of (i) a series of leaflets to provide information and guidance for those concerned with building, maintaining and regulating septic tanks and (ii) a technical guidance document for NRA pollution control staff	12/94 4/95
A06(94)1	Proposed new starts A6 Expert system for consenting discharges To develop an expert system to assist in the setting of discharge consents	94/95 95/96
A06(94)3	Fate of detergents and associated chemicals in wastewater and rivers* To assess the sources, transport and fate of detergents and similar chemicals to enable receiving waters to be protected	94/95 95/96
A06(94)8	Benefit assessment of water quality improvements* To determine and quantify the benefits arising from water quality improvements in industrial river corridors in order to justify undertaking such work	94/95 96/97
A06(95)1	Implications of real time control for continuous discharges* To assess the potential for using real time control for regulating continuous discharges	95/96 96/97
A06(95)2	UPM workbench and review of manual implementation* To provide assistance for the implementation of the UPM Manual to address user problems	95/96 96/97
A06(95)3	Catchment inventories of dangerous substances in sewerage networks* To provide a method for assessing the sources of dangerous substances in catchment sewerage systems to permit more effective pollution control	95/96 96/97

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A06(95)4	Development of CSO monitoring - compliance testing* To develop a simple technique for auditing new CSO structures through acceptance trials and undertaking an audit with manufacturers and designers	95/96 96/97
	Business Area: Pollution Prevention Topic Area A7 - Rural Land Use	
	On-going projects A7	
A07(94)3	Impact of pesticides on river ecology To assess the impact of different pesticides on the structure and functioning of riverine ecosystems	94/95 95/96
A07(91)4 561	Occurrence of Cryptosporidium* To study the presence, routes and fates of oocysts in animal wastes in order to determine their potential for contaminating water courses	12/94 3/97
A02(90)3 205	Management of acid lakes by regulating nutrients - Phase 2 To obtain a viable and effective alternative methodology of habitat amelioration to liming for soft water upland lakes by addition of phosphate and monitoring changes in ecosystem and buffering capacity in order to produce a management tool	4/93 3/96
122	Effects of agricultural erosion on water courses To identify the factors affecting the yield of high sediment yielding catchment, and to produce recommendations to reduce adverse impacts of soil erosion	1/90 3/95
A07(95)4	Phase 2 - Assessment of opportunities for soil erosion control	95/96 96/97
A02(91)4 368	Impact of erosion of forest roads on water quality To study the natural erosion processes and rates from mixed aggregate built roads in upland forests and the impacts of heavy vehicles used for timber extraction, in order to identify impact on water quality	11/91 9/94
119	Total impact assessment of pollutants in rivers - Phase 3 To investigate the pollution of streams draining agricultural catchments and specifically, to develop a simple model of the movement of pesticides from the point of application to streams	4/92 5/94
A02(92)5 416	Nitrogen module for the IH acidification model (MAGIC) To develop a nitrogen process module for MAGIC and to apply the model to investigate increasing nitrate in atmospheric deposition	8/92 7/95
A07(94)8	Land management techniques - Phase 2 To develop management techniques for soil and nutrient conservation including : i) buffer zones	94/95 96/97
A07(94)9	ii) demonstration of best practice	95/96 96/97
A03(92)3 434 A07(94)10	Pathogens from farming practices To study the incidence of pathogenic bacteria and viruses in soils receiving livestock waste and to investigate the persistence and mechanisms of transport of these organisms in the soil	10/92 11/94 94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A02(92)3 465	Impacts of fine particulates associated with timber harvesting To quantify the impacts of timber felling on stream particulate loads and to investigate methods to ameliorate long and short term sediment pollution associated with forestry land use and practice	7/93 7/96
001/012	Sources, impacts and detection of farm pollution To develop biological methods for the detection of organic pollution from farms and for assessing the effectiveness of remedial action	4/90 7/94
A02(92)10 462	Zinc from watercress farms To produce watercress with improved resistance to the crook root fungus (<i>Spongospora subterranea</i> f. <i>sp.nasturti</i>) and watercress yellow spot virus in order to reduce the need to treat watercress with zinc and consequent contamination of watercourses	3/93 10/96
A07(93)2 502	Impact of conifer harvesting* To assess the impacts of conifer harvesting and replanting on upland stream water quality with a view to identify ameliorative management strategies and the development of a model and guidelines for environmental impact assessment	1/94 12/96
A07(94)2 542	Alternative farming methods - arable* To demonstrate a viable way of reducing the levels of certain agrochemicals reaching "controlled waters" which can be promoted by the NRA as "Best Practice"	9/94 10/96
A07(94)6 553	Treatment technology for farm wastes* To investigate the potential for developing new technology to treat farm wastes for disposal to land in order to reduce the level of pollution from this type of waste	10/94 10/96
A07(94)5 562	Guidance for assessing and controlling non-point sources of phosphorus* To develop guidance for the assessment of the contribution of non-point sources to the phosphorus budget in rivers to assist in pollution prevention	12/94 3/95
A07(94)4 568	Quantifying point source inputs of pesticides To investigate the importance of small point source discharges to background concentrations of pesticides in river catchments in order to improve monitoring programmes	12/94 3/95
A07(95)5		95/96 95/96
	Proposed new starts A7	
A07(94)1 575	Alternative farming methods - dairy To develop new systems of milk production to reduce the impact on water quality, in particular, levels of phosphate	94/95 98/99
A07(94)7	Best Practice Manual To develop a manual of Best Practice to help NRA staff advise farmers on how to reduce risks of farm pollution	94/95 95/96
A07(95)1	Land use change as a result of CAP* To assess the land use change that may be brought about through CAP reforms to aid pollution prevention measures	95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A07(95)2	Forestry and acid waters To develop a monitoring strategy to assess the effects of forestry on water quality and acidification in water courses using indicator species	95/96 95/96
A07(95)3	Development of risk assessment models To develop risk assessment models as tools to be used at a farm/catchment level and regional/national level	95/96 95/96
Business Area: Pollution Prevention		
Topic Area A8 - Groundwater Pollution		
On-going projects A8		
A08(94)5	Pollution potential of contaminated sites - Phase 2 To assess groundwater pollution potential of contaminated sites and to relate these leaching tests to target levels for acceptability with respect to groundwater	94/95 95/96
A14(91)3 380	Development on contaminated land - Phase 3* To provide guidance to developers and regulatory bodies in the assessment, specification, supervision and achievement of effective and safe remediation of contaminated land using the most appropriate techniques	2/94 1/96
A08(93)5 514	Risk assessment methodology for landfills* To develop a risk assessment methodology for the assessment of landfill engineering plans	11/93 3/95
A08(93)10 519	Reliability of sewers in ESAs* To assess the impact of sewer leakages on groundwater quality and to identify factors which give rise to the problem and steps which can be taken to minimise the risks in order for the NRA to produce a strategy to minimise the risk of future groundwater pollution	2/94 11/94
A08(93)11 513	Long-term monitoring of non-containment landfills* To produce long term monitoring data for landfill gas and leachate for uncontained landfill sites on different aquifers in the UK, in order to provide the NRA and DoE with the technical background needed to develop waste management policy	1/94 3/95
A14(92)6 543	Remediation of groundwater pollution for organic solvents To develop and test a decision tree to enable the NRA to respond rapidly and rationally to both short and long term problems concerning organic solvents	9/94 9/94
A08(94)4		94/95 95/96
A08(94)3 564	Leachate recirculation* To demonstrate by means of a field trial that waste and site manipulation techniques enhance both the rate of waste stabilisation and landfill gas production	12/94 9/95
A08(94)2 569	Effects of old landfill sites on groundwater quality* To assess the extent of groundwater and surface water pollution potentials of old sites containing domestic, commercial and co-dispersal wastes, particularly those overlying major aquifers	11/94 3/95
A08(95)7		95/96 96/97

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
	Proposed new starts A8	
A08(94)1	Contaminated soils and shallow systems* To clarify the flow and transport of pollutants in soils to underpin the vulnerability classification within the GPP	94/95 95/96
A08(95)1	Guidance for the assessment of land spreading of wastes* To review the types of wastes commonly spread on land for disposal purposes and quantify acceptable sludge application rates and loadings for different wastes and different soil/subsurface	95/96 95/96
A08(95)2	Guidance on clean-up standards* To produce a guidance manual in order to provide consistent advice on clean-up requirements for sites	95/96 95/96
A08(95)3	Cost-benefit consideration in choosing remedial technologies for contaminated land* To consider the issues involved in consideration of methods in the light of costs and benefit to the environment and attempt to quantify the environmental benefits in the same terms as the costs	95/96 95/96
A08(95)4	Quantification of the likely impacts of specific pollutants on groundwater supplies* To develop better technical understanding of the source and distribution of the most widely legislated inorganic water contaminants in Europe in order to develop guidance and policy	95/96 96/97
A08(95)5	Guidance manual on underground tank installations in sensitive groundwater situations To review current engineering practice and new risk minimisation techniques used in underground fluid storage tanks, with special reference to petroleum tanks beneath filling stations	95/96 95/96
A08(95)6	Review of R&D work in groundwater pollution area To review R&D work undertaken in this area, specifically in-situ bioremediation, in order to inform NRA staff of current position	95/96 95/96
	Business Area: Pollution Prevention Topic Area A9 - Pollution Prevention	
	On-going projects A9	
A09(94)7	Review of pollution emergency arrangements and remedial measures To review the NRA's response and effectiveness in dealing with pollution incidents in 95/96 controlled waters, and so to specify identified areas in which improvements can be made to the current emergency service across the Regions	95/96 96/97
A08(90)4 271	Production and fate of blue-green algal toxins To investigate the production and fate of cyanobacterial toxins in the environment in order to elucidate effective management strategies related to cyanobacterial blooms and scums	12/90 8/94

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
A17(90)2 292	Development of a risk-assessment tool for catchment control To produce a pollution assessment tool, applicable on a site by site basis, to calculate the probability of that site causing unacceptable pollution to Controlled Waters	2/91 7/94
A09(94)8		94/95 95/96
A09(94)6	Use of recombinant M13 bacteriophage for pollution tracing To produce a method for tracing pollution sources with a readily available non-toxic organism that can be identified in the laboratory	94/95 96/97
A01(92)8 391	Demonstration project for wastewater minimisation* To identify, assess and demonstrate the benefits arising from the minimisation of industrial waste water through systematic and strategic practice in association with other regulators	4/92 5/94
A09(94)9	Phase 2 - further demonstration areas including agriculture	94/95 96/97
A06(94)4 528	Fire water and chemical spillage retention systems* To develop detailed technical guidance on NRA/DoE requirements for the planning, design and construction of containment systems for the prevention of water pollution following industrial accidents	5/94 4/96
A09(94)1 537	Use of industrial by-products in road pavement foundations* To examine the potential for contamination of ground and surface water as a result of using industrial by-products (including reclaimed materials) in road construction, with a view to increasing the scope for the use of these materials where they can substitute for primary aggregate	8/94 7/95
Proposed new starts A9		
A02(94)2	Distribution and dynamics of blue-green algae* To assess the occurrence, variability and detection of blue-green algae and their toxins as part of a pollution prevention and monitoring strategy	94/95 95/96
A09(94)4	Review of pollution prevention R&D outputs To review all NRA-funded pollution prevention R&D outputs and to extract relevant information in support of the Pollution Prevention Manual	94/95 94/95
A09(94)5	Construction of bunds for oil storage tanks* To produce best practice guidance on the design, choice of materials, construction and maintenance of bunds in order to minimise pollution problems from oil storage tanks	94/95 94/95
A09(95)1	Management of gully pots for optimum runoff quality* To determine and document the water quality effects of roadside gully pots and produce guidance on how runoff quality can be improved through good management practices	95/96 97/98

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
	B1 - Hydrometric Data <i>To develop and improve hydrometric instrumentation and related techniques, including related data storage, retrieval and processing, to ensure that methods are consistent, cost effective and reliable throughout the NRA, and that output data can readily be utilised for management purposes</i>	
	On-going projects B1	
B01(92)2 478	Calibration of portable electromagnetic current meters at low velocities To evaluate the performance of all electromagnetic current meters currently available on the commercial market to ensure NRA staff are aware of the benefits and limitations of such meters	5/94 7/94
B01(93)2 529	Current metering standards To improve hydrometric instrumentation to provide more accurate data to the NRA	5/94 3/95
B01(94)1 548	Evaluation of low head flow measurement techniques To establish the scale of the problem relating to low head flow measurement at certain types of abstractions and to determine the potential offered by available techniques and equipment to solve the problem	10/94 3/95
B01(94)4		95/96 95/96
	Proposed new starts B1	
B01(93)1	Performance assessments of ultrasonic and electromagnetic gauges at low velocities To determine the performance of multipath ultrasonic and electromagnetic gauges at very low water velocities	96/97 97/98
B01(94)2	Evaluation of acoustic doppler current profiler equipment To identify the limitations of the equipment and to confirm that it operates within the manufacturers specification to enable regional application	94/95 95/96
B01(94)3	Evaluation methodology for benefit of hydrometric networks To develop the procedures for assessing (1) the requirements for hydrometric data, in an appropriate geographical area (2) the benefits derived from making such data available (3) whether or not the requirements are met by existing networks (4) what additions/reductions are necessary	94/95 95/96
B01(95)1	Calibration of gauging stations using portable ultrasonics To determine the feasibility of using ultrasonics to obtain high volumes of data for calibration purposes, in order to determine the limits of their use, accuracy and optimum configuration	95/96 96/97
	B2 - Flow Regimes <i>To improve the understanding of the inter-relationship between river flow and environmental factors with regard to both availability of water resources and impact on the aquatic environment so as to achieve a balance between water consumption and environmental protection</i>	
	On-going projects B2	
B02(93)3 491	Design tools for low flow estimation* To scope the benefits and costs of a range of proposals by IH to define a programme of future collaborative research	9/93 5/94
B02(94)2	To improve and extend the application of enhanced MICROLOWFLOWS software by selected developments	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
B02(91)2 282	Ecologically acceptable flows - Phase 2 To provide the framework for an objective method of evaluation of prescribed minimum flows based on the recognition of ecologically acceptable flows apposite to particular seasonal requirements of aquatic life forms	1/94 6/96
B02(93)1 520	Determination of minimum acceptable flows To develop the concept of minimum acceptable flows (MAFs) and a policy for their application	2/94 12/95
B02(93)2 515	Extended flow records at locations in England and Wales - Phase 1 To synthesize monthly records at 15 locations distributed throughout England and Wales for the period 1860-1992 to be used in the assessment of the yield of water resource systems	6/94 9/94
B02(94)3		94/95 95/96
B02(94)1 549	Revision of SWK methodology for assessing low flows To review and revise the new NRA methodology in terms of relevant criteria, associated data needs and scoring matrix to improve consistency of results between regions	9/94 3/95
B02(95)1	Proposed new starts B2 Enhanced low flow estimation at the ungauged site* To develop techniques for incorporating the impact of variations in the timing of minimum flows and improve the statistical models in order to develop new techniques for the estimate of the flow duration curve	95/96 97/98
	B3 - Water Resources Management <i>To develop and improve water resources assessment and management techniques to secure optimum strategies and policies for the use of water resources taking account of both catchment-wide and national interests</i>	
	On-going projects B3	
B03(92)5 484	Evaluating the costs and benefits of low flow alleviation - Phase 2 To undertake surveys on two specified low flow rivers to obtain data for a cost benefit analysis in order for the NRA to justify alleviating low flows	7/93 7/94
B03(92)1 406	Expert systems for water resources management - Phase 2 To provide an intelligent assistant computer programme incorporating an expert system and data organiser to aid abstraction licence application determination and monitoring by NRA water resources officers	8/93 9/94
B03(93)4 505	Technical procedures for licence determination To develop a methodology by which abstraction licence applications may be determined consistently and with due regard to protected rights and in-river needs	1/94 3/95
B03(93)5	Proposed New Starts B3 Metering of water abstraction - good practice manuals To produce "Good Practice Manuals" to be used as reference documents and a basis for training, giving the best type of metering for each application plus guidance on maintenance, calibration and accuracy	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
B03(94)4	Incentive charges: Practical difficulties of measurement To identify the "weights and measures" type of standards which would be required for quantity based abstraction charges and to identify the practical problems and costs of meeting these standards by completing a field based review for each type of abstraction including Public Water Supply, Spray Irrigation, Industry and Agriculture	94/95 95/96
B03(95)1	Standard values for economic benefit of low flow alleviation To develop a framework and operational values for the benefits of low flow alleviation, the standard values would act as an indicator of benefits without carrying out expensive survey work	95/96 95/96
	B4 - Groundwater Resources <i>To understand groundwater recharge mechanisms and aquifer properties including the effects of surface geology and dual porosity and to develop conceptual frameworks to harmonise groundwater modelling in order to improve integration of groundwater quality and groundwater quantity issues</i>	
	On-going projects B4	
B04(93)1 499	National system for recharge assessment* To develop an accurate, consistent and publicly defensible method of estimating mean annual groundwater recharge applicable to drift free areas of aquifer outcrop in England and Wales	10/93 2/95
B04(95)6		95/96 95/96
B04(92)6 454	Manual of aquifer properties* To assemble and publish an Aquifer Properties Manual for England and Wales in order to underpin water resources management, particularly groundwater protection policy	3/93 3/96
B04(92)5 455	Hydrogeological characterisation of clays* To assess parameters relevant to superficial clay cover, identify missing data and pursue field evaluation of techniques for measuring these data	2/93 1/96
B04(93)2 541	Strategic groundwater and chalk aquifer review* To undertake a strategic review with BGS and other researchers/customers into the priority areas of applied strategic research which are of concern to the NRA and other customers and into more strategic issues relevant to the work of BGS and other research groups	9/94 3/95
B01(94)7		94/95 95/96
B03(93)1 544	Groundwater resource reliable yield To identify criteria and develop a methodology for estimating the yield of groundwater resources for use on a national basis to improve water resource planning	10/94 9/95
	Proposed new starts B4	
B04(94)1	Manual of best practice for groundwater tracing techniques To evaluate tracer testing, including an assessment of the strengths and limitations both of tracing as a general technique and of specific tracer types/compounds/groups, evaluation of UK experience of tracer testing using selected case studies and in order to produce a manual of good practice	94/95 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
B04(95)1	Chalk porosity and fissure storage* To determine whether water drains from intergranular space in the rock and from irregularities on the walls of fissures and whether "micro-fissures" are present and contribute to storage	95/96 95/96
B04(95)2	Improved modelling of abandoned mines* To develop an improved model for the flow and solute transport in abandoned coal mines where the structure of the flow paths are different in other geological formations and require special models	95/96 97/98
B04(95)3	Strategic review of groundwater modelling To compile information on present models in use within the NRA to establish protocols for future groundwater modelling in the NRA in order to provide advice on appropriate models to be used in particular circumstances	95/96 96/97
B04(95)4	Baseline quality of aquifer To obtain full information on current groundwater quality data holdings in regional archives, both in respect of data volumes and data quality, in order to devise a method of collation and presentation of the data, and report on the existing groundwater quality in the aquifers of England and Wales	95/96 96/97
	B5 - Demand Management <i>To develop understanding of the effectiveness, cost and applicability of measures to manage the demand for water in households, industry, commerce and agriculture, including the reduction of waste in public and private water distribution systems</i>	
	On-going projects B5	
B03(94)3 547	Demand forecasting issues and methodology* To derive a forecasting methodology for Public Water Supply and industrial abstraction incorporating current initiatives within the water industry and enabling the economic level of demand management to be determined and to improve knowledge of present components of water demand	11/94 9/95
	Proposed new starts B5	
B05(95)1	Water saving technology in buildings* To assess how water consumption in buildings may be reduced, if this is shown to be feasible and cost effective, NRA may produce publicity/advisory leaflets	95/96 96/97
B05(95)2	Water saving in industries dependent on direct abstraction* To develop and apply water saving management methods within industries reliant on their own water resources	95/96 96/97
B05(95)3	Effective methods of water saving education To produce a package of educational material that can be used by the NRA to encourage water conservation and test the effectiveness of different educational approaches on reducing consumption	95/96 95/96
B05(95)4	Economics of demand management* To develop a framework, capable of allowing for local and regional variations, to facilitate the optimum balance of demand management investment when compared to deferment of water resource scheme investments	95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
	C1 - Fluvial Defences and Processes	
	<i>To provide a better understanding of the specialised fields of engineering hydrology and hydraulics for the practising engineer to improve design and maintenance techniques across a wide range of Flood Defence Works. To ensure that River Structures are cost effective in terms of capital investment and recurring operation and maintenance costs especially considering likely effects on the river environment due to climate change</i>	
	On-going projects C1	
C01(90)1 252	SERC flood channel facility - Phase 4* To provide reliable procedures for assessing the hydraulic performance and stage discharge function of two-stage or compound river channels taking into account sediment movement	5/94 6/94
C01(94)3		94/95 96/97
C05(90)3 300	Design and operation of trash screens To establish best practice for the design and operation of trash screens, and to produce a manual of best practice	10/91 9/93
C01(94)4	Phase 3 - Monitoring schemes	94/95 96/97
C05(91)1 384	Sediment and gravel bed transportation To carry out field studies and monitoring of selected sites to improve management practice	2/92 5/94
C01(91)1 394	Rainfall frequency studies - Phases 1b and 2* To review current methods used for rainfall frequency analysis and develop new procedures where the current methods give unsatisfactory results. To compile the new procedures to form a volume of the proposed flood estimation handbook entitled "Rainfall Frequency Estimation"	2/94 5/96
C01(95)1		95/96 95/96
C01(93)1 508	Benchmarking for models To produce standard benchmarks against which to test fluvial flood defence models in order to provide the NRA with a decision-making tool on appropriateness for different applications	1/94 7/94
C01(94)5		94/95 95/96
	Proposed new starts C1	
C01(94)1	Monitoring methods and techniques for fluvial defences To determine what fluvial parameters should be monitored and how to meet the needs of Flood Defence and integrate with other river management parameters	94/95 96/97
C01(94)2	Scoping study and design notes for fluvial design manual To provide a framework, format and cross-referencing system to draw together new knowledge and techniques in a fluvial design manual	94/95 94/95
C01(95)2	Phase 2 - Fluvial design manual	95/96 96/97

**PROPOSAL
PROJECT****TITLE
OBJECTIVE****START
END****C2 - River Flood Forecasting**

To support the development of systems for flood forecasting, including use of weather radar information, that will provide accurate forecasts of river stage heights with increased lead times

On-going projects C2

C02(90)3 287	Evaluation of integrated flood forecasting models To evaluate the integrated flood forecasting systems currently being commissioned or operational in the NRA, and to provide recommendations for future development	1/92 3/95
C02(91)1 372	Continuous monitoring of soil moisture for flood hydrology To install and test in the field instrumentation to provide continuous measurements of soil moisture and to assess the value of measurements from such instruments in an operational flood forecasting system	1/92 10/94
C02(91)2 357	Development of fully distributed models using radar rainfall data To develop the methodology to use radar data from 2km and 5km squares to construct distributed models of rainfall on a catchment basis	11/91 5/94
C02(92)1 470	Improving the accuracy of radar rainfall data* To compare accuracy of different methods of weather radar precipitation measurement and data processing technique	3/93 3/96
C02(92)2 448	Development of improved methods for snow melt forecasting To develop improved models for assessing the water content of snow packs and forecasting snow melt	2/93 2/95
C02(93)2 510	Thunderstorm and deep convection warning system To develop a system for alerting hydrologists to the likely occurrence of thunderstorms and for forecasting the heavy rainfall associated with thunderstorms and deep convection through development of the GANDOLF system (Generating Advanced Nowcasts for Deployment in Operational Land-surface Flood Forecasting)	1/94 3/96
C02(94)2 546	Evaluation of integrated flood warning systems* To determine how the different components of a total flood warning system can be integrated operationally to reduce flood damage (small river catchments in the Thames Basin)	10/94 3/98
C02(94)1	Proposed new starts C2 Comparison of calibration techniques to determine best approach To compare radar rainfall calibration techniques in order to identify Best Practice	94/95 95/96
C02(95)1	Comparison of different forecasting models To provide a technique to quickly and easily compare river flood forecasting models in order to evaluate new and existing forecasting models	95/96 95/96

C3 - Catchment Appraisal and Control
This has moved to Commission G2

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
C4 - Operational Management		
<i>To develop the framework for management of NRA flood defence maintenance, to ensure that work programmes through the NRA are consistent, prioritised adequately, justified and cost-effective, and that the interests of other functions are recognised</i>		
On-going projects C4		
C04(91)2 341	Asset management planning for flood defence To develop a manual which identifies the variety of flood defences in existence, their strengths, failings and relative vulnerability, the management of their maintenance and, where appropriate, the methods available for rehabilitation	8/91 10/94
C04(91)1 317	Evaluation of alternative river maintenance strategies To develop and verify a database and methodology which assesses the benefits associated with alternative river maintenance strategies in rural, mainly agricultural catchments	4/91 9/95
536	Phase 2 - Effects of river maintenance operations	6/94 5/95
C04(93)1 488	Aquatic weed control operation - Phase 2 To produce Best Practice guidelines for aquatic weed control throughout the NRA in order to promote efficient and effective management practices	2/94 6/95
C04(93)2 512	Evaluation of aquatic weeds research* To undertake an evaluation of the past work undertaken by the AWRU for its sponsors, and to recommend how their requirements for information and advice on the management of aquatic weeds should be provided in the future	1/94 3/95
C04(93)3	Grass management operations - Phase 2 To assess routine mowing operations throughout the NRA, to implement further research identified in Phase 1, carry out field trials, and produce guidance note on best practice for riverbank grass management	94/95 95/96
C04(92)1 516	Management of shoaling/desilting operations To review guidance on the safe, economic and effective disposal and management of dredging in order to develop best practice guidelines	2/94 10/94
C04(94)2		94/95 95/96
Proposed new starts C4		
C04(94)1	Quality assurance for survey techniques To determine what quality of survey work the NRA should specify	94/95 95/96
C04(95)1	Flood defence management manual - review of trial To review and modify the Flood Defence management manual in the light of its trial implementation	95/96 96/97
C04(95)2	Performance specifications To develop contractor performance specifications for key areas of operational management activity	95/96 96/97

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
	C6 - Coastal and Tidal Defences and Processes	
	<i>To ensure that cost-effective and environmentally sympathetic engineering options are adopted for coastal and estuarine flood defence through a better understanding of processes in the coastal zone.</i>	
	<i>To improve the planning and execution of coastal defences by adopting coastal management techniques and developing defence strategy to compensate for sea level rise</i>	
	On-going projects C6	
C06(92)1 459	Risk assessment for sea and tidal defence structures To define and indicate the use and understanding of probabilistic design of sea and tidal defence structures and to develop methods for assessing areas at risk for coastal and tidal flooding	2/93 3/96
C06(90)4 279	Use of timber in sea defence schemes To review available information on different types of timber and preservative, and to carry out site trials on their effectiveness	1/91 3/95
C06(92)2 446	Beach management manual* To produce a practical manual incorporating current practice and research findings to direct engineers on planning, design, implementation and management of beaches and beach recharge schemes. Supporting projects for research feeding into the manual will be:	9/93 9/96
C06(92)13 441	A. National database for monitoring data - scoping study	8/93 8/94
C06(94)4	B. Production of national database	94/95 95/96
C06(92)15	C. Assessment of risks of beach recharge schemes	94/95 94/95
C06(92)16 489	D. Use of non-aggregate materials	9/93 9/95
C06(92)3 480	Saltmarsh management for flood defence* To produce practical guidelines and further advance the understanding of saltmarshes in sea defences and consequently enhance the NRA's capability in engineering and environmental management. Packages for research feeding into the guidelines will be:	7/93 6/98
C06(92)3 444	A. Saltmarsh management guide	7/93 10/94
C06(92)17 567	B. Maintenance and enhancement of salting	1/95 6/95
C06(92)18 566	C. Historic changes in saltmarshes	1/95 12/95
C06(92)19 C06(92)22 C06(92)23	D. Experimental setback of salting: i) Saltmarsh sedimentation process ii) Mathematical modelling techniques iii) Pollution of managed retreat sites	95/96 98/99

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
C06(92)20	E. Estuary morphology	94/95 95/96
C06(92)21	F. Saltmarsh process	94/95 97/98
C06(92)8 433	Dissemination of Anglian Sea Defence Management Study To produce practical guidance notes setting out the approach, methods and conclusions in generic terms which will benefit other regions	11/92 5/94
C06(92)7 522	Public safety of access to coastal structures To determine the accident record of different types of coastal structures, and to identify design features which enhance public safety while retaining the engineering effectiveness	2/94 9/95
C06(94)3 571	Geotechnical performance of flood defence embankments* To assist with development of best practice in the NRA's management of flood defence embankments in terms of assessment, maintenance and improvement of existing embankments plus design of new works	1/95 5/95
C06(94)1	Proposed new starts C6 Education and public awareness To seek ways of explaining to the public why beach recharge and other soft defence methods are preferred	94/95 94/95
C06(94)2	Coastal management, including standards of performance for beaches To identify the standard to which a beach should perform and how	94/95 96/97
C06(95)1	Extreme water levels in estuaries To develop practical methods for prediction of storm water level in estuaries, affected partly by sea level and river flows	95/96 96/97
C06(95)2	GPS network for long term monitoring of ground subsidence* To establish a benchmark for long-term monitoring of ground subsidence, characterise short-term variations via a permanent tracking system in the Thames Estuary and develop an optimal scheme for monitoring ground subsidence in the Thames Estuary, which will be effective for the foreseeable future	95/96 97/98
	C8 - Response to Emergencies <i>To evaluate the overall standards required of the NRA in flood emergencies and to establish the best methods of response, including flood and storm tide warnings, dissemination of information and operational response procedures</i>	
	On-going projects C8	
C08(91)3 431	Emergency sealing of breaches To investigate and develop alternative methods and materials for sealing breaches in NRA flood defences	4/94 1/95
C08(94)1 545	Benefit of flood warning and forecasting To determine whether flood warning and forecasting systems are justified and the benefits of providing this service can be established	9/94 10/94
C08(94)2		94/95 95/96
	No proposed new starts C8	

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
D1-- Fisheries Resources		
<i>To undertake relevant research into the individual or population biology of fishes in order to provide basic resource information for operational management</i>		
On-going projects D1		
D01(90)3 244	Development of a fisheries classification scheme To enable clear analysis of stock assessment data used for operational duties and to assess performance	10/90 10/94
D03(90)1 370	Design and use of fish counters To evaluate the performance of automatic fish counters and their use in monitoring adult migratory salmonid stocks	7/91 9/94
D01(91)2 404	Use of catch statistics to determine fish stock size To evaluate the use of migratory salmonid, eel and freshwater fish catch statistics for the management of these stocks in England and Wales and to determine how they can best be used to estimate stock size	4/92 4/95
D01(91)3 559 D01(95)3	Sea trout investigations - Phase 2 To review and evaluate current knowledge, research and stock assessment capability in relation to sea trout and to design a cost effective programme of investigations which will enable the NRA to effectively manage sea trout stocks sustainably	12/94 3/95 95/96 95/96
D03(93)3 486	Assessing salmon stocks using a hydroacoustic counter To install, operate and evaluate a hydroacoustic fish counter on the River Wye in order to produce reliable data for stock management	2/94 3/97
D03(93)1 500	Effectiveness of salmonid stocking strategy To identify the most cost-effective strategies for stocking migratory salmonids in order to maximise returns of adult fish to fisheries and/or their natal river	11/93 5/94
D03(90)2 250	Surveying by hydroacoustic techniques To evaluate and develop the use of hydroacoustic techniques to quantitatively estimate the abundance and size distribution of fish in larger watercourses and produce a field manual	5/94 9/94
D03(91)1 325	Development of fish stock assessment methodologies and methods To evaluate and develop efficient fishery survey strategies and methodologies and produce practical guidelines for their implementation in NRA stock	7/91 5/94
D03(92)1 503 D01(94)1	Fish tracking developments To undertake a definition study to appraise the options to develop fish tracking equipment, in particular tags and data logging systems, in order to improve the efficiency of NRA tracking studies and to obtain a greater understanding of fish biology	12/93 4/94 94/95 95/96
Proposed new starts D1		
D01(94)2	Sea trout scale reading To produce an atlas for reading sea trout scales and organise a workshop to enable NRA staff to prepare and read scales in a consistent manner	94/95 94/95

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
D03(93)2	Development of systems for designing and implementing surveys To develop systems for designing and implementing fisheries survey, including evaluation of alternative strategies	94/95 95/96
D03(94)1 573	Smolt trapping using acoustic deflectors To investigate how sound can be best used to direct the route for migration in order to increase trapping efficiency	1/95 1/97
D01(95)1	Effects of electric fishing on fish and fishing* To assess the physiological responses of fish to different electric fishing intensities in order to review electric fishing design and practices	95/96 97/98
D01(95)2	Stock discrimination in two coastal fisheries To identify the degree of intermixing of salmon stocks in the Morecambe Bay and Severn Estuary salmon net fisheries	95/96 97/98
D2 - Environmental and Biological Influences		
<i>To develop an improved understanding of the effect of environmental and biological influences on fish populations so that results from monitoring programmes can be correctly interpreted and effective fisheries management carried out when natural or man-made changes occur</i>		
On-going projects D2		
D02(90)7 312	Estuarine migratory behaviour of salmon and sea trout smolts To investigate, using advanced telemetry techniques, and describe the behaviour of Atlantic salmon and sea trout smolts during the estuarine phase of their migration	1/94 10/95
D02(91)2 338	Habscore To develop a stream habitat procedure that will enable prediction of salmon abundance from stream features; and which will assist the NRA to achieve related statutory objectives	7/91 3/94
D02(94)2	Coarse fish populations in large lowland rivers To identify the critical factors constraining coarse fish populations in lowland rivers and to determine management strategies to develop and improve the fisheries	95/96 96/97
D02(94)1 551	Spawning escapement targets for Atlantic salmon To establish the optimum spawn biomass to maintain self sustaining salmon and sea trout stocks to underpin the national migratory fisheries management plan	10/94 3/95
Proposed new starts D2		
D02(95)1	River reach inventory To develop and map stream habitats in order to plan for the maintenance and improvement of such area	95/96 95/96
D02(96)1		96/97 97/98
D02(95)2	Impact of low level habitat degradation in small streams To review literature and design surveys to demonstrate the variety and distribution of fish in small headwater streams in order to recommend remedial operational management practices	95/96 95/96
D02(96)2		96/97 97/98

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
D02(95)3	<p>Dee Stock Assessment Study to include development of salmon lifecycle simulation model</p> <p>To enhance the DSA study and review existing lifecycle models in order to devise a computer-based simulation model in order to improve decision making in the management of salmon stocks</p>	95/96 97/98
	<p>D3 - Fisheries Management</p> <p><i>To develop and implement management strategies which assist the NRA to maintain, improve, regulate and develop fisheries in ways that are adequately justified and cost-effective</i></p>	
	<p>On-going projects D3</p>	
D01(90)2 249	<p>Status of rare fish</p> <p>To determine the present status of rare fish in certain lakes of England and Wales, and to compile related information on the ecology and genetic variation of these species which is necessary to safeguard their populations</p>	10/90 9/94
D03(94)5	<p>Survival and dispersal of stocked coarse fish</p> <p>To evaluate the effectiveness of stocking with coarse fish, both hatchery-reared and transferred from other waters, and to determine the most effective stocking practices</p>	95/96 96/97
D02(92)2 452	<p>Effects of stocked trout on the survival of wild fish populations</p> <p>To assess the effect of stocked trout on the survival of wild fish stocks in order to produce recommendations on future trout stocking policies</p>	1/92 9/95
	<p>Proposed new starts D3</p>	
D03(92)2	<p>Methods for fishery rehabilitation - trout</p> <p>To develop new methods of environmental restoration (other than water quality related) that will enable the NRA to improve, develop and rehabilitate damaged trout fisheries</p>	94/95 96/97
D03(94)2	<p>Methods for fishery rehabilitation - salmon</p> <p>To develop new methods of environmental restoration (other than water quality related) that will enable the NRA to improve, develop and rehabilitate damaged salmon fisheries</p>	94/95 96/97
D03(94)3	<p>Methods for fishery rehabilitation - coarse fish</p> <p>To develop new methods of environmental restoration (other than water quality related) that will enable the NRA to improve, develop and rehabilitate damaged coarse fish fisheries</p>	94/95 96/97
D01(94)1 574	<p>Classification of river fisheries</p> <p>To classify, by computer programme, all waters on the Fisheries Database and to produce a computer program for the use of all Fisheries Staff in future classifications</p>	1/95 5/95
D03(95)1	<p>North East Coast fishery study</p> <p>To develop monitoring programmes to investigate the exploitation rates of beach and drift nets on the salmon and sea trout fisheries</p>	95/96 95/96 96/97 97/98

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
D03(95)2	Impact of stocked rainbow trout on resident fish To review the current status of rainbow trout in England and Wales and evaluate their impact on resident fish in order to recommend a future stocking policy	95/96 95/96
D03(96)2		96/97 97/98
D03(95)3	Review of fisheries activities To review opportunities and benefits of R&D in fisheries function areas other than directly related to fishery science	95/96 96/97

**PROPOSAL
PROJECT**

**TITLE
OBJECTIVE**

**START
END**

E1 - Recreation and Navigation

To develop specific directions and guidelines that will enable the NRA to promote the amenity and recreational potential of water and associated land, and to manage effectively navigation on waters and their related facilities where it is the navigation authority

On-going projects E1

E01(91)1 498	Impact of recreation on wildlife To provide information to enable the NRA to reconcile its recreation and conservation duties	11/93 6/94
E01(94)1		94/95 95/96

E01(93)1 501	Socio-economic review of angling To assess the current status of angling in England and Wales and analyze the distribution of NRA rod licence holders to enable the NRA to plan and forecast income and research implications	11/93 4/94
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Proposed new starts E1

E01(94)2	Demand studies - boating on NRA navigations* To develop an understanding of boating demand and price elasticity to assist the setting of charges, price structures and prioritisation of capital and revenue works	94/95 95/96
E01(94)3	Use value of NRA navigations* To apply "contingent valuation" methods to NRA navigations to identify visitor value to enable the NRA to better quantify benefits of the navigation function	95/96 95/96
E01(95)1	Design guidelines for the recreational use of weirs* To produce a set of design guidelines to modify or design weirs to make them safer for canoeists and the general public	95/96 96/97
E01(95)2	Boat traffic congestion at NRA locks* To investigate boat movement and trip pattern in order to identify reasons for boat traffic congestion and provide recommendations to alleviate the problem in a cost effective manner	95/96 96/97
E01(95)3	Feasibility of options for lock automation* To investigate the feasibility of using power generation from river flow to power locks and sluices in remote locations	95/96 96/97
E01(95)4	Demand and supply study - needs of disabled people* To understand where and what amenities and facilities people with disabilities require in order to develop NRA policy and planning	95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
	F1 - Conservation Resource Appraisal and Impact Assessment <i>To develop effective survey, monitoring and classification methods for assessing the conservation resource of inland and coastal waters and associated lands, and to evaluate the impacts upon and clarify acceptable criteria for maintaining and enhancing the conservation status</i>	
	On-going projects F1	
F01(90)25 294	Control of invasive riparian and aquatic weeds To control the spread of invasive plants and to formulate and promote good management practices which would enhance the conservation and amenity value of areas for which the NRA is responsible	2/91 5/94
F01(94)12	Impact assessment and acceptable conservation criteria* To evaluate impacts upon and identify acceptable criteria for maintaining and enhancing the conservation status of inland and coastal waters and associated land in England and Wales	94/95 95/96
F01(94)11	Rehabilitation of degraded habitats To determine the effects of land use and river management practices on riverine habitats so as to more objectively define and implement an effective rehabilitation programme for degraded river corridors	94/95 95/96
F01(93)1 554	Impact of NRA activities on archaeology To review the duties of the NRA to archaeology and the approach to be taken towards archaeological sites and discoveries, in order to enable effective execution of the NRA's statutory responsibilities in this area	10/94 3/95
F01(93)3 517	River morphology and plant relationships To establish key relationships between physical characteristics of river types and associated aquatic plant communities by analysing data collected by JNCC	2/94 7/94
F01(94)2 526	Validation and calibration of River Habitat Survey data To calibrate and validate River Habitat Survey (RHS) methodology by sampling river and stream sites in England and Wales and quality checking selected sites being surveyed by NRA staff	5/94 9/94
F01(94)7	Phase 2 - to establish a site reference network and refine the working classification system (including database) for RHS	95/96 96/97
F01(94)5 530	Working classification of River Habitat Survey To analyze RHS field survey data and generate a national river typology and habitat quality classification in order to produce a national methodology to be implemented in 1995/96	6/94 3/95
F01(94)1 539	River channel typology for catchment and river management To develop a standard method of surveying channel cross-sections with respect to forming an associated vegetation/habitat structure, in a fashion amenable to easy data management and computerisation	8/94 3/95
F01(94)8		95/96 95/96
F01(94)6 563	Updating the Waterways Bird Survey (WBS)* To assess the feasibility of modifying the WBS method to ensure that the NRA will potentially have the capability of assessing water bird population changes at a local site and compare this with national trends	3/95
F01(94)9		95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
Proposed new starts F1		
F01(93)2	Conservation assessment and management strategies for ponds and other small water bodies* To develop a cost-effective, predictive means of assessing the conservation status of ponds and to identify management techniques which optimise aquatic and associated terrestrial habitats	95/96 95/96
F01(95)1	Review for conservation input to HMIP/WRA authorizations* To assess the extent of likely increased scope in conservation responsibilities in ENVAGE with respect to HMIP and WRA activities and to identify areas of work and associated requirements to fulfil their new responsibilities	95/96 95/96
F01(95)2	Quality assessment of the conservation value of rivers To establish a sound basis for assessing the quality of rivers on an integrated basis of functional and process mechanisms acting through water quality, water quantity and habitat structure to identify a sound evaluation framework to be tested in the field	95/96 95/96
F01(95)5		95/96 96/97
F01(95)3	Woody debris in rivers* To assess the ecological value of organic debris in rivers in order to assess consequences for river management	95/96 96/97
F01(95)4	Conservation evaluation using SERCON* To test the applicability of SERCON evaluation in pilot catchments and assess the options for wider implementation	95/96 96/97
F2 - Conservation Management		
<i>To develop management strategies and techniques which are consistent and effective from the Conservation viewpoint, compatible with the NRA's other duties where possible, and justifiable in terms of costs and the NRA's statutory responsibilities</i>		
On-going projects F2		
F01(91)11 400	Appraisal of conservation enhancement of flood defence works To develop a method for post-project appraisal of habitat conservation and enhancement works and to assess the value of such works in relation to natural recovery from NRA operational schemes	3/92 3/95
F01(91)10 352	Aquatic flora database To develop and update a computerised database of submerged and floating aquatic vascular plants in order to provide up to date information on their occurrence and distribution	10/91 3/95
F01(91)1 378	Conservation of freshwater crayfish* To assess the impact of introductions of non-native crayfish and outbreaks of crayfish plague on freshwater ecosystems and to formulate a strategy for the conservation of the native species (<i>Austropotamobius pallipes</i>)	1/92 12/94
F02(95)3		95/96 95/96
F01(91)2 383	Wetland creation/river corridor enhancement To assess the conservation value of 'off-river' wetland habitats created during a river corridor enhancement programme and investigate experimental management techniques for increasing the native conservation value of created habitats	1/92 1/95

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
F02(94)3	Species management in aquatic habitats* To identify effective management strategies for protecting and enhancing the status of rare or dispersed species and minimising the impact of nuisance species, associated with inland and coastal waters in England and Wales	94/95 96/97
A02(91)1 313	Classification of catchment sources in relation to the ecological effects of wetland liming* To refine the understanding of the potential biological effects of catchment liming on important conservation resources and produce a classification system for upland wetlands of different conservation value and susceptibility	7/91 5/94
F02(94)1	Conservation in coastal areas To clearly define and interpret NRA legal responsibilities in the coastal zone and relate these to the legal responsibilities of other relevant organisations and to NRA's own conservation duties	95/96 96/97
F02(94)2	Wetland conservation* To develop a working classification of wetlands, define the NRA's responsibilities for wetland conservation and recommend options for assessing the wetland resource in England and Wales	94/95 96/97
F02(93)2 525 F02(95)4	Survey of habitats for invertebrates on exposed riverside sediments To review information obtained from river corridor habitat and other NRA surveys on habitat features in order to assess their likely importance	5/94 4/95 95/96 96/97
F01(94)4 535 F02(95)3	Root disease of alder* To obtain information on the distribution of diseased alders in different catchments and determine the rate of intensification of the disease and factors influencing this rate in order to determine the potential impact of the spread of the disease and suggested actions to minimise the effects	7/94 3/95 95/96 96/97
F02(95)1	Proposed new starts F2 Conservation targets for catchment and coastal management plans To produce an objective framework for setting conservation targets for CMPs in order to ensure a consistent approach to identifying and prioritising conservation issues	95/96 96/97
F02(95)2	Economic evaluation for conservation enhancement works To evaluate the benefits of enhancement works using appropriate criteria, consider the benefits relative to spend and underscore the development of a manual/methodology for routine appraisal of enhancement works	95/96 96/97

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
G1-- Cross functional		
<i>The Cross-functional Commission covers major issues relating to more than one of the NRA's primary functions. Projects undertaken in this Commission must have a nationally-acknowledged customer or sponsor and be accepted by the Commissioners whose functions are charged.</i>		
On-going projects		
F01(91)6 351	Environmental assessments undertaken by external developers - Phase 2 To provide the NRA with operational evaluation of guidance on responses to environmental assessments produced by others	7/93 3/95
G01(95)1	Phase 3 - To extend and update the range of guidance notes on environmental assessments for the use of both the NRA and external developers	95/96 95/96
G01(92)1 409	Lone worker alarm - Phase 2 To provide a means by which employees working alone can summon assistance in the event of an immobilising accident or sudden illness and to study the wider potential for "out of vehicle" communications via the NRA radio system	8/94 3/96
G01(91)5 388	Review of specific legal issues To undertake a study of the law and practice of the Authority in relation to fish farming, with particular emphasis upon the farming of trout, but also encompassing related difficulties arising from the farming of freshwater fish and crayfish	1/93 10/94
G01(95)6		95/96 95/96
G01(94)2	Functional Analysis of European Wetland Ecosystems* To participate in relevant wetlands management research undertaken on behalf of the European Commission (DG XII) STEP to direct EC policy in this area and to define future wetland R&D requirements for both EC and NRA	94/95 95/96
G01(93)2 475	Bio-manipulation of eutrophic waters (EC LIFE)* To develop a framework for the bio-manipulation of aquatic habitats for the restoration of shallow eutrophic lakes and to evaluate appropriate restoration techniques	5/93 3/96
G01(91)9 492	Development of public perception methodology To develop and carry out initial public perception surveys to assess public views on needs and performance	10/93 12/93
G01(91)3 509	Development of airborne remote sensing techniques* To further develop data interpretation procedures for maximising the use of airborne remote sensing information to provide coastal sediment information for Flood Defence and a strategic overview capability for Conservation	2/94 7/95
G01(93)4 518	West Coast Directory To contribute to the promotion of integrated coastal zone management by providing a synthesis of existing information	2/94 3/96
G01(92)5 524	Review of databases To assess the availability and relevance of databases held by external organisations to NRA activities in order to improve NRA's efficiency and effectiveness	2/94 6/94
G01(95)5		95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
G01(94)7 531	Catchment ecosystem R&D* To examine the feasibility of undertaking a programme of research and/or development on man's impact catchment ecosystems which is both of high scientific value and of significant practical value for enabling catchments to be managed on a sustainable basis; if affirmative, to produce detailed plans outlining the programme	5/94 1/95
G01(95)4		95/96 95/96
G01(92)7 538	Expert systems for Financial Memorandum (FM) To produce a feasibility study on introducing an expert system to ensure consistent and accurate adherence throughout the NRA	8/94 3/95
G01(94)8 552	Constructed wetlands* To assess the potential for the use of constructed wetlands for the treatment of industrial, domestic, agricultural and urban wastewater, including an assessment of their economic and environmental benefits and costs in order to influence policy on constructed wetlands	10/94 3/95
G01(94)1 558	Environmental risk criteria To produce a discussion document on risk criteria for use by the European Commission as part of the development and application of risk management systems for the natural environment	12/94 3/9
G01(94)4		94/95 95/96
G01(94)9 572	Examination of benefit measures in contingent valuation To evaluate the use of "value of enjoyment" and "willingness to pay" in order to provide guidance on how such values can be used	1/95 3/95
Proposed new starts G1		
C05(91)2	River bank erosion protection To carry out field trials and monitoring of selected sites to improve understanding of management practice	94/95 94/95 95/96 96/97
G01(94)11		
G01(94)3	Barrages* To assess the issues involved in barrage development to enable the NRA to respond to planning applications and in-house proposals Phase 1 - Review of external best practice	94/95 94/95
G01(94)6	River management framework To take the guiding principles outlined in the bank erosion report and apply them to a number of sites covering bank erosion, sediment transfer and various types of waterway	94/95 95/96
G01(94)10	Estuary morphology and processes To investigate the possible lines of research and/or development towards the goal of developing techniques to predict large scale long term morphological changes and other sediment related impacts within estuaries and assess their consequences for estuarine management.	94/95 94/95
G01(95)2	Environmental economics To study a range of cost benefit issues, and develop the techniques and methodologies required to support further development of an economics capability	95/96 97/98

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
G02(95)4	Community participation in catchment management plans To build on the R&D projects best European practice and public participation, in order to identify widening the ownership of the catchment planning process	95/96 95/96
G01(95)3	Climate change impact assessments To formulate response options, through topic and function specific studies, to the key climate change impacts identified in R&D Report 12 in order to develop NRA policy	95/96 97/98
A02(95)1	Environmental indicators To investigate and develop environmental indicators to enable NRA/ENVAGE to measure its performance and environmental improvements	95/96 95/96
	G2 - Planning Liaison <i>To develop both existing and new approaches for assessing and influencing the impact and extent of development to prevent the creation or extension of flooding risks. To further develop the current understanding on the extent to which environmental processes may affect Planning Liaison</i>	
	On-going projects G2	
C03(91)1 426	Forward planning process - Best European Practice To study experiences in other EC member states and limited examples elsewhere with integrated flood plain land use and flood defence, taking into account the conservation and enhancement of the river environment	8/92 7/94
G02(95)5		95/96 95/96
C03(94)1	Developing new strategic instructions and guidelines To provide enhanced national guidance for influencing development in flood risk areas	94/95 95/96
C03(94)2	Developers contribution to works To consider the economics of development in the flood plain and determine the extent of contributions from proposed developers for NRA schemes	94/95 95/96
	Proposed new starts G2	
C03(93)1	Economic and environmental appraisal To develop economic tools for analysing the impact of catchment control in order to link economic appraisal to environmental assessment	95/96 97/98
C03(93)2	Analysis of catchment control problems To analyze the failure in planning liaison to improve the development of the control in planning of flood defence activities	95/96 96/97
G02(95)1	Joint project with l'Agence de l'Eau To explore areas of mutual interest including consideration of Agenda 21 and compare techniques for producing catchment management plans in order to influence EU legislation	95/96 95/96
G02(95)2	Implications of development within areas at risk from tidal flooding To investigate the extent to which areas at risk from tidal flooding are subject to pressures for development in order to develop a range of policy options	95/96 95/96

PROPOSAL PROJECT	TITLE OBJECTIVE	START END
G02(95)3	Surface water runoff from new developments and land use change To provide an accepted standard approach to runoff analysis in order to provide guidance to industry	95/96 95/96
G02(94)1	Severn Estuary Strategy Partnership To ensure the NRA contributes as a partner, and benefits from the development of a strategic plan for the Severn Estuary.	94/95 97/98

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The NRA is committed to the principles of stewardship and sustainability. In addition to pursuing its statutory responsibilities as Guardians of the Water Environment, the NRA will aim to establish and demonstrate wise environmental practice throughout all its functions.