

ENVIRONMENT AGENCY



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A FRAMEWORK FOR CHANGE

A better quality of life

JULY 2001



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A better quality of life

“In our own lives, we know the value of money.

We know it can bring comfort, security and new opportunities.
But we also know that money isn't everything.

Feeling safe on our streets or in our homes. Enjoying our rich
or diverse countryside. Living in strong communities.

These all matter too.”

TONY BLAIR, PRIME MINISTER, MAY 1999
FOREWORD TO “A BETTER QUALITY OF LIFE:
A STRATEGY FOR SUSTAINABLE DEVELOPMENT FOR THE UNITED KINGDOM”

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision's* nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Understanding quality of life

As it is described in the Government's 1999 White Paper *A better quality of life: A strategy for sustainable development for the UK*, sustainable development means achieving a number of economic, social and environmental goals at the same time. These goals are:

- Social progress which recognises the needs of everyone;
- Effective protection of the environment;
- Prudent use of natural resources; and
- Maintenance of high and stable levels of economic growth and employment.

The strategy also describes a number of guiding principles, such as transparency, participation in decision making and access to justice, which add a governance dimension to sustainable development.

The basis of sustainable development is that each of these goals depends on the others; progress towards one of them would be limited by failure to make progress on all of them.

The specific outcome of working towards sustainable development should be that quality of life improves for everyone. This is, therefore, the measure of the Agency's success in contributing to sustainable development, and the Vision recognises it as one of the fundamental goals we want to help achieve. It is why we focus explicitly on quality of life in this *Framework*. However, as is implicit in our principal aim, it is our work to protect and enhance the environment, described in the other themes of the Vision and their respective *Frameworks*, that forms the core of our contribution to this overarching goal.

3. The Environment Agency's role

The principal aim of the Environment Agency, provided in the 1995 Environment Act, is to protect and enhance the environment so as to make the contribution to sustainable development that Ministers consider appropriate. Ministers have provided statutory guidance on how the Agency should make this contribution. The guidance asks the Agency to ensure integration

and take a long-term view in its work. This guidance is currently under review as part of the Government's five – yearly financial management and policy review of the Agency. Both cost and benefits of action are to be taken into account, and the Agency is encouraged to form close and responsive relationships with its stakeholders. Through its work, and by following this guidance, the Environment Agency contributes to the quality of life in a variety of ways.

Contributing to the quality of life

The most immediate impact the Agency makes on quality of life is through its primary functions. These have a direct effect on quality of life, for example by protecting people against pollution and flooding, providing agreeable riverside recreation, and by ensuring wise stewardship of precious resources such as water. Economic regeneration is encouraged by the cleaning up of historic pollution and providing a clean environment within which new businesses might establish themselves. New markets are opened up by the drive for improved pollution abatement technologies, and waste minimisation can also reduce costs and improve competitiveness.

The Agency also has an impact on quality of life through the way in which it carries out its functions. By consulting widely, by engaging with others in partnership and by forming close and responsive relationships with its partners, the Agency makes a substantial contribution to the inclusion of all parts of society in the decisions which affect them. This also contributes to good governance, supporting the Government's aims for local democracy and social inclusion.

Finally, the Agency contributes to improving quality of life by providing expertise and information. This enables decisions ranging from the national and major to the local or those of individual choice to be taken with the best advice and knowledge underpinning them. For example, the Agency provides local environmental information through its web-site. The Agency's knowledge of the environment at a local scale has enabled it to play a key role in contributing an environmental dimension to regional economic strategies and in developing the new Regional Frameworks for Sustainable Development.

4. The Environment Agency's objectives

Having an over-arching objective of contributing to quality of life shifts the emphasis away from single outcomes and towards a set of inter-linked outcomes. In contrast to relatively narrow, quantitative measures of value – for example relative income or standard of living – quality of life is defined by a more holistic set of issues such as health, recreation, equity, social cohesion and democratic vitality, alongside economic wealth and environmental quality. The Government's set of headline and core indicators, described in *Quality of life counts*³, illustrates this type of thinking at the national level, and many complementary examples exist at the regional and local levels⁴. While individual communities naturally differ in their definitions and preferred indicators of quality of life, in each case the focus is on a comprehensive and inter-linked set of outcomes.

Joined-up approaches

It is this inter-linking of diverse outcomes which provides the key to understanding quality of life. This first *Framework* is therefore about highlighting these linkages and ensuring their delivery through the remaining eight thematic *Frameworks*. While each of these eight *Frameworks* focuses

³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment.*

⁴ Audit Commission (2001) *Voluntary quality of life and cross-cutting indicators for local authorities.*

on a specific set of environmental outcomes, the task of the quality of life *Framework* is to ensure 'joined-up' thinking in the ways that these outcomes are delivered – so that overall quality of life is strengthened rather than weakened.

Recognising that the primary functions of the Agency already make a direct and important contribution to quality of life, the aim of a joined-up perspective is to strengthen this contribution. This means thinking more broadly about how environmental measures and outcomes can contribute to a comprehensive set of quality of life outcomes (for example, how sustainable waste management practices can also provide socially inclusive and cohesive employment opportunities), and equally, how social and economic policy can be tapped into to secure positive environmental outcomes.

In summary, the quality of life *Framework* begins to highlight some of the key approaches to joined-up thinking that we will need to apply through the remaining eight *Frameworks* in order to strengthen our contribution to sustainable development. This is expressed through the Agency's overall long-term objective with respect to quality of life, which is that:

People will have peace of mind from knowing that they live in a clean, healthy environment, rich in wildlife and natural diversity – an environment that they can use, care for, appreciate and enjoy.

This *Framework* sets out how, through the other eight *Frameworks*, we will achieve the following outcomes:

- People will be confident that the environment is well cared for, is not damaged by pollution, and does not provide a health risk because of human activities.
- The environment will be greatly valued and cared for by all sectors of society as a source of food, water, materials, income, recreation, sport and wildlife conservation.
- Environmental responsibilities will be taken seriously by all and mechanisms for ensuring environmental equality and justice will be readily available to all individuals and communities who need them.
- Information and processes will be readily available to enable citizens, communities, businesses and Government and its agencies to agree quality of life and environmental targets and the plans that will realise them.
- Local, regional, national, rural and urban strategies will fully reflect sustainable development principles and will be appropriately linked, thereby enabling effective and integrated environmental protection and enhancement.
- Sustainability values and working practices within the Agency, including those of openness, collaboration, partnership, participatory decision making, precaution and respect for diversity, will reflect those of key stakeholders and of society in general.

We will seek to achieve these outcomes in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

5. Goals and actions

For each outcome we have identified overleaf a number of goals we intend to achieve in the short to medium term in order to move towards the Vision. We have also outlined the activities

that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators⁵ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁶ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

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Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

Because this *Framework*, in particular, reaches across the full range of the Agency's activities, its goals contain implicit references to goals in other *Frameworks*.

⁵ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment*.

⁶ Environment Agency (July 2000) *Environmental Indicators*. A set of environmental indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Confidence in the state of the environment

Outcome 1 – People will be confident that the environment is well cared for, is not damaged by pollution, and does not provide a health risk because of human activities.

Tests for progress:

- Progress against key environmental indicators at national, regional and local levels.
- Progress against key health indicators impacted by our core functions.
- Public confidence in levels of environmental protection and the reduction of pollution and health risk.
- Public understanding of our role in improving the environment.
- Stakeholders' feedback on our understanding of their agendas and on our capacity to work with them to address these agendas.

GOAL	ACTIVITY
Goal 1.1 Improved public confidence that the environment is improving.	Short to medium term: <ul style="list-style-type: none"> • Report on the state of the environment, including use of the internet for presenting information directly and through discussion groups. • Focussing on those aspects most relevant to the Agency's activities, report on the quality of life and on key interactions between social, environmental and economic indicators.
Goal 1.2 Improved trust and relationships with our stakeholders including the public.	Short to medium term: <ul style="list-style-type: none"> • Increase the level of confidence in the Agency as expressed in opinion surveys. • Become more engaged in debates and dialogues focusing on 'environmental issues' as perceived locally, regionally & nationally and by different stakeholders.
Goal 1.3 Health Impact Assessments will form a key part of relevant regulatory processes.	Short to medium term: <ul style="list-style-type: none"> • Promote and actively participate in Health Impact Assessments for key issues of national public health concern, e.g. waste management activities including incinerators and housing on brownfield sites. • Use others' national Health Impact Assessments to help assess, and as required control, the impacts of local industrial processes and other activities.

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The value society places on the environment

Outcome 2 – The environment will be greatly valued and cared for by all sectors of society as a source of food, water, materials, income, recreation, sport and wildlife conservation.

Tests for progress:

- Public understanding and appreciation of environmental goods and benefits.
- Numbers of community action groups addressing environmental issues.
- Percentage of large and small businesses addressing environmental issues.
- Progress against key environmental indicators at national, regional and local levels.
- Levels of access to our own land and navigation.
- Levels of participation in water based recreation.
- Levels of environmental exclusion.

GOAL	ACTIVITY
Goal 2.1 General levels of environmental understanding and appreciation are enhanced.	Short to medium term: <ul style="list-style-type: none"> • Make appropriate use of tools such as the 'quality of life capital' approach developed in partnership with English Nature, English Heritage and the Countryside Agency to help stakeholders achieve sustainable planning decisions. • Encourage the use of popular TV/radio soap to highlight key environmental issues involving the Agency.
Goal 2.2 Ready access to easily understood information relevant to local circumstances.	Short to medium term: <ul style="list-style-type: none"> • Improve our provision of local information including through our internet site on issues such as pollution, flood risk, waterside recreation. • Maintain a local spotlight on environmental performance: public information on angling waters, navigation and public access to Agency-owned sites.
Goal 2.3 Improved access to our own land and to navigations for employment or recreation.	Short to medium term: <ul style="list-style-type: none"> • Improve access for the enjoyment of the water environment for recreation, specifically on our own land and navigations. Medium term: <ul style="list-style-type: none"> • Influence partnership investments by others, equal to the value of the Agency total budget, on new opportunities to increase enjoyment of the environment.
Goal 2.4 An enhanced contribution of fishing to local economies and social inclusion.	Short to medium term: <ul style="list-style-type: none"> • Maintain and increase participation in fishing, focussing particularly on disadvantaged groups such as young people, disabled, unemployed and elderly. • Develop and promote improved market information (participation, tourism values etc). • Develop fishing opportunities close to centres of population. • Seek the inclusion of fishing tourism in rural development plans and in Tourist Board promotion.
Goal 2.5 Environmental benefits are readily accessible to, and enjoyed by, all sectors of society.	Short to medium term: <ul style="list-style-type: none"> • Explore opportunities to open up land and water for recreation and report on new facilities thereby created.

The value society places on the environment *continued*

	<ul style="list-style-type: none">• Reduce inequalities in access to environmental benefits by working closely with existing initiatives focusing on social and environmental exclusion.• Develop specific practical approaches to improve access and facilities for disabled people, particularly to quality urban sites owned by the Agency.
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Environmental responsibilities

Outcome 3 – Environmental responsibilities will be taken seriously by all and mechanisms for ensuring environmental equality and justice will be readily available to all individuals and communities who need them.

Tests for progress:

- Percentage of companies demonstrating board level commitment to sustainability reporting.
- Numbers of community initiatives focusing on waste minimisation, sustainable waste management and/or sustainable energy management.
- Levels of environmental inclusion.
- Numbers of community sustainable development plans and/or initiatives.

GOAL	ACTIVITY
Goal 3.1 All key sectors including the public are aware of their rights and responsibilities for minimising waste and caring for the environment – and act accordingly.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work with Government and industry to develop and launch an indicator for business and sustainable development. • Work with others to combat environmental crime. <p>Medium term:</p> <ul style="list-style-type: none"> • Encourage the 2005 national curriculum for schools review to include personal responsibility for sustainable development and the environment as a core requirement.
Goal 3.2 There is widespread recognition of the economic benefits resulting from taking environmental responsibilities seriously.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work with local and regional regeneration initiatives to highlight the economic benefits of environmental responsibility and investment. • Recognise mechanisms by which environmental renewal can contribute to economic, social and community renewal.
Goal 3.3 Environmental equality issues are integrated into the Agency's major work areas.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop means by which environmental equality issues are integrated where appropriate into the Agency's major work areas. • Further develop the skills and capacity of Agency staff to work with stakeholders and communities. • Continue to research and map the linkages between social, economic and environmental indicators. • Understand how we might present this information in a way which is accessible and of value to different stakeholders, including currently excluded communities. • Work with key partners to ensure full stakeholder involvement in the development and implementation of local plans, including the voices of deprived groups. • Work closely with the National Strategy for Neighbourhood Renewal, the New Deal for Communities and Communities First (in Wales).
Goal 3.4 All groups have equal access to decisions on the environment & quality of life and feel equally confident to contribute to them.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Promote opportunities for full stakeholder involvement throughout the Agency's decision making processes.

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Decision making processes

Outcome 4 – Information and processes will be readily available to enable citizens, communities, businesses, Government and its agencies to agree quality of life and environmental targets and the plans that will realise them.

Tests for progress:

- Numbers of effective stakeholder fora at different levels.
- Numbers of effective learning networks focusing on sustainable development.
- Numbers of trained facilitators in the Agency supporting effective stakeholder dialogue processes.
- National and international reputation of the Agency's R&D programme.

GOAL	ACTIVITY
Goal 4.1 Participatory decision making processes established.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop and adopt integrated policy appraisal techniques, covering environmental, social and economic costs and benefits, to inform our consultative decision making processes. • Promote and facilitate participatory decision making processes to set targets and agree action wherever these are focused on our primary functions. • Provide more staff with training to enable them to better engage with citizens, communities, businesses, Government and agencies to share values, concerns, perceptions of risk and key information relating to the environment, and thereby to agree quality of life measures and targets. • Expand the education pages on our internet site as a resource for primary, secondary, higher and further education. • Ensure that we engage academia in leading edge ways in addressing key issues of policy and practice, and in contributing to the formulation and delivery of educational programmes in rural, urban and industrial areas. • Support Local Agenda 21 initiatives which engage people in local decision making about quality of life issues. • Help set up and participate in 'learning networks' based on sufficient levels of trust to enable citizens, communities, businesses, Government and agencies to learn and to reach effective decisions together on how to maintain and improve sustainable levels of wellbeing. • Become more engaged in the debates and dialogues through which we can, as a society, find ways to integrate environmental sustainability with measures for social justice and a more dynamic economy.

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Adoption of sustainable development principles

Outcome 5 – Local, regional, national, rural and urban strategies will fully reflect sustainable development principles and will be appropriately linked, thereby enabling effective and integrated environmental protection and enhancement.

Tests for progress:

- Percentages of plans based on effective and inclusive partnerships and with quality of life targets and plans embedded in them, covering: community plans; regional plans (including regional economic development plans); rural plans; and urban plans.

GOAL	ACTIVITY
Goal 5.1 Effective community planning process in place that fully reflects sustainable development principles.	Short to medium term: <ul style="list-style-type: none"> Use community strategies to help derive Agency priorities when implementing LEAPs. Use partnership funding regimes to address local environmental priorities in joined-up ways. Ensure that community strategies reflect local (neighbourhood) as well as catchment, sub-regional and regional priorities. Adopt more appropriate and effective use of the land-use planning process, e.g. Better Town Planning project to provide structure and systems for efficient and effective interface with planning authorities.
Goal 5.2 Regional and Sub-regional policy & planning processes fully reflect sustainable development principles.	Short to medium term: <ul style="list-style-type: none"> Work closely with regional assemblies and regional Sustainable Development roundtables to develop sustainability appraisals for all regional and sub-regional strategies – e.g. regional planning guidance; structure plan examinations in public. Promote the value of water systems, sustainable transport systems and green space/wildlife corridors as a key structural elements in sustainable spatial urban development.
Goal 5.3 Urban renaissance and rural regeneration is based of sustainability principles and effective urban-rural linkages.	Short to medium term: <ul style="list-style-type: none"> Work with the Urban Task Force on the national “clean up our land” campaign. Form effective partnerships in rural areas with other statutory, voluntary, community and business organisations to clarify and then to deliver community priorities.
Goal 5.4 National policy & planning processes fully reflect sustainable development principles.	Short to medium term: <ul style="list-style-type: none"> Support Government in embedding sustainable development principles in all policies and plans. Work with regional and local planners to ensure that the national policy and planning process goes beyond legislative and functional compliance.
Goal 5.5 Policy and planning processes at international levels fully reflect sustainable development principles.	Short to medium term: <ul style="list-style-type: none"> Work with Government to ensure UK has influence on the EU Sustainable Development Agenda. Work with European partners to deliver the benefits for our three European Interreg III regions.

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Agency values and working practices

Outcome 6 – Sustainability values and working practices within the Agency, including those of openness, collaboration, partnership, participatory decision making, precaution and respect for diversity, will reflect those of key stakeholders and of society in general.

Tests for progress:

- Measures of internal environmental performance.
- Measures of corporate social responsibility in our annual report.
- Internal culture audits.
- Internal learning audits.

GOAL	ACTIVITY
Goal 6.1 The Agency demonstrates best practice in its own environmental performance, together with high levels of economic efficiency and corporate social responsibility.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Continually improve our environmental management systems. • Introduce processes for auditing and reporting on a range of measures of corporate social responsibility. • Promote sustainability values and working practices within the Agency, including those of openness, collaboration, partnership, participatory decision making, precaution and respect for diversity, reflect those of key stakeholders and of society in general. • Develop a culture of learning and continuous improvement, based on best practice in 'participatory' science.

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6. Working in partnership

We have already noted that the Agency has an impact on quality of life through the way in which it carries out its functions – by consulting widely, by engaging with others in partnership, and by forming close and responsive relationships with partners. For example, strong links have been built with Government through the Department for Environment, Food & Rural Affairs (DEFRA) and the National Assembly of Wales (NAW). We also work with the Department of Transport, Local Government and the Regions (DTLR) on planning and related issues. Our activities are framed by, and help to implement, a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White Papers, and Modernising Government and Better Regulation policies. The Agency is also involved in a wide range of other partnerships and liaison arrangements, involving other national agencies; the Regional Government Offices; the Regional Development Agencies; industry and commerce; local authorities; non-government organisations in the environmental and social sectors; trusts; researchers, consultants and academia.

In the future, we aim to develop even closer, more responsive and more inclusive styles of working with partners.

The issue of partnership is central to all *Frameworks for Change*, as well as underpinning quality of life in particular, therefore we have noted some of the key elements that will be needed in the future. These apply equally to all the *Frameworks*.

Lead and joint responsibilities

In some cases, the Agency already plays the lead role in establishing partnerships – a good example of this is our involvement in setting up many of the waste minimisation “clubs” in England and Wales. In most cases however, we do not have the lead or sole responsibility for establishing partnership initiatives. For example, local authorities have the lead responsibility for establishing the community planning partnerships, responsible for producing and implementing community plans, and for many of the “local strategic partnerships” which the Government intends to designate in 2001.

However, irrespective of who takes the lead role in establishing a partnership, successful outcomes depend on the combined activities of many players. Therefore, it is important that the Agency is able to demonstrate effective collaboration and influence.

Wherever possible we should refer to the Concordats (for example that between the Agency and the Local Government Association) which clarify and reinforce the joint interpretation of partners’ roles.

Variations in roles and responsibilities

It is unlikely that the Agency’s investment in “local strategic partnerships”, or in urban or rural regeneration partnerships covering broader areas such as river catchments or sub-regions, will be equal across all areas. However, we will aim to concentrate our resources in areas of particularly high value or risk to the Agency, and/or where strong leadership is otherwise lacking. In those cases we may want to take an initiating or leading role in partnership development.

Building inclusive partnerships

One of the key drivers of partnership development is the opportunity to share funding. New funding routes now place increasing emphasis on inclusive partnerships. For example, Treasury support for “local strategic partnerships” is likely to depend on their ability to involve all key players, including the community, voluntary and private sectors. The Agency recognises that it will need to become skilled at operating effectively within increasingly diverse and more extensive partnership arrangements. The added value is that community involvement is fundamental to the development of local democracy, which itself contributes to quality of life.

The Agency should also expect to become increasingly involved in international partnership initiatives, particularly in Europe. For example, the Agency is a partner in the three European Interreg III regions: the Atlantic Area, the North-West European Metropolitan Area, and the North Sea Region.

Creative tensions between the partnership and partner organisations

The individuals involved in agreeing the goals and working arrangements of a partnership tend to also contribute to those of the individual partner organisations. As a result, tensions between the partnership and contributing organisations are inevitable. These tensions provide a major

opportunity for positive change and the Agency will seek to learn from them wherever possible, adjusting our own goals and working practices accordingly.

Promotion of learning

Given the increasing importance of partnership arrangements and the tensions underlying these, it is important to recognise that all parties are learning to work in new ways. If this is recognised, it can provide a valuable tool to support learning both from individual experience and from evidence of best practice. The best application of both types of learning will be identified so that the Agency will seek to promote effective learning, adaptation and innovation across its organisation as a whole.

7. Research and development

A change in focus of research and development is needed by ourselves and others to support delivery of our quality of life *Framework*.

We expect that up to 15% of our current science-based R&D budgets and those of others will need to be diverted to social and economic science, including new and leading edge forms of 'participatory' science. This will be key to supporting the types of partnership and organisational learning outlined in the previous section.

To deliver this research and development we will aim to influence and collaborate with other key stakeholders, in particular working through existing national and international networks.

8. Implications for the Environment Agency

The Agency's ability to deliver and to influence these goals varies. Some aspects are entirely within our power (for example, delivering our expertise), while others depend on the Government to introduce legislative changes (for example, developing new and revised regulation), or working with us in influencing others (such as the development of the local authority community plans or application of the selected licence application procedure) or a mixture of these. Successful delivery will require:

Expertise, knowledge and awareness

- Increased awareness in the Agency of the need to value social and economic impacts to support sustainable development.
- Increased awareness of diversity in work and the community.
- Increased understanding of sustainable development for rural and urban communities.
- Increased expertise and knowledge of social science and economics.
- Better developed skills in the communication of our role and support to communities in the way we regulate and operate to improve and enhance the environment.
- A better understanding of human diversity in the community.
- A better understanding of how social inclusion and economic practices impact on the environment.
- A better understanding of the Agency's role in sustainable development.

Policies and strategies

- Integration of social and economic policy within the Agency's activities in support of our sustainable development duty.

- Development of social and economic capacity within the Agency, to inform the whole range of Agency policy.
- Development of integrated policy appraisal techniques, covering environmental, social and economic costs and benefits, to inform our consultative decision making processes.
- Development and implementation of an Agency diversity policy.

Monitoring and reporting

- A co-ordinated programme of monitoring social and economic impacts to support our State of the Environment reporting.
- Reporting on the environmental impact of rural and urban development in the Regions.

Influencing and education

- Influencing economic decisions relating to both rural and urban development, including regional plans, local structure plans and community plans.
- Providing clear leadership on the impacts of sustainable development on the environment.
- Leading and being responsive to public opinion on environmental issues.

The planning system

- Developing and implementing sustainable development frameworks in assembly, regional and local planning forums.
- Work with planning authorities on sustainable development within their planning area.

Resources

- A re-balance and re-direction of staff with understanding of the social and economic impact of Agency work.
- Deliver our recreation work through dedicated skilled staff and resources at a local level.
- A strategy to incorporate social and economic awareness into the training and development programme.
- Recognition of the need to expand our influencing role.
- Increased investment in and use of the internet.

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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

An enhanced environment for wildlife

JULY 2001



ENVIRONMENT
AGENCY

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A FRAMEWORK FOR CHANGE

An enhanced environment for wildlife

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“Each one of us carries a share of the responsibility to keep alive the fascinating and wonderful miracles of life on this planet. We can best do this by knowing as much about them as we can.”

SIR JULIAN HUXLEY, FRs.

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision's* nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. An enhanced environment for wildlife

Many people value wildlife as one of the key elements contributing to their quality of life, whether in their own backyard or the wider beyond. It follows that the variety and abundance of wildlife – plants, insects, fish, birds and mammals living on the land, in the water and around our coasts – provides a critical indicator of how successful we are in using our environment wisely.

Changes in wildlife

In Britain, the study of natural history has been a long-standing tradition, with thousands of amateur and professional naturalists and ecologists recording the distribution and abundance of dozens of different species. Consequently, the historical trends for those species concerned has been well documented. The fortunes of different types of wildlife have fluctuated as the landscape of England and Wales has been modified by human activity. Indeed, land-use has been, and continues to be, the single biggest influence on wildlife in Britain. The pace of change has been particularly rapid during the past century, during which time more than 100 species have become extinct in the UK. During the past 20–30 years several species traditionally regarded as common, notably the skylark and song thrush, have suffered serious declines. Reversing this unwelcome trend is a major challenge, and one which requires sustained effort both to protect the best remaining habitats and enhance the wider countryside and urban environments for wildlife.

It is not all bad news. Indeed, there have been notable recoveries, reflecting successful action to improve the environment. Overall, (and although further improvement is needed) both water and air quality have improved substantially in the past 50 years. As a result, many previously fishless reaches of industrial rivers now have thriving fisheries – salmon have returned to the Tyne, Thames, Taff and more recently the Mersey. Otters are now re-colonising many of their old haunts after a 30 year pollution-related absence.

The impact of human activities

Some of the changes in wildlife are caused by natural variations, but most can be attributed directly or indirectly to human activities. The major ones are:

- **Habitat loss and fragmentation** caused by urban development and an expanding transport network;
- **Intensification of agriculture and forestry**, leading to loss of habitat associated with low intensity land-use and field margins;
- **Nutrient enrichment** of rivers, lakes and coastal waters caused by inputs from sewage treatment works and excess fertiliser run-off;
- **Chemical compounds** in fresh and salt water producing various toxic and chronic side-effects;
- **sulphur and nitrogen oxide emissions** causing acid rain affecting water and soil;
- **Increased abstraction of water**, leading to drying out of wetlands;
- **Wetland loss** caused by land drainage and inappropriate water level management as part of flood and tidal defences;
- **Artificial barriers to fish migration** caused by weirs, barrages and pollution;
- **The spread of aggressive non-native species** (e.g. mink, signal crayfish, swamp stonecrop) that threaten native species.

Individually and collectively, the impact of these factors varies according to geographical location and sensitivity of particular habitats or species. An overview of the relative impact of specific factors is shown in Table 1 (page 17), whilst a more detailed account of the state of wildlife and impacts upon it appears in Table 2 (page 18).

Climate change

Climate change is undoubtedly one factor that has already begun to alter the distribution and behaviour of certain species. Recent examples include the spread northwards of the speckled wood butterfly within the UK, and the arrival of breeding birds such as the little egret from Northern Europe. The worrying decline in spring-run salmon may partly be due to sea temperature changes in the North Atlantic. An increased incidence of droughts would threaten vulnerable wetlands in South East England. Climate change also increases the risks of new parasites and diseases.

Policy Context

The UK Biodiversity Action Plan (UK BAP) is the Government's blueprint for wildlife conservation, setting out what action is required to protect and enhance wildlife under greatest threat. More than 400 individual plans for species and habitats provide the baselines against which future changes can be measured, and specific targets set. Air quality, water quality and quantity, energy, transport and, above all, land-use are seen as the key areas for improvement if wildlife is to thrive. The Countryside and Rights of Way Act 2000 provides a legal underpinning of the UK BAP. In addition, there is a Department for Environment, Food & Rural Affairs (DEFRA) Public Service Agreement target that 95% of Sites of Special Scientific Interest (SSSIs) in England should be in favourable conservation condition by 2010.

3. The Environment Agency's role

Nature conservation is not our primary role: the lead government agencies in England and Wales are English Nature and the Countryside Council for Wales respectively. However, through our statutory duty to further conservation our other duties we have a major part to play, particularly for rivers, wetlands and coastal areas in England and Wales. We can create suitable conditions for wildlife by setting and enforcing environmental standards and by managing habitats and water levels. We have significant obligations under the UK BAP when carrying out our regulatory and operational activities, and we actively promote and take part in river and wetland habitat restoration projects. As a public body we need to demonstrate that our action is effective.

For example, we have developed River Habitat Survey (RHS), a method that provides an assessment of the physical state of our rivers. This complements chemical and biological quality assessments and helps improve our understanding of the factors and processes influencing the overall ecological condition of rivers. It can be used to help plan improvement works with confidence and also establish how successful management action has been.

Environment Agency activities that benefit wildlife

Our obligations, responsibilities and examples of how the Agency contributes to wildlife conservation are set out in *'Focus on biodiversity'*, published in July 2000. Our actions that help to create suitable environmental conditions for wildlife include:

- Regulating pollution to the air, land and water;
- Influencing water levels and flows by controlling abstraction from lakes, rivers and under ground sources;
- Controlling the exploitation and movement of fish stocks to prevent over-exploitation, poaching and the spread of non-native fish species and disease and parasites;
- Monitoring and assessing the chemical and biological and quality of rivers, lakes and estuaries to determine whether our environmental objectives and standards are being achieved;
- Ensuring that our flood and tidal defence works protect, and wherever possible, help to restore or enhance riverine, wetland and coastal habitats;
- Advising planning authorities on how best to protect and enhance wetland habitats, and, working with developers, achieving local habitat improvements to offset previous losses;
- Promoting the benefits of wildlife conservation locally through projects with partners and landowners; and
- Investing in research to understand better the environmental requirements of species and habitats.

Policy drivers

Major national and international drivers that will influence our actions over the period of this *Framework* include:

- **European and international drivers:** European Directives on: Habitats and Birds, Environmental Impact Assessment, Strategic Environmental Assessment, Integrated Pollution Prevention and Control, Water Framework, and Landfill. Also the proposed EU 6th Environmental Action Plan, the EU Biodiversity Strategy, the Rural Development Regulations, and the International Ramsar Convention on the Wise Use of Wetlands.
- **National and regional drivers:** UK Biodiversity Action Plan; Wildlife and Countryside Act; Countryside and Rights of Way Act; Water Industry Investment Programmes; the Rural and Urban White Papers; DEFRA (formerly DETR) high-level targets for flood and coastal defence, Government response to the Fisheries legislative review, DEFRA Planning Policy Guidance revisions; and the Water Bill.

Specifically, under the UK BAP, we have lead responsibility for 39 species and 5 habitats of wetland character. These include otter, water vole, white-clawed crayfish, southern damselfly, depressed river mussel, chalk rivers and coastal saltmarsh. This is a very significant responsibility that reflects our expertise, experience and influence in riverine, coastal and wetland management.

There has been a significant shift from chemical to ecological measures for assessing environmental quality, reflected in Government headline indicators for sustainable development and the EU Water Framework Directive. The development of ecologically-based criteria for impact assessment and consent-setting will be a major challenge.

4. Working in partnership

The Environment Agency works closely on policy development with the Department for Environment, Food & Rural Affairs (DEFRA) and the National Assembly for Wales (NAW). We also maintain links with the Department of Transport, Local Government and the Regions (DTLR) on planning issues. Our activities are framed by, and help to implement a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White papers and Modernising Government and Better Regulation policies. We also have very close working relationships with the statutory nature conservation organisations (English Nature EN, Countryside Council for Wales CCW), other statutory countryside bodies, (e.g. Countryside Agency, Forestry Commission), voluntary conservation organisations (e.g. Wildlife Trusts, RSPB), fisheries organisations, academic and research institutions, and local authorities. In particular, the Agency's demanding programme for reviewing existing environmental licences, as required by the EU Birds and Habitats Directives, requires a very close working relationship with various Government departments, EN, CCW and local planning authorities.

The Agency's role in both helping to protect special wildlife sites and improve the environment in towns, the wider countryside and coasts means that partnership and collaboration are watchwords for success. *Focus on biodiversity* provides a flavour of the many hundreds of projects and local partners involved over the past five years. These range from large European-funded projects (e.g. Safeguarding *Natura 2000* rivers in the UK) and Heritage Lottery funded initiatives (Wetlands for Wales) to local partnerships with schools, local wildlife and community groups, and above all, landowners. We are actively supporting fisheries trusts that have been established to improve riverine habitats.

In delivering the activities set out in this *Framework*, we will seek to build on and develop partnerships such as these.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to enhancing the environment for wildlife is:

Wildlife will thrive in urban areas. Habitats will improve, in extent and quality, to sustainable levels for the benefit of all species. Everyone will understand the importance of safeguarding biodiversity.

An enhanced environment for wildlife is one of the outcomes resulting from work within the other themes of the Vision. A 'greener' business world and *Wiser, sustainable use of natural resources* and *Improved and protected inland and coastal waters* provide mechanisms by which improvements to the state of our air, land and water will be delivered for the benefit of landscape and wildlife. Wildlife will also benefit from our proposals for addressing flood risk and climate change.

The *Vision* and long-term objectives will help achieve these outcomes:

- Degraded habitats, especially rivers, estuaries and wetlands, will have been restored.
- Wildlife corridors and their associated habitats will be of high quality, with no artificial barriers to wildlife movement.
- The UK Biodiversity Action Plan will have been successfully delivered and priority species will no longer be under threat.
- Rivers, estuaries, lakes and canals will all support appropriate fish communities.
- Urban and rural land-use practices will encourage the protection and restoration of habitats, species and natural processes.
- The management of land for wildlife and landscape benefits will be accepted and supported as a normal activity of rural life.
- There will be a broad consensus on how the environment should be managed against a background of climate change.
- Threats to the genetic integrity of our native wildlife will be greatly reduced.

Through a 'biodiversity check' on all our policies, plans and projects we will ensure that our activities and those we authorise do not threaten key species and habitats. We will continue to work with many partners at local, regional and national levels to safeguard and enhance biodiversity.

We will seek to achieve these goals in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so. Better understanding of the requirements of wildlife, and risk-based decision making will be central to the success of our approach.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards our vision for the environment. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the supporting activities very approximately to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment.*

⁴ Environment Agency (July 2000) *Environmental Indicators.* A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Restoration of degraded habitats

Outcome 1 – Degraded habitats, especially rivers, estuaries and wetlands will have been restored.

(See also Framework documents *Improved and protected inland and coastal waters* and *Reducing flood risk*)

Tests for progress:

- Condition of rivers, estuaries and wetlands influenced by the Agency.
- Achievement of river, wetland and estuarine habitat action plan targets in the UK BAP.
- River habitat quality as measured by River Habitat Survey.
- Air, water and soil quality.

GOAL	ACTIVITY
Goal 1.1 Conservation criteria for safeguarding and wherever possible enhancing key species and habitats applied to all our licensing and operational activities.	Ongoing:
	<ul style="list-style-type: none"> • Restore urban rivers through our flood defence and fisheries enhancement works.
	Short to medium term:
	<ul style="list-style-type: none"> • Take a lead role in co-ordinated programme of river and river corridor habitat restoration. • Ensure that Catchment Abstraction Management Strategies and Eutrophication Action Plans take full account of wildlife conservation needs. • Ensure full Implementation of 2000-2005 Water Industry investment programme. • Complete review of existing Agency consents known to be adversely affecting wetland SPAs and SACs at high risk and modify them. • Develop a GIS-based capability for determining all authorisations and operational work using risk-based decision tools. • Complete and begin to implement water level management plan for SSSIs.
	Medium term:
	<ul style="list-style-type: none"> • Ensure that the 2005-10 Water Industry investment programme takes full account of water quality and water quantity improvements needed for SSSIs. • Complete review of existing Agency consents thought to be affecting wetland SPAs and SACs at medium risk and modify accordingly.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Wildlife corridors

Outcome 2 – Wildlife corridors and their associated habitats will be of high quality, with no artificial barriers to wildlife movement.

Tests for progress:

- Runs of salmon and other migratory fish, such as shad and eels.
- Populations of water voles, otters and other species (e.g. barn owls) dependent on river corridors.
- Length of uninterrupted high habitat quality rivers, hedges and other corridors.

GOAL	ACTIVITY
Goal 2.1 An increased network of linked wildlife habitats and sites developed.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Use River Habitat Survey to identify a wildlife grid based on rivers. • Seek inclusion of Habitats Directive Article 10 requirement in revised PPG9. • Identify key gaps, bottlenecks and barriers that fragment or disrupt river corridors and wetlands and incorporate into river corridor habitat improvement programmes. • Help DEFRA and NAW target agri-environment schemes on key gaps needing to be bridged. • Agree with partners (organisations and landowners) a long-term plan for wildlife networks. <p>Medium term:</p> <ul style="list-style-type: none"> • Report with others on progress in expanding the network.
Goal 2.2 Non-statutory river habitat objectives implemented to help improve wildlife corridors	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop and test river habitat objectives on pilot catchments, and then publish river habitat objectives for all rivers. <p>Medium term:</p> <ul style="list-style-type: none"> • Use flood defence programme to help deliver river habitat objectives.
Goal 2.3 Fish passes installed on all major artificial barriers.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Identify key artificial barriers to fish migration. • Implement a rolling programme for fish pass installation and monitor the benefits on fish populations.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

UK Biodiversity Action Plan

Outcome 3 – The UK Biodiversity Action Plan will have been successfully delivered and priority species will no longer be under threat.

Tests for progress:

- Achievement of UK BAP species and habitats targets.
- Status of UK BAP priority species (such as otter and water vole) and habitats.

GOAL	ACTIVITY
Goal 3.1 Pollution control, water abstraction, flood and tidal defence work and fisheries management measures are sufficient for Agency targets in the UK BAP to be achieved on time.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Determine, publish, and, with partners, implement 5-year targets for UK BAP and DEFRA high-level targets for biodiversity species and habitats for which we have lead responsibility. • Produce annual update report on progress towards our UK BAP targets, with a full report every five years. • Ensure monitoring systems are in place for these species and habitats. • Help establish, through collaborative survey and research, better understanding of environmental requirements for key species and habitats. <p>Medium term:</p> <ul style="list-style-type: none"> • Implement AMP3, Eutrophication Catchment Action Plans, Habitats Directive, Water Level Management Plans plus other initiatives to help deliver UK BAP targets.

Environment Agency's role is central

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Environment Agency's involvement to build understanding

Fish communities**Outcome 4 – Rivers, estuaries, lakes and canals will all support appropriate fish communities.**(see also *Framework document Improved and protected inland and coastal waters*)**Tests for progress:**

- Self-sustaining salmon and sea-trout populations in rivers.
- Sustainable eel stocks.
- Catches of game and coarse fish.

GOAL	ACTIVITY
Goal 4.1 An improved ability to measure the population and health of fish.	Short to medium term: <ul style="list-style-type: none"> • Implement improved monitoring strategy and sampling procedures for fish in rivers. • Report annually on fish populations at key river monitoring sites. • Improve information from angler catch records. • Improve information on health status of fish populations. Medium term: <ul style="list-style-type: none"> • Fish counters installed on all principal salmon rivers.
Goal 4.2 Action plans delivered to ensure an increase in healthy fish populations.	Short to medium term: <ul style="list-style-type: none"> • Target high-risk illegal fish transfers to combat disease, prosecuting where necessary. • Prepare contingency plans to combat new fish parasites and diseases. • Implement Salmon action plans. • Help DEFRA/NAW develop proposals for improved regulation of fish farms and dealers to reduce fish disease risks. Medium term: <ul style="list-style-type: none"> • Implement coarse fish population targets for main rivers.
Goal 4.3 Reduced illegal catches and overexploitation of salmon and eel stocks.	Ongoing: <ul style="list-style-type: none"> • Implement catch returns for eels and elvers. Short to medium term: <ul style="list-style-type: none"> • Introduce a risk-based approach for targeting poaching and over exploitation of salmon to reduce illegal and unreported catch. • Develop and implement an eel strategy and new byelaws to reduce the exploitation of eels and elvers. Medium term: <ul style="list-style-type: none"> • Develop a stock recovery plan for eels as part of wider European Management Programme.
Goal 4.4 Natural distribution and range of native fish species protected.	Ongoing: <ul style="list-style-type: none"> • Improve control over release of alien fish species into the wild. Short to Medium Term: <ul style="list-style-type: none"> • Revise guidelines and procedures on fish introductions. • Work with DEFRA/NAW to improve legislation so that conditions can be applied to consents to introduce fish.

Land-use practices

Outcome 5 – Urban and rural land-use practices will encourage the protection and restoration of habitats, species and natural processes.

Tests for progress:

- The quality and extent of wetland and other habitats.
- Extent and effectiveness of buffer zones to protect designated wildlife sites.

GOAL	ACTIVITY
Goal 5.1 Habitat restoration is integral to development policies and plans.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Promote wildlife corridor network approach with regional and local government in structure plans. • Develop and promote Environmental Impact Assessment for policies and development plans. • Promote geomorphological principles in sustainable catchment management. • Promote with local authorities the basis for setting targets to reverse habitat fragmentation. • Promote the improved management of urban green spaces.
Goal 5.2 Our own land shows overall increase in biodiversity.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Set targets for habitat improvement and reporting progress on them. • Implement habitat improvement programmes on our landholdings. <p>Medium term:</p> <ul style="list-style-type: none"> • Link Agency land into to local wildlife corridor network.
Goal 5.3 Every opportunity is taken to create and restore habitats.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Introduce strategic environmental assessment of flood defence plans. • Implement water level management plans and promote flood storage wetlands consistent with the wise use of wetlands principle (Ramsar). • Exploit 'planning gain' to restore river and wetland habitats. • Implement with others, managed retreat on coastlines where this is the best practicable environmental option.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Land management

Outcome 6 – The management of land for wildlife and landscape benefits will be accepted and supported as a normal activity of rural life.

(See also *Framework* document *Restored, protected land with healthier soils*)

Tests for progress:

- Level of economic support for agri-environment and wildlife incentive schemes.
- Demand and uptake of wildlife-friendly management techniques.
- Land-use and landscape quality.
- Soil structure and quality.
- Silt load in rivers.

GOAL	ACTIVITY
Goal 6.1 Wildlife-friendly farming and forestry is widely adopted.	Ongoing: <ul style="list-style-type: none"> • Influence agricultural priorities, incentives and best practice. • Promote social, economic and environmental benefits of wildlife-friendly practices.
	Ongoing: <ul style="list-style-type: none"> • Advise on environmental conditions for farming and forestry incentives.
Goal 6.2 Good environmental practice is a benchmark evaluation criterion for economic support for land managers.	Short to medium term: <ul style="list-style-type: none"> • Identify key areas for effective uptake of agri-environment schemes. • Promote cross-compliance between economic subsidies and environmental outcome to help bring about improvement of river habitats and wetlands.
	<ul style="list-style-type: none"> • Encourage the uptake of wildlife-friendly goods and services.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Biodiversity and climate change

Outcome 7 – There will be broad consensus on how biodiversity should be managed against a background of climate change.

(see also *Framework* document *Limiting and adapting to climate change*)

Tests for progress:

- Long-term strategy for sustainable protection of designated wildlife sites agreed.
- State of knowledge regarding likely changes in habitat and species distribution.

GOAL	ACTIVITY
Goal 7.1 Likely changes in species and habitat distribution under climate change scenarios determined.	Short to medium term: <ul style="list-style-type: none"> • Undertake collaborative research with the nature conservation agencies and research councils to identify high-risk sites and species.
Goal 7.2 Species and habitat changes taken into account in determining environmental licences, carrying out our flood and tidal defence works, and managing our own land.	Short to medium term: <ul style="list-style-type: none"> • Establish environmental change parameters for Catchment Abstraction Management Plans, Eutrophication Catchment Plans and flood defence programmes. • Modify monitoring strategy to reflect the need to assess sensitive species. • Agree with EN and CCW acceptable limits of change on all SSSIs, SPAs, SACs and Ramsar sites. • Take account of climate change in all management plans for Agency-owned land. • Complete Coastal Habitat Management Plans and begin to implement actions to protect internationally important sites.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Genetic integrity

Outcome 8 – Threats to the genetic integrity of our native wildlife will have been greatly reduced.

Tests for progress:

- Incidence of new hybrids.
- Occurrence and distribution of existing hybrids and ornamental/exotic varieties in the wild.
- Genetic variety of key native species.

GOALS	ACTIVITIES
Goal 8.1 The genetic variation in key native species established.	<p>Medium term:</p> <ul style="list-style-type: none"> • In partnership with research institutes, undertake genetic studies of rare, declining or vulnerable species (e.g. black poplar, wild brown trout).
Goal 8.2 The risks to genetic integrity caused by the accidental or deliberate introductions of non-native species and varieties determined.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Monitor incidence of key non-native species and varieties during routine biological and fisheries surveys and report publicly. • Determine the risk of hybridisation / genetic loss to vulnerable species.
Goal 8.3 The impact of non-native species and varieties minimised.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Prevent the release of non-native fish by increased enforcement and prosecutions where necessary. • Promote legal controls on import and distribution of non-native species. • Promote a ban on sales of aquatic and other waterside non-native invasive plants. • Help establish effective ways of containing or eradicating non-native species (e.g. signal crayfish, invasive aquatic plants).
Goal 8.4 Effective methods to maintain genetic diversity identified.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Assess level of hybridisation and non-native varieties recorded in fisheries surveys. • Use native plants from local sources during Agency operational work and planting on our own landholdings. • Ensure stocking policy protects native wild fish stocks (e.g. brown trout). • Identify one or more key catchments to be treated as 'alien-free' and, with others, implement action to keep them that way. <p>Medium term:</p> <ul style="list-style-type: none"> • Determine feasibility of establishing gene-banks for endangered fish species.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

7. Research and development

Knowledge about the ecological requirements of many habitats and species is still poor. This limits our confidence in setting environmental standards and determining operating procedures. Improving understanding of ecological requirements is therefore fundamental.

Uncertainties associated with climate change make it even more important to better understand ecological requirements and the sensitivities of key habitats and indicator species. This means developing decision-making tools that take account of risks and uncertainties in the context of cost and effectiveness. This applies particularly to less well-known species and to inter-tidal habitats along coasts with rising sea-levels, and sensitive wetlands vulnerable to prolonged drought.

8. Implications for the Environment Agency

Our ability to deliver these goals varies. Some are entirely within our power, others depend on influencing others, working in partnership or even amending legislation. Successful delivery will depend on a combination of external and internal factors and will require effort on several fronts:

Legal and policy obligations

- Effective implementation of existing and new European legislation (e.g. Birds, Habitats, IPPC, Groundwater, Water Framework Directives).
- Fulfilling obligations for public bodies under the Countryside and Rights of Way Act.
- Fulfilling UK BAP requirements.
- Implementing environmental initiatives such as Restoring Sustainable Abstraction Projects, Catchment Abstraction Management Strategies, Eutrophication Catchment Action Plans and Fisheries Action Plans.
- Anticipating the requirements of the Strategic Environmental Assessment Directive.

Internal awareness and culture

- A higher profile of ecological outcomes in Agency strategic planning and decision-making.
- Increased internal awareness and understanding of wildlife conservation issues through biodiversity checks on all policies and activities.
- A shift from site-based to process-related environmental and impact assessment.
- A shift to risk-based ecological assessment and environmental management.

Knowledge and expertise

- Better understanding of physical processes and biological interactions.
- Better understanding of the ecological requirements of species and habitats, and their sensitivities to pollution, land-use and climate change.
- Wider expertise base to understand land, water, air and marine ecosystems.
- Consideration of wildlife requirements in all Agency activities.
- Better ability to determine and manage risk.
- Development of practicable decision-making and post-project appraisal tools.

Monitoring and reporting

- Re-balanced monitoring effort for more effective assessment of the effects of Agency activities on UK BAP species and habitats.
- Better co-ordinated information systems, common standards and shared databases.
- Simple performance measures for easy public understanding.
- A smarter approach including surveillance and monitoring by remote-sensing.

Influencing and education

- Providing clear leadership in setting environmental standards and risk management.
- Demonstrating that our actions make a real difference to wildlife and landscapes.
- Generating public support for our aims, whilst managing unrealistic expectations.
- Demonstrating the socio-economic benefits of wildlife-friendly action.
- Improving our ability to attract collaborative funding for habitat improvements.
- Promoting environmental education in schools and universities.

New and revised legislation

- Working with national Government to shape and implement new wildlife and fisheries legislation.
- Helping develop ecological methods and technical standards to support new European Directives.
- Applying Strategic Environmental Assessment to policies and work programmes.

The Planning System

- Ensuring that UK BAP obligations are included in land-use and planning decisions.
- Working with local and regional government to achieve sustainable land use plans.
- Applying Strategic Environmental Assessment to structure plans and to Regional Planning guidance.
- Influencing strategic plans and development projects early in their preparation.

TABLE 1: Variation in environmental pressures on wildlife based on Agency Regions

Pressure	Anglian	Midland	North East	North West	Southern	South West	Thames	Wales
River habitat modification	H	M	M	M	M	L	H	L
River quality (biological)	M	M	H	H	M	L	M	L
Sea-level rise	H	N/A	M	L	H	M	H	M
River quality (nutrients)	H	M	M	L	M	M	H	L
River quality (chemical)	H	M	M	H	M	L	M	L
Nitrogen deposition (exceedance of critical loads)	M	L	M	M	M	H	L	H
Soils (exceedance of acidity critical loads)	M	L	M	H	L	M	L	H

KEY

This has been based on selecting the two Regions with the greatest breaches of standards, poorest quality or highest loadings and ranking these as H – highly impacted; the two Regions with the best quality or lowest loadings are ranked as L – least impacted. The other Regions are ranked M – moderate (where the impacts are about equal, more than two Regions may be designated H or L).

Source: Environment Agency (2000) *Environment 2000 and beyond*.

TABLE 2: Summary of the state of wildlife and key impacts

Viewpoint	State and trends
Land use and resources	<p>Habitats: Some 42 per cent of river length is extensively modified physically and less than 15 per cent of lowland streams and rivers still retain semi-natural channel structure. Overdeveloped channels and land drainage have resulted in a huge loss of floodplain wetlands.</p> <p>Over 90 per cent of saltmarshes have been lost due to erosion, land claim and coastal squeeze. Over 4000ha of important coastal habitat could be lost by 2025 due to rising sea levels.</p> <p>Some 78% of man-made ponds have been lost since 1880, but garden ponds, reservoirs and gravel pits provide new open water areas.</p> <p>Semi-natural areas: Cover 13 per cent of the land but they have declined in extent, and become fragmented over time, with the most areas intact now existing in the uplands and Wales. Unimproved grassland and heathlands of the south and east have declined dramatically.</p> <p>Habitat fragmentation: Urban and industrial development and associated transport links, together with intensification of agriculture have had a major impact on landscape quality and habitat integrity. The disconnection of functioning floodplains from river channels is particularly significant. Agri-environment schemes, organic farming, river rehabilitation projects, and wildlife-friendly forestry have begun to consider the importance of landscape features, though so far only a tiny fraction of the landscape has been improved as a result.</p>
Key populations	<p>Plants: There has been a significant reduction in species diversity in moorlands, upland woods and lowlands since 1978. Some 20 to 30 per cent of aquatic species have been lost from some places in the past 150 years.</p> <p>Invertebrates: Dragonfly and butterfly species have declined, although some butterflies are increasing their range and number. The White-clawed crayfish has disappeared from several catchments and is declining in others.</p> <p>Fish: The burbot became extinct in early 1970s. Vendace are under threat from eutrophication in their last remaining locations in the Lake District. Wild brown trout are declining and spring salmon numbers have reduced substantially over the last 25 years. Coarse fish populations appear stable and many new coarse and game fisheries have been created on gravel pits and other still waters. Several non-native species (e.g. zander) now established in the wild. Commercial sea fish populations (e.g. cod) are at low levels and severe restrictions catch quotas have been introduced.</p> <p>Birds: Breeding populations of many farmland (e.g. skylark, tree sparrow), woodland (e.g. turtle dove) and wetland birds (e.g. redshank, lapwings, yellow wagtail) have declined. Others, such as mute swan and buzzard, have increased significantly due to increased protection measures.</p> <p>Amphibians and reptiles: Some species such as natterjack toad and adders have become confined to fewer sites but others are still widespread.</p> <p>Mammals: About half of small mammal species (e.g. dormouse) have declined in number, but some larger mammal species (e.g. badger) have increased. Otters are returning well in some catchments. Water voles have declined by 88 per cent.</p>

TABLE 2: Summary of the state of wildlife and key impacts *continued*

Compliance with standards, targets and classification schemes	<p>Only 57 per cent of SSSIs were in favourable condition in 1997/98, and 12 per cent were in a poor state and declining.</p> <p>At least 26 SSSIs in England are affected by over-abstraction and low water levels – a further 170 sites are vulnerable and require further investigation to establish impacts.</p> <p>Sulphur dioxide eradicated sensitive lichens in much of England from the mid-19th century onwards, but some species have started to recolonise as a result of cleaner air.</p> <p>Acidification of upland waters in the 1970s led to declines of mosses, liverworts and lichens, and freshwater species including salmon, trout, invertebrates and dippers. High nitrogen deposition causes eutrophication; it has probably damaged mosses in the southern Pennines and may lead to the replacement of heather by grassland. As deposition reduces, affected ecosystems may recover only slowly and may not return to their former state.</p> <p>Sulphur and nitrogen deposition exceeds critical loads of acidity over a significant area of the UK. International agreements are likely to lead to significant reductions in emissions of sulphur and nitrogen by 2010, but, critical loads in parts of Wales, Cumbria and the Pennines will still be exceeded. Nutrient nitrogen exceeds critical loads in many regions. The input of nitrogen into the atmosphere may be significant for remote marine areas, increasing the risk of eutrophication.</p> <p>Almost 20 per cent of rivers in some Agency regions are still in a poor or bad biological state. Targets and standards associated with the water company investment programme (AMP 3) and EC Directives should improve river and estuary water quality further.</p> <p>Eutrophication of rivers and lakes is still a major concern in some places, with soil erosion and agricultural runoff a principal cause of nitrate input and sewage-works for phosphorus. Five estuaries and 75 river stretches are designated as 'eutrophic sensitive areas'. There are generally greater problems in the south and east, but algal blooms can occur in several coastal areas and inland waters.</p> <p>Ninety-two per cent of estuaries were classified as having good or fair quality water in 1995; 17 per cent of sites failed water quality standards for shell fisheries in 1998; certain pesticide concentrations still exceed operational standards in rivers, notably in Yorkshire and Humberside. Acidity has increased under many grassland soils.</p>
Human and environmental health	<p>Harmful effects caused by endocrine disruptors evident in some fish, but are largely unstudied in other wildlife. Synthetic pyrethroids (used in sheep-dips) have had a devastating effect on aquatic insects and fish in some upland rivers in Wales and the North-West. Harmful effects caused by endocrine disruptors evident in some fish, but are largely unstudied in other wildlife.</p>
Aesthetic quality	<p>Litter is a continuing and increasing problem along urban rivers and some beaches. Fly-tipping is increasing in some places.</p>

Source: Environment Agency (2000) *Environment 2000 and beyond*.



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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

Cleaner air for everyone

JULY 2001



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A FRAMEWORK FOR CHANGE

Cleaner air for everyone

JULY 2001

Cleaner air for everyone

“Delivering cleaner air and a healthy environment more quickly are things worth working for”

MICHAEL MEACHER, 19 JANUARY 2000

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹. This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination – that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision*'s nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* – and the associated dialogue and business development that will flow from them – are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Cleaner air for everyone

Air pollution has been a major problem, particularly in urban areas of the UK, for many centuries; "pea-souper" fogs were a frequent winter occurrence in many cities from about the middle of the 19th century. The Clean Air Acts of 1956 and 1968 largely eradicated the high levels of smoke and sulphur dioxide from domestic coal burning, and have led to a substantial improvement in air quality. In central London, levels of sulphur dioxide have reduced to less than 5 per cent of their concentrations in the mid-1930s. However, at the same time there has been an increase in other types of air pollution.

Health effects

There is now a growing understanding of the effects of air pollution, which indicate that health may be damaged at lower levels than previously thought. Air pollution episodes may lead to increases in hospital admissions for cardiovascular and respiratory disorders, while high levels of some other pollutants may cause cancer. Evidence is beginning to emerge that long-term exposure to air pollution could have more significant health effects than those associated with short-term effects.

Urban air pollution

Urban air pollution, primarily as a result of local emissions, presently exceed air quality standards set by the Expert Panel on Air Quality Standards (EPAQS) from time to time in some urban centres. The implementation of the Government's air quality strategy should ensure that national objectives for a range of pollutants are met within 5–10 years. However, continued progress is needed to deliver and sustain the anticipated improvements.

Environmental effects

Acidification as a result of sulphur and nitrogen deposition and eutrophication by nitrogen deposition are important issues and have been addressed by a series of EU Directives and successive Protocols under the 1972 UN Convention on Long Range Transboundary Air Pollution. Critical loads, which have been developed according to international guidelines, are currently exceeded in parts of England and Wales, particularly the Pennines, northern England, southern and mid Wales. Sulphur and nitrogen deposition from UK and European sources is expected to continue to decline over the next 10 years and some freshwater ecosystems are showing chemical and biological signs of recovery. However, for soils there is no unequivocal evidence

of recovery from acidification in the UK and ecosystems may need to be actively managed to promote recovery. Recovery may take many years, possibly decades, and even then ecosystems may not return to their past status.

Ground-level ozone pollution is a Europe-wide problem which affects human health and vegetation. In the UK the highest concentrations occur in rural areas and over high ground, lower concentrations are generally found in urban areas where ozone undergoes chemical reactions with oxides of nitrogen to form nitrogen dioxide. Peak levels have fallen substantially since the 1970's and emissions controls which have so far been agreed within the EU are expected to deliver further improvements over the next decade. However, there are still likely to be substantial areas where impacts on vegetation arising from ozone may occur.

Aesthetic air pollution, such as odour, noise or light pollution has not been well quantified but is detrimental to the quality of life of many people and may affect wildlife. For example, light pollution may disrupt migration and roosting behaviour in birds. Odour is a key issue affecting local communities in the vicinity of operational processes, such as landfill sites, sewage treatment works, agricultural units and industrial plant.

All these issues require further understanding of the links between emissions and effects in relation to the health of humans and the ecosystem. Other pollutants, such as heavy metals and persistent organic substances, are not known to have significant effects at current levels but require further evaluation. Although air pollution is not restricted by physical boundaries, environmental pressures do vary from region to region as well as within regions, as shown in Table 1 (page 14). In March 2000 the Agency published a report on the State of the Atmosphere and its findings are summarised in Table 2 (page 15).

3. The Environment Agency's role

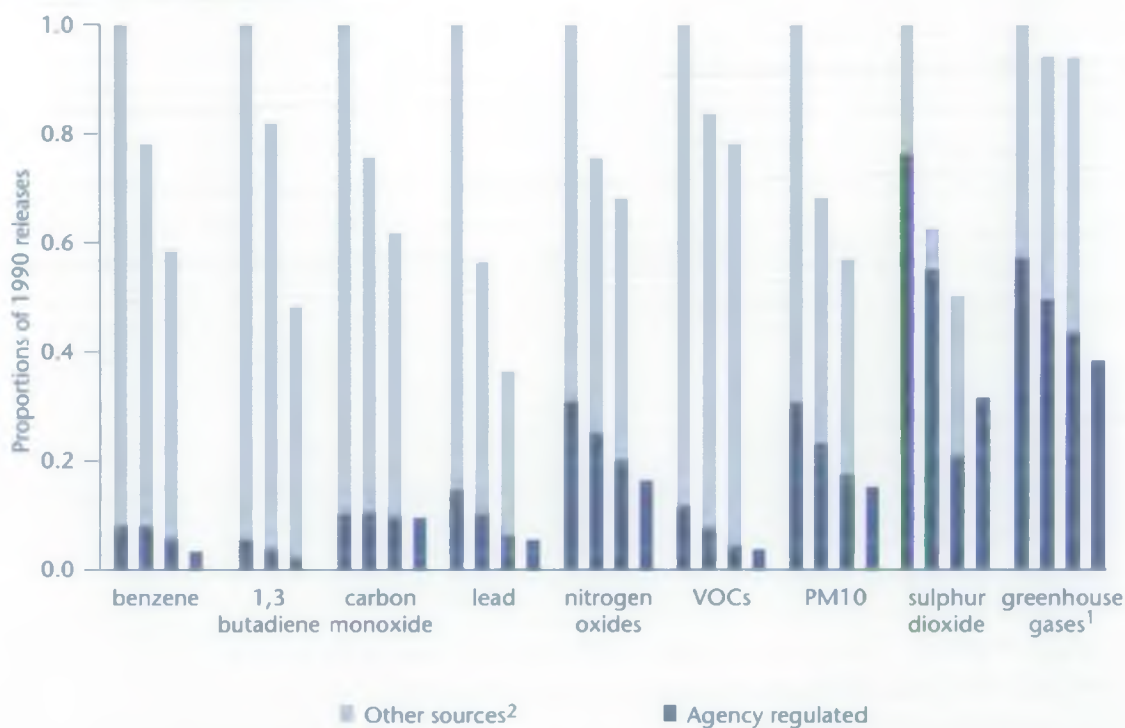
The Agency regulates releases of pollutants to air in England and Wales from over 2,000 of the larger or more complex industrial processes through Integrated Pollution Control (IPC) under the 1990 Environmental Protection Act. Also under the 1990 Act, local authorities regulate over 20,000 smaller processes. During 2000 this legislation will be superseded by the Pollution Prevention and Control Regulations which implement the EU Directive on Integrated Pollution Prevention and Control (IPPC). The Directive is similar to IPC but covers a wider range of activities and industrial processes, including landfill sites and larger sewage treatment works. IPPC will be progressively applied to existing processes, with full implementation by 31 October 2007.

Processes regulated by the Environment Agency

The contribution of Agency-regulated processes to national emissions of key pollutants is shown in Figure 1 overleaf.

It can be seen that releases from IPC processes controlled by the Agency make a significant contribution to the national emissions inventory for sulphur dioxide and greenhouse gases and, to a lesser extent, for nitrogen oxides and particulates (PM10). However, releases of all substances may be important locally in the vicinity of particular processes. Our understanding of pollutant releases has improved significantly in recent years, and the development of the Pollution Inventory has made this information readily available. However, the level of understanding of releases to air from non-IPC processes is relatively poor.

Figure 1 Contribution of Agency-regulated processes to national emissions of key pollutants in 1990, 1995, 1998 and 1999



¹ Emissions expressed as carbon equivalents

² Not available for 1999

Information needs

Information on the impacts of pollutants needs to be improved. There are relatively few environmental quality standards available for releases to air and, where they do exist, the majority relate to human health. Nationally or internationally agreed criteria for impacts on ecosystems are limited to sulphur dioxide, nitrogen oxides, ozone and ammonia, which is a major constraint in assessing the risks posed by air pollution. In order to deal with this issue the Agency is working to develop a suite of environmental assessment levels for use in assessing the impact from IPPC processes.

Policy drivers

Among the key national and international drivers that will influence our actions over the period of this *Framework* are:

- **International drivers:** UNECE Protocol to abate acidification, eutrophication and ground level ozone; UNECE Persistent Organic Pollutant and Heavy Metal Protocols; the Montreal Protocol and subsequent agreements on ozone depleting substances.
- **European drivers:** European Directives on: Integrated Pollution Prevention and Control; Habitats; Birds; Sulphur content of Liquid Fuels; Solvents; Daughter Directives on air quality limit values for nitrogen dioxide, sulphur dioxide, particulate matter, lead, benzene, carbon monoxide, PAHs, arsenic, cadmium, mercury, nickel; Ozone; large combustion plant; national emissions ceilings; and waste incineration. The proposed 6th Environmental Action Programme.

- **National and Regional drivers:** Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

4. Working in partnership

The Agency works closely on policy development with the Department for Environment, Food & Rural Affairs (DEFRA), the Department of Trade and Industry (DTI), the National Assembly for Wales (NAW). Our activities are framed by, and help to implement, a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White papers, and Modernising Government and Better Regulation policies.

The Environment Agency works with a wide variety of partners on air quality issues and to deliver improvements in air pollution:

- EU and other international organisations (for example OECD) – mainly by contributing experts to working groups.
- Central Government – by liaison on policy development and advice and guidance on regulatory issues.
- Local authorities – by working with them to identify and quantify key sources of air pollution and assist with local air quality management. The Agency is involved in over 40 regional groups related to air quality issues.
- Industry – by working with trade associations and operators to improve their environmental performance and to ensure that regulation is undertaken in a consistent, transparent and cost effective-manner. The Agency was a founder member of the Environmental Analysis Co-operative, a group made up of industry, regulators, academics, consultants and central Government which provides a forum for discussion and a collaborative approach to solving regulatory issues.
- Non-governmental organisations – the Agency works with a number of such groups, (eg the National Society for Clean Air and the Environmental Analysis Cooperative).
- Environmental organisations – the Agency collaborates with English Nature and the Countryside Council for Wales in monitoring and assessing the environmental impacts of air pollution, and works with the Forestry Commission on monitoring the impacts of air pollution on tree health.

Over the period covered by the *Framework* it is anticipated that links with local authorities and industry will be strengthened and new partnerships developed with organisations such as the Highways Agency. This will assist the Agency to take more account of the contributions and changes to air quality due, for example, to diffuse sources, industry and traffic, and to work with other organisations to address them.

5. The Environment Agency's objectives

In *An Environmental Vision, The Environment Agency's Contribution to Sustainable Development* our overall long-term objective with respect to air is that:

We will have cleaner and healthier air. The emission of chemical pollutants into the atmosphere will decline greatly and will be below the level at which they can do significant harm.

This *Framework* has strong links with the others in the series. *A greener business world* and *Wiser, sustainable use of natural resources* provide many of the mechanisms by which air quality can be improved. Air pollution can also impact on both soil and water quality issues, which are addressed in *Restored, protected land with healthier soils* and *Improved and protected inland and coastal waters*.

The Vision and long-term objectives will help achieve these outcomes:

- Clean air will be valued and demanded by society.
- Air quality standards will have been set, and met, for all significant pollutants.
- Air quality will no longer be a significant cause of adverse human health effects and damage to the urban and rural environment.
- Air pollution will no longer have a detrimental effect on plants, animals or their habitats.
- Adverse effects on the natural processes of the global atmosphere will have been greatly reduced.
- All national and international aspects of air pollution will be recognised.
- All controllable emissions to the air will be regulated on the basis of their environmental impact.

We will seek to achieve these outcomes in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the vision for the environment. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment*.

⁴ Environment Agency (July 2000) *Environmental Indicators*. A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

The value of clean air**Outcome 1 – Clean air will be valued and demanded by society.****Tests for progress:**

- The value the public and other stakeholders place on air quality.

GOAL	ACTIVITY
Goal 1.1 Pressures and impacts on air quality at local and national level are better understood and communicated.	Short to medium term: <ul style="list-style-type: none"> • Shift the balance from Agency to operator check-monitoring to facilitate more focused Agency auditing and monitoring. • Work with Government to encourage the use of an air quality index on the weather forecast. • Improve the provision of national and regional information to the public on air quality issues associated with Agency regulated processes through paper and electronic media, placing them into the context of all sources, making full use of the DEFRA/NETCEN maps and the National Air Emissions Inventory. • Work with Government to identify and develop environmental indicators for priority issues. Medium term: <ul style="list-style-type: none"> • Pilot making publicly available real time monitoring of emissions via means such as the internet and displays in public places. • Model the impact of all Agency regulated releases using an appropriate air quality model.
Goal 1.2 Improved public understanding of the factors affecting air quality.	Short to medium term: <ul style="list-style-type: none"> • Require operators to provide impact assessments of releases to air as part of IPPC applications. • Develop a consistent framework for inclusion of air quality information within Local Environment Agency Plans (LEAPs).
Goal 1.3 A reduction in emissions to air as a result of the Agency's own activities.	Short to medium term: <ul style="list-style-type: none"> • Develop a strategy for reduction in air pollutant emissions as part of Agency wide EMS scheme. • Including BREEAM assessments in the Agency's building acquisition policy.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Air quality standards

Outcome 2 – Air Quality Standards will have been set and met for all relevant pollutants.

Air Quality will no longer be a significant cause of adverse human health effects and damage to the urban and rural environment.

Air Quality will no longer have a detrimental effect on plants, animals or their habitats.

Tests for progress:

- Compliance with Air Quality Objectives.
- Additional health and environmental standards established.
- Urban Air Quality – measured air pollutants in urban areas in relation to standards and targets.
- DEFRA Air Quality Index.
- Area of country subject to acidification and eutrophication.
- Area of country over which critical levels for the protection of vegetation are exceeded.
- Biological monitoring of sensitive habitats.

GOAL	ACTIVITY
Goal 2.1 Local air quality strategies in place covering all sources.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop greater collaboration with central Government and devolved administrations in policy development and technical issues. • Develop links with local planners and Highways Agency to develop integrated air quality strategies. • Develop closer links with local authorities as part of next Air Quality Strategy Review. • To support Agency work on the Habitats Directive develop a biological monitoring strategy for the terrestrial environment, impacted by industrial sources. <p>Medium term:</p> <ul style="list-style-type: none"> • Through Agency authorisations reduce industry emissions in identified air quality management areas to meet National Air Quality Strategy objectives consistent with regulatory powers.
Goal 2.2 Air quality standards and objectives to protect human health and the natural environment developed to cover a wider range of pollutants.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • In collaboration with industry, Government and other regulators develop interim environmental criteria where these do not otherwise exist. <p>Medium term:</p> <ul style="list-style-type: none"> • In collaboration with Government, develop risk-based objectives for impacts from Agency regulated processes to human health and the environment.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Natural atmospheric processes

Outcome 3 – Adverse effects on the natural processes of the global atmosphere will have been greatly reduced.

All national and international aspects of air pollution will be recognised.

Tests for progress:

- Emissions to air from Agency regulated processes.

GOAL	ACTIVITY
Goal 3.1 The impact of pollutants on global atmospheric processes better understood.	Short to medium term: <ul style="list-style-type: none"> • Work with DEFRA on their existing programme and seek greater collaboration with academic and research community to tackle outstanding issues.
Goal 3.2 The importance of transboundary pollution will be recognised globally.	Short to medium term: <ul style="list-style-type: none"> • Work with central Government on their existing programme and international organisations to identify the relative importance of transboundary contributions as emissions in western Europe decline and, potential mechanisms for future collaboration.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Regulation of emissions

Outcome 4 – All controllable emissions to air will be regulated on the basis of their environmental impact.

Tests for progress:

- Availability of league tables at site, company and sector level.
- Introduction of benchmarking of site performance on basis of environmental impact.
- Number of odour complaints.

GOAL	ACTIVITY
Goal 4.1 Controllable emissions regulated on the basis of their environmental impact and the cost of reductions.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Where consistent with IPPC and other regulatory regimes, develop and consult upon pilot sectoral plans for reductions in emissions based on environmental objectives set against the cost of reductions. • Prioritise pollutants and sources for regulatory action on basis of environmental damage and costs of reduction. • Develop database of release characteristics for all Agency regulated processes. • Incorporate into licences plans for reductions in emissions based on the costs and benefits of meeting environmental objectives. <p>Medium/longer term:</p> <ul style="list-style-type: none"> • Work with Government to provide a GIS based system for Agency staff to access information on releases and ambient concentrations.
Goal 4.2 League tables on emissions to air from Agency regulated processes widely available.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Publication of league tables. • Review and develop emission factors for releases to air from existing and closed landfill. • Place emissions from Agency regulated processes and relevant trends into context with other sources, including traffic, working with DEFRA, and using information from the National Atmospheric Emissions inventory and other sources.
Goal 4.3 Odour complaints relating to Agency regulated processes are minimised.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop guidance on the assessment and control of odours from IPPC processes, including landfills and also from sewage treatment works and progressively incorporate conditions on the control of odours for processes under IPPC. • Require sites to record the number and nature of accurate complaints made to them by the local public.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

7. Research and development

New research and development will be required to support the delivery of the *Framework*, which will be undertaken in conjunction with others including the DEFRA and DoH. The main areas for further work are outlined below:

- Development of risk based health and environmental objectives where they do not otherwise exist.
- Development of interim environmental criteria.
- Development of biological monitoring techniques and strategy.
- Development of environmental indicators for priority issues.
- Development of landfill emission factors.
- Strategic review of air quality R&D requirements.

8. Implications for the Environment Agency

The Agency's ability to deliver these goals varies. Some are entirely within our power, while others depend on influencing the Government in its introduction of legislative changes or working with or influencing others. Successful delivery will require:

Expertise and Awareness

- Increased awareness in the Agency of the potential and implications of air quality impacts.
- Developing, with Government, greater expertise in assessing the impacts of pollutants on human health and the natural environment.
- Using the National Atmospheric Emissions Inventory for the assessment, with Government and local authorities, of source attribution at a regional and national scale, leading to:
 - Increasing awareness of the importance of releases and impacts from Agency controlled processes in relation to those from other sources.

Policies and strategies

- Development of policies on targeting regulation based on environmental objectives, set against costs to business.
- Develop and adopt integrated policy appraisal techniques, covering environmental, social and economic costs and benefits, to inform our consultative decision making processes.

Monitoring and reporting

- Reporting on releases to air from Agency controlled processes in relation to releases from other sources through the National Atmospheric Emissions Inventory.
- Increased environmental monitoring by operators.
- Working with Government in its development of:
 - a terrestrial monitoring programme.
 - improved indicators of air quality.
 - an air quality communications strategy.

Knowledge

- Inputting to Government's development of objectives and criteria for air quality impacts to human health and the environment.
- Working with Government to agree a process whereby interim health and environmental criteria can be established for a wider range of air pollutants than currently available.

- Improved Agency understanding of atmospheric processes on local and national scale, based on and consistent with DEFRA models.
- Contribution of information on Agency controlled sources to the development of databases, such as the NAEI on emissions and impacts from all sources of air pollution.
- Better information systems.

Influencing and education

- Working with Government to raise public awareness of air quality issues.
- Working with other regulators such as local authorities, and organisations such as the Highways Agency, to achieve cost effective reductions in all sources of air pollution.
- Helping to improve public awareness of the impact of Agency controlled processes in relation to releases from other sources.

New and Revised Regulations

- Working with Government to develop measures to reduce air pollution.
- Working with other international and European institutions to develop air pollution control measures.

The Planning System

- Working with Government on revised planning guidance.
- Working with strategic and local planning authorities to achieve sustainable local air quality.

TABLE 1: Regional variation in pressures and the state of the atmosphere¹

Environmental quality measure	Anglian East	Midland West	North	North West	Southern	South	Thames	Wales
Urban air pollution*	L	M	M	M	L	L	H	H
Air quality (nitrogen oxides)	M	M	M	H	M	L	H	L
Regional air quality (sulphur dioxide)	L	M	M	H	M	L	H	M
Emissions from transport	M	H	M	M	L	L	H	L
Emissions of CO ₂ from Part A processes	M	H	H	M	M	L	L	M
Nitrogen deposition (critical load exceedance for natural vegetation)	M	L	M	M	M	H	L	H
Soils (exceedance of acidity critical loads)	M	L	M	H	L	M	L	H
Ground-level ozone	M	M	L	L	H	H	M	M
Aesthetic quality	M	M	M	M	H	L	H	L

KEY

This has been based on selecting the two Regions with the greatest breaches of standards, poorest quality or highest loadings and ranking these as H – highly impacted; the two Regions with the best quality or lowest loadings are ranked as L – least impacted. The other Regions are ranked M – moderate (where the impacts are about equal, more than two Regions may be designated H or L).

* Applicable to specific urban areas.

Source: Environment Agency (2000) *Environment 2000 and Beyond*.

TABLE 2: Summary of the state of the atmosphere and key impacts

Viewpoint	State and trends
<p>Compliance with standards, targets and classification schemes</p>	<p>Urban air quality: In 1999 the main causes of short-term urban air pollution, which occurred on one day in 12 on average, were particles (PM10) and ozone. About half the urban sites also exceeded the annual objective for nitrogen dioxide. There have been declines in concentrations of sulphur dioxide since the 1960s, of carbon monoxide since 1990, particles since 1993 and nitrogen dioxide since 1995, but no clear trend in ozone. Improvements are projected to continue but particles and ozone may still exceed health standards in some areas in 2010.</p> <p>Rural air quality: In rural areas ozone exceeded the health standard on an average of about one day in 8 in 1999, and critical levels of ozone for crops and natural vegetation are widely exceeded. Exceedances of critical levels for sulphur dioxide and nitrogen oxides should be eliminated in the next few years.</p> <p>Persistent organic pollutants: Levels of dioxins and PCBs in air and deposition have fallen since the early 1970s and human intake in food is generally within present recommended limits. PAH concentrations in air have also fallen but concentrations in urban areas in 1997 were two or three times the health-based standard, although values were generally below the standard at rural sites. The soil burden of persistent organic pollutants will decline only gradually and their health effects are not well understood.</p> <p>Metals: Deposition of heavy metals is greater near industrial and urban areas and in regions of high rainfall. The effects on crops, ecosystems and humans are poorly understood.</p> <p>Airborne radioactivity: Concentrations in air and deposition are very low. The average human dose from artificial sources, excluding medical procedures, is less than one per cent of the total, and human exposure near nuclear sites is well within recommended limits. Restrictions on sheep contaminated by the 1986 Chernobyl accident were still in place on 389 farm holdings in 1998. Levels of natural radon are above the advice threshold in some 110,000 homes in England and Wales.</p> <p>Sulphur and nitrogen deposition: Sulphur and nitrogen deposition exceeds critical loads of acidity over a significant area of the UK. International agreements are likely to lead to significant reductions in emissions of sulphur and nitrogen by 2010, however, critical loads in parts of Wales, Cumbria and the Pennines will still be exceeded. Nutrient nitrogen exceeds critical loads in many regions. The input of nitrogen into the atmosphere may be significant for remote marine areas, increasing the risk of eutrophication.</p>
<p>Human and environmental health</p>	<p>Human health: Air pollution can lead to serious short and long-term effects, particularly for sensitive groups. Particles, sulphur dioxide and ozone may bring forward 12,000 to 24,000 deaths and 15,000 to 24,000 hospital admissions annually. Personal exposure and the effects of pollution relative to other factors are not well quantified.</p> <p>Health of the environment: The effects of air pollution are difficult to separate from those of other pressures. For example, the UK forest survey of changes in crown condition shows variations related to the effects of insects, fungi, storms, frost and drought, while air pollution is thought to have a comparatively minor influence. For other species and habitats, land management is another major influence on ecosystems that interacts with air pollution.</p>

TABLE 2: Summary of the state of the atmosphere and key impacts *continued*

Aesthetic quality	<p>Odours: Industrial odours gave rise to over 15,000 complaints to local authorities in England and Wales in 1996/97, an improvement on previous years.</p> <p>Soiling: Particles from stack emissions, site activity, mineral workings and traffic soil local property, although they are being reduced.</p> <p>Visible air pollution: Visible stack plumes often lead to complaints. Long-range visibility has improved since the 1960s as fine particles and sulphate aerosols have been reduced.</p> <p>Light pollution: Intrusive light from roads and buildings spoils the night sky and potentially affects moths, birds and other species.</p> <p>Noise pollution: In 1991 road traffic was heard inside the home by 47 per cent of those surveyed in England and Wales, of whom almost 70 per cent objected to it. Only 56 per cent of England is now classed as tranquil, compared with 71 per cent in the 1960s.</p>
Land use and resources	<p>Stratospheric ozone: Total halogen loading peaked in the 1990s and should decline steadily. The ozone column has declined slightly across the UK over the past 20 years although there is no clear trend in UVB. There are potential risks but little evidence of increased human skin cancers, ecological effects and changes to atmospheric chemistry. The ozone layer is projected to recover substantially by 2050 although uncertainties remain.</p> <p>The effects of air pollution on materials: Ground-level ozone damage to rubber products costs £35 million–£189 million/year in the UK.</p> <p>Acidic air pollutants erode limestone and sandstone building materials; the damage from sulphur dioxide, excluding historic buildings, is around £800 million/year, projected to decline to £450 million/year over the next five years, although the rate of erosion is declining more slowly than pollutant concentrations.</p> <p>Particle pollution from coal and diesel soils buildings, although this has reduced over the past 30 years.</p>
Key biological populations	<p>Toxic effects of air quality: There are few examples of population responses to poor air quality. Sulphur dioxide eradicated sensitive lichens in much of England from the mid-19th century onwards, although some species have started to recolonise.</p> <p>Acidification and nitrogen deposition impacts: Acidification led to declines of mosses, liverworts and lichens and also freshwater species including salmon, trout, invertebrates and dippers. High nitrogen deposition causes eutrophication, which has probably damaged mosses in the southern Pennines and may lead to the replacement of heather by grassland. As deposition reduces, affected ecosystems may recover only slowly and may not return to their former state.</p>

Source: Environment Agency 2000, *The State of the Environment of England and Wales: The Atmosphere*.

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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

Improved and protected inland and coastal waters

JULY 2001



ENVIRONMENT
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A FRAMEWORK FOR CHANGE

Improved and protected inland and coastal waters

JULY 2001

Improved and protected inland and coastal waters

“Clean rivers are not only a vital source of water for drinking and industry, they also support a wide variety of wildlife and are enjoyed by millions for recreation. That is why river water quality is one of the Government’s 15 sustainable development headline indicators, measuring how much our quality of life is improving.”

MICHAEL MEACHER,
ENVIRONMENT MINISTER SEPTEMBER 2000

1. Why a Framework for Change?

The Environment Agency’s vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency’s Contribution to Sustainable Development* (the *Vision*)¹. This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision*’s nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency’s service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions,

¹ The Environmental Vision, and Frameworks for Change is available on the Agency’s website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Improved and protected inland and coastal waters

Clean waters with thriving wildlife help guarantee the health and safety of the water supplied to homes, the water used to produce food, and the waters valued for recreation. The appearance, quality and value of waters can be damaged by how land is used. Rainfall washes over the land and into rivers and underground waters and can carry with it chemicals added to soils or plants and contamination from existing or previous industrial activities. Much of the water that disappears underground eventually enters rivers. Rivers, estuaries and the sea also receive the treated wastewater collected from homes and businesses.

In England and Wales about two thirds of the public water supply comes from rivers and reservoirs. The rest is taken directly from wells and boreholes which tap the rainfall stored in underground rocks. In the south and east the pressure on water resources is greatest in terms of the amounts used in homes, industry and agriculture.

The use of land can produce short and long-term risks to wildlife, recreation and the quality and quantity of water supplies. So can abstractions. Most of these risks increase at time of drought. It is particularly important to protect underground waters. Once polluted, these vital resources can be extremely difficult to put right.

Environmental pressures on inland and coastal and underground waters vary from region to region. A comparison is shown in Table 1 (page 17).

3. The Environment Agency's role

The Environment Agency licences abstractions from and discharges to water and also has a range of powers and duties for water resources management, conservation, recreation, navigation, fisheries and the control of pollution. We are responsible for implementing Government policy on 15 European Directives on water. We help develop national policy for the environment and the use of natural resources.

The Agency regulates the abstractions of water through 48,000 licences. We plan the future use of water resources so as to balance the needs for water supplies to homes, industry and agriculture alongside those of fisheries, recreation and navigation, water quality and conservation. During droughts we co-ordinate action to ensure that essential needs are met and the environment protected.

As a navigation authority we manage a number of rivers and harbours for recreational and commercial boating. Through our work on recreation we promote the sustainable enjoyment of water by all sectors of the community.

We monitor the quality of discharges from more than 7,000 sewage treatment works and 5,000 trade discharges; and monitor the condition of freshwater, groundwater and tidal waters. We publish regular reports on the state of the water environment; Table 2 (page 18) is a summary. We investigate pollution incidents and bring prosecutions against those who have caused incidents or break the conditions in their permits.

We have responsibilities for the conservation and management of all freshwater fisheries. This includes the sustainable development of fisheries and the promotion of fishing.

On the global scale the second World Water Forum highlighted in 2000 the issues of urbanisation and the need for research into water recycling, the need to make polluters pay for the damage they cause, the empowerment of people to manage their water resources, the need to know more about underground resources, and the impact of food production as a contributor to water stress. These concerns, and others like the threats to the oceans from dumping wastes and over-fishing, and the global loss of species and habitats, come through in the European and national drivers that direct the Agency's actions. The principle that the polluters pay for the damage they cause is well established in the UK. The opportunities for public involvement are extensive and increasing.

The proposed Sixth Environment Action Programme of the European Community for 2001 to 2010 reminds us that there are 30,000 chemicals currently in use and states the need for a reliable way to assess and reduce their impact on human health. It notes that pesticides used in agriculture require special attention, especially to stop them contaminating underground water used for drinking water. It reports that coastal bathing waters and drinking water are cleaner than they used to be and asserts that our water resources must be used in a sustainable way.

Policy drivers

Among the key national and international drivers that will influence our actions over the period of this *Framework* are:

- **European drivers:** The proposed Sixth Environment Action Programme of the European Community 2001–2010; the Directives on Urban Waste Water Treatment, Bathing Waters, Groundwater, Nitrate Pollution by Agriculture, Shellfish Waters, Shellfish Hygiene, Freshwater Fish, Surface Water Abstracted for Drinking, Drinking Water, Dangerous Substances, Habitats, Water Framework, Waste Framework, Sewage Sludge and Integrated Pollution Prevention and Control. There are also other international agreements to protect marine waters, for example, the Oslo and Paris Commission.

- **National and regional drivers:** Government targets for sustainable development and water quality, the reviews by the Director General of Water Services on the prices charged by water companies and the associated environmental investment programmes; the national strategy of the Association of Inland Navigation Authorities; the UK Biodiversity Action Plans; the Government's response to the Salmon and Freshwater Fisheries Review; the water resource plans and drought plans of water companies; changes to abstraction licensing proposed in the draft Water Bill; other initiatives agreed with the Government for improving the abstraction licensing system, the Government's commitment to realising the potential of inland waterways described in *Waterways for Tomorrow*; strategies agreed with Government, for example on water resources, conservation, chemicals, the control of eutrophication and the protection of groundwater. National and regional initiatives for housing, infrastructure, land-use, navigation and recreation.

4. Working in partnership

The Environment Agency works closely with, and provides support to, the Department for Environment, Food & Rural Affairs (DEFRA) and the National Assembly for Wales (NAW). We also maintain links with the Department of Transport, Local Government and the Regions (DTLR) on planning issues.

We work with industry, especially the water industry and agriculture, and with other regulators like the Office of Water Services (OFWAT). Much of our work requires effective liaison with English Nature, the Countryside Council for Wales, British Waterways, Sport England, the Countryside Agency, local authorities, planning authorities, and local groups and interests.

In delivering this *Framework*, we will seek to build on and expand these partnerships, particularly through Local Environment Agency Plans (LEAPs), Catchment Abstraction Plans (CAMs), Eutrophication Control Action Plans (ECAPs), Fisheries Action Plans (FAPs) and the river basin plans required for the Water Framework Directive.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to inland and coastal waters is that:

Our rivers, lakes, underground waters and coastal waters will be far cleaner. They will sustain diverse and healthy ecosystems, water sports and recreation (including boating and fishing) and those uses needed by a thriving and healthy community.

This *Framework* has strong links with others in the series. Many of the mechanisms by which the water environment will be improved are addressed through the themes of *A 'greener' business world* and *Wiser, sustainable use of natural resources*. *An improved state of inland and coastal waters* will in turn help deliver our aspirations to improve the quality of life and enhance wildlife. Much of the *Framework* on *Reducing flood risk* is also relevant.

The *Vision* and long-term objectives will help achieve these outcomes:

- Abstractions and discharges will neither damage the environment nor threaten human health.
- Damaging pollution incidents will have been prevented at source.
- The causes of water pollution, eutrophication, and acidification will have been fully controlled.

- The quantities of chemicals entering the sea will have been greatly reduced.
- Surface waters will sustain a diverse variety of habitats and wildlife.
- Water will be acknowledged as a valuable resource.
- Surface waters will be regarded as a recreational and amenity asset.
- Inland and coastal waters will be cherished by local communities.

We will seek to achieve these outcomes in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the Vision. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

³ DETR (1999) *Quality of Life Counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment.*

⁴ Environment Agency (July 2000) *Environmental Indicators.* A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Impact of abstractions and discharges

Outcome 1 – Abstractions and discharges will not damage the environment, nor threaten human health.

Tests for progress:

- Water quality and compliance with River Quality Objectives and the mandatory and guideline standards from EC Directives.
- Further urban renewal following improvements to river quality.
- Numbers of Blue Flag beaches.
- Improved shellfish waters.
- Improved quality of underground waters.
- Completion to time of the 7,000 schemes in the 2000 – 2005 water industry investment programme.
- Numbers of Catchment Abstraction Management Strategies established and agreed.
- Numbers of abstractions identified as damaging the environment, and resolved.
- Compliance with relevant conservation objectives set for Special Protection Areas (SPAs) and Special Areas for Conservation (SACs) by English Nature and the Countryside Council for Wales under the Habitats and Birds Directives.
- Compliance with ecological targets developed for the EC Water Framework Directive.
- Compliance with future biological targets for rivers.
- Compliance with permit conditions for discharges to water.

GOAL	ACTIVITY
Goal 1.1 Improved quality and more sustainable use of rivers, lakes, underground waters, estuaries and coastal waters.	Short to medium term: <ul style="list-style-type: none"> • Ensure full implementation of 2000 – 2005 Water Industry investment programme. • Set all the permits. • Maintain and refine the quality and quantity monitoring arrangements necessary to inform targeting and achievement of this goal. • Agree priorities for the 2005 – 2010 Water Industry investment programme with Government, OFWAT, water companies, the Countryside Council for Wales, English Nature, and others, taking account of the views of customers and other stakeholders. • Agree arrangements with OFWAT and the Government for any funding of action needed before AMP4 (2002–2005). • Ensure all IPPC authorisations take proper account of the potential of the processes to cause affect water quality and future plans for improved water quality.
	Medium term: <ul style="list-style-type: none"> • Help implement the EC Water Framework Directive in liaison with the Scottish Environment Protection Agency, the Government, English Nature, the Countryside Council for Wales, local authorities and planning authorities, and others. • Work with the farming industry and others to tackle diffuse pollution, especially where bathing waters, shellfish waters or River Quality Objectives are threatened. • Identify the environmental pressures on river basins, coastal waters and underground waters by 2004 (as required by the Water Framework Directive).

Impact of abstractions and discharges *continued*

	<ul style="list-style-type: none"> • Establish and implement improvement programmes with associated targets including action to improve Bathing Waters and the Government's target to eliminate by 2005 at least half of the 1997 shortfall in compliance with River Quality Objectives. • Use River Basin Plans to consult people about proposed improvements to waters.
Goal 1.2 National and Regional Water Resources Strategies and Catchment Abstraction Management Strategies in place.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Implement or facilitate required actions in the National Water Resources Strategy and eight Regional Strategies. • Ensure that water resource strategies provide a secure framework for the management of water that protects the long term future of the water environment while encouraging sustainable development within which all parties can work together. <p>• Develop Catchment Abstraction Management Strategies (CAMS) as a mechanism for providing information about water resource availability in each catchment, with the water industry, local authorities and planning authorities, English Nature, the Countryside Council for Wales, British Waterways and local people.</p> <p>Medium term:</p> <ul style="list-style-type: none"> • Ensure CAMS provide for adequate freshwater flows from rivers into estuaries. • Co-ordinate production of CAMS with work on the EC Water Framework Directive. • Ensure CAMS are compatibility with policies on housing.
Goal 1.3 No abstractions cause environmental damage.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Identify damaging abstractions and implement a Government-agreed programme for their curtailment, seeking voluntary solutions where possible. • Agree with Government and implement a framework with timetable for changing abstraction licences to a sustainable basis.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Pollution incidents

Outcome 2 – Damaging pollution incidents will have been prevented at source.

Tests for progress:

- Numbers and severity of pollution incidents.
- Water quality.

GOAL	ACTIVITY
Goal 2.1 Pollution incidents are a rare event.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work to secure more prosecutions following pollution incidents. • Continue to raise the profile of prosecutions and success in pollution prevention. • Use pollution incident information as the basis for proactive pollution prevention campaigns. • Work with the Coal Authority and others to monitor and minimise the risks of pollution from old mine workings.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Pollution, eutrophication and acidification

Outcome 3 – The causes of pollution, eutrophication and acidification will have been fully controlled.

Tests for progress:

- Water quality.
- Further urban renewal following improvements to river quality.
- Compliance with permit conditions for discharges to water.
- Pollution load.
- Numbers of confirmed cases of blue-green algae.

GOAL	ACTIVITY
Goal 3.1 Risks of harm to people, damage to wildlife, impairment of water supplies, and interference with amenity have been reduced.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Implement the Agency's Eutrophication Strategy by working with industry and agriculture to reduce nutrient inputs to rivers and coastal waters and introducing local Eutrophication Control Action Plans (ECAPs) in partnership with local water users and local interests. • Implement the Agency's Chemicals Strategy: establish priority chemicals having an impact on water quality, identify sources (point and diffuse) and develop cost-effective reduction programmes for priority chemicals. • Establish water quality standards for priority chemicals in conjunction with stakeholders, the Government and the EU. • Support DEFRA chemicals stakeholders forum. • Work with Government, industry and consumers in the development of integrated product policy to control releases of chemicals to the water environment. • Work with Government to protect surface and underground waters by identifying and designating Sensitive Areas under the Urban Waste Water Treatment Directive and Nitrate Vulnerable Zones. • Implement Government requirements for any "eutrophication problem areas" that arise under Oslo and Paris Convention.
Goal 3.2 Underground waters are protected from contamination.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work with Government to identify and designate additional nitrate vulnerable zones. • Implement the measures for underground waters that will follow from the Water Framework Directive. • Liaise with local authorities and others on planning and development to protect underground waters. • Ensure all IPPC authorisations take proper account of the potential of the processes to cause deterioration to water quality and affect other plans requiring improvement and protection of underground waters.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Chemicals entering the sea

Outcome 4 – The quantities of chemicals entering the sea will have been greatly reduced.

Tests for progress:

- Water quality.
- Chemical loads entering the sea.

GOAL	ACTIVITY
Goal 4.1 Reduced quantities of chemical entering the sea.	<p>Medium term:</p> <ul style="list-style-type: none"> • Continue to implement the Dangerous Substances Directive. • Prepare to implement the Priority Substance requirements for the Water Framework Directive. • Make progress towards international agreements to “move towards the target of cessation of discharges, emissions and losses of hazardous substances by the year 2020”.

Wildlife and habitats

Outcome 5 – Surface waters will sustain a diverse variety of habitats and wildlife.

Tests for progress:

- Compliance with relevant conservation objectives set for Special Protection Areas (SPAs) and Special Areas for Conservation (SACs) by English Nature and the Countryside Council for Wales under the Habitats and Birds Directives.
- Achievement of relevant UK Biodiversity Action Plan (UK BAP) species and habitats targets.
- Status of UK BAP priority species and habitats.
- Compliance with ecological objectives required by the EC Water Framework Directive.

GOAL	ACTIVITY
Goal 5.1 Special wildlife and habitats that could be put at risk through human activities in the catchments of rivers, lakes and reservoirs, underground waters and coastal waters are protected.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Complete the review of existing consents and licences affecting high priority SPAs and SACs. • Ensure that all new permits take account of the potential impacts on SPAs and SACs. <p>Medium term:</p> <ul style="list-style-type: none"> • Complete the review of existing consents and licences affecting other SPAs and SACs.
Goal 5.2 Improved habitats and wildlife.	<p>Medium term:</p> <ul style="list-style-type: none"> • Use consents and licences to help deliver the targets for the United Kingdom's Biodiversity Action Plan. • Target action for rivers through future Biological Quality Objectives. • Tackle diffuse pollution.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Water as a valuable resource**Outcome 6 – Water will be acknowledged to be a valuable resource.****Tests for progress:**

- Degree of acceptance by people of the need to reduce consumption.
- Water company water resource and drought management plans in place and regularly reviewed.
- Achievement of leakage reduction targets.
- Evidence of demand reduction.
- National and regional water resources strategies in place and regularly reviewed.

GOAL	ACTIVITY
Goal 6.1 All water companies have water resource plans and drought management plans that are agreed by the Agency.	Short to medium term: <ul style="list-style-type: none"> • Advise water companies on water needs forecasting developments. • Ensure water company resource and drought management plans contain appropriate leakage targets and demand management measures.
Goal 6.2 Water used efficiently.	Short to medium term: <ul style="list-style-type: none"> • Promote, with Government, industry, agriculture, local authorities, planning authorities and developers, the full range of demand management measures in planning guidance and building regulations.
Goal 6.3 More re-use of water.	Short to medium term: <ul style="list-style-type: none"> • Define, agree and implement with dischargers, abstractors and water users policies that encourage more use of wastewater, having full regard to water quality issues and maintaining adequate flows in rivers.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Recreation and amenity**Outcome 7 – Surface waters will be regarded as a recreational and amenity asset.****Tests for progress:**

- What people tell us about their local waters.
- Numbers of completed recreation, navigation and fisheries development projects.
- The tests listed for other outcomes for the reduction of pollution, the achievement of targets for water quality, and reducing the impacts of abstractions.

GOAL	ACTIVITY
Goal 7.1 Improved and developed Agency's navigations.	Short to medium term: <ul style="list-style-type: none"> • Review and develop the programme of work to maintain, improve and promote navigation, as part of waterway development plans. • Implement the national strategy of the Association of Inland Navigation Authorities (now adopted as Agency strategy). • Work in partnership with British Waterways on areas of mutual benefit. • Clarify sources of alternative funds, and then use them to support investment in the Agency's navigations.
Goal 7.2 The statutory Code of practice on conservation, access and recreation implemented.	Short to medium term: <ul style="list-style-type: none"> • Develop recreation work to the standards and guidance in the code.
Goal 7.3 Regional strategies for recreation are in place that make use of the full potential of waters.	Short to medium term: <ul style="list-style-type: none"> • Deliver our recreation work through dedicated skilled staff and resources at a local level. • In partnership with others, implement, review, publicise, consult and update regional strategies. • Explore opportunities to open up land and water for recreation and report on new facilities thereby created.
Goal 7.4 Develop new fisheries, particularly in urban areas.	Short to medium term <ul style="list-style-type: none"> • Work in partnership with angling governing bodies, angling clubs and local authorities to identify potential fisheries developments. • Clarify funding sources for fisheries developments. • Incorporate fisheries developments into Fisheries Action Plans.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Local communities**Outcome 8 – Inland and coastal waters will be cherished by local communities.****Tests for progress:**

- What people tell us about their local waters.
- Numbers of urban redevelopment schemes making a positive feature of waterways.
- The tests listed for other outcomes for the reduction of pollution, the achievement of targets for water quality, and reducing the impacts of abstractions.

GOAL	ACTIVITY
Goal 8.1 Transparent, fit for purpose monitoring programmes and information dissemination.	Short to medium term: <ul style="list-style-type: none"> • Annually review and update monitoring programmes. • Use technological developments to obtain information and make it available to the public. • Use biological information to help show where improvements need to be made. • Include a high proportion of discharges to water in the Pollution Inventory. • Undertake surveys to establish how people value inland and coastal waters.
Goal 8.2 Waterways will feature as a focus of urban redevelopment.	<ul style="list-style-type: none"> • Work with others to assess and develop opportunities.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

7. Research and development

To support our plans we will work with others on programmes to:

- Produce risk-based water quality standards.
- Derive an increased range of biological indicators to help pick up impacts from intermittent pollution or unforeseen risks, or to help demonstrate their absence.
- Improve our knowledge of:
 - land use and the risk of contamination of Bathing Waters, Shellfish Waters, rivers and underground waters.
 - the impact of underground waters on the flow and quality of rivers.
 - the impacts of rivers on estuaries and water quality at beaches and shellfisheries.
 - the causes and control of eutrophication.
 - the potential risks posed by chemicals, bacteria and viruses on wildlife and the use of water.
 - the supply and demand for water-based recreation.
 - the impacts on waterways of recreation.
 - the value of recreation to the community.
- Decide action on sites where an impact appears to have a number of causes.
- Agree action in the face of uncertainty in the science.
- Transform data into information and improve our ability to detect impacts and trend.

- Assess options for the treatment of wastewater.
- Develop further opportunities to recycle used water.
- Investigate further the treatment of sea water for use as a water resource.
- Further assess the impact of climate change on water quantity, water quality and the behaviour of species.
- Improve our understanding of the impact of changes in land use such as forestry and cultivation, on the water available in catchments.
- Provide information so that we can influence how water is used.

8. Implications for the Environment Agency

We are well placed to achieve a significant portion of our goals through our powers for licensing abstractions and discharges and implementing directives. In some cases, new or modified duties or powers may be necessary, for example, as required by the Water Framework Directive.

We will continue to regulate in a firm but fair manner in order to maintain basic standards in environmental performance and to bring about improvements. We will ensure that administrative and bureaucratic aspects are minimised. We will target our resources on those sites and operators presenting the greatest environmental risks. Other goals depend more critically on influencing others. We plan to undertake organisational change, for example, to help us work more effectively with industry and the users of waterways.

Successful delivery of our outcomes will require:

Expertise and Awareness

- Better developed skills in the communication of issues to the community.
- Greater expertise in assessing the risks associated with pollutants and in developing cost-effective proportionate responses.
- Better techniques for assessing the recharge rates for underground waters.
- Improved awareness of tools for the assessment of costs and benefits.
- Techniques to take account of uncertainty when making decisions.
- Effective promotion of the waterways we manage.

Policies and strategies

- Consultation on and promotion of our strategies on, for example: water resources; eutrophication; chemicals; and water quality standards.

Monitoring and reporting

- Better indicators of the state of inland and coastal waters.
- Better indicators of the impact of flow regimes on the health of rivers.
- Better reporting on the relative environmental impact of sectors.
- Better comparisons between EU Member States.
- Improved indicators on the impact of land use on rivers and underground waters.

Knowledge

- Improved understanding of the following issues, and how they affect inland and coastal waters, their wildlife, fisheries and the uses they support:
 - changes to river flows.
 - effluent discharges.
 - the relationships between groundwater use and rivers and wetlands.
 - the relationship between water quality in rivers and in estuaries and coastal waters.

- Society's use of chemicals.
- Bacteria and viruses.
- The management of agricultural land.
- Urban drainage.
- The value of waterways to local communities.
- The impact of climate change.
- The impact of changes in land use.

Influencing and education

- Lead society to a full understanding of its impacts on the water environment and how harmful impacts can be overcome.
- Influence European legislation and its application in England and Wales.
- Raise public awareness about the value of water and the need to use it wisely.
- Promote the understanding, appreciation and enjoyment of the water environment.

New and revised regulations

- Work with Government to develop new regulations on the remediation of contaminated land.
- Work with Government on new regulations and guidance for the implementation of EC Directives, including the Water Framework and Dangerous Substances Directives.

The planning system

- Influence decisions on development, including regional plans and housing.
- Work with planning authorities on the achievement of the sustainable use of water.

TABLE 1: Regional variation in pressures on and the state of inland and coastal waters

Issue	Anglian	Midland	North East	North West	Southern	South West	Thames	Wales
Public water supply demands and availability	M	H	L	M	M	M	H	L
Lack of scope to develop new water resources	H	H	M	M	H	H	H	M
Impacts of abstractions on wildlife	H	H	M	M	H	H	M	M
Navigation	H	H	M	M	M	M	H	L
Use and demand for recreation	H	M	M	H	M	M	M	M
Tackling poor quality underground waters	H	M	L	L	H	L	H	L
River quality (chemical)	H	M	M	H	M	L	M	L
River quality (biological)	M	M	H	H	M	L	M	L
River quality (nutrients)	H	M	M	L	M	M	H	L
Quality of bathing waters	M	L	M	H	M	H	L	M
Achievement of river quality targets	H	M	H	M	M	L	M	L
Nutrient loads to sea	L	M	M	H	L	M	H	M
Metal loads to sea	M	M	H	H	L	M	L	M
Pesticide loads discharged to the sea	L	H	M	H	L	M	M	M
Pollution incidents	M	H	M	M	L	H	L	M

KEY

This has been based on selecting the two Regions with the greatest breaches of standards, poorest quality or highest loads and ranking these as H - highly impacted; the two Regions with the best quality or lowest loads are ranked as L - least impacted. The other Regions are ranked M - moderate (where the impacts are about equal, more than two Regions may be designated H or L).

Sources: Environment Agency (2000) *Environment 2000 and Beyond*.
Environment Agency (2000) *Environmental indicators*.

TABLE 2: Summary of trends in inland and coastal waters

Viewpoint	State and trends
Land and water resources	<p>Water resources: The natural water stock is 77,000 Mm³/year on average. This amounts to 4,000 litres per person per day on average, which is low by European standards due to the population density. Most of us take water supplies for granted except at times of drought. The amount used for drinking water and by agriculture is stable at present but the total abstracted from rivers and underground waters has reduced by 16 per cent since 1971 because of less use by industry.</p> <p>Stored water is essential to supplies. The total usable reservoir volume is 1,560 million cubic metres and aquifers store much more. The impact of climate change on the frequency and severity of droughts is uncertain and may affect the reliable supply from resources. Increasing quantities of water are re-used indirectly.</p>
Key biological populations	<p>Habitats: Some 42 per cent of river habitats are extensively modified. Less than 15 per cent of lowland rivers still retain a semi-natural state. There are clear regional differences; modification is greatest in the east and least in Wales. Flood defence works in the past have affected river habitats. Hard defences along the coast have led to the loss of estuarine habitats.</p> <p>Aquatic plants: Relatively rich although 20 to 33 per cent of flora species have become extinct locally in past 150 years and 50 per cent have declined. An increase in exotic species.</p> <p>Macroinvertebrates: Some 76 families found in 1995. Biological water quality improved in the 1990s, although almost 20 per cent of rivers in some regions were still poor or bad biologically.</p> <p>SSSIs: In 1999 nearly 200 Sites of Special Scientific Interest were noted as needing investigation or re-mediation because of risks from over-abstraction and low water levels. Over 100 wetlands and other sites at risk from water company discharges or abstraction are the subject of remedial schemes incorporated in the Ofwat water price determinations for 2000 – 2004.</p> <p>Fish populations: Most rivers have good fish populations including many that were devoid of life 40 years ago, although salmon stocks have declined in some of the traditionally good salmon rivers. The loss of brown trout continues.</p> <p>Mammals: Otters have returned to many catchments since 1970s but water voles have declined.</p>
Compliance with standards and targets	<p>River water quality: 18 per cent of river length failed in 1997 to meet the River Quality Objectives (RQOs). The Government has set a target to achieve at least 91% compliance for 2005. In 1999, almost 87% of rivers met their RQOs. Almost 92% of rivers are of good or fair quality. There has been a net improvement in chemical quality of rivers of 31% in the period 1990-1999.</p> <p>Some 15 per cent of river sites and 34 per cent of coastal sites exceeded pesticide standards in 1998. Some waters that are abstracted for drinking water exceed standards for nitrate, and concentrations are still rising in some ground waters.</p> <p>Run-off from land is a threat to some rivers and bathing waters. Pollution by soil washed off farms is a particular risk to some spawning beds of salmon. Growth in transport poses an increasing risk of pollution through run-off from roads. About 5 per cent of waters face a risk of pollution from abandoned mines.</p>

TABLE 2: Summary of trends in inland and coastal waters *continued*

	<p>Coastal waters: About 5 per cent of bathing waters failed the main mandatory standards in 2000 compared with 24 per cent in 1988 (about half failed the stricter guideline standards in 2000). About a quarter of shellfish waters need improving to meet targets. Loads of metals discharged to the sea have reduced substantially since the 1980s.</p> <p>Overall, trends in water quality are encouraging. There were large reductions in pollution from industry and sewage treatment works in the 1990s. Phosphorus inputs from detergents and sewage works have reduced by 40 per cent. Pollution from land use and via the atmosphere especially nitrogen is becoming relatively more important as the discharges from the treatment works and industrial sectors have been cleaned up.</p> <p>Water pollution incidents: are declining but in 1999 there were still nearly 14,500 substantiated incidents, most of which were due to industry (including the water industry). Some 92 incidents had major impacts on wildlife, water supplies or amenity.</p> <p>Oil pollution: Ships illegally release between 15 and 60 thousands of tonnes of oil per year into the North sea. The number of major spills has declined but the Sea Empress accident in 1996 killed 7,000 birds and harmed marine life and the local economy.</p>
Human and environmental health	<p>Nutrient enrichment: Many standing fresh waters and some rivers and estuaries are affected by eutrophication, including sites of high wildlife conservation value. Algal blooms affect many waters including sites used for recreation. The greatest problems are in the south and east. Five estuaries, 62 rivers and 13 lakes and reservoirs are designated as "eutrophic sensitive areas" under the EC Directive on Urban Waste Water Treatment.</p> <p>Some 600,000 hectares have been designated as 'nitrate vulnerable zones' where rivers and aquifers exceed or have the potential to exceed nitrate standards.</p> <p>Acidification: Areas where acidity of waters is naturally low are most affected – Wales, Pennines, Cumbria, and the south west. In Wales over five per cent of Sites of Special Scientific Interest are affected. The main causes have been tackled but recovery is slow.</p> <p>Animal health: Evidence of hormone-disruption in some fish emerged in 1990s but the impact on populations is still unknown. The effect of tributyl tin on molluscs, causing females to become infertile, was established in 1980s.</p> <p>Some eels exceed standards for HCH, dieldrin and PCBs. Pollutants tend to accumulate in estuaries – metal contamination is associated with historically polluted estuaries.</p>
Aesthetic quality	<p>Some 34 per cent of rivers were of poor or bad aesthetic quality in a survey of Midlands rivers in 1995. Some rivers have suffered discoloration from minewaters or industrial discharges and some suffer from fly-tipped rubbish. But 85 per cent of unsatisfactory Combined Sewer Overflows will be dealt with under the water industry's investment programme for 2000–2005.</p>

Sources: Environment Agency (1998) *The state of the environment of England and Wales: fresh waters*.
Environment Agency (1999) *The state of the environment of England and Wales: coasts*.
Environment Agency (2000) *Environment 2000 and beyond*.

A FRAMEWORK FOR CHANGE

Restored, protected land with healthier soils

JULY 2001



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AGENCY

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A FRAMEWORK FOR CHANGE

Restored, protected land with healthier soils

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Restored, protected land with healthier soils

“A nation’s capital is the health and
proper use of its land”

LORD LYTTLETON IN HIS ADDRESS TO
THE WORCESTERSHIRE AGRICULTURAL SOCIETY, 1872

1. Why a Framework for Change?

The Environment Agency’s vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency’s Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination – that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision*’s nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* – and the associated dialogue and business development that will flow from them – are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency’s service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government’s current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

¹ The Environmental Vision, and Frameworks for Change is available on the Agency’s website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Restored, protected land with healthier soils

The environmental importance of land tends to be poorly appreciated by society. Land is a finite resource and care is required to ensure that its potential is conserved and where possible enhanced. Society needs to appreciate better the environmental importance of appropriate land management for protection of soils and to avoid harm to water and air.

Land management

There are many aspects of land management that potentially can have a major impact on the environment – including land use planning, agriculture, land contamination, the spreading of wastes and sewage sludge, mineral extraction and the deposition of air pollution. Inappropriate land use or management can be detrimental to the health of soils, through, for example, a reduction in organic matter, reduced biological activity; and, through erosion, loss of the soil itself. Land use also impacts on water resources, through urbanisation, land drainage and afforestation, and soil management can affect the retention and infiltration of water. At the same time, a great number of different factors can impact on land and its management – ranging from its historical usage, through national and international legislative requirements to current Government policy.

Most land in the UK is privately owned and this has a significant bearing on the way it is managed. We need to ensure, therefore, that private land managers understand fully the impact of their actions and accept their responsibility to put right any damage they may cause.

The Common Agricultural Policy (CAP) has a major influence on land use in rural areas. The European Union is shifting the emphasis away from CAP payments linked to production towards measures aimed at helping the environment. Agricultural land use should be sustainable and should not cause permanent deterioration to soils or the landscape. There are many different types of soils in England and Wales but little is known about how their quality is changing, although a continued decline is indicated. A Code of Good Agricultural Practice (COGAP) for soil management has been published, but it has no statutory status and evidence shows it is not very widely adopted. Meanwhile, Government has prepared a draft soil strategy for England, following a recommendation by the Royal Commission on Environmental Pollution.

The health of soil can be considered to be its ability, based on its physical, chemical and biological status to perform the functions that it is required to perform to support current and likely future uses. Application of suitable organic wastes to land can help maintain and improve soil health, and avoid problems caused by their disposal by other means, for example incineration. However, applying contaminated or inappropriate wastes, or using inappropriate cultivation techniques, can have negative impacts.

On certain soils, the risk of soil erosion, surface water runoff and local flooding can be increased by inappropriate cultivation methods that damage soil structure. The risks are higher on sandy and chalk soils that are naturally free draining, so problems can be overcome by adoption of good agricultural practices.

Contaminated land

Current estimates put the number of contaminated land sites in England and Wales at somewhere between 5,000 and 20,000. Even at the lower end of this estimate, contaminated land would still cover an area greater than Manchester. Such sites can present unacceptable risks to human health, to surface and groundwater, ecosystems, buildings, crops and animals.

Most remediation of contaminated land currently occurs through development under planning regulations. However a new contaminated land regime (for dealing with contaminated land not being developed) was introduced in England in April 2000, under which remediation requirements are based on a "suitable for use" approach. Where possible, those responsible for contaminating land are also held responsible for funding the necessary clean-up. Arrangements for dealing with 'orphan' sites – where there is no responsible party is unclear – are also provided. The Pollution Prevention and Control Regulations, introduced in August 2000, oblige operators of permitted processes to take steps to prevent current land contamination and, where it does occur, to carry out remediation.

Urban land use

In its 1999 Report, the Urban Task Force advocated a design-led approach to urban regeneration. It highlighted the expanding 'footprint' of urban development and emphasised the need to avoid developments on 'greenfield' sites through the use, where possible, of derelict land and the cleaning up of existing contamination. Unfortunately, there is for the moment a geographic mismatch between the supply and the demand for 'brownfield' sites. Generally, environmental pressures on land vary from region to region as shown in table 1 (page 15).

3. The Environment Agency's role

The Environment Agency has a limited range of powers relating directly to land and soil protection. It has some powers relating to the spreading of industrial wastes and sewage sludge. Under the Pollution Prevention and Control Regulations, it will also have powers to prevent direct pollution of land by industrial activities, while greater influence over land management may be delivered by more focus on regional and national planning issues.

The Agency, together with local authorities, also has a key role in operating the Part IIA Contaminated Land Regime. It will prepare progress reports on implementation of the new regime and on the remediation and management of contaminated land. The Agency has an important out-reach role in dealing with contaminated land and encouraging best practice.

The Agency's role in flood defence requires it to understand the causes of flooding and to advise on appropriate risk management measures. Within this role, the Agency has to advise on the flood risk impact of both urban development and agricultural practices.

The Agency uses its technical understanding of soil and land issues to influence national environmental policy. We maintain a national leadership on the technical aspects of contaminated land management and have an increasing role as a source of soil expertise.

The State of the Land

The Agency has recently published a State of the Land report³. Generally, there is a lack of sufficient information on the state of the land environment to support national and regional policy decisions. Some information is collected but its scope is limited. Table 2 (page 16) provides a summary of the information available at present.

Policy drivers

Among the key national and international drivers that will influence our actions over the period of this *Framework* are:

- **European drivers:** The Common Agriculture Policy and Directives on: Integrated Pollution Prevention & Control (IPPC); Water Framework; Strategic Environmental Assessment; Environmental Impact Assessment; Landfill; Sewage Sludge; Nitrates; Habitats; and Birds. The Environmental Liability White Paper.
- **National and regional drivers:** England Soil Strategy, Wales Soil Strategy, Waste Strategy for England and Wales; Urban White Paper; Rural White Paper; and revised Planning Guidance.

4. Working in partnership

Wherever possible, the Agency will identify partners with common interests, with whom it can collaborate to maximise overall impact. We routinely work very closely with, and provide technical support to, the Department for Environment, Food & Rural Affairs (DEFRA) and to the National Assembly for Wales (NAW). We also maintain links with the Department of Transport, Local Government and the Regions (DTLR) on planning issues. Our activities are framed by, and help to implement a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the Department of Trade and Industry and NAW), its Urban and Rural White papers and Modernising Government and Better Regulation policies.

We have agreed a Memorandum of Understanding with the Local Government Association for work related to the contaminated land regime. Through our R&D programme, we are collaborating with the Soil Survey and Land Research Centre and the Centre for Ecology and Hydrology on soil quality monitoring. We have also joined the Land Use Policy Group – a collaborative forum of regulatory agencies concerned with the rural environment (including English Nature and the Countryside Council for Wales).

³ Environment Agency (2000) *State of the environment of England and Wales: the band*

We have strong relationships with the key stakeholders of both urban and rural land, including other regulators, industry representatives, researchers, consultants, technology providers and owners of land.

Effective dialogue has been established with the agricultural and forestry sector over a number of years at regional level, while liaison and partnerships with a range of key organisations – such as the National Farmers Union and Farmers Union of Wales – are being strengthened at a national level.

We also work with others to develop new and better technical methods for the assessment and treatment of land contamination, including the Soil and Groundwater Technology Association (SAGTA), Contaminated Land: Applications In the Real Environment (CLAIRE) and European initiatives.

In the longer term, we will further strengthen our partnerships with key players in the agricultural sector, and will continue to work closely with local government and key stakeholders on contaminated land issues.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to land is that:

Our land and soils in countryside and towns will be exposed far less to pollutants. They will support a wide range of uses, including production of healthy, nutritious food and other crops, without damaging wildlife or human health. Contaminated and damaged land will be restored and protected.

Many of the mechanisms by which land will be improved are addressed through the *Frameworks* covering A "greener" business world and *Wiser, sustainable use of natural resources*. Air pollution can impact on land, and land use can affect water quality and the rate at which water reaches ground and surface waters. An improved state of the land will in turn help deliver our aspirations to improve the quality of life and enhance the environment for wildlife.

The *Vision* and long-term objectives will help achieve these outcomes:

- Society will value land and soil quality as much as it values the quality of air and water.
- Major contaminated land problems will have been identified, and the land cleaned up and restored so that it is fit for specific uses, and the landscape enhanced.
- The creation of new problems by the inappropriate use and development of land, by direct and indirect additions to the soil, and by accelerated soil erosion, will have been prevented.
- More land will have been brought into sustainable use through more effective clean-up methods and clearer planning targets.
- Land use will match its capability, and land users will pre-guarantee appropriate restoration and long term management as required.

We will seek to achieve these goals in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the *Vision* for the environment. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators⁴ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁵ that will be used to show progress towards the *Vision*. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

⁴ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment.*

⁵ Environment Agency (July 2000) *Environmental Indicators*. A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Land and soil quality

Outcome 1 – Society will value land and soil quality as much as it values the quality of the air and water.

Tests for progress:

- Opinion surveys to determine the value the public, industry, farmers and Agency staff place on land and soil.
- Actual land use practices will have changed positively.
- Area of Agency-owned contaminated land will reduce.

GOAL	ACTIVITY
Goal 1.1 Increased awareness of the importance of land and soil quality.	Short to medium term:
	<ul style="list-style-type: none"> • Provide annual summary reports on the state of land indicating trends in main indicators. • Agree, publish and then implement an Agency soil protection strategy.
	<ul style="list-style-type: none"> • Complete a baseline survey of public attitudes to land and undertake subsequent surveys. • Agree and implement a national framework for monitoring of soil and land.
	Medium term:
Goal 1.2 Best practice in dealing with Agency land holdings developed and recognised as a benchmark for others.	<ul style="list-style-type: none"> • Agree and implement a national plan for developing the Agency's technical skills and expertise in the environmental management of land. • Working with Government, review existing environmental indicators for soil and land and develop further indicators as required.
	Short to medium term:
	<ul style="list-style-type: none"> • Publish an Agency land management strategy and include a progress report on contaminated land management in annual reports.
	Medium term:
	<ul style="list-style-type: none"> • Survey Agency owned contaminated land and complete necessary remediation.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Contaminated land

Outcome 2 – Major historic contaminated land problems will have been identified, and the land cleaned up and restored so that it is fit for specific uses, and the landscape enhanced.

Tests for progress:

- Area of contaminated land.
- Area of derelict land.
- Previously developed land available for use.
- Land gained through remediation.
- Number of sites still awaiting remediation.
- Numbers of major orphan sites in England and Wales.
- Number of contaminated sites remediated through planning.
- Number of voluntary site agreements relative to the number of remediation notices.

GOAL	ACTIVITY
Goal 2.1 Comprehensive guidance on the assessment of risks from contaminated land available.	Short to medium term: <ul style="list-style-type: none"> • Establish within the Agency a centre of expertise in risks to human health from contaminated land. • Continue the production and revision of guideline values for the assessment of risks to humans from contaminants in land. • Complete the development of models for assessing risk to ecosystems and others receptors from contaminants in land. • Promote best practice in contaminated land management.
Goal 2.2 Comprehensive guidance on the management of risks from contaminated land available.	Short to medium term: <ul style="list-style-type: none"> • Publish further guidance on the choice and application of remedial technologies. Medium term: <ul style="list-style-type: none"> • Produce annual reports on remediation practice, including price comparisons. • Publish guidance on sustainable land treatment options.
Goal 2.3 A simplified remediation licensing regime will be in place.	Short to medium term: <ul style="list-style-type: none"> • Make recommendations for a dedicated remediation licensing regime. • Implement remediation licensing regime (timing dependent on Government introducing regulations).
Goal 2.4 The number of historic contaminated land sites for which we have specific responsibility will be reduced by remediation action.	Short to medium term: <ul style="list-style-type: none"> • Develop a regime for radioactively contaminated land, based on the main Part IIA Contaminated Land Regime. • Agree a plan for the management of "orphan" sites. • Progress work on Special Sites. Medium Term: <ul style="list-style-type: none"> • Reduce the numbers of remediation notices issued, as voluntary action increases. • Agree policy for the Agency's input to the management of contaminated land within the planning regime.

Contaminated land *continued*

<p>Goal 2.5 The geographical extent of contaminated land will be known.</p>	<p>Short to medium term:</p> <ul style="list-style-type: none">• Agree standard formats with local authorities for information for the state of contaminated land report.• Publish first report on the state of contaminated land.• Publish information on the state of radioactively contaminated land.
<p>Environment Agency's role is central</p>	<p>Environment Agency as a substantial partner</p>
<p>Environment Agency's involvement to build understanding</p>	

Avoiding misuse of land and soil

Outcome 3 – The creation of new problems by the inappropriate use and development of land, by direct and indirect additions to the soil, and by accelerated erosion, will have been prevented.

(See also Framework document A “greener” business world and Improved and protected inland and coastal waters)

Tests for progress:

- Number of newly (not historic) contaminated sites being identified.
- Trends in concentrations of toxic substances in soils.
- Organic matter in top soils.
- Area of land where critical loads are exceeded by aerial deposition.
- Number of farms with a nutrient management plan.
- Number of farmers who use the Code of Good Agricultural Practice (soil) and other relevant guidance.
- Area of land at medium to high risk of soil erosion.
- Reduction in major soil erosion incidents.

GOAL	ACTIVITY
Goal 3.1 Activities on IPPC sites will not cause new land contamination.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Publish guidance on site reports for IPPC sites. • Assess and report on the impact of aerial deposition on land and soil quality. <p>Medium term:</p> <ul style="list-style-type: none"> • Ensure all IPPC sites have produced and acted on site reports. • Require all IPPC authorisations take proper account of the potential of the process to cause deterioration of land quality, both on-site and away from the site.
Goal 3.2 Soil erosion and degradation will be reduced.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop and agree criteria for producing maps of existing and potential soil erosion and degradation. <p>Medium term:</p> <ul style="list-style-type: none"> • Produce maps for all of England and Wales and include them in local environment action plans. • Identify vulnerable catchments and prioritise soil management actions, including changes to agricultural activities.
Goal 3.3 Flood risk from inappropriate soil cultivation will be reduced.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Encourage the uptake of good cultivation practices for the protection of soil by working in partnership with farmers and farming organisations in high risk areas. • Develop catchment models to identify flood risk due to soil degradation and land use practices. • Carry-out further research on how to reduce surface water run-off through good soil husbandry methods.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Avoiding misuse of land and soil *continued*

Goal 3.4 Waste will only be spread on land where it confers a benefit and does not have negative impacts on human health or the environment.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Publish guidance on how to assess the benefit and potential impacts of spreading activity. • Encourage the use of farm waste management plans and nutrient management planning. <p>Medium term:</p> <ul style="list-style-type: none"> • Establish the capacity of different soil types to accept wastes without impairment of soil function.
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Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Bringing land into sustainable use

Outcome 4 – More land will have been brought into sustainable use through more effective clean-up methods and clearer planning targets.

Tests for progress:

- Proportion of contaminated sites remediated using sustainable techniques.
- Number of major soil erosion incidents; sedimentation / siltation incidents.
- Off-site sediment flow.

GOAL	ACTIVITY
Goal 4.1 Soil quality will be maintained and improved.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Integrate soil and land protection into all current Agency regulatory policy including consideration of "heritage soils". • Identify the number of sediment related pollution incidents and achieve a reduction in numbers. • Support the development by Government of new regulations for the spreading of waste and other materials on land available. <p>Medium term:</p> <ul style="list-style-type: none"> • Evaluate the scope for further protection of soil and land through regulation. • Repeat survey of sustainable remediation techniques.
Goal 4.2 Agricultural soil will be protected.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Make recommendations for measures (both advisory and regulatory) to improve and protect agricultural soils, and produce advisory documents.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Land use and capability

Outcome 5 – Land use will match its capability and land users will pre-guarantee appropriate restoration and long term management as required.

(see also *Framework* document *An enhanced environment for wildlife*)

Tests for progress:

- Amount of new development approved in inappropriate environmental locations.

GOAL	ACTIVITY
Goal 5.1 Land use will be optimised.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work with DEFRA and NAW to identify and promote agri-environment schemes which enhance land quality. • Increase the Agency's role and influence in further CAP reform and identify "best options" that support land management. • Work with DEFRA and NAW to introduce strategic environmental assessment of new policies that may result in significant changes in agricultural and forestry cropping patterns and techniques. <p>Medium term:</p> <ul style="list-style-type: none"> • Secure national agreements for an enhanced role of the Agency in planning. • Investigate and publish impacts of land use decisions on the environment. • Include land use capability in all local environment action plans.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

7. Research and development

New R&D is needed by ourselves and others to support delivery of this *Framework*.

This will need to:

- develop better indicators of soil quality, including those to assess the environmental impact of agriculture.
- support collection, collation and assessment of soil information for national and regional planning.
- further develop and review the Contaminated Land Exposure Assessment (CLEA) model and guideline values.
- identify and quantify those activities, including spreading of wastes, that most impact on soil quality.
- determine criteria to evaluate the economic costs of soil deterioration and erosion.
- support and evaluate innovative remedial technologies.
- identify soil husbandry methods that reduce surface water run-off.
- describe criteria to evaluate the sustainability of different land use options.
- provide guidance for determining land capability and matching it to land use.

To deliver this R&D, we will aim to influence and collaborate with other key stakeholders, in particular working through existing national and international networks.

8. Implications for the Environment Agency

The Environment Agency's ability to deliver these goals varies. Some aspects are entirely within our power (for example, developing our expertise). Others depend on persuading the Government to introduce legislative changes (for example, developing new and revised regulations), or working with or influencing others (such as through education) or a mixture of these (as in the case of the Planning System). Successful delivery will require:

Expertise and awareness

- Increased awareness in the Agency of the need to value soil and land.
- Increased technical understanding of soil systems and their functions, including the retention and infiltration of water.
- Enhancement of existing technical excellence in contaminated land and its remediation.
- Increased expertise and knowledge of land and agricultural economics.
- Better developed skills in the communication of land-based issues to the community.
- Better developed technical skills in land management.
- Integration of land and soil protection within all Agency activities.

Policies and strategies

- Development and implementation of an Agency soil strategy.
- Development of a public communication programme on land issues.

Monitoring and reporting

- Coordinated programme for monitoring land and soil, in partnership with others.
- Better indicators of land and soil quality.
- Reporting on the environmental impact of agriculture.
- Reporting on the environmental impact of urban development and minerals extraction.

Knowledge

- Better understanding of health issues relating to land contamination.
- Better understanding of the links between soil contaminants and risks to wildlife and other environmental media.
- Better understanding of soil systems and their functions, including the retention and infiltration of water.
- Better understanding of sustainable land use and which land uses are sustainable in what circumstances.

Influencing and education

- Influence economic decisions relating to both urban and rural land, including regional plans and the future reform of agriculture.
- Provide clear leadership on the impacts of agriculture on the environment and their control.
- Influence the reform of the Common Agricultural Policy and its application in England and Wales.
- Raising public awareness of land quality issues.

New and revised regulations

- Work with Government to develop new regulations relating to the remediation of contaminated land.
- Work with Government to develop new regulations relating to land spreading.
- Work with Government to develop measures to support soil protection in agriculture.

The planning system

- Develop and implement land use and development control policies.
- Work with planning authorities on the implementation of sustainable land use plans.

TABLE 1: Regional variation in environmental pressures on the land

Environmental quality measure	Anglian East	Midland West	North	North West	Southern	South	Thames	Wales
Nitrogen deposition (critical load exceedance for natural vegetation)	M	L	M	M	M	H	L	H
Soils (exceedance of acidity critical loads)	M	L	M	H	L	M	L	H
Stock of vacant and derelict land	L	M	H	H	M	M	M	M
Demand for land for housing	L	M	M	M	H	L	H	L

KEY

This has been based on selecting the two Regions with the greatest breaches of standards, poorest quality or highest loadings and ranking these as H - highly impacted; the two Regions with the best quality or lowest loadings are ranked as L - least impacted. The other Regions are ranked M - moderate (where the impacts are about equal, more than two Regions may be designated H or L).

Source: Environment Agency (2000) *Environment 2000 and Beyond*.

TABLE 2: Key environmental trends

Viewpoint	State and trends
Land use and resources	<p>Total stock: 150,360km² (15 million ha).</p> <p>Land use: A total of 74% agriculture, 8.5% woodland 10% urban and 7.5% other uses in 1996. Small but steady increase in woodland and urban areas and slight decline in crop areas linked to set-aside.</p> <p>Land cover: In 1990, 66% arable and improved grassland; 13% semi-natural and heath/moorland; 9% woodland; 10% urbanised. Reduction of arable, grass and semi-natural cover since 1984 due to increased urbanisation and afforestation. Over 4% increase in amount of urban use since 1945, rate of 0.8% per decade.</p> <p>Housing development: Numbers of households increasing: 3.8 million new homes needed in England between 1996 and 2021; 0.2 million in Wales.</p> <p>Farming: Increased productivity, increased mechanisation, intensification of livestock grazing, land drainage. Changed nature of landscape in arable areas – larger fields, fewer hedges. Decline in horticulture.</p> <p>Industry: Decline in industrial land use generation of derelict land in 1970s and 1980s, legacy of contaminated land.</p> <p>Commerce: Between 1986 and 1990, the amount of out-of-town retail floorspace almost tripled, but growth has since reduced. Affects land use, dependence on cars.</p> <p>Previously developed land: 33,000ha in England in 1998 (0.3% of land); 5,700ha in Wales in 1993 (0.3%). Reclamation now outpaces new dereliction in England (8.5% less derelict land in 1993 than in 1974 in England).</p> <p>Contaminated land: Estimates vary between 50,000 and 200,000ha in England and 4,000ha in Wales (1.6% total land area) but better information needed.</p> <p>Land classifications: About one-third of agricultural land is classified as grade 1, 2 and 3a (best and most versatile) in England. Only 20% grade 1, 2 and 3 in Wales. Some 159 Countryside Character Areas in England.</p> <p>Erosion: Nearly half the arable land in England and Wales is likely to be vulnerable to soil erosion. Livestock, vehicles and people are causing accelerated peat loss in the hills.</p> <p>Soil condition: Water-holding capacity, soil structure and resistance to erosion are being affected adversely by reductions in soil organic matter levels.</p> <p>Habitats: Diversity reflects changes over centuries from "original" state. Recent declines in amount of heathland and unimproved grassland; increases in woodland and improved grassland.</p> <p>Mineral extraction: Some 50,000ha of land was being mined in 1994, mainly for aggregates, for which demand is projected to increase by 25 to 40% by 2011.</p>
Key biological populations	<p>Soil biodiversity: No information on trends. Non-native flatworm affecting earthworms in some areas. Falling levels of soil organic matter indicate reducing soil biomass.</p>
Compliance with standards and targets	<p>Soil acidity: Under arable crops, acid soils have decreased from 10% to 4% since 1970s. Under grass, acid soils have increased from 39% to 55%.</p> <p>Nutrients: Soils with low phosphorus or potassium levels have fallen over the past 20 years. A total of 22% of soils now have high phosphorus levels.</p>

TABLE 2: Key environmental trends *continued*

	<p>Organic matter: Between about 1980 and 1995 arable soils with less than 4% organic carbon increased from 78% to 88%; similarly, grassland soils increased from 44% to 60%. Lower levels of organic matter provide smaller reservoirs of nitrogen and other nutrients that support the long-term fertility of soils.</p> <p>Hazardous substances: Very small changes in soil metal concentrations between 1980 and 1995. Urban soils tend to have higher concentrations than agricultural soils. Organic contaminants (such as dioxins, PCBs) at low concentrations.</p> <p>Radioactive pollution: There is no specific information on the state of radioactively contaminated land in England and Wales.</p>
Health of the environment	<p>Acidification: Sulphur and nitrogen deposition exceeds critical loads of acidity over a significant area of the UK. International agreements are likely to lead to significant reductions in emissions of sulphur and nitrogen by 2010, however, critical loads in parts of Wales, Cumbria and the Pennines will still be exceeded.</p>
Long-term reference sites	<p>Environmental Change Network: Insufficient number of years to show trends yet. Soils at sites at Rothamsted reflect trends in atmospheric pollution and inputs (fertilisers, management). There is increasing acidity in some grassland soils, decreasing levels of organic matter in arable soils.</p>
Aesthetic quality	<p>Landscape: Over 23% of the countryside in England and Wales is protected as a National Park or an Area of Outstanding Natural Beauty. Quality and local character of lowland landscapes declined between 1972 and 1994, although the rate of landscape change was greatest from 1945 to 1972. Declining features include hedges, trees and unimproved land.</p> <p>Buildings and other developments: Only 56% of England is classed as tranquil. Since the 1960s England has lost 21% of its tranquil areas (19,000km²). There is potential pressure from wind farms and inappropriate development.</p> <p>Litter: Detracts from aesthetic appeal. High standards in National Parks, but 15% of city and town centres had unsatisfactory levels of cleanliness. Some 30% of people "very worried" by litter in 1996/97.</p>

Source: Environment Agency (2000) *The state of the environment of England and Wales: the land*.



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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

A 'greener' business world

JULY 2001



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A FRAMEWORK FOR CHANGE

A 'greener' business world

JULY 2001

A 'greener' business world

"The enlightened company increasingly recognises that there are good commercial reasons for being ahead of the pack when it comes to issues to do with the environment."

SIR JOHN BROWNE, CHIEF EXECUTIVE OFFICER, BP AMOCO,
APRIL 2000 (BBC REITH LECTURE)

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision's* nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. A 'greener' business world

We recognise that businesses are major contributors to the economic wealth of the nation and that they operate in a global competitive economy.

It is in the interest of businesses to minimise adverse impacts on the environment and to adopt a sustainable approach to their operations. An increasing number of companies act in this way. The inefficient use of raw materials not only produces waste and pollution; it represents a loss of productivity and potential profit.

The Environment Agency seeks to encourage this shift to more sustainable production through smarter regulation and the use of economic instruments. It expects companies to accept and demonstrate leadership at board level to protecting the environment. This commitment should be visible to all employees. Management should use this undertaking to promote a strong environmental culture in the organisation. Some companies do act in this way, but such approaches are far from universal.

Environmental effects of business

Business, particularly industry is a major contributor to environmental effects such as acid rain and global warming, as well as to a wide variety of more local problems as a consequence of emissions to air and water from processes, and from the disposal of process wastes.

During the 20th century, changes in the types of industry, regulation and voluntary action by industry led to substantial reductions in pollution from industrial sources. However, industry continues to have an impact on the environment. There is also a legacy of past environmental effects, such as contaminated land and groundwater.

Table 1 (page 18) shows the regional variability of pressures due to businesses and Table 2 (page 19) sets out a selection of environmental trends associated with business activities.

Emissions to air and water have generally fallen but the levels of some pollutants have increased. We now have a greater understanding of the effects of these pollutants. This indicates that health may be damaged at lower levels than previously thought. In certain industries such as, pharmaceuticals and agro-chemicals, the numbers of compounds being discovered and manufactured are increasing.

We can make major reductions in our impact on the environment by encouraging businesses to adopt greater responsibility for their activities and products. They can help to minimise pollution by considering such aspects as product design, and conducting life cycle analysis to identify the major environmental impacts. Companies can also develop and implement waste control strategies including reuse and recycling.

Sustainable development

Business makes a fundamental contribution to society and has an important role in contributing to sustainable development by developing more sustainable consumption of resources and the sustainable production of goods, whilst also promoting social fairness and a prosperous economy. However, business does not exist in isolation from the rest of society, it is driven by the demands of its customers and is responsive to public opinion. The Agency recognises that greener business can only thrive when there is consumer demand and support for the goods and services produced through sustainable business practices. This requires a change not only on the part of business, but also by society in general, by those who use and benefit from the goods and services business provides.

There are a number of elements to bringing about this change to more sustainable business practices:

- The Agency will continue to regulate in order to maintain basic standards and to bring about improvements. In doing so, we will modernise our regulatory approach, in consultation with our stakeholders, to simplify and improve the regulatory process for business and ensure that administrative and bureaucratic aspects are minimised. We will target our effort through taking a risk-based approach to regulation.
- We will encourage the application of external pressure from customers, suppliers and investors through approaches such as supply chain development and wider use of green criteria for investment.
- We will support stronger corporate governance for the environment and better training and awareness of staff in order that the internal management of companies is "greener". Real benefits would be achieved from more companies having a clear commitment at Company Board level, which is visible to all employees and promotes a strong environmental culture within the organisation. This can make good business sense.
- We will encourage businesses, especially in the manufacturing sector, to measure and report on key determinants of environmental performance such as the ratio of the quantity of raw materials/natural resources to production levels (natural resource efficiency)
- We will support Government in the examination of economic instruments, such as green taxes and tradable permits, in order to give further incentives to companies. Such instruments can provide a mechanism for promoting change, innovation and efficiency, and higher environmental standards. Measures already adopted by the Government include landfill tax, a fuel duty differential and the climate change levy. We will also determine how we can use our charging regime to create incentives for good environmental performance.

3. The Environment Agency's role

The Agency regulates a wide range of industrial activities in England and Wales, including energy, manufacturing and service industries, chemical and steel works, oil refineries, waste incinerators, the water industry, the nuclear industry and some parts of food and agriculture. Historically, regulation has been a major influence on businesses to reduce their impacts on the environment.

Under Integrated Pollution Control (IPC) we regulate about 2,000 industrial processes with the greatest pollution potential, ensuring that Best Available Techniques Not Entailing Excessive Cost (BATNEEC) are used to prevent or minimise pollution of the environment. We regulate the treating, keeping, movement and disposal of controlled waste, involving around 7,000 waste management sites and over 50,000 waste carriers and brokers, so as to prevent pollution of the environment or harm to public health. We monitor more than 7,000 sewage treatment works and 5,000 trade discharges; and monitor the quality of freshwater, groundwater and tidal waters. We also regulate the disposal of radioactive waste at approximately 1,000 sites, including about 30 nuclear sites. However, although a range of environmental legislation is in place, many environmental impacts of business remain largely unregulated, including transport and domestic sources.

During 2000 the legislation that implements IPC will be superseded by the Pollution Prevention and Control Regulations, which implement the EU Directive on Integrated Pollution Prevention and Control (IPPC). The Directive is similar to IPC but covers a wider range of activities and industrial processes, including landfill sites and larger sewage treatment works. IPPC will be progressively applied to existing processes, with full implementation by 31 October 2007.

We are committed to developing goal-orientated, risk-based approaches to regulation. The Operator and Pollution Risk Appraisal (OPRA) system has been implemented for IPC and waste management sites and will help the Agency target its resources on those sites presenting the greatest environmental risks.

A small number of environmental licences issued by the Agency give rise to significant public interest. The Agency is developing procedures for enhanced public consultation in such circumstances.

Environmental Management Systems

Environmental Management Systems (EMS) provide a means for businesses to manage their environmental impacts in a considered and structured manner. A number of initiatives are in place to encourage business to progress to EMS, including the pilot Department of Trade and Industry (DTI), British Standards Institute (BSI) and Department for Environment, Food & Rural Affairs (DEFRA) "Acorn" project. The Agency encourages the use of EMS by those we regulate and recognises that many aspects of an EMS are similar to our regulatory activities. We are therefore evaluating the opportunities for a new approach that combines the voluntary elements of an EMS with our regulatory systems.

Provision of Information

Information on releases to air, water and land from IPC processes is now available via the Agency's web site and we are looking at how such information can be extended to produce annual environmental reports. Greater standardisation in the type of information provided in

environmental reports is required including a common set of criteria for each sector. More companies and sites will be encouraged to report. DEFRA's MACC2 initiative ("Making a Corporate Commitment") is a recently introduced tool to promote reporting.

Policy drivers

Among the key national and international drivers that will influence our actions over the period of this *Framework* are:

- **International drivers:** United Nations Framework Convention on Climate Change; Kyoto Protocol; UNECE (United Nations Economic Commission for Europe) Protocol to abate acidification, eutrophication and ground-level ozone; and the UNECE persistent Organic Pollutant and Heavy Metal Protocols.
- **European drivers:** The proposed Sixth Environment Action Programme of the European Community 2001–2010. European Directives on Integrated Pollution Prevention & Control, Water Framework, Waste Incineration, Large Combustion Plant, Air Quality Daughter Directives, Landfill, Habitats and Birds. White Paper on Environmental Liability.
- **National and regional drivers:** Air Quality Strategy for England, Scotland, Wales and Northern Ireland; UK Strategy for Radioactive Discharges 2001 – 2020; Climate Change: The UK Programme; Waste Strategy for England and Wales.

4. Working in partnership

The Agency works closely on policy development with the Department for Environment, Food & the Regions (DEFRA), the Department of Trade and Industry (DTI), the National Assembly for Wales (NAW). We also provide technical advice and guidance based on our expertise and operational experience. Our activities are framed by, and help to implement, a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White Papers, and Modernising Government and Better Regulation policies.

We are actively involved in a number of European and other international fora. We contribute experts to technical committees and have seconded a number of technical experts to the European IPPC Bureau in Seville to assist with the production of EC Best Available Techniques reference documents (BREFs).

We work with local and regional government, through our role as a consultee in their planning control of developments and in local air quality management. We liaise with other regulators, both in the UK and overseas, to develop better regulation and promote consistency.

We have agreed Memoranda of Understanding with the Health and Safety Executive and the Food Standards Agency relating to areas where we have mutual interests. We also have a signed Concordat with the Cabinet Office Regulatory Impact Unit.

We work with many companies, frequently at board level. We are actively involved with over 50 waste minimisation "clubs" to help reduce water use, production of solid waste and energy consumption.

The Agency also works with industry trade associations on many issues. We work with the Environmental Industries Commission to ensure that our technical guidance addresses best available techniques and to encourage innovation. We are also keen to encourage businesses that are promoting environmental technologies.

We work with a range of business support services such as Envirowise and the Energy Efficiency Best Practice Programme and Carbon Trust in order to understand and add value to their activities.

We are also involved with a wide range of groups with specific interests, such as non-governmental organisations, liaison committees, research organisations, other agencies and consultancies, to provide advice and develop tools for better regulation.

We will be seeking to strengthen our links with industry and our other partners over the short and medium term.

4. The Agency's objectives and goals

In *An Environmental Vision*, our overall long-term objective with respect to the business world is that:

Industry and businesses will value the services provided by a rich and diverse natural environment. In the process they will reap the benefits of sustainable business practices, improving competitiveness and value to shareholders and securing trust in the wider community.

A 'greener' business world provides many of the mechanisms – along with *Wiser, sustainable use of our natural resources* – by which improvements to the state of our air, land and water, will be delivered, with resulting benefits for everyone's quality of life, and for wildlife.

The *Vision* and long-term objectives will help achieve these outcomes:

- All business activities will have environmental concerns at the heart of their thinking and operations.
- The adoption of sustainable production and consumption practices will be the norm.
- Industries will exercise stewardship over their products to ensure that they are compatible with sustainable development.
- Risk and incentive-based charging schemes will reward reduced risks to human health and the environment and encourage effective environmental management.
- The public will use its purchasing and investment powers, and its opinion, to influence industrial performance in terms of human health and the environment.
- Through the public being better informed and involved, there will be greater general approval in the regulatory process and public confidence in it.

We will seek to achieve these outcomes in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the *Vision*. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the *Vision*. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment*.

⁴ Environment Agency (July 2000) *Environmental Indicators*. A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Business attitude to the environment

Outcome 1 – All business practices will have environmental concerns at the heart of their thinking and operations.

Tests for progress:

- Emissions to air and water.
- Wastes are quantified and reduced.
- Numbers of pollution incidents.
- Number of sites and companies with certified environmental management systems.
- Proportion of SMEs using EMS.
- Contribution of SMEs to key environmental impacts is recognised.
- Extent of standardisation of licences.
- Sector based criteria agreed with trade groups and reported on.
- Regulation and voluntary environmental management are integrated.

GOAL	ACTIVITY
Goal 1.1 Major reductions in the impact on human health and the environment arising from industrial activities.	<p>Ongoing:</p> <ul style="list-style-type: none"> • Use site environmental improvement programmes cost effectively to reduce emissions to air and water and the production of solid wastes. <p>Short to medium term:</p> <ul style="list-style-type: none"> • Implement national strategy and statutory guidance for reduction in radioactive discharges through revised authorisations. • Introduce IPPC (phased to 2007).
Goal 1.2 Increased commitment, at Company Board level, to environmental performance.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Recommend that company directors have a "duty of care" towards the environment in the same way that directors have a statutory duty of care towards their employees and customers. • Support a requirement for companies to publish a company policy on the environment and a statement by company directors of how environmental risks, impacts and performance have been managed.
Goal 1.3 Increased number of sites and companies with formal, externally certified environmental management systems.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop Agency policy and guidance for the role of EMS in its regulatory approach • Produce guidance on EMS for IPPC applicants and then extend to all Agency regulatory regimes. <p>Medium term:</p> <ul style="list-style-type: none"> • Encourage IPPC processes to have EMS at time of application or as part of an improvement plan, and for these to become effective within four years of authorisation. • Develop joint compliance assessment and reporting arrangements for Agency and organisations certifying EMS. • Encourage industries to promote the use of EMS with their suppliers and to require them to comply with environmental legislation.

Business attitude to the environment *continued*

Goal 1.4 Greater ownership by operators of their releases to the environment.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Introduce audited "Operator Self-Monitoring Regimes" across all regulatory functions. • Work to increase public acceptance and trust of Operator Self-Monitoring Regimes.
Goal 1.5 Standardised approach to environmental licences, which are available electronically.	<p>Ongoing:</p> <ul style="list-style-type: none"> • Continue development and pilot testing of licences with consistent layout and format (Unified Environmental Licences – UELs) and then (short term to medium term) extend to use in all the Agency's Area offices. <p>Short to medium term:</p> <ul style="list-style-type: none"> • Install facilities for electronic dissemination of licences.
Goal 1.6 Single, integrated, environmental site licences available. Further development of General Binding Rules (GBRs).	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Identify costs and benefits of simplifying and resolving inconsistencies between regulatory regimes. • Identify opportunities for changes to legislation to remove inconsistencies and to use standard conditions. • Develop opportunities for General Binding Rules (GBRs) and other procedures designed to reduce the cost to business of regulation, while fully securing environmental aims.
Goal 1.7 Industry sector groups and account managers established in Agency.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop key industry-facing sector groups to coordinate activities in the Agency, improve liaison with trade associations and link with DEFRA/DTI work on sectoral sustainability strategies. • Establish an account manager for each site to coordinate all regulatory activities.
Goal 1.8 SMEs understand their obligations under environmental legislation and receive guidance on good practice.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Use the internet to provide guidance on legislation for specific industry sectors based on NetRegs. • Identify key environmental impacts from SME subgroups. • Work with business support services to provide SME subgroups with guidance and other tools to improve their environmental performance.

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Adoption of sustainable business practices

Outcome 2 – The adoption of sustainable production and consumption practices will be the norm.

(Cross refer to future uses of land addressed in the *Framework* document *Restored, protected land with healthier soils*).

Tests for progress:

- Benchmarked environmental impact criteria established for key industry sectors.
- Waste quantities and types generated by site and sector and disposal routes.
- Waste generated per unit of production.
- Overall resource used by industry.
- Use of priority chemicals.

GOAL	ACTIVITY
Goal 2.1 Long-term environmental objectives and targets set for individual industries and sites.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop a methodology to assess the environmental burdens of industries and the relative impact of the same substances to air, water and land. Use the National Atmospheric Emissions Inventory and other sources to demonstrate the contribution of industries relative to other sources of pollution. • Quantify and rank environmental impacts of SME subgroups, and use the outcome to prioritise effort. • Establish environmental impact criteria for key industry sectors addressing resource consumption and waste generated. <p>Medium term:</p> <ul style="list-style-type: none"> • Use environmental impact criteria to develop benchmarks. • Work with Government to investigate methodologies for calculating environmental burdens for product life cycles. • Work with industry to produce life cycle statements of processes and products and link with environmental management systems.
Goal 2.2 National reduction targets for environmental burdens from business in place, including specific chemicals.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Implement Agency Chemicals Strategy: establish priority chemicals, identify sources (point and diffuse) and develop cost effective reduction programmes for priority chemicals. • Support DEFRA chemicals stakeholders forum.
Goal 2.3 More appropriate siting of new industry.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Improve Agency input to the planning process through earlier contact and a streamlined Agency response service (the "Better Town Planning" project). • Pilot improved communications with local planning authorities through the "e-commerce" project.

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Product stewardship

Outcome 3 – Industries will exercise stewardship over their products to ensure that they are compatible with sustainable development.

Tests for progress:

- Integrated product policy developed.
- Number of "tax and return" schemes examined.
- New producer responsibility systems developed to maximise protection of health and the environment, and which minimise purely administrative burdens.

GOAL	ACTIVITY
Goal 3.1 Further development of integrated product policy.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Work with Government, industry and consumers in the development of integrated product policy. • Help to influence EC and UK Government to identify new producer responsibility schemes by provision of information on Life cycle analysis, environmental burdens and associated risks. • Examine end-of-life integrated product policy options for small items of electrical equipment and small batteries. • Introduce, with Government and industry, formal producer responsibility schemes for end-of-life vehicles and waste electrical and electronic equipment, minimising purely administrative burdens for business and regulators. • Work with Government to determine the scope and applicability for "tax and return" schemes. <p>Medium term:</p> <ul style="list-style-type: none"> • With Government and industry, examine tax and return pilot schemes for tyres and batteries and the lessons for other products.

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New charging schemes

Outcome 4 – Risk and Incentive-based charging will reward reduced risks to human health and the environment and encourage effective environmental management.

Tests for progress:

- Proportion of Agency activities based on risk-based approach.
- Risk-based charging introduced.
- OPRA scores for individual sites and for sectors.
- Emission trading schemes in place.
- Charging based on key emissions, working to complement regulation.
- Green taxes and other economic instruments, working with regulation.
- Further development of negotiated agreements, particularly with industry, dovetailing with regulatory approaches.

GOAL	ACTIVITY
Goal 4.1 Regulatory effort targeted on those activities and operators that have the greatest environmental impact.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop a common risk based regulation strategy to cover all Agency-regulated activities and operators. • Implement a risk based compliance scheme covering IPPC. • Use National Waste Survey information and Special Waste data to target waste reduction activities. • Extend risk-based compliance scheme to all the Agency's regulatory regimes. • Influence increased penalties for environmental offences.
Goal 4.2 Increased use of economic instruments and negotiated agreements.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Consult with Government on legislative and other barriers to the introduction of charging for key emissions and trading. • Develop, in consultation with stakeholders, proposals for charging for key emissions and trading, consistent with regulatory approach, and with wider trading schemes, such as for carbon. Explore capacity for flexibility in regulatory approach in these cases. • Work with those developing energy efficiency and other sector negotiated agreements, to obtain optimal balance with regulation. • Work with Government and Emissions Trading Group on establishment of greenhouse gas emissions trading scheme. <p>Medium term:</p> <ul style="list-style-type: none"> • After consultation, examine pilot schemes for emission charging, worked up together with regulatory approach. • Develop pilot trading trials and then, in conjunction with Government and stakeholders, draw necessary lessons for operation of regulation. • Work with partners (such as Treasury, DEFRA, DTI, Cabinet Office Regulatory Impact Unit) to identify further scope for economic instruments, and to ensure such changes work with the grain of regulation.

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Public influence

Outcome 5 – The public will use its purchasing and investment powers, and its opinion, to influence industrial performance in terms of human health and the environment.

Through the public being better informed and involved, there will be greater general approval of the regulatory process and public confidence in it.

Tests for progress:

- Number of IPPC sites producing annual reports for the community.
- Number of FTSE 350 companies disclosing their environmental performance in annual reports and accounts.
- Number of businesses using environmental cost accounting in their audited annual report and accounts.
- Use of environmental information by financial markets.
- Number of industries for which pollution inventory information is available via the Agency's web site.
- Trends in emission data available on internet for sites and sectors.
- Health based information available for key substances.
- Number of health and environmental based environmental quality standards available for emission to air and water.

GOAL	ACTIVITY
Goal 5.1 Increased numbers of companies producing high quality environmental reports.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Within businesses the Agency regulates. • Support good practice in company environmental reporting, including the use of environmental cost accounting. • Press for greater transparency of environmental costs via new company law. • Use the Agency's expertise to demonstrate to insurance and credit providers the benefits to them of company environmental information. <p>Medium term:</p> <ul style="list-style-type: none"> • Work with Government and others to apply the lessons from our work with businesses we regulate to the wider business community.
Goal 5.2 Pollution inventory extended.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Widen the Pollution Inventory to cover processes to come under IPPC, waste, sewage treatment works and radioactive discharges. • Produce first report on IPPC emissions to EC. • With DEFRA place IPPC emissions into context with national air quality data. <p>Medium term:</p> <ul style="list-style-type: none"> • Make Pollution Inventory data user friendly and accessible.
Goal 5.3 League tables on site environmental performance available.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Agree key environmental impact criteria with industry sectors and publish performance data on sites on basis of these reporting criteria. • Publish Operator and Pollution Risk Assessment (OPRA) and permit compliance scores.

Public influence *continued*

	Medium term: <ul style="list-style-type: none"> • Make data available via internet to allow comparisons of sites and operators within sectors. • Ensure sufficient data available to establish benchmarks and trends.
Goal 5.4 Effective engagement with public in relation to environmental permits.	Short to medium term: <ul style="list-style-type: none"> • Evaluate and refine our own consultation process for permits. • Develop partnerships at local level with local authorities, community groups and industry to encourage dialogue around sites. Medium term: <ul style="list-style-type: none"> • Pilot making publicly available real time monitoring results of emissions via means such as the internet and displays in public places.
Goal 5.5 Wider engagement of companies with the public and interest groups.	Short to medium term: <ul style="list-style-type: none"> • Promote opportunities for industry to set out and justify their environmental performance (open days, local liaison groups etc).

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7. Research and development

New R&D to support delivery of our *Framework* is required to develop our understanding of how regulation should best be applied and how methods complementary to regulation should best be developed.

Key areas include:

- Determining the overall environmental burden of processes and practices.
- life cycles assessments of processes and products.
- emissions trading.
- use of economic measures.
- use of negotiated agreements.
- environment and health based assessment criteria.
- reducing the administrative burden associated with environmental protection and regulation.

8. Implications for the Agency

The Agency's ability to deliver these goals varies. Some are entirely within our power, while others depend on companies seriously addressing sustainability issues and the Government introducing legislative changes. We will be working with business, Government and others to influence these developments.

The Agency will continue to regulate in a firm but fair manner in order to maintain basic standards in environmental performance by industry and to bring about improvements. We will ensure that administrative and bureaucratic aspects are minimised. The Agency will target its resources on those sites and operators presenting the greatest environmental risks. We will achieve this through:

- Effective risk based regulation to ensure industry minimises adverse effects on people and the environment, thereby contributing to the achievement of sustainable development.
- Ensuring that the regulatory process is integrated and addresses the local, national and other environmental impacts of a site.
- Where possible, persuading industry to go beyond legal compliance.
- Delivering regulatory services to industry, Government sponsors, the public and internal audiences with consistency, transparency, and clarity. We will do this in a timely manner, with no surprises and delivering value for money.
- Developing and adopting integrated policy appraisal techniques, covering environmental, social and economic costs and benefits, to inform our decision making processes.
- Ensuring that the Agency is respected as a technically skilled, efficient and effective environmental regulator.
- Establishing an organisation and career structure that encourages the development and retention of staff with relevant skills within the Agency.

Policies and strategies

The Environment Agency uses and will continue to develop the following approaches to deliver effective regulation, in consultation with our stakeholders. We will:

- Pursue a risk based regulatory process that is based on the control of environmental impacts and addresses technical, people, leadership and management system issues.
- Match our approach at any site to the operator's performance, retaining a firm and proportionate enforcement response where necessary.

- Adopt a standardised approach to issuing permits wherever practical using, for example, Unified Environmental Licences and standard conditions.
- Investigate ways to charge industry based on environmental burdens imposed by activities, including incentives for better performers.
- Seek increased levels of fines so that they act as a significant deterrent to non-compliance with environmental regulations.
- Move progressively to the use of auditing and review of formal site environmental management systems as a complement to approaches based on technology, persuading those we regulate to take full responsibility for their environmental performance.
- Develop and implement cost effective programmes to reduce key pollutants.
- Encourage "product stewardship" approaches such as life cycle assessment and producer responsibility for key products such as pesticides and fertilisers.
- Shift to self-monitoring of discharges and impacts on the receiving environment, with the Agency periodically auditing and checking.
- Establish sector groups, focussed on specific industrial sectors to review policy, establish priorities and manage a coordinated national approach.

Monitoring and reporting

- Make widely available information on businesses' discharges to the environment and compliance with environmental permit requirements, to inform the public and to facilitate benchmarking.
- Place the information on discharges from industry in the context of the overall emissions of substances from all sources, including domestic and transport.

Influencing and education

- Work with others to promote the use of company environmental information by insurance and credit providers.
- Work with partners, such as the Treasury and Regulatory Impact Unit of the Cabinet Office, to investigate the further use of economic instruments, such as green taxes and tradable permits, to promote change, innovation and efficiency to achieve higher environmental standards.
- Consult widely to ensure that we make the best possible decisions and keep relevant audiences informed of regulatory developments.
- Further develop objectives and criteria against which we can assess impacts on human health and the environment.
- Develop a structured training programme for our new staff and ensure continued professional development of existing staff.
- Make representations to the independent Company Law Review of the environmental advantages of giving company directors a 'Duty of Care' towards the environment in addition to looking after their employees and customers.
- Promote the development and use of clean technologies and 'green chemistry'.

The bottom line

Achieving a cleaner environment is both a challenge and an opportunity for the business world. It is not, though, an optional ambition. Customers, both in business and the general public, expect companies to be "greener". The Agency will help companies to achieve this.

TABLE 1: Regional variation in environment impacts linked to major industry

Pressure	Anglian	Midland	North East	North West	Southern	South West	Thames	Wales
Emissions of CO ₂ from Part A processes	M	H	H	M	M	L	L	M
Emissions of NO _x from Part A processes	M	H	H	M	M	L	L	M
Emissions of SO _x from Part A processes	M	H	H	M	M	L	L	M
Loads from sewage-treatment works	M	M	H	M	H	L	M	L
Pollution incidents	M	H	M	M	L	H	L	M
Area worked for aggregates	L	M	M	L	H	M	H	M
States								
River quality (biological)	M	M	H	H	M	L	M	L
Air quality (sulphur dioxide)	L	M	M	H	M	L	H	M
Nitrogen deposition	M	L	M	M	M	H	L	H
Soils (exceedance of critical loads)	M	L	M	H	L	M	L	H

KEY

This has been based on selecting the two Regions with the greatest breaches of standards, poorest quality, or highest loadings and ranking these as H – highly impacted; the two Regions with the best quality or lowest loadings are ranked as L – less impacted. The other Regions are ranked M – moderate. (where the impacts are about equal, more than two Regions may be designated H or L).

Sources: Environment Agency (2000) *Environment 2000 and Beyond*.
Environment Agency (2000) *Environmental Indicators*.

TABLE 2: Summary of selected environmental trends linked to business

Viewpoint	State and trends
Land use and resources	<p>Aggregates: By far the largest quantity of minerals extracted in the 1990s were aggregates, used mainly in the construction industry. Even though resources are not running out, their use and transportation requires energy and affects local environments. Current rates of extraction are four tonnes per person per year. Peat resources, on the other hand, are running out.</p> <p>Water abstraction: Abstraction of water by industry has fallen in the past 20 years. Reduced river flows and groundwater levels, potentially or actually caused by abstraction, cause concern in many areas. Some 23 Sites of Special Scientific Interest (SSSIs) are affected and more are under investigation as sites of potential deterioration.</p> <p>Land contamination: An area larger than the site of Greater London is thought to be contaminated. Much is in the north around sites formerly associated with coal mining and heavy industry.</p> <p>Renewable energy resources: Wind, wave and solar power could provide large amounts of our energy needs but provide less than 3 per cent at present.</p>
Key biological populations	<p>Habitats: Habitats have been lost through drainage, buildings, roads, cultivation and afforestation. Some upland habitats have been degraded by acid deposition.</p> <p>Effects on species: Variable trends; there are examples of some species on the decline, whereas others are thriving. About half of small mammal species have declined but half of larger mammal species have increased in the past decade. Some lichens eradicated due to sulphur dioxide in the past are now starting to recolonise.</p>
Compliance with standards, targets and classification schemes	<p>Water and air standards: A multitude of standards apply to air and water. Many have tightened over time and are expected to continue to do so in the future. Investment in better sewage treatment has contributed to a reduction in non-compliance with EC standards. Point source emissions from industry have reduced, for example, sulphur emissions fell by 67 per cent between 1980 and 1998. Dioxins have reduced by 76 per cent since 1990 and lead by 60 per cent. Loads of hazardous substances have reduced substantially since the 1980s. Pollution incidents are reducing but industry is still a major source of these.</p> <p>Diffuse impacts: Nitrate concentrations are still increasing in some groundwaters. Certain pesticide concentrations still exceed operational standards in rivers and groundwaters.</p> <p>Radioactive discharges: Discharges from nuclear facilities have reduced substantially as a result of regulation. The average human dose from artificial sources, excluding medical procedures, is less than one per cent of the total from natural background sources, and human exposure near nuclear sites is well within recommended limits.</p>
Human and environmental health	<p>Human health: Air pollution can lead to serious short and long-term effects, particularly for sensitive groups. Particles, sulphur dioxide and ozone may bring forward 12,000 to 24,000 deaths and 15,000 to 24,000 hospital admissions annually. Personal exposure and the effects of pollution relative to other factors are not well quantified.</p> <p>Eutrophication: Nutrient enrichment is a problem in some areas, although causes are diverse. This has largely been tackled by EC Directives of the 1990s, and successes should be evident in the next five years. Nutrient removal at large sewage works should reduce phosphate inputs to rivers and estuaries. Critical loads from nitrogen still exceeded in many areas of natural vegetation.</p>

TABLE 2: Summary of selected environmental trends linked to business *continued*

	<p>Persistent organic pollutants: Substances such as hexachlorohexane (HCH), dieldrin and poly-chlorinated biphenyls can accumulate in some animals. Some hazardous substances have been banned or their usage reduced, but historic hotspots still occur. Other substances, such as poly-aromatic hydrocarbons (PAHs), may be increasing due to extra traffic.</p> <p>Sub-lethal effects: Evidence of hormone disruption in some fish emerged in the 1990s, but impact on populations are still unknown. Considerable work is being carried out into causes.</p>
Long-term reference sites	<p>Industrial impacts: Few data are available on actual emissions in the 19th century, although anecdotal information suggests that air and water quality was a serious problem in cities at this time. Industrial impacts have reduced in the last 20 years due to investment in reducing emissions and tighter regulation.</p> <p>Nutrients in marine waters: These have increased, although there are measures in place to reduce inputs.</p> <p>Soil quality: Organic carbon has been decreasing due to changes in agricultural practices over the last 50 years.</p>
Aesthetic quality	<p>Lowland landscapes: The nature of many lowland landscapes has changed, mainly due to changes in agriculture, to new housing developments and associated transport infrastructures. The Common Agricultural Policy includes financial incentives for farmers to look after the countryside, although the effects of this are uncertain.</p> <p>Industrial plumes: Plumes from chimneys have reduced substantially since the 1960s and visibility improved as air pollution has been cut.</p> <p>Odours: There has been a downward trend in the number of complaints from industrial premises since the mid-1990s, linked to tighter regulation.</p>

Source: Environment Agency (2000) *Environment 2000 and beyond*.

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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

Wiser, sustainable use of natural resources

JULY 2001



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A FRAMEWORK FOR CHANGE

Wiser, sustainable use of natural resources

JULY 2001

Wiser, sustainable use of natural resources

“The central theme of our approach is a more productive use of environmental resources. It is clear that if we continue to grow, and share the benefits of that growth; we must reduce the impact of growth on the environment.”

TONY BLAIR, PRIME MINISTER. OCTOBER 2000

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision's* nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Wiser, sustainable use of natural resources

Society's demands for water, energy and minerals are increasing, and are likely to become more intense as more houses are built, the population expands and standards of living rise. Continued and lasting improvements in resource efficiency are therefore essential if we are to achieve sustainable development. We need to identify innovative solutions which will radically change our demands on natural resources in the future whilst introducing changes now, wherever we can.

Consumption of goods is increasing more rapidly than the economy, largely due to an increase in the number of households. Households are becoming smaller, with many people now living alone. Some four million new homes are needed in England and Wales between 1996 and 2021, including many in the South East where some resources are already stretched. Table 1 (page 17) shows the regional variation in some key pressures on the environment resulting from resource use.

Waste production

The quantity of waste produced is also rising. Its treatment and disposal causes pressure on the environment. More houses, roads and cars will mean greater consumption of resources in future unless more reduction, reuse and recycling takes place. Consumption of renewable resources is of less concern than consumption of non-renewable resources. Demands for certain types of goods can exert pressures on the environment in other parts of the world and any transportation required will have associated environmental impacts.

Sustainable resource use

We need to understand and plan for the truly sustainable rate of consumption of 'renewable' resources such as water and balance that with the needs of wildlife and the quality of life and the environment. The move towards resource rather than waste management is also reflected in the proposed European 6th Environment Action Programme whose principles are picked up and developed in this *Framework*. The return of water to rivers as high-quality effluent is essential to support uses downstream in many catchments. Removal of finite resources such as fossil fuels

and minerals needs to be prudent to conserve stocks for future generations and to minimise local and more widely-felt impacts. Table 2 (page 18) shows the current state and associated trends for a number of key resources in England and Wales.

3. The Environment Agency's role

The Environment Agency is directly responsible for regulating the overall environmental performance of a broad range of activities that consume natural resources, and for controlling wastes. Through effective regulation we seek to protect or enhance the environment as a whole and to require or encourage more efficient use or management of natural resources.

Direct regulatory controls

This includes controls over the energy, manufacturing and service industries, chemical and steel works, oil refineries, waste management sites, and the water and nuclear energy industries. The principal environmental protection regimes are applied through Integrated Pollution Control (Environmental Protection Act (EPA) 1990 Part I), waste management regulation (mostly through EPA Part II), and the Radioactive Substances Act 1993. Many IPC and waste facilities will be introduced into regulation under the Pollution Prevention and Control Act 1999. There is considerable scope for the Agency to assist and encourage industry to be cleaner. The *Framework* document *A 'greener' business world* sets out how we can achieve real improvement.

The Pollution Prevention and Control Regulations were introduced in August 2000. They will introduce EC Integrated Pollution Prevention and Control (IPPC) Directive requirements for a wide range of activities including waste minimisation and resource and energy use.

The Agency manages the water resources of England and Wales by a strategic planning process and, at a local level, by the grant of abstraction licences and other authorisations under the Water Resources Act 1991. It regulates exploitation of inland fisheries through licences and regulations; this is considered in the *Framework* document *An enhanced environment for wildlife*.

Advising and influencing

We also **influence** a broad range of public and private sector organisations through:

- our role as a consultee in strategic planning by local and regional government to control development, transport, minerals and waste management, and water demand
- our input to central government planning through the National Waste Strategy for example, and the development of economic instruments aimed at influencing behaviours and environmental performance
- provision of information on the environmental performance of industries and waste production
- providing advice on waste minimisation and resource efficiencies and encouraging uptake of formal environment management systems such as EMAS and ISO14001.

Policy drivers

Our actions over the period of this *Framework* will be influenced by a variety of key national and international drivers, including:

- **European drivers:** The proposed Sixth Environment Action Programme of the European Community 2001–2010; European Directives on Landfill, End of Life Vehicles, Waste Incineration, Water Framework, Waste Electrical and Electronic Equipment, and revision of the Packaging and Packaging Waste Directive.

- **National and regional drivers:** Waste Strategy for England and Wales; review of policy on future provision for aggregates; Renewables Obligation; Energy Efficiency Standards of Performance; Planning Policy Guidance 22 on renewable energy; Water Bill; the Department for Environment, Food & Rural Affairs (DEFRA) (formerly DETR) Abstraction licence review; Water Industry Investment programmes; annual reviews of Water Company Water Resources Plans and Drought Contingency Plans.

4. Working in partnership

The Environment Agency works closely on policy development with the Department for Environment, Food & Rural Affairs (DEFRA), the Department of Trade and Industry (DTI) and the National Assembly for Wales (NAW). We also maintain links with the Department of Transport, Local Government and the Regions (DTLR). Our activities are framed by, and help to implement, a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White papers, and Modernising Government and Better Regulation policies.

The Agency maintains a number of collaborative relationships with public, private and voluntary sector organisations to plan and control resource use. Examples include:

- Waste minimisation clubs – the Agency is currently actively involved in over 50 schemes nationally, often with local small and medium sized enterprises;
- Non-governmental organisations and trade associations such as the Tidy Britain Group, the Country Landowners' Association and the Federation of Small Businesses – promoting awareness and avoidance of flytipping;
- Waste industry, academia and consultants – collaborative research and development into waste management science, public attitudes and life cycle assessment;
- Local government – planning for least environmental cost waste strategies through regional technical advisory bodies;
- Other EU member state regulators – to identify regulatory best practice and common standards;
- Government departments to develop better understanding of water demand and supply; waste generation and management; model resource use and substitution by renewables and better regulatory controls;
- Trade associations such as the metals recovery associations, Environmental Services Association and Water UK – to make regulation as simple but effective as possible and to develop tools and information jointly; and
- The public – the Agency depends on individuals for reports of incidents and, ultimately, consumer behaviour and personal responsibility for resource use and re-use/conservation.

We look to build on and develop these partnerships and develop new ones, to help achieve the goals set out in this *Framework*.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to resource use is that:

Business, public agencies, other organisations and individuals will minimise the waste they produce. They will reuse and recycle materials far more intensively and will make more efficient use of energy and materials.

Many of the mechanisms by which our resources can be sustainably managed are addressed through the *Frameworks* covering A 'greener' business world and *Restored, protected land with healthier soils and Improved and protected inland and coastal waters*. Making better use of resources will also help deliver our aspirations to improve the quality of life and enhance wildlife.

The Vision and long-term objectives will help achieve these outcomes:

- People will be aware of their natural resource consumption and take responsibility for the environmental impact of this.
- Water will be acknowledged as a valuable resource and will be used wisely by all sectors of society. The justifiable demands for water use will be understood and the means of meeting them in place.
- The majority of wastes will be disposed of as close to the source of origin as appropriate, taking full account of their environmental impact.
- Both business and the public sector will be adopting and implementing long-term strategies to reduce the consumption of energy and resources.
- Waste will be regarded by both industry and consumers as a potential resource, with the efficient reuse and recycling of materials the social norm.
- The built environment will be efficient in its use of energy, water, materials and space.
- Products will be designed, marketed and licensed to minimise environmental costs in manufacture/use/end of life; and make producers responsible for the end-of-life fate of products. Prices of goods will reflect all these costs, based on full global environmental impact.

We will seek to achieve these goals in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the Vision. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

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³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment*.

⁴ Environment Agency (July 2000) *Environmental Indicators*. A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Responsibility for resource consumption

Outcome 1 – People will be aware of their natural resource consumption and take responsibility for the environmental impact of this.

Tests for progress:

- Waste quantities and types generated by site and sector, and disposal routes, including re-use and recycling.
- Waste generated per unit of production.
- Numbers of fly-tipping incidents.
- Public participation in waste reduction programmes (e.g recycling schemes).
- Numbers of products with readily available environmental impact measures.
- Public awareness of environmental impacts (and the best options for minimising these).
- Non-renewable resources consumed per person .

GOAL	ACTIVITY
Goal 1.1 Accurate information on the environmental impacts of products and services and of wastes and their management will be readily available.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Provide LCA information in the public domain to encourage informed public input to local waste strategy development. • Introduce a standard waste classification system to facilitate data collection and reporting. • Undertake and publish, via the internet, regular national waste production and management surveys, moving to a continuous survey and reporting system. • Undertake materials-specific surveys e.g. batteries (important under possible producer responsibility schemes), mineral oils (significant ground and surface water pollutant) and construction materials (to complement industrial and commercial waste surveys). • Further develop life cycle assessment for waste production, treatment (including recycling and re-use) and disposal options. • Undertake and publish generic environmental and health risk assessments and supporting information on: <ul style="list-style-type: none"> – Landfill – energy from waste/incineration – composting – energy generation. • Collaborate in national programmes to promote greater waste and environmental awareness in the public. • Through the flytipping stakeholders group, launch multi-party initiatives and PR campaigns to encourage public participation to combat fly-tipping and illegal waste disposal. • Help develop and promote reliable environmental impact measures for products and services to encourage 'green consumerism', starting with motor cars.

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Water as a valuable resource

Outcome 2 – Water will be acknowledged to be a valuable resource and will be used wisely by all sectors of society. The justifiable demands for water use will be understood and the means of meeting them in place.

(See also *Framework document Improved and protected inland and coastal waters*)

Tests for progress:

- Water consumption per person.
- The balance between water supply and demand.

GOAL	ACTIVITY
Goal 2.1 Minimise additional abstraction and optimise timing of abstractions.	Short to medium term:
	<ul style="list-style-type: none"> • On an annual basis monitor and refine demand forecasts and review drought plans and water company water resource plans. • Develop Catchment Abstraction Management Strategies (CAMS) as a mechanism for providing information about water resource availability in each catchment, with the water industry, Local Authorities and Planning Authorities, English Nature, the Countryside Council for Wales, British Waterways and local people. • Identify damaging abstractions and implement a Government-agreed programme for their curtailment, seeking voluntary solutions where possible. • Set benchmarks for all direct abstractors and monitor compliance. • Influence the public's use of water to reduce or stabilise consumption. • Publicise water use benchmarks for industry. • Implement or facilitate actions required in the National Water Resources Strategy and eight Regional Strategies. • Implement, to a timescale agreed with Government, its requirements for the Abstraction Licensing Review and the actions to implement the proposed Water Bill.
	Medium term:
	<ul style="list-style-type: none"> • Ensure water use plans are completed for all IPPC authorised sites.

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Waste disposal

Outcome 3 – The majority of wastes will be disposed of as close to their source of origin as appropriate, taking full account of their environmental impact.

Tests for progress:

- All 10 regional waste strategies completed.
- All waste local plans completed.
- Whole environmental costs of waste management strategies.

GOAL	ACTIVITY
Goal 3.1 Strategic planning promotes sustainable waste management that reflects the Best Practicable Environmental Option (BPEO).	Short to medium term: <ul style="list-style-type: none"> • Support Regional Technical Advisory Bodies and Regional Planning fora in setting and then implementing (medium term) regional planning guidance and regional waste strategies reflecting BPEO and Life Cycle Analysis (LCA) or assessment.
Goal 3.2 Individual Planning permission applications for waste management facilities will be subject to rigorous risk assessment at that stage.	Short to medium term: <ul style="list-style-type: none"> • Work with local government and applicants for planning permissions to ensure full Agency involvement at as early a stage as possible in planning applications and Local Authority plans including full Environmental Impact Assessments, where required. • Provide guidance on the process and content of risk assessments for: <ul style="list-style-type: none"> – landfill – energy from waste/incineration – composting/biological treatment of wastes at both planning and environmental authorisation stages. • Promote 'twin tracking' of applications for planning permission and environmental authorisations. Medium term: <ul style="list-style-type: none"> • Re-assess with national and local government the ability of the planning system, and the Agency's role within it, to deliver an appropriate network of waste management facilities to allow National Waste Strategy targets to be met.

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Reducing energy and resource consumption

Outcome 4 – Both business and the public sector will be adopting and implementing long term strategies to reduce the consumption of energy and resources.

Tests for progress:

- Amounts of waste sent to landfill.
- Waste management facility risk and management performance, as measured by Operator and Pollution Risk Appraisal (OPRA) schemes.
- Numbers of sectoral benchmarks of environmental performance available.
- Overall resource use by industry.
- Local authorities' recycling rates.
- Completion of waste and minerals local plans.
- Hazardous waste produced in identified sectors.
- Quantities of hazardous substances released to the environment from regulated processes.
- The use of substitutes or safer alternatives to hazardous substances.

GOAL	ACTIVITY
Goal 4.1 Organisations will use resources wisely and minimise waste generation.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Promote voluntary waste exchange and the use of waste derived secondary materials through publishing information from our waste survey. • Use Agency survey information to target our waste minimisation efforts on hazardous wastes, concentrating on the biggest or the environmentally significant producers. • Undertake collaborative research and data collection to identify materials and resource flows in England and Wales. • Inform industry of sector-specific benchmarks and performance on waste generation, through accurate data sets for materials use and waste, and through surveys, R&D, self reporting by industry and data from regulatory activity. Publish after completion of waste arisings surveys. • Introduce risk and performance related charges for Waste Management Licences, and consider their extension to other regulatory regimes. • Advise Government on performance of local authorities in meeting recycling targets and inform review of future targets. • Assess the impact of the Landfill Tax and other economic instruments e.g. Packaging PRNs and Climate Change Levy, to advise Government on setting and refining them. • Work with Government and industry/academia to model the "sustainable" rate of use of finite resources, including the rate of replacement of non-renewable sources by renewable, to guide policy making. • Advise Government on the environmental implications of energy generation and use strategies to inform energy strategy development. • Extend LCA techniques to cover aggregates and use to advise on and influence local minerals development plans. Press Government for completion date for all Minerals Local Plans.

Reducing energy and resource consumption *continued*

	<ul style="list-style-type: none"> • Require all major industries permitted under IPPC to have resource, waste minimisation and energy efficiency plans and benchmarking within 2 years of authorisation. • Publish a league table on energy use and resource use by industry sector drawing on energy and resource use plans, starting 12 months from the introduction of IPPC to individual sectors.
Goal 4.2 Developments in 'green' chemistry and clean technology are incorporated into the sustainable production and use of chemicals.	<p>Medium term:</p> <ul style="list-style-type: none"> • Monitor the impact and effectiveness of tradable permits for local authorities under the Landfill Directive to enable full reporting in time for the first Waste Strategy diversion target in 2010. <p>Short to medium term:</p> <ul style="list-style-type: none"> • Implement Agency Chemicals Strategy: establish priority chemicals, identify sources (point and diffuse) and develop cost effective reduction programmes for priority chemicals. • Support DEFRA chemicals stakeholder forum. • Promote the development and use of clean technologies and 'green chemistry'.

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Re-use and recycling

Outcome 5 – Waste will be regarded by both industry and consumers as a potential resource, with the efficient re-use and recycling of materials the social norm.

Tests for progress:

- Demand for primary soil additives.
- Illegal waste management activity and pressure for recycling.
- Regional and local minerals planning informed by secondary materials information.
- Use of secondary minerals.
- Agency 'green' purchasing policy influences and sets the trend for public and private sector procurement.
- Progress towards National Waste Strategy targets on waste recycling and reliance on landfill.

GOAL	ACTIVITY
Goal 5.1 Appropriate recovery of waste will be encouraged.	Short to medium term: <ul style="list-style-type: none"> • Encourage controlled application of waste derived soil improvers through the provision of guidance and information and appropriate regulation. • Enforce rigorously regulations to prevent inappropriate applications of materials to soil. • Advise Government on improving exemptions from waste management licensing to allow greater monitoring and control of application of controlled wastes to land. • Introduce risk based permits and charges for authorised treatment and disposal of materials to land.
Goal 5.2 The re-use and recycling of secondary minerals is encouraged.	Short to medium term: <ul style="list-style-type: none"> • Increase the proportion of secondary minerals/aggregates and other construction materials in Agency capital works. • Improve quality and availability of information on secondary minerals, including construction and demolition waste, through targeted surveys. • Help Government review the aggregates levy and Minerals Planning Guidance 6 including consideration of targets for secondary minerals/aggregates. • Agree procedures to allow industry to demonstrate fitness for purpose of waste derived aggregates e.g. furnace bottom ash, foundry sand and other metal production slags. • Influence bodies setting aggregates specifications to encourage the highest possible use of secondary aggregates.

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Resource efficiency in the built environment**Outcome 6 – The built environment will be energy, water, materials and spatially efficient.****Tests for progress:**

- Balance between water supply and demand.
- New opportunities and markets for construction materials derived from secondary materials.

GOAL	ACTIVITY
Goal 6.1 Planning guidance and building regulations encourage efficient resource use.	Short to medium term: <ul style="list-style-type: none"> • Use the water resource planning process to inform the Agency's comments on local authority plans. • Seek to influence the planning process to ensure that all new buildings are water and energy efficient. • Work with Government and industry to develop LCA techniques and supporting data for whole life costing of domestic and commercial buildings to inform the Conservation Best Practice Programme. • Develop guidance with industry on fitness for purpose for the re-use of previously developed or contaminated ("brown-field") sites to encourage urban re-development.

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Producer responsibility

Outcome 7 – Products will be designed, marketed and licensed to minimise environmental costs in manufacture/use/end-of-life; and make producers responsible for end-of-life fate of products. Price of goods will reflect all of these costs based on a full global environmental impact.

Tests for progress:

- Illegal disposal of tyres.
- Beneficial use of tyres.
- Progress towards targets set under the End-of-Life Vehicle and Waste Electrical and Electronic Equipment Directives and associated producer responsibilities.
- Cost effective and efficient new producer responsibility schemes identified and implemented.
- Compliance with waste management and producer responsibility regulations.
- No artificial regulatory barriers to secondary materials markets.

GOAL	ACTIVITY
Goal 7.1 Further development of producer responsibility schemes.	Short to medium term:
	<ul style="list-style-type: none"> • Gather information on tyre disposal and best practice. • Work with DEFRA and DTI and the industry on potential schemes for producer responsibility for mineral oils, batteries and tyres. • Work with and support industry in preparing producer responsibilities for other waste streams – in strategic, regulatory and economic terms. • Help to influence EU & UK Government to identify new producer responsibility streams by provision of information on LCA, environmental burdens and associated risks. • Explore producer responsibility mechanisms with industry and Government to identify the most efficient and effective system in each case, helping avoid administrative burdens. • Undertake Research and Development (R&D) and information gathering to support the development of appropriate schemes, including LCA assessment of priority waste streams. • Engage with Government and EU to clarify the definition of 'waste' and 'recycling' to remove unnecessary regulatory barriers to reuse, recovery and recycling.
	Medium term: <ul style="list-style-type: none"> • Help to evaluate pilot producer responsibility schemes and work with Government on any extension.

Environment Agency's role is central

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7. Research and development

We will need to increase our R&D and development of new tools to allow the assessment of the environmental burdens and health impacts of resource use and facilities involved in regulating or re-use.

We need a better understanding of materials movements through the economy to identify what can be done to reduce demand or wastage. We will also need to increase our work in monitoring and predicting the impact of new approaches such as using economic instruments or producer responsibilities. We will continue and extend our research on LCA.

8. Implications for the Environment Agency

Most of the Agency's regulatory effort goes into controlling the use of natural resources, such as water and minerals, and into controlling wastes. Regulation is becoming more complex. We will continue to regulate in a firm but fair manner, and we will target our resources on those sites and operators presenting the greatest environmental risks. We will ensure that administrative and bureaucratic aspects are minimised. We need to do more to change behavior and attitudes.

The Agency's ability to deliver these goals varies. Some are entirely within our power, while others depend on persuading the Government to introduce legislative changes or on the Agency working with or influencing others. Successful delivery will require the Agency to:

Expertise and awareness

- Develop a better understanding of what resources we use, what wastes we generate, and how they are managed.
- Enhance existing expertise in LCA.
- Increase understanding of the effect of economic instruments.
- Increase influencing and communication skills.
- Increase core competence in the assessment and development of policy on the use of natural resources.

Policies and strategies

- Assist national regional and local government in completion of local waste plans.
- Develop policies and procedures to implement the Water Bill.
- Implement the National Water Resource Strategy.
- Implement CAMS and associated resource assessments.
- Seek increased levels of fines so that they act as a significant deterrent to non-compliance with environmental legislation.

Monitoring and reporting

- Extend coverage of the Pollution Inventory to cover landfill sites.
- Continue water demand monitoring and refine demand forecasts.
- Benchmark efficiency levels within and between sectors.
- Transfer monitoring and reporting responsibilities to regulated organisations.

Knowledge

- Develop better understanding of tyre disposal and best practice.
- Develop and promote better understanding of quantities of water saved and costs involved in a range of demand management options.
- Improve quality and coverage of information on wastes generated and resource use in all industry sectors.
- Improve quality and availability of construction and demolition waste generation data.
- Improve understanding of environmental and health impacts of resource use and reuse/recycling.

Influencing and education

- Influence the behavior of others to reduce demand on resources.
- Influence regional and local strategic planning by regional and local government.
- Exert greater influence and enforcement in the areas of producer responsibility.
- Influence bodies setting aggregates specifications to choose appropriate secondary aggregates on the basis of LCA and fitness for purpose.
- Influence regional and local waste strategies and undertake publicity campaigns to promote environmentally beneficial recycling.
- Encourage, with others, consumer choice of lower environmental cost options of high-profile consumer products and services.
- Carry out targeted campaigns for waste minimisation and pollution prevention to promote increased resource efficiency, using resource use benchmarks.
- Maintain best practice procedures to allow industry to demonstrate fitness for purpose of secondary aggregates/construction materials.
- Work with industry to influence Government to introduce a UK-wide waste classification scheme.
- Influence Government to review and improve aggregates levy and MPG6 and in considering more use of economic instruments to increase use of secondary construction materials.
- Influence development of regional waste planning guidance to reflect LCA and best environmental option waste solutions.

New and revised regulations

- Provide advice to Government in the areas of economic instruments and the design of appropriate producer responsibility schemes for wastes.
- Work with Government to:
 - clarify the energy strategy.
 - develop and implement controls on composting.
 - improve waste management licensing exemptions for use of construction and demolition wastes for land reclamation/improvement schemes.
 - help develop and then implement producer responsibility for tyres, end of life vehicles and electrical/electronic equipment.
 - identify and support new producer responsibility streams on the basis of LCA and environmental burdens.
 - assist in preparing and introducing waste reporting systems to satisfy the EU waste statistics Regulations.
 - influence EU to improve the European Waste Catalogue to allow monitoring of materials in the economy and to support national and international waste and materials strategies.
- Co-operate with local government and other landowners in controlling fly-tipping.

The planning system

- Ensure that planning for the built environment is guided by Agency water resource strategies.
- Work with Government and local authorities to ensure that all planning permission applications meet appropriate requirements of the EC and UK Environmental Impact Assessment (EIA) Directive and regulations.

TABLE 1: Regional variation in relative environmental pressures on natural resources

Stress	Anglian	Midland	North East	North West	Southern	South West	Thames	Wales
Households	L	M	M	M	H	L	H	L
Public water supply demands and availability	M	H	L	M	M	M	H	L
Water availability per person	H	M	M	M	H	L	H	L
Area worked for aggregates	L	M	M	L	H	M	H	(M)
Waste arisings (municipal)	M	H	M	M	M	L	H	L

KEY

Regions with the greatest stress are denoted H, and Regions with relatively low stress, others are denoted M. Where data are lacking, moderate M has been assumed and placed in brackets.

Sources: Environment Agency (2000) *Environment 2000 and beyond*

Environment Agency (1998) *The state of the environment of England and Wales: fresh waters*.

TABLE 2: Summary of the state of key natural resources and associated trends

Resource	State and trends
<p>Water</p> <p>The total quantity of fresh water abstracted in England and Wales has fallen by 16% since 1971, mainly due to less use by industry.</p> <p>Even after allowing for further leakage reduction and other demand management initiatives, some modest resource developments may be necessary to meet local growth in demand.</p> <p>Minerals</p> <p>Reserves of oil and gas have remained roughly constant over the past decade (the lifetime of known reserves extends with technological and market developments). Consumption is about 1.2 tonnes of oil and 1.5 tonnes of gas (oil equivalent) per person per year.</p> <p>An average of over four tonnes of aggregates and 400kg of cement per person per year are used for roads, houses and other buildings. Demand is expected to go up by between 25 and 40 per cent by 2011.</p> <p>Peat demand for horticulture increased by 52 per cent between 1980 and 1990; its use in gardening continues to rise.</p> <p>The UK has world class resources of industrial minerals such as china clay and ball clay where demand continues to grow.</p>	
Energy	<p>Energy consumption has increased slightly since 1970 despite energy efficiency programmes, although at a lesser rate than GDP.</p> <p>Electricity meets more of the total energy demand now than in the past because of its use in appliances and air conditioning. Much more electricity is now generated by gas, a cleaner fuel than other options.</p> <p>Carbon dioxide emissions fell by 7% between 1990 and 1998 and are projected to fall further; they are still much greater per person than for most other countries in the world.</p> <p>The Government's Non-Fossil Fuel Obligation (Sept 1998) should lead to 5% of UK electricity supplied by renewables by 2003, up from the current 2%. The Government's future renewable energy policy consultation (2000) has a target of 10% of UK electricity supplied by renewables, cost-effectively, by 2010.</p> <p>Combined heat and power schemes, which are more efficient, produced 6% of UK electricity in 1998. This is expected to more than double by 2010.</p> <p>Nuclear power stations generated 27 per cent of UK electricity in 1998 but two-thirds of stations are expected to close by 2012.</p>
Waste	<p>In the UK we produce 400 million tonnes of solid and sludge waste per annum, 100 million tonnes of it from industry, commerce and households. Household waste is growing by around 3% each year.</p> <p>The Government's target is to reduce industrial and commercial waste going to landfill to 85 per cent of 1998 levels and to recycle or compost at least 25% of household waste by 2005; and at least 33% by 2015.</p> <p>Landfill voidspace is becoming increasingly scarce in England and Wales and targets in the Landfill Directive will mean reducing the biodegradable municipal waste going to landfill to 75% of that produced in 1995 by 2010; falling to 35% by 2020.</p>

Source: Environment Agency (2000) *Environment 2000 and beyond*.

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A FRAMEWORK FOR CHANGE

Limiting and adapting to climate change

JULY 2001

Limiting and adapting to climate change

“Climate change is not some trendy intellectual scenario for the distant future. It is with us now”

MICHAEL MEACHER, ENVIRONMENT MINISTER, OCTOBER 2000

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision's* nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Limiting and adapting to climate change

Climate change is likely to have a major effect both on the natural world and human society. At the same time, policies that address climate change will deliver homes that are better insulated, industry that is more fuel efficient and competitive, better public transport and business opportunities in the important global market for environmental technology. Climate change is, therefore, both a challenge and an opportunity.

If we do not act to limit emissions of greenhouse gases, the world's temperature could rise by between 1.4 °C and 5.8 °C by the end of this century. This would be the fastest rate of warming since the end of the last ice age 10,000 years ago³.

The pattern of the world's weather is also predicted to change, with an increase in the intensity and frequency of some extremes becoming evident. This could increase the frequency and intensity of heat waves, floods, drought and storms. Combined with rising sea levels, these effects would have significant impacts on water resources, agriculture, wildlife and human health.

Possible scenarios

Research has produced a range of climate change scenarios that allow us to begin to understand the possible impacts on the environment of different concentrations of carbon dioxide (CO₂) in the atmosphere. These stabilisation scenarios suggest that if we do not act to reduce CO₂ emissions global temperatures could rise by 2 °C by the 2050s.

The climate change scenarios show that we could delay this increase by more than a century if we stabilise CO₂ concentrations at 550 parts per million (ppm). Stabilising CO₂ concentrations in the atmosphere at this level would similarly delay by about 40 years the 40cm rise in sea level expected by the 2080s under a "business as usual" scenario⁴. To stabilise CO₂ concentrations at 550 ppm would require a 60% reduction in emissions from 1990 levels and perhaps even more than this for developed countries if they recognise the need to allow for real growth in the emissions from developing countries.

³ Intergovernmental Panel on Climate Change 2001: *Third assessment report on climate change*.

⁴ The Meteorological Office, (1999) *Climate Change and its Impacts: Stabilisation of CO₂ in the atmosphere*.

Greenhouse gases

Carbon dioxide and methane are the two principal greenhouse gases (Figure 1). They contribute 84% and 8% respectively to the UK's emissions when measured on a scale that takes account of their total global warming effect (global warming potential). The biggest source of greenhouse gases is combustion of fossil fuels whilst agriculture and waste are major sources of methane (Figure 2).

Growth in private transport, domestic energy use and the number of households are amongst a number of societal trends which threaten to dwarf emissions reductions made by industries regulated by the Agency and other bodies.

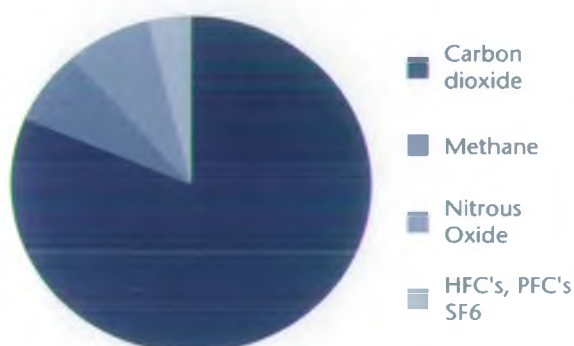


Figure 1: UK emissions of greenhouse gases, measured in global warming potential.

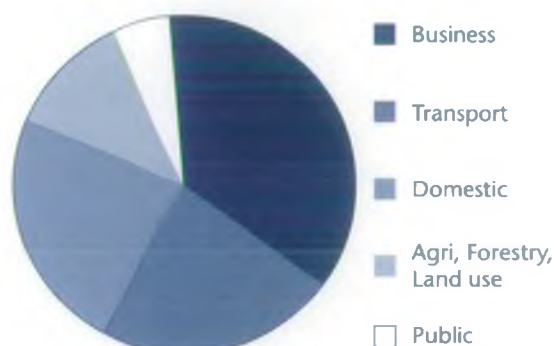


Figure 2: UK sources of emissions of greenhouse gases

The international response to concern about climate change was the United Nations Framework Convention on Climate Change, agreed at the 1992 Earth Summit in Rio de Janeiro. This Framework was further strengthened by the adoption of the Kyoto Protocol in 1997 in which developed countries have agreed to reduce their overall emissions of greenhouse gases by 5.2% over the period 2008–2012 (using 1990 as a baseline). These targets are legally binding and were also differentiated between parties: the member states of the European Union agreed to an 8% cut, for example. In addition EU member states decided to meet their commitments jointly under the 'bubble' arrangement, under which the UK has agreed to reduce its emissions by 12.5%.

The Government published its Climate Change Programme in November 2000⁵. This showed that the UK's greenhouse gas emissions were projected to reach 13.5% below 1990 levels by the end of the year 2000. This exceeds the UK's Kyoto Protocol target to be achieved by 2008–2012.

Where the impacts of the policies it puts forward can be quantified, the Government's Programme could cut CO₂ emissions to about 19% below 1990 levels by 2010. However, the UK's reductions in emissions between 1990 and 2000 were achieved in part through a substantial contribution made by fuel switching in energy production from coal to natural gas. This was a once only benefit and further reductions in emissions will be more difficult to achieve. Sustaining progress to 2050 and beyond – moving toward a low-carbon economy – will require fundamental policy shifts. The Agency believes that it will require a whole economy transition, including a significant increase in support for renewable energy technologies, to facilitate this.

⁵ The Stationery Office, (November 2000) *Climate change: The UK Programme*.

Regional differences

Climate change will have profound effects on society and the natural environment. In the UK, scenarios for climate change predict lower summer rainfall in the South East and higher winter rainfall, rising sea levels, more frequent extreme weather events and greater regional variability in climate. The predictions show warming generally being faster in the south east of the UK compared with north west England⁶. Table 1 indicates current regional activity on climate change and the vulnerability of regions to some important climate change impacts.

Table 2 (page 20) indicates the key impacts and trends that climate change will have on the environment.

3. The Environment Agency's role

The Agency is in the front line in tackling climate change, both as regulator of processes that give rise to about half of the current emissions of greenhouse gases, and as the body responsible for many functions that will be affected by a changing climate, such as flood defence. The Agency regards climate change as the most significant environmental challenge that it faces. We respond regularly to Government consultations and play an active role in policy development.

To encourage a reduction in CO₂ emissions, the Agency participated in the process that led to energy intensive industries being offered the incentive of lower climate change levies in return for voluntary agreements to reduce energy consumption.

We are keen to ensure complementarity between these agreements and the energy efficiency component of the EU Directive on Integrated Pollution Prevention and Control (IPPC). These measures, together with the domestic carbon-trading scheme, will yield significant energy savings.

National framework

The Agency's efforts in adapting to the impacts of a changing climate are set in the context of the framework provided by the Department for Environment, Food & Rural Affairs (DEFRA) and the UK Climate Impacts Programme (UKCIP), which includes the Agency on its steering committee.

The Agency has contributed to a series of studies of the likely regional impacts of climate change. These studies allowed us to pool our knowledge with other affected parties and decision-makers.

The four basic scenarios of climate change published by the UKCIP made it possible to ensure a common basis to the regional studies. The scenarios also assisted the Agency in developing its response to climate change in the UK. They were developed by the Hadley Centre at the Meteorological Office and the Climatic Research Unit at the University of East Anglia and are based on the UK Global Climate Model⁷. These scenarios represent some of the most up-to-date simulations of the UK's climate to the end of this century. They are currently being updated to provide greater resolution and to reflect the latest Inter-governmental Panel on Climate Change thinking on emissions.

⁶ UKCIP, Hadley Centre and University of East Anglia (1998) *Climate change scenarios for the UK*.

⁷ UKCIP, Hadley Centre and University of East Anglia (1998). *Op cit*.

Our role will, of course, change over the lifetime of this *Framework*. For example, a shift to control of greenhouse gases based on carbon trading may result in the Agency playing a verification and/or policing role. In any case, there will clearly be a need to verify, with some precision, the levels of emissions of greenhouse gases.

Future initiatives

The Agency will review the environmental implications of the various options that could contribute to a long term energy strategy for the UK and make an informed contribution to the public debate.

We will improve our understanding of the direct effects of climate change, particularly in terms of changes to sea level and the impacts of an expected increase in storms and rainfall intensity.

Our work on adapting to climate change will include evaluating the protection afforded by existing flood defences against a range of scenarios for climate change. We will also initiate a forum to generate practical guidance for future design standards. If necessary, we will substantially increase our investment in flood defences to maintain the level of protection.

In addition, we will not only lead by example but will also place more emphasis on promoting and sharing our approaches with other public bodies.

Policy drivers

Among the key national and international drivers that will influence our actions over the period of this *Framework* are:

- **International drivers:** United Nations Framework Convention on Climate Change, Kyoto Protocol.
- **European drivers:** The proposed Sixth Environment Action Programme of the European Community 2001–2010. Directives on Integrated Pollution Prevention and Control, Landfill, and Habitats; EU Kyoto agreements on burden sharing and EU voluntary agreements on CO₂ from cars.
- **National and regional drivers:** Climate Change: The UK Programme; UK Sustainable Development Strategy; Utilities Bill; Renewables Obligation; Energy Efficiency Standards of Performance; Climate Change Levy; UK Climate Impacts Programme; Planning Policy Guidance 22 on Renewable Energy.

4. Working in partnership

The Agency works closely on policy development with the Department for Environment, Food & Rural Affairs (DEFRA), the Department of Trade and Industry (DTI), and the National Assembly for Wales (NAW). Our activities are framed by, and help to implement, a range of Government policies and commitments, including its Sustainable Development Strategy (and the supporting strategies and schemes of the DTI and NAW), its Urban and Rural White papers, and Modernising Government and Better Regulation policies. Of specific relevance to this *Framework* is the Governments' UK Climate Change Programme.

Wherever possible, the Agency will identify partners to further sustainable development through tackling climate change. We already work with a wide range of organisations to make best use of our resources and to help to spread best practice. In particular, under the umbrella of the UK Climate Impacts Programme the Agency is a key player in promoting prudent adaptation to the impacts of climate change through a number of collaborative regional studies. We have played, and will continue to play, an active role in the following regional partnerships and studies:

- *Climate Change Impacts in North West England*
- *Climate Change Impacts in East Midlands*
- *Climate Change Impacts in West Midlands*
- *Climate Change Impacts in the South East of England*
- *The Climatic Challenge: Climate Change Impacts in South West England*
- *Regional Integrated Assessment of Climate Change Impacts in the NW/East Anglia (REGIS)*
- *Scoping Study on Climate Change Impacts in Wales*
- *The impacts of climate change on natural resources – for example the impact on water quality, water resources and conservation*
- *The risks and uncertainties in decision making in the light of climate change*
- *Socio-economic scenarios for assessing the impact of climate change.*

Moreover, the Agency has particularly good links with DEFRA in this area, and we collaborate on policy development and the identification of research needs (see section 7).

The Agency also works closely with a wide range of other public bodies, such as English Nature and the Countryside Agency and the Countryside Council for Wales. We also co-operate with non-governmental organisations (NGOs), such as the National Trust.

Partnerships will, of course, change over time. Regulation of greenhouse emissions will evolve. Changes to the climate change levy and the carbon trading scheme are both possibilities over the lifetime of this *Framework*. In particular, discussions between the Agency and DEFRA could mean that we will play a key role in the scheme for carbon trading.

New partnerships with NGOs are also likely to develop out of the Agency's commitment to support Government in its view that there is a wide range of other groups, organisations and individuals whose contributions will be critical to the success of the UK climate change programme. The Agency will expand its role in influencing public policy to help this process.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to climate change is that:

Drastic cuts will have been made in the emission of 'greenhouse gases' such as carbon dioxide; and society as a whole will take account of and be prepared for the probable changes to our climate.

This *Framework* clearly does not stand in isolation from the others and the need for the Agency to lead by example is a common theme in them all. Consideration of economic instruments and negotiated agreements link this *Framework* to A 'greener' business world and *Wiser, sustainable use of natural resources*. Similarly, issues relating to risk and inventories of emissions are a common

link between this report and the *Framework* documents covering *Restored and protected land and healthier soils*; *Wiser, sustainable use of natural resources*, and *A 'greener' business world*.

The *Vision* and long-term objectives will help achieve these outcomes:

- Energy efficiency programmes will be an integral part of all industrial sectors, transport and domestic life.
- 'Greenhouse gas' emissions from all sources will have been quantified and greatly reduced, with an evident trend showing continuous enhancement.
- Energy and transport policies will take full account of their environmental impacts.
- The basis for positive attempts to remove carbon from the atmosphere will be better understood.
- Society will have accepted the reality of climate change, and will be prepared to take the appropriate actions and bear the necessary costs of limitation and adaptation.
- Uncertainty over future impacts of climate change will have been incorporated into long-term decision making, and reflected in environmental standards and targets.
- Environmental needs for water and the continuity of public supply will be in balance as the climate changes.
- Environmental monitoring programmes will provide accurate information on the direct effects of climate change.

We have identified a number of goals we intend to achieve between now and 2008. We will seek to meet these goals in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the *Vision*. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators⁸ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁹ that will be used to show progress towards the vision. In addition to these, we have included some key tests for progress for each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the activities to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

⁸ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment*.

⁹ Environment Agency (July 2000) *Environmental Indicators*. A set of Environmental Indicators for Agency use. (also available on the Agency's website at <http://www.environment-agency.gov.uk>)

Energy efficiency

Outcome 1 – Energy efficiency programmes will be an integral part of all industrial sectors, transport and domestic life.

Tests for progress:

- Proportion of industry with energy management programmes.
- Fuel efficiency of vehicles in the UK.
- Numbers of houses with unsatisfactory energy efficiency.
- The heating requirement of the average UK building.
- Use of combined heat and power.

GOAL	ACTIVITY
Goal 1.1 The focus is maintained on improving the efficiency of energy use and distribution as a key means of reducing fossil-fuel emissions and reducing energy demand.	Short to medium term:
	<ul style="list-style-type: none"> • Ensure that energy efficiency is actively reviewed and improved at all regulated sites, including the productive use of excess heat
	<ul style="list-style-type: none"> • Support partnerships to promote domestic energy efficiency; highlight the need for improved energy ratings for new houses.
	<ul style="list-style-type: none"> • In partnership with the Energy Saving Trust, strengthen energy efficiency education with industry and the public.

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Reduce emissions

Outcome 2 –Greenhouse gas emissions from all sources will have been quantified and greatly reduced, with an evident trend showing continuous enhancement.

(see also *Framework* document A 'greener' business world)

Tests for progress:

- Reduction in the emissions of the comprehensive inventory of greenhouse gases.

GOAL	ACTIVITY
Goal 2.1 Those industries we regulate under national and European law meet all legal requirements, to ensure a level playing field.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Finalise arrangements for satisfying IPPC requirements within the climate change levy agreements and the greenhouse gas emissions trading scheme. <p>Medium term:</p> <ul style="list-style-type: none"> • Introduce IPPC (phased to 2007). • Fully implement IPPC: energy efficiency and named greenhouse gas emissions for Agency-regulated sites being reduced to contribute to meeting Government climate change targets.
Goal 2.2 Lists produced of the most relevant industrial sites and report on their performance, to build environmental performance as a key issue for industrial competitiveness.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Agree with stakeholders the procedure for classification of industrial site priorities. • Publish details of the performance of the most relevant industrial sites.
Goal 2.3 The emissions of other greenhouse gases reduced as part of the regulatory process, so that all stakeholders play their part.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Reduce greenhouse gas emissions from Agency-regulated sites. • Build requirement for estimation of greenhouse gas emissions into regulatory reviews of permits.
Goal 2.4 The relative role of different greenhouse-gas emissions from all sources continually reviewed, to ensure fair play and that everyone plays their part, and to give industry benchmarks to strive for in improving their environmental performance.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Use the Agency Pollution Inventory to provide an estimate of the releases of greenhouse gases from Agency-regulated processes, with an understanding of the uncertainty attached to such estimates. • Assess the options for controlling industrial releases of greenhouse gases other than CO₂.
Goal 2.5 The spreading of best practice assisted – by measuring the success of our regulatory role – including regulation of methane emissions from landfill sites. These estimates compared with those made by others for other sources.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Review the programme to monitor reduction of methane emissions. • Compare internal estimates of Agency-regulated emissions with estimates made by others. • Contribute to a programme to monitor methane and N₂O from agriculture, forestry and land use. • Use regional partnerships to encourage the public to reduce the amount of domestic waste.

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Reduce emissions *continued*

Goal 2.6 League tables of greenhouse gas emissions from regulated sources produced and placed on the internet, so that best practice can be identified and promoted.	Medium term: <ul style="list-style-type: none"> • Produce league tables of named greenhouse gas emissions and place them on the internet. • Update the internet site on a regular basis in consultation with industry.
Goal 2.7 Estimates of methane emissions improved. Operators of landfill sites required to reduce emissions, by better management of the gases emitted and through reducing the amounts of biological waste deposited in them, so that landfill operators can improve their environmental performance.	Short to medium term: <ul style="list-style-type: none"> • Promote improvements in methodology for estimating methane emissions with landfill site operators; continue to push for reduction in methane emissions. Medium term: <ul style="list-style-type: none"> • Implement the Landfill Directive to timetable; publicise improvements in the reduction of biodegradable materials going to landfill as a result (see <i>Framework</i> document <i>Wiser, sustainable use of natural resources</i>).
Goal 2.8 Emissions from landfill sites compared across the country, so that operators can benchmark and improve environmental performance, by spreading best practice.	Medium term: <ul style="list-style-type: none"> • Initiate site benchmarking after agreeing the methodology with operators.
Goal 2.9 Waste reduction and management practices will have targets set in relation to emissions of greenhouse gases and energy use so that the waste sector plays its full part. Attention will be focussed on the roles of different forms of waste management.	Short to medium term: <ul style="list-style-type: none"> • Examine, in each region, the role of the waste sector, outlining how the region intends to move forward and giving clear details of its relationship and links within the Agency and with other regional partners. • Encourage the waste sector to set targets for the reduction of greenhouse gas emissions and energy use in the context of a long-term vision (see <i>Framework</i> document <i>Wiser, sustainable use of natural resources</i>).
Goal 2.10 More attention will be paid to diffuse sources of emissions, so that all sectors of the economy play their part.	Short to medium term: <ul style="list-style-type: none"> • Encourage better monitoring and source identification. • Build partnerships with stakeholders to help to take forward the Agency's long-term vision.
Goal 2.11 The Agency will lead by example. Emissions of greenhouse gases from our own activities assessed and published, showing to what extent we have succeeded in reducing them per unit of our own activity.	Short to medium term: <ul style="list-style-type: none"> • Publicise and have a programme of improvement for the emissions inventory from the Agency's activities. • Reduce the Agency's business mileage (by seven per cent in 2001/02 using a 1996/7 baseline); pioneer the use of a total emissions to air model; ensure that three per cent of the vehicle fleet use alternative fuels; and ensure that 1.2 million kWh of electricity used by the Agency is generated from renewable sources.

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Energy and transport

Outcome 3 – Energy and transport policies will take full account of their environmental emissions.**Tests for progress:**

- Percentage of electricity generated from renewable sources.
- Clear Government strategy to work towards a long-term energy vision for the UK, in which emissions of greenhouse gases arising from different energy sources are fully taken into account, both in energy pricing and in wider policy developments.

GOAL	ACTIVITY
Goal 3.1 The most effective mixture of economic measures, negotiated agreements and direct regulation to reduce industry's emissions of greenhouse gases determined.	Short to medium term: <ul style="list-style-type: none"> • Explore these issues with DETR, DTI, HM Treasury, HM Customs and Excise and industry sectors. Identify data and data validation needs (see <i>Framework</i> document <i>A greener business world</i>).
Goal 3.2 Options that can be applied to different industrial sectors produced and related to other efficiencies that could be derived in the overall efficient use of energy. Fair but firm regulation thereby developed.	Short to medium term: <ul style="list-style-type: none"> • Provide guidance, promote best options, and seek to influence others, and build these into reviews of sectors. • With Government and industry support the implementation of the carbon trading scheme. Medium term: <ul style="list-style-type: none"> • Promote, with industry, the adoption of Combined Heat and Power schemes.
Goal 3.3 The development of renewable energy encouraged and developed, in particular the achievement of the target of 10% of electricity from renewable sources by 2010.	Short to medium term: <ul style="list-style-type: none"> • Support the development of renewable energy through our own purchase of renewable electricity (1.2 million kWh in 2001/ 2002). • Participate in the development of regional renewable energy targets. Medium term: <ul style="list-style-type: none"> • Contribute to environmentally sensitive development of small-scale hydropower projects. • Ensure recognition and minimisation of the environmental impact of renewable energy developments.
Goal 3.4 Greater debate on the lifetime impact of different energy sources, the use of non-renewable resources, and the environmental impact as seen from all points of view promoted, with natural and social science at the heart of the debate on energy policy.	Short to medium term: <ul style="list-style-type: none"> • Run active campaigns for change, including educational activity. • Carry out research with stakeholders on environmental impacts of different energy sources, within a strategy to reduce greenhouse gases. • Promote an Agency view on the environmental impact of long-term energy supply, consistent with findings of study. Medium term: <ul style="list-style-type: none"> • Liase with stakeholders on the best way to promote a "sustainable energy future" in the UK.

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Removing CO₂

Outcome 4 – The basis for positive attempts to remove carbon from the atmosphere will be better understood.

Tests for progress:

- Consensus reached on the value of options for carbon sequestration.

GOAL	ACTIVITY
Goal 4.1 The focus on the environmental integrity of carbon sequestration options maintained, to avoid taking unacceptable risks.	Short to medium term: <ul style="list-style-type: none"> • Support and provide careful comment on research and development into the science and technology of carbon sequestration.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Social acceptance and action

Outcome 5 – Society will have accepted the reality of climate change, and will be prepared to take the appropriate actions and bear the necessary costs of limitation and adaptation. (See also Outcome 7 on meeting needs for water)

Tests for progress:

- A comprehensive programme in place throughout England and Wales for adapting to climate change.
- The Agency will have in place a comprehensive programme for adapting to climate change for all of its functions.

GOAL	ACTIVITY
Goal 5.1 The future protection afforded by existing flood defences evaluated against a range of predictions of climate change, so that the desired level of protection can be negotiated with a full range of stakeholders.	Short to medium term: <ul style="list-style-type: none"> • Produce an action plan for the Agency for flood defence, addressing the implications of climate change. • Promote understanding of the impact of climate change within flood awareness campaigns. • Evaluate the future protection afforded by existing flood defences against a range of climate change scenarios. Initiate forum to generate practical guidance for new design standards. • Review investment necessary to maintain level of protection (see <i>Framework</i> document <i>Reducing flood risk</i>).
Goal 5.2 A list of areas around the coast where we consider that it is unlikely to be appropriate to maintain publicly funded defences produced for discussion, so that informed debate can take place.	Short to medium term: <ul style="list-style-type: none"> • Evaluate areas around the coast where the maintenance of publicly funded flood defences is unlikely to be appropriate. • Promote, in our regions, the sustainable options they have adopted for flood defence – including managed retreat. • Begin to implement adaptation programme (see <i>Framework</i> document <i>Reducing flood risk</i>).
Goal 5.3 An improved understanding of the impacts of climate change.	Short to medium term: <ul style="list-style-type: none"> • A detailed analysis of the vulnerability of each of the Agency's functions to climate change that identifies priorities for action and options for adaptation. • An analysis of current and potential flood risks that reflect the implications of climate change and which would inform a 3-year review of PPG25. • Build partnerships with stakeholders, and provide environmental expertise to regional evaluations of the impact of climate change.
Goal 5.4 Systems more resilient to climate change through better land management.	Short to medium term: <ul style="list-style-type: none"> • Promote conservation objectives within the wider countryside; promote best management practices. • Link conservation sites through wildlife corridors to improve resilience (see <i>Framework</i> document <i>An enhanced environment for wildlife</i>).

Environment Agency's role is central

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Dealing with risk and uncertainty

Outcome 6 – Uncertainty over future impacts of climate change will have been incorporated into long-term decision making, and reflected in environmental standards and targets.
(See also Outcome 7 on meeting needs for water).

Tests for progress:

- Transparent process for setting environmental standards and targets, which takes account of risks and uncertainties.
- Policy and political debates over long-term decision making includes discussion of risk and uncertainty.

GOAL	ACTIVITY
Goal 6.1 Identification of key priorities for adaptation at a regional level.	Short to medium term: <ul style="list-style-type: none"> • Make an assessment of the sensitivity of the Agency regional operations to climate change and identifying adaptation priorities in association with other regional partners. • Demonstrate integration of guidance on decision making which takes into account the risk of climate change and the uncertainty inherent in forecasting medium- and long-term impacts of climate change. • Promote and contribute to regional "Partnerships for Change". • Promote and implement locally derived plans.

Meeting needs for water

Outcome 7 – Environmental needs for water and the continuity of public supply will be in balance as the climate changes.

Tests for progress:

- Maintenance of public supply.
- River flows.
- River water quality.

GOAL	ACTIVITY
Goal 7.1 Water companies' and other major water users' resource plans tested and made robust against a range of predictions of climate change, thereby demonstrating ability to maintain water supply without unacceptable environmental and social impacts. This will assist water companies in carrying out environmental benchmarking.	Short to medium term: <ul style="list-style-type: none"> • Complete the second stage analysis of the impacts of climate change for water resources. Utilise the thinking of the National Centre for Risk Analysis and Options Appraisal. Consult water companies and other major water users. • Evaluate robustness of each water company's water resources plan and drought plan, and resource plans of other major water users, against a range of scenarios for climate change. • Increase promotion of measures that reduce demand to address potential water shortfalls. • Promote improvements by water companies and other major water users. Take forward with respect to OFWAT/AMP4 process (see Framework document <i>Improved and protected inland and coastal waters</i>).

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Monitoring the environment

Outcome 8 – Environmental monitoring programmes will provide accurate information on the direct effects of climate change.**Tests for progress:**

- Peer review demonstrates that the Agency's methodologies for environmental monitoring are consistent with best practice.
- Opinion surveys of stakeholders demonstrate that the Agency's environmental monitoring is valued and is seen to be accurate.

GOAL	ACTIVITY
Goal 8.1 Predictive models improved and a greater sense of urgency achieved.	Short to medium term: <ul style="list-style-type: none"> • Report on the Agency's work plan for monitoring climate change. Explore with others opportunities for appropriate monitoring partnerships. • Develop and promote better techniques, for example through remote-sensing of land use, landform and algal/nutrient status of coastal waters. Take forward new monitoring partnerships. • Promote key aspects of the Agency's environmental information – and its accuracy/robustness – with the general public and media as part of strategy for education and influencing opinion. • Review environmental monitoring programme with stakeholders.
Goal 8.2 The likely effects on those wildlife and natural habitats for which we have direct responsibilities, assessed, particularly in the aquatic environment.	Short to medium term: <ul style="list-style-type: none"> • Maintain and refine the water quality and quantity monitoring arrangements necessary to inform targeting and achievement of this goal. • Examine the implications of climate change on water quantity and quality. Build findings into all forthcoming consent and licence reviews. • Ensure that water resources strategies are robust against the range of possible climate change scenarios. • Define ecologically acceptable river flows to protect fish stocks and fisheries. • Develop and disseminate best practice for fishery managers to provide options for a sustainable response to projected climate change. • Assess indirect impacts on habitats from increased recreation and navigation (see <i>Framework</i> document <i>An enhanced environment for wildlife</i>). • Assess with English Nature and the Countryside Council for Wales the likely effects on those wildlife and natural habitats for which the Agency has direct responsibilities, particularly in the aquatic environment. Develop a joint policy statement on climate change on terrestrial riverine and coastal Natura 2000 sites. • Work with DEFRA to develop policies to promote the migration of species and their re-establishment in more suitable areas.

Monitoring the environment *continued*

Goal 8.3 Baseline information at key environmental sites obtained to a high level of accuracy and precision – to record the effects of climate change.	Short to medium term: <ul style="list-style-type: none"> • Publish the Agency's baseline information at key environmental sites. • Assess the impact of climate change on water-based recreation and navigation.
Environment Agency's role is central	
Environment Agency as a substantial partner	
Environment Agency's involvement to build understanding	

7. Research and development

The Agency's R&D programme will make a clear contribution to delivering this *Framework*. Climate change R&D includes:

- An *Uptake Study* will build on *The Implications of Climate Change for the Agency* (R&D publication number 22) to determine the extent of business risk posed by climate change at a functional level (E2A(00)01).
- Improve our understanding of the releases of greenhouse gases to the atmosphere from processes that we regulate. This will yield important data on the cost of abatement options that will allow us to target regulatory effort where it has the greatest impact (P4A(99)05).
- *Integrated regional assessment of climate change impacts*. Collaborative work on adapting to the regional impacts of a changing climate – set in the context of DETR's UK Climate Impacts Programme (UKCIP), on whose steering committee we are represented (E2A(00)09).
- *Future climate change impacts and uncertainty – risk based methodologies and tools to aid decision making*. Develop approaches to dealing with the risks and uncertainties – for example, of changing flood zones or intense rainfall events – that are inherent in climate change science (E2B(99)05).
- *Long-term reference sites for monitoring climate change and other key monitoring programmes* (E1A(99)01) and a *Study of the impact of sea-level rise on coastal processes* which create our important inter-tidal wildlife habitats.
- *Climate change and the demand for water* (DEFRA-sponsored research): the Agency is represented on the steering group of this project, which is looking at demands from public water supply, agriculture, industry and recreation.

8. Implications for the Environment Agency

It will take partnership at varying levels to achieve our environmental outcomes for climate change. None of the outcomes are entirely within our power. Some, such as outcome 2 on quantification and reduction of emissions of greenhouse gases from all sources, depend in part on persuading the Government to introduce legislative changes.

Most outcomes, for example, numbers 1 and 3 on energy and transport, require working with or influencing others. Successful delivery will therefore require the Agency to:

Expertise and awareness

- Increase awareness internally of the relevance of climate change.
- Increase technical understanding of risks and uncertainties in climate science.

- Increase awareness in the Agency of international impacts of climate change and how they may influence the UK.
- Develop skills in communicating to the media the issues surrounding climate change.

Policies and strategies

- Develop and implement a strategy for responding to environmental stresses such as rising sea levels, greater intensity and duration of storms, water stress and the protection of habitats.
- Develop a policy for taking practical decisions on appropriate design criteria for new and refurbished flood defence structures, despite the inherent uncertainty of future conditions.
- Develop and implement a strategy for climate change R&D, with more support for work focussed on implementing the results or on regional collaboration.
- Develop and implement an Agency policy to ensure greater co-ordination at head office level on climate change.
- Develop a long-term vision of the environmental issues in a sustainable energy system for the UK.
- Develop a policy on risks and uncertainties in decision making in the light of climate change.

Monitoring and reporting

- Reporting on releases to air from Agency controlled processes, in relation to releases from other sources, through the National Atmospheric Emissions Inventory.
- Co-ordinate a programme of monitoring, measuring and reporting on changes to the natural environment.

Knowledge

- Develop a clear ownership, across the Agency, of responsibilities for climate change and share this with partners.
- Improve understanding of the technological options for controlling industrial releases of greenhouse gases other than carbon dioxide (nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) and how they might be controlled under the IPC/IPPC Directive.
- Improve understanding of technologies for methane capture and the potential for reducing emissions from landfills by methane oxidation.
- Improve understanding of technologies for carbon sequestration.

Influencing and education

- Liaison with others to communicate a consistent message.
- Play a role in educating the public, so that society accepts the reality of climate change, and is prepared to bear the necessary costs of limitation and adaptation.
- Play a role in influencing public policy, with a focus on ensuring that all sectors of the UK play their part in addressing climate change.
- Raise public awareness about the link between climate change and events such as an increased incidence of flooding or greater restriction on summers water usage.
- Make an informed contribution to public debate on the environmental implications of long-term energy policy for the UK.
- Influence industry, the public sector and other partners to promote energy efficiency.

New and revised regulations

- Focus more on energy efficiency, through the shift from regulation from Integrated Pollution Control (IPC) to Integrated Pollution Prevention and Control (IPPC).
- Interact more with other regulators to ensure our roles are complementary.
- Work with Government to ensure the environmental credibility of the carbon trading scheme.
- Work with Government to encourage the development of energy and transport policies where prices take better account of climate change.

The Planning System

- Work in partnership with DEFRA on R&D to examine the role of the planning system in adapting to climate change and reducing emissions of greenhouse gases.
- Contribute to guidance on good practice for planning for the impacts of climate change.

The bottom line

Climate change will affect us all. The Agency will play a key role in helping the UK prepare for climate change. We have set down our proposals in a series of ambitious goals. It is up to all of us to take action to limit climate change and adapt to its impacts.

TABLE 1: Regional analysis

Issue	Anglian East	Midland West	North	North West	Southern	South	Thames	Wales
Produce regional inventory of greenhouse gas emissions	X	X	X	✓	X	X	X	✓
Produce study into regional impacts of climate change	✓	✓	X	✓	✓	✓	✓	✓
Flood risk	M	M	H	M	M	L	H	L
Public water supply demands and availability	M	H	L	M	M	M	H	L
Sea level rise	H	N/A	M	L	H	M	H	M
Emissions of CO ₂ from major industry	M	H	H	M	M	L	L	M
Emissions from transport	M	H	M	M	L	L	H	L

KEY

Regions with the greatest risks are denoted H (high) and the Regions with relatively low stress, L (low). The other Regions are designated M (medium). X means no progress and progress made.

Source: Environment Agency (2000). *Environment 2000 and Beyond*.

TABLE 2: The state of the environment – key impacts and trends

Viewpoint	State and trends
Land use and resources	<p>Changes to temperature and precipitation: Air temperatures in the UK are increasing by between 0.1°C and 0.3°C per decade. In all scenarios, there is a SE-NW gradient for both precipitation and temperature change – the greatest precipitation and temperature increases being in the NW and SE respectively. This will result in a change in the types of crops grown, which may require different amounts of water. Changes are also likely in species composition. Salmon for example may become scarcer in southern England with species of coarse fish, such as chub and barbel, becoming more prominent.</p> <p>Impacts on water resources: Climate change will affect the availability of water stocks, particularly in summer, and groundwater recharge. Water demand for crops will increase due to the need to irrigate in drier and warmer areas, although changes in the types of crops will change the amount of irrigation required. Protected fish species, such as bullheads, may suffer because of lower summer flows in smaller streams. Trout populations are likely to suffer further declines in the south. There is also more likelihood of summer kills – due to algal blooms or low oxygen levels – affecting both game and coarse fish.</p> <p>Sea level rise: Climate change is predicted to bring rises in sea levels. The level is rising relative to the land at a rate of 4mm/year in the north west and north east (north of Flamborough Head), 5mm/year in the south west and 6mm/year in Anglian, Thames, Southern and North East regions (south of Flamborough Head).</p> <p>Clay soil shrinkage: Clay soils could shrink in dry summers as a result of climate change, causing building subsidence, while an increase in severe storms would mean more property damage.</p>
Key biological populations	<p>Impacts on wildlife: Warming of the UK's climate has been linked to, among other things, earlier spring leafing of oak trees, earlier emergence of insects and earlier egg laying by 20 out of 65 species of birds.</p> <p>Increased air temperatures may result in a northward shift of natural habitats by 50km to 80km per decade, which could affect species abundance including soil organisms. Further climate change is likely to put some rare habitats and species at risk, as many of the areas to which they would migrate have now been developed. It is very likely that over the medium and long terms, the special interest features at Natura 2000 sites may well decline to a point where the site is no longer outstanding for that feature.</p> <p>Impacts on coastal habitats: Both terrestrial and marine coastal habitats could be threatened by a northward shift. The potential effects of climate change on ocean circulation, fish populations, spawning and growth could also cause fundamental shifts in the distribution and abundance of different fish stocks. Increased water demand due to climate change may result in further abstraction from rivers, which could have important consequences for estuarine ecosystems.</p> <p>Impacts on wetlands and soils: Climate change may result in wetland habitats drying out, but other "Mediterranean-type" habitats may be created over a long period.</p> <p>Impact of sea level rise: A rise of 200mm without appropriate sea defences would cause losses of freshwater habitats in the Somerset levels, Fens and Broad, and may lead to saline intrusion into coastal aquifers reducing groundwater abstraction yield. Such a rise is exceeded in the UK Climate Impacts Programme 1998 medium-low scenario for the 2050's.</p> <p>Fish stocks are likely to change in coastal waters with new species moving further north. Rising sea level, particularly in the south east is likely to cause significant reductions in inter-tidal habitats such as saltmarshes with effects on flora and fauna.</p>

TABLE 2: The state of the environment – key impacts and trends *continued*

Compliance with standards, targets and classification schemes	<p>Atmospheric concentrations of greenhouse gases: By 2100 carbon cycle models project atmospheric CO₂ concentrations of between 540 and 970 ppm depending on the scenario. These levels would be 90 to 250% above the pre-industrial (1750) CO₂ concentration of 280 ppm. The same scenarios project an increase of between 1.4 and 5.8°C in globally averaged surface temperature over the period 1990 to 2100.</p> <p>Compliance with Kyoto target: The UK is on course to more than meet its target under the Kyoto agreement to reduce emissions of greenhouse gases by 12.5 per cent from the 1990 baseline by 2008–2012.</p> <p>Soil releases: The release of greenhouse gases from soil threatens the UK's ability to meet its targets for reduced emissions. Higher levels of carbon dioxide in the atmosphere and climate change could increase breakdown rates of organic matter and the release of carbon dioxide to the atmosphere.</p>
Human and environmental health	<p>Pests and diseases: Higher air temperatures in the UK may result in an increase in exotic pests and diseases, such as mosquitoes and malaria. In addition, lower river flows mean less dilution of pollutants, although higher temperatures should make sewage treatment processes more effective.</p> <p>Ozone episodes: Higher temperatures could increase emissions of volatile organic compounds and photochemical reaction rates, so increasing the frequency or severity of episodes of raised ozone concentrations.</p> <p>More periods of high pressure in the UK and Europe could also increase summer ozone episodes fed by pollutants from the continent and winter episodes from the build-up of nitrogen oxides and particles.</p> <p>Changes in atmospheric conditions could also alter the impacts of industrial plumes.</p> <p>Acidification: Acidification could be increased by higher or more intense rainfall, increasing the annual or short-term deposition of pollutants. A higher frequency of droughts could increase oxidation of organic sulphur and nitrogen in the soil, increasing the flow of strong acids into surface waters.</p> <p>Sewer overflows: Increased flooding caused by storms could increase their frequency.</p> <p>Soil erosion: More frequent extremes of rainfall or drought could increase soil erosion.</p>
Long-term reference sites	<p>Environmental monitoring: Long-term reference sites are necessary for monitoring climate change and its impacts.</p>
Aesthetic quality	<p>Tourism and recreation: Predicted changes in the UK's climate will enhance the potential for tourism and recreation, especially in the south, which is set to become warmer and where a large proportion of the population lives. This may increase the demand for access to the countryside and increased environmental stress on the coast.</p>

Sources: Environment Agency (1998, 1999, and 2000)

The State of the Environment of England and Wales: Fresh Waters, Coasts, the Land and the Atmosphere.

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**ENVIRONMENT
AGENCY**

A FRAMEWORK FOR CHANGE

Reducing flood risk

JULY 2001



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A FRAMEWORK FOR CHANGE

Reducing flood risk

JULY 2001

Reducing flood risk

“Severe flooding could become more common
as a result of global warming”

JOHN PRESCOTT, DEPUTY PRIME MINISTER,
NOVEMBER 2000

1. Why a Framework for Change?

The Environment Agency's vision

In June 2000 the Agency consulted widely on its long-term objectives and goals. After taking into account the responses that we received, in January 2001 we published *An Environmental Vision: The Environment Agency's Contribution to Sustainable Development* (the *Vision*)¹.

This sets out our long term, aspirational objectives for the environment, grouped under nine environmental themes. In preparing it, we were very conscious that it would be the process by which those objectives are met - the route by which the Agency plans, in partnership with others, to make progress towards the long term destination - that would be of particular interest. This was reinforced by the comments we received during the consultation on the *Vision*.

Frameworks for Change

To show the route we propose to take, we have prepared a series of *Frameworks for Change*, one for each of the *Vision*'s nine environmental themes. This document is one of these thematic *Frameworks* which are intended mainly for internal planning purposes though they are publicly available. They set out our proposals for the medium term to make progress towards the long-term objectives described in the *Vision*. These *Frameworks* - and the associated dialogue and business development that will flow from them - are not only intended to make progress towards the environmental outcomes in the *Vision*, but also to improve the Agency's service delivery to Government², industry, and the public. They are also intended to improve our own internal efficiency and effectiveness. Overall, we regard them as being beneficial to both our stakeholders, and society in general. They are frameworks with a menu of possible actions, rather than final plans, because we still have to agree the final proposals. We have to balance the competing priorities within them, take into account their specific implications for others, and match them to the resources we have available. This balancing and prioritisation has to be agreed with Government, and will be done through our corporate planning process, with our firmed-up work programmes appearing in our formal Corporate Plans. The Government's current revision of its statutory guidance in respect of our sustainable development remit will also help us clarify the routes and options available to us.

We will be discussing these proposals with our stakeholders. The main vehicle for this external dialogue and discussion will be a separate series of sector based *Frameworks* starting late in 2001. These will draw from the nine themes the issues and outcomes relevant to the sector concerned.

¹ The Environmental Vision, and Frameworks for Change is available on the Agency's website <http://www.environment-agency.gov.uk>

² References to Government include the UK Government and, where appropriate, the National Assembly for Wales.

Working with partners

We recognise that we cannot on our own deliver the outcomes and goals we have set out. We already work in close partnership with a wide range of organisations and groups, and we are keen to explore how we can strengthen existing partnerships and develop new ones. This does not just involve seeking partners for Agency led projects, but also supporting the work of others. We will need to work with a wide range of bodies with an interest in land issues, including those we regulate. Below we list areas where we will want to work in partnership with others, but have not sought fully to specify who these others might be.

2. Reducing flood risk

Flood risk cannot be eliminated but it can be reduced. The Agency's flood defence strategy aims to minimise risk to life and property, while exploiting the benefits of natural flooding for biodiversity, in an integrated way that will accommodate the inevitable impacts of climate change. Our current estimate is that nearly two million properties are at risk from floods, affecting about ten per cent of the population. The projected growth in household numbers from 21 million in 1997 to 24 million by 2021 represents a 12 per cent increase in housing stock and will place flood risk areas under even greater development pressure. Recent floods have highlighted the fact that many vulnerable people, especially those in poor housing, need support to protect themselves and their homes against floods.

However, flood reduction measures can only be implemented if the potential benefits outweigh the financial costs. For this reason the Agency is unable to guarantee flood protection to all people, buildings and land within flood risk areas.

Safeguarding the environment

The Agency is committed to safeguarding nature conservation sites and to minimising the potential impacts on biodiversity and the environment. The damage to natural habitats caused by past flood defence schemes and climate change is becoming increasingly evident, particularly on the coast. It will be essential to expand the use of sustainable, soft engineering techniques such as managed realignment and foreshore recharge in order to overcome problems of intertidal habitat loss through "coastal squeeze" and erosion.

Recent changes

The catalysts for the recent change in the Environment Agency's flood defence strategy have been the Agriculture Select Committee report on Flood and Coastal Defence (July 1998) and the Environment Agency Response to the Independent Report on the Easter 1998 Floods (November 1998) and the report *Lessons Learned from the Autumn 2000 Floods* (March 2001). The most immediate priority for action is the call by the Ministry for Agriculture, Fisheries and Food (MAFF) for the Agency to achieve a "seamless and integrated service of flood forecasting, warning and response".

Flood warning

The public response to flood warning is influenced by three socially-linked factors: the public's awareness of whether or not they are in a flood risk area; their understanding of the implication of a flood warning; and their knowledge of what actions to take in order to protect themselves and their property (both before and during flooding). Recent surveys show that the current availability and ability of residents to respond to a flood warning is satisfactory, but residents'

effectiveness in taking action is low. Furthermore, these surveys identified that 25% of residents suffered health problems, were hard of hearing, or did not have English as their first language. These groups are considered to be especially vulnerable, and their proportions may be greater in some areas.

The regional pressures on flood risk in general and the Agency's flood defence activities in particular are shown in Table 1 (page 17).

3. The Environment Agency's role

England and Wales have over 36,000 km of main rivers, one of the longest coastlines in Europe, and large areas of land below sea level (see Table 2: Key Facts and Figures). The population density is high, and complex flood defences have been constructed to protect residents of flood risk areas. Historical planning decisions have permitted the expansion of built development in floodplains, drastically increasing flood risk. Furthermore, past flood defence schemes, such as those involving the re-routing of rivers and surface waters, have frequently led to increased risks elsewhere in the catchment area.

Powers and duties

The Environment Agency has a duty to undertake a general supervision of all matters related to flood defence. It has permissive powers to operate, improve and maintain flood defences to mitigate flooding from rivers and the sea. We are responsible for the dissemination of flood warnings to the public, and continually monitor weather conditions, rainfall, and tidal and river levels to forecast where flooding may occur. We have set up a National Flood Warning Centre to lead the development of our seamless and integrated service of flood forecasting, warning and response. We maintain a highly skilled emergency workforce to enable us to provide an effective response to emergencies.

The Agency has its own limited powers to regulate development that may increase flood risk. We are a statutory consultee in the land use planning process to ensure that if new development is permitted, it is safe from flooding and does not increase flood risk elsewhere. Our main input to development planning is through the provision of flood plain surveys and consistent advice on development and flood risk.

Strategic approaches

The Agency has taken on a national approach to the management, procurement and delivery of our capital investment programme. National frameworks will soon be in place for consultancy services and construction work, which will support our aims of building collaborative relationships and promoting the principles and practice of sustainable construction.

Traditionally, money was injected in a reactive way at the 'point of trouble' in response to floods. The Agency is now pursuing a more strategic approach to catchment and coastal zone management. Strategy plans are being developed which identify flood defence requirements for coastal sediment cells: this approach will be applied to river catchments in the future. The strategic approach is more compatible with the long-term concept of sustainability and the potential for working with, rather than against, nature. Applied to the Agency's role in the statutory land use planning process, this approach focuses on the importance of flood prevention as preferable to costly remedial measures after the event.

4. Working in partnership

We routinely work very closely with the Department for the Environment, Food and Rural Affairs (DEFRA) and the National Assembly for Wales (NAW) in supporting the development of policy and best practice. We also maintain strong links with the Department of Transport Local Government and the Regions (DTLR) on land use planning guidance.

Although the Agency is the main operating authority for flood risk management, local authorities and Internal Drainage Boards perform similar roles for smaller rivers and drains. We have working parties with the Local Government Association at both Member and Officer levels to develop collaborative working on the achievement of DEFRA (formerly MAFF) high level targets, Planning Policy Guidance Notes, funding, and institutional arrangements. The Agency is represented on the Association of Drainage Authorities committees to help facilitate the most effective use of available resources by all operating authorities.

We have a good, strong partnership with English Nature. In the specific context of flood defence we are working with them on joint projects on the coast and on the implementation of Biodiversity Action Plans.

The Agency also has good links with the Meteorological Office, the Association of British Insurers the Royal Society for the Protection of Birds, major research institutions, the Wildlife Trusts and the WWF-UK. This collaborative work involves the development of best practice and the identification and promotion of research needs. Working in partnership on demonstration sites for sustainable management of river floodplains, the coastline and estuaries is fundamental to increasing our knowledge of the impact of climate change. We have also established international links within and beyond Europe on a range of research topics.

5. The Environment Agency's objectives

In *An Environmental Vision*, our overall long-term objective with respect to reducing flood risk is that:

Flood warnings and sustainable defences will continue to prevent deaths from flooding. Property damage and distress will be minimised. The role of wetlands in reducing flood risks will be recognised and all the environmental benefits from natural floods will be maximised.

This *Framework* has links with those for *Improved and protected inland and coastal waters*, and *Limiting and adapting to climate change*, and the prevention of flooding and a reduction in flood risk help contribute to the overall quality of life. There are also close links to the *Enhanced environment for wildlife* theme.

The outcomes we will help achieve are:

- Flood warnings will be given in good time, acted upon and damage minimised.
- People will accept the need to avoid flood risks, take warnings seriously and act accordingly.
- Nationally consistent standards of flood defences will be in place to meet the challenges of climate change.
- Flood defences will be designed and constructed to deliver optimum environmental benefits.
- Positive aspects of natural flood events will be recognised and flood defences designed to work with nature in accommodating them.

- Flood risks arising from land use and climate change will be recognised, understood and fully taken into account in planning decisions.
- Planners and developers will understand their role in sustainable flood risk management.
- Properties at risk will be designed or modified to cope with the likely consequences of being flooded.
- Flood defences that may be required because of new development will be fully funded by developers as part of that development, and should not lead to additional flood risk.
- Innovative uses of technology will improve the ability to predict and cope with floods.
- Benefits for water resources and wildlife will be achieved from natural flood events.

We will seek to achieve these goals in the most efficient and effective manner, taking into account the costs and benefits of the options available to do so.

6. Goals and actions

For each outcome we have identified below a number of goals we intend to achieve in the short to medium term in order to move towards the vision for the environment. We have also outlined the activities that will help achieve these goals, together with the tests to assess progress in their delivery. In practice, activities may contribute to the achievement of more than one goal and outcome.

Tests for progress

The Government's set of sustainable development indicators³ help show, at a high level, whether we are on a sustainable track. The Agency has also developed its own set of environmental indicators⁴ that will be used to show progress towards the Vision. In addition to these, we have included some key tests for progress towards each outcome.

Role of the Environment Agency

To clarify the role of the Agency in achieving each of these goals, we have allocated the supporting activities very approximately to one of three categories:

Environment Agency's role is central
Environment Agency as a substantial partner
Environment Agency's involvement to build understanding

³ DETR (1999) *Quality of life counts. Indicators for a strategy for sustainable development for the UK: a baseline assessment.*

⁴ Environment Agency (July 2000) *Environmental Indicators.* A set of Environmental Indicators for Agency use (also available on the Agency's website <http://www.environment-agency.gov.uk>)

Flood warning

Outcome 1 – Flood warnings will be given in good time, acted upon and damage minimised.

Tests for progress:

- Coverage of flood warning service to medium and high flood risk areas.
- Number of residential and commercial properties connected to an automatic warning service.
- Number of rain and river gauges.
- Number of properties covered by flood wardens.
- Number of properties covered by public sirens (or similar).

GOAL	ACTIVITY
Goal 1.1 People living in medium to high flood risk areas will receive a full flood warning service and a two hour prior warning of flooding.	<p>Medium term:</p> <ul style="list-style-type: none"> • Implement automatic warning messages to commercial properties. • Extend coverage of flood warning service to all medium and high flood risk areas. • Complete current planned improvements to the rain and river monitoring system, then review the network and undertake further improvements. • Develop and implement new public alert systems within residential properties.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Response to flood warnings

Outcome 2 – People will accept the need to avoid flood risks, take warnings seriously and act accordingly.

Tests for progress:

- Increased public awareness of Agency role in flood defence.
- Number of lives lost through flooding.
- Number of community self help groups.
- Opinion surveys to report the performance of the flood forecasting, warning and response service.
- Number of residents taking effective action.

GOAL	ACTIVITY
Goal 2.1 In flood risk areas the public will be supported in taking effective action.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Act on lessons from the 2000 Public Awareness Campaign and Flood Directory booklet. • Conduct targeted public awareness campaigns and publish evidence of their impact. • Publish annually performance of residents taking effective action. • Establish the regional number of residents suffering from health problems and introduce better targeting of people with hearing difficulties and language problems. <p>Medium term:</p> <ul style="list-style-type: none"> • Explore community self-help with the public, establish Community Flood Help Groups and continue dialogue with community groups.
Goal 2.2 Major national flood exercises with local authorities and emergency services undertaken.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Carry out national emergency exercise. <p>Medium term:</p> <ul style="list-style-type: none"> • Publish findings of national major flood emergency exercise. • Implement lessons from national, regional and local emergency exercises.

Environment Agency's role is central

Environment Agency as a substantial partner

Environment Agency's involvement to build understanding

Standards of flood defences

Outcome 3 – Nationally consistent standards of flood defences will be in place to meet the challenges of climate change.

Tests for progress:

- The condition of defences.
- Frequency of inspections (according to the degree of risk).
- National consistency of standards of defence (according to the degree of risk).

GOAL	ACTIVITY
Goal 3.1 Nationally consistent standards of defences based on the degree of risk.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Develop and introduce social equality issues with regard to standards of defence. • Establish current standards of defences according to risk. • Develop and introduce broad regional climate change scenarios for evaluating impacts on standards of defences. • Develop and introduce a multi-criteria framework for nationally consistent standards of defences that takes into account economic, social and environmental issues, discuss with Government and stakeholders and introduce.
Goal 3.2 The conditions of flood defences assessed nationally.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Create a national database for all flood defences and annually assess their condition. • Publish a State of the Nation's Flood Defences Report annually. • Establish a clear policy for taking over defences from local authorities, Internal Drainage Boards and those in private and public ownership.

Environment Agency's role is central

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Design of flood defences

Outcomes: 4 – Flood defences will be designed and constructed to deliver optimum environmental benefits; – Positive aspects of natural flood events will be recognised, and flood defences designed to work with nature in accommodating them.

Tests for progress:

- The number of sites with fully implemented Water Level Management Plans (WLMPs).
- The use of recycled and secondary materials.
- Changes in habitat extent as a result of flood defence schemes.
- The number of sites in which managed realignment or foreshore recharge is recognised to be the most cost-effective and environmentally beneficial option.
- The number of river restoration sites.

GOAL	ACTIVITY
Goal 4.1 New defences will have a low adverse impact on the environment and maximum environmental enhancements for the benefit of wildlife.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Introduce guidance on best practice in the use of recycled and secondary materials in the design and construction of flood defences. • Establish monitoring requirements for loss of habitat from construction of new defences and maintenance of existing defences. • Introduce methodology for assessing the whole life costs of design and construction. • Complete Coastal Habitat Management Plans and implement actions to protect internationally important sites. <p>Medium term:</p> <ul style="list-style-type: none"> • Review current experience on our procurement strategy with regard to achievement of environmental best practice. • Introduce guidance on environmental best practice for the design, construction and maintenance of defences. • With Government and the EU, review the EC Habitats Regulations.
Goal 4.2 Managed realignment and foreshore recharge incorporated into coastal defences at sites for which they are the most cost-effective and environmentally beneficial option.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Introduce guidance on the use of managed realignment in the design of flood defences on the coast. • Introduce guidance on the use of foreshore recharge in the design and maintenance of flood defences.
Goal 4.3 Joined-up funding available to maximise efficiency.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Explore “joined-up” funding options with DEFRA, English Nature, NAW, Countryside Council for Wales and environmental groups, consult on the options available and if required, promote appropriate legislative change.
Goal 4.4 Rivers and floodplains restored at the earliest opportunity.	<p>Medium term:</p> <ul style="list-style-type: none"> • Introduce guidance on river restoration into the Agency manual for the design and maintenance of defences.
Goal 4.5 Water Level Management Plans (WLMPs) implemented in key sites.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Complete WLMPs and implement actions to protect key sites.

Planning and flood risk

Outcomes: 5 – Flood risks arising from land use and climate change will be recognised, understood and fully taken into account in planning decisions; Planners will understand their role in sustainable flood risk management.

Tests for progress:

- The number of planning applications permitted against Agency advice.
- The number of properties within flood risk areas.
- The coverage of Catchment Flood Management Plans.

GOAL	ACTIVITY
Goal 5.1 A risk-based approach incorporated into land use planning.	<p>Short to medium term:</p> <ul style="list-style-type: none"> • Establish clear Government policy with Planning and Policy Guidance Note 25: <i>Development and Flood Risk</i>. • Develop and introduce criteria and tests for sustainable development. • Review current experience of Agency's response to planning applications and continue dialogue with Local Government Association (LGA) to introduce a more strategic approach into land use planning. <p>Medium term:</p> <ul style="list-style-type: none"> • Carry out further research into a risk-based approach for determining what type of development may be appropriate in different zones, consult on options, agree an approach with Government and LGA and introduce it into the land use planning process.
Goal 5.2 Catchment Flood Management Plans integrated into land use planning.	<p>Medium term:</p> <ul style="list-style-type: none"> • Carry out a pilot study for the development of Catchment Flood Management Plans, agree criteria with Government and LGA, and implement integrated flood risk maps into land use planning.

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Coping with flooding

Outcome 6 – Properties at risk will be designed or modified to cope with the likely consequences of being flooded.

Tests for progress:

- The number of existing properties modified.
- The number of new dwellings with flood defence measures.
- The number of sewers constructed to new guidelines.

GOAL	ACTIVITY
Goal 6.1 Properties in flood risk areas will be designed and constructed to minimise loss of life and structural damage in the event of a flood.	Short to medium term: <ul style="list-style-type: none"> • Promote, with Government, research into surface water management and disposal and building design for flood damage avoidance, leading to the production of design guides for surface water management and disposal and for new properties and existing single storey buildings.
Goal 6.2 Temporary flood defence measures and retro-fitting encouraged for existing properties in flood risk areas.	Short to medium term: <ul style="list-style-type: none"> • Produce a leaflet for the public on the availability and use of temporary flood defence measures. • Develop and introduce options for the public for retro-fitting of properties at risk of flood damage and in liaison with the insurance industry produce a leaflet on retro-fitting. Medium term: <ul style="list-style-type: none"> • Review take-up of temporary flood defence measures.

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Funding of defences for new development

Outcome 7 – Flood defences that may be required because of new development will be fully funded by developers as part of that development, and should not lead to additional flood risk.

Tests for progress:

- The number of defences for new developments paid for by the public purse.

GOAL	ACTIVITY
Goal 7.1 New development is not a burden on the public purse.	Short to medium term: <ul style="list-style-type: none"> • Discuss with developers and Government options for developer contribution, and seek Government approval for the preferred policy option which is then implemented and subsequently reviewed.

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Use of new technology

Outcome 8 – Innovative uses of technology will improve the ability to predict and cope with floods.

Tests for progress:

- The percentage of the public at risk receiving prior warnings of floods.
- The cost effectiveness of data collection and the quality of data collected.

GOAL	ACTIVITY
Goal 8.1 An improved flood forecasting and warning service.	Short to medium term:
	<ul style="list-style-type: none"> • Review best practice in fluvial forecasting modelling and adopt nationally. • Explore improvements of the coverage and accuracy of weather radar, carry out pilot studies and introduce improved accuracy. • Consider impacts of saturated catchment conditions on flood forecasting and review forecasting models in light of findings. • Implement best practice for flood forecasting modelling. • Investigate options for estimation of the speed of flooding.
	Medium term:
	<ul style="list-style-type: none"> • Identify options for real time flood forecasting modelling, carry out pilot studies and introduce preferred approach. • Investigate development of a system to provide earlier river level warnings and introduce selected option.
Goal 8.2 Improved remote sensing techniques for data collection.	Short to medium term: <ul style="list-style-type: none"> • Promote research for advance remote sensing techniques, and incorporate proven advanced techniques into data collection best practice.

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Benefits of natural floods

Outcome 9 – Benefits for water resources and wildlife will be achieved from natural flood events. Tests for progress: <ul style="list-style-type: none"> • The number of sites using sustainable urban drainage systems. • The number of sites using wetlands for flood storage. 	
GOAL	ACTIVITY
Goal 9.1 Better ways of using surface water run-off in place.	Short to medium term: <ul style="list-style-type: none"> • Encourage the use of sustainable urban drainage systems for new development by promoting a manual for developers. • Review the effectiveness of off-site storage measures in reducing flood risk. • Review current practice on the recycling of surface water run-off from properties. Medium term: <ul style="list-style-type: none"> • Introduce whole catchment decision support systems to target the siting of strategic surface water run-off storage areas.
Goal 9.2 Increased use of wetlands for flood storage.	Medium term: <ul style="list-style-type: none"> • Develop and implement evaluation methods taking into account impacts on land use.

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7. Research and development

DEFRA and the Environment Agency are developing a new joint R&D Programme in Flood and Coastal Defence. The impetus for this change was the June 1999 report of the joint MAFF (now DEFRA)/Agency Advisory Committee for Flood and Coastal Defence R&D, which recommended restructuring and bringing together the existing MAFF and Agency R&D programmes in order to improve cost-effectiveness and performance.

The new joint programme will have a thematic structure that will follow through from developing strategic policy to constructing and managing defences. Links between R&D and DEFRA/Agency business process will be enhanced. There will also be improvements to R&D management and uptake, including the dissemination and implementation of research outputs. This will increase the effectiveness of the research and maximise the benefits of collaboration.

In developing the new programme, DEFRA and the Agency are seeking to achieve a strong "user drive" to ensure that R&D starts and ends with real-world issues and outcomes relating to practice rather than research for its own sake. Sustainability will be emphasised. A strong link is being established with the National Capital Programme for Flood Defence to promote benchmarking and the sharing of good practice.

The Programme and management structure are being set up in 2000/01 and will be fully operational from April 2001 onwards. An independent review of the results of the joint R&D Programme will be carried out in three to four years' time.

8. Implications for the Environment Agency

The Agency's strategic approach to flood defence will in future place a greater emphasis on its general supervisory and enforcement roles. This need was highlighted by both the Agriculture Select Committee (1998) and the Independent Review of the Easter Floods. In November 1999, MAFF published a series of high level targets for flood and coastal defence (NAW has introduced similar targets for Wales). These targets provide the means by which the Agency's delivery of flood defence aims and objectives can be measured. The Agency's elaboration of its flood defence supervisory duty addresses the actions required to fulfil the high level targets. The Agency aims to achieve supervision by consent, in partnership with the other operating authorities and the Association of Drainage Authorities.

The Agency will continue to play the lead role in providing strategic advice on flood issues. This is one of the major conclusions of the DETR's consultation draft on the new Planning Policy Guidance Note 25: *Development and Flood Risk*, published in April 2000. The draft guidance is the result of a review of the existing guidance by DETR in close consultation with MAFF and the Agency. It emphasises the importance of flood risk as a national planning consideration.

The Agriculture Select Committee highlighted the need to simplify existing flood defence funding arrangements in order to improve the efficiency of policy implementation and service delivery. The Agency aims to cut out unnecessary bureaucracy and administration by working on arrangements for DEFRA to pay a block grant to support our capital programme. Long-term funding is a concern for the Agency and we eagerly await the outcome of the flood and coastal defence funding review instigated by the Government.

A model flood risk management structure has recently been introduced under the Changing Needs in Flood Defence Review. This clarifies the day-to-day duties and responsibilities of flood defence staff and their role in dealing with flood emergencies. A Human Resources Strategy has been introduced to support this transition, which will ensure that the skills and competencies of new and experienced staff are continuously enhanced. Our highly skilled emergency workforce will continue to benefit from on-site training and focused National Vocational Qualifications.

The Agency is able to deliver many of the goals laid out in this *Framework*. However, some are not entirely within our power, while others depend on persuading the Government to introduce legislative change and working with or influencing others. Successful delivery of the goals will require the Agency to:

Taking action ourselves

- Train our staff in best practice methods and maintain the awareness of new methods.
Extend coverage of the flood warning service so that people living in medium to high flood risk areas receive a two hour prior warning of flooding.
- Introduce better targeting of people with hearing difficulties and language problems in order that they understand and receive a flood warning message.

- Introduce environmental best practice for the design, construction and maintenance of defences to ensure that they will have minimal adverse impacts on the environment.
- Introduce guidance on managed realignment and foreshore recharge to assist the selection of the most cost-effective and environmentally beneficial flood defence option.
- Introduce guidance on river restoration and a programme for the implementation of Water Level Management Plans to restore the quality of river habitats.
- Integrate Catchment Flood Management Plans into the land use planning process to maximise the impact of the Agency's advice on new development proposals.
- Improve the flood forecasting and warning service through the innovative use of technology.
- Promote sustainable urban drainage systems for new development in order to maximise the benefit for water resources.
- Introduce catchment-wide decision support systems to target the siting of strategic surface water run-off storage areas.

Influencing and educating others

- Establish community self-help groups to improve the number of people taking effective action upon receipt of a flood warning.
- Carry out and publish the findings of national emergency exercises to improve the responses of the Agency, Local Authorities and emergency services to major flood emergencies.
- Establish a clear policy for taking over defences from Local Authorities, Internal Drainage Boards and those in private and public ownership.
- Review experience of Agency's response to planning applications to minimise the number of applications permitted contrary to our advice.
- Produce design guide for new properties and existing single storey buildings to minimise structural damage and loss of life in the event of a flood.
- Increase the awareness of temporary flood defence measures and retro-fitting of properties to minimise flood damage to property.
- Produce design guide for surface water management and disposal to allow for the impacts of climate change.

Working with Government

- Introduce a multi-criteria framework for nationally consistent standards of defences that take account of economic, social and environmental issues.
- Introduce legislative change for "joined-up" funding of flood defences to improve the efficiency of service delivery.
- Review EC Habitat Regulations in the light of lessons learned from the production of Coastal Habitats Management Plans to encompass maximum benefits for wildlife.
- Introduce a risk-based approach for land use planning and incorporate into the land use planning process to minimise the amount of new development in flood risk areas.
- Introduce a developer contribution policy to ensure that flood defences made necessary by new development are fully funded by developers.

TABLE 1: Regional variation in some pressures linked to flood defence

Pressure	Anglian	Midland	North East	North West	Southern	South West	Thames	Wales
Sea level rise	H	L	M	L	H	M	H	M
Wetter winters (projected)	M	H	H	H	M	H	M	H
Demand for housing	L	M	M	M	H	L	H	L
River habitat classification	H	M	M	M	M	L	H	L

KEY

Sources: Environment Agency (2000) *Environment 2000 and beyond*
 Environment Agency 88pp Hulme, M and Jenkins, G J (1998) *Climate change scenarios for the UK: scientific report*
 UKCIP technical report no 1, Climatic Research Unit, Norwich, 80pp

TABLE 2: Flood defence: key facts and figures

Resources	<p>Length of main river: 36,600 km</p> <p>Length of coastline: over 4,400 km</p> <p>Length of estuary: 2,400 km</p>
Extent of risk	<p>Frequency of incidents: Over 1550 flooding and erosion incidents since 1700, increasing in frequency up to the 1950's after which the frequency declined. The factors influencing these trends include the rapid spread of development into vulnerable locations in the 19th and 20th centuries, institutional and structural responses after the major floods of 1947 and 1953, and changes in reporting.</p> <p>Fluvial flood risk: Around 10,000 km² (seven per cent of the total area) of England and Wales is at risk from river flooding once in 100 years (including tidal rivers and estuaries).</p> <p>Tidal flood risk: About 30 per cent of the coastline is developed, and around 2,500 km² of the land lies below 5m which is at risk of direct flooding by the sea in the absence of defences. Some 40 per cent of all manufacturing industry is located along coastlines and estuaries, and one- third of the population live within 10 km of the coast (resident numbers may increase by as much as 50 per cent in the summer).</p> <p>Population at risk: About 10 per cent of the population live in and 1.8 million properties are located in areas potentially at risk from flooding or coastal erosion.</p> <p>Land at risk: About 12 per cent of agricultural land (including over 60 per cent of the Grade 1 agricultural land) is located within areas potentially at risk from flooding or coastal erosion.</p>
State of defences	<p>Length of coast defended: Some 1,260km of sea defences and a further 1,018km of coastline protected. Tidal defences amount to 2,150km. There is a greater density of defences in the south and east of England than elsewhere.</p> <p>State of sea defences: In 1997, more than 12 per cent of sea defences needed moderate or significant work and another 40 per cent showed signs of wear.</p>
Economic risk	<p>Capital value of assets at risk: The value of assets at risk in England, including property and agricultural land, is about £214 billion.</p>

TABLE 2: Flood defence: key facts and figures *continued*

	<p>Potential economic damage: Without existing flood defences, the average annual cost of potential damage in England is £2.8 billion.</p> <p>Actual damage avoided: With present defences in place, the average annual cost of potential damage avoided is about £0.6 billion.</p>
Costs of flood defence	<p>Current expenditure: Current capital works and revenue expenditure is about £310 million a year, of which about half is spent on capital works. MAFF research indicates that current expenditure is some £100m per annum short of that required to maintain current standards.</p> <p>Funding: Over 80 per cent of the Agency's flood defence work is funded by levies on local authorities. A further 13 per cent comes from central government and the remainder comes from a mix of sources, including internal drainage boards.</p>
Flooding and biodiversity	<p>Coastal habitats: Over 90 per cent of saltmarshes have been lost due to erosion, land claim and coastal squeeze in the past few centuries. A further 8,000 and 10,000 hectares of intertidal mud and sand flats (4% of the current total area) and 2,100 hectares of saltmarsh (6% of the total) may be lost due to "coastal squeeze" around the entire coast of England between 1992 and 2012.</p> <p>River habitats: Some 42 per cent are extensively modified with the greatest amounts of change in the east of England and the least changes in Wales. Many of these modifications are due to past flood defence works.</p> <p>Managed realignment: Implementation of the "best guess" coastal defence policies (including managed realignment) could lead to a net loss of around 40 km² of freshwater and brackish habitats (wet grassland, coastal lagoon and reed bed) and a net gain of around 80 km² of intertidal habitat (saltmarsh and mudflat or sandflat).</p>

Sources: Environment Agency (1999) *The state of the environment of England and Wales: coasts*.

Environment Agency (2000) *Environment 2000 and beyond*.

Ministry of Agriculture Fisheries and Food (2000) *The National Appraisal of Assets at risk from Flooding and Coastal Erosion*.

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