ENVIRONMENT AGENCY

A GUIDE FOR VOLUNTARY FLOOD WARDENS ON HOW TO SET UP A FLOOD WARDEN SCHEME

MARCH 2002

ENVIRONMENT AGENCY

ABOUT THIS GUIDE

Individuals and communities have roles to play and responsibilities for looking after themselves, their families and their own properties during flood incidents.

Flood Wardens during flooding incidents can be very effective in helping meet these roles and responsibilities, adding substantial value to the support role of the flood warning service.

Voluntary Flood Warden schemes have operated successfully in parts of England and Wales for many years. Similarly, the police have had much success encouraging the setting up of "Neighbourhood Watch" schemes. Local communities can benefit from both schemes as they involve local people in protecting themselves.

Flooding In Ropsley July 2001

Lincolnshire Fire & Rescue Service attending to road flooding, July 2001

These guidance notes are to help Voluntary Flood Wardens set up a scheme in their area and suggest how it can be set up, operated, administered and supported. It highlights the advantages of such schemes and shows how they can be of most benefit to flood risk communities and how they can link to the services provided by the Environment Agency and Civil Protection Unit.

FLOOD RISKS AND THE FLOOD WARNING SERVICE

Lincolnshire is a low-lying county with an extensive network of rivers and drains and a long coastline.

Parts of the County are at risk of flooding from high tides and dangerous sea conditions. Around 30% of Lincolnshire lies below sea level and over 60,000 people live and work in areas at risk of flooding around the coast and tidal estuaries.

The County has over 1000km of main river channels and an extensive network of fenland drains. Many urban areas such as Lincoln, Louth, Gainsborough and Grantham, as well as many other towns and villages are at risk of river flooding. Over 50,000 people in the county live in properties in the floodplain of rivers.

Flooding in Bridge Street, Horncastle, 1981

Properties at risk of flooding in Lincoln

It is vitally important that people in Lincolnshire are aware of the risk of flooding, that there is an effective flood warning system in place and that those at risk know how they can receive flood warnings and how to prepare for flooding that could happen at any time.

The Environment Agency provides a flood warning service for most main rivers, estuaries and the coast. It cannot provide a service for all watercourses and in all conditions. Rivers and streams that rise rapidly in response to rainfall cause particular difficulties because there is insufficient time to issue specific warnings. In some localities a general warning service is provided; in others it is not possible to provide a warning service at all. The Agency does not provide a flood warning service in respect of local flooding from sewers, road drainage, overland flow, dam bursts or blockages.

The flood warning service comprises:

- the constant monitoring of weather, catchment and coastal conditions
- predictions of future river and sea levels
- preparation of warnings for locations at which forecast levels might result in flooding
- dissemination of warnings to those at risk and to emergency response organisations, and
- effective responses by emergency services, local authorities, the Environment Agency and the public.

At present there are a number successful Flood Warden schemes operating in towns and villages along the East Coast

WHAT IS A VOLUNTARY FLOOD WARDEN SCHEME ?

A Voluntary Flood Warden scheme can consist of a single person, or several people acting as volunteers to help their community to be aware of any flood risks, to help pass flood warnings when they are issued, to help prepare for flooding when this is predicted and to help vulnerable people both during and after flooding has happened. They would act as an interface between the Environment Agency and Lincolnshire's Civil Protection Unit (CPU).

Wardens are part of the local community and should be supported by their community.

Wardens can play an important role in assisting the Environment Agency and the County's Civil Protection Unit with local information on flood conditions. For example, Wardens may notice/or have been given information about a watercourse, culvert, blocked drain or burst pipe; information which they can relay onto the respective organisation which can undertake the necessary remedial action.

Example of a River being blocked by a fallen tree

THE SUPPORT ROLE OF THE CIVIL PROTECTION UNIT

In times of emergency the County Council's Civil Protection Unit (CPU) works closely with the emergency services to assist and support local communities. When there is threat of flooding the CPU can arrange for people to be evacuated from their homes to a safe place in rest centres, or to provide temporary accommodation. They can provide assistance to people and communities who are dealing with the after effects of flooding which can be very stressful.

Wardens can be the eyes and ears of the emergency services on the ground relaying important advice and information to their community

Flood Wardens are an important link between the emergency services, the Environment Agency, the Civil Protection Unit and the community at risk from flooding. They provide an invaluable source of information for their local area. The emergency services and others work across the County and Flood Wardens work locally to help themselves and their local community.

Flood risk areas around the coast at risk of tidal flooding

The main river systems and areas of river floodplain

Voluntary Flood Wardens appointed locally are important because:

- local people will know the Warden personally, leading to a mutual trust and understanding
- local people are more likely to believe in warnings and advice which are reinforced by a local Warden who they know
- they would be familiar with those people and properties at risk. They could distribute leaflets on flood warning and emergency response arrangements to properties in the floodplain and would ensure people receive and understand them
- they would be able to help the Environment Agency and Civil Protection Unit with local information during a flood event and confirm conditions on the ground. An important two-way information link would be established.

Flood Wardens can:

- encourage communities to help themselves with training and support from the Environment Agency and the Lincolnshire County Council Civil Protection Unit
- develop good local communication links and customer liaison for passing out information and receiving feedback
- help build partnerships which would bring improvements in flood preparedness and response
- potentially act as a back-up system to get flood warnings to people if other arrangements fail

DEVELOPING A VOLUNTARY FLOOD WARDEN SCHEME

Wardens will be working to protect and support the local community and should be supported and acknowledged by the community. The basic role of a Warden is to be the representative of the local community in flood related maters, to check that flood warnings have been received in the community and be the point of contact with the Environment Agency, Civil Protection Unit and maybe other emergency organisations if required.

A Flood Warden needs to ensure that every property in their area is visited, that occupants are aware of the flood risk, that they are aware of the warning service and essential contact numbers and that they have appropriate publications and advice to prepare them to cope with a flood risk situation.

WHAT SORT OF PERSON CAN BE A FLOOD WARDEN

Basically anyone can be a Flood Warden . To be a good Warden the person would generally need to :-

- be reasonably fit and mobile enough to carry out warden duties
- be normally available to pass on information quickly and report back (i.e. they should normally be at home during the day or have flexible working arrangements which would allow easy release)
- be personable and able to explain and pass on information in a clear and friendly manner even when under pressure and neighbours are shocked or panicked
- have a genuine interest in serving their local community and be interested in the local area and the river/coastal environment
- have good local knowledge, access to a telephone and preferably live close to the area at risk of flooding
- be willing and able to attend twice yearly Flood Warden liaison meetings with the Environment Agency and the Civil Protection Unit staff for training and feedback (which will be arranged at convenient times whenever possible)

WHAT THINGS WOULD A FLOOD WARDEN BE EXPECTED TO DO?

There are many ways in which a Flood Warden could help their local community in times of flood risk. These include:

- making arrangements to reinforce flood warnings when they are issued
- visit people at risk without delay to ensure that warnings have been received
- help the Environment Agency by passing on local details of people and properties in the floodplain (e.g. telephone numbers)
- call for assistance for people who are struggling to carry out essential actions to safeguard themselves or their property
- have local knowledge and information on the latest flood situation (the Environment Agency will help with this)
- liaise with the County Council Civil Protection Unit, Environment Agency and emergency services on local conditions and needs on the ground
- note and report local flood event details
- if possible set up local patrols to monitor the local situation

WHAT EQUIPMENT WOULD A FLOOD WARDEN NEED?

- The local community should issue an identification card with a photograph of the flood warden with space for the wardens signature
- Suitable footwear
- A high visibility jacket
- A waterproof torch
- Details provided by the Environment Agency of areas at risk of flooding
- Lists of names, addresses and telephone numbers of vulnerable people, like the disabled, infirm etc.
- Correspondence, leaflets and information relating to Flood Warning arrangements (for issuing to occupiers)
- Any other equipment which you/your community group consider necessary.

NOTE: Flood Wardens should never place themselves in positions where their own personal safety is at risk. In particular they should not go into deep, fast flowing water. They should always call the emergency services to deal with such situations.

OTHER SUPPORT THAT CAN BE PROVIDED AT LOCAL LEVEL

The Flood Warden and/or the Parish/Town/Ward Council/Meeting should also consider enlisting able bodied personnel to assist with:

Flooding underneath Thornedge in Lincoln

- the maintenance of sand bags stocks
- filling of sand bags in the case of an emergency
- delivering of sand bags or other flood protection equipment to properties at risk
- help people in their homes, especially the old, disabled and those awaiting evacuation
- be aware of those in the community who have access to tractors, pumps, boats and 4-wheel drive vehicles

Waves crashing over the sea defences along the Lincolnshire Coast

FLOOD WARDENS AS AN ESSENTIAL PART OF AN INTEGRATED APPROACH TO EFFECTIVE FLOOD WARNING AND EMERGENCY RESPONSE

The response to flooding involves several organisations performing key roles. The Government and the public expect the emergency response to flooding at the local level to be fully integrated and effective.

A display at "Emergency Services Sunday" to increase awareness of Flood Warning.

A major flooding incident is one which involves the flooding (fluvial, coastal or through structural failure) of a significant number of properties, or significant disruption to key parts of the infrastructure of the locality.

The response to a major flooding incident involves the Professional Partners working together at a local level in conjunction with the Public.

The response also requires the implementation of special arrangements by one or more of the Emergency Services, the Local Authority and the Environment Agency.

Examples of these special arrangements are the activation of Major Incident Plans, opening of rest centres and the co-ordination of volunteer groups such as the Women Royal Voluntary Service.

The Environment Agency

- is responsible for flood defence and flood warning in England and Wales and the issuing of flood warnings to the public
- provides the Floodline 0845 9881188 service

Lincolnshire County Council Civil Protection Unit and Local Authorities

- work with the police, fire and rescue services and the Environment Agency in the response to severe flooding
- set up rest centres for people evacuated from their homes and arrange temporary accommodation
- deal with road closures caused by overflowing drains and sewers

The Police

- co-ordinate the emergency services in a major flood incident and help with evacuation of people from their homes where necessary

The Fire and Rescue Service

- is responsible primarily for rescue, recovery and saving life
- may (subject to operational requirements) pump out flood water. [There may be a charge to householders for this service]

The Ambulance Service

- is primarily responsible for saving life

Voluntary Flood Wardens

- disseminate flood warning information received from the Agency and the Civil Protection Unit
- represent the local community in flood related matters

Internal Drainage Boards

- are responsible for providing a flood protection and water-level management service within the statutory drainage districts
- advise on developing flood conditions

British Waterways

- protect their own structures
- along with other bodies, help warn the public about flood risk from their own navigation system
- provide specialist equipment, materials and other resources as appropriate by local agreement

Public Utility Companies

- secure their services and equipment to ensure continuity of supply
- repair services disrupted by flood events
- provide alternative means of supply during service disruption if life and health risks are identified
- advise local authorities and the communications media when disrupted services will be re-instated

The Communications Media

- issue flood warnings received from the Agency to agreed standards
- issue updated information during a flood event
- issue All Clear messages received from the Agency to agreed standards

Citizen's Advice Bureaux

- can give advice on how to obtain money in emergency
- help to deal with insurance queries

MONITORING AND FORECASTING

24hr Monitoring and Forecasting 365 days a year

The Environment Agency in Anglian Region has a 24hr manned control centre (Regional Control Centre) based in the Agency's regional office at Peterborough. In Northern Area there are six Duty Officers rostered a week, who each have a role in monitoring, forecasting and responding to flooding.

Telemetry Network

The Environment Agency has a large telemetry network of rainfall, river level and flow monitoring stations throughout its areas. This telemetry network allows the Agency to continuously monitor actual rainfall, river levels and flows at specific key sites within the area.

Routine Monitoring and Forecasting

The Monitoring Duty Officer undertakes daily monitoring of the fluvial and tidal conditions.

For fluvial conditions the following are routinely monitored:

- actual rainfall
- river level/flow
- forecast rainfall

For tidal conditions the following are routinely monitored:

- tide surge residuals
- wave height
- wind speed and direction

The flow forecasting model is run three times a week by the Forecasting Duty Officer, to determine how the rivers are likely to respond to forecast rainfall. If rainfall forecasts dictate then the forecast model runs are undertaken more frequently, to ensure the Agency is prepared for possible problems.

Through the routine monitoring process early indication of possible flooding conditions is obtained and duty officers are alerted to the situation developing further into a flood event.

Event Monitoring and Forecasting

Many of the telemetry gauging stations have threshold levels that trigger alarms when reached. These alarms are received by the 24hr Regional Control Centre and are then passed on to the Area Monitoring Duty Officer, who then investigates the alarm and takes appropriate action. This may require the continuing monitoring of the situation, informing other duty officers and opening up of the incident room in Lincoln.

As a flood situation develops, monitoring and forecasting is undertaken in the area incident room continually to allow accurate and timely Flood Warnings to be issued, until such time as the situation improves.

FLOOD WARNING

THE AIM OF THE FLOOD WARNING SERVICE

A flood warning service comprises:

the constant monitoring of weather, catchment and coastal conditions;

- predictions of future river and sea levels;
- preparation of warnings for locations at which forecast levels might result in flooding;
- dissemination of warnings to those at risk and to operational organisations; and
- emergency response by those organisations, the Agency and the public.

The Agency seeks to reduce the risks associated with flooding, wherever technically sound, cost-effective and environmentally acceptable measures are feasible and can be funded. Protecting human life is the highest priority.

Flooding is a natural process, but it is sometimes necessary to intervene where people and important assets are at risk in order to reduce the economic and social impact. The risk of flooding can be reduced but never eliminated, so there is a need to warn people when flooding is likely to occur. We issue warnings to alert the public and organisations that provide an emergency response during flooding, so that they can take action.

The Environment Agency aims to give at least a two-hour warning where it can forecast flooding. Unfortunately, this isn't always possible. Weather forecasts may be incorrect, warnings may be issued too late or flash floods may catch everyone by surprise. Specific warnings cannot be given for many small rivers and streams. Often these rise too fast for warnings to be issued. The same applies to flooding from road drains, sewers or run-off from hillsides.

THE FLOOD WARNING SERVICE

Flood warning policy is determined nationally by the Agency in conjunction with the Department of the Environment, Food and Rural Affairs (DEFRA) and the National Assembly for Wales (the Assembly) and is implemented operationally within each Agency region.

The Agency provides a flood warning service for most main rivers, estuaries and coasts. We do not provide a service for most ordinary watercourses. Rivers and streams that rise rapidly in response to rainfall cause particular difficulties because there is insufficient time for the issuing of specific warnings. In some of these cases a general warning service may be provided; in other cases it will not be possible to provide a warning service at all. We do not, and cannot, provide a flood warning service in respect of local flooding from sewers, road drainage, overland flow, dam bursts or blockages.

The Agency has produced maps showing areas at risk of flooding. They are published in a standard format throughout the Agency. The maps will be improved continuously as better information and the results of modelling become available. Properties within flood-risk areas may be protected by defences, which may reduce but not eliminate the risk of flooding.

The flood-risk at each site can be assessed, based on both the likelihood of flooding and the number of properties at risk. These factors provide categories of flood-risk and a guide to appropriate warning methods.

Investment in flood warning improvements will be prioritised towards areas of greatest benefit, such as high-risk urban areas. The Agency has developed a method for appraising flood warning proposals, known as flood warning levels of service (FWLOS) which, together with guidance from DEFRA and the Assembly, ensure that improvements provide value for money in accordance with Government rules.

The responsibility for deciding the ultimate priority in any region is that of the Regional, and where they exist, Local Flood Defence Committees. Grant aid by DEFRA or the Assembly may be available towards the cost of improvements. Each region will systematically assess the need for flood warning system enhancements, and will promote these according to priority and its ability to fund improvements.

The Agency provides self-help information to the public, and will continue to investigate new methods of raising awareness and understanding for the flood warning service. The effectiveness of the service is measured by analysis of data gained from public opinion surveys, undertaken by independent market research. The results are used in planning improvements.

RESPONSE TO FLOOD WARNINGS

During flood emergencies the Agency priorities are to issue flood warnings and to ensure our defences are operating properly. The Agency will keep other operational bodies and the broadcasting media informed on the development of flood events. We will also assist the civil authorities in dealing with the consequences of flooding when resources permit.

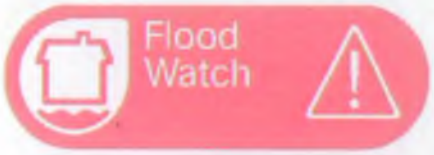
The police co-ordinate the response of public bodies to flood emergencies. The Agency's role is to ensure that Local Authorities and the emergency services are kept fully aware of flood threats so that they are able to identify the locations where their services might be required to take preventative action and, following flooding, to provide relief measures.

Local Authorities and emergency services will be expected to keep themselves aware of current and forecast weather conditions.

The Agency meets regularly with the bodies responsible for responding to flood emergencies, to agree and maintain emergency plans, and maintains close contact with them during flood events.

HOW FLOOD WARNINGS ARE ISSUED

The Environment Agency issue flood warnings to people at risk in a variety of ways, either direct to people at home or at work or indirectly through the media.



Flooding is possible.
Be Aware! Be Prepared! Watch Out!

Flooding of homes, businesses and main roads is expected. ACT NOW!

Severe flooding is expected. Imminent danger to life and property. ACT NOW!

There are no Flood Watches or Warnings currently in force in the area.

Direct warnings are designed to grab people's attention, so the warnings are usually short and sharp.

Broadcast warnings can contain more information and advice so people know what to do. Using the media also allows us to reach more people

FLOODPLAINS, FLOODPLAIN MAPS AND FLOOD RIKS

FLOODPLAINS

River Floodplains

River (fluvial) floodplains are generally natural are generally natural areas of low lying land adjacent to a river over which excess water can flow when the capacity of the river channel is exceeded either as a result of heavy rain or snow melt.

Coastal Floodplains

Coastal (tidal) floodplains are areas of low lying land along the coast line which can be flooded by the sea. Parts of these floodplains particularly in estuaries can also be at risk of flooding from rivers.

Definition of Floodplain

Government has defined floodplains as:

"All land adjacent to a watercourse over which water flows in time of flood or would flow but for the presence of defences where they exist. The limits of floodplain are defined by the peak water level of an appropriate return period event on the watercourse or at the coast. On rivers this will normally be the greater of the 1 in 100 year return period flood or the highest known water level. In coastal areas the 1 in 200 year return period flood or the highest known flood will be used. In both instances, where a flood defence exists which protects to a greater standard than those defined, then the floodplain is the area defended to the designed water level."

Return periods can be a difficult concept for the lay person to understand, it often being assumed that this means frequency of occurrence, which it does not. A flood described as having a return period of once in 100 years can occur more than once in any single year since return period refers to the mathematical probability of occurrence and not the frequency. In other words, in any single year there is a 1% chance of the 100 year flood occurring, or put another way, a 99% chance that it will not.

FLOODPLAIN MAPS

Indicative Floodplain Maps

The Agency's indicative floodplain maps can be found on the "In Your Backyard" section on the Agency's website. These show all those areas that are at risk of flooding from both rivers and the sea. The maps identify the floodplain areas at risk of flooding in 1:100 year (fluvial) and 1:200 year (tidal) events. The maps give no indication as to the degree of risk or whether or not flood defences exist.

Circular 30/92 Floodplain Maps

These maps have been provided by the Agency to Local Authorities as an aid to development control. They were produced under Section 105 (2) of the Water Resources Act 1991 in accordance with guidance given in the now superseded Department of the Environment Circular 30/92 – Development and Flood Risk.

The extent of floodplain shown is the same as that on the Indicative Flood Plain Maps but areas within the floodplain that are defended to either a 100 year standard (fluvial) or 200 year standard (tidal) are shown by cross hatching.

Derivation of the Maps

The floodplain maps should not be regarded as definitive but as indicative only on the extent of flooding that has, or can be expected to occur as per the definition above.

The extent of floodplain shown will be either for:

A recorded flood – where this is equal to or greater than

- 1 in 100yr (fluvial) or 1 in 200 yr (tidal).
  A computer modelled flood equivalent to 1 in 100/200 year.
- A combination of the 1 and 2 amended through the application of engineering judgement/local knowledge.

Where actual flood events have been assessed as having return periods lower than 1 in 100/200 maps will have been produced based on computer modelled floods.

Recorded Floods

The most reliable floodplain extent is that obtained from a recorded event although even under these circumstances, there will be locations where the extent of flooding shown on the map has been estimated. It is simply not practicable to record the exact extent of flooding along the entire length of a river valley. Efforts are concentrated upon areas where properties flooded and even here it may not be possible to be certain as to the depth and therefore extent of flooding that occurred.

The extent of flooding can also be determined from aerial photography, however, unless the event is continually monitored in this way from beginning to end, there can be no certainty that the actual maximum height and extent of flooding has been recorded throughout the course of the river(s).

Modelled Floods

Model predictions vary and have limitations depending upon:

- Availability and extent of physical survey data of the river channel and adjacent floodplain
- Availability of rainfall/run-off data for the catchment being considered
- Type of model used
- Availability of real flood data with which to calibrate the model

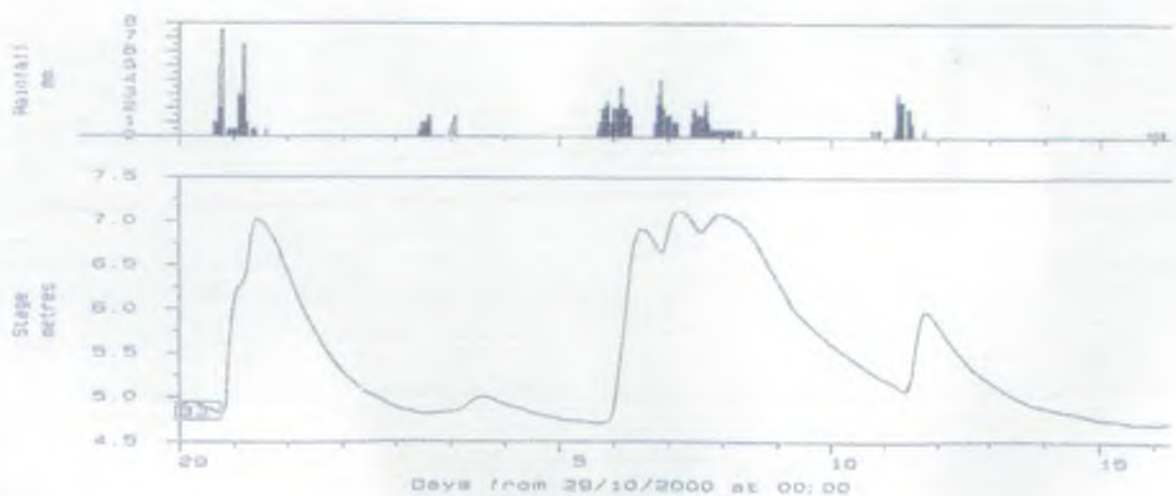
The most accurate model predictions will result from the most rigorous analysis. This in turn depends upon the extent and quality of data available and the sophistication of the models being used. Clearly there are financial consequences to this and since the Agency inevitably has to operate within budgetary constraints limitations have to be imposed. Consequently the modelling techniques adopted vary and in some locations will be a very broad brush approach whereas in others, for example where there are more properties at risk, a more detailed investigation will have been made.

Combined Data

There are circumstances where recorded and modelled flood extents have to be manually adjusted to give a truer reflection of what is likely to happen on the ground, examples are:

- Where model predictions are based upon limited survey data it is possible that the resultant extent of flooding is clearly incorrect when compared to actual site topography.

- In the case of an historic flood event some physical feature influencing the flood extent has been removed or modified. For example a railway embankment crossing the flood plain thereby restricting the passage of flood flows may have subsequently been removed and in consequence lower flood levels would result.



FLOOD RISK

Risk is defined as the probability of an event occurring multiplied by the impact of that event and it is obvious that within the floodplain as defined on the maps, differing degrees of risk will apply. Where flood defences exist, the probability of a flood occurring will reduce as the standard of the defence increases. Flood defences can take many forms and include:

- Raised embankments
- Flood walls
- Flood storage reservoirs
- Enlarged river channels
- Or any combination of the above

The probability of flooding will also be influenced by the topography within the floodplain i.e. the lower ground will have a greater probability of flooding than higher ground.

Flood Risk Areas

Flood risk areas have been defined by dividing the floodplain into discreet compartments where, in general the same probability of flooding (defence standard) applies. Where defence standards are not a matter of record these will have been determined in the modelling process or an assessment made based upon historic flood frequencies. The location and number of properties within a flood risk area is then calculated from an Ordnance Survey computer database known as "Address point". The probability and property numbers for each compartment are then combined to determine the appropriate risk category.

Fenland

Some concerns have been expressed over the fact that the whole of the Fen areas within eastern England are shown as floodplain on the maps. Although the Fens are generally defended from both fluvial and coastal flooding, they are not in many cases defended to the appropriate standards - they remain at or below the 200 year still water tide level and the levels which can be reached in the main river channels which cross them.

The flood compartments defined here are very large and in consequence contain a high number of properties, combined with the general high standards of defence ie low probability of flooding, strict application of the methodology would result in a high risk categorisation of these areas. However, it has been recognised that save for certain areas where defence standards are not appropriate, the great majority of Fenland is at low risk.

Limitations

The process described above is a consistent approach to categorising flood risk across the whole of the Anglian Region. In Northern Area there are some 2400km of main river and sea defence for which the Agency is responsible.

In consequence within a defined flood risk area some properties remote from a river and at higher elevation which are at less frequent risk of flooding than those in close proximity to it, are considered to be at the same risk. This is an anomaly which will be addressed due course.

Since the various floodplain maps have been released some amendments have been made to them either as a result of representations or improved survey/modelling information. This is an ongoing process that will continue, and it is envisaged that some revisions will be necessary each year.

MAINTENANCE AND IMPROVEMENT OF FLOOD DEFENCES

Under Section 165 of the Water Resources Act 1991 the Agency is empowered to carry out works in connection with statutory main river. These powers permit existing works to be repaired and maintained and also the power to improve and construct new works.

Section 165 also gives power to the Agency to maintain and improve defences against the sea irrespective of whether the works are in connection with main river.

MAINTENANCE OPERATIONS

Over £2m of maintenance works are undertaken by the Environment Agency in Lincolnshire each year. In addition, Internal Drainage Boards, Local Authorities and Riparian Owners undertake maintenance of rivers and drains. Maintenance works are generally categorised under one of the following headings:-

Weed Control

Control of aquatic vegetation growing within the waterway area. The objective of this exercise is to remove excessive waterweed from the channel that would otherwise slow water velocities during periods of flood. This would lead to unnecessarily high water levels and increased risk of flooding. This work is generally carried out during the warm summer months when weed growth may be prolific.

Depending on the sensitivity of the channel concerned weed cutting may be carried out once, twice or three times during a summer growing season. Some channels, due to their characteristics, will not require any weed cutting. When selecting the most appropriate method of weed control the Agency selects from a range of maintenance "options" which consider both the environmental and engineering needs of the river channel.

Dredging

The removal of accumulated silts from the bed of river channels is a periodic activity. Depending on the size and characteristics of a channel, dredging may be required every 7-10 years (smaller watercourses) or more infrequently (20 – 40 years) on larger watercourses. The objective of the work is to re-establish the original design measurements of the river channel. Environmental enhancements are often included when carrying out this type of work. Some watercourses are effectively self cleansing and require very little dredging.

Obstruction Removal

Large obstructions entering a waterway area may have an adverse impact on a channel's ability to convey high flows during times of flood. The degree of impact depends on the size of the obstruction in relation to the size of the watercourse. The Agency will remove large obstructions from waterways where a risk of flooding exists.

The removal of fallen trees is the responsibility of the relevant landowner. Where the Agency removes these from a watercourse it may seek to recover the costs from the relevant landowner.

Where grids, trash screens and culverts are known to be potential blockage points, these are routinely inspected and cleared.

Structures

There are numerous structures which protect land from flooding from both freshwater (river control sluices and walls) and from tidal waters (sea doors on outfalls such as Black Sluice, Grand Sluice etc). These are maintained routinely to ensure they are mechanically sound and fit for purpose. They are operated as required to control and manage floodwaters.

The Agency also operates a number of flood washland areas that store excess floodwaters, which would otherwise spill out of river channels and flood vulnerable and and property. Most of these washlands depend on some form of structure to control the flow of water onto and off the washland. These are maintained routinely and operated as required.

Banks and Embankments

Where raised embankments exist, these protect vulnerable low lying land and property from flooding. During flood events they are required to contain potentially high stresses both within the embankment core and resist the erosion of fast flowing waters. Various routine works are carried out to maintain embankments and minimise the risk of bank failure during flood conditions.

- Bank Mowing – where banks are not used for grazing stock, vegetation is managed by cutting either once, twice or three times during the summer months.
- Vermin control – burrowing animals can easily create runs passing through a raised embankment. Banks are routinely inspected during winter months and infestations dealt with.
- Bank repairs – bank use together with normal wear, tear and settlement leads to local lowering of embankment crests and damage to the bank profile. Periodic repairs are required to re-instate the bank to its original condition.

Pumping Stations

Low lying land often is reliant on pumping stations to provide drainage and protection from flooding during periods of wet weather. The Agency maintains and operates a number of pumping stations across Lincolnshire.

Sea Defences

Lincolnshire places a strong reliance on the provision and maintenance of a range of different sea defences along its coastline.

CONTACT DETAILS

CIVIL PROTECTION UNIT

Fire and Rescue Headquarters
South Park Avenue
Lincoln LN5 8EL

Main Line	-	01522 582220
Fax	-	01522 519318
Direct Line	-	01522 582286

ENVIRONMENT AGENCY

Waterside House
Waterside North
Lincoln LN2 5HA

Main Line	-	01522 513100
Main Fax	-	01522 512927

Gill Thornalley:
Flood Warning/Community Liaison Officer

Direct Line	-	01522 785867

Allan Bond:
Flood Warning /Community Liaison Officer

Direct Line	-	01522 785877
Direct Fax:	-	01522 785018
FLOOD LINE NUMBER:	-	**0845 988 1188**
EMERGENCY HOTLINE:	-	**0800 80 70 60**

INTERNAL DRAINAGE BOARDS

Ancholme IDB	-	01302 342055
Black Sluice IDB	-	01205361061
Lindsey Marsh Drainage Consortium	-	01507 328095
North East Lindsey IDB	-	01469 588991/2
North Level IDB	-	01733 270333
South Holland IDB	-	01406 424933
Upper Witham IDB	-	01522 525528
Welland & Deepings IDB	-	01755 725861
The Witham 1st & 3rd District IDB	-	01522 794479
Witham 4th IDB	-	01205 310088

ANGLIAN REGION ADDRESSES

REGIONAL OFFICE
Environment Agency
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P61
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