

Digital Groundwater Vulnerability Maps



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User Guide

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Introduction

What's included

The Digital Groundwater Vulnerability Maps publication contains an end user licence, a User Guide, a large scale map of England and a CD-ROM. The CD-ROM contains 53 individual map sheets (see map availability on page 12) and access software which enables licenced maps to be copied to the users hard disk.

Origin of Vulnerability Maps

The 1:100,000 series of Groundwater Vulnerability Maps have been produced for the Environment Agency (and its predecessor - the National Rivers Authority) under contract by the Soil Survey and Land Research Centre (SSLRC) and by the British Geological Survey (BGS). Both organisations supplied data from their extensive specialist databases and expert interpretation of that data as well as supplying cartographic services. The maps are subject to quality control by Environment Agency staff at several stages in production.

Further details and background to the maps can be found in the *Guide to Groundwater Vulnerability Mapping in England & Wales* (HMSO, ISBN 0 11 310103 1).

About the Digital Groundwater Vulnerability Maps

The Groundwater Protection Policy, initiated by the National Rivers Authority and promoted by the Environment Agency as a key instrument of Pollution Prevention, depends substantially on influencing the Planning Process. The Policy uses a two-tier approach, protecting individual groundwater sources by means of Groundwater Protection Zones and protecting the overall groundwater resource by means of Groundwater Vulnerability Maps.

The groundwater vulnerability maps at a scale of 1:100,000 are being produced at a rate of 1 per month in batches of 5. 53 sheets will be required to cover the whole of England & Wales. 39 maps have already been published and are included on this CD-ROM a further 14 are to be published by May 1998. A free update will be available to all purchasers of the first CD-ROM (see map availability on page 12).

The vulnerability maps show, by means of colour coding, areas of the country where water-bearing rocks (aquifers) are vulnerable to pollution because of the type of soil cover which occurs above them. Rocks at the surface are divided into major aquifers (capable of yielding large quantities of water for abstracting) minor aquifers (capable of providing somewhat lower yields) and non-aquifers based on the physical properties of the water-bearing rocks. The overlying soils are similarly divided into high, intermediate and low vulnerability classes, depending on the

ability of the soil to transmit water-borne pollutants into the groundwater. The paper map shows, for example at one extreme, a deep purple colour indicating high vulnerability major aquifer and at the other extreme a light buff colour indicating low vulnerability minor aquifer.

There are some further subdivisions of vulnerability classes. For example, the high vulnerability class is subdivided into subclasses 1, 2, 3 (the lower number indicating higher vulnerability) and a special 'U' class, indicating Urban locations, where soil cover is often highly disturbed and where the vulnerability should be treated as subclass 1. Details are provided in the Technical Details section. The maps also show the presence of low permeability 'drift' material which can afford some added protection to aquifers.

A potential developer can look at the vulnerability map and see, at a glance, whether the proposed development would be in an area in which groundwater resources would be threatened.

Technical Details

Developers and other users of vulnerability maps often hold data pertinent to their interests in Geographical Information Systems (GIS) - computer systems capable of holding information in a way which relates the data to relevant geographical locations. The ability to add Groundwater Vulnerability Maps to such systems is advantageous since it allows the computer system 'look up' a site and report on its vulnerability rapidly. It also provides the capability to answer questions such as 'Are there any low vulnerability sites within 10 Km of this point?' and 'What is the area of highly vulnerable aquifer with this County?' etc.

GIS systems are a rapidly evolving technology and at present no universally agreed interchange formats exist for GIS data. The digital maps are therefore being made available in three formats which are all provided on a single CD-ROM covering the same areas as the existing 1:100,000 paper map sheets. The sheet numbering system being used for the digital maps is the same as that in use for the paper maps.

The digital map data files contain the linework which defines the various classes and subclasses of aquifer vulnerability. It should be noted that the data files contain no other geographical features - if the user wishes to overlay vulnerability data on other geographical features then these must be provided by the user's host GIS.

Digital Map Formats.

The formats in which the data is supplied are :

DXF (AutoCAD drawing exchange format)

DGN (Intergraph Drawing format)

NTF (National Transfer Format as used by Ordnance Survey).

Each format consists of one file with a filename based on the pattern GVMxx.ext, where 'xx' is the sheet number and 'ext' is the appropriate file extension for the format. Each licenced map is made available in all three formats.

Layers

All three of the above formats support the concept of data 'layers'. The vulnerability class boundaries have been coded into separate layers. Each class has both external and internal boundaries, which can be used to 'punch holes' into the external boundaries. These have been coded into separate layers.

The layers are numbered and named (in those formats which allow naming) as follows:

Aquifer	Vulnerability Class	Boundaries	Label	Layer No
Major	H1	External	Major H1 Ext	11
Major	H1	Internal	Major H1 Int	12
Major	H2	External	Major H2 Ext	21
Major	H2	Internal	Major H2 Int	22
Major	H3	External	Major H3 Ext	31
Major	H3	Internal	Major H3 Int	32
Major	HU	External	Major HU Ext	41
Major	HU	Internal	Major HU Int	42
Major	I1	External	Major I1 Ext	51
Major	I1	Internal	Major I1 Int	52
Major	I2	External	Major I2 Ext	61
Major	I2	Internal	Major I2 Int	62
Major	L	External	Major L Ext	71
Major	L	Internal	Major L Int	72
Minor	H1	External	Major H1 Ext	81
Minor	H1	Internal	Major H1 Int	82
Minor	H2	External	Major H2 Ext	91
Minor	H2	Internal	Major H2 Int	92
Minor	H3	External	Major H3 Ext	101
Minor	H3	Internal	Major H3 Int	102
Minor	HU	External	Major HU Ext	111
Minor	HU	Internal	Major HU Int	112
Minor	I1	External	Major I1 Ext	121
Minor	I1	Internal	Major I1 Int	122
Minor	I2	External	Major I2 Ext	131
Minor	I2	Internal	Major I2 Int	132
Minor	L	External	Major L Ext	141
Minor	L	Internal	Major L Int	142
Drift		External	Drift Ext	151
Drift		Internal	Drift Int	152

Installation

System requirements

Hardware

A 486DX or better PC with:

CD-ROM drive

Monitor capable of displaying at least 256 colours at 640x480 resolution

Software

Microsoft Windows™ 3.1 or higher

Memory

The software requires 2Mb of free RAM. You will need sufficient space on your system to copy the maps you purchase from the CD-ROM.

A 'map group' purchase (4 map areas) will require about 40Mb of disk space.

Installing the software

An installation programme is included on the CD-ROM and should be used as follows:

Installation – Windows™3.1x

- 1 From the Windows™ Program Manager choose the File option and select Run.
- 2 Type D:\GVMAPS\INSTALL.EXE (when D: is the letter of your CD-ROM drive) and press return.

The installation program will create a Windows™ group and icon on your hard disk. To launch the software double click on the GVMAPS.EXE icon in the new 'Groundwater Vulnerability Maps' program group.

Installation – Windows®95

The CD-ROM includes an auto-run feature which will install the software as soon as the CD-ROM is inserted into the CD-ROM drive. If the auto-run feature of your computer is disabled you can manually install the software as follows:

- 1 From the TaskBar select Start then select Run.
- 2 Against the open prompt type D:\GVMAPS\INSTALL.EXE (when D: is the letter of your CD-ROM drive) and press return.

The installation program will have created a Windows®95 icon in the programs list. To launch the software, select Start from the TaskBar, select Programs from the List then select GVMAPS.

Installation – Windows NT™

The CD-ROM includes an auto-run feature which will install the software as soon as the CD-ROM is inserted into the CD-ROM drive. If the auto-run feature of your computer is disabled you can manually install the software as follows:

- 1 From the TaskBar select Start then select Run.
- 2 Against the open prompt type D:\GVMAPS\INSTALL.EXE (when D: is the letter of your CD-ROM drive) and press return.

The installation program will have created an icon in the programs list. To launch the software, select Start from the TaskBar, select Programs from the List then select GVMAPS.

Accessing the maps

All the maps currently available are on the CD-ROM (see map availability on page 12). To activate the licence which enables you to use the maps you will need to obtain access codes. These access codes 'unlock' the maps from the CD-ROM and copy them to your computer's hard disk.

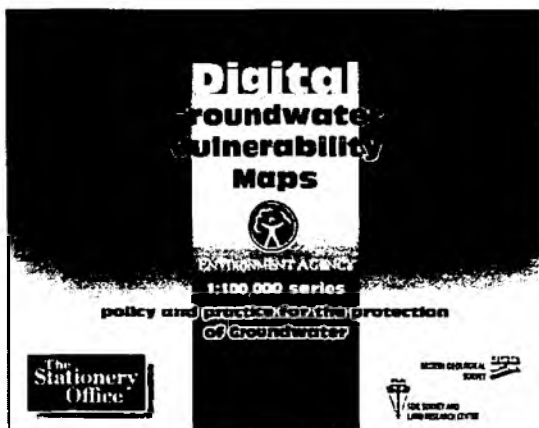
The purchase price of the CD-ROM allows you to access any 4 maps of your choice. Additional groups of 4 maps can be obtained at any time in the future. The charge of any group of 4 maps will be equivalent to the purchase price in force at the time. Alternatively you can licence all the maps at a special price. Current prices are available from The Stationery Office.

Follow the instructions below to access the maps.

First time users

If your CD-ROM has not previously been used to access the maps follow these instructions.

- 1 Ensure that the CD-ROM is in the CD-ROM drive, the software is installed correctly and running on your computer as described in the Installation section.
- 2 When you launch the software you will be presented with this introduction screen



- 3 You are required to read the Licence Agreement, which is available as a printed document in the package as well on screen. Click on the I Accept button if you agree to be bound by the Licence Agreement. If you do not agree to be bound by the Licence Agreement click on the Cancel button which will exit the program.

- 4 After you have clicked on the I Accept button you will be presented with this map licencing screen.



- 5 Use your mouse to navigate over the map of England. As the cursor passes over each individual map area it is highlighted in pale orange and information about that map is displayed in the information boxes. Click once on each of the 4 maps you wish to licence. As you click on each of the 4 maps their colour changes to a dark orange and the ISBN number of each map is entered into the licence box. Once you have selected 4 maps the software will not allow you to select any others. To deselect a map simply click on it again you are then free to select another map to complete your group of 4 maps.

You can also view the entire contents of the CD-ROM in list form by clicking on the contents button.

- 6 Once you have selected the 4 maps you wish to licence click on the Licence Map Group button at the bottom of the window. Once you have done this a telephone number and a Request Code will be displayed at the top of the Licence Box . As a first time user you will be required to provide the following details:

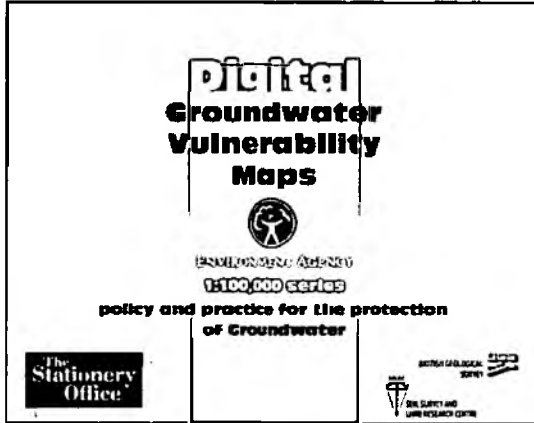
- Proof of purchase (eg Stationery office order/invoice number)
- Your name/company name
- A contact name (if different from above)
- Nature of business
- Full address (including postcode)
- Telephone and facsimile number

Ring the phone number given. Once your details have been checked you will be asked to quote the Request Code. You will then be given a Response Code. Enter this Response Code into the space at the bottom of the Licence Box and press the Return Key. The maps you have licenced will be copied to your hard disk into C:\Windows\GVMAPS directory.

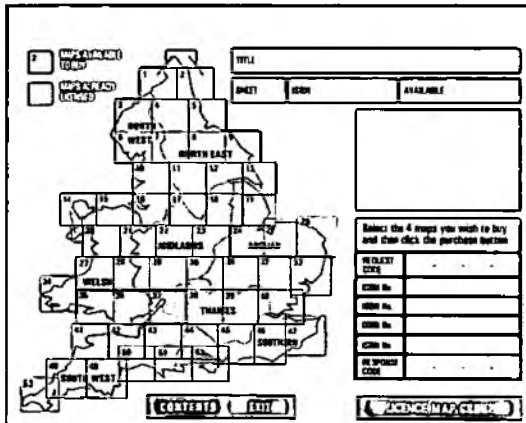
Previous users

If you have previously licenced maps from the CD-ROM follow these instructions.

- 1 Ensure that the CD-ROM is in the CD-ROM drive, the software is installed correctly and running on the same computer that you previously used to licence the maps (see copying lost maps on page 11).
- 2 When you launch the software you will be presented with this introduction screen



- 3 Click anywhere on this screen to display the map Licence Screen.



- 4 The maps you have previously licenced will be coloured blue, as shown in the key on the map licence screen, to prevent you from accidentally relicencing them.
- 5 Use your mouse to navigate over the map of England. As the cursor passes over each individual map area that has not yet been licenced it is highlighted in pale

orange and information about that map is displayed in the Information Boxes. Click *once* on each of the 4 new maps you wish to licence. As you click on each of the 4 maps their colour changes to a dark orange and the ISBN number of each map is entered into the Licence Box. Once you have selected 4 new maps the software will not allow you to select any others. To deselect a map simply click on it again you are then free to select another map to complete your group of 4 maps.

You can also view the entire contents of the CD-ROM in list form by clicking on the contents button.

- 6 Once you have selected the 4 new maps you wish to licence click on the Licence Map Group button at the bottom of the window. Once you have done this a telephone number and a Request Code will be displayed at the top of the licence box. As a previous customer you will only be required to provide:

- An acceptable form of payment or official order
- Your name/company name (*as used previously*)
- A contact name (*as used previously*)

Ring the phone number given. Your details will be checked against the database and you will be asked to quote the Request Code. You will then be given a Response Code. Enter this Response Code into the space at the bottom of the licence box and press the Return Key. The maps you have licenced will be copied to your hard disk into C:\Windows\GVMAPS directory.

Licencing all the maps

If you wish to licence the entire collection of maps follow the instructions above to select the first 4 maps. Ring the number given and state that you wish to licence all the maps. You will be asked to repeat the licensing process until all the maps have been licensed.

Re copying lost maps

If any licensed maps are accidentally erased from your hard disk they can be re copied from the CD-ROM as follows.

- 1 Insert the CD-ROM into the machine on which the maps were originally licensed and launch the software.
- 2 With the software still running switch to your Windows™ interface and use File Manager (or its equivalent) to make a new copy of the maps from the CD-ROM.

Map availability

The first release of this CD-ROM (December 1997) contains 30 of the 53 maps. An updated CD-ROM, containing all the maps, will be supplied to all registered users when the data is available. This is scheduled to be in May 1998. For information on the availability of particular maps see the table below or view the software.

Sheet No.	Name	ISBN	Availability
1	<i>West Northumberland</i>	0 11 312097 4	Yes
2	<i>Coastal Northumberland</i>	0 11 312098 2	May-98
3	<i>North West Cumbria</i>	0 11 312099 0	May-98
4	<i>North Pennines</i>	0 11 312100 8	Yes
5	<i>Tyne and Tees</i>	0 11 312101 6	May-98
6	<i>South West Cumbria</i>	0 11 312102 4	May-98
7	<i>Yorkshire Dales</i>	0 11 312103 2	Yes
8	<i>Central North Yorkshire</i>	0 11 312104 0	Yes
9	<i>North East Yorkshire</i>	0 11 312105 9	Yes
10	<i>Central Lancashire</i>	0 11 312106 7	Yes
11	<i>South Pennines</i>	0 11 312107 5	Yes
12	<i>Vale of York</i>	0 11 312108 3	Yes
13	<i>Humber Estuary</i>	0 11 312109 1	Yes
14	<i>Anglesey</i>	0 11 312110 5	May-98
15	<i>North Wales Coast</i>	0 11 312111 3	May-98
16	<i>West Cheshire</i>	0 11 312112 1	Yes
17	<i>Derbyshire and N. Staffordshire</i>	0 11 312113 X	Yes
18	<i>Nottinghamshire</i>	0 11 312114 8	Yes
19	<i>Lincolnshire</i>	0 11 312115 6	Yes
20	<i>Meirionnydd</i>	0 11 312116 4	May-98
21	<i>West Shropshire</i>	0 11 312117 2	Yes
22	<i>South Staffordshire – E. Shropshire</i>	0 11 312118 0	Yes
23	<i>Leicestershire</i>	0 11 312119 9	Yes
24	<i>North Northants</i>	0 11 312120 2	Yes

25	<i>West Suffolk</i>	0 11 312121 0	Yes
26	<i>East Norfolk</i>	0 11 312122 9	May-98
27	<i>Dyfed</i>	0 11 312123 7	May-98
28	<i>Powys</i>	0 11 312124 5	May-98
29	<i>Worcestershire</i>	0 11 312125 3	Yes
30	<i>Northern Cotswolds</i>	0 11 312126 1	Yes
31	<i>Bedfordshire</i>	0 11 312127 X	Yes
32	<i>North Essex</i>	0 11 312128 8	Yes
33	<i>East Suffolk</i>	0 11 312129 6	Yes
34	<i>Pembrooke</i>	0 11 312130 X	Yes
35	<i>West Glamorgan</i>	0 11 312131 8	Yes
36	<i>Gwent, S. and Mid Glamorgan</i>	0 11 312132 6	Yes
37	<i>Southern Cotswolds</i>	0 11 312133 4	Yes
38	<i>Upper thames and Bedfordshire Downs</i>	0 11 312134 2	Yes
39	<i>West London</i>	0 11 312135 0	Yes
40	<i>Thames Estuary</i>	0 11 312136 9	Yes
41	<i>North West Devon</i>	0 11 312137 7	Yes
42	<i>Somerset Coast</i>	0 11 312138 5	Yes
43	<i>East Somerset and SW. Wiltshire</i>	0 11 312139 3	May-98
44	<i>North West Hants</i>	0 11 312140 7	Yes
45	<i>West Sussex and Surrey</i>	0 11 312141 5	Yes
46	<i>East Sussex</i>	0 11 312142 3	Yes
47	<i>East Kent</i>	0 11 312143 1	Yes
48	<i>East Cornwall</i>	0 11 312144 X	May-98
49	<i>South Devon</i>	0 11 312145 8	May-98
50	<i>East Devon and S. Somerset</i>	0 11 312146 6	May-98
51	<i>Dorset</i>	0 11 312147 4	Yes
52	<i>Southern Hampshire</i>	0 11 312148 2	Yes
53	<i>West Cornwall</i>	0 11 312149 0	Yes

If you have licenced any maps off the first CD-ROM which were not available at the time of licensing, these maps will automatically be available to you when you receive your updated CD-ROM. Follow the instructions given in the section re copying lost maps to copy your pre-licensed maps off the new CD-ROM.



ENVIRONMENT AGENCY



SOIL SURVEY AND
LAND RESEARCH CENTRE

BRITISH GEOLOGICAL
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Digital Groundwater Vulnerability Maps CD-ROM licence agreement for single End User*



The Stationery Office Ltd
St Crispins, Duke Street
Norwich, NR3 1PD

between The Licensee and
The Stationery Office
(publishing agents for the Environment Agency)

of St Crispins, Duke Street, Norwich NR3 1PD (hereinafter called the Publishers)

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7 General

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 - Full address (including post code)
 - Nature of business
 - Telephone and facsimile number
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