Scottish Executive Geographic Information Service

Impact of Flooding in Scotland

In-house GIS analysis using the SEPA Indicative Flood Map 2007

Summary results

Introduction

The recent release of the Indicative River & Coastal Flood Map (Scotland) by the Scottish Environmental Protection Agency (SEPA) in November 2006[1] has initiated an in-house analysis of the impact of flooding in Scotland. In 2002 the 'Climate Change: Flooding Occurrences Review'[2] report was produced for the Scottish Executive. This report contains an estimate of the Economic Impact of Flooding, based on the extent of fluvial and coastal flood zones and the number of properties located in these flood zones. Improvement of the 2002 flood zones, especially the coastal flood zone has resulted in a more accurate characterisation, summarised in this report.

The datasets used for the 2006 analysis are:

- Scottish Environmental Protection Agency (SEPA) Indicative River & Coastal Flood Map (Scotland) version 2 November 2006
- Ordnance Survey (OS) Mastermap Address Layer 2 First Release April 2006[3]
- Ordnance Survey (OS) Boundary Line 2005 - Local Authority High Water Mark Boundary dataset.
- Outlines of Scottish Flood Defence Schemes that provide protection for 1/200 annual chance of flooding May 2007[4]

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[1] Scottish Environment Protection Agency, 2006, 'Indicative River & Coastal Flood Map (Scotland), Summary of Technical Methodology', version 2 September 2006, 12p.

http://www.sepa.org.uk/flooding/mapping/pdf/technical_methodology_v2.pdf

[2] Alan Werritty, Andrew Black, Rob Duck, Bill Finlinson, Neil Thurston, Simon Shackley and David Crichton, 2002, 'Climate Change: Flooding Occurrences Review', University of Dundee and Entec UK Ltd for Scottish Executive Central Research Unit, 83p.

http://www.scotland.gov.uk/cru/kd01/lightgreen/ccfo.pdf

[3] Ordnance Survey, 2006, 'MasterMap Address Layer 2 First Release Technical Specification', version 1.0 April 2006

http://www.ordnancesurvey.co.uk/oswebsite/products/osmastermap/layers/addresslayer2/detailedproductinfo/al2_tech_spec.pdf

Or for more general information:

http://www.ordnancesurvey.co.uk/oswebsite/products/osmastermap/layers/addresslayer2/index.html

[4] Outlines provided by JBA Consulting show the areas protected by defence schemes held on the Scottish Flood Defence Asset database

Health warnings

- All figures should be treated as indicative, not definitive, as they are based on the SEPA Indicative Flood Map.
- The number of potentially affected properties is based on the estimated number of postal entries at the time of release of the OS Address Layer 2 dataset (April 2006) and is likely to have a high degree of variability.
- The map is an indicative map at scale 1/50,000, which is not a recommended scale to use for individual properties
- The property figures in this report have all been rounded to the nearest 1,000.
- The coastline of Scotland used in this analysis is the Ordnance Survey Boundary Line 2005 high water mark coastline. The coastal flood zone produced by SEPA is based on a low water mark boundary. In the calculations, areas between high and low water mark boundaries were excluded either as coastal flood zone, or as land surface.
- There are 12 flood prevention schemes with details of areas protected . The area protected by the Perth flood prevention scheme has been determined from the original design reports as no flood outlines are available.

Results

The total land surface area of Scotland is 78,805 km^2 based on the high water mark boundary. The total extent of the fluvial flood zone is 3,425 km^2 and covers 4.3 % of Scotland. The total extent of the coastal flood zone is 566 km^2 and covers 0.7 % of Scotland.

Table 1 shows the extent of the flood zone in each Local Authority, both in square kilometres and as a percentage of the Local Authority area, based on high water mark boundary. Two types of flood zones are included, the zone with a 0.5% or 1 in 200 year annual probability of fluvial flooding and the zone with a 0.5% or 1 in 200 annual probability of coastal flooding.

The total number of properties in Scotland inside the high water mark coastline is 2,553,000. This is an estimation and should be used as an indication only. In total the fluvial flood zone affects approximately 73,000 properties, which is 2.9 % of all properties in Scotland. In total the coastal flood zone affects approximately 26,000 properties, which is 1.0 % of all properties in Scotland.

Table 1: Areas inside 1/200 fluvial or coastal flood zone, by Local Authority

		FLUVIAL FLOODING		COASTAL FLOODING	
LOCAL AUTHORITY	**AREA (KM2)**	**AREA(KM^2)**	**AREA(%)**	**AREA(KM^2)**	**AREA(%)**
Aberdeen City	186	10.3	5.5	0.9	0.5
Aberdeenshire	6,318	222.0	3.5	10.5	0.2
Angus	2,185	103.4	4.7	7.8	0.4
Argyll & Bute	7,008	216.6	3.1	51.4	0.7
Clackmannanshire	159	9.7	6.1	6.3	4.0
Dumfries & Galloway	6,437	268.5	4.2	52.5	0.8
Dundee City	60	2.3	3.9	2.2	3.6
East Ayrshire	1,270	46.8	3.7	0.0	0.0
East Dunbartonshire	175	14.5	8.3	0.0	0.0
East Lothian	679	21.9	3.2	9.1	1.3
East Renfrewshire	174	4.8	2.8	0.0	0.0
Edinburgh, City of	263	14.1	5.4	2.9	1.1
Eilean Siar	3,098	121.6	3.9	136.9	4.4
Falkirk	297	13.9	4.7	22.7	7.6
Fife	1,325	58.1	4.4	16.7	1.3
Glasgow City	175	11.7	6.7	2.6	1.5
Highland	26,162	1,138.7	4.4	96.1	0.4
Inverclyde	162	6.7	4.2	1.6	1.0
Midlothian	355	10.0	2.8	0.0	0.0
Moray	2,238	124.8	5.6	20.3	0.9
North Ayrshire	885	28.8	3.2	7.4	0.8
North Lanarkshire	472	18.9	4.0	3.2	0.7
Orkney Islands	1,012	35.8	3.5	55.9	5.5
Perth & Kinross	5,384	357.8	6.6	8.0	0.1
Renfrewshire	262	20.3	7.8	7.8	3.0
Scottish Borders	4,739	201.7	4.3	0.3	0.0
Shetland Islands	1,467	13.9	0.9	24.4	1.7
South Ayrshire	1,224	39.4	3.2	3.4	0.3
South Lanarkshire	1,774	65.4	3.7	7.9	0.4
Stirling	2,253	180.2	8.0	4.0	0.2
West Dunbartonshire	177	28.3	16.0	3.7	2.1
West Lothian	429	14.9	3.5	0.0	0.0
Scotland	***78,805***	***3,425***	***4.3***	***566.4***	***0.7***

Table 2: comparison between the key findings of the 2002 analysis and the 2006 analysis

	2002 analysis	2006 analysis
flood zone areas [Km2]		
fluvial	2,950	3,425
coastal	966	566
affected properties	(to the nearest 1,000)	
fluvial	77,000	73,000
coastal	94,000	26,000