

## **FLOODING ISSUES ADVISORY COMMITTEE**

### **FLOOD MANAGEMENT & MULTIFUNCTIONAL LAND USE IN RIVER CATCHMENTS**

#### **Introduction**

1. This paper will look at the impact of flooding on Aberdeenshire Council and how they are managing the problems faced and how by making best use of our involvement with INTERREG project NOLIMP we could design scheme that would provide flood protection while maintaining best use of farmland and create new biodiversity.

2. Under the Flood Prevention (Scotland) Act 1961 Councils in Scotland are responsible for all NON-agricultural ground including recreational areas. Aberdeenshire Council Flood Prevention Team do environmental, ecological and geomorphologic assessments to satisfy the requirements of the Water Framework Directive.

#### **Results / Findings**

3. The long-term records in Scotland show the rainfall pattern over hundreds of years. It is interesting to note a shorter snapshot. By analysing rainfall in the Dee catchment over the past 12 years it can readily be seen that from a figure of 640mm in 1990 rainfall had nearly doubled to 1123mm by the year 2002. Research by Scottish Natural Heritage has shown that seasonally adjusted Average annual rainfall rose by 32% between 1914/1950 period and 1961/1990. This trend would appear to be continuing.

4. Having assessed the collected data one must give attention to flood incidence data. That is far more sketchy and quite frankly flow data in rivers is very short. So one has to rely on 'local knowledge'. That in itself poses problems.

#### **The Value of Integrating Historic Local Knowledge and Diverse Skills**

5. It is worth remembering that we live in a very mobile society where people may only have lived in the area for a short time. This is particularly prevalent in the Aberdeen area where the Oil Industry dominates. Many people only stay a few years and then move on. On the other hand in areas of Aberdeenshire many of the Farmers families have lived in the area for generations and passed down stories of flooding and great storms through the years.

6. In the author's opinion listening to local folklore is crucial to putting sustainable flood defences in place and there are two reasons. If local people are listened to and feel that their voice is being heard they are far more likely to embrace ideas and proposals through feeling empowered and part of the solution. Experience in recent months has shown it also draws the community together. Sometimes this is to throw brickbats at us but more often it's to debate the issues together and come forward with invaluable information.

7. One excellent example put together from photos obtained from an old lady that lived in a manse on near to the River Dee in Ballater. The first was taken in about 1910 and shows the river some 150m from the Manse across an open pasture. 10 years later and the family are sitting on shingle that used to be their field. By the 1930s/40s the River had decided to move again unfortunately the house didn't and the main structure of the house collapsed into

the river. The remains of the house, the servant's quarters, were pictured 10 years ago. Believe it or not the original family still stay there. A cautionary tale for those who build houses near rivers.

8. Equally important are old photos or flood marks. These can be transferred onto our computer programmes and a valuable calibration/verification can be found.

### **Implementing Change and Innovation with the Community and Partners.**

9. There is more than one way manage River Flow. It is not always correct to solve the problem at the site of the problem.

10. Aberdeenshire Council is actively implementing and promoting the detailed study of River Behaviour. In doing so the Council can not only ensure any measures they put in place do not have a detrimental effect on downstream properties and habitats but they may also have the opportunity to harness/attenuate flood flows out with sensitive areas and urban conurbations in an effort to effect and overall environmental improvement.

11. As partners in the INTERREG / NOLIMP project 3DVISION Aberdeenshire Council promoted the Tarland Burn Catchment (a tributary of the Dee 30 miles upstream of the sea at Aberdeen) as an excellent example of where measures could be to best demonstrate the advantages of the implementation of the Water Framework Directive. The proposals include flood alleviation measures, biodiversity improvements, farming practice improvements and habitat enhancement in other words: multi functional land use.

12. At an early stage the decision was taken to try to avoid building invasive flood prevention structures but rather to investigate whether nature itself could give any clues as to the best way forward.

13. Digitised outlines of natural flood plains during flood events in 2002 were taken from the aerial photos. This was to be our starting point. It was the Council's firm belief that by amplifying the effects of nature we could come up with a solution that would sit best with the many interest groups and local bodies.

14. Having studied the natural flood outlines, a team of surveyors walked every km of main flow and tributaries to assess the suitability for further storage and gauge the environmental impact that may ensue be it positive or negative. All these possible sites were plotted on a plan of the catchment. At an early stage it was fairly easy to see the similarity between theoretical outlines and actual flood areas. This was most encouraging.

15. Next Stop was public engagement and gauging reaction to the outline proposals. This was first put to the farmers and landowners in late spring 2004. Thereafter we held public meetings and invited local people to contribute to our early ideas.

16. As time went on and faces became known there was a definite ground swell of support. More rewarding was the mutual trust, which was obviously building. It is the team's firm belief that this more than anything spread the word and helped them go forward. People felt they were stakeholders in the decision process and not just being told what was going to happen. In addition to personal visits the Council also enlisted the help of the local press and open nights to keep locals abreast of developments. This was doubly helpful in that

not only did it get through to those who may not have been aware of proposals but also it undoubtedly led to new questions being raised and answers sought.

### **Lidar and Computer Analysis**

17. Allied to the public participation was the obvious need for computer analysis of the hydrology and storage potential of the many sites identified. It became clear early on that it was not going to be an easy task to survey the entire catchment by traditional methods. In late summer 2004 Aberdeenshire Council contracted a LIDAR survey of the area. This allowed us to study in greater detail the potential for storage of floodwaters and what modification, if any would be required to make the areas suitable.

18. FEH Software and INFOWORKS RS modelling software were used to create computer models of the proposed flood areas. The LIDAR information was invaluable in giving the team the ability to create three-dimensional imagery and take cross sections of the land in a much shorter time than would have been the case in the past.

19. The Council also took the opportunity to drop the orthorectified photographs onto a contour model and create a fly-through of the entire catchment. It has been a great visualisation tool for describing our proposals to the public.

20. The combination of on-line and off line storage areas that the Council have proposed not only provide potential for flood management but also present clear opportunities for re-introducing natural wetlands, re-meandering and the establishment on new wildlife habitats.

21. Aberdeenshire Council was delighted when the first step was completed recently at site called Mill Of Gellan. This site comprises off line storage for 5000 cu.m of water, a small wetland and biodiversity pond. The work was carried out in three weeks at a cost of approximately 30,000 Euros. Most rewarding is the fact that that the land was handed over to Aberdeenshire Council for Flood Prevention free of charge.

22. Aberdeenshire Council is now in the process of creating further schemes on the Tarland Burn. It is felt that that in carrying out many smaller less obtrusive schemes the Council may well have greater support from the public than if the Council promote one big storage scheme. Likewise the financial and social impact is spread over the community and not on one or two individuals.

### **Trans-national Cooperation**

23. Experiences gained working with our fellow partners in NOLIMP have been invaluable.

24. From a very early stage it was clear that expert knowledge of biodiversity and wetland construction lay within the structure of our Partners both at home and across the North Sea.

25. Our in-house skills lay with flood modelling and the analysis of hydrological events. We did not have the skills of wetland design, experiences of installing wetlands and the experience of working with the farming and local communities in providing a multi use flood prevention project.

26. At our first annual meeting of NOLIMP partners in 2004 I made a point of paying close attention to other projects and what skills our partners had. It was clear that Waterskip Fryslan in the Netherlands had a very skilled expert in this field. Theo Classen and his staff arranged for a representative from Scotland to visit the Netherlands to share ideas and experiences that would help with our project.

27. Valuable experiences were gained studying the surface water drainage system in Fryslan, how it is managed to prevent flooding and improve the land for agriculture and the impact of climate change on the system. Site visits included a proposed storage area which had been inundated in a controlled manner three separate times to observe the impact on wildlife and agriculture, a river restoration project and a large floodwater storage complex in the Hunze river catchment near Groningen and two areas on the River Ijssel near Zwolle and Deventer where side channels had been constructed to both increase channel capacity and improve conditions for wildlife/nature development in the river corridor.

28. Further International meetings in Norway and Sweden showed how working with local farmers could bring about mutual benefits to both commerce and the environment. These lessons were very important in taking forward our own project. We also worked closely with all our local partners in NOLIMP and other bodies such as the World Wildlife Fund and Royal Society for the Protection of Birds and local Fisheries interests to maximise the benefits to all parties and endeavour to seek a fair balance in our proposals.

29. One of the intangible benefits of the project has been the build up of a pool of experts who can be consulted for opinions. In many cases when one works in an area out-with the more widespread skill base it is very difficult to seek opinions or bounce ideas off colleagues. By being involved in INTERREG we have been able to share experiences and skills in water / environmental management. Not only do our resultant projects become more comprehensive they include benefits that we may not have considered without the input of our European Partners.

### **Scope for further Cooperation**

30. Water management is not just about flooding and chemical imbalance we need to take a holistic view of the problem. Further interaction with our European Partners will minimise the time taken to resolve these problems

31. At present there is some difficulty in identifying who one should liaise with. By having a wide range of partners of diverse skill we can build up a database of consultees and provide more multi functional schemes.

32. Rivers must be managed and properly understood before fully effective flood defences can be put in place. This means involving the public at an early stage, gathering information and feedback and keeping them well informed of developments and progress. Sharing of experience with both local, national and international partners will increase our ability to provide our Clients with a quality product.

**Alasdair J. Smith**  
**Aberdeenshire Council, Scotland**  
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