

# The Catchment Approach

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## Appendix 1

This Technical Information Note aims to introduce LI members to the “Catchment” concept and indicate ways in which they may want to get involved in catchment-based initiatives. References are mainly to practice within England.

## 1. Introduction

- 1.1 Over recent years the long-established geographical concept of the catchment has risen in prominence linked to the work of governments and their agencies in developing better approaches to the management of the environment.
- 1.2 This Technical Information Note aims to introduce LI members who are unfamiliar with catchments to the concept and indicate ways in which they may want to get involved in catchment-based initiatives.
- 1.3 Although principles are often the same throughout the UK, this edition mainly refers to practice and initiatives within England.
- 1.4 This note is provided for information only.

## 2. Catchments

- 2.1 Water that falls on land, where able to, drains away under the force of gravity. Much will soak (infiltrate) into the surface, and flow underground (laterally and vertically) as groundwater flow. But when the surface becomes saturated, or with heavy precipitation, water starts to run over the land. As this surface water flows it first fills up any local depressions in its path. These then overflow to form a drainage network of channels of increasing size, such as rills, watercourses and rivers, ultimately reaching the sea.
- 2.2 During its journey water also changes in chemistry, biology and levels of suspended matter, depending on the surfaces it runs over or through. It also changes as it merges with water from different sources. These changes have implications for the water's appearance, ecology and suitability, including for treatment to become drinking water.
- 2.3 A **catchment** is the area of land which drains into a particular channel or body of water. Each catchment is bounded and separated from its neighbour by a ridge of relatively higher land called the watershed. The watershed is often not obvious visually and is typically confirmed through examination of the landform, e.g. using lidar data or undertaking a topographic survey. The landform is normally the principal factor determining the catchment area, although water that infiltrates into the ground at one point can reappear at the surface at another point some distance from the point of entry (e.g. a resurgent stream). This is principally determined by geological factors, which may not be decipherable from surface features.
- 2.4 In the same way drainage channels connect in a hierarchy, so catchments also form a hierarchy and at a variety of scales. These also vary greatly in nature, for example from the largely undeveloped landscape of the Scottish Highlands, to rural farmed lowlands, to built up urban areas. Every catchment is typically associated with different soils, landcover and patterns of human interventions, all having different implications.

- 2.5 For instance, in smaller scale rural landscapes, intensified landuse associated with agriculture or nearby urban areas can result in negative effects on water quality and soil erosion. As another example, in urban areas, natural drainage patterns are strongly modified by the large areas of impermeable surfaces and traditionally engineered drainage schemes. This can result in increased surface run-off volumes and elevated discharge rates into main-drains, water courses and water bodies in excess of their existing capacity, which can cause flooding at various points within the catchment area.
- 2.6 Other human interventions affecting catchments include: static water pumps for the abstraction of water for drinking, irrigation or other purposes; pipes; channels; sewers; aqueducts; and canals. Sometimes these result in significant water transfers between catchments, such as the supply of drinking water to Birmingham from Lake Vyrnwy in Wales. Land management is another important intervention. The way that the land-cover in catchments is managed by people also has a bearing; vegetation has a key role in intercepting and transpiring water. Similarly, the state of cultivation in different parts of a catchment has a significant effect on whether or not soil particles might be eroded and make water cloudy and discoloured, or if the soil were contaminated, make the water polluted.
- 2.7 Another source of pollution can occur when greywater waste and foul sewage from properties has been connected to the stormwater drainage system. This may be as a result of the historical practice of combining sewerage systems, or due to ‘misconnections’ which have intentionally or accidentally arisen with new construction projects.

### **3. Stakeholders in catchments**

- 3.1 Everyone has a stake in the way catchments are managed; whether it be for drinking or irrigation water, flood alleviation, recreational and landscape amenity, biodiversity or other ecosystem services. But some community representatives are likely to come to the fore in discussions. Some typical scenarios are as follows:
- A landscape planner, seeking to improve informal countryside recreation opportunities and green infrastructure, may be concerned by the very low levels of water in a previously attractive stretch of river which has resulted from heavy abstraction of subsurface water by a water company through water pumping stations further up the valley;
  - An anglers’ consortium, concerned that river trout is not faring well in one stretch of river, wants to negotiate to ensure that there are no artificial obstructions in the rivers downstream which are hindering the natural passage for fish upstream and supports silt removal, gravel injections and channel modification to allow conditions for spawning;
  - The local wildlife trust wants to stop non-native species using the river system to invade their reserves and seeks to promote action to tackle the problem as close to source as possible (upstream or downstream depending on the direction of invasion);

- A water company, on abstracting water from a river for the drinking water supply, discovers the level of phosphates is too high, so it wants to negotiate with farmers upstream to better target their phosphate fertiliser applications;
- A project officer for a designated landscape seeks general improvements in the amenity, biodiversity and heritage value of streams within the landscape, and collaborates over an integrated approach;
- Local authority flood or drainage officers may be promoting the development of sustainable drainage schemes, the better management of ordinary watercourses or the conservation of structures which may alleviate flooding; and
- A group of residents are concerned about their properties being at risk of flooding and the difficulty they are having in obtaining insurance.

#### **4. Administration of catchments**

- 4.1 Because of possible implications for water supply, pollution incidents, flooding, and depletion of fish stocks, stakeholder activities within catchments have long been regulated by Government and its agencies. In England, for example, the key bodies are Defra and the Environment Agency although important roles are also performed by the Internal Drainage Boards and local authorities (e.g. through their roles as planning and lead local flood authorities).
- 4.2 For practical reasons, the Environment Agency organises itself on the basis of catchments (“operational” or “management”) which may be the same as the hydrological catchment, a combination of smaller ones or a subset of a larger one. The Environment Agency also treats underground aquifers as separate catchments.
- 4.3 To support its work and as a wider resource, the Environment Agency has developed a large body of data about its catchments and has produced extensive summary descriptions for them. These descriptions provide a potential information resource for projects, including supporting economic cases for proposed landscape interventions. For further information see the [EA catchment data explorer](#).
- 4.4 The Environment Agency also undertakes forward planning within River Basin Districts (the largest catchment unit) through River Basin Management Plans<sup>1</sup>.
- 4.5 With devolution, the other nations of the UK are developing new, but not dissimilar, regulatory and administrative structures and resources. In Wales the roles rest with Natural Resources Wales, in Scotland with Scottish Natural Heritage (SNH) and the Scottish Environmental Protection Agency (SEPA) and in Northern Ireland the role lies with the Northern Ireland Environment Agency (NIEA). Wales, for example, is piloting a much more integrated approach to natural resource management and catchment management, for example in the Dyfi catchment.

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<sup>1</sup> The second cycle of these were being worked on as this information note was being produced

## 5. The Catchment Based Approach (CaBA)

- 5.1 Catchments have been of interest for planning and regulatory bodies whenever people have sought to understand and manage problems with water quantity or quality in one part of the system, when the cause of the problem lies elsewhere within the system. Problems of this kind have come to the fore as a result of the Water Framework Directive.
- 5.2 Particular impetus has been given to CaBA in England and Wales through a Defra position statement in February 2011. A number of pilot catchment initiatives were subsequently undertaken, which were evaluated by March 2013, and led to the launch of a [policy framework by Defra](#). A related handbook was also produced (see [www.ccmhub.net](http://www.ccmhub.net)).
- 5.3 The objectives Defra currently has for each catchment are:
- To deliver positive and sustained outcomes for the water environment by promoting a better understanding of the environment at a local level; and
  - To encourage local collaboration and more transparent decision-making when both planning and delivering activities to improve the water environment.
- 5.4 Defra also seeks benefits for its River Basin Management Planning process, the delivery of the Water Framework Directive and ecosystem services, and better strategic planning.

## 6. Catchment Partnerships

- 6.1 An associated development of the CaBA has been to recognise catchment partnerships. This move has been driven by the desire to foster better collaboration and to develop capacity within catchments to find solutions to problems, and catalyse a collaborative approach to funding. It is also seen as a better approach following the first cycle of River Basin Management Plans which had been felt by some to be too large-scale and ‘top-down’. The catchment is a scale to which people relate and stimulates bottom-up input.
- 6.2 In England, many catchment partnerships have formal arrangements with the Environment Agency. Defra has also made a commitment to have a named [Environment Agency] catchment co-ordinator for every catchment and to develop partnership processes for each. Typical members of these partnerships include the Environment Agency, Water Companies, Wildlife Trusts, Rivers Trusts, AONB Conservation Boards, landowners and local user and community groups. Each catchment is ‘hosted’ by a partner (or where there is no host, by the Environment Agency). The way in which partnerships are organised is not prescriptive, though an inclusive and collaborative approach is at the core of the way in which they work. In 2015/16, each management catchment with a recognised catchment partnership can benefit from up to £15k funding towards the costs of hosting the partnership. Wildlife Trusts and Rivers Trusts in particular have been taking a lead in hosting. Involvement of local

authorities and large private sector stakeholders other than Water Companies, however, appears to be less frequent<sup>2</sup>.

### 6.3 Further information on catchment partnerships:

- [DEFRA information on catchment partnerships](#)
- [Catchment Partnerships in England and Wales](#)
- [South West Scotland Catchment Management Initiative](#)
- Joint NE/EA Pilot project in Derwent and Taw-Torridge catchments

## 7. Drivers for action in catchments

- 7.1 The main drivers for action within catchments are currently: compliance with the Water Framework Directive<sup>3</sup>; improved water quality for drinking; prevention of flooding, and improved biodiversity including control of invasive species. These hold across the UK.
- 7.2 Further support is being given to the CaBA in England, and part of Wales, by an association of stakeholders including some of the more active environmental NGOs, particularly the Rivers Trusts. To support best practice and enable access to useful training and resources they have developed a [CaBA Support Team](#).
- 7.3 Another driver for the CaBA is the encouragement being given by the water supply regulators (e.g. OFWAT (in England and Wales), WICS (in Scotland) and The Utility Regulator (in Northern Ireland)) to Water Companies. Periodically, the regulators review the Water Companies' business and asset management plans and encourage innovation to reduce costs<sup>4</sup>. This can raise interest in invest-to-save schemes and the catchment partnership approach is viewed as one of these. It may mean substantial opportunities for landscape change, for example where landscape interventions can be shown to have sufficient benefits for alleviating diffuse pollution. Several Water Companies are already leading the way here, for example by arranging the blocking-up of drainage channels ("grips") to restore the integrity of peat-land and reduce discolouration of water, and by funding farm management advisers and incentivising direct changes in land management.
- 7.4 Other drivers, in England at least, include: the new Countryside Stewardship Scheme (an agri-environment scheme which also enables delivery of Water Framework Directive objectives); the priorities of Natural England; the initiative of Water and Environmental Management Consultants; and the support of the [Natural Capital Committee](#)<sup>5</sup>.

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<sup>2</sup> At the time of writing only 27 partnerships had funding post 2017 from non-Defra sources. (according to Kieran Conlon speaking at *Water & Environment 2015*)

<sup>3</sup> [Original version of regulations](#):

<sup>4</sup> At the time of writing Periodic Review PR14 had led to Asset Management Plan AMP6

<sup>5</sup> The Committee is of the view that catchments perhaps offer the best means of exploiting synergies at a local level so that individual actions can collectively become far greater than the sum of their parts.

## 8. Catchment Management Plans

- 8.1 Associated with the development of catchment management partnerships and River Basin Management Planning is the process of developing catchment management plans. This has been encouraged in England via starter funding from the Environment Agency and contributions from partners. These partnership plans are non-statutory, but the Environment Agency has been known to object to a draft Local Plan if it does not comply with them. The plans have also supported and provided a reference point for funding bids (such as to the Catchment Restoration Fund, which has improved over 300 waterbodies) and inspired better co-ordinated action by various community groups. They tend to cover topics such as water quality, biodiversity, diffuse pollution, access and recreational amenity, flood alleviation, and invasive species.
- 8.2 Examples of Catchment management plans can be found via the [CaBA website](#) (noting that this only relates to England and part of Wales).
- 8.3 In Scotland, the key process is the larger-scale River Basin Management Planning, involving SEPA and supported by the James Hutton Institute. In Wales, the aspiration is to integrate catchment management more generally with natural resource management and natural resource management pilots are underway in the Dyfi, Tawe and Rhondda catchments.

## 9. Catchment Sensitive Farming

- 9.1 Catchment Sensitive Farming (CSF) in England is a programme run by Natural England in partnership with the Environment Agency and Defra. It operates in selected areas, called *priority catchments*, where improvements in water quality will make the greatest contribution under the Water Framework Directive.
- 9.2 The priority catchments can be identified using the online mapping tool at <http://www.magic.gov.uk/MagicMap.aspx>. (They are listed under the Designations>Land-based designations>Non-statutory tab).
- 9.3 The programme raises awareness of diffuse water pollution from agriculture by giving free training and advice to farmers. To some extent this is targeted to priority catchments with the following characteristics: Water Framework Directive failure (where agricultural practices are implicated); the potential benefit to protected areas (European, national and local designations); and the likelihood that CSF support will be effective. Its success is linked to the development of working relationships with farmers over time.
- 9.4 From time to time priority catchments benefit from grant schemes. In 2015-6 £10M was available for Water Capital Grants. Under the scheme, grant items that could be applied for (and livestock farmers are a frequent beneficiary) included:
- gateway relocation and gap restoration;
  - water gates;
  - resurfacing of gateways;

- watercourse crossings;
- sediment ponds and traps;
- earth banks and soil bunds;
- silt filtration dams/seepage barriers;
- swales; and
- fencing.

9.5 CSF officers are also likely to be involved with any local Catchment Partnership.

9.6 Further information about CSF is available from:

- [An introductory guide to CSF;](#)
- [Working towards catchment sensitive farming; and](#)
- [https://www.gov.uk/catchment-sensitive-farming-reduce-agricultural-water-pollution.](https://www.gov.uk/catchment-sensitive-farming-reduce-agricultural-water-pollution)

9.7 In addition to the priority catchments in England there are ten **Catchment partnership initiatives** which extend CSF services in the following areas:

- Portsmouth Downs & Harbours;
- Upper Great Ouse;
- Semerwater & Upper Lune;
- River Nidd;
- River Nene;
- Rivers Taw, Torridge & North Devon Streams;
- Isle of Wight;
- Rivers Chelmer & Blackwater;
- The Leam;
- Cound Brook;
- River Dane;
- Mimshall Brook;
- Alt & Crossens; and
- Somerset Frome.

## 10. Possible roles for the landscape professional

10.1 There are a number of situations where the landscape professional may come into contact with catchment-based initiatives.

10.2 Firstly, clients and their advisers will typically need to become aware of, and support the minimisation of potentially adverse environmental effects of landscape initiatives in relation to the Water Framework Directive and the Flood and Water Management Act 2010. For example, since many Water Framework Directive failures relate to what are now seen to be unnecessary modifications to channels, any scheme involving an ordinary watercourse or river will normally need to involve discussions with the relevant regulators. The landscape professional may need to help mediate between different competing interests.



- 10.3 Secondly, all projects undertaken or assessed by landscape professionals will take place within one or more catchments. Understanding how the project could fit positively within catchment management plans (or equivalent) is important. If the catchment is a priority catchment, there may be an opportunity to get funding for elements of the project that are in the catchment plan. The catchment management plan may be influencing planning policy, and so by aligning oneself with the catchment plan, planning permission may be easier to obtain. The catchment co-ordinator may be a useful resource here.
- 10.4 Thirdly, there are also notable opportunities for landscape professionals to become involved in the work already being proposed by the catchment plans, local authorities and Government Agencies. Some of the initiatives and interventions likely to be needed within catchments are typically within the capability of many landscape professionals to either advocate, consult on or to secure and possibly all three; Examples are given in Appendix 1.
- 10.5 The experience of some landscape professionals may also make them suitable for a role on a catchment partnership. For example, local authorities may find that their in-house landscape professional has the best mix of experience to represent their breadth of interests.
- 10.6 Outside of priority catchments and partnership catchments there may be scope for landscape professionals to champion relevant Catchment Sensitive Farming resources for mutual benefit. Through long-standing contacts they may also be able to help CSF achieve better penetration within the horticulture industry.
- 10.7 The landscape profession may be able to help add to the evidence of the gain in cultural ecosystem services through catchment interventions.
- 10.8 Because of their understanding of landscape character in particular, the landscape professional may be able to see connections and opportunities for clients and regulators that go beyond catchment boundaries.

## **11. Relationship between catchment and landscape character boundaries**

- 11.1 Like landscape character type boundaries, catchment boundaries are based on physical geography - but the correlation between the boundaries is patchy.
- 11.2 In many cases, especially at the scale of National Character Areas, landscape character will be identical either side of a watershed. For example, the rather uniform Bodmin Moor is divided by two Environment Agency management catchments and six main river catchments.
- 11.3 On a smaller scale, particularly in areas with prominent valleys, the boundaries of landscape character areas may be similar to the boundaries of catchments.
- 11.4 Often, however, the landscape character type boundary will be more of a determining factor for guiding management prescriptions than the catchment boundary.

## 12. Some further resources on catchments

12.1 This technical information note provides only an introduction to the concept. Apart from the sources of information referenced above, miscellaneous pointers to further information follow:

- Information about the hydrology of different soil types within a catchment can be obtained via the [uksuds](#) website
- The British Geological Society is interested in the connections between groundwater and surface hydrology:  
<http://www.bgs.ac.uk/research/groundwater/catchment/home.html>.
- [The Rivers Trusts websites](#), because of their frequent leading role in catchment work;
- United Utilities' work in upland areas - [SCAMP](#);
- Information about [Demonstration Test Catchments](#) (Eden, Wensum & Avon) exploring whether new farming practices that reduce diffuse pollution can also deliver sustainable food production and environmental benefits across whole catchment; and
- [Multiple benefits of river and wetland restoration – “Killer Facts” from projects](#) compiled by Alastair Driver, National Biodiversity Manager, Environment Agency.

12.2 Further information may also, from time to time, be posted on the Landscape Institute website or the Landscape Institute's Social & Professional Network, [Talking Landscape](#).

## Appendix 1 - Some typical catchment interventions likely to be of interest to the landscape professional

- Promoting ditch management on 2-3 year rotation;
- Promoting channel management;
- Buffering of watercourses with grassland strips;
- Avoiding cultivating soils on land liable to erosion;
- Using winter cover crops or retention of stubble to protect soil from erosion;
- Establishing in-field grass areas to reduce soil erosion in arable fields;
- Blocking of grips on moorland to encourage return of blanket bog;
- Stabilising of peat with heather brash and geotextiles;
- Fencing to keep livestock away from streams;
- Re-establishing woodland adjacent to watercourses or abstraction points;
- The removal of weirs;
- The introduction of fish-ladders and eel passes;
- Changes to river morphology (“adaptive measures”);
- Design of schemes to handle storm water;
- Removal of invasive plant species from waterbodies;
- Riverbank coppicing;
- River gravel augmentation;
- Better specification of fertiliser use;
- Alternatives to certain damaging herbicides;
- Development of on-farm reservoirs;
- Promoting planting;
- Soft landscape design which avoids the need to irrigate;
- Helping mitigate the effect of point source pollutants such as scrap metal yards, garages, or fuel tanks by bunding;
- Helping design land restoration to minimise leachates;
- Removing culverts;
- Flood alleviation schemes;
- Helping develop a shared vision;
- Helping prepare information;
- Assisting with facilitation and public engagement; and
- Contributing to whole farm plans.

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