

StreamScapes Catchment Assessment Guide



illustration by Jessie Winchester

***A DIY Guide to understanding
your local environment, aquatic habitats, & biodiversity***

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Introduction

The best way to understand "the environment" is to look around you at your own locality. This "Catchment Assessment Guide" provides a template for schools (primary and secondary), or community groups (such as Tidy Towns, angling clubs, Scouts, etc.), or even families or individuals, to gather and collate information which will assist you in understanding the state of your local environment, and to provide the basis for action. The *Catchment Assessment Guide* is divided up into four areas, with accompanying **Worksheets**. There is no reason to be intimidated by any one area of assessment...let people work individually, or in subgroups, *to their strengths and aptitude*, reporting back to the class or group on their findings. Consistent with your group's skills and interest, go as shallow or as deep as you wish. The range of assessment exercises and activities portrayed in this *Guide* is intended as a *Menu* from which to choose. Ignore areas which you find to be beyond your competence. The aim is to acquaint all group members with a *basic knowledge* of the workings of your local catchment; geology, topography, demographics, industry, land-usage, vegetation, wildlife; and how these elements shape the status of your local aquatic resource and the biodiversity which it supports. You may be surprised at how much you already know, individually and as a group. Acquire relevant maps (as detailed as possible). Seek permission for access to your survey sites. To help you assemble a portrait of your local Catchment, invite local expertise in to address your group; representatives of local authorities, farming organisations, forestry, industry, local Regional Fisheries Boards, environmental groups, historians...anyone who you believe would assist you in enlarging your understanding of relevant issues. When you reach a point in your assessment that you are satisfied with, then you may wish to publish your project, both in hard copy form as a report, which could be lodged in the local library or as a press release for a local paper

So, the main points:

- ***The aim is to get a basic working knowledge of your catchment, and how various factors influence the quality of waters, our wildlife, and our own prosperity***
- ***Allow people to work to their strengths; divide your group according to the Worksheets in this Section***
- ***Obtain relevant maps and permission(s)***
- ***Enlist local expertise in your assessment activities***
- ***Use the responses to your Worksheets to produce a Project Report***
- ***Publish your Report! Make it available to a local library, send it to politicians, submit it to the StreamScapes website. Get it out there to produce discussion and awareness!***

ASSESSMENT SECTION I: Catchment Earth, Water, Air & People
(Geography, Geology, Land- and Water-use Patterns, Air Quality, Demographics,
History, and Mythology)

Here we set the scene by looking at our wider catchment; geography, geology, present and historical human activities... We shall assemble a picture of how these elements come to influence the state of our aquatic resource, our wildlife habitats, and ultimately, our own quality of life.

Geography (What is the nature of the landscape around us? What are the names? Where are these places)?

- 1) River/Stream Name: _____
- 2) Wider Catchment: _____
- 3) Catchment Area (km²): _____
- 4) Describe the nature of the catchment (*hilly, flat, lakes, fast- or slow- moving river...*): _____

- 5) Source of River/Stream: _____
- 6) Highest Peak: _____ Height in Metres: _____
- 7) Where does the Catchment meet the Sea? _____

Geology (How does underlying bedrock type affect vegetation? water chemistry)?

What is the dominant Type of Rock found in the Catchment?

Igneous _____ Sedimentary _____ Metamorphic _____

Land Use Patterns (The undisturbed landscape tends to a stable dynamic; once we drain, plough, plant, pave, or shelter, things get stirred up. How do we use our land and what are the influences to be minded)?

Tick the appropriate box for the Catchment:

Land uses	Dominant	Well represented	Some	Little/none
Agriculture: (crops)				
Agriculture: (grazing)				
Forestry				
Industrial				
Urban: (Commercial)				
Urban: (Residential)				

Is there any wilderness, or Special Areas of Conservation, etc? Describe:

Water Use Patterns

What uses are made of catchment water resources?

Uses	Large extent	Some	Occasional	None
Drinking water supply				
Industrial water supply				
Angling: coarse				
Angling: Game				
Watering animals				
Amenity: Riverside walks				
Amenity: Watersports				
Amenity: Swimming				
Other eg electricity generation				

Catchment Air Quality *(The quality of local air may have a profound influence upon people's health, wildlife habitats, and water quality).*

Source information on local air quality. If pollutants are present, what is their source? What effect might air chemistry have on the catchment...on water quality (does it influence lake pH, does it affect sensitive life-forms like certain lichens,etc?) Comment:

Demographics *(Population densities have their own impacts upon water quality. By knowing age spreads and employment trends, we can understand the socio-economic needs of our catchment. We can also anticipate potential impacts upon habitat quality, and work with our community to ensure that "best-practice principles" are employed in the development and management of these various fields).*

- 1) What is the population of the wider Catchment? _____
- 2) What is the population of your local Catchment? _____
- 3) Profile local population by Age and Sectoral Employment:

History & Mythology *(Who are the people...what are their stories)?*

- 1) From records and local knowledge, how do land-use, demographics, and fish catches thirty years ago compare with that which pertains today?
- 2) Profile local townland and bridge names, together with their origins: _____
- 3) List local river pool names, and any associated stories: _____
- 4) Describe local megalithic or other archaeological remains: _____
- 5) Profile any locally associated myth or legend: _____

ASSESSMENT SECTION II: Riparian Zone
(Bank Structure, Vegetation, Birds, and Mammals)

For the studies in this Section on Riparian Zone and the next Section on Instream Habitats, select a representative stream reach within your locality for the purposes of your survey. 20 - 50 metres of stream should be adequate, but depending on your resources and local conditions, it may be shorter or longer than this. Ensure that you have necessary permissions for access and sampling. In this worksheet you will look at the quality of the Riparian Zone along your stream reach...how its well-being influences its ability to act as a buffer to our activities, and its ability to support a wide biodiversity.

Bank Structure (Has many implications for water quality and the capacity of our stream to support wide bio-diversity).

- 1) Are the banks stable along your stream reach? Why or why not?

- 2) Does the riparian area function as a buffer zone against catchment land-use activities? Why or why not? _____
- 3) Is there evidence of dredging? If so, how has this affected banks? Hydrology? Pool/Riffle ratios? _____

Riparian Vegetation (Riparian vegetation: is the primary energy source for the instream foodweb [leaves feed aquatic insects which feed other insects which feed fish which feed heron and otters]; is able to modulate summer water temperatures (and, in proper balance, may ameliorate climate change); and creates shelter/habitat for bird/mammal visitation, and etc.).

- 1) Along your Stream Reach, profile riparian vegetation by percentage:

Type	%
Tall trees deciduous	
Medium trees deciduous	
Tall trees coniferous	
Medium trees coniferous	
Shrubs	
Grasses and herbs	
Grazing ground	
Barren ground	

- 2) Is the vegetation helping to stabilise the bank? Why or why not? _____

- 3) Estimate the % of your stream reach in noon shadow on a sunny day: _____
- 4) Is the canopy closed over the stream? _____
- 5) Profile human use of your stream (walking path, angling, dumping, animal watering, etc.): _____

Birds & Mammals

Wild creatures generally don't stay around people; if you are visiting a stream with your group, they will usually scatter before you arrive. Beyond observation, however, you may learn about their presence by looking for their tracks and signs. In the riparian zone, look for the following:

	Present	Absent
Bird tracks		
Mammal tracks		
Old nests		
Hairs & feathers		
Faeces		

Along your stream reach, are there:

- 1) Large trees for herons? _____
- 2) Sandy banks and instream perches for kingfishers? _____
- 3) Stone bridges and/or rock faces for dippers? _____
- 4) Reed beds for ducks, swans, and coots? _____
- 5) Holes in the bank for otters? _____

What other birds and mammals are associated with your stream reach?

Species	Seen on visit	Seen at other time	Local knowledge	Comments
Ducks				
Heron				
Dipper				
Swan				
Kingfisher				
Gulls				
Cormorant				
Wading birds				
Wagtails				
Otter				
Mink				
Other				

(Other species that your group may see, or reliably hear about, along your stream reach, include songbirds, migrating birds (like thrushes in Autumn), birds of prey, finches, swallows and martins, members of the crow family, brown rat, foxes, bats, etc. Note all of these in your report).

ASSESSMENT SECTION III: Instream Habitat
(Substrate, H₂O Chemistry, Macro-invertebrates, and Fish)

A local stream provides a fair reflection of the state of your local environment. Here your group takes a good close look at various Instream parameters, seeking to establish if our stream is capable of supporting rich and varied wildlife as well as a viable water source for human communities .

Water Chemistry & Hydrology (Water Chemistry parameters indicate short- and long-term trends in water, and Catchment, quality...sample several points in your stream reach; for example, up- and down-stream from an incoming tributary to spot inputs. Enlist the support of local third-level institution, County Council, or Fisheries Board Environmental Officer for technical support).

Information:	Site 1	Site 2	Site 3	Average
Depth (average depth from 3 points measured across width of stream)				
pH				
Dissolved oxygen (mg/l)				
Temp °C				
Bank Stable (y/n)				
Current speed (m/s)				
Conductivity (mS/cm)				
Width (m)				
Cross sectional area/m ²				
Flow m ³ /sec				
Appearance (cloudy/clear?)				

Substrate & Habitat Types (A healthy stream has good diversity of substrate and habitats such as pools, riffles and glides, all of which are inhabited by various age-groups of different aquatic species).

Substrate/habitat type:	Percentage at:	% Site 1	% Site 2	% Site 3
Bedrock				
Boulders >100 cm				
Cobbles 12-100 cm				
Gravel 2-12 cm				
Sand <2 cm				
Silt, mud				
Pools, current slow				
Glides, current moderate				
Riffles, current fast and turbulent				
Shaded by overhanging vegetation				

Macro-Invertebrates (Aquatic Insect diversity and abundance is used to determine water quality - "Q values" - for rivers throughout Ireland. Refer to Appendix E, "Macroinvertebrates", to learn how to sample and identify the following basic species).

Indicators of Good Water Quality (Q4-Q5)	Many	Some	Rare	None
Stonefly larvae				
Mayfly larvae				
Cased Caddis fly larvae				
Indicators of Moderate Water Quality (Q3)				
Beetles				
Uncased caddis				
Freshwater shrimp				
Indicators of Poor Water Quality (Q1-Q2)				
Water louse				
Worms particularly bloodworms				
Fly larvae				

Fish (Is your stream reach blessed with fish? What kinds? Can you see any fish? Have you heard locally about the presence of fish?).

- 1) Are there any angling clubs associated with your stream? catchment?
- 2) From local knowledge, are fishing levels declining/stable/improving?
- 3) Has there been stream pollution or fish kills along your stream? If yes, what was the source? None ___ Industrial ___ Agricultural ___ Sewage ___
- 4) Note any knowledge of fish in the following box:

	Date	Time	Feeding activity e.g. rises	Breeding Activity e.g. redds	Fish observed	Local Knowledge
Coarse fish						
Game fish						
Eels						
Stickleback						
Minnnow						
Other:						

- 5) If you are able, try catching a few local fish (in season, with relevant permission). Complete the following information, as well as noting fish health (by inspecting condition of scales, fungus infection, parasites, etc.).

	Species	Number	Method of capture	Weight	Length	Age from scales
Fish caught:						

- 6) Assess the advantages and disadvantages for fish in your watercourse:

	Present/absent	Advantage/disadvantage
River with variety of habitats e.g. depths, substrate, current etc		
Flow of water all year including summer		
Deep pools with over hanging trees		
Riffle gravel with little sediment		
Lots of nutrients from farms.		
Stable banks and bottom		
Large numbers of aquatic insects		
No shade in summer months		
Silt-laden watercourse		
Canalized stream reach		

ASSESSMENT SECTION IV: Information Technology
(Data Management/Report Production, Imaging, Public Relations)

Our project is gathering a lot of information about our Catchment...how do we manage this data and what are we going to do with it?

Data Management/Report Production

It is all very well to gather the data we have identified as being relevant to our studies, but it will be useless unless we "throw a shape on it", and enable it to be accessible to ourselves, let alone anyone else. Ensure that files (real and virtual) are organised in advance to be ready to receive the research that is being undertaken by the group. As the project proceeds, and when it is completed, a Report of the Project should be produced. This requires organisation and order. You have a wealth of information...make it clear and easily accessible.

Imaging

Make sure your group is equipped with good camera (ideally waterproof). Keep a log of your shots, as you may not remember later. Record the important visual features of your Project, including:

- Group Photograph
- Panoramic Overviews of Catchment
- Overviews from various aspects of the group's stream reach
- Close-ups of stream details, shot in varying weather and water conditions
- Assessment Activities, and any interesting features (bugs, fish, banks...)
- "Before and After" Enhancement Activity shots: community tree planting, stream-cleaning activities, etc.

Organise images (including other scanned images) so they are available for:

- Illustrating the Group's Project Report
- Public Exhibition of the Project (in Library or School)
- Inclusion with Press Release on Project
- Submission to ***StreamScapes Database*** on the web

Public Relations

You may wish to communicate with your community or a wider area about what you're up to. It is up to your public relations team to:

- Liase with and form Project partnerships with local authorities, community groups, farming organisations, angling clubs, industry, etc.
- Prepare a public exhibition of your Project
- Draft a leaflet about freshwater issues for community distribution
- Frame and distribute a press release about your Catchment status
- Organise Community Activities, such as a *Stream Clean*, or perhaps declaring your locality as a "Phosphate-Free Zone"!

~ ***StreamScapes Catchment Assessment Guide*** ~

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