## 2. SECTION A: SITE INFORMATION (to be filled in before or during initial visit to site)

### 2.1 GENERAL

*Site Code:* the following standard has been adopted for naming sites: Secondary catchment code, first four letters of river name, first five letters of location. E.g. X2CROC-VELOR (Crocodile River at Veloren Vallei Nature Reserve, X3MARI-VERSA (Martisane River at Versailles). The site code needs to be a unique entry so if a duplicate site code will result with the standardised naming method, a change to the location code should be made.

*River:* name of river assessed.

*Site Description:* details of site location, e.g. farm name, road bridge, village etc.

*Site Length:* length of river being assessed, recommended length 30-50 m.

*Tributary of:* parent river , e.g. Marite is a tributary of the Sabie.

*Map Reference:* either 1: 250 000 or 1: 50 000.

*Political Region:* one of seven regions.

*Bioregion:* one of 18 bioregions as identified in Brown *et al.* (1996).

*Ecoregion:* one of 18 as identified in Kleynhans *et al.* (1998).

*Water Quality Management Region:* one of seven as identified in Day *et al.* (1998).

*Secondary Catchment Code*: DWAF secondary drainage region.

*Catchment Area:* area ($km^2$) of secondary catchment.

*Quartenary Catchment Code*: DWAF quartenary drainage region.

*Sub-region:* based on Rowntree *et al.'s* (1996) geomorphological zonation of river channels (Table 1). Using these descriptions the assessor should allocate a site to a sub-region which may be confirmed by calculating gradient (see below).

*River Segment:* based on aerial or other surveys wherein the river is divided into 5 km sections.

*Lat/Long:* GPS (degrees and minutes+seconds) or degree/minutes/seconds co-ordinates of the site (preferably GPS).

*Source Distance:* distance from source of river estimated from 1: 50 000 map.

*Contour Range:* altitude range within which site falls estimated off 1:50 000 map.

*Stream Order:* order estimated of 1: 50 000 map using the Strahler method. Finger tributaries are designated as first order; successively higher orders are formed by the junction of two stream segments of the same order (see Rowntree and Wadeson 1999).

*Slope/gradient:* calculated: vertical difference between contours (m) divided by horizontal distance between contours, estimated from 1: 50 000 map.

*Geological Type:* based on Vegter's (1995) simplified lithostratigraphic units.

*Vegetation Type:* based on Low and Rebelo's (1996) potential natural vegetation of South Africa, Lesotho and Swaziland.

**Note**: Classification of sites into ecoregions, bioregions, water quality management region, geology and vegetation types is easily done using the appropriate Geographical Information System (GIS) coverages.

*Hydrological Type:* based on the following types:

- Perennial: flows continuously all year round.
- Seasonal: flows annually at a predictable time of year, but ceases to flow for some time each year.
- Ephemeral: flows periodically every few years.

Note: Hydrological type should be recorded for "natural" conditions and for "present-day" conditions .

*Rainfall Region:* season in which the majority of rain falls.

*DWAF Gauging Station:* indicate the presence of a DWAF gauging station and estimate distance upstream or downstream of the site.

*Associated System:* indicate the presence of important systems that may be associated with the site or river, e.g. wetlands or estuaries.

**Table 1. Geomorphological zonation of river channels (after Rowntree *et al.* 1996, Rowntree *et al.* 1998 and Rowntree and Wadeson 1999, with acknowledgement to Harrison and Elsworth 1958, Olif 1960 and Chutter 1967).**

| Geomorphological Zone | Characteristic Gradient | Diagnostic Channel Characteristics |
|---|---|---|
| ***A. Zonation associated with a 'normal' profile*** *(and which has a characteristic concave profile)* | | |
| **Source zone** | not specified | Low gradient, upland plateau or upland basin able to store water. Spongy or peaty hydromorphic soils. |
| **Mountain Headwater Stream** | 0.1 - 0.7 | A very steep gradient stream dominated by vertical flow over bedrock with waterfalls and plunge pools. Normally first or second order. Reach types include bedrock fall and cascades. |
| **Mountain Stream** | 0.01 - 0.1 | Steep gradient stream dominated by bedrock and boulders, locally cobble or coarse gravels in pools. Reach types include cascades, bedrock fall, step-pool, plane bed, pool-rapid or pool riffle. Approximate equal distribution of 'vertical' and 'horizontal' flow components. |
| **Foothills - Cobble Bed** | 0.005 - 0.01 | Moderately steep, cobble-bed or mixed bedrock-cobble bed channel, with plane bed, pool-riffle or pool-rapid reach types. Length of pools and riffles/rapids similar. Narrow floodplain of sand, gravel or cobble often present. |
| **Foothills - Gravel Bed** | 0.001 - 0.005 | Lower gradient mixed bed alluvial channel with sand and gravel dominating the bed, locally may be bedrock controlled. Reach types typically include pool- riffle or pool-rapid, sand bars common in pools. Pools of significantly greater extent than rapids or riffles. Floodplain often present. |
| **Lowland Floodplain or Lowland Sand Bed** | 0.0001- 0.001 | Low gradient alluvial sand bed channel, typically regime reach type. Often confined, but fully developed meandering pattern within a distinct floodplain develops in unconfined reaches where there is an increased silt content in bed or banks. |
| ***B. Additional zones associated with a rejuvenated profile*** *(which exhibits steepening in the downstream segments)* | | |
| **Rejuvenated Bedrock Fall / Cascades** | 0.01 - 0.5 | Moderate to steep gradient, often confined channel (gorge) resulting from uplift in the middle to lower reaches of the long profile, limited lateral development of alluvial features, reach types include bedrock fall, cascades and pool-rapid. |

| | | |
|---|---|---|
| **Rejuvenated Foothills** | 0.001 - 0.01 | Steepened section within middle reaches of the river caused by uplift, often within or downstream of gorge; characteristics similar to foothills (gravel/cobble bed rivers with pool-riffle/ pool-rapid morphology) but of a higher order. A compound channel is often present with an active channel contained within a macro channel activated only during infrequent flood events. A floodplain may be present between the active and macro-channel. |
| **Upland Floodplain** | 0.0001-0.001 | An upland low gradient channel, often associated with uplifted plateau areas as occur beneath the eastern escarpment. |

*Note: Definitions of terms available in Rowntree and Wadeson (1999).*

## 2.2 LOCATION DETAILS

This is a sketch of the site location to enable a new assessor to find it. It therefore needs details such as direction of north, road access to site, road names or codes, bridges/crossings, gauges/instream barriers, buildings, scale and flow direction. The landowners name, contact number, permit and key details, and farm name and registration code should also be recorded.

## 2.3 GEOMORPHOLOGY AND PHYSICAL CHARACTERISTICS

**Definitions:**

- *Macro-channel width:* the outer channel of a compound channel. The bank top is well above "normal" flood levels but may be inundated infrequently (e.g. once in 20 years). Flood bench between active and macro-channel banks is usually vegetated. Macro-channel banks may or may not be vegetated.
- *Active channel width:* the area of the channel(s) that has been inundated at sufficiently regular intervals to maintain channel form and to keep the channel free of established terrestrial vegetation.

**Valley form or floor:** describes the general shape of the river valley. The valley form is classified according to the presence or absence of sedimentary deposits and their relationship to the modern channel (Rowntree and Wadeson 1999). Although some of the valley floor features can be recognised from cartographic maps, field verification is necessary. Common features and additional definitions are given below (from Rowntree and Wadeson 1999). More than one feature may be present.

- *Floodplain*: a relatively level alluvial (sand or gravel) area lying adjacent to the river channel which has been constructed by the present river in its existing regime.

- *Erosional bench*: terrace-like features resulting from active down cutting within a broader macro-channel.
- *Terraces*: relict floodplains which have been raise above the level regularly inundated by flooding due to lowering of the river channel.
- *Valleyside bench:* narrow terrace-like feature formed at the edge of the active channel abutting on to the valley side slope.
- *Pediment*: a low angled hillslope which is formed by surface wash processes.
- *Valley floor absent:* no valley floor.

**Lateral mobility or entrenchment:** relates to the extent to which the river channel is restricted by the valley side walls or migrates laterally over the valley floor. One of four categories have been identified (Rowntree and Wadeson 1999).

- *Confined:* channel laterally confined by valley side walls.
- *Moderately confined:* channel course determined by macro-scale features, but some lateral migration is possible.
- *Non-confined:* channel free to migrate laterally over the valley floor (associated with floodplain).
- *Entrenched:* active channel confined by steep banks and/or terraces.

**Channel form:** relates to the presence or absence of a macro-channel. Macro-channels appear to develop as the result of incision by the active channel into former terraces which mark the outer boundary of all but the most extreme flood flows (Rowntree and Wadeson 1999). Two types are identified:

- *Compound* (macro-channel present).
- *Simple* (no macro-channel).

**Channel pattern**: The simplest classification of channel pattern distinguishes two main groups: single thread and multi-thread. Single thread channels are further subdivided into straight or sinuous and meandering; multi-thread channels can de subdivided into braided, and anastomosing or anabranching (Rowntree and Wadeson 1999). The following descriptions are modified from Rowntree and Wadeson (1999) and Rowntree and Ziervogel (in prep).

- *Single thread: low sinuosity*: single channel, laterally inactive.
- *Single thread: high sinuosity - stable-sinuous*: single channel, moderately, laterally inactive.
- *Single thread: high sinuosity - laterally mobile*: meandering: laterally active, single channel

with significant s-bends, sometimes cutting off from the main channel to form ox-bows.

- *Multiple thread: braided (unstable)*: multi-thread channels, laterally active, two or more channels divided by alluvial (sand or gravel) bars or islands with one dominant channel.
- *Multiple thread: anatomosing/anabranching*: multi-thread channels separated by vegetated or otherwise stable alluvial islands or bedrock.

**Channel type:** river channels can be classified into two broad types: bedrock channels and alluvial channels (Rowntree and Wadeson 1999). Sometimes a mixture of bedrock and alluvial channels occurs. Alluvial channels may be further subdivided depending on the size of their bed material.

- *Bedrock*: bedrock bed
- *Mixed bedrock and alluvial*: mixture of bedrock and either fine (sand) or coarse (gravel) alluvial beds
- *Alluvial with dominant type(s)*: alluvial bed, with dominant bed material(s) of:
- Sand, gravel, cobble and/or boulder