

Barrier Feasibility Geomorphology Assessment – Clachan Burn, Kintyre Barrier ID - 1480

<i>Name of surveyor</i>	Helen Reid
<i>Site name</i>	Clachan Burn
<i>River Name</i>	Clachan Burn
<i>Grid ref</i>	NR 76316 56080
<i>Date/time/weather</i>	15/10/19; 12.10; Sunny

<i>Geomorphic Aspect</i>	<i>Detail</i>	<i>Implications for Risk?</i>
Geomorphic Characteristics of the reach the weir is located in		
<i>Landscape setting/valley confinement</i>	The valley is flat and unconfined at this location, though fairly narrow.	High – as the channel could adjust laterally
<i>Channel characteristics?</i> - <i>Geo unit</i> - <i>Bed material</i> - <i>Energy</i>	The channel type is plane – riffle demonstrating that the channel has moderate energy and is not a passive lowland river. Bed material are mostly boulders and cobbles, which are discoloured black from diatoms. This indicates that this material is not transported often and is relatively stable. An active gravel layer was also present moving through the system and superimposed on bars and on the rivers margins.	Moderate – energy is moderate reflecting energy to adjust
<i>Presence of bedrock or other impoundments?</i> <i>Extent and location?</i> <i>Evidence of instability?</i>	No bedrock was visible from the site visit. The channel does not exhibit too much instability and would be likely to naturally have fairly low sinuosity. However, there is some bank protection, especially on the right bank of the channel which is in very poor condition and is crumbling (Figure 5; Figure 6). Some of it is held in place by fencing which has been strapped on to hold it in place. In contrast, the left bank is well vegetated and fairly stable. The poor state of the bank protection is more likely to reflect its age, and the fact that it is vertical so likely to fail, rather than be an indication that the river is overly mobile.	Moderate – not overly mobile, but some bank protection is failing indicating some lateral instability
<i>Geomorphic Risk Assessment</i>	The weir is only a relatively small structure (0.5 m from water level at time of visit, Figure 2; Figure 4), so its removal would not be likely to have significant impacts on the river. Firstly, there is minimal backwater impact from the structure. There is a footbridge 40 m upstream which has a steep riffle below it showing that is no impact of the structure on the bed slope at this point (Figure 7). The bed between the weir and the footbridge still has a good gradient on it, seen in the hydraulic unit of a run, indicating that the bed slope is not hugely impacted (i.e. there is not a large pool which stretches for a distance). This is also reflected in the sediment distribution of	Mod – low – The weir is quite small and is only having a local impact upon the river, which limits the length of river that would be impacted by its removal

	<p>the river. Immediately upstream of the weir, the bed is coarse with large boulders evident. This indicates that this is not acting as a depositional environment (there is not a lot of sand as would be seen with a larger structure) and that the weir is likely to be having minimal impacts upon sediment transport. However, we would still expect some bed lowering immediately upstream of the weir as the channel resets its gradient to remove the step in its profile which the weir causes.</p>	
<i>Size, character and age of the structure</i>	<p>The weir is relatively small. There is 1 m present which was submerged and then the height above the water was only around 0.5 m. It is likely to be Victorian, though it doesn't appear on any of the older topographic maps (e.g. 1880 - 1910) so this may be due to the detail of the mapping. It was constructed to try and direct fish up the tributary of the Allt Mor (which is directly below the structure) to establish a fishery in Loch Ciaran</p>	Low – this is due to the weir being quite small
<i>Risk to infrastructure</i>	<p>There is minimal infrastructure on the site that would be impacted by the removal of the weir. Downstream is pasture, and it is unlikely that removal would release significant volumes of sediment which would have an impact downstream. Upstream on the right bank there is a field which has 5 caravans in it and a house behind. This bank would likely need to be protected as the current bank protection is already failing. There is also a footbridge 40 m upstream. This has large concrete foundations and the river has a steep gradient at this point indicating minimal impact of the weir on the channel at this location. Thus, it is unlikely modifying the weir would have an impact upon this, though it should be considered when designing actions (to be precautionary).</p>	Low
<i>Heritage Value</i>	<p>None, that we are aware of.</p>	Low
<i>Extent of works likely to be required if removal was feasible</i>	<p>Works could be done quite simply. The most likely thing that may need to be done would be works to protect the bank protection on the right bank if this is a priority for the landowner. However, regardless of what happens with the weir, this bank protection is likely to continue to fail. Bank protection works could be in the form of some boulders along the toe of the bank to protect this if the bed did lower. The impact could also be mitigated by leaving some form of step at the location of the weir. One options would be to break up the weir and leave parts of it there so that the bed lowers slowly. This could be done in stages with more material removed in the future.</p>	Low – but may need bank protection for right bank
SUMMARY	<p>In summary, the channel has moderate energy, despite its lowland location. The weir is small and is only impacting a short section of river, and has not significantly impacted processes. The only infrastructure which is potentially threatened at the site, is the already failing bank protection on the right bank upstream of the structure. Works may have to be undertaken to ensure that further deterioration isn't attributed to alterations to the weir. However, for this site, removal or direct modification to the structure is most viable options as it could be carried out relatively easily.</p>	Low – mod