Peer reviewed – replace with numbered system.

There is increasing scientific literature to design and support the implementation of the river restoration process goal of Stage Zero.

Cluer and Thorne (2014) first coined the term Stage Zero for the preliminary natural step in the Stream Evolution Model. It had become apparent that previous channel change models proposed to have been starting from a river’s “natural” state were in fact examples of the degraded result of consistent long-term anthropogenic influence (Walter and Merritts, 2008; Major, 2008). Instead it is argued that chains of Stage Zero wetlands and anastomosing or braided streams separated by valley confined transport reaches characterised as a chain of bead would make up river systems.

<STAGEs>

A rose by any other name

As well as being a more natural state at some sites, Cluer and Thorne also stipulated that by providing multiple degrees of freedom for vegetation, water, and sediment to interact at a site, Stage Zero reaches would also provide the greatest ecosystem benefits. To some extent, Stage Zero can represent a confluence of practises and research tracks under a number of different terms, which to various extents incorporate the same ideals as a Stage Zero target. Valley floor resetting, flood plain reconnection, beaver meadows and leaky dams are all examples of these restoration processes and paradigms which incorporate some elements of a Stage Zero goal. These are exemplified by the case studies under the resources tab.

<IMAGE STG 0>

Benefits

The benefits of producing a stage zero stream in the correct place are apparent from a variety of different literature sources. Some looking at the benefits of reconnecting a flood plain. Others focus more on the benefits directly for fisheries where the results appear to be speaking for themselves with increases in fish hatcheries due to the slower flow and greater nutrients. Natural flood management techniques is also a large study area which to some extent is included in stage zero and needs to be taken account of, with the alternating side that it needs to be watched for the risk of aligning flood peaks further downstream.

Risk management

As will become apparent whilst viewing the resources provided and considering other Stage Zero streams, it is not applicable everywhere. Many of the early advocates will argue that there are multiple situations and scales with which stage zero can be used where it might otherwise be dismissed, but they will also be the first to admit that it is not suitable in every environment. In fact, as a process-based goal it is reliant on repetitions of transport and depositional reaches to provide sediment input to the reach.

Stage Zero should only be implemented where there is a geomorphic control above and below the project in order to protect against head cuts or increased erosion at the site. This can be seen in the Geomorphic grade line technique created by Paul Powers which provides a scientific method for defining the gradient when resetting a whole flood plain.

There is also a need to structure projects using the correct materials and processes for the biome and site being considered. Beavers have proven heavily destructive in the wrong biome whilst slowing the flow comes with the risk of synchronising flood peaks if not fully understood. Hopefully, this website and the links within will help provide the contacts and knowledge to maximise the potential and minimise the risks of Stage Zero projects. In doing so, plenty of research calls for the need to include all stakeholders in river restoration of this type and that is bringing together scientists, practitioners and the public is even more important in the case of Stage Zero.

 (Brown & Sear, [**2008**](https://onlinelibrary.wiley.com/doi/full/10.1002/rra.3378#rra3378-bib-0011); Cluer & Thorne, [**2013**](https://onlinelibrary.wiley.com/doi/full/10.1002/rra.3378#rra3378-bib-0013); Sear & Arnell, [**2006**](https://onlinelibrary.wiley.com/doi/full/10.1002/rra.3378#rra3378-bib-0028)).