Making Natural Flood Management at the Landscape Scale a Reality:

An Investigation of the Barriers and Spatial Disconnection between NFM Investments and Beneficiaries

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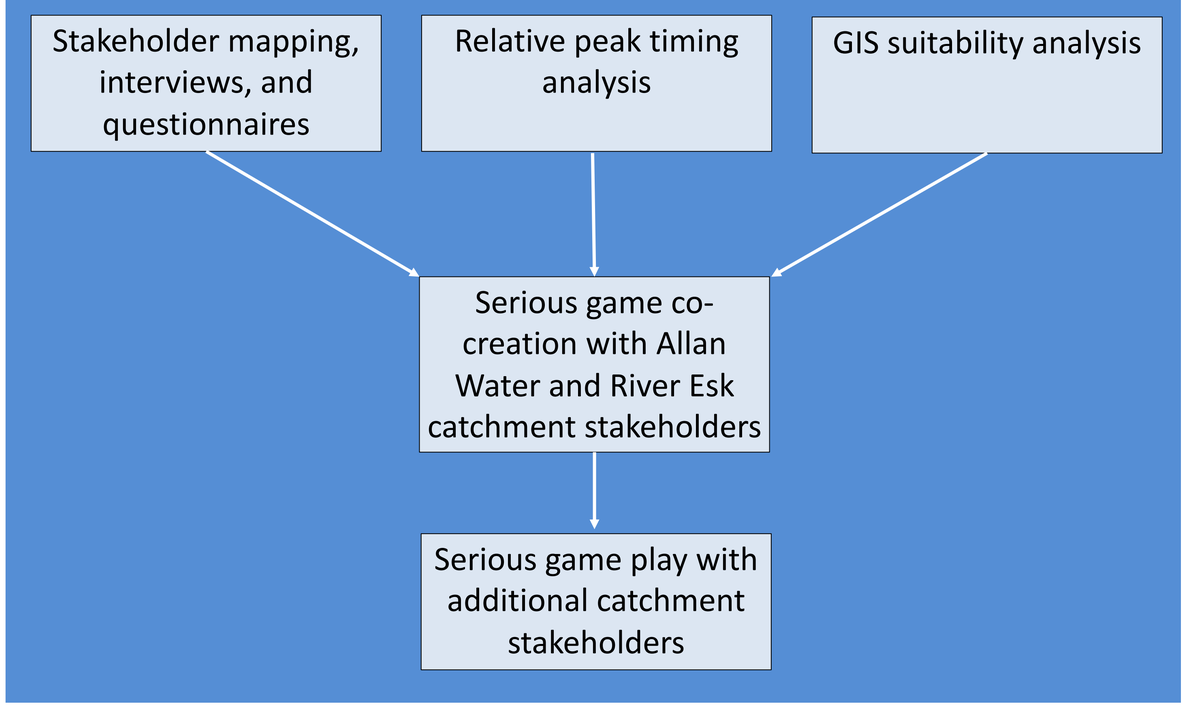
Introduction

- Nature-Based Solutions (NBS) are practices that use natural processes to achieve environmental, social, or economic goals (Cohen-Shacham et al. 2016).
- Under the "umbrella" of NBS, Natural Flood Management (NFM) aims to use natural processes to manage flood risk (Forbes, Ball and McLay 2015).
- NFM is difficult to implement at scale due to a variety of technical and political "barriers" (Wingfield et al. 2021).
- I am investigating the ways in which upstream and downstream communities can cooperate to reduce flood risk and overcome these barriers.

Figure 1: Removing outdated drainage systems can slow the flow of water.

Methods



Progress

- Completed 20 interviews to learn about perspectives on Natural Flood Management and the barriers and drivers of implementation.
- Collected 57 questionnaires by Allan Water and River Esk catchment residents that showed varying levels of concern about flood risk.
- Installed four stilling wells to measure water levels at the River North Esk-River South Esk and Allan Water-River Knaik confluences.
- Demonstrated a Serious Game at the Hydro Nation Welcome Event.
- Joined the Esk Flood Forum research initiative to build contacts in the River Esk catchment.

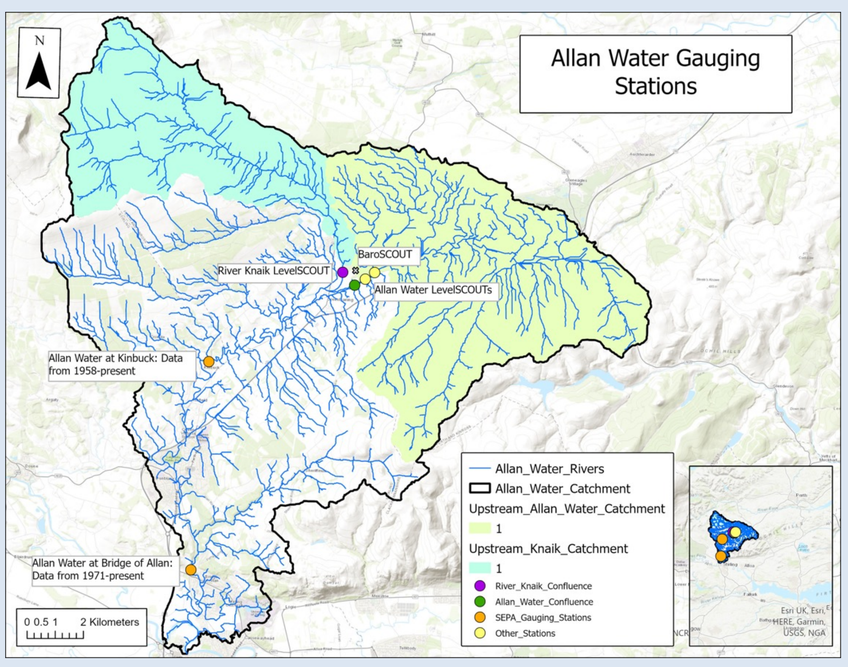


Figure 2: Stilling well locations on the Allan Water.

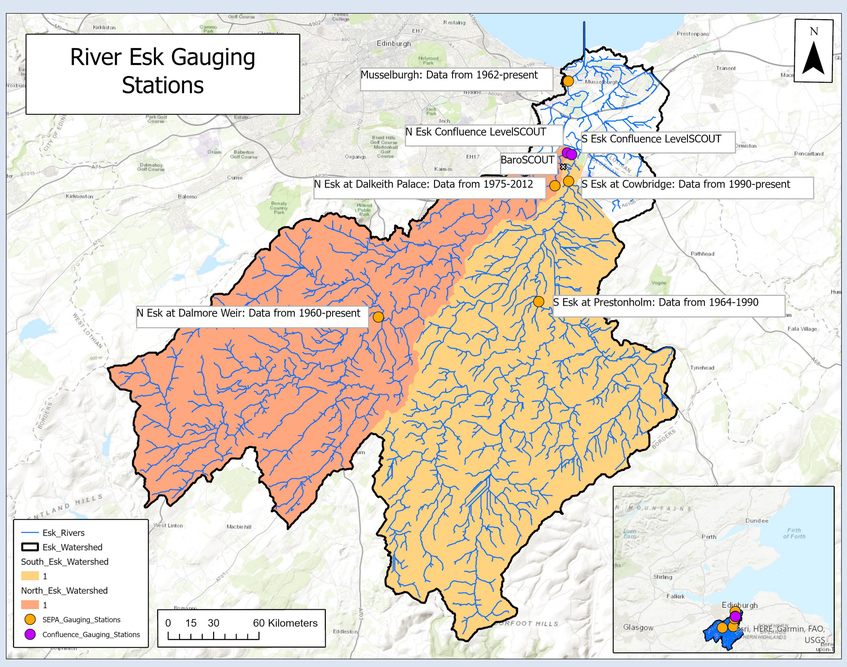


Figure 3: Stilling well locations on the River Esk.

Future Steps

- Conduct workshops in the Allan Water and River Esk catchments to learn about barriers and drivers of NFM.
- Begin the process of serious game co-creation.
- Collect water level data on the Allan Water-River Knaik and North Esk-South Esk confluences to investigate tributary peak timing.

Figure 4: Stilling well on the River North Esk.

References

Cohen-Shacham, E. et al. (eds) (2016) Nature-based solutions to address global societal challenges. IUCN International Union for Conservation of Nature. Available at: https://doi.org/10.2305/IUCN.CH.2016.13.en.

Edina Digimap (2023) Digimap. Available at: https://digimap.edina.ac.uk/ (Accessed: 30 September 2023).

Forbes, H., Ball, K. and McLay, F. (2015) 'Natural Flood Management Handbook'. Scottish Environment Protection Agency. Available at: https://www.sepa.org.uk/media/163560/sepanatural-flood-management-handbook1.pdf.

Harteveld, C. (2011). 'Triadic Game Design'. Available at: https://link.springer.com/book/10.1007/978-1-84996-157-8

Holstead, K. (2014) Natural flood management from the farmer's perspective: criteria that affect uptake. Available at: https://onlinelibrary.wiley.com/doi/full/10.1111/jfr3.12129 (Accessed: 19 September 2023).

Kabisch, N. et al. (2016) 'Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action', Ecology and Society, 21(2). Available at: https://doi.org/10.5751/ES-08373-210239.

Wingfield, T. et al. (2021) 'Barriers to mainstream adoption of catchment-wide natural flood management: a transdisciplinary problem-framing study of delivery practice', Hydrology and Earth System Sciences, 25(12), pp. 6239–6259. Available at: https://doi.org/10.5194/hess-25-6239-2021.

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