Beavers and Climate Resilience

Allaire Diamond, Ecologist

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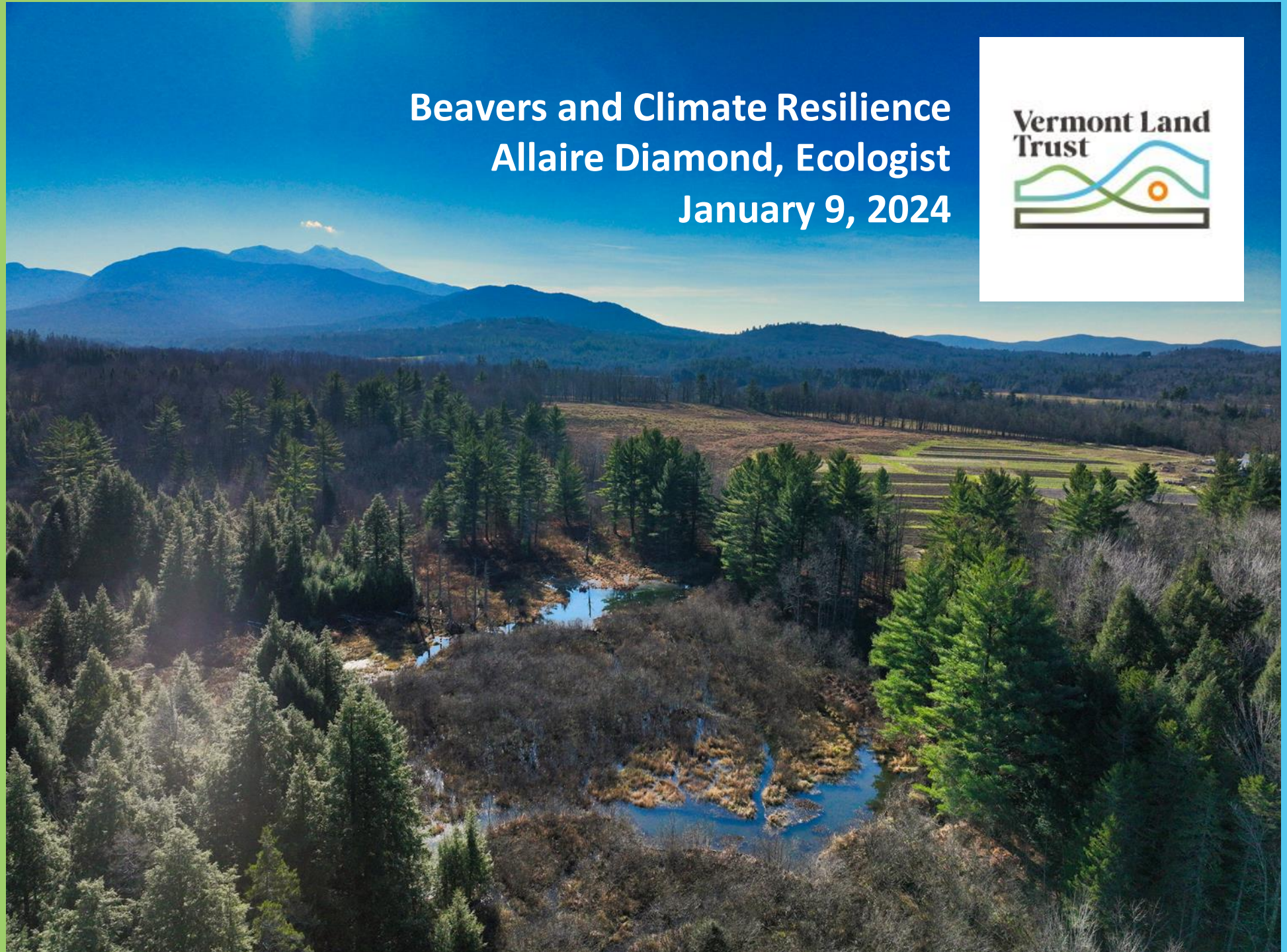

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1962

~2018

Pleasant Valley Rd.
Rockingham/Saxtons River

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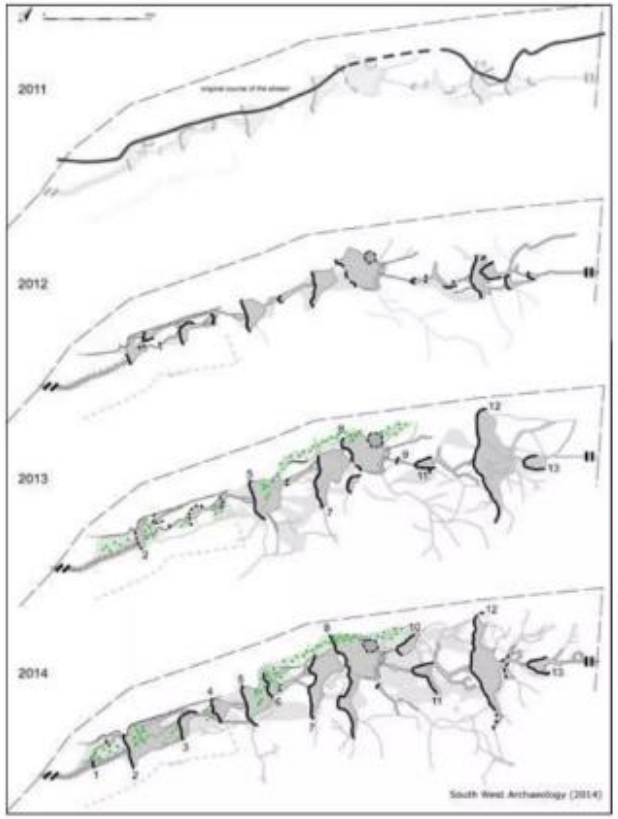
Devon Beaver Project: Overview

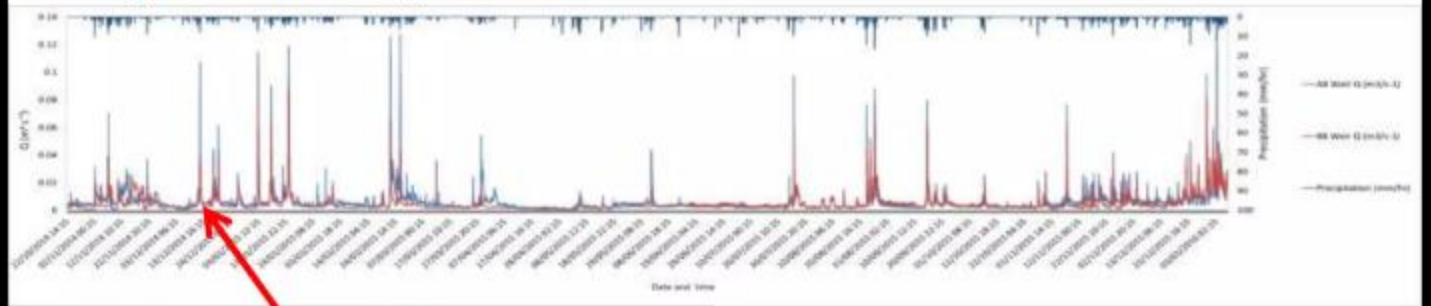


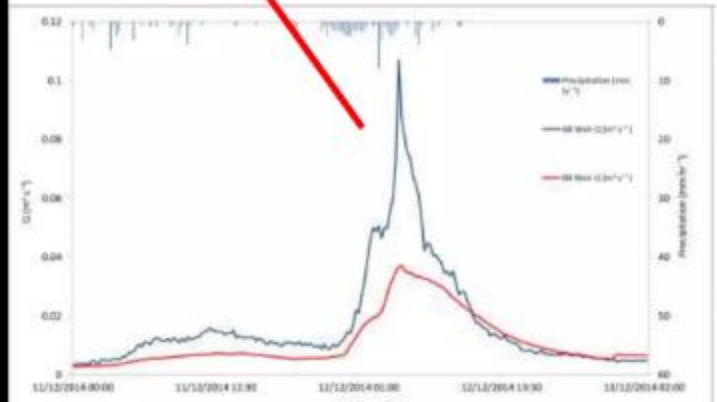
- Fenced 1.8 ha site in North Devon, UK
- 1st order tributary draining from IMG
- A pair of beavers introduced in 2011
- Dramatically changed site from small first order tributary running through wet woodland, to a diverse mosaicked wetland environment.

Devon Beaver Project: Results - Flow Attenuation

Project has now been collecting continuous flow and rainfall data for 2+ years, quantifying the rate and amount of water entering and leaving the site.

Results (from 70+ rainfall-runoff events) indicate that beaver activity, particularly the building of ponds and dams, moderates the channel response to rainfall following storm events, potentially reducing the risk of flooding downstream.





- Event Rain = 24 mm
- Above Beaver (blue)
  Peak Discharge = 0.11 ($m^3\ s^{-1}$)
  Storm event discharge = 2923 (m^3)
- Below Beaver (red)
  Peak Discharge = 0.04 ($m^3\ s^{-1}$)
  Storm event discharge = 1493 (m^3)

Slides from Dr. Alan Puttock, University of Exeter (UK)

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Abstract:

Beaver dams attenuate flow: a multi-site study

Beavers can profoundly alter riparian environments, most conspicuously by creating dams and wetlands. Eurasian beaver (Castor fiber) populations are increasing and it has been suggested they could play a role in the provision of multiple ecosystem services, including natural flood management. Research at different scales, in contrasting ecosystems is required to establish to what extent beavers can impact on flood regimes. Therefore, this study determines whether flow regimes and flow responses to storm events were altered following the building of beaver dams and whether a flow attenuation effect could be significantly attributed to beaver activity. Four sites were monitored where beavers have been reintroduced in England. Continuous monitoring of hydrology, before and after beaver impacts, was undertaken on streams where beavers built sequences of dams. Stream orders ranged from 2nd to 4th, in both agricultural and forest-dominated catchments. Analysis of >1000 storm events, across four sites showed an overall trend of reduced total stormflow, increased peak rainfall to peak flow lag times and reduced peak flows, all suggesting flow attenuation, following beaver impacts. Additionally, reduced high flow to low flow ratios indicated that flow regimes were overall becoming less “flashy” following beaver reintroduction. Statistical analysis, showed the effect of beaver to be statistically significant in reducing peak flows with estimated overall reductions in peak flows from −0.359 to −0.065 m3 s−1 across sites. Analysis showed spatial and temporal variability in the hydrological response to beaver between sites, depending on the level of impact and seasonality. Critically, the effect of beavers in reducing peak flows persists for the largest storms monitored, showing that even in wet conditions, beaver dams can attenuate average flood flows by up to ca. 60%. This research indicates that beavers could play a role in delivering natural flood management.

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Puttock A, Graham HA, Ashe J, Luscombe DJ, Brazier RE (2021). Beaver dams attenuate flow: a multi-site study. *Hydrological Processes*, *35*(2). Abstract. Altmetric 216

Example from Charlotte Park & Wildlife Refuge
using VLT Restoration Viewer

https://vlt.maps.arcgis.com/apps/webappviewer/index.html?id=c15320db0fbc4412a852ea2caa3fb694

Imagery: Dana Allen, FluidState Consulting

CITY OF GRESHAM

Beavers are Cleaning Stormwater, Cooling Streams, and Increasing Complexity in Gresham

https://www.dfw.state.or.us/wildlife/living_with/docs/2020_beaver_wg/5%20StormwaterTempsComplexity_Holzer_BWG%20Feb%202020.pdf

Katie Holzer
Watershed Scientist
City of Gresham, Oregon

Beaver Coexistence Strategies

“Beaver Deceiver” installed in Cambridge
Fall 2023

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Instream Restoration on a Colchester headwater stream

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