

Stream restoration effects on exchange, storage and baseflow generation

Ninemile Creek, Montana

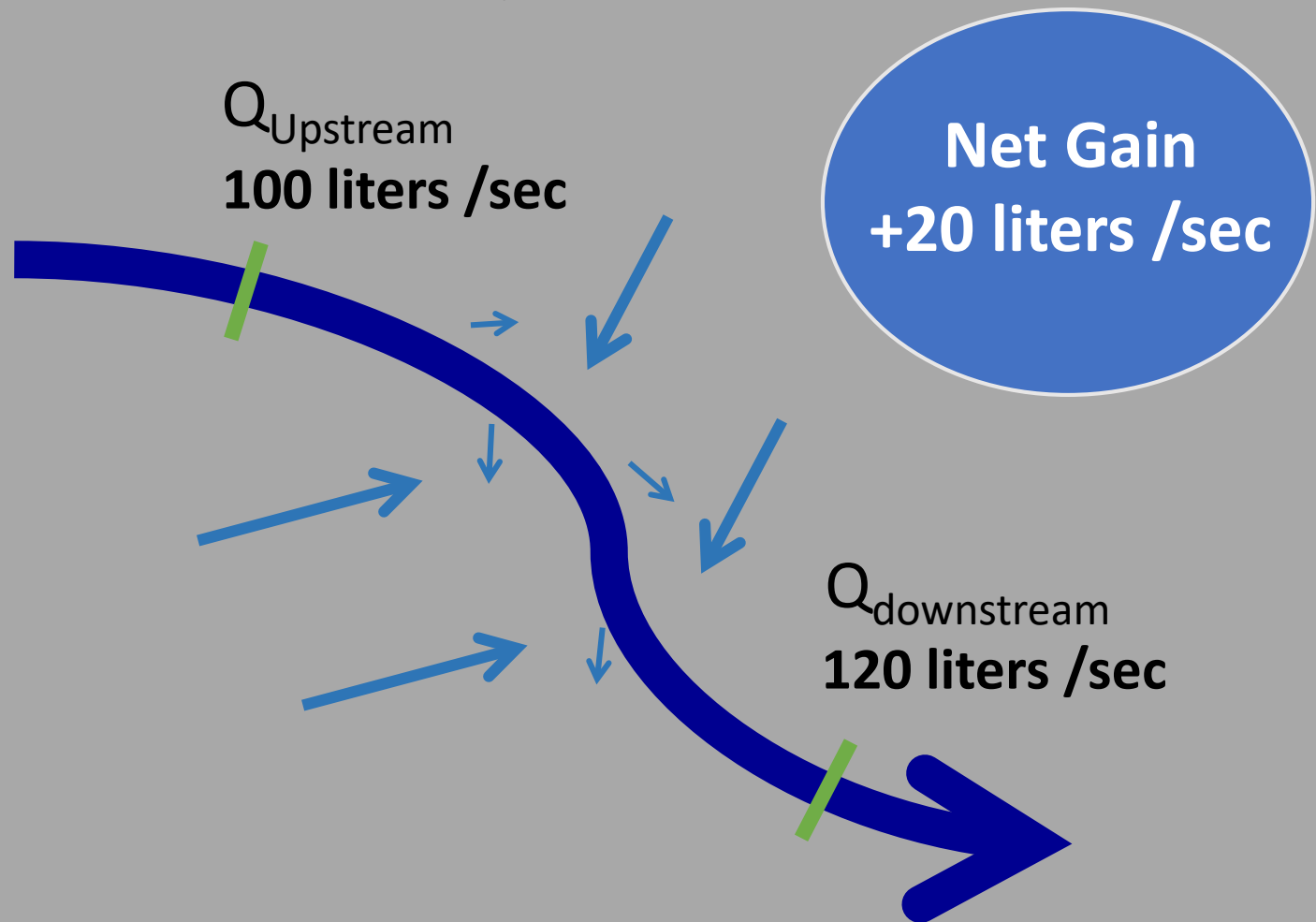
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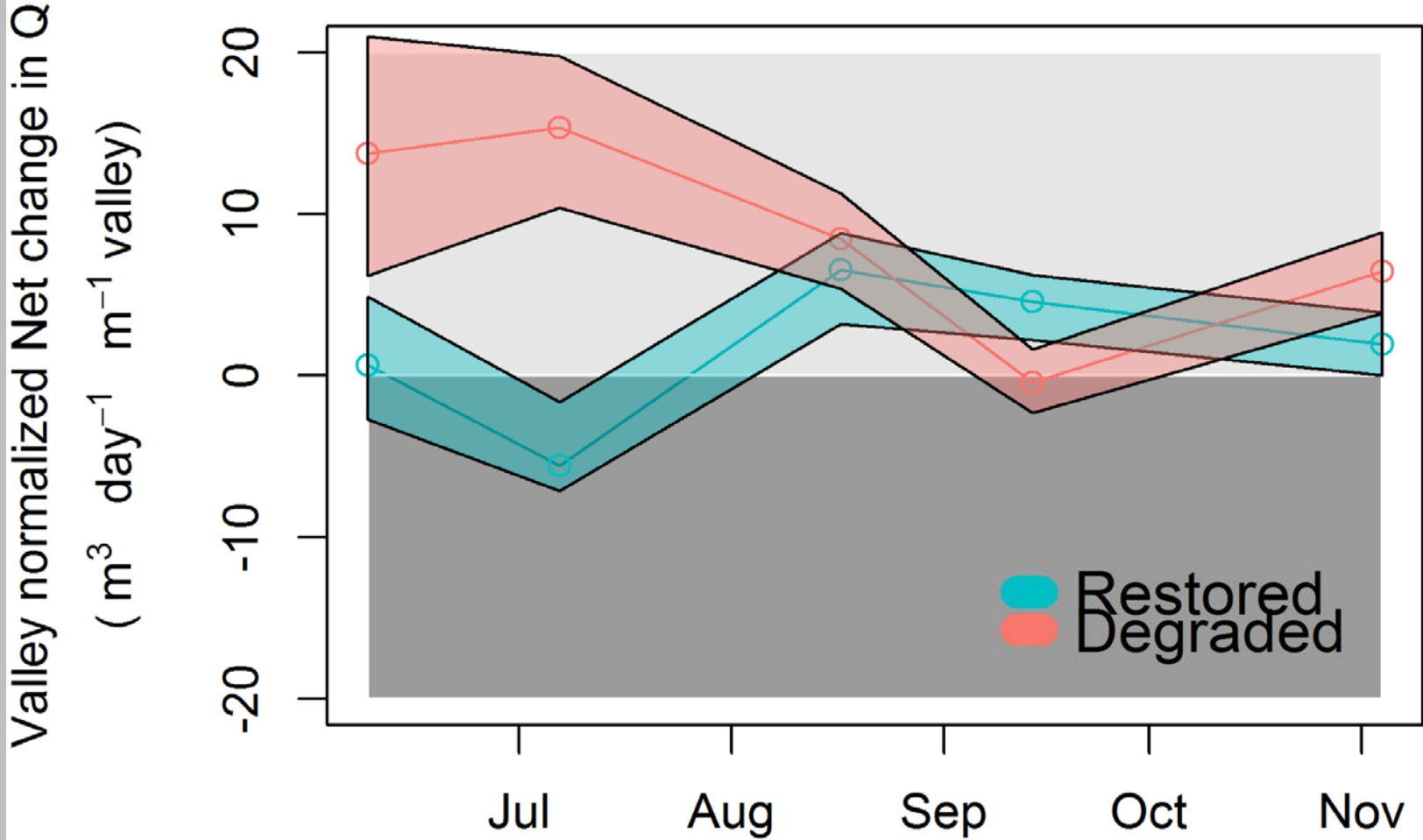
How much water is being stored or drained?

Net Change in Discharge

$$\text{Net } \Delta Q = Q_{\text{downstream}} - Q_{\text{Upstream}}$$

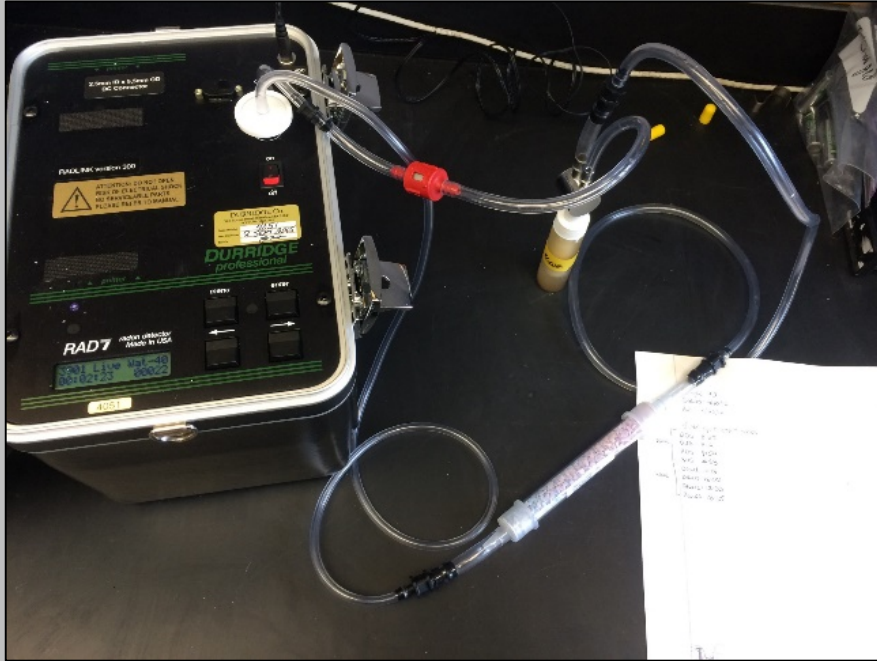


Net change in Discharge



How much **groundwater** is entering the stream?

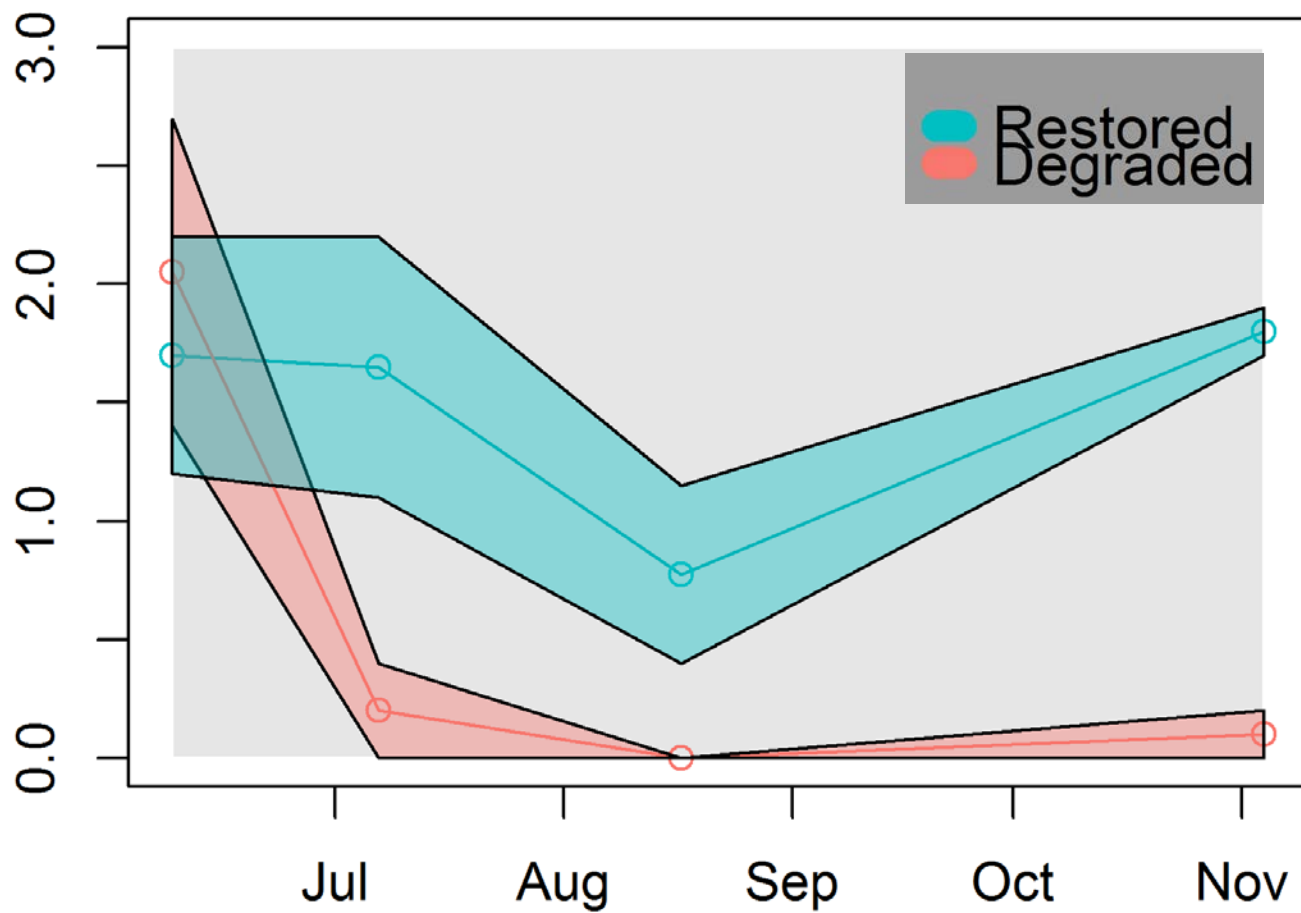
Radon-222 modeling



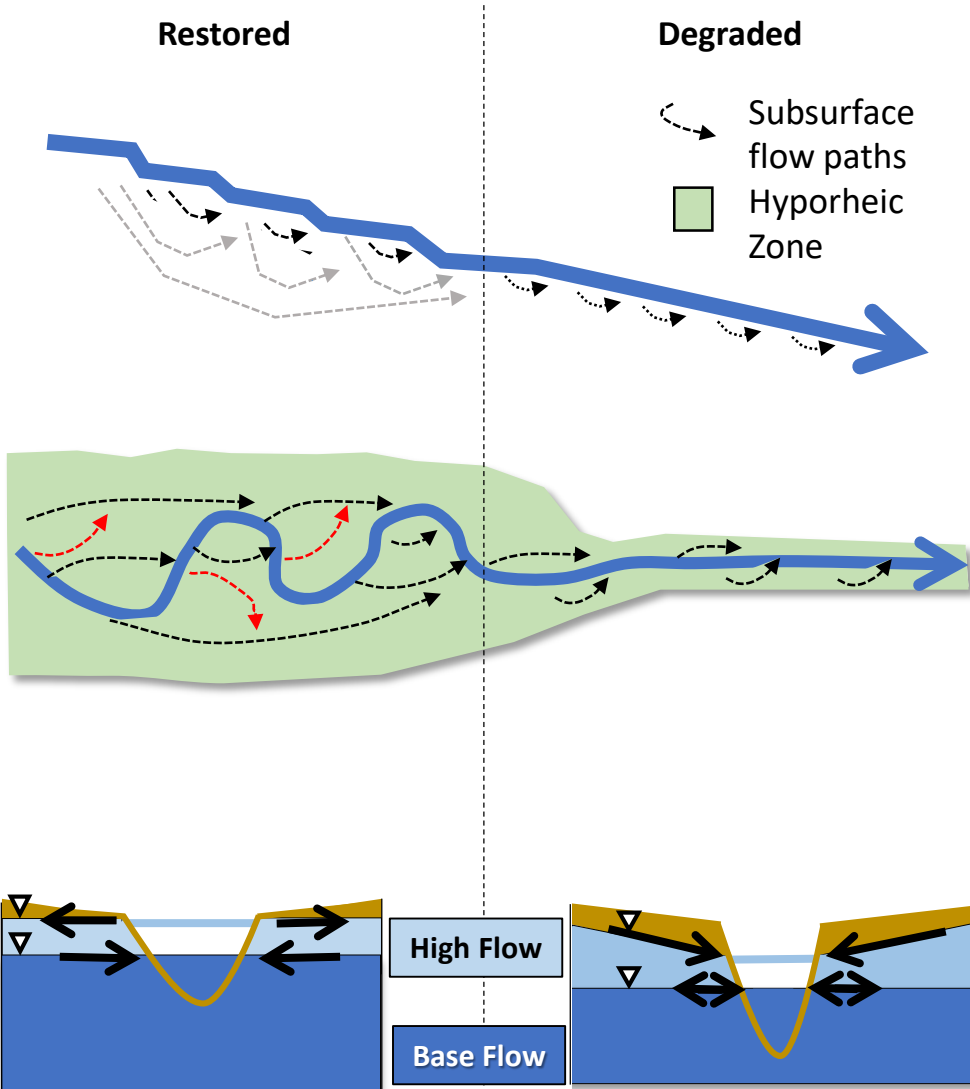
$$Q \frac{dc}{dx} = I(c_i - \bar{c}) + wE\bar{c} - kw\bar{c} - dw\lambda\bar{c} + \frac{\gamma h w \theta}{1 + \lambda t_n} - \frac{\lambda h w \theta}{1 + \lambda t_n} \bar{c}$$

Groundwater discharge

Valley Normalized Groundwater discharge
($\text{m}^3 \text{ day}^{-1} \text{ m}^{-1} \text{ valley}$)



Summary



- Increased underflow/storage
- Longer duration of storage period
- More gradual decline in GW discharge to stream
- Higher volumetric gains/groundwater discharge at baseflow