

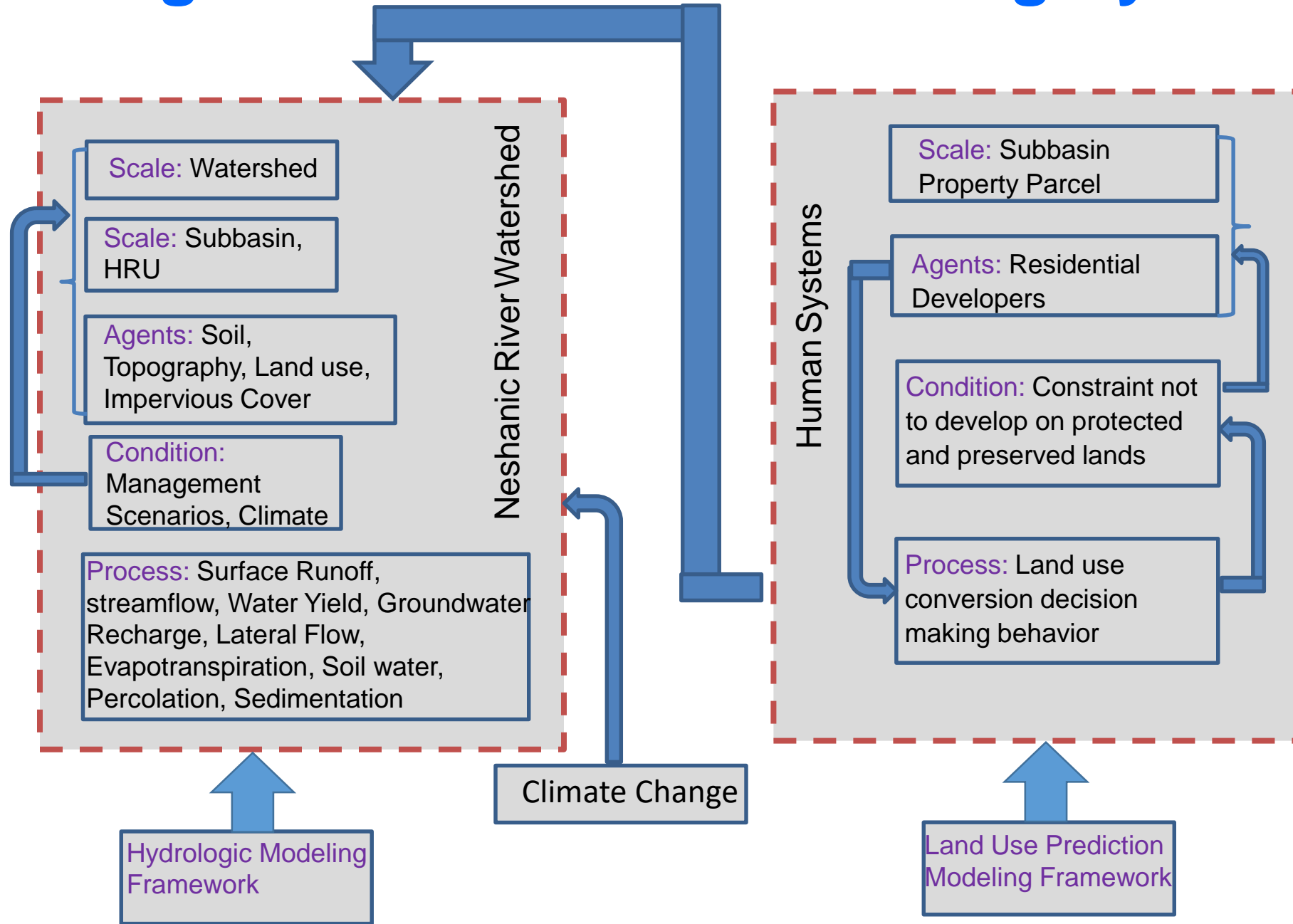
Assessing the Potential Impacts of Climate and Land Use Change on Water Fluxes and Sediment Transport

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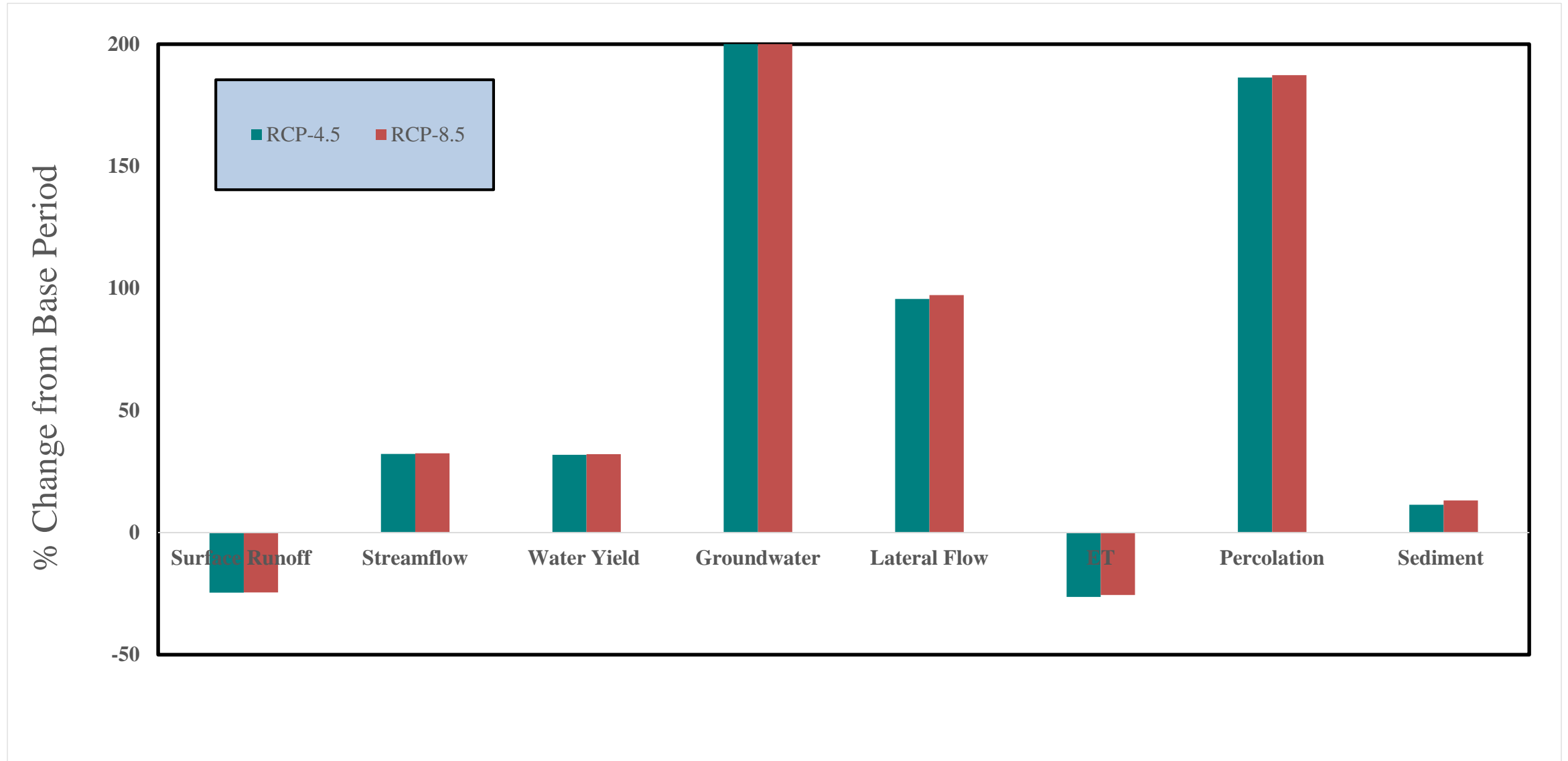
Research Questions

- What might be the potential impact of **climate change** on different components of the hydrological cycle as well as sediment generation on field and watershed scale in the Neshanic River Watershed?
- How might **land use change alone** as well as **combined climate and land use change** affect different water fluxes and sediment loads in the watershed at the Year 2040?
- Examined these questions using the Neshanic Watershed as our study basin.

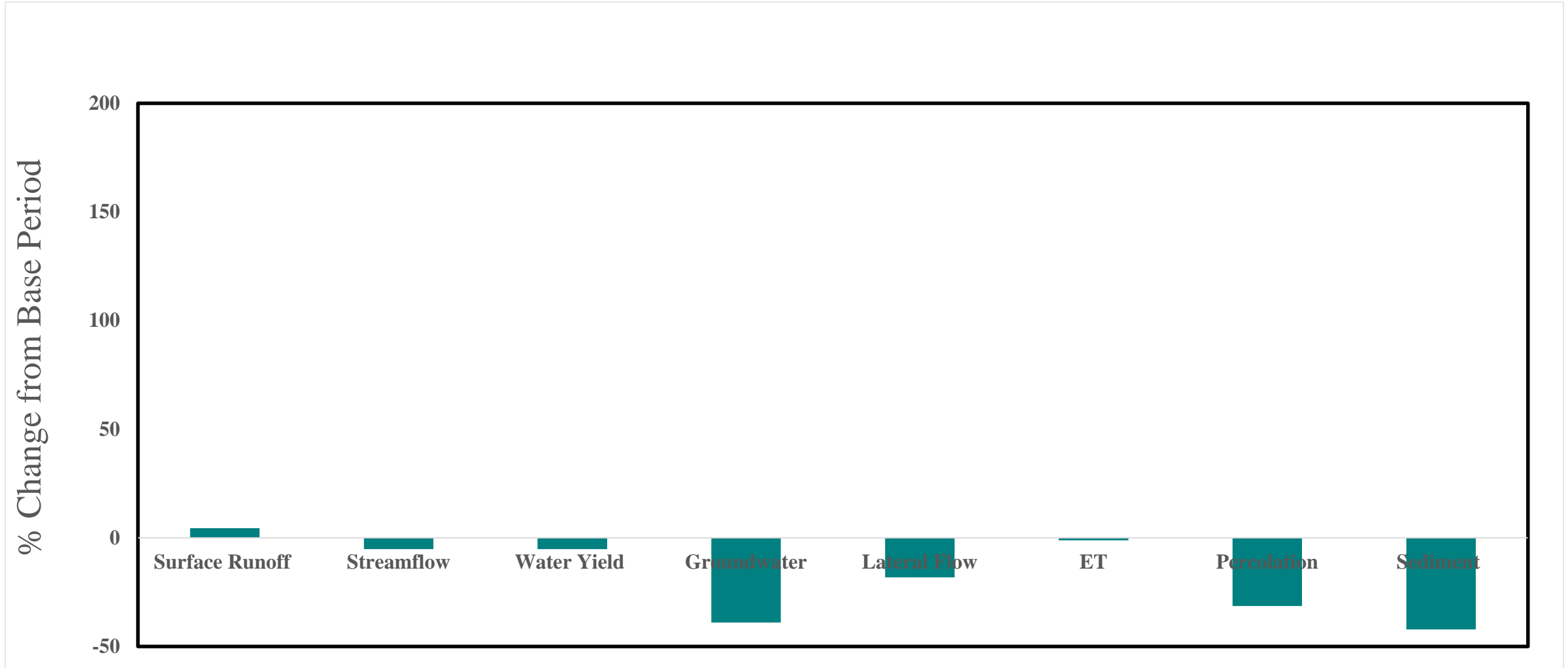
Integrated Watershed Modeling System



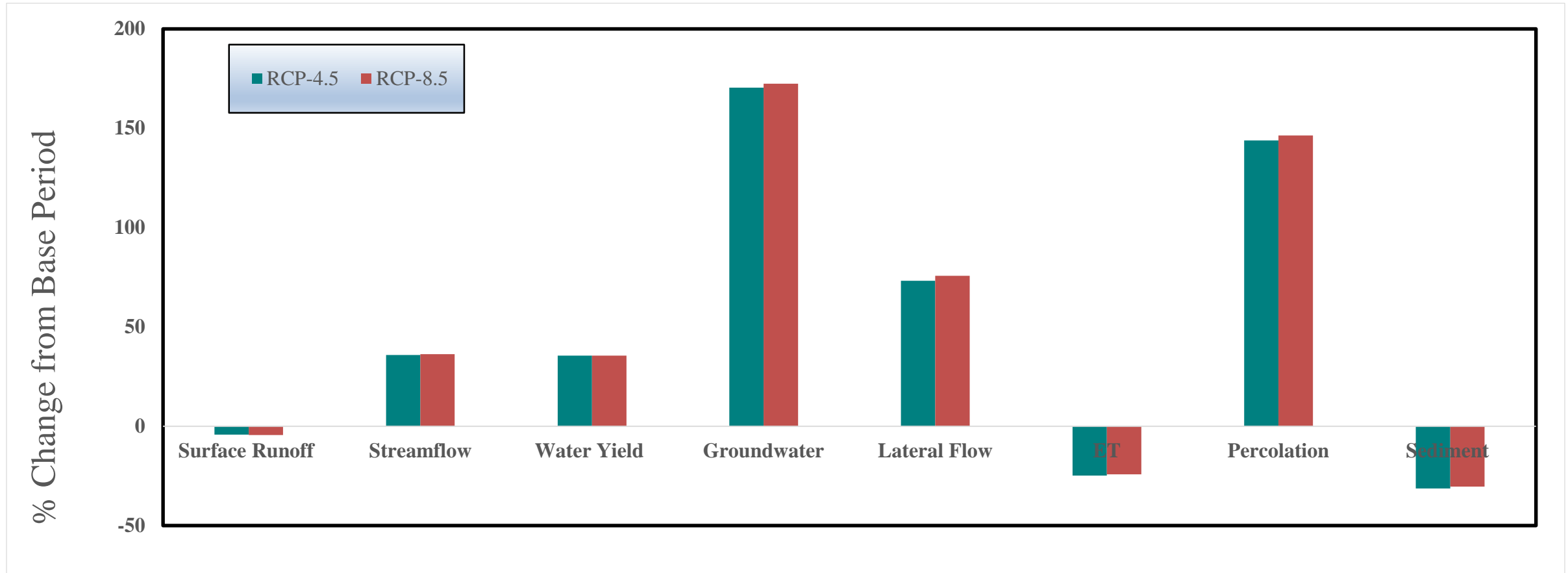
Climate Change Impact on Water Fluxes and Sediment Transport



Land Use Change on Water Fluxes and Sediment Transport



Climate and Land Use Change on Water Fluxes and Sediment Transport



Take-home Message

- Climate change and intensifying urban land uses are expected to have different, and sometimes countervailing effects on hydrological processes.
- The higher percolation, lateral flow, and groundwater predicted under the climate change scenarios appear to be due to an increase in frost free soil conditions resulting in higher infiltration and less surface runoff.
- Climate change scenarios, either alone or in composite with land use change, predicts higher streamflow (32% and 36% increase over baseline, respectively), overriding the effect of land use change which predicts a decline of 5% in streamflow.
- Higher streamflow could result in more stream bed downcutting and higher sediment loading. However, when modelled in composite, the effect of land use change (conversion of erodible agricultural fields to suburban development) appears to largely balance out the predicted higher sediment loading under climate change.