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# Summer low flow response to different riparian treatments in forested headwater streams of coastal Northern California

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## Introduction

Timber harvests generally decrease interception and transpiration leading to increased soil water content and groundwater recharge. These changes in the water balance components can also increase water yields. However, recent research has illustrated that regrowing vegetation may reduce summer streamflow over the long-term due to elevated transpiration rates, especially from riparian vegetation. As such, it is critical to evaluate the summer low flow response to different riparian treatments, which have changed rapidly in recent years. Our study will address the question: How are runoff generation processes and warm-season low flows affected by different riparian buffer treatments in Coastal Northern California? We hypothesize retention of denser riparian vegetation will reduce the increase in low flows and will reduce groundwater discharge to streams.

## Goals and Objectives

1. Assess the effects of different riparian treatments during timber harvest on (a) stream discharge in summer months and (b) diel changes in streamflow.
2. Quantify the effects of riparian treatments during timber harvests on groundwater flow in headwater catchments.

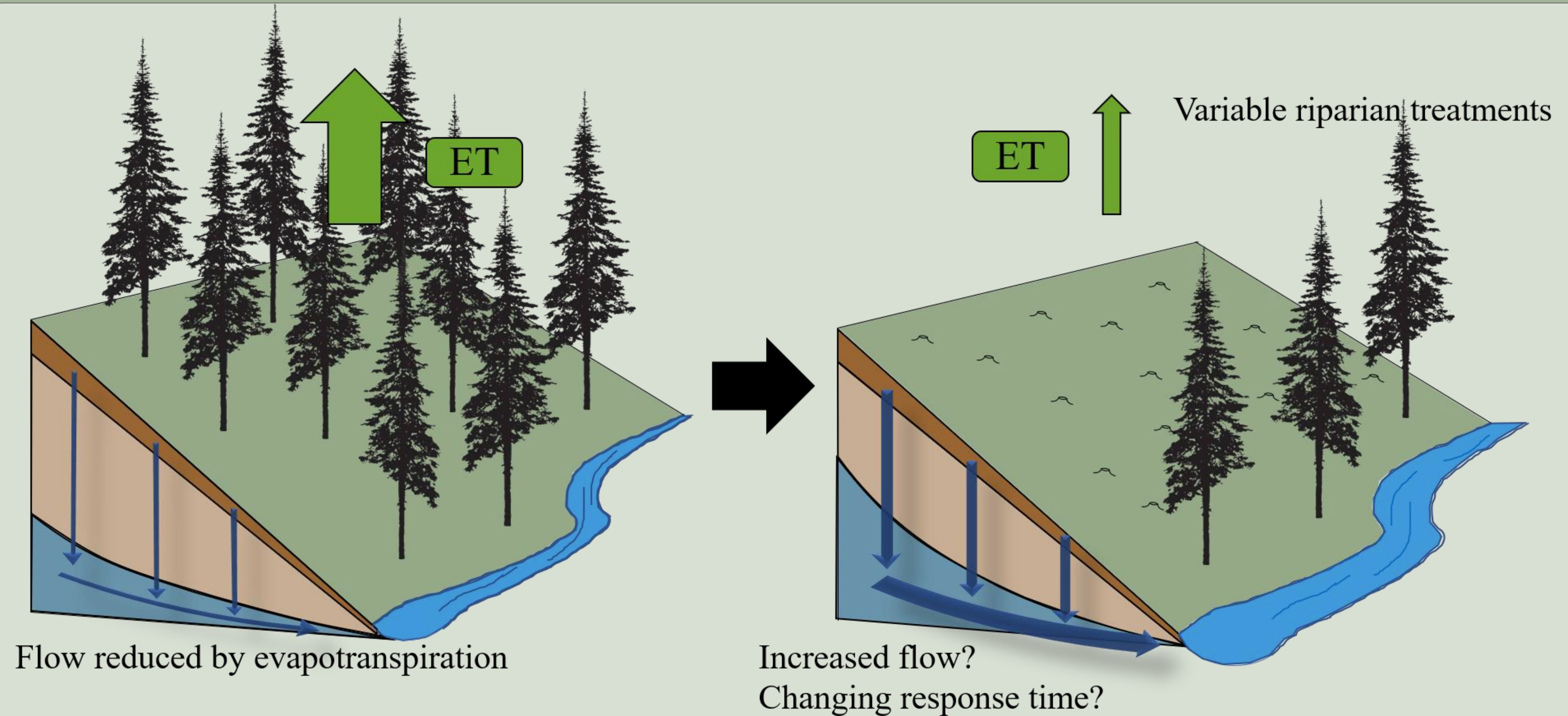
## Treatments

Control	No Harvest	
Heavy	50ft inner zone – 70% canopy cover	50ft outer zone – 30% canopy cover
Light 1	30ft inner zone – no harvest	70ft outer zone – 80% canopy cover
Light 2	30ft inner zone – 85% canopy cover	70ft outer zone – 70% canopy cover



## Expected Outcomes

- We hypothesize the riparian treatment that leaves the densest vegetation will reduce the effects of timber harvest the most.
- Evaluating this hypothesis will allow land managers and regulatory agencies to have greater understanding of the impact of riparian treatment regulation and implementation.



The above diagram describes our hypothesis of the effects of timber harvest and riparian treatment on streamflow. Previous studies have shown that timber harvests increase streamflow directly after the harvest, which we hypothesize is due to the reduced transpiration from less dense vegetation. Our experiment is testing whether different riparian treatments affect this process.

## Research Methods

- Instrumenting 18 1<sup>st</sup> and 2<sup>nd</sup> order streams with electronic stage sensors
- Measuring streamflow by salt dilution gauging
- Measuring precipitation through weather stations located nearby test sites
- Measuring groundwater in a subset of the streams



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