# Leveraging monitoring data to inform weed management in the world's largest urban national park

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What are the long-term outcomes of weed management?

Can we use monitoring data to identify predictors of success and failure?

Weed management outcomes in Santa Monica Mountains National Recreation Area

Compiled historical treatment data for 279 infestations spanning nearly 20 years

Resurveyed all sites in spring 2023 to evaluate effectiveness and outcomes for native plant communities

Used machine learning and traditional statistical approaches to identify potential predictors of management outcomes

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#### How effective have control efforts been for these species?







Time of first treatment



#### Why is weed control successful at some sites but not others?

#### What site-level factors influence management outcomes?



The larger the infestation, the more difficult to eradicate

Infestations on steep slopes are more difficult to eradicate



#### The greater the initial cover, the more difficult to eradicate

More frequent fires make eradication less likely

## How do management inputs influence control?



More frequent treatments result in greater control

The more hours invested per area, the greater the reductions in cover



Greater investment in labor hours results in mToceatsmentessful continents. except for when it doesn't

## What drives management success? Yellow starthistle



## Using machine learning to identify drivers of management success: Yellow starthistle



## Using machine learning to identify drivers of management success: Yellow starthistle



#### Does weed control benefit native plant communities?



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Responses of natives depend on site characteristics and management inputs

#### Does weed control benefit native plant communities?



Nonnative and invasive species suppress native cover Native richness is higher at sites where control is effective and lower where invasives spread Increased investment in labor benefits native cover... but not always Eradication alone may be insufficient for natives to recover. Restoration is key.

# Weed management is complicated

Evidence for a successful weed management program in a large, urban national park

Control is complicated by site-level characteristics and finite resources

A key is learning how to get out of neverending treatment cycles

Natives do indeed appear to benefit from successful weed control, but posttreatment restoration may be necessary

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