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Introduction and Background

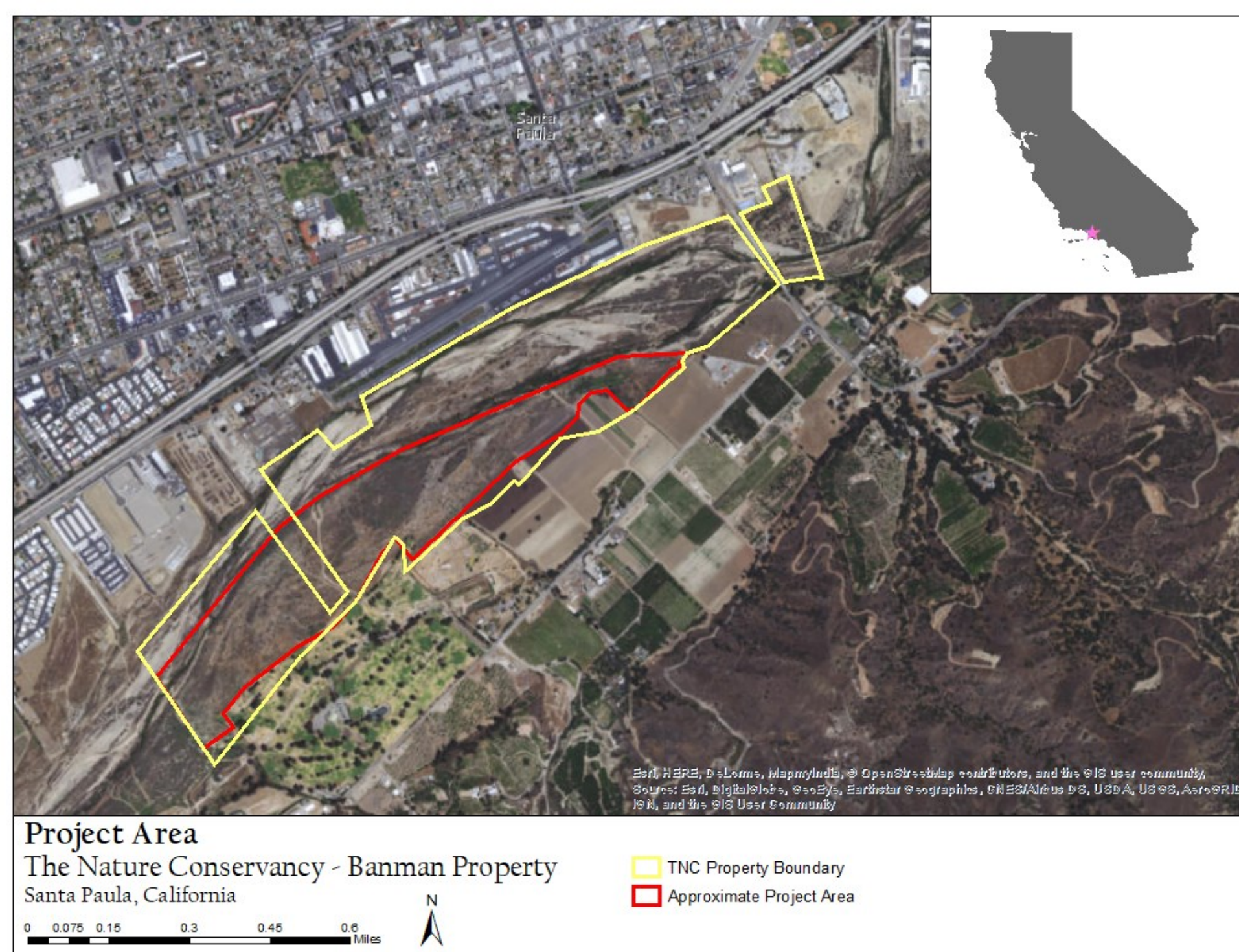
- *Arundo donax* (arundo) is an invasive grass that forms tall dense stands, outcompetes native species, alters natural hydrology, and is a threat to California's riparian ecosystems.
- The Santa Clara River is one of the most dynamic river systems in southern California, and is part of the only coastal watershed in southern California to retain much of its natural hydrology. Arundo invasion is one of the top threats to the watershed.
- In June 2015, a wildfire burned approximately 100 acres of riparian vegetation, including strands of arundo, within TNC Banman property in the Santa Clara River floodplain.
- In August 2015, Resource Conservation Partners (RCP) began invasive species removal treatments within the burn scar of the Banman property, specifically using foliar herbicide application to target arundo regrowth.

Goal

- To remove arundo regrowth within the Banman Property, allowing natural recruitment of native species



Untreated arundo in dense stands and in excess of 14 feet. June 2016



Problem

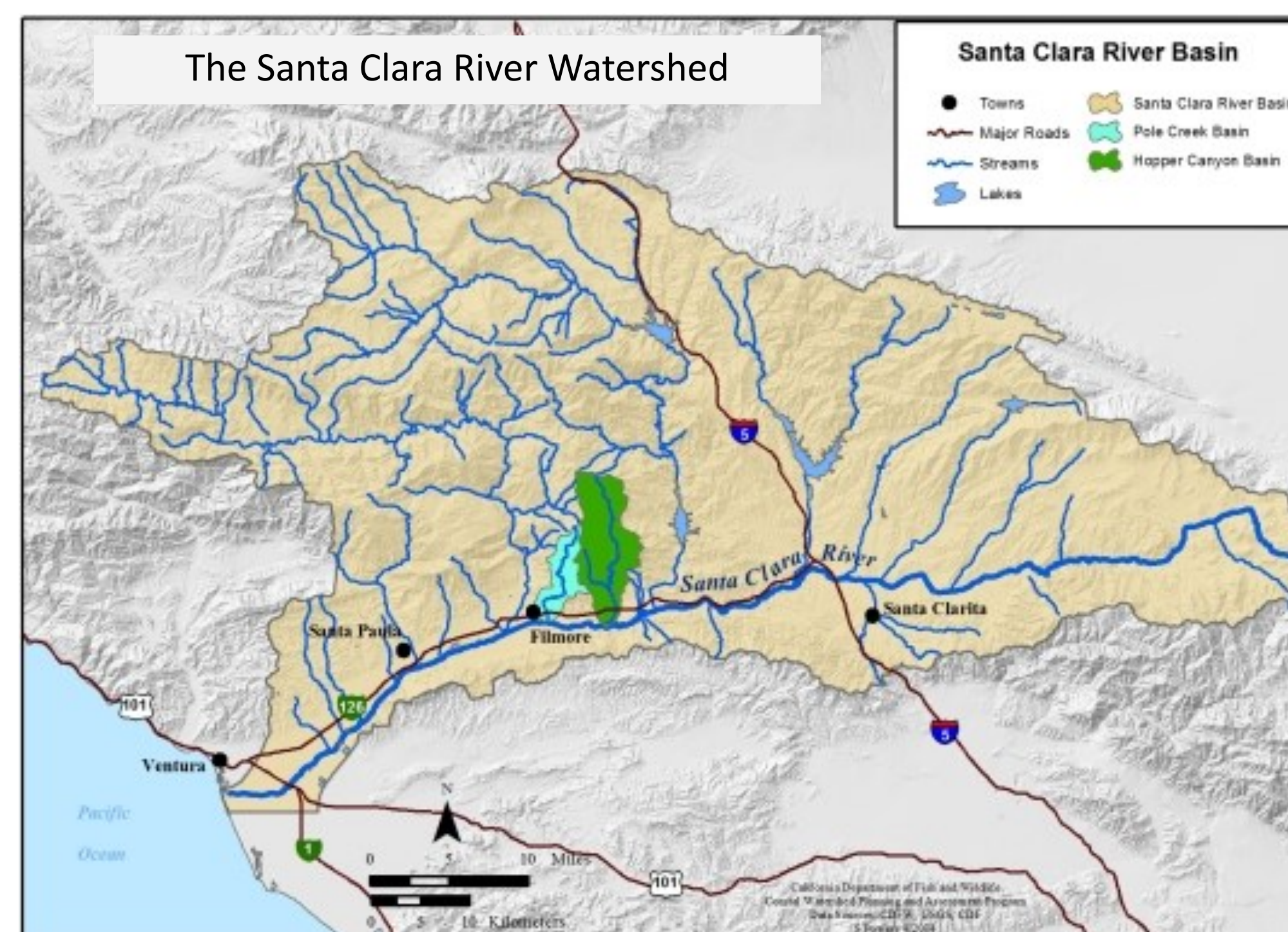
- Foliar herbicide application using typical glyphosate concentrations was ineffective at limiting growth and survival of arundo at the project site.



Project site 30 days after the 2015 fire



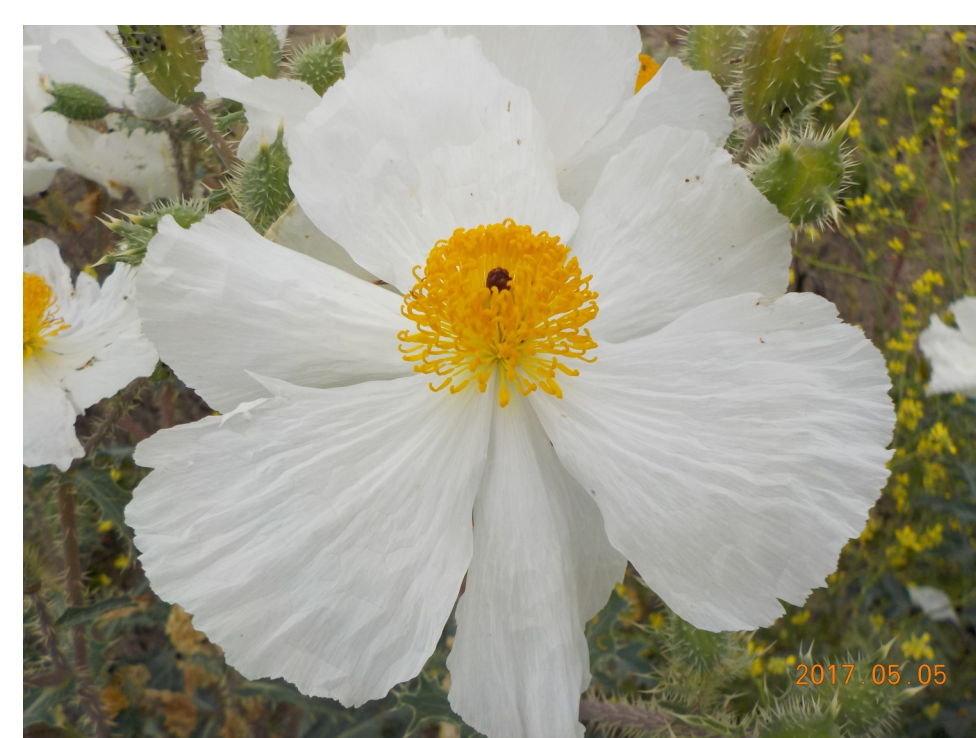
Rapid arundo regrowth approx. 6 weeks post fire



Methods

- RCP performed arundo maintenance in 2015-2017, and annual monitoring in 2016 and 2017 to determine percent cover of native and non-native species.
- In 2015, RCP treated arundo regrowth using foliar herbicide application with 4% glyphosate, a typical herbicide concentration used on giant reed. In foliar application, diluted herbicide is applied to the stems and leaves of the targeted plant.
- Arundo treated multiple times with 4% glyphosate continued to show signs of growth.
- In 2016, RCP doubled the herbicide concentration to 8% glyphosate for foliar herbicide application.
- In 2017, RCP added 1% ammonium sulfate to the herbicide and reduced herbicide concentration to 5%.

Native flower species



Prickly poppy (*Argemone munita*)



Phacelia (*Phacelia grandiflora*)



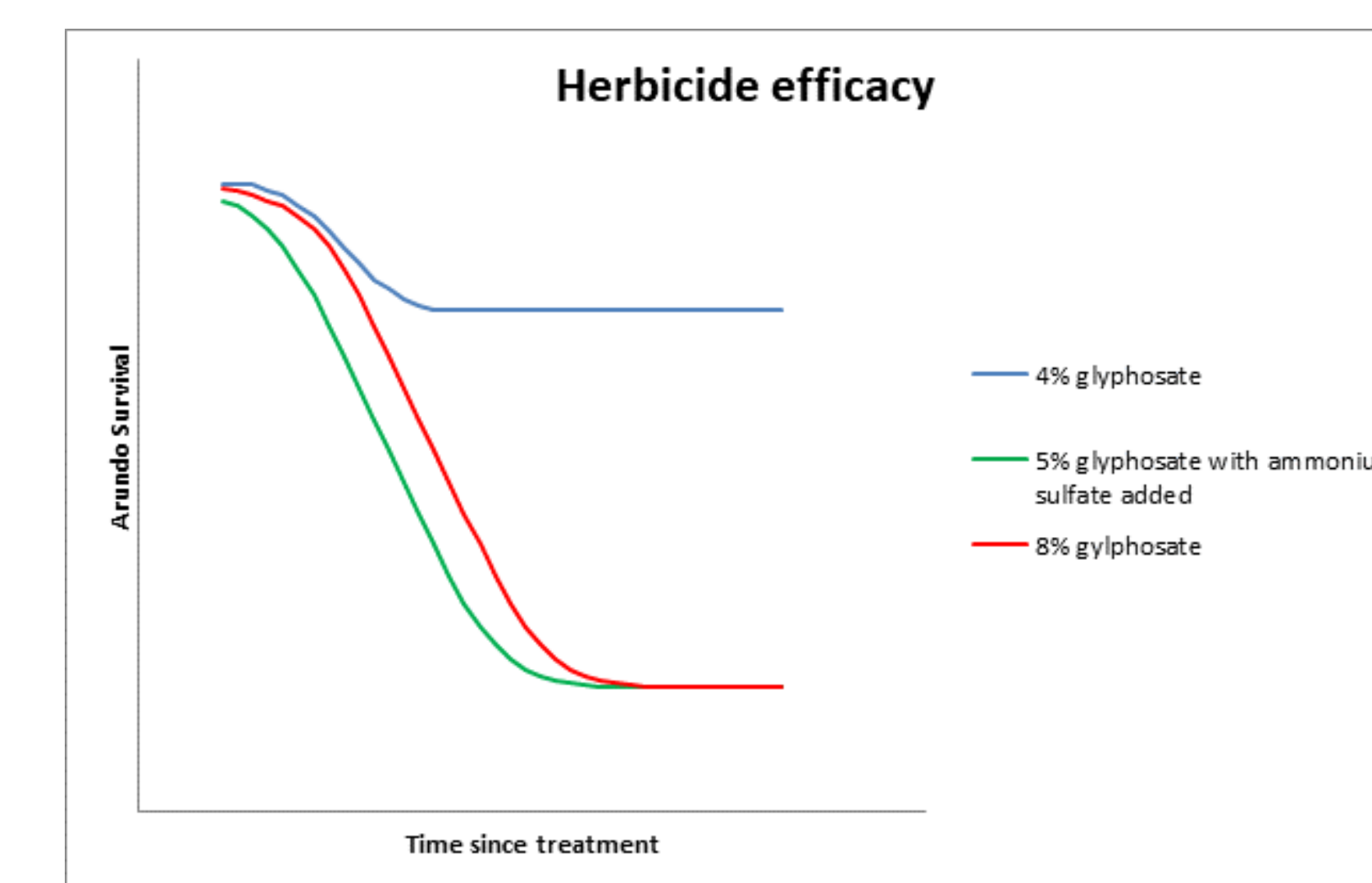
Fire hearts (*Ehrendorferia achroleuca*)



Arundo with herbicide treatment (blue)



Yellowing arundo after herbicide treatment with ammonium sulfate—6 day post spray



Results and Conclusions

- Herbicide efficacy was lowered by ash from the fire binding to leaves, and by hard water at the site.
- Both increased herbicide concentrations and the addition of ammonium sulfate were effective when performing foliar herbicide application on giant reed regrowth.
- Annual survey results native plant cover to be 21% in 2017, up from 14% in 2016. Non-native plant cover was reduced from 36% in 2016 to 33% in 2017.
- Qualitative monitoring found a number of species that had not been seen flowering in recent years, likely because the fire and maintenance of giant reed reduced competition towards native plants.
- A breeding pair of the federally endangered least Bell's vireos (*Vireo bellii pusillus*) were detected on the site in 2016. Presence of vireos indicates a healthy riparian ecosystem.

Acknowledgements

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