

INTRODUCTION

Two non-native grasses, fountain grass (*Pennisetum setaceum*) and buffelgrass (*Pennisetum ciliare*), are a growing concern within the McDowell Sonoran Preserve. These non-native grasses displace native plants and spread wildfire. Their spread and the threat of fire within the Preserve is exacerbated by close proximity to urban development.



Figure 1. Fountain grass (*Pennisetum setaceum*)

The McDowell Sonoran Conservancy has recently partnered with the City of Scottsdale to better understand the distribution of fountain grass and buffelgrass within the Preserve and to help control these species.

Our objectives are to determine the extent and severity of these species in the Preserve, to remove observed populations and to monitor the effectiveness of these removal projects.



Figure 2. Buffelgrass (*Pennisetum ciliare*)

METHODOLOGY

We identified priority areas in the Preserve based on conditions favored by each non-native plant species or known infestations.

We are mapping areas of the Preserve using a systematic one hectare grid approach. In each grid, we record the presence or absence of the non-native grasses, abundance and distribution.

METHODOLOGY (cont)

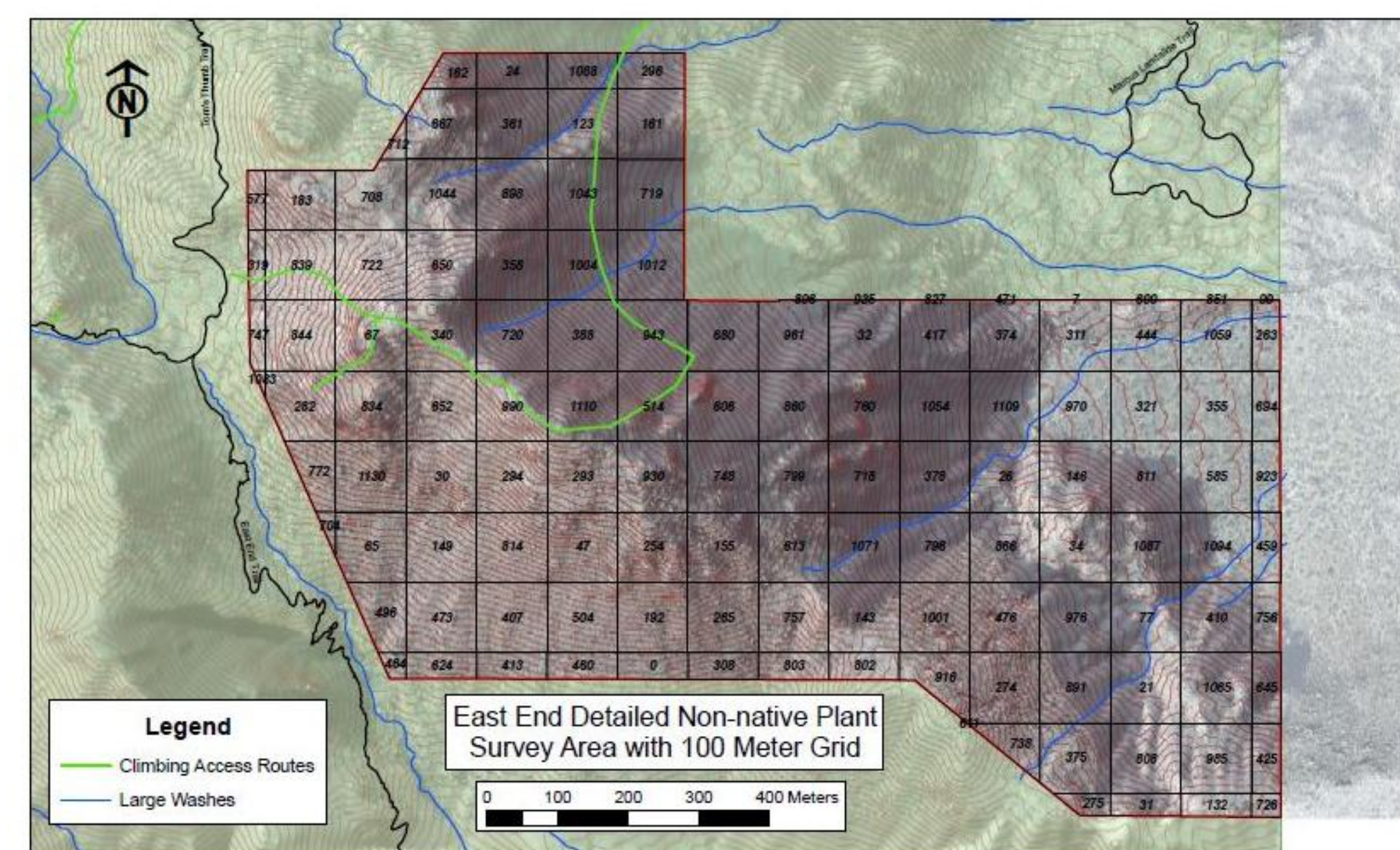


Figure 3. Example of gridded survey area

Data are collected using Survey 123 for ArcGIS on a mobile device that can be used in field. The survey captures location information using a GPS-enabled map.

Citizen scientists pull and thatch small to medium sized populations that are reasonably accessible. Thatching involves leaving the removed material in place to deter germination of the seed bank by reducing sunlight exposure.¹ Removal sites are monitored every 6-12 months and any plants noted are removed.

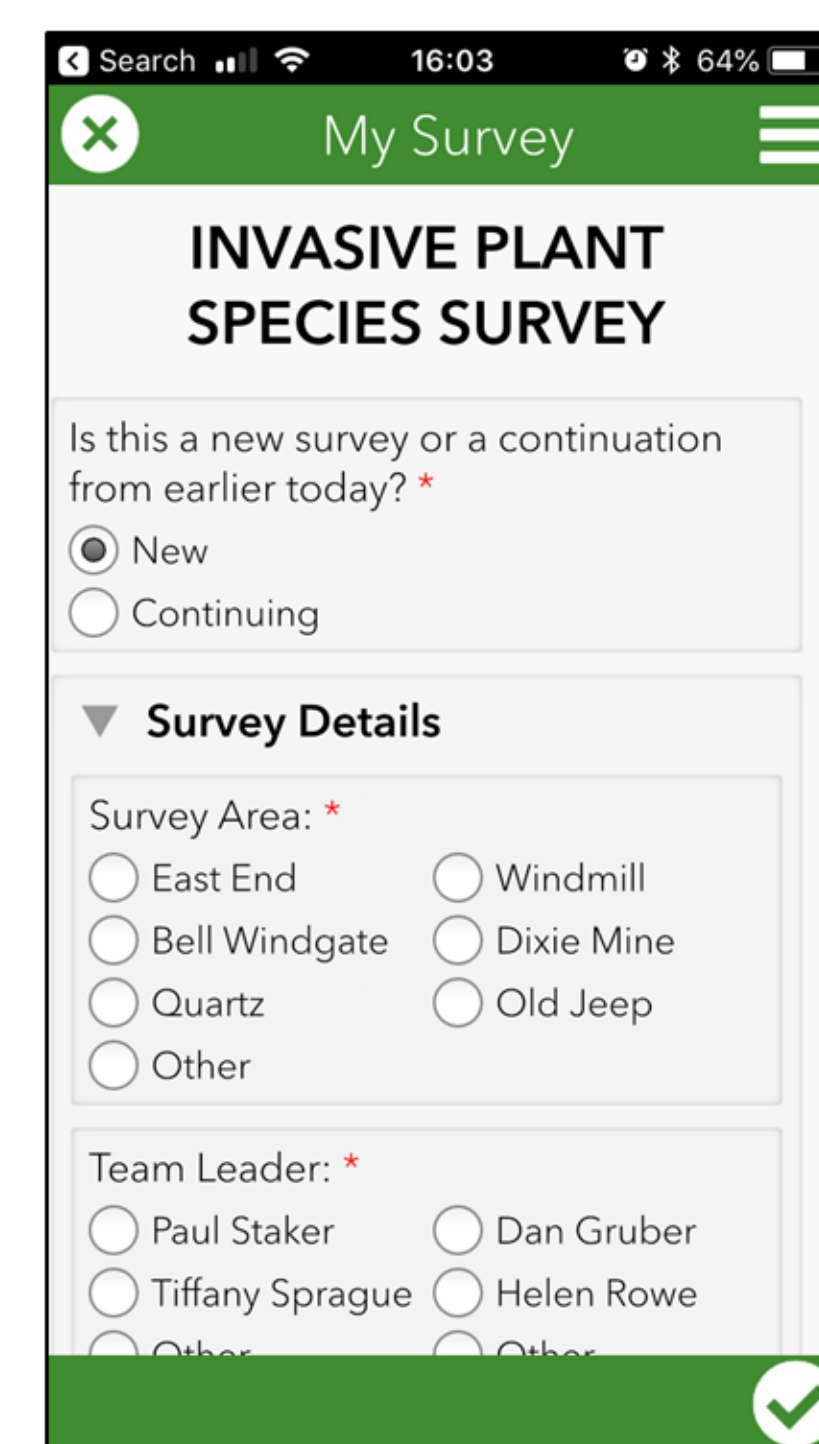


Figure 4. Survey123



Figure 5. Fountain grass removal
Photo D. Langenfeld

RESULTS

Mapping efforts are in the early stages. We have mapped approximately 30% of the Preserve since 2015. We have removed non-native plants from approximately 10 hectares of land.

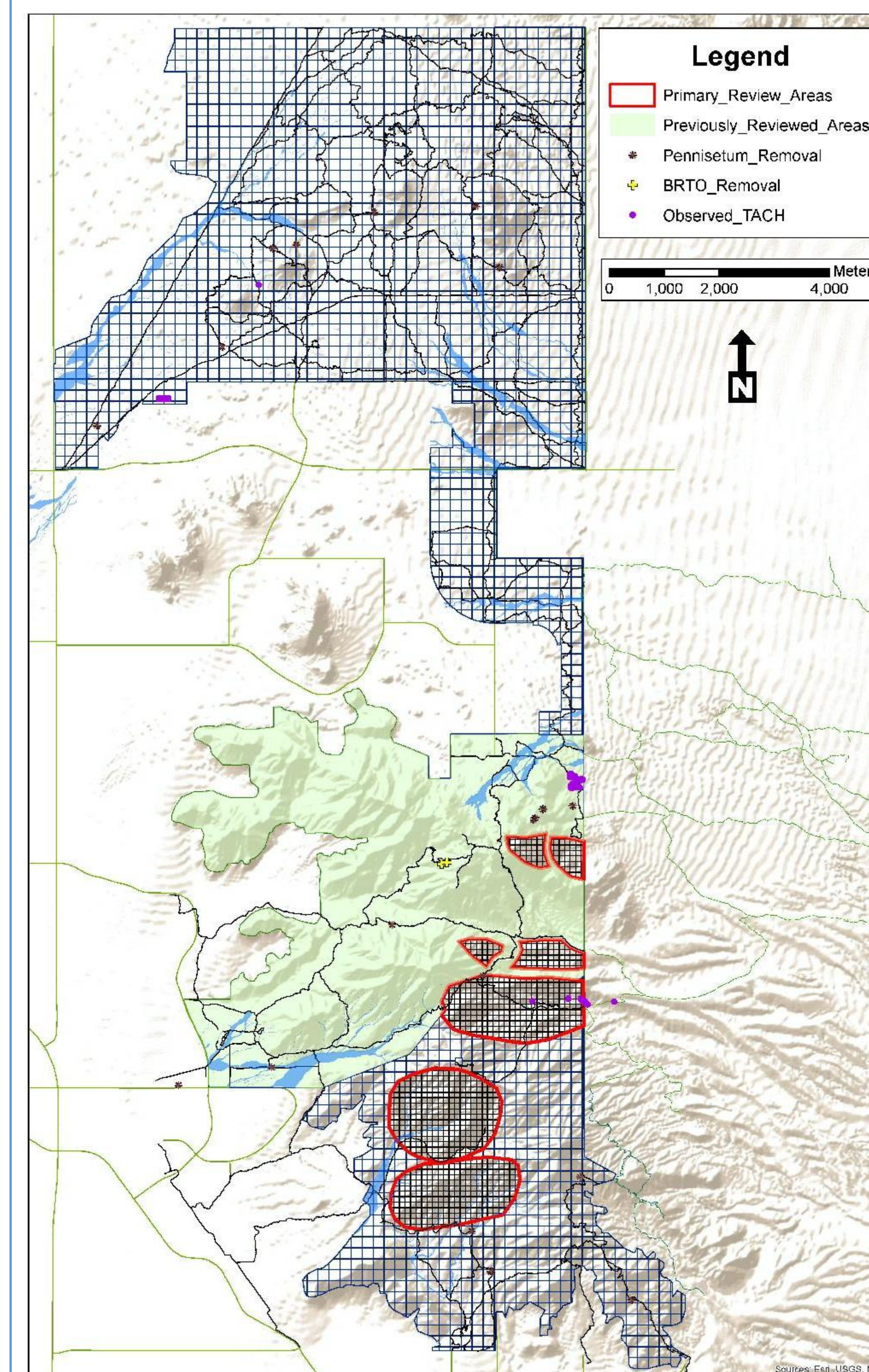


Figure 6. Map of McDowell Sonoran Preserve showing areas surveyed and non-native plant populations that have been removed.

Viable plant material at time of first post-removal monitoring is an estimated 0–10% of original population. From our observations, fountain grass regeneration is likely due to failure to remove the entire rootball. Similarly, buffelgrass regeneration appears to be from its rhizomous root structure. Very little of the secondary removal efforts are directed at new growth from seeds.

RESULTS (cont.)

We plan to continue monitoring efforts on all prior removal sites on an annual basis until we observe multiple years of no growth, indicating that the seed bank has been eliminated or significantly reduced.

DISCUSSION AND IMPLICATIONS

The challenge of the grid mapping approach is the difficult terrain where it is impractical to traverse on foot. Remote observation is possible in some cases. Aerial surveys are also being investigated to determine if they can be used effectively. The use of Survey123 to collect field data has been very successful.

Preliminary results indicate that physical removal can be effective in significantly reducing and eventually eliminating populations. It is important to conduct subsequent monitoring to be confident that all material has been removed and that the possibility of new growth from seed has been significantly reduced.

Physical removal is a labor-intensive process that is difficult in areas of widespread infestation. This process cannot eliminate all of the grass. We are conducting field studies at this time to compare the efficiency, cost and effectiveness using chemical herbicides either as a stand-alone treatment or in combination with physical effort.

REFERENCES

¹Jernigan, MB, MP McClaran, SH Biedenbender, JS Fehmi. 2016. Uprooted buffelgrass thatch reduces buffelgrass seedling establishment. *Arid Land Research and Management* 30(3):320-329.

ACKNOWLEDGEMENTS

Thank you to the many McDowell Sonoran Conservancy citizen scientists who assisted with our mapping and removal efforts.