

# HydroMechanical Obliteration (H\_M\_O<sup>sm</sup>) in the Golden Gate National Recreation Area

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## Abstract

We are reporting on the use of a new control technique: Hydro-Mechanical Obliteration (H\_M\_O<sup>sm</sup>), on six invasive plant species in Marin County, California at the Golden Gate National Recreation Area (GGNRA). Data collection consisted of a combination of before and after plots while others were recorded with photo-documentation. H\_M\_O involves the use of small amounts of water at 3500-7000 PSI to remove woody and herbaceous perennial plants. The result is a leave-in-place mulch with herbaceous plants or in the case of French Broom (*Genista monspessulana*) mature plants were removed and piled. For Cape-ivy (*Delairea odorata*) and English ivy (*Hedera sp.*) significant reductions in both species were achieved with a single treatment. For Hardwing grass (*Phalaris aquatica*) multiple treatments over time were required. We had great success with Cape-ivy and panic veldt grass (*Ehrharta erecta*) control as a follow-up to our initial mechanical removal of Cape-ivy conducted two years previously. On jubata grass (*Cortaderia jubata*) only small plants were removed with one treatment, larger plants have taken 3-4 treatments over 12 months and French broom (*Genista monspessulana*) growing among compacted rock along Bolinas Lagoon removal was also successful. We found H\_M\_O to be a beneficial and cost-effective addition to our IPM toolbox.

## Method and Materials

Hydro-Mechanical Obliteration<sup>sm</sup> uses low volume water at very high pressure to micro-minimize vegetative matter in-situ.

H\_M\_O<sup>sm</sup> is a highly targetable growth control process. It works well on reducing light weedy vegetation and frustrating plant growth.

Woody materials are subjected to three possible scenarios:  
 • controlled defoliation of green vegetation and dead biomass and around the living plant to reduce fuel.  
 • removing plant by root via liquefaction.  
 • or girdling the plant by killing by removing outer bark around the tree/plant.

Since all materials are left in place the nutrients are recycled back to the soil in which they came.

The H\_M\_O application works in any interface, urban weed control, wild land, and water.



## Results of Additional Applications

H\_M\_O has been used as an invasive plant removal technique in the GGNRA on French broom (*Genista monspessulana*), Hardwing Grass (*Phalaris aquatica*), Panic Veldt Grass (*Ehrharta erecta*), Jubata (*Cortaderia jubata*) and Fennel (*Foeniculum vulgare*).

### FRENCH BROOM:

H\_M\_O was able to rapidly cut plants at the soil level and be collected into piles.



Before

After

### HARDING GRASS:

Four treatments of H\_M\_O applied over 18 months resulted in 100% reduction in seed head production.



Before

After

### JUBATA:

50% of the smaller plants were removed after one treatment; larger plants needed three to four treatments over 12 months.



Before

After

### FENNEL:

One treatment was able to successfully remove all but two fennel plants. Only small portions of those two plants remained and there was no need to retreat the sites:



Before

After

H\_M\_O was used successfully as a follow-up to a prior mechanical removal for Cape-ivy and panic veldt grass.

## Advantages of H\_M\_O

### •FAST:

- Time spent hauling herbaceous biomass from site is eliminated.
- "Bare Ground" initial treatments for species like cape-ivy are completed in significantly less time than traditional manual methods.
- One applicator can obliterate one quarter to one acre of vegetation in one day (depending on species type).

### •CLEAN:

- Eliminates the exposure to Herbicides and other Chemicals, especially when removing aggressive plants.
- Avoids use of engine driven cutters which pollute and can cause fires.
- Can be used with reclaimed water.

### •MINIMALLY DISRUPTIVE:

- Does not cause erosion
- Recycles nutrients from the obliterated vegetation back to the soil.
- Allows the applicator to be incredibly specific in obliterating the target species
- Leaves canopy layer undisturbed.

### OTHER BENEFITS

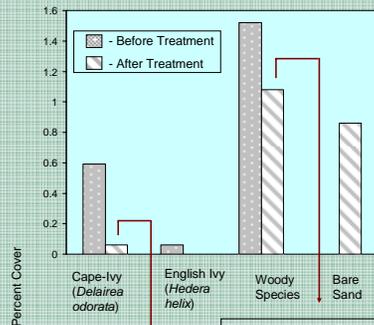
- Systems can be mobilized for certain applications where access and target species are deep in impassable vegetation.
- Systems are built to suit a wide range of tasks.

## Case Study: Cape-ivy removal at Stinson Beach

**Objective:** Determine the effectiveness of H\_M\_O to control Cape-ivy in sandy soil.

**Methods:** Sampling: Point-intercept sampling of vegetation cover was collected before treatment and six weeks after treatment. 30 points in a 9 x 10 meter square.

**Treatment:** The plot was entirely cleared of visible Cape-ivy using the H\_M\_O technique and 150 gallons of water. No limbing of willows occurred.



**Result:** H\_M\_O significantly decreases Cape-ivy and English-ivy cover without removing canopy species.

## Limitations

### •REVISITATION

- Hydro-Mechanical Obliteration often requires multiple treatments, especially when removing aggressive plants.
- It can unintentionally girdle trees and shrubs when used sub-soil.

### •PROXIMITY

- Systems are limited by hose: 400 feet max line.

### •TRAINING

- Applicators must be trained and maintain certification.

## Future Studies

To better understand the capabilities and limitations of H\_M\_O more studies must be performed investigating:

- Long term invasive control
- Seed mortality/obliteration
- Seasonality considerations and constrictions
- Effectiveness on other invasive species

## Acknowledgements

Funding for this project was provided by the National Fish and Wildlife Foundation. Thank you to Craig Scott for helping us print this poster. Funding for the production of this poster was provided by the Golden Gate National Parks Conservancy and the National Park Service.

