# Eliminating Invasive Introduced Species While Preserving Native Species in Coastal Meadow Habitat, a Critically Imperiled Ecosystem

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## Background:

Reed Ranch is a 100-acre site of degraded coastal meadow habitat that is located 1.3 miles from Camp Rilea, a military installation situated on the Clatsop Plains in northwest Oregon. Restoration of coastal meadow habitat is considered crucial to the recovery of the Oregon silverspot butterfly, a federally threatened species on the Clatsop Plains. As a part of dune stabilization efforts in the 1930s, Scotch broom, a non-native invasive woody shrub species, was widely planted throughout the Clatsop Plains. Within the last 30 years, this invasive shrub has spread across the landscape, dominating much of the historical coastal meadow habitat in the region. We examined the effects of mowing 100 acres of a mature Scotch broom shrubland with a tractor-mounted mower on extant invasive and native species in coastal meadow habitat.

## Objective:

Study the effectiveness of large-scale mechanical removal of Scotch broom (*Cytisus scoparius* L.) and the impacts on native vegetation in a critically imperiled ecosystem, coastal meadow habitat.

Priorities included:
(1) eradication of the invasive European shrub, *Cytisus scoparius*;
(2) protection of native species in a critically imperiled ecosystem on adjacent non-DoD Lands;
(3) improvement of training lands by reducing encroachment of invasive woody species in grasslands.

**Table 1.** Frequency analyses using Chi-square to compare pre-treatment to post-treatment plots.

| Species | Response | $x^2$ |
|---|---|---|
| Scotch broom (*Cytisus scoparius*) | NS | 2.72 |

**p-value = 0.05; v = 1; critical value = 3.841; NS = no significant difference*

**Table 2.** Frequency analyses using Chi-square to compare pre-treatment to post-treatment plots.

| Life Forms | Response | $x^2$ |
|---|---|---|
| Forb, Annual, Introduced | * *increase* | 32.91 |
| Forb, Annual, Native | NS | 1.20 |
| Forb, Perennial, Introduced | NS | 0.60 |
| Forb, Perennial, Native | * *increase* | 26.53 |
| Grass, Annual, Introduced | * *increase* | 14.01 |
| Grass, Perennial, Introduced | *no change* | NA |
| Grass, Perennial, Native | NS | 3.21 |
| Rush, Perennial, Native | NS | 2.25 |
| Shrub, Perennial, Introduced | * *increase* | 5.11 |
| Sedge, Perennial, Native | NS | 2.03 |
| Shrub, Perennial, Native | NS | 1.34 |

**p-value = 0.05; v = 1; critical value = 3.841; NS = no statistically significant difference*

*Aerial view of Reed Ranch.*

**Pre-Treatment 2008**

**Post-Treatment 2009**

*First day of mowing 2008.*

## Methods:

Ninety 1-m$^2$ plots were installed to record the frequency of all species detected in plots. Pre-treatment data were collected in spring prior to mowing treatments. Mowing was conducted twice during the summer (June and September). Post-treatment data were collected in the spring one year following mowing treatments. Frequency comparisons were conducted on Scotch broom data and life-form groups.

*One month following mowing treatment (2008).*

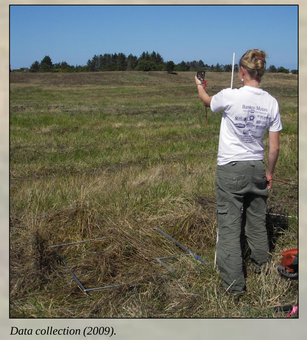
## Results: (Tables 1 & 2)

1) Frequency of Scotch broom plants increased following mowing, though not significantly (44 plots, 2008 to 55 plots, 2009).
2) Percentage of area occupied by Scotch broom was dramatically decreased following mowing treatments (*see photos*).
3) Non-native life-form groups increased significantly following mowing treatments: annual forbs, annual grasses, and perennial shrubs.
4) Native perennial forbs also significantly increased following treatments.
5) Invasive perennial pasture grasses were present in all 90 plots before and after mowing treatments.

*Data collection (2008).*

*Cut stems of mature Scotch broom.*

*Pre-treatment plot (2008).*



*Data collection (2009).*

## Summary:

The long-lived seed bank (~ 80 years) will demand management strategies that consider repeated treatments over many years. Mowing treatments of Scotch broom and other non-native invasive plants at Reed Ranch will continue to be monitored for effectiveness in the future, and adjustments in treatments will be made as study results inform us of the best approach to enhance early successional meadow habitat.