Spatial Analysis of Perennial Pepperweed Infestation in a Seasonal Floodplain

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Objective
To inform restoration management and monitoring by tracking and modeling the expansion of Lepidium latifolium populations on a restored floodplain.

Parameters measured
- Number of Stems at each pepperweed patch
- Area of each pepperweed patch
- Relative elevation as a correlate for flooding/inundation
- Distance to Levee Breaches
- Distance to Roads

Future Directions
- CRG Researchers will be creating probability surface models of future Lepidium latifolium invasion by using statistical relationships between relevant factors, such as elevation, distance to disturbance vector, and proximity to former invasion.
- Other information, such as LiDAR imagery of canopy cover and mapping of infestations in other sites on the Preserve, will allow a more synoptic view of Lepidium latifolium invasions that can be applied to other areas within the aegis of CALFED.
- Correlating invasion probabilities with management activities and restoration site analysis will allow natural resource managers to more effectively manage this pernicious weed.

Abstract
Rapid on-going expansion of Lepidium latifolium (perennial pepperweed) populations threatens to create vegetation monocultures in riparian and wetland habitats throughout California. Understanding site characteristics that promote spread of Lepidium latifolium can help resource managers target and prioritize areas for weed control and future habitat restoration.

We are developing a site-specific, GIS-based model that can be used to identify and examine correlations between rate of Lepidium latifolium spread, hydrological characteristics, disturbance regime and existing plant community types.

Here we present our results from three years of monitoring Lepidium latifolium on a recently restored seasonal floodplain at the Cosumnes River Preserve in Sacramento County, California. These monitoring data are overlaid with elevation, distance to potential seed sources and disturbance using ArcGIS to assess patterns of Lepidium latifolium infestation. Physical and environmental site characteristics can then be used to assess future infestation risk and to target areas for management.

Discussion
Populations of perennial pepperweed (Lepidium latifolium) are increasing rapidly in the Cosumnes River Preserve’s restored floodplain. Introductions appear to be from both roads and breaches, and are spreading quickly. In 3 years, area covered by perennial pepperweed has increased from 1% to 7% of the 1122 km² floodplain.

We are modeling growth trajectories and dispersal patterns to inform management priorities. We are also designing an adaptive management strategy which we will implement next spring, testing the efficacy of different control methods at sites with differing physical characteristics.