Progress Report: Costs of Invasive Weed Control and Bioeconomic Modeling, February 2018

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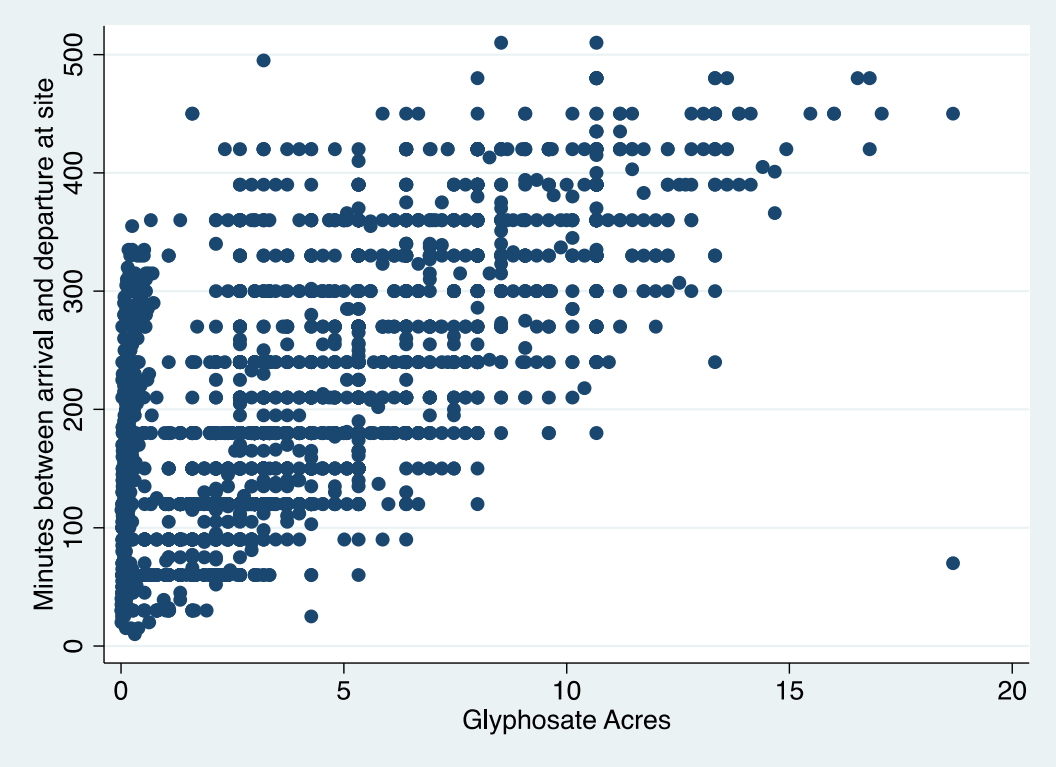
The economic analysis of the DRAAWP project has two components: An annual survey of the costs to manage invasive weeds by agencies and marinas, and the development of a bioeconomic model to estimate benefits and conduct policy simulations. The annual survey was completed to update the costs incurred in 2016 to manage invasive aquatic weeds. Total expenditures in 2016 were $13,669 million, down from the high of $15,787 million that were incurred in 2015. The decrease in expenditures was the result of a combination of changes in rainfall and improved management. With greater rain currents were stronger and floating weeds were more likely to be swept out to sea. With improved management there were lower populations in nursery sites and early treatment of weed patches in critical locations with weed harvesters. The result was lower weed masses in the Delta in 2017 than in previous years. The California Division of Boating and Waterways is responsible for areawide management and, thus, incurs the greatest costs. In 2016 the budget was $12.525 million, slightly less than the $13,718 in 2015. Among agencies that control weeds locally, the U.S. Bureau of Reclamation costs were $657 thousand dollars in 2016, down from $921 thousand in 2015. Marinas incurred the next highest level of costs at $310 thousand in 2016. In 2015 marinas were the group that incurred the highest share of costs at $943 thousand. The only agency that incurred more costs in 2016 than in 2015 was the San Joaquin County mosquito control district. However, mosquito control is strongly influenced by factors outside the Delta having to do with the risk of spread of west nile virus and other mosquito vectored diseases, then by the presence of weeds. In 2016 the Port of Stockton did not have to complete any independent management of invasive aquatic weeds. This was the first time since this project began that they did not have to do so.

Cost of Invasive Weed Control – California Bay Delta (in $1000)

	2013	2014	2015	2016	2017	Total
Division of Boating and Waterways	7,124	6,804	13,718	12,545	12,545	52,736
Department of Water Resources		821			484	1,305
Port of Stockton	51	306	168	0	0	524
Bureau of Reclamation	343	833	921	658	TBD	2,755
Weed Control District/San Joaquin	223	73	37	155	TBD	488
Weed Control District/ Contra Costa	74	0	0	0	TBD	74
Marinas	169	576	943	310	TBD	1,999
Total	7,984	9,413	15,787	13,669	13,029	59,881

Significant progress was made in 2017 on developing the architecture and linkages between the components of the bioeconomic model, and on modeling the cost equations. The bioeconomic model consists of two parts: the weed growth model being estimated by NASA; and an economic model that will estimate costs based on weed growth at a given point in time. Changes in weed populations and weed growth are an output from the biological modeling and inputs into the economic modeling. All economic costs are calculated as a function of acreage (herbicide treatments), mass (BOR weed management) or presence (Marinas). The management scenarios that will be analyzed enter into both the biological and economic models. They determine when treatment will be done, how, and the effectiveness for that treatment. The management scenarios also enter the economic equations by determining what the treatments will costs, and how that affects damages to other agencies and marinas. Preliminary estimates of the labor demand functions for applying herbicides was completed and reviewed. These equations estimate the time on water needed to treat a given infestation from the data presented in Figure 1.

Figure 1. Scatter plot between minutes on water and the number of glyphosate acres treated



The mode of the acres treated is 2.67. At the mode (acres=2.67), the minute spent at site varies between 60 minutes and 420 minutes. Most sites spent either 120 minutes at site or 180 minutes at sites.