



Costs to manage invasive aquatic weeds in the California Bay-Delta 2013 - 2017

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Stockton, CA

October 26, 2018

The California Bay Delta is home to:



Marinas



Commercial Shipping



Native fish



Agriculture



Pumping stations that provide water to the California Aquaduct System



Native plants

The California Bay Delta is home to:

... and invasive aquatic weeds



Floating
aquatic
weeds such
as Water
hyacinth




*Submerged aquatic weeds
such as Egeria densa*



Costs: California Division of Boating and Waterways (DBW)

DBW is the only agency licensed to treat infestations with herbicides, use harvesters, etc. Other agencies can use these options under agreement with DBW.





Costs: California Division of Boating and Waterways (DBW)

Year	Costs
2013	7,124,000
2014	6,804,000
2015	13,718,000
2016	12,545,000
2017	12,545,000

Benefits

Control by DBW influences the costs incurred by other agencies to manage invasive weeds.

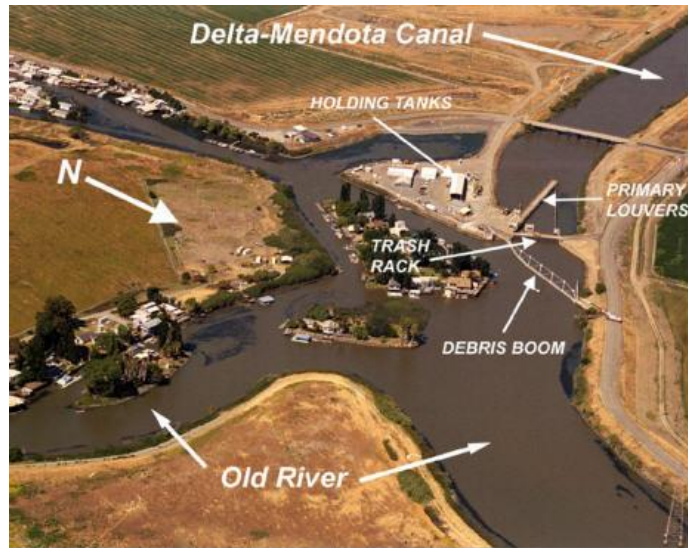
Keeps open public access to waterways.

Protects native habitats and the native fauna that rely on those habitats.

U.S. Bureau of Reclamation

Before water enters the facility that pumps water into the California aquaduct system, the water must be free of any debris, and fish collected and moved downstream. This is done at the Tracy Fish Facility.

Tracy Fish Facility



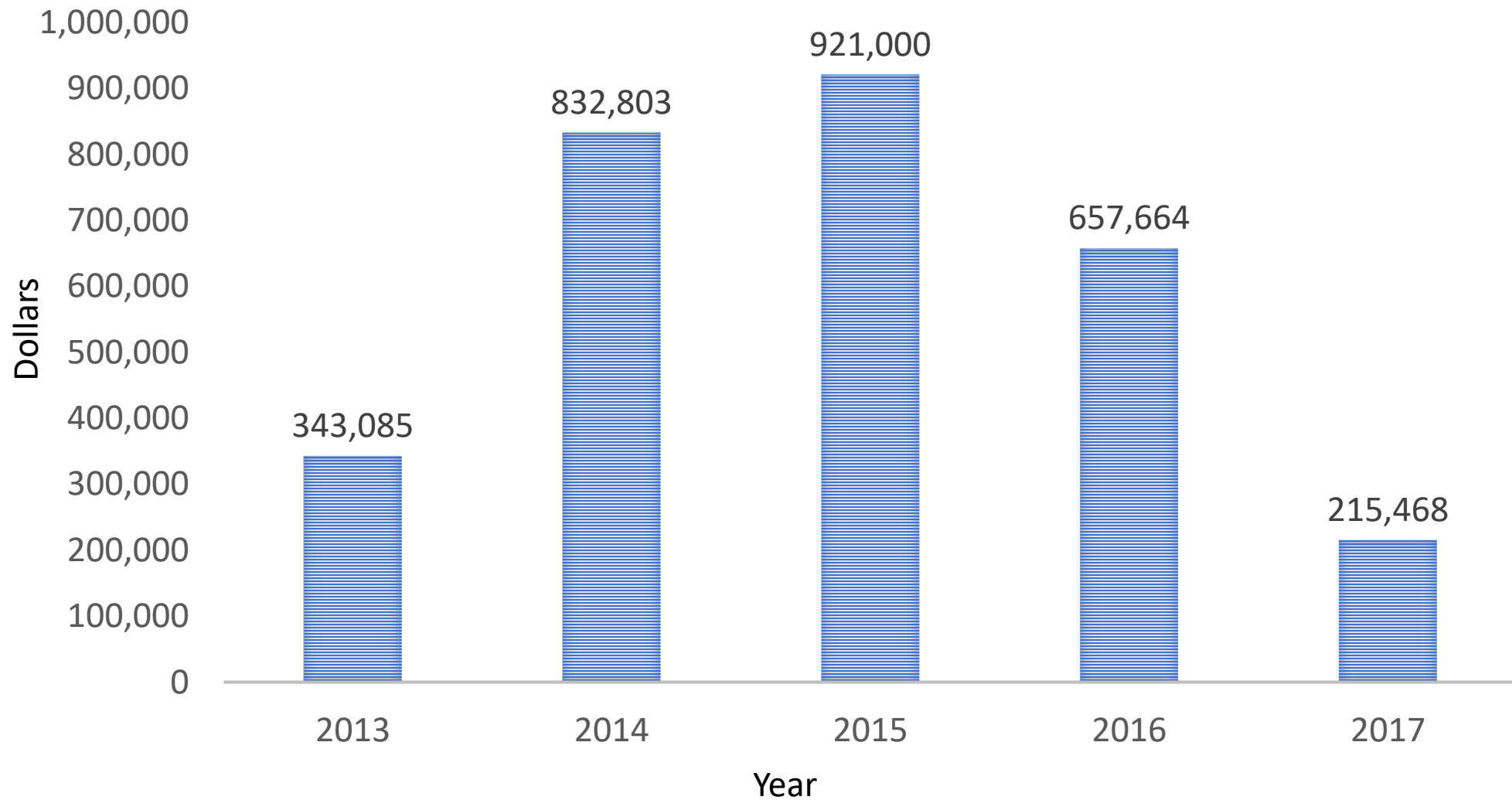
Water hyacinth being harvested at the Tracy Fish Facility.
Harvesting at peak infestation.



Water hyacinth being harvested at the Tracy Fish Facility. Typical water hyacinth debris removal process.



Annual Costs: U.S. Bureau of Reclamation

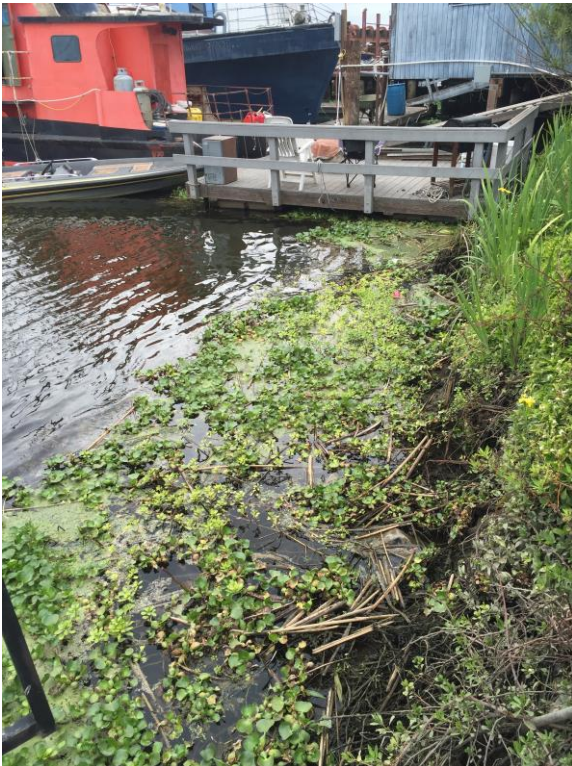


Marinas

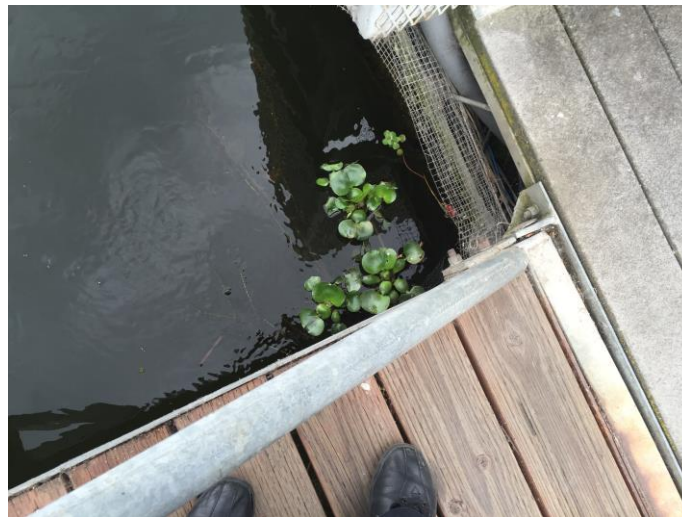
Invasive weeds can cut off access to marinas, or access to slips.
To prevent losses many marina owners and operators

- remove weeds from the water,
- push weeds out into the river, or
- use a boom (with approval from the army corps of engineers).

Weeds that will be pushed out



Weeds that will be removed



Boom preventing weed entry



Annual Costs: Marinas

	2014		2015		2016		2017	
	Egeria	Hyacinth	Egeria	Hyacinth	Egeria	Hyacinth	Egeria	Hyacinth
Respondent	58	58	50	50	57	57	43	43
Unknown management	3	3	0	0	0	0	1	1
Number treated	12	36	11	25	8	24	6	9
% treated	22%	65%	22%	50%	14%	42%	14%	21%
Total cost of treatment	\$145,500	\$353,245	\$50,218	\$534,199	\$193,420	\$80,821	\$5,760	\$10,030
Average cost per marina if cost incurred	\$12,125	\$9,812	\$4,565	\$21,368	\$27,631	\$5,938	\$1,920	\$2,508
Average cost per marina	\$2,509	\$169	\$1,004	\$10,684	\$3,454	\$1,166	\$134	\$233
Marina lost business	1	7	4	9	1	2	1	\$0
Total cost of lost business	\$25,000	\$52,431	\$53,000	\$305,910	\$5,250	\$31,000	\$5,250	\$0
Average cost of lost business if marina lost business	\$25,000	\$7,490	\$13,250	\$33,990	\$5,250	\$15,500	\$5,250	\$0
Average cost of lost business per marina	\$455	\$953	\$1,060	\$6,118	\$94	\$544	\$122	\$0

Commercial Shipping

Navigation

Pilotin Deep Draft Vessels with Water Hyacinth
on the San Joaquin River



Heavy Hyacinth growth - buoys, markers and banks obscured on radar



Moderate Hyacinth Growth—Banks and markers
obscured on radar in some areas

Night time navigation
shut down, typically
late
September to
February.

Night time
navigation
possible

Port of Stockton

Under agreement with DBW
will treat or harvest weeds to
keep access to docks clear.



Costs: Commercial shipping

Navigation

- Dates of Daylight Only Transfers
 - 10/26/14 - 01/30/15
 - 10/20/15 - 02/18/16
- Costs of Daylight Only Transfers
 - \$0
 - Why:
 - Large fixed costs (boat lease, labor, etc.).
 - Largest ships cannot navigate at night anyway
 - Ships can still navigate the Delta between Oakland and Antioch at night.

Port of Stockton

Year	Costs
2013	50,602
2014	305,827
2015	168,000
2016	0
2017	0

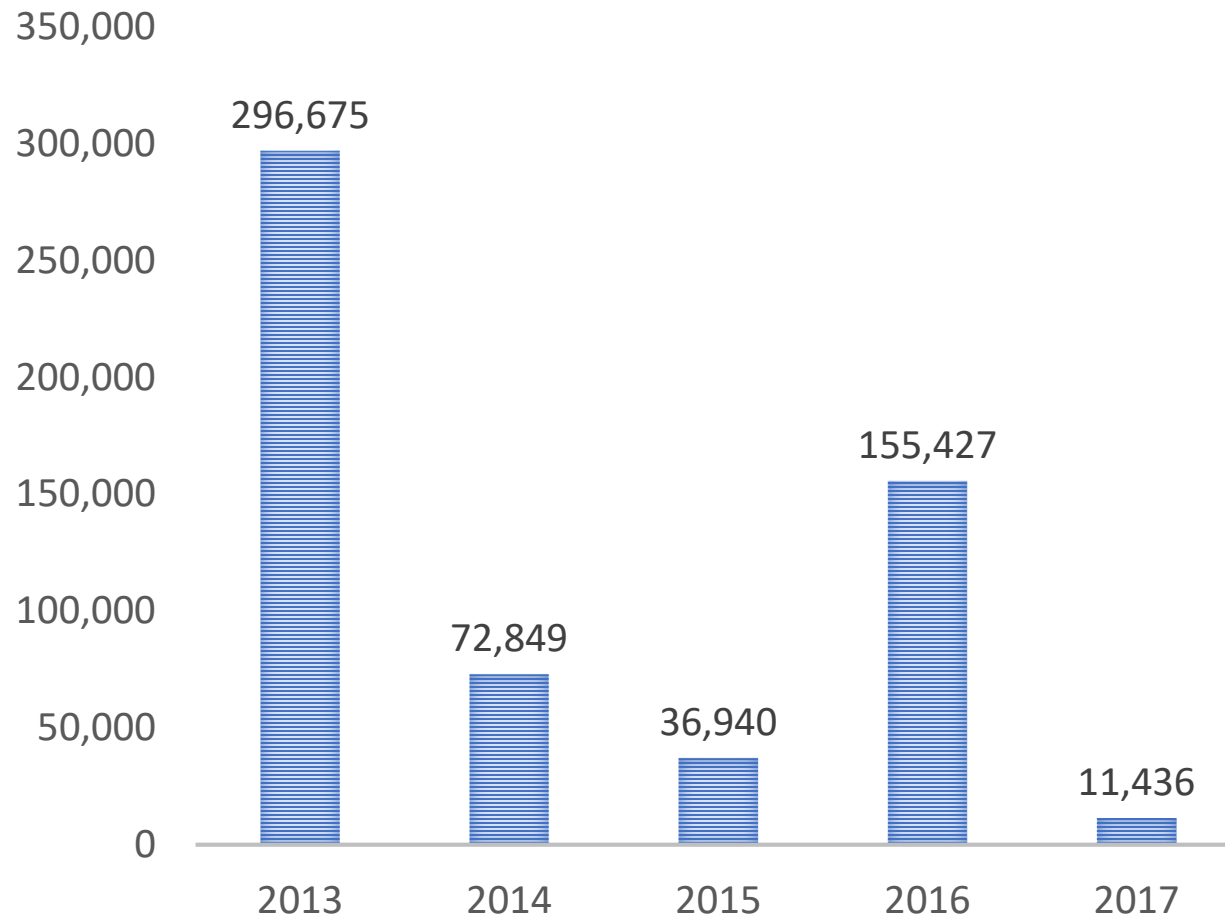
Mosquito control for West Nile Virus and other mosquito vectored diseases.

Mosquitos can breed in the “ponds” formed by water hyacinth. Weed control districts monitor for mosquitos in water hyacinth along river banks and treat infestations.

Surveying for mosquitos in Delta



Costs: Weed Control Districts



Costs are for larvicide treatments in water hyacinth mats and along the Delta where mosquito populations are found.

All costs were incurred by the San Joaquin Mosquito Control District except for \$74,139 incurred by the Contra Costa Mosquito Control District in 2013.

Summary of Costs of Invasive Weed Control – California Bay Delta (in \$1000)

	2013	2014	2015	2016	2017	Total
CA Division of Boating and Waterways	7,124	6,804	13,718	12,545	12,545	52,736
CA Department of Water Resources		821			484	1,305
Bureau of Reclamation	343	833	921	658	215	2,970
Marinas	169	576	943	310	21	2,020
Port of Stockton	51	306	168	0	0	524
Mosquito Control District - San Joaquin County	223	73	37	155	11	499
Mosquito Control District - Contra Costa	74	0	0	0	0	74
Total	7,984	9,413	15,787	13,669	13,277	60,129

Acknowledgments

The research for this project was funded by a grant from the USDA – Agricultural Research Service.

The Delta Region Areawide Aquatic Weed Project is a multi-disciplinary, multiagency project.

To learn more about the DRAAWP project visit <http://ucanr.edu/sites/DRAAWP/>.

