Managing the Salt Marsh Harvest Mouse in the Built Environment

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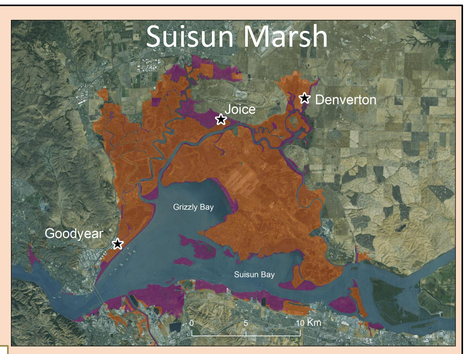
Background and Rationale

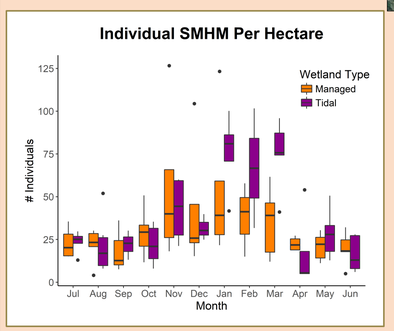
The salt marsh harvest mouse (*Reithrodontomys raviventris*, SMHM) is endemic to the salt and brackish marshes of the San Francisco Bay Estuary (SFE). Despite being listed as endangered since the early 1970's there is still very little data regarding the ecology of this species. Uncertainties regarding the value of habitat types hinder current and future conservation efforts and delay SMHM recovery.

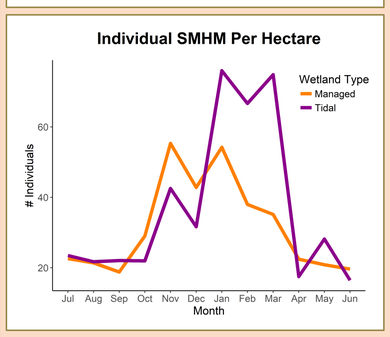
Much remaining marsh habitat for SMHM exists as diked and managed wetlands. Understanding how various management activities in the built environment promote or hinder SMHM recovery is vital for conservation efforts. By examining SMHM demographics, diet, and habitat use in paired tidal and managed wetlands, we can understand which aspects of each habitat support SMHM populations.

Populations and Demographics

Project activities took place at 3 blocks with paired managed and tidal wetlands in the Suisun Marsh: Denverton Property, Goodyear Slough Unit and Joice Island.





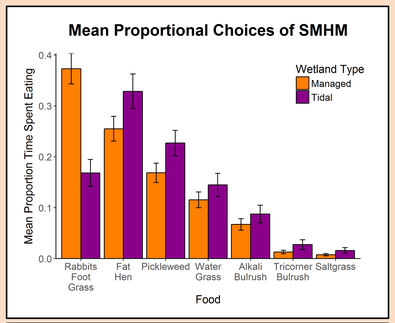


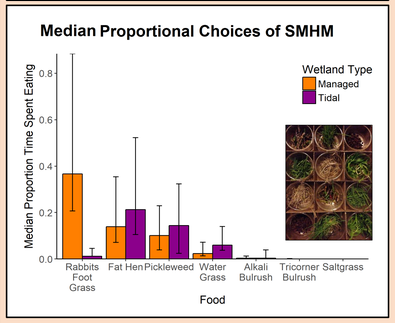
Three years of monthly trapping revealed that overall SMHM populations were not significantly different in managed and tidal wetlands. They also did not differ in terms of important demographic parameters such as survival, growth rates, and proportion of reproductive individuals.

Mean Estimated Populations:

Tidal: ~35 Managed: ~31.5

Diet Preferences





Seasonal cafeteria trials presented in all of the blocks revealed that, contrary to traditional belief, pickleweed (*Salicornia pacifica*) was not the most preferred food of SMHM. SMHM strongly preferred not native plants that are grown commonly in managed wetlands. They also consumed 45 different native and non-native plants, as well as invertebrates, when presented a variety of foods that were seasonally abundant.

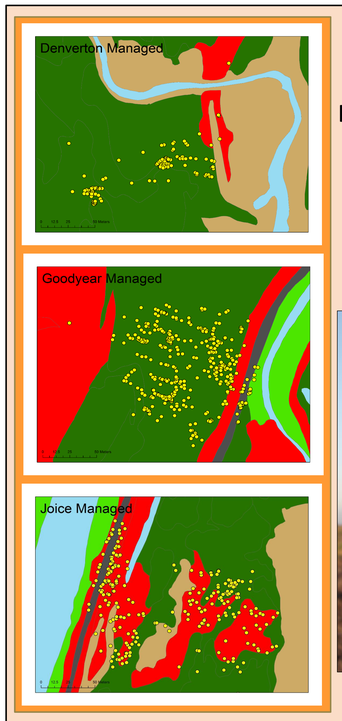
Seasonal Menu - Managed

Fall				Winter				Spring				Summer			
	N	Mean	SD		N	Mean	SD		N	Mean	SD		N	Mean	SD
Pickleweed	21	0.46	0.32	Pickleweed	34	0.47	0.36	Rabbits Foot Grass	20	0.34	0.30	Rabbits Foot Grass	34	0.41	0.37
Fat Hen	21	0.27	0.25	Fat Hen	23	0.33	0.25	Annual Grass	10	0.26	0.14	Knotweed	8	0.34	0.26
Sea Purslane	5	0.15	0.20	Annual Grass - Young	12	0.22	0.29	Hardstem Bulrush	16	0.23	0.24	Common Reed	29	0.22	0.33
Hardstem Bulrush	7	0.10	0.22	Rabbits Foot Grass	17	0.14	0.24	Fat Hen	16	0.17	0.25	Dock spp.	6	0.21	0.24
California Rose	13	0.10	0.27	Saltgrass	14	0.08	0.16	Saltgrass	20	0.14	0.17	Sea Purslane	26	0.17	0.22

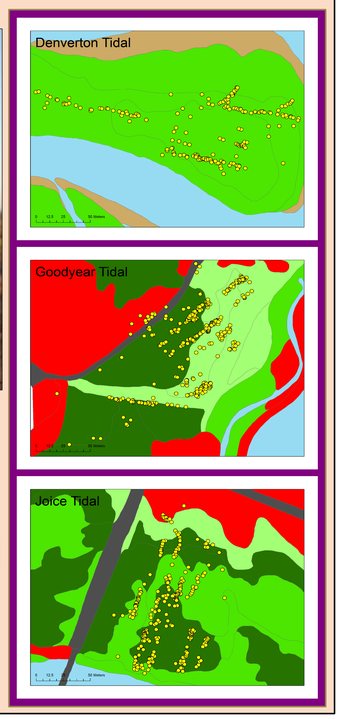
Seasonal Menu - Tidal

Fall				Winter				Spring				Summer			
	N	Mean	SD		N	Mean	SD		N	Mean	SD		N	Mean	SD
Fat Hen	18	0.39	0.25	Fat Hen	9	0.60	0.23	Baltic Rush	17	0.49	0.35	Arrowgrass	13	0.59	0.28
Cattail	19	0.29	0.36	Pickleweed	20	0.23	0.23	Arrowgrass	17	0.31	0.26	Common Reed	16	0.38	0.36
Pickleweed	24	0.27	0.26	Cattail	16	0.21	0.21	Tricorner Bulrush	10	0.13	0.18	Hardstem Bulrush	18	0.24	0.30
Baltic Rush	6	0.13	0.16	Baltic Rush	11	0.11	0.19	Invertebrates	11	0.05	0.08	Cattail	16	0.22	0.28
Hardstem Bulrush	17	0.09	0.14	Alkali Heath	8	0.11	0.04	Pickleweed	17	0.04	0.08	Dodder	8	0.11	0.03

Habitat Use



When radiocollared, SMHM did not avoid what would traditionally be considered poor habitat (red) or preferentially use traditionally good habitat (dark green)



SMHM used virtually all microhabitat types within managed and tidal wetlands including flooded duck ponds, upland grasslands, and marshes dominated by bulrush and devoid of large pickleweed patches.

Discussion and Management Implications

The SF Estuary is already a highly engineered and managed ecosystem. Future challenges like sea level rise will likely require further engineering and management. The flexibility of SMHM to utilize built and managed habitats will be vital in the ability of this endangered species to persist in the future. Understanding which foods SMHM eat in managed wetlands will allow duck clubs to grow mouse food. Further, understanding how flexible SMHM habitat requirements now appear to be will allow managers performing habitat enhancement and restoration to achieve recovery objectives at a faster rate with more efficient resource use.

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