Effects of green crab removal in California

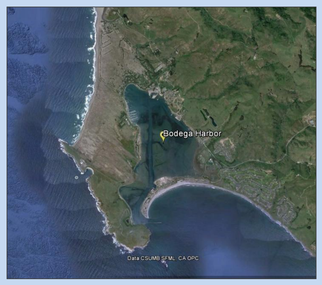
Brian Turner[1], Ted Grosholz[2], Catherine de Rivera[1], Amy Larson[1], Greg Ruiz[3]

[1]Portland State University, [2]University of California at Davis, [3]Smithsonian Environmental Research Center

Project Overview

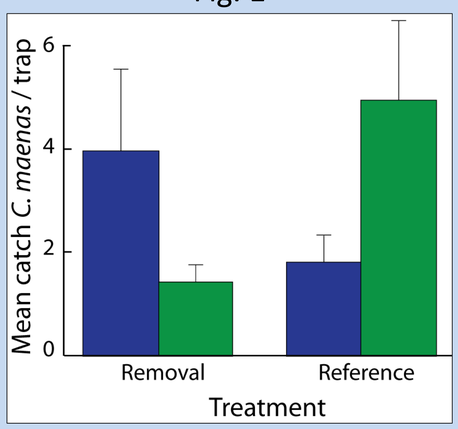
We conducted two removal projects along the central California coast, one in Bodega Harbor and one in Seadrift Lagoon. Green crabs in western North America are restricted to low energy bays (Grosholz & Ruiz 1996). Unlike eastern NA and native range, there is less connectivity among estuaries and no outer coast refuge from control efforts. These differences in abundance and habitat use suggest that population reduction efforts could be successful along western North America. We predict that removal will result in lasting population reductions and increase native crab abundance.

Bodega Harbor



Trap retrieval

Fig. 1



Hemigrapsus oregonensis

Removal methods

- Intensive removal July 2006 through August 2007; low intensity during summers through 2011.
- Crabs were removed primarily from four sites where density was highest.
- Minnow and larger box traps were used to target all sizes of *C. maenas* as well as native crabs.
- Seining was effective for recruiting juveniles.

Removal data

- Initial population size estimated at ~ 13,000 *C. maenas.*
- Fig. 1 shows the *C. maenas* catch (mean/trap ± se) before (July 2006) versus after removal (summer 2007-2009) and for Bodega Harbor (Removal) versus three Reference bays.

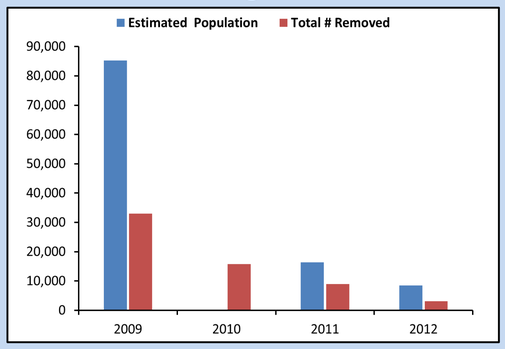
Observed responses of native fauna

- Shortly after removal began, population and body size of *Hemigrapsus oregonensis* rebounded. Predation on tethered *H. oregonensis* also decreased.

Seadrift Lagoon

Volunteer in action

Fig. 2



Cancer productus

Removal methods

- Removal efforts from June 2009 to present.
- Crabs removed using box traps.
- Citizen volunteers joined researchers in pulsed, intense removal efforts.
- Collected crabs donated to a local organic farmer for fertilizer.

Removal data

- Initial population size estimated at ~ 85,000 *C. maenas.*
- Fig. 2 shows estimated population size of *C. maenas* in Seadrift Lagoon and # of crabs removed annually.

Observed responses of native fauna

- Removal has resulted in increased numbers of native crabs including predators such as the red rock crab, *Cancer productus.*

Conclusions: These efforts have greatly reduced *C. maenas* populations in Bodega Harbor (catch per trap declined ~ 60%) and Seadrift Lagoon (~ 90% of population removed), allowing native fauna at both locations to rebound.

Funding from Pacific States Marine Fisheries Commission, NOAA, and Alaska F&G
Thanks to the many assistants and volunteers who helped with these projects!