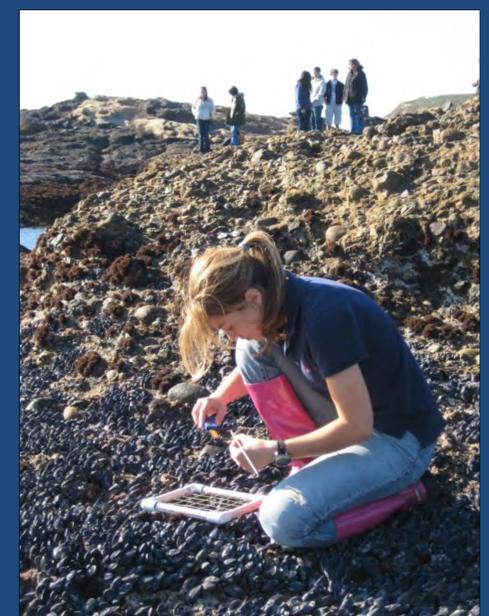




Mytilus californianus



Introduction

•Disturbance associated with visitation to the intertidal includes trampling and the harvesting of organisms for food, bait and ornamentation.

•Despite protection by marine reserves, effects of trampling are still apparent and collection of organisms continues due to these accessible areas being highly visited (Smith and Murray, 2005, *Marine Biology*).

•There is growing interest in the potential application of *de facto* reserves as a tool for marine conservation

•***De facto* reserves** are areas of the marine environment where access and use are restricted for reasons other than conservation, e.g. Power-plants, military bases and training areas and private coastal homes and ranches that restrict access to the coast

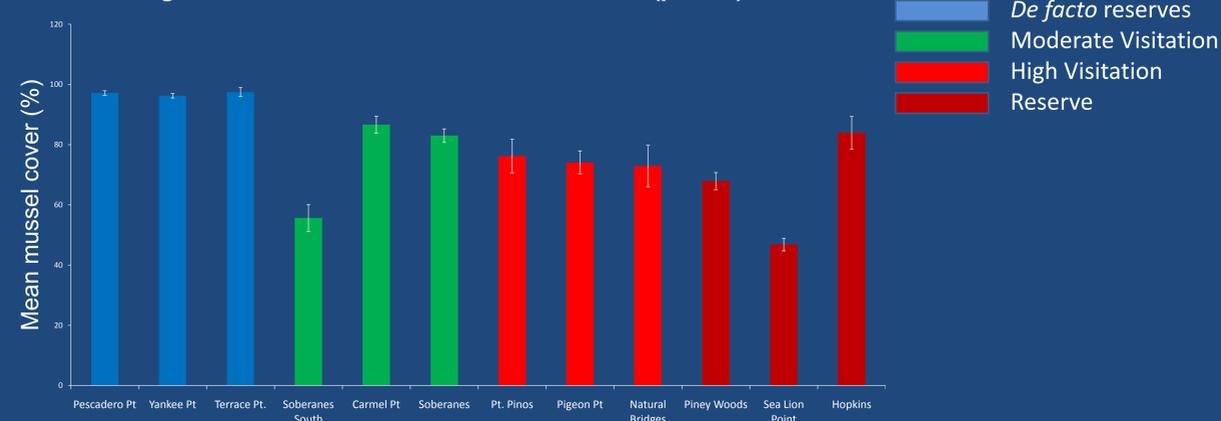
•*De facto* reserves may expand the current extent of protected habitat and natural resources and are without the disturbances associated with visitation that occur in reserves.

Research questions:

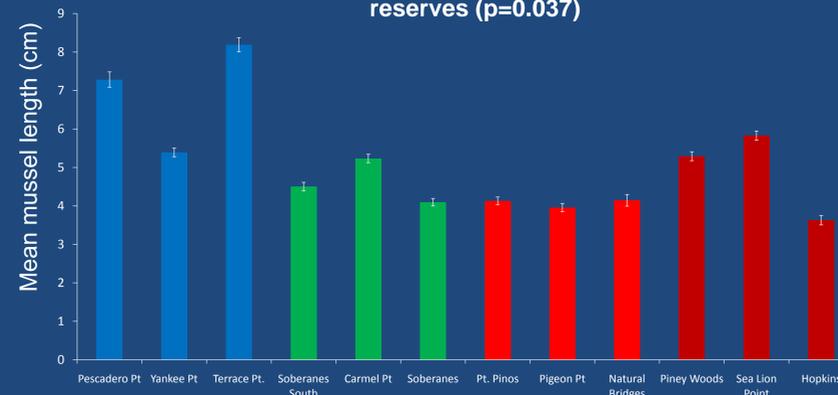
•What are the impacts of human visitation on the shore of an important intertidal biogenic habitat, mussel beds?

•Do *de facto* reserves offer additional protection benefits compared to marine reserves?

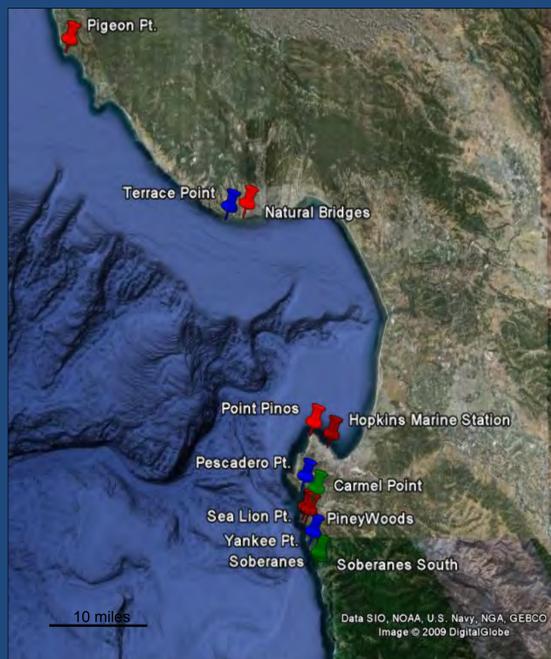
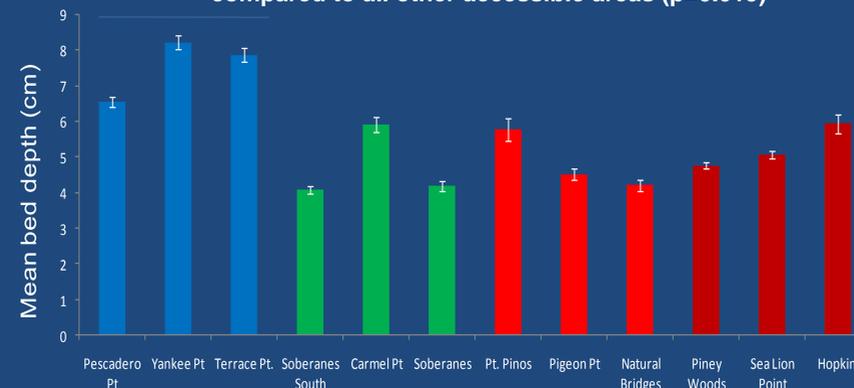
No significant effect of access on mussel cover (p=0.09)



Significantly larger mussels in *de facto* and no-take reserves (p=0.037)



Significantly greater mussel bed thickness in *de facto* reserves compared to all other accessible areas (p=0.019)



Map of study sites: Monterey Bay, California

Methodology

•Mussel cover, bed thickness and shell length were measured nondestructively at three *de facto* reserve and three reserve sites as well as three moderately and highly visited sites.

•At each location, 20 quadrats (20 x 20 cm²) were placed randomly within the boundaries of a mussel bed (if the bed was large and continuous) or across multiple beds (if beds were small and patchy)

•Percent cover was calculated for the twenty quadrats sampled at each site

•Mussel bed thickness was measured in all quadrats by pushing a steel pin through the bed in five grid points of each quadrat until the pin touched the understory rock

•Five individual mussels in each quadrat were measured for shell length



Conclusions

- 1) *De facto* reserves have significant benefits for mussel bed structure, promoting:
 - greater bed thickness, and
 - larger individuals
- 2) *De facto* reserves provide additional conservation benefits compared to marine reserves and thus show potential as an effective conservation management tool.

Implications for management

Conservation of coastal marine ecosystems will be improved through:

- promoting more effective protection in reserves with the implementation of additional measures such as restricting the number of people accessing the intertidal and improving enforcement in reserves to provide more adequate protection of intertidal habitats, and
- encouraging continued protection of natural resources in *de facto* reserves in the event they become opened to the public.