



Mussels

Pacific blue mussels (*Mytilus trossulus*) are common and abundant in shallow nearshore marine waters. They often form dense stands of individuals, commonly called mussel beds. They are a valued food for humans as well as wildlife. In the nearshore, they are consumed by many predators including sea otters, black oystercatchers, and several species of sea ducks and sea stars. Because of their ecological and cultural value, mussels are an important part of our nearshore monitoring in the Gulf of Alaska.

Findings

When we began sampling in 2008, mussel beds were largest in Kenai Fjords National Park, averaging about 25,000 individuals/m². Katmai National Park and Preserve and Kachemak Bay averaged about 9,000/m², and western Prince William Sound averaged about 3,000/m² (Figure 1). We observed high annual variation in all mussel densities, with maximum densities in all blocks except western Prince William Sound occurring in 2014, and a trend toward declining densities of all mussels through 2017.

Densities of large mussels (those preferred by some predators) show the same patterns of decline and recovery as density estimates of all mussels. Densities of large mussels (≥ 20 mm) in Kenai Fjords National Park have the highest values, averaging about 3,000/m² (12% of total density, i.e., density of all mussels), Katmai National Park and Preserve and Kachemak Bay average about 1,000/m² (11% of total density), and western Prince William Sound averages about 350/m² (12% of total density; Figure 2). The similar proportion of large mussels to all mussels at the block level (~12%) is suggestive of consistent processes structuring the upper end of the distribution of mussel sizes across the Gulf of Alaska. We also see a marked increase in the density of large mussels at Kenai Fjords National Park in 2017, possibly reflecting high survival of small mussels that were evident in 2014 and 2015.



NPS/Jim Pfeiffenberger

Collecting mussels in an intertidal sampling plot.



NPS/Jim Pfeiffenberger

In addition to recording mussel density, tissue samples are collected and tested for contaminants.



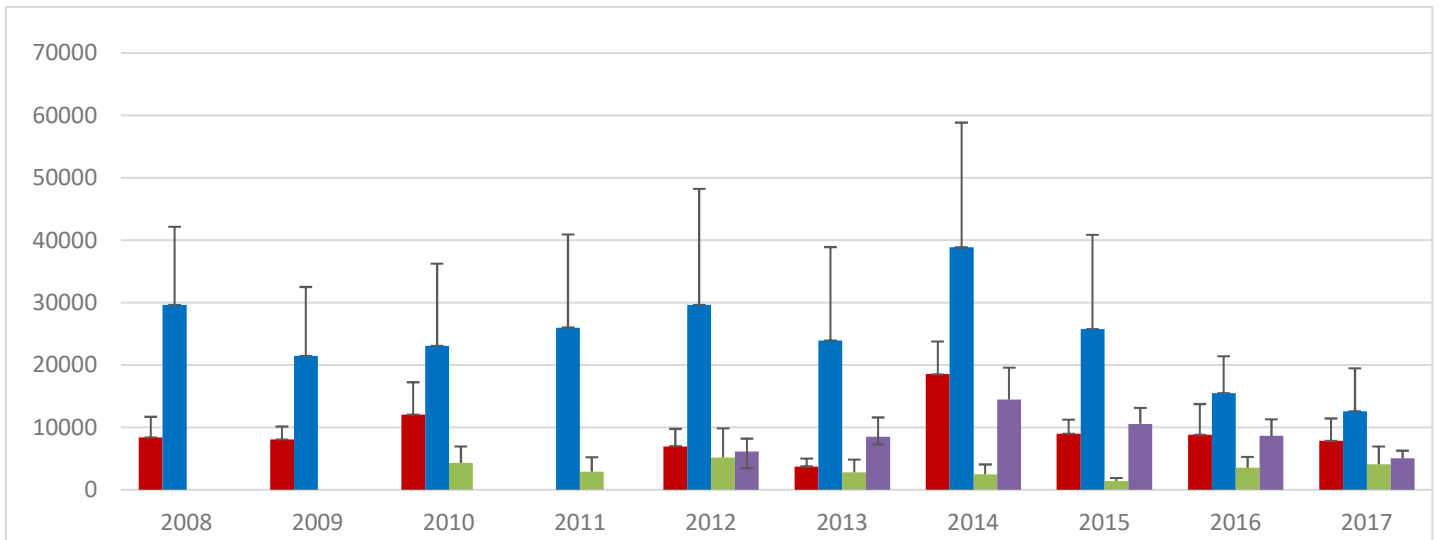


Figure 1. Density of all mussels (#/m²) sampled. Error bars indicate SE.

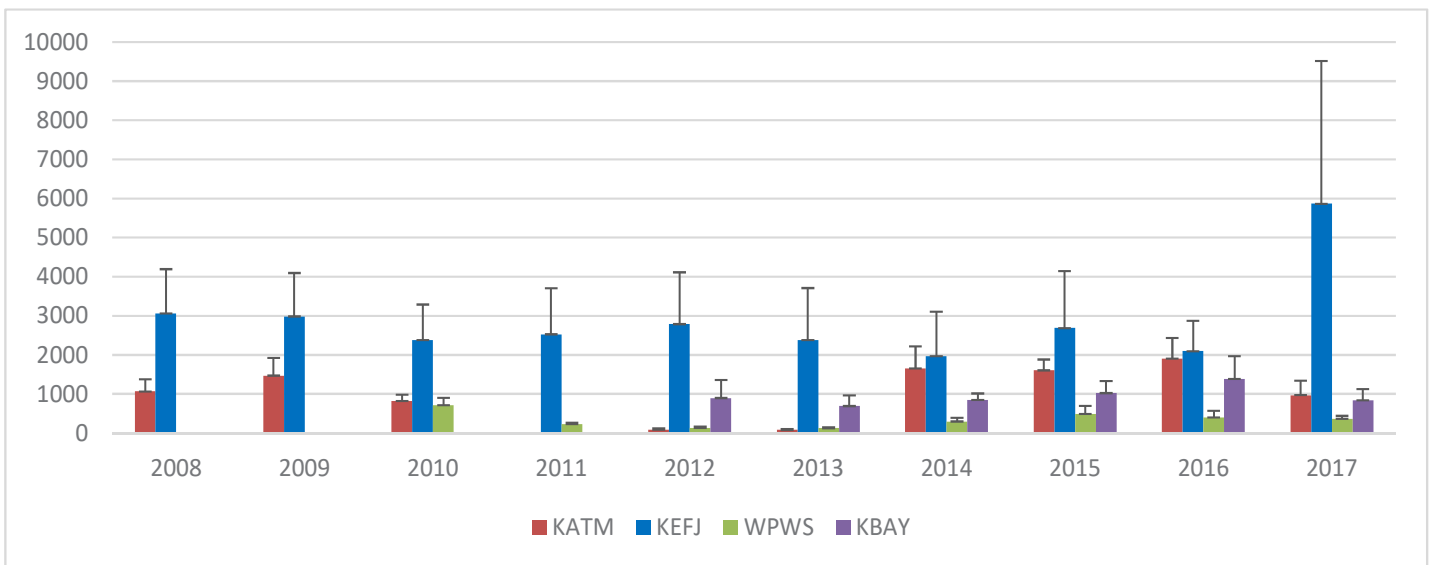


Figure 2. Density of large (≥ 20 mm) mussels (#/m²) sampled at Katmai National Park and Preserve (KATM), Kenai Fjords National Park (KEFJ), western Prince William Sound (WPWS), and Kachemak Bay (KBAY). Error bars indicate SE.

Methods

We estimate the abundance of mussels at 21 mussel sites across the four regions or blocks. These blocks include Katmai National Park and Preserve, Kenai Fjords National Park, Kachemak Bay, and western Prince William Sound. From these counts, we calculate densities of all mussels, small mussels (those ≤ 5 mm representing recruits for each year), and large mussels (those ≥ 20 mm).

Understanding how and why mussel populations vary over time will aid management and conservation of not only mussels, but also of the many consumers that rely on this important bivalve for food.