Mussels

Importance

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. 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.

Monitoring mussel beds.
NPS photo/P. Calamari

Findings

Beginning in 2008, we have been monitoring mussel beds at sites in Katmai National Park and Preserve (NPP), Kenai Fjords National Park (NP), and western Prince William Sound (WPWS). When we began sampling, beds were largest in Kenai Fjords NP, averaging about 5,000 m^2. In Katmai NPP and WPWS, beds averaged about 2,000 m^2 (Figure 1).

Interestingly, mussel populations have declined throughout the Gulf of Alaska. Average mussel bed size declined by about half, and some beds essentially vanished by 2012 or 2013 (see photo 2 in Kaflia Bay time series, taken in Katmai NPP). Since then, we have monitored mussel recovery to their initial bed sizes at most sites (10 out of 15, see photo 3). The largest beds in Kenai Fjords NP, mostly found on unconsolidated sediments, have not recovered, resulting in the patterns shown in Figure 1.

PHOTO 1 **Kaflia Bay in 2008**

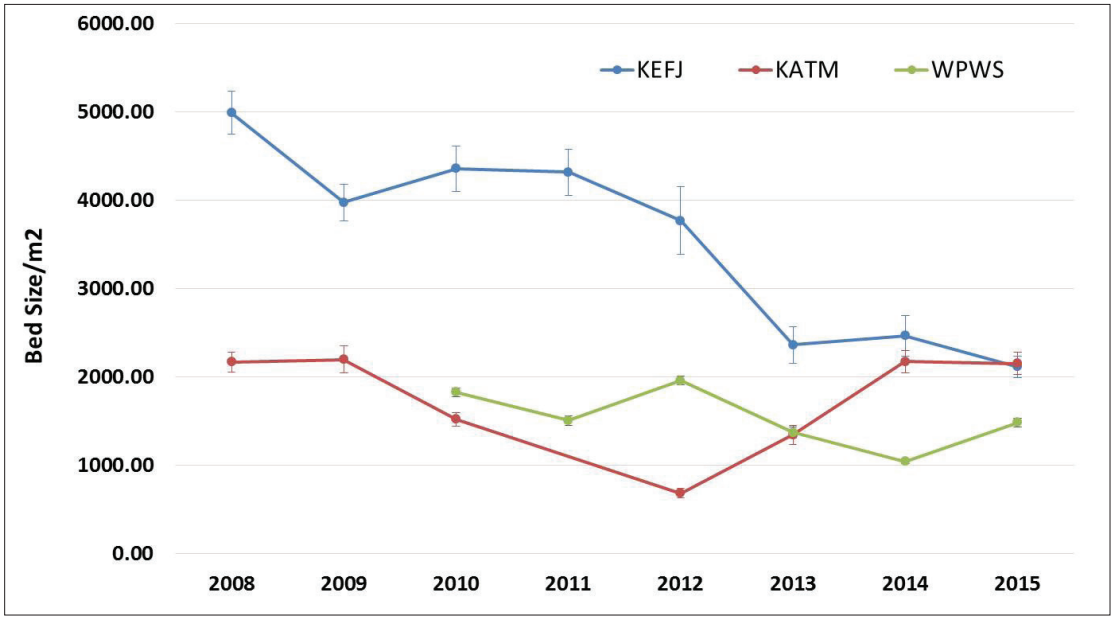
PHOTO 2 **Kaflia Bay in 2012**

PHOTO 3 **Kaflia Bay in 2015**

Densities of large mussels (those preferred by some predators) show the same patterns of decline and recovery as bed size. We see similar patterns of large mussel abundance across the Gulf of Alaska, with average densities declining by 50-90% and then increasing at most sites. We also monitor the abundance of small mussels to see how recruitment of juvenile mussels will eventually affect bed size. We see similar patterns of small mussel abundance across the Gulf of Alaska, with average densities at Kenai Fjords NP (about 25,000 m^2) more than five times the average than in other areas (Figure 2). However, the densities of small mussels do not show the same pattern of decline and recovery observed in bed size or large mussel abundance.

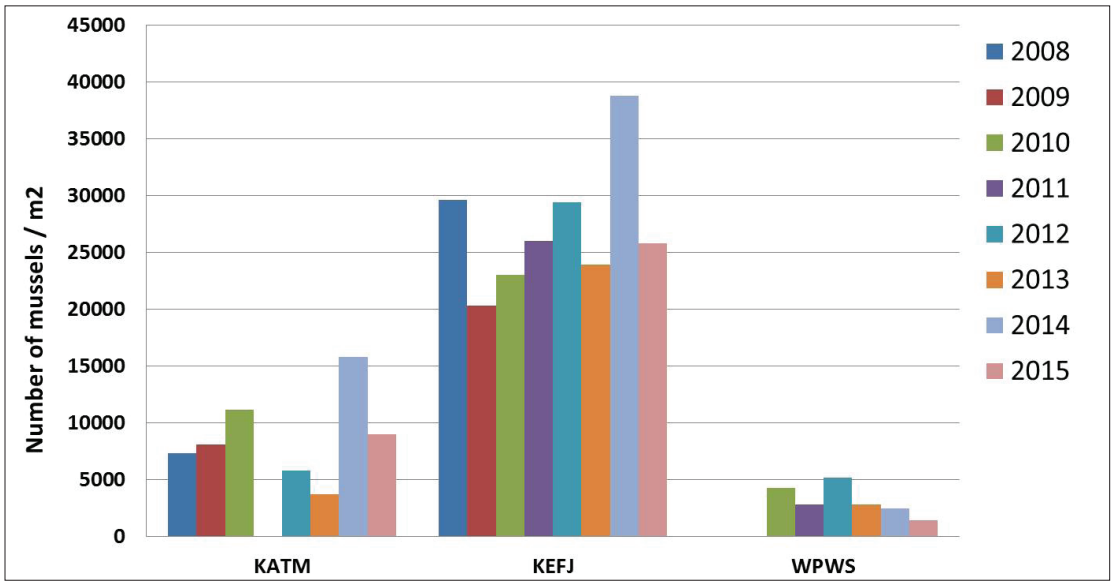
Instead we see much more consistent densities of small mussels across years (Figure 2), despite the reductions of large mussels and observed bed size. It appears as though settlement of juvenile mussels occurs on a frequency and magnitude likely sufficient to support the losses of adult mussels. It also appears that survival of those recent recruits may be highly variable, possibly leading to the longer term patterns of mussel bed declines and recovery (Figure 1). 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.

Figure 1



Mussel bed size across three regions in the Gulf of Alaska. Kenai Fjords NP (KEFJ), Katmai NPP (KATM)--not sampled in 2011, and western Prince William Sound (WPWS)--not sampled in 2008 or 2009. Error bars indicate standard error.

Figure 2



Density of small mussels across three regions in the Gulf of Alaska. Kenai Fjords NP (KEFJ), Katmai NPP (KATM), and western Prince William Sound (WPWS).

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