Comments on sbs\_results.pdf version 2016-08-16

For L. keenae, the pattern of larger body sizes in the high intertidal does make sense in light of desiccation stress, but we probably need to pay lip service to the fact that the size differences could be driven by the season that the sites were sampled in. Winter waves will tend to encourage higher distributions of L. keenae, while calm summer conditions will tend to drive them lower on the shore. I would imagine this seasonal shift also applies to the limpets to some extent, and possible also the Tegula. Although Tegula are usually so tied to tide pools that I’m less certain they’d do much moving up and down the shore on a seasonal basis.

For the modern picture in Fig 3, you can mention that the upper line of gray plates in the lower left corner are at 2.2m above MLLW for reference, and the lower line is at 1.7m. At some point in the past I may have said to you that the upper plates were at 2.0m, but they are closer to 2.2m.

For Fig 4 for the L. keenae site, I think it might be helpful to have some way to denote on the points (at least the pink points) which locations were in crevices vs. open rocks (or south vs north-facing), to help explain the big discontinuity in maximum temperature as you go from 4m to 6m height.

The discrepancy between the iButtons and the limpet heat budget model may be due simply to surface area and color differences between the loggers and limpets. A darker Z-spar coating on the iButtons should make them hotter than a light-brown limpet.

On the comparison of ibutton data vs heat budget data, I want to make sure that the same metrics are being compared (Fig 4 vs 7). The way it reads in the text right now, I think Figure 4 is plotting average daily maximum temperature for the ibuttons, which gives very high values at some of the L. keenae sites. Those are for 8 weeks of data. The Fig 7 plots are calculating an average daily maximum for each month, then for each year the month with the highest avg. daily max. is chosen, and then multiple years of hottest months are averaged together, potentially pulling the values down if some or many years are cold in general relative to the 8 weeks of iButton data. Am I interpreting that correctly? If so, how much does it change if you simply pull the hottest month of average daily max temperatures out of the entire heat budget time series and compare to the averaged iButton maxima? Probably still lower than the iButtons, but perhaps less so.

On Figure 6, I wonder if this is overfitting given the lack of different temperatures for the littorines (basically just 3 temperatures). I’m more inclined to go with the linear fits in Fig 5.

Fig 7 probably ought to be modified to make it more clear what’s being represented. The labels at the top give the 3 species names, but the legend points out that these estimates are for a model limpet. Maybe change the labels the top to say “C. funebralis sites”, “L. digitalis sites”, “L. keenae sites”. It’s still going to be a little confusing but that may be unavoidable. The same labeling could be applied to Fig 4 I suppose.

Next Steps:

1. Re: correlating with Monterey weather data, if you use the West Beach air temperatures from Chris Patton/MLO, those are the same as the heat budget model inputs.
2. I don’t expect that there should be any major shifts in submersion time across the two eras, although the sea level + tide datum has risen a bit (about 8 cm) since the 60’s. It might be worth looking at whether the months preceding a sampling effort were particularly different though, in case that might drive some of the distributional differences with respect to shore height.
3. Is there any strong evidence that local snail densities correlate with body size distributions in these species? I think we see evidence of shore height differences in body size here and in other people’s work, but not necessarily evidence of density relationships to size. I would typically expect that size increasing with shore height would be tied to desiccation resistance (rather than temperature necessarily) since the return time for rock wetting is likely longer at higher shore heights.