Review of Root et al. 2017 Biogeosciences "Biological soil crust communities 12-16 years after wildfires in Idaho, USA"

In this manuscript, the authors address the long-term influence of fire on biotic soil crust communities in a sagebrush steppe system. Wildfires are increasing in frequency and severity in this region and we know very little about how this disturbance influences soil crust communities which play an integral role in structuring these systems. This research helps to fill that gap by comparing vascular and nonvascular communities in 12-16 year old burned sites with adjacent communities in unburned areas.

While the functional group distinctions are interesting and appear to be very important, many readers like myself are likely to not know how these nonvascular groups actually differ in function, the importance of those functions or the consequences for burned systems which might experience a loss of some functional group. Discussion on this in the introduction and then later in the discussion would add more clarification on the functions of those groups and how changes in functional group diversity might impact ecosystem function.

I agree that the purpose and findings of this study increase our understanding of the resilience of this system and of the BSC communities to wildfires. A return to this concept in the discussion could strengthen that connection for your reader.

Page 3, line 14: This wording is slightly confusing. Are you referring to the end product of recovery, the process of recovery, or that different communities will recover in different ways (or all of the above?)?

Page 3, lines 15-17: Is this something you can parse out with your data? Were there remnant populations within the burned areas or do you not know? If you think that remnant populations may have contributed to the patterns you find it should be added into the discussion. If not, this information may be extraneous here.

Page 3, paragraph 2: Information on the negative impacts of fire and recovery go back and forth a bit in a manner that it not easy to follow. You may consider separating the topics and even integrating some of the previous paragraph on disturbance and recovery from mechanical disturbances.

Page 3, line 20: This second mention of algal and cyanobacterial community recovery makes me wonder if this is something you looked at or are you assuming that since your BSC communities were dominated by lichen and moss that they are later successional BSC communities?

Page 3, line 23: It would be interested to understand how these recovering ecosystem functions might be connected with the recovering BSCs functional groups if it is known.

Page 4, lines 12-14: It would be useful if these parameters could be clarified, defined or at least contextualized. For instance, does -32 dNBR indicate a greater severity burn than 381 dNBR?

Page 6, lines 15-21: Could this also be interpreted as when there were more crusts present there were more crusts to be damaged? You might play with how you present these results. To me, the part you are presenting is the common sense part (e.g. there are more crusts in unburned plots and they have a greater richness and cover). Isn't the question though about how fires influence long term BSC cover and richness (or recovery) and whether or not the variation present in the BSC community before fire influences that recovery? I actually think all of this information is there in your results but I am having a hard time picking it out. You might consider reworking the presentation of these results to make that more clear.

Page 7, line 7: This is great! It is crazy that burn severity does not influence BSC cover or richness?

Page 7, BSC functional groups: It would be interesting to know which functional groups were indicators of burned sites for a within and across site understanding of the influence of wildfires on BSC functional groups. I wonder if it is possible for you to parse apart if any groups were more strongly influenced by the high severity fires? This could help lay out those ecological expectations of changing BSC functional groups after fire and as BSCs recover from fire.

Page 8, lines 1-5: I think this is one of the most important findings of this research and it makes me see that the connection between fire intensity and invasive annual grass cover was not clear in the introduction. Knowing that well developed BSC communities are vulnerable to wildfire damage is important. Well done!

Page 8, lines 10-13: I think these findings are really interesting!

Page 8, line 14: recovery to recover

Page 8, lines13-15: Is this contrary? Since the speed of recovery with or without vascular plants wasn't tested in this study, I'm not sure that the two are comparable but there is a good chance that I am simply misunderstanding.

Page 8, lines 25-27: My understanding was that the fire severity metrics were quantitative values associated with the fire intensity. My interpretation then of these sentences is that they were derived post-fire (sorry I realize that is obvious but I had to spell it out for myself), based on reflectance, and that when those reflections were off of crusts the metrics appear to be incorrect. I assumed that the severity metrics would be used to compare recovery across a severity gradient but the conclusion of this paragraph states that these metrics may not be able to predict long term effects of fire on BSC communities. Was this the goal? You should consider stating it more plainly. From the maps, it does look like your sites did not venture into high severity conditions. Could the discrepancy be simply that the fires were not severe enough?

Figure 4: I stared at this figure for a long time trying to come up with other ways to present it that might be easier to interpret. Ultimately though, I think you are right on. I'm sure you played

with making paired ordinations of burned and unburned? I just wondered if that might help at all. There is a lot of information here that isn't discussed. I'm not sure that it is necessary to do so but there appear to be some neat patterns that might help parse apart some of the site specific differences in BSC growth forms, cover, and richness. Wonderful!