

Review of “Species status assessment for the hermes copper butterfly (*Lycaena [Hermelycaena] hermes*) Version 1.0”

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I thoroughly read this SSA and believe that it effectively describes the current status for the Hermes copper butterfly (HCB) as well as the various threats. I found the conceptual model helpful in describing what we need to know and what stressors need to be evaluated. In support of this, I thought the descriptions of biological uncertainties and management actions were helpful on pages 12-13. I agree that maintaining maximum species redundancy will be the most effective way to mitigate fire as a stressor. Additionally, enhancing corridors, translocations, and captive rearing are good ideas in my opinion. After reading section 3.1 describing wildfires and the current status of HCB, translocating adults from high fire risk to adjacent suitable habitat seems like a necessary precaution. I am referring specifically to the 19 occurrences mentioned on page 27 that fall within a contiguous area that has not recently burned. Translocating adults from these occurrences to recolonize adjacent unoccupied sites could help ease the threat of a megafire that affects all or many of the 19 occurrences. I think these ideas need to be more emphasized.

I found the description of the Species Viability Model (SVM) misleading and confusing, and I think the results were interpreted to indicate a more positive outlook than I thought the rest of the SSA supports. There are a number of points I had issues with here and I will attempt to describe them below, but I should first say that I did find the SVM interesting and useful. I have never seen a model like this, and if it is not new, then references would help. I offer these comments not to criticize, but to help the authors target the weak points and strengthen them.

I was initially confused by the summary of the SVM in chapter 1 (page 5). I was able to make sense of it after reading chapter 4, but as I understand the model, I disagree with this description. The term “theoretical probability” does not seem appropriate given there are no probabilities in the model nor is the model theoretical. Similarly, the terms “likelihood” and “independent events” are misleading. The last statement in this description in my opinion confuses and overstates what the reported measure of viability actually represents. I thought the statement in chapter 5 was more accurate, HCB “has lost approximately 43% of its known historical species-level viability”. This measure really has no direct relationship with extinction risk, even proportionally. We have permanently altered this ecosystem, which resulted in the resulting decrease in viability. This viability measure shows the decline from historical viability at best, but does not provide information for the future.

The definition given for viability is a major source of confusion; “the ability of the species to sustain populations in the natural ecosystem beyond a biologically meaningful timeframe, in this case, 30 years”. Time is never really entered into the equation. Three scenarios are discussed, increasing extinction risk, no change, and decreasing risk. I found this interesting and useful, but there is an implicit assumption that conditions would have to change for extinction risk to change, and I do not see the rationale for this. It is possible, but it is also possible that HCB populations will continue to decline even if conditions stay the same. As stated on page 42, a single megafire could extirpate 60% of the occurrences. This seems likely, and translocations

appear necessary to avoid this. I thought the SVM and the discussion of future scenarios contradict the threat of wildfire described in Chapter 3.

Again, I thought this SVM was very interesting and novel. I do think it adds an important viewpoint to the SSA, e.g., the loss of ecological unit representation (page 45), but I think its representation needs revision.

General Comments:

The figures are mislabeled making all references to figures unreliable.

Mega-wildfires or megafires?

Specific Comments:

Page 3 Is this SSA framework Figure 1 or is Figure 1 the life cycle presented on page 6?

Page 4 Missing an article or something in the phrase “Because species status assessments we analyze . . .”

Page 8 Please define SDSU, unless I missed this somewhere.

Page 10 Figure 3 does not exist, but is perhaps listed as Figure 2 if referring to the HCB range. If so, then it precedes the conceptual model which is referred to as Figure 2. Please correct these issues.

Page 13 under F: “corridor in not yet understood” switch “in” to “is”. Under G: Fuel should not be capitalized.

Page 20 First paragraph: “to eventually be replaced as habitat is recolonized” needs to be reworded. Also, the outline format changes after the first numbered section.

Page 21 I found the wording in 3.2 confusing and the point unclear.

Page 22 Chapter 3 has a different section heading format. I found the numbering very helpful, but consistency throughout the document would be appropriate.

Page 30 In 3.2.3: “while a considered a current stressor” remove extra “a”

Page 31 Toward the bottom of the page, remove “movement” from “individuals can move long-distance movement”.

Page 32 Middle of the page, remove either “during” or “by” in “was last detected during by monitoring in 2011”.

Page 35 Fahrenheit and Celsius need to be switched for the mean temperature change estimates. In terms of change in temp, $0.07^{\circ}\text{C} = 0.13^{\circ}\text{F}$, not the other way around.

Page 41 There is a missing parenthesis in “fragmentation is discussed further below; for geographic, context see Table 1 and Figure 3).”

Page 42 “the estimate annual mean area under extreme fire risk” should be “the estimated . . .”. Also further down the page, “that fell at least 67% within an historical fire footprints” needs correcting. Well, the meaning of this sentence over all is unclear to me. What does “this” refer to in “and found this had happened sixteen times in the past”?

Page 43 Either remove during and add in some missing word or phrase in “Hermes copper butterfly’s range during has increased”.

Page 44 Change “one” to “on” in “we assume that one average they were all as large”

Page 48 Change comma to period in “uncertainty level relatively high, We estimate”