

## Peer Review Plan for Species Status Assessment for Ute-Ladies' Tresses (*Spiranthes diluvialis*)

### Estimated Timeline of the Peer Review:

**Draft document to be sent to peer reviewers:** January 2022

**Peer review initiated:** January 2022

**Peer review to be completed by:** March 2022

**Expected determination regarding species' status:** The Species Status Assessment (SSA) will inform a 5-year status review for Ute-ladies'-tresses expected before the end of Fiscal Year 2022

### About the Peer Review Process:

In accordance with our July 1, 1994 peer review policy (59 FR 34270), the Office of Management and Budget's December 16, 2004 Final Information Quality Bulletin for Peer Review, and our August 22, 2016 memorandum clarifying the peer review process, the U.S. Fish and Wildlife Service (Service) will solicit independent scientific review of the information contained in this SSA. The Service will nominate potential peer reviewers.

We will consider the following criteria for any potential nomination:

- **Expertise:** The reviewer should have knowledge of or experience with the three milkvetch species or with similar species biology.
- **Independence:** The reviewer should not be employed by the Service. In rare cases, a Service employee may be a valuable expert and may be used as a peer reviewer, provided that the employee is independent of the SSA Project Teams. If a Service employee is selected, we will still solicit peer review from at least three other experts. Academic, consulting, or government scientists should have sufficient independence from the Service if the government supports their work.
- **Objectivity:** The reviewer should be recognized by his or her peers as being objective, open-minded, and thoughtful. In addition, the reviewer should be comfortable sharing his or her knowledge and perspectives and openly identifying his or her knowledge gaps.
- **Conflict of Interest:** The reviewer should not have any financial or other interest that conflicts or that could impair his or her objectivity or create an unfair competitive advantage. If an otherwise qualified reviewer has an unavoidable conflict of interest, the Service may publicly disclose the conflict.

While expertise is the primary consideration, we will select peer reviewers that add to a diversity of scientific perspectives relevant to the species. We will not be providing financial compensation to peer reviewers. We will solicit reviews from at least three qualified experts.

We will provide each peer reviewer with information explaining their role, instructions for fulfilling that role, and the draft SSA. The purpose of seeking independent peer review is to

ensure use of the best scientific and commercial information available and to ensure and maximize the quality, objectivity, utility, and integrity of the information upon which the recovery plan is based, as well as to ensure that reviews by recognized experts are incorporated into the final recovery plan. Peer reviewers will be advised that they are not to provide advice on policy. Rather, they should focus their review on identifying and characterizing scientific uncertainties. Peer reviewers will be asked to answer questions pertaining to the logic of our assumptions, arguments, and conclusions and to provide any other relevant comments, criticisms, or thoughts.

Specific questions the reviewers will be asked include the following:

1. Is our description and analysis of the biology, habitat, population trends, and historical and current distribution of the species accurate?
2. Does the draft SSA report provide accurate and adequate review and analysis of the current and projected future condition of the species?
3. Are our assumptions and determinations regarding suitable habitat logical and adequate?
4. Are there any significant oversights, omissions, or inconsistencies in our draft SSA?
5. Are the conclusions we reach logical and supported by the evidence we provide?
6. Did we include all the necessary and pertinent literature to support our assumptions/arguments/conclusions?

Peer reviewers will provide individual responses to the Service via the Peer Review Portal. Peer reviewers will be advised that their reviews, including their names and affiliations, will (1) be included in the administrative record for the SSA, and (2) be available to the public upon request once all reviews are completed. We will summarize and respond to the issues raised by the peer reviewers before releasing the final draft SSA.

### **About Public Participation**

The peer review process will be initiated shortly. We strongly encourage that public comments on the approach of this peer review be submitted by January 2022 in order to allow enough time for processing and consideration. However, we will accept comments on the peer review plan through the normal comment process associated with review of the SSA. The final draft SSA will inform a 5-year status review for Ute ladies-tresses, which we expect to complete before the end of Fiscal Year 2022.

### **Contact**

For more information, contact Craig Hansen at 303–236–4749 or by email [craig\\_hansen@fws.gov](mailto:craig_hansen@fws.gov).

## View results

Respondent

203

Anonymous

04:49

Time to complete

### Conflict of Interest Disclosure

1. ID Number (provided in request email) \*

This question is required.

2. SSA Report Name (provided in request email) \*

3. SSA Point of Contact Email (the @[fws.gov](https://www.fws.gov) address provided in request email) \*

## 4. Your Name \*

## 5. Telephone (work/professional) \*

## 6. Address (work/professional) \*

## 7. Email Address (work/professional) \*

## 8. Current Employer \*

## Instructions

It is essential that a peer reviewer used by the U.S. Fish and Wildlife Service as part of its peer review of proposed listing and proposed critical habitat rules under the ESA report any conflict of interest. For this purpose, the term "conflict of interest" means any financial or other interest which conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization. In those situations in which the Service determines that a conflict of interest is unavoidable we will publicly disclose the conflict of interest.

The term "conflict of interest" means something more than individual bias. There must be an interest that could be directly affected by your participation as a peer reviewer.

Conflict of interest requirements are objective and prophylactic. They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the Service, and the public interest. The individual and the Service should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the information produced through the peer review simply because of the existence of conflicting interests.

## Instructions (continued)

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The term "conflict of interest" applies not only to the personal interests of the individual but also to the interests of others with whom the individual has substantial common financial or other interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial or other interests. Consideration must also be given to the interests of those for whom one is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Such interests could include an individual's stock holdings in excess of \$10,000 in a potentially affected company or being an officer, director, or employee of the company. Serving as a consultant to the company could constitute such an interest if the consulting relationship with the company could be directly affected or is directly related to the subject matter of the regulatory process.

An individual's other possible interests might include, for example, relevant patents and other forms of intellectual property, serving as an expert witness in litigation directly related to the subject matter of the regulatory process, or receiving research funding from a party that would be directly affected by the regulatory process if the research funding could be directly affected or is directly related to the subject matter of the regulatory process and the right to independently conduct and publish the results of this research is limited by the sponsor. Consideration would also need to be given to the

interests of others with whom the individual has substantial common financial interests -- particularly spouses, employers, clients, and business or research partners.

The following questions are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by your peer review.

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

## Employment

If the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

9. If you are employed or self-employed, could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected? \*

No



10. To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) clients and/or business partners be directly affected? \*

No



11. If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected? \*

Not applicable



12. If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships? \*

Not applicable



13. Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction? \*

No



14. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Employment (continued)

15. If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge, are there any federal conflict of interest restrictions that may be applicable to your service in connection with this peer review? \*

No



16. If you are a U.S. Government employee, are you currently employed by the Service? \*

No



17. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Investment Interests

Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than \$10,000), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

18. Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? \*

No



19. Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? \*

No





20. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Property Interests

Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

21. Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected? \*

No



22. To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, etc.) own directly or indirectly any such property interests that could be directly affected? \*

No



23. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Research Funding and Other Interests

Taking into account your research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

24. Could the research funding and support for you or your close research colleagues and collaborators be directly affected, OR, if you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research? \*

No



25. If you answered "Yes" to the question above, briefly describe the circumstances.

## Research Funding and Other Interests (continued)

26. Is the central purpose of the proposed rule for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer? \*

No



27. Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the proposed rule? \*

No



28. To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information? \*

No



29. Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests? \*

No



30. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Blumenthal review of Ute ladie's tresses SSA

### Comments:

Overall, this report is very clear, and does a good job describing the challenges of conducting the SSA as well as the reasoning behind the methods used. Below are suggestions for areas that might be improved in this or subsequent evaluations. Note that references referred to are listed at the end. Please feel free to contact me with any questions.

Page 42, lines 15-19. This statement would be much more useful if information were provided about the populations studied for genetic analysis. Where were they, and how far apart were the different populations? Given that populations are being defined very broadly at the level of the AU, it seems important to be very clear about the scale at which "populations" were determined to have high gene flow. More broadly is seems unlikely that there would be high levels of gene flow among the locations listed in this study given their level of separation and the apparent rarity of the species.

Table 9. One potential stressor that is not addressed in this report is eutrophication. Wetland and riparian ecosystems can be particularly susceptible to eutrophication by nutrients that arrive with incoming water. Furthermore, eutrophication is well known to reduce diversity in many ecosystems (e.g., (Borer *et al.*, 2014), including wetlands (Bedford *et al.*, 1999). At the same time, eutrophication can facilitate invasion (Gonzalez *et al.*, 2010), another stressor already discussed. While information may be lacking on Ladies' Tresses response to eutrophication, addressing this potential may be helpful for modeling suitable habitat, and alerting those monitoring species abundance to another possible habitat limitation.

Page 96, lines 41-46. This section of the report describes why occurrences are used rather than abundance within occurrences. I can see how this would make information from different sites more comparable. However, it also ends up discarding data when data is scarce to begin with. If ladies' tresses are locally much more abundant in some areas, this should increase resiliency in those areas. Alternative approaches might include:

1. Conduct assessments both ways (accounting for within-occurrence estimates and not), and compare the results.
2. Rate the quality of within-occurrence data for each occurrence, model resiliency including within-occurrence data, but note uncertainty associated with poorly sampled occurrences.

A related concern is that abundance makes up a relative small fraction of the resiliency estimate. The abundance information is clearly imperfect. However, that limitation means that the characterization of suitable habitat via hydrology, successional stage and pollination resources is even more imperfect, because those relationships are inferred from information about abundance. Given that the species is uncommon, it seems very likely that there are additional habitat restrictions that cannot be inferred from the available abundance data. Under such circumstances, actual abundance data, limited though it is, would seem to be the best indicator of habitat requirements, and therefore resiliency.

Page 98, lines 15-22. It seems like information is lost when converting continuous data (# occupied sites, % suitable habitat) to ranks. Would it be possible to instead relativize the continuous data, so that "3" would be equivalent to the maximum observed value, and 1 the minimum?

Page 117, lines 30-32. I disagree with this conclusion. The fact that no single factor drove resilience seems like a necessary consequence of equally weighting different factors. As long as all the factors vary across the AUs they will all contribute to resiliency.

With regard to how climate change is incorporated into resiliency scores, I have a number of thoughts followed by a suggestion:

- 1) I agree ladies tresses are likely to be sensitive to evaporative deficit. All things equal, if their habitat becomes warmer and drier, it should become less suitable.
- 2) It is possible that they would also be influenced by direct effects of temperature or elevated CO<sub>2</sub>, but these effects would be difficult to assess.
- 3) Perhaps most importantly, as a riparian species, ladies' tresses likely relies mostly on groundwater for survival. Thus climate change is likely to have its biggest impacts by altering streamflow (see (Perry *et al.*, 2012). One resource that might be helpful is a recent snowpack prediction for the western US: (Ikeda *et al.*, 2021). This paper provides regional predictions that might allow you to roughly estimate changes in water supply to riparian areas in different AUs. It would be important to use snowpack estimates for the headwaters that supply water via streamflow to the habitat in question, rather than the particular occurrence locations. Depending on the region, one might give more weight to changes in snowpack (for snow-driven watersheds) or more weight to changes in evaporative deficit (for rain-driven watersheds).

Bedford, B. L., Walbridge, M. R., & Aldous, A. (1999). Patterns in nutrient availability and plant diversity of temperate North American wetlands. *Ecology*, *80*(7), 2151-2169.

Borer, E. T., Seabloom, E. W., Gruner, D. S., Harpole, W. S., Hillebrand, H., Lind, E. M., Adler, P. B., Alberti, J., Anderson, T. M., Bakker, J. D., Biederman, L., Blumenthal, D., Brown, C. S., Brudvig, L. A., Buckley, Y. M., Cadotte, M., Chu, C. J., Cleland, E. E., Crawley, M. J., Daleo, P., Damschen, E. I., Davies, K. F., DeCrappeo, N. M., Du, G. Z., Firn, J., Hautier, Y., Heckman, R. W., Hector, A., HilleRisLambers, J., Iribarne, O., Klein, J. A., Knops, J. M. H., La Pierre, K. J., Leakey, A. D. B., Li, W., MacDougall, A. S., McCulley, R. L., Melbourne, B. A., Mitchell, C. E., Moore, J. L., Mortensen, B., O'Halloran, L. R., Orrock, J. L., Pascual, J., Prober, S. M., Pyke, D. A., Risch, A. C., Schuetz, M., Smith, M. D., Stevens, C. J., Sullivan, L. L., Williams, R. J., Wragg, P. D., Wright, J. P., & Yang, L. H. (2014). Herbivores and nutrients control grassland plant diversity via light limitation. *Nature*, *508*(7497), 517-+.

Gonzalez, A. L., Kominoski, J. S., Danger, M., Ishida, S., Iwai, N., & Rubach, A. (2010). Can ecological stoichiometry help explain patterns of biological invasions? *Oikos*, *119*(5), 779-790.

Ikeda, K., Rasmussen, R., Liu, C., Newman, A., Chen, F., Barlage, M., Gutmann, E., Dudhia, J., Dai, A., & Luce, C. (2021). Snowfall and snowpack in the Western US as captured by convection permitting climate simulations: current climate and pseudo global warming future climate. *Climate Dynamics*, *57*(7), 2191-2215.

Perry, L. G., Andersen, D. C., Reynolds, L. V., Nelson, S. M., & Shafroth, P. B. (2012). Vulnerability of riparian ecosystems to elevated CO<sub>2</sub> and climate change in arid and semiarid western North America. *Global Change Biology*, *18*(3), 821-842.

## View results

Respondent

150

Anonymous

04:47

Time to complete

### Conflict of Interest Disclosure

1. ID Number (provided in request email) \*

This question is required.

2. SSA Report Name (provided in request email) \*

3. SSA Point of Contact Email (the [@fws.gov](mailto:) address provided in request email) \*

## 4. Your Name \*

## 5. Telephone (work/professional) \*

## 6. Address (work/professional) \*

## 7. Email Address (work/professional) \*

## 8. Current Employer \*

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No



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12. If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships? \*

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13. Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction? \*

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14. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Employment (continued)

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Yes



16. If you are a U.S. Government employee, are you currently employed by the Service? \*

Yes



17. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

I am a Federal employee of the Smithsonian Institution. My title is Senior Botanist

## Investment Interests

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No



19. Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? \*

No



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No



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No



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24. Could the research funding and support for you or your close research colleagues and collaborators be directly affected, OR, if you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research? \*

No



25. If you answered "Yes" to the question above, briefly describe the circumstances.

## Research Funding and Other Interests (continued)

26. Is the central purpose of the proposed rule for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer? \*

No



27. Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the proposed rule? \*

No



28. To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information? \*

No



29. Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests? \*

No



30. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

Thanks for the opportunity to review the Page Species Status Assessment Report for Ute Ladies' - Tresses.

The objective of the review and report was to assess whether or not the species will persist in the areas where it is known to occur under different scenarios of climate change and changes in human populations in the area and variables associated with the projected changes. The logic that was used throughout the report was clearly presented but I don't really have the expertise to evaluate those scenarios. The closest activity that I was involved in was the national effort to assess wetland conditions. In that situation there were many similar scenarios – lack of data.

A general comment on several sections of the report, mostly related to descriptions of the species and its ecology, was the lack of recent references for aspects of the species life history. Specifically, there are more recent publications on orchid mycorrhiza, the importance of the fungi on orchid growth and reproduction (i.e., evidence suggests that all native orchids that have green leaves are mixotrophic: get some carbon from photosynthesis and some from fungi), and dormancy. My guess is that those sections of the report were present in earlier versions and there was not a lot of effort to search for and include more recent relevant publications. I suggest that some effort be placed on further literature review to support the report. There are, for example, relevant publication on the issue of dormancy in orchids.

The lack of data on the ecology of the species and the habits where it occurs (e.g., what soil moisture levels are relevant and what are they associated with; what aspects of disturbance are important) make it very difficult to predict changes that might occur in the future. Overall, the situation does not look very good even though the conclusion is that the species will persist (the vast majority of colors in the right-most column in the last tables in the report were red).

It would have been useful to see a section the report where there was a list of priority research needs that, if addressed, would benefit future efforts to evaluate the species. I know that USFWS does not have a lot of funds to conduct research on threatened and endangered species but without some effort and resource in the direction, future reports will be similarly based on the lack of data and, while logically consistent, not very relevant for efforts to conserve and restore species.

What follows are mostly general comments on the species of the ecology. The documents was mostly error free.

Mycorrhiza: The orchid can't survive without the appropriate orchid mycorrhiza being present. The identity of the fungi that the orchid interacts with needs to be determined and studies are needed to determine if the presence or absence or abundance and growth are determined by the presence of the fungus or the presence and abundance. We have published data on two species that indicates that fungal abundance may be as important as the presence or absence of the fungus. Maybe something like: The achlorophyllous life history stage between the embryo and seedlings. Development of the protocorm depends on the presence of an appropriate orchid mycorrhizal fungus.

Page 24. Line 28. Can you give more detail on what is an appropriate disturbance regime?

Page 31. Line 9. Issue of whether or not a protocorm is a seedling. A seedling would be a plant with a roots and shoot. Protocorms don't have roots and I don't think that they are a 'germinated seedling'. Change in wording suggested.

Page 31. Lines 14 and 15. There are numerous more recent articles on the importance of mycorrhiza in orchid life histories. Many of the isotope related studies are showing that all orchids that have been examined are mixotrophic (partially mycoheterotrophic is another term that is used). It means that, in nature, all orchids get some resources from fungi at all life history stages.

Page 32. Line 10. Need to add the year to Sipes et al. Also, this paragraph has a lot of references that are not recent. There are more recent articles on these topics; including articles on dormancy (Google Scholar search of articles by Shefferson will result in a lot of publications on the topic). One or more of the Shefferson publications would also be relevant to add to the paragraph starting on Line 25.

Page 33. Line 11. What is the evidence that orchids get nutrition from the soil? Should 'fungi' or 'mycorrhiza' replace 'soil'?

Page 32. Line 18. What is 'root splitting' – not a term I am familiar with.

Page 35. Figure 6. Earlier in the text, disturbance is described as being important. Disturbance should be part of Figure 6 if it has been shown to be important. I notice more detail on Page 36. Move some of that information to Page 35 when disturbance is first indicated as being important.

Page 36. Lines 25-36. Moisture is certainly important but there apparently are not data to quantify the levels of soil moisture associated with plants. It would be great if USFWS could find some funds to purchase a couple of microloggers that can continuously measure soil moisture and temperature and put them into populations of the species, as well as control areas (not orchids). Unless some resources are spent on actual measurements, we will always be guessing.

Page 36. Lines 2 and 3. Can you give more details about the successional stages that will not be good for the species? Herbaceous species that get too tall? Too much litter? Invasion of woody species that produce shade, etc.

Page 37. Lines 14-15. This sentence needs further elaboration. What other needs? Be as specific as possible.

Page 37. Lines 17-29. What is described here is logical but not very informative. It would be very helpful if specific information was provided on the plants that would be present when *Spiranthes* is flowering that would also attract pollinator to increase reproductive success. Information at the species level would also support efforts to restore sites (i.e., assure that the right plants are present to attract pollinators).

Page 37. 31-37. There is a lot of literature on this topic and mycorrhiza are known for some species of *Spiranthes* that might inform what this species interacts with. Do a Google Scholar search on *Spiranthes* mycorrhiza.

I did not do a detailed reading of the section where occurrences were described and summarized. The information is useful and an important element of the document.

Section 4.1. I have no detailed comments on this section as the lack of data on individual plants over time is a key missing element. What I noticed, however, is that none of the references cited are recent. My guess is that much of this material came from the earlier recovery plan. If time and resources are



available, it would be valuable to do a literature review and add more recent references. This comment is relevant to other section of the document.

Section 4.2. The information presented is OK but the issue of genetic diversity may be masked by plant longevity. If individual plants live for a very long period of time, the current level of genetic diversity may be historical. What is needed are individual plant and plant population studies to identify new plants (recruits from seed) to determine if the populations are really viable and if there is recruitment, molecular analysis of the plants (only a tiny piece of leaf is needed these days), it would then be possible to comment on genetic diversity in the context of whether or not there is a mixing of genes that result in sustained levels of genetic diversity.

Page 122. Line 25. What information is available to confirm that protocorms of this species have been shown to remain dormant for 25 years? If data exist to confirm this, I think it would be unique. If there are not real data, suggest removing 'protocorm' from the sentence.

Section 7.1. This section, from the beginning to Line 10 on Page 124, is interesting reading but it has nothing to do with the specie of concern. All that needs to be presented at the beginning of this section is a sentence or two (with a reference or two) stating that climate is likely to change but the current IPCC models are not suitable for addressing future conditions for the species because.....; then continue with the material starting on Page 124. Line 10 (this is what was done and therefore is the only thing that is relevant).

Page 124. Line 39. I don't disagree with the decision to examine the spring and summer time periods but what were the reasons for not including, at least, the period between September and the onset of freezing conditions? Following flowering and seed production, plants will begin to prepare to enter winter dormancy and one feature that is present for almost all herbs (including orchids) is the production of an overwintering bud that will contain the tissues that will give rise to next year's plant. In most herbs, you can tell what the plant will be like the next year (number of leaves, whether or not it will flower, etc.) based on what is in the bud. If conditions are not suitable for bud development, the plant could die but, more likely, enter dormancy. This is potentially ecologically relevant if the species only produces a single bud each year and has not potential to emerge from other buds. There is no easy answer to this issue because of the lack of information on the species biology but the autumn conditions, might also be considered in the analysis.

Section 7.1. The logic for the approach to include human population effect is logical but I wonder if there are any projections for changes in cattle. If an area is not impacted by direct human activities (development of subdivisions, diversion of streams, etc.) my guess (really a guess!) is that the mammal that potentially impacts the orchids habitat the most is the cow. As climate changes and as human activities change there will likely be changes in the number of cattle that will be in the region.

## View results

Respondent

202

Anonymous

04:22

Time to complete

### Conflict of Interest Disclosure

1. ID Number (provided in request email) \*

This question is required.

2. SSA Report Name (provided in request email) \*

3. SSA Point of Contact Email (the [@fws.gov](mailto:fws.gov) address provided in request email) \*

## 4. Your Name \*

## 5. Telephone (work/professional) \*

## 6. Address (work/professional) \*

## 7. Email Address (work/professional) \*

## 8. Current Employer \*

## Instructions

It is essential that a peer reviewer used by the U.S. Fish and Wildlife Service as part of its peer review of proposed listing and proposed critical habitat rules under the ESA report any conflict of interest. For this purpose, the term "conflict of interest" means any financial or other interest which conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization. In those situations in which the Service determines that a conflict of interest is unavoidable we will publicly disclose the conflict of interest.

The term "conflict of interest" means something more than individual bias. There must be an interest that could be directly affected by your participation as a peer reviewer.

Conflict of interest requirements are objective and prophylactic. They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the Service, and the public interest. The individual and the Service should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the information produced through the peer review simply because of the existence of conflicting interests.

## Instructions (continued)

The term "conflict of interest" applies only to current interests. It does not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future but do not currently exist, because such future interests are inherently speculative and uncertain. For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is not a current interest.

The term "conflict of interest" applies not only to the personal interests of the individual but also to the interests of others with whom the individual has substantial common financial or other interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial or other interests. Consideration must also be given to the interests of those for whom one is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Such interests could include an individual's stock holdings in excess of \$10,000 in a potentially affected company or being an officer, director, or employee of the company. Serving as a consultant to the company could constitute such an interest if the consulting relationship with the company could be directly affected or is directly related to the subject matter of the regulatory process.

An individual's other possible interests might include, for example, relevant patents and other forms of intellectual property, serving as an expert witness in litigation directly related to the subject matter of the regulatory process, or receiving research funding from a party that would be directly affected by the regulatory process if the research funding could be directly affected or is directly related to the subject matter of the regulatory process and the right to independently conduct and publish the results of this research is limited by the sponsor. Consideration would also need to be given to the

interests of others with whom the individual has substantial common financial interests -- particularly spouses, employers, clients, and business or research partners.

The following questions are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by your peer review.

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

## Employment

If the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

9. If you are employed or self-employed, could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected? \*

No



10. To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) clients and/or business partners be directly affected? \*

No



11. If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected? \*

No



12. If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships? \*

No



13. Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction? \*

No



14. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Employment (continued)

15. If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge, are there any federal conflict of interest restrictions that may be applicable to your service in connection with this peer review? \*

No



16. If you are a U.S. Government employee, are you currently employed by the Service? \*

No



17. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Investment Interests

Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than \$10,000), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

18. Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? \*

No



19. Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? \*

No



20. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Property Interests

Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

21. Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected? \*

No



22. To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, etc.) own directly or indirectly any such property interests that could be directly affected? \*

No



23. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

## Research Funding and Other Interests



Taking into account your research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the species assessed within the pertinent draft SSA report --

24. Could the research funding and support for you or your close research colleagues and collaborators be directly affected, OR, if you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research? \*

No



25. If you answered "Yes" to the question above, briefly describe the circumstances.

## Research Funding and Other Interests (continued)

26. Is the central purpose of the proposed rule for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer? \*

No



27. Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the proposed rule? \*

No



28. To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information? \*

No



29. Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests? \*

No



30. If you answered "Yes" to any of the questions above, briefly describe the circumstances.

Thank you for the opportunity to provide comments on the Species Status Assessment Report for Ute ladies'-tresses (ULT). This is a fascinating species with traits that pose many challenges for assessing its current status and future threats. I have a number of suggestions for ways to improve the assessment:

1. Concepts missing from the discussion of potential effects of climate change
  - a. The estimates of potential future effects of climate change (pages 120-122) focus on evaporative deficit, and do not consider effects of climate change on streamflow, which are probably more important for ULT. Riparian hydrology is largely determined by streamflow dynamics, not local precipitation and evaporative demand. Much of ULT suitable habitat is in river basins with snowmelt-dominated hydrology. Reduced headwaters snowpack due to warmer winters is expected to lead to drier summer conditions in riparian ecosystems along snowmelt-dominated rivers. In addition, reduced snowpack is expected to reduce spring flood magnitudes, thus reducing the likelihood of fluvial disturbance to maintain early successional riparian habitat for ULT. The following citation provides a thorough review of potential climate change effects on western riparian ecosystems: Perry et al. (2012) Vulnerability of riparian ecosystems to elevated CO<sub>2</sub> and climate change in arid and semiarid western North America. *Global Change Biology* 18: 821-842 doi: 10.1111/j.1365-2486.2011.02588.x. It may be difficult to develop an index of likely effects of climate change on streamflow by HUC6 for this assessment. However, the potential importance of climate change effects on streamflow for ULT should at least be described in the assessment. Further, it would be useful to provide figures that indicate which ULT occurrences and predicted suitable habitat are located along snowmelt-dominated rivers and streams and are therefore more likely to be affected by changes in snowpack.
  - b. In addition, climate change could threaten ULT by altering flowering phenology relative to pollinator phenology (which are both generally determined by temperature, but not necessarily in the same way), and thus reducing pollinator availability during flowering. The potential for climate change to result in phenological mismatches between plants and pollinators is reviewed in: Hegland et al. (2009) How does climate warming affect plant-pollinator interactions? *Ecology Letters* 12:184-195. There is probably also more recent literature on the topic. I doubt there is a way to develop a useful metric to predict whether and where this might be a problem for ULT for the purpose of this assessment, but the possibility should be included in the discussion.
2. Concerns about measures and interpretation of resiliency
  - a. I'm troubled by the derivation and interpretation of an overall index for resiliency for each AU, shown in Table 13. These overall labels, based on arbitrarily defined bins of "average" resiliency, seem to me to be at best uninformative and at worst misleading. Numerous AUs are labelled as having high or moderate resiliency, and this masks the fact that almost all AUs have poor resiliency by at least one measure (Upper Green is the only exception). To be confident that a population will withstand perturbations, the population must have good hydrologic and vegetative habitat and good demographics. Having good hydrologic habitat will

not necessarily negate problems posed by having poor vegetative habitat. Therefore, it seems misleading to label an AU with poor habitat vegetation as having high resiliency, even if it has other good conditions. This makes the viewer think the population is highly resilient, when the true meaning is that the AU is more resilient than some others, but still threatened by lack of suitable vegetation. The problem with this approach is exemplified in the executive summary of current condition (page 7) and in the summary of current condition (page 119), where Figure C/G is interpreted as showing that the populations are largely resilient and at low risk of extirpation, when in fact only one of them is not threatened by at least one poor condition. The resiliency categories (high, moderate, low) appear to have been defined simply by dividing the possible values into equal thirds, when this does not necessarily identify truly high resiliency conditions. One potential solution would be to use different thresholds for the overall resiliency categories to better reflect the implications of “high” resiliency (e.g., >2.4 with no poor resiliency measures), and perhaps adding additional categories (very low, low, moderate, high). However, this would still be arbitrary and mask meaningful differences between AUs. I think it would be more informative to distinguish the AUs with regard to which measures of resiliency are limiting – indicating in Table 14 and Figure G which AUs are largely threatened by insufficient resources, which are threatened by insufficient demographics, which are threatened by both, and which are threatened by neither (only Upper Green).

- b. In addition, the comparisons of resiliency among AUs based on suitable habitat and connectivity are problematic. Different modeling approaches were used for predicting habitat in different AUs, based on preferences of different local biologists. In particular, the selection of suitable habitat was much more conservative and therefore limited than for some AUs than others (e.g. 1-model vs 3-model concordance vs 5<sup>th</sup> percentile thresholds). It can make sense to use the knowledge of local biologists to select the best species distribution models, but this approach makes it so that comparisons between AUs may reflect differences of opinion between local biologists rather than differences in suitable habitat between AUs. For example, the Cheyenne, Niobrara, and North Platte AUs have abundant predicted suitable habitat, but this is almost certainly because they were predicted using one of the less conservative model thresholds (Concordance 1). For the purpose of evaluating overall resiliency across the range and for comparing resiliency among AUs, methods for habitat suitability modeling need to be consistent.
3. Concerns about evaluation of species future condition
    - a. I am confused by the assumption that effects of climate change and human population expansion will each explain 50% of the influence on ULT future condition (Page 122, line 34). I don't understand why this would be the case, nor do I understand why such an assumption was necessary. Perhaps as a result, I also don't understand the logic behind the calculations on page 122, lines 137-139. First, the percent change in evaporative deficit is multiplied by the current resiliency score, which makes it so that the potential effect of climate change is smaller for AUs with lower resilience. This does not make sense; increased

evaporative deficit should have a larger effect on AUs with lower resilience. Second, this value is divided by 2. I think this second step is supposed to be related to the assumption that evaporative deficit can account for only 50% of the influence of future stressors, but it doesn't actually accomplish that. Instead, it simply reduces the magnitude of the estimate of that stressor's effect on resiliency by 50%. Neither of these mathematical steps makes sense to me, and both bias the results considerably towards lowering the estimated impacts of future stressors on ULT resiliency. I think a more appropriate approach would be to use the available information on ULT moisture requirements to estimate a constant for the rate of decline in resiliency per unit increase in evaporative deficit, and then use that constant rate to calculate the expected decline in future resiliency based on the expected increase in evaporative deficit for each AU.

- b. Somewhere on or before page 129, the threshold for extirpation needs to be explained. I eventually figured out that future resiliency values that were lower than the minimum for current conditions ( $<0.9$ ) were interpreted as extirpations, but that was not immediately clear. Also, now that I know the basis for those predictions, I'm not sure I understand the logic for why an average resiliency value  $<0.9$  necessarily indicates extirpation – obviously, it suggests a resiliency where all metrics are “low” or lower than “low”, but, calculated in this way, does this actually clearly indicate extirpation? All of this might change with improved methods for estimated current and future condition based on my earlier comments, but whatever standard for extirpation is eventually developed should be fully explained. It's important for readers to be able to understand the logic behind the extirpation predictions, since they form the sole basis for the conclusions on likely change in redundancy and representation.
4. Other issues with species distribution models
    - a. Methods for species distribution modeling on page 145 explain that efforts were made to remove highly correlated predictors, using a threshold of 0.9 to identify highly correlated predictors. This threshold is too high, and may have resulted in inclusion of collinear predictors. The standard threshold to use for this purpose is 0.7 (see Dormann et al. 2013. Collinearity: a review of methods to deal with it and a simulation evaluating their performance. *Ecography* 36: 27-46. Doi: 10.1111/j.1600-0587.2012.07348.x). It would also be good to include a table of correlations between all predictors so readers can evaluate which predictors may have been collinear.
    - b. The description of the methods for species distribution modeling is confusing, because on page 146 it states that the same methods were used for HUC6 and range-wide modeling, but the methods described in detail for the modeling at these two scales are different in almost every respect (pages 143-146 vs pages 150-151). The reasons and potential effects of these methodological differences for the resulting models should be acknowledged and described.
    - c. It would be useful to include tables that show the relative importance of the different predictors in at least a subset of the different species distribution models, so that readers can evaluate what environmental conditions the predicted habitat distributions are capturing.