Technical Review of Proposed Model for
Defining and Delimiting Ecological Unusually Sensitive Areas

Dr. Bruce A. Stein
Vice President for Programs
Association for Biodiversity Information

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General Comments on the Proposed Model

Given the congressional mandate to OPS, the intended use of USAs as an additional level of protection provided to existing pipelines, and the agency imposed constraint for use of only existing data sets (i.e., no new data development), the proposed model provides a reasonable framework for identifying key sites where damage to ecological resources could be irreparable. The proposed data model emphasizes species-level information, focusing in particular on those species that already are at increased risk of extinction, and therefore could be expected to be especially adversely effected by a spill event. Such a focus on rare or threatened species is justified based on the potential for irreparable harm to those species.

Ideally, however, one would want to include some type of ecological level filter, indicating those ecological systems that are either most rare and unique, or that are most sensitive to the effects of liquid petroleum spills and where such spills would cause irreparable harm. The Association for Biodiversity Information and the Network of Natural Heritage programs have developed a terrestrial ecological classification that may be suitable for this purpose—and has been adopted with slight modifications by the Federal Geographic Data Committee (FGDC) for use as a federal interagency standard for vegetation mapping. In concept, ecological communities ranked as G1 or G2 could be used in defining ecological unusually sensitive areas. However, the implementation of this ecological classification at the state level, including mapping of the finest units as occurrences, is highly variable at present. While excellent data exists in some states, it is not available in many others. Perhaps even more relevant to this program, however, is work currently underway to develop a framework for freshwater ecological community classification. Once developed this could provide a way to identify those aquatic habitats that should be considered unusually sensitive.

Comments Regarding Filtering Criterion #2

My major concerns with the proposed model is the use of filtering criterion #2. Species ranked as critically imperiled (G1 or T1) by the heritage network receive designation under the proposed model for the reason that by virtue of their extreme rarity (generally 5 or fewer populations across their range) impacts to any single occurrence would impact a large proportion of the species' populations. The other candidate species included in the model—species ranked as imperiled (G2 or T2) by the heritage network, or species listed

as threatened or endangered under the federal Endangered Species Act—are for the most part also quite rare and populations of these can be construed as being unusually sensitive to additional perturbations. Indeed, in a recent study (Stein et al. 2000), we found that 90% of federally listed threatened and endangered species are also classified as either critically imperiled (G1 or T1 – 67%) or imperiled (G2 or T2 – 23%) by the heritage network.

The current approach emphasizes using multiple concentrations of rare species as a way of identifying unique and sensitive habitats, an approach that has been developed and employed for conservation planning particularly in southern California where numerous rare species have made species-by-species planning difficult. This "hot spots" approach can be useful for setting priorities, but one of its major limitations is that it may not lead to the identification of sites including a representative set of candidate species. Indeed, "representation" analysis is another conservation planning tool often used in parallel with hot spots analysis. In this sense, one might be interested in identifying those sites that harbor the greatest diversity of target species (i.e., the candidates), but in order to ensure that the full array of targets is included, identify a select set of sites that also includes species not included in the hot spots. This is precisely the approach that was used to generate a "minimum set" map (Figure 6.10) in our recent publication *Precious Heritage*. The fundamental problem is that hot spots may consist of the same set of species co-occurring, and focusing only on such concentrations could entirely miss many other species.

My principal concern is that the current 3-species filtering criterion may not be adequate outside of California, which is a highly unusual state from both a biological and conservation perspective. To test this hypothesis, OPS's contractors ran the data model on the three pilot states using both 3-species and 2-species filters. The results indicate that states are highly variable in their sensitivity to this filter. In California, lowering the filter from 3 species to 2 had very little effect on the number of target species included in USAs, (a 5% increase for G2s and 1% increase for T/E species. In contrast, Louisiana shows a significant underrepresentation for both G2s and T/E species using a 3-species filter: only 30% of G2s are included in USAs and only 60% of T/Es. Dropping the filter to 2-species considerably improves representation, leading to a 110% increase for G2s (total of 63% covered) and a 33% increase in coverage of T/E species (total of 80%). Texas is intermediate between these two conditions.

Several factors may be involved in the difference exhibited between the effectiveness of the filter in California and Louisiana. First, California has an order of magnitude more rare species than most other states. Furthermore, the California dataset used in the model included polygon data, whereas the Louisiana data was represented as buffered point localities. Polygons, particularly large ones, by definition have a higher probability of intersecting with other species (and therefore becoming multi-species areas) than do buffered points. The key factor here is that most state heritage programs only have point data, and in this regard are more like Louisiana than California.

For this reason, I strongly urge that if OPS decides to use a multi-species filtering criterion as a way of limiting the coverage of USAs, these multi-species USAs should be defined based on 2-species rather than 3. The effect of this is likely to be small in California, but will substantially improve the robustness and credibility of the model elsewhere.

Even using a 2-species filter, some targets will not be included. For example, the Arkansas River Shiner (*Notropis girardi*), is a G2 species and federally listed as threatened that occurs in Texas. Because of its rarity and its reliance on aquatic habitat it can be considered an ecological resource unusually sensitive to oil releases. Indeed, this species is probably more sensitive to such releases than many terrestrial species included in USAs (for instance the desert tortoise in California, which is responsible for a USA vast in acreage). However, in the Texas pilot this species is not included in any USAs under either the 3-species or 2-species scenarios. I suspect that in some states significant numbers of G2s and T/E species, such as the Arkansas River Shiner, will be entirely missing in the state's USA network.

In order to be truly representational among these sensitive species, I suggest that a method be developed to capture at least one occurrence of each of these missing targets as a USA. This might be done by identifying and delimiting that population that is in best condition and regarded as most viable in the state as measured by the heritage EO ranking or some comparable measure. An alternative approach would be to automatically include as USAs all aquatic or aquatic-dependent candidates (Federally listed and G2s), which would be those species most likely to be impacted by a liquid spill.

The converse of this related to treatment of terrestrial federally listed species with large ranges. Several such species have the potential to generate very large USAs, even though the potential risk from liquid spills to these types of highly mobile species (e.g., red-cockaded woodpecker, spotted owl, desert tortoise) may be low. (Typically wide-ranging listed species are not either G1,T1 or G2,T2). For this reason, USAs for these species should probably focus on occupied habitat, and polygon occurrences relating to these species may need to be individually reviewed and modified to reflect this.

<u>Considerations Related to Future Updates</u>

Mapping USAs must be viewed as an evolving process for two reasons. First, understanding of the distribution of the candidates is subject to continual improvement, leading to better data. In addition, major new data sources, such as ecological community occurrences, might become available that should be incorporated in the data model and mapping. Second, as environmental conditions change, the actual conservation status and distribution of species and ecosystems also change. Therefore, additional species may become candidates while others may be removed from consideration as USA candidates. For these two reasons it will be essential for the USA mapping to be periodically updated. A reasonable periodicity in updates might be every 4 of 5 years.

Finally, I must note that the underlying premise that USAs should be based on existing data must be questioned. We know that for many of the USA candidate species, scientific knowledge of distribution and status is imperfect, and the USAs will underrepresent those

areas on the landscape that should qualify for designation. Targeted inventories of pipeline Rights of Way would be the most cost-effective manner to improve the existing data in a way directly relevant to the administration of this program.

Citation

Stein, B.A., L.S. Kutner, J.S. Adams. 2000. *Precious Heritage: The Status of Biodiversity in the United States.* New York: Oxford University Press.