

**Recovery Plan for Western Lily (*Lilium occidentale*)**

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**Original Approved:** March 31, 1998

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**RECOVERY PLAN AMENDMENT**

We have identified best available information that indicates the need to amend recovery criteria for western lily (*Lilium occidentale*) since the Recovery Plan was completed. In this modification, we synthesize the adequacy of existing recovery criteria, show amended recovery criteria, and provided the rationale supporting Recovery Plan modifications. The modification is shown as an addendum that supplements the Recovery Plan, superseding only page iii of the Recovery Plan.

**For  
U.S. Fish and Wildlife Service  
Pacific Southwest – Region 8  
Sacramento, CA**

**November 2019**

Approved:   
Acting Regional Director, U.S. Fish and Wildlife Service  
Pacific Southwest Region

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## **METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT**

The U.S. Fish and Wildlife Service (Service) reviewed the available literature, most recent 5-year Status Review, and information from California Department of Fish and Wildlife, Oregon State Parks, Oregon Department of Agriculture, and the Wiyot Tribe to determine criteria for removing western lily from the list of threatened and endangered species. This review represents an individual effort; however, valuable input and feedback from colleagues and partners was incorporated throughout. We relied on the current Recovery Plan and most recent 5-year status review, as each document is comprehensive in describing the biology of and threats to western lily.

## **ADEQUACY OF RECOVERY CRITERIA**

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each Recovery Plan shall incorporate, to the maximum extent practicable, “objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list.” Legal challenges to Recovery Plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) have also affirmed the need to frame recovery criteria in terms of threats assessed under the five threat factors (Act 4(a)(1)).

### **Recovery Criteria**

The current recovery criteria can be found on page iii in the Recovery Plan (see link above).

### **Synthesis**

Western lily is an endangered, long-lived, perennial plant species that relies on early-successional, coastal habitat (Service 1998). In the Recovery Plan for western lily, the Service identified criteria necessary for downlisting the species to threatened status; however, no criteria were identified for delisting the species. In the most recent status review, no change in listing status was recommended (Service 2009). Since the 2009 review, new information regarding population occurrences, habitat extent and quality, and threat prevalence has been obtained. This information is pertinent to western lily recovery and is relevant to assessing the adequacy of current recovery criteria. This new information is available in the 2019 status review ([https://ecos.fws.gov/docs/five\\_year\\_review/doc6069.pdf](https://ecos.fws.gov/docs/five_year_review/doc6069.pdf)).

## **AMENDED RECOVERY CRITERIA**

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and the species may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants (here forward, Lists). Downlisting is reclassification of a species from an endangered species to a threatened species. The term “endangered species” means any species (species, sub-species, or Distinct Population Segment [DPS]) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any

species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made “solely on the basis of the best scientific and commercial data available.” Thus, while Recovery Plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species’ status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or a threatened species. A decision to revise the status of or remove a species from the Lists, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the Recovery Plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We provide both downlisting and delisting criteria for the western lily, which will supersede those included in *Final Recovery Plan for the Endangered Western Lily* (*Lilium occidentale*), as follows:

### **Downlisting Recovery Criteria**

The western lily can be considered for downlisting to threatened when at least 20 viable populations are protected and managed to assure their continued existence. The 20 populations should be distributed among six recovery areas, with at least three in Area 1, five in Area 2, and four each in Areas 4, 5, and 6. For the purposes of this Recovery Plan, a viable population includes at least 1,000 flowering plants, and a population structure indicating stable or increasing plant numbers. Populations may consist of multiple, geographically proximal locations, which allows smaller sites to be combined to achieve the 1,000 flowering plants criterion.

These criteria remain the same as detailed in the existing Recovery Plan. However, the number of recovery populations specified per recovery zone was not stated in the “Recovery Criteria” section on page iii of the Recovery Plan, but were detailed in the “Criteria for reclassification to threatened status” section on page 21. These specifications are now included in the downlisting criteria for clarity.

### **Delisting Recovery Criteria**

The western lily should be considered for delisting when the criteria for downlisting are fulfilled, with the following additions:

1. Trends at each of the 20 populations are determined to be stable or increasing for a minimum of 25 years. Trend determination will be based on the number of flowering (reproductive) individuals present.

Justification: We carried forward the same number of populations required for downlisting (n=20), as well as the requirement for each recovery population to have 1,000 flowering individuals in order to conserve the majority of the remaining genetic diversity. A population of 1,000 flowering individuals is presumed to be resistant to deleterious mutations as well as browsing pressures by deer (Lynch et al. 1995; Service 1998). Furthermore, to conserve the genetic diversity, as well as provide redundancy among recovery areas, these populations should be distributed among recovery areas similar to the historical distribution of western lily populations. A threshold value of 25 years is biologically informed by the reported lifespan of individual lilies as well as representing the duration for which, on average, two cycles of early-successional habitat maintaining activities (e.g., prevention or reversal of encroachment by trees and shrubs) would occur (Kline 1984; D. Imper pers. comm.). This time period allows the Service to evaluate trends over one full generation of this long-lived perennial plant and to account for changes in habitat in a dynamic system. Plants may take 4-5 years to flower for the first time (Schultz 1989), and in ideal conditions may live past 25 years (Kline 1984). Thus, we determined that delisting will require stable or positive trends for at least 25 years (i.e., approximate lifetime of one generation). Additionally, this information informed our determination that post-delisting monitoring should occur for at least 12 years (i.e., approximately one-half of a generation and one cycle of early-successional habitat maintenance). In the original Recovery Plan, downlisting criteria stated that there should be at least 20 viable populations in order to consider downlisting to threatened. We carried this forward to the downlisting criteria because it adequately and directly addresses the need for redundancy for the species. These trends will be determined using a standardized methodology across all sites, which will primarily focus on reproductive plant inventories. Additionally, complete population censuses are periodically needed to fully demonstrate stable or increasing trends in response to the repeated phases of habitat manipulation required by this early successional species.

2. A minimum of 20 viable populations are appropriately managed through long-term landowner agreements (e.g., stewardship plans, easements, or memorandums of agreement), which identify maintenance of *Lilium occidentale* habitat as a primary management objective for the site or permanent conservation easement/covenant that commits both present and future landowners to the conservation of the species.

Justification: Western lily is a long-lived perennial plant that requires early-successional habitat to successfully reproduce (Service 1998). Anthropogenic influence has altered natural disturbance regimes that maintained suitable habitat conditions for western lily (Service 1998). Therefore, protection of western lily habitat alone is not sufficient to ensure recovery. In the absence of natural disturbance regimes, active management to maintain habitats in an early-successional state through intermediate disturbance is necessary for western lily populations to reproduce. The need for such agreements, plans, easements, or memoranda of agreement is supported by the habitat needs of the species. Without the commitment to and

implementation of this management, western lily habitat is expected to degrade and become unsuitable for lily reproduction.

3. A monitoring plan to cover a minimum of 12 years post-delisting of *Lilium occidentale* has been approved by the Pacific Southwest Regional Director and is ready to be implemented at the time of delisting to ensure the ongoing conservation of the species and the continuing effectiveness of management actions.

Justification: A threshold value of 12 years is a biologically-informed threshold because it is one-half the lifespan of individual lilies and accounts for approximately one cycle of early-succession habitat maintenance (Kline 1984; D. Imper pers. comm.). This provides monitoring efforts for one-half of a generation of this long-lived perennial plant, which will allow the Service to detect slowly declining population growth rates.

### **Rationale for Amended Recovery Criteria**

Providing delisting criteria guides the path to recovery for listed species. These amended criteria fit within the current context of the Recovery Plan as they expand upon existing downlisting criteria and reinforce the needs of western lily as detailed in the Recovery Plan. Together, these newly detailed delisting recovery criteria address Factors A–E of the Service’s Five-Factor Analysis Framework. Factor A will be addressed because the Service and its partners will be able to assess the success of habitat management for western lily on biologically relevant time-scales. The criteria will also address Factor A by including management of habitat in perpetuity. Factor B will be addressed because the protection of western lily habitat will curtail attempts to collect the plants, as well as provide a permitting pathway for scientific studies. Factor C will be addressed through management practices that exclude or discourage floral predation by browsing deer. Factor D is addressed through inclusion of conservation agreements, which will afford the western lily protection on private lands. This is relevant because Oregon populations currently are not protected at the State level or Federal level on private lands. The Service defines Factor E as “Other Natural or Manmade Factors Affecting (western lily’s) continued existence.” In the 2009 status review, the three threats identified under Factor E included non-native plants, small population size, and climate change. The newly detailed delisting criteria would address Factor E through implementation of management agreements that will remove non-native plants, which compete with western lily, as well as manage sites to connect small populations, where practicable.

When practicable, habitat restoration activities should seek to facilitate genetic exchange between populations that are in close geographic proximity. This increases the likelihood of populations withstanding stochastic disturbance events that exceed the disturbance tolerance of the species. In addition, by protecting and managing populations throughout the range of the species, these recovery criteria address the need for representation of the species in multiple habitat types and along a latitudinal gradient. Representation of the species within different habitat types and latitudinal gradients will increase the likelihood of some populations withstanding changing environmental conditions, as well as preserving genetic diversity across the populations.

## LITERATURE CITED

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(Service) U.S. Fish and Wildlife Service. 1998. Recovery Plan for the Endangered Western lily (*Lilium occidentale*). Portland, Oregon. 82 pp.

(Service) U.S. Fish and Wildlife Service. 2009. *Lilium occidentale* (Western lily) 5 Year Review: Summary and Evaluation. Sacramento, California. 49 pp.

## PERSONAL COMMUNICATIONS

Imper, D. 2019. Personal communication via email dated 23 September 2019.

## **APPENDIX A – SUMMARY OF PUBLIC, PARTNER, AND PEER REVIEW COMMENTS RECEIVED**

### **Summary of Public Comments**

We published a notice of availability in the *Federal Register* on August 6, 2019 (84 FR 151) to announce that the draft recovery plan revision was available for public review, and to solicit comments by the scientific community, State and Federal agencies, Tribal governments, and other interested parties on the general information base, assumptions, and conclusions presented in the draft revision. An electronic version of the draft amendment was posted on the Service's Species Profile website

([https://ecos.fws.gov/docs/recovery\\_plan/Draft%20Amendment%20to%20Western%20lily%20Recovery%20Plan.pdf](https://ecos.fws.gov/docs/recovery_plan/Draft%20Amendment%20to%20Western%20lily%20Recovery%20Plan.pdf)). We also developed and implemented an outreach plan that included (1) publishing a news release on our national webpage (<https://www.fws.gov/news/>) on August 5, 2019, (2) sending specific notifications to Congressional contacts in California's 2<sup>nd</sup> congressional district and in Oregon's 4<sup>th</sup> congressional district, and (3) sending specific notifications to key stakeholders in conservation and recovery efforts. These outreach efforts were conducted in advance of the *Federal Register* publication to ensure that we provided adequate notification to all potentially interested audiences of the opportunity to review and comment on the draft amendment.

We did not receive any comments in response to our request.

### **Summary of Peer Review Comments**

We solicited independent peer review between the draft and final amendment in accordance with the requirements of the Act, including local and federal agencies. Criteria used for selecting peer reviewers included their demonstrated expertise and specialized knowledge related to the management of the western lily and its habitat. The qualifications of the peer reviewers are in the decision file and the administrative record for this recovery plan amendment.

In total, we solicited review and comment from three peer reviewers. We received substantive comments from two peer reviewers and a response that included no suggested changes from the third peer reviewer. In general, the draft recovery plan amendment was well received by the peer reviewers and garnered positive comments. Two reviewers provided additional specific information, including documents or citations; we thank the reviewers for these data and we have added the information where appropriate.

We considered all substantive comments, and to the extent appropriate, we incorporated the applicable information or suggested changes into the final recovery plan amendment. Below, we provide a summary of specific comments received from peer reviewers with our responses; however, we addressed many of the reviewers' specific critiques and incorporated their suggestions as changes to the final recovery plan amendment. Such comments did not warrant explicit response, and as such, are not addressed here. We appreciate the input from all commenters, which helped us to consider and incorporate the best available scientific and commercial information during development and approval of the final recovery plan amendment.

## Peer Review

*Peer Review Comment (1).* Commenter detailed information regarding spatial correlation between Native American villages and western lily populations in present-day Oregon. Commenter suggested that the burning activities by Native Americans surrounding these villages might have encouraged the early successional habitat upon which western lily depends. The commenter suggested that the Service discuss this correlation with the Wiyot Tribe and explore burning as an option for habitat treatment.

*Response.* We appreciate this useful suggestion and will consider it when collaborating on restoration events in the future. This suggestion does not suggest any edits to the recovery criteria.

*Peer Review Comment (2).* Commenter expressed concerns with the estimate of the time required for plants to reach reproductive status.

*Response.* Schultz (1989) provides the best available science on these data and therefore this language is retained, but with an additional mention that that under suboptimal conditions plants may take much longer to flower.

*Peer Review Comment (3).* Commenter suggested that monitoring be conducted annually at all populations for at least 25 years until delisting and then every five years post-delisting in perpetuity.

*Response.* Annual monitoring of all populations for 25 is currently not feasible given the workload, limited resources of the Service, and the limited time during which the populations are in flower. The 12 years of post-delisting monitoring is seven more years than the 5 years that is the Service's standard for post-delisting monitoring. These 12 years would follow 25 years of stable to increasing population trends for all the populations, which we believe would be sufficient to document any declines in populations.

*Peer Review Comment (4).* Commenter requested clarification on the meaning of "inventory of each flowering plant" in regards to monitoring.

*Response.* "Inventory of each flowering plant" means that we would count each plant with flowers or reproductive structures. Each plant would count towards the 1,000 flowering plants that each population would need for recovery. It does not mean following the fate of individual plants.

*Peer Review Comment (5).* Commenter mentioned that the long-term nature of any agreements for privately-owned land must be such that they survive changes in ownership.

*Response.* This is specifically addressed in the following language taken from the revision: "objective for the site or permanent conservation easement/covenant that commits both present and future landowners to the conservation of *Lilium occidentale*."

*Peer Review Comment (6).* Commenter suggests that the phrase “proximal locations” needs to be defined in such a way as to indicate cross pollination among sub-populations is explicitly taken into consideration and alternatively suggests manual cross-pollination be specified among the sub-populations.

*Response.* We agree, this would be useful, however it would require substantial study and analysis to determine which populations are true sub-populations when this information can be inferred using geographical proximity. We are hesitant to be proscriptive by suggesting manual cross-pollination in the absence of information of how the populations are currently exchanging genetic material.

*Peer Review Comment (7).* Commenter expressed concern with the estimated life span of western lily.

*Response.* The literature provides little in the way of estimates for the life span of western lily, however Kline (1984) does provide such an estimate and is the best available science and therefore is retained in the document.

*Peer Review Comment (8).* Through examples of past actions, the commenter elucidated the need to have legally-binding, long-term landowner agreements to ensure habitat is maintained for western lily.

*Response.* We incorporated language which reflects the need for legally-binding, long-term landowner agreements to ensure habitat is maintained for western lily.