5-Year Review: Summary and Evaluation

Barton Springs Salamander *(Eurycea sosorum)*
Current Classification: Endangered

U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
Austin, Texas

1.0 GENERAL INFORMATION

1.1 Reviewer: Paige Najvar, Austin Ecological Services Field Office

Lead Regional or Headquarters Office: Region 2, Wendy Brown (505) 248-6664

Lead Field Office: Austin Ecological Services Field Office (505) 490-0057

Cooperating Field Office(s): Not Applicable

Cooperating Regional Office(s): Not Applicable

1.2 Methodology used to complete the review: The U.S. Fish and Wildlife Service (Service) conducts status reviews of species on the List of Endangered and Threatened Wildlife and Plants (50 CFR 17.12) as required by section 4(c)(2)(A) of the Endangered Species Act (Act) (16 U.S.C. 1531 *et seq.*). This status review was conducted during the development of the Barton Springs Salamander Recovery Plan, which was finalized on September 21, 2005. The development of the recovery plan began before 2000 and involved extensive participation of the Barton Springs Salamander Recovery Team. The recovery team members represent a variety of technical and stakeholder expertise pertinent to the species and its habitat. The information contained in the recovery plan comprises the best available information regarding the species and threats to it. This information was gathered from a variety of sources, including State and Federal agencies, universities, local municipalities, and the recovery team.

A notice announcing the initiation of the 5-year review process was published in the Federal Register on January 25, 2005, concurrent with the notice announcing the availability of the draft recovery plan (70 FR 3548). Over 100 postcards announcing the availability of the draft recovery plan and the initiation of the 5-year status review were mailed to interested parties. We asked the public to submit scientific and commercial information on the Barton Springs salamander that has become available since its original listing as a federally endangered species in 1997.

In addition to making the draft recovery plan available for public review and comment, we asked 10 individuals to serve as peer reviewers. Depending on their expertise, peer reviewers were asked to review and comment on: (1) issues and assumptions relating to the biological or hydrological information in the plan's Background section; (2) scientific data regarding the proposed recovery activities in the Recovery Criteria and Recovery Action Outline sections; and (3) technical feasibility of the proposed recovery activities

in the Recovery Criteria and Recovery Action Outline sections. The qualifications of the peer reviewers are documented in the administrative record for this plan. Three peer reviewers provided comments, which were incorporated into the final version of the recovery plan.

We requested that all new information pertinent to the draft recovery plan or 5-year review be received in the Austin Ecological Services Office no later than March 28, 2005. Although no new information was provided, we received a number of comments on the draft recovery plan from various interested parties that related to the threats analysis; recovery strategy, criteria, and recovery actions; implementation schedule and priorities; miscellaneous technical comments; and other general comments. These comments were incorporated as appropriate. A detailed summary of the comments and our responses can be found in Appendix C of the Barton Springs Salamander Recovery Plan.

1.3 Background: The Barton Springs salamander is a strictly aquatic, neotenic species that depends on a continual supply of quality springflows from the Barton Springs Segment of the Edwards Aquifer for its survival. This species is only known to occur at four spring outlets (collectively known as Barton Springs) within the City of Austin's Zilker Park in Travis County, Texas.

1.4 FR Notice citation announcing initiation of this review: 70 FR 3548-3550 (January 25, 2005).

1.5 Original Listing and Associated Actions: The Barton Springs salamander was listed as an endangered species on May 30, 1997 (62 FR 23377). Critical habitat has not been designated.

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) Policy:
Not Applicable

2.2 Review Summary: The Barton Springs Salamander Recovery Plan contains the best available information about the species' status including biology, habitat, threats, and conservation and management efforts. The plan also contains a complete 5-factor analysis of threats to the species, based on the 5 listing factors in section 4(b) of the Act:

(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms;
(E) other natural or manmade factors affecting its continued existence.

The primary threats or reasons for listing the Barton Springs salamander were "the degradation of the quality and quantity of water that feeds Barton Springs" as a result of urban expansion over the watershed (62 FR 23377). The species' restricted range makes

it vulnerable to both acute and chronic groundwater contamination. The salamander is also vulnerable to catastrophic hazardous materials spills, increased water withdrawals from the Edwards Aquifer, and impacts to the surface habitat. Results of the 5 factor analysis and status review indicate that the salamander continues to be faced with these threats and the possibility of extinction throughout its range.

The recovery plan outlines six recovery objectives that address threats to the species associated with the pertinent listing factors. Downlisting and delisting criteria are provided to measure how recovery efforts for the salamander can meet these objectives. Three of the downlisting criteria (Downlisting Criteria 3(b), 4(a), and 5) have been partially achieved. Only one delisting criterion has been partially achieved (Delisting Criterion 5(a)). None of the downlisting or delisting criteria have been fully achieved.

Objective 1 - Protect water quality (Listing Factors A, D, E).

Downlisting Criterion 1 - Mechanisms (such as laws, rules, regulations, and cooperative agreements) are in place to protect and, when necessary, improve water quality (including sediment quality) in the Barton Springs watershed to ensure the long-term survival of self-sustaining populations of the Barton Springs salamander in its natural environment.

Delisting Criterion 1(a) - The mechanisms to protect water quality at Barton Springs are shown to be effective.

Delisting Criterion 1(b) - Commitments are in place to ensure the continued, long-term protection of water quality at Barton Springs at a level that provides for the long-term conservation of the Barton Springs salamander.

Objective 2 - Prevent or contain catastrophic spills (Listing Factors A, E).

Downlisting Criterion 2 - A comprehensive hazardous material spills plan for the Barton Springs watershed is developed and implemented with measures to avoid or completely contain catastrophic spills.

Delisting Criterion 2(a) - Evaluation of the hazardous spills plan shows it to be effective in minimizing risks to the Barton Springs salamander to an insignificant level.

Delisting Criterion 2(b) - Long-term commitments to implement the hazardous materials spills plan are in place.

Objective 3 - Protect water quantity (Listing Factors A, D, E).

Downlisting Criterion 3(a) - Develop and implement an Aquifer Management Plan that ensures natural springflows at Barton Springs outlets (Main Springs, Eliza Springs, Sunken Garden Springs, and Upper Barton Springs). Springflows are continuous at Main Springs, Eliza Springs, and Sunken Gardens Springs even in severe drought. During drought, flows do

not fall below the historic low flow of 10 cfs, as measured at the USGS monitoring well that measures flow from all four sites combined.

Downlisting Criterion 3(b) - The Barton Springs Pool is managed in a way that springs remain flowing as described in the City of Austin's HCP (City of Austin 1998b), which means that the pool will not be lowered for cleaning should the flow fall below 54 cfs.

Delisting Criterion 3(a) - Measures to ensure natural springflows at the four spring outlets and continuous springflows at Main Springs, Eliza Springs, and Sunken Garden Springs are shown to be effective.

Delisting Criterion 3(b) - Long-term commitments are in place to maintain these measures.

Objective 4 - Maintain healthy, self sustaining salamander population levels throughout the Barton Springs ecosystem (Listing Factors A, E)

Downlisting Criterion 4(a) - Barton Springs salamanders appear to be thriving in their natural environment, as indicated by their presence and condition based on annual survey information.

Downlisting Criterion 4(b) - Population Viability Analyses (using information from mark-recapture studies) show that reproduction is adequate to sustain a stable or increasing population. Until such analyses are completed, the criteria should be that salamanders less than 1-inch (25 mm) in total length should comprise at least 50 percent of the total number of salamanders observed each year.

Delisting Criterion 4 - Survey data indicate the Barton Springs salamander population is stable or increasing and expected (with a probability of at least 95 percent) to be viable for 100 years. This determination should be based on threat assessments and salamander survey data. The data should cover an adequate time span and include appropriate demographic parameters to assess long-term viability.

Objective 5 - Manage surface habitat to adequately reduce local threats to the Barton Springs ecosystem (Listing Factors A,D).

Downlisting Criterion 5 - Surface habitat management is met by the ongoing implementation and completion of the actions detailed within the City of Austin's HCP (see Section 1.7, Conservation Measures).

Delisting Criterion 5(a) - Long-term monitoring shows that the measures outlined in the HCP have been effective.

Delisting Criterion 5(b) - Long-term commitments are in place to maintain the measures outlined in the HCP.

Objective 6 - Establish and maintain captive population(s) to ensure protection from extinction (Listing Factors A, E).

Downlisting Criterion 6(a) - A CPCP is developed and implemented.

Downlisting Criterion 6(b) – Establish an adequate number of captive Barton Springs salamanders in secure locations. This criterion should be refined through further studies to determine the adequate size and genetic structure of captive populations. At the present, establishment of two captive populations is deemed adequate, but this may change based on future information. Number of populations, size, and structure should be outlined during the development of the CPCP.

Delisting Criterion 6(a) - Adequate captive populations have been assembled and maintained following the recommendations provided in the CPCP.

Delisting Criterion 6(b) - Captive breeding and reintroduction techniques are shown to be successful and reliable.

Delisting Criterion 6(c) - Commitments are in place to maintain adequate captive populations for any needed salamander restoration work

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__x__ No change is needed

3.2 New Recovery Priority Number: Recovery Priority is a Service ranking system published in the Federal Register on September 21, 1983 (48 FR 43098-43105). The system is based on the degree of threat to the listed entity, the potential for recovery, and the taxonomic status of the listed entity. Priority numbers range from 1 to 18 based on determinations of "high," "medium," or "low" for these factors.

The Barton Springs salamander has a recovery priority of 2c, which indicates a species at high risk of extinction, with a high recovery potential, in some conflict with economic development. No change in recovery priority number is recommended based on the status review.

Brief Rationale: None of the downlisting or delisting criteria presented in the Barton Springs Salamander Recovery Plan that was completed in September of 2005 has been fully achieved. Also, urban expansion continues to occur within the contributing and recharge zones of the Barton Springs Segment of the Edwards Aquifer. As a result of this, it is probable that the threats to the continual, quality springflow necessary for the salamander's survival are increasing. Because this species continues to be in danger of extinction throughout all of its small range, we recommend no change in the classification of this species.

3.3 Listing and Reclassification Priority Number: Reclassification is not recommended.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Corresponding recovery action numbers, as presented in the Barton Springs Salamander Recovery Plan, are presented after each recommendation.

Information is still needed to refine several of the recovery plan's downlisting and delisting criteria before they can be met. Specifically, the following actions should be conducted to refine Downlisting Criterion 1: (1) determine if previously documented levels of water quality constituents may be directly or indirectly detrimental to the Barton Springs salamander (action 1.2.6) and (2) determine which water quality constituents may negatively affect the salamander and the levels (concentrations, durations, and combinations of these) that effects may occur (action 1.2.6). Downlisting Criterion 2 should be refined by developing a methodology for assessing risk of harm to the salamander from contaminants spills (action 1.1.2). Also, the implementation of Downlisting Criterion 6 (a) requires further studies to determine the adequate size and genetic structure of captive populations of the salamander (action 5.1).

In addition to the information that still needs to be collected to refine the downlisting and delisting criteria, we consider a number of recovery actions to be high priorities and should be conducted before the next 5-year status review. The actions below do not represent all of the actions we believe are necessary to recover the species, but only those we believe are the highest priority between now and the next 5-year review.

(1) Current mechanisms (laws, regulations, and cooperative agreements) that are in place to protect and enhance water quality in the Barton Springs Segment of the Edwards Aquifer to ensure the long-term survival of the Barton Springs salamander should be evaluated (action 1.2.1). Before the efficacy of existing water quality protection mechanisms can be assessed, a number of other actions should first be accomplished. First, baseflow, stormwater, biological, (action 1.2.3.3) and sediment quality (action 1.2.3.1) data should be collected throughout the Barton Springs watershed. A comprehensive water quality database should then be established to house data from sites within the Barton Springs watershed that can be analyzed to evaluate water quality conditions and monitor effectiveness of existing protection measures (action 1.2.2). Measures such as best management practices (action 1.2.4.1), pollution mitigation programs (action

1.2.4.2), buffer zones (action 1.2.4.3), impervious cover restrictions (action 1.2.4.6), and land preservation (action 1.2.7) should be evaluated for their effectiveness and incorporated in regional plans to protect water quality throughout the Barton Springs watershed (action 1.2.1).

(2) A comprehensive hazardous materials spills plan for the entire Barton Springs watershed should be finalized, implemented, and monitored for effectiveness (action 1.1.4). To put this plan in place, all stream crossings, major recharge features, and potential sources of catastrophic spills should be identified and mapped (action 1.1.1). Also, a database to track potential sources of spills that occur in the Barton Springs watershed should be developed (action 1.1.2).

(3) An Aquifer Management Plan to ensure natural springflows at Barton Springs (action 2.2.1) should be developed, implemented, and monitored for effectiveness. To achieve this, watershed models should be developed to predict the effects of development and groundwater pumping (action 2.1.2). Also, the effects of various flow levels, especially low flows on the salamander and the spring ecosystem, should be investigated (action 4.1.4).

(4) Surface habitat management actions detailed within the City of Austin's HCP should be completed or continued (action 3.4).

(5) A captive propagation and contingency plan should be developed (action 5.1) and an adequate captive breeding program for the Barton Springs salamander should be established in at least two locations (action 5.3). Dependable techniques for controlled captive breeding should be developed to ensure the success of the captive breeding program (action 5.2).

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of the Barton Springs Salamander

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__x__ No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable_____

Review Conducted By: Austin, Texas Ecological Services Field Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 9/13/06

REGIONAL OFFICE APPROVAL:

Lead Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve _____ Date 10/05/06
ACTING