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Public Comments Processing
Attn: FWS-R2-ES-2008-0114
Division of Policy and Directives Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, Suite 222
Arlington, VA 22203

Re: Comments on the 90-Day Finding on a Petition to Delist the Sacramento Mountains Thistle (*Cirsium vinaceum*) (Federal Register: November 6, 2008 (Volume 73, Number 216)).

Greetings:

Please accept these comments submitted on behalf of The Center for Biological Diversity on the U.S. Fish and Wildlife Service's ("FWS") 90-day petition finding and initiation of status review for the Sacramento Mountains Thistle (*Cirsium vinaceum*) ("the Thistle" or "CIVI") (Federal Register: November 6, 2008 (Volume 73, Number 216)).

Based upon the best available scientific information, delisting of the Sacramento Mountains Thistle is not warranted because: 1) an increase in the number of known plants does not represent species recovery, 2) recovery criteria have not been met, 3) threats to the species have not been alleviated, and 4) threats would be magnified were the species to be delisted. *Cirsium vinaceum* continues to need the effective protection of the Endangered Species Act to ensure its survival.

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I. Delisting of *Cirsium vinaceum* is not warranted because an increase in the number of known plants does not represent species recovery.

The petitioner states that the species should be considered recovered because of the increase in the number of known plants and locations, but this position is not scientifically justifiable. First, the increase in the number of known locations is likely more attributable to increased survey effort than to recovery or range expansion, as acknowledged by FWS in the 90-day finding. Second, an increase in the number of individual plants, while encouraging, doesn't ensure thistle survival for several reasons: a) the number of locations and their distribution is more relevant to species conservation than the number of plants; b) thistle numbers fluctuate from year to year, and a year with high population numbers could be followed by a year with low numbers due to water availability and other factors (Barker and Garcia 2003, FWS 2005); c) the range of genetic diversity might not be represented by a handful of locations where the plant is abundant; d) the Thistle is predominantly a vegetative reproducer which means it is difficult to define a genetic individual; e) fragmented plant populations are at increased risk of extinction (Lennartsson 2002); f) because of the narrow range of the species, stochastic genetic or environmental events could lead to extirpation regardless of plant number; g) different methods employed across time could influence survey results. For these reasons, an increase in the number of plants does not represent species recovery and does not warrant delisting.

II. Delisting of *Cirsium vinaceum* is not warranted because Recovery Criteria have not been met.

Under the ESA, delisting may be warranted as a result of: (1) extinction, (2) recovery, and/or (3) a determination that the original data used for classification of the species as endangered or threatened were in error. None of these conditions are applicable to the Sacramento Mountains Thistle. Recovery Criteria have not been met, and delisting is thus not warranted.

Specifically, the Recovery Criteria for *Cirsium vinaceum* are:

1. Acquire water rights specifically for the maintenance of travertine spring habitats at a minimum of 30 percent of the occupied spring localities, including at least 1 occupied spring locality in each of the 20 known canyons of occurrence.
2. Develop habitat management plans to alleviate threats to the species and ensure permanent protection of at least 75 percent of the known occupied habitats according to steps outlined in the plans. Sites should include both core populations at springs as well as other occupied riparian habitats. Unoccupied stream habitat downstream of occupied springs should be protected for future colonization by the thistle.
3. Establish a 10-year monitoring and research program to demonstrate the effectiveness of management implemented under the plans (Sivinski and Lightfoot 1993).

A. The first recovery criterion has not been met.

Water rights have not been acquired specifically for the maintenance of a minimum of 30 percent of the occupied spring localities, including at least one occupied spring locality in each of the 20 known canyons of occurrence. The State of New Mexico enacted in-stream flow legislation in 2005, amended in 2007, that establishes a water reserve based on donation, purchase or lease from willing sellers for the benefit of species conservation (N.M. Stat. Ann. Sec. 72-14-3.33). This statute could provide a mechanism to protect the Sacramento Mountains Thistle in lower drainage habitats *if* a strategic water reserve were to be created. This legislation does not satisfy the first delisting criterion for several reasons. First, it only protects lower drainage habitats, second, a strategic water reserve has *not* been created for the thistle, and third, water rights have not been acquired to satisfy either the 30 percent objective or for at least one known locality in each canyon of occurrence. FWS acknowledges this in the 90-day finding:

“The legislation does not prevent the diversion of water from isolated montane wetlands or headwater springs where *C. vinaceum* also occurs, and does not directly establish a strategic water reserve for the thistle” (FWS 2008, p. 66007).

B. The second recovery criterion has not been met.

Habitat management plans that alleviate threats to the species have not been developed, and permanent protection of 75 percent of known occupied habitats has not been assured.

The Forest Service has not developed a comprehensive habitat management plan to protect the Thistle. The Thistle occurs in Lincoln National Forest management areas where the primary emphasis is recreation, wildlife habitat, and timber management (FWS 2005, p. 699). The Lincoln National Forest Land and Resource Management Plan (LRMP) does not satisfy this recovery criterion because it not only fails to alleviate threats to the species, but nearly 17 percent of the applicable Standards and Guidelines cause mortality of Thistle plants (FWS 2005, p. 701). Further, the Standards and Guidelines that afford the Thistle some protection from habitat destruction, grazing, and other threats are only applicable because of the Thistle’s status as a listed species, and these protections would be lost were the species to be delisted. FWS (2005) has acknowledged that the LRMP does not adequately protect the Thistle:

“FWS anticipates adverse effects to the Sacramento Mountains Thistle are reasonably certain to occur under the direction of the Lincoln National Forest Land and Resource Management Plan and 1996 Regional Amendment” (FWS 2005, p. 705).

Nor can the Sacramento Grazing Allotment Management Plan (AMP) be considered adequate to satisfy this recovery criterion, for several reasons: 1) the rangeland assessment criteria are not necessarily applicable to the Thistle, Thistle monitoring has been neglected, and habitat has been overgrazed; 2) the provisions in the AMP to protect

the Thistle, such as exclosures and seasonal closures, have been documented to have been disregarded by grazing permittees; 3) existing exclosures do not protect all or even 75% of Thistle locations; 4) the FS has acknowledged that grazing guidance criteria are inadequate to protect the species.

1. The rangeland assessment criteria are not necessarily applicable for the Thistle, Thistle monitoring has been neglected, and habitat has been overgrazed.

The FS has set criteria for rangeland assessment and acceptable forage use levels on the grazing allotment. The species which are assessed, however, such as Kentucky Bluegrass (*Poa pratensis*), are not necessarily representative of use levels on *C. vinaceum*. The Forest Service has stated that use levels on other forage species have been determined to have little or no obvious relationship to herbivory on CIVI (Barker and Garcia 2003, p. 43). Although the Annual Operating Instructions (AOI) specify that *C. vinaceum* use levels are to be monitored, this monitoring has been neglected. Monitoring of *C. vinaceum* as a key monitoring species was not conducted in 2001 or 2002 (Barker and Garcia 2003, p. 4, 5). The Forest Service 2003 Biological Assessment states:

“The Annual Operating Instructions for each year from 2000 to 2003 state that monitoring of use levels on CIVI is critical. No data has been recorded regarding use levels on CIVI” (Barker and Garcia 2003, p. 43).

In years when monitoring of CIVI was conducted, it was found that all or the majority of accessible Thistle sites were impacted by livestock grazing:

“Within one month of cattle entering a pasture, at least 75 percent and up to 100 percent of the thistle sites visited were found to have been impacted during every monitoring season. This indicates that the thistle is a forage plant of some value to cattle. After entry into the South Pasture in August 1993, and in spite of widely available forage, herbivory by livestock was detected at 100 percent of sites accessible to livestock” (FWS 2004, p. 39).

Despite the existence of forage-use criteria, it is known that overgrazing occurs on the Sacramento Allotment. The 2003 Biological Assessment for the allotment describes the forage use as “extreme” (Barker and Garcia, p. 5). Barker and Garcia (2003) state:

“In 2001 and 2002 over 50% of the key areas (for rangeland assessment) had leaf lengths at the end of the grazing season that exceeded threshold levels (threshold leaf length is the point at which individual plants suffer damage and possible mortality), likely resulting in resource damage” (p. 5).

In 2002, “Forage use levels did not meet standards in either the North or South Pastures” (Barker and Garcia 2003, p. 4). In 2003 it was known that minimum residual levels would be exceeded in an area if cows were allowed to stay until the scheduled date, and the permittee was told to remove all cattle. However, when the area was inspected, some cattle were still present (Barker and Garcia 2003, p. 5).

The impacts of overgrazing are magnified by drought conditions. Barker and Garcia (2003) state, “The continued drought conditions combined with heavy use has resulted in a dramatic decline in annual forage production over the past 4 years” (Barker and Garcia, p. 4).

2. Provisions in the AMP to protect the Thistle, such as exclosures and seasonal closures, have been disregarded by grazing permittees.

The petitioner asserts that the use of exclosures, herding efforts, and natural inaccessibility collectively have satisfied the second recovery criterion. Exclosures, herding efforts, and natural inaccessibility, while beneficial to the species, do not constitute or substitute for a comprehensive habitat management plan to protect the species. Further, exclosures currently protect only roughly half of occupied habitat, as stated in the 90-day finding, and plans for future exclosures cannot be used to satisfy this criterion (FWS 2008).

In relying on exclosures to protect the Thistle, FWS assumes that exclosures effectively keep cattle out of exclosed areas (FWS 2004, p. 12), but this assumption has not been supported. In fact, exclosures intended to protect the Thistle have illegally been used to hold livestock on more than one occasion. In 2001, livestock were held for a number of days in October in the grazing exclosure containing *C. vinaceum* in the upper Rio Penasco (Barker and Garcia 2003, p. 4). Cattle were present in that exclosure again in the fall of 2002 and in the spring of 2003 (Ibid., p. 43). In the spring of 2003 a letter was issued to the permittee stating, “Please be sure that no cattle are allowed inside these areas.” The permittee disregarded the letter and livestock were present in the exclosure again the following month (Barker and Garcia 2003, p. 6). The impacts on the Thistle of using the exclosures to hold cattle are likely severe. FWS (2004) states:

“Thistles located in livestock traps are likely to face the most severe impacts. Traps will concentrate livestock for short periods of time. During that time utilization levels will be severe and impacts to thistles through herbivory and trampling are likely to increase correspondingly” (p. 62).

The permittee’s illegal use of the exclosure intended to protect the Thistle to hold cattle is even more egregious because the exclosure is not even part of the grazing allotment (Ibid., p. 43). In the fall of 2002, cattle were also present in the Sacramento Lake exclosure because the gates had been opened (Ibid., p. 5). Exclosures are not necessarily effective for the protection of *C. vinaceum* because they have been blatantly and repeatedly violated by the permittee, some fences are known to be ineffective, and it is difficult to keep the fences intact (Ibid., p. 40, 42). Were the Thistle to be delisted, it is highly unlikely that exclosure fencing would be maintained.

In addition to overgrazing and blatant violation of exclosure boundaries, the permittee has also violated seasonal closures. In 2000, the permittee was ordered to remove cattle from an area, and this order was disregarded. Barker and Garcia (2003) state:

“An August 2, 2000 certified letter to the permit holder directed that 98 head of cattle be removed immediately for the remainder of the summer season. This removal of 98 head was not carried out by the permittee” (p. 3).

The Biological Assessment (2003) documents the repeated presence of cattle in certain areas before the areas were officially open: “Early entry has occurred to some extent each spring during the on-going consultation period” (p. 43). In 2002 and 2003 cattle were found on the summer range prior to the allowed date (Barker and Garcia 2003, p. 5). Early entry of livestock onto summer range has the potential to create increased impacts on Thistle seedlings and small rosettes (Barker and Garcia 2003, p. 43).

Not only are the provisions of the AMP insufficient to protect the Thistle, but the permittee has repeatedly disregarded those provisions.

3. Existing exclosures do not protect all or even 75% of Thistle locations.

The second recovery criterion specifies that at least 75% of known occupied habitats are to be permanently protected before the species can be considered to be recovered, and FWS acknowledges that this is not the case. The 90-day finding states:

“[T]he information presented by the petitioner does *not* indicate that protection of 75 percent of known occupied habitat has been achieved” (FWS 2008, p. 66007, emphasis added).

Given the history of blatant and repeated exclosure violations by the permittee, it is doubtful that without enforcement and maintenance, even existing exclosures can be considered as permanent habitat protection.

It is important to note that this recovery criterion calls for the protection of 75% of occupied habitats, and not 75% of CIVI plants. For the reasons discussed in section I (p. 2-3, above), protecting 75% of the number of plants should not be substituted for protecting 75% of occupied habitats, to ensure the preservation of genetic diversity and maximize the chance of survival in the case of stochastic genetic or environmental events.

4. The FS has acknowledged that grazing guidance criteria are inadequate to protect the species.

The 2003 Review and Resubmission of the Biological Assessment for the grazing allotment states:

“I cannot say that the grazing effects criteria needed for a “not likely to adversely affect . . . have been met . . . Based upon the 1998 Grazing Guidance Criteria for CIVI, and the analysis provided here, the updated effects finding for this species

for on-going grazing activities is ‘likely to adversely affect’” (Barker and Garcia 2003, p. 44).

For these reasons, FWS should not accept the LRMP or AMP as sufficient to satisfy the second recovery criterion.

C. The third recovery criterion has not been met.

The third recovery criterion, the establishment of a 10-year monitoring and research program to demonstrate the effectiveness of habitat management plans, has not been met.

CIVI monitoring has been conducted in some years, but monitoring funds have been repeatedly cut (Barker and Garcia 2003, p. 39). Systematic extensive monitoring of *C. vinaceum* was conducted in 1995, 1998, 2001, and 2003 (FWS 2005, p. 698). In 2003 funds to continue monitoring were reallocated to support wildlife suppression efforts (Ibid., p. 39). The Conservation Recommendations in the Biological Opinion for the Grazing Allotment (FWS 2004) include continued extensive monitoring of Thistle occurrences (p. 71), but implementation of Conservation Measures is discretionary (p. 1). Even though the Annual Operating Instructions of the grazing allotment plan state that CIVI monitoring is critical, monitoring of *C. vinaceum* as a key species was not conducted from 2000-2003 (Barker and Garcia 2003, p. 5). In the Biological Assessment for the Sacramento Grazing Allotment, Barker and Garcia (2003) state, “No data has been recorded regarding use levels on CIVI” (p. 43). The monitoring of use levels on other forage species cannot substitute for CIVI monitoring because use levels on other forage species are not obviously related to herbivory on CIVI (Barker and Garcia 2003, p. 43). In sum, although some monitoring has been conducted, a 10-year monitoring and research program has not been established, and the recovery criterion has thus not been satisfied.

Because none of the Recovery Criteria have been satisfied, delisting of the Sacramento Mountains Thistle is not justifiable.

III. Delisting of *Cirsium vinaceum* is not warranted because threats to the species have not been alleviated.

Cirsium vinaceum is still threatened by reduced water availability, livestock grazing, invasive species, recreation, and restricted range.

A. Reduced Water Availability

The threat of reduced water availability has not been alleviated since the time of listing. Although New Mexico developed legislation in 2005 that creates a water reserve for species conservation, as discussed above, no water rights have been guaranteed for the protection of the Sacramento Mountains Thistle. As an obligate wetland species, water quantity is an essential influence on the distribution, abundance, and survival of this species. The thistle is threatened by drought, altered flow due to spring trampling by livestock, wildlife, and/or humans, rerouting of underground water channels, legal and

illegal spring development and diversion, and diversion due to the development of roads or trails (FWS 2008, p. 66009). Land-use impacts, such as logging and road building, also “pose a significant threat to the thistle” because they potentially affect groundwater recharge to occupied thistle habitat (FWS 2005, p. 697).

It is known that reduced water availability decreases the abundance of this species or destroys sites entirely. Barker and Garcia (2003) state:

“Loss of available water at CIVI sites has been observed to lead to retractions of occurrence boundaries, a reduction in the numbers of individuals, and in some cases, a loss of all plants at previously occupied sites” (p. 27).

The drought that has been affecting the region since 1999 will likely be exacerbated by the effects of global climate change (Field et al. 2007). Global warming conditions are likely to reduce habitat carrying capacity for rare plants such as the Sacramento Mountains Thistle (Maschinski et al. 2006). Decreased water availability due to drought and global climate change will increase the pressure to divert water from species conservation towards human uses. The drought situation in the area is already dire; for example, treated wastewater now supplies the town of Cloudcroft following the loss of natural supplies. Were this species to be delisted, there would be no mechanisms in place to assure water availability for its continued survival.

Reduced water availability also magnifies the threat posed to the Thistle by other threats such as invasive species and livestock grazing. Invasive weeds may out-compete the Thistle under dry conditions. FWS (2005) states, “Noxious weeds have invaded thistle sites and pose a threat to continued occupancy, relative to water availability. Decreased natural water flows at travertine springs create conditions that favor introduced weeds over the thistle” (p. 697). During drought conditions the Thistle is more likely to be trampled or consumed by livestock or wildlife. Barker and Garcia (2003) state: “[W]et sites (where CIVI occurs) are subject to trampling and hoof damage, and receive especially heavy use during drought periods when both water and green forage are not readily available elsewhere” (p. 40).

B. Livestock Grazing

Although the threat of habitat degradation and destruction due to livestock grazing has been reduced since the time of listing, it has not been alleviated. Impacts of grazing on *C. vinaceum* include trampling, consumption, ground disturbance, substrate destruction, and rechanneling of water flow (FWS 2008, p. 66007). FWS (2005) has acknowledged that livestock grazing continues to threaten the thistle:

“Animal grazing within the Sacramento Mountains continues to impact thistle along valley bottoms and riparian areas. Trampling by livestock, wildlife, or humans can cause damage to travertine formations or out-flow creek beds, which alter water flow (U.S. Fish and Wildlife Service 2004). Livestock graze on the

thistle flowering stalks and the leaves of rosettes, contributing to the loss of the entire reproductive output of the plant” (p. 697).

and:

“Any grazing regime, regardless of range condition, is likely to have negative impacts to the thistle due to its palatability to livestock, trampling, and temporary habitat destruction where livestock are concentrated” (p. 702).

The vast majority of the habitat of this species falls within grazing allotments on the Lincoln National Forest. For example, 96% of all plants counted in 2001 are in the Sacramento Allotment (Barker and Garcia 2003, p. 40). As long as these allotments are active, grazing will continue to threaten this species. The petitioner states that the threat of livestock grazing has been alleviated by exclosures and the future construction of more exclosures, but this does not alleviate the threat of livestock grazing to species survival for several reasons—the permittee has blatantly and repeatedly placed livestock in exclosed and seasonally closed areas and ignored orders to remove animals from these areas, not all or even most habitats have been protected, FWS cannot rely on future activities in delisting decisions, it is unknown whether the full range of genetic diversity of the species is protected within exclosures, and without ESA protection, exclosures could be removed or left unmaintained.

C. Invasive Species

The threat posed to the Sacramento Mountains Thistle from invasive species has not been alleviated since the time of listing. FWS (2004) states, “Noxious weeds have invaded a number of thistle sites and pose a threat to its continued occupancy” (p. 36). Introduced weeds that are growing on the Lincoln National Forest, and at thistle occurrence sites include musk thistle (*Carduus natans*), teasel (*Dipsacus sylvestris*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and poison hemlock (*Conium maculatum*) (FWS 2004).

It is known that invasive teasel (*Dipsacus sylvestris*) and musk thistle negatively affect *C. vinaceum*, and that they are currently present at approximately one-third of *C. vinaceum* localities (FWS 2008, p. 66010). Huenneke and Thomson (1994) found that the growth of *C. vinaceum* was significantly reduced in the greenhouse by the presence of invasive teasel, and field experiments suggested interference between the two plants (p. 416). They state:

“There appears to be substantial potential for interference effects of teasel on the threatened *Cirsium vinaceum* . . . Direct evidence of interference in experimental studies suggests that under at least some environmental conditions teasel seedlings and rosettes may have a negative effect on the growth of similarly sized thistles. . . observations suggest that teasel may increase its representation in sites currently dominated by *Cirsium vinaceum* and that the thistle may experience

difficulty in maintaining high rates of growth and seedling recruitment once the two species are growing interspersed” (p. 423).

The 90-day finding acknowledges that competition from teasel and introduced musk thistle has had negative population effects on the Sacramento Mountains Thistle, stating:

“At the time of listing, competition with introduced teasel and musk thistle had reduced or eliminated populations of *Cirsium vinaceum* at sites where it had formerly grown or where habitat was still suitable but where invasive plant species were present (52 FR 22933, June 16, 1987)” (FWS 2008, p. 66010).

Decreased water availability is a direct threat to the thistle, as discussed above, and also creates conditions that favor introduced weeds over the thistle (Barker and Garcia 2003, p. 28, FWS 2004, p. 36).

In addition to the threats posed by invasive plants, the exotic seed head weevil (*Rhinocyllus conicus*) poses a potential threat to *C. vinaceum*. Barker and Garcia (2003) state, “The presence of the *Rhinocyllus* beetle may also affect CIVI” (p. 44). Robert Sivinski, a botanist for the New Mexico Forestry Division has documented the weevil in the Silver Springs population of *C. vinaceum* (Renee Galeano-Popp, pers. comm., 12/02/2008).

Currently populations of invasive species are being monitored, but without ESA protection, this monitoring could cease. Although the 90-day finding states that invasive species do not pose a significant threat to *C. vinaceum*, previous FWS statements (e.g. FWS 2004, p. 36, above), and the best available science do not support this assertion.

D. Recreation

Recreational activities, including occasional off-road vehicle use, pose an ongoing threat to the Sacramento Mountains Thistle (FWS 2005, p. 697). Barker and Garcia (2003) cite a 1996 field observation describing recreational impacts to the Thistle:

““Heavy traffic of hikers, campers, picnickers, dirt bikers, etc. in Water Canyon and the Rio Penasco drainage was astounding and worrisome’ over Labor Day weekend. Both foot and vehicle traffic . . . within some thistle occurrences were heavy; . . . and more trivial effects, such as the picking of flowers, were occurring constantly” (p. 39).

Recreational threats to the species are intensified because of the plant’s limited range.

E. Restricted Range and Reduced Population Size

The Sacramento Mountains Thistle is inherently vulnerable to extinction because its distribution is limited to a small area within a single mountain range. As an endemic species, threats posed to the species by habitat destruction and degradation, drought,

invasive species, and other threats are magnified. Because of its narrow range, the thistle is at higher risk of extinction due to stochastic environmental and genetic events (Matthies et al. 2004). Due to the reduced population size of the thistle, it is also more vulnerable to inbreeding depression and eroded adaptive diversity (Vilas et al. 2006). Because the overall range of the species is so constricted, a single catastrophic event could extirpate the species.

IV. Threats to *Cirsium vinaceum* would be magnified were the species to be delisted, necessitating relisting.

Without the effective protection of the Endangered Species Act, threats to the Sacramento Mountains Thistle from water development and livestock grazing would be magnified. Conservation of this species is currently taken into account during timber harvests, road building, and recreation planning, and this might not be the case were the species to be delisted. In conjunction with the threats of naturally occurring drought, magnified drought caused by global climate change, and competition with invasive species, the Sacramento Mountains Thistle would warrant relisting under the ESA were current protections to be removed. Rather than reinitiate the listing process, FWS should move forward to implement existing Recovery Criteria to ensure the survival of this species.

Thank you for considering our comments.

Sincerely,



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Literature Cited

Barker, L.M. and G.C. Garcia. 2003. Review and Resubmission of the Biological Assessment: Sacramento Grazing Allotment On-going Grazing Activities, Lincoln National Forest, Sacramento Ranger District. June 6, 2003.

Field, C.B., L.D. Mortsch., M. Brklacich, D.L. Forbes, P. Kovacs, J.A. Patz, S.W. Running and M.J. Scott. 2007. North America Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge Univ. Press, Cambridge, UK. http://www.ipccinfo.com/wg2report_north_america.php

Hueneke, L. and J. Thomson. 1994. Potential interference between a threatened endemic thistle and an invasive nonnative plant. *Conservation Biology* 9: 416-425.

Lennartsson, T. 2002. Extinction Thresholds and Disrupted Plant-Pollinator Interactions in Fragmented Plant Populations. *Ecology* 83(11):3060-3072.

Maschinski, J., J.E. Baggs, P.F. Quintana-Ascencio, and E.S. Menges. 2006. Using Population Viability Analysis to Predict the Effects of Climate Change on the Extinction Risk of an Endangered Limestone Endemic Shrub, Arizona Cliffrose. *Conservation Biology* 20(1): 218-228.

Matthies, D., I. Brauer, W. Maibom, and T. Tschardtke. 2004. Population size and the risk of local extinction: empirical evidence from rare plants. *Oikos* 105:481-488.

Sivinski, R. and K. Lightfoot. 1993. Sacramento Mountains Thistle (*Cirsium vinaceum*) Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 29 pp.

U.S. Fish and Wildlife Service (FWS). 2008. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To Delist *Cirsium vinaceum* (Sacramento Mountains Thistle). *Federal Register*: November 6, 2008 (Volume 73, Number 216).

U.S. Fish and Wildlife Service (FWS). 2005. Programmatic Biological and Conference Opinion: The Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region. Regional Office, Region 2. Cons. #2-22-03-F-366. June 10, 2005. 1010 pp.

U.S. Fish and Wildlife Service (FWS). 2004. Summary Biological Opinion on the Effects to the Mexican Spotted Owl, Sacramento Mountains Thistle, and Sacramento Mountains Prickly Poppy from the Proposal to Issue a Permit for the Sacramento Grazing Allotment, Sacramento Ranger District, Lincoln National Forest, Otero County, New Mexico. February 4, 2004. Albuquerque, N.M. Feb. 4, 2004.

Vilas, C., E. San Miguel, R. Amaro, and C. Garcia. 2006. Relative contribution of inbreeding depression and eroded adaptive diversity to extinction risk in small populations of Shore Campion. *Conservation Biology* 20(1): 229-238.