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In Reply Refer To:
AESO/SE
02-21-05-F-0710

February 5, 2007

Ms. Cindy Lester, P.E.
Chief, Arizona Section
Regulatory Branch
U.S. Army Corps of Engineers
3636 North Central Avenue, Suite 900
Phoenix, Arizona 85012-1939

RE: Bella Montaña Residential Community Development Biological Opinion,
U.S. Corps of Engineers File Number 2005-00158-DE

Dear Ms. Lester:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated July 20, 2006, and received by us on July 25, 2006. This consultation concerns the effects of the proposed Bella Montaña Residential Development, Yavapai County, Arizona, on the endangered Arizona cliffrose (*Purshia subintegra*).

This biological opinion is based on information provided in the January 2006, Biological Assessment (BA), and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the Arizona cliffrose or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

Details of the consultation history are summarized in Table 1.

Table 1. Summary of Consultation History

<i>Date</i>	<i>Event</i>
June 22, 2005	FWS staff met with the developer and environmental consultant to discuss the proposed development and potential conservation measures.
July 18, 2005	FWS staff met with the developer and environmental consultant to discuss the proposed development and potential conservation measures.
August 24, 2005	FWS staff met with the developer and environmental consultant to discuss the proposed development and potential conservation measures.
June – October, 2005	We exchanged multiple electronic mails with the developer and consultant discussing the project, conservation measures, and potential language for the Restrictive Covenants.
March 10, 2006	We received the Army Corps of Engineers (Corps) request for formal consultation regarding potential adverse effects to Arizona cliffrose from the proposed development. This consultation package included the January 2006 BA, March 2005 biological evaluation, the Nationwide Permit application, and maps of the project area.
April 3, 2006	We acknowledged your request for formal consultation with a 30-day letter.
April 19, 2006	We received your letter formally withdrawing your request for consultation on the proposed action.
July 25, 2006	We received your letter re-initiating consultation on the proposed development.
August 9, 2006	We acknowledged your request for formal consultation with a 30-day letter.
December 6, 2006	A draft biological opinion was sent to the Corps along with a request to extend the consultation period.
January 29, 2007	We received your letter documenting review of the draft biological opinion. You did not have any comments on the draft and agreed to our request to extend the consultation period.

BIOLOGICAL OPINION

DESCRIPTION OF THE ACTION

The Corps proposes to authorize, under the Clean Water Act (CWA) Section 404 Nationwide Permit program, the construction of building pads, roads, and utility crossings of ephemeral waters of the United States on a 700-acre private parcel located in Cottonwood, Arizona in Yavapai County. The private parcel is located near the northeast corner of State Route 89A and

Cornville Road. The site represents a portion of Section 31 in Township 16 North, Range 4 East and a portion of Section 6 in Township 15 North, Range 4 East, Gila and Salt River Base and Meridian.

The Verde-Santa Fe Limited Partnership (applicant) has requested authorization for these activities to facilitate the development of a mixed-use, master-planned community that will include residential housing and commercial facilities called Bella Montaña. For this assessment, the action area includes all areas which support Arizona cliffrose that may be affected directly or indirectly by the Corps' permit authorization. Therefore, the action area includes all portions of the applicant's private property occupied by Arizona cliffrose, in addition to the Arizona State Land Department (ASLD) lands directly adjacent (west) to the site that also support Arizona cliffrose.

The project area will be developed as a master-planned residential community, and will include residential housing, retail commercial development, associated utility and transportation infrastructure, and preserved natural and other open space. Residential areas will consist of single family housing at a density of about 3 units per acre and medium density multi-family housing at a density of 10 units per acre. These residential land uses will cover approximately 565 acres. Approximately 135 acres will be developed as mixed use, including commercial, employment, and high density multi-family facilities. This land use will be located predominantly in the western portion of the site. The site will include over 200 acres of open space, the majority of which will consist of natural corridors preserved along the larger ephemeral drainages (arroyos). These areas will include some recreational trails. A total of 15 acres will be protected as a preserve for Arizona cliffrose in the southwest corner of the project site. This area will be fenced and all other land uses, including public access, will be prevented. Open space and preserve acreage, as well as transportation and utility infrastructure, are included in the gross acreage listed for residential and mixed use.

Construction will employ standard construction methods and equipment. Areas proposed for residential and mixed use development will be cleared of vegetation and graded to create elevated building pads. Utilities will generally be buried, and road crossings of washes will be accomplished with box culverts and or span-bridges. Prior to starting construction, the applicant will file a Notice of Intent for an Arizona Pollution Discharge and Elimination System (AZPDES) permit and will develop and implement a Storm Water Pollution Prevention Plan to control construction-related erosion and sediment discharge to drainages. After construction is complete, the applicant will construct permanent storm water retention basins to control increased run-off from impervious surfaces. Retention basins will prevent post-development increases in peak flows in natural waterways.

The development will be governed by a Declaration of Covenants, Conditions, Restrictions, Reservations, and Easements (CC&Rs) and will be managed by the Bella Montaña Community Association (Association). Annual fees will be collected from individual homeowners to fund Association activities, which will consist of maintenance of the development, including long-term maintenance and annual inspection of the area dedicated for the preservation of Arizona cliffrose (see conservation measures below). The Association will employ a professional management company to perform this work and will be responsible for enforcing compliance with all CC&Rs. The Association will be operated by the applicant until there are enough residents to fund and take over the required tasks.

Conservation Measures

The applicant has agreed to the following conservation measures, which will be included as Special Conditions to the Corps' authorization of the project under the Nationwide Permit program:

- The applicant will set-aside a total of 15.37 acres in the southwest corner of the property to conserve and protect 574 Arizona cliffrose plants, representing 92% of the cliffrose occurring on the property. This area will be fenced and signed to reduce incidental trespass. A Restrictive Covenant will be recorded to ensure that the area ("Restricted Property") is retained in a natural condition in perpetuity. The Restrictive Covenant limits the uses of the Restricted Property to those activities that target the preservation and enhancement of native species and their habitat (specifically the Arizona cliffrose). The Restrictive Covenant grants and conveys certain rights to the Corps, including non-exclusive easements to (1) preserve and protect the conservation values of the Restricted Property; (2) to enter the Restricted Property to determine compliance with the Restrictive Covenant; and (3) to prevent any activity inconsistent with the Restrictive Covenant and to require restoration; all present and future development rights (the Corps may not exercise any present or future development rights that are in conflict with the conservation values of the Restricted Property); and the right to enforce the terms and conditions of the Restrictive Covenant. Under the Restrictive Covenant, the applicant will be responsible for (1) implementation of reasonable measures to prevent unlawful entry and trespass, (2) compliance with the terms of the Restrictive Covenant, (3) repair and restoration of any damage to Restricted Property, contingent on prior consultation with the Corps, (4) acquisition of any applicable permits and approvals required for activities within the Restricted Property, (5) performance of long-term maintenance of the Restricted Property and annual inspections by a qualified botanist or biologist, (6) installation of maintenance and signs, and (7) ensuring compliance with the Restrictive Covenant before conveyance of Restricted Property to the Association. All uses of the Restricted Property will be prohibited by the Restrictive Covenant, with exception of access, habitat enhancement activities (e.g., weed control), repair and remediation of damage and refuse, erection and maintenance of informative signage, and fire protection activities consistent with the conservation values of the Restricted Property. Under the Restrictive Covenant, the applicant and its subsequent transferees and assigns will grant discretionary rights to the Corps, the U.S. Department of Justice, the State Attorney General, and the City of Cottonwood for the enforcement of the Restrictive Covenant.

In accordance with a phasing schedule, the applicant will convey fee title to the Association, which will assume the roles and responsibilities of the applicant under the Restrictive Covenant. The Association will establish and maintain a separate reserve fund to ensure compliance with the terms of the Restrictive Covenant, including long-term maintenance and monitoring requirements. These requirements are also reflected in the CC&Rs for the property. Copies of the Restrictive Covenant and CC&Rs are included in the BA and are incorporated into this biological opinion by reference.

- The Flagstaff Arboretum (Arboretum) will transplant the remaining Arizona cliffrose plants from areas to be developed to the on-site conservation area. This will be

accomplished through transplanting of smaller individuals, and by the taking of cuttings from larger individuals that will be grown into adult plants and transplanted on site. A total of 47 cliffrose plants occur in the area to be impacted by development. Two of these plants appear to be hybrids. No cuttings will be taken from these two plants. Therefore, cuttings will be taken from an estimated 45 individuals. If the Arboretum botanist determines that other plants are potential hybrids, these will also be excluded from the transplant effort. Previous transplant experiments of Arizona cliffrose have resulted in 50% success. To maximize success, four plants grown from one individual will be transplanted. The Arboretum will collect, propagate, grow, and acclimate transplants during an initial two-year period. At the end of the two year period, transplants will be established in the field and will be watered and monitored for one year. After this initial 3-year period, a qualified biologist (acceptable to the FWS) will continue annual monitoring of the site to inventory pre-existing plant numbers and transplant numbers (survivorship), and to document any disturbances of the site and the adjacent ASLD parcel (fire, illegal trespass, etc.). This annual monitoring effort will be funded by the Association, and the CC&Rs will require that a specific portion of fees assessed to individual homeowners will be allocated for this purpose. The annual report will be provided to the FWS, the Association, and the applicant and will include the current Association contact name and telephone number. Access to the on-site conservation area for transplanting, irrigation, and monitoring activities will be via Cornville Road or from the north.

- A collection agreement will be set-up between the applicant and the Coconino National Forest (CNF) for actions or programs that benefit or help protect Arizona cliffrose. Under this collection agreement, the applicant will provide funding in the total amount of \$36,000 that will be available to the CNF for activities geared to the conservation of Arizona cliffrose. These activities may include: livestock enclosure fencing, existing fence repair, road/trail closure/obliteration/relocation, signage, interpretive facilities for public education, noxious weed surveys and control efforts along roadways in or near cliffrose habitat, and/or funding for completion of the draft management plan for the Verde Valley Botanical Area and/or additional monitoring, survey, or research activities. The CNF will use the available funds at its discretion, given that the activities will directly or indirectly benefit or contribute to the conservation of Arizona cliffrose.

STATUS OF THE SPECIES

Arizona cliffrose was listed as endangered under the Act on May 29, 1984 (USDI 1984). Critical habitat has not been designated. The Arizona Cliffrose Recovery Plan was completed in 1995 (USFWS 1995). This species has narrow habitat requirements and occurs in four widely separated areas in central Arizona: near Bylas (Graham County), the Horseshoe Lake vicinity (Maricopa County), near Burro Creek (Mohave County), and near Cottonwood in the Verde Valley (Yavapai County) (Rutman 1992). These sites differ slightly in elevation and associated vegetation, but all sites have limestone soils (generally white but also reddish in color) derived from Tertiary lakebed deposits, and at each site Arizona cliffrose is part of a locally unique vegetative community (Anderson 1993).

Arizona cliffrose is a long-lived, xerophytic, edaphic endemic woody perennial in the family *Rosaceae*. Plants are of low stature and open growth form compared with its congener Stansbury cliffrose (*P. stansburiana*). Flowers are perfect and pollination can occur on any of the first three days of anthesis. Experiments have shown that this species is partially self-compatible, but sets significantly more seeds and produces fruit more often when outcrossed (Fitts *et al.* 1993). Arizona cliffrose generally flowers from late March through early May and is visited by a wide variety of insects, including lepidopterans, dipterans, and bees. Native and introduced honeybees (*Apis mellifera*) are the most important pollinators, the latter becoming the predominant pollinator later in the flowering season (Fitts *et al.* 1993). Fruit dispersal occurs when summer rains dislodge seeds from plants (USFWS 1995). Flower and seed production varies between years based on climatic conditions, plant vigor, browsing, and other factors. Typically hundreds of flowers are produced on each mature plant, which can reproduce for many years (USFWS 1995). Other life history traits, such as age at first reproduction, gross and net reproductive rates, and longevity, are unknown (USFWS 1995).

The geographic and local distribution of Arizona cliffrose appears to be limited by competition from other plant species rather than a requirement for a specific soil type. At all four widely-separated locations, Arizona cliffrose is restricted to limestone-tuff soils derived from Tertiary lacustrine (lakebed) deposits. These soils are relatively infertile and have significantly lower amounts of phosphorus and organic matter compared with surrounding areas where Arizona cliffrose is absent (Anderson 1986, Anderson 1993). These surrounding areas are typically dominated by creosotebush (*Larrea tridentata*), which is thought to have a competitive advantage over Arizona cliffrose due to its aggressive seedling establishment (Anderson 1993). Creosotebush is unable to grow on the relatively infertile lacustrine soils. However, it has been found growing together with Arizona cliffrose in the Verde Valley, in areas with higher amounts of organic matter and phosphorus. This suggests that the distribution of Arizona cliffrose is limited primarily by competition from creosotebush, rather than a requirement for specific soil properties (Anderson 1986, Anderson 1993).

Arizona cliffrose is subject to browsing by livestock and wildlife, which may affect its reproductive output. Plants are browsed by livestock, deer, and/or wild burros, which preferentially select tender seedlings, new growth, and branches with flowers and developing fruit and may therefore reduce plant vigor, reproduction, and seedling establishment (Bingham 1976, USDI 1984, Denham 1992).

Arizona cliffrose populations in the state are genetically variable, exhibit phenotypic plasticity in response to environmental conditions, and hybridize with common cliffrose. These factors have complicated taxonomic identification and quantification of population sizes. Phenotypic and genetic variability between populations has been studied using morphometrics and DNA analysis. These studies, which are summarized in the Recovery Plan, indicate that *P. subintegra* is distinct from the more common *P. stansburiana*, despite sometimes overlapping plant characteristics (USFWS 1995). Introgression or hybridization between *P. subintegra* and the more common *P. stansburiana* has resulted in hybrid swarms in the Tonto Basin and Verde Valley of central Arizona (USFWS 1995). Hybrid plants were found in areas supporting Arizona cliffrose along Mingus Avenue west of the project area and appear to grow more readily in disturbed areas (USFWS 2001). The proliferation of hybrids has the potential to negatively affect long-term population dynamics of Arizona cliffrose through loss of genetic integrity (Fitts *et al.* 1993).

The total population size of Arizona cliffrose is not known. Not all areas of potential habitat have been surveyed, and in some areas (e.g., Cottonwood) the presence of hybrids or introgressed forms has made quantification of total numbers difficult (USFWS 2001). Total population size for all four sites was estimated to exceed 40,000 plants, although a large percentage may include hybrids (USFWS 1988). At the time of listing, the USFWS estimated 600 acres of habitat at Burro Creek and 100 acres at Bylas, with an estimated total of 700 plants (USDI 1984). At this time, roughly 10,000 plants are thought to occur in the largest subpopulation at Burro Creek (USFWS 2004). Discovery of additional populations in the Verde Valley and at Horseshoe Lake and discovery of two smaller subpopulations at Burro Creek substantially increased the known geographic range and population size of the species. The Horseshoe Lake population is estimated to include 750 plants (USFWS 1987). The Verde Valley population is the largest, covering over 1,000 acres (USFWS 1995), but total plant numbers are not known. Dead Horse Ranch State Park was estimated to support over 40,000 plants, although many were likely to be hybrids (USFWS 1988). The Verde Valley Botanical Area (VVBA) established in 1987 is thought to contain 50-60% of the plants in the Verde Valley. Completion of the Mingus Avenue Extension impacted an estimated 600 Arizona cliffrose within about 12 acres of right-of-way. Based on these figures, the Arizona cliffrose population in the Verde Valley is conservatively estimated to include several tens of thousands of plants.

Reproductive output is potentially large, but recruitment rates vary among populations. No demographic studies have been completed in any populations to determine whether recruitment rates are sufficient to maintain or increase population sizes (USFWS 1995). The Cottonwood population appears to have the most recruitment and is likely to be the most stable, while the other populations appear to have poor recruitment (USFWS 1995). When the species was listed, the Burro Creek and Bylas populations were found to lack fertile seeds and have low seedling recruitment, suggesting that reproduction was inadequate to maintain the existing population size (USDI 1984). Factors potentially affecting reproductive output include browsing by animals; climatic conditions that influence fruit production, seed viability, and seedling recruitment; and ground-disturbance that affect seedling and adult survival.

Grazing by livestock, feral animals, and wildlife threatens the long-term survival of Arizona cliffrose (Phillips 1986, Phillips *et al.* 1980, Rutman 1992, USDI 1984, USFWS 1995). This relatively palatable shrub often receives moderate to heavy grazing pressure when exposed to ungulate herbivores, particularly in the vicinity of water sources and frequently used trails (Bingham 1976, Phillips *et al.* 1980, Reichenbacher 1987). Tender seedlings, new growth, and branches with flowers and developing fruit are preferentially selected (Bingham 1976, Denham 1992). Observations and preliminary data analysis of BLM enclosure studies on the Burro Creek population indicate that consistent yearly browsing pressure may have reduced the vigor and/or form-size class of the remaining plants. Reduced vigor may result in less than optimal reproductive success, and the presence of livestock is also thought to reduce seedling establishment (USFWS 1995). The extent to which browsing has altered successful reproduction in any Arizona cliffrose population has not been quantified (USFWS 2001). However, the studies conducted at Burro Creek showed that exclusion of livestock reduced browsing of Arizona cliffrose from 65% to between 16 and 18%. The relatively low levels of browsing following exclusion of livestock and burros were attributed to mule deer and other wildlife (USFWS 1995).

The type locality for the species is Burro Creek. This population occurs on Bureau of Land Management (BLM) administered lands. Primary threats to the species in this area are grazing by wildlife, livestock and feral burros; mining; road and utility development; recreational developments; and off-highway vehicle (OHV) use (USFWS 1991). Enclosure studies at this site suggest that browsing by large animals reduces the vigor of plants and may reduce reproductive success. Mining and exploration activities for the extraction of bentonite have resulted in a loss of 14% of Arizona cliffrose habitat in the Burro Creek area. This population is divided by a graded dirt road and parallel natural gas pipeline and overhead electric power line easements (USFWS 2001). Increased recreational activity from development of the Burro Creek campground and from rock-collecting activities and associated OHV travel may also affect seedling establishment and survival of adult plants (USFWS 2001). The Kingman Resource Management Plan (BLM 1993) was approved in 1995 and established the 1,119-acre Clay Hills Area of Critical Environmental Concern (ACEC; USFWS 2004). Approximately 98% of the Arizona cliffrose population at Burro Creek occurs within the fenced-off portion of the ACEC. Only a small population of about 100 plants several miles from the main population is located outside the ACEC (John Anderson, BLM, pers. comm., 2005).

Primary threats to the Bylas population of Arizona cliffrose are livestock grazing and road maintenance/construction activities. Observational data suggests that livestock grazing substantially reduced seedling recruitment at this site (USFWS 1995, AGFD 2001). At the time of listing, there was a concern regarding potential widening of U.S. Highway 70, which bisects this population, and herbicide application for road shoulder maintenance. No special land management designations or other special protections are afforded this population, although the Arizona Department of Transportation (ADOT) agreed to contact the FWS regarding any activities potentially affecting Arizona cliffrose in this area (USDI 1984).

The Horseshoe Lake population includes several subpopulations and is found on the Tonto National Forest. This population was the subject of a biological opinion issued on March 10, 1987 for the Central Arizona Water Control Study Plan 6. This biological opinion determined that 250 plants would be affected due to construction and operation of the Cliff Dam (33 percent of the Horseshoe Lake population, USFWS 1987), although the dam was never constructed (USFWS 2001). Increased recreation from the development of a Forest Service recreation area may pose a threat to the Lime Creek subpopulation (AGFD 2001).

The Cottonwood population is the largest and occurs on lands administered by the CNF, Arizona State Parks, ASLD, and privately-held lands. Threats to this population include grazing by livestock and wildlife, road development and maintenance, urban development, and recreation (USFWS 2001).

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions within the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

A. Status of the species within the action area

The Verde Valley supports the largest number of Arizona cliffrose in the state and represents the only population where seedling establishment is resulting in population recruitment (AGFD 2001, USFWS 2001). Habitat for this species extends over an area approximately one mile wide and three miles long (USFWS 2001), and is estimated to exceed 2,000 acres in size (USFWS 1995). This population occurs mostly north of US 89A and east of the Verde River. An estimated 60 to 80% of the habitat occurs on CNF lands, with the remainder located on Arizona State Parks, ASLD, and privately-held lands (USFWS 2001). Hybrid forms between *P. subintegra* and *P. stansburiana* have been found in the Cottonwood area. These introgressed forms are considered to be outside the definition of *P. subintegra* and present some threat from genetic assimilation (Fitts *et al.* 1993, USFWS 2001). The presence of hybrids makes estimates of the number of individuals in this population problematic, although existing information suggests there are at least several tens of thousands of individuals in this population (USFWS 1988).

Arizona cliffrose in the Verde Valley are restricted to a narrow band at the northern end of the Verde Formation, which consist of Pliocene limestone interbedded clastic and tuffaceous sediments (USFWS 1996, USFWS 2001). The highest plant densities occur on flat-topped finger ridges and along first-order shallow drainages in limestone-derived white calcareous soils, red sandy calcareous soils, or a mixture of both (USFWS 1995, USFWS 2001). Relative to the other Arizona cliffrose sites in Arizona, soils associated with the Cottonwood population have higher amounts of phosphorus and organic matter, and have higher soil moisture compared with adjacent areas of non-lacustrine soils (Anderson 1986). Arizona cliffrose has also been occasionally found in non-lacustrine soils in this area, suggesting it is not strictly dependent on the lacustrine soil properties. Instead, its distribution is thought to be primarily limited to these soil types due to competition for moisture by creosotebush on other soils, the latter of which is intolerant of the lacustrine soil chemistry (Anderson 1986, Anderson 1993).

B. Factors affecting the species within the action area

Because the majority of Arizona cliffrose habitat occurs on National Forest lands, land management practices such as livestock grazing and recreation have affected Arizona cliffrose. Section 7 consultations with the CNF were completed in 1992 and 1997 for the Windmill Allotment Management Plan (AMP), which contains most of the Cottonwood population of Arizona cliffrose, and for the Apache Maid Allotment in 1995, which supports potential habitat. The Cottonwood population of Arizona cliffrose is contained within the Gyberg, Rocking Chair, and Cornville pastures addressed in the Windmill AMP. Grazing has been excluded since 1992 from the Rocking Chair and Cornville pastures. Seasonal grazing has continued in the Gyberg pasture under a deferred rest rotation system (USFWS 1995).

The 472-acre Verde Valley Botanical Area (VVBA) was established by the CNF in 1987 for the protection of Arizona cliffrose and its unique associated plant communities. The VVBA is located within the Windmill Allotment and includes an estimated 50 to 60% of Arizona cliffrose in the Verde Valley, with an additional 10 to 20% occurring on other CNF lands. A draft management plan has been developed for the VVBA, but has not been finalized. The draft management plan establishes long-term monitoring plots and precludes road development, OHV

use, mining, and land exchanges. The Windmill AMP allows seasonal livestock grazing within the VVBA, up to a maximum of 20% utilization of key forage grasses. Livestock grazing within the VVBA in 1994 and 1995 was inconsistent with Recovery Plan guidelines and the Windmill AMP Biological Opinion issued in 1992 (USFWS 1997, USFWS 2001).

Recreational activities and OHV use have impacted the Verde Valley population of Arizona cliffrose. Impacts have resulted from unauthorized parking lots, illegal dump sites, a target shooting range, OHV use areas, “party” sites, and the development of mountain bike trails (USFWS 1997, USFWS 2001). In order to protect Arizona cliffrose, the CNF has delineated and fenced the parking area at Rocking Horse Road and US 89A, constructed additional fencing along Rocking Horse Road to restrict OHV use, closed and rehabilitated several two-track roads, and relocated a shooting range out of Arizona cliffrose habitat (USFWS 2001). Arizona State Parks has coordinated the planning of a proposed campground at Dead Horse Ranch State Park with the FWS and CNF to avoid impacts to Arizona cliffrose. Dead Horse Ranch State Park is coordinating with the CNF regarding trail development and recreational use in this area (USFWS 2001).

Road construction has affected Arizona cliffrose in the action area. The improvement of Segment 2 of US 89A (Mingus Avenue Extension) resulted in the elimination of an estimated 14.7 acres of Arizona cliffrose habitat and removed or indirectly affected a total of 29 plants. This roadway now bisects the southern portion of the Cottonwood population and directly or indirectly impacted about 600 mature plants and seedlings. As part of the consultation, Yavapai County agreed to acquire 357 acres of ASLD lands to be exchanged to the CNF and managed for Arizona cliffrose. As a part of the Mingus Avenue Extension proposed action, Yavapai County provided funding to the Arboretum to conduct research on the ecology of Arizona cliffrose and potential propagation/transplant techniques (USFWS 2001). Yavapai County also funded the collection and propagation of cuttings from each of the impacted plants, and the subsequent transplantation of nursery-grown plants back into Section 36 (USFWS 2001). A total of 4,595 cuttings were taken from 513 plants and an additional 23 small plants were collected and potted. Of the plants collected, 405 plants representing 148 individuals were transplanted to portions of the VVBA and Dead Horse Ranch State Park (Murray 2004). Currently, about 250 plants have survived, representing about 50% survival (Sheila Murray, The Arboretum at Flagstaff, pers. comm., 2005).

Factors affecting Arizona cliffrose in the project area and its immediate vicinity include livestock grazing and OHV use. The specific action area is defined as the 700-acre private property proposed for development and the parcel of ASLD land at the northeast corner of Cornville Road and US 89A. Prior to recent surveys (Senna 2005), this area was thought to be outside the range of Arizona cliffrose. This parcel was included in a federal land-exchange with the CNF in 1983, at which time it was transferred into private ownership. This was before Arizona cliffrose was listed and before the Cottonwood population was discovered. Since that time, both the private parcel and the adjacent ASLD parcel have been grazed by livestock. Arizona cliffrose growing on the private parcel and adjacent ASLD lands show evidence of browsing by livestock. Multiple shoots and young stems are cropped on most plants and cow droppings were found throughout areas supporting Arizona cliffrose. Mule deer and javelina also occur in the area, although the relative effects of browsing by wildlife are thought to be small compared to livestock (USFWS 1995). There are several two-track roads on the property. One of these is located just east of the intersection of US 89A and Cornville Road and extends north for

approximately ½-mile on ASLD lands. This road does not appear to experience much vehicular traffic, probably due to the fact that it dead-ends after a relatively short distance. This two-track does not bisect Arizona cliffrose habitat, but comes within 100 feet in places. A second two-track road, located about ½-mile east of the US 89A/Cornville Road intersection, extends north and northeast, almost to the northern property boundary. This road parallels a ridge that supports Arizona cliffrose and comes within several feet of a handful of individuals. This roadway receives more use and parking and vehicular travel off this roadway has impacted a small number of plants. A few “party” sites were located during the survey of the property, but none were in or near areas supporting Arizona cliffrose.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline.

Direct Effects

The proposed development of the private parcel will directly impact a small percentage of Arizona cliffrose in the action area. Surveys conducted by Ron Van Ommeren (Senna Environmental Services) and Marc Baker (Southwest Botanical Research) located a total of 706 plants in the project area and its immediate vicinity. Of this total, 85 plants were subsequently determined to be on ASLD lands just west of the private property boundary. The private parcel supports a total of 621 Arizona cliffrose, the majority of which (574 plants) are concentrated in the southwest corner of the property. The remaining 47 plants occur on a limestone ridge further east, and two of these plants appear to be hybrids (Senna 2005). The landowner has agreed to avoid, protect through fencing, deed-restrict, and monitor the 574 plants that occur in the southwest property corner, avoiding direct impacts to 92.4% of the plants on the private parcel. A total of 47 Arizona cliffrose growing in six separate clusters will be removed because of development along the limestone ridge further east on the private parcel. This represents 7.6% of the total number of plants on the private parcel and 6.7% of the plants total number of plants on the private parcel and the adjacent ASLD parcel (east of US 89A and north of Cornville Road) combined. Based on a conservative estimate of 20,000 plants, this represents the removal of 0.2% of Arizona cliffrose in the Cottonwood population. Transplanting efforts by the Arboretum, one of the conservation measures described under the proposed action, is expected to replace impacted plant numbers at a 2:1 (replacement to impact) ratio.

The proposed action will benefit the Arizona cliffrose that remain on site through the elimination of livestock from the private parcel. These plants are expected to experience some increase in reproductive output due to the elimination of browsing of plant parts and the elimination of potential trampling of seedlings and compaction of soils by livestock.

Indirect Effects

Indirect effects to the Arizona cliffrose are related to increased human presence in the area and potential effects of recreation, trespass, noxious weed proliferation, and fire. The biological opinion completed for the Mingus Avenue Extension (USFWS 2001) discusses other indirect effects, specifically habitat fragmentation and/or isolation of plant populations and facilitation of

introgression with *P. stansburiana*. The proposed action will not result in fragmentation of habitat or isolation of plant populations. The plants in the project area represent the eastern-most known extent of Arizona cliffrose in the Cottonwood population. The 47 plants that will be impacted represent the eastern-most plants on the site. No plants were found on the remainder of the project area. Although some limestone finger-ridges occur further east and north on the site, these do not support cliffrose, are characterized by exposed limestone bedrock with little soil development or re-deposited lacustrine soils, and are therefore not considered habitat for Arizona cliffrose. Therefore, development of the project area will not result in fragmentation of habitat or isolation of any subpopulations of Arizona cliffrose. Development of the site will not facilitate introgression by *P. stansburiana*. Only two plants near the eastern extent of the cliffrose distribution on the site exhibit some characteristics of *P. stansburiana* and may represent hybrids (Marc Baker, Southwest Botanical Research, pers. comm., 2005). These two plants are located immediately adjacent to a two-track road and are among the 47 plants that will be directly impacted by development. These potential hybrid plants will not be included in the transplant efforts.

Increased human presence and density in the area can potentially increase indirect impacts stemming from human use (recreation and trespass) of areas supporting Arizona cliffrose. Development of the site will result in single-family and medium density multi-family housing on 565 acres, as well about 135 acres of mixed use (high density multi-family residential and commercial). Greater human presence increases the potential for trampling of seedlings and/or compaction of soils from hiking, mountain biking, and/or OHV travel. These potential indirect effects will be minimized by conservation measures included in the proposed action and inherent characteristics of the site. The Arizona cliffrose in the southwest portion of the site not directly impacted by development will be protected by fencing, which will be maintained and monitored by the Association. These plants are also physically separated from the remainder of site to the east by a large and deeply-incised wash or arroyo. These conditions will effectively prevent OHV access and will discourage pedestrian access to the conservation area. Nevertheless, public access for hiking, mountain biking, and OHV use may still occur via the ASLD parcel located directly to the west. This parcel has perimeter fencing, but there is an unlocked livestock gate where a two-track road travels north off Cornville Road, approximately 500 feet east of the intersection with US 89A. Increased human presence in the immediate vicinity may result in greater use of this ASLD parcel, particularly by OHV users and mountain bikers, as natural open space in the area becomes developed. Demand for pedestrian recreational areas will likely be met, at least in part, by the inclusion of natural open space corridors and trails along preserved washes on the private property. Overall recreational use of the ASLD parcel (± 20 acres) and the on-site Arizona cliffrose conservation area is expected to be low based on the small area involved, the presence of fencing, and continual monitoring activities.

Development of the private parcel may indirectly impact Arizona cliffrose by increasing the abundance of invasive weeds. Invasive weeds could affect Arizona cliffrose directly by competing for water, nutrients, and light and indirectly by increasing the risk for wildfire. Development of the private parcel will result in disturbance over more than 600 acres and will create conditions for the establishment and proliferation of weedy species. The project area already supports a number of invasive plants, including Sahara Mustard (*Brassica tournefortii*), foxtail chess (*Bromus madritensis*), *Erodium* spp. and *Sisymbrium* spp. These species generally do not grow in areas supporting Arizona cliffrose, possibly due to lacustrine soil properties. The exception is red brome, which forms a dense groundcover under and between creosotebush on

the site and is also sparsely distributed in cliffrose areas. The extent to which this species competes with Arizona cliffrose for resources is not known, but is likely to be minor based on its low abundance in these areas. It is not known to what extent, if any, other weedy species introduced as a result of site development may impact Arizona cliffrose. Annual monitoring activities will detect any substantial invasion of weeds and will allow for potential remedial actions to occur.

Increased potential from wildfire is an indirect effect stemming from development and human occupation of the site and increased abundance of weeds. The frequency of wildfires in Sonoran Desert scrub plant communities has increased dramatically over the last century due to a combination of increased human activity and higher fuel loads resulting from proliferation of weeds. Specifically, the proliferation of red brome (*Bromus rubens*), a species closely-related to foxtail chess has been implicated in increased fire frequency and size due to its ability to carry fire between more widely-spaced shrubs and trees (McLaughlin and Bowers 1982, Brown and Minnich 1986, Rogers 1986). Development of the site will increase traffic volumes on Cornville Road and US 89A, both during and after construction. This will increase the potential for fire to start along the road from discarded cigarette butts. Numerous fires along major roadways, such as Interstate 17, have started in a similar fashion and have burned extensive areas away from the road. The location of the site within the City of Cottonwood puts it in close proximity to fire stations, decreasing the response time for fire crews and vehicles and limiting the spread of wildfire away from the roads and into areas occupied by Arizona cliffrose.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Continued urbanization is the predominant cumulative effect on Arizona cliffrose in the Cottonwood area. The human population in Cottonwood is projected to double from the year 2000 to the year 2040 and will result in greater impacts to Arizona cliffrose on both National Forest and other lands (Phillips et al. 1995). Direct impacts are likely to include removal of additional Arizona cliffrose habitat and individuals by development of other private lands, including ASLD lands auctioned and sold for private development. Human growth in the area will also result in increased demand for recreational opportunities, such as hiking and mountain biking trails, picnic areas, and OHV use areas. Although the CNF Management Plan addresses the protection of Arizona cliffrose on National Forest System lands, there is expected to be an increase in unauthorized public access of CNF, ASLD, and private lands by recreationists. This is expected to result in greater impacts to Arizona cliffrose as a result of trampling of plants and compaction of soils. Continued urbanization in the Cottonwood area may also result in the further proliferation of weedy plant species, which may impact Arizona cliffrose directly through competition for resources or indirectly through the promotion of wildfires. Potential sale and development of ASLD lands along US 89A in the project vicinity could isolate the protected Arizona cliffrose found on and directly adjacent to the project area and could compromise the long-term integrity of this small but previously unknown subpopulation of plants.

CONCLUSION

After reviewing the current status of the Arizona cliffrose, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Bella Montaña Residential Development Project will not likely jeopardize the continued existence of the Arizona cliffrose. No critical habitat has been designated; therefore, none will be affected.

While we remain concerned about the status of the Arizona cliffrose as described in this biological opinion, we present this conclusion for the following reasons:

- Only approximately 0.2% of the Arizona cliffrose plants in the Verde Valley will be removed due to the proposed action and transplanting efforts are expected to replace the impacted plants. In addition, the proposed action will help to maintain in perpetuity a population of 574 Arizona cliffrose plants.
- The proposed action will aid in recovery of the species within the project area and promote recovery actions on nearby federal land.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- We recommend that the Corps work with the applicant, the Association, the FWS, the Forest Service, and others in the Verde Valley to control invasive and weedy species. An invasive species control program would aid in protecting native plant species, including Arizona cliffrose.

In order for us to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

We appreciate your efforts to identify and minimize effects from this project. No further section 7 consultation is required for this project at this time. In all future correspondence on this project, please refer to consultation number 02-21-05-F-0710. Should you require further assistance or if you have any questions, please contact Shaula Hedwall (x103) or Brenda Smith (x101) of our Flagstaff Suboffice at (928) 226-0614.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

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Mima Falk, U.S. Fish and Wildlife Service, Tucson, AZ

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