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AESO/SE
02-21-04-F-0237

August 17, 2004

Ms. Jeanine Derby, Forest Supervisor
Coronado National Forest
300 West Congress Street, 6th Floor
Tucson, Arizona 85701

RE: Coronado National Forest Invasive Exotic Plant Management Program

Dear Ms. Derby:

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 February 17, 2003, and received by us on December 18, 2003. At issue are impacts that may result from the proposed Coronado National Forest Invasive Exotic Plant Management Program located Forest-wide in Pinal, Pima, Santa Cruz, Cochise, and Graham counties in southeastern Arizona and Hidalgo County in southwestern New Mexico. The action would be implemented on the Douglas, Nogales, Sierra Vista, Safford, and Santa Catalina ranger districts. You determined that the proposed action is likely to adversely affect the endangered Huachuca water umbel (*Lilaeopsis schnaffneriana* ssp. *recurvata*) and its designated critical habitat, pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act).

In your letter, you requested our concurrence that the proposed action is not likely to adversely affect the endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*). We concur with your determination for this species. Our analysis is provided in Appendix A.

This biological opinion (BO) is based on information provided in your November 17, 2003, project proposal; your December 17, 2003, biological assessment and evaluation; your January 2004, environmental assessment; telephone conversations in March, April, May, and June of 2004 between staff biologists; and other sources of information. References cited in this biological opinion are not a complete bibliography of all literature available on the species of concern; invasive, nonnative, and exotic (invasive) plant control methods and effects; or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in our Phoenix office.

Consultation History

- November 17, 2003: We received your scoping letter with proposal and methods.
- December 18, 2003: We received your BAE and request for consultation.
- March, April, May, and June 2004: Our staff communicated about your proposed actions/project.
- June 22, 2004: We sent you our draft biological opinion.
- July 21, 2004: We received your July 19, 2004 letter providing comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

You propose treatment and actions to eradicate and/or control existing populations of invasive plant species on the Coronado National Forest (CNF) and restrict the establishment of additional invasive plant populations for the next 10 years. Your proposal is a Forest-wide approach planned and coordinated with State and other Federal agencies' invasive plant species plans. Your treatments include the latest guidance available regarding the protection of public and ecosystem health, as well as the protection and recovery of Federally listed wildlife and plant species.

You propose an Integrated Vegetation Management (IVM) approach. Your goals are to:

- Prevent introduction and establishment of invasive plant populations.
- Contain and/or eradicate existing invasive plant populations.
- Cooperate formally and informally with State agencies, landowners, weed control districts and boards, and other Federal agencies in the management and control of invasive plant species.
- Educate and raise the awareness of employees, Forest users, nearby landowners, and State agencies about invasive plant species' threats to native plant ecosystems.

The proposed IVM approach is divided into four elements.

1. **Treatment of existing populations**

You propose to use cultural, manual, mechanical, and/or chemical methods of control.

- Cultural control methods involve reducing soil disturbance, planting, fertilizing, or generally encouraging desired native vegetation to thrive; thus limiting encroachment by invasive plant species.

- Manual control methods involve hand-pulling, hand-grubbing, and clipping of invasive plant species. Burning is a possible practise, but is not proposed for this plan. Should burning become considered for invasive plant species management control, you have agreed to evaluate the site-specific effects under the National Environmental Protection Act (NEPA) and the Act. If analysis discloses potential effects to listed species, you will consult or conference with us, as needed.

- Mechanical control methods involve mowing, tilling, 'pushing', and other mechanized means of removing plants.

- Chemical control methods involve spot treatment with herbicides that selectively kill invasive plant species while maintaining desired native vegetation. There will be no aerial application of herbicides.

Biological control methods and agents are not being considered for use at this time on the CNF. Should their use be proposed in the future on the CNF, you will evalute the site-specific effects under NEPA and the Act, and consult or conference with us, as needed.

Depending on the extent of the infestation and the feasibility of treatment, invasive plant species populations will be proposed for eradication or containment and control. Specific treatment for specific invasive populations to be eradicated and those to be controlled or contained are listed in Tables 1 and 2 in Appendix B.

Where chemical treatment is warranted, the following herbicides are proposed for use: 2,4-D, Chlorsulfuron, Clopyralid, Dicamba, Glyphosate, Imazapic, Imazapyr, Metsufuron, Picloram, Sulfometron methyl (Sufometuron), Triclopyr, and Tebuthiuron (BAE, Appendix A).

Application of herbicides will be limited to spot treatment of individual plants or ground-based broadcast application on stands of invasives. The use of herbicides in Wilderness areas or other specially designated areas (*i.e.* Research Natural Areas, Zoological/Botanical Areas, Wilderness Study Areas, and potential Wild and Scenic Rivers) will be subject to written approval by the Regional Forester.

2. Monitoring

Control-method effectiveness will be monitored annually for a minimum of five years following treatment. Additional treatments will occur as necessary during the life of this plan (10 years). All known invasive plant populations will be monitored at least every three years, noting any changes in densities and/or areas of infestation. Invasive plant-species inventories will be

continued in order to detect new or additional populations of invasive plants before they become well-established and widespread on the CNF.

3. Restoration

Where large concentrations of an invasive plant species occur, the treated area will be restored in a timely manner to native vegetation. Restoration will most likely consist of erosion control and planting/seeding of native species in the treated areas.

4. Prevention, coordination, cooperation, and education

You propose to follow recognized, effective invasive plant-species prevention practices and use the guidance put forth in The Guide to Noxious Invasive Prevention Practices [Environmental Assessment (EA), Appendix C] for planning any resource-management activities. You propose to continue your ongoing cooperative efforts with other agencies and landowners, and encourage new cooperative efforts as appropriate, especially the establishment of Cooperative Invasive Management Areas. You will pursue opportunities to partner effectively with groups such as the Pima Invasive Plant Species Council and other private organizations and public agencies to enhance invasive plant species control across landscapes with a mixture of public and private ownership. These efforts will include lands of all ownerships and jurisdictions to ensure overall control.

You propose to partner with the State of Arizona and the State of New Mexico Departments of Transportation to cooperate on control of invasive exotic species and ensure mulches and seed mixes are invasive-free, including coordination of this treatment plan with the ongoing plan for treatment of invasive exotic plants in highway rights-of-way. You also continue to develop and implement educational and public awareness materials.

You propose to use all methods to prevent, eradicate, contain, or control populations of invasive plant species as described in Tables 1 and 2 in Appendix B. <u>If the use of herbicides is considered warranted, herbicides will be applied to individual plants rather than broadcast, wherever possible.</u> There are few areas known to likely require broadcast application of herbicides. Complete eradication of existing populations may be difficult to achieve; thus, only invasive plant populations that are small and localized or that present significant risks to ecosystem health have been identified for eradication. Many populations are already well-established, but their spread can be contained through management activities.

Each year, before invasive management activities begin, an annual operating plan (AOP) will be made available by the specific district proposing plant treatments. If herbicides are proposed, a pesticide use proposal (PUP), form FS-2100-2(EA), must be completed according to Forest Service policy (FSM 2100); this proposal may be used as the AOP. This plan will include a list of each site to be treated, methods to be used, herbicide and rate of application if applicable, map of the site and legal description, and area to be treated. This plan will be reviewed by the district or Forest TEPS (Threatened, Endangered, Proposed, Sensitive) plant coordinator, wildlife biologist, and heritage resource specialist to ensure that effects of treatment(s) are within the

scope of this analysis. Site-specific minimization measures may be specified at this time, should greater concerns with any of these resources arise. The designated Forest pesticide coordinator will approve this site-specific operating plan.

Timely, site-specific review of treatment areas will occur on the districts prior to control activities in order to ensure that impacts to rare plants, wildlife, and cultural resources will not occur as a result of invasive plant species management activities. All herbicide application will be done in accordance with Environmental Protection Agency (EPA) label restrictions.

During the course of each season, it is likely that new invasive species populations will be found and require quick action to control. The AOP will be updated at this time and signed off by the previously mentioned specialists and the Forest pesticide coordinator before treatment proceeds. Reviews must be timely to allow management of new invasive infestations to minimize seed production and potential spread, but are important to prevent unintended impacts. The AOP will be available to the public on request.

Adaptive Management

During the life of this project, invasive plant species are likely to be introduced to new locations by vehicles, heavy equipment, livestock, wildlife, recreationists, and all the usual vectors of spread, and will be detected through monitoring. It is also likely that new species of invasive plants not identified in the BAE, Table 1 (page 4), may be discovered on the CNF over the life of the project. You propose to respond to these new infestations by completing a site-specific review to determine effects to TEPS wildlife and plants, as well as to heritage resources or any plant species of significance to local Tribes. New invasive plant species populations will be treated when they are found if the conditions of this analysis and decision are met. In the event that implementation monitoring demonstrates that herbicides being used are not effective, and a new or improved product is available, the new product will be considered for use. As long as the new treatment activity fits within the range of effects analyzed and disclosed in the original EA, no further National Environmental Protection Act (NEPA) analysis will be performed. If monitoring determines that treatment activities are ineffective, and need for control exceeds the scope of this analysis, further analysis under NEPA will be conducted, and you will reinitiate and re-consult with us if the reinitiation criteria at 50 CFR 402.16 are triggered.

Conservation Measures

The following measures and design features are part of the proposed action and will be incorporated into all invasive plant species treatments.

Measures Common to All Actions

- Prevention measures as described in the Forest Service Guide to Noxious Invasive Prevention Practices (EA, Appendix C) will be followed to the degree possible to minimize invasive plant introduction and spread on the CNF. This is the single most effective and least expensive invasive management option available.

- Invasive plant species populations will be treated only after the area has been evaluated and surveyed for sensitive plant species (as listed in EA, Appendix C and/or identified by the district biologist). Field surveys will be conducted within occupied and potential habitat for sensitive species. The scope of the survey will be dependant on the type of treatment proposed, but will be sufficient to provide for the identification and protection of sensitive species within the project area. Individuals and populations of sensitive plants will be flagged or otherwise identified so that they are avoided during treatments. If necessary, a buffer zone of sufficient size will be established to protect sensitive species from mechanical disturbance or spray drift. When invasive plants are within three feet of a sensitive species plant, herbicides will not be used.

- Heritage resources will be identified and protected from any ground-disturbing activities.

- Spray trucks, all terrain vehicles (ATVs), tractor-mounted mowers, and other equipment used for invasive plant management will be used in such a way as to minimize erosion. Steep or highly erodible slopes will be avoided and soil disturbance will be minimized.

- Heavy equipment will not be used within 30 feet of any stream bank. Handheld equipment for control of invasive plant species will be used within this zone.

- Native vegetation in riparian zones will be retained.

- If restoration of treated areas includes establishing new plants, this will be accomplished by mulching, broadcast seeding of native species, or use of non-persistent, nonnative cover crops.

- All sites treated for invasive plant species will be monitored and retreated as necessary. A monitoring plan will be prepared as part of each treatment activity. Baseline monitoring to determine existing conditions will occur prior to treatment. Implementation monitoring will occur during treatments to ensure design and safety standards are followed. Monitoring will be designed to ensure that surveys for occupied and potential habitats for sensitive plants and animals have been conducted prior to invasive treatment activities, and that specified buffers for sensitive species or live water have been correctly established and enforced.

- Effectiveness monitoring will be conducted to aid in planning subsequent treatments and to determine target plant response to treatment, native plant community response to treatment, and whether there are any unforeseen adverse impacts to resources from invasive plant control actions.

- Education efforts to increase personnel and public awareness will be implemented and documented in your annual report to us.

- You will briefly summarize your monitoring results and include them in your annual report to us.

Measures Involving Herbicide Use

The application of herbicides is tightly controlled by State and Federal agencies. You will follow all State and Federal laws and regulations concerning the use of herbicides. The following measures and design features are common to all actions involving the use of herbicides:

- Herbicides will only be used after it has been determined that they offer the only practical method for control.
- All applicable State and Federal laws, including herbicide label requirements, will be followed.
- Projects will be supervised by a Forest Service-certified applicator who will be responsible for insuring safe handling, application, and disposal of herbicides.
- Herbicides will be applied only by ground-based equipment, including hand-painting or daubing, use of backpack sprayers, and use of spray units mounted on ATV's or trucks. In areas with sensitive vegetation, spot application methods will be used to treat individual invasive plants while protecting desired vegetation. Spot application requires that the site be revisited many times to treat plants that were missed or have grown since the previous application, making this method less effective than broadcast treatments. Spot application is not a good choice for all sites and situations, but it is useful when few invasive plants and sensitive vegetation are present.
- Picloram will not be used where the water table is within 40 inches of the surface and/or where soil permeability would be conducive to water contamination.
- Only herbicides labeled for aquatic use (ie. Rodeo (glyphosate) Renovate (triclopyr) and Invasivear 64 (2,4-D amine)) will be used within 30 feet of streams and other bodies of water.
- Persons involved in mixing, loading, and applying herbicides will be required to wear appropriate personal protective equipment as required on the label.
- Areas used for mixing herbicides and cleaning equipment will be located where spillage will not run into surface waters or result in ground water contamination.
- All requirements in a Safety and Spill Plan (EA, Appendix D) will be followed.
- Treatment areas will be signed to alert the public of the herbicide application.
- Landowners within 0.5 mile of the area to be treated with herbicide will receive written notification in a timely manner prior to project actions.

- Regional Forester approval of the Pesticide Use Plan will be necessary for the application of any herbicide in designated or proposed Wilderness areas and research natural areas.

TEPS Identification

About 175 TEPS wildlife and plant species occur or potentially occur on the CNF. To define the geographic scope of your analysis, all known TEPS wildlife and plant species occurring within one mile of identified invasive plant treatment sites were identified using the Forest Geographic Information System (GIS) database and information on species occurrence contained in the Arizona Game and Fish Department's Heritage Data Management System (AGFD HDMS). You based your analysis on known occupied habitat and occurrences of TEPS wildlife and plant species within one mile of treatment sites to ensure consideration for a full range of wildlife and plant species that had the potential to be affected by the proposed actions. You do not anticipate effects to extend beyond the treatment site and the immediate area next to the edges of a treatment site.

STATUS OF THE SPECIES

Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*)

We listed the Huachuca water umbel as an endangered species in a Federal Register notice (62 FR 665), dated January 6, 1997(U.S. Fish and Wildlife Service 1997). We designated critical habitat on the upper San Pedro River, Garden Canyon on Fort Huachuca, and on other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek in a Federal Register notice (64 FR 37441), dated July 12, 1999. The umbel is an herbaceous, semiaquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants that may re-root in a different site along aquatic systems.

The Huachuca water umbel was first described by Hill (1926) and was based on the type specimen collected near Tucson in 1881. Hill applied the name *Lilaeopsis recurva* to the specimen, and the name prevailed until Affolter (1985) revised the genus. Affolter applied the name *L. schaffneriana* var. *recurva* to plants found west of the Continental Divide.

Huachuca water umbel has been documented from 27 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the Continental Divide (Haas and Frye 1997, Saucedo 1990, Warren *et al*. 1989, Warren *et al* 1991, Warren and Reichenbacher 1991). The plant has been extirpated from six of the 27 sites. The 21 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora. All sites are between 3,500 and 6,500 feet in elevation.

Huachuca water umbel has an opportunistic strategy that ensures its survival in healthy riverine systems, cienegas, and springs. In upper watersheds that generally do not experience scouring floods, the umbel occurs in microsites where interspecific plant competition is low. At these sites, the umbel occurs on wetted soils interspersed with other plants at low density, along the periphery of the wetted channel, or in small openings in the understory. The upper Santa Cruz River and associated springs in the San Rafael Valley, where a population of Huachuca water umbel occurs, is an example of a site that meets these conditions. The types of microsites required by the umbel were generally lost from the mainstems of the San Pedro and Santa Cruz rivers when channel entrenchment occurred in the late 1800s to early 1900s. Habitat on the upper San Pedro River is recovering, and Huachuca water umbel has recently been found along short reaches of the main channel.

In stream and river habitats, Huachuca water umbel can occur in backwaters, side channels, and nearby springs. After a flood, it can rapidly expand its population and occupy disturbed habitat until interspecific competition exceeds its tolerance. This response was recorded at Sonoita Creek in August 1988, when a scouring flood removed about 95 percent of the Huachuca water umbel population (Gori *et al.* 1990). One year later, the umbel had re-colonized the stream and was again codominant with watercress (*Rorippa nasturtium-aquaticum*) (Warren *et al.* 1991). The expansion and contraction of Huachuca water umbel populations appear to depend on the presence of "refugia" where the species can escape the effects of scouring floods, a watershed that has an unaltered hydrograph, and a healthy riparian community that stabilizes the channel.

Density of umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics. Some sites, such as Black Draw, have a few sparsely distributed clones, possibly due to the dense shade of the even-aged overstory of trees, dense nonnative herbaceous layer beneath the canopy, and deeply entrenched channel. The Sonoita Creek population occupies 14.5 percent of a 5,385 square foot patch of habitat (Gori *et al.* 1990). Some populations are as small as 11 to 22 square feet. The Scotia Canyon population, by contrast, has dense mats of leaves. Scotia Canyon contains one of the larger Huachuca water umbel populations, occupying about 57 percent of the 756-foot perennial reach (Gori *et al.* 1990, Falk and Warren 1994).

While the extent of occupied habitat can be estimated, the number of individuals in each population is difficult to determine because of the intermeshing nature of the creeping rhizomes and the predominantly asexual mode of reproduction. A "population" of Huachuca water umbel may be composed of one or many genetically distinct individuals.

Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800s and early 1900s (Bahre 1991, Bryan 1925, Dobyns 1981, Hastings and Turner 1980, Hendrickson and Minckley 1984, Martin 1975, Sheridan 1986, Webb and Betancourt 1992, Hereford 1993). A major earthquake near Batepito, Sonora, about 40 miles south of the upper

San Pedro Valley, resulted in land fissures, changes in groundwater elevation and spring flow, and may have preconditioned the San Pedro River channel for rapid flood-induced entrenchment (Hereford 1993, Geraghty and Miller, Inc. 1995). These events contributed to long-term or permanent degradation and loss of cienega and riparian habitat on the San Pedro River and throughout southern Arizona and northern Mexico. Much habitat of the Huachuca water umbel and other cienega-dependent species was presumably lost at that time.

Wetland degradation and loss continues today. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, chaining, agriculture, mining, sand and gravel operations, road building, nonnative species introductions, urbanization, wood cutting, and recreation all contribute to riparian and cienega habitat loss and degradation in southern Arizona. The local and regional effects of these activities are expected to increase with the increasing human population.

A suite of nonnative plant species has invaded wetland habitats in southern Arizona (Stromberg and Chew 1997, 2002), including those occupied by the Huachuca water umbel (Arizona Department of Water Resources 1994). In some cases, their effect on the umbel is unclear; however, in certain microsites, a nonnative Bermuda grass **(***Cynodon dactylon*) may directly compete with the umbel. Bermuda grass forms a thick sod in which many native plants are unable to establish. Watercress is another nonnative plant now abundant along perennial streams in Arizona. It is successful in disturbed areas and can form dense monocultures that can outcompete Huachuca water umbel populations.

Limited numbers of populations and the small size of populations make the Huachuca water umbel vulnerable to extinction as a result of stochastic events that are often exacerbated by habitat disturbance. The restriction of this taxon to a relatively small area in southeastern Arizona and adjacent Sonora increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction. Populations are isolated in most cases, resulting in a less likely chance of natural re-colonization after extirpation. Small populations are also subject to demographic and genetic stochastic events, which increases the probability of population extirpation (Shafer 1990, Wilcox and Murphy 1985).

Huachuca water umbel Critical Habitat

Critical habitat was designated in a July 12, 1999, Federal Register notice (64 FR 37441). The constituent elements identified in the final rule provide for:

1) Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel;

2) A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for water umbel expansion;

3) A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for water umbel growth and reproduction; and

4) In streams and rivers, refugial sites in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and re-colonize larger areas.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, Tribal, State, local, or private actions in the action area, the anticipated impacts of all proposed Federal actions in 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.

The action area for this consultation is the entire CNF (BAE, Map 1). This includes National Forest System lands in parts of Pinal, Pima, Santa Cruz, Cochise, and Graham counties in southeastern Arizona and Hidalgo County in southwestern New Mexico on the Douglas, Nogales, Sierra Vista, Safford, and Santa Catalina Ranger districts.

The CNF contains approximately 1,724,271 acres in 12 distinct blocks of land (Ecosystem Management Areas or EMAs) scattered across southeastern Arizona and into southwestern New Mexico. Each EMA corresponds roughly to one of several mountain ranges within the Basin and Range Geographic Province that form an archipelago of "sky islands" connecting the Rocky Mountains of the United States to the Sierra Madre Occidental in Mexico. The CNF is situated on the border between the Sonoran and Chihuahuan deserts; elevations range from 2,800 to 10,720 feet.

Area geology is complex and results in a highly variable and complex soil pattern. Weather and climate on the CNF varies and depends on aspects and elevations. At lower elevations, summer temperatures can exceed 110° F, and annual precipitation ranges from 11 to 13 inches per year. Higher elevations are cooler and wetter with annual precipitation approaching 30 inches per year, and snowfall can accumulate significantly.

The CNF supports a varied and rich mixture of biotic communities with a diverse assemblage of wildlife and plant species. Vegetation communities include greater than 1,000 plant species. Major vegetation communities include desert scrub, semi-desert grassland, broadleaf evergreen woodland, coniferous woodland, transition coniferous forest, mixed conifer forest, dry desert

riparian areas, and deciduous riparian areas. Almost 580 vertebrate species are found on the CNF; many are endemic to the highlands of Mexico and southeastern Arizona and are found nowhere else in the world.

A. Status of the species within the action area

Lilaeopsis is known to occur on the CNF at the following locations: Joaquin and O'Donnell creeks; Freeman, Sycamore, and Mud springs; Scotia, Sunnyside, and Bear Creek canyons. *Lilaeopsis* metapopulations were monitored in Bear and Scotia canyons in 1989, 1993, 1995, 1998, 1999, and 2001(Gori *et al*. 1990, Falk and Warren 1994, Falk 1998). You established another transect in 2001, located in Sunnyside Canyon. The Bear Canyon population increased in linear extent by 33 feet, and patches of the plant were located more frequently on 46 percent versus 33 percent of transects across the creek) in 1993 as compared to 1989. By 1995, it had expanded another 1,150 feet in the canyon along Bear Creek, but frequency decreased to 38 percent. In Scotia Canyon, the linear extent of the stream occupied by the water umbel varied from 3,494 feet in 1989, 4,722 feet in 1993, and 4,660 feet in 1995. Frequency varied from 47 percent (1989) to 60 percent (1993) and 64 percent (1995). Because of the dynamic nature of riparian systems, variation from year to year is expected under natural conditions. As a result, long-term population trends cannot be discerned from these data; however, based on this limited sampling, populations in Bear and Lone Mountain canyons appear to be relatively stable.

B. Critical habitat within the action area

On the CNF, Huachuca water umbel critical habitat was designated in the following areas: Scotia Canyon (3.4 miles); Sunnyside Canyon (0.7 mile); Bear Canyon (1.0 mile) and an unnamed tributary to Bear Canyon (0.6 mile); Lone Mountain Canyon (1.0 mile) and associated tributaries including "Rattlesnake Canyon" (1.0 mile) and an unnamed tributary (0.6 mile). This totals 8.3 miles, or 16 percent of the total stream/river miles designated as critical habitat.

The largest reach of umbel habitat is on the upper San Pedro River, where 33.7 miles were designated as critical habitat.

C. Factors affecting species' environment within the action area

Recreational impacts in unmanaged areas can compact soils, destabilize stream banks, and decrease riparian plant density, including densities of the Huachuca water umbel. Species populations in Bear Canyon (Huachuca Mountains) have been badly affected by trampling and off-highway vehicles. Drought can reduce the amount of available habitat for the Huachuca water umbel. Site invasion by nonnative plant species can also decrease umbel populations by competing for resources and can lead to increases in water umbel density. Livestock grazing in uplands of water umbel habitat can cause increases in soil erosion and movement of a higher-than-typical sediment load into streams.

Livestock grazing in riparian areas can result in trampled and broken-down streambanks, reduced shade due to browsing, loss of plants due to browsing, destruction of habitat elements by compaction and grazing, and and decreases in pool sizes as sediment load increases in the stream. Fire effects to water umbel can vary. A fire might be a wildfire, a prescribed fire, or a suppression-action fire (such as a backburn). Fire can degrade the watershed above an umbel population and lead to scouring, sedimentation, and loss of riparian plant species (Bowers and McLaughlin 1994) such as water umbel. Water from a stream supporting water umbel could be drafted to fight a fire. In a worse case example, high intensity fire can lead to loss of vegetation on streams, dewatering, and loss of habitat for the species.

Drought and site invasion by nonnative species can decrease umbel plant populations by out-competing them for water and light. Small populations can experience stochastic events that can lead to their inability to re-colonize a site, especially if the damaging event is too extreme for the species to re-colonize without aid.

Populations of giant reed and potential treatment sites exist within designated critical habitat for *Lilaeopsis* in Bear Canyon in the Huachuca EMA. Populations of *Lilaeopsis* are found immediately downstream from the Van Horn exclosure where giant reed (*Arundo donax*) grows.

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. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Known populations of *Lilaeopsis* occur in close proximity downstream of giant reed in Bear Creek. *Lilaeopsis* is found in saturated soils in the streambed, while giant reed occurs on adjacent stream banks. Treatments for giant reed will involve cutting individual plants followed by daubing or spraying of the cut surface with glyphosate labeled for wetland use. Treatments will occur during periods of low streamflow, if possible, to minimize effects to other wetland species and soils. Some trampling of individual plants will likely occur during treatments if *Lilaeopsis* is growing in the immediate vicinity. In accordance with the identified conservation measures, pre-treatment surveys will be conducted to identify and protect sensitive species, and workers will be briefed on how to identify and avoid *Lilaeopsis* in the project area. Herbicides will not be used within three feet of any sensitive plant.

The wetland formulation of glyphosate (Rodeo) is rapidly dispersed in water or absorbed by soils. There will not be any direct spraying of the water surface; downstream drift of contaminated water is not anticipated. Because glyphosate binds strongly to soils, it is unlikely it

will enter waters through surface runoff, unless the soil itself is washed away. Even in water, the herbicide remains bound to soil particles and is generally unavailable to plants. The soil particles themselves precipitate to the bottom sediments where the herbicide is degraded by microbial action. The properties of the herbicide and the use of conservation measures described under the proposed action will restrict any effects to the immediate vicinity of the treatment area. Based on the juxtaposition of invasive plants and *Lilaeopsis*, there remains a minor potential for disturbance to the species as a result of trampling or minor spray drift. Some plants will be affected with any treatment to permanently remove exotic species from the exclosure. Effective control of invasive species may require more than one treatment over consecutive years, so short-term direct effects may occur more than once. Over time, the removal of an invasive exotic species should result in the maintenance of more natural conditions conducive to the survival of *Lilaeopsis*.

No effects to water umbel from the Invasive Exotic Plant Management Program are expected outside of Bear Canyon.

Critical Habitat

With regard to critical habitat constituent elements, the proposed action is not anticipated to reduce perennial base flows, but rather to contribute to increased base flows over the long term by removing competing invasive plants that remove water from the stream through transpiration. Stream-channel stability may be altered by minor disturbances resulting from people conducting the treatment activities, but these effects are expected to be short-term, small, and localized. Invasive plant species will be eliminated or reduced as a result of the proposed action, reducing their effect on resources necessary for Huachuca water umbel survival and propagation. No significant or long-term effects to designated critical habitat are anticipated to occur from this proposed action.

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 and conference 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.

Areas supporing perennial water flow have a high rate of attraction for people. Effects to riparian areas where *Lilaeopsis* occurs may include soil and water disturbance caused by people using the stream systems to travel illegally and/or transport drugs. Private inholdings that support populations of water umbel could experience activities (blading, development, livestock grazing, and other events) that may affect water umbel. These impacts are not expected to increase significantly over current levels, but may continue to contribute to degradation of localized riparian areas.

CONCLUSION

Huachuca water umbel metapopulations appear to be relatively stable. The environmental baseline for the species is dynamic and variable, but appears to remain supportive of the species' survivability and allows the known populations to expand and contract their size without extirpation. The cumulative effects known do not appear to significantly adversely affect the species, and the critical habitat remains stable.

After reviewing the current status of the Huachuca water umbel, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the Invasive Exotic Plant Management Program as proposed, is not likely to jeopardize the continued existence of the Huachuca water umbel, and is not likely to destroy or adversely modify designated critical habitat.

We base our conclusions on the above reasons and because:

1. The project includes conservation measures that minimize negative effects to the species, especially in the long-term.

2. Negative effects to individual plants are anticipated to be small, localized, and recoverable.

The conclusions of this biological and conference 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 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 purposes 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 you:

1. Continue to monitor populations of Huachuca water umbel on the CNF.

2. Fund, aid, or establish research or study projects for the Huachuca water umbel.

3. Educate employees and your public users about the Huachuca water umbel.

4. Assist in the development and implementation of a recovery plan for the Huachuca water umbel.

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 NOTICE

This concludes formal consultation on your proposed project outlined in your request. As provided in 50 CFR §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) new information reveals effects of your action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (2) your action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your efforts to identify and minimize effects to listed species from this project. For further information please contact Thetis Gamberg at (520) 670-6150 (x231), or Jim Rorabaugh at (602) 242-0210 **(**x 238**)**. Please refer to the consultation number, 02-21-04-F-0237, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)

Field Supervisor, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Fish and Wildlife Service, Tucson AZ

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APPENDIX A

CONCURRENCES

Gila topminnow (*Poeciliopsis occidentalis occidentalis*)

STATUS OF THE SPECIES

Gila topminnows belong to a group of live-bearing fishes within the family Poeciliidae that includes the familiar guppy (*Poecilia reticulata*), which is not native to the Gila River basin. Males are smaller than females, rarely greater than one inch, while females are larger, reaching two inches. Body coloration is tan to olivaceous, darker above, lighter below, and often white on the belly. Breeding males are usually blackened, with some golden coloration of the midline, and with orange or yellow at the base of the dorsal fin.

The Gila topminnow was listed as endangered in 1967 without critical habitat (U.S. Fish and Wildlife Service 1967). The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, is collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA. Only Gila topminnow populations in the United States, and not in Mexico, are listed under the Endangered Species Act (ESA). The reasons for decline of this fish include past dewatering of rivers, springs, and marshlands; impoundment, channelization, diversion, and regulation of flow; land-management practices that promote erosion and arroyo formation; and the introduction of predacious and competing nonnative fishes (Miller 1961, Minckley 1985).

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at not more than 30 localities (12 natural and 18 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe 1983, Laurenson and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe (1983) considered extinction of Gila topminnow populations almost as critical as recognized species extinctions and Moyle and Williams (1990) noted that fish in California that are in trouble tend to be endemic, restricted to a small area, part of fish communities with fewer than five species, and found in isolated springs or streams. The Gila topminnow has most of these characteristics.

Effects of the Action

One Johnson grass eradication site is located within the Redrock Canyon drainage. This small site sits on a bench of land adjacent to, but not within, the streambed. The proposed treatment is to hand-pull individual plants and roots at the site. Herbicide use will only be considered if hand

treatments cause significant soil disturbance or are determined to be ineffective. Because of the distance between the treatment site and known populations of Gila topminnow (about 0.75 mile), only minor effects, if any, are anticipated as a result of any of the proposed treatments. Disturbance on the stream bank may result in short-term contribution of small amounts of sediment to the stream. If the use of herbicides is required, Johnson grass plants will be treated with an aquatic formulation of glyphosate, which does not contain a surfactant and is considered moderately toxic to fish. Because spraying will not occur next to water, and it will be carefully hand-applied, the chance of spray drift onto the water is considered very low. Glyphosate binds strongly with soil particles and is not expected to wash into the stream during runoff. Conservation measures incorporated into the proposed action should prevent or strongly minimize the possible introduction of herbicides into the water.

Conclusion

After reviewing the status of the Gila topminnow, the environmental baseline, and the cumulative effects, we concur with your determination that the project, as proposed, is not likely to adversely affect Gila topminnow. Our concurrence is based on the following:

1. Extreme caution will be used in hand-applying treatment to nonnative plants near riparian areas, especially to the Johnson grass site in Redrock Canyon.

2. Nonnative plants to be hand-treated are not in the immediate water of the creek or stream, but are up on the banks.

3. Conservation measures incorporated into this project are anticipated to reduce potential effects to Gila topminnow to an insignificant and discountable level.

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APPENDIX B

Table 1

Table 1. Proposed *eradication* of existing populations

Species common name	**Growth habit**	**Proposed treatment**
Tree of Heaven	Tree with prolific root and stump sprouting; not shade tolerant; allelopathic to other trees	Small trees, oil basal with 25% Garlon 4 (triclopyr); large trees, cut-surface application with 50% Garlon 3A (Triclopyr). This will be 70-80% effective and follow-up treatments will be necessary. Other effective herbicides are glyphosate, dicamba, metsulfuron methyl and imazapyr.
Yellow starthistle	Winter annual herbaceous species; prolific seed productions; spreads rapidly	Hand pull plants if only a few; ensure most of root is removed. Remove and burn pulled plants to destroy seed. If area is too large for effective hand pulling, spot apply herbicides. Effective herbicides are picloram, dicamba, 2,4-D, clopyralid, and glyphosate. Ensure good stand of native species; revegetate if necessary.
Malta starthistle	Winter annual herbaceous species; prolific seed productions; spreads rapidly. Small seed head formed in the center of rosettes makes hand pulling ineffective.	Hand grub, removing all of the root. Remove and burn pulled plants to destroy seed. If area is too large for effective hand pulling, spot apply herbicides. Effective herbicides are picloram, dicamba, 2,4-D, clopyralid, and glyphosate. Ensure good stand of native species; revegetate if necessary.
Canada thistle	Aggressive perennial with creeping root system. Reproduces easily from roots.	Repeated annual treatments of spot applied herbicides. Effective herbicides are 2,4-D, chlorsulfuron, dicamba, clopyralid, metsulfuron, glyphosate, alone or in mixes. Hand pulling not effective because of root system.
Buffelgrass (small population in the Santa Rita EMA)	Perennial with moderate spread by seed and slow spread vegetatively.	Hand pull plants in Santa Rita EMA; if this is not successful, spot apply herbicide; repeat pulling and/or herbicide use as necessary to prevent re-establishment. Effective herbicides are glyphosate, imazapic and metsulfuron methyl.
Fountain grass (small population in the Santa Rita EMA)	Perennial with slow spread by seed; generally does not spread vegetatively but there are non-seed producing cultivars.	Hand pull plants in Santa Rita EMA; if this is not successful, spot apply herbicide (glyphosate, imazapic and metsulfuron methyl); repeat pulling and/or herbicide use as necessary to prevent re-establishment.
Johnson grass (Redrock Canyon)	Perennial rhizomatous grass; spreads rapidly	Hand grub individuals in Redrock Canyon when ground is moist. Repeat as necessary to prevent re-establishment. Consider using herbicides (glyphosate labeled for wetland use) if grubbing causes too much soil disturbance, or if treatment is ineffective.
Sweet resin bush	Low growing perennial shrub; reproduces by seed; expands slowly at first and then rapidly; replaces native vegetation.	Work with WMA to determine most effective treatment. Most likely will include burning, pulling, and ground-based broadcast application of herbicides (picloram or clopyralid).
Pentzia	Perennial shrub	Work with WMA to determine most effective treatment. Most likely will include burning, pulling, and spot applied herbicides (picloram and clopyralid).

Complete eradication of existing populations may be difficult to achieve, so only invasive plant populations that are small and localized or that present significant risks to ecosystem health have been identified for eradication. Many populations are already well-established, but their spread can be contained through management activities. These species/populations are displayed in Table 4.

APPENDIX B

Table 2

Table 2. Proposed *containment* and *control* of existing populations

Species common name	Growth habit	Proposed treatment
Bull thistle	Biennial thistle; establishes taproot but not creeping roots; prolific seed producer in open areas.	Spot apply herbicides on existing population followed by maintaining light to moderate grazing to ensure good cover by native species. Apply when plants are in rosette stage. Revegetate if necessary. Use biological methods if become available.
Buffelgrass	Perennial with moderate spread by seed and slow spread vegetatively.	Monitor populations; treat new populations with hand pulling and/or spot apply herbicides (see previous section). Use biological control methods on large infestations if they become available.
Fountain grass	Perennial with slow spread by seed; generally does not spread vegetatively but there are non-seed producing cultivars.	Monitor populations; treat new populations with hand pulling and/or spot apply herbicides (see previous section). Use biological control methods on large infestations if they become available.
Giant reed	Large bamboo like grass. Prolific shoot production; spreads rapidly vegetatively.	Treat individual plants by cutting then treatment of cut surface with glyphosate labeled for wetland use. Treat post-flowering and pre-dormancy. Treat in Sabino and Bear Canyons when dry if possible. Remove dead material in Sabino and Bear Canyons after 2-3 weeks.
Salt cedar	Woody shrub; reproduces by seed	Small trees, oil basal with 25% Garlon 4; large trees, cut-surface application with 50% Garlon 3A. This will be 70-80% effective and follow-up treatments will be necessary.
Johnson grass	Perennial rhizomatous grass; sprouts readily	Monitor populations; treat new populations by hand pulling when ground is moist and/or spot apply herbicides; use biological control methods on large infestations if they become available.
Lehmann lovegrass	Perennial bunchgrass; highly adaptable and spreads rapidly	If found in small populations, spot treat with herbicide (glyphosate, imazapic or mesulfuron methyl) and revegetate as needed.
African sumac		Hand pull small plants; cut down and spot treat with herbicides if too large to effectively pull.